October 22, 2018

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

Re: **Notice of Exempt Modification – Antenna Swap**
Property Address: **231 Kettletown Rd, Southbury, Ct 06488**
Applicant: **AT&T Mobility, LLC**

Dear Ms. Bachman:

On behalf of AT&T, 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).

AT&T currently maintains a wireless telecommunications facility consisting of nine (9) wireless telecommunication antennas at an antenna center line height of 85-feet on an existing 195 foot – Monopole, owned by Phoenix Tower International and the property by the Town of Southbury. AT&T now intends INSTALL (3) NEW RRH'S AT GRADE · INSTALL (3) NEW RRH'S, (1) PER SECTOR · INSTALL (3) NEW PANEL ANTENNAS, (1) PER SECTOR · SWAP DUS's WITH (1) 5216 · ADD 2ND XMU AND (1) RBS 6630 and · INSTALL PLATFORM KICKER SUPPORT KIT.

This facility was approved by the Southbury Zoning Commission on: May 3rd, 2000 for a certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of telecommunications antennas, associated equipment, and building to provide Domestic Public Cellular Radio Telecommunication service in the Connecticut- New England area.

The following is a list of subsequent decisions:

TS-AT&T-130-000703 - AT&T Wireless Services request for an order to approve tower sharing at an existing telecommunications tower located at 231 Kettletown Rd., **Southbury**, Connecticut

EM-CING-047-094-115-130-142-020828 - SNET Mobility, LLC notice of intent to modify existing telecommunications facilities located in East Windsor, Newington, Prospect, **Southbury**, and Tolland, Connecticut. (Kettletown Road, Southbury

EM-CING-011-054-105-130-157-070220 - New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 1021 Blue Hills Avenue, Bloomfield; Dickenson Road, Glastonbury; 38 Hatchets Hill Road, Old Lyme; 231 Kettletown Road, **Southbury**; and 56 Norfield Road, Weston, Connecticut. Decision Letter.

EM-CING-130-100923 – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 231 Kettletown Road, **Southbury**, Connecticut.

EM-AT&T-130-120618 – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 231 Kettletown Road, **Southbury**, Connecticut.

EM-CING-130-160223 – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 231 Kettletown Road, **Southbury**, Connecticut. Decision. Completion Letter.

EM-CING-130-160919 - New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 231 Kettletown Road, **Southbury**, Connecticut. Decision Completion Letter

Please accept this letter pursuant to Regulation of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-5l0j-72(b) (2). In accordance with R.C.S.A., a copy of this letter is being sent to the First Selectman, Jeff Manville and the AICP, Land Use Administrator, DeLoris Curtis at: 501 Main Street South (Room 212 and 204) Southbury, CT 06488. A copy is also being sent to PHOENIX TOWER INTERNATIONAL, tower owner at: 1001 YAMATO ROAD, SUITE 105 BOCA RATON, FL 33431.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. §16-50j-72(b) (2).

1. The proposed modifications will not result in an increase in the height of the existing tower. AT&T's replacement antennas will be installed at the 185-foot level of the 195 foot - Monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore, will not require and extension of the site boundary.
3. The proposed modifications will not increase the noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative worst-case RF emissions calculation for AT&T's modified facility is provided in the RF Emissions Compliance Report, included in Tab 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (See Structural Analysis Report included in Tab 3).

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

Sincerely,

David Barbagallo

Enclosures:

First Selectman, Jeff Manville
Land Use Administrator, DeLoris Curtis
Tower Owner Phoenix Tower International

Google Maps 231 Kettletown Rd

Map data ©2018 Google 200 ft

231 Kettletown Rd

Southbury, CT 06488

FQCV+6W Southbury, Newtown, CT

At this location

Southbury Dump

5.0 ★★★★★ (1)

City Government Office · 231 Kettletown Rd

Southbury Town Recycling

City Government Office · 231 Kettletown Rd

Southbury Transfer Station

4.8 ★★★★★ (4)

Garbage Dump · 231 Kettletown Rd

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Signed for by: S.RANSCOURT

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FROM

Smartlink LLC
Dave Barbagallo
265 Lincoln St
KENSINGTON, CT US 06037
860 681-7708

TO

Town of Southbury
Deloris Curtis
SOUTHBURY, CT US 06488
203 262-0600

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Shipment Facts

DELIVERY ATTEMPTS
1

DELIVERED TO
Receptionist/Front Desk

TOTAL PIECES
1

TOTAL SHIPMENT WEIGHT
1 lbs / 0.45 kgs

TERMS
Not Available

PACKAGING
FedEx Pak

SPECIAL HANDLING SECTION
Deliver Weekday

STANDARD TRANSIT
10/29/2018 by 4:30 pm

SHIP DATE
Wed 10/24/2018

Travel History

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ACTUAL DELIVERY
Thu 10/25/2018 11:58 am

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Smartlink LLC
Dave Barbagallo
265 Lincoln St
KENSINGTON, CT US 06037
860 681-7708

TO

Phoenix Tower International
Samanatha Griffin
BOCA RATON, FL US 33431
561 270-4835

Ask FedEx

Shipment Facts

WEIGHT
1 lbs / 0.45 kgs

DELIVERY ATTEMPTS
1

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TOTAL SHIPMENT WEIGHT
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TERMS
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FROM

Smartlink LLC
Dave Barbagallo
265 Lincoln St
KENSINGTON, CT US 06037
860 681-7708

TO

Town of Southbury
First Selectman Jeff Manville
SOUTHBURY, CT US 06488
203 262-0600

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Shipment Facts

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Receptionist/Front Desk

TOTAL PIECES
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TOTAL SHIPMENT WEIGHT
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PROJECT NOTES

1. SITE INFORMATION OBTAINED FROM THE FOLLOWING:
   - A. PLAN ENTITLED "SOUTHBURY KETTLETOWN ROAD" PREPARED BY VERTICAL RESOURCES GRP. OF AUBURN, MA LAST REVISED 02/17/2016.
   - 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 NO 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.
19. CONTRACTOR SHALL CONTACT STATE SPECIFIC ONE CALL SYSTEM THREE WORKING DAYS PRIOR TO ANY EARTH MOVING ACTIVITIES.

00100339_CTL02086_Rev 0.dwg T-1 By: ACOA

APPROVED
By David C. Rodriguez at 5:00 pm, Oct 18, 2018

SITE NAME: SOUTHBURY KETTLETOWN RD
FA NUMBER: 10035309
SITE NUMBER: CTL02086
PTI SITE NAME: KETTLETOWN
PTI SITE NUMBER: US-CT-1002
4C - MRCTB031784
5C - MRCTB031854
231 KETTLETOWN ROAD
SOUTHBURY, CT 06488
NEW HAVEN COUNTY

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:	41.47118611° N
LONGITUDE:	73.2055550° W
JURISDICTION:	NEW HAVEN COUNTY

APPLICANT/LESSEE

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

LANDLORD

LANDLORD:	PHOENIX TOWER INTERNATIONAL
ADDRESS:	1001 YAMATO ROAD, SUITE 105
CITY, STATE, ZIP:	BOCA RATON, FL 33431

CLIENT REPRESENTATIVE

COMPANY:	SMARTLINK, LLC
ADDRESS:	85 RANGEWAY ROAD, BUILDING 3, STE. 102
CITY, STATE, ZIP:	NORTH BILLERICA, MA 01862
CONTACT:	TODD OLIVER
E-MAIL:	TODD.OLIVER@SMARTLINKLLC.COM

SITE ACQUISITION

COMPANY:	SMARTLINK, LLC
ADDRESS:	85 RANGEWAY ROAD, BUILDING 3, STE. 102
CITY, STATE, ZIP:	NORTH BILLERICA, MA 01862
CONTACT:	SHARON KEEFE
E-MAIL:	SHARON.KEEFE@SMARTLINKLLC.COM

CONSTRUCTION MANAGER

COMPANY:	SMARTLINK, LLC
ADDRESS:	85 RANGEWAY ROAD, BUILDING 3, STE. 102
CITY, STATE, ZIP:	NORTH BILLERICA, MA 01862
CONTACT:	MARK DONNELLY
E-MAIL:	MARK.DONNELLY@SMARTLINKLLC.COM

ENGINEER

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

PROJECT DESCRIPTION/ SCOPE OF WORK

- INSTALL (3) NEW RRH'S AT GRADE
- INSTALL (3) NEW RRH'S, (1) PER SECTOR
- INSTALL (3) NEW PANEL ANTENNAS, (1) PER SECTOR
- SWAP DUS's WITH (1) 5216
- ADD 2ND XMU AND (1) RBS 6630
- INSTALL PLATFORM KICKER SUPPORT KIT

PROPOSED PROJECT SCOPE BASED ON RFDS ID# 2282458, VERSION 2.00, LAST UPDATED 07/23/2018.

SHEET INDEX

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SCALE:	JOB NUMBER:
AS SHOWN	18946016A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
3	10/17/18	REVISED PER COMMENTS	AJC	RA
2	09/25/18	REVISED PER COMMENTS	AJC	RA
1	09/10/18	REVISED PER STRUCTURAL	AJC	RA
0	08/06/18	ISSUED FOR REVIEW	AJC	RA

STATE OF CONNECTICUT
PETROS I. SOUKIAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577
32577
PROFESSIONAL ENGINEER

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

SITE NAME:
SOUTHBURY
KETTLETOWN RD
FA# 10035309
SITE# CTL02086

231 KETTLETOWN ROAD
SOUTHBURY, CT 06488
NEW HAVEN 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 - SMARTLINK
    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 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 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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SCALE : AS SHOWN

JOB NUMBER : 18946016A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
3	10/17/18	REVISED PER COMMENTS	AJC	RA
2	09/25/18	REVISED PER COMMENTS	AJC	RA
1	09/10/18	REVISED PER STRUCTURAL	AJC	RA
0	08/06/18	ISSUED FOR REVIEW	AJC	RA

STATE OF CONNECTICUT — PETROS I. SOUKIAS — 32577 — PROFESSIONAL ENGINEER

PETROS I. SOUKIAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577

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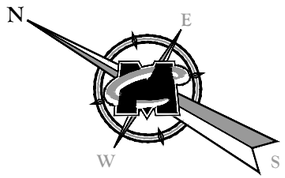
SITE NAME:
SOUTHBURY
KETTLETOWN RD
FA# 10035309
SITE# CTL02086

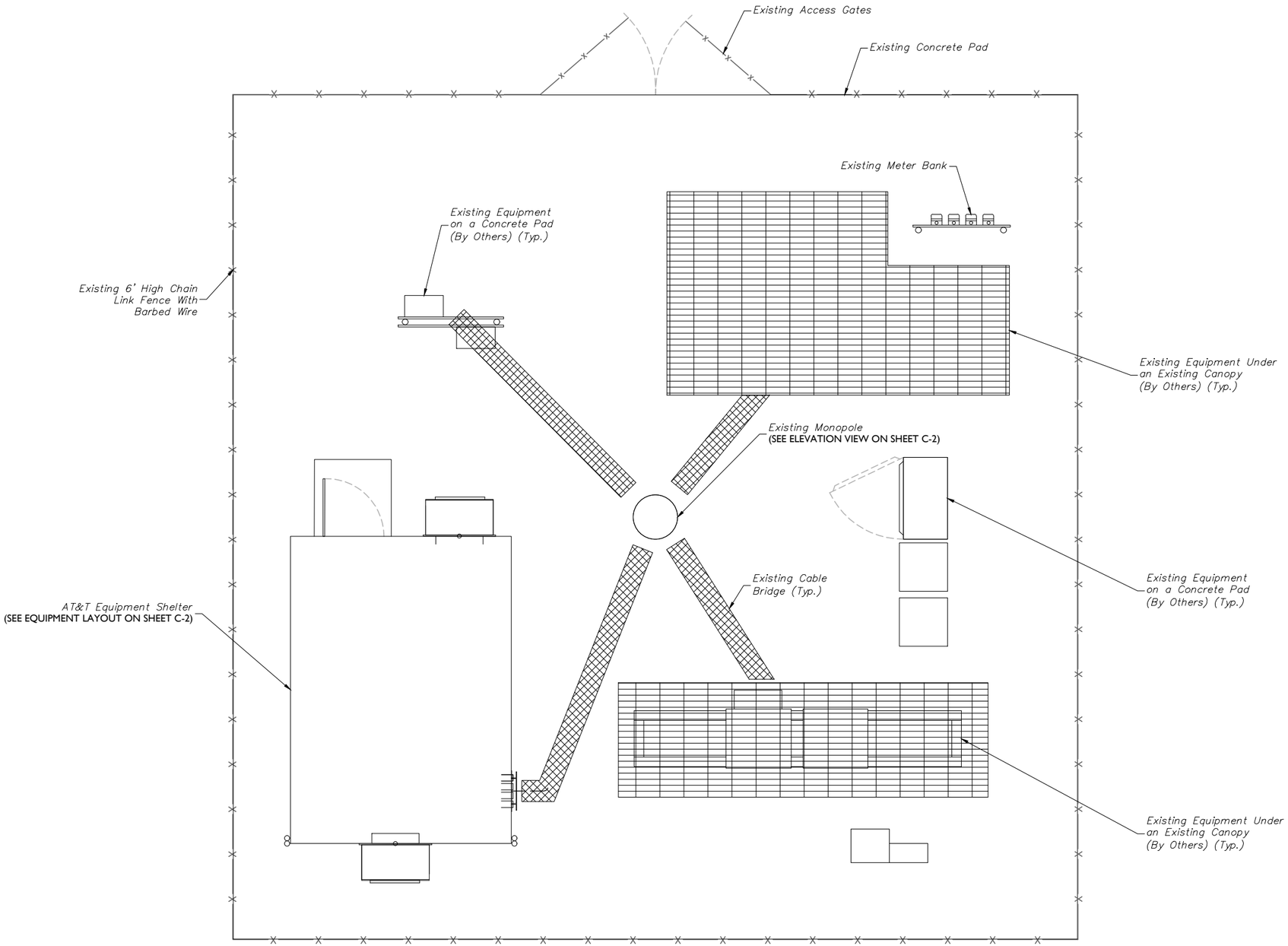
231 KETTLETOWN ROAD
SOUTHBURY, CT 06488
NEW HAVEN COUNTY

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 : GENERAL NOTES

SHEET NUMBER : GN-1





COMPOUND PLAN

3 2.4 1.8 1.2 0.6 0 1.5 3 6

SCALE : 1" = 3' FOR 22"X34"
(SCALE : 1" = 6' FOR 11"X17")

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STATE OF CONNECTICUT
PETROS J. SOUKIAS
32577
REGISTERED PROFESSIONAL ENGINEER

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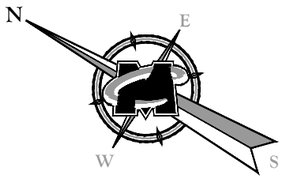
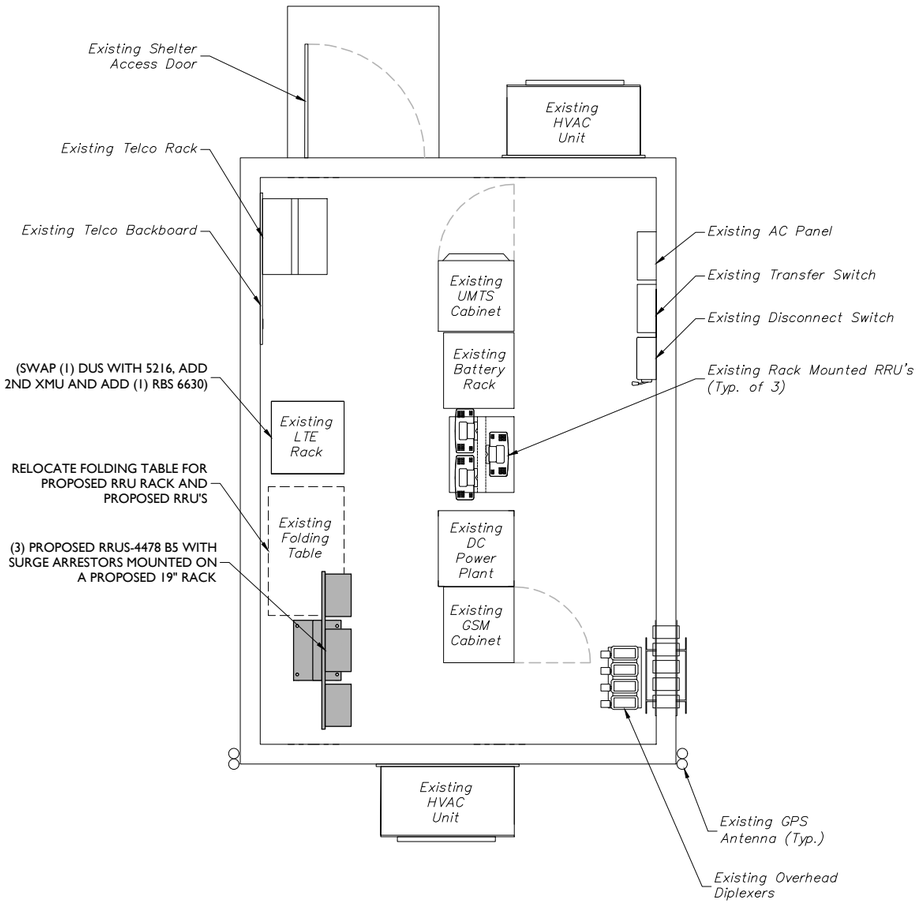
SHEET TITLE :
COMPOUND PLAN

SHEET NUMBER :
C-1





EQUIPMENT LAYOUT

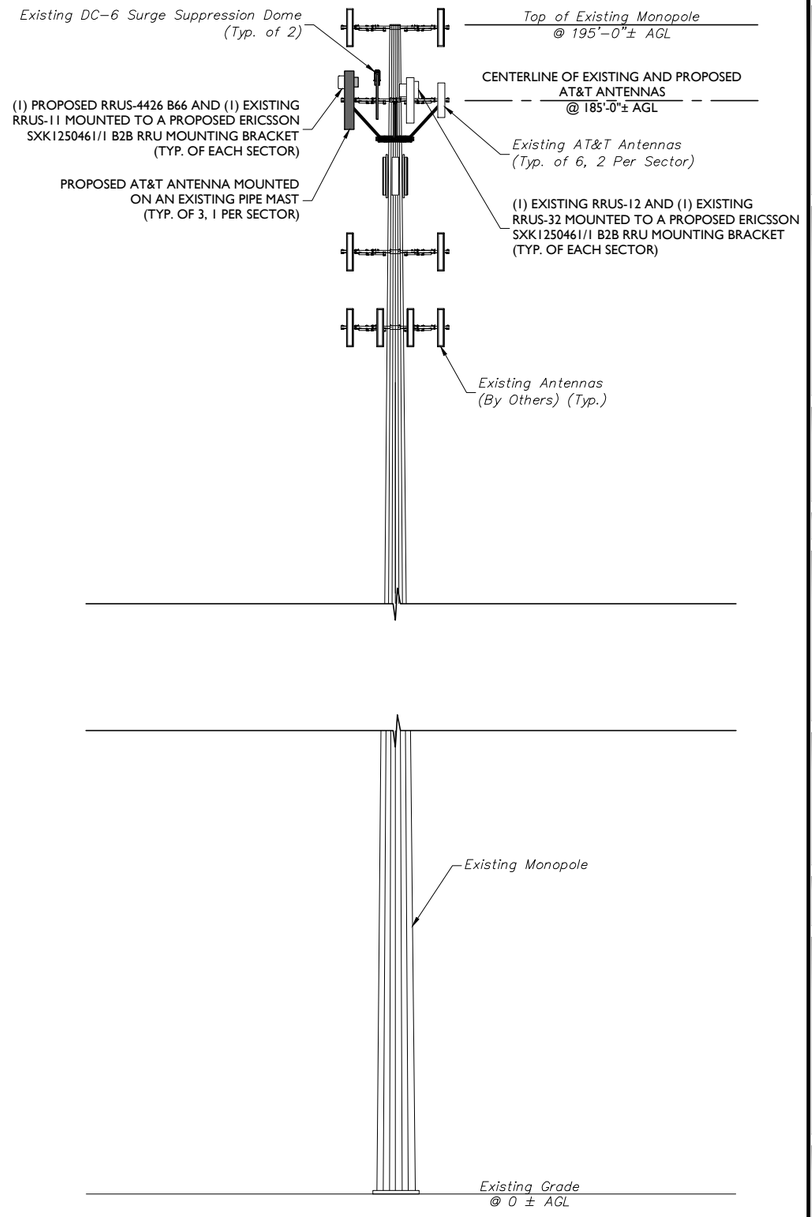
2 1.6 1.2 0.8 0.4 0 1 2 4

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

STRUCTURAL NOTES:

1. MASER CONSULTING P.A. HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THIS TOWER AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY AS REQUIRED UNDER THE MOST CURRENT LOCAL, STATE AND FEDERAL CODES. A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION MUST BE PREPARED BY AN APPROPRIATE LICENSED STRUCTURAL ENGINEER CERTIFYING THAT THE EXISTING TOWER AND ANY REQUIRED IMPROVEMENTS AND REINFORCEMENTS HAVE SUFFICIENT CAPACITY TO SUPPORT ALL EXISTING AND PROPOSED ANTENNAS, SUPPORTS, CABLES AND APPURTENANCES COMPLIES WITH THE MOST CURRENT LOCAL, STATE AND FEDERAL CODES.

2. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY IMPROVEMENTS AND REINFORCEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, CABLES, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWINGS OR OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.



