EMPIRE telecom

December ____, 2016

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

Regarding:	Notice of Exempt Modification – Remote Radio Head Swap
Property Address:	23 Kelleher Court Wethersfield, CT 01609
AT&T Site:	CT5122 – Wethersfield North

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 179-foot monopole at the above-referenced address, latitude 41.7153919 longitude -72.6905989. Said monopole is owned by the Town of Wethersfield. The existing equipment shelter measures approximately 432 square feet.

AT&T desires to modify its existing telecommunications facility by swapping three (3) remote-radio heads ("RRHs"). The centerline height of said antennas is and will remain at 140 feet. Antennas are mounted utilizing a sector frame.

Please accept this application as notification pursuant to R.C.S.A. §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16-50j-72 (b)(2). In accordance with R.C.S.A. §16-50j-73, a copy of this letter is being sent to the Town Manager of Wethersfield, Jeff Bridges, as well as to the Town Communications Consultant who manages the monopole, John Eichner. As stated previously the Town is the landowner and monopole owner.

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

1. The planned modification will not result in an increase in the height of the existing structure. The antennas to be swapped will be installed at the existing height of 140 feet on the 179 foot monopole.

2. The proposed modifications will not involve any changes to ground-mounted equipment, and therefore will not require an extension of the site boundary.

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

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

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

6. The water tank and its foundation can support AT&T's proposed modifications (please see attached structural analysis completed by Destek Engineering, LLC dated November 29, 2016).

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

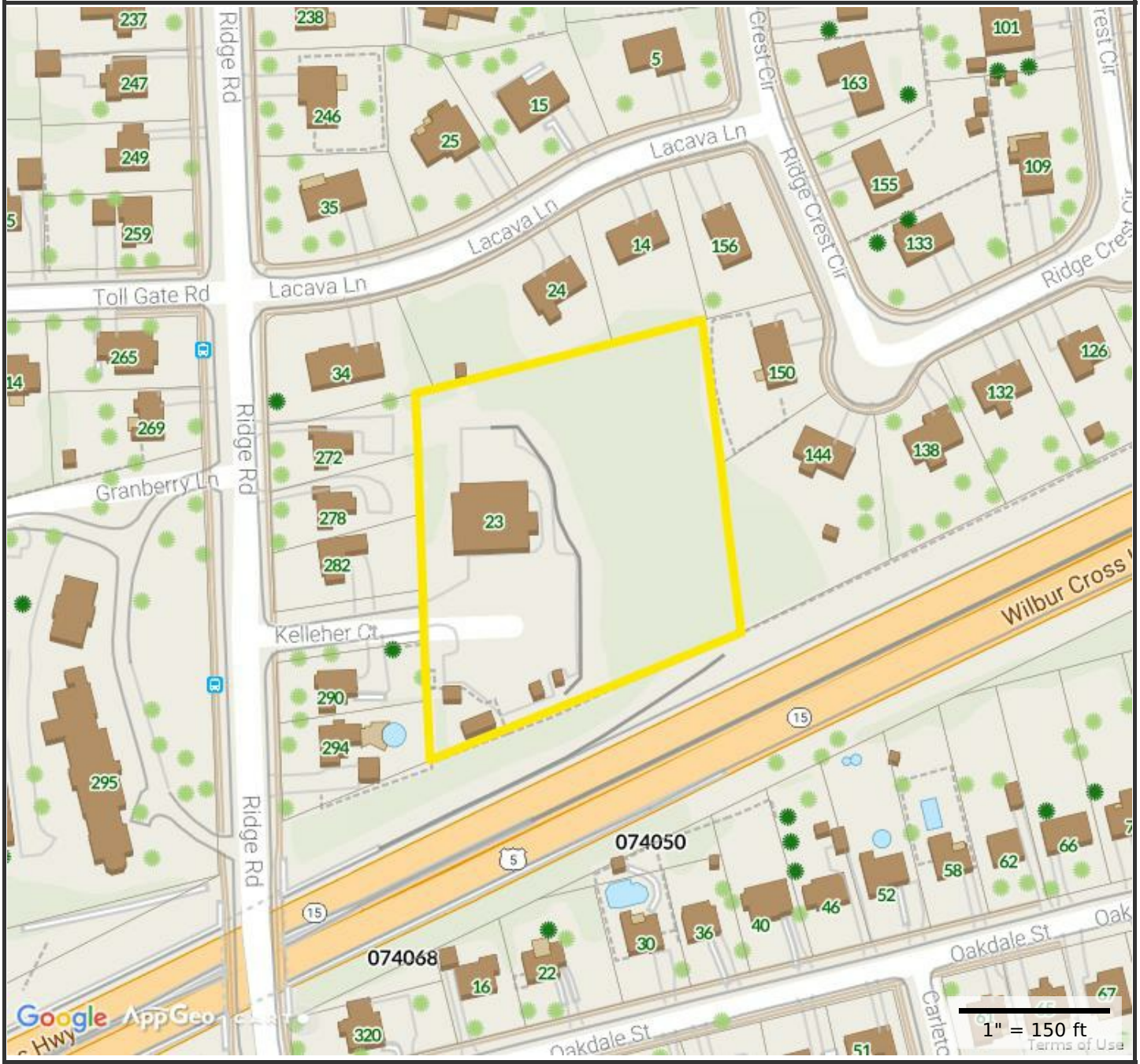
Sincerely,

Sarah Snell

Sarah Snell
Site Acquisition Specialist

cc: Jeff Bridges, Town Manager of Wethersfield (Municipality, Landowner & Monopole Owner)
John Eichner, Town Communications Consultant (Manages Monopole)

23 Kelleher Ct. Wethersfield



Property Information

Property ID	073060
Location	23 KELLEHER CT
Owner	WETHERSFIELD TOWN OF

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Wethersfield, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 2/3/2016
Properties updated 8/10/2016

PROJECT INFORMATION

SCOPE OF WORK:
- REMOVE 1 RRH PER SECTOR (TOTAL OF 3)
- ADD 1 RRH PER SECTOR (TOTAL OF 3 NEW RRHs)

SITE ADDRESS:	23 KELLEHER CT WETHERSFIELD, CT 06109
LATITUDE:	41.7153919 41'–42'–55.41084"N
LONGITUDE:	–72.6905989 72'–41'–2615604"W
USID:	25877
TOWER OWNER:	TOWN OF WETHERSFIELD
TYPE OF SITE:	MONOPOLE/OUTDOOR EQUIPMENT
STRUCTURE HEIGHT:	179'–0"± (TOP OF MONOPOLE)
RAD CENTER:	140'–0"±
CURRENT USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

DRAWING INDEX

		REV.
T–1	TITLE SHEET	0
GN–1	GROUNDING & GENERAL NOTES	0
A–1	SITE PLAN	0
A–2	EQUIPMENT LAYOUTS	0
A–3	ANTENNA LAYOUTS & ELEVATIONS	0
A–4	DETAILS	0
A–5	ANTENNA MOUNTING DETAILS	0
G–1	GROUNDING, ONE–LINE DIAGRAM & DETAILS	0

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AMD MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

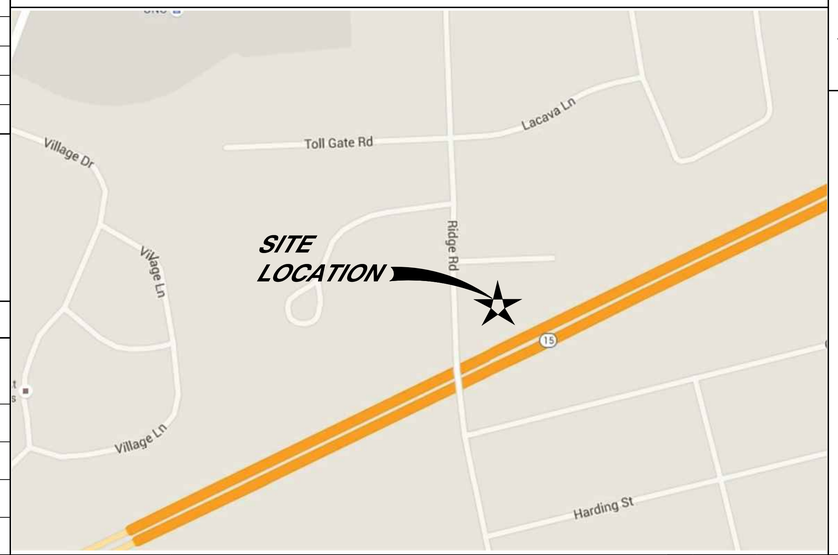
DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

at&t MOBILITY

FA CODE: 10092829
SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH
PROJECT: LTE BWE

VICINITY MAP

FROM ROCKY HILL, HEAD SOUTHWEST ON CONCRIB LN. TURN RIGHT ONTO SOLO DR. TURN RIGHT ONTO CT 160 E. TURN LEFT ONTO GILBERT AVE. SLIGHT RIGHT ONTO MAPLE ST. TURN LEFT ONTO GRISWOLD RD. TURN LEFT ONTO PROSPECT ST. FOLLOW RIDGE RD TO KELLEHER CT. SITE WILL BE ON RIGHT.



PROJECT TEAM

CLIENT REPRESENTATIVE
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

ZONING:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617–639–4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:
COMPANY: COM–EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46, SUITE E39, MOUNTAIN LAKES, NJ 07046
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862–209–4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:
COMPANY: AT&T MOBILITY – NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD, SUITE 550 13 & 14, FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508–596–7146
EMAIL: cs6970@att.com

CONSTRUCTION MANAGEMENT:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484–683–1750
EMAIL: gdorman@empiretelecomm.com

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 REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP · CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800–922–4455 OR DIAL 811

COM–EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH
23 KELLEHER CT.
WETHERSFIELD, CT 06109
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/14/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: PAV

SEAL: STATE OF CONNECTICUT — NICHOLAS D. BARILE — 28643 — PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV.
16063–EMP	T–1	0

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. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

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 WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER 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 AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   - CONTRACTOR – EMPIRE TELECOM
   - SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   - OWNER – AT&T MOBILITY
   - OEM – ORIGINAL EQUIPMENT MANUFACTURER

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 (EMPIRE TELECOM).

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

7. 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.

8. 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. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

9. 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.

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF 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.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

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

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. 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). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. 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.

17. 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 MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

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

19. 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.
   - CONNECTICUT BUILDING CODE: CBC 2016 WITH LOCAL & COUNTY AMENDMENTS
   - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
   - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. 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, THIRTEENTH EDITION
   - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
   - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
   - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
   - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
   - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
   - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

21. 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.

22. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH

23 KELLEHER CT.
WETHERSFIELD, CT 06109
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/14/16	ISSUED AS FINAL	NJM	NDB	NDB

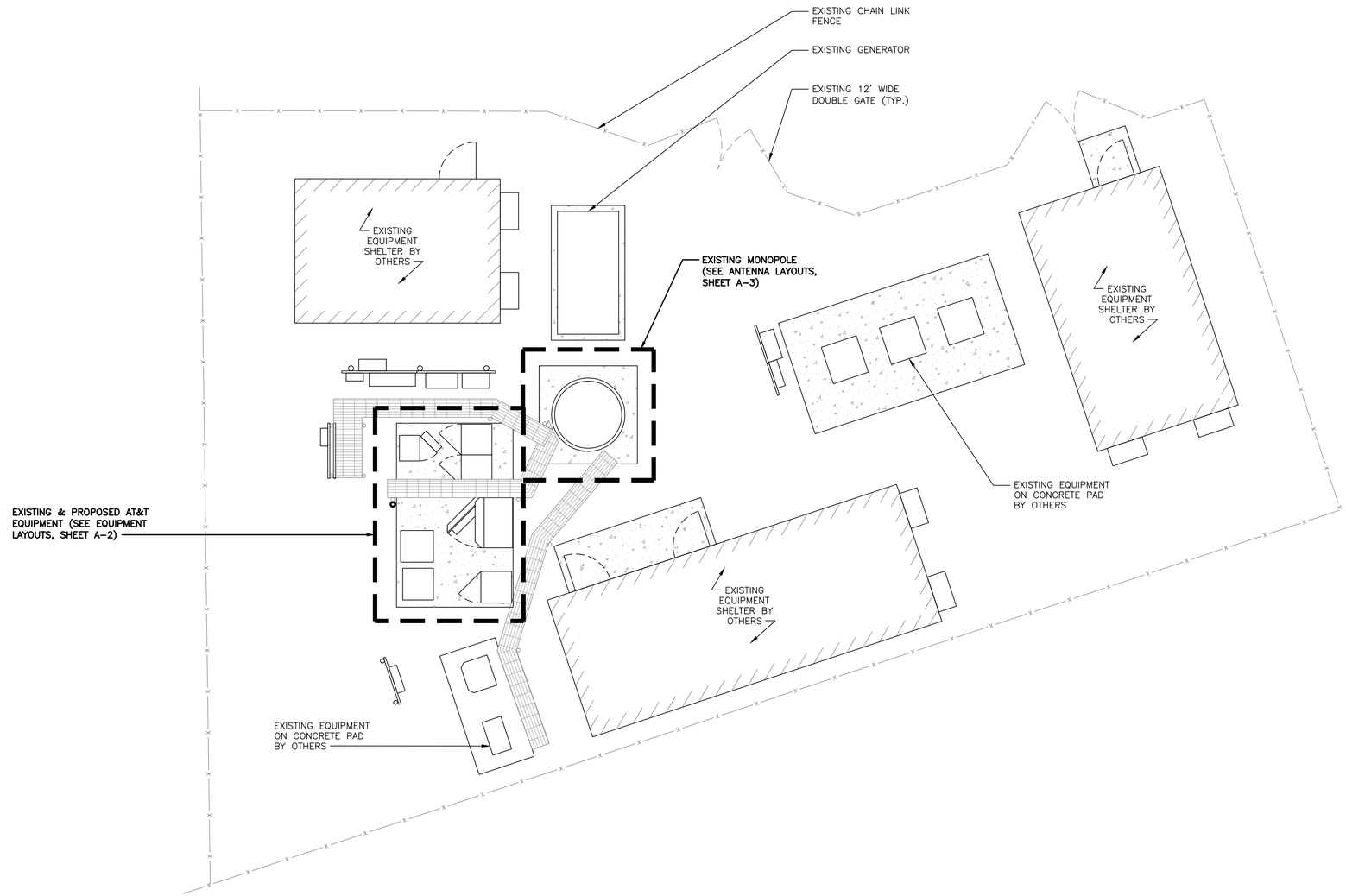
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: PAV

