February 1, 2019

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

Regarding:	Notice of Exempt Modification – Equipment Modifications
Property Address:	315 Old Hartford Road; Colchester, CT 06415 (the "Property")
Applicant:	AT&T Mobility ("AT&T") Site # CT5346

Dear Ms. Bachman:

AT&T currently maintains a (9) wireless telecommunications facility on an existing 60-foot monopole at the above-referenced address, latitude 41.58000000, longitude -72.35000000. Said monopole is owned by AT&T, is operated by Crown Castle, and the property is owned by Cell Tower Lease Acquisition LLC (Exhibit 1).

AT&T desires to modify its existing telecommunications facility by removing (3) panel antennas and replacing with (3) new panel antennas and upgrading ancillary equipment as follows: swap (6) remote radio head units and add (3) low band combiners. The existing mount will also be reinforced as shown in the Antenna Mount Modification Design & Analysis by Maser Consulting Connecticut, dated October 18, 2018 and shown in the Construction Drawings provided. The centerline height of the existing antennas and ancillary tower-mounted equipment is and will remain at 57 feet.

Please accept this application 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 the Honorable Art Shilosky, First Selectman of the Town of Colchester; Daphne Schaub, the Zoning Enforcement Officer of the Town of Colchester;Randall Benson, the Town Planner; Cell Tower Lease Acquisition LLC, as property owner; AT&T as tower owner, and the tower operator Crown Castle.

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). Specifically:

1. The planned modification will not result in an increase in the height of the existing structure. The swapped antennas and accessory equipment to be swapped will be installed at the existing height of 57 feet on the 60-foot monopole.

2. The proposed modifications will not involve any changes to AT&T's ground-space footprint, and therefore and therefore will not require an extension of the site boundary.

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

Kristen White • Empire Telecom USA, LLC • 16 Esquire Road, Billerica, MA 01862 • 978-284-3801 • kwhite@empiretelecomm.com

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above Federal Communications Commission (FCC) safety standard. An RF emissions calculation (Exhibit 4) for AT&T's modified facility is herein provided.

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

6. The existing structure and its foundation can support AT&T's proposed modifications. Please see enclosed structural analysis completed by Jacobs Engineering Group dated January 3, 2019 (Exhibit 3), which takes into account the Antenna Mount Modification Design & Analysis by Maser Consulting Connecticut, dated October 18, 2018 (Exhibit 5)

7. Proof of mailing to the municipal officials and property owners specified below is also provided.

For the foregoing reasons, AT&T respectfully requests that the proposed installation be allowed within the exempt modifications under R.C.S.A. §16-50j-72 (b)(2).

Sincerely,

Kristen White

Kristen White
Site Acquisition Specialist
Empire Telecom USA, LLC
kwhite@empiretelecomm.com

Enclosures: Exhibit 1 – Field Card and GIS Map
Exhibit 2 – Construction Drawings
Exhibit 3 – Structural Analysis
Exhibit 4 – RF Emissions Analysis Report Evaluation
Exhibit 5 - Antenna Mount Modification Design & Analysis

cc:

Hon. Art Shilosky
First Selectman's Office
127 Norwich Ave.
Colchester, CT 06415

Daphne Schaub
Colchester Zoning Department
127 Norwich Ave.
Colchester, CT 06415

Randall Benson
Colchester, CT Town Planner
127 Norwich Ave.
Colchester, CT 06415

Crown Castle
3 Corporate Park Drive
Suite 101
Clifton Park, NY 12065
Attn: Paul Pedicone

Cell Tower Lease Acquisition LLC
C/O CT Corporation System, Agent
155 Federal Street, Suite 700
Boston, MA, 02110

AT&T Mobility
ATT Tax Manager
909 Chestnut St.
St. Louis, MO 63101

EXHIBIT 1

Town of Colchester, CT

Property Listing Report | Map Block Lot 09-00/012-000/TWR | Account 11AT0010 | PID 105120

Property Information

Property Location	315 OLD HARTFORD RD
Owner	AT&T MOBILITY
Co-Owner	ATT TAX MANAGER
Mailing Address	909 CHESTNUT ST ST LOUIS MO 63101
Land Use	4310 Tel Rel Tw
Land Class	I
Zoning Code	
Census Tract	
Sub Lot	

Neighborhood	
Acreage	0
Utilities	
Lot Setting/Desc	
Survey Map	
Additional Info	

Photo

Sketch

Primary Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Floors	
Total Rooms	

Bedrooms	
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	
Total Living Area	

Report Created On 1/29/2019

Town of Colchester, CT

Property Listing Report | **Map Block Lot** 09-00/012-000/TWR | **Account** 11AT0010

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	0	0
Extras	0	0
Outbuildings	247300	173100
Land	0	0
Total	247300	173100

Outbuilding and Extra Items

Type	Description
Cell Tower	1.00 SITES
Cell Shed	240.00 S.F.
Fence 8' Chain	140.00 L.F.

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area		0

Sales History

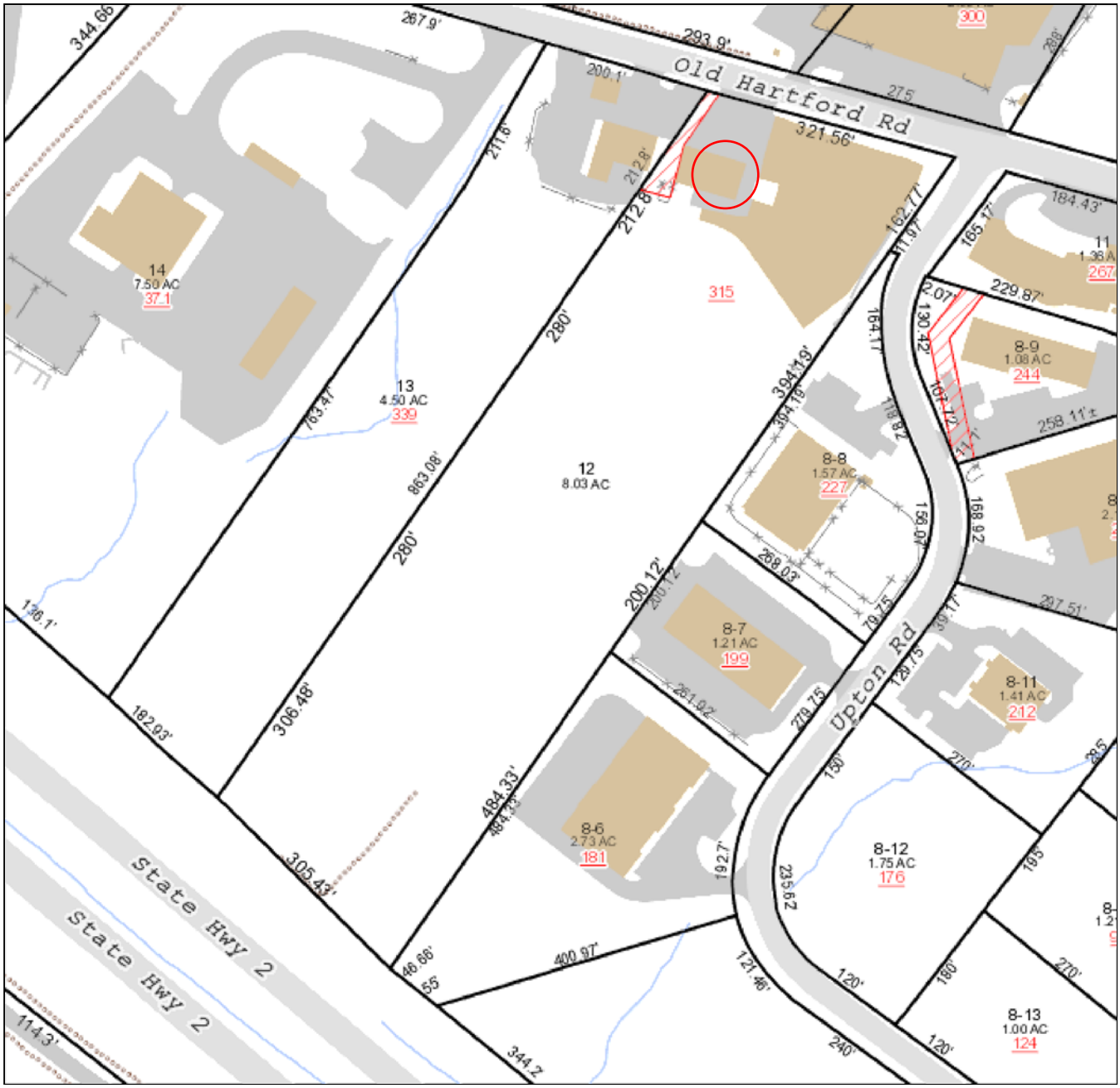
Owner of Record	Book/ Page	Sale Date	Sale Price
AT&T MOBILITY	000/ 000	10/1/2011	

Report Created On 1/29/2019

Town of Colchester

Geographic Information System (GIS)

Date Printed: 1/29/2019



MAP DISCLAIMER - NOTICE OF LIABILITY

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The Town of Colchester and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 200 feet

0 200 Feet

N W E S

EXHIBIT 2

at&t

SITE NAME: COLCHESTER NORTH CENTRAL
FA NUMBER: 10070973
SITE NUMBER: CT5346
3C -MRCTB032309
4C - MRCTB032279
5C - MRCTB032230
6C - MRCTB032273
RETROFIT - MRCTB032284
315 OLD HARTFORD ROAD
COLCHESTER, CT 06415
NEW LONDON COUNTY

PROJECT NOTES

1. SITE INFORMATION OBTAINED FROM THE FOLLOWING:
   A. PLAN ENTITLED "COLCHESTER" PREPARED BY COM EX CONSULTANTS OF MOUTAIN LAKES, NJ LAST REVISED 02/08/2016.
   B. LIMITED FIELD OBSERVATION BY MASER CONSULTING ON 06/14/2018.
2. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, LAWS AND REGULATIONS OF ALL MUNICIPALITIES, UTILITY COMPANIES OR OTHER PUBLIC/GOVERNING AUTHORITIES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS THAT MAY BE REQUIRED BY ANY FEDERAL, STATE, COUNTY OR MUNICIPAL AUTHORITIES.
4. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER, IN WRITING, OF ANY CONFLICTS, ERRORS OR OMISSIONS PRIOR TO THE SUBMISSION OF BIDS OR PERFORMANCE OF WORK.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING SITE IMPROVEMENTS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL REPAIR ANY DAMAGE AS A RESULT OF CONSTRUCTION OF THIS FACILITY AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
6. THE SCOPE OF WORK FOR THIS PROJECT SHALL INCLUDE PROVIDING ALL MATERIALS, EQUIPMENT AND LABOR REQUIRED TO COMPLETE THIS PROJECT. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
7. THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO SUBMITTING THE BID TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND CONSTRUCTION DRAWINGS.
8. THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THESE DRAWINGS MUST BE VERIFIED. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
9. SINCE THE CELL SITE MAY BE 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 REQUIRED TO BE WORN TO ALERT OF ANY POTENTIALLY DANGEROUS EXPOSURE LEVELS.
10. THE PROPOSED FACILITY WILL CAUSE AN INSIGNIFICANT OR "DE-MINIMUS" INCREASE IN STORM WATER RUNOFF, THEREFORE, NO DRAINAGE STRUCTURES ARE PROPOSED.
11. NO NOISE, SMOKE, DUST OR ODOR WILL RESULT FROM THIS FACILITY AS TO CAUSE A NUISANCE.
12. THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION (NO HANDICAP ACCESS IS REQUIRED).
13. THE FACILITY DOES NOT REQUIRE POTABLE WATER OR SANITARY SERVICE.
14. CONTRACTOR SHALL VERIFY ANTENNA ELEVATION AND AZIMUTHS WITH RF ENGINEERING PRIOR TO INSTALLATION.
15. THE TOWER, MOUNTS AND ANTENNAS SHALL BE DESIGNED TO MEET EIA/TIA-222-G AS PER IBC REQUIREMENTS.
16. ALL STRUCTURAL ELEMENTS SHALL BE HOT DIPPED GALVANIZED STEEL.
17. CONTRACTOR MUST FIELD LOCATE ALL EXISTING UNDERGROUND UTILITIES PRIOR TO ANY EXCAVATION.
18. CONSTRUCTION SHALL NOT COMMENCE UNTIL COMPLETION OF A PASSING STRUCTURAL ANALYSIS CERTIFIED BY A LICENSED PROFESSIONAL ENGINEER. THE STRUCTURAL ANALYSIS IS TO BE PERFORMED BY OTHERS.

VICINITY MAP

CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING CODES.

1. 2016 CONNECTICUT STATE BUILDING CODE, INCORPORATING THE 2012 IBC
2. 2014 NATIONAL ELECTRICAL CODE - NFPA 70
3. 2012 NFPA 101
4. AMERICAN INSTITUTE OF STEEL CONSTRUCTION 360-10
5. AMERICAN CONCRETE INSTITUTE
6. TIA-222-G
7. TIA 607 FOR GROUNDING
8. INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81 IEEE C2 LATEST EDITION
9. TELCORDIA GR-1275
10. ANSI T1.311
11. PROPOSED USE: UNMANNED TELECOM FACILITY
12. HANDICAP REQUIREMENTS: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.
13. CONSTRUCTION TYPE: IIB
14. USE GROUP: U

PROJECT INFORMATION

SITE INFORMATION

LATITUDE: 41.5806919° N
LONGITUDE: 72.3503989° W
JURISDICTION: NEW LONDON COUNTY

APPLICANT/LESSEE

COMPANY: NEW CINGULAR WIRELESS PCS, LLC
ADDRESS: 550 COCHITUATE ROAD
CITY, STATE, ZIP: FRAMINGHAM, MA 01701

TOWER OWNER

COMPANY: AT&T MOBILITY
ADDRESS: 550 COCHITUATE ROAD, SUITE 550 13 & 14
CITY, STATE, ZIP: FRAMINGHAM, MA 01701

CLIENT REPRESENTATIVE

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
CITY, STATE, ZIP: BILLERICA, MA 01862
CONTACT: DAVID COOPER
E-MAIL: DCOOPER@EMPIRETELECOM.COM

SITE ACQUISITION

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
CITY, STATE, ZIP: BILLERICA, MA 01862
CONTACT: DAVID COOPER
E-MAIL: DCOOPER@EMPIRETELECOM.COM

ENGINEER

COMPANY: MASER CONSULTING CONNECTICUT
ADDRESS: 331 NEWMAN SPRINGS ROAD, SUITE 203
CITY, STATE, ZIP: RED BANK, NJ 07701-5699
CONTACT: ROBERT ANDREWS
PHONE: (856) 797-0412
E-MAIL: RANDREWS@MASERCONSULTING.COM

PROJECT DESCRIPTION/ SCOPE OF WORK

- INSTALL (5) NEW RRU'S AT GRADE
- INSTALL (6) NEW RRU'S, (2) PER SECTOR
- REMOVE (3) EXISTING RRU'S, (1) PER SECTOR
- INSTALL (3) NEW PANEL ANTENNAS, (1) PER SECTOR
- INSTALL NEW HANDRAIL KIT, (1) PER SECTOR
- REMOVE (3) EXISTING PANEL ANTENNAS, (1) PER SECTOR
- REMOVE (12) DIPLEXERS
- INSTALL (3) LOW BAND COMBINERS, (1) PER SECTOR
- INSTALL (3) LOW BAND COMBINERS AT GRADE
- INSTALL (2) NEW DC-6 SURGE SUPPRESSION DOME
- INSTALL (1) NEW 18-PAIR FIBER TRUNK
- INSTALL (4) NEW 6/C DC CABLES
- DECOMMISSION GSM 850/1900
- DECOMMISSION UMTS RRU 850/1900
- SWAP DUS's WITH (1) 5216 AND INSTALL 2ND 5216
- INSTALL 2ND XMU AND IDLe
- ADD (1) RBS 6630 TO LTE CABINET
- INSTALL (2) DC12 BOX AT GRADE

PROPOSED PROJECT SCOPE BASED ON RFDS ID# 2325793, VERSION 3.00, LAST UPDATED 08/13/2018.

SHEET INDEX

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE :	JOB NUMBER :
AS SHOWN	18963026A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
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0	10/22/18	STRUCTURAL MODS	AJC	RA
2	09/18/18	REVISED PER COMMENTS	AJC	RA
1	09/06/18	ISSUED FOR REVIEW	MSG	RA

STATE OF CONNECTICUT
PETROS TSOUKALAS
32577
PROFESSIONAL ENGINEER

PETROS E. TSOUKALAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577

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

SITE NAME:
COLCHESTER NORTH CENTRAL
FA# 10070973
SITE# CT5346

315 OLD HARTFORD ROAD
COLCHESTER, CT 06415
NEW LONDON COUNTY

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank NJ 07701-5699
Phone: .732.383.1950
Fax: .732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE :
TITLE SHEET

SHEET NUMBER :
T-1

GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING 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 SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR 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 IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5O HMS OR LESS.
4. THE SUBCONTRACTOR 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.
5. 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 UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
6. 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 BTS EQUIPMENT.
7. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE EQUIPMENT GROUND RING WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
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. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
10. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
11. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. ALL BENDS SHALL BE MADE WITH 12" RADIUS OR LARGER.
12. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
13. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS EXCEPT FOR GROUND BAR CONNECTION FROM MGB TO OUTSIDE EXTERIOR GROUND SHALL ALL BE CADWELD CONNECTIONS.
14. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
15. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED TO THE TOWER GROUND BAR.
16. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
17. ALL EXTERIOR AND INTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
18. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
19. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
20. 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.
21. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/4" IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50.
22. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

    CONTRACTOR - EMPIRE TELECOM
    SUBCONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)
    OWNER - AT&T (NEW CINGULAR WIRELESS PCS, LLC)

23. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
24. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
25. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR 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.
26. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
27. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
28. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
29. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
30. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
31. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
32. 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 THE RESPONSIBLE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR 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.
33. 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, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
34. 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.
35. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
36. 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.
37. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
38. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
39. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
40. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
41. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
42. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR.
43. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
44. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
45. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS.
46. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (F_y = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (F_y = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
47. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
48. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
49. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION, ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
50. 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 ALERT OF DANGEROUS EXPOSURE LEVELS.

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2	09/18/18	REVISED PER COMMENTS	AJC	RA
1	09/06/18	ISSUED FOR REVIEW	MSG	RA

STATE OF CONNECTICUT · PETROS TSOUKALAS · 32577 · PROFESSIONAL ENGINEER · LICENSED

PETROS E. TSOUKALAS
CONNECTICUT PROFESSIONAL
ENGINEER - LICENSE NUMBER: 32577

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SITE# CT5346

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NEW LONDON COUNTY

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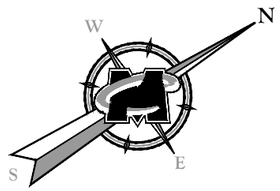
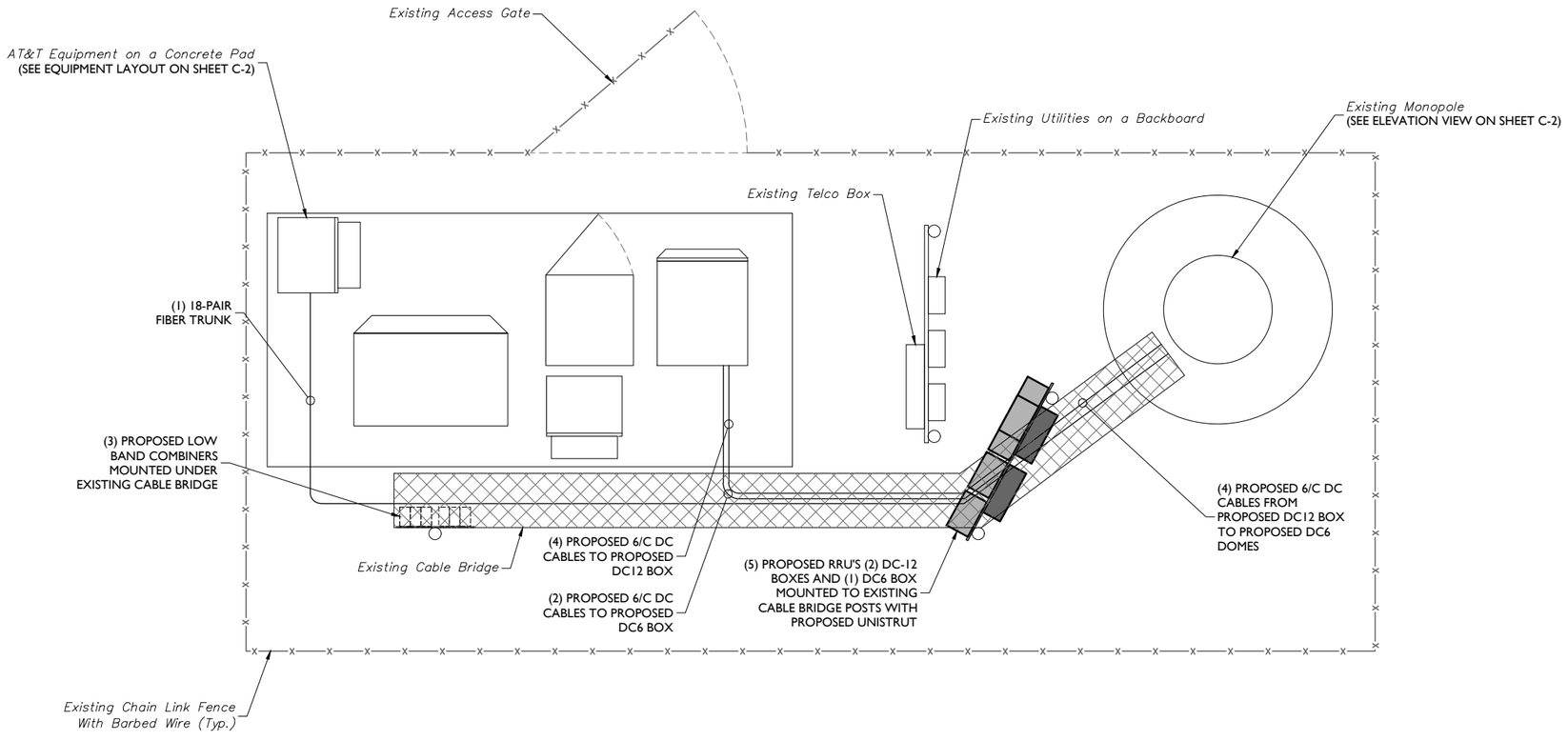
Suite 203
Red Bank NJ 07701-5699
Phone: .732.383.1950
Fax: .732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE :
GENERAL NOTES

SHEET NUMBER :
GN-1





COMPOUND PLAN

2 1.6 1.2 0.8 0.4 0 1 2 4

SCALE : 1" = 2' FOR 22"X34"
(SCALE : 1" = 4' FOR 11"X17")

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PETROS D. TSOUKALAS
CONNECTICUT PROFESSIONAL ENGINEER
LICENSE NUMBER: 32577
32577
REGISTERED PROFESSIONAL ENGINEER