ELEVATION VIEW

10 8 6 4 2 0 5 10 20

SCALE : 1" = 10' FOR 22"X34"
(SCALE : 1" = 20' FOR 11"X17")

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0	08/06/18	ISSUED FOR REVIEW	AJC	RA

STATE OF CONNECTICUT
PETROS I. SOUKIAS
32577
PETROS I. SOUKIAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577

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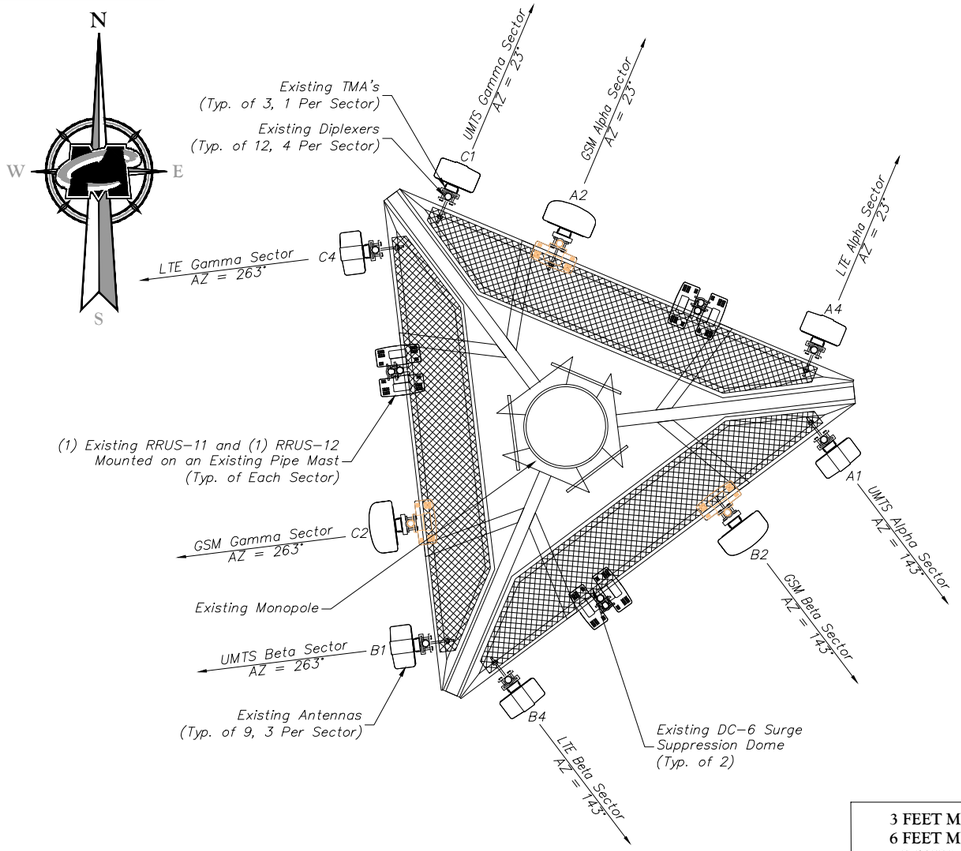
email: solutions@maserconsulting.com

SHEET TITLE :
EQUIPMENT LAYOUT AND ELEVATION VIEW

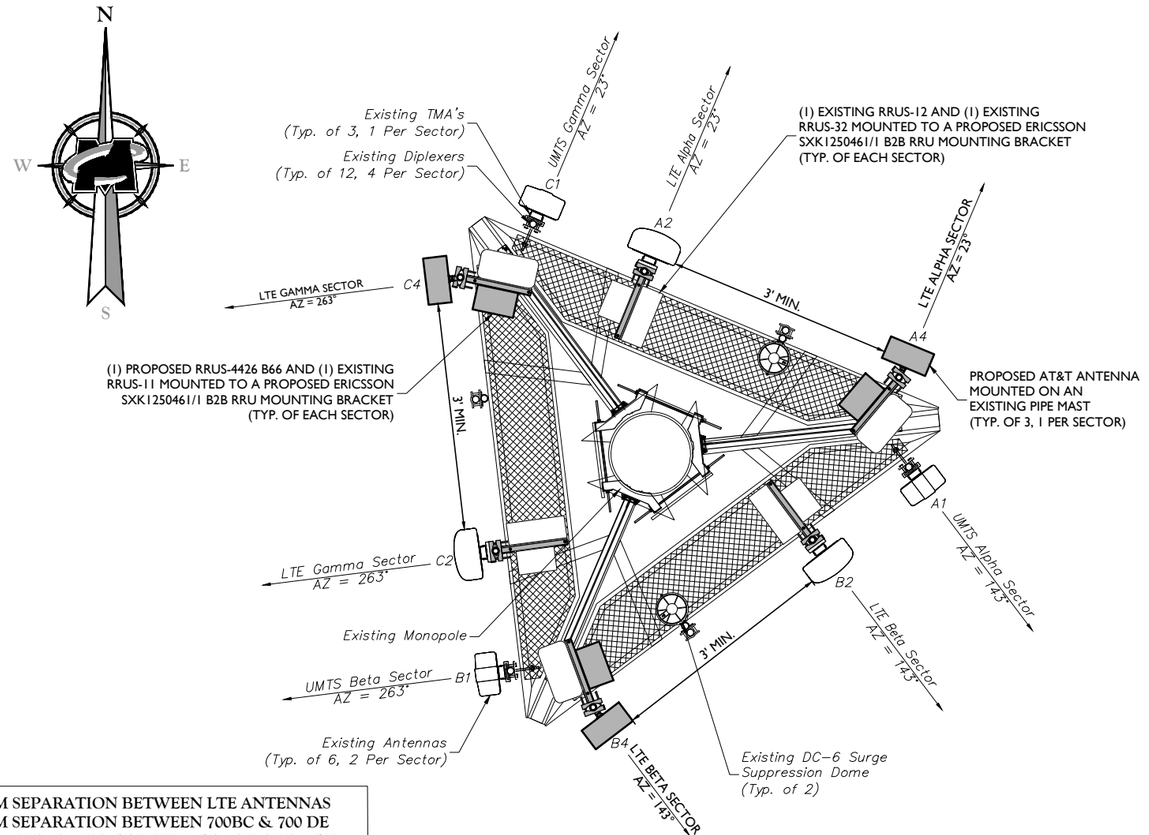
SHEET NUMBER :
C-2



EXISTING ANTENNA LAYOUT

NOT TO SCALE

3 FEET MINIMUM SEPARATION BETWEEN LTE ANTENNAS
6 FEET MINIMUM SEPARATION BETWEEN 700BC & 700 DE
8 INCH MINIMUM SEPARATION BETWEEN BACK OF PANEL
ANTENNA AND ALL EXISTING/PROPOSED EQUIPMENT



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	143	185	(2) DIPLEXER LGP 21901 (1) TMA TT19-08BP111-001	2	1 1/4" COAX	EXISTING
	2	QUINTEL QS66512-2	QUINTEL QS66512-2	LTE	EXISTING	72.00	12.00	9.60	123.00	23	185	(1) RRUS-4478 B5 (AT GRADE) (1) RRUS-12 (1) RRUS-32 (2) DIPLEXER 782-10250	12	FIBER/DC	EXISTING
	3									-	-				
	4	KMW AM-X-CD-16-65-00T-RET	CCI HPA-65R-BUU-H8	LTE	PROPOSED	92.80	14.40	7.30	65.60	23	185	(1) RRUS-4426 B66 (1) RRUS-11			
Sector 2	1	POWERWAVE 7770	POWERWAVE 7770	UMTS	EXISTING	55.00	11.00	5.00	35.00	263	185	(2) DIPLEXER LGP 21901 (1) TMA TT19-08BP111-001	2	1 1/4" COAX	EXISTING
	2	QUINTEL QS66512-2	QUINTEL QS66512-2	LTE	EXISTING	72.00	12.00	9.60	123.00	143	185	(1) RRUS-4478 B5 (AT GRADE) (1) RRUS-12 (1) RRUS-32 (2) DIPLEXER 782-10250			
	3									-	-				
	4	KMW AM-X-CD-16-65-00T-RET	CCI HPA-65R-BUU-H8	LTE	PROPOSED	92.80	14.40	7.30	65.60	143	185	(1) RRUS-4426 B66 (1) RRUS-11			
Sector 3	1	POWERWAVE 7770	POWERWAVE 7770	UMTS	EXISTING	55.00	11.00	5.00	35.00	23	185	(2) DIPLEXER LGP 21901 (1) TMA TT19-08BP111-001	2	1 1/4" COAX	EXISTING
	2	CCI TPA-65R-LCUUUU-H8	CCI TPA-65R-LCUUUU-H8	LTE	EXISTING	96.00	14.40	8.60	87.60	263	185	(1) RRUS-4478 B5 (AT GRADE) (1) RRUS-12 (1) RRUS-32	12	FIBER/DC	EXISTING
	3									-	-				
	4	POWERWAVE P65-17-XLH-RR	CCI HPA-65R-BUU-H8	LTE	PROPOSED	92.80	14.40	7.30	65.60	263	185	(1) RRUS-4426 B66 (1) RRUS-11			

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STATE OF CONNECTICUT
PETROS TSOUKALAS
PETROS TSOUKALAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577
32577
REGISTERED PROFESSIONAL ENGINEER

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SITE# CTL02086

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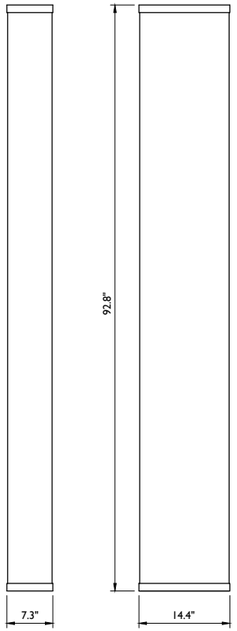
email: solutions@maserconsulting.com

SHEET TITLE:
ANTENNA LAYOUTS AND ANTENNA SCHEDULE

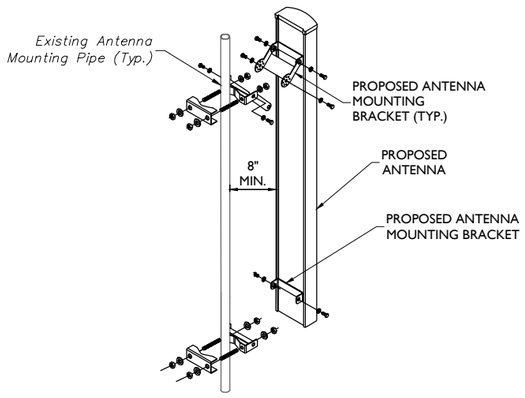
SHEET NUMBER:
C-3



WEIGHT = 53.0 LBS

CCI HPA-65R-BUU-H8

ANTENNA DETAIL

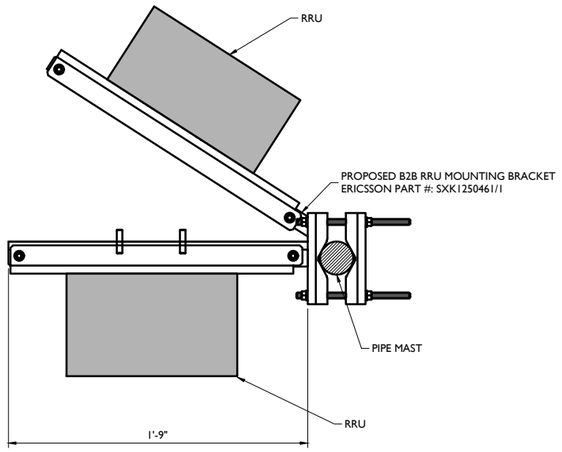


ANTENNA MOUNTING DETAIL

NOT TO SCALE

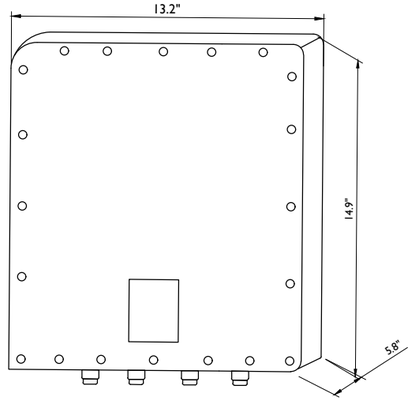
NOTE:

ALL EQUIPMENT MOUNTED TO ANTENNA PIPE MASTS MUST MAINTAIN A MINIMUM DISTANCE OF 8" FROM BACK OF EXISTING/PROPOSED PANEL ANTENNA



RRU MOUNTING DETAIL

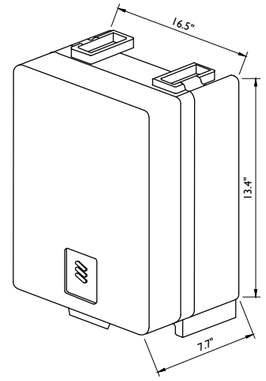
NOT TO SCALE



RRUS 4426 B66 DIMENSIONS (H X W X D): 14.9" X 13.2" X 5.9" (INCLUDES SUNSHIELD) WEIGHT: 48 LBS

RRUS 4426 B66 DETAIL

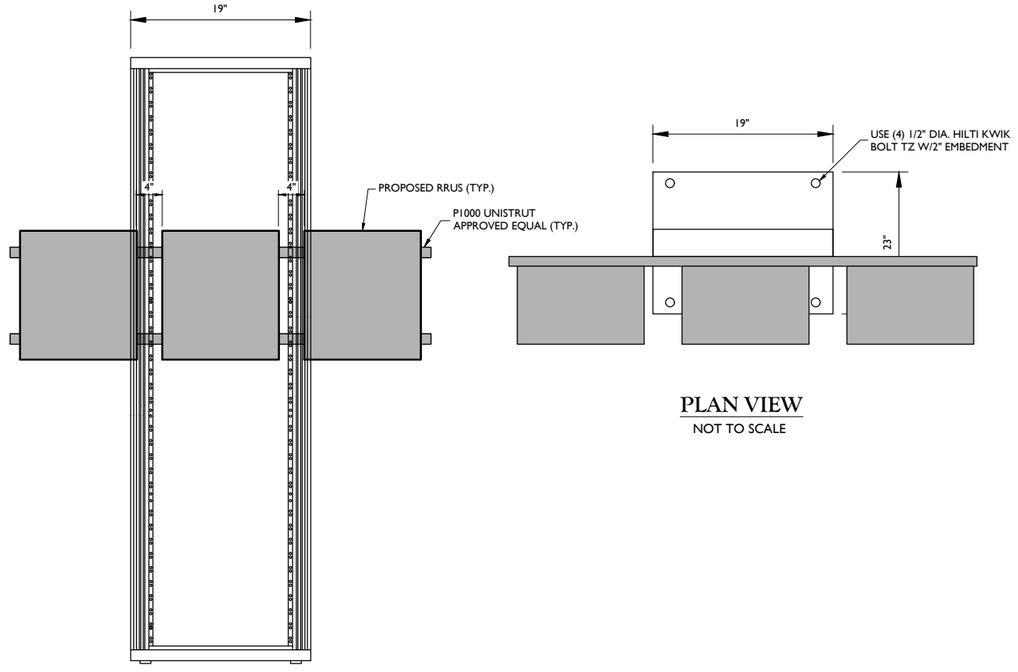
NOT TO SCALE



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



PLAN VIEW

NOT TO SCALE

NOTE:

MOUNT RRU'S TO UNISTRUT WITH 3/8"Ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS THROUGH EQUIPMENT MOUNTING HOLES. SUBCONTRACTOR SHALL SUPPLY.

RRU RACK MOUNTED DETAIL

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STATE OF CONNECTICUT
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CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577
32577
PROFESSIONAL ENGINEER

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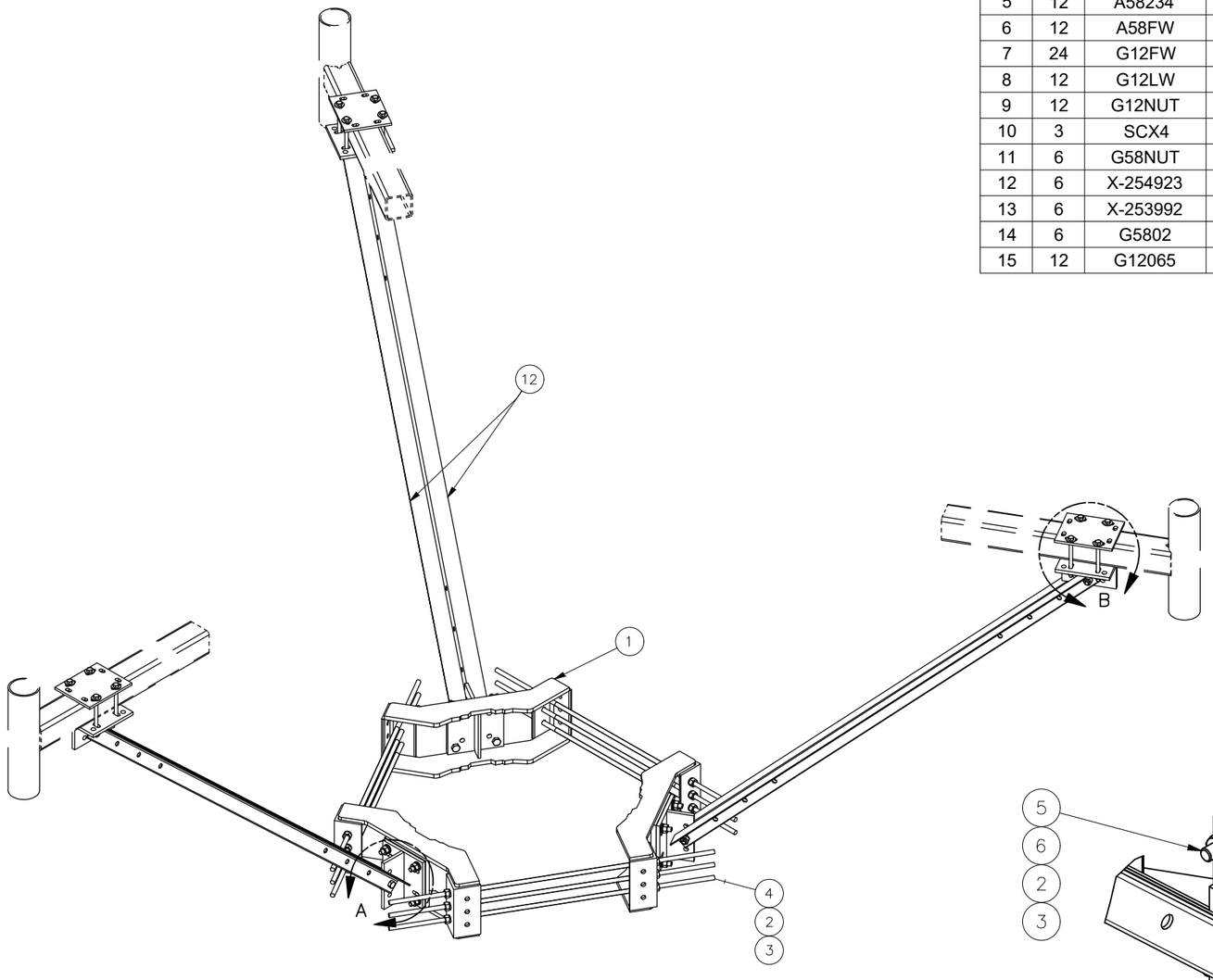
email: solutions@maserconsulting.com

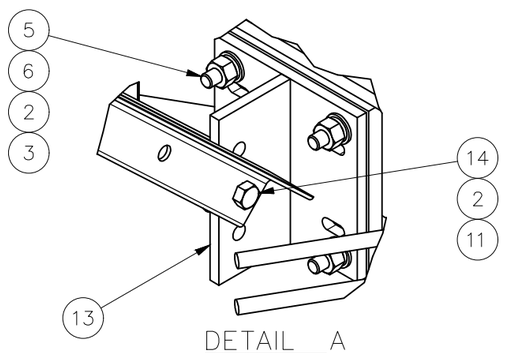
SHEET TITLE : CONSTRUCTION DETAILS

SHEET NUMBER : A-1

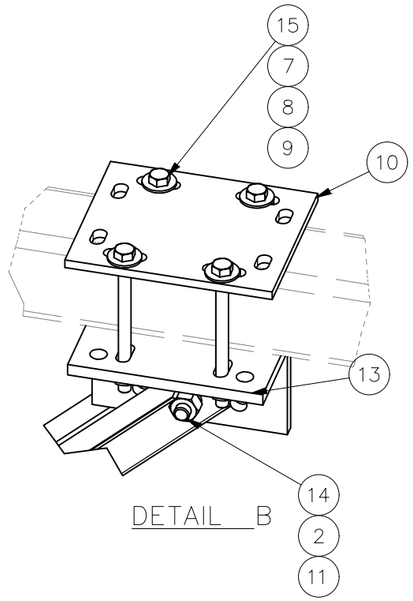
00100339_CTL02086_Rev 0.dwg A-1 By: ACOA

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 I. SOUKIAS · 32577 · PROFESSIONAL ENGINEER

