Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

March 9, 2016

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

RE: **Notice of Exempt Modification for AT&T / L700 Crown Site BU: 829013**
AT&T Site ID: CT5258
Located at: 467 South Quaker Lane, West Hartford, CT 06110
(With also a known address of 471/457/491 South Quaker Lane)
Latitude: 41° 44' 55.59" / Longitude: -72° 43' 52.86"

Dear Ms. Bachman,

AT&T currently maintains nine (9) antennas at the 110 foot level of the existing 120 foot monopole located at 467 South Quaker Lane, West Hartford, CT. The tower is owned by Crown Castle. The property is owned by St. Mark's Church. AT&T now proposes to replace three (3) antennas and add three (3) remote radio units (non-antennas), six (6) triplexers, two (2) DC power cables, one (1) surge arrestor, and one (1) fiber line. The antennas would be installed at the same 110 foot level of the tower.

This facility was approved by the Town of West Hartford Planning Office on March 3, 2000. This approval included the condition(s) that:

1. The landscape plan shall be revised to substitute the proposed hemlocks with Austrian Pines. The landscape plan shall provide the number, type and size of all proposed plantings.
2. As required by Section 177.16.7D(A) Telecommunications towers and antennas of the West Hartford Code of Ordinances, the applicant shall make payment to the "Town Abandonment Fund". The applicant shall provide to the Town of West Hartford a statement setting forth the estimated cost of construction for the approved antennas, ancillary facilities and supporting

structure, together with a payment equal to 5% of the estimated cost of the construction. The payment shall be deposited to the Tower Abandonment Fund.

3. The proposed Special Use Permit will comply with the finding requirements of Section 177-42A(5a & 5b) of the West Hartford Code of Ordinances.

This modification complies with the aforementioned condition(s).

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. Ron Van Winkle, Town Manager for the Town of West Hartford, as well as the property owner and the tower owner.

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

2. The proposed modification 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-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Amanda Goodall.

Sincerely,

Amanda Goodall
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
339-205-7017
Amanda.Goodall@crowncastle.com
Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 4: Exhibit-3: General Power Density Table report (RF Emissions Analysis Report)

cc: Ron Van Winkle, Town Manager
Town of West Hartford
50 South Main Street, Rm. 310
West Hartford, CT 06107

Crown Castle, Tower Owner
12 Gill Street, Suite 5800
Woburn, Ma 01801

The Catholic Church of St. Mark the Evangelist, Property Owner
467 South Quaker Lane
West Hartford, CT 06110

DEPARTMENT OF COMMUNITY SERVICES

Filing Information Required by P.A. 75-317

TOWN OF WEST HARTFORD - PLANNING OFFICE

SPECIAL USE PERMIT: #893

NAME OF RECORD OWNER: Archidiocise of Hartford

STREET ADDRESS OF PROPERTY: ~~457~~ 471 South Quaker Lane

DEED REFERENCE - VOLUME: 215 **PAGE:** 42 **ZONE:** R-13
ORDINANCE: 177 **SECTION:** 42 (A-E)

DESCRIPTION OF ACTION:

~~457~~ 471 **South Quaker Lane – St. Mark's Church** – Application (SUP #893) of the Archdiocese of Hartford, R.O., Omnipoint Communications, Inc., Dennis Brown of Omnipoint and Agent for Special Use Permit application. Omnipoint Communications, Inc. proposes to erect a 120 foot tall telecommunications monopole behind St. Mark's Rectory and abutting the right-of-way for Interstate 84. The 120 foot monopole would provide location for Omnipoint antenna and co-location for two other carriers. At the base of the monopole would be an equipment box the size of two filing cabinets. The site would be surrounded by a chain link fenced area, 50' x 50', with security gate and landscape buffering. (Submitted for TPZ receipt on February 7, 2000. Suggest required public hearing be scheduled for March 6, 2000. Required TPZ public hearing scheduled for March 6, 2000.)
R-6 ZONE

DATE APPROVED: 3/6/00 **EFFECTIVE DATE:** 3/31/00
LEGAL NOTICE OF ACTION PUBLISHED - DATE: 3/16/00
CONDITIONS - IF ANY:

1. The landscape plan shall be revised to substitute the proposed hemlocks with Austrian Pines. The landscape plan shall provide the number, type and size of all proposed plantings.
2. As required by Section 177.16.7D(4) Telecommunication towers and antennas of the West Hartford Code of Ordinances, the applicant shall make payment to the "Town Abandonment Fund". The applicant shall provide to the Town of West Hartford a statement setting forth the estimated cost of construction for the approved antennas, ancillary facilities and supporting structure, together with a payment equal to 5% of the estimated cost of the construction. The payment shall be deposited to the Tower Abandonment Fund.
3. The proposed Special Use Permit will comply with the finding requirements of Section 177-42A(5a & 5b) of the West Hartford Code of Ordinances.

DESCRIPTION OF PROPERTY: (MAY BE ATTACHED)

SEE DEED REFERENCE

TOWN PLAN AND ZONING COMMISSION
SECRETARY, DONALD R. FOSTER 15 March 2000 **Date**

TOWN OF WEST HARTFORD
TOWN OF WEST HARTFORD 50 SOUTH MAIN STREET
WEST HARTFORD, CONNECTICUT 06107-2431
(860) 523-3123 FAX: (860) 523-3200

PROJECT INFORMATION

SCOPE OF WORK:	ITEMS TO BE MOUNTED ON THE EXISTING TOWER: (3) LTE ANTENNAS, (3) RRH'S, (6) TRIPLEXERS, (1) SURGE ARRESTOR, (2) DC POWER CABLES, (1) FIBER LINE ITEMS TO BE INSTALLED INSIDE THE EXISTING AT&T EQUIPMENT AREA: (1) DUS & (1) ARGUS CONVERTER MODULE ITEMS TO REMAIN: (3) LTE ANTENNAS, (3) UMTS ANTENNAS, (6) RRH'S, (6) TMA'S, (1) SURGE ARRESTOR, (2) DC POWER CABLES, (1) FIBER LINE, (12) COAX LINES @ 1–5/8" ITEMS TO BE REMOVED: (3) GSM ANTENNAS PTN: 2051A03JNQ
SITE ADDRESS:	491 SOUTH QUAKER LANE WEST HARTFORD, MA 06110
LATITUDE:	41.75 N, 41° 44' 53.85" N
LONGITUDE:	72.73 W, –72° 43' 50.87" W
USID:	15075
PROPERTY OWNER:	CROWN CASTLE
TYPE OF SITE:	MONOPOLE
TOWER HEIGHT:	120'–0"±
RAD CENTER:	110'–0"±
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

FA NUMBER: 10071355
SITE NUMBER: CTL05258

SITE NAME: WEST HARTFORD
491 SOUTH QUAKER LANE
WEST HARTFORD, MA 06110
CROWN SITE ID #: 829013
PROJECT: LTE 3C

PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY:	SMARTLINK, LLC
ADDRESS:	1997 ANNAPOLIS EXCHANGE PARKWAY, SUITE 200
CITY, STATE, ZIP:	ANNAPOLIS, MD 21401
CONTACT:	TIM BOYCE
PHONE:	(908) 333–3640
E–MAIL:	tboyce@smartlinkllc.com

RF ENGINEER

COMPANY:	AT&T MOBILITY – NEW ENGLAND
ADDRESS:	550 COCHITUATE ROAD SUITE 550 13 AND 14
CITY, STATE, ZIP:	FRAMINGHAM, MA 01701
CONTACT:	CAMERON SYME
PHONE:	(508) 596–7146
E–MAIL:	cs6970@att.com

SITE ACQUISITION

COMPANY:	SMARTLINK, LLC
ADDRESS:	33 BOSTON POST ROAD WEST SUITE 210
CITY, STATE, ZIP:	MARLBOROUGH, MA 01752
CONTACT:	TODD OLIVER
PHONE:	(774) 369–3618
E–MAIL:	todd.oliver@smartlink.com

CONSTRUCTION MANAGER

COMPANY:	SMARTLINK, LLC.
ADDRESS:	33 BOSTON POST ROAD WEST SUITE 210
CITY, STATE, ZIP:	MARLBOROUGH, MA 01752
CONTACT:	ROBERT PICARD
PHONE:	(774) 369–3618
E–MAIL:	robert.picard@smartlinkllc.com

ENGINEERING

COMPANY:	HUDSON DESIGN GROUP, LLC.
ADDRESS:	1600 OSGOOD STREET BUILDING 20 NORTH, SUITE 3090
CITY, STATE, ZIP:	NORTH ANDOVER, MA 01845
CONTACT:	DANIEL P. HAMM, PE
PHONE:	(978) 557–5553
E–MAIL:	info@hudsondesigngroupllc.com

DRAWING INDEX

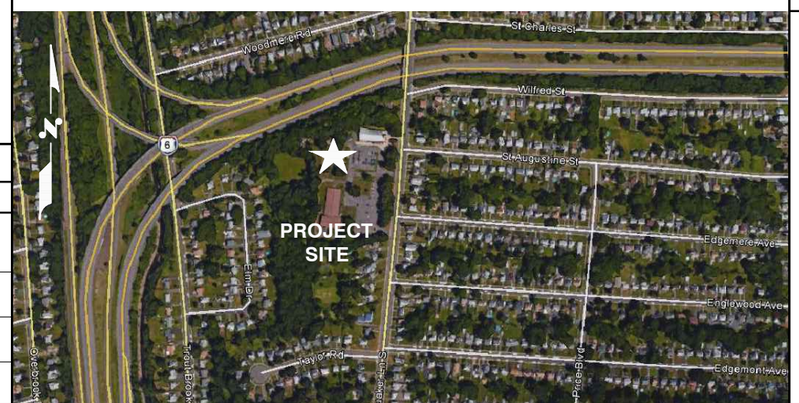
APPROVALS

DISCIPLINE:	SIGNATURE:	DATE:
THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS & AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT & MAY IMPOSE CHANGES OR MODIFICATIONS.		
SMARTLINK SITE ACQUISITION:		
SMARTLINK CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

VICINITY MAP

DIRECTIONS TO SITE:

FROM FRAMINGHAM, MA:
DEPART RT–30W/COCHITUATE RD TOWARD CALDOR RD 0.3 MI. KEEP RIGHT ONTO RT–30/COCHITUATE RD 0.5 MI. BEAR RIGHT ONTO RT–9 W/RT–30W/WORCESTER RD 0.8 MI. KEEP LEFT ONTO RT–9 W/WORCESTER RD 2.4 MI. TAKE RAMP RIGHT FOR I–90 WEST TOWARD WORCESTER/SPRINGFIELD 33.5 MI. AT EXIT 9, TAKE RAMP RIGHT FOR I–84 TOWARD NY CITY/HARTFORD 47.0 MI. AT EXIT 44, TAKE RAMP RIGHT TOWARD PROSPECT/OAKWOOD/AVENUES 0.2 MI. TURN LEFT ONTO KANE STREET 0.2 MI. TURN LEFT ONTO OAKWOOD AVE 361 FT. TURN RIGHT ONTO WILFRED ST 0.4 MI. TURN LEFT ONTO SOUTH QUAKER LANE 0.1 MI. ARRIVE 471 QUAKER LANE SOUTH, THE SITE WILL BE ON YOUR RIGHT



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

72 HOURS

CALL
BEFORE YOU DIG
CALL TOLL FREE 1–800–922–4455
OR CALL 811

UNDERGROUND SERVICE ALERT

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

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SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: FM

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	T–1	1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – SMARTLINK
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
    BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT, + 2009 & 2013 CT AMENDMENTS
    ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
    LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

    SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

    MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

    TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

    EQUIPMENT AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

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

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

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SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: FM

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

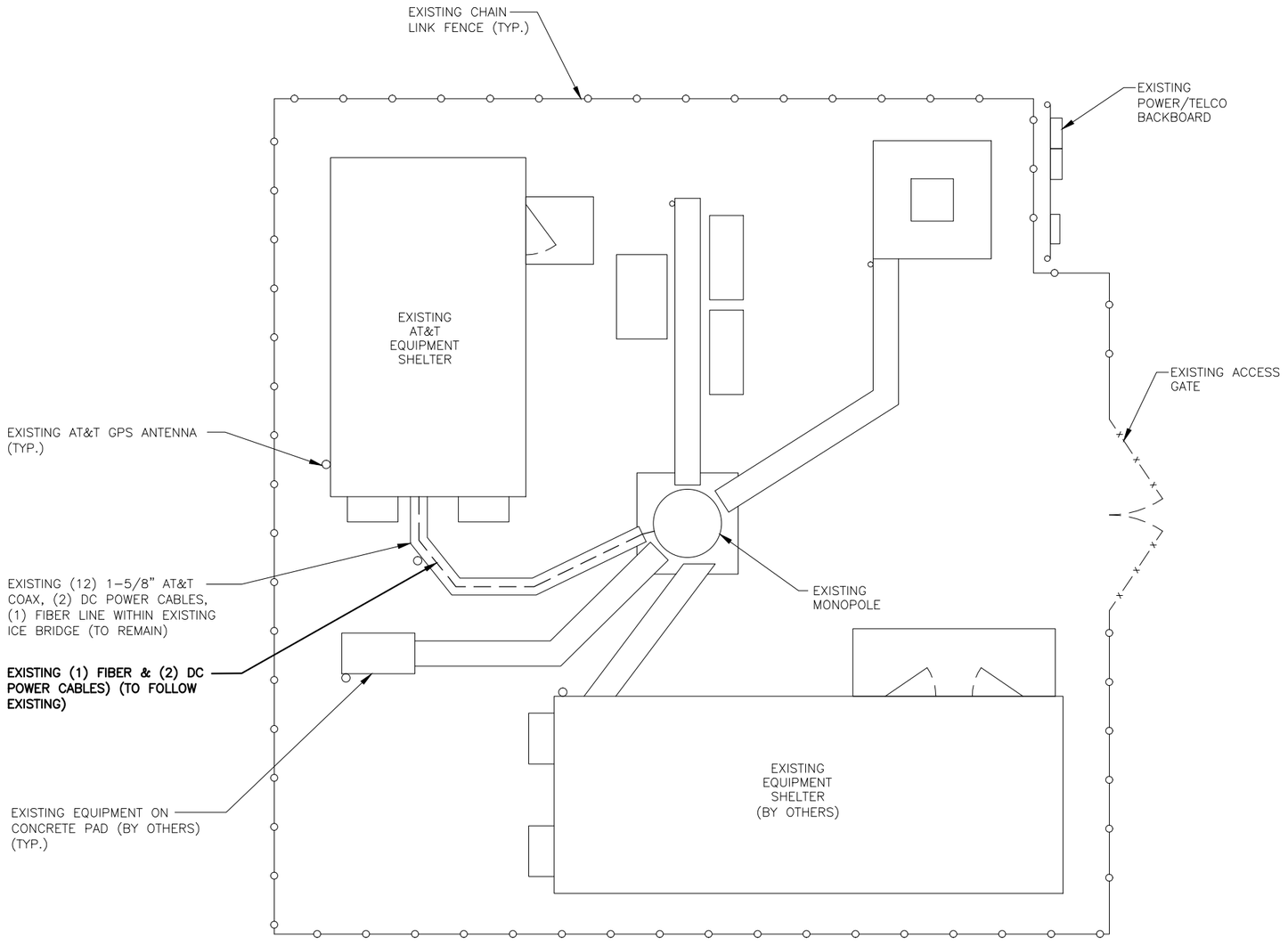
AT&T

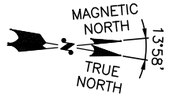
GENERAL NOTES
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	GN-1	1

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
ALL LINES AND ANTENNAS TO BE INSTALLED IN ACCORDANCE WITH PASSING STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND AT&T ANTENNA DESIGN SHEET RECOMMENDATION.





COMPOUND PLAN (1 / A-1)
22x34 SCALE: 1/4"=1'-0"
11x17 SCALE: 1/8"=1'-0"

0 2'-0" 4'-0" 8'-0" 12'-0"

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 3090
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

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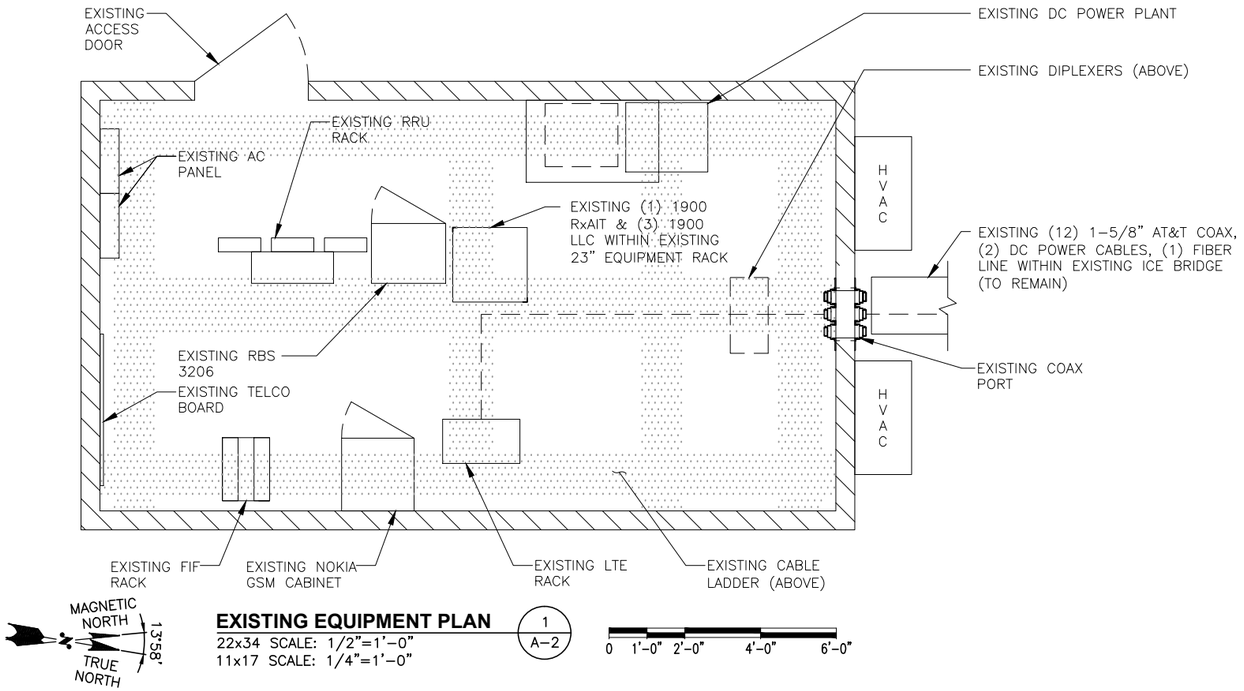
SCALE: AS SHOWN | DESIGNED BY: HC | DRAWN BY: FM

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND PLAN
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	A-1	1