PETROS D. TSOUKALAS
CONNECTICUT PROFESSIONAL ENGINEER
LICENSE NUMBER: 32577

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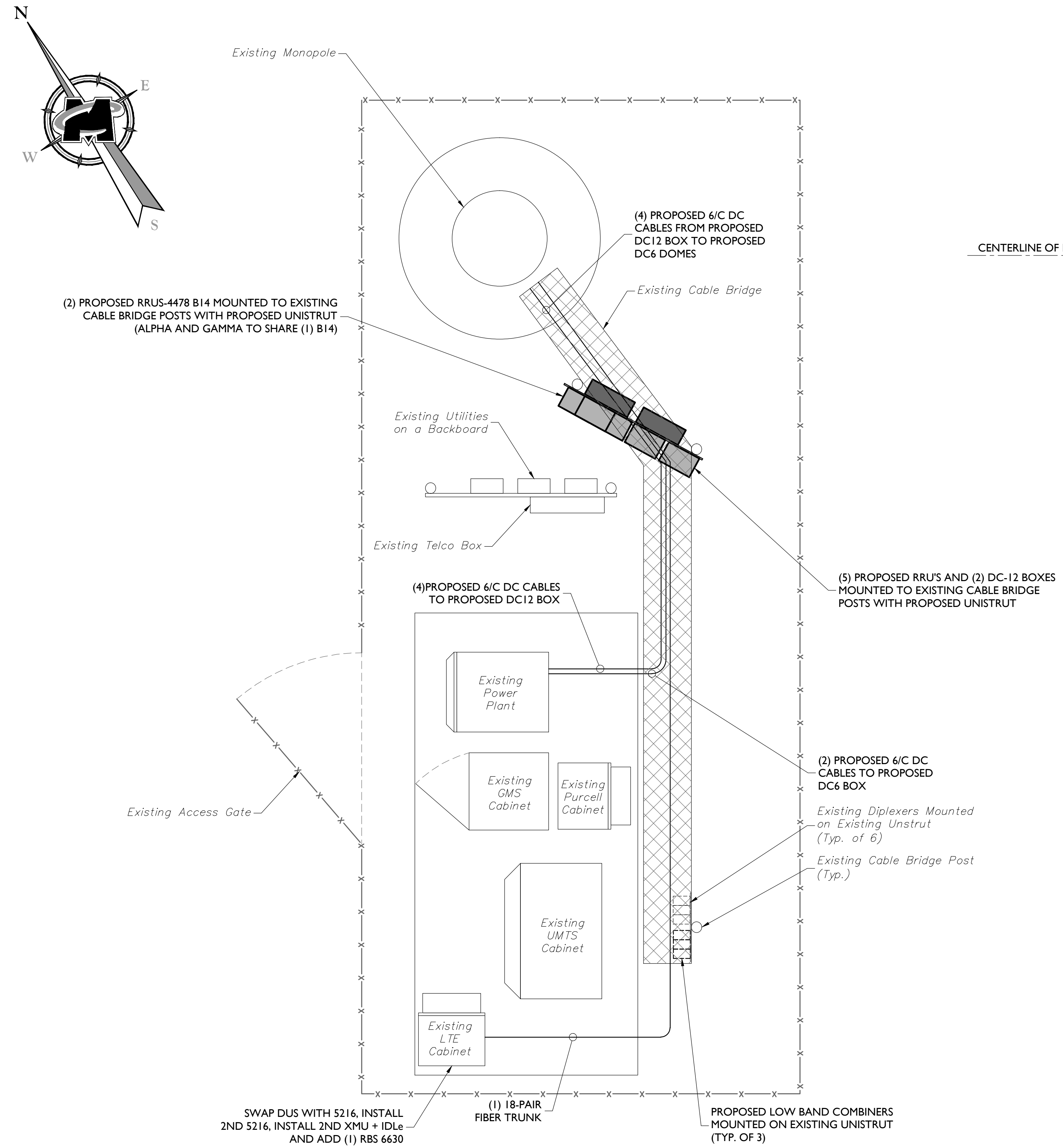
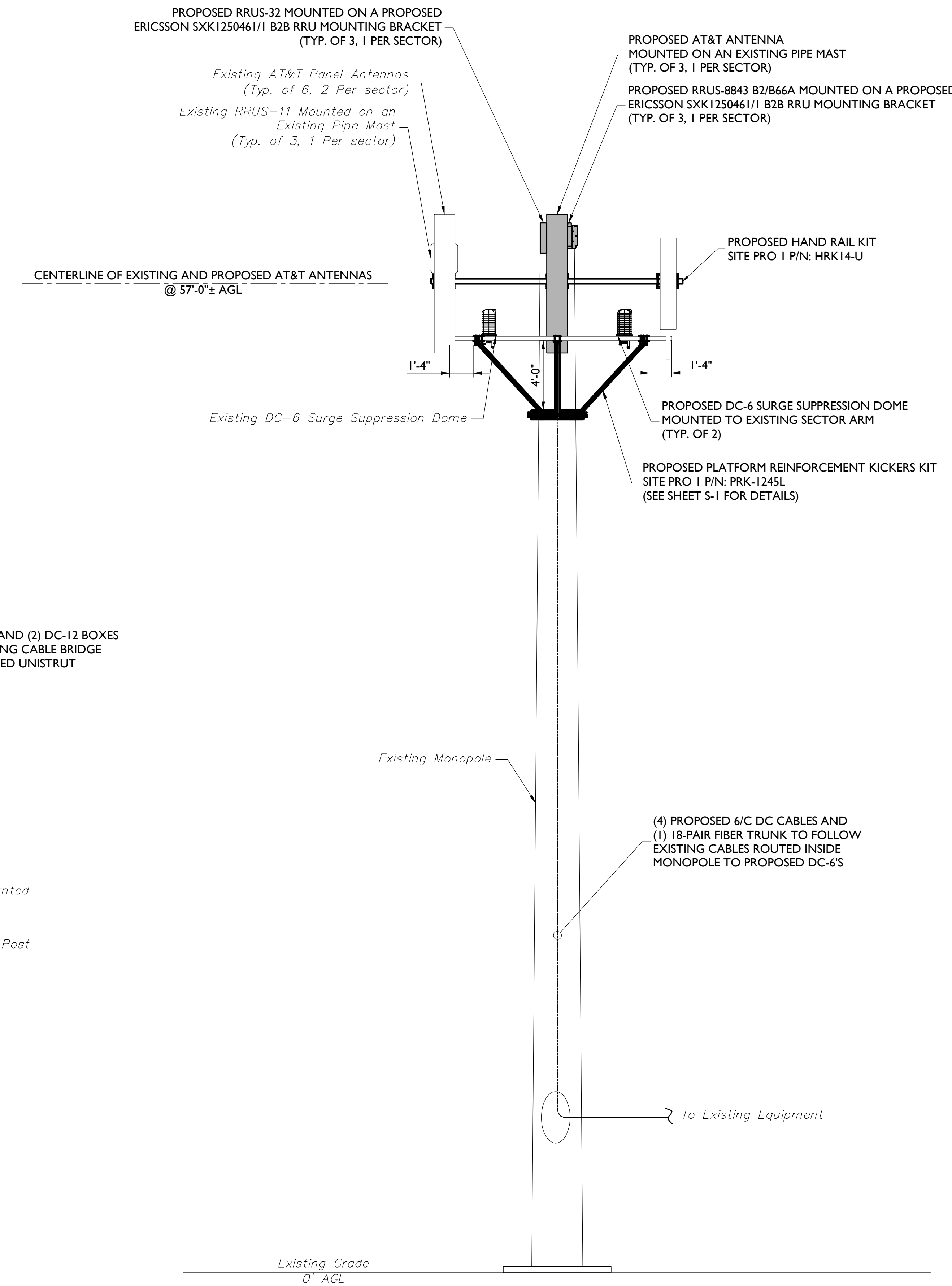
SHEET TITLE :
COMPOUND PLAN

SHEET NUMBER :
C-1



EQUIPMENT LAYOUT

SCALE : 1" = 2' FOR 22"X34"
(SCALE : 1" = 4' FOR 11"X17")



ELEVATION VIEW

SCALE : 1" = 4' FOR 22"X34"
(SCALE : 1" = 8' FOR 11"X17")

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PETROS E. TSOUKALAS
CONNECTICUT PROFESSIONAL
ENGINEER - LICENSE NUMBER: 32577

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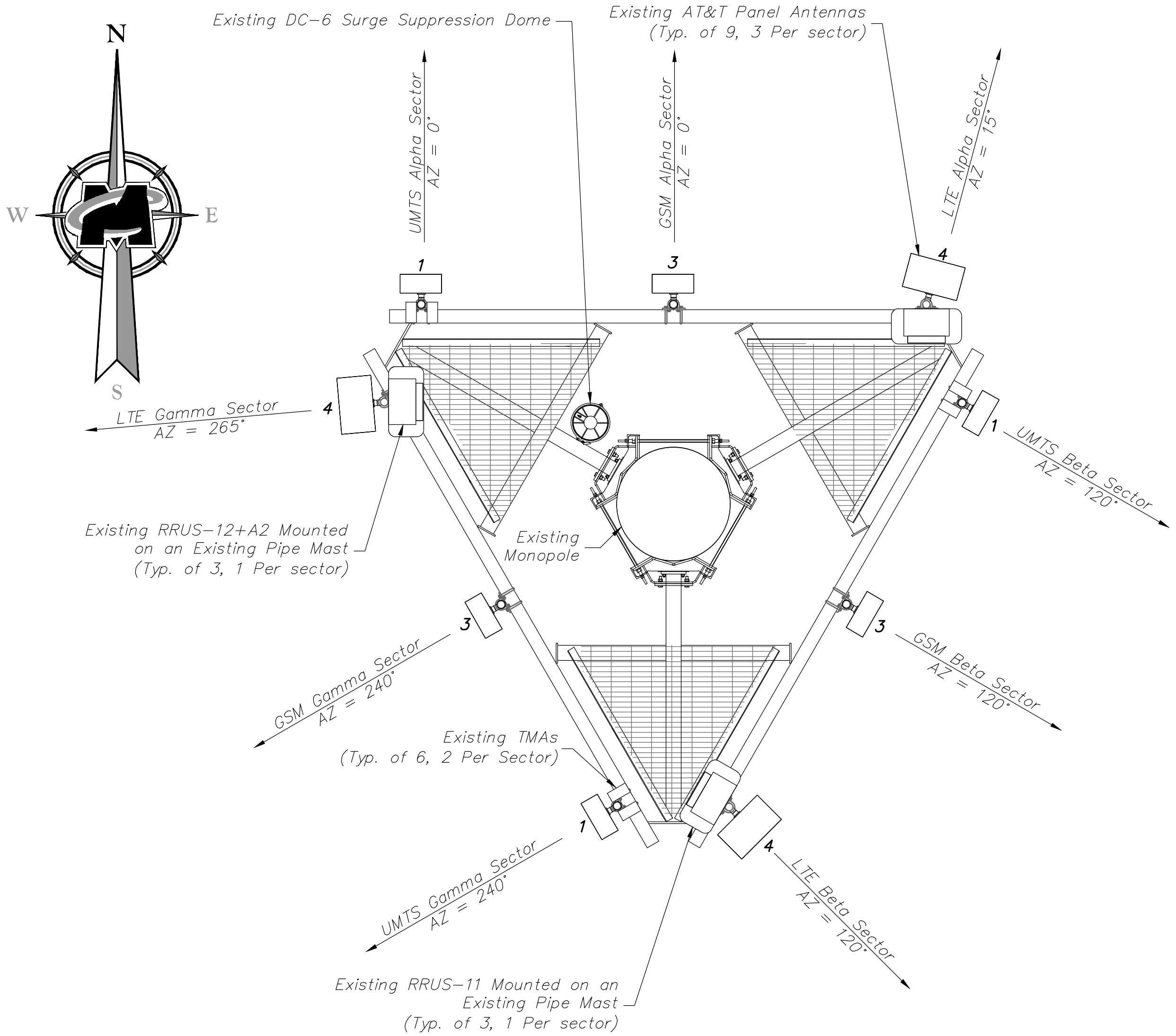
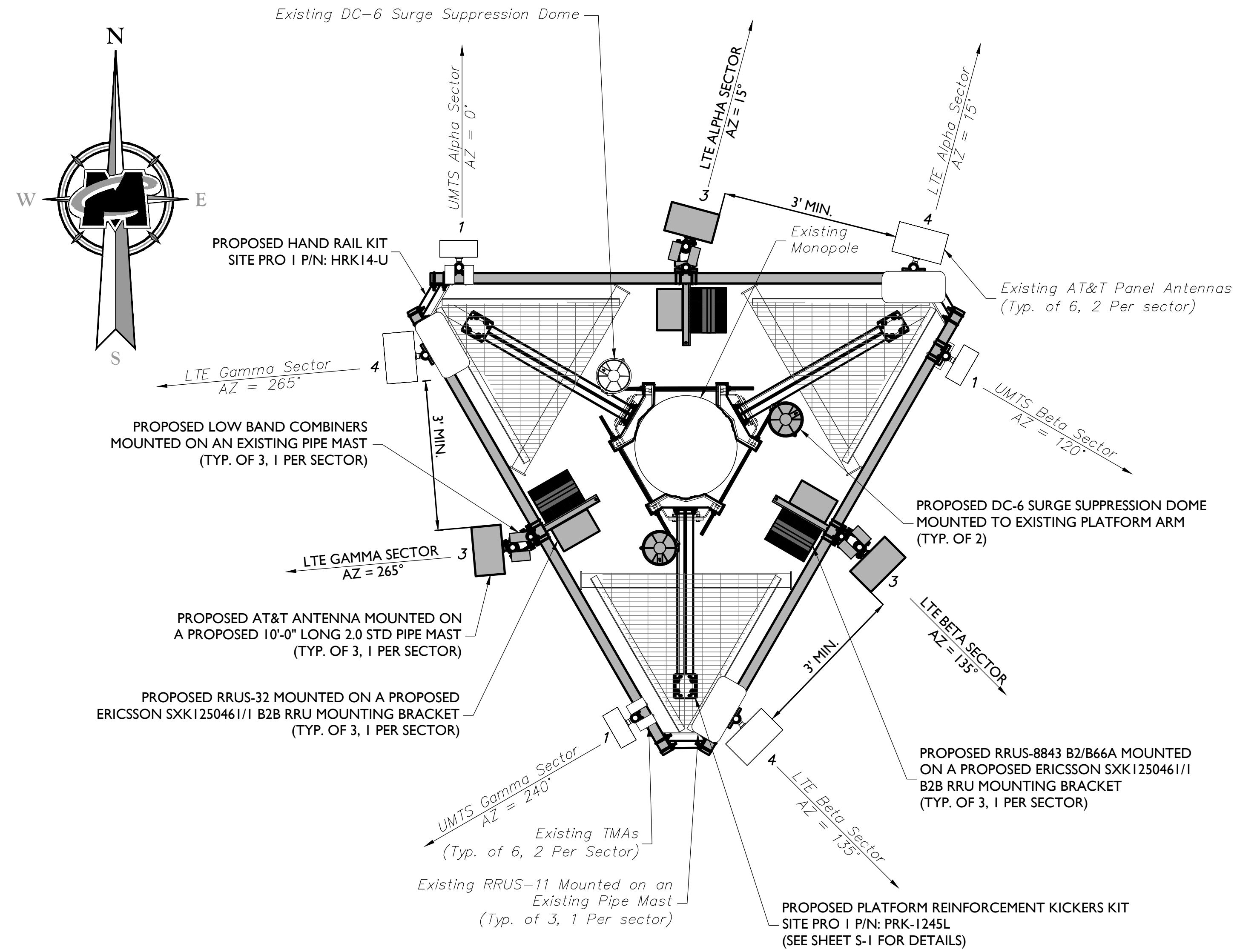
SHEET TITLE :
EQUIPMENT LAYOUT AND ELEVATION VIEW

SHEET NUMBER :
C-2



EXISTING ANTENNA LAYOUT

NOT TO SCALE



PROPOSED ANTENNA LAYOUT

NOT TO SCALE

ANTENNA SCHEDULE

SECTOR		EXISTING ANTENNA	PROPOSED ANTENNA	TECHNOLOGY	ANTENNA STATUS	HEIGHT (in)	WIDTH (in)	DEPTH (in)	WEIGHT (lbs)	ANTENNA AZIMUTH (DEG.)	ANT. CL. ELEV. (ft.)	REMOTE RADIO/TMA CONFIGURATION	TRANSMISSION CABLE		
													QUANTITY	TYPE	STATUS
Sector 1	1	POWERWAVE 7770	POWERWAVE 7770	UMTS	EXISTING	55.00	11.00	5.00	35.00	0	57'	(2) LGP 21901 DIPLEXER (AT GRADE) (2) LGP 21401 TMA		7/8" COAX	EXISTING
	2			-	-					-	-	-		-	-
	3	POWERWAVE 7770	**CCI TPA-65R-LCUUUU-H8**	**LTE**	**PROPOSED**	**96.00**	**14.40**	**8.60**	**87.60**	**15**	**57'**	**(1) DBCT108F1V92-1 (AT GRADE) (1) RRUS-4478 B14 (AT GRADE) (1) RRUS-4478 B5 (AT GRADE) (1) RRUS-32 (1) DBCT108F1V92-1**	1/2	FIBER/DC	EXISTING
	4	CCI HPA-65R-BUU-H8	CCI HPA-65R-BUU-H8	LTE	EXISTING	92.80	14.40	7.30	65.60	15	57'	**(1) RRUS-8846 B2/B66A** (1) RRUS-11		-	-
Sector 2	1	POWERWAVE 7770	POWERWAVE 7770	UMTS	EXISTING	55.00	11.00	5.00	35.00	120	57'	(2) LGP 21901 DIPLEXER (AT GRADE) (2) LGP 21401 TMA		7/8" COAX	EXISTING
	2			-	-					-	-	-		-	-
	3	POWERWAVE 7770	**CCI TPA-65R-LCUUUU-H8**	**LTE**	**PROPOSED**	**96.00**	**14.40**	**8.60**	**87.60**	**135**	**57'**	**(1) DBCT108F1V92-1 (AT GRADE) (1) RRUS-4478 B14 (AT GRADE) (1) RRUS-4478 B5 (AT GRADE) (1) RRUS-32 (1) DBCT108F1V92-1**	**1/2**	**FIBER/DC**	**PROPOSED**
	4	CCI HPA-65R-BUU-H8	CCI HPA-65R-BUU-H8	LTE	EXISTING	92.80	14.40	7.30	65.60	135	57'	**(1) RRUS-8846 B2/B66A** (1) RRUS-11		-	-
Sector 3	1	POWERWAVE 7770	POWERWAVE 7770	UMTS	EXISTING	55.00	11.00	5.00	35.00	240	57'	(2) LGP 21901 DIPLEXER (AT GRADE) (2) LGP 21401 TMA		7/8" COAX	EXISTING
	2			-	-					-	-	-		-	-
	3	POWERWAVE 7770	**CCI TPA-65R-LCUUUU-H8**	**LTE**	**PROPOSED**	**96.00**	**14.40**	**8.60**	**87.60**	**265**	**57'**	**(1) DBCT108F1V92-1 (AT GRADE) (1) RRUS-4478 B14 (AT GRADE) (1) RRUS-32 (1) DBCT108F1V92-1**	**2**	**DC**	**PROPOSED**
	4	CCI HPA-65R-BUU-H8	CCI HPA-65R-BUU-H8	LTE	EXISTING	92.80	14.40	7.30	65.60	265	57'	**(1) RRUS-8846 B2/B66A** (1) RRUS-11		-	-

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PETROS TSOUKALAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE: 32577

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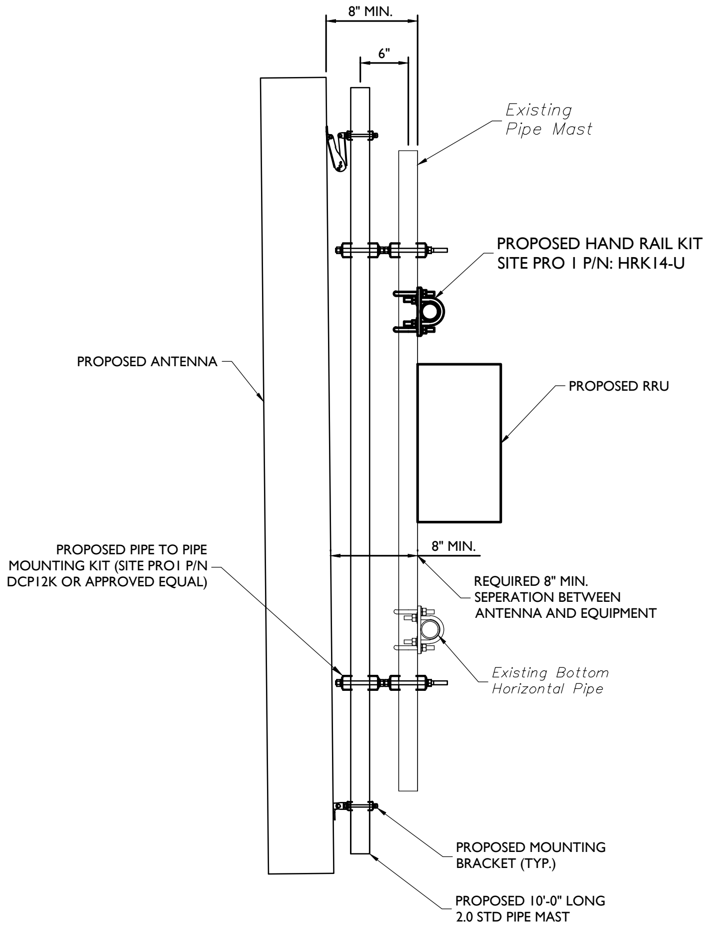
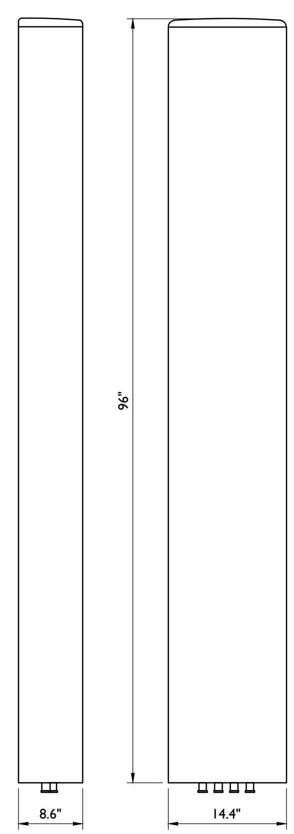
SHEET TITLE :
ANTENNA LAYOUT AND ANTENNA SCHEDULE

SHEET NUMBER :
C-3



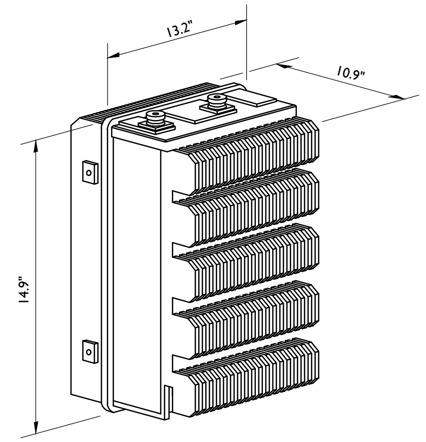
ANTENNA MOUNTING DETAIL
NOT TO SCALE



WEIGHT =75 LBS

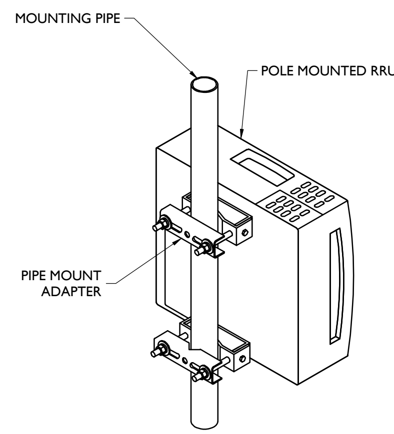
CCI TPA-65R-LCUUUU-H8

ANTENNA DETAIL

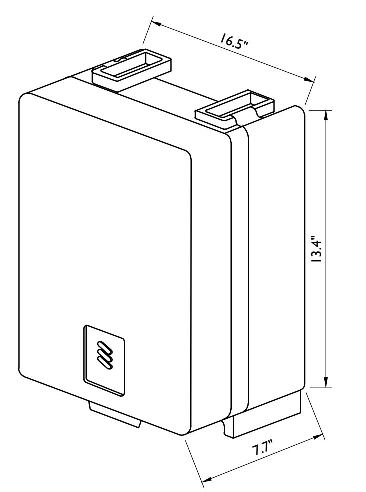


RRUS-8843 B2/B66A DIMENSIONS
(H X W X D): 14.9" X 13.2" X 10.9"
WEIGHT: 72 LBS

RRUS-8843 B2/B66A DETAIL
NOT TO SCALE

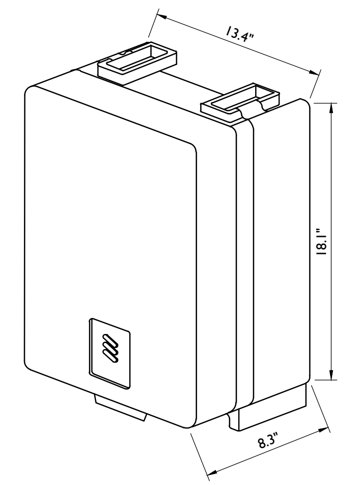


RRU MOUNTING DETAIL
NOT TO SCALE



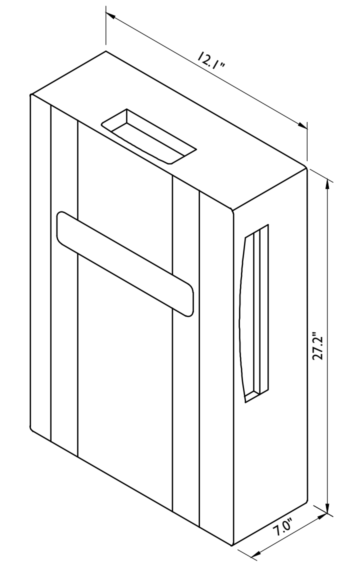
DIMENSIONS (H X W X D): 16.5"H X 13.4"W X 7.7"D (INCLUDES SUNSHIELD)
WEIGHT: 59.9 LBS