PETROS I. SOUKIAS
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: 32577

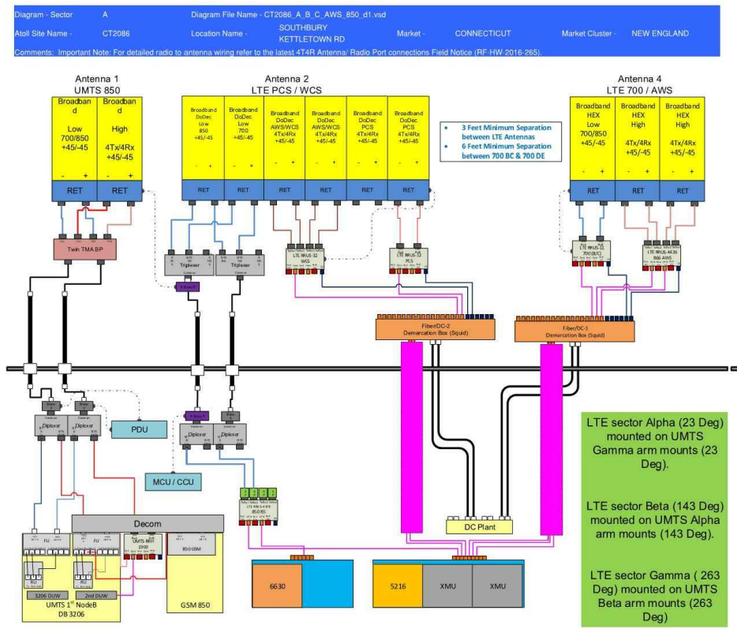
SITE NAME:
SOUTHBURY
KETTLETOWN RD
FA# 10035309
SITE# CTL02086

231 KETTLETOWN ROAD
SOUTHBURY, CT 06488
NEW HAVEN COUNTY

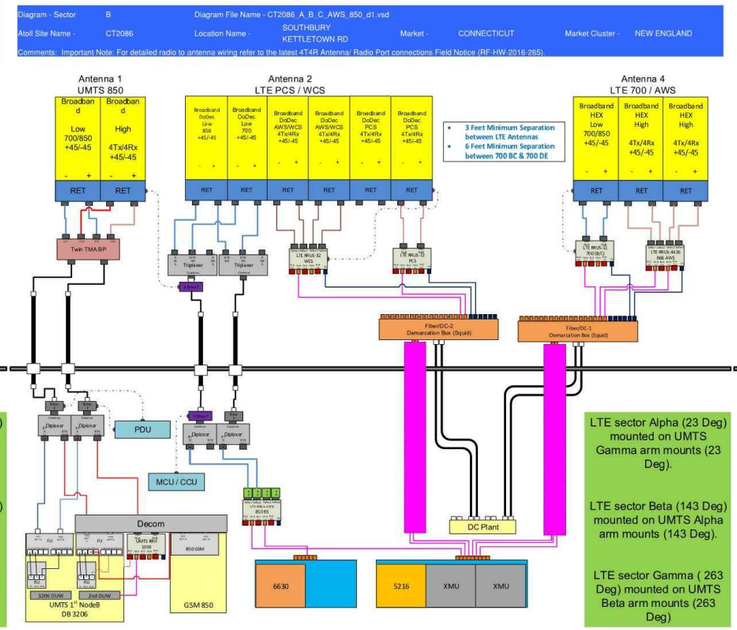
RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE :
CONSTRUCTION DETAILS

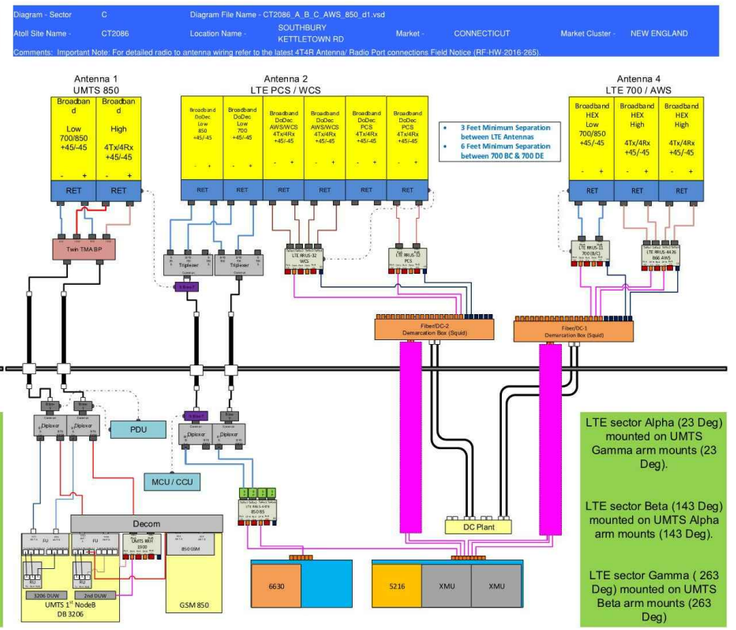
SHEET NUMBER :
A-2



ALPHA SECTOR



BETA SECTOR



GAMMA SECTOR

BASED ON: RF ENGINEERING DESIGN ENTITLED "NEW-ENGLAND_CONNECTICUT_CT2086_2018-LTE-Next-Carrier_LTE-4C_mr673a_2051A0GGLD_10035309_61174_03-14-2018_Final-Approved_v2.00", LAST REVISED 07/23/2018.

RF PLUMBING DIAGRAMS

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FA# 10035309
SITE# CTL02086

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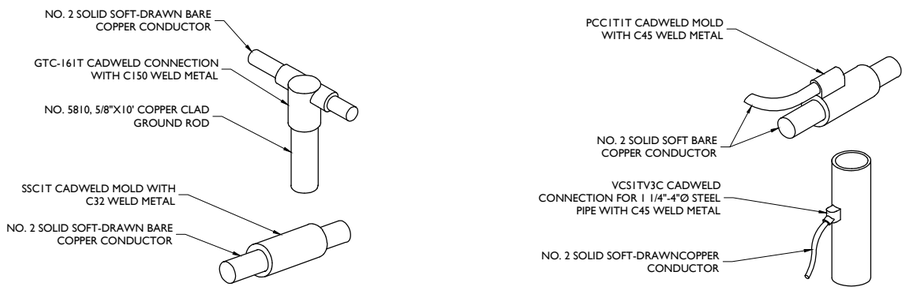
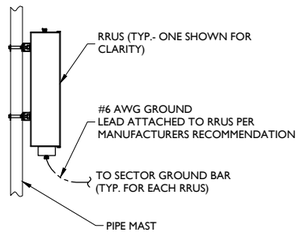
SHEET TITLE: RF PLUMBING DIAGRAM

SHEET NUMBER: A-3



CADWELD DETAILS

NOT TO SCALE



RRU GROUNDING

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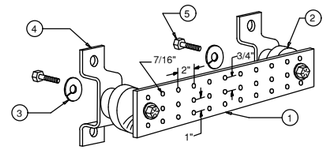


LEGEND

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

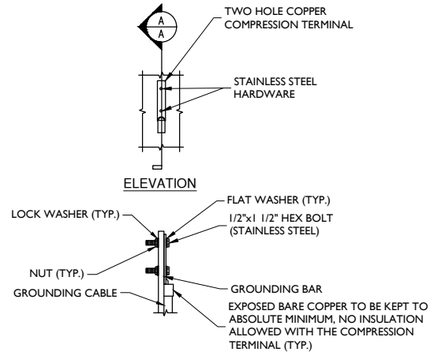
CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
-48V POWER SUPPLT RETURN BAR (#2)
RECTIFIER FRAMES.

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)

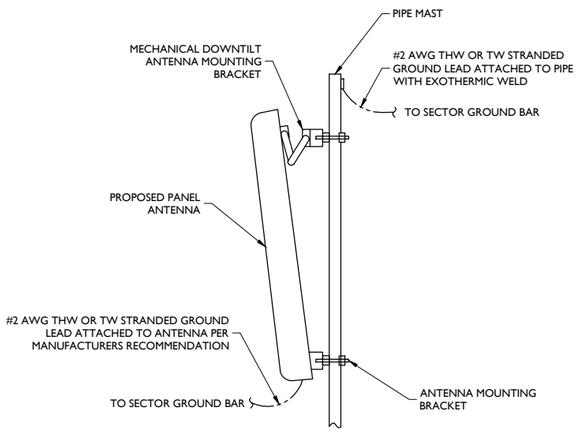
MASTER GROUND BAR

NOT TO SCALE

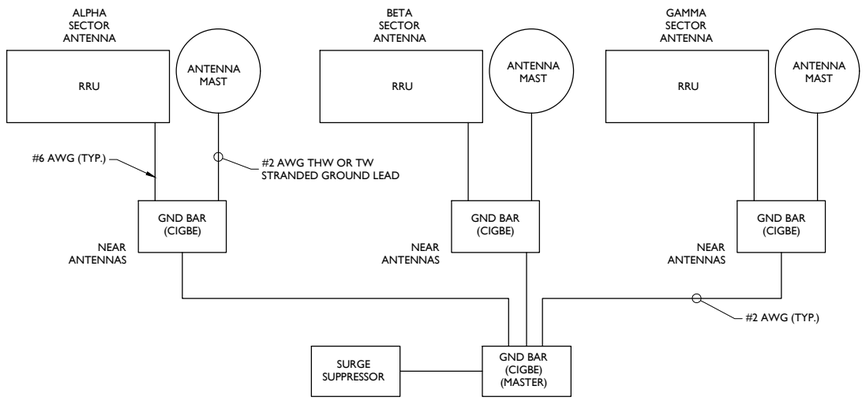


TYPICAL GROUND BAR CONNECTION DETAIL

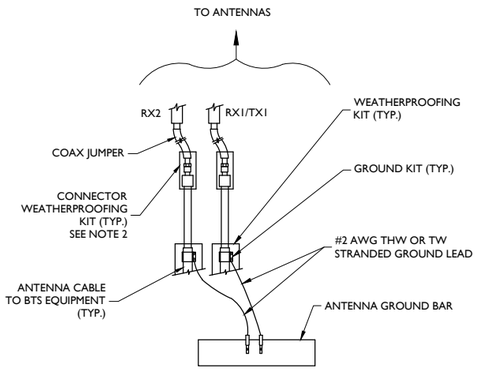
NOT TO SCALE



ANTENNA GROUNDING



SCHEMATIC DIAGRAM GROUNDING SYSTEM



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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KETTLETOWN RD
FA# 10035309
SITE# CTL02086

231 KETTLETOWN ROAD
SOUTHBURY, CT 06488
NEW HAVEN COUNTY

RED BANK OFFICE
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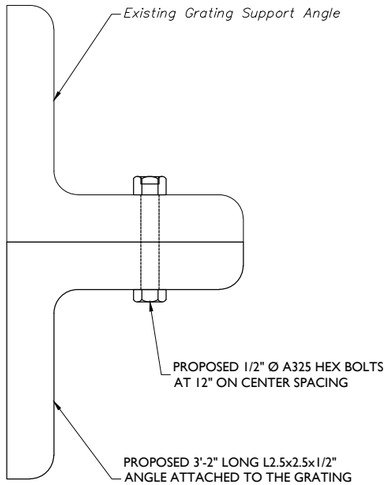
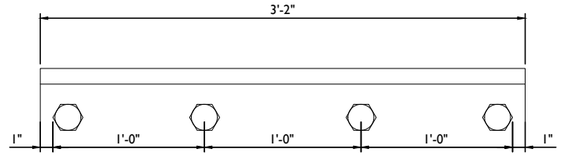
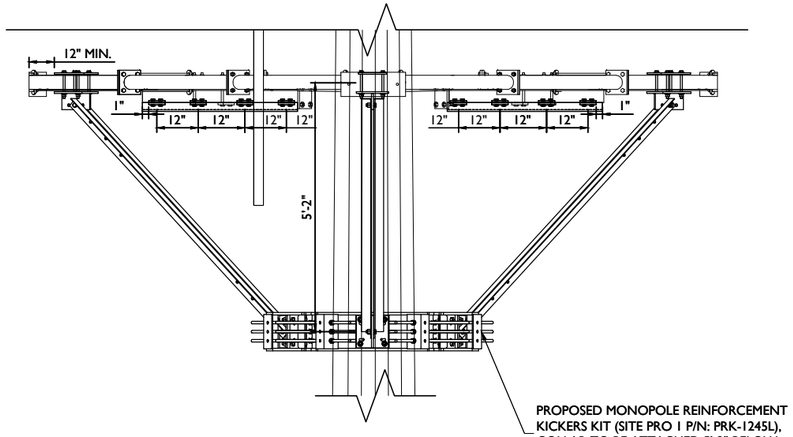
Fax: 732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE : GROUNDING DETAILS

SHEET NUMBER : G-1







ELEVATION VIEW

SITE PRO 1 P/N PRK-1245L

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STATE OF CONNECTICUT
PETROS L. TSOUKALAS
32577
REGISTERED PROFESSIONAL ENGINEER

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

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RED BANK OFFICE
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Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE :
STRUCTURAL DETAILS

SHEET NUMBER :
S-1

Phoenix Tower International
999 Yamato Road, Suite 100
Boca Raton, FL. 33431
(610) 357-8763

GPD Engineering and Architecture
Professional Corporation

Todd Rasey
520 South Main Street, Suite 2531
Akron, OH 44311
(330) 572-2198
trasey@gpdgroup.com

GPD# 2018791.CT1002.05
August 29, 2018

RIGOROUS STRUCTURAL ANALYSIS REPORT

SITE DESIGNATION:	**PTI Site #:**	**US-CT-1002**
	PTI Site Name:	**Kettleton**
	AT&T Site #:	**CT2086**
	AT&T Site Name:	**Southbury Kettletown Rd**
ANALYSIS CRITERIA:	**Codes:**	**TIA-222-G, 2012 IBC & 2016 CSBC** **120-mph Ultimate (3-second gust) with 0" ice** **93-mph Nominal (3-second gust) with 0" ice** **50-mph Nominal (3-second gust) with 3/4" ice**
SITE DATA:		**231 Kettleton Road, Southbury, CT 6488, New Haven County** **Latitude 41° 28' 16.580" N, Longitude 73° 12' 18.352" W** **196' Modified PiROD Monopole**

Mr. David Rodriguez,

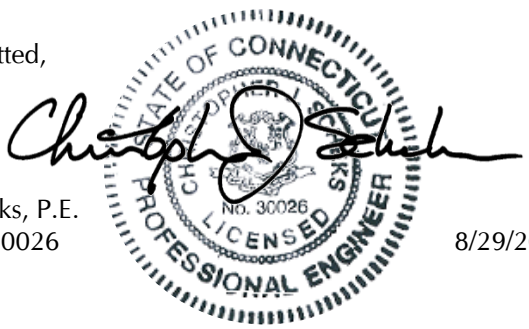
GPD is pleased to submit this Rigorous Structural Analysis Report to determine the structural integrity of the aforementioned tower. The purpose of the analysis is to determine the suitability of the tower with the existing and proposed loading configuration detailed in the analysis report.

Analysis Results

Tower Stress Level with Proposed Equipment:	83.9%	Pass
Foundation Ratio with Proposed Equipment:	65.8%	Pass

We at GPD appreciate the opportunity of providing our continuing professional services to you and Phoenix Tower International. If you have any questions or need further assistance on this or any other projects please do not hesitate to call.

Respectfully submitted,



Christopher J. Scheks, P.E.
Connecticut #: 0030026

8/29/2018

SUMMARY & RESULTS

The purpose of this analysis was to verify whether the existing structure is capable of carrying the proposed loading configuration as specified by AT&T to Phoenix Tower International. This report was commissioned by Mr. David Rodriguez of Phoenix Tower International.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

Note: In order for the analysis results to be valid for the proposed, existing, and reserved loading in Appendix A, the modifications referenced in the design drawings by GPD (Project #: 2010293.91, dated 9/14/10 and Project #: 2013792.15 Rev. A, dated 3/11/14) must be installed. Modifications consisted of reinforcing the pole from 0'-139', adding stiffener plates across the flanges from 20'-120', adding additional anchor rods, and installing a foundation collar with piles to the existing foundation.

TOWER SUMMARY AND RESULTS

Member	Capacity	Results
Monopole	71.9%	Pass
Flange Connections	83.9%	Pass
Base Plate	68.5%	Pass
Anchor Rods	65.7%	Pass
Foundation	65.8%	Pass

ANALYSIS METHOD

tnxTower (Version 8.0.4.0), a commercially available software program, was used to create a three-dimensional model of the tower and calculate primary member stresses for various dead, live, wind, and ice load cases. Selected output from the analysis is included in Appendices B & F. The following table details the information provided to complete this structural analysis. This analysis is based solely on this information and is being completed without the benefit of a detailed site visit.

DOCUMENTS PROVIDED

Document	Remarks	Source
Collocation Application	PTI Collocation Application, revised 8/14/2018	PTI
Tower Design	PiROD, File #: A-115080, dated 3/26/1999	GPD
Foundation Design	PiROD, File #: A-115080, dated 3/26/1999	GPD
Geotechnical Report	Dr. Clarence Welti, dated 10/7/1998	GPD
Previous Structural Analysis	GPD Project #: 2018791.CT1002.04, dated 5/18/2018	GPD
Modification Drawings	GPD Project #: 2010293.91, dated 9/14/2010	GPD
Modification Drawings	GPD Project #: 2013792.15 Rev. A, dated 3/11/2014	GPD

ASSUMPTIONS

This rigorous structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the tower. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. GPD has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The tower member sizes and shapes are considered accurate as supplied. The material grade is as per data supplied and/or as assumed and as stated in the materials section.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations.
6. Foundations are properly designed and constructed to resist the original design loads indicated in the documents provided.
7. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
8. All welds and connections are assumed to develop at least the member capacity unless determined otherwise and explicitly stated in this report.
9. All prior structural modifications are assumed to be as per data supplied/available and to have been properly installed.
10. Loading interpreted from photos is accurate to $\pm 5'$ AGL, antenna size accurate to ± 3.3 sf, and coax equal to the number of existing antennas without reserve.
11. All existing loading was obtained from the provided collocation application, the previous structural analysis by GPD (Project #: 2018791.CT1002.04, dated 5/18/2018) and site photos and is assumed to be accurate.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and GPD should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

GPD has not performed a site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by GPD in connection with this Rigorous Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

This analysis is limited to the designated maximum wind and seismic conditions per the governing tower standards and code. Wind forces resulting in tower vibrations near the structure's resonant frequencies were not considered in this analysis and are outside the scope of this analysis. Lateral loading from any dynamic response was not evaluated under a time-domain based fatigue analysis.

GPD does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. GPD provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the capability of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the code specified amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from GPD, but are beyond the scope of this report.

Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

Towers are designed to carry gravity, wind, and ice loads. All members, legs, diagonals, struts, and redundant members provide structural stability to the tower with little redundancy. Absence or removal of a member can trigger catastrophic failure unless a substitute is provided before any removal. Legs carry axial loads and derive their strength from shorter unbraced lengths by the presence of redundant members and their connection to the diagonals with bolts or welds. If the bolts or welds are removed without providing any substitute to the frame, the leg is subjected to a higher unbraced length that immediately reduces its load carrying capacity. If a diagonal is also removed in addition to the connection, the unbraced length of the leg is greatly increased, jeopardizing its load carrying capacity. Failure of one leg can result in a tower collapse because there is no redundancy. Redundant members and diagonals are critical to the stability of the tower.

GPD makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of GPD pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

Tower Analysis Summary Form

Tower Analysis Summary Form

General Info

Site Name	Kettleton
Site Number	US-CT-1002
Proposed Carrier	Sprint
Date of Analysis	August 29, 2018
Company Performing Analysis	GPD

The information contained in this summary report is not to be used independently from the PE stamped tower analysis.