SEAL:
STATE OF CONNECTICUT
DOUGLAS D. BARLOW
PROFESSIONAL ENGINEER
CT 20643
PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE:
GROUNDING & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
16063-EMP	GN-1	0



NORTH

SITE PLAN
SCALE: 3/16" = 1'-0"

0 2'-8" 5'-4" 10'-8"

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

NOTE:
CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH

23 KELLEHER CT.
WETHERSFIELD, CT 06109
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/14/16	ISSUED AS FINAL	NJM	NDB	NDB

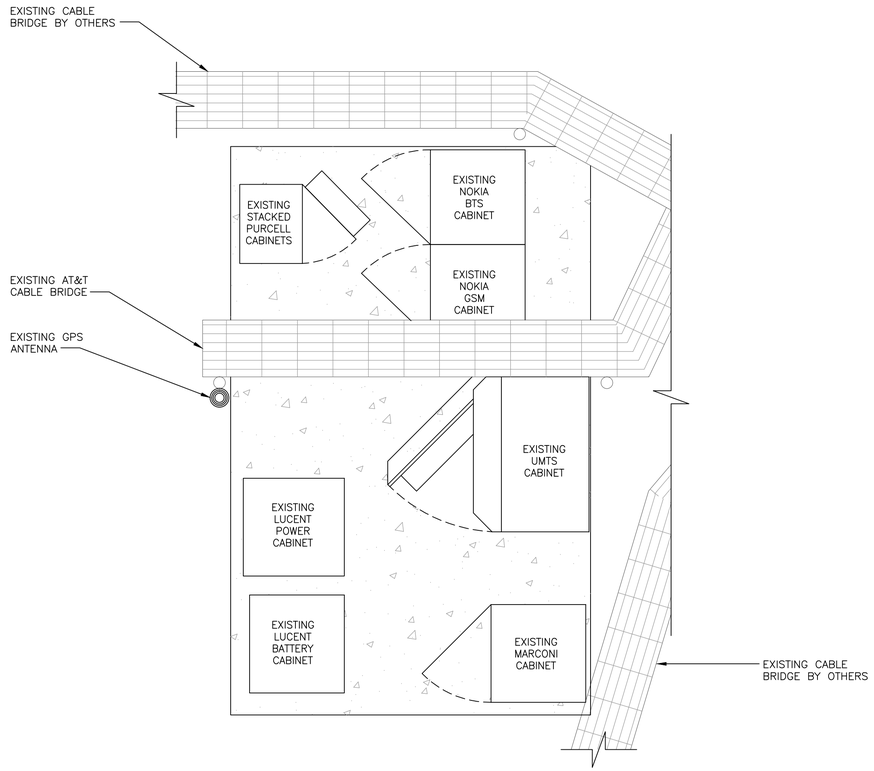
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: PAV

SEAL:
STATE OF CONNECTICUT
NICHOLAS D. BARLOW
NO. 28419
PROFESSIONAL ENGINEER
CT PROFESSIONAL ENGINEER LICENSE NO. 28643

AT&T

DRAWING TITLE:
SITE PLAN

JOB NUMBER	DRAWING NUMBER	REV
16063-EMP	A-1	0

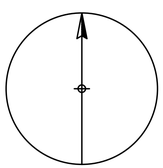


EXISTING EQUIPMENT LAYOUT

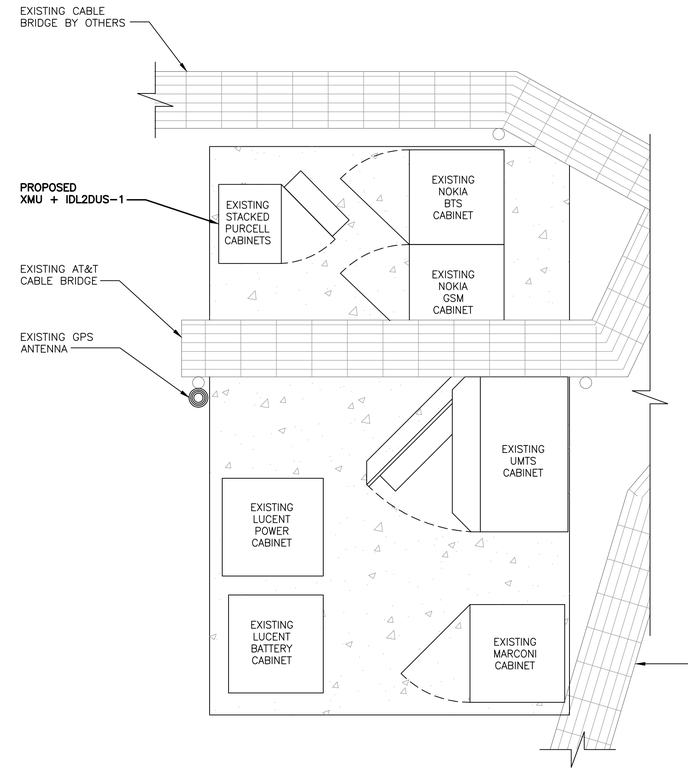
SCALE: 1" = 2'-0"

2 0 1 2 4 8

(IN FEET)
1/2 Inch = 1 Foot



NORTH

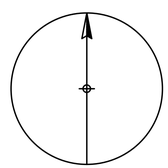


PROPOSED EQUIPMENT LAYOUT

SCALE: 1" = 2'-0"

2 0 1 2 4 8

(IN FEET)
1/2 Inch = 1 Foot



NORTH

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH

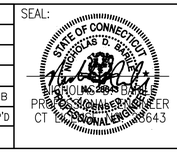
23 KELLEHER CT.
WETHERSFIELD, CT 06109
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/14/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: PAV

SEAL:

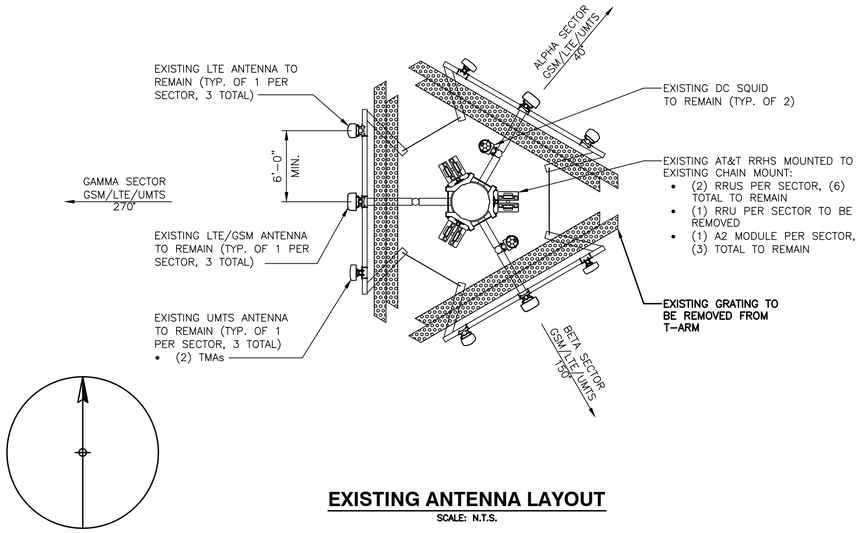


PROFESSIONAL ENGINEER
CT LICENSE NO. 12643

AT&T

DRAWING TITLE:
EQUIPMENT LAYOUTS

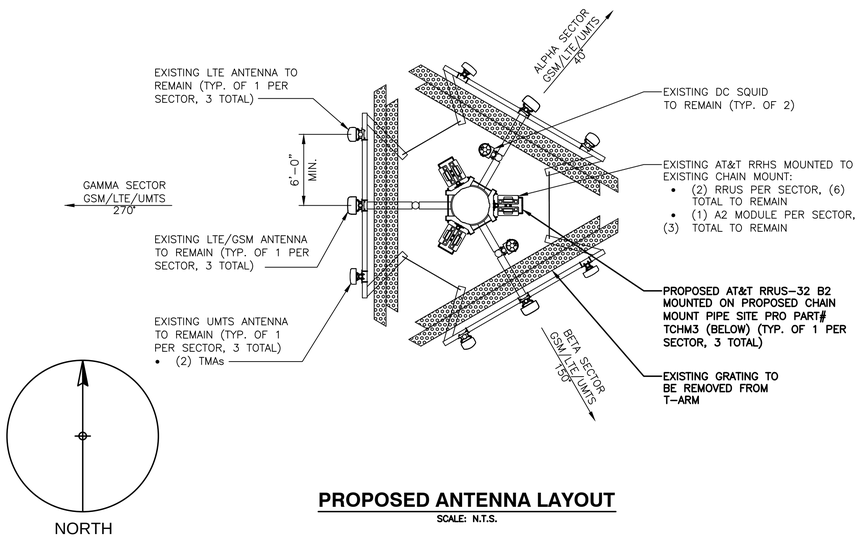
JOB NUMBER	DRAWING NUMBER	REV
16063-EMP	A-2	0



EXISTING ANTENNA LAYOUT

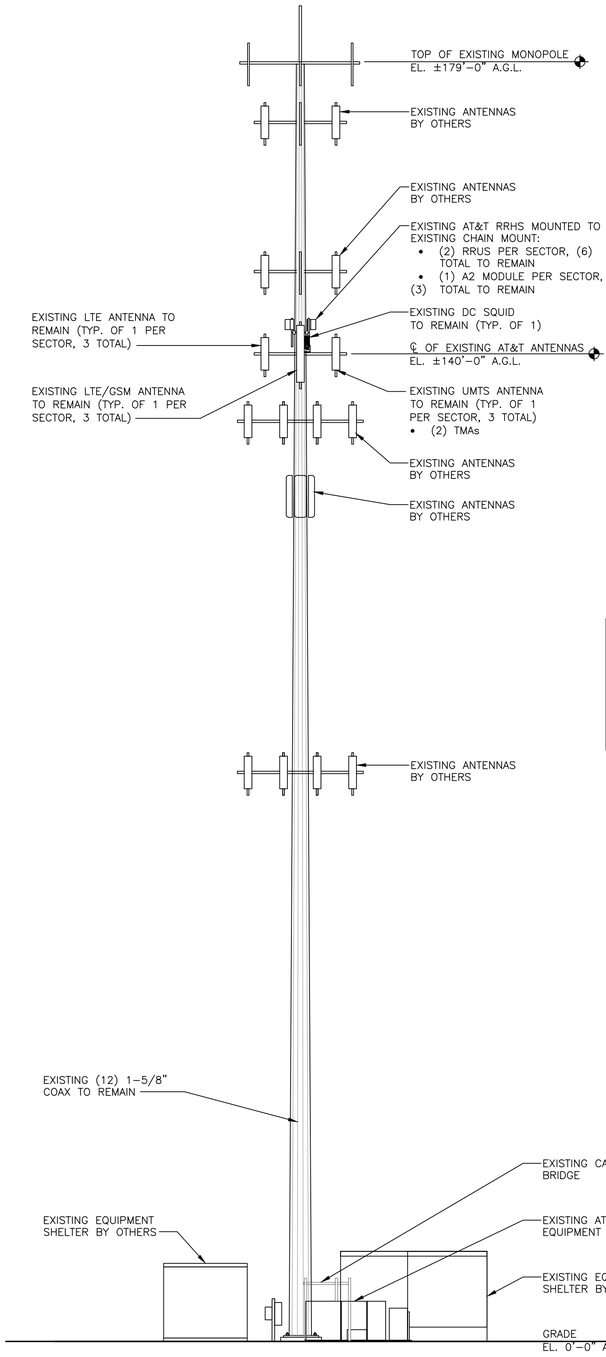
SCALE: N.T.S.

CONTRACTOR IS RESPONSIBLE FOR INSURING TOWER MODIFICATIONS BY HUDSON DESIGN GROUP DATED 08/12/16 OR LATEST, IS COMPLETED PRIOR TO ANY PROPOSED AT&T INSTALLATION, THE TOWN MUST BE NOTIFIED SHOULD THERE BE ANY CHANGES OR SUBSTITUTIONS TO THE MODIFICATION DESIGN



PROPOSED ANTENNA LAYOUT

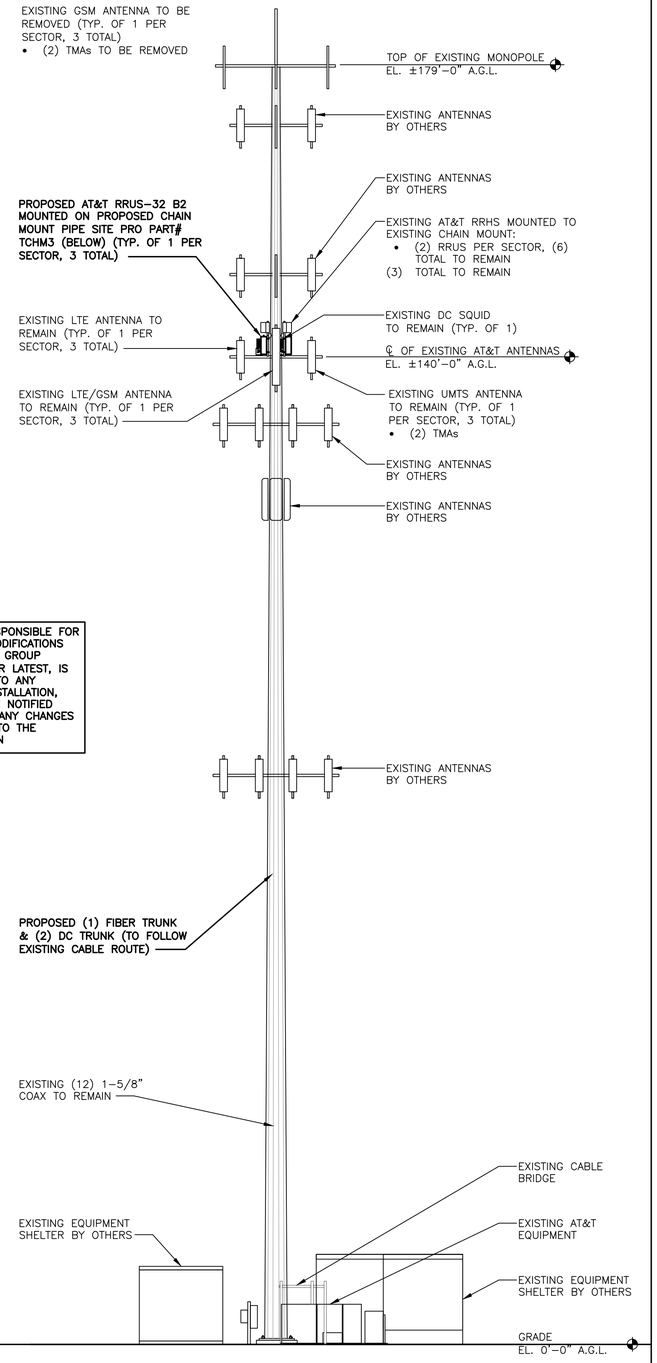
SCALE: N.T.S.



