Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

May 4, 2017

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 876313**
AT&T Site ID: CT5264
1394 Meriden Waterbury Turnpike, Southington, CT 06489
Latitude: 41° 33′ 51.39″/ Longitude: -72° 53′ 30.70″

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 158-foot level of the existing 160-foot monopole tower at 1394 Meriden Waterbury Turnpike in Southington, CT. The tower and property is owned by Crown Castle. AT&T now intends to replace three (3) antennas with three (3) new antennas. These antennas would be installed at the 158-foot level of the tower. AT&T also intends to install three (3) RRU's, two (2) DC, one (1) fiber, and one (1) raycap.

The Town of Southington has not responded to a request for original zoning documents, at this time.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to Mr. Garry Brumback, Town Manager, Town of Southington, as well as the property owner, and Crown Castle is the tower owner.

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

2. The proposed modifications will not require the extension of the site boundary.

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

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

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

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

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

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

cc: Mr. Garry Brumback, Town Manager
Town of Southington
75 Main Street
Southington, CT 06489

Town of Southington, CT
Property Listing Report

GIS PIN 0321030004

Account 18522

Property Information

Property Location	1394 MERIDEN WATERBURY TPKE
Owner	SOUTHINGTON TOWER DEVELOPMENT LLC
Co-Owner	%GLOBAL SIGNAL
Mailing Address	PMB331 CANONSBURG PA 15317-252
Land Use	391 Vac Com Lnd wAcc
Land Class	C
Water Service	

Sewer Service	
Census Tract	4303
Neighborhood	1135
Zoning Code	B
Acreage	0.83
Book / Page	997/1112
Lot Setting/Desc	Level
Trash Day	

Photo

No Photo Available

Sketch

Primary Construction Details

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

Bedrooms	0
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	0
Total Living Area	0

Report Created On 5/4/2017

Town of Southington, CT
Property Listing Report

GIS PIN 0321030004 Account 18522

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings		0
Outbuildings	0	0
Improvements	0	0
Extras	0	0
Land	204320	143020
Total	204320	143020

Outbuilding and Extra Items

Type	Description

Sub Areas

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

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
SOUTHINGTON TOWER DEVELOPMENT LLC	997/1112	2005-01-18	90000

Report Created On 5/4/2017

EX-21 4 ex21123110.htm SUBSIDIARIES OF CROWN CASTLE INTERNATIONAL CORP

EXHIBIT 21

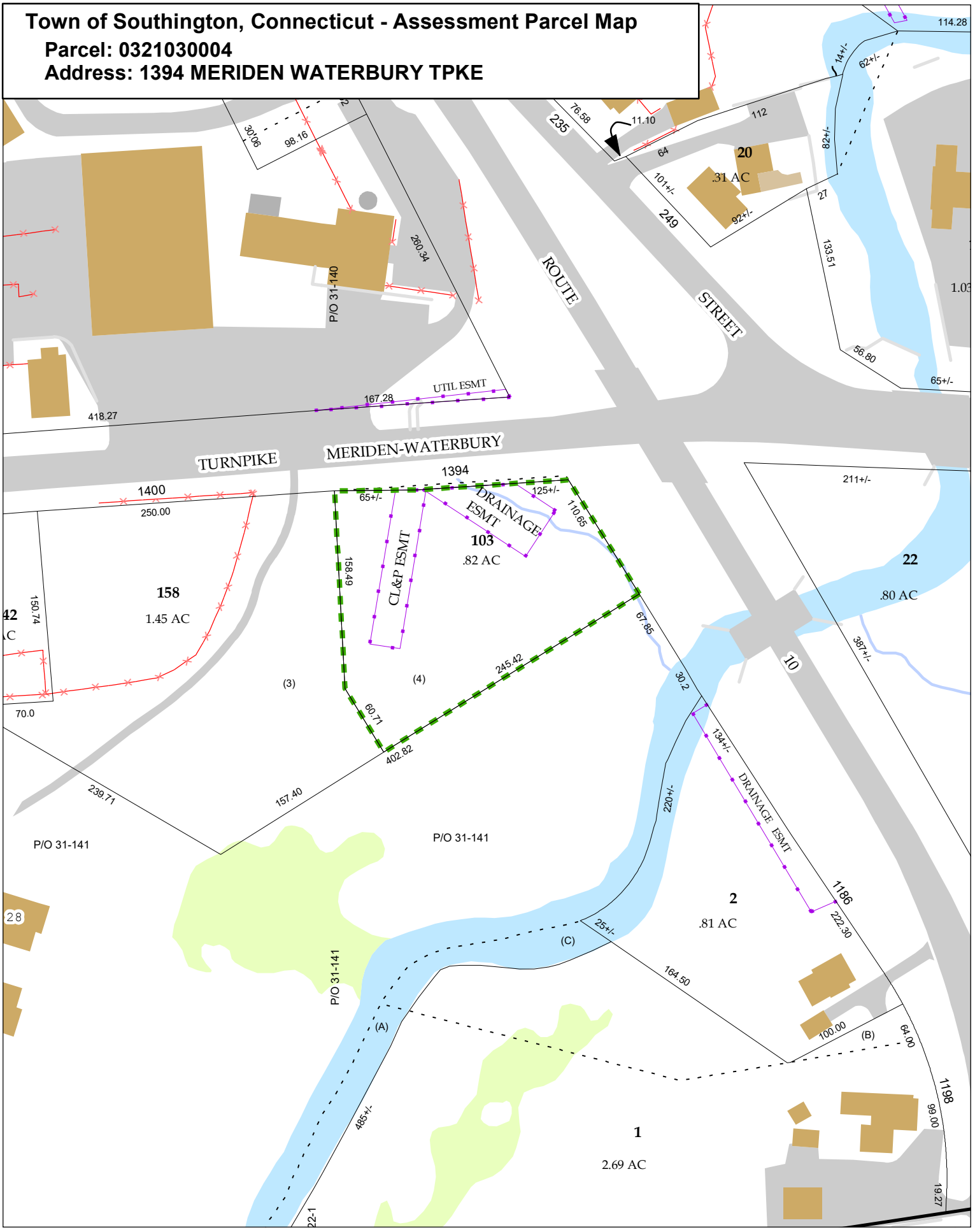
CROWN CASTLE INTERNATIONAL CORP. SUBSIDIARIES

Subsidiary	Jurisdiction of Incorporation
CC Holdings GS V LLC	Delaware
CC Towers Guarantor LLC	Delaware
CC Towers Holding LLC	Delaware
CCGS Holdings Corp.	Delaware
Crown Atlantic Company LLC	Delaware
Crown Castle Atlantic LLC	Delaware
Crown Castle Australia Holdings Pty Limited	Australia
Crown Castle Australia Pty Ltd	Australia
Crown Castle CA Corp.	Delaware
Crown Castle GT Company LLC	Delaware
Crown Castle GT Corp.	Delaware
Crown Castle GT Holding Sub LLC	Delaware
Crown Castle Investment Corp.	Delaware
Crown Castle Operating Company	Delaware
Crown Castle Operating LLC	Delaware
Crown Castle PT Inc.	Delaware
Crown Castle South LLC	Delaware
Crown Castle Towers 05 LLC	Delaware
Crown Castle Towers LLC	Delaware
Crown Castle USA Inc.	Pennsylvania
Crown Communication LLC (f/k/a Crown Communication Inc. d/b/a/ Crown Communications and CrownCom)	Delaware
Global Signal Acquisitions II LLC	Delaware
Global Signal Acquisitions III LLC	Delaware
Global Signal Acquisitions IV LLC	Delaware
Global Signal Acquisitions LLC	Delaware
Global Signal GP LLC	Delaware
Global Signal Holdings III LLC	Delaware
Global Signal Operating Partnership, L.P.	Delaware
Pinnacle Towers Acquisition LLC	Delaware
Pinnacle Towers Acquisitions Holdings LLC	Delaware
Pinnacle Towers LLC	Delaware

Town of Southington, Connecticut - Assessment Parcel Map

Parcel: 0321030004

Address: 1394 MERIDEN WATERBURY TPKE



Approximate Scale:

20 0 20 40 60 80 Feet

Disclaimer: This map is for informational purposes only.
All information is subject to verification by any user.
The Town of Southington and its mapping contractors
assume no legal responsibility for the information contained herein.

Map Produced April 2017

PROJECT:	LTE 3C
SITE NUMBER:	CTL05264
FA NUMBER:	10092035
PTN NUMBER:	2051A03JNP
PACE NUMBER:	MRCTB016480
CROWN BU#:	876313
SITE NAME:	SOUTHINGTON - SOUTH
SITE ADDRESS:	1394 MERIDEN WATERBURY TURNPIKE PLANTSVILLE, CT 06479

at&t
550 COCHITUATE ROAD
SUITE 550 13 AND 14
FRAMINGHAM, MA 01701

smartlink
1362 MELLON ROAD
SUITE 140
HANOVER, MD 21076

FULLERTON ENGINEERING · DESIGN
1100 E. WOODFIELD ROAD, SUITE 500
SCHAUMBURG, ILLINOIS 60173
TEL: 847-908-8400
COA# PEC.0001444
www.FullertonEngineering.com

PROJECT INFORMATION

SITE NAME:	SOUTHINGTON – SOUTH
SITE NUMBER:	CTL05264
SITE ADDRESS:	1394 MERIDEN WATERBURY TURNPIKE PLANTSVILLE, CT 06479
FA NUMBER:	10092035
PTN NUMBER:	2051A03JNP
PACE NUMBER:	MRCTB016480
USID NUMBER:	25915
CROWN BU#:	876313
APPLICANT:	AT&T WIRELESS 550 COCHITUATE ROAD SUITE 550 13 AND 14 FRAMINGHAM, MA 01701
TOWER OWNER:	CROWN CASTLE INTERNATIONAL 2000 CORPORATE DRIVE CANONSBURG, PA 15317
JURISDICTION:	TOWN OF SOUTHINGTON
COUNTY:	HARTFORD
SITE COORDINATES FROM	(RFDS)
LATITUDE:	41.564192°
LONGITUDE:	–72.891899°
GROUND ELEV.:	134'
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
AT&T RF MANAGER:	CAMERON SYME
PHONE:	(508) 596–7146
EMAIL:	cs6970@att.com

PROJECT CONSULTANTS

PROJECT MANAGER:	SMARTLINK
ADDRESS:	33 BOSTON POST RD. WEST, SUITE 210 MARLBOROUGH, MA 01752
CONTACT:	SHARON KEEFE (978) 930–3918
EMAIL:	Sharon.Keefe@Smartlinkllc.com
SITE AQUISITION:	SMARTLINK
ADDRESS:	33 BOSTON POST RD. WEST, SUITE 210 MARLBOROUGH, MA 01752
CONTACT:	SHARON KEEFE (978) 930–3918
EMAIL:	Sharon.Keefe@Smartlinkllc.com
ENGINEER/ARCHITECT:	FULLERTON ENGINEERING
ADDRESS:	9600 W. BRYN MAWR, SUITE 200 ROSEMONT, IL 60018
CONTACT:	MILEN DIMITROV (224) 585–4437
EMAIL:	mdimitrov@fullertonengineering.com
CONSTRUCTION:	SMARTLINK
ADDRESS:	33 BOSTON POST RD. WEST, SUITE 210 MARLBOROUGH, MA 01752
CONTACT:	ROBERT PICARD (413) 772–9277
EMAIL:	robert.picard@smartlinkllc.com

SCOPE OF WORK

THE SCOPE OF WORK CONSISTS OF:

ITEMS TO BE MOUNTED ON EXISTING TOWER:
(3) LTE ANTENNAS, (3) RRU UNITS, (1) RAYCAP UNIT, (2) DC POWER CABLES & (1) FIBER CABLE, (1) LOW–PROFILE PLATFORM, (1) HANDRAIL KIT, (1) KICKER SUPPORT KIT

ITEMS TO BE INSTALLED IN EXISTING AT&T EQUIPMENT AREA:
(1) LTE DUS, (1) XMU, (1) RECTIFIER, (3) 25 AMP BREAKERS

ITEMS TO REMAIN:
(6) ANTENNAS, (6) TMA UNITS, (6) RRU UNITS, (1) RAYCAP UNIT, (2) DC POWER CABLES, (1) FIBER CABLE, (6) 1–5/8" COAX CABLES

ITEMS TO BE REMOVED:
(3) ANTENNA MOUNTS

- CONTRACTOR SHALL FURNISH ALL MATERIAL WITH THE EXCEPTION OF AT&T SUPPLIED MATERIAL.
- ALL MATERIAL SHALL BE INSTALLED BY THE CONTRACTOR, UNLESS STATED OTHERWISE.

SITE LOCATION MAP

NO SCALE

DIRECTIONS

SCAN QR CODE FOR LINK
TO SITE LOCATION MAP

APPLICABLE BUILDING CODES AND STANDARDS

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.

BUILDING CODE:	2003 INTERNATIONAL BUILDING CODE
ELECTRICAL CODE:	2011 NATIONAL ELECTRIC CODE

- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- ADA ACCESS REQUIREMENTS ARE NOT REQUIRED.
- THIS FACILITY DOES NOT REQUIRE POTABLE WATER AND WILL NOT PRODUCE ANY SEWAGE

DRAWING INDEX

NOTE: DRAWING SCALES ARE FOR 11"x17" SHEETS UNLESS OTHERWISE NOTED

REV	DATE	DESCRIPTION	BY
0	02/29/16	90% REVIEW	EB
1	03/03/16	FINAL	AS
2	03/21/16	FOR CONSTRUCTION	KC

I HEREBY CERTIFY THAT THESE DRAWING WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CONTROL, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF COMPLY WITH THE REQUIREMENTS OF ALL APPLICABLE CODES.

SITE NAME
SOUTHINGTON - SOUTH

SITE NUMBER:
CTL05264

SITE ADDRESS
1394 MERIDEN WATERBURY TURNPIKE
PLANTSVILLE, CT 06479

SHEET NAME
TITLE SHEET

SHEET NUMBER
T1

FEC# 2015.0046.0005

GENERAL CONSTRUCTION

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR/CM – SMARTLINK
   OWNER – AT&T WIRELESS
2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.
5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.
10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.
12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.
19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2–A OT 2–A:10–B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.
23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED 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.
24. 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.
25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE–APPROVED BY THE LOCAL JURISDICTION.
28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS–BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.

ANTENNA MOUNTING

40. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA–222 OR APPLICABLE LOCAL CODES.
41. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT–DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.
42. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC–COATING (HOT–DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.
43. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.
44. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.
45. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.
46. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50–OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.
47. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/– 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/– 0.5% AS DEFINED BY THE RFDS. REFER TO ND–00246.
48. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.
49. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.
50. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

51. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.
52. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
    A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
    B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.

FIBER & POWER CABLE MOUNTING

53. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.
54. THE TYPE TC–ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC–ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.
55. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC–ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

62. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO

    ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.
63. CONTRACTOR SHALL VERIFY THE DOWN–TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.
64. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION.
65. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'–0".
66. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'–0" OC.
67. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.
68. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.
69. CONTRACTOR SHALL PROVIDE STRAIN–RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN–RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
70. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

71. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.
72. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.
73. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.
74. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE–HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.
75. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
    A. TEMPERATURE SHALL BE ABOVE 50° F.
    B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
    C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
    D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS
76. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
    A. GROUNDING AT THE ANTENNA LEVEL.
    B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'–0", ADDITIONAL CABLE GROUNDING REQUIRED.
    C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
    D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
    E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.
77. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF 4'–0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

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REV	DATE	DESCRIPTION	BY
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2	03/21/16	FOR CONSTRUCTION	KC

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SITE NAME
SOUTHINGTON - SOUTH

SITE NUMBER:
CTL05264

SITE ADDRESS
1394 MERIDEN WATERBURY TURNPIKE
PLANTSVILLE, CT 06479

SHEET NAME
NOTES AND SPECIFICATIONS

SHEET NUMBER
SP1

NOTICE

Beyond This Point you are entering a controlled area where RF emissions *may exceed* the FCC General Population Exposure Limits.

Follow all posted signs and site guidelines for working in a RF environment.

at&t

Ref: 47CFR 1.1307(b)

CAUTION

Beyond This Point you are entering a controlled area where RF emissions *may exceed* the FCC Occupational Exposure Limits.

Obey all posted signs and site guidelines for working in a RF environment.

at&t

Ref: 47CFR 1.1307(b)

ALERTING SIGNS

WARNING!

DANGER DO NOT TOUCH TOWER!

SERIOUS "RF" BURN HAZARD!

MAINTAIN AN ADEQUATE CLEARANCE BETWEEN TOWER SUPPORTS AND GUY WIRES

FAILURE TO OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN A RADIO FREQUENCY ENVIRONMENT COULD RESULT IN SERIOUS INJURY. CONTACT CURRENT MAY EXCEED LIMITS PRESCRIBED IN ANSI/EEE C95.1-1992 FOR CONTROLLED ENVIRONMENTS.

at&t

PROPERTY OF AT&T

at&t

AUTHORIZED PERSONNEL ONLY

IN CASE OF EMERGENCY, OR PRIOR TO PERFORMING MAINTENANCE ON THIS SITE, CALL 800-638-2822 AND REFERENCE CELL SITE NUMBER_____

ALERTING SIGN

INFO SIGN #4

INFORMATION

AT&T operates telecommunications antennas at this location. Remain at least 3 feet away from any antenna and obey all posted signs.

Contact the owner(s) of the antenna(s) before working closer than 3 feet from the antenna.

Contact AT&T at _____ prior to performing any maintenance or repairs near AT&T antennas. This is Site#_____

Contact the management office if this door/hatch/gate is found unlocked.

INFORMACION

En esta propiedad se ubican antenas de telecomunicationes operadas por AT&T. Favor mantener una distancia de no menos de 3 pies y obedecer todos los avisos.

Comuniquese con el propietario o los propicetarios de las antenas antes de trabajar o caminar a una distancia de menos de 3 pies de la antena.

Comuniquese con AT&T _____antes de realizar cualquier mantenimiento o reparaciones cerca de la antenas de AT&T.

Esta es la estacion base numero_____

Favor comunicarse con la oficina de la administracion del edificio si esta puerta o compuerta se encuentra sin candado.

at&t

INFO SIGN #1

INFORMATION

ACTIVE ANTENNAS ARE MOUNTED

- ☐ ON THE OUTSIDE OF THIS BUILDING
- ☐ BEHIND THIS PANEL
- ☐ ON THIS STRUCTURE

STAY BACK A MINIMUM OF 3 FEET FROM THESE ANTENNAS

Contact AT&T at _____ and follow their instructions prior to performing any maintenance or repairs closer than 3 feet from the antennas.

This is AT&T site# _____

at&t

INFO SIGN #2

STAY BACK 3 FEET FROM ANTENNA

at&t

INFO SIGN #3

ALERTING SIGN
(FOR CELL SITE BATTERIES)

ALERTING SIGN
(FOR DIESEL FUEL)

ALERTING SIGN
(FOR PROPANE)

GENERAL SIGNAGE GUIDELINES

Structure Type	INFO SIGN #1	INFO SIGN #2	INFO SIGN #3	INFO SIGN #4	Striping	NOTICE SIGN	CAUTION SIGN
Towers							
Monopole/Monopine/Monopalm	entrance gates, shelter doors **OR** on the outdoor cabinets	climbing side of the Tower	On backside of Antennas	entrance gates, shelter doors **OR** on the outdoor cabinets			At the height of the first climbing step, min. 9ft above ground
SCE Towers/ Towers with high voltage	entrance gates, shelter doors **OR** on the outdoor cabinets	climbing side of the Tower	On backside of Antennas	entrance gates, shelter doors **OR** on the outdoor cabinets			At the height of the first climbing step, min. 9ft above ground
Light Poles / Flag Poles	entrance gates, shelter doors **OR** on the outdoor cabinets	on the pole, no less than 3ft below the Antenna and no less than 9ft above ground	On backside of Antennas	entrance gates, shelter doors **OR** on the outdoor cabinets			
Utility Wood Poles (JPA)	entrance gates, shelter doors **OR** on the outdoor cabinets	on the pole, no less than 3ft below the Antenna and no less than 9ft above ground	On backside of Antennas	entrance gates, shelter doors **OR** on the outdoor cabinets		If GP max value of MPE at antenna level is: 0-99%: Notice sign; over 99%: Caution sign at no less than 3ft below antenna and 9ft above ground	
Microcells mounted on non-JPA poles	entrance gates, shelter doors **OR** on the outdoor cabinets	on the pole, no less than 3ft below the Antenna and no less than 9ft above ground	On backside of Antennas	entrance gates, shelter doors **OR** on the outdoor cabinets		Notice or Caution sign at no less than 9ft above ground: only if the exposure exceeds 90% of the General Public exposure at 6ft above ground or at outside surface of adjacent buildings	
Roof Tops							
At all access points to the roof	X			X			
On Antennas	X		X	X			
Concealed Antennas	X	X		X			
antennas mounted facing outside the building	X	X		X			
antennas on support structure	X	X		X			
Roofview Graph:						either Notice or Caution sign (based on Roofview results) at antennas/barrier	
Radiation area is within 3ft from antenna	X	adjacent to each antenna		X			
Radiation area is beyond 3ft from antenna	X	adjacent to each antenna		X	diagonal, yellow striping as to Roofview graph		
Church Steeples	Access to steeple	adjacent to antennas if antennas are concealed	On backside of Antennas	Access to steeple			Caution sign at the antennas
Water Stations	Access to ladder	adjacent to antennas if antennas are concealed	On backside of Antennas	Access to ladder			Caution sign beside Info sign #1, min. 9ft above ground

Notes for Rooftop sites:

1. Either NOTICE or CAUTION signs need to be posted at each sector as close as possible to: the outer edge of the striped off area or the outer antennas of the sector.
2. If Roofview shows: only blue = Notice Sign, blue and yellow = Caution Sign, only yellow = Caution Sign to be installed.
3. Should the required striping area interfere with any structures or equipment (A/C, vents, roof hatch, doors, other antennas, dishes, etc.), please notify AT&T to modify the striping area, prior to starting the work

SIGNAGE GUIDELINES CHART

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SOUTHINGTON - SOUTH

SITE NUMBER:
CTL05264

SITE ADDRESS
1394 MERIDEN WATERBURY TURNPIKE
PLANTSVILLE, CT 06479

SHEET NAME
NOTES AND SPECIFICATIONS

SHEET NUMBER
SP2

FEC# 2015.0046.0005

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AGL	ABOVE GRADE LEVEL
AMSL	ABOVE MEAN SEA LEVEL
APPROX	APPROXIMATE
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BTS	BASE TRANSMISSION STATION
℄	CENTERLINE
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CND	CONDUIT
DWG	DRAWING
FT	FOOT(FEET)
EGB	EQUIPMENT GROUND BAR
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ELEV	ELEVATION
EQUIP	EQUIPMENT
(E)	EXISTING
EXT	EXTERIOR
FND	FOUNDATION
F	FIBER
FIF	FACILITY INTERFACE FRAME
GA	GAUGE
GALV	GALVANIZED
GPS	GLOBAL POSITIONING SYSTEM
GND	GROUND
GSM	GLOBAL SYSTEM FOR MOBILE COMMUNICATION
LTE	LONG TERM EVOLUTION
MAX	MAXIMUM
MCPA	MULTI-CARRIER POWER AMPLIFIER
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MTS	MANUAL TRANSFER SWITCH
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OE/OT	OVERHEAD ELECTRIC/TELCO
PPC	POWER PROTECTION CABINET
PL	PROPERY LINE
RBS	RADIO BASED STATION
RET	REMOTE ELECTRIC TILT
RRU	REMOTE RADIO UNIT
RGS	RIGID GALVANIZED STEEL
IN	INCH(ES)
INT	INTERIOR
LB(S), #	POUND(S)
SF	SQUARE FOOT
STL	STEEL
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UE/UT	UNDERGROUND ELECTRIC/TELCO
UNO	UNLESS NOTED OTHERWISE
UMTS	UNIVERSAL MOBILE TELE-COMMUNICATION SYSTEM
VIF	VERIFY IN FIELD
W/	WITH
XFMR	TRANSFORMER