Tower Info	Description	Date
Tower Type (G, SST, MP)	MP	
Tower Height (top of steel AGL)	196'	
Tower Manufacturer	PiROD	
Tower Model	n/a	
Tower Design	PiROD, File #: A-115080	3/26/1999
Foundation Design	PiROD, File #: A-115080	3/26/1999
Geotech Report	Dr. Clarence Welti	10/7/1998
Previous Structural Analysis	GPD Project #: 2018791.CT1002.04	5/18/2018
Modification Drawings	GPD Project #: 2010293.91	9/14/2010
Modification Drawings	GPD Project #: 2013792.15 Rev. A	3/11/2014
Foundation Mapping	n/a	

Design Parameters

Design Code Used	TIA-222-G 2012 IBC & 2016 CSBC
Location of Tower (County, State)	New Haven, CT
Nominal Wind Speed (mph)	93 Nominal (3-sec gust)
Ice Thickness (in)	0.75
Risk Category (I, II, III)	II
Exposure Category (B, C, D)	B
Topographic Category (1 to 5)	1

Analysis Results (% Maximum Usage)

Existing/Reserved + Future + Proposed Condition	
Tower (%)	83.9%
Tower Base (%)	68.5%
Foundation (%)	65.8%
Foundation Adequate?	Yes

T-Mobile Future Loading Information	
Existing/Proposed Area (in^2)	11,692
Future Area (in^2)	10,308
Total Wind Area (in^2)	22,000
Does T-Mobile's Loading Exceed 22,000 in^2?	No
If yes, by how much? (in^2)	n/a

Steel Yield Strength (ksi)

Monopole Shaft	65
Base Plate	50
Anchor Rods	75

Existing / Reserved Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Int./Ext.
T-Mobile	195	195	3	Panel	Andrew	RR90-17-02DP	110/230/350	1	Unknown	LP Platform	12	Unknown	1-5/8"	Internal
T-Mobile	195	195	3	Panel	Commscope	LNX-6515DS-VTM	110/230/350			on the same mount	1	Hybrid Cables	1-5/8"	Internal
T-Mobile	195	195	3	Panel	Ericsson	AIR 33	110/230/350			on the same mount				
T-Mobile	195	195	3	TMA	Ericsson	KRY 112 71				on the same mount				
T-Mobile	195	195	1	Surge	Raycap	DC4-48-60-8-20F				on the same mount				
AT&T Mobility	185	185	3	Panel	Powerwave	7770	23/143/263	1	Unknown	LP Platform	12	Unknown	1-1/4"	Internal
AT&T Mobility	185	185	2	Panel	KMW	AM-X-CD-16-65-00T RET	23/143			on the same mount	4	DC Power	3/4"	Internal
AT&T Mobility	185	185	2	Panel	Quintel	QS66512-2	23/143			on the same mount	2	Fiber Cable	1.496"	Internal
AT&T Mobility	185	185	1	Panel	Powerwave	P65-17-XLH-RR	263			on the same mount				
AT&T Mobility	185	185	1	Panel	CCI	TPA-65R-LCUUUU-H8	263			on the same mount				
AT&T Mobility	185	185	3	TMA	Powerwave	TT19-08B9111-001				on the same mount				
AT&T Mobility	185	185	6	Diplexer	Powerwave	LGP 21901				on the same mount				
AT&T Mobility	185	185	6	Diplexer	Kathrein	782-10250				on the same mount				
AT&T Mobility	185	185	6	RET	Powerwave	7020				on the same mount				
AT&T Mobility	185	185	3	RRU	Ericsson	RRUS 11				on the same mount				
AT&T Mobility	185	185	3	RRU	Ericsson	RRUS 12				on the same mount				
AT&T Mobility	185	185	3	RRU	Ericsson	RRUS 32				on the same mount				
AT&T Mobility	185	185	2	Surge	Raycap	DC6-48-60-18-8F				on the same mount				
Pocket	175	175	3	Panel	RFS	APXV18-206517S-C	110/230/350			Flush mounted	6	Unknown	1-5/8"	External
Sprint	165	165	3	Panel	RFS	APXVTM14-ALU-I20	340/70/260	1	Unknown	LP Platform	4	Hybriflex	1-1/4"	External
Sprint	165	165	3	Panel	Commscope	NNVV-65B-R4	340/70/260			on the same mount				
Sprint	165	165	3	RRH	Alcatel Lucent	RRH 1900 4x45 65 MHz				on the same mount				
Sprint	165	165	3	RRH	Alcatel Lucent	800 MHz RRH				on the same mount				
Sprint	165	165	3	RRH	Alcatel Lucent	TD-RRH8x20-25 w/ Solar Shield				on the same mount				
Sprint	165	165	3	RRH	Alcatel Lucent	RRH2x50-08 (800 MHz)				on the same mount				
Verizon Wireless	155	155	3	Panel	Amphenol	BXA-70063/4CF	60/180/300	1	Unknown	LP Platform	6	Unknown	1-5/8"	External
Verizon Wireless	155	155	6	Panel	Commscope	JAHH-65B-R3B	60/180/300	3	Commscope	BSAMNT SBS-2-2	2	Hybriflex	1-5/8"	External
Verizon Wireless	155	155	1	OVP	RFS	DB-C1-12C-24-AB-0Z				on the same mounts				
Verizon Wireless	155	155	3	RRU	Alcatel Lucent	B66A RRH 4x45				on the same mounts				
Verizon Wireless	155	155	3	RRU	Alcatel Lucent	B25 RRH4x30				on the same mounts				
Verizon Wireless	155	155	3	RRU	Alcatel Lucent	B13 RRH 4x30				on the same mounts				
T-Mobile	91	91	1	Dish	Unknown	2' MW Dish	240			Collar mount	1	Unknown	1-5/8"	Internal
T-Mobile	75	75	1	Panel	Pctel	TMG-HR-26N GPS	240			Pipe mounted	1	Unknown	7/8"	External

Note: (2) AM-X-CD-16-65-00T RET antennas and (1) P65-17-XLH-RR antenna at 185' are to be removed prior to installation of the proposed loading and were not considered in the analysis. All other loading shall remain as shown.

Proposed Loading

Antenna								Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Manufacturer	Model	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Int./Ext.
AT&T Mobility	185	185	3	Panel	CCI	HPA-65R-BUU-H8	23/143/263			on the existing mount				
AT&T Mobility	185	185	3	RRH	Ericsson	RRUS 4426 B66				on the existing mount				

Note: The proposed equipment shall be installed in addition to the remaining existing/reserved loading at the same elevation.

Reserved Loading

Antenna						Mount			Transmission Line			
Antenna Owner	Mount Height (ft)	Antenna CL (ft)	Quantity	Type	Azimuth	Quantity	Manufacturer	Type	Quantity	Model	Size	Attachment Int./Ext.
T-Mobile	195	195	1	10,308 in^2 Remaining Reserved Loading				on the existing mounts				

Note: T-Mobile's final loading configuration uses 11,692 in^2 of their MLA reserved loading.

APPENDIX B

tnxTower Output

Tower Input Data

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

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

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	*Sector*	*Component Type*	*Placement*	*Total Number*	*Number Per Row*	*Start/End Position*	*Width or Diameter*	*Perimeter*	*Weight*
			ft				*in*	*in*	*klf*
PiROD Climbing Rungs	C	Surface Ar (CaAa)	196.00 - 8.00	1	1	0.000 0.000	0.6250		0.00
LDF7-50A (1-5/8 FOAM)	A	Surface Ar (CaAa)	175.00 - 8.00	1	1	0.000 0.000	1.9800		0.00
LDF7-50A (1-5/8 FOAM)	A	Surface Ar (CaAa)	175.00 - 8.00	5	5	0.000 0.000	0.0000		0.00
Hybriflex	A	Surface Ar (CaAa)	165.00 - 8.00	4	4	0.000 0.000	1.2500		0.00
LDF7-50A (1-5/8 FOAM)	B	Surface Ar (CaAa)	155.00 - 8.00	6	6	0.000 0.000	1.9800		0.00
1-5/8" Hybrid Cable	B	Surface Ar (CaAa)	155.00 - 8.00	2	2	0.000 0.000	1.9800		0.00
LDF5-50A (7/8 FOAM)	C	Surface Ar (CaAa)	75.00 - 8.00	1	1	0.000 0.000	1.0900		0.00
4" x 1-1/4" Mod Plate	A	Surface Af (CaAa)	22.00 - 18.00	2	2	0.000 0.000	1.2500	10.5000	0.02
4" x 1-1/4" Mod Plate	B	Surface Af (CaAa)	22.00 - 18.00	2	2	0.000 0.000	1.2500	10.5000	0.02
4" x 1-1/4" Mod Plate	C	Surface Af (CaAa)	22.00 - 18.00	2	2	0.000 0.000	1.2500	10.5000	0.02
4" x 1-1/4" Mod Plate	A	Surface Af (CaAa)	42.00 - 38.00	2	2	0.000 0.000	1.2500	10.5000	0.02
4" x 1-1/4" Mod Plate	B	Surface Af (CaAa)	42.00 - 38.00	2	2	0.000 0.000	1.2500	10.5000	0.02
4" x 1-1/4" Mod Plate	C	Surface Af	42.00 - 38.00	2	2	0.000	1.2500	10.5000	0.02

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
		(CaAa)				0.000			
6" x 1-1/2" Mod Plate	A	Surface Af (CaAa)	24.00 - 16.00	2	2	0.000 0.000	0.0000	0.0000	0.03
6" x 1-1/2" Mod Plate	B	Surface Af (CaAa)	24.00 - 16.00	2	1	0.000 0.000	0.0000	0.0000	0.03
6" x 1-1/2" Mod Plate	C	Surface Af (CaAa)	24.00 - 16.00	2	1	0.000 0.000	0.0000	0.0000	0.03
6" x 1-1/2" Mod Plate	A	Surface Af (CaAa)	44.00 - 36.00	2	1	0.000 0.000	0.0000	0.0000	0.03
6" x 1-1/2" Mod Plate	B	Surface Af (CaAa)	44.00 - 36.00	2	1	0.000 0.000	0.0000	0.0000	0.03
6" x 1-1/2" Mod Plate	C	Surface Af (CaAa)	44.00 - 36.00	2	1	0.000 0.000	0.0000	0.0000	0.03
6" x 1-1/2" Mod Plate	A	Surface Af (CaAa)	64.00 - 56.00	2	1	0.000 0.000	0.0000	0.0000	0.03
6" x 1-1/2" Mod Plate	B	Surface Af (CaAa)	64.00 - 56.00	2	1	0.000 0.000	0.0000	0.0000	0.03
6" x 1-1/2" Mod Plate	C	Surface Af (CaAa)	64.00 - 56.00	2	1	0.000 0.000	0.0000	0.0000	0.03

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
Safety Line 3/8	C	No	CaAa (Out Of Face)	196.00 - 8.00	1	No Ice	0.04	0.00
						1/2" Ice	0.14	0.00
						1" Ice	0.24	0.00
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	195.00 - 8.00	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
1-5/8" Hybrid Cable	C	No	Inside Pole	195.00 - 8.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
LDF6-50A (1-1/4 FOAM)	A	No	Inside Pole	185.00 - 8.00	12	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
1.496" Fiber Cable	A	No	Inside Pole	185.00 - 8.00	2	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
3/4" DC Power Line	A	No	Inside Pole	185.00 - 8.00	4	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	91.00 - 8.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pirod 16.5' LP Platform	C	None		0.0000	195.00	No Ice	20.80	20.80	1.80
						1/2" Ice	28.10	28.10	2.07
						1" Ice	35.40	35.40	2.33
AIR 33 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	6.63 7.35 8.01	6.31 7.48 8.50	0.14 0.20 0.27
AIR 33 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	6.63 7.35 8.01	6.31 7.48 8.50	0.14 0.20 0.27
AIR 33 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	6.63 7.35 8.01	6.31 7.48 8.50	0.14 0.20 0.27
RR90-17-02DP w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.34 4.11 4.81	0.00 0.00 0.00
RR90-17-02DP w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.34 4.11 4.81	0.00 0.00 0.00
RR90-17-02DP w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	4.59 5.09 5.58	3.34 4.11 4.81	0.00 0.00 0.00
LNX-6515DS-VTM w/ mount pipe	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	11.43 12.05 12.67	9.35 10.67 11.70	0.08 0.16 0.25
LNX-6515DS-VTM w/ mount pipe	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	11.43 12.05 12.67	9.35 10.67 11.70	0.08 0.16 0.25
LNX-6515DS-VTM w/ mount pipe	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	11.43 12.05 12.67	9.35 10.67 11.70	0.08 0.16 0.25
KRY 112 71	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	0.58 0.69 0.80	0.40 0.49 0.59	0.01 0.02 0.03
KRY 112 71	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	0.58 0.69 0.80	0.40 0.49 0.59	0.01 0.02 0.03
KRY 112 71	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	0.58 0.69 0.80	0.40 0.49 0.59	0.01 0.02 0.03
DC4-48-60-8-20F	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	1.43 1.58 1.74	0.59 0.70 0.81	0.01 0.02 0.03
T-Mobile Reserved Loading	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	47.72 50.18 52.51	24.42 26.92 29.44	0.44 0.62 0.83
T-Mobile Reserved Loading	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	47.72 50.18 52.51	24.42 26.92 29.44	0.44 0.62 0.83
T-Mobile Reserved Loading	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	195.00	No Ice 1/2" Ice 1" Ice	47.72 50.18 52.51	24.42 26.92 29.44	0.44 0.62 0.83
PiROD 13' Low Profile Platform (Monopole)	C	None		0.0000	185.00	No Ice 1/2" Ice 1" Ice	15.70 20.10 24.50	15.70 20.10 24.50	1.30 1.76 2.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
7770.00 w/Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	4.10 4.73 5.37	0.06 0.11 0.16
7770.00 w/Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	4.10 4.73 5.37	0.06 0.11 0.16
7770.00 w/Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	4.10 4.73 5.37	0.06 0.11 0.16
QS66512-2 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	8.13 8.59 9.05	8.17 9.13 9.96	0.13 0.20 0.28
QS66512-2 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	8.13 8.59 9.05	8.17 9.13 9.96	0.13 0.20 0.28
TPA-65R-LCUUUU-H8 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	13.54 14.24 14.95	10.96 12.49 14.04	0.11 0.22 0.33
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	13.05 13.66 14.27	9.42 10.82 12.07	0.09 0.19 0.29
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	13.05 13.66 14.27	9.42 10.82 12.07	0.09 0.19 0.29
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	13.05 13.66 14.27	9.42 10.82 12.07	0.09 0.19 0.29
TT19-08BP111-001	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.55 0.65 0.75	0.45 0.53 0.63	0.02 0.02 0.03
TT19-08BP111-001	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.55 0.65 0.75	0.45 0.53 0.63	0.02 0.02 0.03
TT19-08BP111-001	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.55 0.65 0.75	0.45 0.53 0.63	0.02 0.02 0.03
(2) LGP21901	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
(2) LGP21901	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
(2) LGP21901	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.23 0.29 0.36	0.16 0.21 0.28	0.01 0.01 0.01
(2) 782 10250	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.45 0.54 0.64	0.25 0.32 0.40	0.01 0.01 0.02
(2) 782 10250	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.45 0.54 0.64	0.25 0.32 0.40	0.01 0.01 0.02
(2) 782 10250	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.45 0.54 0.64	0.25 0.32 0.40	0.01 0.01 0.02
(2) 7020.00	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 7020.00	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
(2) 7020.00	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.10 0.15 0.20	0.17 0.24 0.31	0.00 0.01 0.01
RRUS 11	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
RRUS 11	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
RRUS 11	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
RRUS 12	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS 12	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS 12	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.15 3.36 3.59	1.29 1.44 1.60	0.06 0.08 0.11
RRUS 32	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.08 0.10 0.14
RRUS 32	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.08 0.10 0.14
RRUS 32	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.08 0.10 0.14
RRUS 4426 B66	A	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.73 0.84 0.97	0.05 0.06 0.08
RRUS 4426 B66	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.73 0.84 0.97	0.05 0.06 0.08
RRUS 4426 B66	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	1.64 1.80 1.97	0.73 0.84 0.97	0.05 0.06 0.08
DC6-48-60-18-8F Surge Suppression Unit	B	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
DC6-48-60-18-8F Surge Suppression Unit	C	From Centroid-Leg	4.00 0.00 0.00	23.0000	185.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	0.02 0.04 0.06
Valmont Light Duty Tri-Bracket (1)	C	None		0.0000	175.00	No Ice 1/2" Ice 1" Ice	1.76 2.08 2.40	1.76 2.08 2.40	0.05 0.07 0.09
APXV18-206517S-C w/ Mount Pipe	A	From Leg	0.50 0.00 0.00	-10.0000	175.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	4.46 5.39 6.20	0.05 0.09 0.14
APXV18-206517S-C w/ Mount Pipe	B	From Leg	0.50 0.00 0.00	-10.0000	175.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	4.46 5.39 6.20	0.05 0.09 0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXV18-206517S-C w/ Mount Pipe	C	From Leg	0.50	-10.0000	175.00	No Ice	5.17	4.46	0.05
			0.00			1/2" Ice	5.62	5.39	0.09
			0.00			1" Ice	6.08	6.20	0.14
MTS 12.5' LP Platform	C	None		0.0000	165.00	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Centroid-Face	4.00	40.0000	165.00	No Ice	6.58	4.96	0.08
			0.00			1/2" Ice	7.03	5.75	0.13
			0.00			1" Ice	7.47	6.47	0.19
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Centroid-Face	4.00	10.0000	165.00	No Ice	6.58	4.96	0.08
			0.00			1/2" Ice	7.03	5.75	0.13
			0.00			1" Ice	7.47	6.47	0.19
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Centroid-Face	4.00	80.0000	165.00	No Ice	6.58	4.96	0.08
			0.00			1/2" Ice	7.03	5.75	0.13
			0.00			1" Ice	7.47	6.47	0.19
NNVV-65B-R4 w/ Mount Pipe	A	From Centroid-Face	4.00	40.0000	165.00	No Ice	12.27	7.17	0.10
			0.00			1/2" Ice	12.77	8.13	0.19
			0.00			1" Ice	13.27	8.97	0.28
NNVV-65B-R4 w/ Mount Pipe	B	From Centroid-Face	4.00	10.0000	165.00	No Ice	12.27	7.17	0.10
			0.00			1/2" Ice	12.77	8.13	0.19
			0.00			1" Ice	13.27	8.97	0.28
NNVV-65B-R4 w/ Mount Pipe	C	From Centroid-Face	4.00	80.0000	165.00	No Ice	12.27	7.17	0.10
			0.00			1/2" Ice	12.77	8.13	0.19
			0.00			1" Ice	13.27	8.97	0.28
RRH 1900 4x45 65 MHz	A	From Centroid-Face	4.00	40.0000	165.00	No Ice	2.29	2.29	0.06
			0.00			1/2" Ice	2.50	2.50	0.08
			0.00			1" Ice	2.71	2.71	0.11
RRH 1900 4x45 65 MHz	B	From Centroid-Face	4.00	10.0000	165.00	No Ice	2.29	2.29	0.06
			0.00			1/2" Ice	2.50	2.50	0.08
			0.00			1" Ice	2.71	2.71	0.11
RRH 1900 4x45 65 MHz	C	From Centroid-Face	4.00	80.0000	165.00	No Ice	2.29	2.29	0.06
			0.00			1/2" Ice	2.50	2.50	0.08
			0.00			1" Ice	2.71	2.71	0.11
800 MHz RRH	A	From Centroid-Face	4.00	40.0000	165.00	No Ice	1.70	1.28	0.05
			0.00			1/2" Ice	1.86	1.43	0.07
			0.00			1" Ice	2.03	1.58	0.09
800 MHz RRH	B	From Centroid-Face	4.00	10.0000	165.00	No Ice	1.70	1.28	0.05
			0.00			1/2" Ice	1.86	1.43	0.07
			0.00			1" Ice	2.03	1.58	0.09
800 MHz RRH	C	From Centroid-Face	4.00	80.0000	165.00	No Ice	1.70	1.28	0.05
			0.00			1/2" Ice	1.86	1.43	0.07
			0.00			1" Ice	2.03	1.58	0.09
TD-RRH8x20-25 w/ Solar Shield	A	From Centroid-Face	4.00	40.0000	165.00	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			0.00			1" Ice	4.20	1.64	0.12
TD-RRH8x20-25 w/ Solar Shield	B	From Centroid-Face	4.00	10.0000	165.00	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			0.00			1" Ice	4.20	1.64	0.12
TD-RRH8x20-25 w/ Solar Shield	C	From Centroid-Face	4.00	80.0000	165.00	No Ice	3.70	1.29	0.07
			0.00			1/2" Ice	3.95	1.46	0.09
			0.00			1" Ice	4.20	1.64	0.12
RRH2X50-08 (800 MHz)	A	From Centroid-Face	4.00	40.0000	165.00	No Ice	1.70	1.28	0.05
			0.00			1/2" Ice	1.86	1.43	0.07
			0.00			1" Ice	2.03	1.58	0.09
RRH2X50-08 (800 MHz)	B	From Centroid-Face	4.00	10.0000	165.00	No Ice	1.70	1.28	0.05
			0.00			1/2" Ice	1.86	1.43	0.07
			0.00			1" Ice	2.03	1.58	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRH2X50-08 (800 MHz)	C	From Centroid-Face	4.00 0.00	0.00	80.0000	165.00	No Ice 1/2" Ice 1" Ice	1.70 1.86 2.03	1.28 1.43 1.58	0.05 0.07 0.09
PiROD 15' Low Profile Platform (Monopole)	C	None			0.0000	155.00	No Ice 1/2" Ice 1" Ice	17.30 22.10 26.90	17.30 22.10 26.90	1.50 2.03 2.56
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	9.35 9.92 10.46	7.65 8.83 9.73	0.09 0.16 0.25
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	9.35 9.92 10.46	7.65 8.83 9.73	0.09 0.16 0.25
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	9.35 9.92 10.46	7.65 8.83 9.73	0.09 0.16 0.25
BXA-70063-4CF-EDIN-6 w/ Mount Pipe	A	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.95 5.32 5.71	3.69 4.29 4.91	0.03 0.07 0.12
BXA-70063-4CF-EDIN-6 w/ Mount Pipe	B	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.95 5.32 5.71	3.69 4.29 4.91	0.03 0.07 0.12
BXA-70063-4CF-EDIN-6 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.95 5.32 5.71	3.69 4.29 4.91	0.03 0.07 0.12
DB-C1-12C-24AB-0Z	A	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	4.06 4.32 4.58	3.10 3.34 3.58	0.03 0.07 0.11
B66A RRH4X45	A	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.54 2.75 2.97	1.61 1.79 1.98	0.06 0.08 0.10
B66A RRH4X45	B	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.54 2.75 2.97	1.61 1.79 1.98	0.06 0.08 0.10
B66A RRH4X45	C	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.54 2.75 2.97	1.61 1.79 1.98	0.06 0.08 0.10
B25 RRH4X30	A	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.74 1.92 2.11	0.06 0.08 0.10
B25 RRH4X30	B	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.74 1.92 2.11	0.06 0.08 0.10
B25 RRH4X30	C	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.74 1.92 2.11	0.06 0.08 0.10
B13 RRH 4X30	A	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.32 1.48 1.64	0.06 0.07 0.09
B13 RRH 4X30	B	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.32 1.48 1.64	0.06 0.07 0.09
B13 RRH 4X30	C	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.32 1.48 1.64	0.06 0.07 0.09
BSAMNT SBS-2-2	A	From Centroid-Face	4.00 0.00	0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.43 1.92 2.29	0.03 0.04 0.05