EXISTING EQUIPMENT PLAN

1 / A-2

22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
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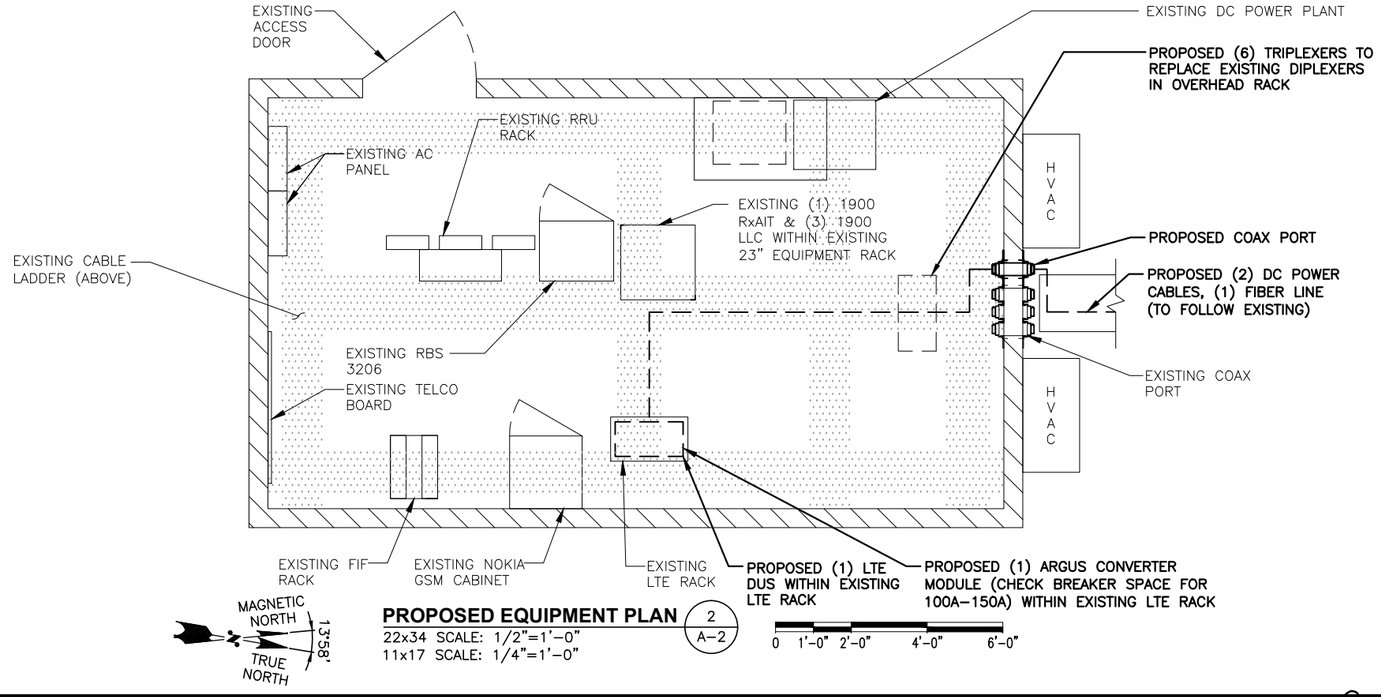

PROPOSED EQUIPMENT PLAN

2 / A-2

22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

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HARTFORD COUNTY

at&t
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

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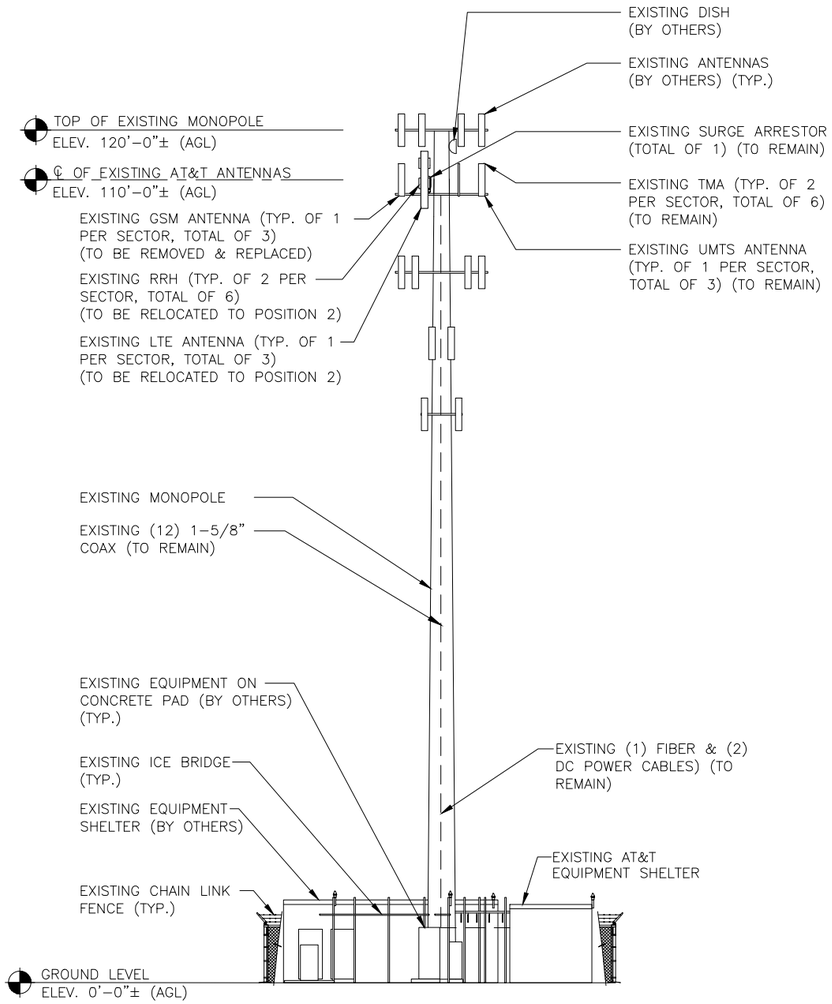
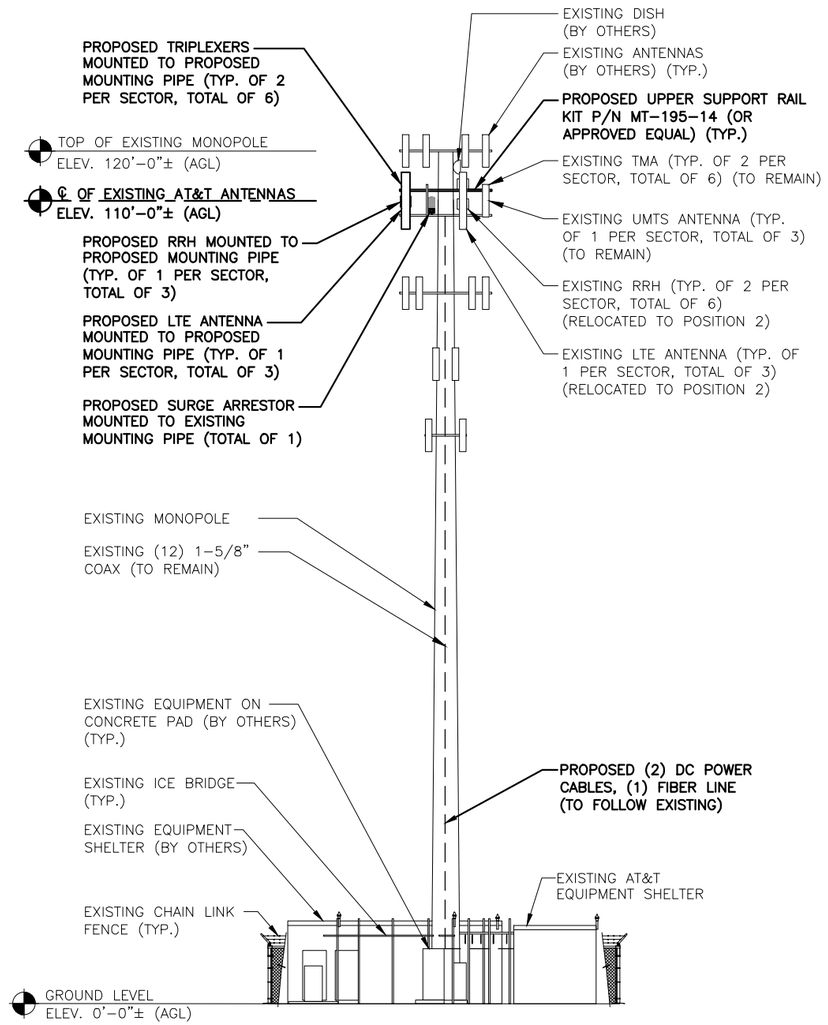
EQUIPMENT PLANS
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	A-2	1



EXISTING NORTH ELEVATION (1 / A-3)
22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"

0 5'-4" 10'-8" 21'-4" 32'-0"



PROPOSED NORTHWEST ELEVATION (2 / A-3)
22x34 SCALE: 3/32"=1'-0"
11x17 SCALE: 3/64"=1'-0"

0 5'-4" 10'-8" 21'-4" 32'-0"

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:
ALL LINES AND ANTENNAS TO BE INSTALLED IN ACCORDANCE WITH PASSING STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND AT&T ANTENNA DESIGN SHEET RECOMMENDATION.

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ELEVATION
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	A-3	1

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NOTE:
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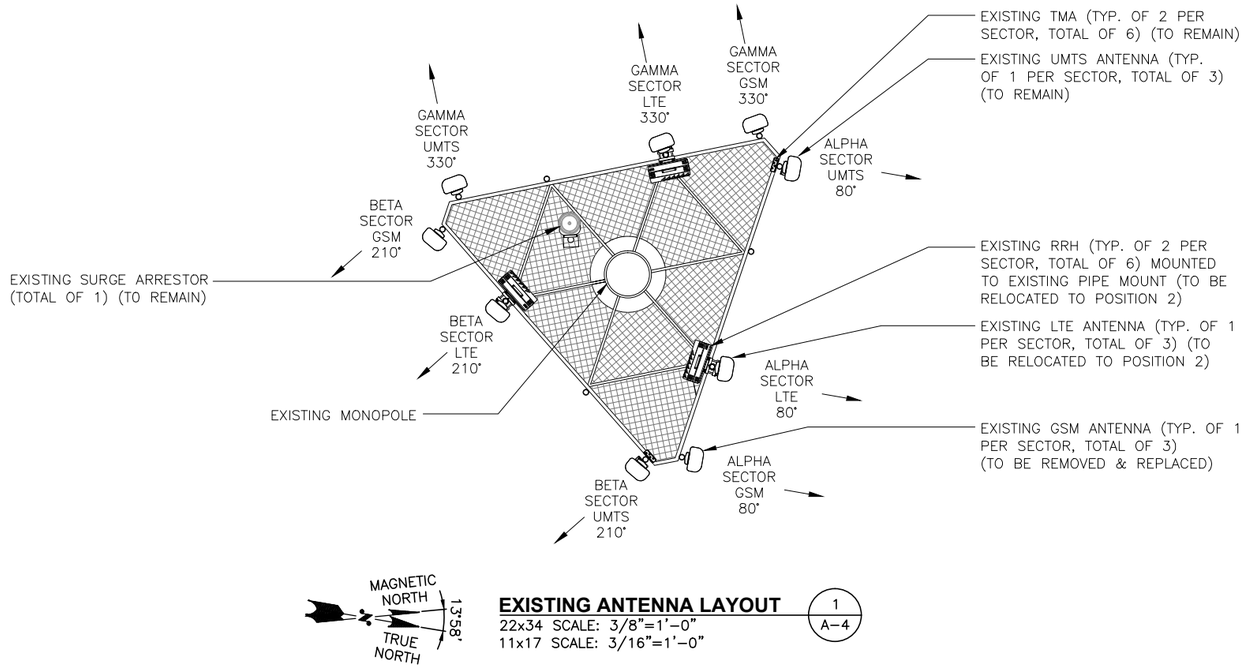

EXISTING ANTENNA LAYOUT (1 / A-4)

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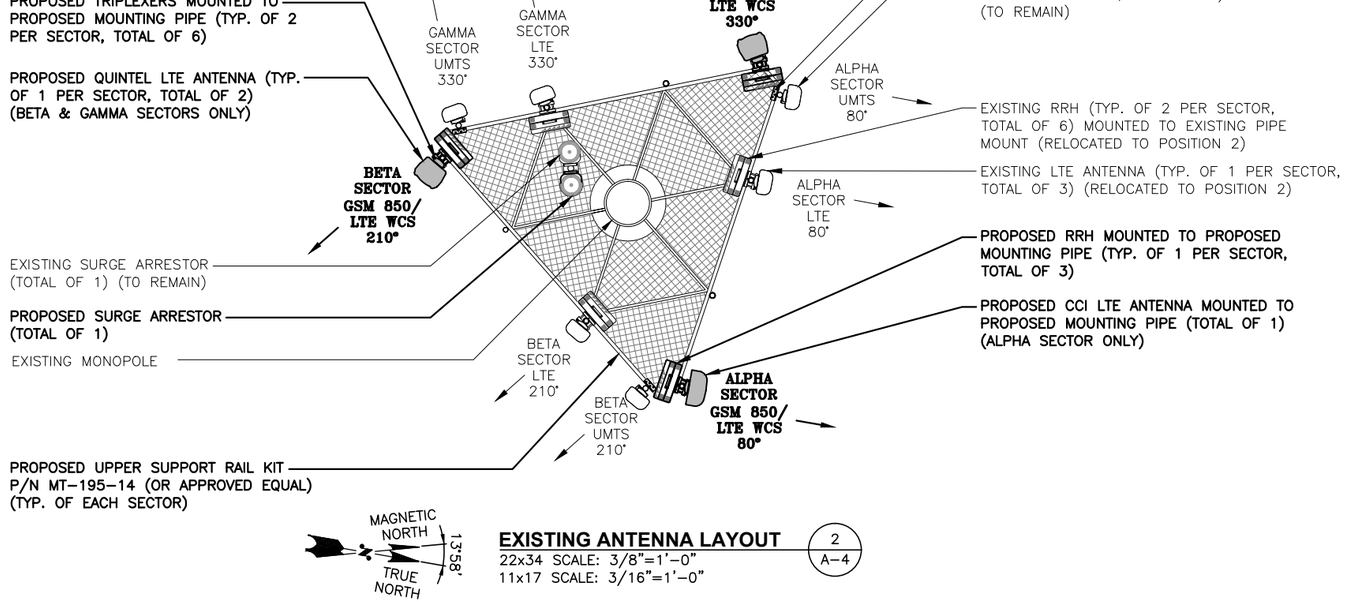
11x17 SCALE: 3/16"=1'-0"



EXISTING ANTENNA LAYOUT (2 / A-4)

22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"

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DANIEL P. HAMM
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ANTENNA LAYOUTS
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	A-4	1

NOTE:
ALL LINES AND ANTENNAS TO BE INSTALLED IN ACCORDANCE WITH PASSING STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND AT&T ANTENNA DESIGN SHEET RECOMMENDATION.

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

EXISTING & PROPOSED ANTENNA SCHEDULE

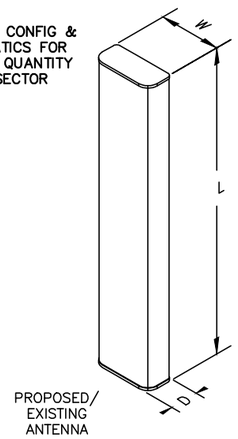
SECTOR	TECHNOLOGY	EXISTING/PROPOSED	RAD CENTER	AZIMUTH	MAKE	MODEL#	SIZE (INCHES) (L x W x D)
ALPHA	UMTS	EXISTING	110'-0"±	80°	POWERWAVE	7770	55.0x11.0x5.0
	LTE	EXISTING	110'-0"±	80°	ANDREW	SBNH-1D6565C	96.4x11.9x7.1
	LTE 3C	PROPOSED	110'-0"±	80°	CCI	TPA-65R-LCUUUU-H8	96.0x14.4x8.6
BETA	UMTS	EXISTING	110'-0"±	210°	POWERWAVE	7770	55.0x11.0x5.0
	LTE	EXISTING	110'-0"±	210°	KMW	AM-X-CD-16-65-00T-RET	72.0x11.8x5.9
	LTE 3C	PROPOSED	110'-0"±	210°	QUINTEL	QS66512-3	72.0x12.0x9.6
GAMMA	UMTS	EXISTING	110'-0"±	330°	POWERWAVE	7770	55.0x11.0x5.0
	LTE	EXISTING	110'-0"±	330°	KMW	AM-X-CD-16-65-00T-RET	72.0x11.8x5.9
	LTE 3C	PROPOSED	110'-0"±	330°	QUINTEL	QS66512-3	72.0x12.0x9.6

EXISTING & PROPOSED RRU SCHEDULE

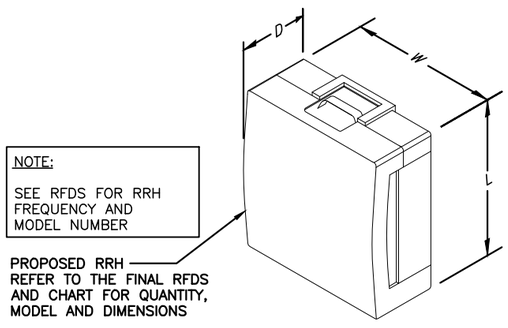
SECTOR	EXISTING/PROPOSED	MAKE	MODEL#	SIZE (INCHES) (L x W x D)
ALPHA				
	EXISTING	ERICSSON	(2)RRUS-11	19.7x17.0x7.2
	PROPOSED	ERICSSON	RRUS-32	26.7x12.1x6.7
BETA				
	EXISTING	ERICSSON	(2)RRUS-11	19.7x17.0x7.2
	PROPOSED	ERICSSON	RRUS-32	26.7x12.1x6.7
GAMMA				
	EXISTING	ERICSSON	(2)RRUS-11	19.7x17.0x7.2
	PROPOSED	ERICSSON	RRUS-32	26.7x12.1x6.7

NOTES:

1. REFER TO RF CONFIG & SECTOR SCHEMATICS FOR MODEL, TYPE & QUANTITY REQUIRED PER SECTOR

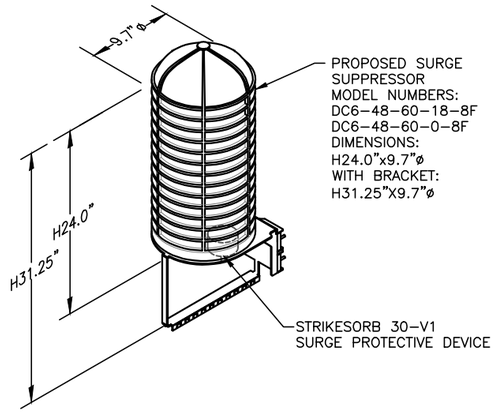


PROPOSED ANTENNA DETAIL 1 / A-5
SCALE: N.T.S



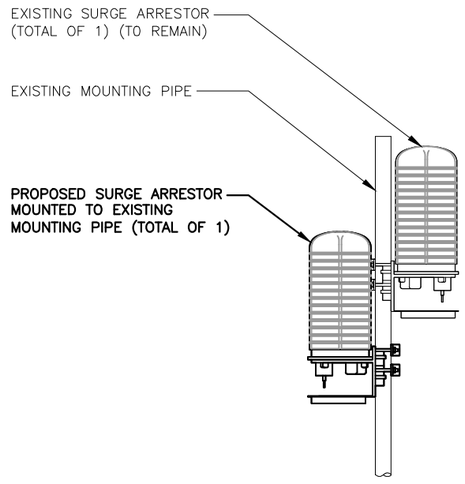
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