SYMBOLS

REVISION

WORK POINT

UTILITY POLE

COMPRESSED STONE

BRICK

CONCRETE

EARTH

GRAVEL

MASONRY

STEEL

CENTERLINE

PROPERTY LINE

LEASE LINE

EASEMENT LINE

CHAIN LINK FENCE

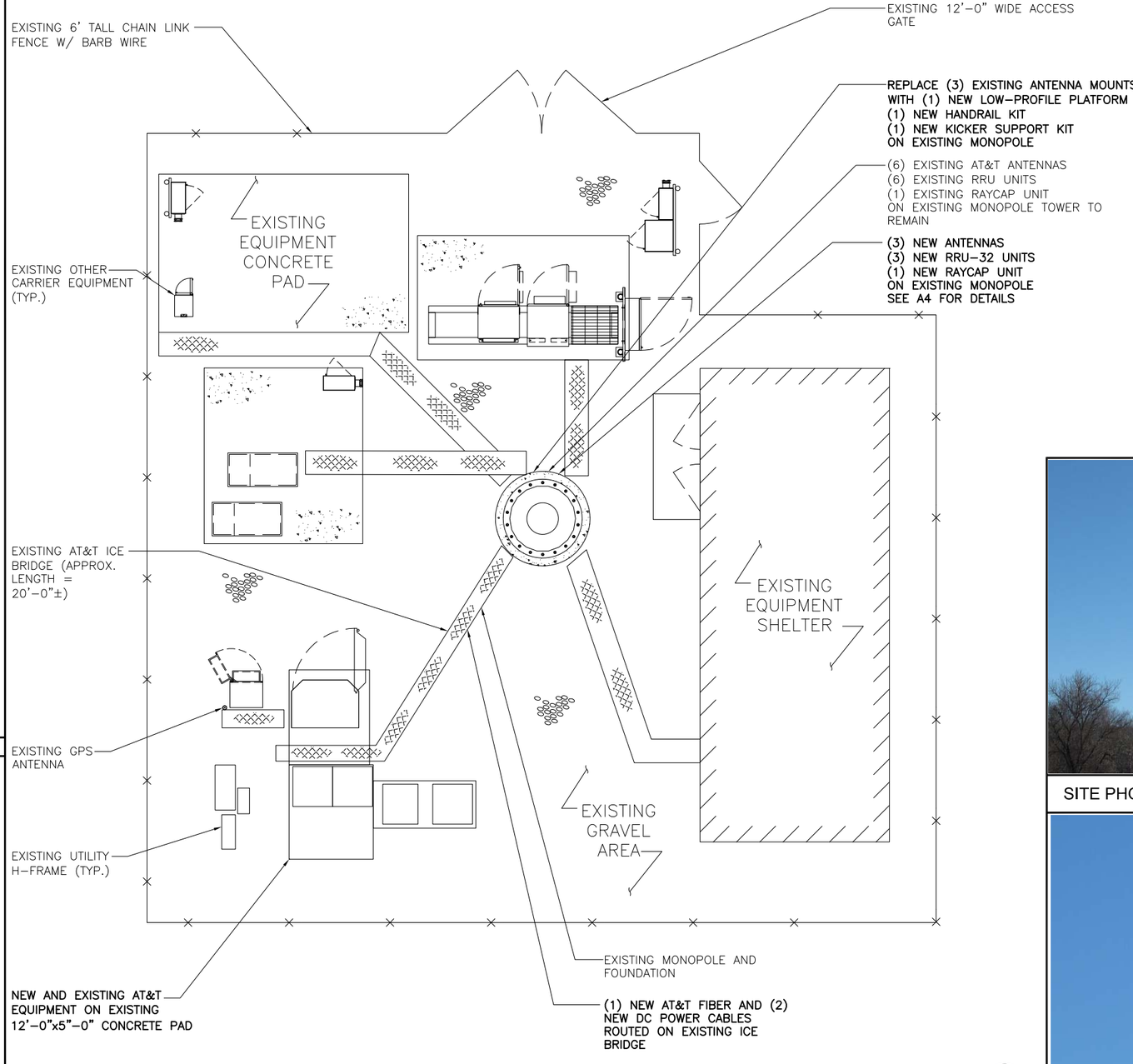
WOOD FENCE

UE — BELOW GRADE ELECTRIC

UT — BELOW GRADE TELEPHONE

OE/OT — OVERHEAD ELECTRIC/TELEPHONE

SECTION REFERENCE (A, S-1)



COMPOUND PLAN — SCALE: 1/8" = 1'-0" — 1

SITE PHOTO 1 — SCALE: N.T.S. — 2

SITE PHOTO 2 — SCALE: N.T.S. — 3

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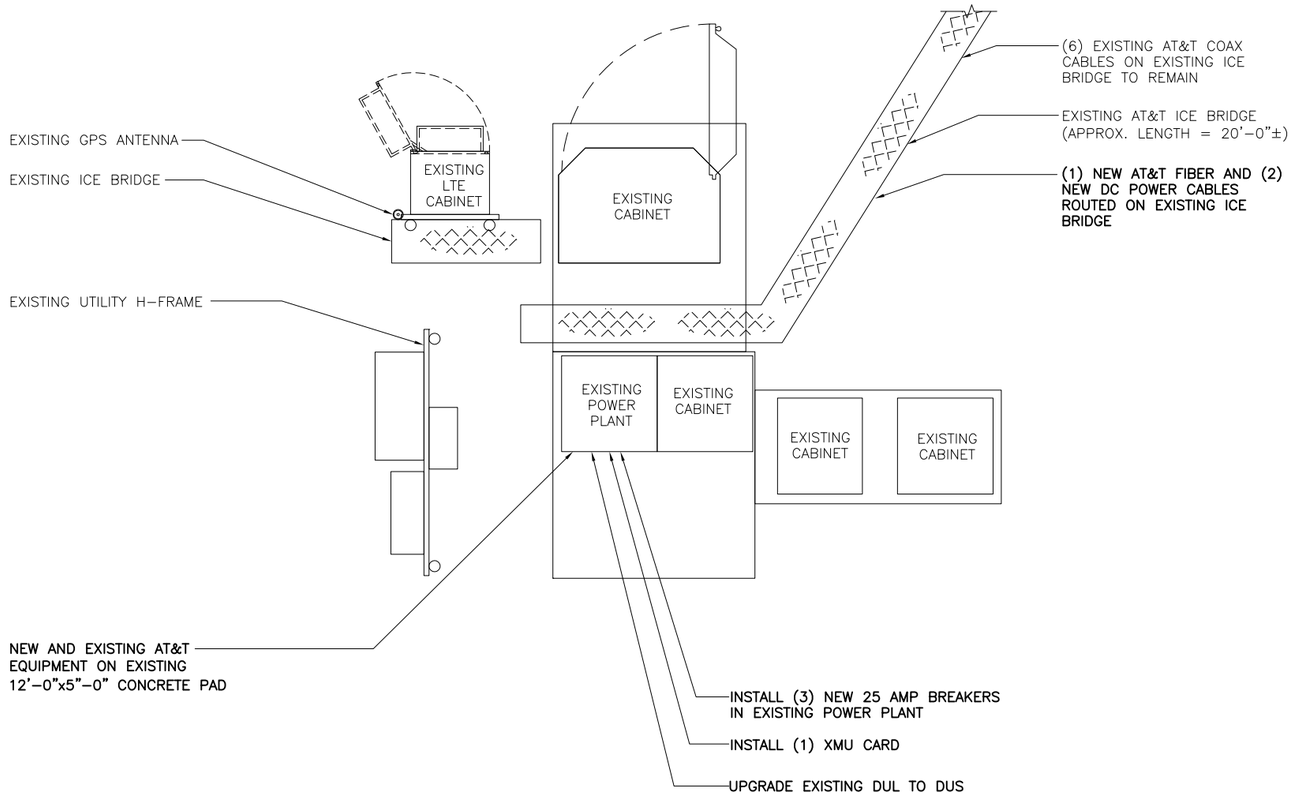
SHEET NAME
COMPOUND PLAN

SHEET NUMBER
A1

FEC# 2015.0046.0005



EQUIPMENT PLAN

SCALE: 1/4" = 1'-0" | 1

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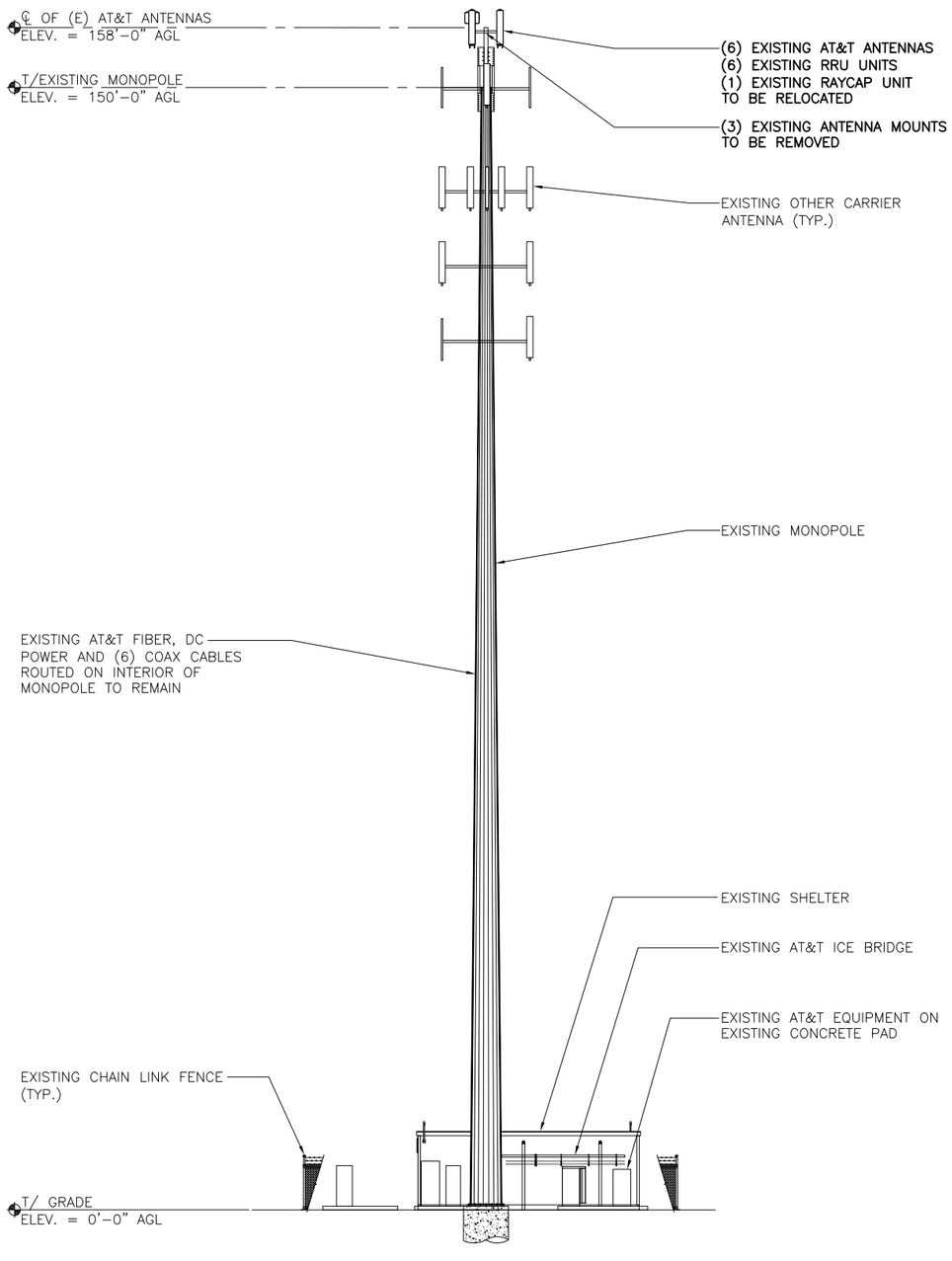
SHEET NAME
EQUIPMENT PLAN

SHEET NUMBER
A2

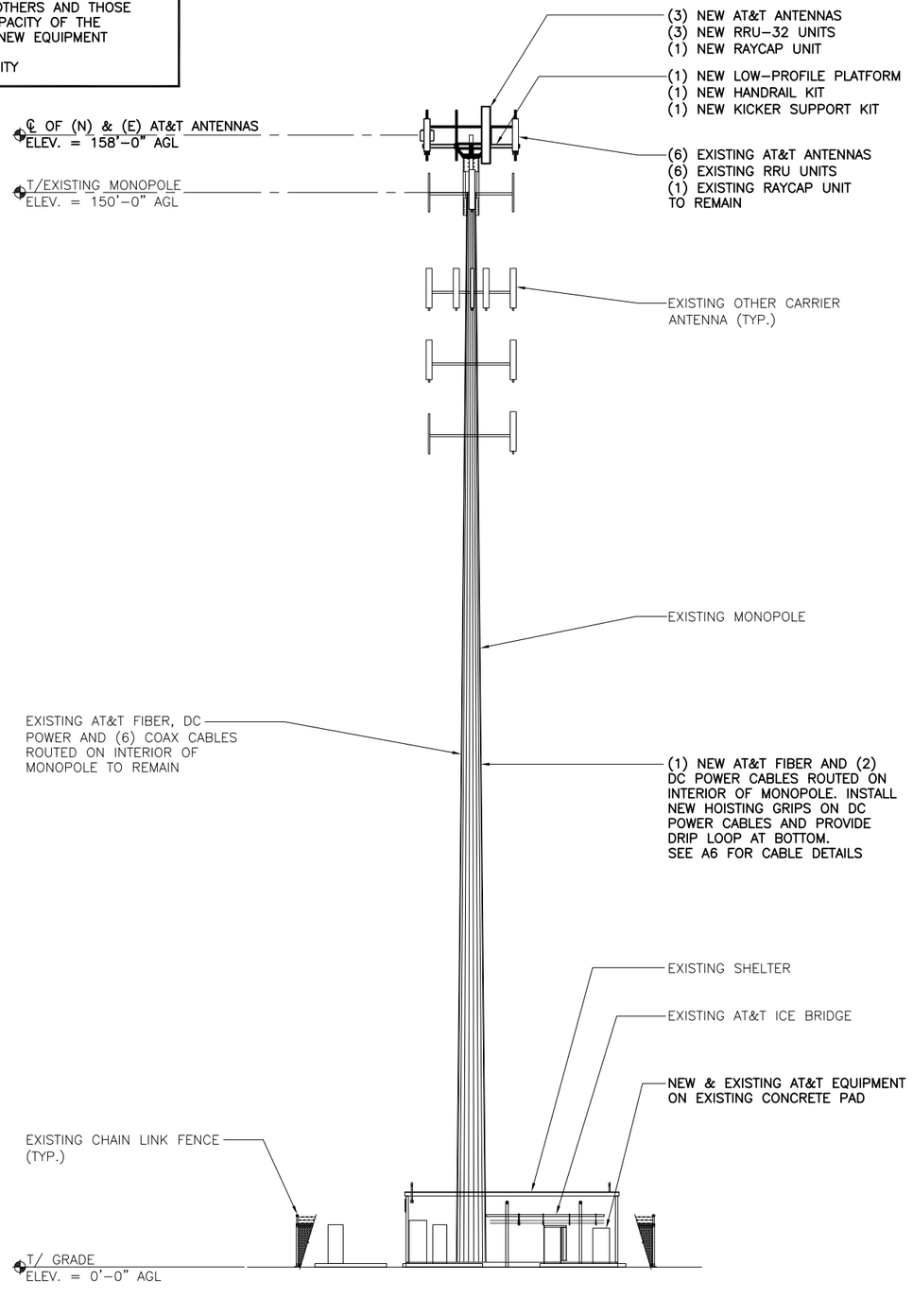
FEC# 2015.0046.0005

NOTES:

1. CALCULATIONS FOR THE STRUCTURE AND ANTENNA MOUNTS WERE PREPARED BY OTHERS AND THOSE CALCULATIONS CERTIFY THE CAPACITY OF THE STRUCTURE TO SUPPORT THE NEW EQUIPMENT
2. CABLES NOT SHOWN FOR CLARITY



EXISTING ELEVATION — SCALE: 1" = 20'-0" — 1



NEW ELEVATION — SCALE: 1" = 20'-0" — 2

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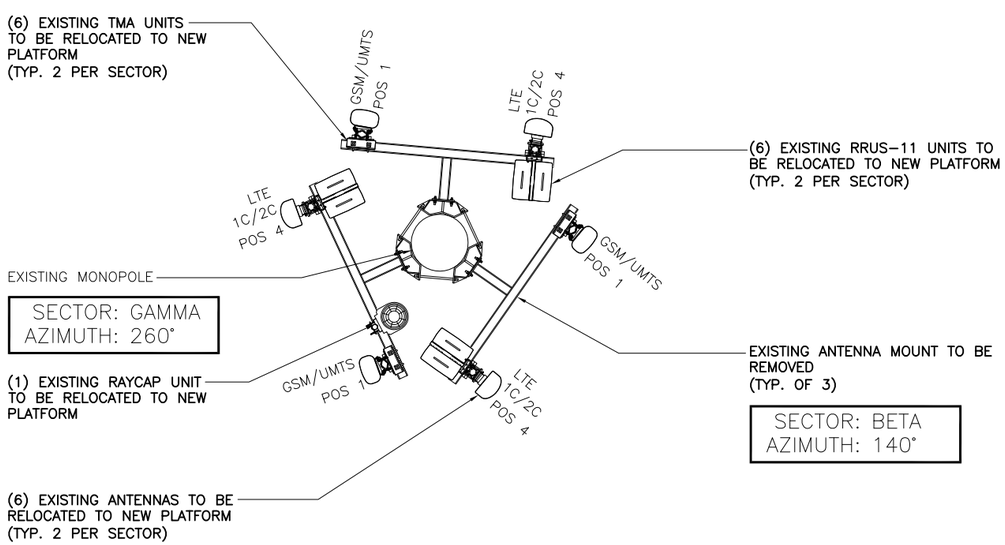
SHEET NAME
ELEVATIONS

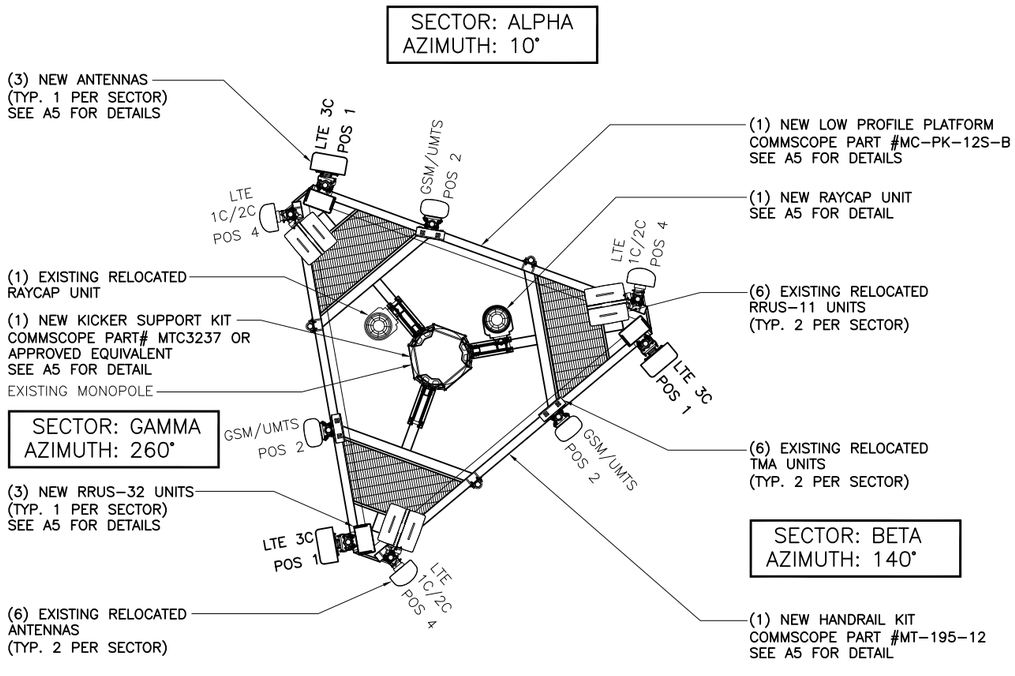
SHEET NUMBER
A3

FEC# 2015.0046.0005



EXISTING ANTENNA PLAN

SCALE: 3/16" = 1'-0" | 1



FINAL ANTENNA PLAN

SCALE: 3/16" = 1'-0" | 2

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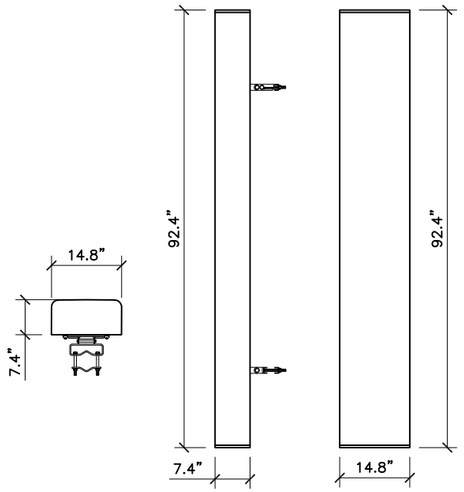
SHEET NAME
ANTENNA PLANS

SHEET NUMBER
A4

FEC# 2015.0046.0005



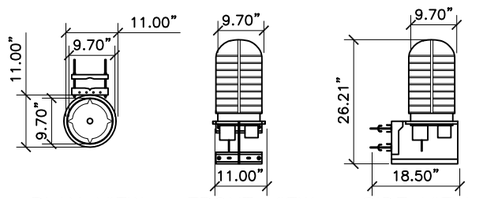
PLAN VIEW SIDE VIEW FRONT VIEW

CCI – HPA–65R–BUU–H8

HEXPORT MULTI–BAND ANTENNA

FREQUENCY RANGE	698–806 MHz
	824–894 MHz
	1850–1990 MHz
	1710–1755/2110–2170 MHz
	2305–2360 MHz
ANTENNA	68 Lbs
WITH BRACKET	78 Lbs