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)
BSAMNT SBS-2-2	B	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.43 1.92 2.29	0.03 0.04 0.05
BSAMNT SBS-2-2	C	From Centroid-Face	4.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.43 1.92 2.29	0.03 0.04 0.05
Pipe Mount 3'x4.5"	C	From Leg	0.50 0.00 0.00	0.0000	91.00	No Ice 1/2" Ice 1" Ice	0.90 1.12 1.33	0.90 1.12 1.33	0.03 0.04 0.05
Pipe Mount 3'x4.5"	C	From Leg	0.50 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	0.91 1.12 1.33	0.91 1.12 1.33	0.03 0.04 0.05
GPS-TMG-HR-26N	C	From Leg	0.50 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice	0.13 0.18 0.24	0.13 0.18 0.24	0.00 0.00 0.01
Bridge Stiffener (3.25 sq ft)	A	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00
Bridge Stiffener (3.25 sq ft)	B	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00
Bridge Stiffener (3.25 sq ft)	C	From Leg	0.50 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00
Bridge Stiffener (3.25 sq ft)	A	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00
Bridge Stiffener (3.25 sq ft)	B	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00
Bridge Stiffener (3.25 sq ft)	C	From Leg	0.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00
Bridge Stiffener (3.25 sq ft)	A	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00
Bridge Stiffener (3.25 sq ft)	B	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00
Bridge Stiffener (3.25 sq ft)	C	From Leg	0.50 0.00 0.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice	3.25 3.60 3.94	0.74 1.25 1.73	0.00 0.00 0.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral / Vert (ft)	Azimuth Adjustment (°)	3 dB Beam Width (°)	Elevation (ft)	Outside Diameter (ft)		Aperture Area (ft^2)	Weight (K)
2' MW	C	Paraboloid w/Radome	From Leg	1.00 0.00 0.00	0.0000		91.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	0.04 0.07 0.10

Critical Deflections and Radius of Curvature - Service Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
195.00	Pirod 16.5' LP Platform	48	18.671	0.9149	0.0018	50175
185.00	PiROD 13' Low Profile Platform (Monopole)	48	16.765	0.9004	0.0019	18562
175.00	Valmont Light Duty Tri-Bracket (1)	48	14.918	0.8635	0.0017	14618
165.00	MTS 12.5' LP Platform	48	13.160	0.8113	0.0016	8680
155.00	PiROD 15' Low Profile Platform (Monopole)	48	11.531	0.7484	0.0012	10006
120.00	Bridge Stiffener (3.25 sq ft)	48	6.887	0.5378	0.0006	12519
100.00	Bridge Stiffener (3.25 sq ft)	48	4.813	0.4473	0.0004	12527
91.00	2' MW	48	4.005	0.4096	0.0004	12924
80.00	Bridge Stiffener (3.25 sq ft)	48	3.120	0.3574	0.0003	12965
75.00	Pipe Mount 3'x4.5"	48	2.756	0.3379	0.0003	14304

CCIpole

per TIA-222- G

Site BU: US-CT-1002 Kettleton

Work Order: 2018791.CT1002.05

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	196	1		0	18	18	0.375		A53-B-42
2	195	15		0	24.00	24	0.375		A53-B-42
3	180	20		0	30.00	30	0.375		A53-B-42
4	160	20		0	36.00	36	0.375		A53-B-42
5	140	20		0	42.00	42	0.375		A53-B-42
6	120	20		0	48.00	48	0.375		A53-B-42
7	100	20		0	54.00	54	0.375		A53-B-42
8	80	20		0	60.00	60	0.375		A53-B-42
9	60	20		0	60.00	60	0.5		A53-B-42
10	40	40		0	60.00	60	0.625		A53-B-42

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Pole Flat Width (in)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	20	plate	6-1/2"x1-1/2" FP	-	0						120						240					
2	20	40	plate	6-1/2"x1-1/2" FP	-	0						120						240					
3	40	60	plate	6-1/2"x1-1/2" FP	-	0						120						240					
4	60	80	plate	6-1/2"x1-1/2" FP	-	0						120						240					
5	80	100	plate	6-1/2"x1-1/2" FP	-	0						120						240					
6	100	120	plate	6-1/2"x1-1/2" FP	-	0						120						240					
7	120	136	plate	6-1/2"x1-1/2" FP	-	0						120						240					
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6.5	1.5	9.75	0.75	33.000	33.000	18.000	7.875	1.1875	A572-65
2	6.5	1.5	9.75	0.75	33.000	33.000	18.000	7.875	1.1875	A572-65
3	6.5	1.5	9.75	0.75	33.000	33.000	18.000	7.875	1.1875	A572-65
4	6.5	1.5	9.75	0.75	33.000	33.000	18.000	7.875	1.1875	A572-65
5	6.5	1.5	9.75	0.75	33.000	33.000	18.000	7.875	1.1875	A572-65
6	6.5	1.5	9.75	0.75	33.000	33.000	18.000	7.875	1.1875	A572-65
7	6.5	1.5	9.75	0.75	33.000	33.000	18.000	7.875	1.1875	A572-65

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
196 - 195	Pole	TP18x18x0.375	Pole	0.0%	Pass
195 - 190	Pole	TP24x24x0.375	Pole	7.3%	Pass
190 - 185	Pole	TP24x24x0.375	Pole	14.5%	Pass
185 - 180	Pole	TP24x24x0.375	Pole	26.0%	Pass
180 - 175	Pole	TP30x30x0.375	Pole	24.8%	Pass
175 - 170	Pole	TP30x30x0.375	Pole	32.9%	Pass
170 - 165	Pole	TP30x30x0.375	Pole	41.2%	Pass
165 - 160	Pole	TP30x30x0.375	Pole	51.7%	Pass
160 - 155	Pole	TP36x36x0.375	Pole	44.2%	Pass
155 - 150	Pole	TP36x36x0.375	Pole	53.5%	Pass
150 - 145	Pole	TP36x36x0.375	Pole	62.6%	Pass
145 - 140	Pole	TP36x36x0.375	Pole	71.9%	Pass
140 - 136	Pole	TP42x42x0.375	Pole	59.4%	Pass
136 - 135.75	Pole + Reinf.	TP42x42x0.6375	Pole	35.9%	Pass
135.75 - 130.75	Pole + Reinf.	TP42x42x0.6375	Pole	40.2%	Pass
130.75 - 125.75	Pole + Reinf.	TP42x42x0.6375	Pole	44.6%	Pass
125.75 - 120.75	Pole + Reinf.	TP42x42x0.6375	Pole	49.1%	Pass
120.75 - 120	Pole + Reinf.	TP42x42x0.6375	Pole	49.8%	Pass
120 - 119.75	Pole + Reinf.	TP48x48x0.6	Pole	41.1%	Pass
119.75 - 114.75	Pole + Reinf.	TP48x48x0.6	Pole	44.8%	Pass
114.75 - 109.75	Pole + Reinf.	TP48x48x0.6	Pole	48.7%	Pass
109.75 - 104.75	Pole + Reinf.	TP48x48x0.6	Pole	52.6%	Pass
104.75 - 100	Pole + Reinf.	TP48x48x0.6	Pole	56.4%	Pass
100 - 99.75	Pole + Reinf.	TP54x54x0.5625	Pole	47.3%	Pass
99.75 - 94.75	Pole + Reinf.	TP54x54x0.5625	Pole	50.7%	Pass
94.75 - 89.75	Pole + Reinf.	TP54x54x0.5625	Pole	54.2%	Pass
89.75 - 84.75	Pole + Reinf.	TP54x54x0.5625	Pole	57.7%	Pass
84.75 - 80	Pole + Reinf.	TP54x54x0.5625	Pole	61.1%	Pass
80 - 79.75	Pole + Reinf.	TP60x60x0.55	Pole	52.0%	Pass
79.75 - 74.75	Pole + Reinf.	TP60x60x0.55	Pole	55.1%	Pass
74.75 - 69.75	Pole + Reinf.	TP60x60x0.55	Pole	58.2%	Pass
69.75 - 64.75	Pole + Reinf.	TP60x60x0.55	Pole	61.4%	Pass
64.75 - 60	Pole + Reinf.	TP60x60x0.55	Pole	64.5%	Pass
60 - 59.75	Pole + Reinf.	TP60x60x0.675	Pole	51.4%	Pass
59.75 - 54.75	Pole + Reinf.	TP60x60x0.675	Pole	54.1%	Pass
54.75 - 49.75	Pole + Reinf.	TP60x60x0.675	Pole	56.7%	Pass
49.75 - 44.75	Pole + Reinf.	TP60x60x0.675	Pole	59.4%	Pass
44.75 - 40	Pole + Reinf.	TP60x60x0.675	Pole	62.0%	Pass
40 - 39.75	Pole + Reinf.	TP60x60x0.8	Reinf. 2 Bolt Shear	51.4%	Pass
39.75 - 34.75	Pole + Reinf.	TP60x60x0.8	Pole	53.5%	Pass
34.75 - 29.75	Pole + Reinf.	TP60x60x0.8	Pole	55.8%	Pass
29.75 - 24.75	Pole + Reinf.	TP60x60x0.8	Pole	58.1%	Pass
24.75 - 20	Pole + Reinf.	TP60x60x0.8	Reinf. 2 Bolt Shear	60.6%	Pass
20 - 19.75	Pole + Reinf.	TP60x60x0.8	Reinf. 1 Bolt Shear	60.7%	Pass
19.75 - 14.75	Pole + Reinf.	TP60x60x0.8	Pole	62.9%	Pass
14.75 - 9.75	Pole + Reinf.	TP60x60x0.8	Pole	65.2%	Pass
9.75 - 4.75	Pole + Reinf.	TP60x60x0.8	Pole	67.6%	Pass
4.75 - 0	Pole + Reinf.	TP60x60x0.8	Reinf. 1 Bolt Shear	70.1%	Pass
				Summary	
			Pole	71.9%	Pass
			Reinforcement	70.1%	Pass
			Overall	71.9%	Pass

Additional Calculations

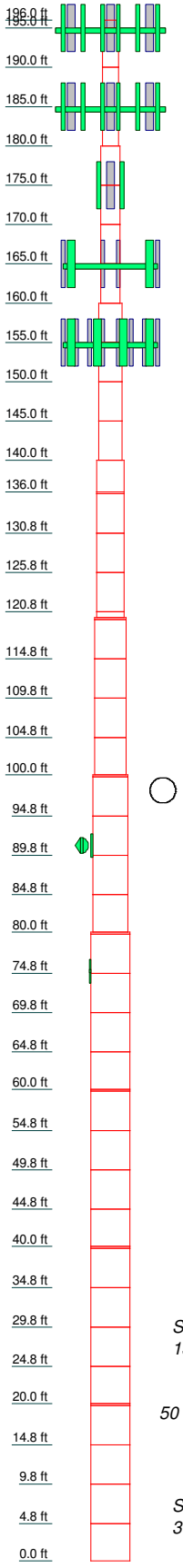
Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity							
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7
196 - 195	807	n/a	807	20.76	n/a	20.76	0.0%							
195 - 190	1942	n/a	1942	27.83	n/a	27.83	7.3%							
190 - 185	1942	n/a	1942	27.83	n/a	27.83	14.5%							
185 - 180	1942	n/a	1942	27.83	n/a	27.83	26.0%							
180 - 175	3829	n/a	3829	34.90	n/a	34.90	24.8%							
175 - 170	3829	n/a	3829	34.90	n/a	34.90	32.9%							
170 - 165	3829	n/a	3829	34.90	n/a	34.90	41.2%							
165 - 160	3829	n/a	3829	34.90	n/a	34.90	51.7%							
160 - 155	6659	n/a	6659	41.97	n/a	41.97	44.2%							
155 - 150	6659	n/a	6659	41.97	n/a	41.97	53.5%							
150 - 145	6659	n/a	6659	41.97	n/a	41.97	62.6%							
145 - 140	6659	n/a	6659	41.97	n/a	41.97	71.9%							
140 - 136	10622	n/a	10622	49.04	n/a	49.04	59.4%							
136 - 135.75	10622	6973	17594	49.04	29.25	78.29	35.9%							35.8%
135.75 - 130.75	10622	6973	17594	49.04	29.25	78.29	40.2%							36.7%
130.75 - 125.75	10622	6973	17594	49.04	29.25	78.29	44.6%							40.7%
125.75 - 120.75	10622	6973	17594	49.04	29.25	78.29	49.1%							44.8%
120.75 - 120	10622	6973	17594	49.04	29.25	78.29	49.8%							49.6%
120 - 119.75	15908	9013	24921	56.11	29.25	85.36	41.1%						40.1%	
119.75 - 114.75	15908	9013	24921	56.11	29.25	85.36	44.8%						40.2%	
114.75 - 109.75	15908	9013	24921	56.11	29.25	85.36	48.7%						43.6%	
109.75 - 104.75	15908	9013	24921	56.11	29.25	85.36	52.6%						47.2%	
104.75 - 100	15908	9013	24921	56.11	29.25	85.36	56.4%						55.1%	
100 - 99.75	22710	11316	34026	63.18	29.25	92.43	47.3%					45.6%		
99.75 - 94.75	22710	11316	34026	63.18	29.25	92.43	50.7%					44.8%		
94.75 - 89.75	22710	11316	34026	63.18	29.25	92.43	54.2%					47.9%		
89.75 - 84.75	22710	11316	34026	63.18	29.25	92.43	57.7%					51.0%		
84.75 - 80	22710	11316	34026	63.18	29.25	92.43	61.1%					58.9%		
80 - 79.75	31217	13883	45100	70.24	29.25	99.49	52.0%				49.5%			
79.75 - 74.75	31217	13883	45100	70.24	29.25	99.49	55.1%				48.1%			
74.75 - 69.75	31217	13883	45100	70.24	29.25	99.49	58.2%				50.9%			
69.75 - 64.75	31217	13883	45100	70.24	29.25	99.49	61.4%				53.7%			
64.75 - 60	31217	13883	45100	70.24	29.25	99.49	64.5%				61.5%			
60 - 59.75	41363	13883	55246	93.46	29.25	122.71	51.4%			50.3%				
59.75 - 54.75	41363	13883	55246	93.46	29.25	122.71	54.1%			48.5%				
54.75 - 49.75	41363	13883	55246	93.46	29.25	122.71	56.7%			50.9%				
49.75 - 44.75	41363	13883	55246	93.46	29.25	122.71	59.4%			53.3%				
44.75 - 40	41363	13883	55246	93.46	29.25	122.71	62.0%			60.7%				
40 - 39.75	51381	13883	65264	116.58	29.25	145.83	51.2%		51.4%					
39.75 - 34.75	51381	13883	65264	116.58	29.25	145.83	53.5%		49.3%					
34.75 - 29.75	51381	13883	65264	116.58	29.25	145.83	55.8%		51.4%					
29.75 - 24.75	51381	13883	65264	116.58	29.25	145.83	58.1%		53.5%					
24.75 - 20	51381	13883	65264	116.58	29.25	145.83	60.4%		60.6%					
20 - 19.75	51381	13883	65264	116.58	29.25	145.83	60.5%	60.7%						
19.75 - 14.75	51381	13883	65264	116.58	29.25	145.83	62.9%	57.9%						
14.75 - 9.75	51381	13883	65264	116.58	29.25	145.83	65.2%	60.1%						
9.75 - 4.75	51381	13883	65264	116.58	29.25	145.83	67.6%	62.2%						
4.75 - 0	51381	13883	65264	116.58	29.25	145.83	69.9%	70.1%						

Note: Section capacity checked in 5 degree increments.

APPENDIX C

Tower Elevation Drawing & Feedline Plan

Section	Size	Length (ft)	Grade	Weight (K)
1	P60x0.375	5.00	A53-B-42	0.1
2	P60x0.375	5.00		0.5
3	P60x0.375	5.00		0.5
4	P60x0.375	5.00		0.5
5	P60x0.375	5.00		0.6
6	P60x0.375	5.00		0.6
7	P60x0.375	5.00		0.6
8	P60x0.375	5.00		0.6
9	P60x0.375	5.00		0.7
10	P60x0.375	5.00		0.7
11	P60x0.375	5.00		0.7
12	P60x0.375	5.00		0.7
13	P60x0.375	5.00		10.7
14	P60x0.375	5.00		1.3
15	P60x0.375	5.00		1.3
16	P60x0.375	5.00		1.3
17	P60x0.375	5.00		1.3
18	P60x0.375	5.00		1.5
19	P60x0.375	5.00		1.5
20	P60x0.375	5.00		1.5
21	P48x0.375	5.00		1.5
22	P48x0.375	5.00		1.5
23	P48x0.375	5.00		11.4
24	P48x0.375	5.00		1.6
25	P48x0.375	5.00		1.6
26	P48x0.375	5.00		1.6
27	P48x0.375	5.00		1.6
28	P48x0.375	5.00		11.5
29	P48x0.375	5.00		1.7
30	P48x0.375	5.00		1.7
31	P48x0.375	5.00		1.7
32	P48x0.375	5.00		1.7
33	P48x0.375	5.00		11.6
34	P48x0.375	5.00		2.1
35	P48x0.375	5.00		2.1
36	P48x0.375	5.00		2.1
37	P48x0.375	5.00		2.1
38	P48x0.375	5.00		12.0
39	P48x0.375	5.00		2.5
40	P48x0.375	5.00		2.5
41	P48x0.375	5.00		2.5
42	P48x0.375	5.00		2.5
43	P48x0.375	5.00		12.4
44	P48x0.375	5.00		2.5
45	P48x0.375	5.00		2.5
46	P48x0.375	5.00		2.5
47	P48x0.375	5.00		2.5
48	P48x0.375	4.75		2.4
				58.7



ALL REACTIONS ARE FACTORED

AXIAL 150 K

SHEAR 13 K *MOMENT 1795 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 100 K

SHEAR 37 K *MOMENT 5361 kip-ft*

TORQUE 3 kip-ft
REACTIONS - 93 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 71.9%

GPD
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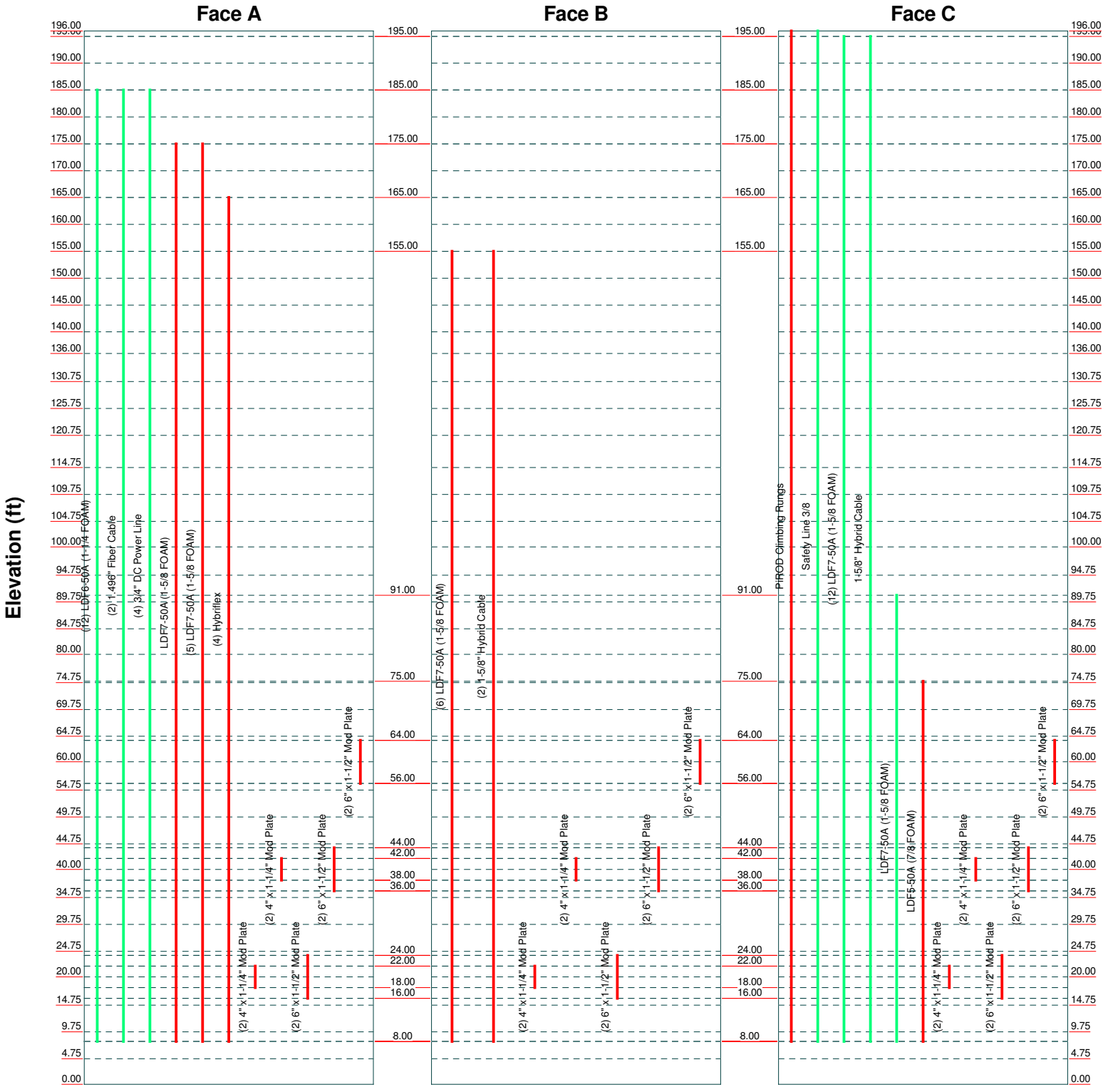
Akron, Ohio 44311
Phone: (555) 555-1234
FAX: (555) 555-1235

Job: ***US-CT-1002 Kettleton***			
Project: ***2017791.CT1002.05***			
Client: PTI	Drawn by: mrisley	App'd:	
Code: TIA-222-G	Date: 08/28/18	Scale: NTS	
Path: T:\PTI\US-CT-1002 (CT1126F)\05 2018791.CT1002.05 PTI ATT SA\SA Rev0\TNX\US-CT-1002 Modified.eri		Dwg No. E-1	