EXISTING TOWER ELEVATION

SCALE: NTS

CONTRACTOR IS RESPONSIBLE FOR INSURING TOWER MODIFICATIONS BY HUDSON DESIGN GROUP DATED 08/12/16 OR LATEST, IS COMPLETED PRIOR TO ANY PROPOSED AT&T INSTALLATION, THE TOWN MUST BE NOTIFIED SHOULD THERE BE ANY CHANGES OR SUBSTITUTIONS TO THE MODIFICATION DESIGN



PROPOSED TOWER ELEVATION

SCALE: NTS

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH

23 KELLEHER CT.
WETHERSFIELD, CT 06109
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/14/16	ISSUED AS FINAL	NJM	NDB	NDB

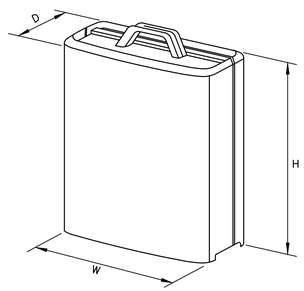
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: PAV

SEAL:
STATE OF CONNECTICUT
NICHOLAS D. BARILE
PROFESSIONAL ENGINEER
CT PROFESSIONAL ENGINEER #29643
NICHOLAS D. BARILE
PROFESSIONAL ENGINEER
CT PROFESSIONAL ENGINEER #29643

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
16063-EMP	A-3	0



MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-32	29.9" x 13.3" x 9.5"	77 LBS
RRUS-32 B2	27.2" x 12.1" x 7"	60 LBS

*DENOTES EXISTING

RRUS DETAIL

SCALE: N.T.S.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH

23 KELLEHER CT.
WETHERSFIELD, CT 06109
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/14/16	ISSUED AS FINAL	NJM	NDB	NDB

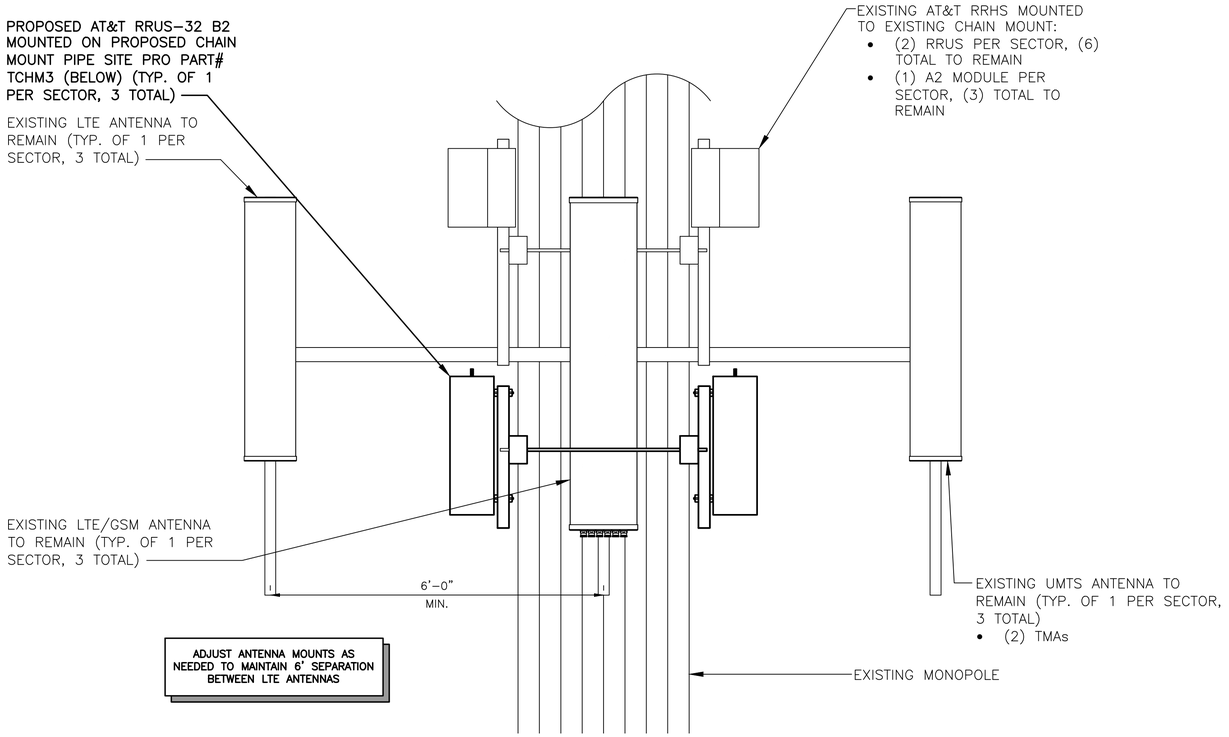
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: PAV

SEAL:
STATE OF CONNECTICUT
NICHOLAS D. BAKER
LICENSED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
CT 30643

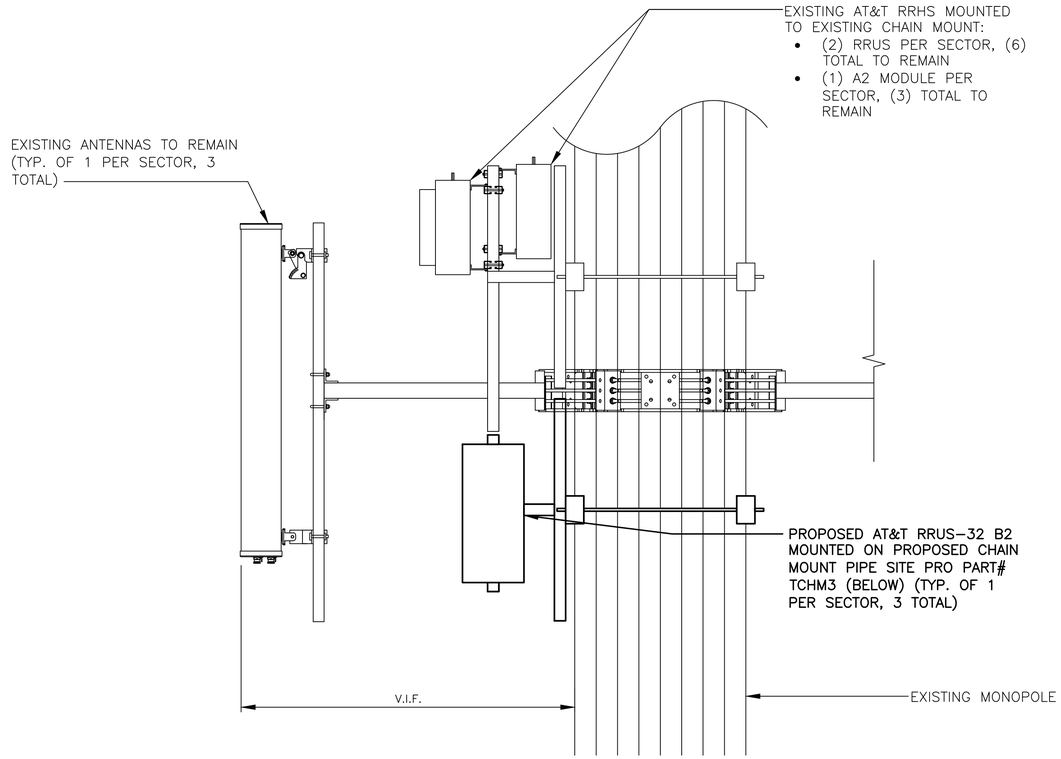
AT&T

DRAWING TITLE:
DETAILS

JOB NUMBER	DRAWING NUMBER	REV
16063-EMP	A-4	0



PROPOSED ANTENNA MOUNTING DETAIL (FRONT VIEW)
SCALE: N.T.S.



PROPOSED ANTENNA MOUNTING DETAIL (SIDE VIEW)
SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	CCI	TPA–65R–LCUUUU–H8	92.7"x14.4"x7"
	A3	CCI	HPA–65R–BUU–H8	92.4"x14.8"x7.4"
	–	–	–	–
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	CCI	TPA–65R–LCUUUU–H8	92.7"x14.4"x7"
	B3	CCI	HPA–65R–BUU–H8	92.4"x14.8"x7.4"
	–	–	–	–
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	ANDREW	SBNHH–1D65A	55"x11.9"x7.1"
	G3	ANDREW	SBNHH–1D65A	55"x11.9"x7.1"
	–	–	–	–

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	CCI	TPA–65R–LCUUUU–H8	92.7"x14.4"x7"
	A3	CCI	HPA–65R–BUU–H8	92.4"x14.8"x7.4"
	–	–	–	–
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	CCI	TPA–65R–LCUUUU–H8	92.7"x14.4"x7"
	B3	CCI	HPA–65R–BUU–H8	92.4"x14.8"x7.4"
	–	–	–	–
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	ANDREW	SBNHH–1D65A	55"x11.9"x7.1"
	G3	ANDREW	SBNHH–1D65A	55"x11.9"x7.1"
	–	–	–	–

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	ERICSSON	RRUS–11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	RRUS–32 (EXISTING)	29.9"x13.3"x9.5"		
	ERICSSON	**RRUS–32 B2 (PROPOSED)**	**27.2"x12.1"x7"**		
BETA	ERICSSON	RRUS–11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	RRUS–32 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	**RRUS–32 B2 (PROPOSED)**	**27.2"x12.1"x7"**		
GAMMA	ERICSSON	RRUS–11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	RRUS–32 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	**RRUS–32 B2 (PROPOSED)**	**27.2"x12.1"x7"**		

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

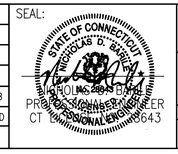
SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH

23 KELLEHER CT.
WETHERSFIELD, CT 06109
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/14/16	ISSUED AS FINAL	NJM	NDB	NDB

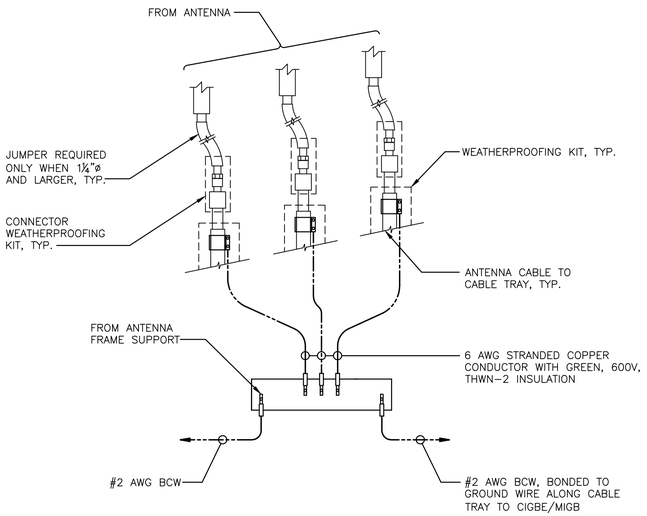
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: PAV

SEAL:


AT&T

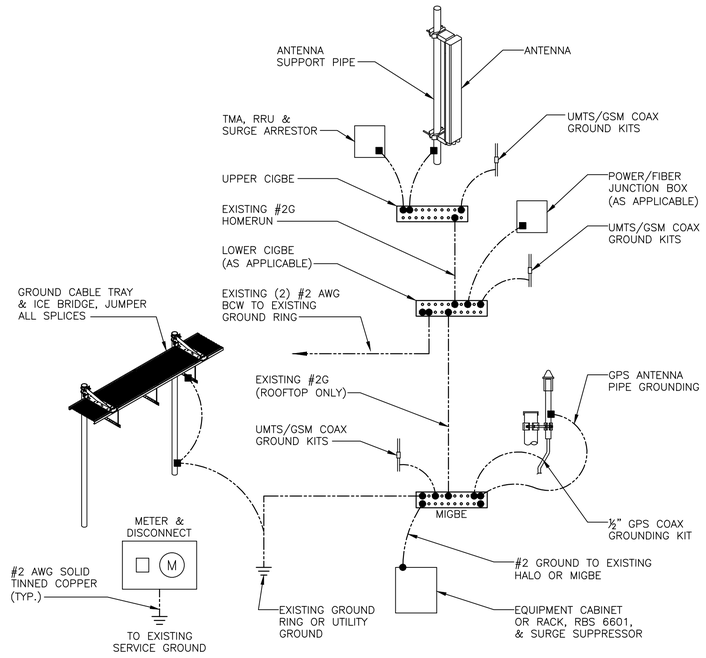
DRAWING TITLE:
ANTENNA MOUNTING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
16063–EMP	A–5	0



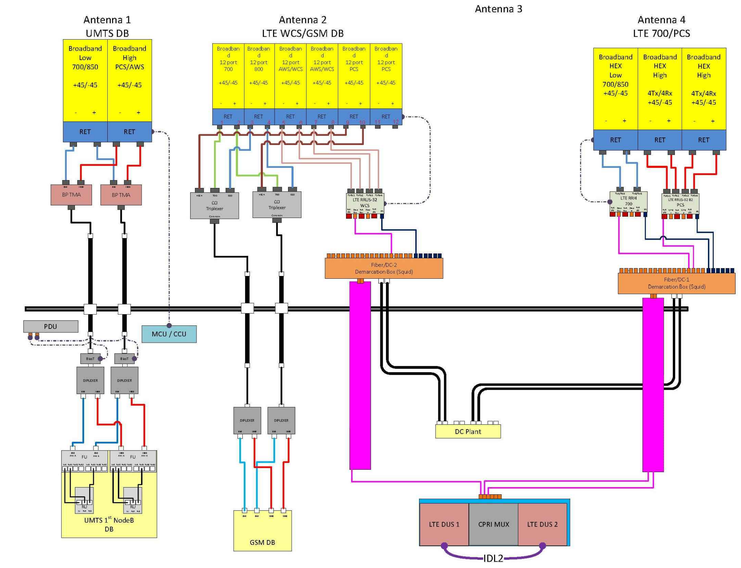
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



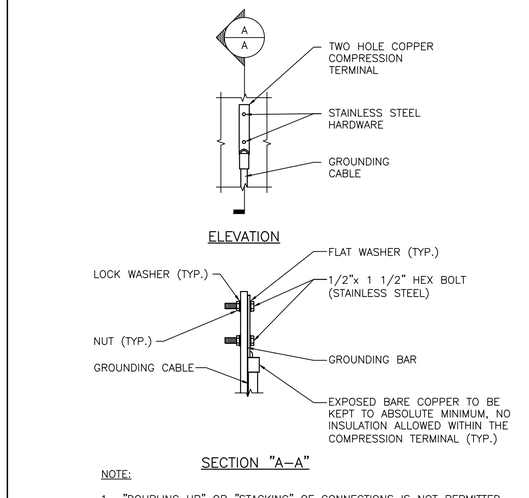
GROUNDING RISER DIAGRAM

SCALE: N.T.S.