PROPOSED RRH DETAIL 2 / A-5
SCALE: N.T.S

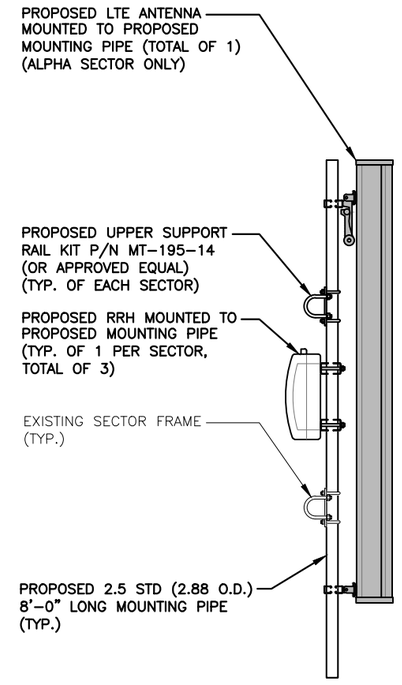


NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL 3 / A-5
SCALE: N.T.S



PROPOSED SURGE ARRESTOR MOUNTING DETAIL 4 / A-5
SCALE: N.T.S



PROPOSED LTE ANTENNA & RRH MOUNTING DETAIL 5 / A-5
SCALE: N.T.S

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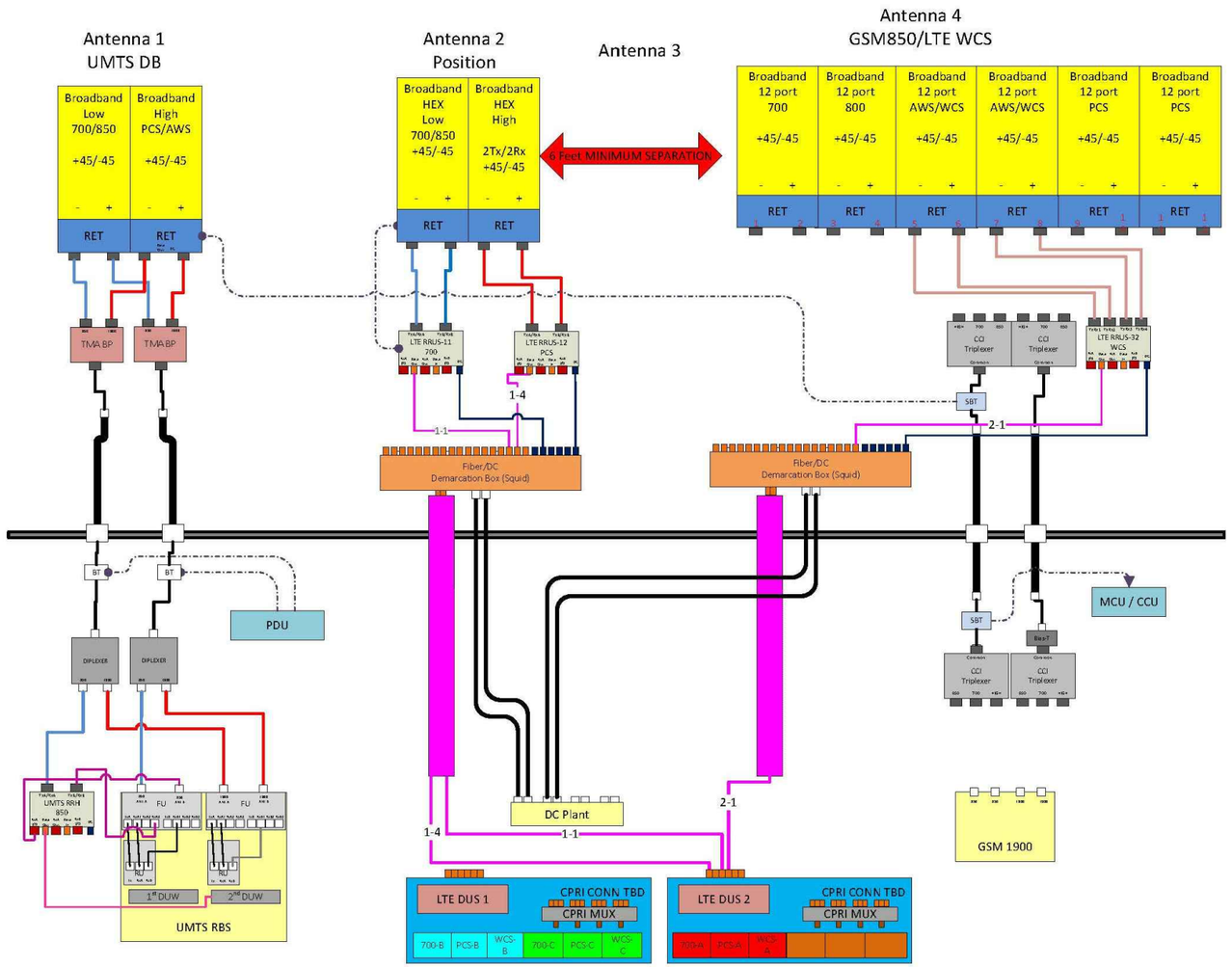
STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

DETAILS
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	A-5	1



RF PLUMBING DIAGRAM (1 / RF–1)
SCALE: N.T.S

NOTE:
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

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STATE OF CONNECTICUT — DANIEL P. HAMM — No. 24178 — LICENSED PROFESSIONAL ENGINEER

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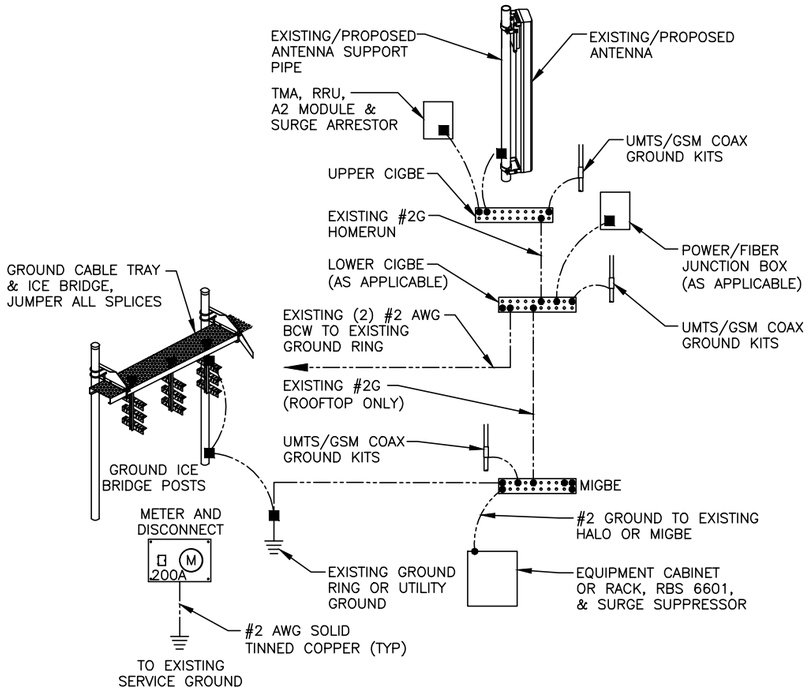
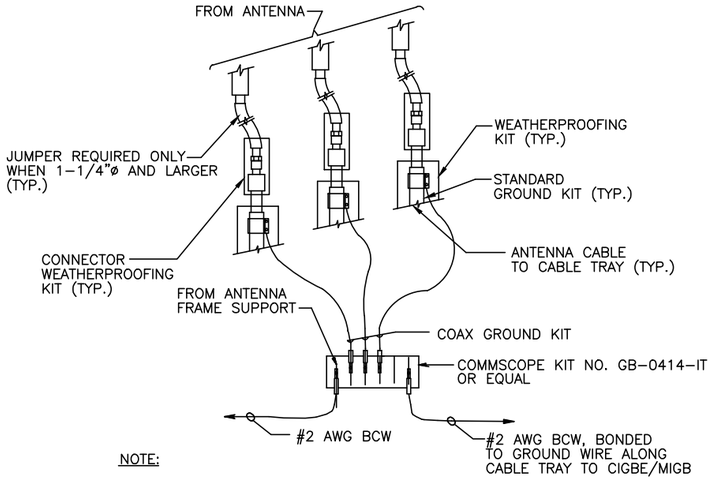
RF PLUMBING DIAGRAM
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	RF–1	1



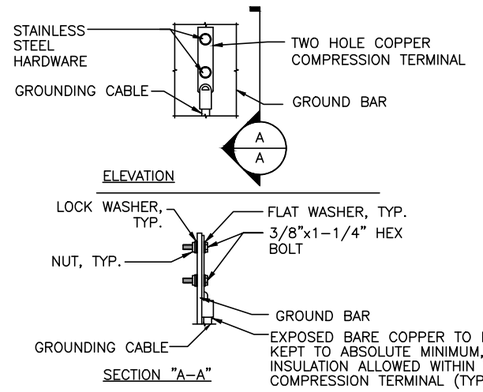
GROUNDING RISER DIAGRAM 1 / G–1
SCALE: N.T.S



NOTE:

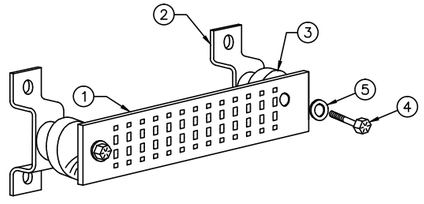
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL 2 / G–1
SCALE: N.T.S



NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATION.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB

TYPICAL GROUND BAR CONNECTION DETAIL 3 / G–1
SCALE: N.T.S



GROUND BAR - DETAIL 4 / G–1
SCALE: N.T.S

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

SECTION "P" – SURGE PRODUCERS

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

SECTION "A" – SURGE ABSORBERS

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

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GROUNDING DETAILS
(LTE 3C)

SITE NUMBER	DRAWING NUMBER	REV
CTL05258	G–1	1

Date: **March 3, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6565

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
crown@tepgroup.net

Subject: Structural Analysis Report

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL05258
	Carrier Site Name:	West Hartford
Crown Castle Designation:	**Crown Castle BU Number:**	829013
	Crown Castle Site Name:	West Hartford/I-84/X43
	Crown Castle JDE Job Number:	365149
	Crown Castle Work Order Number:	1200313
	Crown Castle Application Number:	328829 Rev. 6
Engineering Firm Designation:	**TEP Project Number:**	25680.44546
Site Data:	**467 South Quaker Lane (Church of St. Mark)** **West Hartford, Hartford County, CT 06110** **Latitude *41° 44' 55.59"*, Longitude *-72° 43' 52.86"*** **119 Foot - Monopole Tower**	

Dear Sean Dempsey,

Tower Engineering Professionals 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 878403, in accordance with application 328829, revision 6.

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.

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut State Building Code with 2013 Amendments (2003 International Building Code) based upon a wind speed of 80 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawing for the determined available structural capacity to be effective.

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

Structural analysis prepared by: Christopher D. Crook E.I. / ZRH

Respectfully submitted by:

Graham M. Andres, P.E.

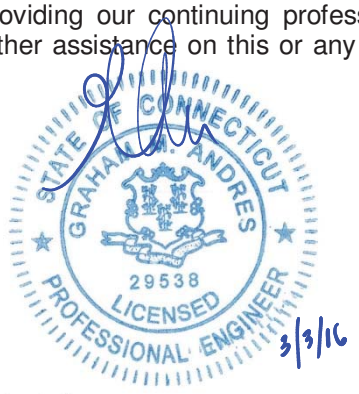

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TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 119-ft monopole tower designed by Pirod, Inc. in May of 2000. The tower was originally designed for a wind speed of 80 mph per EIA/TIA-222-F for the appurtenances listed in Table 3. The tower has been modified multiple times to accommodate additional loading. TEP visited the site on July of 2014 to perform a Rebar Mapping. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 Minimum Design Loads for Buildings and Other Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.0 inch escalating ice thickness and 50 mph under service loads.

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
110.0	110.0	1	CCI Antennas	TPA-65R-LCUUUU-H8 w/ Mount Pipe	1 2	3/8 3/4	1
		2	Quintel	QS66512-3 w/ Mount Pipe			
		1	Raycap	DC6-48-60-18-8F			
		3	Ericsson	RRUS 32			
		6	CCI Antennas	TPX-070821			
		1	Handrail Kit	Miscellaneous [NA 507-1]			

Notes:
1) See “Appendix B – Base Level Drawing” for assumed feed line configuration.

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
120.0	120.0	3	Ericsson	Air 21 B2A B4P w/ Mount Pipe	13	1-5/8	1
		3	Commscope	LNX-6515DS-VTM w/ Mount Pipe			
		3	Ericsson	Air 21 B4A B2P w/ Mount Pipe			
		1	RFS Celwave	APXV18-206517S-C w/ Mount Pipe			
		3	Ericsson	KRY 112 144/1			
		3	Ericsson	RRUS 11 B12			
		1	Tower Mounts	Platform Mount [LP 403-1]			
115.0	115.0	1	Andrew	VHLP2-18	1	1/2	1
		1	Tower Mounts	Side Arm Mount [SO 102-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
110.0	110.0	3	Powerwave Technologies	7770.00 w/ Mount Pipe	-	-	2
		3	Powerwave Technologies	7770.00 w/ Mount Pipe	1 2 12	3/8 7/16 1-5/8	1
		1	Andrew	SBNH-1D6565C w/ Mount Pipe			
		2	KMW Communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	Ericsson	RRUS 11			
		1	Raycap	DC6-48-60-18-8F			
		6	Powerwave Technologies	LGP21901			
		1	Tower Mounts	Platform Mount [LP 712-1]			
100.0	100.0	6	Commscope	SBNHH-1D65B w/ Mount Pipe	2	1-5/8	3
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Alcatel Lucent	RRH2x60-700			
		3	Alcatel Lucent	RRH2x60-AWS			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		2	Andrew	LNX-6514DS-T4M w/ Mount Pipe	12	1-5/8	1
		3	Amphenol	BXA-80063-4BF-EDIN-X w/ Mount Pipe			
		1	Antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			
		1	Tower Mounts	Platform Mount [LP 403-1]			
90.0	90.0	3	Kathrein	742 213 w/ Mount Pipe	6	1-5/8	1
80.0	83.0	1	Andrew	VHLP2-23	1 3 3 3	5/16 1/4 1/2 5/8	1
		1	Clearwire	CW Junction Box			
	81.0	3	Argus Technologies	LLPX310R w/ Mount Pipe			
		3	Samsung Telecom.	Wimax Dap Head			
	80.0	1	Tower Mounts	Side Arm Mount [SO 101-3]			

Notes:
1) Existing equipment
2) Existing equipment to be removed; not considered in this analysis
3) Reserved equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
120.0	120.0	12	Generic	1'x4' Panels	12	1-5/8
110.0	110.0	12	Generic	1'x4' Panels	12	1-5/8
100.0	100.0	12	Generic	1'x4' Panels	12	1-5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Supplemental Geotechnical Report	Tower Engineering Professionals / Dr. Clarence Welti, P.E., P.C.	3636697	CCISites
Tower Foundation Drawings	Pirod, Inc.	3636698	CCISites
Rebar Mapping	Tower Engineering Professionals	3636698	CCISites
Tower Manufacturer Drawings	Pirod, Inc.	3525378	CCISites
Tower Reinforcement Drawings	Natcomm Consulting Engineers, Inc.	3525386	CCISites
Post Modification Inspection	Natcomm Consulting Engineers, Inc.	3974228	CCISites
Tower Reinforcement Drawings	Tower Engineering Professionals	5650111	CCISites
Post Modification Inspection	Sinnott Gering and Schmitt Towers, Inc.	5852136	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.

RISA-3D (version 13.0.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower foundation. Selected output from the analysis is included in Appendix C.