Feed Line Distribution Chart
0' - 196'

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



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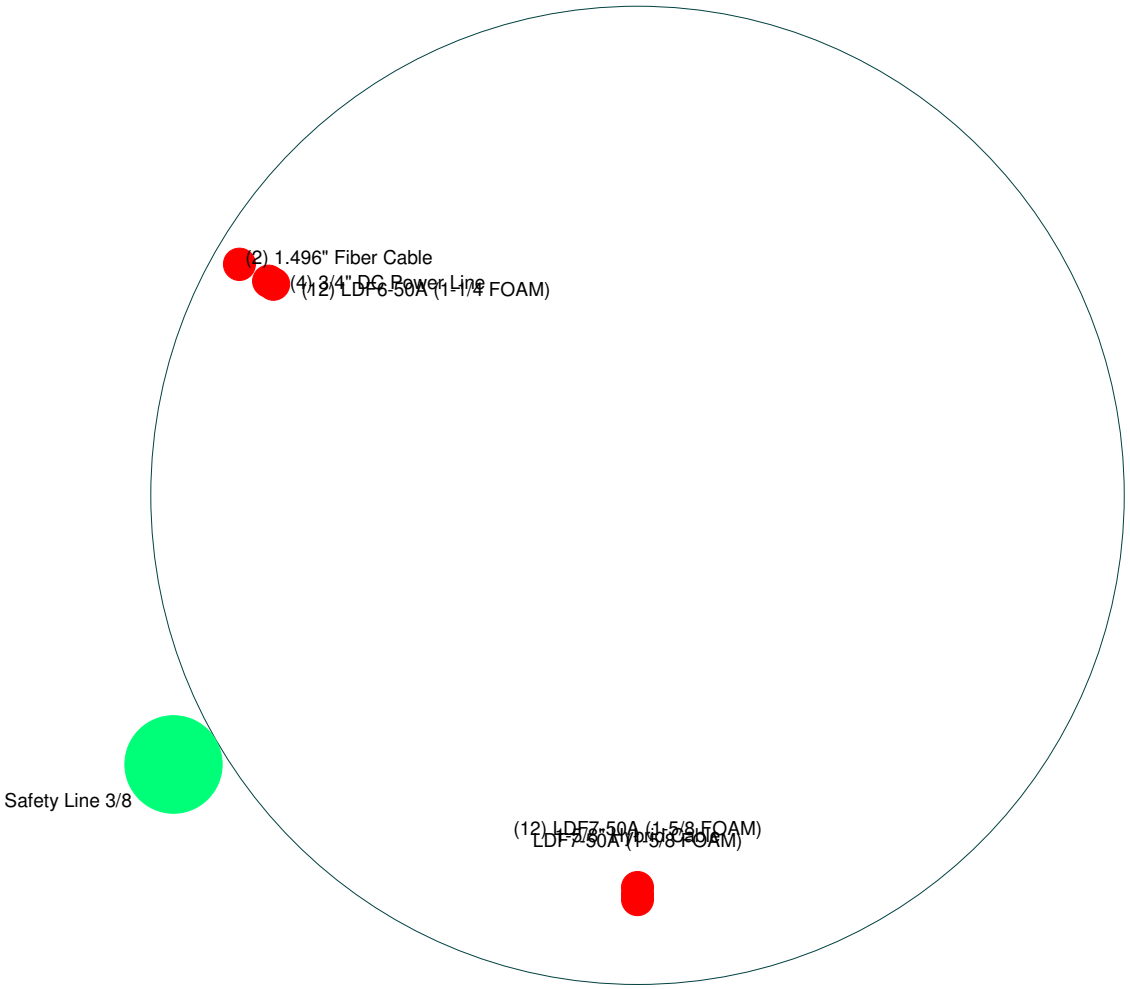
Code: TIA-222-G	Date: 08/28/18	Scale: NTS	
Path: T:\PTI\US-CT-1002 (CT1126F)\05 2018791.CT1002.05 PTI ATT SA\SA Rev0\TNX\US-CT-1002 Modified.eri		Dwg No. E-7	

Feed Line Plan

Round Flat App In Face App Out Face



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Job:	***US-CT-1002 Kettleton***		
Project:	***2017791.CT1002.05***		
Client: PTI	Drawn by: mrisley	App'd:	
Code: TIA-222-G	Date: 08/28/18	Scale: NTS	
Path: T:\PTI\US-CT-1002 (CT1126F)\05 2018791.CT1002.05 PTI ATT SA\SA Rev0\TNX\US-CT-1002 Modified.eri		Dwg No. E-7	

APPENDIX D

Flange Bolt & Flange Plate Analysis

GPD GROUP

Existing Flange Connection @ 180'
US-CT-1002, Kettleton
2018791.CT1002.05

O.T. Moment =	156.12	k*ft
Axial =	9.41	kips
Shear =	14.01	kips

Acceptable Stress Ratio =	105.0%

Flange Bolts		
# Bolts =	20	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	27	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
ϕR_{nt} (adjusted)=	54.53	kips
V_{ub} =	0.70	kips
T_{ub} =	13.40	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	14.34	kips
Shear Capacity =	2.2%	
Tensile Capacity =	24.6%	
Interaction Capacity =	24.6%	
Bolt Capacity =	**24.6% OK**	

Pole Information		
Shaft Diam. (Upper) =	24	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	30	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	30.375	in
ϕ_f =	0.9	
wcalc =	12.37	in
wmax =	20.84	in
w =	12.37	in
Z =	4.83	in^3
M_u =	44.44	k-in
ϕM_n =	156.5492	k-in
UP Capacity =	**28.4% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	24.25	in
Pole Inner Diameter =	29.25	in
e =	1.13	in
w =	4.59	in
Z =	1.79	in^3
M_u =	16.13	k-in
ϕM_n =	58.15014	k-in
LP Capacity =	**27.7% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

GPD GROUP

Existing Flange Connection @ 160'
US-CT-1002, Kettleton
2018791.CT1002.05

O.T. Moment =	477.72	k*ft
Axial =	16.00	kips
Shear =	19.43	kips

Acceptable Stress Ratio =	105.0%

Flange Bolts		
# Bolts =	24	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	33	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
ϕR_{nt} (adjusted)=	54.52	kips
V_{ub} =	0.81	kips
T_{ub} =	28.27	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	29.61	kips
Shear Capacity =	2.5%	
Tensile Capacity =	51.8%	
Interaction Capacity =	51.9%	
Bolt Capacity =	**51.9% OK**	

Pole Information		
Shaft Diam. (Upper) =	30	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	36	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	36.375	in
ϕ_f =	0.9	
wcalc =	13.75	in
wmax =	21.04	in
w =	13.75	in
Z =	5.37	in^3
M_u =	98.09	k-in
ϕM_n =	173.9947	k-in
UP Capacity =	**56.4% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	27.375	in
Pole Inner Diameter =	35.25	in
e =	1.13	in
w =	4.61	in
Z =	1.80	in^3
M_u =	33.31	k-in
ϕM_n =	58.39865	k-in
LP Capacity =	**57.0% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

GPD GROUP

Existing Flange Connection @ 140'
US-CT-1002, Kettleton
2018791.CT1002.05

O.T. Moment =	939.32	k*ft
Axial =	23.65	kips
Shear =	24.76	kips

Acceptable Stress Ratio =	105.0%

Flange Bolts		
# Bolts =	28	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	39	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
ϕR_{nt} (adjusted)=	54.52	kips
V_{ub} =	0.88	kips
T_{ub} =	40.43	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	42.12	kips
Shear Capacity =	2.8%	
Tensile Capacity =	74.1%	
Interaction Capacity =	74.2%	
Bolt Capacity =	**74.2% OK**	

Pole Information		
Shaft Diam. (Upper) =	36	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	42	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	42.375	in
ϕ_f =	0.9	
wcalc =	15.00	in
wmax =	25.38	in
w =	15.00	in
Z =	5.86	in^3
M_u =	147.61	k-in
ϕM_n =	189.8438	k-in
UP Capacity =	**77.8% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	33.375	in
Pole Inner Diameter =	41.25	in
e =	1.13	in
w =	4.63	in
Z =	1.81	in^3
M_u =	47.38	k-in
ϕM_n =	58.57615	k-in
LP Capacity =	**80.9% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.5	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.5	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

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GPD GROUP
Engineers • Architects • Planners

Project #: 2018791.CT1002.05

BOLT AND BRIDGE STIFFENER CALCULATIONS @ 120'

Moment from TNX (M) =	1452.45	kip-ft	ASIF =	1.00			
Axial from TNX (P) =	30.66	kip					
Inner Bolt Diameter =	1	in					
Inner Bolt Area (A_{inner}) =	0.79	in^2	Inner Bolt Circle (BC_{inner}) =	45	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.05	in^4	Total Area ($A_{tot.in}$) =	25.13	in^2		
Number Inner Bolts (N_{inner}) =	32		Percent Total Area (η_{in}) =	48.2%		Axial, Inner Bolts ($P*\eta_{in}$) =	14.78 kips
Bridge Stiffener Width =	6.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	0	in		
Bridge Stiffener Unbraced Length =	12.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	9	in2		
Bridge Stiffener Area (A_{pl}) =	9.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	51	in		
Bridge Stiffener MOI (I_o) =	27.00	in^4	Total Area ($A_{tot.pl}$) =	27.00	in^2		
Number Bridge Stiffeners (N_{pl})	3		Percent Total Area (η_{pl}) =	51.8%		Axial, Bridge Stiffener ($P*\eta_{pl}$) =	15.88 kips

I_{inner} =	6363.30	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	8859.38	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	15222.67	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	19.8	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$
$P_{u.t.pl}$ =	257.5	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	268.1	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$
$ØP_{nt.bolt}$ =	61.85	kips	
Bolt Rating =	32.0%	OK	

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	23.556	
F_e =	515.82	ksi
F_{cr} =	48.01	ksi
$ØP_{nc}$ =	388.90	kips
$ØP_{nt}$ =	438.75	kips
Bridge Stiffener Rating =	68.9%	OK

Existing Flange Connection @ 120'
US-CT-1002, Kettleton
2018791.CT1002.05

*O.T. Moment =	700.2135	k*ft
Axial =	30.66	kips
Shear =	26.55	kips

Acceptable Stress Ratio =	105.0%

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Flange Bolts		
# Bolts =	32	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	45	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
ϕR_{nt} (adjusted)=	54.52	kips
V_{ub} =	0.83	kips
T_{ub} =	22.38	kips
Prying Action Check		
N/A, top flange thickness > tc		
Max Comp. on Bolt =	24.29	kips
Shear Capacity =	2.6%	
Tensile Capacity =	41.0%	
Interaction Capacity =	41.0%	
Bolt Capacity =	**41.0% OK**	

Pole Information		
Shaft Diam. (Upper) =	42	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	48	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	48.375	in
ϕ_f =	0.9	
wcalc =	16.16	in
wmax =	25.56	in
w =	16.16	in
Z =	6.31	in^3
M_u =	92.04	k-in
ϕM_n =	204.468	k-in
UP Capacity =	**45.0% OK**	

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	39.375	in
Pole Inner Diameter =	47.25	in
e =	1.13	in
w =	4.64	in
Z =	1.81	in^3
M_u =	27.33	k-in
ϕM_n =	58.70928	k-in
LP Capacity =	**46.6% OK**	

UpperStiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners		
Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

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Project #: 2018791.CT1002.05

BOLT AND BRIDGE STIFFENER CALCULATIONS @ 100'

Moment from TNX (M) =	2007.34	kip-ft	ASIF =	1.00			
Axial from TNX (P) =	38.72	kip					
Inner Bolt Diameter =	1	in					
Inner Bolt Area (A_{inner}) =	0.79	in^2	Inner Bolt Circle (BC_{inner}) =	51	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.05	in^4	Total Area ($A_{tot.in}$) =	25.92	in^2		
Number Inner Bolts (N_{inner}) =	33		Percent Total Area (η_{in}) =	49.0%		Axial, Inner Bolts ($P*\eta_{in}$) =	18.96 kips
Bridge Stiffener Width =	6.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	0	in		
Bridge Stiffener Unbraced Length =	12.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	9	in2		
Bridge Stiffener Area (A_{pl}) =	9.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	57	in		
Bridge Stiffener MOI (I_o) =	27.00	in^4	Total Area ($A_{tot.pl}$) =	27.00	in^2		
Number Bridge Stiffeners (N_{pl})	3		Percent Total Area (η_{pl}) =	51.0%		Axial, Bridge Stiffener ($P*\eta_{pl}$) =	19.76 kips

I_{inner} =	8428.25	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	11046.38	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	19474.63	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	24.2	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$
$P_{u.t.pl}$ =	310.7	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	323.8	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$
$ØP_{nt.bolt}$ =	61.85	kips	
Bolt Rating =	39.1%	OK	

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	23.556	
F_e =	515.82	ksi
F_{cr} =	48.01	ksi
$ØP_{nc}$ =	388.90	kips
$ØP_{nt}$ =	438.75	kips
Bridge Stiffener Rating =	83.3%	OK

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Existing Flange Connection @ 100'
US-CT-1002, Kettleton
2018791.CT1002.05

*O.T. Moment =	983.1509	k*ft
Axial =	38.72	kips
Shear =	28.67	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio	
=	105.0%

Flange Bolts

# Bolts =	36	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	51	in
ϕ_t =	0.75	
ϕ_v =	0.75	

Tension & Shear (TIA-222-G-1, Section 4.9.6)

F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
ϕR_{nt} (adjusted)=	54.52	kips
V_{ub} =	0.80	kips
T_{ub} =	24.62	kips

Prying Action Check

N/A, top flange thickness > tc

Max Comp. on Bolt =	26.77	kips
Shear Capacity =	2.5%	
Tensile Capacity =	45.1%	
Interaction Capacity =	45.2%	
Bolt Capacity =	**45.2% OK**	

Pole Information

Shaft Diam. (Upper) =	48	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	54	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	54.375	in
ϕ_f =	0.9	
wcalc =	17.23	in
wmax =	25.70	in
w =	17.23	in
Z =	6.73	in^3
M_u =	107.54	k-in
ϕM_n =	218.1139	k-in
UP Capacity =	**49.3% OK**	

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	45.375	in
Pole Inner Diameter =	53.25	in
e =	1.13	in
w =	4.65	in
Z =	1.82	in^3
M_u =	30.12	k-in
ϕM_n =	58.81282	k-in
LP Capacity =	**51.2% OK**	

UpperStiffeners

Configuration =	Every Other	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

Lower Stiffeners

Configuration =	Every Other	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi

Stiffeners ineffective - check plate unstiffened

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BOLT AND BRIDGE STIFFENER CALCULATIONS @ 80'

Moment from TNX (M) =	2606.00	kip-ft	ASIF =	1.00			
Axial from TNX (P) =	47.47	kip					
Inner Bolt Diameter =	1	in					
Inner Bolt Area (A_{inner}) =	0.79	in^2	Inner Bolt Circle (BC_{inner}) =	57	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.05	in^4	Total Area ($A_{tot.in}$) =	37.70	in^2		
Number Inner Bolts (N_{inner}) =	48		Percent Total Area (η_{in}) =	58.3%		Axial, Inner Bolts ($P*\eta_{in}$) =	27.66 kips
Bridge Stiffener Width =	6.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	0	in		
Bridge Stiffener Unbraced Length =	12.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	9	in		
Bridge Stiffener Area (A_{pl}) =	9.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	63	in		
Bridge Stiffener MOI (I_o) =	27.00	in^4	Total Area ($A_{tot.pl}$) =	27.00	in^2		
Number Bridge Stiffeners (N_{pl})	3		Percent Total Area (η_{pl}) =	41.7%		Axial, Bridge Stiffener ($P*\eta_{pl}$) =	19.81 kips

I_{inner} =	15312.91	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{pl} =	13476.38	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	28789.28	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$
$P_{u.t.inner}$ =	23.7	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$
$P_{u.t.pl}$ =	301.3	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	314.6	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$
$ØP_{nt.bolt}$ =	61.85	kips	
Bolt Rating =	38.4%	OK	

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	23.556	
F_e =	515.82	ksi
F_{cr} =	48.01	ksi
$ØP_{nc}$ =	388.90	kips
$ØP_{nt}$ =	438.75	kips
Bridge Stiffener Rating =	80.9%	OK

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Existing Flange Connection @ 80'
US-CT-1002, Kettleton
2018791.CT1002.05

*O.T. Moment =	1518.473	k*ft
Axial =	47.47	kips
Shear =	30.90	kips

Acceptable Stress Ratio =	105.0%

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Flange Bolts

# Bolts =	48	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1	in
Bolt Circle =	57	in
ϕ_t =	0.75	
ϕ_v =	0.75	

Tension & Shear (TIA-222-G-1, Section 4.9.6)

F_{ub} =	120	ksi
A_b =	0.785398	in^2
A_n =	0.606	in^2
ϕR_{nv} =	31.81	kips
ϕR_{nt} =	54.54	kips
ϕR_{nt} (adjusted)=	54.53	kips
V_{ub} =	0.64	kips
T_{ub} =	25.65	kips

Prying Action Check

N/A, top flange thickness > tc

Max Comp. on Bolt =	27.62	kips
Shear Capacity =	2.0%	
Tensile Capacity =	47.0%	
Interaction Capacity =	47.0%	
Bolt Capacity =	**47.0%**	**OK**

Pole Information

Shaft Diam. (Upper) =	54	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.375	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	External	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Outer Diameter =	60.375	in
ϕ_f =	0.9	
b =	3.11	in
Le =	3.00	in
Z =	2.34	in^3
M_u =	35.14	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**46.3%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	51.375	in
b =	3.11	in
Le =	2.00	in
Z =	2.34	in^3
M_u =	41.18	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**54.2%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	3	in
Notch =	0.5	in
Height =	5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	15.77	kips
Vert. Weld Capacity =	34.7%	kips
Horiz. Weld Capacity =	49.4%	kips
Stiffener Capacity =	54.9%	kips
Controlling Capacity =	**54.9%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	2	in
Notch =	0.5	in
Height =	3.5	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.3125	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.3125	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	10.21	kips
Vert. Weld Capacity =	33.2%	kips
Horiz. Weld Capacity =	53.4%	kips
Stiffener Capacity =	50.3%	kips
Controlling Capacity =	**53.4%**	**OK**

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BOLT AND BRIDGE STIFFENER CALCULATIONS @ 60'

Moment from TNX (M) =	3248.18	kip-ft	ASIF =	1.00			
Axial from TNX (P) =	57.67	kip					
Inner Bolt Diameter =	1.25	in					
Inner Bolt Area (A_{inner}) =	1.23	in^2	Inner Bolt Circle (BC_{inner}) =	47	in		
Inner Bolt MOI ($I_{o.inner}$) =	0.12	in^4	Total Area ($A_{tot.in}$) =	39.27	in^2		
Number Inner Bolts (N_{inner}) =	32		Percent Total Area (η_{in}) =	29.6%		Axial, Inner Bolts ($P*\eta_{in}$) =	17.09 kips
Outer Bolt Diameter =	1.25	in					
Outer Bolt Area (A_{outer}) =	1.23	in^2	Outer Bolt Circle (BC_{outer}) =	53	in		
Outer Bolt MOI ($I_{o.outer}$) =	0.12	in^4	Total Area ($A_{tot.out}$) =	39.27	in^2		
Number Outer Bolts (N_{outer}) =	32		Percent Total Area (η_{out}) =	29.6%		Axial, Outer Bolts ($P*\eta_{out}$) =	17.09 kips
Bridge Stiffener Width =	6.00	in					
Bridge Stiffener Thickness =	1.50	in	Connection Bolt Hole Size =	1.21875	in		
Bridge Stiffener Unbraced Length =	30.00	in	Net Bridge Stiffener Area ($A_{e.pl}$)	7.17188	in		
Bridge Stiffener Area (A_{pl}) =	9.00	in^2	Bridge Stiffener Circle (BC_{pl}) =	63	in		
Bridge Stiffener MOI (I_o) =	27.00	in^4	Total Area ($A_{tot.pl}$) =	54.00	in^2		
Number Bridge Stiffeners (N_{pl})	6		Percent Total Area (η_{pl}) =	40.7%		Axial, Bridge Stiffener ($P*\eta_{pl}$) =	23.50 kips

I_{inner} =	10847.24	$in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$
I_{outer} =	13792.48	$in.^4$	$(N_{outer}*A_{outer}*BC_{outer}^2/8 + N_{outer}*I_{o.outer})$
I_{pl} =	26952.75	$in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$
I_{tot} =	51592.47	$in.^4$	$(I_{inner} + I_{outer} + I_{pl})$

$P_{u.t.inner}$ =	21.3	kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$
$P_{u.t.outer}$ =	24.0	kips	$(M*(BC_{outer}/2)*A_{outer})/I_{total} - P*\eta_{out}/N_{outer})$
$P_{u.t.pl}$ =	210.3	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$
$P_{u.c.pl}$ =	218.1	kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$
$ØP_{nt.bolt}$ =	96.64	kips	
Bolt Rating =	24.9%	OK	

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	58.890	
F_e =	82.53	ksi
F_{cr} =	38.80	ksi
$ØP_{nc}$ =	314.29	kips
$ØP_{nt}$ =	349.63	kips
Bridge Stiffener Rating =	69.4%	OK

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Existing Flange Connection @ 60'
US-CT-1002, Kettleton
2018791.CT1002.05