TYPICAL PLUMBING DIAGRAM (SECTORS A & B)

SCALE: N.T.S.

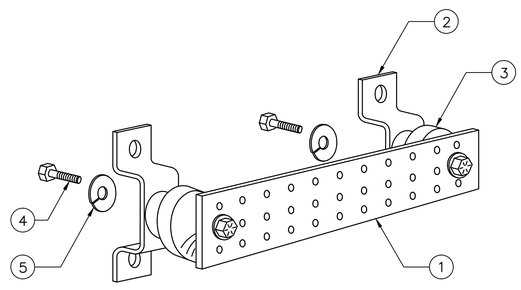


NOTE:

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

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"-11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

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

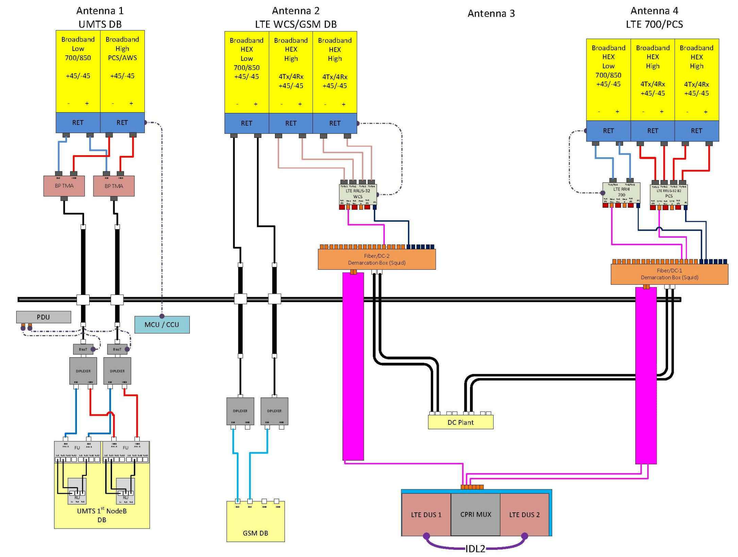
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- -48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES

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)

GROUND BAR DETAIL

SCALE: N.T.S.



TYPICAL PLUMBING DIAGRAM (SECTOR C)

SCALE: N.T.S.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5122
SITE NAME: WETHERSFIELD NORTH

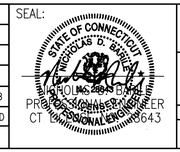
23 KELLEHER CT.
WETHERSFIELD, CT 06109
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	12/14/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: PAV

SEAL:



AT&T

DRAWING TITLE:
GROUNDING, ONE-LINE DIAGRAM & DETAILS

JOB NUMBER	DRAWING NUMBER	REV
16063-EMP	G-1	0

STRUCTURAL ANALYSIS REPORT
MONOPOLE

Prepared For:

Com-Ex Consultants, LLC
115 Route 46 – Suite E39
Mountain Lakes, NJ 07046

Structure Rating:

Monopole:	**Pass (71.1%)**
Foundation:	**Pass**

Sincerely,
Destek Engineering, LLC

11-29-2016

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

AT&T Site ID: CT5122
FA Number: 10092829
Site Name: Wethersfield North
23 Kelleher Court
Wethersfield, CT 06109

Destek Job No: 1629137 November 29, 2016

CONTENTS

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the existing monopole located at 23 Kelleher Court, Wethersfield, CT, 06109, for the additions and alterations proposed by AT&T.

The structural analysis is based on the following information provided to Destek Engineering, LLC (Destek):

- Structural Analysis Report prepared by Hudson Design Group, dated 08/08/2016
- Upgrade Drawings prepared by Hudson Design Group, dates 08/23/2016
- Construction Drawings prepared by Com-Ex, dated 11/02/2016.
- RFDS prepared by AT&T, dated 09/01/2016.

1.1 STRUCTURE

The structure is a 179'-0" (18) sided monopole, which is attached to the foundation with anchor bolts and a base plate. Please refer to the software output in Appendix A, for tower geometry, member sizes, and other details.

ELEVATION (FEET)	SECTION LENGTH (FEET)	LAP SPLICE (FT)	SHAFT THICKNESS (IN)	TOP DIAMETER (IN)	BOTTOM DIAMETER (IN)	YIELD STRENGTH (KSI)
179.00-141.25	37.75	4.33	0.250	23.100	33.249	65
141.25-92.58	53.00	5.92	0.375	31.585	45.834	65
92.58-45.50	53.00	7.50	0.375	43.492	57.742	65
45.50-0.0	53.00	-	0.375	54.976	69.225	65

*Does not include description of existing monopole modifications.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

2.0 EXISTING AND PROPOSED APPURTENANCES

AT&T is proposing the following antenna configuration on the tower:

Existing Configuration of AT&T Appurtenances:

Rad. Center (ft)	Antenna & TMA	Mount	Cables*
142	(6) RRUS-11 (3) RRUS-A2	Ring Mount	(12) 1-5/8"
140	(3) 7770.00 w/Mount Pipe (2) SBNHH-1D65A w/Mount Pipe (2) HPA-65R-BUU-H8 w/Mount Pipe (2) TPA-65R-LCUUUU-H8 w/Mount Pipe (6) LGP21401 TMAs (3) RRUS-32 (2) DC 6 (12) TPX-070821	(3) Sector Mounts	

Proposed and Final Configuration of AT&T Appurtenances:

Rad. Center (ft)	Antenna & TMA	Mount	Cables*
142	(3) RRUS-11 (3) RRUS-32 B2	Ring Mount	(12) 1-5/8" (2) DC Cable (1) Fiber Cable
140	(3) 7770.00 w/Mount Pipe (2) SBNHH-1D65A w/Mount Pipe (2) HPA-65R-BUU-H8 w/Mount Pipe (2) TPA-65R-LCUUUU-H8 w/Mount Pipe (6) LGP21401 TMAs (3) RRUS-32 (2) DC 6 (12) TPX-070821	(3) Sector Mounts	

*All feed lines inside the shaft

Existing Appurtenances by Others

Rad. Center (ft)	Antenna & TMA	Mount	Feedlines
188	(1) 10’ Omni	(1) Pipe Mount	(1) 1-1/4”
186	(2) 6’ Omni	(2) Pipe Mounts	(2) 7/8”
185	(2) 4’ Omni 4’ Dipole	(3) Pipe Mounts	(4) 1-5/8”
181	Distribution Box	-	(2) 1/2”
174	(2) APXVSPP18-C w/Mount Pipe ET-X-TU-42-15 w/Mount Pipe	(3) Sector Mounts	(4) 1-1/4”

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

	(3) APXV9TM14 w/Mount Pipe (3) RRH 8X20-25		
170	(3) RRH 800 (3) RRH 1900	Ring Mount	-
159	2’ Dish	Pipe Mount	1/4”
152	(6) AIR21 B4A/B2P w/Mount Pipe (3) LNX-6515DS w/Mount Pipe	(3) Sector Mounts	(18) 1-5/8” 1/4”
151	(3) RRUS – 11 (3) TMA		
130	(3) BXA-171063-12CF w/Mount Pipe (3) BXA-70063-4CF w/Mount Pipe (3) BXA-70063-6CF w/Mount Pipe (3) MGD3-900 w/Mount Pipe (3) RRH2X40 AWS RXXDC-3315-PF-48	Platform	(18) 1-5/8” 1/4”
126	2’ Dish	Pipe Mount	1/4”

3.0 CODES AND LOADING

This analysis has been performed in accordance with the 2016 Connecticut Building Code based upon an ultimate 3-second gust wind speed of 125 mph (Risk Category II) converted to a nominal 3-second gust wind speed of 97 mph per section 1609.3.1 as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. The following loading criteria were used in the analysis:

- Basic wind speed of 97 mph without ice (V)
- Basic wind speed of 50 mph concurrent with the design ice thickness of 1” (V_i and t_i)
- Exposure Category C, Topographic Category 1

The following load combinations were used with wind blowing at 0^o, 60^o, and 90^o, measured from a line normal to the face of the tower:

- $1.2D + 1.6W_o$
- $0.9D + 1.6W_o$
- $1.2D + 1.0D_i + 1.0W_i$

D: Dead load of structure and appurtenances
W_o: Wind load without ice (based upon V)
W_i: Concurrent wind load with factored ice thickness (based upon V_i)
D_i: Weight of ice due to factored ice thickness (based upon t_i)

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided to Destek and is assumed to be current and correct. Unless otherwise noted, the structure is assumed to be in good condition, free of defects, and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service lifespan. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Destek will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis does not include a qualification of the antenna mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

The analysis results presented in this report are only applicable for the previously mentioned existing and proposed appurtenances. Any deviation of the appurtenances and placement, etc., will require Destek to generate an additional structural analysis. Additionally, the proposed linear appurtenances should be placed per recommendations of this report.

5.0 ANALYSIS AND ASSUMPTIONS

The Monopole was analyzed by utilizing tnxTower, a non-linear, three-dimensional, finite element-analysis software package, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix A of this report.

This analysis assumes that the modifications detailed in the Structural Modification Drawings prepared by Hudson Design Group, dated 8/23/2016, have been installed.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

6.0 RESULTS AND CONCLUSION

The structural modifications detailed in the Structural Modification Drawings prepared by Hudson Design Group, dated 8/23/2016, have been incorporated into our analysis. After analyzing the upgraded structure, Destek has deemed the modifications to be **ineffective** due to the inadequate thickness of the reinforcement plates. The added wind area of the reinforcement has been considered in this analysis.

Based on a structural analysis per TIA-222-G, the existing reinforced monopole has **adequate** structural capacity for the proposed changes by AT&T. As a maximum, the monopole shaft between 0 feet and 45.5 feet is stressed to **71.1%** of its capacity. The anchor rods also have **adequate** structural capacity for the proposed changes by AT&T. As a maximum, the anchor rods are stressed to **75.8%** of its capacity. The existing foundation is found to have **adequate** capacity to support the proposed installation by AT&T.

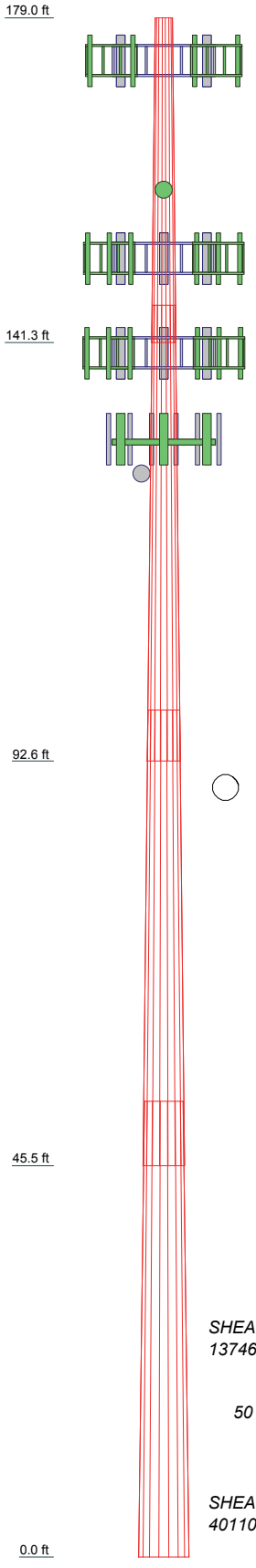
Therefore, the proposed additions and alterations by AT&T can be implemented as intended with the conditions outlined in this report.

Should you have any questions about this report, please contact Ahmet Colakoglu at (770) 693-0835 or acolakoglu@destekengineering.com.

