May 20, 2014

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

Re:	**Notice of Exempt Modification – Antenna Swap**
Property Address:	**670 Captain Neville Drive, Waterbury, CT (the "Property")**
Applicant:	**New Cingular Wireless PCS, LLC ("AT&T")**

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 150-foot tower owned by Crown Castle International, Inc. and situated on land owned by M B Realty LLC at 670 Captain Neville Drive in Waterbury (the "Tower"). AT&T has mounted nine (9) wireless telecommunication antennas on the Tower at a height of 151-feet (antenna centerline). The Connecticut Siting Council (the "Council") approved AT&T's use of the Tower in the following prior decisions: TS-SCLP-151-000330, EM-CING-081-130-151-166-020730, EM-CING-079-138-151-155-164-070815, EM-CING-008-049-080-132-151-070904 and EM-CING-151-120511.

AT&T now intends to replace three (3) Kathrein 800-10121 panel antennas and three (3) Andrews SBNH 1D6565C panel antennas with six (6) CCI HPA-65R-BUU-H-8 panel antennas. AT&T proposes to also add an additional three (3) CCI HPA-65R-BUU-H-6 panel antennas, while retaining three (3) Kathrein 800-10121 panel antennas (for a total of twelve (12) panel antennas) at the 151-foot level. Please refer to Tab 1 for further specifications of the replacement antennas.

Please accept this application as notification pursuant to R.C.S.A. §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16-50j-72(b) (2). In accordance with R.C.S.A. §16-50j-73, a copy of this letter is being sent to The Honorable Neil M. O'Leary, Mayor for the City of Waterbury, City Hall Building 235 Grand Street, 2nd floor Waterbury, CT 06702. A copy of this letter is also being sent to M B REALTY LLC, the owner of the property where the tower is located, and Crown Castle International, Inc., the owner of the tower.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. AT&T's replacement antennas will be installed at the 151-foot level of the 150-foot tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore, will not require and extension of the site boundary.
3. The proposed modifications will not increase the noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative worst-case RF emissions calculation for AT&T's modified facility is provided in the General Power Density study, included in Tab 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (See Structural Analysis Report included in Tab 3).

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

Sincerely,

Kristen E. Smith

Cc:
Mayor Neil M. O'Leary: Mayor for the City of Waterbury
M B REALTY LLC: Property owner
Crown Castle International, Inc.: Tower owner

PROJECT INFORMATION

SCOPE OF WORK:

ITEMS TO BE MOUNTED ON THE EXISTING MONOPOLE:
- NEW SECTOR PLATFORM TO REPLACE EXISTING SECTOR PLATFORM
- NEW AT&T ANTENNAS: (3) ANTENNAS PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (9) ANTENNAS
- NEW AT&T RRU'S: (5) RRU'S PER SECTOR WITH (3) SECTORS, FOR A TOTAL OF (15) RRU'S
- NEW AT&T SURGE SUPPRESSOR: (2) RAYCAP SURGE SUPPRESSORS
- NEW AT&T TMA'S: (3) CCI TMA'S

ITEMS TO BE INSTALLED INSIDE THE EXISTING AT&T EQUIPMENT AREA:
- (1) NEW 850 RXAIT IN PROPOSED 23" RACK
- (6) NEW AT&T DIPLEXERS TO REPLACE (12) EXISTING DIPLEXERS

ITEMS TO REMAIN:
- (3) GSM/UMTS ANTENNAS, (3) RRU'S, & (1) SURGE SUPPRESSOR RELOCATED ON NEW PLATFORM

SITE ADDRESS:	670 CAPTAIN NEVILLE DRIVE WATERBURY, CT 06705
LATITUDE:	41.53433 N (41° 32' 3.59" N)
LONGITUDE:	−72.9690 W (72° 58' 8.40" W)
USID:	46003
PROPERTY OWNER:	MB REALTY LLC 670 CAPTAIN NEVILLE DR WATERBURY, CT 06705
TOWER OWNER:	CROWN CASTLE INTERNATIONAL 500 WEST CUMMINGS PARK, STE. 3600 WOBURN, MA 01801
TYPE OF SITE:	MONOPOLE/INDOOR EQUIPMENT
TOWER HEIGHT:	150'−0"±
RAD CENTER:	151'−0"±
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY

FA NUMBER: 10035324
SITE NUMBER: CT1127
SITE NAME: WATERBURY CAPTAIN NEVILLE DR

PROJECT TEAM

CLIENT REPRESENTATIVE
COMPANY: SMARTLINK, LLC
ADDRESS: 1997 ANNAPOLIS EXCHANGE PARKWAY, SUITE 200
CITY, STATE, ZIP: ANNAPOLIS, MD 21401
CONTACT: TIM BOYCE
PHONE: (980) 333−3640
E−MAIL: tboyce@smartlinkllc.com

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

ENGINEERING
COMPANY: HUDSON DESIGN GROUP, LLC.
ADDRESS: 1600 OSGOOD STREET BUILDING 20 NORTH, SUITE 3090
CITY, STATE, ZIP: NORTH ANDOVER, MA 01845
CONTACT: DANIEL P. HAMM, PE
PHONE: (978) 557−5553 X222
E−MAIL: daniel.hamm@hudsondesigngroupllc.com

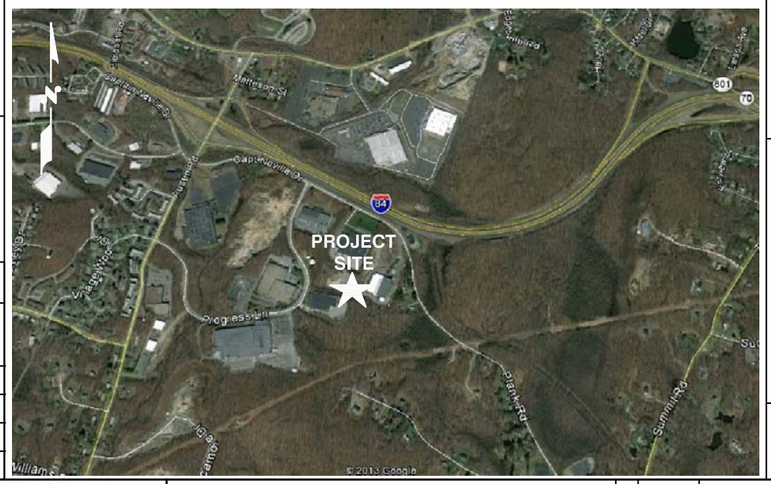
RF ENGINEER
COMPANY: AT&T MOBILITY −NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD SUITE 550 13 AND 14
CITY, STATE, ZIP: FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: (508) 596−7146
E−MAIL: cs6970@att.com

CONSTRUCTION MANAGER
COMPANY: SMARTLINK, LLC.
ADDRESS: 33 BOSTON POST ROAD WEST SUITE 210
CITY, STATE, ZIP: MARLBOROUGH, MA 01752
CONTACT: JERRY BRUNO
PHONE: (508) 920−7349
E−MAIL: jerry.bruno@smartlinkllc.com

DRAWING INDEX

VICINITY MAP

DIRECTIONS TO SITE FROM 550 COCHITUATE ROAD, FRAMINGHAM, MA:
START OUT GOING SOUTHEAST ON BURR ST TOWARD COCHITUATE RD/RT−30 E. 0.01 MI. TAKE THE 1ST LEFT ONTO RT−30 E/COCHITUATE RD. 0.05 MI. TAKE THE RAMP TOWARD I−90/MASSPIKE/ SPRINGFILED/BOSTON. 0.6 MI. MERGE ONTO I−90 W/MASS PIKE/MASSACHUSETTS TURNPIKE VIA THE RAMP ON THE LEFT TOWARD WORCESTER/SPRINGFIELD (PORTIONS TOLL). 38.3 MI. MERGE ONTO I−84 W VIA EXIT 9 TOWARD US−20/HARTFORD/NEW YORK CITY (PORTIONS TOLL) (CROSSING INTO CONNECTICUT). 41.7 MI. MERGE ONTO CT−15 S VIA EXIT 57 ON THE LEFT TOWARD I−91S/CHARTER OAK BR/N.Y. CITY. 1.1 MI. KEEP STRAIGHT ONTO US−5 S/CT−15S. 0.8 MI. AT EXIT 86, TAKE RAMP RIGHT FOR I−91 S TOWARD NEW HAVEN/N.Y. CITY. 16.6MI. AT EXIT 18, TAKE RAMP RIGHT FOR I−691 WEST TOWARD WATERBURY/MERIDAN. 7.9 MI. AT EXIT 1, TAKE RAMP LEFT FOR I−84 WEST TOWARD WATERBURY/DANBURY. 4.1 MI. AT EXIT 25A, TAKE RAMP RIGHT TO FOLLOW SIGNS FOR AUSTIN ROAD. 0.2 MI. TURN LEFT ONTO AUSTIN RD. 0.2 MI. TURN LEFT ONTO CAPTAIN NEVILLE DR. .02 MI. IN 0.5 MI, THE SITE WILL BE ON YOUR RIGHT.