RRU-4478-B5 DETAIL
NOT TO SCALE



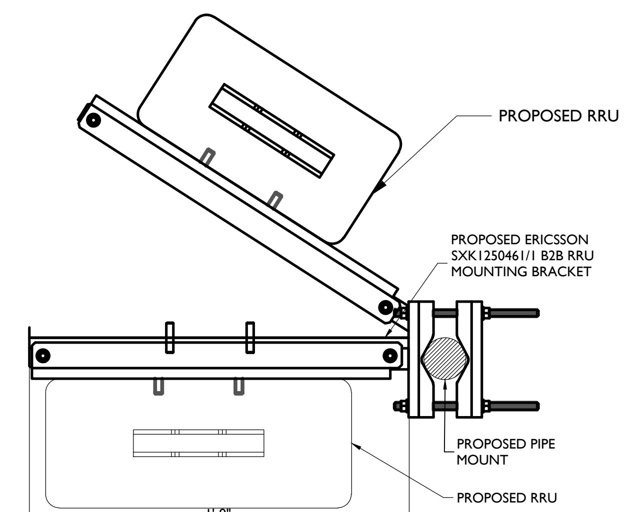
DIMENSIONS (H X W X D): 18.1"H X 13.4"W X 8.3"D (INCLUDES SUNSHIELD)
WEIGHT: 59.4 LBS

RRUS-4478 B14 DETAIL
NOT TO SCALE



RRUS-32 DIMENSIONS (H X W X D): 27.2" X 12.1" X 7.0" (INCLUDES SUNSHIELD)
WEIGHT: 53 LBS

RRUS-32 DETAIL
NOT TO SCALE



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CONNECTICUT PROFESSIONAL ENGINEER LICENSE NUMBER: 32577

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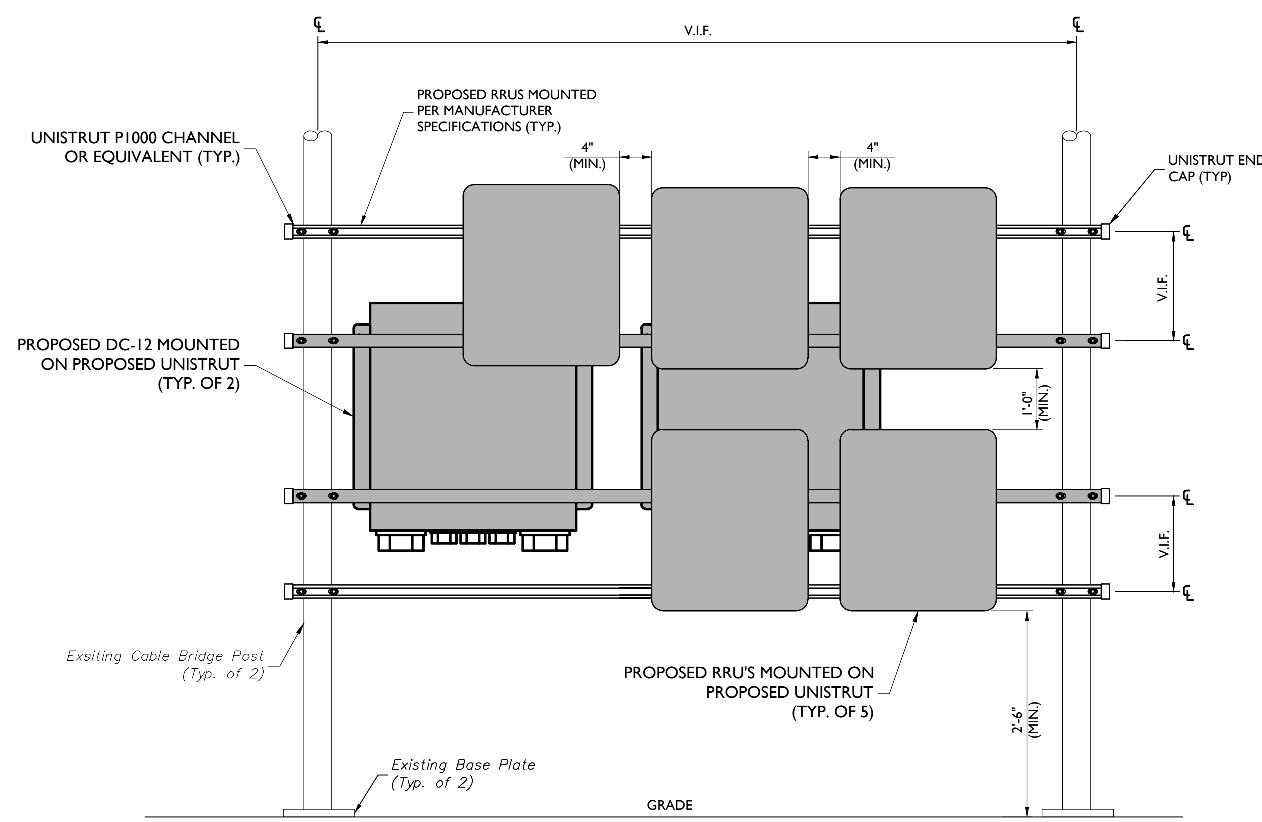
SHEET TITLE:
DETAILS

SHEET NUMBER:
A-1

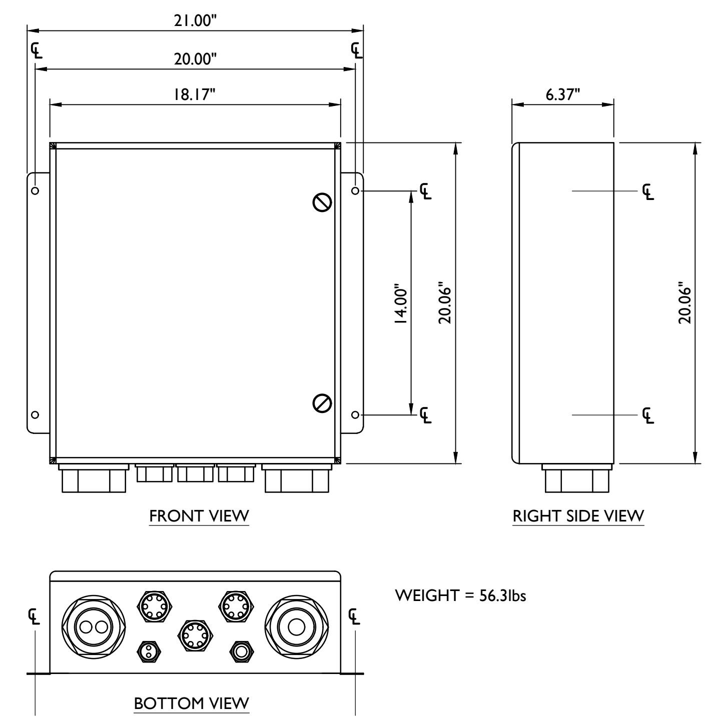


NOTES:

1. INSTALL VERTICAL UNISTRUT CHANNELS AS REQUIRED TO ALIGN FRAME WITH EQUIPMENT MOUNTING HOLES. FASTEN UNISTRUT CHANNELS TOGETHER WITH 3/8" UNISTRUT BOLTING HARDWARE AND SPRING NUTS.
2. MOUNT RRU'S TO UNISTRUT PER MANUFACTURER'S SPECIFICATIONS.
3. MOUNT FRAME AS CLOSE TO PLATFORM AS POSSIBLE.
4. NO PAINTING OF THE RRUS IS ALLOWED.

RRU/DC-12 MOUNTING DETAIL (AT GRADE)

NOT TO SCALE



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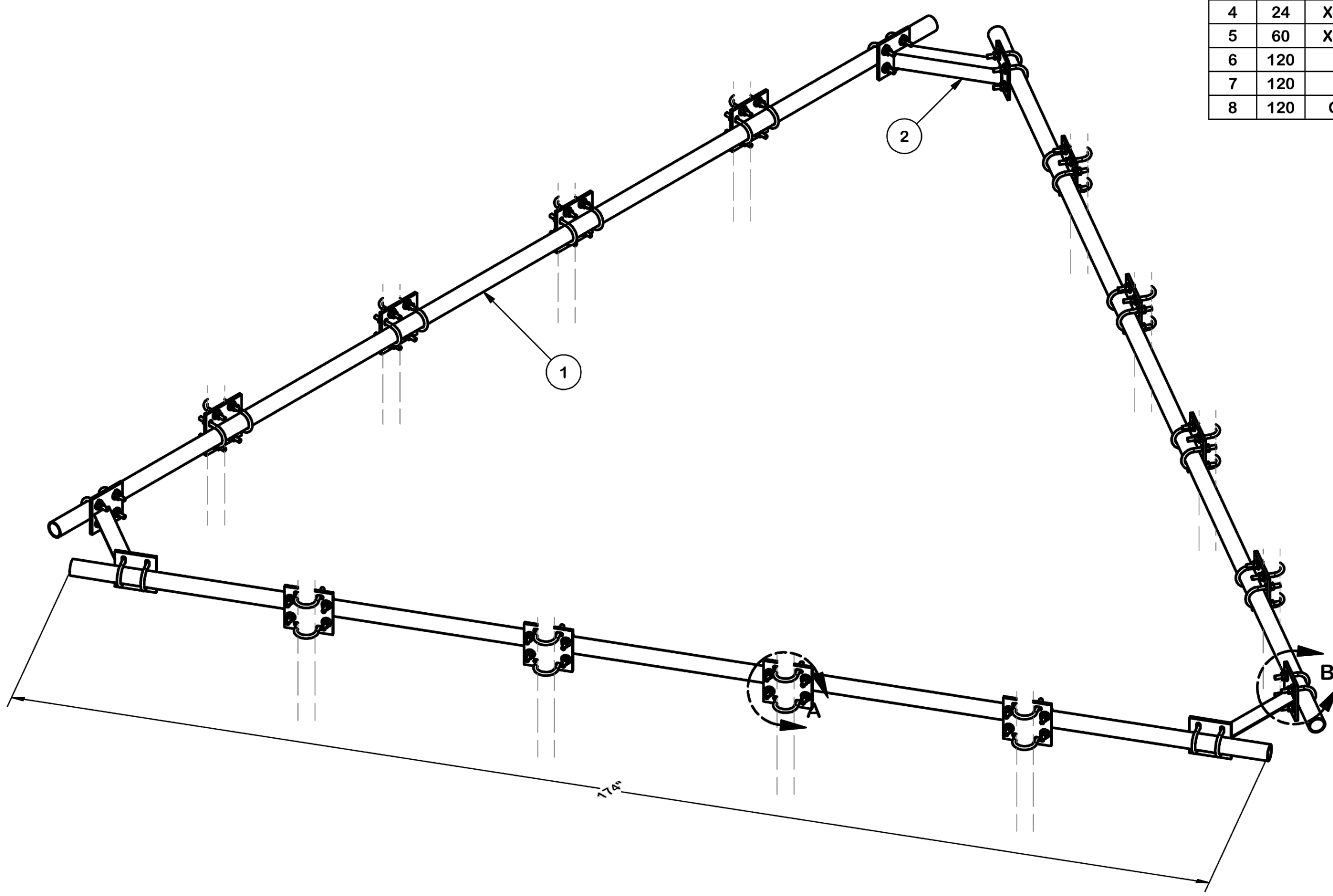
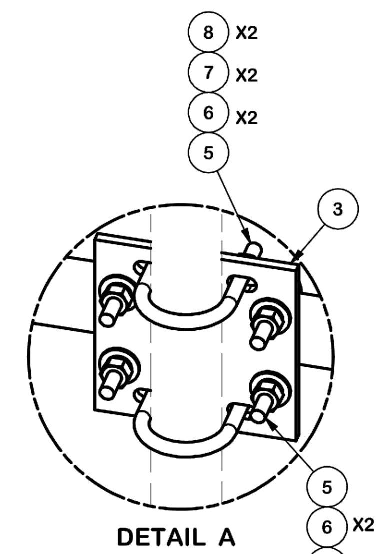
SHEET TITLE : DETAILS

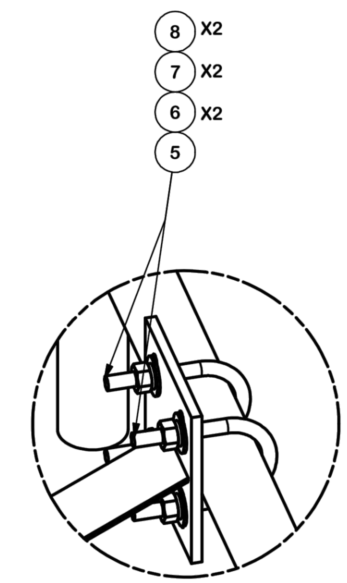
SHEET NUMBER : A-2

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	P2174	2-3/8" OD X 174" SCH 40 GALVANIZED PIPE	174 in	55.75	167.24
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
4	24	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.73	17.56
5	60	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	43.90
6	120	G12FW	1/2" HDG USS FLATWASHER		0.03	4.09
7	120	G12LW	1/2" HDG LOCKWASHER		0.01	1.67
8	120	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	8.60





DETAIL A



DETAIL B

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
UNIVERSAL HANDRAIL KIT FOR 14' PLATFORM 2-3/8" & 2-7/8" ANTENNA PIPES

SITE PRO 1 — a valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	CEK 3/10/2015		HRK14-U	1 OF 1

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
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2	09/18/18	REVISED PER COMMENTS	AJC	RA
1	09/06/18	ISSUED FOR REVIEW	MSG	RA

PETROS E. TSOUKALAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577

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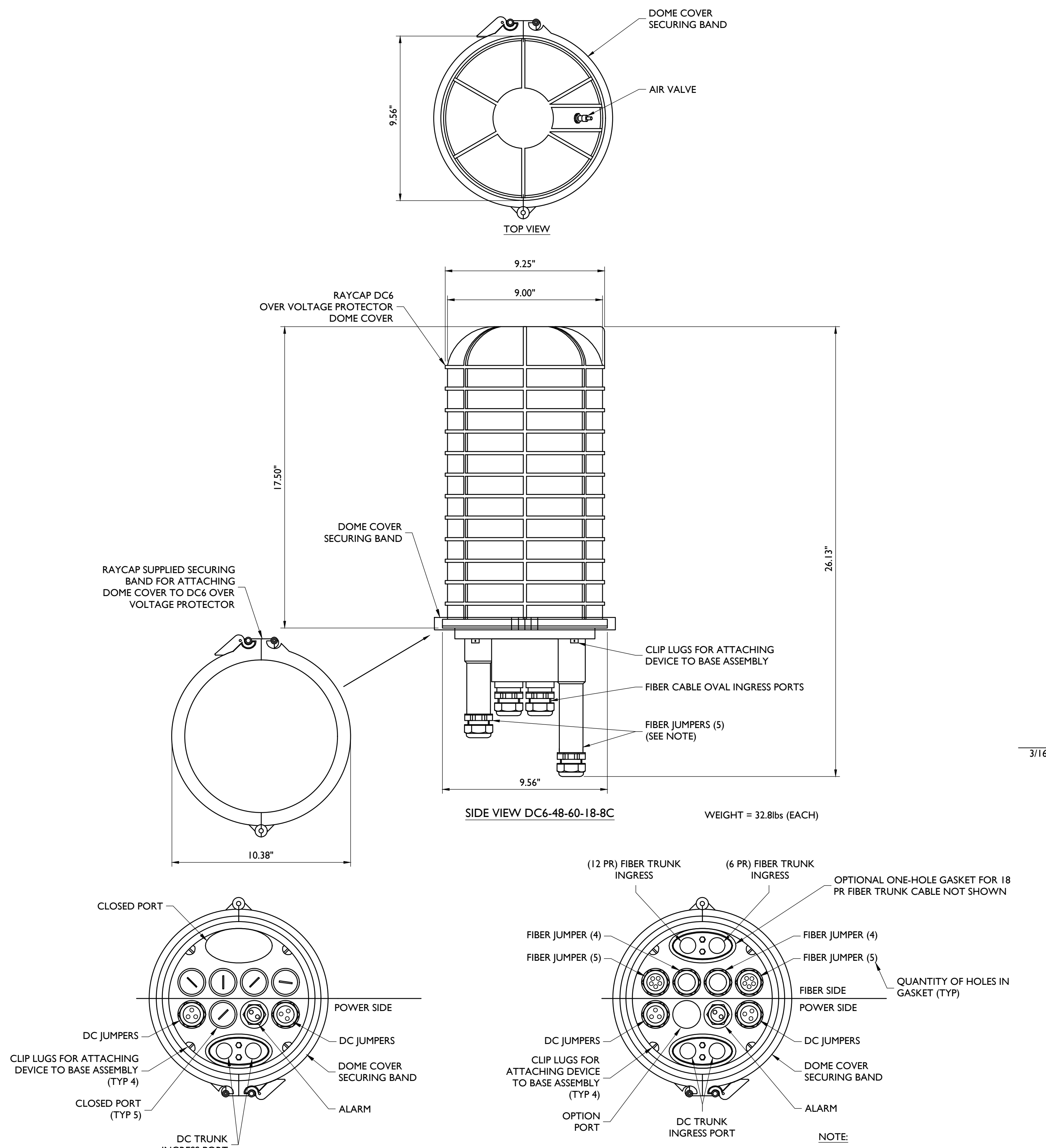
SHEET TITLE :
DETAILS

SHEET NUMBER :
A-3



BOTTOM VIEW
DC6-48-60-0-8C

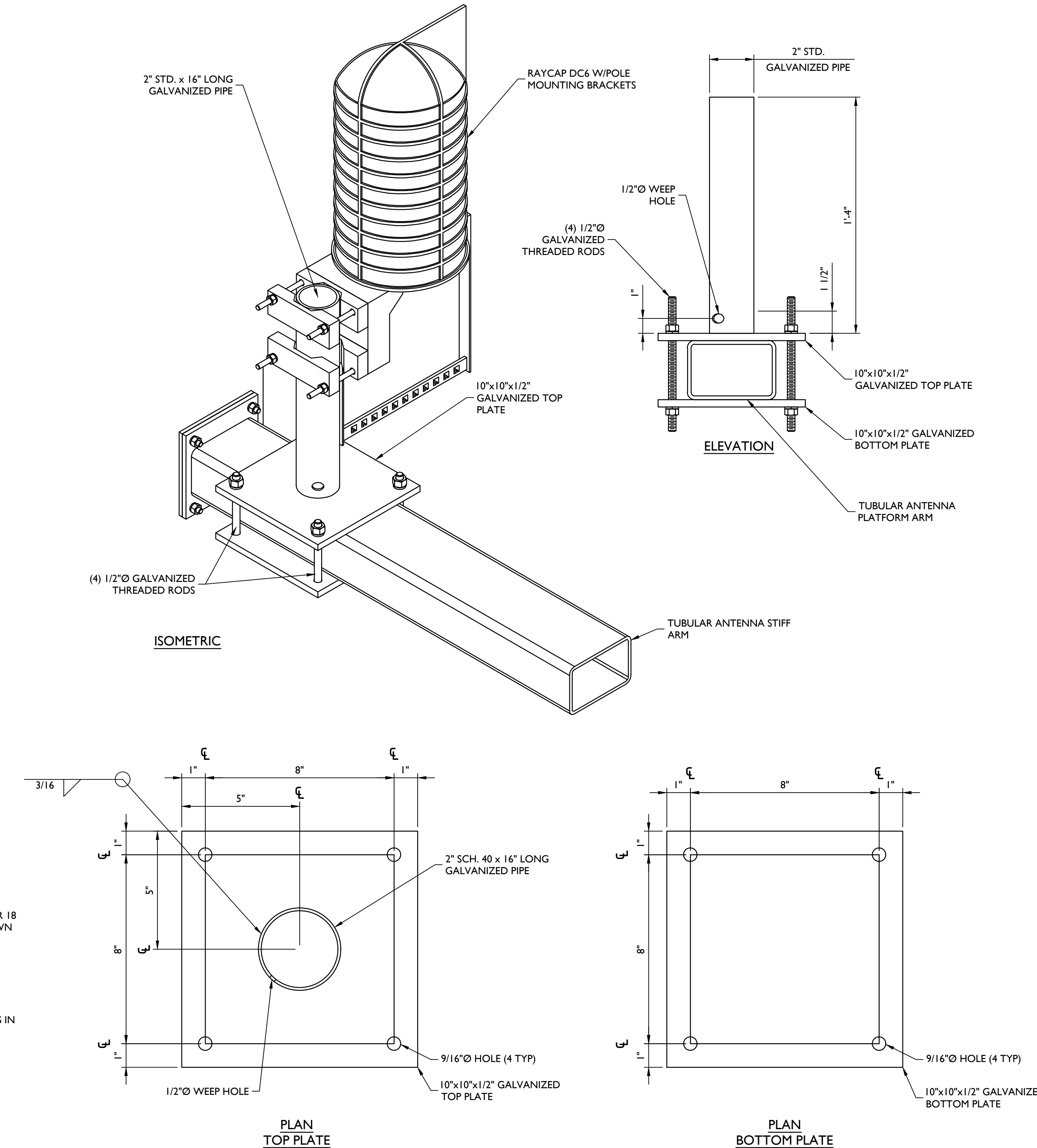
BOTTOM VIEW
DC6-48-60-18-8C

NOTE:

REMOVE CABLE SEALING GLAND AND INSTALL M32x1.5 METRIC-TO-1" NPT ADAPTER (COOPER CROUSE-HINES P/N CAP 740 994 OR EQUIVALENT MFR) WHEN CONNECTING CONDUIT TO OVP.

DC6 SURGE SUPPRESSION DOME DETAIL

NOT TO SCALE



DC6 SURGE SUPPRESSION DOME MOUNTING DETAIL (TUBE)

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2	09/18/18	REVISED PER COMMENTS	AJC	RA
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email: solutions@maserconsulting.com

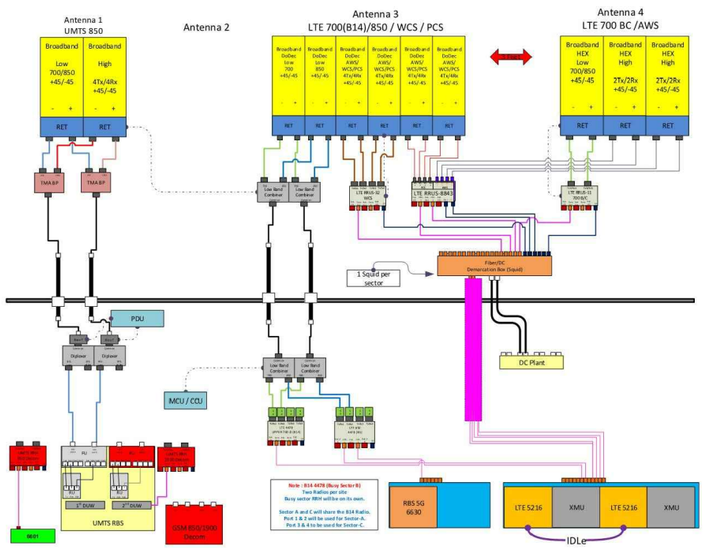
SHEET TITLE :
DETAILS

SHEET NUMBER :
A-4

Diagram - Sector A | Diagram File Name - CT5346_A_B_C_850_700 B14_WCS_AWS_PCS_4T4R_Rev11.vsd

Atoll Site Name - CTL05346 | Location Name - COLCHESTER NORTH CENTRAL | Market - CONNECTICUT | Market Cluster - NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson

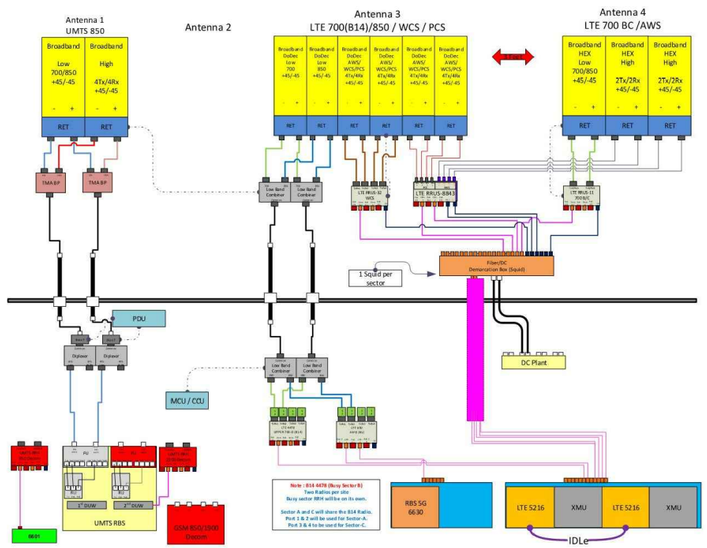


ALPHA SECTOR

Diagram - Sector B | Diagram File Name - CT5346_A_B_C_850_700 B14_WCS_AWS_PCS_4T4R_Rev11.vsd

Atoll Site Name - CTL05346 | Location Name - COLCHESTER NORTH CENTRAL | Market - CONNECTICUT | Market Cluster - NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson

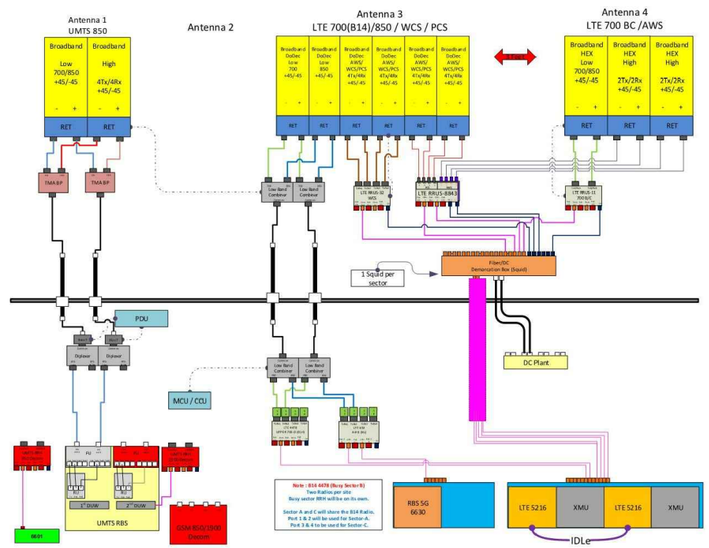


BETA SECTOR

Diagram - Sector C | Diagram File Name - CT5346_A_B_C_850_700 B14_WCS_AWS_PCS_4T4R_Rev11.vsd

Atoll Site Name - CTL05346 | Location Name - COLCHESTER NORTH CENTRAL | Market - CONNECTICUT | Market Cluster - NEW ENGLAND

Comments: Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson



GAMMA SECTOR

BASED ON: RF ENGINEERING DESIGN ENTITLED "NEW-ENGLAND_CONNECTICUT_CTL05346_2019-LTE-Next-Carrier_LTE_mm093q_2051A0GWHX_10070973_25960_04-10-2018_As-Built-In-Progress_v3.00", LAST REVISED 08/13/2018.