3.2) Assumptions

1) The tower and foundation were built in accordance with the manufacturer's specifications.
2) The tower and foundation 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 "Appendix B – Base Level Drawing".
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by the standard.
5) All tower components are in sufficient condition to carry their full design capacity.
6) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
7) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (lb)	SF*P_{allow} (lb)	% Capacity	Pass / Fail
L1	119.083 - 101.083	Pole	TP26x21.61x0.25	1	-6351	1032887	22.5	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.789x0.313	2	-14587	1691417	63.6	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.49x0.375	3	-21665	2488871	70.7	Pass
L4	32.8333 - 0	Pole	TP49.063x39.848x0.375	4	-31361	3012660	78.9	Pass
							Summary	
						Pole (L4)	78.9	Pass
						RATING =	**78.9**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	76.9	Pass
1	Base Plate	-	65.8	Pass
1	Base Foundation Soil Interaction	-	71.2	Pass
1	Base Foundation Structural	-	57.1	Pass
1	Rock Anchors	-	88.2	Pass

Structure Rating (max from all components) =	**88.2%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

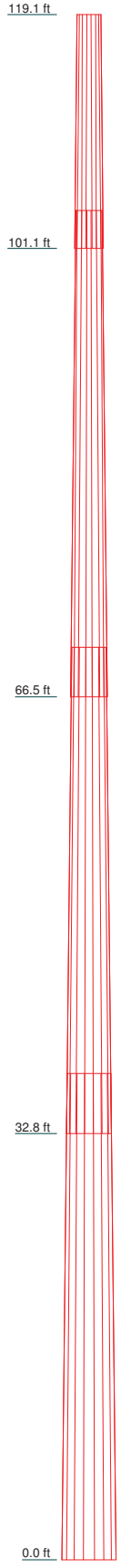
1) If the load differs from that described in Tables 1 and 2 of this report, “Appendix B – Base Level Drawing” or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

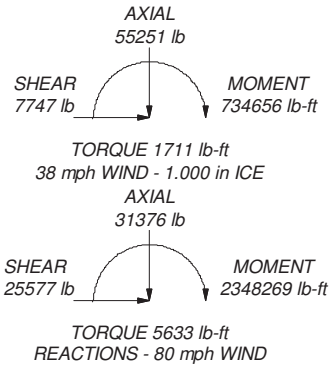
APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	18.000	37.500	37.500	37.500
Number of Sides	18	18	18	18
Thickness (in)	0.250	0.313	0.375	0.375
Socket Length (ft)	2.917	3.833	4.667	
Top Dia (in)	21.610	24.789	32.490	39.848
Bot Dia (in)	26.000	34.063	41.750	49.063
Grade			A572-65	
Weight (lb)	1144.8	3684.8	5580.8	6694.9

17105.4





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
2.4-in x 6-ft Mount Pipe	123	RRUS 32	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120	RRUS 32	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120	RRUS 32	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	120	2.4" Dia. x 6' Mount Pipe	110
LNX-6515DS-VTM w/ Mount Pipe	120	2.4" Dia. x 6' Mount Pipe	110
LNX-6515DS-VTM w/ Mount Pipe	120	2.4" Dia. x 6' Mount Pipe	110
LNX-6515DS-VTM w/ Mount Pipe	120	Miscellaneous [NA 507-1]	110
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120	Platform Mount [LP 712-1]	110
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120	7770.00 w/ Mount Pipe	110
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	120	LNX-6514DS-T4M w/ Mount Pipe	100
APXV18-206517S-C w/ Mount Pipe	120	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	100
KRY 112 144/1	120	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
KRY 112 144/1	120	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
KRY 112 144/1	120	BXA-80063-4BF-EDIN-X w/ Mount Pipe	100
RRUS 11 B12	120	(2) SBNHH-1D65B w/ Mount Pipe	100
RRUS 11 B12	120	(2) SBNHH-1D65B w/ Mount Pipe	100
RRUS 11 B12	120	(2) SBNHH-1D65B w/ Mount Pipe	100
2.4" Dia. x 6' Mount Pipe	120	DB-T1-6Z-8AB-0Z	100
2.4" Dia. x 6' Mount Pipe	120	RRH2X60-PCS	100
Platform Mount [LP 403-1]	120	RRH2X60-PCS	100
Side Arm Mount [SO 102-3]	115	RRH2X60-PCS	100
2.4" Dia. x 6' Mount Pipe	115	RRH2x60-700	100
VHLP2-18	115	RRH2x60-700	100
7770.00 w/ Mount Pipe	110	RRH2x60-700	100
7770.00 w/ Mount Pipe	110	RRH2x60-AWS	100
SBNH-1D6565C w/ Mount Pipe	110	RRH2x60-AWS	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	110	RRH2x60-AWS	100
AM-X-CD-16-65-00T-RET w/ Mount Pipe	110	DB-T1-6Z-8AB-0Z	100
TPA-65R-LCUUUU-H8 w/ Mount Pipe	110	Platform Mount [LP 403-1]	100
QS66512-3 w/ Mount Pipe	110	LNX-6514DS-T4M w/ Mount Pipe	100
QS66512-3 w/ Mount Pipe	110	2'x3' Ice Shield	97
(2) RRUS 11	110	2'x3' Ice Shield	95
(2) RRUS 11	110	742 213 w/ Mount Pipe	90
(2) RRUS 11	110	742 213 w/ Mount Pipe	90
(2) LGP21901	110	742 213 w/ Mount Pipe	90
(2) LGP21901	110	LLPX310R w/ Mount Pipe	80
(2) LGP21901	110	LLPX310R w/ Mount Pipe	80
(2) DC6-48-60-18-8F	110	WIMAX DAP HEAD	80
(2) TPX-070821	110	WIMAX DAP HEAD	80
(2) TPX-070821	110	WIMAX DAP HEAD	80
(2) TPX-070821	110	CW JUNCTION BOX	80
		2.4" Dia. x 6' Mount Pipe	80
		2.4" Dia. x 6' Mount Pipe	80
		2.4" Dia. x 6' Mount Pipe	80
		Side Arm Mount [SO 101-3]	80
		LLPX310R w/ Mount Pipe	80
		VHLP2-23	80

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 78.9%

Tower Engineering Professionals

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
Phone: (919) 661-6351
FAX: (919) 661-6350

Job:	***West Hartford/I-84/X43 (BU 829013)***		
Project:	***TEP No. 25680.44546***		
Client: Crown Castle	Drawn by: Chris D. Crook, E.I.	App'd:	
Code: TIA/EIA-222-F	Date: 03/03/16	Scale: NTS	
Path: C:\Users\cdcrook\Desktop\TNX Tower Run\25680.829013_LC7.eri		Dwg No. E-1	

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
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* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	119.083-101.083	18.000	2.917	18	21.610	26.000	0.250	1.000	A572-65 (65 ksi)
L2	101.083-66.500	37.500	3.833	18	24.789	34.063	0.313	1.250	A572-65 (65 ksi)
L3	66.500-32.833	37.500	4.667	18	32.490	41.750	0.375	1.500	A572-65 (65 ksi)
L4	32.833-0.000	37.500		18	39.848	49.063	0.375	1.500	A572-65 (65 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	21.943	16.949	976.986	7.583	10.978	88.996	1955.257	8.476	3.363	13.453
	26.401	20.433	1711.654	9.141	13.208	129.592	3425.561	10.218	4.136	16.544
L2	25.903	24.277	1837.486	8.689	12.593	145.917	3677.390	12.141	3.813	12.201
	34.588	33.476	4817.433	11.981	17.304	278.404	9641.206	16.741	5.445	17.424
L3	33.952	38.224	4980.574	11.401	16.505	301.768	9967.702	19.116	5.058	13.488
	42.394	49.247	10650.982	14.688	21.209	502.192	21315.979	24.628	6.688	17.835
L4	41.627	46.982	9248.308	14.013	20.243	456.874	18508.785	23.496	6.353	16.942
	49.819	57.950	17355.138	17.284	24.924	696.329	34733.112	28.981	7.975	21.267

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 119.083-101.083				1	1	1			
L2 101.083-66.500				1	1	1			
L3 66.500-32.833				1	1	1			
L4 32.833-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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
Safety Line 3/8	A	No	CaAa (Out Of Face)	119.000 - 0.000	1	No Ice	0.037	0.220
						1/2" Ice	0.137	0.750
						1" Ice	0.238	1.280
						2" Ice	0.437	2.340
						4" Ice	0.838	4.460
Rung 5/8" SR (12.5"w, 16"s)	A	No	CaAa (Out Of Face)	119.000 - 0.000	1	No Ice	0.049	0.816
						1/2" Ice	0.149	1.420
						1" Ice	0.249	2.634
						2" Ice	0.449	6.895
						4" Ice	0.849	22.749
120								
LDF7-50A(1-5/8")	A	No	Inside Pole	119.083 - 0.000	10	No Ice	0.000	0.820

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
						2" Ice	0.000	0.820
						4" Ice	0.000	0.820
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	119.083 - 0.000	1	No Ice	0.198	0.820
						1/2" Ice	0.298	2.335
						1" Ice	0.398	4.461
						2" Ice	0.598	10.545
						4" Ice	0.998	30.044
LDF7-50A(1-5/8")	A	No	CaAa (Out Of Face)	119.083 - 0.000	2	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
						2" Ice	0.000	10.545
						4" Ice	0.000	30.044
110								
LDF7-50A(1-5/8")	C	No	Inside Pole	110.000 - 0.000	12	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
						2" Ice	0.000	0.820
						4" Ice	0.000	0.820
WR-VG102ST-BRDA(7/16")	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.201
						1/2" Ice	0.000	0.201
						1" Ice	0.000	0.201
						2" Ice	0.000	0.201
						4" Ice	0.000	0.201
WR-VG122ST-BRDA(3/8)	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.200
						1/2" Ice	0.000	0.200
						1" Ice	0.000	0.200
						2" Ice	0.000	0.200
						4" Ice	0.000	0.200
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	110.000 - 0.000	2	No Ice	0.000	0.584
						1/2" Ice	0.000	0.584
						1" Ice	0.000	0.584
						2" Ice	0.000	0.584
						4" Ice	0.000	0.584
3" Flexible Conduit	C	No	Inside Pole	110.000 - 0.000	1	No Ice	0.000	1.040
						1/2" Ice	0.000	1.040
						1" Ice	0.000	1.040
						2" Ice	0.000	1.040
						4" Ice	0.000	1.040
100								
LDF7-50A(1-5/8")	B	No	Inside Pole	100.000 - 0.000	11	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
						1" Ice	0.000	0.820
						2" Ice	0.000	0.820
						4" Ice	0.000	0.820
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	80.000 - 0.000	3	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
						2" Ice	0.000	10.545
						4" Ice	0.000	30.044
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	100.000 - 80.000	2	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
						2" Ice	0.000	10.545
						4" Ice	0.000	30.044
LDF7-50A(1-5/8")	B	No	CaAa (Out Of Face)	100.000 - 80.000	1	No Ice	0.198	0.820
						1/2" Ice	0.298	2.335
						1" Ice	0.398	4.461
						2" Ice	0.598	10.545
						4" Ice	0.998	30.044

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
90								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	90.000 - 0.000	6	No Ice	0.000	0.820
						1/2" Ice	0.000	2.335
						1" Ice	0.000	4.461
						2" Ice	0.000	10.545
						4" Ice	0.000	30.044
80								
FSJ1-50A(1/4")	A	No	Inside Pole	80.000 - 0.000	3	No Ice	0.000	0.045
						1/2" Ice	0.000	0.045
						1" Ice	0.000	0.045
						2" Ice	0.000	0.045
						4" Ice	0.000	0.045
HJ4.5-50(5/8")	A	No	Inside Pole	80.000 - 0.000	3	No Ice	0.000	0.400
						1/2" Ice	0.000	0.400
						1" Ice	0.000	0.400
						2" Ice	0.000	0.400
						4" Ice	0.000	0.400
9207(5/16")	A	No	Inside Pole	80.000 - 0.000	1	No Ice	0.000	0.600
						1/2" Ice	0.000	0.600
						1" Ice	0.000	0.600
						2" Ice	0.000	0.600
						4" Ice	0.000	0.600
2" Flexible Conduit	A	No	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.000	0.340
						1/2" Ice	0.000	1.867
						1" Ice	0.000	4.005
						2" Ice	0.000	10.114
						4" Ice	0.000	29.662
2" Flexible Conduit	A	No	CaAa (Out Of Face)	80.000 - 0.000	1	No Ice	0.200	0.340
						1/2" Ice	0.300	1.867
						1" Ice	0.400	4.005
						2" Ice	0.600	10.114
						4" Ice	1.000	29.662
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	80.000 - 0.000	4	No Ice	0.000	0.140
						1/2" Ice	0.000	0.763
						1" Ice	0.000	1.997
						2" Ice	0.000	6.298
						4" Ice	0.000	22.229
***								
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	100.000 - 80.000	1	No Ice	0.000	0.140
						1/2" Ice	0.000	0.763
						1" Ice	0.000	1.997
						2" Ice	0.000	6.298
						4" Ice	0.000	22.229
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	115.000 - 100.000	1	No Ice	0.052	0.140
						1/2" Ice	0.152	0.763
						1" Ice	0.252	1.997
						2" Ice	0.452	6.298
						4" Ice	0.852	22.229
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	119.083-101.083	A	0.000	0.000	0.000	5.834	212
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	115

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L2	101.083-66.500	A	0.000	0.000	0.000	12.588	450
		B	0.000	0.000	0.000	3.960	385
		C	0.000	0.000	0.000	0.000	560
L3	66.500-32.833	A	0.000	0.000	0.000	16.305	501
		B	0.000	0.000	0.000	0.000	386
		C	0.000	0.000	0.000	0.000	598
L4	32.833-0.000	A	0.000	0.000	0.000	15.901	488
		B	0.000	0.000	0.000	0.000	377
		C	0.000	0.000	0.000	0.000	583

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	119.083-101.083	A	1.155	0.000	0.000	0.000	21.487	561
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	115
L2	101.083-66.500	A	1.117	0.000	0.000	0.000	39.928	1368
		B		0.000	0.000	0.000	8.581	845
		C		0.000	0.000	0.000	0.000	1206
L3	66.500-32.833	A	1.050	0.000	0.000	0.000	46.400	1672
		B		0.000	0.000	0.000	0.000	826
		C		0.000	0.000	0.000	0.000	1478
L4	32.833-0.000	A	1.000	0.000	0.000	0.000	43.475	1513
		B		0.000	0.000	0.000	0.000	765
		C		0.000	0.000	0.000	0.000	1360

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	119.083-101.083	0.000	-0.419	0.000	-1.058
L2	101.083-66.500	0.118	-0.398	0.186	-0.959
L3	66.500-32.833	0.000	-0.629	0.000	-1.379
L4	32.833-0.000	0.000	-0.643	0.000	-1.419

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
2.4-in x 6-ft Mount Pipe	C	None		0.000	123.000	No Ice	1.440	1.440	22
						1/2" Ice	1.933	1.933	33

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						1" Ice	2.302	2.302	48
						2" Ice	3.068	3.068	91
						4" Ice	4.711	4.711	232
120									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	112 169 233 383 807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	112 169 233 383 807
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	112 169 233 383 807
LNX-6515DS-VTM w/ Mount Pipe	A	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	83 173 273 506 1151
LNX-6515DS-VTM w/ Mount Pipe	B	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	83 173 273 506 1151
LNX-6515DS-VTM w/ Mount Pipe	C	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	83 173 273 506 1151
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Centroid-Face	4.000 3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	112 169 233 383 807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Centroid-Face	4.000 3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	112 169 233 383 807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.825 7.347 7.863 8.926 11.175	5.642 6.480 7.257 8.864 12.293	112 169 233 383 807
APXV18-206517S-C w/ Mount Pipe	B	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.404 5.960 6.481 7.547 9.919	4.700 5.860 6.734 8.515 12.277	52 97 150 280 679
KRY 112 144/1	A	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice	0.411 0.500 0.597	0.189 0.256 0.332	11 14 18

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	0.818	0.510	32
						4" Ice	1.363	0.970	81
KRY 112 144/1	B	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.411 0.500 0.597 0.818 1.363	0.189 0.256 0.332 0.510 0.970	11 14 18 32 81
KRY 112 144/1	C	From Centroid-Face	4.000 -7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.411 0.500 0.597 0.818 1.363	0.189 0.256 0.332 0.510 0.970	11 14 18 32 81
RRUS 11 B12	A	From Centroid-Face	4.000 7.000 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.306 3.550 3.802 4.334 5.501	1.361 1.540 1.728 2.130 3.038	51 72 95 153 314
RRUS 11 B12	B	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.306 3.550 3.802 4.334 5.501	1.361 1.540 1.728 2.130 3.038	51 72 95 153 314
RRUS 11 B12	C	From Centroid-Face	4.000 -3.750 0.000	30.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.306 3.550 3.802 4.334 5.501	1.361 1.540 1.728 2.130 3.038	51 72 95 153 314
2.4" Dia. x 6' Mount Pipe	A	From Centroid-Face	4.000 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
2.4" Dia. x 6' Mount Pipe	C	From Centroid-Face	4.000 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
Platform Mount [LP 403-1]	C	None		0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.850 24.300 29.750 40.650 62.450	18.850 24.300 29.750 40.650 62.450	1500 1797 2093 2686 3872
115 Side Arm Mount [SO 102-3]	C	None		0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.000 3.480 3.960 4.920 6.840	3.000 3.480 3.960 4.920 6.840	81 111 141 201 321
2.4" Dia. x 6' Mount Pipe	C	From Leg	0.500 0.000 0.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
110 7770.00 w/ Mount Pipe	A	From Centroid-Face	4.000 -6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice	6.119 6.626 7.128	4.254 5.014 5.711	55 103 157

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	8.164	7.155	287
						4" Ice	10.360	10.412	665
7770.00 w/ Mount Pipe	B	From Centroid-Face	4.000 -6.000 0.000	20.000	110.000	No Ice	6.119	4.254	55
						1/2" Ice	6.626	5.014	103
						1" Ice	7.128	5.711	157
						2" Ice	8.164	7.155	287
						4" Ice	10.360	10.412	665
7770.00 w/ Mount Pipe	C	From Centroid-Face	4.000 -6.000 0.000	30.000	110.000	No Ice	6.119	4.254	55
						1/2" Ice	6.626	5.014	103
						1" Ice	7.128	5.711	157
						2" Ice	8.164	7.155	287
						4" Ice	10.360	10.412	665
SBNH-1D6565C w/ Mount Pipe	B	From Centroid-Face	4.000 -2.000 0.000	20.000	110.000	No Ice	11.695	9.854	99
						1/2" Ice	12.421	11.383	189
						1" Ice	13.157	12.936	289
						2" Ice	14.630	15.305	523
						4" Ice	17.917	20.189	1169
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice	8.498	6.304	74
						1/2" Ice	9.149	7.479	139
						1" Ice	9.767	8.368	212
						2" Ice	11.031	10.179	385
						4" Ice	13.679	14.024	874
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice	8.498	6.304	74
						1/2" Ice	9.149	7.479	139
						1" Ice	9.767	8.368	212
						2" Ice	11.031	10.179	385
						4" Ice	13.679	14.024	874
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice	13.678	10.960	114
						1/2" Ice	14.501	12.486	218
						1" Ice	15.334	14.037	331
						2" Ice	16.941	16.391	593
						4" Ice	20.270	21.279	1296
QS66512-3 w/ Mount Pipe	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice	8.637	8.463	131
						1/2" Ice	9.290	9.657	206
						1" Ice	9.910	10.620	290
						2" Ice	11.176	12.610	486
						4" Ice	13.829	16.806	1023
QS66512-3 w/ Mount Pipe	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice	8.637	8.463	131
						1/2" Ice	9.290	9.657	206
						1" Ice	9.910	10.620	290
						2" Ice	11.176	12.610	486
						4" Ice	13.829	16.806	1023
(2) RRUS 11	A	From Centroid-Face	4.000 -4.000 0.000	30.000	110.000	No Ice	3.256	1.379	51
						1/2" Ice	3.498	1.558	72
						1" Ice	3.749	1.745	95
						2" Ice	4.277	2.146	153
						4" Ice	5.435	3.050	314
(2) RRUS 11	B	From Centroid-Face	4.000 -4.000 0.000	20.000	110.000	No Ice	3.256	1.379	51
						1/2" Ice	3.498	1.558	72
						1" Ice	3.749	1.745	95
						2" Ice	4.277	2.146	153
						4" Ice	5.435	3.050	314
(2) RRUS 11	C	From Centroid-Face	4.000 -4.000 0.000	30.000	110.000	No Ice	3.256	1.379	51
						1/2" Ice	3.498	1.558	72
						1" Ice	3.749	1.745	95
						2" Ice	4.277	2.146	153
						4" Ice	5.435	3.050	314