GENERAL NOTES

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

CROWN SITE ID: 881534

CROWN SITE NAME: WATERBURY TOWER

APPROVALS

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

DISCIPLINE:	SIGNATURE:	DATE:
SMARTLINK SITE ACQUISITION:		
SMARTLINK CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

72 HOURS
BEFORE YOU DIG
CALL TOLL FREE 800−922−4455
UNDERGROUND SERVICE ALERT

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

Hudson Design Group LLC
1600 OSGOOD STREET
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A	03/11/14	ISSUED FOR REVIEW	SG	TH	DPH

SCALE: AS SHOWN | DESIGNED BY: TH | DRAWN BY: SG

AT&T

TITLE SHEET
(LTE−2C)

JOB NUMBER	DRAWING NUMBER	REV
1127.01	T−1	1

GROUNDING NOTES

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

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

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

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

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

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

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

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO 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 SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

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

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR – SMARTLINK
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY

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

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

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

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

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

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

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

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

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

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

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

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

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

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

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

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

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

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

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

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

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

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

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

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

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW	TBR	TO BE REMOVED
EXISTING	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF.	REFERENCE		
EGR	EQUIPMENT GROUND RING	REQ'D	REQUIRED	TYP	TYPICAL

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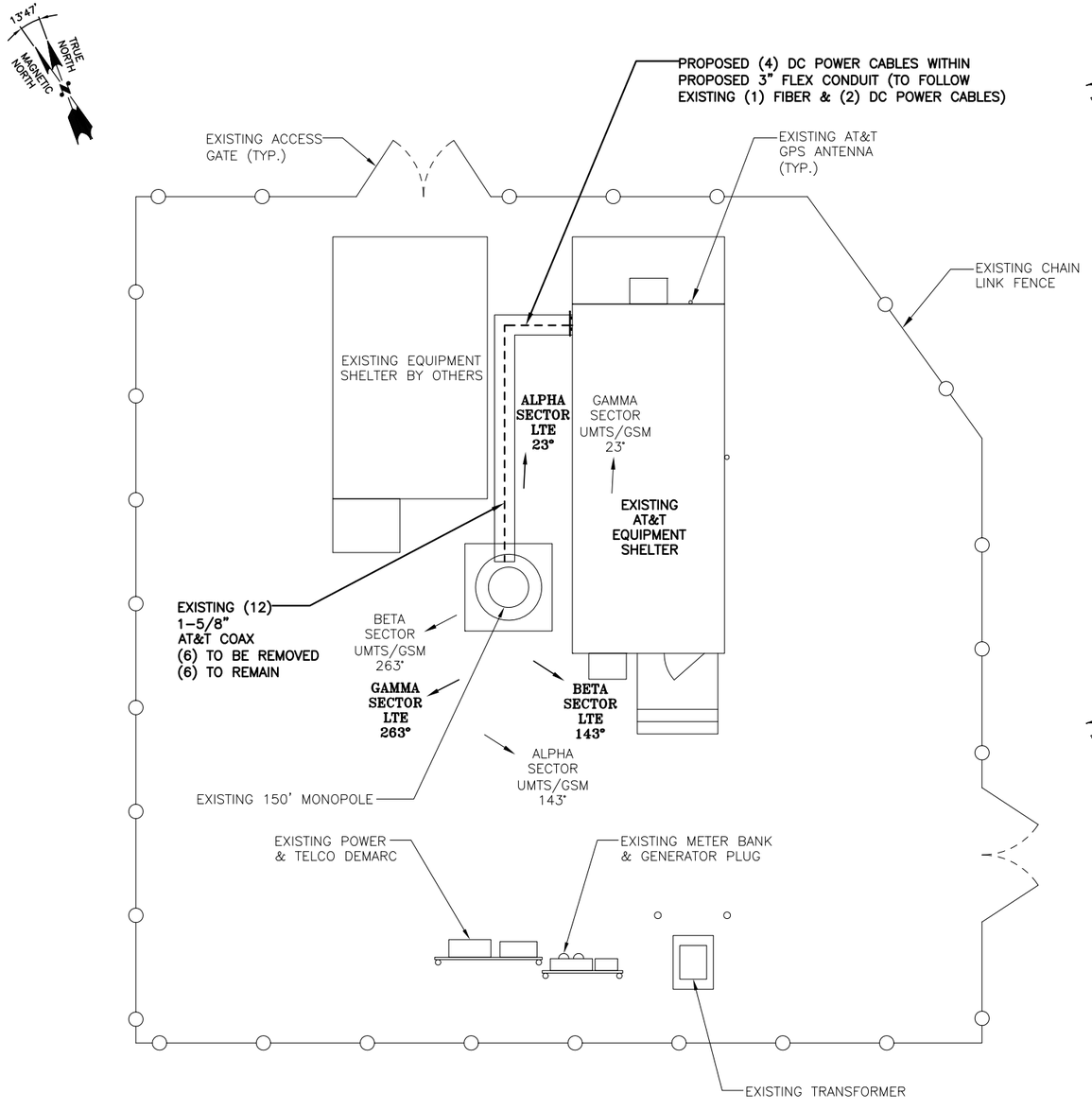
SCALE: AS SHOWN | DESIGNED BY: TH | DRAWN BY: SG