RF PLUMBING DIAGRAMS

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FA# 10070973
SITE# CT5346

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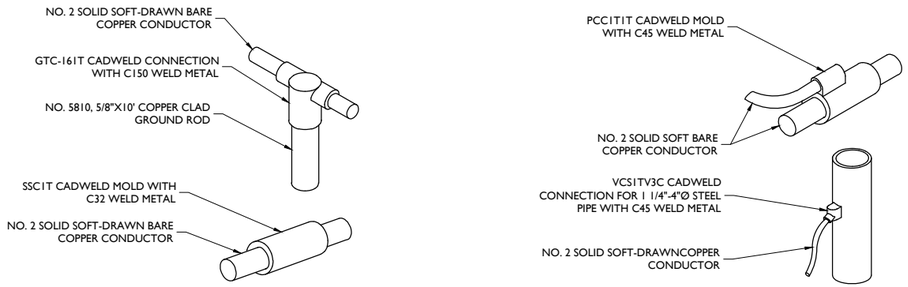
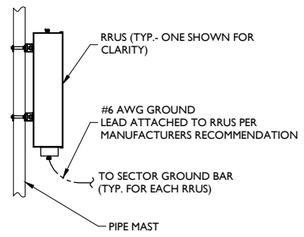
SHEET TITLE :
RF PLUMBING DIAGRAM

SHEET NUMBER :
A-5



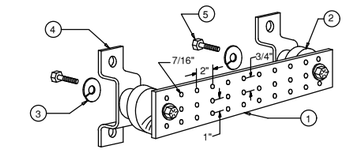
CADWELD DETAILS

NOT TO SCALE



RRU GROUNDING

NOT TO SCALE



LEGEND

1- TINNED COPPER GROUND BAR, 1/4"x4"x20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.

2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4

3- 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8

4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-5056

5- 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1

6- EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" - SURGE PRODUCERS

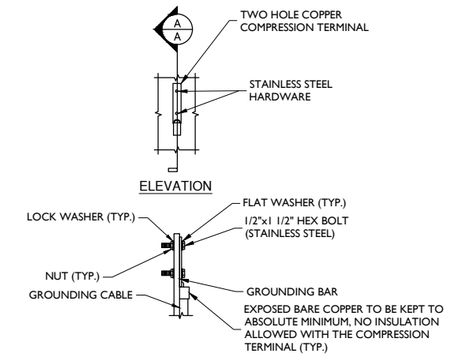
CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
-48V POWER SUPPLT RETURN BAR (#2)
RECTIFIER FRAMES.

SECTION "A" - SURGE ABSORBERS

INTERIOR GROUND RING (#2)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
BUILDING STEEL (IF AVAILABLE) (#2)

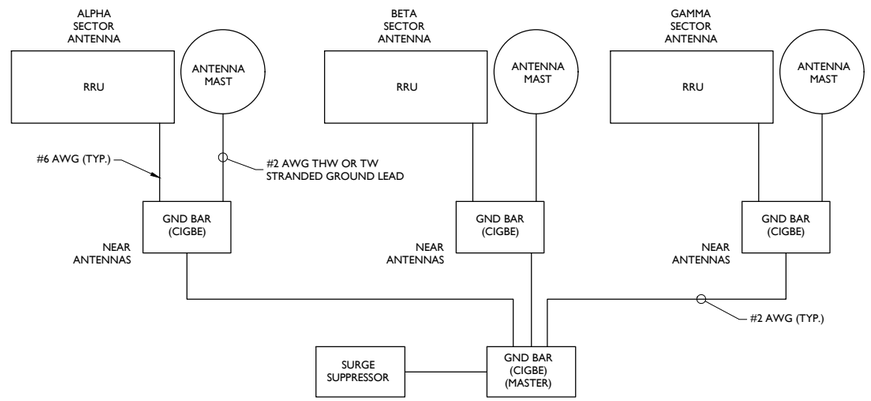
MASTER GROUND BAR

NOT TO SCALE

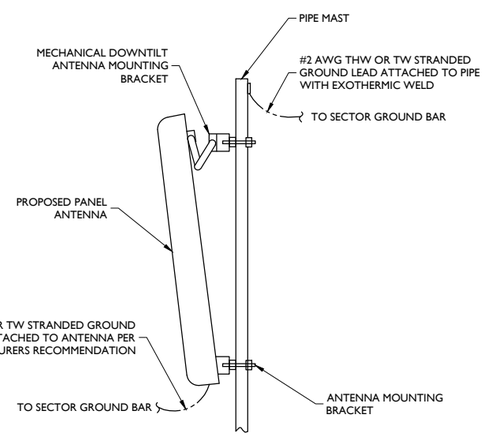


TYPICAL GROUND BAR CONNECTION DETAIL

NOT TO SCALE

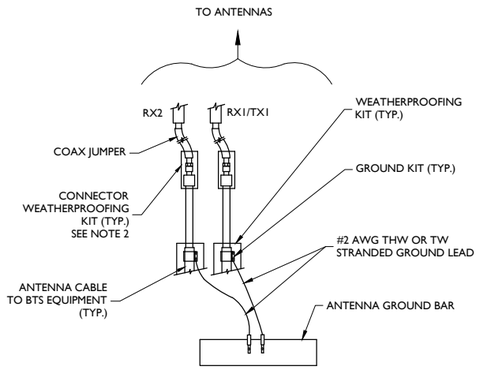


SCHEMATIC DIAGRAM GROUNDING SYSTEM



ANTENNA GROUNDING

NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

TYPICAL GROUND WIRE TO GROUNDING BAR

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SITE# CT5346

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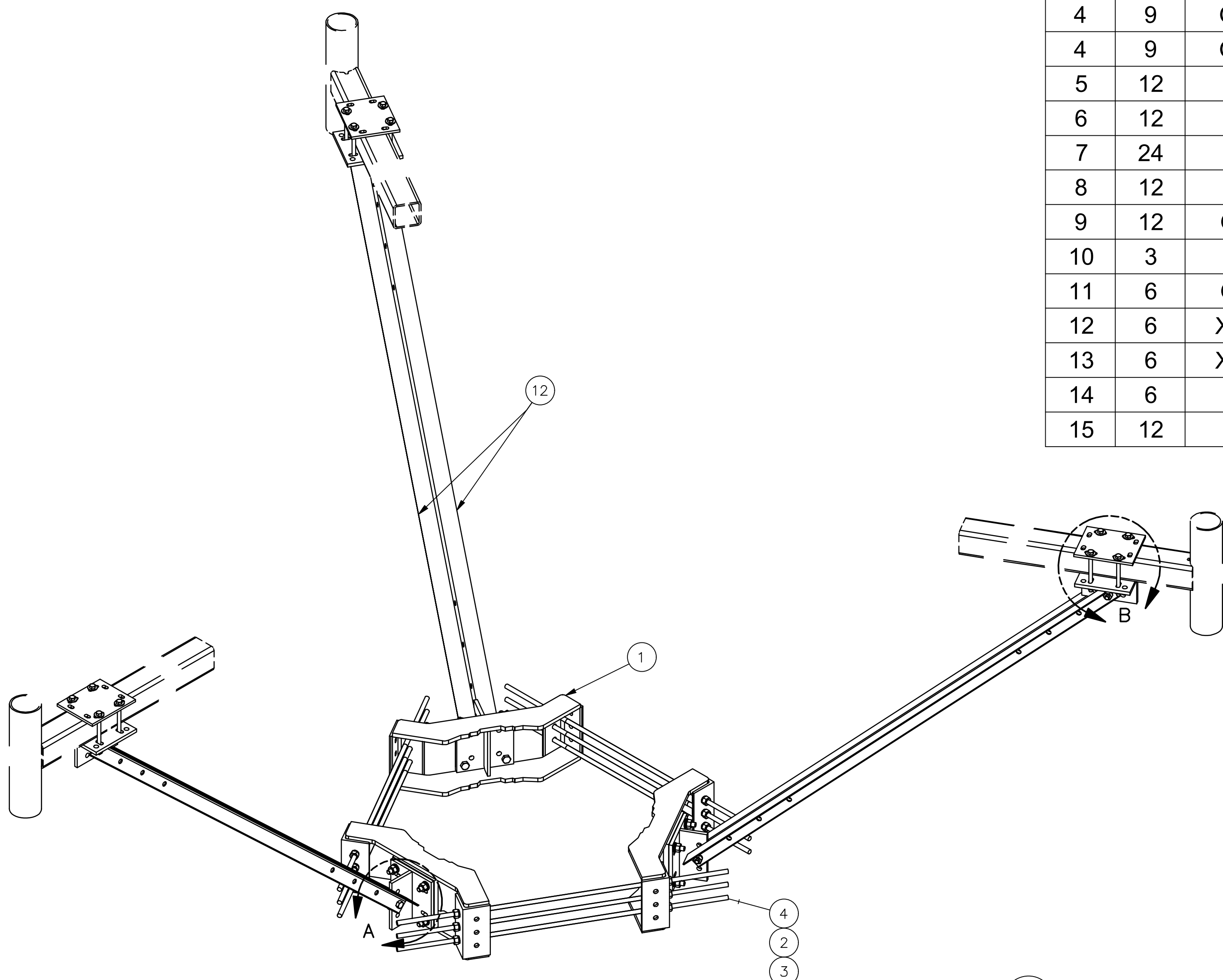
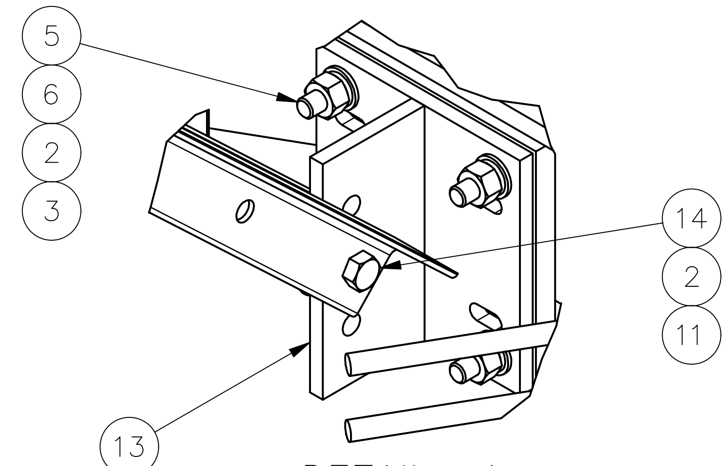
SHEET TITLE : GROUNDING DETAILS

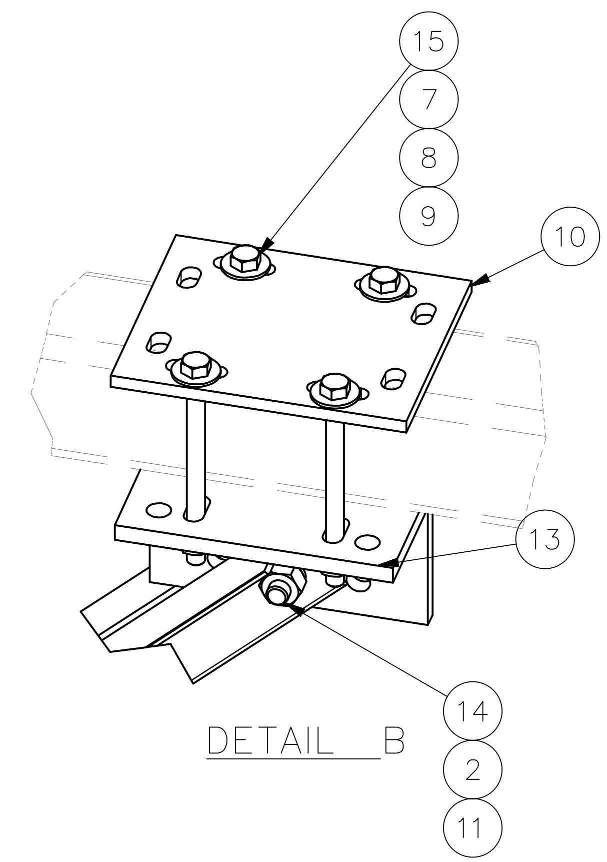
SHEET NUMBER : G-1

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-LWRM	RING MOUNT WELDMENT		68.81	206.42
2	36	G58LW	5/8" HDG LOCKWASHER		0.03	0.94
3	30	A58NUT	5/8" HDG A325 HEX NUT		0.13	3.90
4	9	G58R-24	5/8" x 24" THREADED ROD (HDG.)		0.55	4.94
4	9	G58R-48	5/8" x 48" THREADED ROD (HDG.)		0.55	4.94
5	12	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	4.27
6	12	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.41
7	24	G12FW	1/2" HDG USS FLATWASHER		0.03	0.82
8	12	G12LW	1/2" HDG LOCKWASHER		0.01	0.17
9	12	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.86
10	3	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	18.06
11	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
12	6	X-254923	PLATFORM REINFORCEMENT KIT ANGLE	84 in	22.83	137.00
13	6	X-253992	T-BRACKET FOR REINFORCEMENT KIT		13.55	81.27
14	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
15	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	4.91
					TOTAL WT. #	515.92





DETAIL A



DETAIL B

SITE PRO1 P/N:PRK-1245L
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STATE OF CONNECTICUT
PETROS E. TSOUKALAS
32577
LICENSED PROFESSIONAL ENGINEER

PETROS E. TSOUKALAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577

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Fax: .732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE : STRUCTURAL DETAILS

SHEET NUMBER : S-1

EXHIBIT 3

Date: **January 03, 2019**

Rebecca Klein
Crown Castle
3530 Toringdon Way
Charlotte, NC 28277

Jacobs Engineering Group. Inc.
5449 Bells Ferry Road
Acworth, GA 30102
770-701-2500

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5346
	Carrier Site Name:	COLCHESTER NORTH CENTRAL
Crown Castle Designation:	**Crown Castle BU Number:**	842860
	Crown Castle Site Name:	COLCHESTER NORTH CENTRAL
	Crown Castle JDE Job Number:	550197
	Crown Castle Work Order Number:	1676752
	Crown Castle Order Number:	472822 Rev. 0
Engineering Firm Designation:	**Jacobs Engineering Group, Inc. Project Number:**	1676752
Site Data:	**315 OLD HARTFORD ROAD, COLCHESTER, New London County, CT** **Latitude *41° 34' 49.69"*, Longitude *-72° 21' 0.07"*** **60 Foot - Monopole Tower**	

Dear Rebecca Klein,

Jacobs Engineering Group, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

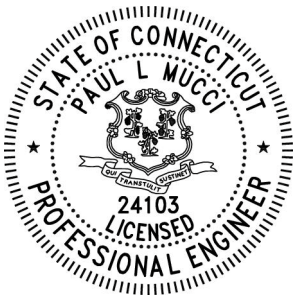
LC5: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 128 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by:

Jhon Michael Felismino
Structural Engineer

Respectfully submitted by:



Paul L. Mucci, P.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 60 ft Monopole tower mapped by Tower Engineering Professionals.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	128 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
53.0	57.0	3	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe	3 6 12 1	3/8 3/4 7/8 2 [Conduit]
		3	cci antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe		
		3	powerwave technologies	7770.00 w/ Mount Pipe		
	55.0	3	ericsson	RADIO 8843		
		3	ericsson	RRUS 32		
		3	kaelus	DBCT108F1V92-1		
		3	raycap	DC6-48-60-18-8F		
	54.0	3	ericsson	RRUS 11 B12		
		6	powerwave technologies	LGP21401		
	53.0	1	sitepro 1	PRK-1245L [Kicker Kit]		
		1	sitepro 1	QMSP-384 [Platform Mount]		
		1	sitepro 1	HRK14-U [Handrail Kit]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
58.0	68.0	1	rfs celwave	BMR12	1	1/2
	58.0	1	tower mounts	Side Arm Mount [SO 701-1]		
44.0	45.0	1	andrew	DB438-A	1	1/2
	44.0	1	tower mounts	Side Arm Mount [SO 701-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
31.0	32.0	1	andrew	DB438-A	2	1/2
		1	pctel	MYA1505K		
	31.0	1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C.	5142093	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Tower Engineering Professionals (Mapped)	6060632	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Tower Engineering Professionals (Mapped)	6041767	CCISITES
MOUNT ANALYSIS	Maser Consulting Connecticut	18963026A	CROWN CASTLE EMAIL

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built and maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) Material grades were not provided at the time of analysis. The following were assumed in this analysis:

Component	Grade
Base Plate	A572-50
Anchor Rods	A615-75
Concrete Strength	f'c = 3,000 psi
Foundation Steel Reinforcement	fy = 60 ksi

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	60 - 36	Pole	TP32.125x27.375x0.1875	1	-6.47	1132.72	21.5	Pass
L2	36 - 0	Pole	TP37.875x32.125x0.2188	2	-10.62	1549.94	43.8	Pass
							Summary	
						Pole (L2)	43.8	Pass
						Rating =	43.8	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	39.1	Pass
1	Base Plate	0	12.9	Pass
1	Base Foundation Structural	0	22.8	Pass
1	Base Foundation Soil Interaction	0	16.0	Pass

Structure Rating (max from all components) =	43.8%

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

4.1) Recommendations

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

APPENDIX A

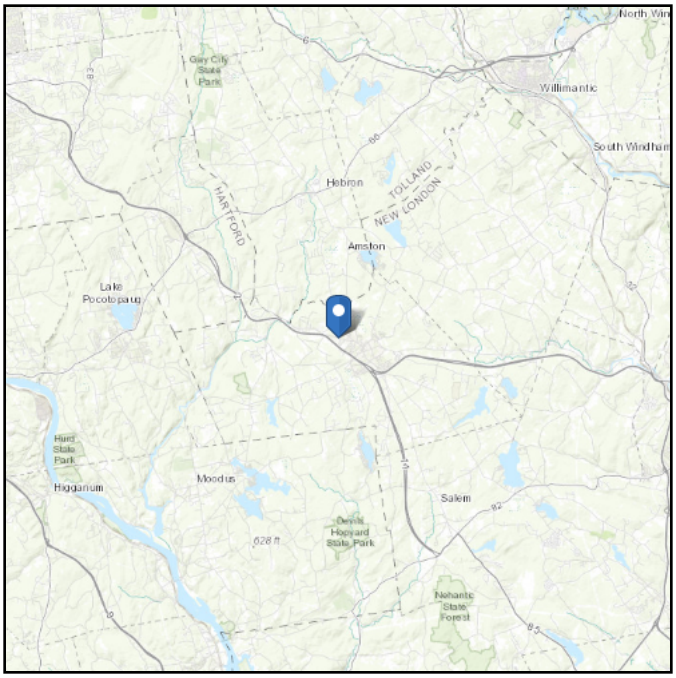
TNXTOWER OUTPUT

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 420.23 ft (NAVD 88)
Latitude: 41.580469
Longitude: -72.350019



Wind

Results:

Wind Speed:	128 Vmph
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	96 Vmph
100-year MRI	105 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Wed Jan 02 2019

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

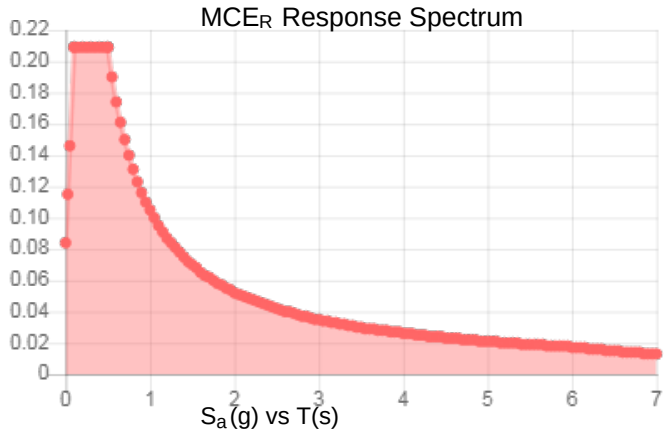
Seismic

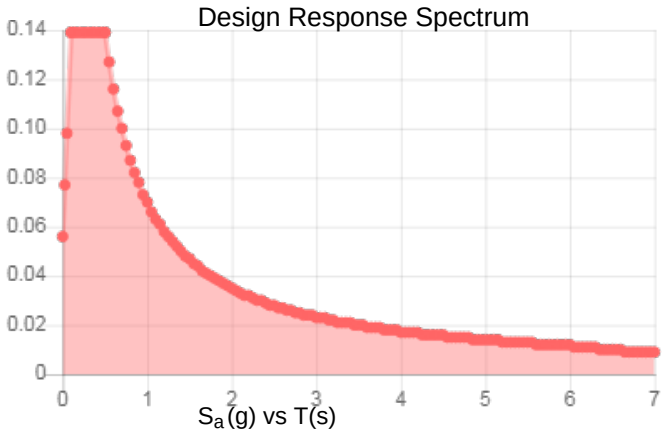
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.174	S_{DS} :	0.139
S_1 :	0.062	S_{D1} :	0.07
F_a :	1.2	T_L :	
F_v :	1.7	PGA :	0.088
S_{MS} :		PGA_M :	0.105
S_{M1} :		F_{PGA} :	1.2
		I_e :	1

Seismic Design Category B





Data Accessed: Wed Jan 02 2019

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Jan 02 2019

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

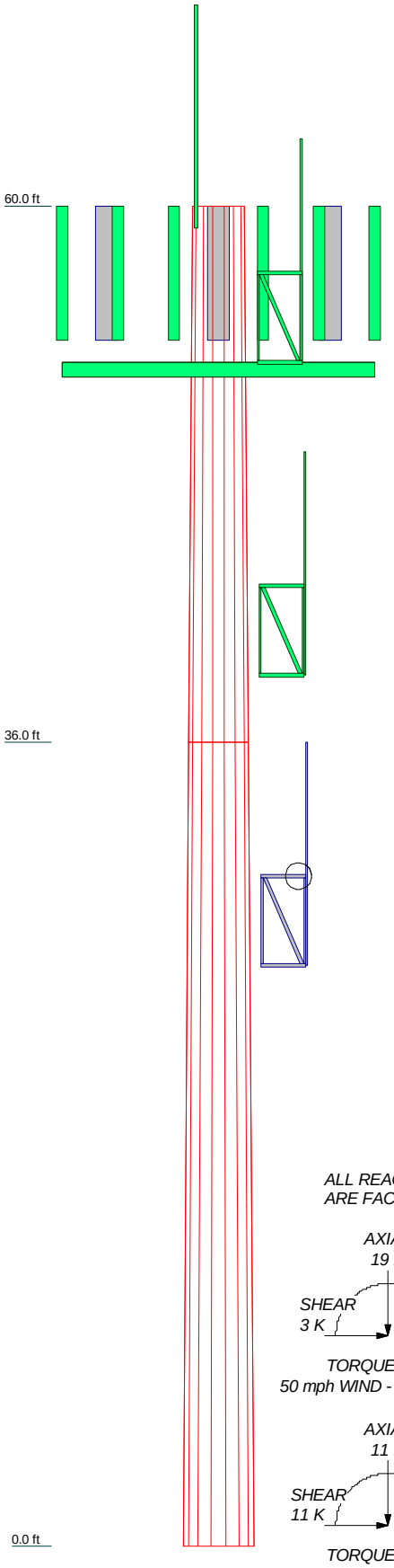
Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-60	60 ksi	75 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 128 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.27 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 43.8%