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066 -Tel: (770) 693-0835

APPENDIX A
CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	37.75	18	0.2500	4.33	23.1000	33.2490	A572-65	2846.3
2	53.00	18	0.3750	5.92	31.5849	45.8340		8228.8
3	53.00	18	0.3750	7.50	43.4924	57.7420		10784.9
4	53.00	18	0.3750		54.9755	69.2250		13249.9
								35110.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) 6' x 2" Mount Pipe	181	RRUS 32 B2	142
(3) 6' x 2" Mount Pipe	181	RRUS 32 B2	142
(3) 6' x 2" Mount Pipe	181	(2) SBNHH-1D65A w/ Mount Pipe	140
Omni 4"x6'	181	7770.00 w/ Mount Pipe	140
Omni 2"x6'	181	7770.00 w/ Mount Pipe	140
Distribution Box	181	TPA-65R-LCUUUU-H8 w/ Mount Pipe	140
Omni 3"x4'	181	RRUS 32	140
Omni 3"x10'	181	RRUS 32	140
Distribution Box	181	RRUS 32	140
Omni 3" x 4'	181	TPA-65R-LCUUUU-H8 w/ Mount Pipe	140
4' Dipole	181	CCI HPA-65R-BUU-H8 with pipe	140
TA 702-3	181	CCI HPA-65R-BUU-H8 with pipe	140
ET-X-TU-42-15-37-18-iR-ST w/ Mount Pipe	174	(2) LGP21401	140
		(2) LGP21401	140
APXVSPP18-C w/ Mount Pipe	174	(2) LGP21401	140
APXVSPP18-C w/ Mount Pipe	174	(2) LGP21901	140
APXV9TM14 w/ Mount Pipe	174	(2) LGP21901	140
APXV9TM14 w/ Mount Pipe	174	(2) LGP21901	140
APXV9TM14 w/ Mount Pipe	174	LGP12104	140
TA 602-3	174	(4) TPX-070821	140
RRH8x20-25	174	(4) TPX-070821	140
RRH8x20-25	174	(4) TPX-070821	140
RRH8x20-25	174	DC6-48-60-18-8F (Round)	140
RRH800MHz	170	DC6-48-60-18-8F (Round)	140
RRH800MHz	170	TA 602-3	140
RRH800MHz	170	7770.00 w/ Mount Pipe	140
RRH1900MHz	170	BXA-70080-4CF-EDIN w/ Mount Pipe	130
RRH1900MHz	170	BXA-70080-6CF-EDIN w/ Mount Pipe	130
RRH1900MHz	170	Rymsa MGD3-900	130
Ring Mount	170	RRH2x40-AWS	130
HP2-102	159	BXA-171063-12CF-EDIN w/ Mount Pipe	130
(2) AIR 21 B4A/B2P w/ Mount Pipe	151		
(2) AIR 21 B4A/B2P w/ Mount Pipe	151	BXA-70080-4CF-EDIN w/ Mount Pipe	130
LNX-6515DS-VTM w/ Mount Pipe	151	BXA-70080-6CF-EDIN w/ Mount Pipe	130
LNX-6515DS-VTM w/ Mount Pipe	151	Rymsa MGD3-900	130
LNX-6515DS-VTM w/ Mount Pipe	151	RRH2x40-AWS	130
RRUS 11	151	BXA-171063-12CF-EDIN w/ Mount Pipe	130
RRUS 11	151		
RRUS 11	151	BXA-70080-4CF-EDIN w/ Mount Pipe	130
Gen TMA	151	BXA-70080-6CF-EDIN w/ Mount Pipe	130
Gen TMA	151	Rymsa MGD3-900	130
Gen TMA	151	RRH2x40-AWS	130
TA 602-3	151	RxxDC-3315-PF-48	130
(2) AIR 21 B4A/B2P w/ Mount Pipe	151	Pirod 13' Low Profit Platfrom	130
RRUS-11	142	BXA-171063-12CF-EDIN w/ Mount Pipe	130
RRUS-11	142	HP2-102	126
RRUS-11	142		
RRUS 32 B2	142		

MATERIAL STRENGTH

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

ALL REACTION
ARE FACTORE

AXIAL
124494 lb

SHEAR
13746 lb

TORQUE 0 kip-
50 mph WIND - 1.0000 in ICE

AXIAL
59749 lb

SHEAR
40110 lb

MOMENT
4770 kip-ft

TORQUE 2 kip-ft
REACTIONS - 97 mph WIND

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 71.1%

Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
Phone: (770) 693-0835
FAX:

Job:			
Project: ***CT5122***			
Client: Com-Ex	Drawn by: Ahmet Coakoglu		App'd:
Code: TIA-222-G	Date: 11/29/16		Scale: NTS
Path: Z:\Projects\2016\29 - Com-Ex\137 - CT5122\TNX\CT5122.eri			Dwg No. E-1

Tower Input Data

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

Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

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	179.00-141.25	37.75	4.33	18	23.1000	33.2490	0.2500	1.0000	A572-65 (65 ksi)
L2	141.25-92.58	53.00	5.92	18	31.5849	45.8340	0.3750	1.5000	A572-65 (65 ksi)
L3	92.58-45.50	53.00	7.50	18	43.4924	57.7420	0.3750	1.5000	A572-65

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
L4	45.50-0.00	53.00		18	54.9755	69.2250	0.3750	1.5000	(65 ksi) 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	23.4564	18.1315	1196.0325	8.1118	11.7348	101.9219	2393.6388	9.0675	3.6256	14.502
	33.7619	26.1847	3602.3567	11.7146	16.8905	213.2772	7209.4536	13.0948	5.4118	21.647
L2	33.2542	37.1476	4571.4330	11.0795	16.0451	284.9110	9148.8811	18.5773	4.8989	13.064
	46.5411	54.1076	14126.5228	16.1379	23.2837	606.7137	28271.6336	27.0589	7.4068	19.751
L3	45.7795	51.3205	12054.0604	15.3067	22.0941	545.5773	24123.9819	25.6651	6.9947	18.652
	58.6328	68.2811	28389.7820	20.3653	29.3329	967.8466	56816.9200	34.1470	9.5026	25.34
L4	57.8712	64.9883	24477.4753	19.3832	27.9276	876.4625	48987.1587	32.5003	9.0157	24.042
	70.2929	81.9487	49078.0698	24.4417	35.1663	1395.5995	98220.7178	40.9821	11.5236	30.73

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 179.00-141.25				1	1	1			
L2 141.25-92.58				1	1	1			
L3 92.58-45.50				1	1	1			
L4 45.50-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
AVA6-50(1-1/4)	B	Surface Ar (CaAa)	6.00 - 174.00	1	1	0.000 0.000	1.5600		0.46
AL7-50(1-5/8")	C	Surface Ar (CaAa)	6.00 - 151.00	6	6	-0.100 0.100	1.9600		0.52
ATCB-B01(1/4")	C	Surface Ar (CaAa)	6.00 - 151.00	1	1	-0.125 -0.125	0.3150		0.07
AL7-50(1-5/8")	C	Surface Ar (CaAa)	6.00 - 130.00	6	6	0.100 0.300	1.9600		0.52
ATCB-B01(1/4")	C	Surface Ar (CaAa)	6.00 - 130.00	1	1	0.313 0.313	0.3150		0.07
***** Step Pegs (Surface Ar)	C	Surface Ar (CaAa)	6.00 - 179.00	1	1	0.000 0.000	0.8000		2.72
**** 8x0.5	A	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.0000	17.0000	13.61
8x0.5	B	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.0000	17.0000	13.61

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
8x0.5	C	Surface Af (CaAa)	30.00 - 0.00	1	1	0.000 0.000	8.0000	17.0000	13.61

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
AL7-50(1-5/8")	B	No	Inside Pole	6.00 - 179.00	4	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
AVA6-50(1-1/4)	B	No	Inside Pole	6.00 - 179.00	1	No Ice	0.00	0.46
						1/2" Ice	0.00	0.46
						1" Ice	0.00	0.46
AL5-50(7/8")	B	No	Inside Pole	6.00 - 179.00	2	No Ice	0.00	0.26
						1/2" Ice	0.00	0.26
						1" Ice	0.00	0.26
HJ4-50(1/2")	B	No	Inside Pole	6.00 - 179.00	2	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
****								
AVA6-50(1-1/4)	B	No	Inside Pole	6.00 - 174.00	3	No Ice	0.00	0.46
						1/2" Ice	0.00	0.46
						1" Ice	0.00	0.46
****								
ATCB-B01(1/4")	B	No	Inside Pole	6.00 - 159.00	1	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
****								
AL7-50(1-5/8")	C	No	Inside Pole	6.00 - 151.00	12	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
*****								
AL7-50(1-5/8")	A	No	Inside Pole	6.00 - 140.00	12	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
FB-L98-002-XXX(3/8")	A	No	Inside Pole	6.00 - 140.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG122ST-BRDA(7/16")	A	No	Inside Pole	6.00 - 140.00	2	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
****								
AL7-50(1-5/8")	C	No	Inside Pole	6.00 - 130.00	12	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
***								
ATCB-B01(1/4")	B	No	Inside Pole	6.00 - 126.00	1	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07

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	179.00-141.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	5.109	0.000	195.98
		C	0.000	0.000	14.793	0.000	194.67
L2	141.25-92.58	A	0.000	0.000	0.000	0.000	322.67
		B	0.000	0.000	7.593	0.000	268.97
		C	0.000	0.000	107.847	0.000	944.64
L3	92.58-45.50	A	0.000	0.000	0.000	0.000	320.36
		B	0.000	0.000	7.344	0.000	261.29
		C	0.000	0.000	117.465	0.000	1016.46
L4	45.50-0.00	A	0.000	0.000	40.000	0.000	677.08
		B	0.000	0.000	46.162	0.000	627.52
		C	0.000	0.000	138.553	0.000	1261.11

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	179.00-141.25	A	2.341	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	20.441	0.000	561.31
		C		0.000	0.000	45.602	0.000	917.27
L2	141.25-92.58	A	2.268	0.000	0.000	0.000	0.000	322.67
		B		0.000	0.000	30.377	0.000	811.89
		C		0.000	0.000	246.623	0.000	4768.37
L3	92.58-45.50	A	2.152	0.000	0.000	0.000	0.000	320.36
		B		0.000	0.000	28.696	0.000	760.52
		C		0.000	0.000	262.581	0.000	4971.42
L4	45.50-0.00	A	1.929	0.000	0.000	52.909	0.000	1308.23
		B		0.000	0.000	76.068	0.000	1644.05
		C		0.000	0.000	268.172	0.000	4986.90

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	179.00-141.25	0.1559	0.4641	0.4046	0.7826
L2	141.25-92.58	-0.2302	1.8838	-0.1138	2.1539
L3	92.58-45.50	-0.3382	2.1963	-0.2496	2.6306
L4	45.50-0.00	-0.2407	1.5640	-0.2074	2.1396

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	7	AVA6-50(1-1/4)	141.25 - 174.00	1.0000	1.0000
L1	12	AL7-50(1-5/8")	141.25 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			151.00		
L1	13	ATCB-B01(1/4")	141.25 - 151.00	1.0000	1.0000
L1	27	Step Pegs (Surface Ar)	141.25 - 179.00	1.0000	1.0000
L1	22	AL7-50(1-5/8")	141.25 - 130.00	1.0000	1.0000
L1	23	ATCB-B01(1/4")	141.25 - 130.00	1.0000	1.0000
L2	7	AVA6-50(1-1/4)	92.58 - 141.25	1.0000	1.0000
L2	12	AL7-50(1-5/8")	92.58 - 141.25	1.0000	1.0000
L2	13	ATCB-B01(1/4")	92.58 - 141.25	1.0000	1.0000
L2	22	AL7-50(1-5/8")	92.58 - 130.00	1.0000	1.0000
L2	23	ATCB-B01(1/4")	92.58 - 130.00	1.0000	1.0000
L2	27	Step Pegs (Surface Ar)	92.58 - 141.25	1.0000	1.0000
L3	7	AVA6-50(1-1/4)	45.50 - 92.58	1.0000	1.0000
L3	12	AL7-50(1-5/8")	45.50 - 92.58	1.0000	1.0000
L3	13	ATCB-B01(1/4")	45.50 - 92.58	1.0000	1.0000
L3	22	AL7-50(1-5/8")	45.50 - 92.58	1.0000	1.0000
L3	23	ATCB-B01(1/4")	45.50 - 92.58	1.0000	1.0000
L3	27	Step Pegs (Surface Ar)	45.50 - 92.58	1.0000	1.0000
L3	29	8x0.5	45.50 - 30.00	1.0000	1.0000
L3	30	8x0.5	45.50 - 30.00	1.0000	1.0000
L3	31	8x0.5	45.50 - 30.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(3) 6' x 2" Mount Pipe	A	From Face	2.00 0.00 0.00	0.0000	181.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	22.00 32.83 47.71
(3) 6' x 2" Mount Pipe	B	From Face	2.00 0.00 0.00	0.0000	181.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	22.00 32.83 47.71
(3) 6' x 2" Mount Pipe	C	From Face	2.00 0.00 0.00	0.0000	181.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	22.00 32.83 47.71
Omni 4"x6'	A	From Face	2.00 0.00 5.00	0.0000	181.00	No Ice 1/2" Ice 1" Ice	2.09 2.46 2.83	2.09 2.46 2.83	20.00 37.13 54.26
Omni 2"x6'	A	From Face	2.00 0.00 5.00	0.0000	181.00	No Ice 1/2" Ice 1" Ice	1.20 1.80 2.40	1.20 1.80 2.40	25.00 34.39 43.78
Distribution Box	A	From Face	2.00 0.00 0.00	0.0000	181.00	No Ice 1/2" Ice 1" Ice	2.33 2.55 2.77	1.36 1.54 1.50	10.00 26.33 42.66
Omni 3"x4'	B	From Face	2.00 0.00 4.00	0.0000	181.00	No Ice 1/2" Ice 1" Ice	1.00 1.25 1.50	1.00 1.25 5.06	15.00 23.96 32.92