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) LGP21901	A	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.270 0.343 0.425 0.616 1.101	0.184 0.248 0.322 0.494 0.943	6 8 11 22 66
(2) LGP21901	B	From Centroid-Face	4.000 -2.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.270 0.343 0.425 0.616 1.101	0.184 0.248 0.322 0.494 0.943	6 8 11 22 66
(2) LGP21901	C	From Centroid-Face	4.000 -2.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.270 0.343 0.425 0.616 1.101	0.184 0.248 0.322 0.494 0.943	6 8 11 22 66
(2) DC6-48-60-18-8F	B	From Centroid-Face	4.000 0.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.467 1.667 1.878 2.333 3.378	1.467 1.667 1.878 2.333 3.378	19 37 57 105 239
(2) TPX-070821	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	8 11 16 30 83
(2) TPX-070821	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	8 11 16 30 83
(2) TPX-070821	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.547 0.652 0.765 1.017 1.626	0.116 0.172 0.236 0.390 0.801	8 11 16 30 83
RRUS 32	A	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	55 77 103 165 336
RRUS 32	B	From Centroid-Face	4.000 6.000 0.000	20.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	55 77 103 165 336
RRUS 32	C	From Centroid-Face	4.000 6.000 0.000	30.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.333 3.597 3.869 4.439 5.684	1.983 2.214 2.453 2.958 4.072	55 77 103 165 336
2.4" Dia. x 6' Mount Pipe	A	From Centroid-Face	4.000 2.000 0.000	0.000	110.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
2.4" Dia. x 6' Mount Pipe	B	From Centroid-Fa	4.000 2.000	0.000	110.000	No Ice 1/2" Ice	1.425 1.931	1.425 1.931	22 38

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
		ce	0.000			1" Ice	2.316	2.316	56
						2" Ice	3.149	3.149	100
						4" Ice	5.058	5.058	252
2.4" Dia. x 6' Mount Pipe	C	From Centroid-Fa	4.000 2.000	0.000	110.000	No Ice 1/2" Ice	1.425 1.931	1.425 1.931	22 38
		ce	0.000			1" Ice	2.316	2.316	56
						2" Ice	3.149	3.149	100
						4" Ice	5.058	5.058	252
Miscellaneous [NA 507-1]	C	None		0.000	110.000	No Ice	4.800	4.800	245
						1/2" Ice	6.700	6.700	294
						1" Ice	8.600	8.600	343
						2" Ice	12.400	12.400	441
						4" Ice	20.000	20.000	637
Platform Mount [LP 712-1]	C	None		0.000	110.000	No Ice	24.530	24.530	1335
						1/2" Ice	29.940	29.940	1646
						1" Ice	35.350	35.350	1956
						2" Ice	46.170	46.170	2577
						4" Ice	67.810	67.810	3820
100									
LNX-6514DS-T4M w/ Mount Pipe	B	From Centroid-Fa	4.000 -3.000	0.000	100.000	No Ice 1/2" Ice	8.682 9.312	7.418 8.452	79 152
		ce	0.000			1" Ice	9.931	9.345	233
						2" Ice	11.198	11.181	420
						4" Ice	13.852	15.216	938
LNX-6514DS-T4M w/ Mount Pipe	C	From Centroid-Fa	4.000 -3.000	0.000	100.000	No Ice 1/2" Ice	8.682 9.312	7.418 8.452	79 152
		ce	0.000			1" Ice	9.931	9.345	233
						2" Ice	11.198	11.181	420
						4" Ice	13.852	15.216	938
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Centroid-Fa	4.000 -3.000	0.000	100.000	No Ice 1/2" Ice	7.969 8.609	5.801 6.953	42 103
		ce	0.000			1" Ice	9.216	7.819	171
						2" Ice	10.459	9.601	335
						4" Ice	13.066	13.366	804
BXA-80063-4BF-EDIN-X w/ Mount Pipe	A	From Centroid-Fa	4.000 7.000	0.000	100.000	No Ice 1/2" Ice	5.089 5.515	3.472 4.045	30 70
		ce	0.000			1" Ice	5.953	4.640	116
						2" Ice	6.859	5.957	227
						4" Ice	8.816	8.886	554
BXA-80063-4BF-EDIN-X w/ Mount Pipe	B	From Centroid-Fa	4.000 7.000	0.000	100.000	No Ice 1/2" Ice	5.089 5.515	3.472 4.045	30 70
		ce	0.000			1" Ice	5.953	4.640	116
						2" Ice	6.859	5.957	227
						4" Ice	8.816	8.886	554
BXA-80063-4BF-EDIN-X w/ Mount Pipe	C	From Centroid-Fa	4.000 7.000	0.000	100.000	No Ice 1/2" Ice	5.089 5.515	3.472 4.045	30 70
		ce	0.000			1" Ice	5.953	4.640	116
						2" Ice	6.859	5.957	227
						4" Ice	8.816	8.886	554
(2) SBNHH-1D65B w/ Mount Pipe	A	From Centroid-Fa	4.000 -3.000	0.000	100.000	No Ice 1/2" Ice	8.533 9.184	7.004 8.185	76 145
		ce	0.000			1" Ice	9.803	9.081	221
						2" Ice	11.067	10.904	401
						4" Ice	13.716	14.926	906
(2) SBNHH-1D65B w/ Mount Pipe	B	From Centroid-Fa	4.000 -3.000	0.000	100.000	No Ice 1/2" Ice	8.533 9.184	7.004 8.185	76 145
		ce	0.000			1" Ice	9.803	9.081	221

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
						2" Ice	11.067	10.904	401
						4" Ice	13.716	14.926	906
(2) SBNHH-1D65B w/ Mount Pipe	C	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.533 9.184 9.803 11.067 13.716	7.004 8.185 9.081 10.904 14.926	76 145 221 401 906
DB-T1-6Z-8AB-0Z	C	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	44 80 120 213 455
RRH2X60-PCS	A	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	55 75 99 155 313
RRH2X60-PCS	B	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	55 75 99 155 313
RRH2X60-PCS	C	From Centroid-Face	4.000 -7.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	55 75 99 155 313
RRH2x60-700	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354
RRH2x60-700	B	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354
RRH2x60-700	C	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354
RRH2x60-AWS	A	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354
RRH2x60-AWS	B	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354
RRH2x60-AWS	C	From Centroid-Face	4.000 3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	60 83 109 173 354

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
DB-T1-6Z-8AB-0Z	A	From Centroid-Face	4.000 -3.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	44 80 120 213 455
Platform Mount [LP 403-1]	C	None		0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.850 24.300 29.750 40.650 62.450	18.850 24.300 29.750 40.650 62.450	1500 1797 2093 2686 3872
90									
742 213 w/ Mount Pipe	A	From Leg	0.500 0.000 0.000	30.000	90.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.373 5.950 6.501 7.611 9.933	4.620 6.000 6.982 8.852 12.794	49 94 146 277 683
742 213 w/ Mount Pipe	B	From Leg	0.500 0.000 0.000	0.000	90.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.373 5.950 6.501 7.611 9.933	4.620 6.000 6.982 8.852 12.794	49 94 146 277 683
742 213 w/ Mount Pipe	C	From Leg	0.500 0.000 0.000	-10.000	90.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.373 5.950 6.501 7.611 9.933	4.620 6.000 6.982 8.852 12.794	49 94 146 277 683
2'x3' Ice Shield	C	From Leg	0.500 0.000 0.000	-10.000	95.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.720 0.990 1.260 1.800 2.880	1.180 1.610 2.040 2.900 4.620	72 132 192 312 552
2'x3' Ice Shield	C	From Leg	0.500 0.000 0.000	-10.000	97.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.720 0.990 1.260 1.800 2.880	1.180 1.610 2.040 2.900 4.620	72 132 192 312 552
80									
LLPX310R w/ Mount Pipe	A	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.982 5.376 5.780 6.618 8.437	2.874 3.398 3.937 5.125 7.894	44 81 123 227 531
LLPX310R w/ Mount Pipe	B	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.982 5.376 5.780 6.618 8.437	2.874 3.398 3.937 5.125 7.894	44 81 123 227 531
LLPX310R w/ Mount Pipe	C	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.982 5.376 5.780 6.618 8.437	2.874 3.398 3.937 5.125 7.894	44 81 123 227 531
WIMAX DAP HEAD	A	From Leg	1.000 2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	33 45 58 94 201

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
WIMAX DAP HEAD	B	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	33 45 58 94 201
WIMAX DAP HEAD	C	From Leg	1.000 -2.000 1.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.804 1.988 2.180 2.589 3.512	0.778 0.918 1.067 1.391 2.143	33 45 58 94 201
CW JUNCTION BOX	A	From Leg	1.000 2.000 3.000	30.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.400 1.560 1.728 2.091 2.921	0.700 0.821 0.951 1.236 1.910	0 10 23 55 153
2.4" Dia. x 6' Mount Pipe	A	From Leg	1.000 2.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
2.4" Dia. x 6' Mount Pipe	B	From Leg	1.000 2.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
2.4" Dia. x 6' Mount Pipe	C	From Leg	1.000 2.000 0.000	0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.425 1.931 2.316 3.149 5.058	1.425 1.931 2.316 3.149 5.058	22 38 56 100 252
Side Arm Mount [SO 101-3]	C	None		0.000	80.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.500 8.900 10.300 13.100 18.700	7.500 8.900 10.300 13.100 18.700	252 333 414 576 900
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
115											
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	1.000 0.000 0.000	0.000		115.000	2.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.140 3.410 3.680 4.210 5.280	31 49 66 101 171
80											

Description	*Face or Leg*	*Dish Type*	*Offset Type*	*Offsets: Horz Lateral Vert* ft	*Azimuth Adjustment* °	*3 dB Beam Width* °	*Elevation* ft	*Outside Diameter* ft		*Aperture Area* ft^2	*Weight* lb
VHLP2-23	A	Paraboloid w/Shroud (HP)	From Leg	1.000 2.000 3.000	-30.000		80.000	2.180	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.730 4.020 4.310 4.900 6.060	30 50 70 110 200
***											

Load Combinations

Comb. No.	*Description*
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.083 - 101.083	22.514	29	1.597	0.024
L2	104 - 66.5	17.539	29	1.534	0.014
L3	70.3333 - 32.8333	8.071	29	1.080	0.006
L4	37.5 - 0	2.314	29	0.567	0.002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.000	2.4-in x 6-ft Mount Pipe	29	22.514	1.597	0.024	19624
120.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	29	22.514	1.597	0.024	19624
115.000	VHLP2-18	29	21.150	1.586	0.021	19624
110.000	7770.00 w/ Mount Pipe	29	19.491	1.568	0.017	10802
100.000	LNX-6514DS-T4M w/ Mount Pipe	29	16.273	1.501	0.012	5949
97.000	2'x3' Ice Shield	29	15.343	1.471	0.011	5587
95.000	2'x3' Ice Shield	29	14.735	1.448	0.010	5371
90.000	742 213 w/ Mount Pipe	29	13.253	1.385	0.009	4896
83.000	VHLP2-23	29	11.283	1.283	0.007	4357
80.000	LLPX310R w/ Mount Pipe	29	10.479	1.237	0.007	4161

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.083 - 101.083	57.446	4	4.071	0.060
L2	104 - 66.5	44.774	4	3.916	0.035
L3	70.3333 - 32.8333	20.619	4	2.759	0.014
L4	37.5 - 0	5.915	4	1.450	0.006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.000	2.4-in x 6-ft Mount Pipe	4	57.446	4.071	0.060	7865
120.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	4	57.446	4.071	0.060	7865
115.000	VHLP2-18	4	53.971	4.043	0.053	7865
110.000	7770.00 w/ Mount Pipe	4	49.747	3.999	0.045	4328
100.000	LNX-6514DS-T4M w/ Mount Pipe	4	41.545	3.832	0.031	2375
97.000	2'x3' Ice Shield	4	39.177	3.755	0.028	2226
95.000	2'x3' Ice Shield	4	37.625	3.698	0.026	2137
90.000	742 213 w/ Mount Pipe	4	33.845	3.537	0.022	1943
83.000	VHLP2-23	4	28.818	3.278	0.019	1723
80.000	LLPX310R w/ Mount Pipe	4	26.766	3.159	0.018	1644

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	18.000	0.000	0.0	39.000	19.868	-6351	774859	0.008
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	37.500	0.000	0.0	39.000	32.535	-14587	1268880	0.011
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	37.500	0.000	0.0	39.000	47.875	-21665	1867120	0.012
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	37.500	0.000	0.0	39.000	57.950	-31361	2260060	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	115893	11.353	39.000	0.291	0	0.000	39.000	0.000
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	714533	32.613	39.000	0.836	0	0.000	39.000	0.000
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	1434900	36.289	39.000	0.931	0	0.000	39.000	0.000
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	2348267	40.468	39.000	1.038	0	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	119.083 - 101.083 (1)	TP26x21.61x0.25	11227	0.565	26.000	0.043	706	0.034	26.000	0.001
L2	101.083 - 66.5 (2)	TP34.063x24.789x0.313	20719	0.637	26.000	0.049	526	0.012	26.000	0.000
L3	66.5 - 32.8333 (3)	TP41.75x32.49x0.375	23113	0.483	26.000	0.037	635	0.008	26.000	0.000
L4	32.8333 - 0 (4)	TP49.063x39.848x0.375	25596	0.442	26.000	0.034	774	0.007	26.000	0.000

Pole Interaction Design Data

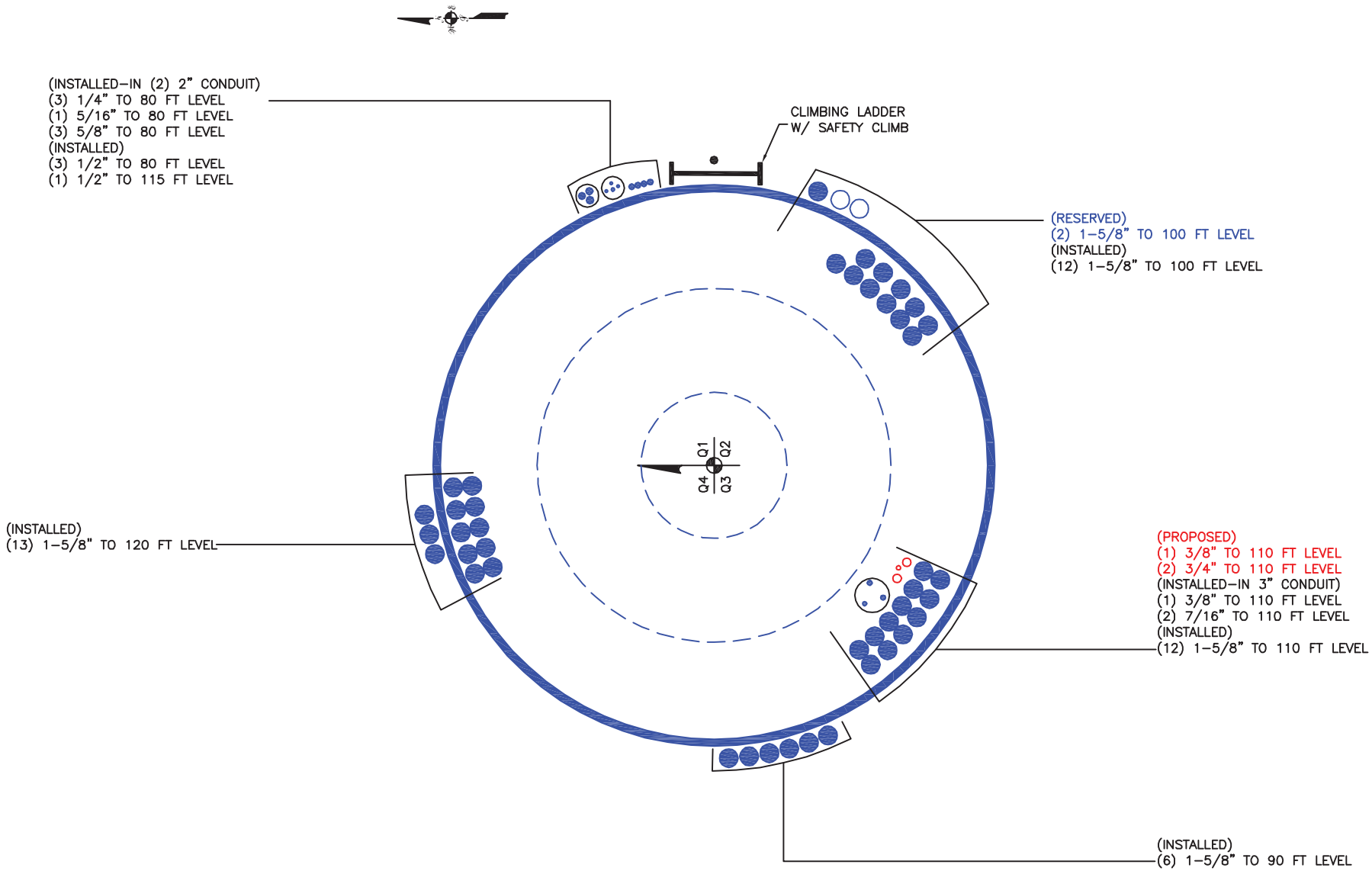
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	119.083 - 101.083 (1)	0.008	0.291	0.000	0.043	0.001	0.300	1.333	H1-3+VT
L2	101.083 - 66.5 (2)	0.011	0.836	0.000	0.049	0.000	0.848	1.333	H1-3+VT
L3	66.5 - 32.8333 (3)	0.012	0.931	0.000	0.037	0.000	0.942	1.333	H1-3+VT
L4	32.8333 - 0 (4)	0.014	1.038	0.000	0.034	0.000	1.052	1.333	H1-3+VT

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	119.083 - 101.083	Pole	TP26x21.61x0.25	1	-6351	1032887	22.5	Pass
L2	101.083 - 66.5	Pole	TP34.063x24.789x0.313	2	-14587	1691417	63.6	Pass
L3	66.5 - 32.8333	Pole	TP41.75x32.49x0.375	3	-21665	2488871	70.7	Pass
L4	32.8333 - 0	Pole	TP49.063x39.848x0.375	4	-31361	3012660	78.9	Pass
							Summary	
						Pole (L4)	78.9	Pass
						RATING =	**78.9**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 829013 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#:	*829013*
Site Name:	*West Hartford/I-84/X43*
App #:	*328829 Rev. 6*
Pole Manufacturer:	*Other*

Reactions		
Moment:	2348.269	ft-kips
Axial:	31.376	kips
Shear:	25.577	kips

Anchor Rod Data		
Qty:	33	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	54	in

Plate Data		
Diam:	58	in
Thick:	1.5	in
Grade:	50	ksi
Single-Rod B-eff:	4.72	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.25	in
Width:	4	in
Height:	12	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	49.0625	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	62.3 Kips	Service, ASD
Allowable Tension:	81.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	76.9% **Pass**	

Base Plate Results Flexural Check

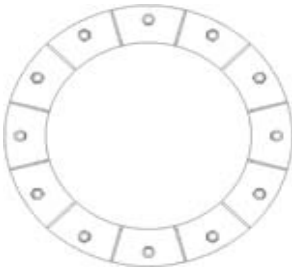
		Stiffened
Base Plate Stress:	32.9 ksi	Service, ASD
Allowable Plate Stress:	50.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	65.8% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	62.1% **Pass**
Vertical Weld:	41.4% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	15.3% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	60.2% **Pass**
Plate Comp. (AISC Bracket):	60.9% **Pass**