ANTENNA SPEC SCALE: N.T.S. 1



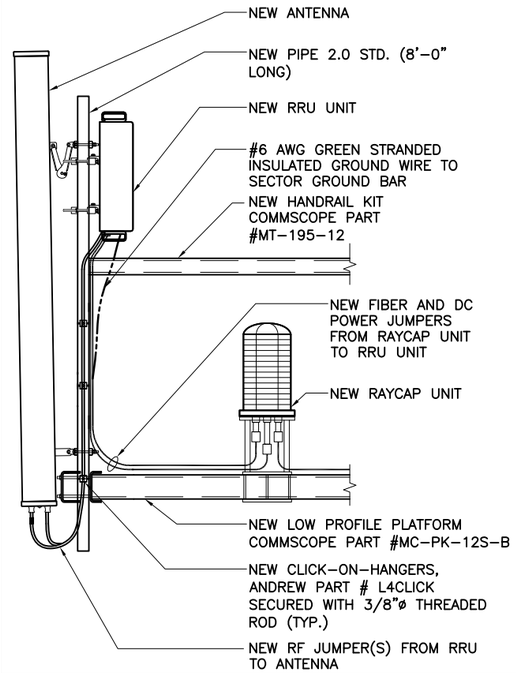
PLAN VIEW FRONT VIEW SIDE VIEW

RAYCAP – DC6–48–60–18–8F

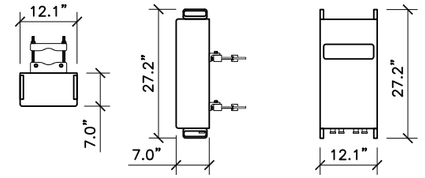
TOWER DC OVER VOLTAGE PROTECTION POWER CONNECTION SOLUTION

UNIT WEIGHT 32.8 Lbs

RAYCAP SPEC SCALE: N.T.S. 2



ANTENNA SCHEMATIC SCALE: N.T.S. 3

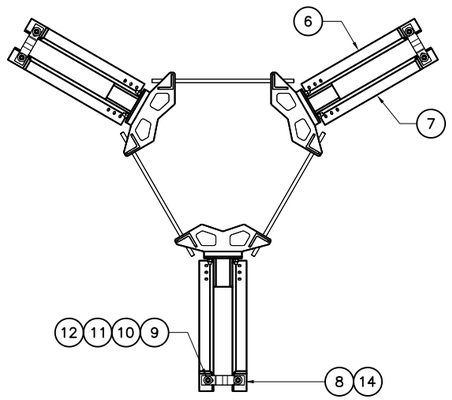


PLAN VIEW SIDE VIEW FRONT VIEW

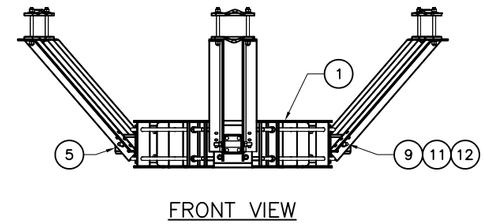
ERICSSON – RRUS 32 B30

UNIT WEIGHT 60 Lbs

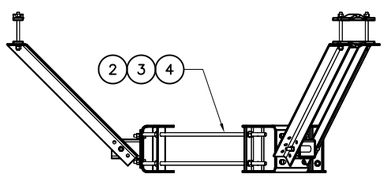
RRU SPEC SCALE: N.T.S. 4



PLAN VIEW



FRONT VIEW



SIDE VIEW

ITEM	PART NO.	DESCRIPTION	QTY.
1	MTC306503	CW 1030 RINGMOUNT WELDMENT	3
2	MTC38430B7	3/4"x30" GALV. THREADED ROD	6
3	GWL–06	3/4" GALV. LOCK WASHER	12
4	GN–06	3/4" GALV. HEX NUT	12
5	MTC313802	KICKER MOUNT STANDOFF	3
6	MTC323701	LEFT KICKER	3
7	MTC323702	RIGHT KICKER	3
8	MTC323704	CLAMP BAR	6
9	MT–381–8	5/8" x 8" GALV. THREADED ROD	9
10	GWF–05	5/8" GALV. FLAT WASHER	12
11	GWL–05	5/8" GALV. LOCK WASHER	18
12	GN–05	5/8" GALV. HEX NUT	18
13	GB–0520A	5/8" x 2" GALV. BOLT KIT (A325)	12
14	DCP10	SMALL CLAMP HALF	6

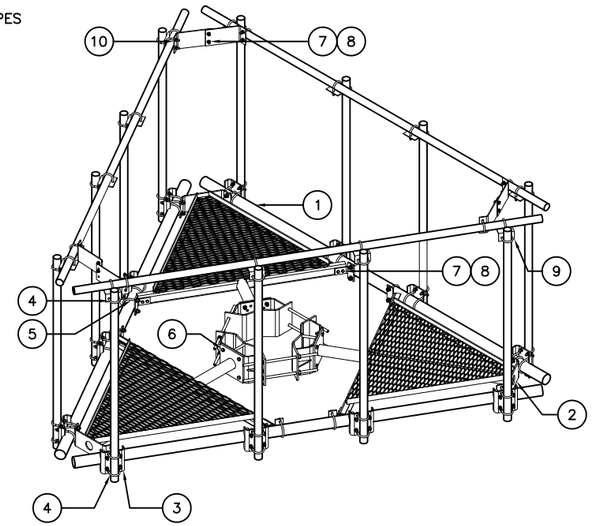
KICKER SUPPORT KIT

(COMMSCOPE #MTC3237)

TOTAL WEIGHT: 275.01 lbs

KICKER SUPPORT SPEC SCALE: N.T.S. 5

NOTES:
1. 2 3/8" OD MOUNTING PIPES (PURCHASED SEPARATELY)



ITEM	PART NO.	DESCRIPTION
1	MC–PK12S–B	LOW PROFILE CO–LOCATION PLATFORM KIT
2	MT196.01	LOW PROFILE CO–LOCATION PLATFORM 12'–6"
3	MT217.01	PIPE MOUNT PLATE
4	GUB–4240	1/2" X 2–1/2" X 4" GALV U–BOLT KIT
5	GUB–4356	1/2" X 3–5/8" X 6" GALV U–BOLT KIT
6	GB–0520A	5/8" X 2" GALV BOLT KIT (A325)
7	GB–04145	1/2" X 1–1/2" GALV BOLT KIT
8	GWF–04	END PLATE
9	XA2020.01	CROSS OVER ANGLE
10	MT195.03	END PLATE

12'–6" LOW PROFILE PLATFORM

(COMMSCOPE #MC–PK12S–B)

12'–6" UPPER SUPPORT RAIL KIT FOR CO–LOCATION PLAFTFORM

(COMMSCOPE #MT–195–12)

TOTAL WEIGHT: 1683.8 lbs

NEW PLATFORM SPEC SCALE: N.T.S. 6

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REV	DATE	DESCRIPTION	BY
0	02/29/16	90% REVIEW	EB
1	03/03/16	FINAL	AS
2	03/21/16	FOR CONSTRUCTION	KC

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SITE NAME

SOUTHINGTON - SOUTH

SITE NUMBER:

CTL05264

SITE ADDRESS

1394 MERIDEN WATERBURY TURNPIKE
PLANTSVILLE, CT 06479

SHEET NAME

EQUIPMENT DETAILS

SHEET NUMBER

A5

FEC# 2015.0046.0005

FINAL ANTENNA CONFIGURATION AND CABLE SCHEDULE
SUPPLIED BY AT&T WIRELESS, FROM RF CONFIG. DATED (09/21/15)

SECTOR	ANTENNA NUMBER	ANTENNA STATUS & TYPE	ANTENNA MODEL NUMBER	ANTENNA VENDOR	TMA/RRU UNIT	AZIMUTH	ANTENNA CL FROM GROUND	CABLE FEEDER TYPE	CABLE FEEDER LENGTH	RAYCAP UNIT
ALPHA	A-1	**(N) LTE3C ANTENNA**	**HPA-65R-BUU-H8**	**CCI**	**(1) NEW RRUS-32 UNIT**	**10°**	**158'-0"**	**(1) NEW FIBER CABLE**	**220'-0"**	(1) (E) DC6-48-60-18-8F UNIT **(1) (N) DC6-48-60-18-8F UNIT**
								(2) NEW DC POWER CABLES	**220'-0"**	
	A-2	(E) UMTS/GSM ANTENNA	800 10121	KATHREIN	(2) EXISTING TMA UNIT(S)	10°	158'-0"	1-5/8"ø LDF7-50A	220'-0"	
								1-5/8"ø LDF7-50A	220'-0"	
	A-3	-	-	-	-	-	-	-		
	A-4	(E) LTE1C/2C ANTENNA	AM-X-CD-16-65-00T-RET	KMW	(2) EXISTING RRUS-11 UNIT(S)	10°	158'-0"	(1) EXISTING FIBER CABLE	220'-0"	
								(2) EXISTING DC POWER CABLES	220'-0"	
BETA	B-1	**(N) LTE3C ANTENNA**	**HPA-65R-BUU-H8**	**CCI**	**(1) NEW RRUS-32 UNIT**	**140°**	**158'-0"**	**SEE ANTENNA A-2 FOR CABLE TYPE AND LENGTH**		
	B-2	(E) UMTS/GSM ANTENNA	800 10121	KATHREIN	(2) EXISTING TMA UNIT(S)	140°	158'-0"	1-5/8"ø LDF7-50A	220'-0"	
								1-5/8"ø LDF7-50A	220'-0"	
	B-3	-	-	-	-	-	-	-		
	B-4	(E) LTE1C/2C ANTENNA	P65-17-XLH-RR	POWERWAVE	(2) EXISTING RRUS-11 UNIT(S)	140°	158'-0"	SEE ANTENNA A-3 FOR CABLE TYPE AND LENGTH		
GAMMA	C-1	**(N) LTE3C ANTENNA**	**HPA-65R-BUU-H8**	**CCI**	**(1) NEW RRUS-32 UNIT**	**260°**	**158'-0"**	**SEE ANTENNA A-2 FOR CABLE TYPE AND LENGTH**		
	C-2	(E) UMTS/GSM ANTENNA	800 10121	KATHREIN	(2) EXISTING TMA UNIT(S)	260°	158'-0"	1-5/8"ø LDF7-50A	220'-0"	
								1-5/8"ø LDF7-50A	220'-0"	
	C-3	-	-	-	-	-	-	-		
	C-4	(E) LTE1C/2C ANTENNA	SBNH-1D6565C	COMMSCOPE	(2) EXISTING RRUS-11 UNIT(S)	260°	158'-0"	SEE ANTENNA A-3 FOR CABLE TYPE AND LENGTH		

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SOUTHINGTON - SOUTH

SITE NUMBER:
CTL05264

SITE ADDRESS
1394 MERIDEN WATERBURY TURNPIKE
PLANTSVILLE, CT 06479

SHEET NAME
ANTENNA & CABLE CONFIGURATION

SHEET NUMBER
A6

FEC# 2015.0046.0005

1. CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.
2. THE SIZE, HEIGHT, AND DIRECTION OF THE ANTENNAS SHALL BE ADJUSTED TO ACHIEVE THE AZIMUTHS SPECIFIED AND LIMIT SHADOWING AND TO MEET THE SYSTEM REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY THE HEIGHT OF THE ANTENNA WITH THE AT&T WIRELESS PROJECT MANAGER.
4. VERIFY TYPE AND SIZE OF TOWER LEG PRIOR TO ORDERING ANY ANTENNA MOUNT.
5. UNLESS NOTED OTHERWISE THE CONTRACTOR MUST PROVIDE ALL MATERIAL NECESSARY.
6. ANTENNA AZIMUTHS ARE DEGREES OFF OF TRUE NORTH, BEARING CLOCKWISE, IN WHICH ANTENNA FACE IS DIRECTED. ALL ANTENNAS (AND SUPPORTING STRUCTURES AS PRACTICAL) SHALL BE ACCURATELY ORIENTED IN THE SPECIFIED DIRECTION.
7. CONTRACTOR SHALL VERIFY ALL RF INFORMATION PRIOR TO CONSTRUCTION.
8. SWEEP TEST SHALL BE PERFORMED BY GENERAL CONTRACTOR AND SUBMITTED TO AT&T WIRELESS CONSTRUCTION SPECIALIST. TEST SHALL BE PERFORMED PER AT&T WIRELESS STANDARDS.
9. CABLE LENGTHS WERE DETERMINED BASED ON THE DESIGN DRAWING. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK.
10. CONTRACTOR TO USE ROSENBERGER FIBER LINE HANGER COMPONENTS (OR ENGINEER APPROVED EQUAL).

ANTENNA AND CABLING NOTES

SCALE: N.T.S. | 1

RF, DC, & COAX CABLE MARKING LOCATIONS TABLE	
NO	LOCATIONS
1	EACH TOP-JUMPER SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS.
2	EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH (1) SET OF 3/4" WIDE COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
3	CABLE ENTRY PORT ON THE INTERIOR OF THE SHELTER.
4	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.
5	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.

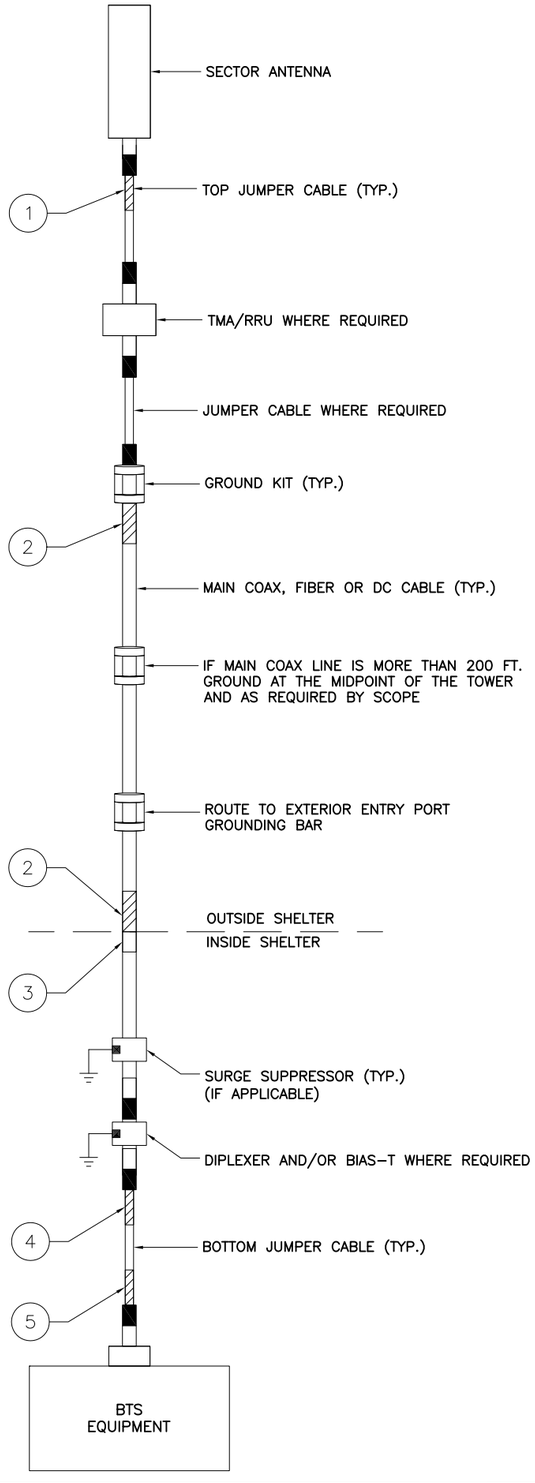
CABLE MARKING DIAGRAM

SCALE: N.T.S. | 2

1. THE ANTENNA SYSTEM COAX SHALL BE LABELED WITH VINYL TAPE.
2. THE STANDARD IS BASED ON EIGHT COLORED TAPES-RED, BLUE, GREEN, YELLOW, ORANGE, BROWN, WHITE, AND VIOLET. THESE TAPES MUST BE 3/4" WIDE & UV RESISTANT SUCH AS SCOTCH 35 VINYL ELECTRICAL COLOR CODING TAPE AND SHOULD BE READILY AVAILABLE TO THE ELECTRICIAN OR CONTRACTOR ON SITE.
3. USING COLOR BANDS ON THE CABLES, MARK ALL RF CABLE BY SECTOR AND CABLE NUMBER AS SHOWN ON "CABLE COLOR CHART".
4. WHEN AN EXISTING COAXIAL LINE THAT IS INTENDED TO BE A SHARED LINE BETWEEN TECHNOLOGIES IS ENCOUNTERED, THE CONTRACTOR SHALL REMOVE THE EXISTING COLOR CODING SCHEME AND REPLACE IT WITH THE COLOR CODING STANDARD. IN THE ABSENCE OF AN EXISTING COLOR CODING AND TAGGING SCHEME, OR WHEN INSTALLING PROPOSED COAXIAL CABLES, THIS GUIDELINE SHALL BE IMPLEMENTED AT THAT SITE REGARDLESS OF TECHNOLOGY.
5. ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) THREE WRAPS OF TAPE AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT SO AS TO AVOID UNRAVELING.
6. ALL COLOR BANDS INSTALLED AT THE TOP OF THE TOWER SHALL BE A MINIMUM OF 3" WIDE, AND SHALL HAVE A MINIMUM OF 3/4" OF SPACE BETWEEN EACH COLOR.
7. ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
8. IF EXISTING CABLES AT THE SITE ALREADY HAVE A COLOR CODING SCHEME AND THEY ARE NOT INTENDED TO BE REUSED OR SHARED WITH THE NEW TECHNOLOGY, THE EXISTING COLOR CODING SCHEME SHALL REMAIN UNTOUCHED.

CABLE MARKING NOTES

SCALE: N.T.S. | 3



CABLE COLOR CODING DIAGRAM

SCALE: N.T.S. | 4

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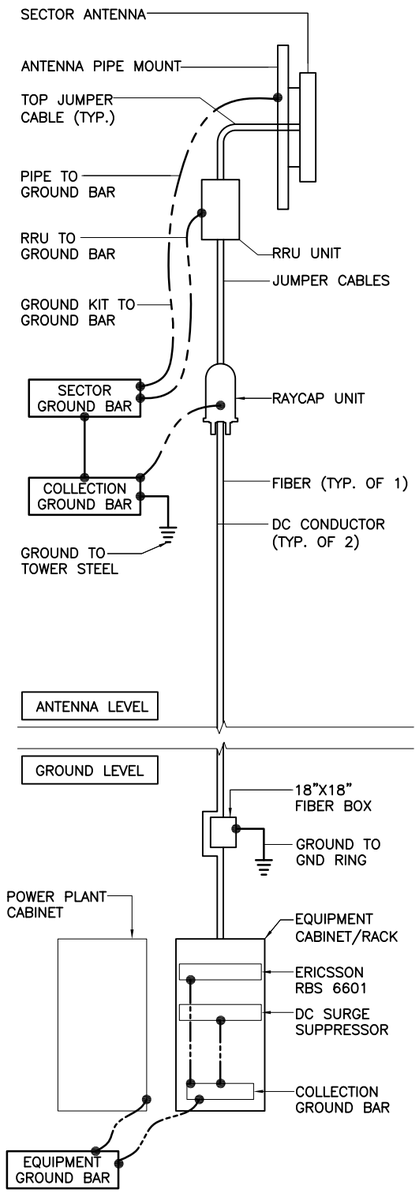
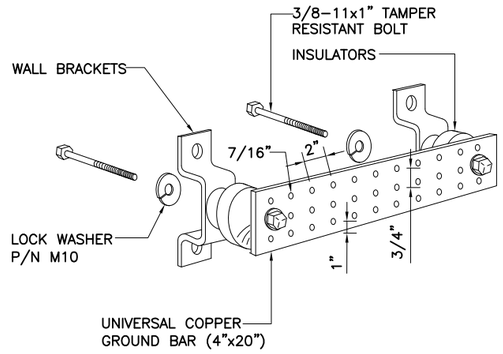
PLANTSVILLE, CT 06479

SHEET NAME
CABLE NOTES AND COLOR CODING

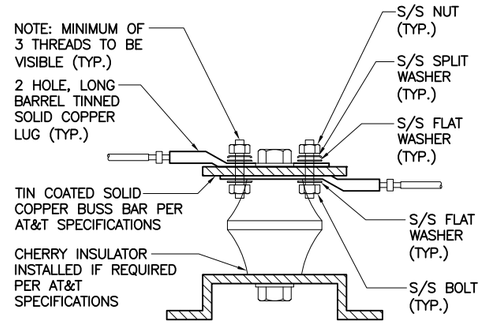
SHEET NUMBER
A7



GROUNDING SCHEMATIC SCALE: N.T.S. 1



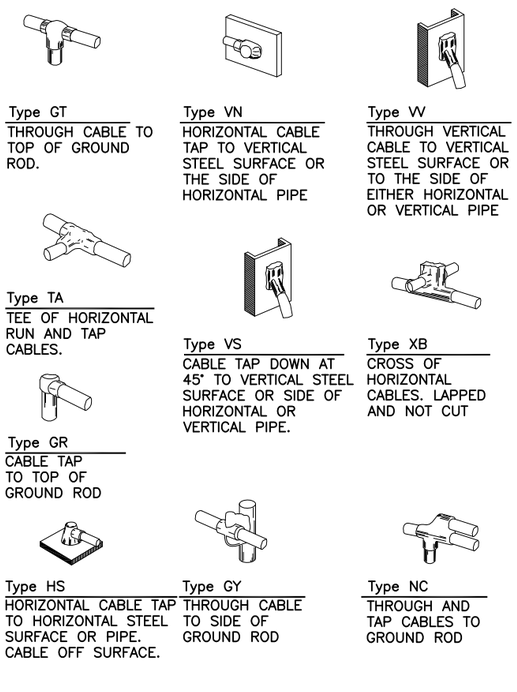
GROUND BAR DETAIL SCALE: N.T.S. 2



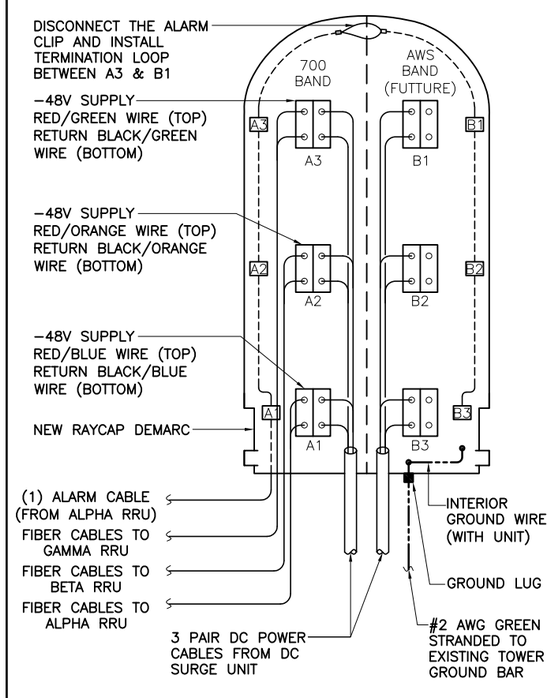
NOTES:

1. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING SPLIT WASHERS.
2. COAT WIRE END WITH ANTI-OXIDATION COMPOUND PRIOR TO INSERTION INTO LUG BARREL AND CRIMPING.
3. APPLY ANTI-OXIDATION COMPOUND BETWEEN ALL LUGS AND BUSS BARS PRIOR TO MATING AND BOLTING.

LUG DETAIL SCALE: N.T.S. 3



EXOTHERMIC WELD DETAILS SCALE: N.T.S. 4



RAYCAP DC POWER AND ALARM DET. SCALE: N.T.S. 5

NOT USED SCALE: N.T.S. 6

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SITE ADDRESS
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PLANTSVILLE, CT 06479

SHEET NAME
GROUNDING DETAILS

SHEET NUMBER
A8

FEC# 2015.0046.0005

PJF PAUL J. FORD & COMPANY

Date: **February 23, 2017**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
(585) 899-3445

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
kthorpe@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL05264
	Carrier Site Name:	Southington - South
Crown Castle Designation:	**Crown Castle BU Number:**	876313
	Crown Castle Site Name:	WEST JOHNSON AVE. BURNT HOUSE
	Crown Castle JDE Job Number:	362947
	Crown Castle Work Order Number:	1366128
	Crown Castle Application Number:	329321 Rev. 12
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0193.006.7805
Site Data:	**1394 Meriden Waterbury Tpk, SOUTHINGTON, Hartford County, CT**	
	Latitude *41° 33' 51.39"*, Longitude *-72° 53' 30.7"*	
	160 Foot - Monopole Tower	

Dear Steve Tuttle,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1004367, in accordance with application 329321, revision 12.