Section	1	2
Length (ft)	24.0000	36.0000
Number of Sides	18	18
Thickness (in)	0.1875	0.2188
Top Dia (in)	27.3750	32.1250
Bot Dia (in)	32.1250	37.8750
Grade	A572-60	
Weight (K)	1.4	3.0

4.4

ALL REACTIONS ARE FACTORED

AXIAL 19 K

SHEAR 3 K *MOMENT 131 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 1.2750 in ICE

AXIAL 11 K

SHEAR 11 K *MOMENT 517 kip-ft*

TORQUE 3 kip-ft
REACTIONS - 128 mph WIND

Jacobs Engineering Group, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
Phone: 770-701-2500
FAX: 770-701-2501

Job:	***COLCHESTER NORTH CENTRAL***		
Project:	***BU#842860 WO#1676752***		
Client: Crown Castle	Drawn by: Jhon MIchael Felismino		App'd:
Code: TIA-222-H	Date: 01/03/19		Scale: NTS
Path:			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

1) Tower is located in New London County, Connecticut.
2) Tower base elevation above sea level: 420.0000 ft.
3) Basic wind speed of 128 mph.
4) Risk Category II.
5) Exposure Category C.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height 0.0000 ft.
9) Nominal ice thickness of 1.2750 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56.00 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Deflections calculated using a wind speed of 60 mph.
14) TIA-222-H Annex S.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.05.
18) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
Secondary Horizontal Braces Leg		Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
				Pole With Shroud Or No Appurtenances
				Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	60.0000-36.0000	24.0000	0.00	18	27.3750	32.1250	0.1875	0.7500	A572-60 (60 ksi)
L2	36.0000-0.0000	36.0000		18	32.1250	37.8750	0.2188	0.8750	A572-60 (60 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	27.7684	16.1800	1510.9617	9.6516	13.9065	108.6515	3023.9116	8.0915	4.4880	23.936
	32.5917	19.0068	2449.3362	11.3378	16.3195	150.0865	4901.8953	9.5052	5.3240	28.395
L2	32.5868	22.1529	2849.1789	11.3267	16.3195	174.5874	5702.1069	11.0786	5.2690	24.087
	38.4255	26.1452	4683.8571	13.3680	19.2405	243.4374	9373.8774	13.0751	6.2810	28.713

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 60.0000-36.0000				1	1	1			
L2 36.0000-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***										
Safety Line 3/8	B	No	Surface Af (CaAa)	60.0000 - 0.0000	1	1	-0.400 -0.400	0.0000	0.7500	0.22
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF4-50A(1/2")	C	No	No	Inside Pole	58.0000 - 8.0000	1	No Ice	0.0000	0.15
							1/2" Ice	0.0000	0.15
							1" Ice	0.0000	0.15
							2" Ice	0.0000	0.15
LDF5-50A(7/8)	C	No	No	Inside Pole	53.0000 - 8.0000	12	No Ice	0.0000	0.33
							1/2" Ice	0.0000	0.33
							1" Ice	0.0000	0.33
							2" Ice	0.0000	0.33
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	53.0000 - 8.0000	3	No Ice	0.0000	0.06
							1/2" Ice	0.0000	0.06
							1" Ice	0.0000	0.06
							2" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4")	C	No	No	Inside Pole	53.0000 - 8.0000	6	No Ice	0.0000	0.58
							1/2" Ice	0.0000	0.58
							1" Ice	0.0000	0.58
							2" Ice	0.0000	0.58
LDF4-50A(1/2")	C	No	No	Inside Pole	44.0000 - 8.0000	1	No Ice	0.0000	0.15
							1/2" Ice	0.0000	0.15
							1" Ice	0.0000	0.15
							2" Ice	0.0000	0.15
LDF4-50A(1/2")	C	No	No	Inside Pole	31.0000 - 8.0000	2	No Ice	0.0000	0.15
							1/2" Ice	0.0000	0.15
							1" Ice	0.0000	0.15
							2" Ice	0.0000	0.15

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
2" Rigid Conduit	C	No	No	Inside Pole	53.0000 - 8.0000	1	No Ice	0.0000	2.80
							1/2" Ice	0.0000	2.80
							1" Ice	0.0000	2.80
							2" Ice	0.0000	2.80
***									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	60.0000-36.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.18
L2	36.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.31

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	60.0000-36.0000	A	1.323	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	6.349	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.18
L2	36.0000-0.0000	A	1.200	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	8.643	0.000	0.10
		C		0.000	0.000	0.000	0.000	0.31

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	60.0000-36.0000	0.0000	0.0000	-0.6346	-1.2834
L2	36.0000-0.0000	0.0000	0.0000	-0.5966	-1.2038

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	9	Safety Line 3/8	36.00 - 60.00	1.0000	1.0000
L2	9	Safety Line 3/8	0.00 - 36.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8"x8'	C	From Leg	0.0000 0.00 4.00	0.0000	60.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.5000 1.3135 2.1437 3.6130	0.5000 1.3135 2.1437 3.6130	0.01 0.02 0.03 0.07
*** Level 58 ***									
BMR12	B	From Leg	4.0000 0.00 10.00	0.0000	58.0000	No Ice 1/2" Ice 1" Ice 2" Ice	6.9361 15.3236 17.4038 20.7954	6.9361 15.3236 17.4038 20.7954	0.12 0.21 0.31 0.56
Side Arm Mount [SO 701-1]	B	From Leg	2.0000 0.00 0.00	0.0000	58.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.8500 1.1400 1.4300 2.0100	1.6700 2.3400 3.0100 4.3500	0.07 0.08 0.09 0.12
*** Level 53 ***									
Platform Mount [LP 403-1]	C	None		0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	18.8500 24.3000 29.7500 40.6500	18.8500 24.3000 29.7500 40.6500	1.50 1.80 2.09 2.69
Miscellaneous [NA 509-3]	C	None		0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	11.8400 16.9600 22.0800 32.3200	11.8400 16.9600 22.0800 32.3200	0.28 0.30 0.32 0.36
Miscellaneous [NA 507-1]	C	None		0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.8000 6.7000 8.6000 12.4000	4.8000 6.7000 8.6000 12.4000	0.25 0.29 0.34 0.44
7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	5.7460 6.1791 6.6067 7.4880	4.2543 5.0137 5.7109 7.1553	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	5.7460 6.1791 6.6067 7.4880	4.2543 5.0137 5.7109 7.1553	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	5.7460 6.1791 6.6067 7.4880	4.2543 5.0137 5.7109 7.1553	0.06 0.10 0.16 0.29
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	13.5881 14.1897 14.7983 16.0364	10.7958 12.1244 13.1669 15.2853	0.08 0.18 0.29 0.54
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice	13.5881 14.1897 14.7983 16.0364	10.7958 12.1244 13.1669 15.2853	0.08 0.18 0.29 0.54

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						2" Ice			
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	13.5881 14.1897 14.7983 16.0364	10.7958 12.1244 13.1669 15.2853	0.08 0.18 0.29 0.54
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	13.5353 14.2380 14.9495 16.3081	10.9597 12.4861 14.0367 16.3910	0.11 0.22 0.33 0.59
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	13.5353 14.2380 14.9495 16.3081	10.9597 12.4861 14.0367 16.3910	0.11 0.22 0.33 0.59
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Leg	4.0000 0.00 4.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	13.5353 14.2380 14.9495 16.3081	10.9597 12.4861 14.0367 16.3910	0.11 0.22 0.33 0.59
(2) DC6-48-60-18-8F	A	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.9167 1.4583 1.6431 2.0417	0.9167 1.4583 1.6431 2.0417	0.03 0.05 0.07 0.12
DC6-48-60-18-8F	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.9167 1.4583 1.6431 2.0417	0.9167 1.4583 1.6431 2.0417	0.03 0.05 0.07 0.12
(2) LGP21401	A	From Leg	4.0000 0.00 1.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1040 1.2388 1.3810 1.6877	0.2070 0.2738 0.3475 0.5208	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Leg	4.0000 0.00 1.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1040 1.2388 1.3810 1.6877	0.2070 0.2738 0.3475 0.5208	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Leg	4.0000 0.00 1.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.1040 1.2388 1.3810 1.6877	0.2070 0.2738 0.3475 0.5208	0.01 0.02 0.03 0.05
DBCT108F1V92-1	A	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.6372 0.7401 0.8504 1.0932	0.6042 0.7050 0.8133 1.0519	0.03 0.04 0.04 0.07
DBCT108F1V92-1	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.6372 0.7401 0.8504 1.0932	0.6042 0.7050 0.8133 1.0519	0.03 0.04 0.04 0.07
DBCT108F1V92-1	C	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.6372 0.7401 0.8504 1.0932	0.6042 0.7050 0.8133 1.0519	0.03 0.04 0.04 0.07
RRUS 32	A	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice	2.8571 3.0830 3.3163 3.8052	1.7766 1.9677 2.1658 2.5829	0.06 0.08 0.10 0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
RRUS 32	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.8571 3.0830 3.3163 3.8052	1.7766 1.9677 2.1658 2.5829	0.06 0.08 0.10 0.16
RRUS 32	C	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.8571 3.0830 3.3163 3.8052	1.7766 1.9677 2.1658 2.5829	0.06 0.08 0.10 0.16
RADIO 8843	A	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5000 3.7426 3.9926 4.5148	2.3593 2.5658 2.7794 3.2370	0.09 0.11 0.15 0.22
RADIO 8843	B	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5000 3.7426 3.9926 4.5148	2.3593 2.5658 2.7794 3.2370	0.09 0.11 0.15 0.22
RADIO 8843	C	From Leg	4.0000 0.00 2.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.5000 3.7426 3.9926 4.5148	2.3593 2.5658 2.7794 3.2370	0.09 0.11 0.15 0.22
RRUS 11 B12	A	From Leg	4.0000 0.00 1.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.8333 3.0426 3.2593 3.7148	1.1821 1.3299 1.4848 1.8259	0.05 0.07 0.10 0.15
RRUS 11 B12	B	From Leg	4.0000 0.00 1.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.8333 3.0426 3.2593 3.7148	1.1821 1.3299 1.4848 1.8259	0.05 0.07 0.10 0.15
RRUS 11 B12	C	From Leg	4.0000 0.00 1.00	0.0000	53.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.8333 3.0426 3.2593 3.7148	1.1821 1.3299 1.4848 1.8259	0.05 0.07 0.10 0.15
***									
DB438-A	B	From Leg	4.0000 0.00 1.00	0.0000	44.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.6222 0.7302 0.8469 1.1062	0.6222 0.7302 0.8469 1.1062	0.01 0.01 0.02 0.05
Side Arm Mount [SO 701-1]	B	From Leg	2.0000 0.00 0.00	0.0000	44.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.8500 1.1400 1.4300 2.0100	1.6700 2.3400 3.0100 4.3500	0.07 0.08 0.09 0.12
***									
DB438-A	B	From Face	4.0000 0.00 0.00	1.0000	31.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.6222 0.7302 0.8469 1.1062	0.6222 0.7302 0.8469 1.1062	0.01 0.01 0.02 0.05
MYA1506K	B	From Face	0.0000 0.00 0.00	1.0000	31.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3125 0.4898 0.6745 1.0662	1.1029 1.7018 2.3081 3.5428	0.01 0.12 0.24 0.51
Side Arm Mount [SO 701-1]	B	From Face	2.0000 0.00	0.0000	31.0000	No Ice	0.8500 1.1400	1.6700 2.3400	0.07 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***			0.00			1/2" Ice 1" Ice 2" Ice	1.4300 2.0100	3.0100 4.3500	0.09 0.12

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service

Comb. No.	Description
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	60 - 36	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.58	-3.17	-0.75
			Max. Mx	8	-6.47	-155.33	0.13
			Max. My	14	-6.47	-0.78	-154.99
			Max. Vy	8	8.51	-155.33	0.13
			Max. Vx	14	8.55	-0.78	-154.99
			Max. Torque	5			-2.30
L2	36 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.99	-4.12	-0.09
			Max. Mx	8	-10.62	-515.35	0.63
			Max. My	14	-10.62	-0.75	-516.86
			Max. Vy	8	11.38	-515.35	0.63
			Max. Vx	14	11.45	-0.75	-516.86
			Max. Torque	17			2.51

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	18.99	-2.83	0.00
	Max. H_x	21	7.97	11.37	-0.01
	Max. H_z	2	10.62	-0.01	11.44
	Max. M_x	2	516.49	-0.01	11.44
	Max. M_z	8	515.35	-11.37	0.01
	Max. Torsion	17	2.51	5.69	-9.91
	Min. Vert	23	7.97	9.85	5.72
	Min. H_x	8	10.62	-11.37	0.01
	Min. H_z	14	10.62	0.01	-11.44
	Min. M_x	14	-516.86	0.01	-11.44
	Min. M_z	20	-512.21	11.37	-0.01
	Min. Torsion	5	-2.51	-5.69	9.91

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	8.85	0.00	0.00	0.16	-1.29	-0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	10.62	0.01	-11.44	-516.49	-2.39	2.48
0.9 Dead+1.0 Wind 0 deg - No Ice	7.97	0.01	-11.44	-515.47	-1.99	2.49
1.2 Dead+1.0 Wind 30 deg - No Ice	10.62	5.69	-9.91	-447.67	-259.17	2.50
0.9 Dead+1.0 Wind 30 deg - No Ice	7.97	5.69	-9.91	-446.80	-258.24	2.51
1.2 Dead+1.0 Wind 60 deg - No Ice	10.62	9.85	-5.72	-258.86	-446.92	1.85
0.9 Dead+1.0 Wind 60 deg - No Ice	7.97	9.85	-5.72	-258.37	-445.61	1.86
1.2 Dead+1.0 Wind 90 deg - No Ice	10.62	11.37	-0.01	-0.63	-515.35	0.71

Load Combination	*Vertical*	*Shear$_x$*	*Shear$_z$*	*Overturning Moment, M$_x$*	*Overturning Moment, M$_z$*	*Torque*
	K	*K*	*K*	*kip-ft*	*kip-ft*	*kip-ft*
0.9 Dead+1.0 Wind 90 deg - No Ice	7.97	11.37	-0.01	-0.68	-513.89	0.71
1.2 Dead+1.0 Wind 120 deg - No Ice	10.62	9.85	5.72	257.82	-446.10	-0.63
0.9 Dead+1.0 Wind 120 deg - No Ice	7.97	9.85	5.72	257.24	-444.79	-0.63
1.2 Dead+1.0 Wind 150 deg - No Ice	10.62	5.68	9.91	447.23	-257.75	-1.80
0.9 Dead+1.0 Wind 150 deg - No Ice	7.97	5.68	9.91	446.27	-256.83	-1.80
1.2 Dead+1.0 Wind 180 deg - No Ice	10.62	-0.01	11.44	516.86	-0.75	-2.48
0.9 Dead+1.0 Wind 180 deg - No Ice	7.97	-0.01	11.44	515.75	-0.36	-2.49
1.2 Dead+1.0 Wind 210 deg - No Ice	10.62	-5.69	9.91	448.05	256.03	-2.50
0.9 Dead+1.0 Wind 210 deg - No Ice	7.97	-5.69	9.91	447.08	255.89	-2.51
1.2 Dead+1.0 Wind 240 deg - No Ice	10.62	-9.85	5.72	259.23	443.78	-1.85
0.9 Dead+1.0 Wind 240 deg - No Ice	7.97	-9.85	5.72	258.65	443.26	-1.86
1.2 Dead+1.0 Wind 270 deg - No Ice	10.62	-11.37	0.01	1.01	512.21	-0.71
0.9 Dead+1.0 Wind 270 deg - No Ice	7.97	-11.37	0.01	0.96	511.55	-0.71
1.2 Dead+1.0 Wind 300 deg - No Ice	10.62	-9.85	-5.72	-257.44	442.96	0.63
0.9 Dead+1.0 Wind 300 deg - No Ice	7.97	-9.85	-5.72	-256.96	442.45	0.63
1.2 Dead+1.0 Wind 330 deg - No Ice	10.62	-5.68	-9.91	-446.86	254.61	1.80
0.9 Dead+1.0 Wind 330 deg - No Ice	7.97	-5.68	-9.91	-445.98	254.48	1.80
1.2 Dead+1.0 Ice	18.99	0.00	0.00	0.09	-4.12	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	18.99	0.00	-2.86	-127.79	-4.41	0.89
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	18.99	1.42	-2.48	-110.80	-67.82	0.93
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	18.99	2.46	-1.43	-64.10	-114.16	0.72
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	18.99	2.83	-0.00	-0.19	-131.02	0.31
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	18.99	2.45	1.43	63.79	-113.88	-0.17
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	18.99	1.42	2.47	110.70	-67.33	-0.61
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	18.99	-0.00	2.86	127.97	-3.85	-0.89
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	18.99	-1.42	2.48	110.98	59.55	-0.93
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	18.99	-2.46	1.43	64.27	105.89	-0.72
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	18.99	-2.83	0.00	0.37	122.75	-0.31
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	18.99	-2.45	-1.43	-63.61	105.61	0.17
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	18.99	-1.42	-2.47	-110.52	59.06	0.61
Dead+Wind 0 deg - Service	8.85	0.00	-2.25	-101.29	-1.47	0.49
Dead+Wind 30 deg - Service	8.85	1.12	-1.95	-87.78	-51.88	0.49
Dead+Wind 60 deg - Service	8.85	1.94	-1.13	-50.70	-88.75	0.36
Dead+Wind 90 deg - Service	8.85	2.24	-0.00	-0.00	-102.18	0.14
Dead+Wind 120 deg - Service	8.85	1.94	1.12	50.74	-88.58	-0.12
Dead+Wind 150 deg - Service	8.85	1.12	1.95	87.93	-51.60	-0.35
Dead+Wind 180 deg - Service	8.85	-0.00	2.25	101.60	-1.15	-0.49

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - Service	8.85	-1.12	1.95	88.09	49.27	-0.49
Dead+Wind 240 deg - Service	8.85	-1.94	1.13	51.02	86.13	-0.36
Dead+Wind 270 deg - Service	8.85	-2.24	0.00	0.32	99.57	-0.14
Dead+Wind 300 deg - Service	8.85	-1.94	-1.12	-50.43	85.97	0.12
Dead+Wind 330 deg - Service	8.85	-1.12	-1.95	-87.62	48.99	0.35

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-8.85	0.00	0.00	8.85	0.00	0.000%
2	0.01	-10.62	-11.44	-0.01	10.62	11.44	0.000%
3	0.01	-7.97	-11.44	-0.01	7.97	11.44	0.000%
4	5.69	-10.62	-9.91	-5.69	10.62	9.91	0.000%
5	5.69	-7.97	-9.91	-5.69	7.97	9.91	0.000%
6	9.85	-10.62	-5.72	-9.85	10.62	5.72	0.000%
7	9.85	-7.97	-5.72	-9.85	7.97	5.72	0.000%
8	11.37	-10.62	-0.01	-11.37	10.62	0.01	0.000%
9	11.37	-7.97	-0.01	-11.37	7.97	0.01	0.000%
10	9.85	-10.62	5.72	-9.85	10.62	-5.72	0.000%
11	9.85	-7.97	5.72	-9.85	7.97	-5.72	0.000%
12	5.68	-10.62	9.91	-5.68	10.62	-9.91	0.000%
13	5.68	-7.97	9.91	-5.68	7.97	-9.91	0.000%
14	-0.01	-10.62	11.44	0.01	10.62	-11.44	0.000%
15	-0.01	-7.97	11.44	0.01	7.97	-11.44	0.000%
16	-5.69	-10.62	9.91	5.69	10.62	-9.91	0.000%
17	-5.69	-7.97	9.91	5.69	7.97	-9.91	0.000%
18	-9.85	-10.62	5.72	9.85	10.62	-5.72	0.000%
19	-9.85	-7.97	5.72	9.85	7.97	-5.72	0.000%
20	-11.37	-10.62	0.01	11.37	10.62	-0.01	0.000%
21	-11.37	-7.97	0.01	11.37	7.97	-0.01	0.000%
22	-9.85	-10.62	-5.72	9.85	10.62	5.72	0.000%
23	-9.85	-7.97	-5.72	9.85	7.97	5.72	0.000%
24	-5.68	-10.62	-9.91	5.68	10.62	9.91	0.000%
25	-5.68	-7.97	-9.91	5.68	7.97	9.91	0.000%
26	0.00	-18.99	0.00	0.00	18.99	0.00	0.000%
27	0.00	-18.99	-2.86	-0.00	18.99	2.86	0.000%
28	1.42	-18.99	-2.48	-1.42	18.99	2.48	0.000%
29	2.46	-18.99	-1.43	-2.46	18.99	1.43	0.000%
30	2.83	-18.99	-0.00	-2.83	18.99	0.00	0.000%
31	2.45	-18.99	1.43	-2.45	18.99	-1.43	0.000%
32	1.42	-18.99	2.47	-1.42	18.99	-2.47	0.000%
33	-0.00	-18.99	2.86	0.00	18.99	-2.86	0.000%
34	-1.42	-18.99	2.48	1.42	18.99	-2.48	0.000%
35	-2.46	-18.99	1.43	2.46	18.99	-1.43	0.000%
36	-2.83	-18.99	0.00	2.83	18.99	-0.00	0.000%
37	-2.45	-18.99	-1.43	2.45	18.99	1.43	0.000%
38	-1.42	-18.99	-2.47	1.42	18.99	2.47	0.000%
39	0.00	-8.85	-2.25	-0.00	8.85	2.25	0.000%
40	1.12	-8.85	-1.95	-1.12	8.85	1.95	0.000%
41	1.94	-8.85	-1.13	-1.94	8.85	1.13	0.000%
42	2.24	-8.85	-0.00	-2.24	8.85	0.00	0.000%
43	1.94	-8.85	1.12	-1.94	8.85	-1.12	0.000%
44	1.12	-8.85	1.95	-1.12	8.85	-1.95	0.000%
45	-0.00	-8.85	2.25	0.00	8.85	-2.25	0.000%
46	-1.12	-8.85	1.95	1.12	8.85	-1.95	0.000%
47	-1.94	-8.85	1.13	1.94	8.85	-1.13	0.000%
48	-2.24	-8.85	0.00	2.24	8.85	-0.00	0.000%
49	-1.94	-8.85	-1.12	1.94	8.85	1.12	0.000%
50	-1.12	-8.85	-1.95	1.12	8.85	1.95	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00008469
3	Yes	4	0.00000001	0.00005225
4	Yes	4	0.00000001	0.00012331
5	Yes	4	0.00000001	0.00007605
6	Yes	4	0.00000001	0.00006392
7	Yes	4	0.00000001	0.00003933
8	Yes	4	0.00000001	0.00002901
9	Yes	4	0.00000001	0.00001787
10	Yes	4	0.00000001	0.00004720
11	Yes	4	0.00000001	0.00002835
12	Yes	4	0.00000001	0.00009656
13	Yes	4	0.00000001	0.00005930
14	Yes	4	0.00000001	0.00008433
15	Yes	4	0.00000001	0.00005201
16	Yes	4	0.00000001	0.00007834
17	Yes	4	0.00000001	0.00004858
18	Yes	4	0.00000001	0.00010318
19	Yes	4	0.00000001	0.00006369
20	Yes	4	0.00000001	0.00002921
21	Yes	4	0.00000001	0.00001804
22	Yes	4	0.00000001	0.00006156
23	Yes	4	0.00000001	0.00003759
24	Yes	4	0.00000001	0.00005654
25	Yes	4	0.00000001	0.00003479
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00002380
28	Yes	4	0.00000001	0.00002730
29	Yes	4	0.00000001	0.00002029
30	Yes	4	0.00000001	0.00001105
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00001828
33	Yes	4	0.00000001	0.00002398
34	Yes	4	0.00000001	0.00002378
35	Yes	4	0.00000001	0.00002064
36	Yes	4	0.00000001	0.00000995
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00001491
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	60 - 36	1.754	42	0.2165	0.0034
L2	36 - 0	0.729	42	0.1750	0.0018