*O.T. Moment =	962.3956	k*ft
Axial =	57.67	kips
Shear =	33.05	kips

Acceptable Stress Ratio =	105.0%

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Flange Bolts		
# Bolts =	32	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1.75	in
Bolt Circle =	44	in
ϕ_t =	0.75	
ϕ_v =	0.75	
Tension & Shear (TIA-222-G-1, Section 4.9.6)		
F_{ub} =	105	ksi
A_b =	2.405282	in^2
A_n =	1.9	in^2
ϕR_{nv} =	85.24	kips
ϕR_{nt} =	149.63	kips
ϕR_{nt} (adjusted)=	149.61	kips
V_{ub} =	1.03	kips
T_{ub} =	30.98	kips
Prying Action Check		
N/A for stiffened flange		
Max Comp. on Bolt =	34.59	kips
Shear Capacity =	1.2%	
Tensile Capacity =	20.7%	
Interaction Capacity =	20.7%	
Bolt Capacity =	**20.7%**	**OK**

Pole Information		
Shaft Diam. (Upper) =	60	in
Thickness (Upper)=	0.375	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.5	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
ϕ_f =	0.9	
b =	3.69	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	20.26	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**26.7%**	**OK**

Lower Flange Plate		
Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	3.69	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	20.26	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**26.7%**	**OK**

UpperStiffeners		
Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	17.37	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	31.7%	kips
Controlling Capacity =	**31.7%**	**OK**

Lower Stiffeners		
Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	15.32	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	28.0%	kips
Controlling Capacity =	**28.0%**	**OK**

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BOLT AND BRIDGE STIFFENER CALCULATIONS @ 40'

Moment from TNX (M) =	3926.11 kip-ft	ASIF =	1.00				
Axial from TNX (P) =	70.90 kip						
Inner Bolt Diameter =	1.25 in						
Inner Bolt Area (A_{inner}) =	1.23 in^2	Inner Bolt Circle (BC_{inner}) =	47 in				
Inner Bolt MOI ($I_{o.inner}$) =	0.12 in^4	Total Area ($A_{tot.in}$) =	39.27 in^2				
Number Inner Bolts (N_{inner}) =	32	Percent Total Area (η_{in}) =	29.6%	Axial, Inner Bolts ($P*\eta_{in}$) =	21.01 kips		
Outer Bolt Diameter =	1.25 in						
Outer Bolt Area (A_{outer}) =	1.23 in^2	Outer Bolt Circle (BC_{outer}) =	53 in				
Outer Bolt MOI ($I_{o.outer}$) =	0.12 in^4	Total Area ($A_{tot.out}$) =	39.27 in^2				
Number Outer Bolts (N_{outer}) =	32	Percent Total Area (η_{out}) =	29.6%	Axial, Outer Bolts ($P*\eta_{out}$) =	21.01 kips		
Bridge Stiffener Width =	6.00 in						
Bridge Stiffener Thickness =	1.50 in	Connection Bolt Hole Size =	1.18 in				
Bridge Stiffener Unbraced Length =	30.00 in	Net Bridge Stiffener Area ($A_{e.pl}$)	7.23 in				
Bridge Stiffener Area (A_{pl}) =	9.00 in^2	Bridge Stiffener Circle (BC_{pl}) =	63 in				
Bridge Stiffener MOI (I_o) =	27.00 in^4	Total Area ($A_{tot.pl}$) =	54.00 in^2				
Number Bridge Stiffeners (N_{pl})	6	Percent Total Area (η_{pl}) =	40.7%	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	28.89 kips		

I_{inner} =	10847.24 $in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$	
I_{outer} =	13792.48 $in.^4$	$(N_{outer}*A_{outer}*BC_{outer}^2/8 + N_{outer}*I_{o.outer})$	
I_{pl} =	26952.75 $in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$	
I_{tot} =	51592.47 $in.^4$	$(I_{inner} + I_{outer} + I_{pl})$	
$P_{u.t.inner}$ =	25.7 kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$	
$P_{u.t.outer}$ =	29.0 kips	$(M*(BC_{outer}/2)*A_{outer})/I_{total} - P*\eta_{out}/N_{outer})$	
$P_{u.t.pl}$ =	254.1 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$	
$P_{u.c.pl}$ =	263.7 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$	
$\emptyset P_{nt.bolt}$ =	96.64 kips		
Bolt Rating =	30.1% OK		

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	58.890	
F_e =	82.53	ksi
F_{cr} =	38.80	ksi
$\emptyset P_{nc}$ =	314.29	kips
$\emptyset P_{nt}$ =	352.46	kips
Bridge Stiffener Rating =	83.9%	OK

GPD GROUP

Existing Flange Connection @ 40'
US-CT-1002, Kettleton
2018791.CT1002.05

*O.T. Moment =	1163.258	k*ft
Axial =	70.9	kips
Shear =	34.69	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio	
=	105.0%

Flange Bolts

# Bolts =	32	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1.75	in
Bolt Circle =	50	in
ϕ_t =	0.75	
ϕ_v =	0.75	

Tension & Shear (TIA-222-G-1, Section 4.9.6)

F_{ub} =	105	ksi
A_b =	2.405282	in^2
A_n =	1.9	in^2
ϕR_{nv} =	85.24	kips
ϕR_{nt} =	149.63	kips
ϕR_{nt} (adjusted)=	149.61	kips
V_{ub} =	1.08	kips
T_{ub} =	32.66	kips

Prying Action Check

N/A for stiffened flange

Max Comp. on Bolt =	37.09	kips
Shear Capacity =	1.3%	
Tensile Capacity =	21.8%	
Interaction Capacity =	21.8%	
Bolt Capacity =	**21.8%**	**OK**

Pole Information

Shaft Diam. (Upper) =	60	in
Thickness (Upper)=	0.5	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.625	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
ϕ_f =	0.9	
b =	4.28	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	23.39	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**30.8%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	23.39	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**30.8%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	18.53	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	33.8%	kips
Controlling Capacity =	**33.8%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	16.58	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	30.3%	kips
Controlling Capacity =	**30.3%**	**OK**

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GPD GROUP
Engineers • Architects • Planners

Project #: 2018791.CT1002.05

BOLT AND BRIDGE STIFFENER CALCULATIONS @ 20'

Moment from TNX (M) =	4632.98 kip-ft	ASIF =	1.00				
Axial from TNX (P) =	86.28 kip						
Inner Bolt Diameter =	1.25 in						
Inner Bolt Area (A_{inner}) =	1.23 in^2	Inner Bolt Circle (BC_{inner}) =	47 in				
Inner Bolt MOI ($I_{o.inner}$) =	0.12 in^4	Total Area ($A_{tot.in}$) =	39.27 in^2				
Number Inner Bolts (N_{inner}) =	32	Percent Total Area (η_{in}) =	24.2%	Axial, Inner Bolts ($P*\eta_{in}$) =	20.85 kips		
Outer Bolt Diameter =	1.25 in						
Outer Bolt Area (A_{outer}) =	1.23 in^2	Outer Bolt Circle (BC_{outer}) =	53 in				
Outer Bolt MOI ($I_{o.outer}$) =	0.12 in^4	Total Area ($A_{tot.out}$) =	39.27 in^2				
Number Outer Bolts (N_{outer}) =	32	Percent Total Area (η_{out}) =	24.2%	Axial, Outer Bolts ($P*\eta_{out}$) =	20.85 kips		
Bridge Stiffener Width =	6.00 in						
Bridge Stiffener Thickness =	1.50 in	Connection Bolt Hole Size =	1.21875 in				
Bridge Stiffener Unbraced Length =	30.00 in	Net Bridge Stiffener Area ($A_{e.pl}$) =	7.17188 in				
Bridge Stiffener Area (A_{pl}) =	9.00 in^2	Bridge Stiffener Circle (BC_{pl}) =	60.75 in				
Bridge Stiffener MOI (I_o) =	27.00 in^4	Total Area ($A_{tot.pl}$) =	54.00 in^2				
Number Bridge Stiffeners (N_{pl})	6	Percent Total Area (η_{pl}) =	33.2%	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	28.66 kips		
Bridge Stiffener Width =	4.00 in						
Bridge Stiffener Thickness =	1.25 in	Connection Bolt Hole Size =	1.21875 in				
Bridge Stiffener Unbraced Length =	12.00 in	Net Bridge Stiffener Area ($A_{e.pl}$) =	3.47656 in				
Bridge Stiffener Area (A_{pl}) =	5.00 in^2	Bridge Stiffener Circle (BC_{pl}) =	60.625 in				
Bridge Stiffener MOI (I_o) =	6.67 in^4	Total Area ($A_{tot.pl}$) =	30.00 in^2				
Number Bridge Stiffeners (N_{pl})	6	Percent Total Area (η_{pl}) =	18.5%	Axial, Bridge Stiffener ($P*\eta_{pl}$) =	15.92 kips		

I_{inner} =	10847.24 $in.^4$	$(N_{inner}*A_{inner}*BC_{inner}^2/8 + N_{inner}*I_{o.inner})$	
I_{outer} =	13792.48 $in.^4$	$(N_{outer}*A_{outer}*BC_{outer}^2/8 + N_{outer}*I_{o.outer})$	
I_{pl} =	25073.30 $in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$	
I_{pl} =	13822.71 $in.^4$	$(N_{pl}*A_{pl}*BC_{pl}^2/8 + N_{pl}*I_{o.pl})$	
I_{tot} =	63535.73 $in.^4$	$(I_{inner} + I_{outer} + I_{pl})$	
$P_{u.t.inner}$ =	24.6 kips	$(M*(BC_{inner}/2)*A_{inner})/I_{total} - P*\eta_{in}/N_{inner})$	
$P_{u.t.outer}$ =	27.8 kips	$(M*(BC_{outer}/2)*A_{outer})/I_{total} - P*\eta_{out}/N_{outer})$	
$P_{u.t.pl}$ =	234.4 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$	
$P_{u.c.pl}$ =	244.0 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$	
$P_{u.t.pl}$ =	130.0 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} - P*\eta_{pl}/N_{pl})$	
$P_{u.c.pl}$ =	135.3 kips	$(M*(BC_{pl}/2)*A_{pl})/I_{total} + P*\eta_{pl}/N_{pl})$	
$ØP_{nt.bolt}$ =	96.64 kips		
Bolt Rating =	28.8% OK		

Bridge Stiffener Check

f_y =	50	ksi
f_u =	65	ksi
E =	29000	ksi
K =	0.85	
KL/r =	58.890	
F_e =	82.53	ksi
F_{cr} =	38.80	ksi
$ØP_{nc}$ =	314.29	kips
$ØP_{nt}$ =	349.63	kips
Bridge Stiffener Rating =	77.6%	OK

GPD GROUP

Existing Flange Connection @ 20'
US-CT-1002, Kettleton
2018791.CT1002.05

*O.T. Moment =	1119.336	k*ft
Axial =	86.28	kips
Shear =	35.95	kips

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of flange bolt forces used in the analysis.

Acceptable Stress Ratio	
=	105.0%

Flange Bolts

# Bolts =	32	
Bolt Type =	A325	
Threads Included? =	Yes	
Bolt Diameter =	1.75	in
Bolt Circle =	50	in
ϕ_t =	0.75	
ϕ_v =	0.75	

Tension & Shear (TIA-222-G-1, Section 4.9.6)

F_{ub} =	105	ksi
A_b =	2.405282	in^2
A_n =	1.9	in^2
ϕR_{nv} =	85.24	kips
ϕR_{nt} =	149.63	kips
ϕR_{nt} (adjusted)=	149.61	kips
V_{ub} =	1.12	kips
T_{ub} =	30.86	kips

Prying Action Check

N/A for stiffened flange

Max Comp. on Bolt =	36.26	kips
Shear Capacity =	1.3%	
Tensile Capacity =	20.6%	
Interaction Capacity =	20.6%	
Bolt Capacity =	**20.6%**	**OK**

Pole Information

Shaft Diam. (Upper) =	60	in
Thickness (Upper)=	0.625	in
# of Sides (Upper) =	Round	
F_y (Upper) =	42	ksi
Shaft Diam. (Lower) =	60	in
Thickness (Lower)=	0.625	in
# of Sides (Lower) =	Round	
F_y (Lower) =	42	ksi

Upper Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Tensile (F_u) =	58	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
ϕ_f =	0.9	
b =	4.28	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	22.87	k-in
ϕM_n =	75.9375	k-in
UP Capacity =	**30.1%**	**OK**

Lower Flange Plate

Location =	Internal	
Plate Strength (F_y) =	36	ksi
Plate Thickness =	1.25	in
Hole Diameter =	43	in
b =	4.28	in
Le =	7.00	in
Z =	2.34	in^3
M_u =	22.87	k-in
ϕM_n =	75.9375	k-in
LP Capacity =	**30.1%**	**OK**

UpperStiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	16.25	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	29.7%	kips
Controlling Capacity =	**29.7%**	**OK**

Lower Stiffeners

Configuration =	Every Bolt	
Thickness =	0.625	in
Width =	7	in
Notch =	0.5	in
Height =	10	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	No	
Stiffener Vertical Force =	16.25	kips
Vert. Weld Capacity =	*Not Verified*	kips
Horiz. Weld Capacity =	*Not Verified*	kips
Stiffener Capacity =	29.7%	kips
Controlling Capacity =	**29.7%**	**OK**

APPENDIX E

Anchor Rod & Base Plate Analysis

Anchor Rod Interaction, TIA-222-G
US-CT-1002, Kettleton
2018791.CT1002.05

tnx Reactions		
Overturning Moment=	5361.46	k*ft
Axial Force =	100.20	k
Shear Force =	36.87	k

Existing Anchor Rods		
Number of Rods =	52	
Rod Circle =	67	in
Rod Diameter =	1.25	in
Est. Dist. b/w ea. Rod =		in
Plate Type =	Round	
Plate Diameter =	69.75	in

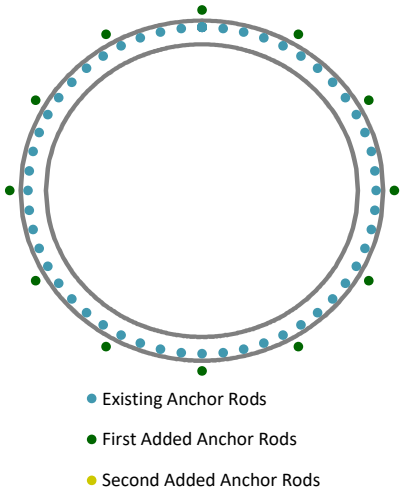
Pole		
Pole Diameter =	60	in
Number of Sides =	Round	
Thickness =	0.625	in

First Added Anchor Rods		
Number of Rods =	12	
Rod Circle =	74.00	in
Rod Diameter =	1.25	in
Anchor Rod Grade =	F1554 GR 105	

Rod Number	Initial Angle
1	0
2	30
3	60
4	90
5	120
6	150
7	180
8	210
9	240
10	270
11	300
12	330

First Added Anchor Rods		
Max Rod Compression =	63.65	k
ϕRnt =	96.90	k
Anchor Rod Capacity =	65.69%	**OK**

Reactions in Existing Rods		
Overturning Moment=	**4183.74**	k*ft
Axial Force =	**100.20**	k
Shear Force =	**36.87**	k
Centroid Offset =	**0.00**	in



Second Added Anchor Rods		
Number of Rods =		
Rod Circle =		in
Rod Diameter =		in
Anchor Rod Grade =		

Anchor Rod and Base Plate Stresses, TIA-222-G-1
US-CT-1002, Kettleton
2018791.CT1002.05

*Overturning Moment =	4183.74	k*ft
Axial Force =	100.20	k
Shear Force =	36.87	k
Centroid Offset =	0.00	in

Acceptable Stress Ratio =	105.0%

*Above reactions have been adjusted due to consideration of modifications. See attached hand calculations for determination of anchor rod forces used in the analysis below.

Anchor Rods *(Section 4.9.9, TIA-222-G-1)*		
Number of Rods =	52	
ϕ =	0.8	
Rod Ultimate Strength (F_u) =	150	ksi
Base Plate Detail Type* =	d	
Rod Circle =	67	in
Rod Diameter =	1.25	in
Net Tensile Area =	0.97	in^2
Max Tension on Rod =	55.70	kips
Max Compression on Rod =	59.56	kips
P_u =	59.56	kips
V_u =	0.71	kips
η =	0.50	
$P_u + V_u / η$=	60.98	
$φR_{nt}$ =	116.28	kips
Anchor Rod Capacity =	**52.4%**	**OK**

Base Plate		
Location =	External	
Plate Strength (Fy) =	36	ksi
ϕ =	0.9	
Outside Diameter =	69.75	in
Plate Thickness =	1.25	in
b =	3.42	in
Le =	4.50	in
Z =	2.34	in^3
M_u =	52.04	k-in
$φM_n$ =	75.94	k-in
BP Capacity =	**68.5%**	**OK**

Pole		
Pole Diameter =	60	in
Number of Sides =	Round	
Thickness =	0.625	in
Pole Yield Strength =	42	ksi

***This analysis assumes the clear distance from the top of the concrete to the bottom of the leveling nut is less than the diameter of the anchor rod. Notify GPD Group immediately if existing field conditions do not meet this assumption.**

Stiffeners		
Configuration =	Every Rod	
Thickness =	0.625	in
Width =	4.5	in
Notch =	0.5	in
Height =	8	in
Stiffener Strength (F_y) =	36	ksi
Weld Info. Known? =	Yes	
Vertical Weld Size =	0.375	in
Horiz. Weld Type =	Fillet	
Fillet Size =	0.375	in
Weld Strength =	70	ksi
Stiffener Vertical Force =	34.99	kips
Vert. Weld Capacity =	37.2%	kips
Horiz. Weld Capacity =	56.2%	kips
Stiffener Capacity =	75.3%	kips
Controlling Capacity =	**75.3%**	**OK**

APPENDIX F

Foundation Analysis

Pile Analysis

US-CT-1002, Kettleton

2018791.CT1002.05

M	5361.46	k-ft
P	100.20	k
V	36.87	k
M tot	5564.245	k-ft
M tot 45	3934.515	k-ft
d	5.5	ft
h	46	ft
Vconc	11638	ft^3
wconc	1745.7	k

Pile Ultimate Capacities

Existing

Compression	150	k
Tension	100	k

Modification

Compression	100	k
Tension	100	k

Wequip 75 k (weight of the equipment above the pad)

n existing	24
n mod	48

Total force on piles

	n	x (ft)	y (ft)	X Pc (k)	X Pt (k)	X Mu (k-ft)	45 Pc (k)	45 Pt (k)
Existing	4	0	0	25.64	25.64	0.00	25.64	25.64
	10	6	6	27.73	23.55	831.88	28.60	22.68
	10	12	12	29.82	21.45	1789.25	31.55	19.72
	24							
Mod	2	0	0	25.64	25.64	0.00	25.64	25.64
	4	3.5	3.5	26.86	24.42	188.00	27.36	23.91
	4	7	7	28.08	23.20	393.09	29.09	22.19
	4	10.5	10.5	29.30	21.98	615.26	30.81	20.46
	4	14	14	30.52	20.76	854.51	32.54	18.74
	4	17.5	17.5	31.74	19.54	1110.84	34.27	17.01
	26	21	21	32.96	18.32	8997.65	35.99	15.28
	48							

Pile Capacities

Existing

Compression	39.8%
Tension	51.3%

Modification

Compression	65.9%
Tension	51.3%

Reinforcement Capacity

Mu	14780.47	k-ft
a	4.262575	in
d	60.885	in
Phi Mn	22473.3	k-ft
Capacity	65.8%	

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info@sitesafe.com ● www.sitesafe.com

Smartlink on behalf of AT&T Mobility, LLC Site FA – 10035309 Site ID – CT2086 (MRCTB031784-MRCTB031854) USID – 61174 Site Name – SOUTHBURY KETTLETOWN RD

231 KETTLETOWN ROAD
SOUTHBURY, CT 06488

Latitude: N41-28-16.27
Longitude: W73-12-20.00
Structure Type: Monopole

Report generated date: October 22, 2018
Report by: Scott Broyles
Customer Contact: David Barbagallo

AT&T Mobility, LLC will be compliant when the remediation recommended in Section 5.2 or other appropriate remediation is implemented.