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

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

This report is only valid if the proposed TMA's specified in Table 1 are installed in such a manner that the largest portion is parallel to the width of the proposed antennas they are mounted behind. Thereby shielding the proposed TMA's from the wind.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Kyle Thorpe, PE
Project Engineer KGR

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED PROFESSIONAL ENGINEER
2.22.17

tnxTower Report - version 7.0.5.1

PAUL J. FORD & COMPANY

Date: **February 23, 2017**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
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(585) 899-3445

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Respectfully submitted by:

Kyle Thorpe, PE
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by SUMMIT in August of 1998. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
157.0	158.0	3	cci antennas	HPA-85R-BUU-H8 w/ Mount Pipe	1 2	3/8 3/4	1
		3	cci antennas	TPA-65R-LCUUUU-H8-K w/ Mount Pipe			
		3*	**ericsson**	**RRUS 32**			
		3*	**ericsson**	**RRUS 32 B2**			
		1	raycap	DC6-48-60-18-8F			
	157.0	1	tower mounts	T-Arm Mount [TA 601-3]			

Notes:
1) Proposed Equipment
* Equipment shall be installed in such a manner that the largest portion is parallel to the width of the proposed antennas they are mounted behind.

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
157.0	158.0	3	ericsson	RRUS-11	2 1 6	3/4 3/8 1-5/8	1
		3	kathrein	800 10121 w/ Mount Pipe			
		6	powerwave	LGP21401			
		1	raycap	DC6-48-60-18-8F			
		3	ericsson	RRUS-11	-	-	3
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	andrew	SBNH-1D6565C w/ Pipe			
	157.0	1	tower mounts	T-Arm Mount [TA 702-3]			
150.0	150.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 103-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
148.0	148.0	3	alcatel lucent	TD-RRH8x20-25	4	1-1/4	4
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		1	tower mounts	Platform Mount [LP 1201-1]	-	-	1
139.0	140.0	3	alcatel lucent	RRH2X40-AWS	-	-	3
	139.0	1	tower mounts	Side Arm Mount [SO 102-3]			
138.0	142.0	1	lucent	KS24019-L112A	1 7	1/2 1-5/8	1
	138.0	6	antel	LPA-80063-6CF-EDIN-2 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 1201-1]			
		3	alcatel lucent	RRH2X60-PCS	1	1-5/8	2
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		6	andrew	SBNHH-1D65B w/ Mount Pipe			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
127.0	129.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	1 6	1-1/4 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
	127.0	1	tower mounts	Platform Mount [LP 1201-1]			
119.0	119.0	3	andrew	HBX-6516DS-VTM w/ Mount Pipe	1 6	3/8 1-5/8	1
		1	tower mounts	T-Arm Mount [TA 602-3]			
48.0	50.0	1	lucent	KS24019-L112A	1	1/2	1
	48.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed
4) SLA Equipment Controlling

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Velocitel, 15CAYC1600, 02/23/2016	5939573	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 128444, 04/12/2013	3846956	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 130340, 10/18/2013	4077468	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25560.9690, 03/13/2014	4600286	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25560, 10/30/2014	5380973	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25560_25075, 03/30/2015	5617077	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29298-582, 08/27/1998	1633746	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, 29298-582, 08/27/1998	2134246	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) For existing modifications: monopole was modified in conformance with the referenced modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 148.5	Pole	TP10.75x10.75x0.349	1	-3.14	359.22	52.2	Pass
L2	148.5 - 148	Pole	TP23x10.75x0.349	2	-3.14	359.22	52.1	Pass
L3	148 - 111	Pole	TP28.994x23x0.25	3	-17.74	1498.80	73.2	Pass
L4	111 - 105.25	Pole	TP29.4254x27.8865x0.3125	4	-19.63	1980.34	72.9	Pass
L5	105.25 - 76.75	Pole	TP34.042x29.4254x0.4446	5	-25.22	2272.54	96.8	Pass
L6	76.75 - 70.75	Pole	TP34.3889x32.4643x0.4785	6	-28.66	2778.39	91.4	Pass
L7	70.75 - 70	Pole	TP34.5104x34.3889x0.6626	7	-28.92	3444.72	75.1	Pass
L8	70 - 43	Pole	TP38.884x34.5104x0.5356	8	-35.66	3200.82	98.2	Pass
L9	43 - 28	Pole	TP40.5641x37.0028x0.6536	9	-44.64	3930.07	94.5	Pass
L10	28 - 27.25	Pole	TP40.6856x40.5641x0.6528	10	-44.94	4240.93	88.0	Pass
L11	27.25 - 16	Pole	TP42.508x40.6856x0.6551	11	-49.52	4468.34	89.2	Pass
L12	16 - 14.5	Pole	TP42.751x42.508x0.8063	12	-50.26	5023.02	80.6	Pass
L13	14.5 - 12.25	Pole	TP43.1155x42.751x0.6431	13	-51.19	4427.64	91.8	Pass
L14	12.25 - 10	Pole	TP43.48x43.1155x0.8213	14	-52.34	5007.94	82.8	Pass
L15	10 - 0	Pole	TP45.1x43.48x0.661	15	-56.68	5109.46	84.7	Pass
							Summary	
						Pole (L8)	98.2	Pass
						Rating =	98.2	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	77.6	Pass
1	Base Plate	0	66.1	Pass
1	Base Foundation Structural Steel	0	70.2	Pass
1	Base Foundation Soil Interaction	0	99.6	Pass
1	Extension Connection	148	29.0	Pass

Structure Rating (max from all components) =	**99.6%**

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

4.1) Recommendations

The monopole and its foundation will have sufficient capacity to carry the proposed loading configuration once the following load changes are met.

- Install the proposed equipment specified in Table 1 in a manner that the largest portion is parallel to the width of the proposed antennas they are mounted behind.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97.0 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50.0 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60.0 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.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*	*Sides*	*in*	*in*	*in*	*in*	
L1	160.00-148.50	11.50	0.00	Round	10.7500	10.7500	0.3490		A53-B-35 (35 ksi)
L2	148.50-148.00	0.50	0.00	Round	10.7500	23.0000	0.3490		A53-B-35 (35 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	148.00-111.00	37.00	3.75	18	23.0000	28.9940	0.2500	1.0000	A607-60 (60 ksi)
L4	111.00-105.25	9.50	0.00	18	27.8865	29.4254	0.3125	1.2500	A607-60 (60 ksi)
L5	105.25-76.75	28.50	4.25	18	29.4254	34.0420	0.4446	1.7785	Reinf 42.81 ksi (43 ksi)
L6	76.75-70.75	10.25	0.00	18	32.4643	34.3889	0.4785	1.9139	Reinf 47.20 ksi (47 ksi)
L7	70.75-70.00	0.75	0.00	18	34.3889	34.5104	0.6625	2.6502	Reinf 42.34 ksi (42 ksi)
L8	70.00-43.00	27.00	5.00	18	34.5104	38.8840	0.5356	2.1425	Reinf 43.88 ksi (44 ksi)
L9	43.00-28.00	20.00	0.00	18	37.0028	40.5641	0.6536	2.6143	Reinf 41.53 ksi (42 ksi)
L10	28.00-27.25	0.75	0.00	18	40.5641	40.6856	0.6528	2.6113	Reinf 44.73 ksi (45 ksi)
L11	27.25-16.00	11.25	0.00	18	40.6856	42.5080	0.6551	2.6205	Reinf 44.92 ksi (45 ksi)
L12	16.00-14.50	1.50	0.00	18	42.5080	42.7510	0.8063	3.2251	Reinf 40.94 ksi (41 ksi)
L13	14.50-12.25	2.25	0.00	18	42.7510	43.1155	0.6431	2.5725	Reinf 44.68 ksi (45 ksi)
L14	12.25-10.00	2.25	0.00	18	43.1155	43.4800	0.8213	3.2852	Reinf 39.40 ksi (39 ksi)
L15	10.00-0.00	10.00		18	43.4800	45.1000	0.6610	2.6438	Reinf 47.95 ksi (48 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	10.7500	11.4038	154.3829	3.6794	5.3750	28.7224	308.7659	5.6985	0.0000	0
	10.7500	11.4038	154.3829	3.6794	5.3750	28.7224	308.7659	5.6985	0.0000	0
L2	10.7500	11.4038	154.3829	3.6794	5.3750	28.7224	308.7659	5.6985	0.0000	0
	23.0000	24.8349	1593.1275	8.0093	11.5000	138.5328	3186.2550	12.4100	0.0000	0
L3	23.3548	18.0521	1180.3983	8.0762	11.6840	101.0269	2362.3498	9.0278	3.6080	14.432
	29.4413	22.8084	2380.8169	10.2041	14.7290	161.6420	4764.7665	11.4063	4.6629	18.652
L4	28.9335	27.3500	2627.2035	9.7888	14.1663	185.4539	5257.8639	13.6776	4.3580	13.946
	29.8793	28.8763	3092.0742	10.3351	14.9481	206.8541	6188.2170	14.4409	4.6289	14.812
L5	29.8793	40.8992	4339.8228	10.2882	14.9481	290.3262	8685.3560	20.4535	4.3963	9.888
	34.5672	47.4145	6761.7480	11.9271	17.2933	391.0031	13532.3933	23.7117	5.2088	11.715
L6	33.7754	48.5767	6278.8556	11.3550	16.4919	380.7245	12565.9730	24.2930	4.8716	10.181
	34.9194	51.4997	7481.8536	12.0382	17.4696	428.2789	14973.5520	25.7547	5.2103	10.889
L7	34.9194	70.9244	10192.3095	11.9729	17.4696	583.4318	20398.0304	35.4689	4.8864	7.375
	35.0428	71.1798	10302.8517	12.0160	17.5313	587.6833	20619.2602	35.5967	4.9077	7.407
L8	35.0428	57.7602	8423.2559	12.0611	17.5313	480.4696	16857.5952	28.8856	5.1311	9.58
	39.4838	65.1957	12112.9519	13.6137	19.7531	613.2186	24241.8423	32.6040	5.9009	11.017
L9	38.4777	75.4051	12587.1996	12.9040	18.7974	669.6233	25190.9617	37.7097	5.3622	8.204
	41.1898	82.7928	16661.1118	14.1682	20.6065	808.5350	33344.1468	41.4043	5.9890	9.163
L10	41.1898	82.6981	16642.6886	14.1685	20.6065	807.6410	33307.2761	41.3569	5.9903	9.176
	41.3132	82.9499	16795.1455	14.2116	20.6683	812.6055	33612.3906	41.4828	6.0117	9.209
L11	41.3132	83.2386	16851.6576	14.2108	20.6683	815.3397	33725.4890	41.6272	6.0076	9.17
	43.1638	87.0282	19259.656	14.8578	21.5941	891.8952	38544.654	43.5224	6.3284	9.66

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L12	43.1638	106.7203	23447.3141	14.8041	21.5941	1085.8214	46925.4805	53.3703	6.0624	7.519
	43.4105	107.3422	23859.5963	14.8904	21.7175	1098.6334	47750.5876	53.6813	6.1051	7.572
L13	43.4105	85.9546	19254.5729	14.9483	21.7175	886.5916	38534.4815	42.9855	6.3923	9.939
	43.7807	86.6987	19758.9357	15.0777	21.9027	902.1237	39543.8708	43.3576	6.4564	10.039
L14	43.7807	110.2529	24916.6449	15.0145	21.9027	1137.6067	49866.0758	55.1369	6.1428	7.479
	44.1508	111.2030	25566.4045	15.1438	22.0879	1157.4872	51166.4499	55.6121	6.2070	7.558
L15	44.1508	89.8282	20807.7284	15.2008	22.0879	942.0441	41642.8362	44.9226	6.4892	9.818
	45.7957	93.2267	23259.8697	15.7759	22.9108	1015.2360	46550.3454	46.6222	6.7743	10.249

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.00-148.50				1	1	1			
L2 148.50-148.00				1	1	1			
L3 148.00-111.00				1	1	1			
L4 111.00-105.25				1	1	1			
L5 105.25-76.75				1	1	1			
L6 76.75-70.75				1	1	1			
L7 70.75-70.00				1	1	1			
L8 70.00-43.00				1	1	1			
L9 43.00-28.00				1	1	1			
L10 28.00-27.25				1	1	1			
L11 27.25-16.00				1	1	1			
L12 16.00-14.50				1	1	1			
L13 14.50-12.25				1	1	1			
L14 12.25-10.00				1	1	1			
L15 10.00-0.00				1	1	1			

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 plf
FB-L98B-002-75000(3/8")	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	157.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
LDF7-50A(1-5/8")	C	No	Inside Pole	157.00 - 0.00	6	No Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
2" (Nominal) Conduit	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
FB-L98B-034-XXX(3/8")	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	157.00 - 0.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
2" (Nominal) Conduit	C	No	Inside Pole	157.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
***								
HB114-1-08U4-M5J(1-1/4")	C	No	Inside Pole	148.00 - 0.00	4	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
***								
LDF4-50A(1/2")	C	No	Inside Pole	138.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
HB158-1-08U8-S8J18(1-5/8")	C	No	Inside Pole	138.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
AL7-50(1-5/8")	C	No	Inside Pole	138.00 - 0.00	6	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	138.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
***								
MLE Hybrid 3Power/6Fiber RL 2(1-1/4")	C	No	CaAa (Out Of Face)	127.00 - 0.00	1	No Ice	0.00	0.68
						1/2" Ice	0.00	1.75
						1" Ice	0.00	3.43
LDF7-50A(1-5/8")	C	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	127.00 - 0.00	4	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	127.00 - 0.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
***								
FXL-1873(1-5/8")	C	No	CaAa (Out Of Face)	119.00 - 106.75	1	No Ice	0.20	0.67
						1/2" Ice	0.30	2.18
						1" Ice	0.40	4.31
FXL-1873(1-5/8")	C	No	CaAa (Out Of Face)	106.75 - 0.00	1	No Ice	0.00	0.67
						1/2" Ice	0.00	2.18
						1" Ice	0.00	4.31
FXL-1873(1-5/8")	C	No	CaAa (Out Of Face)	119.00 - 0.00	5	No Ice	0.00	0.67
						1/2" Ice	0.00	2.18
						1" Ice	0.00	4.31
860 10033(3/8")	C	No	CaAa (Out Of Face)	119.00 - 0.00	1	No Ice	0.00	0.00
						1/2" Ice	0.00	0.50
						1" Ice	0.00	1.61
***								
LDF4-50A(1/2")	C	No	Inside Pole	48.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
***								
Aero MP3-06	C	No	CaAa (Out Of Face)	30.50 - 0.00	1	No Ice	0.43	0.00
						1/2" Ice	0.55	0.00
						1" Ice	0.66	0.00
Aero MP3-05	C	No	CaAa (Out Of Face)	73.00 - 43.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
Aero MP3-04	C	No	CaAa (Out Of	106.75 - 76.75	1	No Ice	0.27	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			1/2" Ice	0.38	0.00
						1" Ice	0.49	0.00
***								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	49.50 - 24.50	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	18.00 - 8.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	82.50 - 67.50	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
***								

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
HPA-85R-BUU-H8 w/ Mount Pipe	A	From Leg	3.00	0.000	157.00	No Ice	12.98	9.32	0.10
			0.00			1/2" Ice	13.67	10.79	0.20
			1.00			1" Ice	14.36	12.24	0.30
HPA-85R-BUU-H8 w/ Mount Pipe	B	From Leg	3.00	0.000	157.00	No Ice	12.98	9.32	0.10
			0.00			1/2" Ice	13.67	10.79	0.20
			1.00			1" Ice	14.36	12.24	0.30
HPA-85R-BUU-H8 w/ Mount Pipe	C	From Leg	3.00	0.000	157.00	No Ice	12.98	9.32	0.10
			0.00			1/2" Ice	13.67	10.79	0.20
			1.00			1" Ice	14.36	12.24	0.30
RRUS 32	A	From Leg	3.00	0.000	157.00	No Ice	0.00	1.78	0.06
			0.00			1/2" Ice	0.00	1.97	0.08
			1.00			1" Ice	0.00	2.17	0.10
RRUS 32	B	From Leg	3.00	0.000	157.00	No Ice	0.00	1.78	0.06
			0.00			1/2" Ice	0.00	1.97	0.08
			1.00			1" Ice	0.00	2.17	0.10
RRUS 32	C	From Leg	3.00	0.000	157.00	No Ice	0.00	1.78	0.06
			0.00			1/2" Ice	0.00	1.97	0.08
			1.00			1" Ice	0.00	2.17	0.10
DC6-48-60-18-8F	A	From Leg	3.00	0.000	157.00	No Ice	0.92	0.92	0.02
			0.00			1/2" Ice	1.46	1.46	0.04
			1.00			1" Ice	1.64	1.64	0.06
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	A	From Leg	3.00	0.000	157.00	No Ice	13.54	10.96	0.13
			0.00			1/2" Ice	14.24	12.49	0.23
			1.00			1" Ice	14.95	14.04	0.34
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	B	From Leg	3.00	0.000	157.00	No Ice	13.54	10.96	0.13
			0.00			1/2" Ice	14.24	12.49	0.23
			1.00			1" Ice	14.95	14.04	0.34
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	C	From Leg	3.00	0.000	157.00	No Ice	13.54	10.96	0.13
			0.00			1/2" Ice	14.24	12.49	0.23
			1.00			1" Ice	14.95	14.04	0.34
RRUS 32 B2	A	From Leg	3.00	0.000	157.00	No Ice	0.00	1.67	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
			0.00			1/2"	0.00	1.86	0.07
			1.00			Ice	0.00	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	3.00	0.000	157.00	No Ice	0.00	1.67	0.05
			0.00			1/2"	0.00	1.86	0.07
			1.00			Ice	0.00	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	3.00	0.000	157.00	No Ice	0.00	1.67	0.05
			0.00			1/2"	0.00	1.86	0.07
			1.00			Ice	0.00	2.05	0.10
						1" Ice			
T-Arm Mount [TA 601-3]	C	None		0.000	157.00	No Ice	10.90	10.90	0.73
						1/2"	14.65	14.65	0.93
						Ice	18.40	18.40	1.13
						1" Ice			
800 10121 w/ Mount Pipe	A	From Leg	3.00	0.000	157.00	No Ice	5.74	4.95	0.07
			0.00			1/2"	6.34	6.02	0.12
			1.00			Ice	6.86	6.81	0.18
						1" Ice			
800 10121 w/ Mount Pipe	B	From Leg	3.00	0.000	157.00	No Ice	5.74	4.95	0.07
			0.00			1/2"	6.34	6.02	0.12
			1.00			Ice	6.86	6.81	0.18
						1" Ice			
800 10121 w/ Mount Pipe	C	From Leg	3.00	0.000	157.00	No Ice	5.74	4.95	0.07
			0.00			1/2"	6.34	6.02	0.12
			1.00			Ice	6.86	6.81	0.18
						1" Ice			
DC6-48-60-18-8F	A	From Leg	3.00	0.000	157.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice			
(2) LGP21401	A	From Leg	3.00	0.000	157.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			1.00			Ice	1.38	0.54	0.03
						1" Ice			
(2) LGP21401	B	From Leg	3.00	0.000	157.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			1.00			Ice	1.38	0.54	0.03
						1" Ice			
(2) LGP21401	C	From Leg	3.00	0.000	157.00	No Ice	1.10	0.35	0.01
			0.00			1/2"	1.24	0.44	0.02
			1.00			Ice	1.38	0.54	0.03
						1" Ice			
RRUS-11	A	From Leg	3.00	0.000	157.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			1.00			Ice	3.21	1.50	0.09
						1" Ice			
RRUS-11	B	From Leg	3.00	0.000	157.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			1.00			Ice	3.21	1.50	0.09
						1" Ice			
RRUS-11	C	From Leg	3.00	0.000	157.00	No Ice	2.79	1.19	0.05
			0.00			1/2"	3.00	1.34	0.07
			1.00			Ice	3.21	1.50	0.09
						1" Ice			
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	2.00	0.000	150.00	No Ice	2.06	1.93	0.06
			0.00			1/2"	2.24	2.11	0.09
			0.00			Ice	2.43	2.29	0.11
						1" Ice			
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00	0.000	150.00	No Ice	2.06	1.93	0.06
			0.00			1/2"	2.24	2.11	0.09
			0.00			Ice	2.43	2.29	0.11
						1" Ice			
800MHz 2X50W RRH	C	From Leg	2.00	0.000	150.00	No Ice	2.06	1.93	0.06

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
W/FILTER			0.00 0.00			1/2" Ice 1" Ice	2.24 2.43	2.11 2.29	0.09 0.11
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 0.00 0.00	0.000	150.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
Side Arm Mount [SO 103-3]	C	None		0.000	150.00	No Ice 1/2" Ice 1" Ice	9.50 11.80 14.10	9.50 11.80 14.10	0.22 0.32 0.41
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APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
IBC1900HG-2A	A	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900HG-2A	B	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900HG-2A	C	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900BB-1	A	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900BB-1	B	From Leg	4.00 0.00 0.00	0.000	148.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900BB-1	C	From Leg	4.00	0.000	148.00	No Ice	0.97	0.46	0.02

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
			0.00				1/2" Ice	1.09	0.56	0.03
			0.00				1" Ice	1.22	0.66	0.04
TD-RRH8x20-25	A	From Leg	4.00		0.000	148.00	No Ice	4.05	1.53	0.07
			0.00				1/2" Ice	4.30	1.71	0.10
			0.00				1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Leg	4.00		0.000	148.00	No Ice	4.05	1.53	0.07
			0.00				1/2" Ice	4.30	1.71	0.10
			0.00				1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Leg	4.00		0.000	148.00	No Ice	4.05	1.53	0.07
			0.00				1/2" Ice	4.30	1.71	0.10
			0.00				1" Ice	4.56	1.90	0.13
Platform Mount [LP 1201-1]	C	None			0.000	148.00	No Ice	23.10	23.10	2.10
							1/2" Ice	26.80	26.80	2.50
							1" Ice	30.50	30.50	2.90
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***										
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00		0.000	138.00	No Ice	8.42	7.42	0.08
			0.00				1/2" Ice	8.96	8.45	0.15
			0.00				1" Ice	9.48	9.35	0.23
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00		0.000	138.00	No Ice	8.42	7.42	0.08
			0.00				1/2" Ice	8.96	8.45	0.15
			0.00				1" Ice	9.48	9.35	0.23
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00		0.000	138.00	No Ice	8.42	7.42	0.08
			0.00				1/2" Ice	8.96	8.45	0.15
			0.00				1" Ice	9.48	9.35	0.23
RRH4X45-AWS4 B66	A	From Leg	4.00		0.000	138.00	No Ice	2.66	1.59	0.06
			0.00				1/2" Ice	2.88	1.77	0.08
			0.00				1" Ice	3.10	1.96	0.11
RRH4X45-AWS4 B66	B	From Leg	4.00		0.000	138.00	No Ice	2.66	1.59	0.06
			0.00				1/2" Ice	2.88	1.77	0.08
			0.00				1" Ice	3.10	1.96	0.11
RRH4X45-AWS4 B66	C	From Leg	4.00		0.000	138.00	No Ice	2.66	1.59	0.06
			0.00				1/2" Ice	2.88	1.77	0.08
			0.00				1" Ice	3.10	1.96	0.11
RRH2X60-PCS	A	From Leg	4.00		0.000	138.00	No Ice	2.20	1.72	0.06
			0.00				1/2" Ice	2.39	1.90	0.08
			0.00				1" Ice	2.59	2.09	0.10
RRH2X60-PCS	B	From Leg	4.00		0.000	138.00	No Ice	2.20	1.72	0.06
			0.00				1/2" Ice	2.39	1.90	0.08
			0.00				1" Ice	2.59	2.09	0.10
RRH2X60-PCS	C	From Leg	4.00		0.000	138.00	No Ice	2.20	1.72	0.06
			0.00				1/2" Ice	2.39	1.90	0.08
			0.00				1" Ice	2.59	2.09	0.10
RRH2x60-700	A	From Leg	4.00		0.000	138.00	No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
			0.00				1" Ice	4.03	2.29	0.11
RRH2x60-700	B	From Leg	4.00		0.000	138.00	No Ice	3.50	1.82	0.06
			0.00				1/2" Ice	3.76	2.05	0.08
			0.00				1" Ice	4.03	2.29	0.11