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

AT&T

GENERAL NOTES (LTE-2C)

JOB NUMBER	DRAWING NUMBER	REV
1127.01	GN-1	1



COMPOUND PLAN

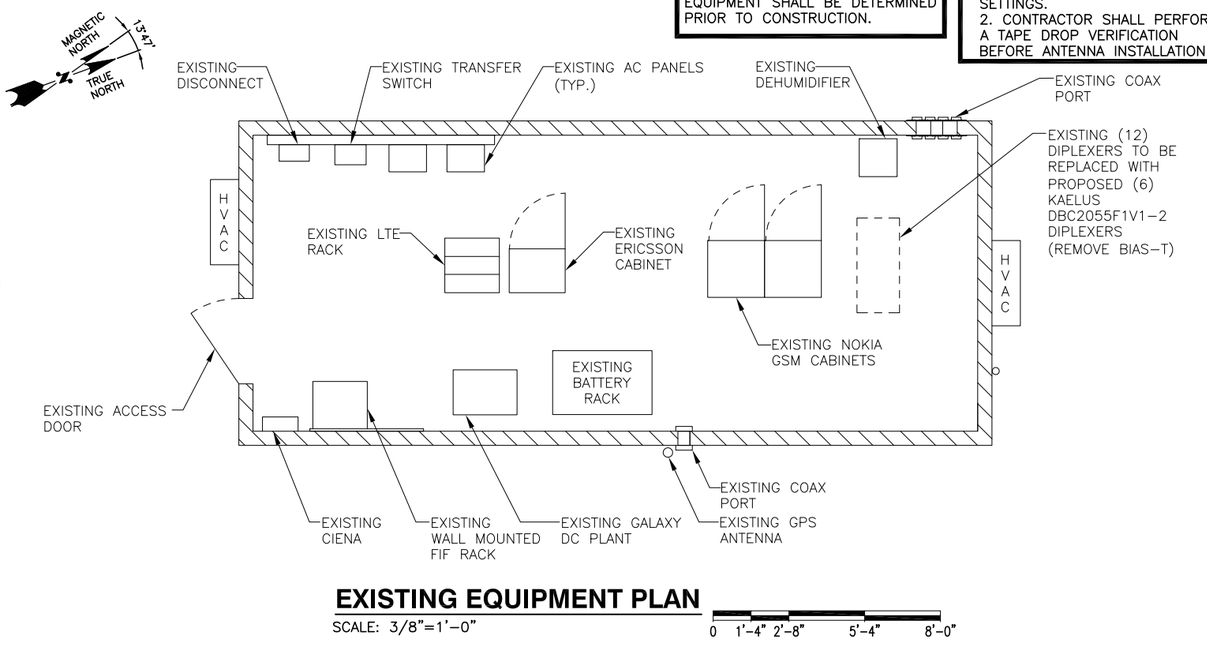
SCALE: 3/16"=1'-0"