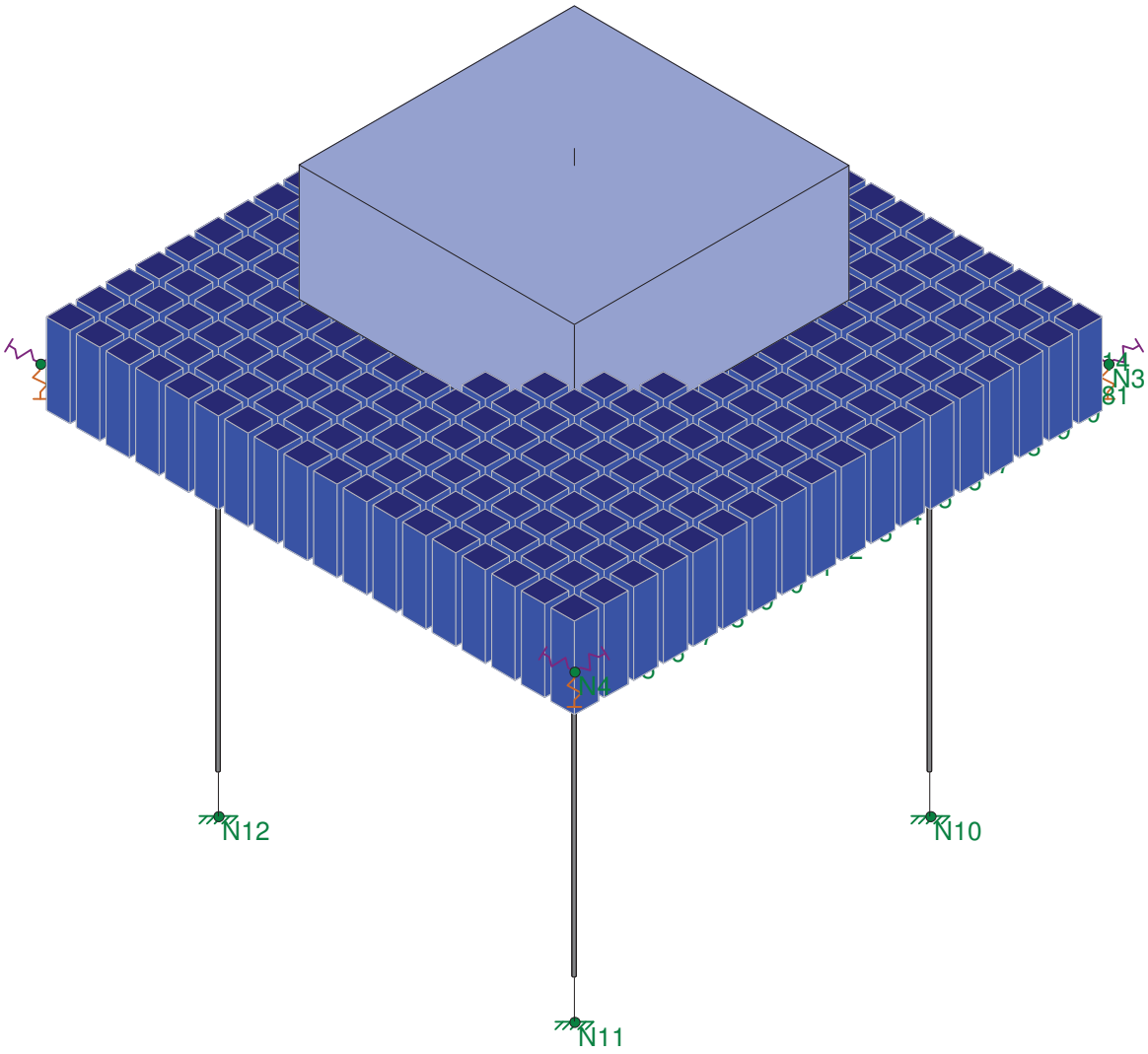
Pole Results

Pole Punching Shear Check:	7.5% **Pass**

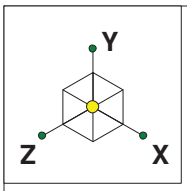


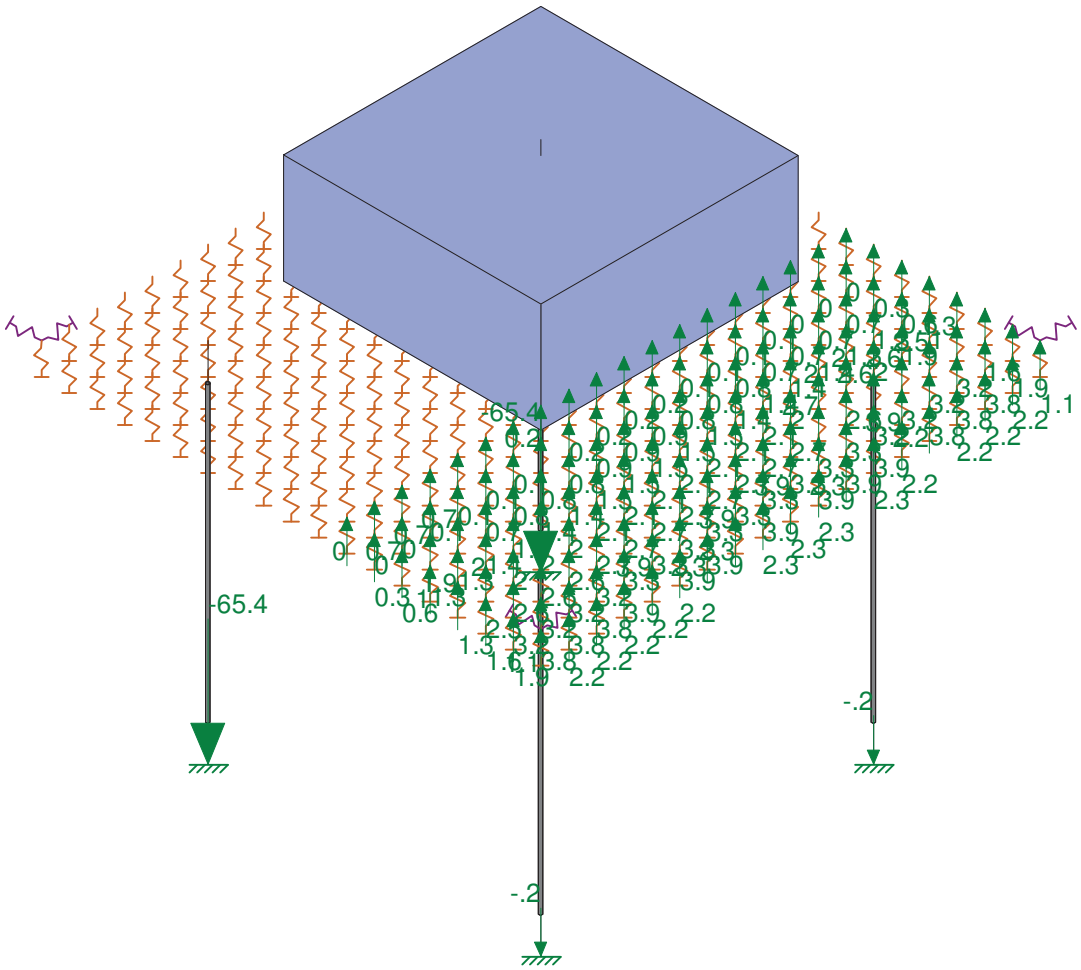
* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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



Crown Castle	West Hartford/I-84/X43 (BU 829013)	SK - 1
CDC		Mar 3, 2016 at 8:05 AM
TEP No. 25680.44546		829013.02S_Foundation.r3d





Results for LC 4, 0.6D+W0
Y-moment Reaction Units are k and k-ft

Crown Castle	West Hartford/I-84/X43 (BU 829013)	SK - 3
CDC		Mar 3, 2016 at 8:18 AM
TEP No. 25680.44546		829013.02S_Foundation.r3d

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[lb/f...	f'c[ksi]	Lambda	Flex Steel[...	Shear Stee...
1	Conc3000NW	3156	1372	.15	.6	145	3	1	60	60
2	Conc3500NW	3409	1482	.15	.6	145	3.5	1	60	60
3	Conc4000NW	3644	1584	.15	.6	145	4	1	60	60
4	Conc3000LW	2085	907	.15	.6	109.999	3	.75	60	60
5	Conc3500LW	2252	979	.15	.6	109.999	3.5	.75	60	60
6	Conc4000LW	2408	1047	.15	.6	109.999	4	.75	60	60

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N8	N12			1" WF Rock	Column	None	A722	Typical
2	M2	N7	N11			1" WF Rock	Column	None	A722	Typical
3	M3	N6	N10			1" WF Rock	Column	None	A722	Typical
4	M4	N5	N9			1" WF Rock	Column	None	A722	Typical
5	M5	TL1	N367			CRECT102X1...	Column	Rectangular	Conc3000...	Typical
6	M6	N367	TOWER			6' rigid offset	Column	None	RIGID	Typical

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	Y	-31.376

Joint Loads and Enforced Displacements (BLC 2 : Wind 0)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	X	25.577
2	TL1	L	Mz	-2348.269

Joint Loads and Enforced Displacements (BLC 3 : Wind 90)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TL1	L	Z	25.577
2	TL1	L	Mx	2348.269

Basic Load Cases

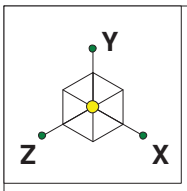
	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	None		-1		1				324
2	Wind 0	None				2				
3	Wind 90	None				2				
4	Prestress	None						4		

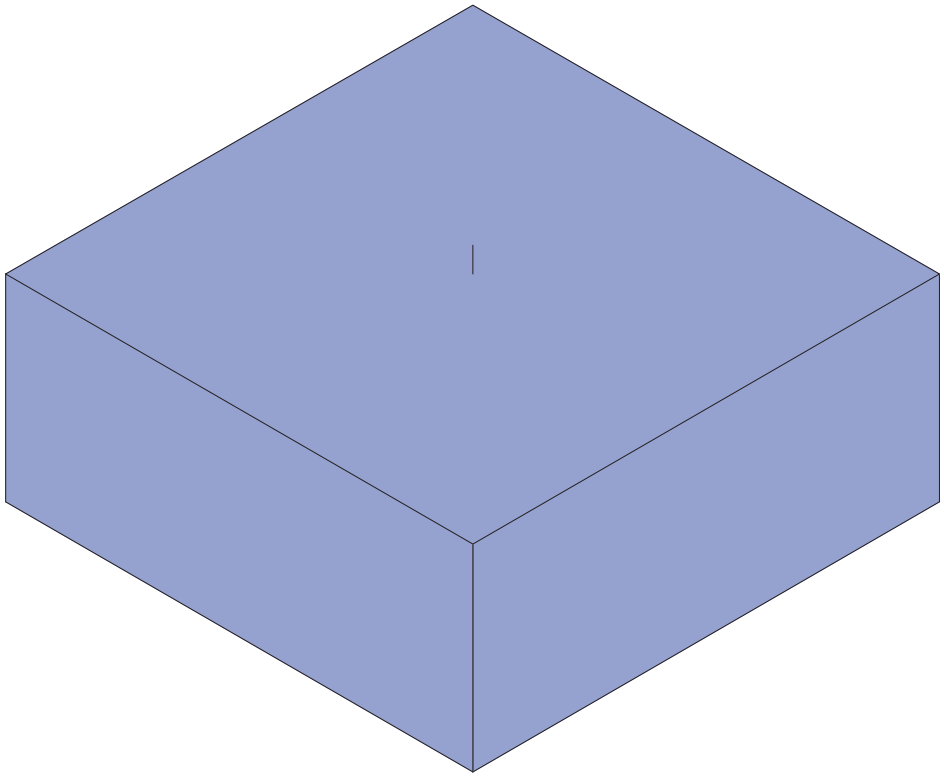
Load Combinations

	Description	Sol...	PD...	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	D+W0	Yes	Y		1	1	2	1	4	1																
2	D-W0	Yes	Y		1	1	2	-1	4	1																
3	Prestress	Yes	Y				4	1																		
4	0.6D+W0	Yes	Y		1	.6	2	1	4	1																
5	0.6D-W0	Yes	Y		1	.6	2	-1	4	1																

Load Combinations (Continued)

	Description	Sol...	PD...	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
6	D+W90	Yes	Y		1	1	3	1	4	1																
7	D-W90	Yes	Y		1	1	3	-1	4	1																
8	0.6D+W90	Yes	Y		1	.6	3	1	4	1																
9	0.6D-W90	Yes	Y		1	.6	3	-1	4	1																
10	D+0.707(...	Yes	Y		1	1	2	.707	3	.707	4	1														
11	D+0.707(...	Yes	Y		1	1	2	.707	3	-.707	4	1														
12	D-0.707(...	Yes	Y		1	1	2	-.707	3	.707	4	1														
13	D+0.707(-...	Yes	Y		1	1	2	-.707	3	-.707	4	1														
14	0.6D+0.70...	Yes	Y		1	.6	2	.707	3	.707	4	1														
15	0.6D+0.70...	Yes	Y		1	.6	2	.707	3	-.707	4	1														
16	0.6D-0.70...	Yes	Y		1	.6	2	-.707	3	.707	4	1														
17	0.6D+0.70...	Yes	Y		1	.6	2	-.707	3	-.707	4	1														



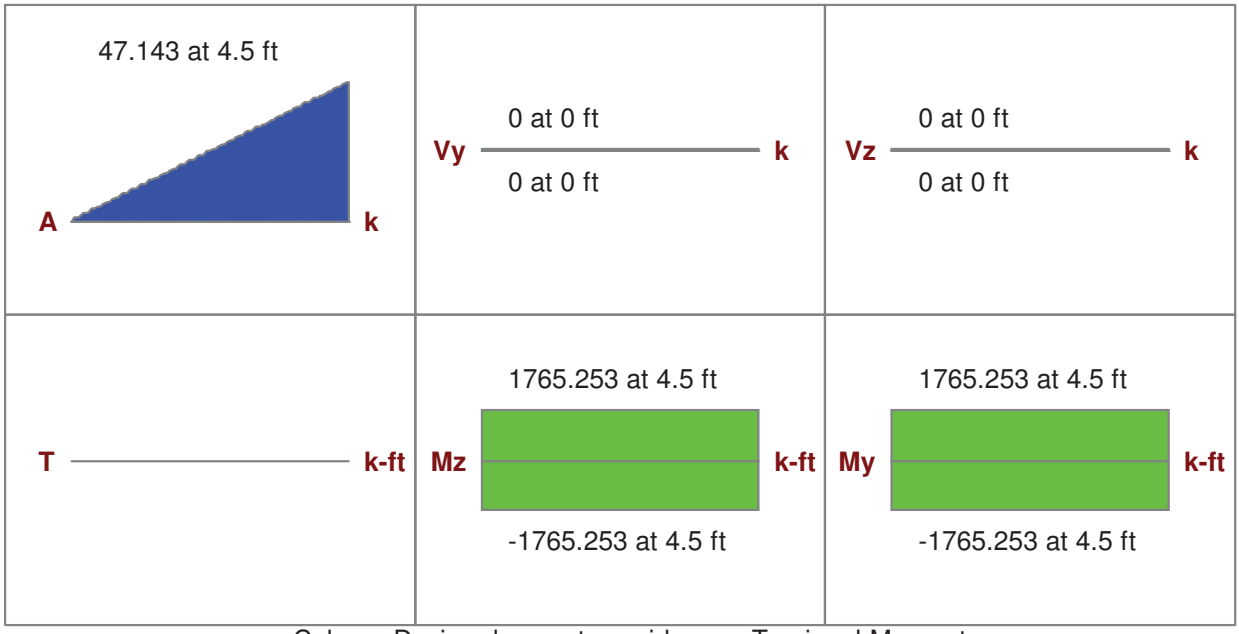


Crown Castle	West Hartford/I-84/X43	SK - 2
CDC		Mar 3, 2016 at 8:20 AM
TEP No. 25680.44546		Collar.r3d

Column: ***M5***

Shape:	**CRECT102X102**	Concrete Stress Block:	**Rectangular**
Material:	**Conc3000NW**	Cracked Sections Used:	**Yes**
Length:	**4.5 ft**	Cracked 'I' Factor:	**.70**
I Joint:	**TL1**	Effective 'I':	**6.31419e+6 in^4**
J Joint:	**N367**	Biaxial Bending Solution:	**PCA Load Contour**

Code Check: **0.454 (bending)**
Report Based On 97 Sections



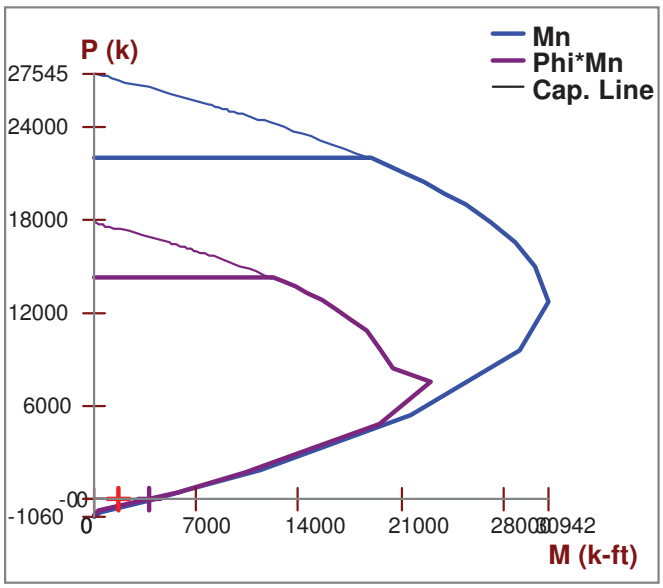
Column Design does not consider any Torsional Moments

Warning: Exact Integration selected but PCA method used
Custom rebar layout does not meet min steel (As,min) per Global Parameters

ACI 318-05 Code Check

		Bending Check	**0.454**	Shear Check	**0.000 (y)**
Gov LC	**7**	Location	**4.5 ft**	Location	**0 ft**
Gov Pu	**0 k**	Gov Muy	**1765.253 k-ft**	Gov Vuy	**0 k**
phi*Pn		Gov Muz	**0 k-ft**	Gov Vuz	**0 k**
Phi eff.	**.9**	phi*Mnoy	**-.9 k-ft**	phi*Vny	**1111.305 k**
		phi*Mnoz		phi*Vnz	**1111.305 k**
Tension Bar Fy	**60 ksi**	Concrete Weight	**145 lb/ft^3**		
Shear Bar Fy	**60 ksi**	Concrete Type	**Normal WT**	Sway yy	**No**
F'c	**3 ksi**	E_Concrete	**3156 ksi**	Sway zz	**No**
Flex. Rebar Set	**ASTM A615**	Shear Rebar Set	**ASTM A615**	Thres. Torsion	**917.543k-ft(LC:1)**
Flex. Bars	**9 #6 , 9 #6 , 11 #6 , 11 #6**				
Shear Bars	**#4 @6in**				