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
Omni 3"x10'	B	From Face	2.00	0.0000	181.00	No Ice	3.00	3.00	20.00
			0.00			1/2" Ice	4.03	4.03	41.79
			7.00			1" Ice	5.06	1.72	63.58
Distribution Box	B	From Face	2.00	0.0000	181.00	No Ice	2.33	1.36	10.00
			0.00			1/2" Ice	2.55	1.54	26.33
			0.00			1" Ice	2.77	1.50	42.66
Omni 3" x 4'	C	From Face	2.00	0.0000	181.00	No Ice	1.00	1.00	15.00
			0.00			1/2" Ice	1.25	1.25	23.96
			4.00			1" Ice	1.50	2.18	32.92
4' Dipole	C	From Face	2.00	0.0000	181.00	No Ice	1.64	1.64	15.00
			0.00			1/2" Ice	1.91	1.91	32.13
			2.00			1" Ice	2.18	2.18	49.26
TA 702-3	A	None		0.0000	181.00	No Ice	5.64	5.64	339.00
						1/2" Ice	6.55	6.55	429.00
						1" Ice	7.46	7.46	519.00
****									
ET-X-TU-42-15-37-18-iR-ST w/ Mount Pipe	A	From Face	3.00	0.0000	174.00	No Ice	8.68	4.50	68.25
			0.00			1/2" Ice	9.18	5.17	127.30
			0.00			1" Ice	9.68	5.84	192.77
APXVSPP18-C w/ Mount Pipe	B	From Face	3.00	0.0000	174.00	No Ice	8.26	6.95	82.55
			0.00			1/2" Ice	8.82	8.13	150.56
			0.00			1" Ice	9.35	9.02	226.53
APXVSPP18-C w/ Mount Pipe	C	From Face	3.00	0.0000	174.00	No Ice	8.26	6.95	82.55
			0.00			1/2" Ice	8.82	8.13	150.56
			0.00			1" Ice	9.35	9.02	226.53
APXV9TM14 w/ Mount Pipe	A	From Face	3.00	0.0000	174.00	No Ice	7.21	5.03	91.90
			0.00			1/2" Ice	7.77	5.89	147.31
			0.00			1" Ice	8.33	6.75	202.72
APXV9TM14 w/ Mount Pipe	B	From Face	3.00	0.0000	174.00	No Ice	7.21	5.03	91.90
			0.00			1/2" Ice	7.77	5.89	147.31
			0.00			1" Ice	8.33	6.75	202.72
APXV9TM14 w/ Mount Pipe	C	From Face	3.00	0.0000	174.00	No Ice	7.21	5.03	91.90
			0.00			1/2" Ice	7.77	5.89	147.31
			0.00			1" Ice	8.33	6.75	202.72
TA 602-3	C	None		0.0000	174.00	No Ice	11.59	11.59	774.00
						1/2" Ice	15.44	15.44	990.00
						1" Ice	19.29	19.29	1206.00
***									
RRH1900MHz	A	From Face	1.50	0.0000	170.00	No Ice	2.60	3.72	59.13
			0.00			1/2" Ice	2.84	4.10	97.16
			0.00			1" Ice	3.09	4.50	139.81
RRH1900MHz	B	From Face	1.50	0.0000	170.00	No Ice	2.60	3.72	59.13
			0.00			1/2" Ice	2.84	4.10	97.16
			0.00			1" Ice	3.09	4.50	139.81
RRH1900MHz	C	From Face	1.50	0.0000	170.00	No Ice	2.60	3.72	59.13
			0.00			1/2" Ice	2.84	4.10	97.16
			0.00			1" Ice	3.09	4.50	139.81
RRH800MHz	A	From Face	1.50	0.0000	170.00	No Ice	2.24	2.41	49.43
			0.00			1/2" Ice	2.49	2.75	78.53
			0.00			1" Ice	2.74	3.11	111.69
RRH800MHz	B	From Face	1.50	0.0000	170.00	No Ice	2.24	2.41	49.43
			0.00			1/2" Ice	2.49	2.75	78.53
			0.00			1" Ice	2.74	3.11	111.69
RRH800MHz	C	From Face	1.50	0.0000	170.00	No Ice	2.24	2.41	49.43
			0.00			1/2" Ice	2.49	2.75	78.53
			0.00			1" Ice	2.74	3.11	111.69
RRH8x20-25	A	From Face	1.50	0.0000	174.00	No Ice	4.72	1.70	70.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1/2" Ice	5.01	1.92	97.14
			0.00			1" Ice	5.30	2.14	124.28
RRH8x20-25	B	From Face	1.50	0.0000	174.00	No Ice	4.72	1.70	70.00
			0.00			1/2" Ice	5.01	1.92	97.14
			0.00			1" Ice	5.30	2.14	124.28
RRH8x20-25	C	From Face	1.50	0.0000	174.00	No Ice	4.72	1.70	70.00
			0.00			1/2" Ice	5.01	1.92	97.14
			0.00			1" Ice	5.30	2.14	124.28
Ring Mount	C	None		0.0000	170.00	No Ice	1.40	1.40	90.00
						1/2" Ice	2.40	2.40	130.00
						1" Ice	3.40	3.40	170.00
****									
(2) AIR 21 B4A/B2P w/ Mount Pipe	A	From Face	3.00	0.0000	151.00	No Ice	6.16	5.55	103.38
			0.00			1/2" Ice	6.60	6.30	159.18
			1.00			1" Ice	7.03	7.00	221.63
(2) AIR 21 B4A/B2P w/ Mount Pipe	B	From Face	3.00	0.0000	151.00	No Ice	6.16	5.55	103.38
			0.00			1/2" Ice	6.60	6.30	159.18
			1.00			1" Ice	7.03	7.00	221.63
(2) AIR 21 B4A/B2P w/ Mount Pipe	C	From Face	3.00	0.0000	151.00	No Ice	6.16	5.55	103.38
			0.00			1/2" Ice	6.60	6.30	159.18
			1.00			1" Ice	7.03	7.00	221.63
LNX-6515DS-VTM w/ Mount Pipe	A	From Face	3.00	0.0000	151.00	No Ice	11.65	9.84	83.25
			0.00			1/2" Ice	12.37	11.37	172.75
			1.00			1" Ice	13.10	12.92	272.22
LNX-6515DS-VTM w/ Mount Pipe	B	From Face	3.00	0.0000	151.00	No Ice	11.65	9.84	83.25
			0.00			1/2" Ice	12.37	11.37	172.75
			1.00			1" Ice	13.10	12.92	272.22
LNX-6515DS-VTM w/ Mount Pipe	C	From Face	3.00	0.0000	151.00	No Ice	11.65	9.84	83.25
			0.00			1/2" Ice	12.37	11.37	172.75
			1.00			1" Ice	13.10	12.92	272.22
RRUS 11	A	From Face	2.00	0.0000	151.00	No Ice	2.78	1.19	50.70
			0.00			1/2" Ice	2.99	1.33	71.50
			0.00			1" Ice	3.21	1.49	95.33
RRUS 11	B	From Face	2.00	0.0000	151.00	No Ice	2.78	1.19	50.70
			0.00			1/2" Ice	2.99	1.33	71.50
			0.00			1" Ice	3.21	1.49	95.33
RRUS 11	C	From Face	2.00	0.0000	151.00	No Ice	2.78	1.19	50.70
			0.00			1/2" Ice	2.99	1.33	71.50
			0.00			1" Ice	3.21	1.49	95.33
Gen TMA	A	From Face	2.00	0.0000	151.00	No Ice	0.68	0.45	13.20
			0.00			1/2" Ice	0.80	0.56	18.38
			0.00			1" Ice	0.92	0.67	23.56
Gen TMA	B	From Face	2.00	0.0000	151.00	No Ice	0.68	0.45	13.20
			0.00			1/2" Ice	0.80	0.56	18.38
			0.00			1" Ice	0.92	0.67	23.56
Gen TMA	C	From Face	2.00	0.0000	151.00	No Ice	0.68	0.45	13.20
			0.00			1/2" Ice	0.80	0.56	18.38
			0.00			1" Ice	0.92	0.67	23.56
TA 602-3	C	None		0.0000	151.00	No Ice	11.59	11.59	774.00
						1/2" Ice	15.44	15.44	990.00
						1" Ice	19.29	19.29	1206.00
****									
7770.00 w/ Mount Pipe	A	From Face	3.00	0.0000	140.00	No Ice	5.75	4.25	55.38
			0.00			1/2" Ice	6.18	5.01	102.81
			0.00			1" Ice	6.61	5.71	156.64
7770.00 w/ Mount Pipe	B	From Face	3.00	0.0000	140.00	No Ice	5.75	4.25	55.38
			0.00			1/2" Ice	6.18	5.01	102.81

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	6.61	5.71	156.64
7770.00 w/ Mount Pipe	C	From Face	3.00	0.0000	140.00	No Ice	5.75	4.25	55.38
			0.00			1/2" Ice	6.18	5.01	102.81
			0.00			1" Ice	6.61	5.71	156.64
TPA-65R-LCUUUU-H8 w/ Mount Pipe	A	From Face	3.00	0.0000	140.00	No Ice	13.54	10.96	114.45
			0.00			1/2" Ice	14.24	12.49	217.61
			0.00			1" Ice	14.95	14.04	330.97
TPA-65R-LCUUUU-H8 w/ Mount Pipe	B	From Face	3.00	0.0000	140.00	No Ice	13.54	10.96	114.45
			0.00			1/2" Ice	14.24	12.49	217.61
			0.00			1" Ice	14.95	14.04	330.97
CCI HPA-65R-BUU-H8 with pipe	A	From Face	3.00	0.0000	140.00	No Ice	13.28	9.65	122.85
			0.00			1/2" Ice	14.00	11.15	220.33
			0.00			1" Ice	14.73	12.68	327.71
CCI HPA-65R-BUU-H8 with pipe	B	From Face	3.00	0.0000	140.00	No Ice	13.28	9.65	122.85
			0.00			1/2" Ice	14.00	11.15	220.33
			0.00			1" Ice	14.73	12.68	327.71
(2) SBNHH-1D65A w/ Mount Pipe	C	From Face	3.00	0.0000	140.00	No Ice	5.95	5.19	61.30
			0.00			1/2" Ice	6.39	5.96	114.32
			0.00			1" Ice	6.82	6.66	173.89
RRUS-11	A	From Face	1.00	0.0000	142.00	No Ice	2.78	1.19	47.62
			0.00			1/2" Ice	2.99	1.33	68.42
			0.00			1" Ice	3.21	1.49	92.25
RRUS-11	B	From Face	1.00	0.0000	142.00	No Ice	2.78	1.19	47.62
			0.00			1/2" Ice	2.99	1.33	68.42
			0.00			1" Ice	3.21	1.49	92.25
RRUS-11	C	From Face	1.00	0.0000	142.00	No Ice	2.78	1.19	47.62
			0.00			1/2" Ice	2.99	1.33	68.42
			0.00			1" Ice	3.21	1.49	92.25
RRUS 32	A	From Face	1.00	0.0000	140.00	No Ice	2.86	1.78	55.12
			0.00			1/2" Ice	3.08	1.97	77.39
			0.00			1" Ice	3.32	2.17	102.93
RRUS 32	B	From Face	1.00	0.0000	140.00	No Ice	2.86	1.78	55.12
			0.00			1/2" Ice	3.08	1.97	77.39
			0.00			1" Ice	3.32	2.17	102.93
RRUS 32	C	From Face	1.00	0.0000	140.00	No Ice	2.86	1.78	55.12
			0.00			1/2" Ice	3.08	1.97	77.39
			0.00			1" Ice	3.32	2.17	102.93
RRUS 32 B2	A	From Face	1.00	0.0000	142.00	No Ice	2.73	1.67	52.90
			0.00			1/2" Ice	2.95	1.86	73.96
			0.00			1" Ice	3.18	2.05	98.21
RRUS 32 B2	B	From Face	1.00	0.0000	142.00	No Ice	2.73	1.67	52.90
			0.00			1/2" Ice	2.95	1.86	73.96
			0.00			1" Ice	3.18	2.05	98.21
RRUS 32 B2	C	From Face	1.00	0.0000	142.00	No Ice	2.73	1.67	52.90
			0.00			1/2" Ice	2.95	1.86	73.96
			0.00			1" Ice	3.18	2.05	98.21
(2) LGP21401	A	From Face	2.00	0.0000	140.00	No Ice	1.10	0.21	14.10
			0.00			1/2" Ice	1.24	0.27	21.26
			0.00			1" Ice	1.38	0.35	30.32
(2) LGP21401	B	From Face	2.00	0.0000	140.00	No Ice	1.10	0.21	14.10
			0.00			1/2" Ice	1.24	0.27	21.26
			0.00			1" Ice	1.38	0.35	30.32
(2) LGP21401	C	From Face	2.00	0.0000	140.00	No Ice	1.10	0.21	14.10
			0.00			1/2" Ice	1.24	0.27	21.26
			0.00			1" Ice	1.38	0.35	30.32
(2) LGP21901	A	From Face	2.00	0.0000	140.00	No Ice	0.23	0.16	5.50
			0.00			1/2" Ice	0.29	0.21	7.92

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00			1" Ice	0.36	0.28	11.41
(2) LGP21901	B	From Face	2.00	0.0000	140.00	No Ice	0.23	0.16	5.50
			0.00			1/2" Ice	0.29	0.21	7.92
			0.00			1" Ice	0.36	0.28	11.41
(2) LGP21901	C	From Face	2.00	0.0000	140.00	No Ice	0.23	0.16	5.50
			0.00			1/2" Ice	0.29	0.21	7.92
			0.00			1" Ice	0.36	0.28	11.41
LGP12104	A	From Face	2.00	0.0000	140.00	No Ice	0.44	0.02	1.80
			0.00			1/2" Ice	0.57	0.05	5.00
			0.00			1" Ice	0.70	0.08	9.88
(4) TPX-070821	A	From Face	2.00	0.0000	140.00	No Ice	0.47	0.10	10.00
			0.00			1/2" Ice	0.56	0.15	13.45
			0.00			1" Ice	0.65	0.20	18.22
(4) TPX-070821	B	From Face	2.00	0.0000	140.00	No Ice	0.47	0.10	10.00
			0.00			1/2" Ice	0.56	0.15	13.45
			0.00			1" Ice	0.65	0.20	18.22
(4) TPX-070821	C	From Face	2.00	0.0000	140.00	No Ice	0.47	0.10	10.00
			0.00			1/2" Ice	0.56	0.15	13.45
			0.00			1" Ice	0.65	0.20	18.22
DC6-48-60-18-8F (Round)	A	From Face	1.00	0.0000	140.00	No Ice	0.79	0.79	18.90
			0.00			1/2" Ice	1.27	1.27	34.02
			0.00			1" Ice	1.45	1.45	51.47
DC6-48-60-18-8F (Round)	A	From Face	1.00	0.0000	140.00	No Ice	0.79	0.79	18.90
			0.00			1/2" Ice	1.27	1.27	34.02
			0.00			1" Ice	1.45	1.45	51.47
TA 602-3	C	None		0.0000	140.00	No Ice	11.59	11.59	774.00
						1/2" Ice	15.44	15.44	990.00
						1" Ice	19.29	19.29	1206.00
****									
***									
BXA-171063-12CF-EDIN w/ Mount Pipe	A	From Face	3.00	0.0000	130.00	No Ice	5.04	5.30	38.50
			0.00			1/2" Ice	5.59	6.47	84.59
			0.00			1" Ice	6.11	7.36	138.12
BXA-70080-4CF-EDIN w/ Mount Pipe	A	From Face	3.00	0.0000	130.00	No Ice	5.41	3.70	28.25
			0.00			1/2" Ice	5.86	4.32	70.71
			0.00			1" Ice	6.31	4.94	113.17
BXA-70080-6CF-EDIN w/ Mount Pipe	A	From Face	3.00	0.0000	130.00	No Ice	7.99	5.82	42.55
			0.00			1/2" Ice	8.64	6.99	103.53
			0.00			1" Ice	9.29	8.16	164.51
Rymsa MGD3-900	A	From Face	3.00	0.0000	130.00	No Ice	5.37	3.60	22.00
			0.00			1/2" Ice	5.83	4.04	51.69
			0.00			1" Ice	6.29	4.48	81.38
RRH2x40-AWS	A	From Face	2.00	0.0000	130.00	No Ice	2.16	1.42	44.00
			0.00			1/2" Ice	2.36	1.59	61.40
			0.00			1" Ice	2.57	1.77	81.69
BXA-171063-12CF-EDIN w/ Mount Pipe	B	From Face	3.00	0.0000	130.00	No Ice	5.04	5.30	38.50
			0.00			1/2" Ice	5.59	6.47	84.59
			0.00			1" Ice	6.11	7.36	138.12
BXA-70080-4CF-EDIN w/ Mount Pipe	B	From Face	3.00	0.0000	130.00	No Ice	5.41	3.70	28.25
			0.00			1/2" Ice	5.86	4.32	70.71
			0.00			1" Ice	6.31	4.94	113.17
BXA-70080-6CF-EDIN w/ Mount Pipe	B	From Face	3.00	0.0000	130.00	No Ice	7.99	5.82	42.55
			0.00			1/2" Ice	8.64	6.99	103.53
			0.00			1" Ice	9.29	8.16	164.51
Rymsa MGD3-900	B	From Face	3.00	0.0000	130.00	No Ice	5.37	3.60	22.00
			0.00			1/2" Ice	5.83	4.04	51.69
			0.00			1" Ice	6.29	4.48	81.38