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
RRH2x60-700	C	From Leg	4.00 0.00 0.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
(2) DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.00 0.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	9.97 10.54 11.08	10.25 11.42 12.31	0.05 0.15 0.25
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	9.97 10.54 11.08	10.25 11.42 12.31	0.05 0.15 0.25
(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	9.97 10.54 11.08	10.25 11.42 12.31	0.05 0.15 0.25
KS24019-L112A	C	From Leg	4.00 0.00 4.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
Platform Mount [LP 1201-1]	C	None		0.000	138.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
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ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	6.32 6.76 7.20	5.63 6.42 7.12	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	6.32 6.76 7.20	5.63 6.42 7.12	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	6.32 6.76 7.20	5.63 6.42 7.12	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
KRY 112 144/1	A	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02

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
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	11.68 12.40 13.14	9.84 11.37 12.91	0.08 0.17 0.27
RRUS 11 B12	A	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	B	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	C	From Leg	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
Platform Mount [LP 1201-1]	C	None		0.000	127.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
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HBX-6516DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
HBX-6516DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
HBX-6516DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
2.375" OD x 5' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	119.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
T-Arm Mount [TA 602-3]	C	None		0.000	119.00	No Ice 1/2" Ice 1" Ice	11.59 15.44 19.29	11.59 15.44 19.29	0.77 0.99 1.21
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KS24019-L112A	A	From Leg	3.00 0.00 2.00	0.000	48.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	A	None		0.000	48.00	No Ice 1/2" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09

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
1" Ice								

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 160.00-148.50	154.25	1.119	26	10.302	A	0.000	10.302	10.302	100.00	0.000	0.000
					B	0.000	10.302		100.00	0.000	0.000
					C	0.000	10.302		100.00	0.000	0.000
L2 148.50-148.00	148.22	1.106	25	0.703	A	0.000	0.703	0.703	100.00	0.000	0.000
					B	0.000	0.703		100.00	0.000	0.000
					C	0.000	0.703		100.00	0.000	0.000
L3 148.00-111.00	128.98	1.063	24	81.394	A	0.000	81.394	81.394	100.00	0.000	0.000
					B	0.000	81.394		100.00	0.000	0.000
					C	0.000	81.394		100.00	0.000	4.752
L4 111.00-105.25	108.11	1.01	23	14.091	A	0.000	14.091	14.091	100.00	0.000	0.000
					B	0.000	14.091		100.00	0.000	0.000
					C	0.000	14.091		100.00	0.000	2.384
L5 105.25-76.75	90.65	0.961	22	76.530	A	0.000	76.530	76.530	100.00	0.000	0.000
					B	0.000	76.530		100.00	0.000	0.000
					C	0.000	76.530		100.00	0.000	14.269
L6 76.75-70.75	73.73	0.906	21	17.174	A	0.000	17.174	17.174	100.00	0.000	0.000
					B	0.000	17.174		100.00	0.000	0.000
					C	0.000	17.174		100.00	0.000	2.971
L7 70.75-70.00	70.37	0.894	20	2.186	A	0.000	2.186	2.186	100.00	0.000	0.000
					B	0.000	2.186		100.00	0.000	0.000
					C	0.000	2.186		100.00	0.000	0.534
L8 70.00-43.00	56.23	0.838	19	83.842	A	0.000	83.842	83.842	100.00	0.000	0.000
					B	0.000	83.842		100.00	0.000	0.000
					C	0.000	83.842		100.00	0.000	16.507
L9 43.00-28.00	35.41	0.735	17	49.792	A	0.000	49.792	49.792	100.00	0.000	0.000
					B	0.000	49.792		100.00	0.000	0.000
					C	0.000	49.792		100.00	0.000	7.181
L10 28.00-27.25	27.62	0.7	16	2.578	A	0.000	2.578	2.578	100.00	0.000	0.000
					B	0.000	2.578		100.00	0.000	0.000
					C	0.000	2.578		100.00	0.000	0.630
L11 27.25-16.00	21.58	0.7	16	39.599	A	0.000	39.599	39.599	100.00	0.000	0.000
					B	0.000	39.599		100.00	0.000	0.000
					C	0.000	39.599		100.00	0.000	8.020
L12 16.00-14.50	15.25	0.7	16	5.411	A	0.000	5.411	5.411	100.00	0.000	0.000
					B	0.000	5.411		100.00	0.000	0.000
					C	0.000	5.411		100.00	0.000	1.198
L13 14.50-12.25	13.37	0.7	16	8.174	A	0.000	8.174	8.174	100.00	0.000	0.000
					B	0.000	8.174		100.00	0.000	0.000
					C	0.000	8.174		100.00	0.000	1.798
L14 12.25-10.00	11.12	0.7	16	8.244	A	0.000	8.244	8.244	100.00	0.000	0.000
					B	0.000	8.244		100.00	0.000	0.000
					C	0.000	8.244		100.00	0.000	1.798
L15 10.00-0.00	4.97	0.7	16	37.478	A	0.000	37.478	37.478	100.00	0.000	0.000
					B	0.000	37.478		100.00	0.000	0.000
					C	0.000	37.478		100.00	0.000	6.657

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 160.00-148.50	154.25	1.119	7	2.3335	14.775	A	0.000	14.775	14.775	100.00	0.000	0.000
						B	0.000	14.775		100.00	0.000	0.000
						C	0.000	14.775		100.00	0.000	0.000
L2 148.50-148.00	148.22	1.106	7	2.3242	0.897	A	0.000	0.897	0.897	100.00	0.000	0.000
						B	0.000	0.897		100.00	0.000	0.000
						C	0.000	0.897		100.00	0.000	0.000
L3 148.00-111.00	128.98	1.063	6	2.2921	95.528	A	0.000	95.528	95.528	100.00	0.000	0.000
						B	0.000	95.528		100.00	0.000	0.000
						C	0.000	95.528		100.00	0.000	15.754
L4 111.00-105.25	108.11	1.01	6	2.2520	16.287	A	0.000	16.287	16.287	100.00	0.000	0.000
						B	0.000	16.287		100.00	0.000	0.000
						C	0.000	16.287		100.00	0.000	7.732
L5 105.25-76.75	90.65	0.961	6	2.2127	87.040	A	0.000	87.040	87.040	100.00	0.000	0.000
						B	0.000	87.040		100.00	0.000	0.000
						C	0.000	87.040		100.00	0.000	43.722
L6 76.75-70.75	73.73	0.906	6	2.1674	19.386	A	0.000	19.386	19.386	100.00	0.000	0.000
						B	0.000	19.386		100.00	0.000	0.000
						C	0.000	19.386		100.00	0.000	9.877
L7 70.75-70.00	70.37	0.894	5	2.1573	2.456	A	0.000	2.456	2.456	100.00	0.000	0.000
						B	0.000	2.456		100.00	0.000	0.000
						C	0.000	2.456		100.00	0.000	1.642
L8 70.00-43.00	56.23	0.838	5	2.1095	93.335	A	0.000	93.335	93.335	100.00	0.000	0.000
						B	0.000	93.335		100.00	0.000	0.000
						C	0.000	93.335		100.00	0.000	47.111
L9 43.00-28.00	35.41	0.735	4	2.0142	55.066	A	0.000	55.066	55.066	100.00	0.000	0.000
						B	0.000	55.066		100.00	0.000	0.000
						C	0.000	55.066		100.00	0.000	21.713
L10 28.00-27.25	27.62	0.7	4	1.9648	2.824	A	0.000	2.824	2.824	100.00	0.000	0.000
						B	0.000	2.824		100.00	0.000	0.000
						C	0.000	2.824		100.00	0.000	1.580
L11 27.25-16.00	21.58	0.7	4	1.9169	43.193	A	0.000	43.193	43.193	100.00	0.000	0.000
						B	0.000	43.193		100.00	0.000	0.000
						C	0.000	43.193		100.00	0.000	19.148
L12 16.00-14.50	15.25	0.7	4	1.8514	5.874	A	0.000	5.874	5.874	100.00	0.000	0.000
						B	0.000	5.874		100.00	0.000	0.000
						C	0.000	5.874		100.00	0.000	2.988
L13 14.50-12.25	13.37	0.7	4	1.8273	8.859	A	0.000	8.859	8.859	100.00	0.000	0.000
						B	0.000	8.859		100.00	0.000	0.000
						C	0.000	8.859		100.00	0.000	4.447
L14 12.25-10.00	11.12	0.7	4	1.7939	8.916	A	0.000	8.916	8.916	100.00	0.000	0.000
						B	0.000	8.916		100.00	0.000	0.000
						C	0.000	8.916		100.00	0.000	4.399
L15 10.00-0.00	4.97	0.7	4	1.6550	40.236	A	0.000	40.236	40.236	100.00	0.000	0.000
						B	0.000	40.236		100.00	0.000	0.000
						C	0.000	40.236		100.00	0.000	14.380

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 160.00-148.50	154.25	1.119	9	10.302	A	0.000	10.302	10.302	100.00	0.000	0.000
					B	0.000	10.302		100.00	0.000	0.000
					C	0.000	10.302		100.00	0.000	0.000
L2 148.50-	148.22	1.106	9	0.703	A	0.000	0.703	0.703	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
148.00					B	0.000	0.703		100.00	0.000	0.000
					C	0.000	0.703		100.00	0.000	0.000
L3 148.00-111.00	128.98	1.063	8	81.394	A	0.000	81.394	81.394	100.00	0.000	0.000
					B	0.000	81.394		100.00	0.000	0.000
					C	0.000	81.394		100.00	0.000	4.752
L4 111.00-105.25	108.11	1.01	8	14.091	A	0.000	14.091	14.091	100.00	0.000	0.000
					B	0.000	14.091		100.00	0.000	0.000
					C	0.000	14.091		100.00	0.000	2.384
L5 105.25-76.75	90.65	0.961	8	76.530	A	0.000	76.530	76.530	100.00	0.000	0.000
					B	0.000	76.530		100.00	0.000	0.000
					C	0.000	76.530		100.00	0.000	14.269
L6 76.75-70.75	73.73	0.906	7	17.174	A	0.000	17.174	17.174	100.00	0.000	0.000
					B	0.000	17.174		100.00	0.000	0.000
					C	0.000	17.174		100.00	0.000	2.971
L7 70.75-70.00	70.37	0.894	7	2.186	A	0.000	2.186	2.186	100.00	0.000	0.000
					B	0.000	2.186		100.00	0.000	0.000
					C	0.000	2.186		100.00	0.000	0.534
L8 70.00-43.00	56.23	0.838	7	83.842	A	0.000	83.842	83.842	100.00	0.000	0.000
					B	0.000	83.842		100.00	0.000	0.000
					C	0.000	83.842		100.00	0.000	16.507
L9 43.00-28.00	35.41	0.735	6	49.792	A	0.000	49.792	49.792	100.00	0.000	0.000
					B	0.000	49.792		100.00	0.000	0.000
					C	0.000	49.792		100.00	0.000	7.181
L10 28.00-27.25	27.62	0.7	5	2.578	A	0.000	2.578	2.578	100.00	0.000	0.000
					B	0.000	2.578		100.00	0.000	0.000
					C	0.000	2.578		100.00	0.000	0.630
L11 27.25-16.00	21.58	0.7	5	39.599	A	0.000	39.599	39.599	100.00	0.000	0.000
					B	0.000	39.599		100.00	0.000	0.000
					C	0.000	39.599		100.00	0.000	8.020
L12 16.00-14.50	15.25	0.7	5	5.411	A	0.000	5.411	5.411	100.00	0.000	0.000
					B	0.000	5.411		100.00	0.000	0.000
					C	0.000	5.411		100.00	0.000	1.198
L13 14.50-12.25	13.37	0.7	5	8.174	A	0.000	8.174	8.174	100.00	0.000	0.000
					B	0.000	8.174		100.00	0.000	0.000
					C	0.000	8.174		100.00	0.000	1.798
L14 12.25-10.00	11.12	0.7	5	8.244	A	0.000	8.244	8.244	100.00	0.000	0.000
					B	0.000	8.244		100.00	0.000	0.000
					C	0.000	8.244		100.00	0.000	1.798
L15 10.00-0.00	4.97	0.7	5	37.478	A	0.000	37.478	37.478	100.00	0.000	0.000
					B	0.000	37.478		100.00	0.000	0.000
					C	0.000	37.478		100.00	0.000	6.657

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice

Comb. No.	Description
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 148.5	Pole	Max Tension	20	0.00	-0.00	-0.00
			Max. Compression	26	-12.78	0.08	0.93
			Max. Mx	20	-3.14	50.59	0.14
			Max. My	2	-3.14	0.01	50.78
			Max. Vy	20	-6.36	50.59	0.14
			Max. Vx	2	-6.37	0.01	50.78
			Max. Torque	20			-0.26
L2	148.5 - 148	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-12.85	0.09	0.93
			Max. Mx	20	-3.19	53.77	0.15
			Max. My	2	-3.18	0.01	53.96
			Max. Vy	20	-6.39	53.77	0.15
			Max. Vx	2	-6.39	0.01	53.96
			Max. Torque	20			-0.26
L3	148 - 111	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.06	2.99	2.41
			Max. Mx	20	-17.78	617.86	0.51
			Max. My	2	-17.74	0.19	623.25
			Max. Vy	20	-23.24	617.86	0.51
			Max. Vx	2	-23.45	0.19	623.25
			Max. Torque	9			0.90
L4	111 - 105.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-59.00	4.57	1.64
			Max. Mx	20	-19.67	842.20	0.48
			Max. My	2	-19.63	0.28	849.47
			Max. Vy	20	-24.00	842.20	0.48
			Max. Vx	2	-24.21	0.28	849.47
			Max. Torque	19			-0.82
L5	105.25 - 76.75	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-69.97	9.87	-1.12
			Max. Mx	20	-25.25	1450.91	0.34
			Max. My	2	-25.22	0.59	1462.85
			Max. Vy	20	-26.21	1450.91	0.34
			Max. Vx	2	-26.42	0.59	1462.85
			Max. Torque	17			-0.96
L6	76.75 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.12	12.15	-2.34
			Max. Mx	20	-28.69	1725.00	0.27
			Max. My	2	-28.66	0.72	1738.91
			Max. Vy	20	-27.19	1725.00	0.27
			Max. Vx	2	-27.40	0.72	1738.91
			Max. Torque	17			-1.09
L7	70.75 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.54	12.32	-2.43
			Max. Mx	20	-28.95	1745.43	0.27
			Max. My	2	-28.92	0.73	1759.48
			Max. Vy	20	-27.29	1745.43	0.27
			Max. Vx	2	-27.50	0.73	1759.48
			Max. Torque	17			-1.11
L8	70 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.93	17.17	-5.08
			Max. Mx	20	-35.68	2365.64	0.10
			Max. My	2	-35.66	1.04	2383.84
			Max. Vy	20	-29.09	2365.64	0.10
			Max. Vx	14	29.30	1.04	-2383.61
			Max. Torque	15			-1.70
L9	43 - 28	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-101.79	21.62	-7.46
			Max. Mx	20	-44.65	2964.57	-0.04
			Max. My	14	-44.64	1.34	-2986.53
			Max. Vy	20	-30.54	2964.57	-0.04
			Max. Vx	14	30.74	1.34	-2986.53
			Max. Torque	15			-2.14
L10	28 - 27.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-102.24	21.78	-7.55
			Max. Mx	20	-44.95	2987.50	-0.04
			Max. My	14	-44.94	1.35	-3009.61
			Max. Vy	20	-30.62	2987.50	-0.04
			Max. Vx	14	30.82	1.35	-3009.61
			Max. Torque	15			-2.17
L11	27.25 - 16	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-108.98	24.02	-8.82
			Max. Mx	20	-49.53	3335.92	-0.14
			Max. My	14	-49.52	1.53	-3360.26
			Max. Vy	20	-31.33	3335.92	-0.14
			Max. Vx	14	31.54	1.53	-3360.26
			Max. Torque	15			-2.50
L12	16 - 14.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-110.01	24.30	-8.98
			Max. Mx	20	-50.26	3383.00	-0.16
			Max. My	14	-50.26	1.55	-3407.63
			Max. Vy	20	-31.45	3383.00	-0.16
			Max. Vx	14	31.65	1.55	-3407.63
			Max. Torque	15			-2.56
L13	14.5 - 12.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-111.34	24.71	-9.22
			Max. Mx	20	-51.20	3453.91	-0.18
			Max. My	14	-51.19	1.59	-3478.98
			Max. Vy	20	-31.60	3453.91	-0.18
			Max. Vx	14	31.80	1.59	-3478.98
			Max. Torque	15			-2.63
L14	12.25 - 10	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-112.90	25.11	-9.45
			Max. Mx	20	-52.34	3525.17	-0.20
			Max. My	14	-52.34	1.62	-3550.68
			Max. Vy	20	-31.76	3525.17	-0.20
			Max. Vx	14	31.96	1.62	-3550.68

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	15			-2.71
L15	10 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-118.86	26.78	-10.42
			Max. Mx	20	-56.68	3845.47	-0.29
			Max. My	14	-56.68	1.78	-3872.90
			Max. Vy	20	-32.30	3845.47	-0.29
			Max. Vx	14	32.50	1.78	-3872.90
			Max. Torque	15			-3.01

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	118.86	-0.00	0.00
	Max. H_x	21	42.52	32.28	0.00
	Max. H_z	2	56.70	0.00	32.48
	Max. M_x	2	3872.32	0.00	32.48
	Max. M_z	8	3841.87	-32.28	0.00
	Max. Torsion	3	3.01	0.00	32.48
	Min. Vert	3	42.52	0.00	32.48
	Min. H_x	9	42.52	-32.28	0.00
	Min. H_z	14	56.70	0.00	-32.48
	Min. M_x	14	-3872.90	0.00	-32.48
	Min. M_z	20	-3845.47	32.28	0.00
	Min. Torsion	15	-3.01	0.00	-32.48

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	47.25	-0.00	-0.00	0.26	1.43	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	56.70	-0.00	-32.48	-3872.32	1.78	-3.01
0.9 Dead+1.6 Wind 0 deg - No Ice	42.52	-0.00	-32.48	-3810.78	1.32	-3.01
1.2 Dead+1.6 Wind 30 deg - No Ice	56.70	16.14	-28.13	-3353.86	-1920.37	-2.21
0.9 Dead+1.6 Wind 30 deg - No Ice	42.52	16.14	-28.13	-3300.65	-1890.32	-2.21
1.2 Dead+1.6 Wind 60 deg - No Ice	56.70	27.96	-16.24	-1936.27	-3327.56	-0.82
0.9 Dead+1.6 Wind 60 deg - No Ice	42.52	27.96	-16.24	-1905.57	-3275.16	-0.82
1.2 Dead+1.6 Wind 90 deg - No Ice	56.70	32.28	-0.00	0.29	-3841.87	0.79
0.9 Dead+1.6 Wind 90 deg - No Ice	42.52	32.28	-0.00	0.23	-3781.58	0.79
1.2 Dead+1.6 Wind 120 deg - No Ice	56.70	27.96	16.24	1936.85	-3327.55	2.19
0.9 Dead+1.6 Wind 120 deg - No Ice	42.52	27.96	16.24	1906.03	-3275.16	2.19
1.2 Dead+1.6 Wind 150 deg - No Ice	56.70	16.14	28.13	3354.45	-1920.37	3.00
0.9 Dead+1.6 Wind 150 deg - No Ice	42.52	16.14	28.13	3301.10	-1890.32	3.00
1.2 Dead+1.6 Wind 180 deg - No Ice	56.70	-0.00	32.48	3872.90	1.78	3.01
0.9 Dead+1.6 Wind 180 deg - No Ice	42.52	-0.00	32.48	3811.23	1.32	3.01

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 210 deg - No Ice	56.70	-16.14	28.13	3354.46	1923.95	2.21
0.9 Dead+1.6 Wind 210 deg - No Ice	42.52	-16.14	28.13	3301.11	1892.96	2.22
1.2 Dead+1.6 Wind 240 deg - No Ice	56.70	-27.96	16.24	1936.87	3331.14	0.82
0.9 Dead+1.6 Wind 240 deg - No Ice	42.52	-27.96	16.24	1906.03	3277.81	0.83
1.2 Dead+1.6 Wind 270 deg - No Ice	56.70	-32.28	-0.00	0.29	3845.47	-0.79
0.9 Dead+1.6 Wind 270 deg - No Ice	42.52	-32.28	-0.00	0.23	3784.24	-0.79
1.2 Dead+1.6 Wind 300 deg - No Ice	56.70	-27.96	-16.24	-1936.28	3331.15	-2.19
0.9 Dead+1.6 Wind 300 deg - No Ice	42.52	-27.96	-16.24	-1905.58	3277.81	-2.19
1.2 Dead+1.6 Wind 330 deg - No Ice	56.70	-16.14	-28.13	-3353.88	1923.95	-3.00
0.9 Dead+1.6 Wind 330 deg - No Ice	42.52	-16.14	-28.13	-3300.66	1892.96	-3.00
1.2 Dead+1.0 Ice+1.0 Temp	118.86	0.00	-0.00	10.42	26.78	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	118.86	0.00	-10.27	-1353.95	26.95	-1.43
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	118.86	5.11	-8.90	-1171.25	-651.50	-0.99
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	118.86	8.86	-5.14	-671.80	-1148.17	-0.28
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	118.86	10.23	-0.00	10.47	-1329.86	0.50
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	118.86	8.86	5.14	692.74	-1148.17	1.14
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	118.86	5.11	8.90	1192.19	-651.50	1.48
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	118.86	0.00	10.27	1374.88	26.95	1.43
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	118.86	-5.11	8.90	1192.18	705.41	0.99
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	118.86	-8.86	5.14	692.73	1202.07	0.28
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	118.86	-10.23	-0.00	10.47	1383.75	-0.50
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	118.86	-8.86	-5.14	-671.79	1202.07	-1.15
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	118.86	-5.11	-8.90	-1171.24	705.41	-1.49
Dead+Wind 0 deg - Service	47.25	0.00	-6.96	-822.75	1.49	-0.00
Dead+Wind 30 deg - Service	47.25	3.46	-6.02	-712.49	-406.96	-0.11
Dead+Wind 60 deg - Service	47.25	5.99	-3.48	-411.26	-705.96	-0.18
Dead+Wind 90 deg - Service	47.25	6.91	0.00	0.24	-815.41	-0.21
Dead+Wind 120 deg - Service	47.25	5.99	3.48	411.74	-705.96	-0.18
Dead+Wind 150 deg - Service	47.25	3.46	6.02	712.98	-406.96	-0.10
Dead+Wind 180 deg - Service	47.25	0.00	6.96	823.24	1.49	0.00
Dead+Wind 210 deg - Service	47.25	-3.46	6.02	712.98	409.95	0.11
Dead+Wind 240 deg - Service	47.25	-5.99	3.48	411.74	708.95	0.18
Dead+Wind 270 deg - Service	47.25	-6.91	0.00	0.24	818.40	0.21
Dead+Wind 300 deg - Service	47.25	-5.99	-3.48	-411.26	708.95	0.18
Dead+Wind 330 deg - Service	47.25	-3.46	-6.02	-712.49	409.95	0.10