Column Interaction Diagram



Span Information

Span	Span Length (ft)	I-Face Dist. (in)	J-Face Dist. (in)
1	0 - 4.5	0	0

Column Steel

Span	Main Bars	UC Max	Gov LC	Loc (ft)	Pu (k)	Muy (k-ft)	Muz (k-ft)
1	40 #6	0.454	7	4.5 ft	0	1765.253	0

Axial Span Results

Span	Phi_eff	Pn (k)	Po (k)	Rho Gross	As Prvd (in^2)
1	.9		27545.425	.0017	17.671

Bending Span Results

Span	ecc. y (ft)	ecc. z (ft)	NA y-y (ft)	NA z-z (ft)	Mny (k-ft)	Mnz (k-ft)	Mnoy (k-ft)	Mnoz (k-ft)
1	0	0		3.949	4319.59			

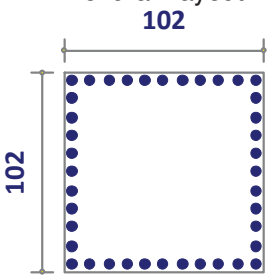
Slender Bending Span Results

Span	KL/r yy	KL/r zz	Cm yy	Cm zz	Lu yy (ft)	Lu zz (ft)	Mcy (k-ft)	Mcz (k-ft)
1	2	2	0	1	4.5	4.5		

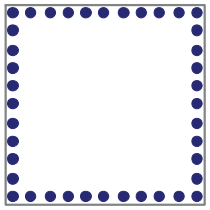
Rebar Detailing

Span	Region(ft)	Shear Steel
1	4.5 -	9 #4 @6in
	0 -	

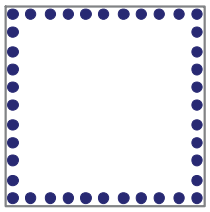
Flexural Layout



Total No. of Bars - Top : 4.5 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom



Total No. of Bars - Middle : 2.25 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom



Total No. of Bars - Bottom : 0 ft
11#6 Top
9#6 Left
9#6 Right
11#6 Bottom

Monopole on Mat Foundation with Rock Anchors - TIA-222-F

Site Data	
Site Name:	West Hartford/I-84/X43
CCI Number:	829013
TEP Job Number:	25680.44546

ASIF	1.333

Unfactored Reactions from TNX		
Axial	31.376	k
Shear	25.577	k
Moment	2348.269	k-ft

Soil Properties		
Allowable Bearing q_a	8.1	ksf
Mat Subgrade, ks	293	kcf
Wt Soil Above Mat	113	pcf

Mat and Pier Properties		
Mat Width	16.5	ft
Mat Length	16.5	ft
Mat Depth	2.5	ft
Pier Type	Square	
Pier Width/Diam.	8.5	ft
Pier Height	4.5	ft

Rock Anchor Properties		
Diameter	1	in
Net Area	0.85	in^2
Yield Stress	127.7	ksi

Rock Geotechnical Properties		
Wt of Rock	160	pcf
Angle of Rock Cone	30	deg
Steel/Grout Bond[1]	190	psi
Grout/Rock Bond[1]	50	psi
Drilled Shaft Diam.	3.75	in

[1]Allowable Bond Values

Mat Foundation Results

Bearing Stress	7.7	ksf
Allowable Bearing	10.8	ksf
% Capacity	71.2%	**Pass**

Mat Structural Results

Bending Moment	656.9	kft
Allowable Bending	1151.0	kft
% Capacity	57.1%	**Pass**

Rock Anchor Steel Results

Load Reaction	76.58	k
Allowable Design Load	86.84	k
% Capacity	88.2%	**Pass**

Rock Anchor Pullout Results

Req. Bond Length, ld	10.83	ft
Load Reaction	76.58	k
Allowable Pullout	96.88	k
% Capacity	79.0%	**Pass**

		PASS	PASS	West Hartford/I-84/X43 (BU 829013)
	Results Summary:	LC1	LC2	TEP #: 25680.44546
	Soil Interaction:	N/A	N/A	Analysis: CDC 3/3/2016
Drilled Caisson Tool - Pier	Foundation Structural:	35.7%	10.8%	Check: ZRH 3/3/2016

Code Revisions: TIA-222-F ACI 318-02

Tower Type: Monopole

	LC1	LC2	
Moment:	698.12	217.26	kip-ft
Axial (download):	31.38	55.25	kip
Shear:	25.58	7.75	kip
Axial (uplift):			kip

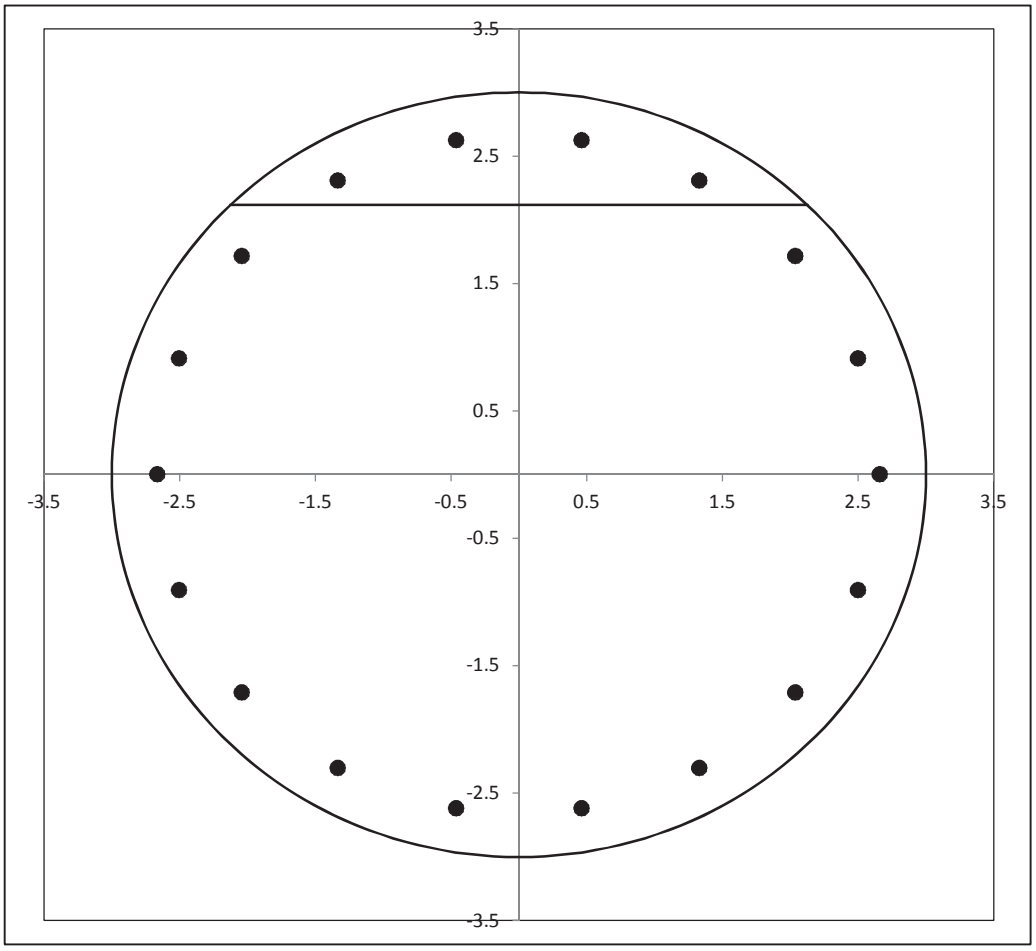
Shaft Information

Diameter:	6.00	ft
Projection:	0.50	ft
Caisson Length:	4.50	ft
f'c:	3.000	ksi
Max εc:	0.003	in/in

Cage 1 Reinforcement

Tie Bar Size:	4	*(fy = 60.0 ksi)*
Clear Cover to Tie:	3.00	*in (Cage Ø = 63.87in)*
Tie Bar Spacing:	6.00	in
Vertical Bar Size:	9	
Vertical Bar Quantity:	18	*(ρ =0.442%)*
fy:	60.0	ksi
E:	29,000	ksi

Reinforcement Capacity



		LC1	LC2	
	Vu =	33.3	33.3	kip
	Vc =	447.7	449.0	kip
fy,tie = 60.0	Vs =	269.8	269.8	kip
	ϕVn =	538.1	539.1	kip
	Capacity =	6.2%	6.2%	
		PASS	PASS	

	LC1	LC2	
Mu =	907.5	282.4	kip-ft
ϕMn =	2544.7	2612.6	kip-ft
Capacity =	35.7%	10.8%	
	PASS	PASS	

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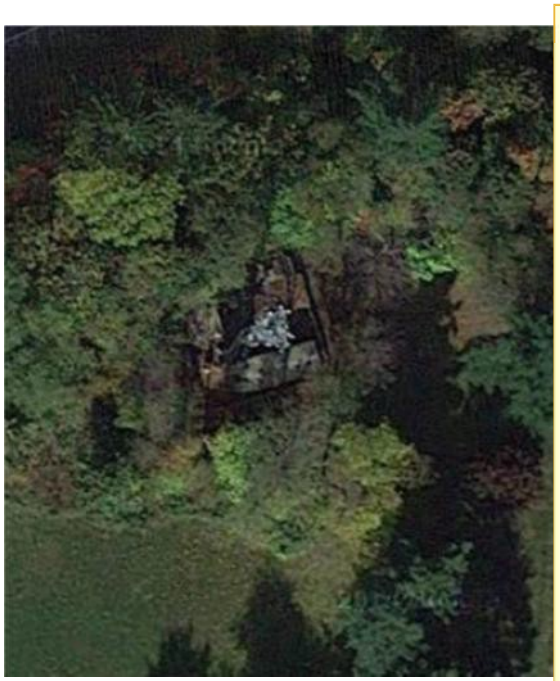


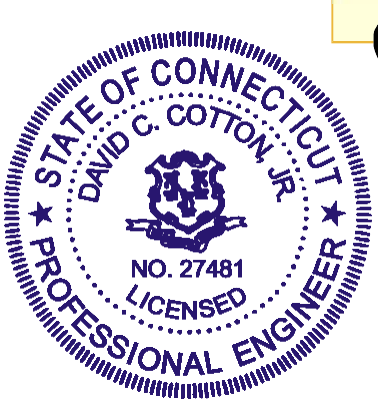
SmartLink, LLC on behalf of AT&T Mobility, LLC
Site FA – 10071355
Site ID – CTU5258 (3C)
USID – 15075
Site Name – West Hartford
Site Compliance Report

491 South Quaker Lane
West Hartford, CT 06110

Latitude: N41-44-53.85
Longitude: W72-43-50.88
Structure Type: Monopole

Report generated date: February 10, 2016
Report by: Brandon Green
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.



David C. Cotton, Jr.
Licensed Professional Engineer (Electrical)
State of Connecticut, PEN.0027481
Date: 2016-February-10

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 Radio Frequency Exposure (RFE) level on the ground	<5% of General Public limit
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_CTU5258_2016-LTE-Next-Carrier_LTE-3C_su0170_2051A03JNQ_10071355_15075_09-25-2015_Final-Approved_v3.00.

CD's: 10071355_AE201_011116_CTL05258_REV0.

2 Map of Site

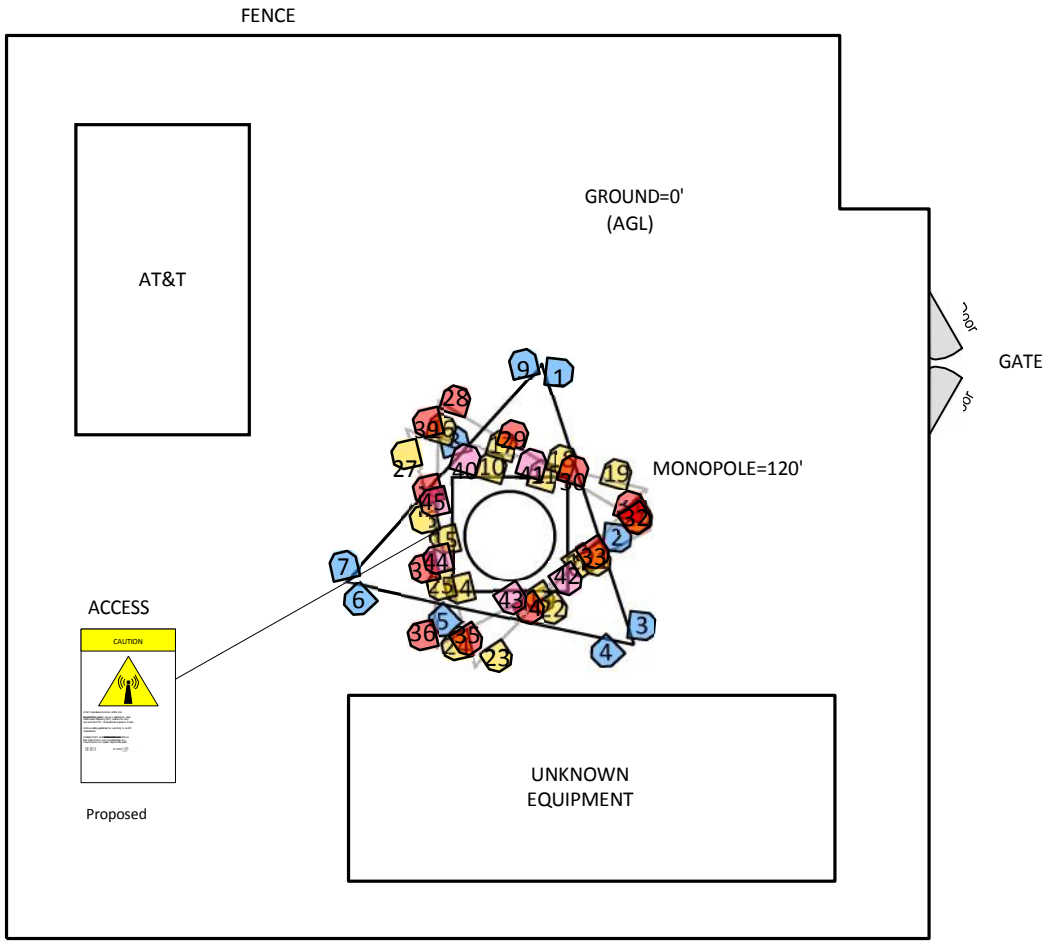
In the RF Emissions Simulations below all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the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

The following diagrams are included:

- Site Map
- RF Emissions Diagram
- AT&T Mobility, LLC Contribution
- Elevation View

Site Map For: West Hartford



(Feet)

0 4.8 9.6

www.sitesafe.com
Site Name:West Hartford

AT&T MOBILITY LLC	VERIZONWIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

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:

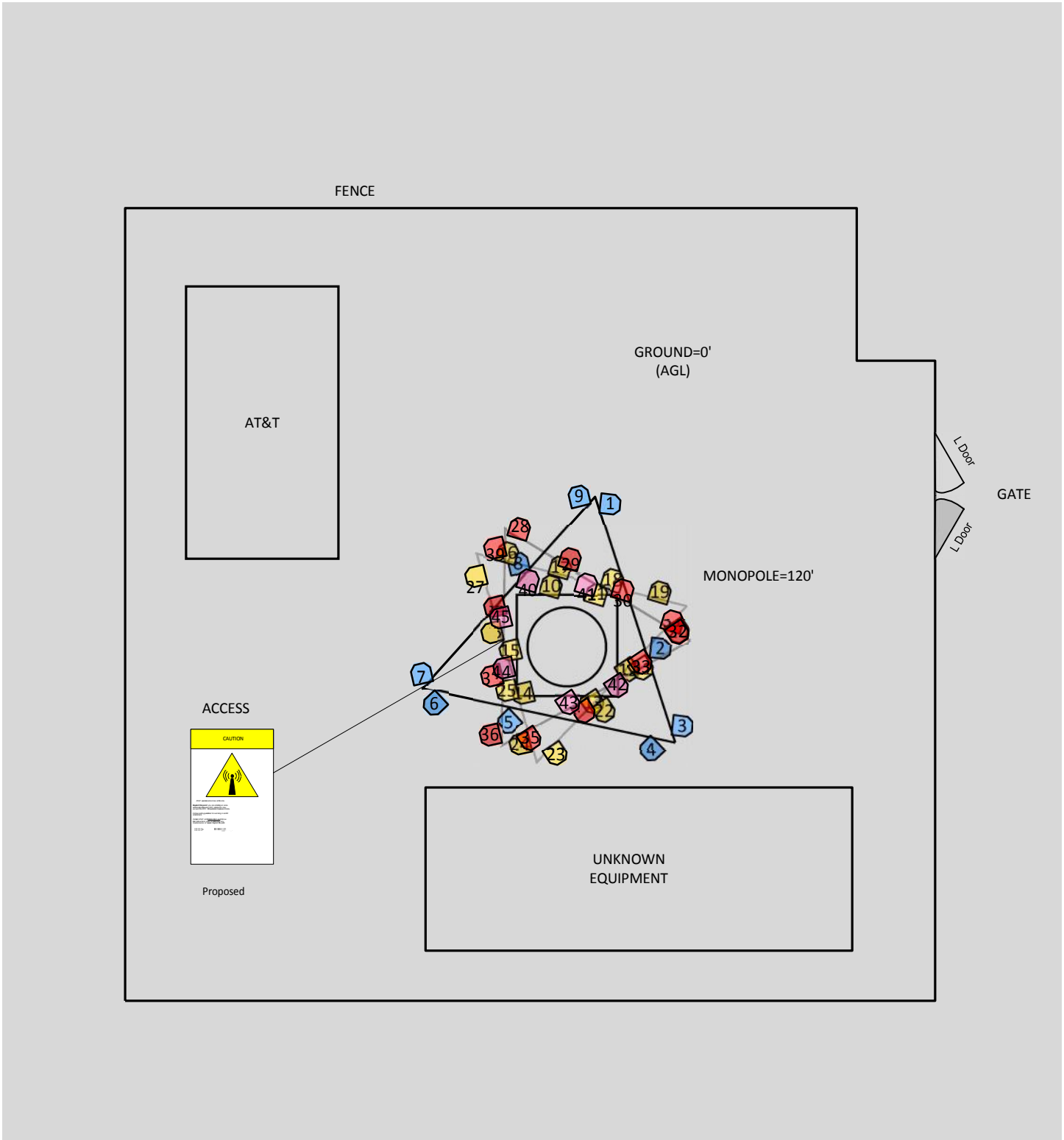
Ant ID	Operator	Antenna Make & Model	Type	TX Freq	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Ant Gain (dBd)	2G GSM Radio(s)	3G UMTS Radio(s)	4G Radio(s)	Total ERP	X	Y	Z (AGL
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	80	82	4.6	11.51	0	2	0	379.3	67.2'	91.1'	107.7'
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	80	86	4.6	13.41	0	1	0	220.7	67.2'	91.1'	107.7'
2	AT&T MOBILITY LLC	Andrew SBNH-1D6565C	Panel	737	80	71	8	13.733	0	0	1	899.4	70'	82.8'	106'
2	AT&T MOBILITY LLC	Andrew SBNH-1D6565C	Panel	1900	80	57	8	15.504	0	0	1	1476.2	70'	82.8'	106'
3	AT&T MOBILITY LLC (Proposed)	CCI Antennas TPA-65R-LCUUUU-H8	Panel	2300	80	65	8	14.36	0	0	1	783.5	71.2'	78.5'	106'
4	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	210	82	4.6	11.51	0	2	0	379.3	69.4'	77.1'	107.7'
4	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	210	86	4.6	13.41	0	1	0	220.7	69.4'	77.1'	107.7'
5	AT&T MOBILITY LLC	KMW AM-X-CD-16-65-00T	Panel	737	210	65	6	13.36	0	0	1	899.4	61.4'	78.7'	107'
5	AT&T MOBILITY LLC	KMW AM-X-CD-16-65-00T	Panel	1900	210	67	6	15.26	0	0	1	1330.5	61.4'	78.7'	107'
6	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-3	Panel	2300	210	58	6	15.05	0	0	1	783.5	57.2'	79.7'	107'
7	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	330	82	4.6	11.51	0	2	0	379.3	56.4'	81.4'	107.7'
7	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	330	86	4.6	13.41	0	1	0	220.7	56.4'	81.4'	107.7'
8	AT&T MOBILITY LLC	KMW AM-X-CD-16-65-00T	Panel	737	330	65	6	13.36	0	0	1	899.4	61.9'	87.6'	107'
8	AT&T MOBILITY LLC	KMW AM-X-CD-16-65-00T	Panel	1900	330	67	6	15.26	0	0	1	1330.5	61.9'	87.6'	107'
9	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-3	Panel	2300	330	58	6	15.05	0	0	1	783.5	65.4'	91.5'	107'
10	SPRINT	Generic	Panel	862	0	65	6.3	13.43	-	-	-	881.2	63.8'	86.3'	76.9'
10	SPRINT	Generic	Panel	1900	0	65	6.3	16.26	-	-	-	1690.7	63.8'	86.3'	76.9'
11	SPRINT	Generic	Panel	2500	0	65	4.1	15.01	-	-	-	1600	66.4'	85.9'	78'
12	SPRINT	Generic	Panel	862	130	65	6.3	13.43	-	-	-	881.2	68.2'	81.6'	76.9'
12	SPRINT	Generic	Panel	1900	130	65	6.3	16.26	-	-	-	1690.7	68.2'	81.6'	76.9'
13	SPRINT	Generic	Panel	2500	130	65	4.1	15.01	-	-	-	1600	66.2'	79.8'	78'
14	SPRINT	Generic	Panel	862	240	65	6.3	13.43	-	-	-	881.2	62.2'	80.3'	76.9'
14	SPRINT	Generic	Panel	1900	240	65	6.3	16.26	-	-	-	1690.7	62.2'	80.3'	76.9'
15	SPRINT	Generic	Panel	2500	240	65	4.1	15.01	-	-	-	1600	61.5'	82.7'	78'
16	SPRINT (Decommissioned)	Generic	Panel	1900	0	65	4.6	15.43	-	-	-	0	61.3'	88.2'	97.7'
17	SPRINT (Decommissioned)	Generic	Panel	1900	0	65	4.6	15.43	-	-	-	0	64.3'	87.4'	97.7'
18	SPRINT (Decommissioned)	Generic	Panel	1900	0	65	4.6	15.43	-	-	-	0	67.3'	86.7'	97.7'