Table of Contents

1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Access to Antennas Locked?	No
Max Cumulative Simulated RFE Level on the Ground	<1% General Public Limit
FCC & AT&T Compliant?	Will Be Compliant
Optional AT&T Mitigation Items?	No

The following documents were provided by the client and were utilized to create this report:

RFDS: RFDS - CT2086 - 10035309

CD's: 10035309_AE201_180925_CTL02086_Rev 2_4C-5C

RF Powers Used: RFDS

1.2 Signage Summary

AT&T Signage Locations	 Information 1	 Information 2	 Notice	 Notice 2	 Caution	 Caution 2	 Warning	 Warning 2	 Barriers
Access Point(s)									
Alpha									
Beta									
Gamma									
Delta									
Epsilon									

1.3 Fall Arrest Anchor Point Summary

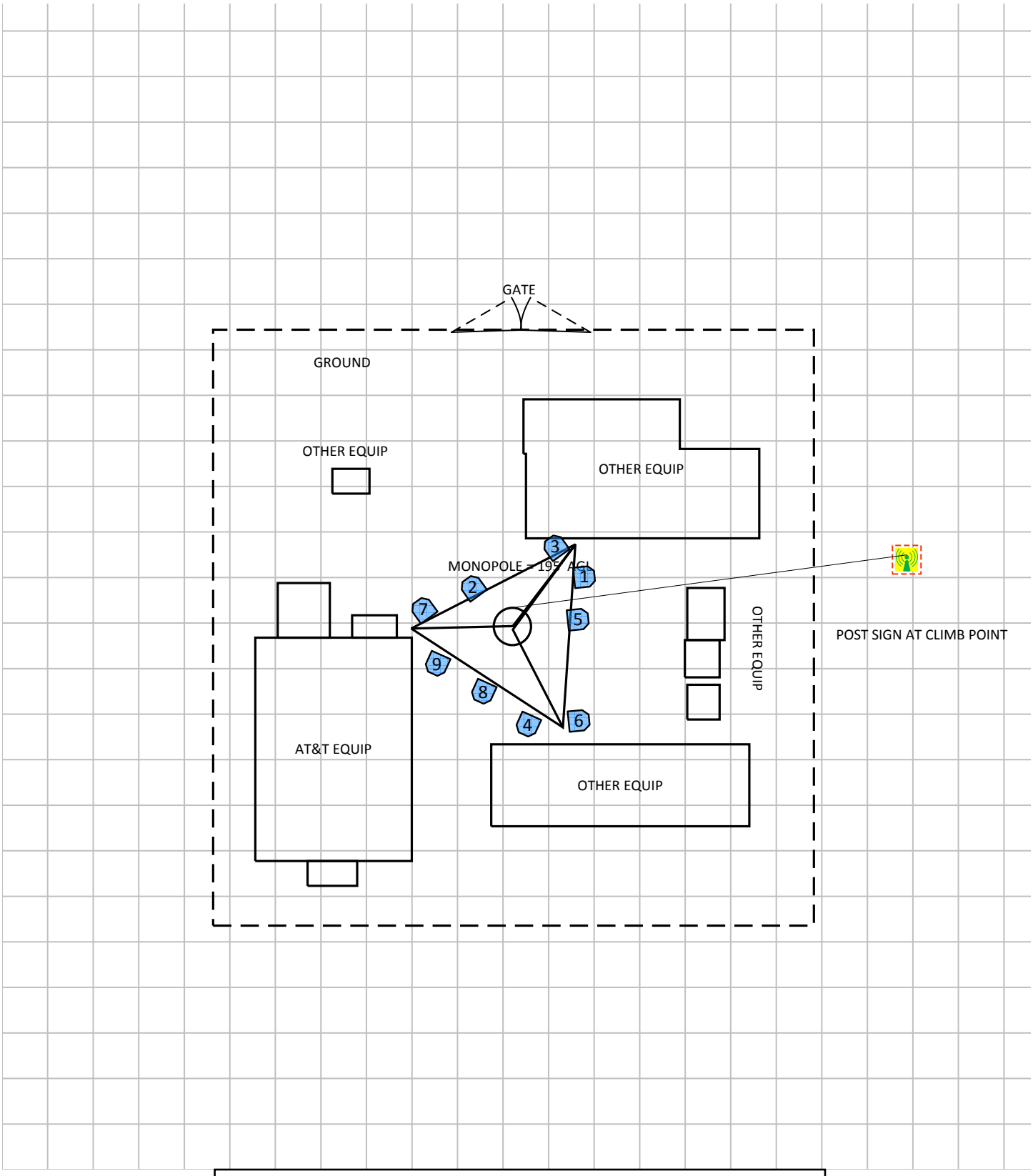
Fall Arrest Anchor & Parapet Info	Parapet Available (Y/N)	Parapet Height (inches)	Fall Arrest Anchor Available (Y/N)
Roof Safety Info	N	N/A	N

2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- RF Exposure Diagram – Elevation View

Site Scale Map For: SOUTHBURY KETTLETOWN RD



N

(Feet)

0 5.6 11.3

www.sitesafe.com
Site Name:SOUTHBURY KETTLETOWN RD
10/22/2018 9:57:14 AM

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Sign Legend

Caution 1 | Caution 2 | Notice 2 | Notice 1 | Warning | Warning 2 | Info 1 | Info 2 | RF Safety Plan

Barrier

Proposed Barriers/ Signs

3 Antenna Inventory

The following antenna inventory was obtained by the customer and was utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Technology	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Power	Power Type	Power Unit	Radio Count	Total ERP (Watts)	Ant Gain (dBd)	Z AGL	MDT	EDT
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	143	82	4.6	232.27	ERP	Watt	1	232.3	11.51	182.7'	0'	6'
2	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	850	LTE	23	63	6	500	ERP	Watt	1	500	10.96	182'	0'	2'
2	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-2	Panel	5G 850	LTE	23	63	6	500	ERP	Watt	1	500	10.96	182'	0'	2'
2	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	1900	LTE	23	68	6	3664.376	ERP	Watt	1	3664.4	14.16	182'	0'	5'
2	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	2300	LTE	23	64	6	1285.287	ERP	Watt	1	1285.3	14.56	182'	0'	2'
3	AT&T MOBILITY LLC (Proposed)	CCI Antennas HPA65R-BU8A	Panel	737	LTE	23	65.7	8	1475.707	ERP	Watt	1	1475.7	13.16	181'	0'	2'
3	AT&T MOBILITY LLC (Proposed)	CCI Antennas HPA65R-BU8A	Panel	2100	LTE	23	61.2	8	3837.072	ERP	Watt	1	3837.1	15.26	181'	0'	2'
4	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	263	82	4.6	232.27	ERP	Watt	1	232.3	11.51	182.7'	0'	0'
5	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-2	Panel	5G 850	LTE	143	63	6	500	ERP	Watt	1	500	10.96	182'	0'	2'
5	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	850	LTE	143	63	6	500	ERP	Watt	1	500	10.96	182'	0'	2'
5	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	1900	LTE	143	68	6	3664.376	ERP	Watt	1	3664.4	14.16	182'	0'	2'
5	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	2300	LTE	143	64	6	1285.287	ERP	Watt	1	1285.3	14.56	182'	0'	2'
6	AT&T MOBILITY LLC (Proposed)	CCI Antennas HPA65R-BU8A	Panel	737	LTE	143	65.7	8	1475.707	ERP	Watt	1	1475.7	13.16	181'	0'	2'
6	AT&T MOBILITY LLC (Proposed)	CCI Antennas HPA65R-BU8A	Panel	2100	LTE	143	61.2	8	3837.072	ERP	Watt	1	3837.1	15.26	181'	0'	2'
7	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	UMTS	23	82	4.6	232.27	ERP	Watt	1	232.3	11.51	182.7'	0'	8'
8	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-2	Panel	5G 850	LTE	263	63	6	500	ERP	Watt	1	500	10.96	182'	0'	2'
8	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	850	LTE	263	63	6	500	ERP	Watt	1	500	10.96	182'	0'	2'
8	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	1900	LTE	263	68	6	3664.376	ERP	Watt	1	3664.4	14.16	182'	0'	2'
8	AT&T MOBILITY LLC	Quintel QS66512-2	Panel	2300	LTE	263	64	6	1285.287	ERP	Watt	1	1285.3	14.56	182'	0'	1'
9	AT&T MOBILITY LLC (Proposed)	CCI Antennas HPA65R-BU8A	Panel	737	LTE	263	65.7	8	1475.707	ERP	Watt	1	1475.7	13.16	181'	0'	2'
9	AT&T MOBILITY LLC (Proposed)	CCI Antennas HPA65R-BU8A	Panel	2100	LTE	263	61.2	8	3837.072	ERP	Watt	1	3837.1	15.26	181'	0'	5'

NOTE: X, Y and Z indicate relative position of the bottom of the antenna to the origin location on the site, displayed in the model results diagram. Specifically, the Z reference indicates the bottom of the antenna height above the main site level unless otherwise indicated. The distance to the bottom of the antenna is calculated by subtracting half of the length of the antenna from the antenna centerline**.** Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed.

Note: The 850 5G MHz LTE technology is being added to an existing antenna.

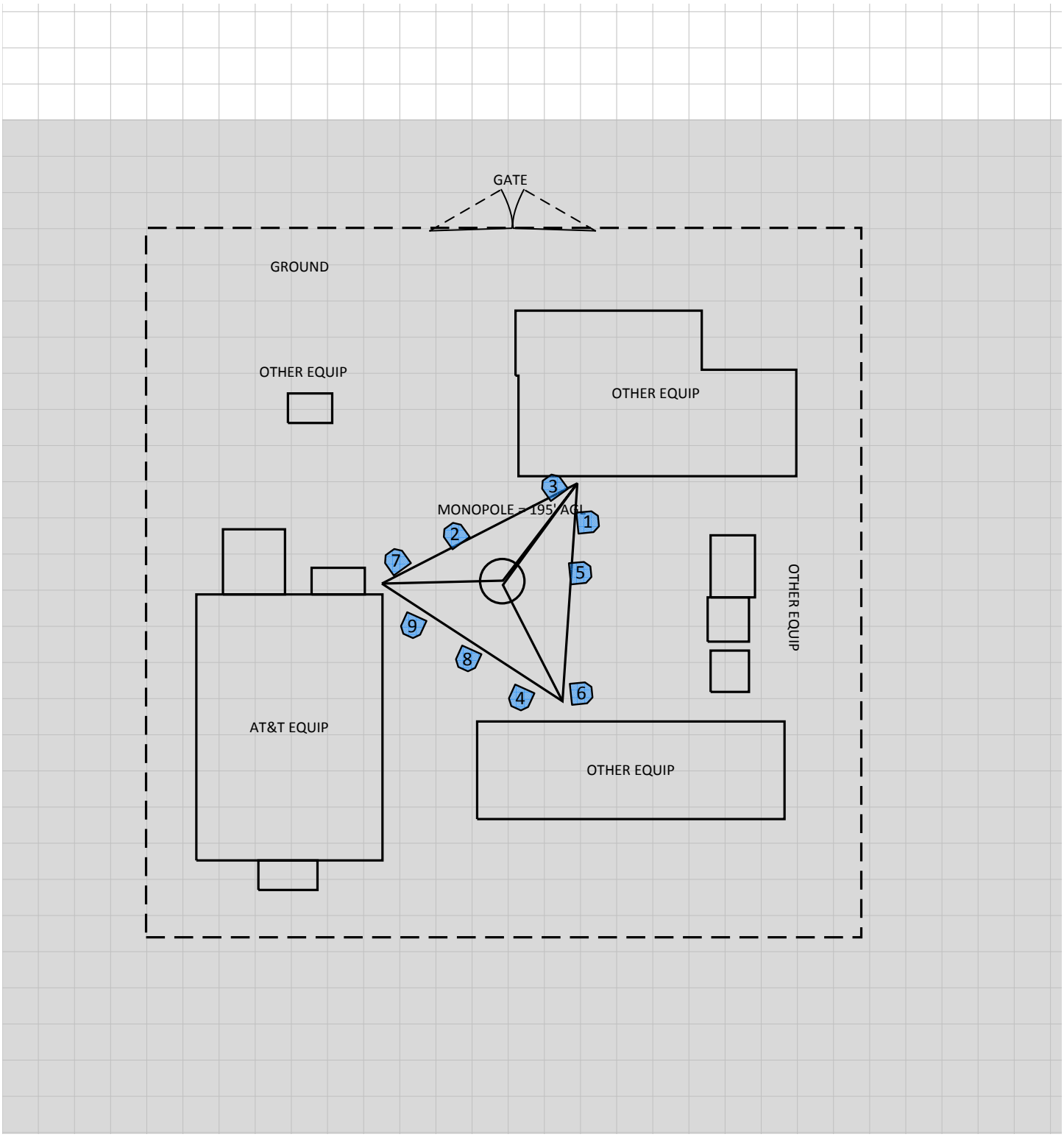
4 Emission Predictions

In the RF Exposure Simulations below all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas. The total analyzed elevations in the below RF Exposure Simulations are listed below.

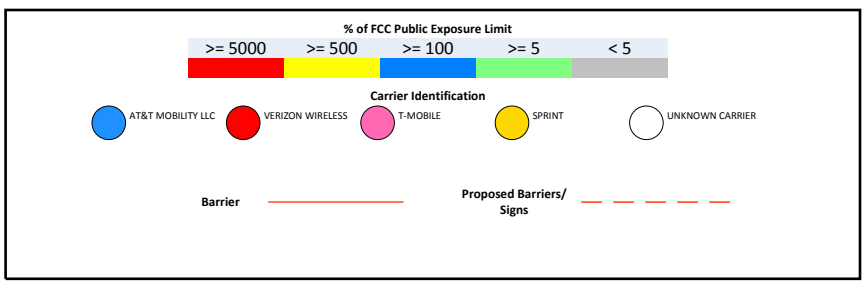
- Ground

The Antenna Inventory heights are referenced to the same level.

RF Exposure Simulation For: SOUTHBURY KETTLETOWN RD
Composite View



% of FCC Public Exposure Limit
Spatial average 0' - 6'



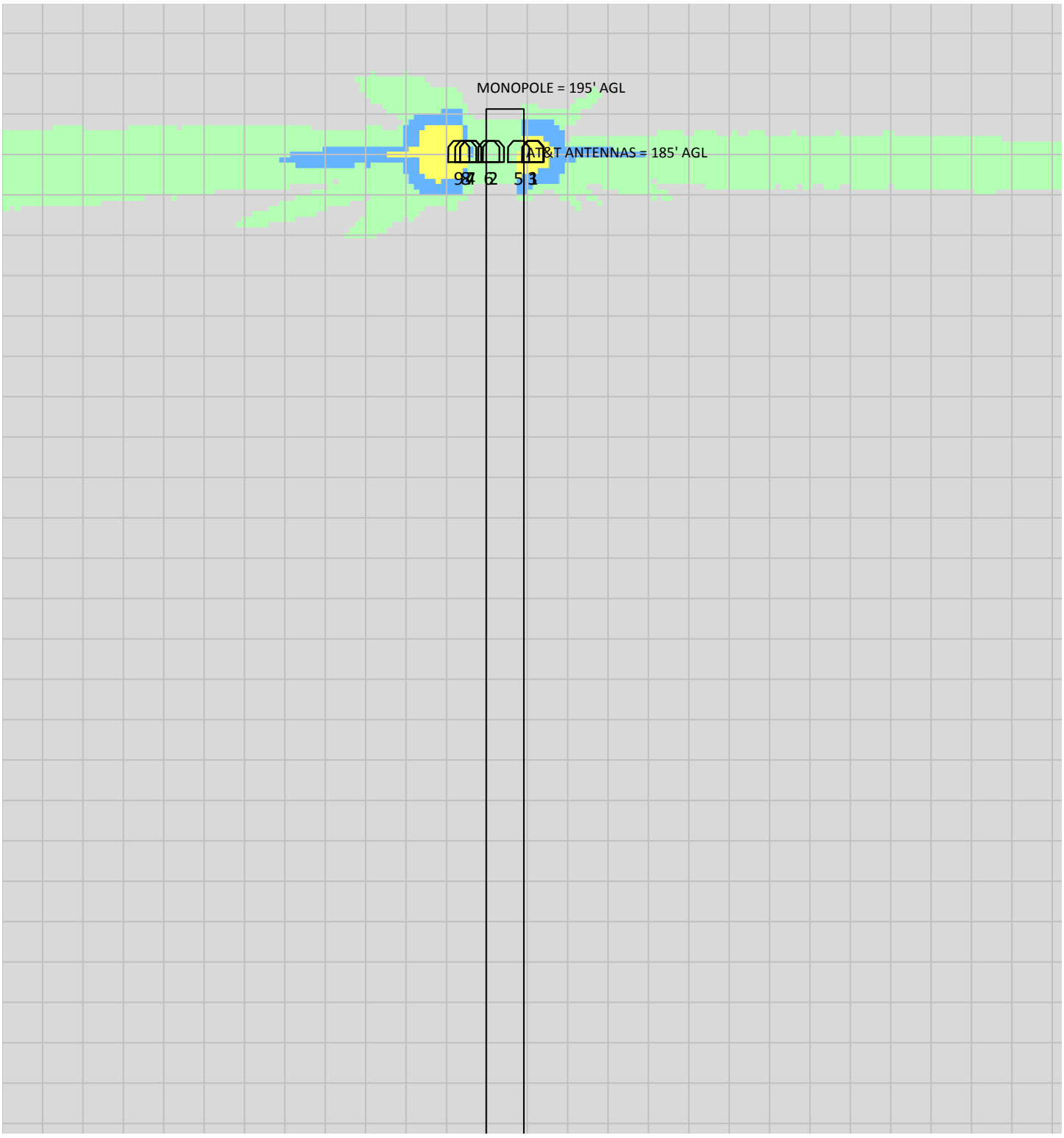
(Feet)

0 4.9 9.8

www.sitesafe.com
Site Name:SOUTHBURY KETTLETOWN RD
10/22/2018 9:49:01 AM

Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: SOUTHBURY KETTLETOWN RD
Elevation View

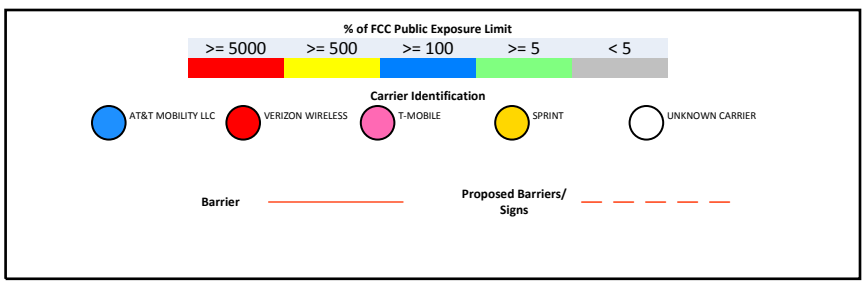


% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)

0 13.9 27.9

www.sitesafe.com
Site Name:SOUTHBURY KETTLETOWN RD
10/22/2018 9:53:44 AM



Sitesafe OET-65 Model
Near Field Boundary:
1.5 * Aperture
Reflection Factor: 1
Single Level (0)

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant when the remediation recommended in Section 5.2 or other appropriate remediation is implemented.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the AT&T Mobility, LLC's proposed deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

AT&T Mobility, LLC will be made compliant if the following changes are implemented:

Monopole Access Location

(1) Yellow Caution 2B sign(s) required at climb point.

Notes:

- Signage may already be in place. Sitesafe does not have record of any existing signage because there were no previous visits or data supplied regarding them. All remediation is based on a worst-case scenario.

6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Sitesafe, LLC., in Vienna, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio-frequency Radiation; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Scott Broyles.

October 22, 2018

Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communications Commission (FCC) adopted regulations for the evaluating of the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996 the FCC periodically reviews these rules and regulations as per their congressional mandate.

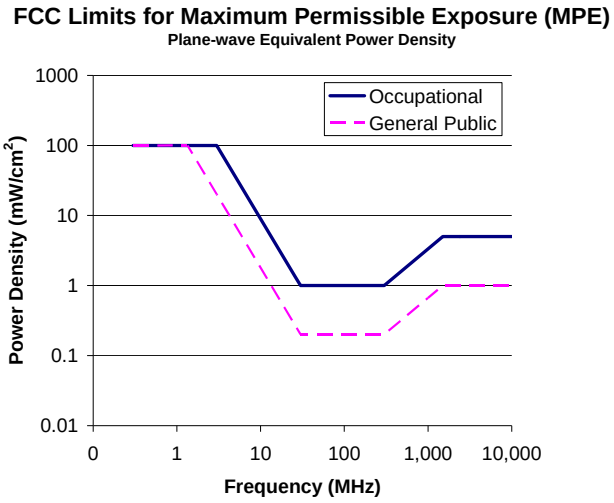
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –
- (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;
- (2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lock Out Tag Out procedure aimed to control the unexpected energization or start up of machines when maintenance or service is being performed.

Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a workers understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3 foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram: Section 4 of this report contains an RF Diagram that outlines various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. Gray represents areas more than 20 times below the most conservative exposure limit.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone**.
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. Yellow areas should be accessible only to RF trained workers able to assess current exposure levels.
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The modeling is based on recommendations from the FCC's OET-65 bulletin with the following variances per AT&T guidance. Reflection has not been considered in the modeling, i.e. the reflection factor is 1.0. The near / far field boundary has been set to 1.5 times the aperture height of the antenna and modeling beyond that point is the lesser of the near field cylindrical model and the far field model taking into account the gain of the antenna.

The site has been modeled with these assumptions to show the maximum RF energy density. Areas modeled with exposure greater than 100% of the General Public MPE level may not actually occur, but are shown as a prediction that could be realized. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site is safe or not with regards to Human Exposure to Radio Frequency Radiation from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half wave dipole multiplied by the net power accepted by the antenna from the connecting transmitter.

Gain (of an antenna) – The ratio of the maximum intensity in a given direction to the maximum radiation in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antennas as compared to an omni directional antenna.

General Population/Uncontrolled Environment – Defined by the FCC, as an area where exposure to RF energy may occur to persons who are **unaware** of the potential for exposure and who have no control of their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of antenna models to select a worst case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The maximum levels of RF exposure a person may be exposed to without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC, as an area where Radio Frequency Radiation (RFR) exposure may occur to persons who are **aware** of the

potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of Radio Frequency radiation on Humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency (RF) – The frequencies of electromagnetic waves which are used for radio communications. Approximately 3 kHz to 300 GHz.

Radio Frequency Exposure (RFE) – The amount of RF power density that a person is or might be exposed to.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average power density an average sized human will be exposed to at a location.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

Appendix F – References

The following references can be followed for further information about RF Health and Safety.

Sitesafe, LLC.
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?siteareа=PED
European Commission Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf
Fairfax County, Virginia Public School Survey
http://www.fcps.edu/fts/safety-security/RFEESurvey/
UK Health Protection Agency Advisory Group on Non-ionising Radiation
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368
Norwegian Institute of Public Health
http://www.fhi.no/dokumenter/545eea7147.pdf