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-47.25	0.00	0.00	47.25	0.00	0.000%
2	0.00	-56.70	-32.48	0.00	56.70	32.48	0.005%
3	0.00	-42.52	-32.48	0.00	42.52	32.48	0.007%
4	16.14	-56.70	-28.13	-16.14	56.70	28.13	0.000%
5	16.14	-42.52	-28.13	-16.14	42.52	28.13	0.000%
6	27.96	-56.70	-16.24	-27.96	56.70	16.24	0.000%
7	27.96	-42.52	-16.24	-27.96	42.52	16.24	0.000%
8	32.28	-56.70	0.00	-32.28	56.70	0.00	0.009%
9	32.28	-42.52	0.00	-32.28	42.52	0.00	0.007%
10	27.96	-56.70	16.24	-27.96	56.70	-16.24	0.000%
11	27.96	-42.52	16.24	-27.96	42.52	-16.24	0.000%
12	16.14	-56.70	28.13	-16.14	56.70	-28.13	0.000%
13	16.14	-42.52	28.13	-16.14	42.52	-28.13	0.000%
14	0.00	-56.70	32.48	0.00	56.70	-32.48	0.005%
15	0.00	-42.52	32.48	0.00	42.52	-32.48	0.007%
16	-16.14	-56.70	28.13	16.14	56.70	-28.13	0.000%
17	-16.14	-42.52	28.13	16.14	42.52	-28.13	0.000%
18	-27.96	-56.70	16.24	27.96	56.70	-16.24	0.000%
19	-27.96	-42.52	16.24	27.96	42.52	-16.24	0.000%
20	-32.28	-56.70	0.00	32.28	56.70	0.00	0.009%
21	-32.28	-42.52	0.00	32.28	42.52	0.00	0.007%
22	-27.96	-56.70	-16.24	27.96	56.70	16.24	0.000%
23	-27.96	-42.52	-16.24	27.96	42.52	16.24	0.000%
24	-16.14	-56.70	-28.13	16.14	56.70	28.13	0.000%
25	-16.14	-42.52	-28.13	16.14	42.52	28.13	0.000%
26	0.00	-118.86	0.00	-0.00	118.86	0.00	0.000%
27	0.00	-118.86	-10.27	-0.00	118.86	10.27	0.001%
28	5.11	-118.86	-8.90	-5.11	118.86	8.90	0.001%
29	8.86	-118.86	-5.14	-8.86	118.86	5.14	0.001%
30	10.23	-118.86	0.00	-10.23	118.86	0.00	0.001%
31	8.86	-118.86	5.14	-8.86	118.86	-5.14	0.001%
32	5.11	-118.86	8.90	-5.11	118.86	-8.90	0.001%
33	0.00	-118.86	10.27	-0.00	118.86	-10.27	0.001%
34	-5.11	-118.86	8.90	5.11	118.86	-8.90	0.001%
35	-8.86	-118.86	5.14	8.86	118.86	-5.14	0.001%
36	-10.23	-118.86	0.00	10.23	118.86	0.00	0.001%
37	-8.86	-118.86	-5.14	8.86	118.86	5.14	0.001%
38	-5.11	-118.86	-8.90	5.11	118.86	8.90	0.001%
39	0.00	-47.25	-6.96	-0.00	47.25	6.96	0.002%
40	3.46	-47.25	-6.02	-3.46	47.25	6.02	0.002%
41	5.99	-47.25	-3.48	-5.99	47.25	3.48	0.002%
42	6.92	-47.25	0.00	-6.91	47.25	-0.00	0.002%
43	5.99	-47.25	3.48	-5.99	47.25	-3.48	0.002%
44	3.46	-47.25	6.02	-3.46	47.25	-6.02	0.002%
45	0.00	-47.25	6.96	-0.00	47.25	-6.96	0.002%
46	-3.46	-47.25	6.02	3.46	47.25	-6.02	0.002%
47	-5.99	-47.25	3.48	5.99	47.25	-3.48	0.002%
48	-6.92	-47.25	0.00	6.91	47.25	-0.00	0.002%
49	-5.99	-47.25	-3.48	5.99	47.25	3.48	0.002%
50	-3.46	-47.25	-6.02	3.46	47.25	6.02	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	18	0.00005165	0.00009743
3	Yes	17	0.00006368	0.00014380
4	Yes	24	0.00000001	0.00007822
5	Yes	23	0.00000001	0.00010299
6	Yes	24	0.00000001	0.00007973
7	Yes	23	0.00000001	0.00010513

8	Yes	17	0.00009881	0.00011197
9	Yes	17	0.00006379	0.00009257
10	Yes	24	0.00000001	0.00007900
11	Yes	23	0.00000001	0.00010414
12	Yes	24	0.00000001	0.00007853
13	Yes	23	0.00000001	0.00010344
14	Yes	18	0.00005166	0.00009740
15	Yes	17	0.00006369	0.00014378
16	Yes	24	0.00000001	0.00008013
17	Yes	23	0.00000001	0.00010560
18	Yes	24	0.00000001	0.00007830
19	Yes	23	0.00000001	0.00010313
20	Yes	17	0.00009880	0.00011205
21	Yes	17	0.00006378	0.00009262
22	Yes	24	0.00000001	0.00007902
23	Yes	23	0.00000001	0.00010410
24	Yes	24	0.00000001	0.00007981
25	Yes	23	0.00000001	0.00010513
26	Yes	15	0.00000001	0.00004051
27	Yes	21	0.00008661	0.00011908
28	Yes	22	0.00005040	0.00012410
29	Yes	22	0.00005039	0.00012686
30	Yes	21	0.00008661	0.00011548
31	Yes	22	0.00005035	0.00012778
32	Yes	22	0.00005033	0.00012496
33	Yes	21	0.00008647	0.00011979
34	Yes	22	0.00005027	0.00013610
35	Yes	22	0.00005028	0.00013270
36	Yes	21	0.00008649	0.00011980
37	Yes	22	0.00005032	0.00013176
38	Yes	22	0.00005034	0.00013519
39	Yes	17	0.00008167	0.00001908
40	Yes	17	0.00008154	0.00008067
41	Yes	17	0.00008154	0.00008654
42	Yes	17	0.00008167	0.00002067
43	Yes	17	0.00008153	0.00007871
44	Yes	17	0.00008152	0.00008465
45	Yes	17	0.00008165	0.00001905
46	Yes	17	0.00008152	0.00008547
47	Yes	17	0.00008152	0.00007914
48	Yes	17	0.00008166	0.00002074
49	Yes	17	0.00008153	0.00008701
50	Yes	17	0.00008154	0.00008149

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 148.5	30.01	39	1.742	0.003
L2	148.5 - 148	25.87	39	1.650	0.002
L3	148 - 111	25.70	39	1.649	0.002
L4	114.75 - 105.25	15.07	39	1.321	0.001
L5	105.25 - 76.75	12.55	39	1.199	0.001
L6	81 - 70.75	7.24	39	0.882	0.000
L7	70.75 - 70	5.45	45	0.768	0.000
L8	70 - 43	5.33	45	0.761	0.000
L9	48 - 28	2.47	45	0.482	0.000
L10	28 - 27.25	0.83	45	0.286	0.000
L11	27.25 - 16	0.78	45	0.278	0.000
L12	16 - 14.5	0.27	45	0.158	0.000
L13	14.5 - 12.25	0.22	45	0.145	0.000
L14	12.25 - 10	0.16	45	0.121	0.000
L15	10 - 0	0.11	45	0.102	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	HPA-85R-BUU-H8 w/ Mount Pipe	39	28.91	1.710	0.003	7835
150.00	800MHz 2X50W RRH W/FILTER	39	26.39	1.655	0.002	5007
148.00	APXVTM14-C-120 w/ Mount Pipe	39	25.70	1.649	0.002	6442
138.00	(2) SBNHH-1D65B w/ Mount Pipe	39	22.30	1.596	0.002	8243
127.00	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	39	18.73	1.480	0.001	5306
119.00	HBX-6516DS-VTM w/ Mount Pipe	39	16.29	1.377	0.001	4214
48.00	KS24019-L112A	45	2.47	0.482	0.000	5586

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 148.5	141.02	2	8.184	0.012
L2	148.5 - 148	121.65	2	7.763	0.008
L3	148 - 111	120.84	2	7.758	0.008
L4	114.75 - 105.25	70.96	2	6.223	0.005
L5	105.25 - 76.75	59.08	2	5.649	0.005
L6	81 - 70.75	34.11	14	4.158	0.004
L7	70.75 - 70	25.68	14	3.620	0.003
L8	70 - 43	25.11	14	3.584	0.003
L9	48 - 28	11.63	14	2.269	0.002
L10	28 - 27.25	3.89	14	1.346	0.001
L11	27.25 - 16	3.68	14	1.308	0.001
L12	16 - 14.5	1.27	14	0.742	0.001
L13	14.5 - 12.25	1.04	14	0.682	0.001
L14	12.25 - 10	0.75	14	0.569	0.001
L15	10 - 0	0.50	14	0.480	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
157.00	HPA-85R-BUU-H8 w/ Mount Pipe	2	135.88	8.037	0.011	1767
150.00	800MHz 2X50W RRH W/FILTER	2	124.10	7.786	0.009	1127
148.00	APXVTM14-C-120 w/ Mount Pipe	2	120.84	7.758	0.008	1447
138.00	(2) SBNHH-1D65B w/ Mount Pipe	2	104.87	7.508	0.008	1823
127.00	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	2	88.11	6.967	0.006	1165
119.00	HBX-6516DS-VTM w/ Mount Pipe	2	76.69	6.485	0.006	922
48.00	KS24019-L112A	14	11.63	2.269	0.002	1189

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 148.5 (1)	TP10.75x10.75x0.349	11.50	0.00	0.0	11.4038	-3.14	359.22	0.009
L2	148.5 - 148 (2)	TP23x10.75x0.349	0.50	0.00	0.0	11.4038	-3.14	359.22	0.009
L3	148 - 111 (3)	TP28.994x23x0.25	37.00	0.00	0.0	22.3263	-17.74	1498.80	0.012
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.3125	9.50	0.00	0.0	28.8763	-19.63	1980.34	0.010
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.4446	28.50	0.00	0.0	46.4429	-25.22	2272.54	0.011
L6	76.75 - 70.75 (6)	TP34.3889x32.4643x0.4785	10.25	0.00	0.0	51.4997	-28.66	2778.39	0.010
L7	70.75 - 70 (7)	TP34.5104x34.3889x0.6626	0.75	0.00	0.0	71.1798	-28.92	3444.72	0.008
L8	70 - 43 (8)	TP38.884x34.5104x0.5356	27.00	0.00	0.0	63.8187	-35.66	3200.82	0.011
L9	43 - 28 (9)	TP40.5641x37.0028x0.6536	20.00	0.00	0.0	82.7928	-44.64	3930.07	0.011
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.6528	0.75	0.00	0.0	82.9499	-44.94	4240.93	0.011
L11	27.25 - 16 (11)	TP42.508x40.6856x0.6551	11.25	0.00	0.0	87.0282	-49.52	4468.34	0.011
L12	16 - 14.5 (12)	TP42.751x42.508x0.8063	1.50	0.00	0.0	107.3420	-50.26	5023.02	0.010
L13	14.5 - 12.25 (13)	TP43.1155x42.751x0.6431	2.25	0.00	0.0	86.6987	-51.19	4427.64	0.012
L14	12.25 - 10 (14)	TP43.48x43.1155x0.8213	2.25	0.00	0.0	111.2030	-52.34	5007.94	0.010
L15	10 - 0 (15)	TP45.1x43.48x0.661	10.00	0.00	0.0	93.2267	-56.68	5109.46	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 148.5 (1)	TP10.75x10.75x0.349	50.78	99.14	0.512	0.00	99.14	0.000
L2	148.5 - 148 (2)	TP23x10.75x0.349	50.78	99.14	0.512	0.00	99.14	0.000
L3	148 - 111 (3)	TP28.994x23x0.25	623.25	866.29	0.719	0.00	866.29	0.000
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.3125	849.48	1182.18	0.719	0.00	1182.18	0.000
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.4446	1462.86	1529.28	0.957	0.00	1529.28	0.000
L6	76.75 - 70.75 (6)	TP34.3889x32.4643x0.4785	1738.92	1925.46	0.903	0.00	1925.46	0.000
L7	70.75 - 70 (7)	TP34.5104x34.3889x0.6626	1759.48	2370.06	0.742	0.00	2370.06	0.000
L8	70 - 43 (8)	TP38.884x34.5104x0.5356	2383.83	2455.14	0.971	0.00	2455.14	0.000
L9	43 - 28 (9)	TP40.5641x37.0028x0.6536	2986.53	3198.35	0.934	0.00	3198.35	0.000
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.6528	3009.61	3462.13	0.869	0.00	3462.13	0.000
L11	27.25 - 16 (11)	TP42.508x40.6856x0.6551	3360.26	3816.09	0.881	0.00	3816.09	0.000
L12	16 - 14.5 (12)	TP42.751x42.508x0.8063	3407.63	4284.16	0.795	0.00	4284.16	0.000
L13	14.5 - 12.25 (13)	TP43.1155x42.751x0.6431	3478.97	3839.23	0.906	0.00	3839.23	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L14	12.25 - 10 (14)	TP43.48x43.1155x0.8213	3550.68	4343.88	0.817	0.00	4343.88	0.000
L15	10 - 0 (15)	TP45.1x43.48x0.661	3872.90	4636.82	0.835	0.00	4636.82	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 148.5 (1)	TP10.75x10.75x0.349	6.37	179.61	0.035	0.00	150.79	0.000
L2	148.5 - 148 (2)	TP23x10.75x0.349	6.39	391.15	0.016	0.00	150.79	0.000
L3	148 - 111 (3)	TP28.994x23x0.25	23.45	749.40	0.031	0.20	1734.71	0.000
L4	111 - 105.25 (4)	TP29.4254x27.8865x0.3125	24.21	990.17	0.024	0.32	2367.23	0.000
L5	105.25 - 76.75 (5)	TP34.042x29.4254x0.4446	26.42	1136.27	0.023	0.85	3062.31	0.000
L6	76.75 - 70.75 (6)	TP34.3889x32.4643x0.4785	27.40	1389.19	0.020	1.08	3855.63	0.000
L7	70.75 - 70 (7)	TP34.5104x34.3889x0.6626	27.50	1722.36	0.016	1.10	4745.92	0.000
L8	70 - 43 (8)	TP38.884x34.5104x0.5356	29.30	1600.41	0.018	1.70	4916.29	0.000
L9	43 - 28 (9)	TP40.5641x37.0028x0.6536	30.74	1965.04	0.016	2.14	6404.52	0.000
L10	28 - 27.25 (10)	TP40.6856x40.5641x0.6528	30.82	2120.46	0.015	2.16	6932.73	0.000
L11	27.25 - 16 (11)	TP42.508x40.6856x0.6551	31.54	2234.17	0.014	2.50	7641.52	0.000
L12	16 - 14.5 (12)	TP42.751x42.508x0.8063	31.65	2511.51	0.013	2.55	8578.83	0.000
L13	14.5 - 12.25 (13)	TP43.1155x42.751x0.6431	31.80	2213.82	0.014	2.63	7687.85	0.000
L14	12.25 - 10 (14)	TP43.48x43.1155x0.8213	31.96	2503.97	0.013	2.71	8698.42	0.000
L15	10 - 0 (15)	TP45.1x43.48x0.661	32.50	2554.73	0.013	3.01	9285.00	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 148.5 (1)	0.009	0.512	0.000	0.035	0.000	0.522 ✔	1.000	4.8.2 ✔
L2	148.5 - 148 (2)	0.009	0.512	0.000	0.016	0.000	0.521 ✔	1.000	4.8.2 ✔
L3	148 - 111 (3)	0.012	0.719	0.000	0.031	0.000	0.732 ✔	1.000	4.8.2 ✔
L4	111 - 105.25 (4)	0.010	0.719	0.000	0.024	0.000	0.729 ✔	1.000	4.8.2 ✔
L5	105.25 - 76.75 (5)	0.011	0.957	0.000	0.023	0.000	0.968 ✔	1.000	4.8.2 ✔
L6	76.75 - 70.75 (6)	0.010	0.903	0.000	0.020	0.000	0.914 ✔	1.000	4.8.2 ✔
L7	70.75 - 70 (7)	0.008	0.742	0.000	0.016	0.000	0.751 ✔	1.000	4.8.2 ✔

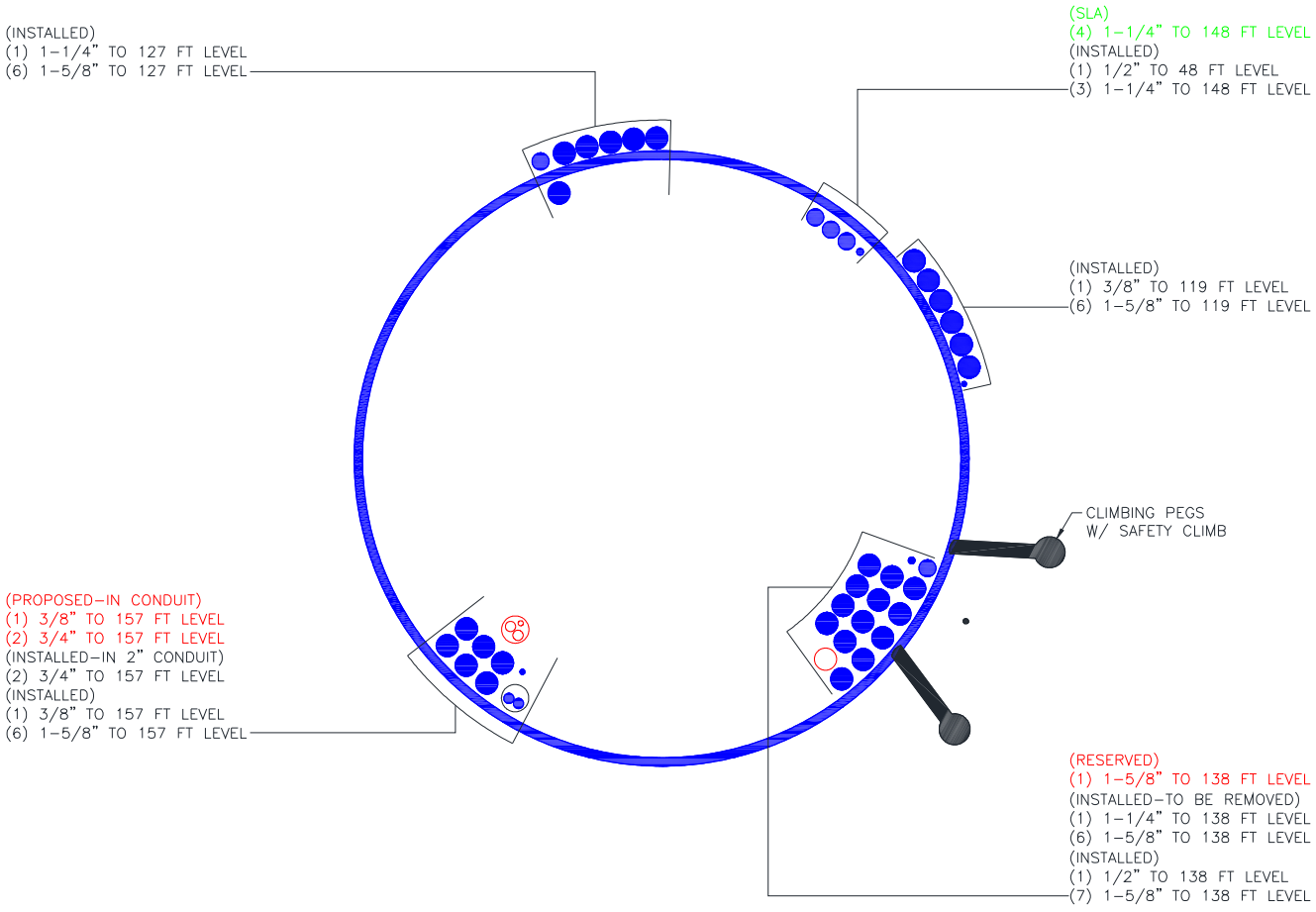
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L8	70 - 43 (8)	0.011	0.971	0.000	0.018	0.000	0.982 ✔	1.000	4.8.2 ✔
L9	43 - 28 (9)	0.011	0.934	0.000	0.016	0.000	0.945 ✔	1.000	4.8.2 ✔
L10	28 - 27.25 (10)	0.011	0.869	0.000	0.015	0.000	0.880 ✔	1.000	4.8.2 ✔
L11	27.25 - 16 (11)	0.011	0.881	0.000	0.014	0.000	0.892 ✔	1.000	4.8.2 ✔
L12	16 - 14.5 (12)	0.010	0.795	0.000	0.013	0.000	0.806 ✔	1.000	4.8.2 ✔
L13	14.5 - 12.25 (13)	0.012	0.906	0.000	0.014	0.000	0.918 ✔	1.000	4.8.2 ✔
L14	12.25 - 10 (14)	0.010	0.817	0.000	0.013	0.000	0.828 ✔	1.000	4.8.2 ✔
L15	10 - 0 (15)	0.011	0.835	0.000	0.013	0.000	0.847 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 148.5	Pole	TP10.75x10.75x0.349	1	-3.14	359.22	52.2	Pass
L2	148.5 - 148	Pole	TP23x10.75x0.349	2	-3.14	359.22	52.1	Pass
L3	148 - 111	Pole	TP28.994x23x0.25	3	-17.74	1498.80	73.2	Pass
L4	111 - 105.25	Pole	TP29.4254x27.8865x0.3125	4	-19.63	1980.34	72.9	Pass
L5	105.25 - 76.75	Pole	TP34.042x29.4254x0.4446	5	-25.22	2272.54	96.8	Pass
L6	76.75 - 70.75	Pole	TP34.3889x32.4643x0.4785	6	-28.66	2778.39	91.4	Pass
L7	70.75 - 70	Pole	TP34.5104x34.3889x0.6626	7	-28.92	3444.72	75.1	Pass
L8	70 - 43	Pole	TP38.884x34.5104x0.5356	8	-35.66	3200.82	98.2	Pass
L9	43 - 28	Pole	TP40.5641x37.0028x0.6536	9	-44.64	3930.07	94.5	Pass
L10	28 - 27.25	Pole	TP40.6856x40.5641x0.6528	10	-44.94	4240.93	88.0	Pass
L11	27.25 - 16	Pole	TP42.508x40.6856x0.6551	11	-49.52	4468.34	89.2	Pass
L12	16 - 14.5	Pole	TP42.751x42.508x0.8063	12	-50.26	5023.02	80.6	Pass
L13	14.5 - 12.25	Pole	TP43.1155x42.751x0.6431	13	-51.19	4427.64	91.8	Pass
L14	12.25 - 10	Pole	TP43.48x43.1155x0.8213	14	-52.34	5007.94	82.8	Pass
L15	10 - 0	Pole	TP45.1x43.48x0.661	15	-56.68	5109.46	84.7	Pass
							Summary	
						Pole (L8)	98.2	Pass
						RATING =	**98.2**	**Pass**