Ant ID	Operator	Antenna Make & Model	Type	TX Freq	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Ant Gain (dBd)	2G GSM Radio(s)	3G UMTS Radio(s)	4G Radio(s)	Total ERP	X	Y	Z (AGL
19	SPRINT (Decommissioned)	Generic	Panel	1900	0	65	4.6	15.43	-	-	-	0	70'	86'	97.7'
20	SPRINT (Decommissioned)	Generic	Panel	1900	130	65	4.6	15.43	-	-	-	0	71'	83.8'	97.7'
21	SPRINT (Decommissioned)	Generic	Panel	1900	130	65	4.6	15.43	-	-	-	0	69'	81.7'	97.7'
22	SPRINT (Decommissioned)	Generic	Panel	1900	130	65	4.6	15.43	-	-	-	0	66.8'	79.3'	97.7'
23	SPRINT (Decommissioned)	Generic	Panel	1900	130	65	4.6	15.43	-	-	-	0	64.1'	76.9'	97.7'
24	SPRINT (Decommissioned)	Generic	Panel	1900	240	65	4.6	15.43	-	-	-	0	62'	77.4'	97.7'
25	SPRINT (Decommissioned)	Generic	Panel	1900	240	65	4.6	15.43	-	-	-	0	61.3'	80.5'	97.7'
26	SPRINT (Decommissioned)	Generic	Panel	1900	240	65	4.6	15.43	-	-	-	0	60.4'	83.7'	97.7'
27	SPRINT (Decommissioned)	Generic	Panel	1900	240	65	4.6	15.43	-	-	-	0	59.5'	86.9'	97.7'
28	VERIZON WIRELESS	Generic	Panel	850	0	65	4.6	12.77	-	-	-	1513.9	62'	89.7'	117.7'
29	VERIZON WIRELESS	Generic	Panel	751	0	65	4.6	12.14	-	-	-	982.1	64.9'	87.9'	117.7'
30	VERIZON WIRELESS	Generic	Panel	1900	0	65	4.6	15.43	-	-	-	1675.9	67.9'	86.2'	117.7'
31	VERIZON WIRELESS	Generic	Panel	850	0	65	4.6	12.77	-	-	-	1513.9	70.7'	84.4'	117.7'
32	VERIZON WIRELESS	Generic	Panel	850	130	65	4.6	12.77	-	-	-	1513.9	71'	83.7'	117.7'
33	VERIZON WIRELESS	Generic	Panel	751	130	65	4.6	12.14	-	-	-	982.1	68.9'	82'	117.7'
34	VERIZON WIRELESS	Generic	Panel	1900	130	65	4.6	15.43	-	-	-	1675.9	65.7'	79.3'	117.7'
35	VERIZON WIRELESS	Generic	Panel	850	130	65	4.6	12.77	-	-	-	1513.9	62.6'	77.7'	117.7'
36	VERIZON WIRELESS	Generic	Panel	850	240	65	4.6	12.77	-	-	-	1513.9	60.3'	77.9'	117.7'
37	VERIZON WIRELESS	Generic	Panel	751	240	65	4.6	12.14	-	-	-	982.1	60.4'	81.3'	117.7'
38	VERIZON WIRELESS	Generic	Panel	1900	240	65	4.6	15.43	-	-	-	1675.9	60.6'	85.2'	117.7'
39	VERIZON WIRELESS	Generic	Panel	850	240	65	4.6	12.77	-	-	-	1513.9	60.6'	88.5'	117.7'
40	T-MOBILE	Generic	Panel	1900	0	65	6.3	16.26	-	-	-	2536	62.5'	86.7'	86.9'
40	T-MOBILE	Generic	Panel	1900	0	65	6.3	16.26	-	-	-	2536	62.5'	86.7'	86.9'
41	T-MOBILE	Generic	Panel	2100	0	65	6.3	15.53	-	-	-	2143.6	65.8'	86.5'	86.9'
42	T-MOBILE	Generic	Panel	1900	130	65	6.3	16.26	-	-	-	2536	67.6'	80.7'	86.9'
42	T-MOBILE	Generic	Panel	1900	130	65	6.3	16.26	-	-	-	2536	67.6'	80.7'	86.9'
43	T-MOBILE	Generic	Panel	2100	130	65	6.3	15.53	-	-	-	2143.6	64.8'	79.7'	86.9'
44	T-MOBILE	Generic	Panel	1900	240	65	6.3	16.26	-	-	-	2536	61.1'	81.7'	86.9'
44	T-MOBILE	Generic	Panel	1900	240	65	6.3	16.26	-	-	-	2536	61.1'	81.7'	86.9'

Ant ID	Operator	Antenna Make & Model	Type	TX Freq	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Ant Gain (dBd)	2G GSM Radio(s)	3G UMTS Radio(s)	4G Radio(s)	Total ERP	X	Y	Z (AGL
45	T-MOBILE	Generic	Panel	2100	240	65	6.3	15.53	-	-	-	2143.6	60.9'	84.6'	86.9'

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. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience.

RF Emissions Simulation For: West Hartford



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

>= 5000	>= 500	>= 100	>= 5	< 5

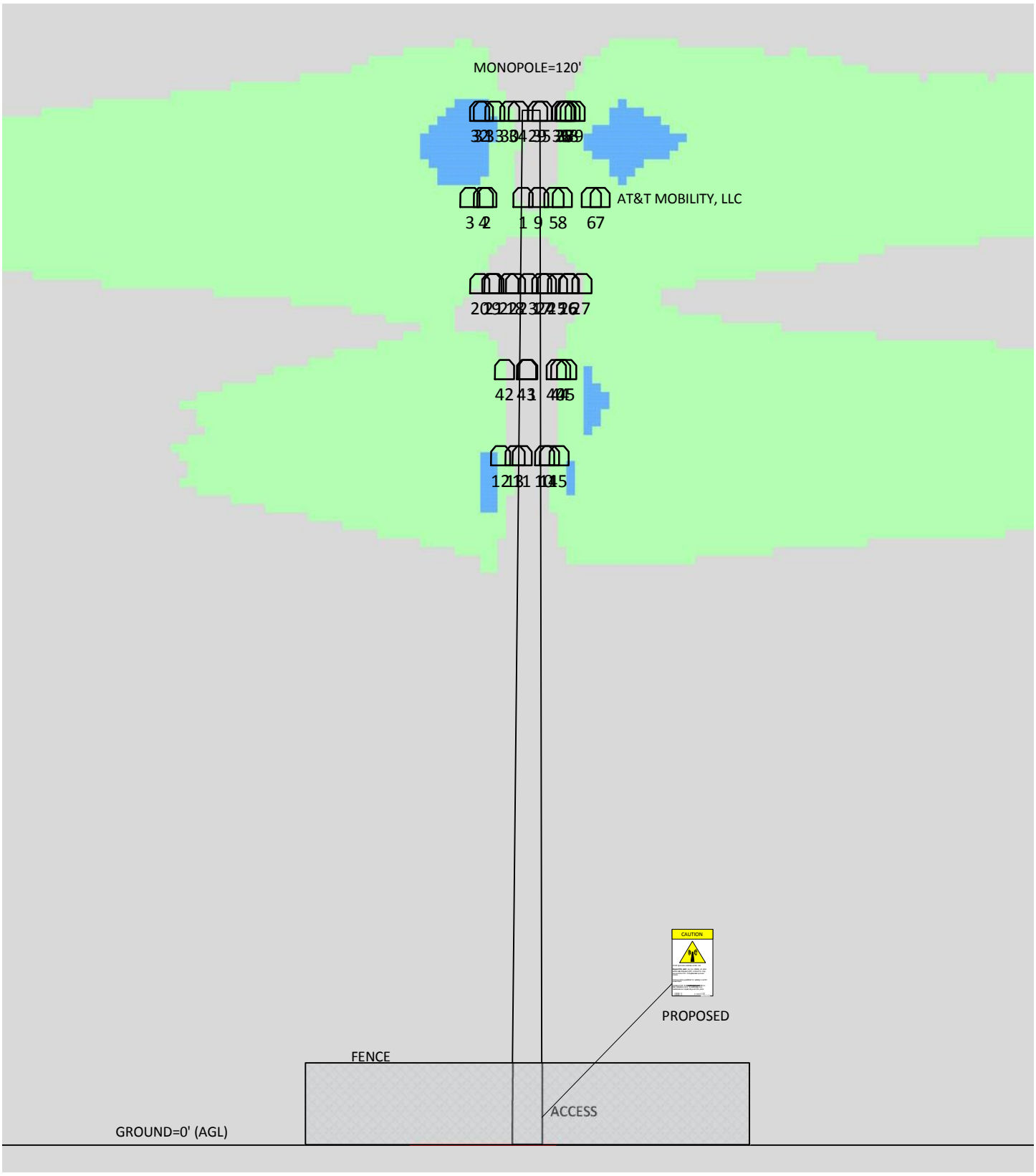
AT&T MOBILITY LLC	VERIZONWIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

(Feet)

0 4 8

www.sitesafe.com
Site Name:West Hartford

RF Emissions Simulation For: West Hartford
Elevation View



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

>= 5000	>= 500	>= 100	>= 5	< 5

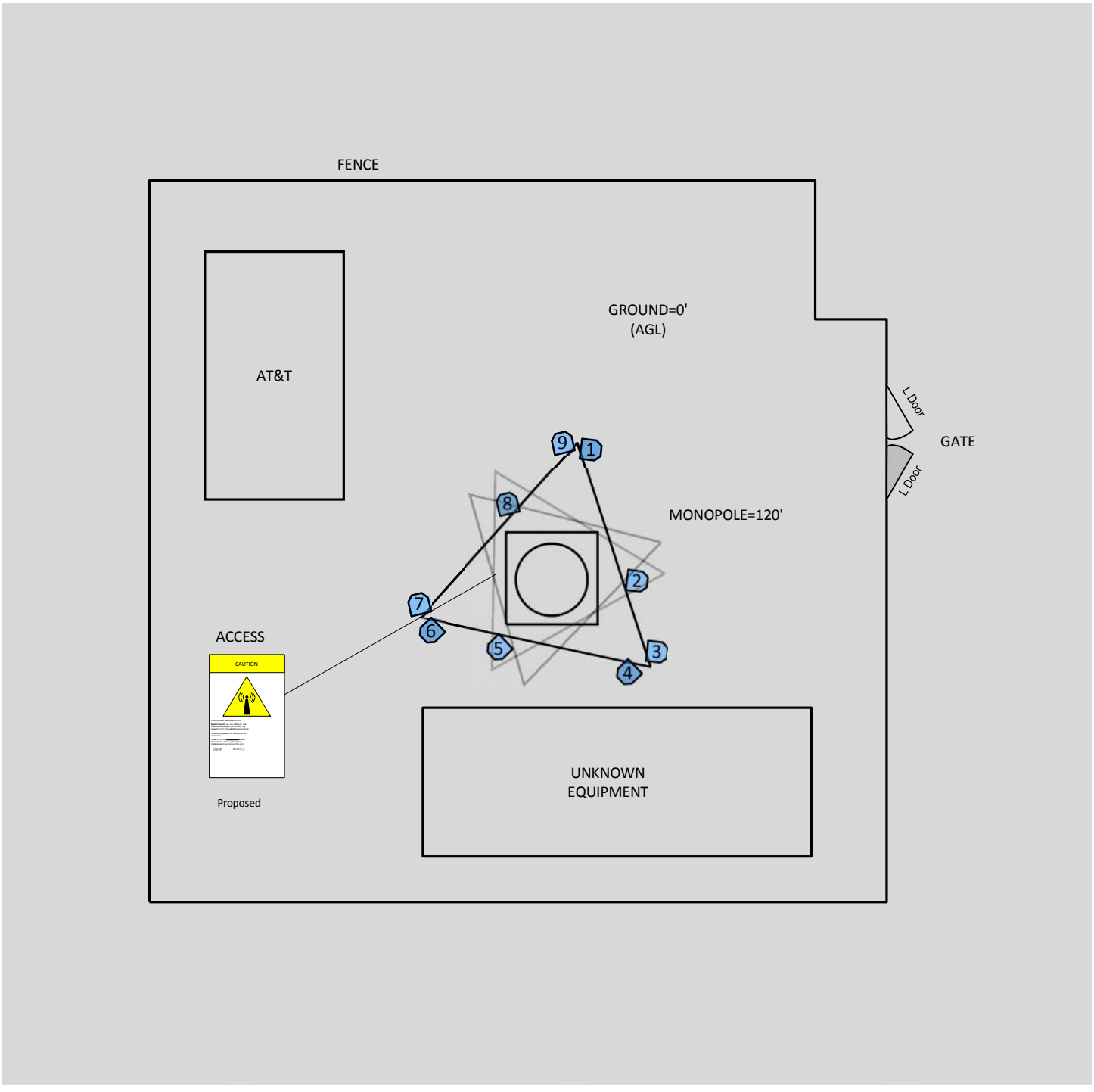
AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

(Feet)

0 8 16

www.sitesafe.com
Site Name:West Hartford

RF Emissions Simulation For: West Hartford
AT&T Mobility, LLC Contribution



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

>= 5000	>= 500	>= 100	>= 5	< 5

AT&T MOBILITY LLC	VERIZONWIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

(Feet)

0 4.5 9.1

www.sitesafe.com
Site Name:West Hartford

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 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.

The site will be made compliant if the following changes are implemented:

Site Access Location

Install a Yellow Caution 2 sign.

AT&T Mobility, LLC Proposed Alpha Sector Location

No action required.

AT&T Mobility, LLC Proposed Beta Sector Location

No action required.

AT&T Mobility, LLC Proposed Gamma Sector Location

No action required.

6 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms that:

I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

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 Brandon Green.

February 10, 2016

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.

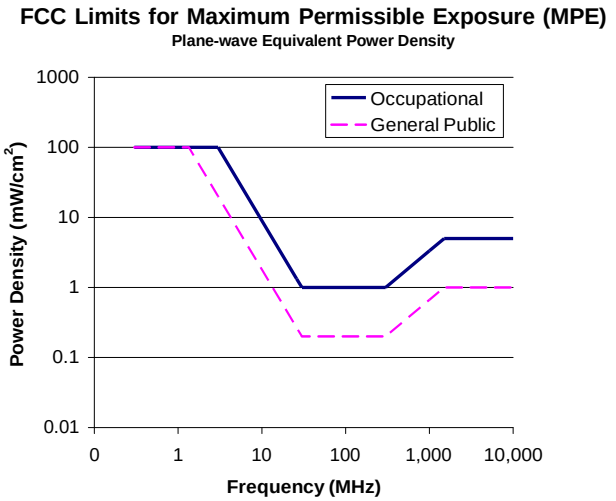
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* 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 site has been modeled with these assumptions to show the maximum RF energy density. Sitesafe believes this to be a *worst-case* analysis, based on best available data. Areas modeled to predict emissions greater than 100% of the applicable MPE level may not actually occur, but are shown as a *worst-case* prediction that could be realized real time. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Thus, at any time, if power density measurements were made, we believe the real-time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modeling in this way, Sitesafe has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

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