0 2'-8" 5'-4" 10'-8" 16'-0"

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

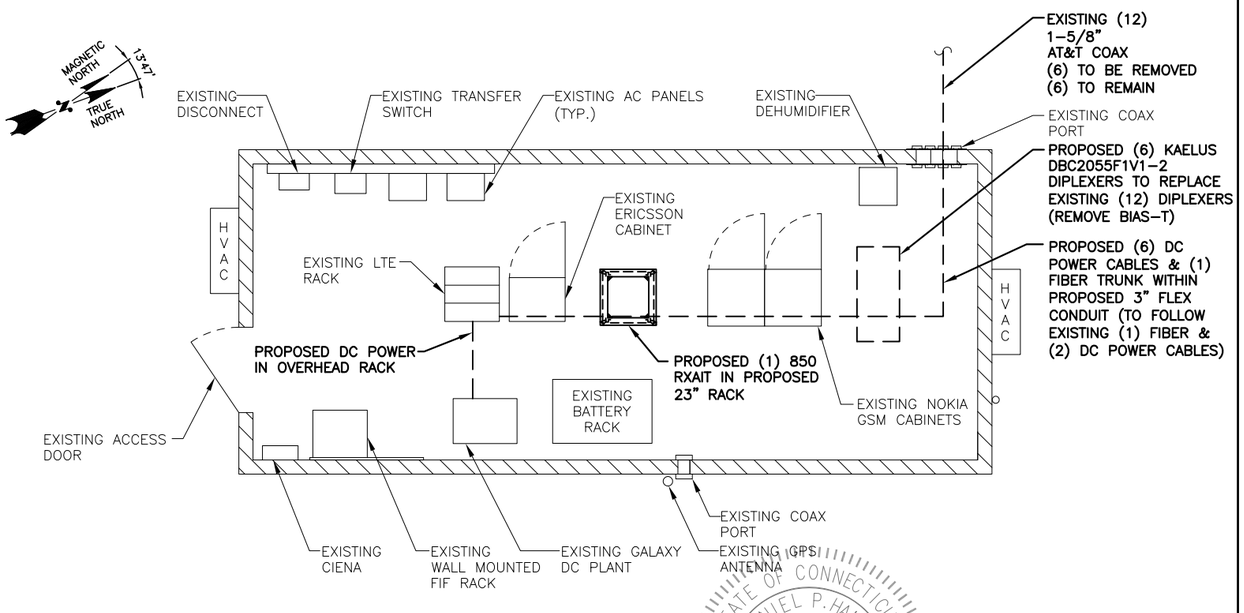
NOTE:
1. RF DATA BASED ON PRELIMINARY RFDS. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.
2. CONTRACTOR SHALL PERFORM A TAPE DROP VERIFICATION BEFORE ANTENNA INSTALLATION



EXISTING EQUIPMENT PLAN

SCALE: 3/8"=1'-0"

0 1'-4" 2'-8" 5'-4" 8'-0"



PROPOSED EQUIPMENT PLAN

SCALE: 3/8"=1'-0"

0 1'-4" 2'-8" 5'-4" 8'-0"