APPENDIX B

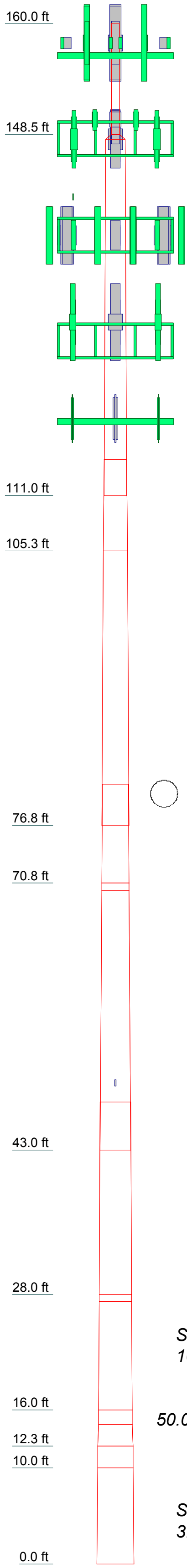
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	11.50	1	0.3490		10.7500	10.7500	A53-B-35	0.4
2	0.50	1	0.3490		10.7500	23.0000		0.0
3	37.00	18	0.2500	3.75	23.0000	28.9940	A607-60	2.6
4	9.50	18	0.3125		27.8865	29.4254		0.9
5	28.50	18	0.4446	4.25	29.4254	34.0420	Reinf 42.81 ksi	4.3
6	10.25	18	0.4785		[illegible].4643	[illegible].3889	Reinf 47.20 ksi	1.7
7	0.75	18	0.662[illegible]		34.388[illegible]	34.51[illegible]	Reinf 42.34 ksi	0.2
8	27.00	18	0.5356	5.00	34.5104	38.8840	Reinf 43.88 ksi	5.6
9	20.00	18	0.6536		37.0028	40.5641	Reinf 41.53 ksi	5.4
10	0.75	18	0.6528		40.5641	40.6856	Reinf 44.73 ksi	0.2
11	11.25	18	0.6551		40.6856	42.5080	Reinf 44.92 ksi	3.3
12	[illegible]	18	[illegible]		[illegible]	[illegible]	[illegible]	0.7
13	[illegible]	18	[illegible]		[illegible]	[illegible]	[illegible]	0.5
14	2.25	18	0.82[illegible]		43.[illegible]	43.[illegible]	[illegible]	0.8
15	10.00	18	0.6610		43.4800	45.1000	Reinf [illegible]	3.1
								29.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
HPA-85R-BUU-H8 w/ Mount Pipe	157	(2) SBNHH-1D65B w/ Mount Pipe	138
HPA-85R-BUU-H8 w/ Mount Pipe	157	(2) SBNHH-1D65B w/ Mount Pipe	138
HPA-85R-BUU-H8 w/ Mount Pipe	157	RRH4X45-AWS4 B66	138
RRUS 32	157	RRH4X45-AWS4 B66	138
RRUS 32	157	RRH4X45-AWS4 B66	138
RRUS 32	157	RRH2X60-PCS	138
DC6-48-60-18-8F	157	RRH2X60-PCS	138
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	157	RRH2X60-PCS	138
		RRH2x60-700	138
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	157	RRH2x60-700	138
		RRH2x60-700	138
TPA-65R-LCUUUU-H8-K w/ Mount Pipe	157	(2) DB-T1-6Z-8AB-0Z	138
RRUS 32 B2	157	(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138
RRUS 32 B2	157	(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138
RRUS 32 B2	157		
T-Arm Mount [TA 601-3]	157	(2) LPA-80063-6CF-EDIN-2 w/ Mount Pipe	138
800 10121 w/ Mount Pipe	157		
800 10121 w/ Mount Pipe	157	KS24019-L112A	138
800 10121 w/ Mount Pipe	157	Platform Mount [LP 1201-1]	138
DC6-48-60-18-8F	157	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
(2) LGP21401	157		
(2) LGP21401	157	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
(2) LGP21401	157		
RRUS-11	157	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	127
RRUS-11	157		
RRUS-11	157	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
800MHz 2X50W RRH W/FILTER	150		
800MHz 2X50W RRH W/FILTER	150	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
800MHz 2X50W RRH W/FILTER	150	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	127
PCS 1900MHz 4x45W-65MHz	150		
PCS 1900MHz 4x45W-65MHz	150	KRY 112 144/1	127
PCS 1900MHz 4x45W-65MHz	150	KRY 112 144/1	127
Side Arm Mount [SO 103-3]	150	KRY 112 144/1	127
APXVTM14-C-120 w/ Mount Pipe	148	LNX-6515DS-VTM w/ Mount Pipe	127
APXVTM14-C-120 w/ Mount Pipe	148	LNX-6515DS-VTM w/ Mount Pipe	127
APXVTM14-C-120 w/ Mount Pipe	148	LNX-6515DS-VTM w/ Mount Pipe	127
APXVSPP18-C-A20 w/ Mount Pipe	148	RRUS 11 B12	127
APXVSPP18-C-A20 w/ Mount Pipe	148	RRUS 11 B12	127
APXVSPP18-C-A20 w/ Mount Pipe	148	RRUS 11 B12	127
IBC1900HG-2A	148	Platform Mount [LP 1201-1]	127
IBC1900HG-2A	148	HBX-6516DS-VTM w/ Mount Pipe	119
IBC1900HG-2A	148	HBX-6516DS-VTM w/ Mount Pipe	119
IBC1900BB-1	148	HBX-6516DS-VTM w/ Mount Pipe	119
IBC1900BB-1	148	2.375" OD x 5' Mount Pipe	119
IBC1900BB-1	148	2.375" OD x 5' Mount Pipe	119
TD-RRH8x20-25	148	2.375" OD x 5' Mount Pipe	119
TD-RRH8x20-25	148	T-Arm Mount [TA 602-3]	119
TD-RRH8x20-25	148	KS24019-L112A	48
Platform Mount [LP 1201-1]	148	Side Arm Mount [SO 701-1]	48
(2) SBNHH-1D65B w/ Mount Pipe	138		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi	Reinf 44.73 ksi	45 ksi	56 ksi
A607-60	60 ksi	75 ksi	Reinf 44.92 ksi	45 ksi	57 ksi
Reinf 42.81 ksi	43 ksi	54 ksi	Reinf 40.94 ksi	41 ksi	52 ksi
Reinf 47.20 ksi	47 ksi	59 ksi	Reinf 44.68 ksi	45 ksi	56 ksi
Reinf 42.34 ksi	42 ksi	53 ksi	Reinf 39.40 ksi	39 ksi	50 ksi
Reinf 43.88 ksi	44 ksi	55 ksi	Reinf 47.95 ksi	48 ksi	60 ksi
Reinf 41.53 ksi	42 ksi	52 ksi			

ALL REACTIONS ARE FACTORED

AXIAL 119 K

SHEAR 10 K

MOMENT 1387 kip-ft

TORQUE 1 kip-ft

50.0 mph WIND - 1.0000 in ICE

AXIAL 57 K

SHEAR 32 K

MOMENT 3873 kip-ft

TORQUE 3 kip-ft

REACTIONS - 97.0 mph WIND

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 98.2%

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: **160 ft Monopole / West Johnson Ave. Burnt House**		
Project: **PJF 37517-0193 / BU 876313**		
Client: Crown Castle	Drawn by: Kyle Thorpe	App'd:
Code: TIA-222-G	Date: 02/23/17	Scale: NTS
Path:		Dwg No. E-1

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number:	37517-0193.006.7805	**Page:**	1
Site Number:	876313	**Date:**	2/23/2017
Site Name:	WEST JOHNSON AVE. BURNT HOUSE	**Version:**	2.6
By:	KAT	**Effective:**	12/10/2015

Tube Bypas Analysis

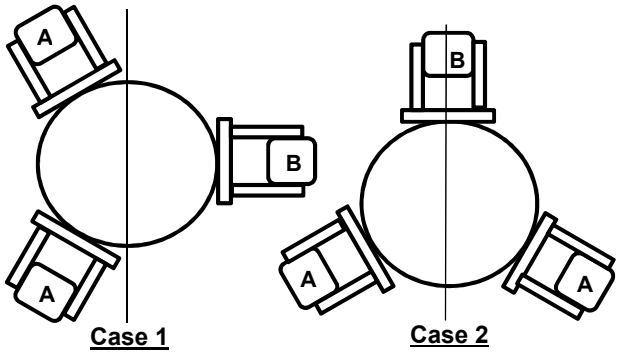
Revision= LRFD Passing= 105% Design/Analysis = Analysis @ 148 ft - 0 in elevation

TNX Tower Output @ Connection:			
Moment	=	50.78	k-ft
Axial	=	3.14	kips
Shear	=	6.39	kips
Design Capacity	=	100.0%	
Extension Geometry:			
Diameter	=	10.75	in
Thickness	=	15/43	in
Height	=	12	ft
Steel Grade	=	A53 Gr. B	
Extension Offset	=		in
Gap Height	=		in
Pole Offset	=		in
Pole Geometry:			
Diameter	=	23	in
Thickness	=	1/4	in
Steel Grade	=	A572 Gr. 60	
Flange/Mount Diam.	=		in
Tube Bypass Information:			
Number of Legs	=	3	
Unbraced Length	=	94	in
Tube Circle	=	39.5	in
K	=	2.10	

Type	Extension	Pole
Blind Bolt	EXISTING AJAX	EXISTING AJAX
Method	Case 2	Case 2
Bolt Qty.	16	16
Spacing (in)	3	3
End Dist. (in)	3	3

New Port Information		
Elevation #1=		ft
Elevation #2=		ft
Elevation #3=		ft
Elevation #4=		ft

Analysis Reactions		
Moment k-ft	Axial kips	Shear kips
50.78	3.14	6.39



Case 1 Case 2

Load Distribution	
Moment of Inertia, I in^2	Axial / Leg kips
585.09	1.047

#

Member Forces

Case	d	Tension (kips)	Comp. (kips)	Mx (k-in)	My (k-in)	M (k-in)
1a	9.88	9.24	11.33	173.40	100.11	200.22
1b	19.75	19.52	21.62	0.00	200.22	200.22
2a	17.10	16.77	18.86	100.11	173.40	200.22
2b	0.00	1.05	1.05	200.22	0.00	200.22

Compression Strength

Case	$4.71*\sqrt{(E/F\_y)}$	KL/r	F_e ksi	F_{cr} ksi	øcPnc kips	P_{rc} kips	Capacity
1a	118.26	88.52	36.53	27.15	238.04	11.33	4.8%
1b	118.26	88.52	36.53	27.15	238.04	21.62	9.1%
2a	118.26	88.52	36.53	27.15	238.04	18.86	7.9%
2b	118.26	88.52	36.53	27.15	238.04	1.05	0.4%

Flexural Strength

Case	ø	I_3 in^4	ΣI in^4	M k-in	øbMn k-in	Capacity
1a	60.00	48.20	144.60	200.22	819.72	24.4%
1b	0.00	48.20	144.60	200.22	819.72	24.4%
2a	30.00	48.20	144.60	200.22	819.72	24.4%
2b	90.00	48.20	144.60	200.22	819.72	24.4%

Tensile Strength

Case	P_{n1} kips	P_{n2} kips	øtPnt kips	P_{rt} kips	Capacity
1a	448.04	499.67	374.75	9.24	2.5%
1b	448.04	499.67	374.75	19.52	5.2%
2a	448.04	499.67	374.75	16.77	4.5%
2b	448.04	499.67	374.75	1.05	0.3%

Combined Strength

Case	Flexure + Tension (H1) Prt / Pnt	Mr / Mn	Capacity
1a	0.012	0.244	25.7%
1b	0.026	0.244	27.0%
2a	0.022	0.244	26.7%
2b	0.001	0.244	24.6%
Case	**Flexure + Compression (H1) Prc / Pnc**	**Mr / Mn**	**Capacity**
1a	0.024	0.244	26.8%
1b	0.045	0.244	29.0%
2a	0.040	0.244	28.4%
2b	0.002	0.244	24.6%

Bolt Check

Case	Location	Tube Comp. kips	e in	Shear on Bolt kips	Bearing Capacity kips	Shear Capacity kips	Tension on Bolt kips	Tension Capacity kips	Limit Capacity
1a	Ext	11.33	14.375	0.72	42.17	37.00	0.91	30.00	0.1%
	Pole	11.33	8.25	1.56	37.76	37.00	1.07	30.00	0.3%
1b	Ext	21.62	14.375	1.35	42.17	37.00	1.75	30.00	0.5%
	Pole	21.62	8.25	1.35	37.76	37.00	2.10	30.00	0.6%
2a	Ext	18.86	14.375	1.18	42.17	37.00	1.53	30.00	0.4%
	Pole	18.86	8.25	1.43	37.76	37.00	1.83	30.00	0.5%
2b	Ext	1.05	14.375	0.15	42.17	37.00	0.08	30.00	0.0%
	Pole	1.05	8.25	1.61	37.76	37.00	0.04	30.00	0.2%

- All equations based on AISC 13th Edition

PAUL J. FORD & COMPANY
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v4.4 - Effective 7-12-13

Date: 2/23/2017
PJF Project: 37517-0193.006.7805
Client Ref. # 876313
Site Name: West Johnson Ave. Burnt House
Description: 148' Pole
Owner: Crown Castle
Engineer: KAT

Asymmetric Anchor Rod Analysis

Moment =	3873	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	57.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	32.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	19							

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	25.0	52.00	0.00	3.98	198.09	191.76	201.65	0.00	260.00	77.6%
2	2.250	#18J A615 Gr 75	75	100	38.0	52.00	0.00	3.98	195.68	189.35	199.23	0.00	260.00	76.6%
3	2.250	#18J A615 Gr 75	75	100	52.0	52.00	0.00	3.98	191.71	185.38	195.26	0.00	260.00	75.1%
4	2.250	#18J A615 Gr 75	75	100	65.0	52.00	0.00	3.98	187.60	181.27	191.15	0.00	260.00	73.5%
5	2.250	#18J A615 Gr 75	75	100	115.0	52.00	0.00	3.98	183.08	176.75	186.63	0.00	260.00	71.8%
6	2.250	#18J A615 Gr 75	75	100	128.0	52.00	0.00	3.98	186.30	179.97	189.85	0.00	260.00	73.0%
7	2.250	#18J A615 Gr 75	75	100	142.0	52.00	0.00	3.98	190.83	184.50	194.38	0.00	260.00	74.8%
8	2.250	#18J A615 Gr 75	75	100	155.0	52.00	0.00	3.98	195.03	188.70	198.59	0.00	260.00	76.4%
9	2.250	#18J A615 Gr 75	75	100	205.0	52.00	0.00	3.98	197.84	191.51	201.40	0.00	260.00	77.5%
10	2.250	#18J A615 Gr 75	75	100	218.0	52.00	0.00	3.98	193.98	187.65	197.53	0.00	260.00	76.0%
11	2.250	#18J A615 Gr 75	75	100	232.0	52.00	0.00	3.98	188.47	182.14	192.02	0.00	260.00	73.9%
12	2.250	#18J A615 Gr 75	75	100	245.0	52.00	0.00	3.98	183.02	176.69	186.58	0.00	260.00	71.8%
13	2.250	#18J A615 Gr 75	75	100	295.0	52.00	0.00	3.98	176.06	169.73	179.61	0.00	260.00	69.1%
14	2.250	#18J A615 Gr 75	75	100	308.0	52.00	0.00	3.98	179.65	173.32	183.20	0.00	260.00	70.5%
15	2.250	#18J A615 Gr 75	75	100	322.0	52.00	0.00	3.98	184.97	178.64	188.53	0.00	260.00	72.5%
16	2.250	#18J A615 Gr 75	75	100	335.0	52.00	0.00	3.98	190.19	183.86	193.74	0.00	260.00	74.5%
17	1.750	Williams R71	127.7	150	100.0	67.10	0.00	2.66	155.43	151.19	157.80	0.00	312.00	50.6%
18	1.750	Williams R71	127.7	150	238.0	67.10	0.00	2.66	160.28	156.05	162.66	0.00	312.00	52.1%
19	1.750	Williams R71	127.7	150	328.0	67.10	0.00	2.66	161.72	157.48	164.10	0.00	312.00	52.6%
								71.67						

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876313*
Site Name: *West Johnson Ave. Burnt House*
App #:

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	3378.8	ft-kips
Factored Axial, Pu:	50.6	kips
Factored Shear, Vu:	28.4	kips

Reactions adjusted to account for additional anchor rods.

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	52	in
Anchor Spacing:	6	in

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	201.6	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	77.6%	**Pass**

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	16	in

Base Plate Results Flexural Check

Base Plate Stress:	29.8	ksi
PL Design Bending Strength, Φ*Fy:	45.0	ksi
Base Plate Stress Ratio:	66.1%	**Pass**

PL Ref. Data
Yield Line (in): 29.85
Max PL Length: 29.85

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

N/A - Unstiffened

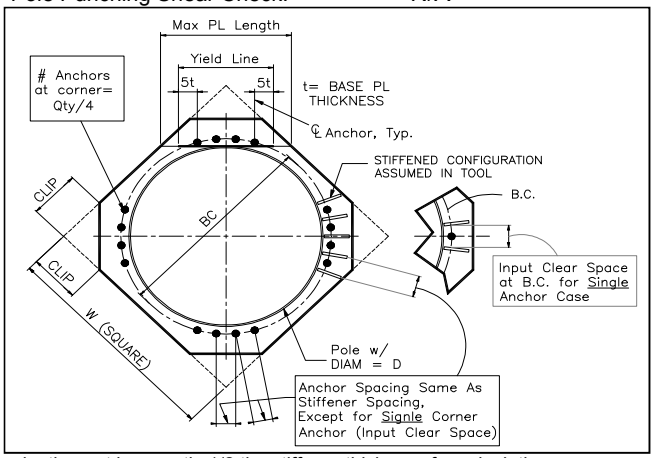
Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Diam:	45.1	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round



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

foundation loads

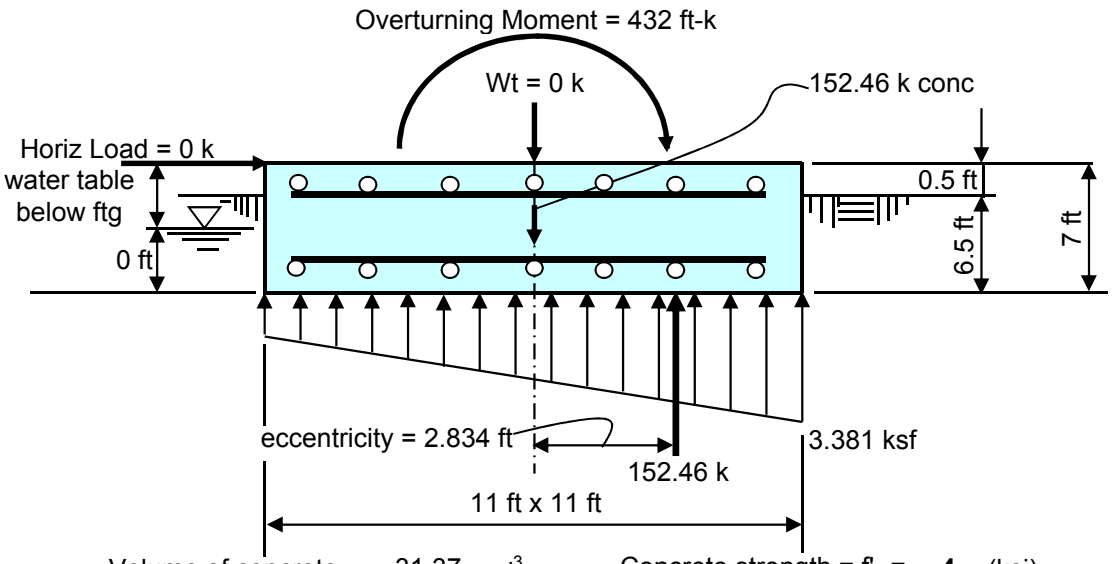
Limit states Tower or Pole Weight =	**0**	kips
limit states total horizontal force =	**0**	kips
limit states overturning moment =	**432**	ft-kips

soil properties

Safety factor against overturning =	**1**	
Soil Density =	**110**	pcf
Ultimate soil bearing =	**3.4**	ksf
Depth to water table =	**10**	ft

mat dimensions

depth to bottom of footing =	**6.5**	ft
Footing thickness =	**7**	ft
Footing Width =	**11**	ft
Footing Length =	**11**	ft
Tower/Pole Center Offset =	**0**	ft



Volume of concrete = 31.37 yd^3 Concrete strength = f'_c = **4** (ksi)

Rebar = (44) #9 bars by 10.5 ft long

reinforcing steel = **(11) #9 @ 12.6 in o.c. ea way top and bottom**

Summary of analysis results

Overturning Moment: (Stress Ratio = 0.687)

Calculated Ultimate Overturning Moment = 432 ft-kips

Resisting Moment = 628.9 ft-kips

Factor of Safety against overturning = 1.456 **> 1 okay**

Rebar strength = F_y = **60** (ksi)

minimum cover over rebar = **3** inches

Soil Bearing (Stress Ratio = 1.326) **< CONTROLLING CRITERIA**

Limit States Maximum Net Soil Bearing = 2.55 ksf

Calculated limit states Soil Bearing Pressure = 3.381 **> 2.55 ksf, NOT okay => allowa**

Bending Moment (Stress Ratio = 0.054)

Ultimate Bending Moment Resistance = 3889 ft-kips

Calculated Ultimate Bending Moment = 210 **ft-kips < 3889 ft-kips okay**

Bending Shear (Stress Ratio = 0.059)

Ultimate Bending Shear Resistance = 1126 kips

Calculated Ultimate Bending Shear = 67 **kips < 1126 kips okay**

Structure Type:

Type = Pole

Foundation Type:

Type = Mat

Factored Foundation Loads:

Load Combination = LC1 = 1.2 D + 1.0 Dg + 1.6 Wo

Load Combination = LC2 = 0.9 D + 1.0 Dg + 1.6 Wo

	LC1	LC2	
Global Factored Axial Load =	0	0	kips (+Comp)
Global Factored Horiz. Load =	0	0	kips
Factored OTM =	432	432	k-ft

LRFD Resistance and Load Factors:

	Φ	Dead Load Factors	
Soil Bearing =	0.75		
Soil Weight =	0.75	1.2	0.9
Concrete Weight =	0.75	1.2	0.9

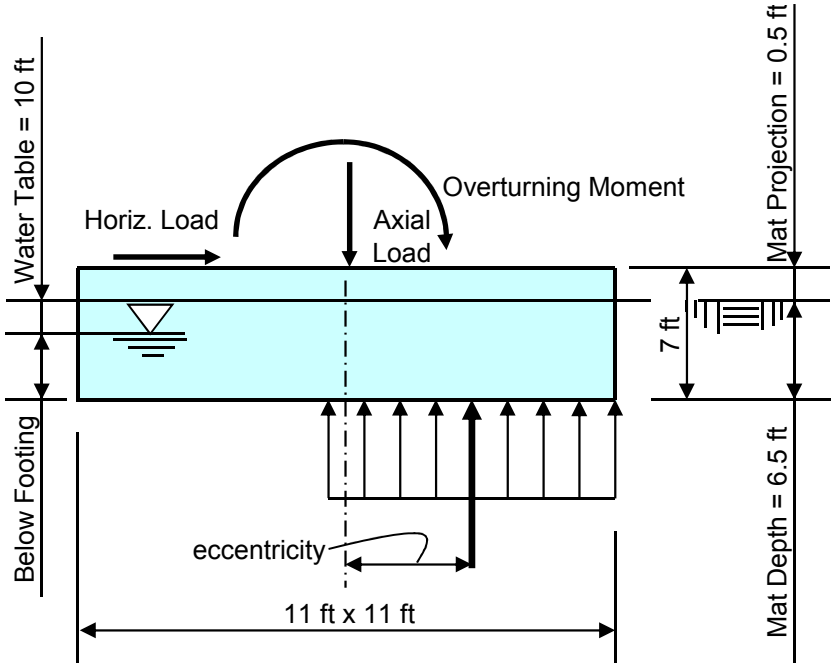
Soil Properties:

Depth to Water Table = 10 ft

Use? (Cohesion or Friction Angle) F

Include Passive Press.? (Yes or No) N (On Pad Only)

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
4	110		20	4.2	4.00
3	117	0	20	3.4	7.00



Dimensions:

Depth to Bottom of Footing =	6.5	ft
Footing Thickness =	7	ft
Footing Width, B =	11	ft
Footing Length, L =	11	ft
Pier Shape (Round or Square)		
Pier Width =		ft
Pier Height above Grade =		ft
Number of Piers =	0	
Structure Offset from Ftdn Centroid =	0	ft, Along Width
Tower (Square or Triangular)		
Tower Base Width =		ft

Summary Results:

	Required		Available				
Max Net Soil Bearing =	1.72	ksf	2.55	ksf	LC1, Width	Stress Ratio =	67.4% in Soil Bearing
Max Net Soil Bearing =	2.36	ksf	2.55	ksf	LC2, Width	Stress Ratio =	92.5% in Soil Bearing
Max Net Soil Bearing =	1.72	ksf	2.55	ksf	LC1, Length	Stress Ratio =	67.4% in Soil Bearing
Max Net Soil Bearing =	2.36	ksf	2.55	ksf	LC2, Length	Stress Ratio =	92.5% in Soil Bearing
Max Net Soil Bearing =	1.89	ksf	2.55	ksf	LC1, Diagonal	Stress Ratio =	74.2% in Soil Bearing
Max Net Soil Bearing =	2.52	ksf	2.55	ksf	LC2, Diagonal	Stress Ratio =	98.7% in Soil Bearing

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Job Number:	37517-0193.006.7805	**Page:**	1
Site Number:	876313	**By:**	KAT
Site Name:	West Johnson Ave. Burnt House	**Date:**	2/23/2017

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-G

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	3441.0		k-ft
Shear, Vu =	33.0		kips
Axial Load, Pu1 =	57.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	42.8	0.0	kips (from 0.9D + 1.6W)**
OTMu =	3457.5	0.0	k-ft @ Ground

***Axial Load, Pu1 will be used for Soil Compression Analysis.**

****Axial Load, Pu2 will be used for Steel Analysis.**

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-05
Seismic Design Category =	D
Reference Standard =	TIA-222-G
Use 1.3 Load Factor?	No
Load Factor =	1.00

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	25.5	ft
fc' =	3	ksi
εc =	0.003	in/in
L / D Ratio =	3.71	
Mat Ftdn. Cap Width =	11	ft
Mat Ftdn. Cap Length =	11	ft
Depth Below Grade =	6.5	ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA-222-G

1. (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing + (1.2) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. ≥ Comp.
2. (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. ≥ Uplift

Steel Parameters

Number of Bars =	20	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Soil Parameters

Water Table Depth =	10.00	ft
Depth to Ignore Soil =	3.50	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)

Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

*Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	4	110	0	29	Sand				4
2	2	117	0	31	Sand				6
3	4	120	1000	0	Clay		720		10
4	5	112	550	0	Clay		550		15
5	5	115	700	0	Clay		660		20
6	10	110	600	0	Clay	1700	600		30
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	13.32	ft, from Grade
Bending Moment, Mu =	3897.05	k-ft, from COR
Resisting Moment, ΦMn =	3911.28	k-ft, from COR

MOMENT RATIO = 99.6% OK

Shear, Vu =	33.00	kips
Resisting Shear, ΦVn =	33.12	kips

SHEAR RATIO = 99.6% OK

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	179.56	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, Cu =	57.00	kips
Comp. Capacity, ΦCn =	167.10	kips

COMPRESSION RATIO = 34.1% OK

Steel Results (ACI 318-05):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	31.20	sq in
Axial, ΦPn (min) =	-1684.80	kips, Where ΦMn = 0 k-ft
Axial, ΦPn (max) =	8280.46	kips, Where ΦMn = 0 k-ft

Axial Load, Pu =	112.17	kips @ 3.75 ft Below Grade
Moment, Mu =	3580.37	k-ft @ 3.75 ft Below Grade
Moment, ΦMn =	5100.05	k-ft

MOMENT RATIO = 70.2% OK

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *876313*
Site Name: *West Johnson Ave. Burnt House*
App #:

Loads Already Factored		
For M (WL)	1	<----Disregard
For P (DL)	1	<----Disregard

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.11	ft
Vert. Cage Diameter =	73.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	20	
As Total=	31.2	in^2
A s/ Aconc, Rho:	0.0056	0.56%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.56%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8280.46	kips
at Mu=(ϕ=0.65)Mn=	5016.69	ft-kips
Max Tu, (φ=0.9) Tn =	1684.8	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	3580.37	ft-kips **(* Note)**
Max. Factored Shaft Pu:	112.17	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.00	Mu:	3580.37	ft-kips
1.00	Pu:	112.17	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2005	

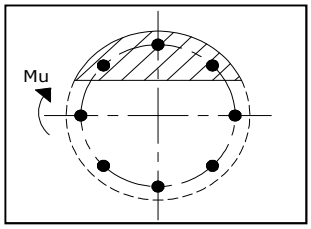
Seismic Properties

Seismic Design Category =	D	
Seismic Risk =	**High**	

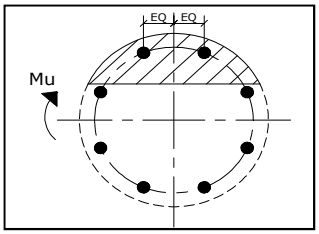
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**14.03**	in
Extreme Steel Strain, εt:	**0.0138**	
	εt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	112.17	kips
Drilled Shaft Moment Capacity, φMn:	**5100.04**	ft-kips
Drilled Shaft Superimposed Mu:	**3580.37**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**70.2%**

SITESAFE
RF COMPLIANCE EXPERTS
A BUSINESS OF FDH VELOCITEL

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SmartLink, LLC on behalf of AT&T Mobility, LLC
Site FA – 10092035
Site ID – CT5264 (3C-MC)
USID – 25915
Site Name – Southington-South
Site Compliance Report

1394 Meriden-Waterbury Turnpike
Plantsville, CT 06479

Latitude: N41-33-51.09
Longitude: W72-53-30.84
Structure Type: Monopole

Report generated date: May 2, 2017
Report by: Kevin Bernstetter II, EI
Customer Contact: Kristen Smith

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?	Yes
RF Sign(s) @ access point(s)	None
RF Sign(s) @ antennas	None
Barrier(s) @ sectors	None
Max cumulative simulated RFE level on the Ground	<1% General Public Limit at Ground Level
FCC & AT&T Compliant?	Will Be Compliant

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

RFDS: NEW-ENGLAND_CONNECTICUT_CTV5264_2017-LTE-Extended-Carrier_1xXMU-RRH-ADD_sp656b_PTN_10092035_25915_08-25-2016_Preliminary-Approved_v1.00

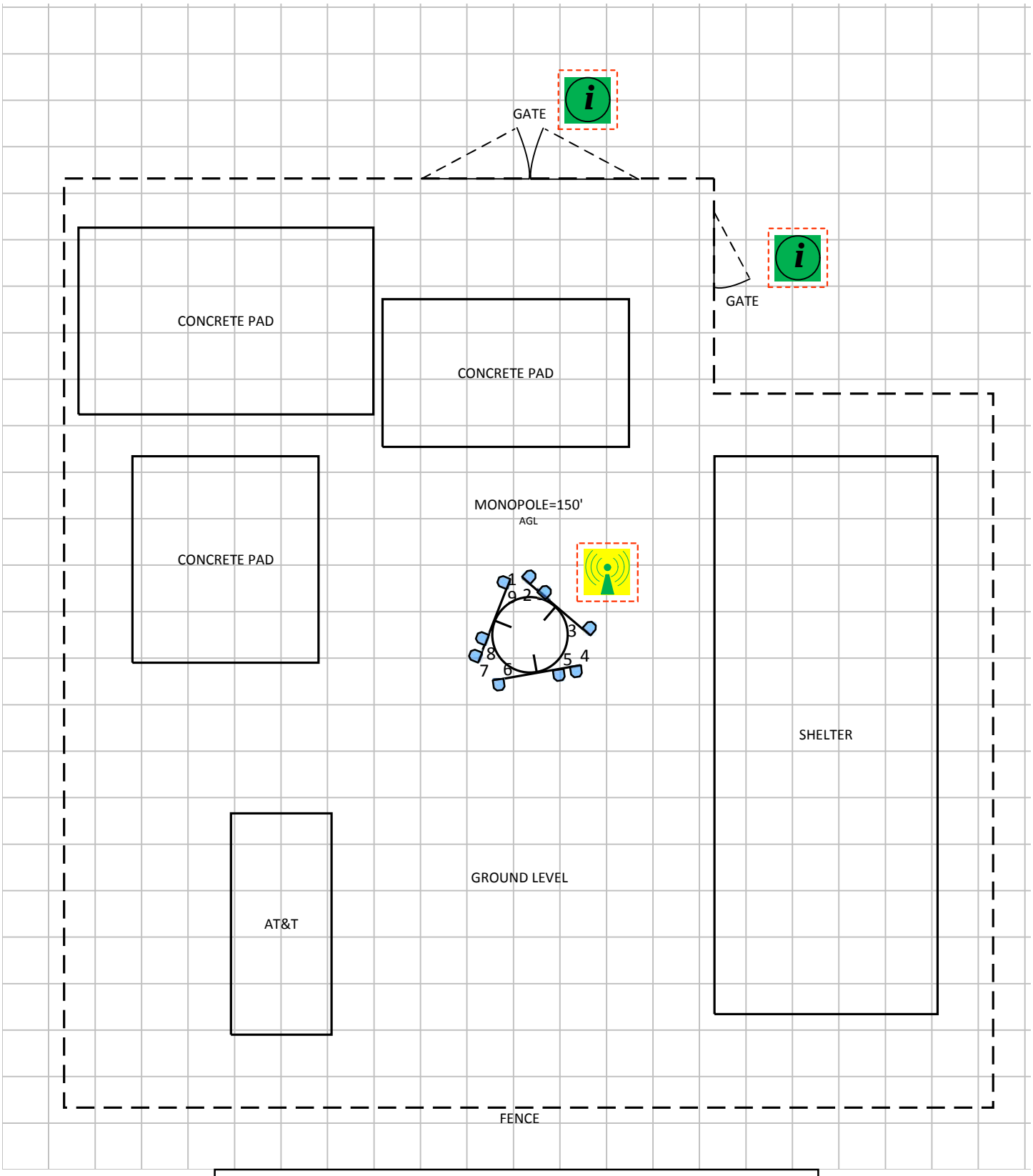
CD's: 10092035_AE201_170420_CTL05264_REV1 3C-MC

2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- Elevation View

Site Scale Map For: Southington-South



(Feet)

0 3.7 7.4

www.sitesafe.com
Site Name:Southington-South
5/2/2017 10:07:50 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 | Info 1 | Info 2

Barrier

Proposed Barriers/ Signs

3 Antenna Inventory

The following antenna inventory on this and the following page, were obtained by the customer and were utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Ant Gain (dBd)	2G GSM Radio(s)	3G UMTS Radio(s)	4G Radio(s)	Total ERP (Watts)	X	Y	Z
1	AT&T MOBILITY LLC	Kathrein-Scala 800-10121	Panel	850	10	87.6	4.5	11.35	0	1	0	244.9	38.7'	53.6'	155.7'
1	AT&T MOBILITY LLC	Kathrein-Scala 800-10121	Panel	1900	10	85.7	4.5	14.32	0	1	0	516.4	38.7'	53.6'	155.7'
2	AT&T MOBILITY LLC	CCI Antennas HPA-65R-BUU-H8	Panel	2300	10	63.3	7.7	15.26	0	0	1	1285.3	39.5'	52.7'	154.2'
3	AT&T MOBILITY LLC (Proposed)	CCI Antennas TPA-65R-LCUUUU-H8	Panel	737	10	61.9	8	13.56	0	0	1	1119.4	41.9'	50.8'	154'
3	AT&T MOBILITY LLC (Proposed)	CCI Antennas TPA-65R-LCUUUU-H8	Panel	1900	10	68.2	8	13.86	0	0	1	2182.7	41.9'	50.8'	154'
4	AT&T MOBILITY LLC	Kathrein-Scala 800-10121	Panel	850	140	87.6	4.5	11.35	0	1	0	244.9	41.2'	48.4'	155.7'
4	AT&T MOBILITY LLC	Kathrein-Scala 800-10121	Panel	1900	140	85.7	4.5	14.32	0	1	0	516.4	41.2'	48.4'	155.7'
5	AT&T MOBILITY LLC	CCI Antennas HPA-65R-BUU-H8	Panel	2300	140	63.3	7.7	15.26	0	0	1	1285.3	40.2'	48.2'	154.2'
6	AT&T MOBILITY LLC (Proposed)	CCI Antennas TPA-65R-LCUUUU-H8	Panel	737	140	61.9	8	13.56	0	0	1	1475.7	37'	47.7'	154'
6	AT&T MOBILITY LLC (Proposed)	CCI Antennas TPA-65R-LCUUUU-H8	Panel	1900	140	68.2	8	13.86	0	0	1	2421	37'	47.7'	154'
7	AT&T MOBILITY LLC	Kathrein-Scala 800-10121	Panel	850	260	87.6	4.5	11.35	0	1	0	244.9	35.7'	49.3'	155.7'
7	AT&T MOBILITY LLC	Kathrein-Scala 800-10121	Panel	1900	260	85.7	4.5	14.32	0	1	0	516.4	35.7'	49.3'	155.7'
8	AT&T MOBILITY LLC	CCI Antennas HPA-65R-BUU-H8	Panel	2300	260	63.3	7.7	15.26	0	0	1	1285.3	36.1'	50.2'	154.2'
9	AT&T MOBILITY LLC (Proposed)	CCI Antennas TPA-65R-LCUUUU-H8	Panel	737	260	61.9	8	13.56	0	0	1	629.5	37.2'	53.2'	154'
9	AT&T MOBILITY LLC (Proposed)	CCI Antennas TPA-65R-LCUUUU-H8	Panel	1900	260	68.2	8	13.86	0	0	1	2133	37.2'	53.2'	154'

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.

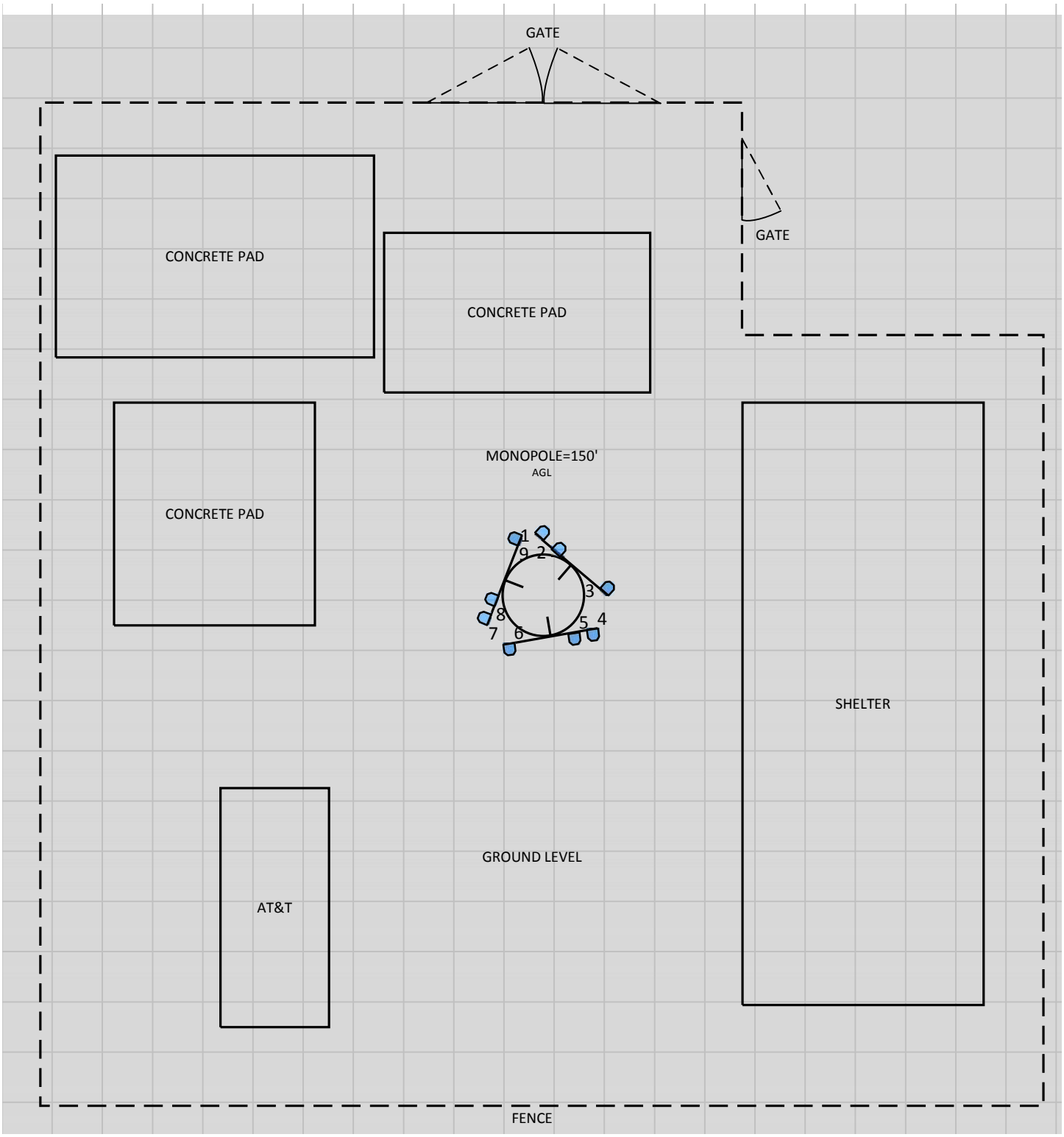
Note: Other carriers exist on site but were not considered for this modeling because SiteSafe did not have data on them.

4 Emission Predictions

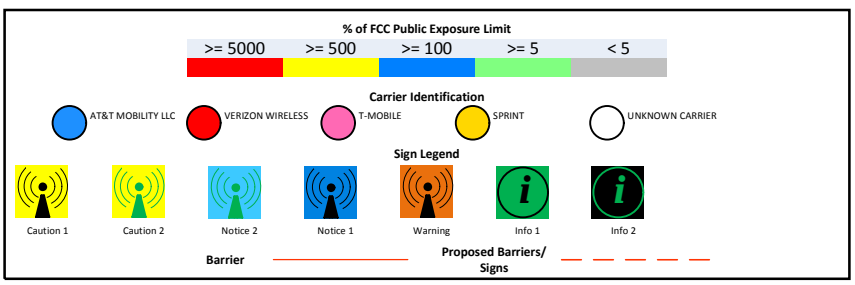
In the RF Exposure Simulations below all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main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

The Antenna Inventory heights are referenced to the same level.

RF Exposure Simulation For: Southington-South



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



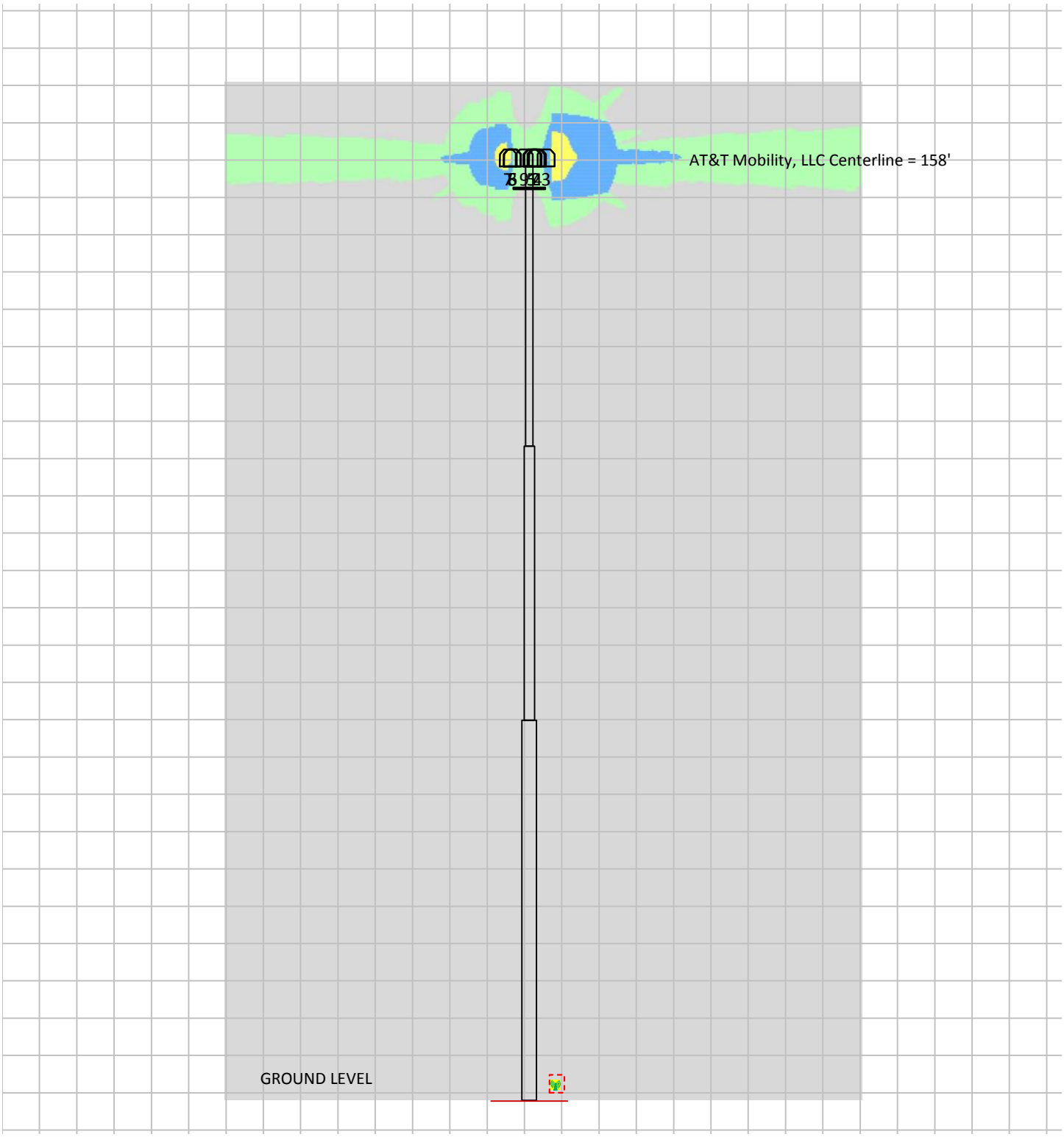
(Feet)

0 3.7 7.5

www.sitesafe.com
Site Name:Southington-South
5/2/2017 10:06:54 AM

SitesafeTC Version:1.0.0.0 - 0.0.0.261
Sitesafe OET-65 Model
Near Field Boundary: 1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Southington-South
Elevation View



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

% of FCC Public Exposure Limit
>= 5000 | >= 500 | >= 100 | >= 5 | < 5

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

Sign Legend
Caution 1 | Caution 2 | Notice 2 | Notice 1 | Warning | Info 1 | Info 2

Barrier | Proposed Barriers/ Signs

(Feet)
0 12.6 25.1

www.sitesafe.com
Site Name:Southington-South
5/2/2017 2:12:22 PM

SitesafeTC Version:1.0.0.0 - 0.0.0.261
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:

Site Access Location

Yellow caution 2 sign required.

Gate Location 1 and 2

Information 1 sign required.

Notes:

- Signage may already exist on site. Sitesafe is recommending as a worst case scenario.

6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

That I am an employee of Sitesafe, Inc., in Arlington, 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 Kevin Bernstetter II, EI.

May 2, 2017

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 Communication 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.

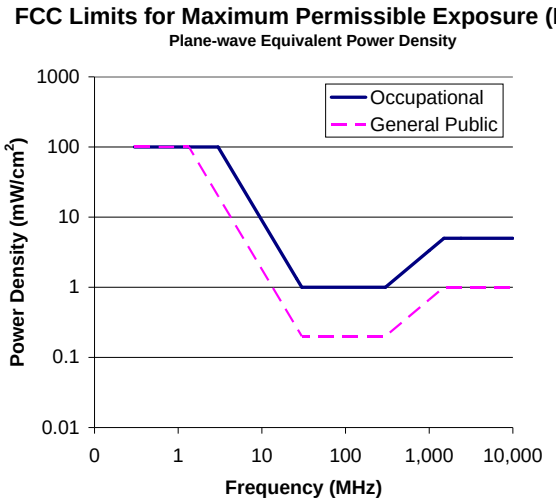
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* 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, Inc.
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