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
RRH2x40-AWS	B	From Face	2.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	2.16 2.36 2.57	1.42 1.59 1.77	44.00 61.40 81.69
BXA-171063-12CF-EDIN w/ Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	5.04 5.59 6.11	5.30 6.47 7.36	38.50 84.59 138.12
BXA-70080-4CF-EDIN w/ Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	5.41 5.86 6.31	3.70 4.32 4.94	28.25 70.71 113.17
BXA-70080-6CF-EDIN w/ Mount Pipe	C	From Face	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	7.99 8.64 9.29	5.82 6.99 8.16	42.55 103.53 164.51
Rymsa MGD3-900	C	From Face	3.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	5.37 5.83 6.29	3.60 4.04 4.48	22.00 51.69 81.38
RRH2x40-AWS	C	From Face	2.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	2.16 2.36 2.57	1.42 1.59 1.77	44.00 61.40 81.69
RxxDC-3315-PF-48	C	From Face	2.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice	3.49 3.73 3.98	2.19 2.39 2.61	21.40 50.67 83.51
Pirod 13' Low Profit Platfrom	C	None		0.0000	130.00	No Ice 1/2" Ice 1" Ice	15.70 20.10 24.50	15.70 20.10 24.50	1300.00 1765.00 2230.00

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
HP2-102	C	Paraboloid w/Shroud (HP)	From Face	1.50 0.00 0.00	0.0000		159.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	25.00 42.49 59.98
HP2-102	A	Paraboloid w/Shroud (HP)	From Face	1.50 0.00 0.00	0.0000		126.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	25.00 42.49 59.98

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice

Comb. No.	Description
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	179 - 141.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-24386.32	-0.68	-1.04
			Max. Mx	8	-7796.21	-256.75	-2.12
			Max. My	2	-7804.94	1.65	254.07
			Max. Vy	8	13218.63	-256.75	-2.12
			Max. Vx	2	-13204.60	1.65	254.07
			Max. Torque	12			0.52
L2	141.25 - 92.58	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-62352.31	0.42	-4.90
			Max. Mx	8	-23007.48	-1365.13	-8.34
			Max. My	2	-23031.89	6.92	1352.64
			Max. Vy	8	28399.27	-1365.13	-8.34
			Max. Vx	2	-28149.77	6.92	1352.64
			Max. Torque	23			-1.91
L3	92.58 - 45.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87798.27	1.10	-13.73
			Max. Mx	8	-37526.98	-2788.68	-16.53
			Max. My	2	-37540.85	13.25	2763.95
			Max. Vy	8	34149.31	-2788.68	-16.53
			Max. Vx	2	-33901.34	13.25	2763.95
			Max. Torque	21			-1.66
L4	45.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-124493.94	1.93	-23.68
			Max. Mx	8	-59725.86	-4765.20	-26.00
			Max. My	2	-59726.19	20.50	4726.37
			Max. Vy	8	40123.60	-4765.20	-26.00
			Max. Vx	2	-39883.65	20.50	4726.37
			Max. Torque	21			-1.65

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	36	124493.94	13735.87	24.45
	Max. H_x	20	59749.19	40046.99	100.30
	Max. H_z	2	59749.19	131.47	39849.20
	Max. M_x	2	4726.37	131.47	39849.20
	Max. M_z	8	4765.20	-40088.86	-151.71
	Max. Torsion	9	1.65	-40088.85	-151.71
	Min. Vert	17	44811.89	19934.67	-34428.98
	Min. H_x	8	59749.19	-40088.86	-151.71
	Min. H_z	14	59749.19	-171.49	-39815.23
	Min. M_x	14	-4725.73	-171.49	-39815.23
	Min. M_z	20	-4760.64	40046.99	100.30
	Min. Torsion	21	-1.65	40046.98	100.30

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	49790.99	0.00	0.00	2.14	0.35	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	59749.19	-131.47	-39849.20	-4726.37	20.50	0.10
0.9 Dead+1.6 Wind 0 deg - No Ice	44811.89	-131.47	-39849.19	-4689.30	20.21	0.10
1.2 Dead+1.6 Wind 30 deg - No Ice	59749.19	19913.18	-34492.17	-4089.67	-2362.32	-0.88
0.9 Dead+1.6 Wind 30 deg - No Ice	44811.89	19913.18	-34492.17	-4057.69	-2343.57	-0.89

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 60 deg - No Ice	59749.19	34653.61	-19836.30	-2349.73	-4115.85	-1.46
0.9 Dead+1.6 Wind 60 deg - No Ice	44811.89	34653.61	-19836.30	-2331.63	-4083.10	-1.46
1.2 Dead+1.6 Wind 90 deg - No Ice	59749.19	40088.86	151.71	26.00	-4765.20	-1.65
0.9 Dead+1.6 Wind 90 deg - No Ice	44811.89	40088.85	151.71	25.13	-4727.25	-1.65
1.2 Dead+1.6 Wind 120 deg - No Ice	59749.19	34745.99	20039.13	2385.07	-4131.21	-1.56
0.9 Dead+1.6 Wind 120 deg - No Ice	44811.89	34745.99	20039.13	2365.36	-4098.33	-1.56
1.2 Dead+1.6 Wind 150 deg - No Ice	59749.19	20134.97	34547.84	4103.57	-2395.90	-1.03
0.9 Dead+1.6 Wind 150 deg - No Ice	44811.89	20134.97	34547.84	4070.16	-2376.87	-1.04
1.2 Dead+1.6 Wind 180 deg - No Ice	59749.19	171.49	39815.23	4725.73	-24.82	-0.16
0.9 Dead+1.6 Wind 180 deg - No Ice	44811.89	171.49	39815.23	4687.37	-24.72	-0.16
1.2 Dead+1.6 Wind 210 deg - No Ice	59749.19	-19934.67	34428.98	4085.20	2365.61	0.88
0.9 Dead+1.6 Wind 210 deg - No Ice	44811.89	-19934.67	34428.98	4051.95	2346.63	0.88
1.2 Dead+1.6 Wind 240 deg - No Ice	59749.19	-34637.82	19824.87	2352.09	4115.10	1.46
0.9 Dead+1.6 Wind 240 deg - No Ice	44811.89	-34637.82	19824.87	2332.68	4082.13	1.46
1.2 Dead+1.6 Wind 270 deg - No Ice	59749.19	-40046.99	-100.30	-12.70	4760.64	1.65
0.9 Dead+1.6 Wind 270 deg - No Ice	44811.89	-40046.98	-100.30	-13.24	4722.51	1.65
1.2 Dead+1.6 Wind 300 deg - No Ice	59749.19	-34697.77	-20059.81	-2383.91	4125.41	1.62
0.9 Dead+1.6 Wind 300 deg - No Ice	44811.89	-34697.77	-20059.81	-2365.51	4092.35	1.62
1.2 Dead+1.6 Wind 330 deg - No Ice	59749.19	-20113.28	-34562.79	-4101.79	2394.33	1.04
0.9 Dead+1.6 Wind 330 deg - No Ice	44811.89	-20113.28	-34562.79	-4069.69	2375.08	1.04
1.2 Dead+1.0 Ice+1.0 Temp	124493.94	-0.00	0.01	23.68	1.93	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	124493.94	-31.70	-12507.88	-1516.58	6.98	0.05
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	124493.94	6236.69	-10827.31	-1309.37	-765.88	-0.23
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	124493.94	10841.23	-6232.49	-743.30	-1333.93	-0.41
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	124493.94	13745.56	36.41	29.73	-1663.95	-0.48
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	124493.94	10863.90	6281.57	798.63	-1337.84	-0.46
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	124493.94	6290.20	10841.41	1359.37	-774.31	-0.31
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	124493.94	40.96	12499.96	1562.88	-4.35	-0.06
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	124493.94	-6241.64	10812.63	1354.73	770.34	0.23
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	124493.94	-10837.60	6229.78	790.33	1337.42	0.41
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	124493.94	-13735.87	-24.45	20.01	1666.52	0.47

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	124493.94	-10852.73	-6286.42	-751.88	1340.09	0.47
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	124493.94	-6285.20	-10844.93	-1312.48	777.61	0.31
Dead+Wind 0 deg - Service	49790.99	-28.13	-8526.17	-1005.01	4.63	0.02
Dead+Wind 30 deg - Service	49790.99	4260.64	-7379.98	-869.41	-502.87	-0.19
Dead+Wind 60 deg - Service	49790.99	7414.52	-4244.19	-498.83	-876.34	-0.31
Dead+Wind 90 deg - Service	49790.99	8577.45	32.46	7.16	-1014.65	-0.35
Dead+Wind 120 deg - Service	49790.99	7434.28	4287.59	509.61	-879.63	-0.34
Dead+Wind 150 deg - Service	49790.99	4308.10	7391.89	875.63	-510.02	-0.22
Dead+Wind 180 deg - Service	49790.99	36.69	8518.90	1008.13	-5.02	-0.04
Dead+Wind 210 deg - Service	49790.99	-4265.24	7366.46	871.71	504.10	0.19
Dead+Wind 240 deg - Service	49790.99	-7411.14	4241.75	502.59	876.72	0.31
Dead+Wind 270 deg - Service	49790.99	-8568.49	-21.46	-1.08	1014.22	0.36
Dead+Wind 300 deg - Service	49790.99	-7423.97	-4292.02	-506.11	878.92	0.35
Dead+Wind 330 deg - Service	49790.99	-4303.46	-7395.09	-872.00	510.22	0.22

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-49790.99	0.00	0.00	49790.99	0.00	0.000%
2	-131.47	-59749.19	-39849.19	131.47	59749.19	39849.20	0.000%
3	-131.47	-44811.89	-39849.19	131.47	44811.89	39849.19	0.000%
4	19913.18	-59749.19	-34492.17	-19913.18	59749.19	34492.17	0.000%
5	19913.18	-44811.89	-34492.17	-19913.18	44811.89	34492.17	0.000%
6	34653.61	-59749.19	-19836.30	-34653.61	59749.19	19836.30	0.000%
7	34653.61	-44811.89	-19836.30	-34653.61	44811.89	19836.30	0.000%
8	40088.85	-59749.19	151.71	-40088.86	59749.19	-151.71	0.000%
9	40088.85	-44811.89	151.71	-40088.85	44811.89	-151.71	0.000%
10	34745.99	-59749.19	20039.13	-34745.99	59749.19	-20039.13	0.000%
11	34745.99	-44811.89	20039.13	-34745.99	44811.89	-20039.13	0.000%
12	20134.97	-59749.19	34547.84	-20134.97	59749.19	-34547.84	0.000%
13	20134.97	-44811.89	34547.84	-20134.97	44811.89	-34547.84	0.000%
14	171.49	-59749.19	39815.22	-171.49	59749.19	-39815.23	0.000%
15	171.49	-44811.89	39815.22	-171.49	44811.89	-39815.23	0.000%
16	-19934.67	-59749.19	34428.98	19934.67	59749.19	-34428.98	0.000%
17	-19934.67	-44811.89	34428.98	19934.67	44811.89	-34428.98	0.000%
18	-34637.82	-59749.19	19824.87	34637.82	59749.19	-19824.87	0.000%
19	-34637.82	-44811.89	19824.87	34637.82	44811.89	-19824.87	0.000%
20	-40046.98	-59749.19	-100.30	40046.99	59749.19	100.30	0.000%
21	-40046.98	-44811.89	-100.30	40046.98	44811.89	100.30	0.000%
22	-34697.77	-59749.19	-20059.81	34697.77	59749.19	20059.81	0.000%
23	-34697.77	-44811.89	-20059.81	34697.77	44811.89	20059.81	0.000%
24	-20113.28	-59749.19	-34562.79	20113.28	59749.19	34562.79	0.000%
25	-20113.28	-44811.89	-34562.79	20113.28	44811.89	34562.79	0.000%
26	0.00	-124493.94	0.00	0.00	124493.94	-0.01	0.000%
27	-31.70	-124493.94	-12507.77	31.70	124493.94	12507.88	0.000%
28	6236.63	-124493.94	-10827.22	-6236.69	124493.94	10827.31	0.000%
29	10841.14	-124493.94	-6232.44	-10841.23	124493.94	6232.49	0.000%
30	13745.45	-124493.94	36.41	-13745.56	124493.94	-36.41	0.000%
31	10863.81	-124493.94	6281.51	-10863.90	124493.94	-6281.57	0.000%
32	6290.15	-124493.94	10841.31	-6290.20	124493.94	-10841.41	0.000%
33	40.96	-124493.94	12499.85	-40.96	124493.94	-12499.96	0.000%
34	-6241.59	-124493.94	10812.53	6241.64	124493.94	-10812.63	0.000%
35	-10837.50	-124493.94	6229.73	10837.60	124493.94	-6229.78	0.000%
36	-13735.76	-124493.94	-24.46	13735.87	124493.94	24.45	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
37	-10852.63	-124493.94	-6286.36	10852.73	124493.94	6286.42	0.000%
38	-6285.14	-124493.94	-10844.84	6285.20	124493.94	10844.93	0.000%
39	-28.13	-49790.99	-8526.17	28.13	49790.99	8526.17	0.000%
40	4260.64	-49790.99	-7379.97	-4260.64	49790.99	7379.98	0.000%
41	7414.52	-49790.99	-4244.19	-7414.52	49790.99	4244.19	0.000%
42	8577.45	-49790.99	32.46	-8577.45	49790.99	-32.46	0.000%
43	7434.28	-49790.99	4287.59	-7434.28	49790.99	-4287.59	0.000%
44	4308.10	-49790.99	7391.89	-4308.10	49790.99	-7391.89	0.000%
45	36.69	-49790.99	8518.90	-36.69	49790.99	-8518.90	0.000%
46	-4265.24	-49790.99	7366.46	4265.24	49790.99	-7366.46	0.000%
47	-7411.14	-49790.99	4241.75	7411.14	49790.99	-4241.75	0.000%
48	-8568.49	-49790.99	-21.46	8568.49	49790.99	21.46	0.000%
49	-7423.96	-49790.99	-4292.02	7423.97	49790.99	4292.02	0.000%
50	-4303.46	-49790.99	-7395.08	4303.46	49790.99	7395.09	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00012253
3	Yes	4	0.00000001	0.00005886
4	Yes	5	0.00000001	0.00026889
5	Yes	5	0.00000001	0.00012052
6	Yes	5	0.00000001	0.00027846
7	Yes	5	0.00000001	0.00012506
8	Yes	4	0.00000001	0.00024645
9	Yes	4	0.00000001	0.00015216
10	Yes	5	0.00000001	0.00027210
11	Yes	5	0.00000001	0.00012141
12	Yes	5	0.00000001	0.00028169
13	Yes	5	0.00000001	0.00012624
14	Yes	4	0.00000001	0.00019861
15	Yes	4	0.00000001	0.00011551
16	Yes	5	0.00000001	0.00027461
17	Yes	5	0.00000001	0.00012330
18	Yes	5	0.00000001	0.00026743
19	Yes	5	0.00000001	0.00011964
20	Yes	4	0.00000001	0.00039657
21	Yes	4	0.00000001	0.00024992
22	Yes	5	0.00000001	0.00028500
23	Yes	5	0.00000001	0.00012775
24	Yes	5	0.00000001	0.00027260
25	Yes	5	0.00000001	0.00012184
26	Yes	4	0.00000001	0.00004180
27	Yes	5	0.00000001	0.00030272
28	Yes	5	0.00000001	0.00038217
29	Yes	5	0.00000001	0.00038462
30	Yes	5	0.00000001	0.00032479
31	Yes	5	0.00000001	0.00039676
32	Yes	5	0.00000001	0.00039820
33	Yes	5	0.00000001	0.00031070
34	Yes	5	0.00000001	0.00039466
35	Yes	5	0.00000001	0.00039399
36	Yes	5	0.00000001	0.00032510
37	Yes	5	0.00000001	0.00038914