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
60.0000	Lightning Rod 5/8"x8'	42	1.754	0.2165	0.0034	51284
58.0000	BMR12	42	1.660	0.2143	0.0033	51284
53.0000	Platform Mount [LP 403-1]	42	1.426	0.2084	0.0029	36631
44.0000	DB438-A	42	1.031	0.1944	0.0023	16026
31.0000	DB438-A	42	0.574	0.1583	0.0015	12407

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	60 - 36	8.808	4	1.0801	0.0174
L2	36 - 0	3.676	4	0.8803	0.0090

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
60.0000	Lightning Rod 5/8"x8'	4	8.808	1.0801	0.0174	10307
58.0000	BMR12	4	8.336	1.0698	0.0167	10307
53.0000	Platform Mount [LP 403-1]	4	7.168	1.0423	0.0148	7362
44.0000	DB438-A	4	5.188	0.9754	0.0116	3220
31.0000	DB438-A	4	2.897	0.7969	0.0075	2493

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	f P_n K	Ratio $\frac{P_u}{f P_n}$
L1	60 - 36 (1)	TP32.125x27.375x0.1875	24.0000	0.0000	0.0	19.0068	-6.47	1078.78	0.006
L2	36 - 0 (2)	TP37.875x32.125x0.2188	36.0000	0.0000	0.0	26.1452	-10.62	1476.13	0.007

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	f M_{nx} kip-ft	Ratio $\frac{M_{ux}}{f M_{nx}}$	M_{uy} kip-ft	f M_{ny} kip-ft	Ratio $\frac{M_{uy}}{f M_{ny}}$
L1	60 - 36 (1)	TP32.125x27.375x0.1875	155.55	709.88	0.219	0.00	709.88	0.000
L2	36 - 0 (2)	TP37.875x32.125x0.2188	517.28	1145.35	0.452	0.00	1145.35	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	60 - 36 (1)	TP32.125x27.375x0.1875	8.55	307.91	0.028	1.85	851.12	0.002
L2	36 - 0 (2)	TP37.875x32.125x0.2188	11.43	423.55	0.027	2.50	1380.58	0.002

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	60 - 36 (1)	0.006	0.219	0.000	0.028	0.002	0.226 ✔	1.050	4.8.2 ✔
L2	36 - 0 (2)	0.007	0.452	0.000	0.027	0.002	0.460 ✔	1.050	4.8.2 ✔

Section Capacity Table

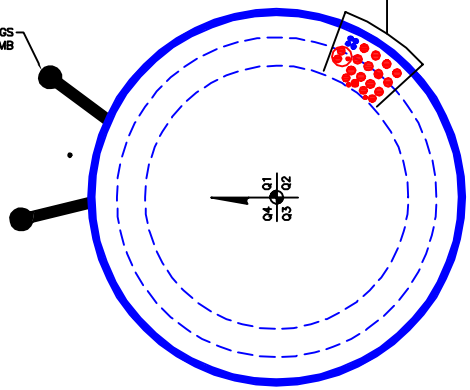
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	60 - 36	Pole	TP32.125x27.375x0.1875	1	-6.47	1132.72	21.5	Pass
L2	36 - 0	Pole	TP37.875x32.125x0.2188	2	-10.62	1549.94	43.8	Pass
							Summary	
						Pole (L2)	43.8	Pass
						RATING =	**43.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

(PROPOSED EQUIPMENT CONFIGURATION)
(3) 3/8" TO 53 FT LEVEL
(6) 3/4" TO 53 FT LEVEL
(12) 7/8" TO 53 FT LEVEL
(1) 2" CONDUIT TO 53 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 1/2" TO 31 FT LEVEL
(1) 1/2" TO 44 FT LEVEL
(1) 1/2" TO 58 FT LEVEL

CLIMBING PEGS
W/ SAFETY CLIMB



BUSINESS UNIT: 842860 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

A	24/08/15	AS-BUILT INFORMATION ADDED PER WORK ORDER 1179467
B	14/1/2016	UPDATED PER WORK ORDER 1412366
C	06/06/17	UPDATED PER WORK ORDER 1545330
D	10/04/18	UPDATED PER WORK ORDER 1579627
E	06/06/18	UPDATED PER WORK ORDER 1578747

DRAWN BY: RJC
CHECKED BY:
DRAWING DATE: 15/08/14

SITE NUMBER:
SITE NAME:

SITE NAME

COLCHESTER NORTH CENTRAL

BUSINESS UNIT NUMBER

842860

SITE ADDRESS

315 OLD HARTFORD ROAD
COLCHESTER, CT 06415
NEW LONDON COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING	1" = 1'-0"	1

PLOT DATE: 1/14/2016 FILE NAME: 842860_BASELEVEL.DWG

APPENDIX C

ADDITIONAL CALCULATIONS

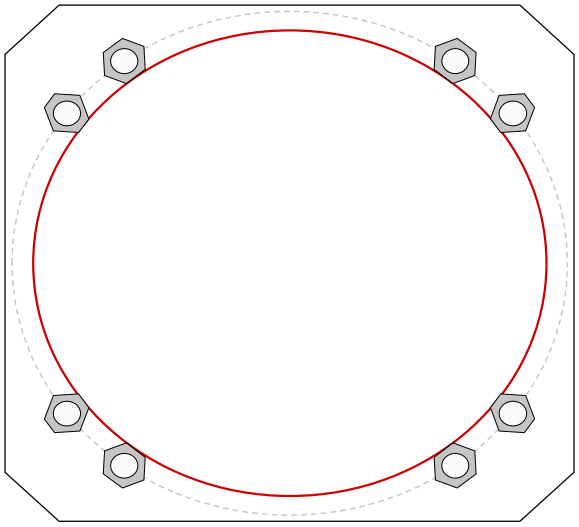
Monopole Base Plate Connection

Site Info	
BU #	842860
Site Name	COLCHESTER NORTH CENTRAL
Order #	472822 Rev.0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.25

Applied Loads	
Moment (kip-ft)	517.28
Axial Force (kips)	10.62
Shear Force (kips)	11.43

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(8) 2" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 41" BC

Base Plate Data

42" OD x 2.5" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

37.875" x 0.22" 18-sided pole (A572-60; Fy=60 ksi, Fu=75 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_c = 76.95	ϕPn_c = 187.5	Stress Rating
Vu = 1.43	ϕVn = 56.25	39.1%
Mu = n/a	ϕMn = n/a	Pass

Base Plate Summary

Max Stress (ksi):	6.08	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	12.9%	Pass

Drilled Pier Foundation

BU # :	842860
Site Name:	COLCHESTER NORTI
Order Number:	472822 Rev.0

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	**Comp.**	**Uplift**
Moment (kip-ft)	517.28	
Axial Force (kips)	10.62	
Shear Force (kips)	11.43	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	16.83	ft
Ext. Above Grade	0.17	ft
Pier Section 1		
From 0.17' above grade to 16.83' below grade		
Pier Diameter	6.5	ft
Rebar Quantity	16	
Rebar Size	12	
Clear Cover to Ties	8.625	in
Tie Size	3	

Analysis Results		
Soil Lateral Capacity	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.26	-
Soil Safety Factor	5.55	-
Max Moment (kip-ft)	590.13	-
Rating*	*22.8%*	-
Soil Vertical Capacity	*Compression*	*Uplift*
Skin Friction (kips)	1304.49	-
End Bearing (kips)	597.30	-
Weight of Concrete (kips)	101.54	-
Total Capacity (kips)	1901.79	-
Axial (kips)	112.16	-
Rating*	*5.6%*	-
Reinforced Concrete Capacity	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.32	-
Critical Moment (kip-ft)	590.11	-
Critical Moment Capacity	3509.01	-
Rating*	*16.0%*	-

Soil Interaction Rating*	**22.8%**
Structural Foundation Rating*	**16.0%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑

Soil Profile

Groundwater Depth	n/a	ft	# of Layers: 2

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	5	5	165	150			0.000	0.000					Cohesionless
2	5	16.83	11.83	165	150		32	0.000	0.000	7.20	7.20	24		Cohesionless

EXHIBIT 4

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5346

FA#: 10070973

Colchester North Central
315 Old Hartford Road
Colchester, CT 06415

January 3, 2019

Centerline Communications Project Number: 950006-164

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**36.50 %**

January 3, 2019

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5346 – Colchester North Central**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **315 Old Hartford Road, Colchester, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **315 Old Hartford Road, Colchester, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
LTE	700 MHz (Band 14)	2	40
LTE	850 MHz	2	40
LTE	1900 MHz (PCS)	4	40
5G	850 MHz	2	25
LTE	2300 MHz (WCS)	4	30
LTE	700 MHz	2	40
LTE	2100 MHz (AWS)	4	30

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave 7770	57
A	2	CCI TPA-65R-LCUUUU-H8	57
A	3	CCI HPA-65R-BUU-H8	57
B	1	Powerwave 7770	57
B	2	CCI TPA-65R-LCUUUU-H8	57
B	3	CCI HPA-65R-BUU-H8	57
C	1	Powerwave 7770	57
C	2	CCI TPA-65R-LCUUUU-H8	57
C	3	CCI HPA-65R-BUU-H8	57

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Powerwave 7770	850 MHz	11.4	2	60	828.23	2.02
Antenna A2	CCI TPA-65R-LCUUUU-H8	700 MHz (Band 14) / 850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)	12.95 / 13.45 / 13.75 / 14.45	12	490	11,592.50	21.55
Antenna A3	CCI HPA-65R-BUU-H8	700 MHz / 2100 MHz (AWS)	13.15 / 15.25 / 0 / 0	6	200	5,671.89	10.45
						Sector A Composite MPE%	**34.01**
Antenna B1	Powerwave 7770	850 MHz	11.4	2	60	828.23	2.02
Antenna B2	CCI TPA-65R-LCUUUU-H8	700 MHz (Band 14) / 850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)	12.95 / 13.45 / 13.75 / 14.45	12	490	11,592.50	21.55
Antenna B3	CCI HPA-65R-BUU-H8	700 MHz / 2100 MHz (AWS)	13.15 / 15.25 / 0 / 0	6	200	5,671.89	10.45
						Sector B Composite MPE%	**34.01**
Antenna C1	Powerwave 7770	850 MHz	11.4	2	60	828.23	2.02
Antenna C2	CCI TPA-65R-LCUUUU-H8	700 MHz (Band 14) / 850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)	12.95 / 13.45 / 13.75 / 14.45	12	490	11,592.50	21.55
Antenna C3	CCI HPA-65R-BUU-H8	700 MHz / 2100 MHz (AWS)	13.15 / 15.25 / 0 / 0	6	200	5,671.89	10.45
						Sector C Composite MPE%	**34.01**

Table 3: AT&T Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Per Sector Value	**34.01 %**
Ken-Tronics	2.49 %
Site Total MPE %:	**36.50 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	34.01 %
AT&T Sector B Total:	34.01 %
AT&T Sector C Total:	34.01 %
Site Total:	36.50 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

AT&T _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	57	11.45	850 MHz	567	2.02%
AT&T 700 MHz LTE	2	788.97	57	21.81	700 MHz	467	4.67%
AT&T 850 MHz LTE	2	885.24	57	24.47	850 MHz	567	4.32%
AT&T 1900 MHz (PCS) LTE	4	948.55	57	52.44	1900 MHz (PCS)	1000	5.24%
AT&T 850 MHz 5G	2	553.27	57	15.29	850 MHz	567	2.70%
AT&T 2300 MHz (WCS) LTE	4	835.84	57	46.21	2300 MHz (WCS)	1000	4.62%
AT&T 700 MHz LTE	2	826.15	57	22.84	700 MHz	467	4.89%
AT&T 2100 MHz (AWS) LTE	4	1,004.90	57	55.56	2100 MHz (AWS)	1000	5.56%
						Total:	**34.01%**

Table 6: AT&T Maximum Sector MPE Power Values

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	34.01 %
Sector B:	34.01 %
Sector C:	34.01 %
AT&T Maximum Total (per sector):	34.01 %
Site Total:	36.50 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **36.50 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767

EXHIBIT 5

Engineers Planners Surveyors Landscape Architects Environmental Scientists

MASER CONSULTING
— CONNECTICUT —

Antenna Mount Modification Design & Analysis

FOR

CT5346 – Colchester North Central

FA # 10070973
315 Old Hartford Road
Colchester, CT 06415
New London County

3C – MRCTB032309
4C - MRCTB032279
5C - MRCTB032230
6C - MRCTB032273
Retrofit – MRCTB032284

Mount Utilization (Without Modification): 150.7%
Mount Utilization (With Modification): 82.2%
Cost Estimate: $2,000-$3,000

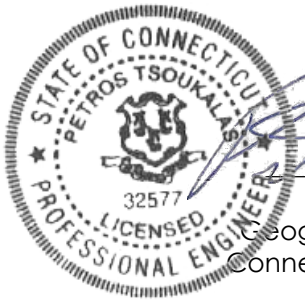
October 18, 2018

Prepared For

AT&T
550 Cochituate Road
Framingham, MA 01701

Prepared By

Maser Consulting Connecticut
331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
T: 732.383.1950



Petros E. Tsoukalas, P.E.
Geographic Discipline Leader
Connecticut License No. 32557

Objective:

The objective of this report is to determine the capacity of the existing antenna support mount with the proposed modification at the subject facility for the final wireless telecommunications configuration, per the applicable codes and standards.

Introduction:

Maser Consulting Connecticut has performed limited field observations on June 13, 2018 to verify the existing condition of the structure and to locate and quantify the existing wireless appurtenances where possible, from ground level. Maser Consulting Connecticut has reviewed the following documents in completing this report:

• RFDS 2325793 provided by Empire, dated August 13, 2018.
• Mount Mapping provided by provided by Empire.
• As-Built Construction Drawings provided by Empire, dated May 12, 2016.
• Previous Construction Drawings prepared by Hudson Design Group LLC, Rev 1, dated November 12, 2008.

The existing and proposed **AT&T** equipment is to be supported on the existing antenna support platform mount with the proposed modification constructed of structural steel antenna support pipes supported by pipes, angles and tubes at a centerline of approximately 57'-0" above ground level. This report is based only upon this information.

Codes, Standards and Loading:

Maser Consulting Connecticut utilized the following codes and standards:

- 2016 Connecticut State Building Code, Incorporating The 2012 IBC
- Structural Standards for Antenna Supporting Structures and Antennas ANSI/TIA-222-G
    - Ultimate Wind Speed – 130 mph
    - Nominal Wind Speed – 101 mph
    - Exposure Category – C
    - Structural Class – II
    - Topographic Category – 1
    - Ice Wind – 50 mph
    - Ice Thickness – 0.75"
- Specification for Structural Steel Buildings ANSI/AISC 360-05, American Institute of Steel Construction (AISC)

Loading used in this analysis is found in **Appendix A** of this report.

Analysis Approach & Assumptions:

The analysis approach used in this structural analysis is based on the premise that if the existing antenna support platform mount with the proposed modification is structurally adequate to support the proposed and existing equipment per the aforementioned codes and standards, or if the increase in the forces in the structure is deemed to be negligible or acceptable, then the proposed equipment can be installed as intended.

The existing antenna support mount with the proposed modification has been modeled in RISA-3D, a comprehensive structural analysis program, as the controlling condition. The program performs design checks of structures under user specified loads. The user specified loads have been calculated separately based on the requirements of the above referenced codes. The program performs an analysis based on the steel code to determine the adequacy of the members, and produces the reactions at the connection points of the mounts to the existing structure.

General Site Design Assumption:

- All engineering services are performed on the basis that the information used is current and correct.
- It is assumed that the telecommunication equipment supports, antenna supports, and existing structure have been designed by a registered licensed professional engineer for the existing loads acting on the structure, as required by all applicable codes, prior to the proposed modifications listed within this report, if any.
- It is assumed that information provided by the client regarding the structure itself, the antenna models, feed lines, and other relevant information is current and correct.
- It is the responsibility of the client to ensure that the information provided to Maser Consulting Connecticut and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that the original design, material production, fabrication, and erection of the existing structure was performed in accordance with accepted industry design standards and in accordance with all applicable codes. Further, it is assumed that the existing structure and appurtenances have been properly maintained in accordance with all applicable codes and manufacturer's specifications and no structural defects and/or deterioration to the structural members has occurred.
- It is assumed all other existing appurtenances, antennas, cables, etc. belonging to others have been installed and supported per code and per specifications so as not to damage any existing structural support members, and that any contributing loads from adjacent equipment has been taken into consideration for their design.
- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Maser Consulting Connecticut is not responsible for the conclusion, opinions, and recommendations made by others based on the information we supply.

Site Specific Assumptions and Design Parameters:

The following assumptions have been utilized in this report:

- *The existing platform mount is a SitePro1 Quick-Pick Full Walkway Monopole Platform (Part Number: QMSP-384)*
- ***Handrail Kit (SitePro1 P/N: HRK14-U) is installed at 48" vertical distance from the bottom horizontal face members.***
- *Structural Steel Tubes are constructed of A500 Grade B Steel*
- *Structural Steel Pipes are constructed of A53 Grade B Steel*
- *Structural Steel Angles are constructed of A36 Steel*

The following design parameters have been utilized in this report:

- The proposed antennas in position 3 in **all** sectors shall replace the existing antennas, on three (3) proposed 10'-0" long 2.5 STD pipe masts, which shall be attached to the horizontal mount face tube via crossover plates.
- The proposed RRUS 8843 B66A B2 and RRUS-32 shall be installed back to back, on three (3) proposed RRU Mount Brackets (Ericsson P/N: SXK1250461/1 B2B) which shall be attached to the proposed antenna pipes in **position 3** in all sectors.
- The proposed RRUS 4478 B14 and RRUS 4478 B5 shall be installed on the existing Unistrut frames, at the ground level.
- The proposed DC-6's shall be installed on two (2) proposed 16" long 2.0 STD pipes, which shall be attached to the existing standoff tubes, via a 10"x10"x1/2" galvanized plates, in the Alpha & Beta sectors.
- The proposed DBCT108F1V92-1 Diplexers shall be installed on the proposed antenna pipes in **position 3** in all sectors.

The proposed modification consists of the following:

- *Install one (1) proposed Platform Reinforcement Kickers Kit (SitePro1 P/N: PRK-1245L), which shall be attached to the existing standoff HSS at 1'-6" from the corner edge, and shall be installed 4 ft below the existing platform's collar attachment to monopole.*

Please refer to the final drawings prepared by Maser Consulting Connecticut for more details.

Calculations:

The calculations are found in Appendix A of this report.

Conclusion:

Maser Consulting Connecticut has determined the existing antenna support platform mount with the proposed modification has **ADEQUATE** structural capacity to support the existing and proposed loadings. The existing antenna support mount with the proposed modification has been determined to be stressed to a maximum of **82.2%** of its structural capacity with the maximum usage occurring at the existing grating support angles. Therefore, the proposed **AT&T** installation **CAN** be installed as intended, **once the proposed modification is installed as intended.**

The conclusions reached by Maser Consulting Connecticut in this evaluation are only applicable for the existing and proposed structural members supporting the proposed **AT&T** telecommunications installation described herein. Further, no structural qualifications are made or implied by this document for the existing structure. The existing mount was checked up to, and including, the bolts that attach to the mount's collar. However, no structural qualifications are made or implied by this document for the existing mount collar.

Maser Consulting Connecticut reserves the right to amend this report if additional information about the existing members is provided. The conclusions reached by Maser Consulting Connecticut in this report are only valid for the appurtenances listed in this report. Any change to the installation will require a revision to this structural analysis.

We appreciate the opportunity to be of service on this project. If you should have any questions or require any additional information, please do not hesitate to call our office.

Sincerely,

Maser Consulting Connecticut

Petros E. Tsoukalas, P.E.
Geographic Discipline Leader

Clara Basanti
Engineer

MASER CONSULTING
— CONNECTICUT—

APPENDIX A

Client:	ATT	Computed By:	CB
Site Name:	CTL05436 - Colchester North Central	Date:	10/18/2018
Project No.	18963026A	Verified By:	SMS
Title:	Antenna Mount Modification Design & Analysis	Page:	1

Version 4.0

LOADING SUMMARY

Quantity	Manufacturer	Antenna/ Appurtenance	Status	Sector	
3	*POWERWAVE*	*7770*	*Existing*	*Alpha, Beta, & Gamma*	
3	*CCI*	*HPA-65R-BUU-H8*	*Existing*	*Alpha, Beta, & Gamma*	
3	**CCI**	**TPA-65R-LCUUUU-H8**	**Proposed**	**Alpha, Beta, & Gamma**	
3	ERICSSON	RRUS 11	Existing	Alpha, Beta, & Gamma	
2	**ERICSSON**	**RRUS 4478 B14**	**Proposed**	**Alpha & Beta**	(At Grade)
3	**ERICSSON**	**RRUS 4478 B5**	**Proposed**	**Alpha, Beta, & Gamma**	(At Grade)
3	**ERICSSON**	**RRUS 32**	**Proposed**	**Alpha, Beta, & Gamma**	
3	**ERICSSON**	**RRUS 8843 B2 B66A**	**Proposed**	**Alpha, Beta, & Gamma**	
6	POWERWAVE	LGP 21401 TMA	Existing	Alpha, Beta, & Gamma	
3	**RAYCAP**	**DC6-48-60-18-8C**	**Existing/Proposed**	**Alpha, Beta, & Gamma**	
6	**KAELUS**	**DBCT108F1V92-1 Low-Band Combiner**	**Proposed**	**Alpha, Beta, & Gamma**	

I. DESIGN INPUTS

Calculations for gravity and lateral loading on equipment and support mounts are determined as per the ANSI/TIA-222-G Code, Addendum 2

Wind Load Inputs Parameters

				Reference	Equation
Antenna Centerline	z	57	ft		
Ultimate Wind Speed	V_U	130	mph		
Nominal Wind Speed (3 sec. Gust):	V	101	mph	Ref. 1, Eqn. 16-33	
Nominal Wind Speed with Ice (3 sec. gust):	V_i	50.0	mph	(Figure a5-2a, p. 233)	
Maintenance Wind Speed:	V_m	30.0	mph		
Service Wind Speed:	V_s	60.0	mph	(Figure a5-2a, p. 233)	
Design Ice Thickness:	t_i	0.75	in	(Figure A1-2a, p. 233)	
Exposure Category:		C		Ref. 3, Section 2.6.5.1	
Structure Class:		II		Ref. 3, Table 2-1	
Gust Effect Factor:	G_h	1.10		Ref. 3, Section 2.6.7	
Wind Directionality Factor:	K_d	0.95		Ref. 3, Table 2-2	
Topographic Category:		1		Ref. 3, Section 2.6.6.2	

Wind Load Coefficients

Importance Factors:

			Reference
Non-Iced:	I	1	Ref. 3, Table 2-3
Iced:	I_{ice}	1	(Table 2-3, P. 39)

Exposure Category Coefficients:

				Reference	Equation
3-s Gust-Speed Power Law Exponent:	α	9.5		Ref. 3, Table 2-4	
Nominal Height of the Atmospheric Boundary Layer:	Z_g	900	ft	Ref. 3, Table 2-4	
Min. Value for k_z:	Kz_{min}	0.85		Ref. 3, Table 2-4	
Terrain Constant:	K_e	1.00		Ref. 3, Table 2-4	
Velocity Pressure Exposure Coefficient:	K_z	1.124		Ref. 3, Section 2.6.5.2	$=2.01 \cdot (z/z_g)^{2/\alpha}$

Topographic Category Coefficients:

			Reference	Equation
Topographic Constant:	K_t	N/A	Ref. 3, Table 2-5	
Height Attenuation Factor:	f	N/A	Ref. 3, Table 2-5	
Height Reduction Factor:	K_h	N/A	Ref. 3, Section 2.6.6.4	$=e^{(f \cdot z/H)}$
Topographic Factor:	K_{zt}	1.00	Ref.3, Section 2.6.6.4	$=[1+(K_e \cdot K_t/K_h)]^2$

Ice Accumulation:

				Reference	Equation
Ice Velocity Pressure Exposure Coefficient:	K_{iz}	1.06			$=(z/33)^{0.10}$
Factored Ice Thickness:	t_{iz}	1.58	in	(Section 2.6.8, p. 16)	$=2.0 \cdot t_i \cdot I \cdot K_{iz} \cdot K_{zt}$
Ice Density:	ρ_i	56.00	pcf		

Design Wind Pressures:

				Reference	Equation
Velocity Pressure:	q_z	27.73	psf	Ref. 3, Section 2.6.9.6	$=0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 \cdot I$
Velocity Pressure (With Ice):	q_{zi}	6.84	psf	(Section 2.6.9.6, P. 25)	$=.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V_i^2 \cdot I$
Velocity Pressure (Maintenance):	q_{zm}	2.46	psf	(Section 2.6.9.6, P. 25)	$=.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V_m^2 \cdot I$
Velocity Pressure (Service):	q_{zs}	9.84	psf	(Section 2.6.9.6, P. 25)	$=.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V_i^2 \cdot I$

II. CALCULATIONS

- ***Wind Load on Appurtenances***

Dimensions and Force Coefficients

Antenna/ Appurtenance	Non-Iced Condition								Iced Condition							
	Mounting Pipe			Equipment			Force Coefficient		Mounting Pipe			Equipment			Force Coefficient	
	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	$C_{a\ Front}$	$C_{a\ Side}$	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	$C_{a\ Front}$	$C_{a\ Side}$
7770	72.0	2.375	1.200	55.00	11.00	5.00	1.31	1.53	75.2	5.5	0.946	58.17	14.17	8.17	1.27	1.40
HPA-65R-BUU-H8	108.0	2.375	1.200	92.80	14.40	7.30	1.38	1.59	111.2	5.5	1.090	95.97	17.57	10.47	1.33	1.47
TPA-65R-LCUUUU-H8	120.0	2.875	1.200	96.00	14.40	8.60	1.39	1.54	123.2	6.0	1.097	99.17	17.57	11.77	1.34	1.45
RRUS 11	0.0	0.000	0.000	19.70	17.00	7.20	1.20	1.21	0.0	0.0	0.000	22.87	20.17	10.37	1.20	1.20
RRUS 32	0.0	0.000	0.000	27.20	12.00	7.00	1.20	1.26	0.0	0.0	0.000	30.37	15.17	10.17	1.20	1.22
RRUS 8843 B2 B66A	0.0	0.000	0.000	14.90	13.20	10.90	1.20	1.20	0.0	0.0	0.000	18.07	16.37	14.07	1.20	1.20
LGP 21401 TMA	0.0	0.000	0.000	13.80	14.40	3.70	1.20	1.25	0.0	0.0	0.000	16.97	17.57	6.87	1.20	1.20
DC6-48-60-18-8C	16.0	2.375	0.794	31.40	10.20	10.20	0.71	0.71	19.2	5.5	0.721	34.57	13.37	13.37	0.70	0.70
DBCT108F1V92-1 Low-Band Combiner	0.0	0.000	0.000	8.00	6.20	6.50	1.20	1.20	0.0	0.0	0.000	11.17	9.37	9.67	1.20	1.20

Antenna/ Appurtenance	# of Brackets	Non-Iced Condition			Iced Condition			Maintenance Condition		
		Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)		
		F_N	F_T		F_N	F_T		F_N	F_T	
7770	2	89.1	66.4	**17.5**	30.3	27.7	**64.1**	7.9	5.9	
HPA-65R-BUU-H8	2	199.2	146.7	**32.8**	61.3	56.2	**137.2**	17.7	13.0	
TPA-65R-LCUUUU-H8	2	211.5	178.4	**43.8**	65.5	65.4	**146.8**	18.8	15.8	
RRUS 11	1	85.1	36.4	**55.7**	28.9	14.9	**73.9**	7.6	3.2	(RRUS 11 is partially shielded by antenna from side wind)
RRUS 32	1	83.0	50.9	**52.9**	28.9	19.7	**75.8**	7.4	4.5	(RRUS 8843 B2 B66A is shielded by RRUS 32 from front wind)
RRUS 8843 B2 B66A	1	50.0	41.3	**72.0**	18.5	15.9	**54.5**	4.4	3.7	(RRUS 8843 B2A B66A & RRUS 32 are partially shielded by antenna from side wind)
LGP 21401 TMA	1	50.5	13.6	**30.0**	18.7	7.3	**45.0**	4.5	1.2	
DC6-48-60-18-8C	1	48.4	54.7	**26.2**	16.9	20.9	**65.7**	4.3	4.9	
DBCT108F1V92-1 Low-Band Combiner	1	12.6	13.2	**18.3**	6.6	6.8	**19.0**	1.1	1.2	

**** ALL CALCULATED LOADS ARE PER MOUNTING BRACKET. TO GET THE TOTAL EQUIPMENT LOAD, MULTIPLY THE INDIVIDUAL LOADS BY THE NUMBER OF BRACKETS***

- ***Wind Load on Framing Members***

Member Category	Member Shape	Length (in)	Member Surface	Non-Iced Condition			Iced Condition						Maintenance Condition
				Exposed Wind Height (in)	Force Coefficient C_a	Wind Load (plf)	Exposed Wind Height (in)	Depth (in)	Length (in)	Force Coefficient C_a	Wind Load (plf)	Ice Weight (plf)	Wind Load (plf)
Pipe	Pipe 2.0	108	Round	2.38	1.20	7.24	5.54	5.54	111.17	1.09	3.79	7.66	0.64
Pipe	Pipe 3.0	54	Round	3.50	0.99	8.78	6.67	6.67	57.17	0.83	3.49	9.84	0.78
Square HSS	HSS 4X4	47	Square	4.00	1.56	15.84	7.17	7.17	50.17	1.40	6.29	14.02	1.41
Pipe	Pipe 2.5	120	Round	2.88	1.20	8.77	6.04	6.04	123.17	1.10	4.15	8.63	0.78
Pipe	Pipe 2.0	170	Round	2.38	1.20	7.24	5.54	5.54	173.17	1.20	4.17	7.66	0.64
											Grating	17.12	psf
Double Angle	2L2.5x2.5	80	Square	5.00	1.70	21.60	8.17	5.67	83.17	1.51	7.71	13.89	1.92

BASIC EQUATIONS

ANSI/TIA-222-G Reference

Importance Factor: Table 2-3, Pg. 39

$$I := \begin{cases} 1.0 & \text{if Class} = \text{"II"} \\ 1.15 & \text{if Class} = \text{"III"} \end{cases}$$

Force Coefficient: (Square) Table 2-8, P. 42

$$C_{f\_square}(h, w) := \begin{cases} 1.2 & \text{if } \frac{h}{w} \le 2.5 \\ \left[1.2 + \frac{0.2}{4.5} \cdot \left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[1.4 + \frac{0.6}{18} \cdot \left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 2.0 & \text{otherwise} \end{cases}$$

Force Coefficient: (Round) Table 2-8, P. 42

$$C_{f\_round}(h, w) := \begin{cases} 0.7 & \text{if } \frac{h}{w} \le 2.5 \\ \left[0.7 + \frac{0.1}{4.5} \cdot \left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[0.8 + \frac{0.4}{18} \cdot \left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 1.2 & \text{otherwise} \end{cases}$$

Terrain Exposure Constants: Table 2-4, P. 40

$$\alpha := \begin{cases} 7.0 & \text{if Exp} = \text{"B"} \\ 9.5 & \text{if Exp} = \text{"C"} \\ 11.5 & \text{if Exp} = \text{"D"} \end{cases} \quad Z_g := \begin{cases} 1200\text{ft} & \text{if Exp} = \text{"B"} \\ 900\text{ft} & \text{if Exp} = \text{"C"} \\ 700\text{ft} & \text{if Exp} = \text{"D"} \end{cases} \quad K_{zmin} := \begin{cases} 0.70 & \text{if Exp} = \text{"B"} \\ 0.85 & \text{if Exp} = \text{"C"} \\ 1.03 & \text{if Exp} = \text{"D"} \end{cases}$$

BASIC EQUATIONS

ANSI/TIA-222-G Reference

Velocity Pressure Coefficient:

$$Kz(z) := \left| \begin{array}{l} K_z \leftarrow \max\left[2.01 \cdot \left(\frac{z}{Z_g} \right)^{\frac{2}{\alpha}}, K_{zmin} \right] \\ K_z \leftarrow \min\left(K_z, 2.01 \right) \end{array} \right.$$

$K_z := Kz(z)$ — Section 2.6.5, P. 13

$$Kzt(z) := K_{zt} \leftarrow \left| \begin{array}{ll} 1.0 \text{ if } Topo = \text{"1"} & \text{Section 2.6.6.4, p. 14} \\ \text{otherwise} & \\ \quad K_e \leftarrow \left| \begin{array}{ll} 0.90 \text{ if } Exp = \text{"B"} & \text{Table 2-4 p. 40} \\ 1.00 \text{ if } Exp = \text{"C"} & \\ 1.10 \text{ if } Exp = \text{"D"} & \end{array} \right. & \\ \quad K_t \leftarrow \left| \begin{array}{ll} 0.43 \text{ if } Topo = \text{"2"} & \text{Table 2-5 p. 40} \\ 0.53 \text{ if } Topo = \text{"3"} & \\ 0.72 \text{ if } Topo = \text{"4"} & \end{array} \right. & \\ \quad f \leftarrow \left| \begin{array}{ll} 1.25 \text{ if } Topo = \text{"2"} & \text{Table 2-5 p. 40} \\ 2.00 \text{ if } Topo = \text{"3"} & \\ 1.50 \text{ if } Topo = \text{"4"} & \end{array} \right. & \\ \quad K_h \leftarrow e^{\left(\frac{f \cdot z}{CH} \right)} & \text{Section 2.6.6.4, P. 14} \\ \quad \left(1 + \frac{K_e \cdot K_t}{K_h} \right)^2 & \text{Section 2.6.6.4, P. 14} \end{array} \right.$$

$K_{zt} := Kzt(z)$

Velocity Pressure: — Section 2.6.9.6, P. 25

$$q_z := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 \cdot I \cdot psf$$

LOAD EQUATIONS

WIND LOAD

Area (Normal): $AN_{area} = H_{ant} \cdot Want$

Area (Side): $AT_{area} = H_{ant} \cdot Dant$

Force Coefficient (Normal): $C_{fn} = C_{fsquare}(H_{ant}, Want)$

Force Coefficient (Side): $C_{fs} = C_{fsquare}(H_{ant}, Dant)$

Pipe Area (Normal): $AN_p = \max[(L_p - H_{ant}) * Dp, 0]$

Pipe Area (Side): $AT_p = L_p \cdot Dp$

Force Coefficient (Normal): $C_{fp} = C_{fround}(Lp, Dp)$

Normal Effective Projected Area: $E_{pan} = (C_{fn} \cdot ANarea) + (Cfp \cdot ANp)$

Side Effective Projected Area: $E_{pat} = (C_{fs} \cdot ATarea) + (Cfp \cdot ATp)$

Effective Projected Area: $EPA = max(E_{pan}, Epat)$

Wind Force: $F_{ant} = q_z \cdot Gh \cdot EPA$

ICE DEAD LOAD

Largest Out-to-Out Dimension: $D_{ant} = \sqrt{{D_{ant}}^2 + {W_{ant}}^2}$

Cross Sectional Area of Ice: $A_{ice\_ant} = \pi \cdot tiz \cdot (Dant + tiz)$

Total Ice Dead Load: $DL_{ice\_ant} = \boldsymbol{\rho_i} \cdot (Aice_{\_ant} \cdot Hant)$

ICE WIND LOAD

Dimensions: $H_{i_{ant}} = H_{ant} + 2tiz$

$W_{i_{ant}} = W_{ant} + 2tiz$

$D_{i_{ant}} = D_{ant} + 2tiz$

Area (Normal): $AIN_{area} = H_{i\_ant} \cdot W_{i\_ant}$

Area (Side): $AIT_{area} = H_{i\_ant} \cdot D_{i\_ant}$

Force Coefficient (Normal): $Ci_{fn} = C_{fsquare}(H_{i\_ant}, W_{i\_ant})$

Force Coefficient (Side): $Ci_{fs} = C_{fsquare}(H_{i\_ant}, D_{i\_ant})$

Pipe Area (Normal): $AN_p = \max[(L_{ip} - H_{i\_ant}) * D_{ip}, 0]$

Pipe Area (Side): $AT_p = L_{ip} \cdot Dip$

Force Coefficient (Normal): $C_{fp} = C_{fround}(L_{ip}, D_{ip})$

Normal Effective Projected Area: $E_{pain} = (Ci_{fn} \cdot ANarea) + (Cfp \cdot ANp)$

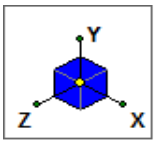
Side Effective Projected Area: $E_{pait} = (Ci_{fs} \cdot ATarea) + (Cfp \cdot ATp)$

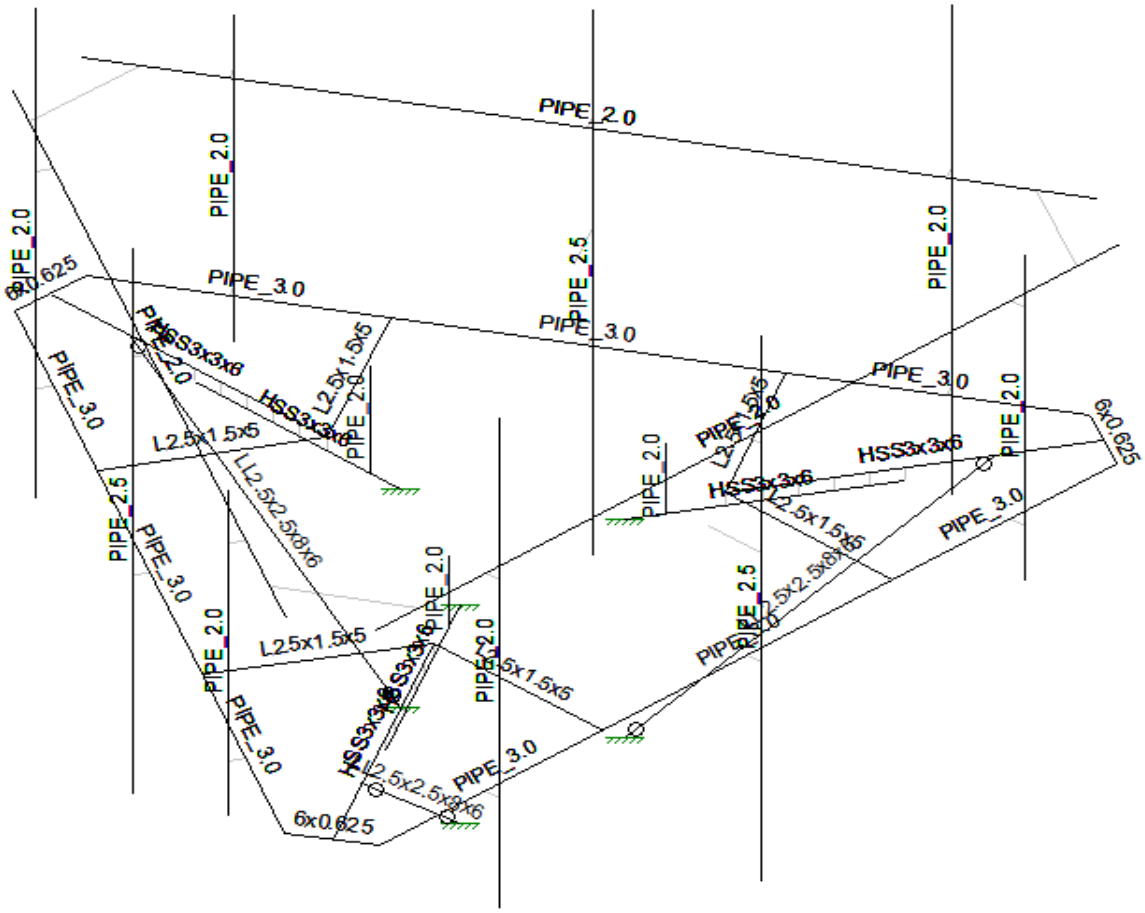
Effective Projected Area: $EPA_i = max(E_{pain}, Epait)$

Wind Force: $F_{i\_ant} = q_z \cdot Gh \cdot EPAi$

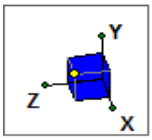
III. ATTACHMENTS

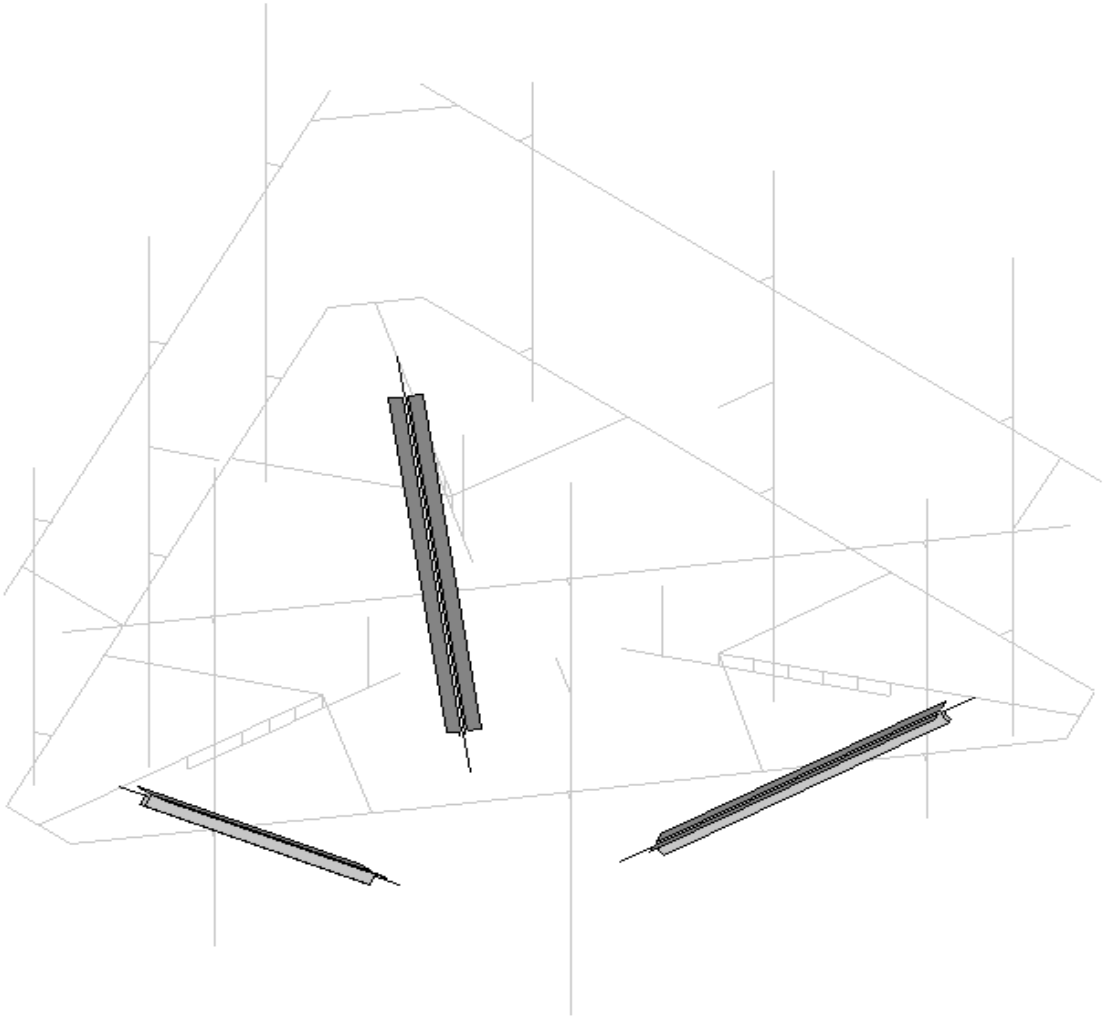
RISA MODEL


Y
Z
X

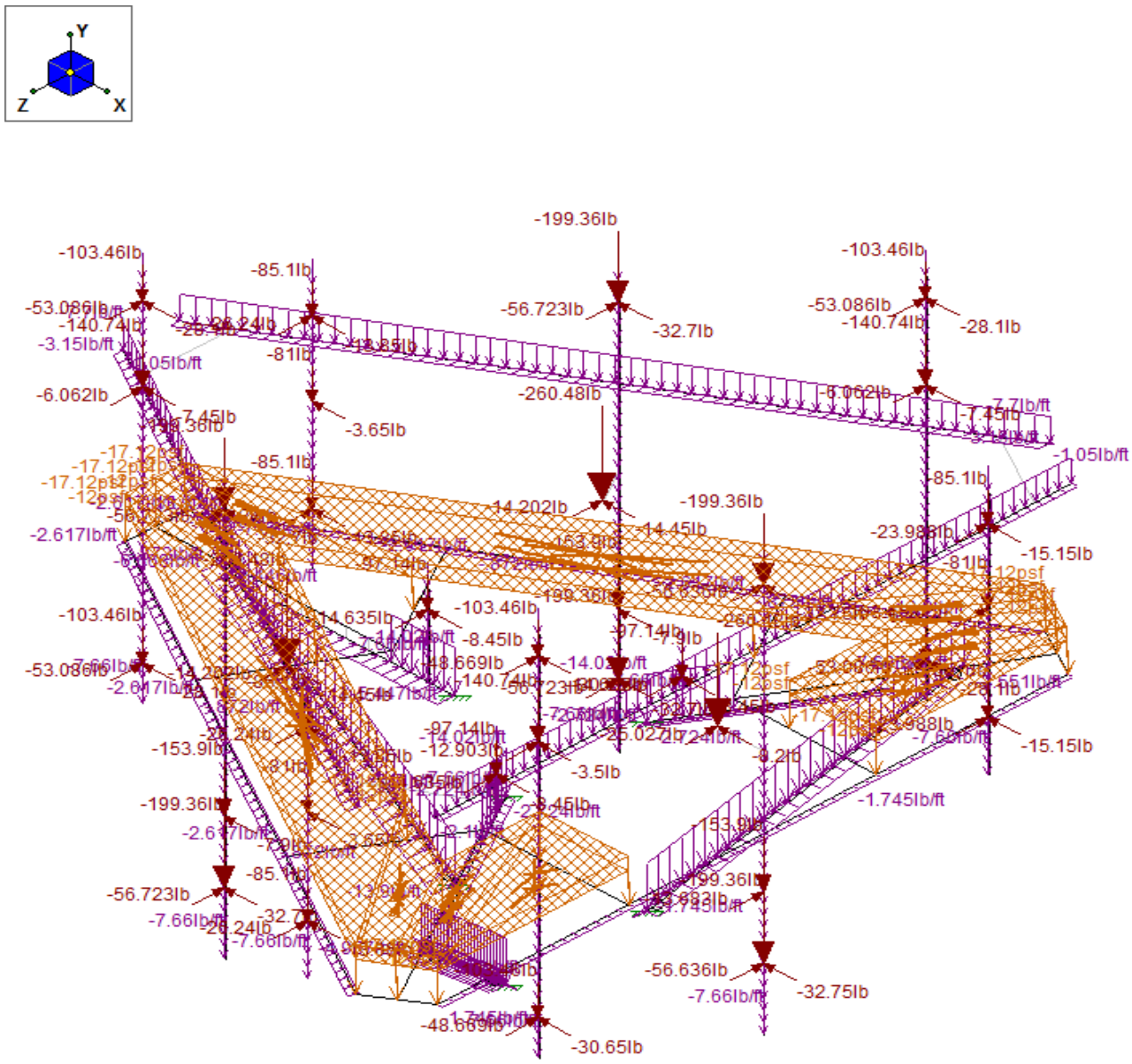

PIPE_2.0
PIPE_3.0
PIPE_2.5
6x0.625
HSS3x3x6
L2.5x1.5x5
L2.5x2.5x8x6

PROPOSED MODIFICATION MEMBERS



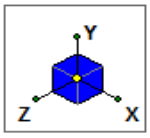


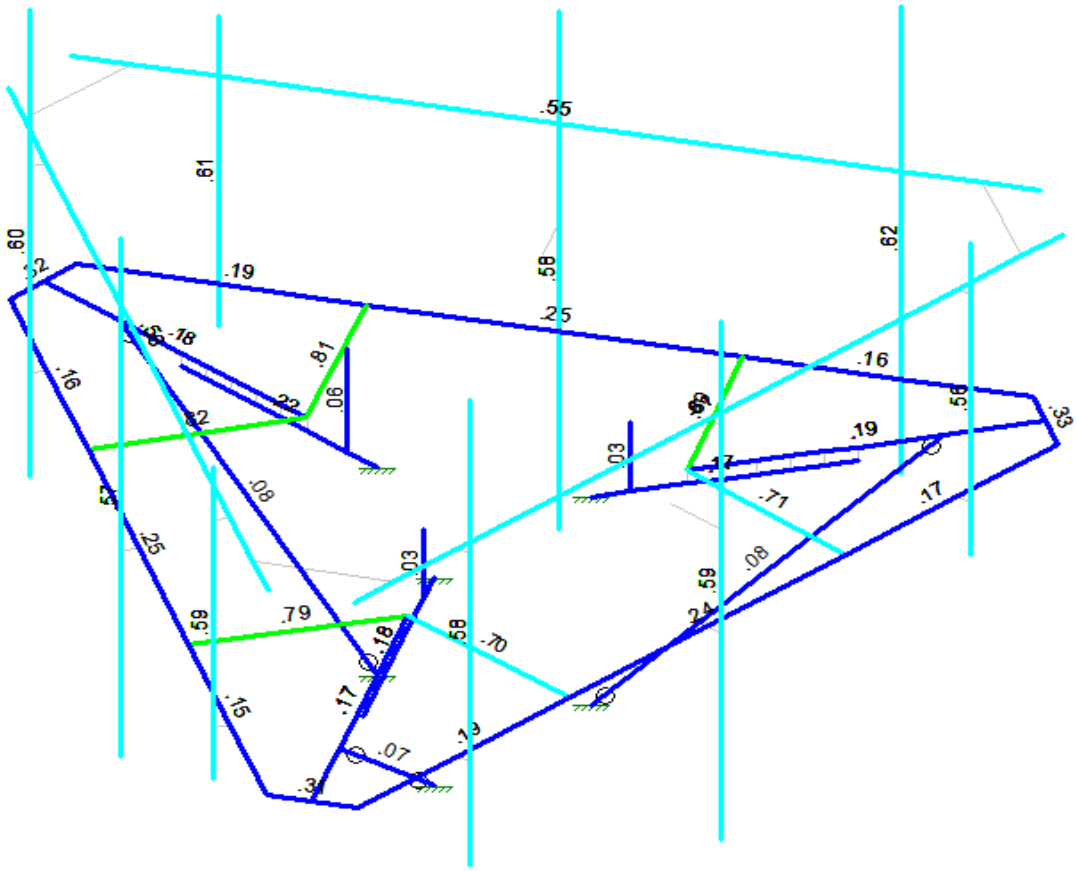
RISA WORST CASE LOADING



Loads: LC 24, 1.2D+1.0ICE+1.0W9ICE
Envelope Only Solution

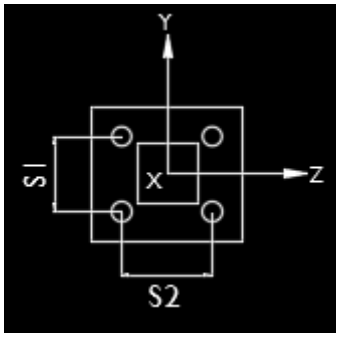
RISA CODE CHECK





Mount to Tower Connection Check:

Applied Tension:	$Rx := 5537.9 \cdot lbf$	From Risa 3D LRFD Loading
Applied Shear:	$Ry := 676.2 lbf$	From Risa 3D LRFD Loading
Applied Shear:	$Rz := 4845.3 \cdot lbf$	From Risa 3D LRFD Loading
Applied Torque:	$Mx := 820.3 \cdot lbf \cdot ft$	From Risa 3D LRFD Loading
Applied Moment:	$My := 2131.9 lbf \cdot ft$	From Risa 3D LRFD Loading
Applied Moment:	$Mz := 718.9 \cdot lbf \cdot ft$	From Risa 3D LRFD Loading
Number of Bolts:	$n := 4$	Per Mapping
Bolts Vertical Spacing:	$S_1 := 4in$	Per Mapping
Bolts Horizontal Spacing:	$S_2 := 4in$	Per Mapping



Applied Tension at Bolt:

$$P_{a.t} := \frac{Rx}{n} + \frac{2My}{n \cdot S_2} + \frac{2Mz}{n \cdot S_1} = 5660.7\ lbf$$

Applied Shear at Bolt:

$$P_{a.v} := \frac{\sqrt{Ry^2 + Rz^2}}{n} + \frac{2Mx}{\sqrt{S_1^2 + S_2^2}} = 4703.3\ lbf$$

Bolt Type Used:	**A325N**	
Nominal Tensile Stress, Fnt:	$F_{n.t} := 90ksi$	AISC, Table J3-2, P. 16.1-104
Nominal Shear Stress, Fnv:	$F_{n.v} := 54ksi$	AISC, Table J3-2, P. 16.1-104
Nominal Bolt Diameter:	$d_b := \frac{5}{8}in$	Per Mapping
Gross Area of the Bolt:	$A_{b.g} := 0.307in^2$	AISC, Table 7-18, P. 7-83
Net Area of the Bolt:	$A_{b.n} := 0.226in^2$	AISC, Table 7-18, P. 7-83
Strength Reduction Factor, ϕ:	$\phi := 0.75$	

Combined Tension And Shear Check

Nominal Tensile Reduced Fntr

$$F_{n.t.r} := 1.3 \cdot F_{n.t} - \frac{F_{n.t}}{\phi \cdot F_{n.v}} \cdot \frac{P_{a.v}}{A_{b.g}} = 83 \cdot ksi$$

AISC Eq. J3-3a, P. 16.1-109

Nominal Shear Reduced Fntv

$$F_{n.v.r} := 1.3 \cdot F_{n.v} - \frac{F_{n.v}}{\phi \cdot F_{n.t}} \cdot \frac{P_{a.t}}{A_{b.g}} = 55.4 \cdot ksi$$

AISC Eq. J3-3a, P. 16.1-109

Bolt Nominal Tensive Strength

$$R_{n.t} := F_{n.t} \cdot A_{b.g} = 27.6 \cdot kip$$

Tension Check

$$Check := \begin{cases} \text{"OK"} & \text{if } \phi \cdot R_{n.t} \geq P_{a.t} \\ \text{"NOT GOOD"} & \text{otherwise} \end{cases}$$

$$Check = \text{"OK"}$$

Tension Ratio

$$Ratio_t := \frac{P_{a.t}}{\phi \cdot R_{n.t}} \qquad Ratio_t = 27.3 \cdot \%$$

Bolt Nominal Shear Strength

$$R_{n.v} := F_{n.v} \cdot A_{b.g} = 16.6 \cdot kip$$

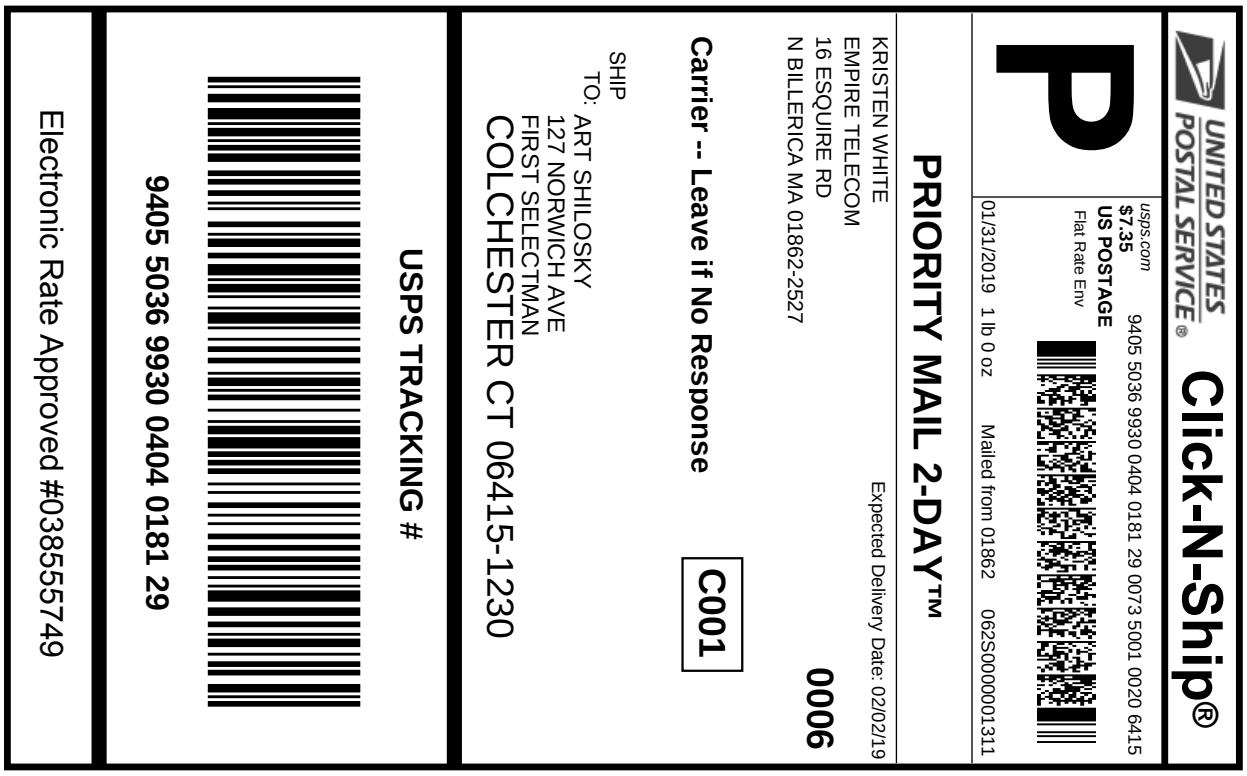
Shear Check

$$Check := \begin{cases} \text{"OK"} & \text{if } \phi \cdot R_{n.v} \geq P_{a.v} \\ \text{"NOT GOOD"} & \text{otherwise} \end{cases}$$

$$Check = \text{"OK"}$$

Shear Ratio

$$Ratio_v := \frac{P_{a.v}}{\phi \cdot R_{n.v}} \qquad Ratio_v = 37.8 \cdot \%$$



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0404 0181 29

Trans. #:	455614529
Print Date:	01/31/2019
Ship Date:	01/31/2019
Expected Delivery Date:	02/02/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

From: KRISTEN WHITE
EMPIRE TELECOM
16 ESQUIRE RD
N BILLERICA MA 01862-2527

To: ART SHILOSKY
127 NORWICH AVE
FIRST SELECTMAN
COLCHESTER CT 06415-1230

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

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

USPS Tracking®

FAQs > (https://www.usps.com/faqs/uspstracking-faqs.htm)

Track Another Package +

Tracking Number: 9405503699300404018129

Remove ×

On Time

Expected Delivery on

MONDAY

4 FEBRUARY 2019

See Product Information

Feedback

Delivered

February 4, 2019 at 11:03 am
Delivered, Left with Individual
COLCHESTER, CT 06415

Get Updates

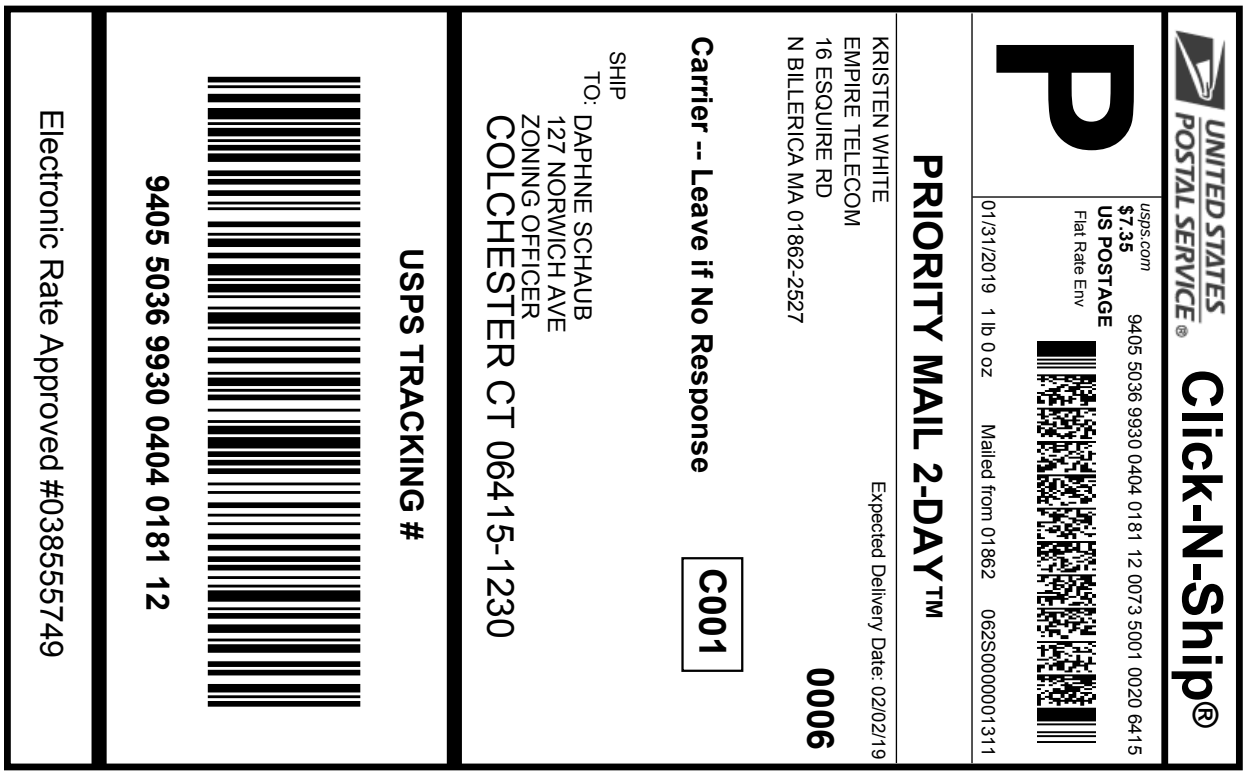
Text & Email Updates

Tracking History

Product Information

See Less

Can’t find what you’re looking for?



Cut on dotted line.

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5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0404 0181 12

Trans. #:	455614529
Print Date:	01/31/2019
Ship Date:	01/31/2019
Expected Delivery Date:	02/02/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

From: KRISTEN WHITE
EMPIRE TELECOM
16 ESQUIRE RD
N BILLERICA MA 01862-2527

To: DAPHNE SCHAUB
127 NORWICH AVE
ZONING OFFICER
COLCHESTER CT 06415-1230

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

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

USPS Tracking®

FAQs > (https://www.usps.com/faqs/uspstracking-faqs.htm)

Track Another Package +

Tracking Number: 9405503699300404018112

Remove ×

On Time

Expected Delivery on

MONDAY

4 FEBRUARY 2019

See Product Information

Feedback

Delivered

February 4, 2019 at 11:03 am
Delivered, Left with Individual
COLCHESTER, CT 06415

Get Updates

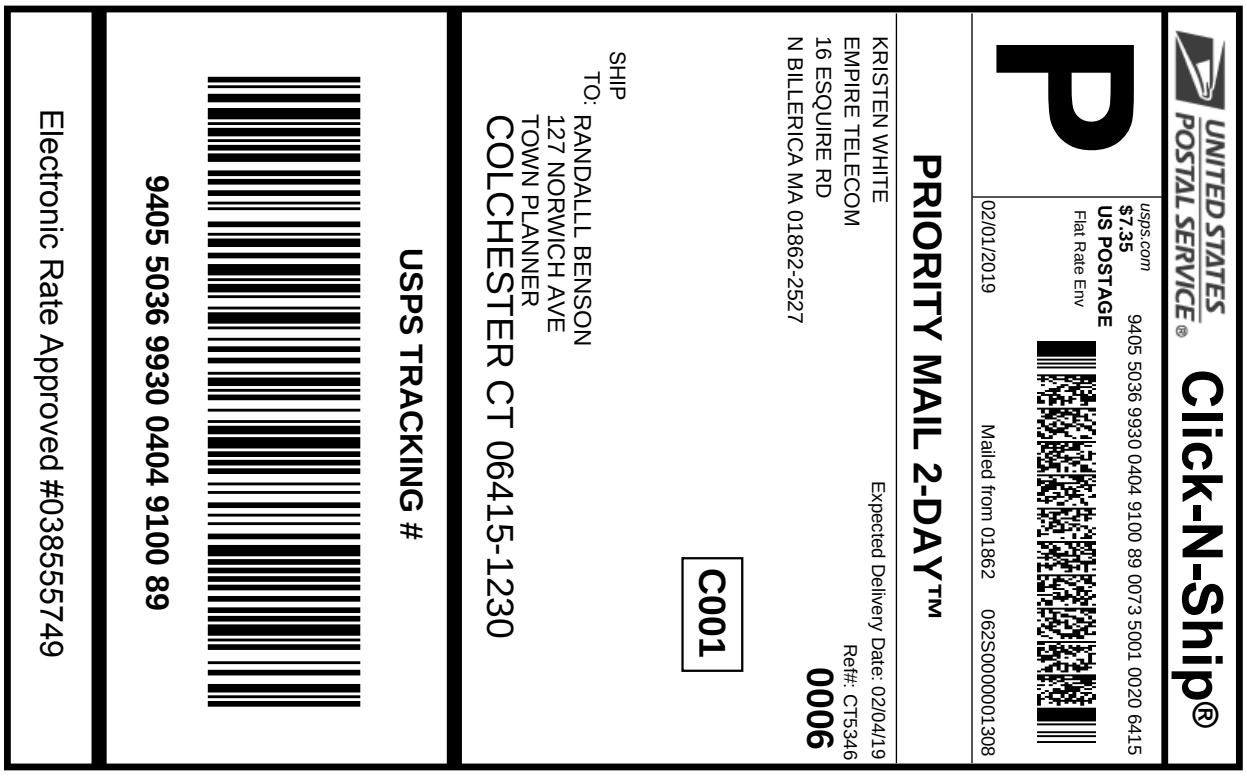
Text & Email Updates

Tracking History

Product Information

See Less

Can’t find what you’re looking for?



Cut on dotted line.

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5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0404 9100 89

Trans. #:	455686744
Print Date:	01/31/2019
Ship Date:	02/01/2019
Expected Delivery Date:	02/04/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

From: KRISTEN WHITE
EMPIRE TELECOM
16 ESQUIRE RD
N BILLERICA MA 01862-2527

Ref#: CT5346

To: RANDALLL BENSON
127 NORWICH AVE
TOWN PLANNER
COLCHESTER CT 06415-1230

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

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

USPS Tracking®

FAQs > (https://www.usps.com/faqs/uspstracking-faqs.htm)

Track Another Package +

Tracking Number: 9405503699300404910089

Remove ×

On Time

Expected Delivery on

MONDAY

4 FEBRUARY 2019

See Product Information

Feedback

Delivered

February 4, 2019 at 11:03 am
Delivered, Left with Individual
COLCHESTER, CT 06415

Get Updates

Text & Email Updates

Tracking History

Product Information

See Less

Can’t find what you’re looking for?

UPS CampusShip: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
MACLF-LOCKR-STOP & SHOP #480
299 CHELMSFORD ST
CHELMSFORD ,MA 01824

UPS Access Point™
JERRY'S VARIETY
1172 LAWRENCE ST
LOWELL ,MA 01852

UPS Access Point™
THE UPS STORE
101 GREAT RD
BEDFORD ,MA 01730

FOLD HERE

Delivery Notification

Dear Customer,

This notice serves as proof of delivery for the shipment listed below.

Tracking Number:	1Z 870 26W 02 9739 199 4
Reference Number(s):	PC 321, CT5346
Service:	UPS 2nd Day Air
Weight:	.30 Lb
Shipped/Billed On:	01/31/2019
Delivered On:	02/04/2019 11:45 A.M.
Delivered To:	155 FEDERAL ST BOSTON, MA, US 02110
Received By:	DEPINA
Location:	Office

Thank you for giving us this opportunity to serve you.

Sincerely,
UPS

Tracking results provided by UPS: 02/15/2019 11:50 A.M. ET

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0404 9133 87 0073 5000 0066 3101

usps.com
$7.35
US POSTAGE
Flat Rate Env

P

01/31/2019 Mailed from 01862 062S0000001310

PRIORITY MAIL 2-DAY™

KRISTEN WHITE
EMPIRE TELECOM
16 ESQUIRE RD
N BILLERICA MA 01862-2527

Expected Delivery Date: 02/04/19
Ref#: CT5346

0006

Carrier -- Leave if No Response

C074

SHIP TO: AT&T MOBILITY
ATT TAX MANAGER
909 CHESTNUT ST
SAINT LOUIS MO 63101-2017

USPS TRACKING #

9405 5036 9930 0404 9133 87

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

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5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0404 9133 87

Trans. #:	455686852
Print Date:	01/31/2019
Ship Date:	01/31/2019
Expected Delivery Date:	02/04/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

From: KRISTEN WHITE
EMPIRE TELECOM
16 ESQUIRE RD
N BILLERICA MA 01862-2527

Ref#: CT5346

To: AT&T MOBILITY
ATT TAX MANAGER
909 CHESTNUT ST
SAINT LOUIS MO 63101-2017

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

UNITED STATES POSTAL SERVICE®

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

USPS Tracking®

FAQs > (https://www.usps.com/faqs/uspstracking-faqs.htm)

Track Another Package +

Tracking Number: 9405503699300404913387

Remove ×

On Time

Expected Delivery on

MONDAY

4 FEBRUARY 2019

See Product Information

Feedback

Delivered

February 4, 2019 at 9:47 am
Delivered, Front Desk/Reception/Mail Room
SAINT LOUIS, MO 63101

Get Updates

Text & Email Updates

Tracking History

Product Information

See Less

Can’t find what you’re looking for?

UPS CampusShip: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

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3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

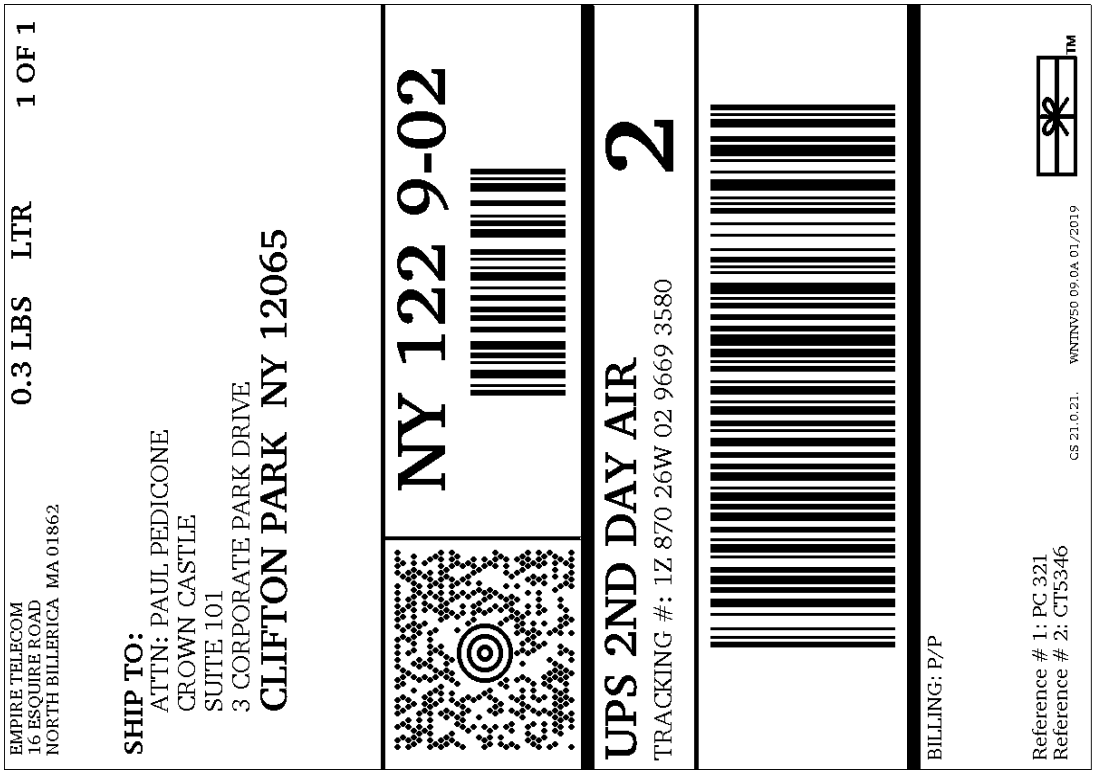
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
MACLF-LOCKR-STOP & SHOP #480
299 CHELMSFORD ST
CHELMSFORD ,MA 01824

UPS Access Point™
JERRY'S VARIETY
1172 LAWRENCE ST
LOWELL ,MA 01852

UPS Access Point™
THE UPS STORE
101 GREAT RD
BEDFORD ,MA 01730

FOLD HERE



Proof of Delivery

Dear Customer,

This notice serves as proof of delivery for the shipment listed below.

Tracking Number
1Z87026W0296693580

Weight
0.30 LBS

Service

UPS 2nd Day Air®

Shipped / Billed On
01/31/2019

Delivered On

02/04/2019 10:58 A.M.

Delivered To
CLIFTON PARK, NY, US

Received By

RHOADES

Left At
Inside Delivery

Thank you for giving us this opportunity to serve you. Details are only available for shipments delivered within the last 120 days. Please print for your records if you require this information after 120 days.

Sincerely,

UPS

Tracking results provided by UPS: 02/15/2019 11:48 A.M. EST