38	Yes	5	0.00000001	0.00038586
39	Yes	4	0.00000001	0.00002032
40	Yes	4	0.00000001	0.00009512
41	Yes	4	0.00000001	0.00010609
42	Yes	4	0.00000001	0.00002579
43	Yes	4	0.00000001	0.00009544
44	Yes	4	0.00000001	0.00010694
45	Yes	4	0.00000001	0.00002075
46	Yes	4	0.00000001	0.00010238
47	Yes	4	0.00000001	0.00009382
48	Yes	4	0.00000001	0.00002697
49	Yes	4	0.00000001	0.00011034
50	Yes	4	0.00000001	0.00009609

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	179 - 141.25 (1)	TP33.249x23.1x0.25	37.75	0.00	0.0	25.2610	-7792.39	1748390.00	0.004
L2	141.25 - 92.58 (2)	TP45.834x31.5849x0.375	53.00	0.00	0.0	52.2132	-23004.70	3714610.00	0.006
L3	92.58 - 45.5 (3)	TP57.742x43.4924x0.375	53.00	0.00	0.0	65.8810	-37525.40	4311140.00	0.009
L4	45.5 - 0 (4)	TP69.225x54.9755x0.375	53.00	0.00	0.0	81.9487	-59725.80	4812990.00	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	179 - 141.25 (1)	TP33.249x23.1x0.25	257.56	1144.56	0.225	0.00	1144.56	0.000
L2	141.25 - 92.58 (2)	TP45.834x31.5849x0.375	1366.82	3348.51	0.408	0.00	3348.51	0.000
L3	92.58 - 45.5 (3)	TP57.742x43.4924x0.375	2791.93	4912.18	0.568	0.00	4912.18	0.000
L4	45.5 - 0 (4)	TP69.225x54.9755x0.375	4770.27	6830.50	0.698	0.00	6830.50	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	179 - 141.25 (1)	TP33.249x23.1x0.25	13257.90	874196.00	0.015	0.17	2291.92	0.000
L2	141.25 - 92.58 (2)	TP45.834x31.5849x0.375	28422.50	1857310.00	0.015	1.56	6705.20	0.000

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L3	92.58 - 45.5 (3)	TP57.742x43.4924x0.375	34171.90	2155570.00	0.016	1.56	9836.33	0.000
L4	45.5 - 0 (4)	TP69.225x54.9755x0.375	40145.30	2406490.00	0.017	1.56	13677.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	179 - 141.25 (1)	0.004	0.225	0.000	0.015	0.000	0.230 ✔	1.000	4.8.2 ✔
L2	141.25 - 92.58 (2)	0.006	0.408	0.000	0.015	0.000	0.415 ✔	1.000	4.8.2 ✔
L3	92.58 - 45.5 (3)	0.009	0.568	0.000	0.016	0.000	0.577 ✔	1.000	4.8.2 ✔
L4	45.5 - 0 (4)	0.012	0.698	0.000	0.017	0.000	0.711 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	179 - 141.25	Pole	TP33.249x23.1x0.25	1	-7792.39	1748390.00	23.0	Pass
L2	141.25 - 92.58	Pole	TP45.834x31.5849x0.375	2	-23004.70	3714610.00	41.5	Pass
L3	92.58 - 45.5	Pole	TP57.742x43.4924x0.375	3	-37525.40	4311140.00	57.7	Pass
L4	45.5 - 0	Pole	TP69.225x54.9755x0.375	4	-59725.80	4812990.00	71.1	Pass
							Summary	
						Pole (L4)	71.1	Pass
						RATING =	**71.1**	**Pass**

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

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

Site Data

BU#:
Site Name: *CT 5122*
App #:

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	4770	ft-kips
Factored Axial, Pu:	59.7	kips
Factored Shear, Vu:	40.1	kips

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	76	in
Anchor Spacing:	6	in

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	197.0	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	75.8%	**Pass**

Plate Data		
W=Side:	82	in
Thick:	2.25	in
Grade:	60	ksi
Clip Distance:	16	in

Base Plate Results Flexural Check

Base Plate Stress:	41.5	ksi
PL Design Bending Strength, Φ*Fy:	54.0	ksi
Base Plate Stress Ratio:	76.9%	**Pass**

PL Ref. Data	
Yield Line (in):	40.35
Max PL Length:	46.74

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

N/A - Unstiffened

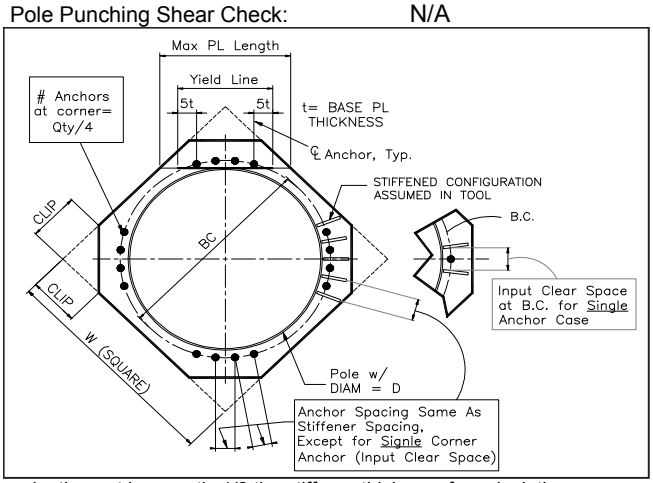
Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Diam:	69.225	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round



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

Monopole Pier and Pad Foundation

BU # : -
Site Name: CT 5122
App. Number: -

TIA-222 Revision: G

Design Reactions		
Shear, **S**:	40.1	kips
Moment, **M**:	4770	ft-kips
Tower Height, **H**:	179	ft
Tower Weight, **Wt**:	59.7	kips
Base Diameter, **BD**:	5.77	ft

Foundation Dimensions		
Depth, **D**:	6.5	ft
Pad Width, **W**:	30	ft
Neglected Depth, **N**:	3.33	ft
Thickness, **T**:	2.50	ft
Pier Diameter, **Pd**:	8.50	ft
Ext. Above Grade, **E**:	0.50	ft
BP Dist. Above Pier:	3	in.
Clear Cover, **Cc**:	3.0	in

Soil Properties		
Soil Unit Weight, **γ**:	0.100	kcf
Ult. Bearing Capacity, Bc:	6.0	ksf
Angle of Friction, **Φ**:	30	deg
Cohesion, **Co**:	0.000	ksf
Passive Pressure, **Pp**:	0.000	ksf
Base Friction, **μ**:	0.40	

Material Properties		
Rebar Yield Strength, **Fy**:	60000	psi
Concrete Strength, **F'c**:	3000	psi
Concrete Unit Weight, **δc**:	0.150	kcf
Seismic Zone, **z**:	1	

Rebar Properties		
Pier Rebar Size, **Sp**:	9	
Pier Rebar Quanity, **mp**:	41	41
Pad Rebar Size, **Spad**:	9	
Pad Rebar Quanity, **mpad**:	33	13
Pier Tie Size, **St**:	4	3
Tie Quanity, **mt**:	14	5

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Req'd Pier Diam.(ft)	8.5	7.77	**OK**
Overturning (ft-kips)	8865.97	4770.00	**53.8%**
Shear Capacity (kips)	249.32	40.10	**16.1%**
Bearing (ksf)	4.50	1.85	**41.1%**
Pad Shear - 1-way (kips)	781.90	445.99	**57.0%**
Pad Shear - 2-way (kips)	1752.73	119.28	**6.8%**
Pad Moment Capacity (k-ft)	3765.60	1621.90	**43.1%**
Pier Moment Capacity (k-ft)	9815.92	4950.45	**50.4%**

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT5122

Wethersfield North
23 Kelleher Court
Hartford, CT 06109

December 20, 2016

Centerline Communications Project Number: 950006-004

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**10.23 %**

December 20, 2016

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

Emissions Analysis for Site: **CT5122 – Wethersfield North**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **23 Kelleher Court, Hartford, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **23 Kelleher Court, Hartford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
GSM	850 MHz	2	30
LTE	2300 MHz (WCS)	2	60
GSM	1900 MHz (PCS)	2	30
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	2	60

Table 1: Channel Data Table

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

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave 7770	140
A	2	CCI TPA-65R-LCUUUU-H8	140
A	3	CCI HPA-65R-BUU-H8	140
B	1	Powerwave 7770	140
B	2	CCI TPA-65R-LCUUUU-H8	140
B	3	CCI HPA-65R-BUU-H8	140
C	1	Powerwave 7770	140
C	2	Commscope SBNHH-1D65A	140
C	3	Commscope SBNHH-1D65A	140

Table 2: Antenna Data

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

RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP(W)	MPE %
Antenna A1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Antenna A2	CCI TPA-65R-LCUUUU-H8	850 MHz / 2300 MHz (WCS) / 1900 MHz (PCS)	13.45 / 14.45 / 13.75	6	240	6,094.03	1.42
Antenna A3	CCI HPA-65R-BUU-H8	700 MHz / 1900 MHz (PCS)	13.15 / 14.95	4	240	6,229.75	1.81
						Sector A Composite MPE%	**3.79**
Antenna B1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Antenna B2	CCI TPA-65R-LCUUUU-H8	850 MHz / 2300 MHz (WCS) / 1900 MHz (PCS)	13.45 / 14.45 / 13.75	6	240	6,094.03	1.42
Antenna B3	CCI HPA-65R-BUU-H8	700 MHz / 1900 MHz (PCS)	13.15 / 14.95	4	240	6,229.75	1.81
						Sector B Composite MPE%	**3.79**
Antenna C1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.56
Antenna C2	Commscope SBNHH-1D65A	850 MHz / 2300 MHz (WCS) / 1900 MHz (PCS)	10.65 / 15.85 / 14.55	6	240	7,022.58	1.51
Antenna C3	Commscope SBNHH-1D65A	700 MHz / 1900 MHz (PCS)	10.85 / 14.55	4	240	4,880.65	1.31
						Sector C Composite MPE%	**3.38**

Table 3: AT&T Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Sector Value	**3.79 %**
Town of Wethersfield	0.17 %
Clearwire	0.07 %
Verizon	2.89 %
Sprint	1.27 %
Nextel	1.65 %
T-Mobile	0.39 %
Site Total MPE %:	**10.23 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	3.79 %
AT&T Sector B Total:	3.79 %
AT&T Sector C Total:	3.38 %
Site Total:	10.23 %

Table 5: Site MPE Summary

Per FCC OET 65, carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, the sectors with the largest calculated MPE% are sectors A & B.

AT&T _ Frequency Band / Technology	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	140	1.66	850 MHz	567	0.29%
AT&T 1900 MHz (PCS) UMTS	2	656.33	140	2.63	1900 MHz (PCS)	1000	0.26%
AT&T 850 MHz GSM	2	663.93	140	2.66	850 MHz	567	0.47%
AT&T 2300 MHz (WCS) LTE	2	1,671.67	140	6.69	2300 MHz (WCS)	1000	0.67%
AT&T 1900 MHz (PCS) GSM	2	711.41	140	2.85	1900 MHz (PCS)	1000	0.28%
AT&T 700 MHz LTE	2	1,239.23	140	4.96	700 MHz	467	1.06%
AT&T 1900 MHz (PCS) LTE	2	1,875.65	140	7.51	1900 MHz (PCS)	1000	0.75%
						Total:	3.79%

Table 6: AT&T Maximum Sector MPE Power Values

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	3.79 %
Sector B:	3.79 %
Sector C:	3.38 %
AT&T Maximum Total (per sector):	3.79 %
Site Total:	10.23 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **10.23 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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