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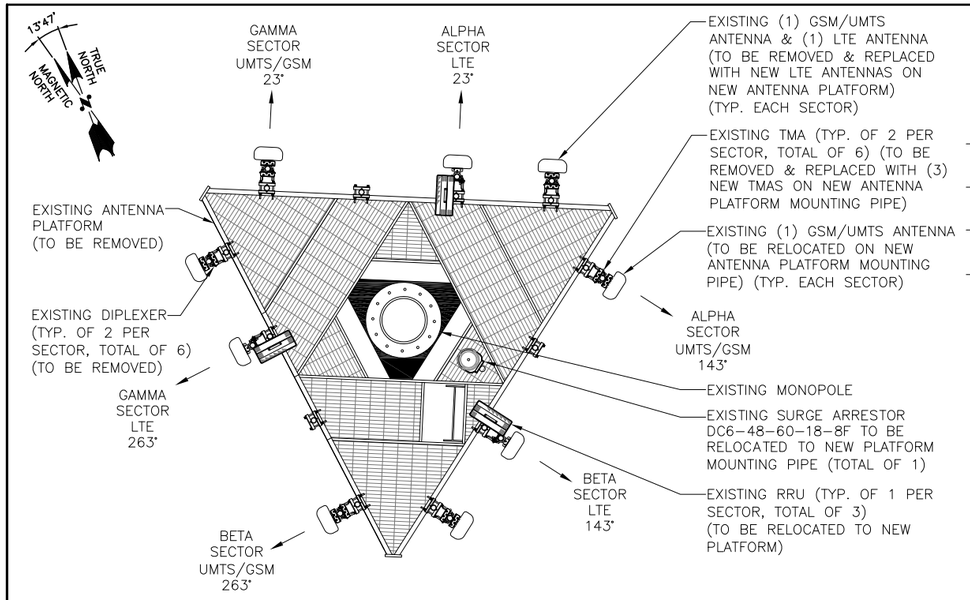
SCALE: AS SHOWN | DESIGNED BY: TH | DRAWN BY: SG

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

AT&T

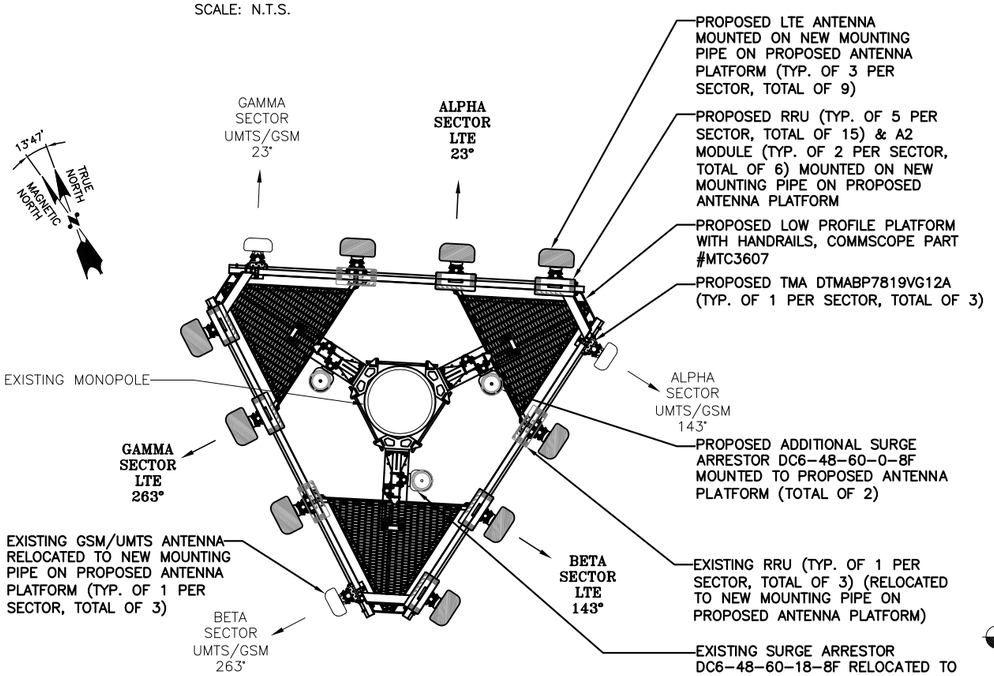
COMPOUND & SHELTER PLANS (LTE-2C)

JOB NUMBER	DRAWING NUMBER	REV
1127.01	A-1	1



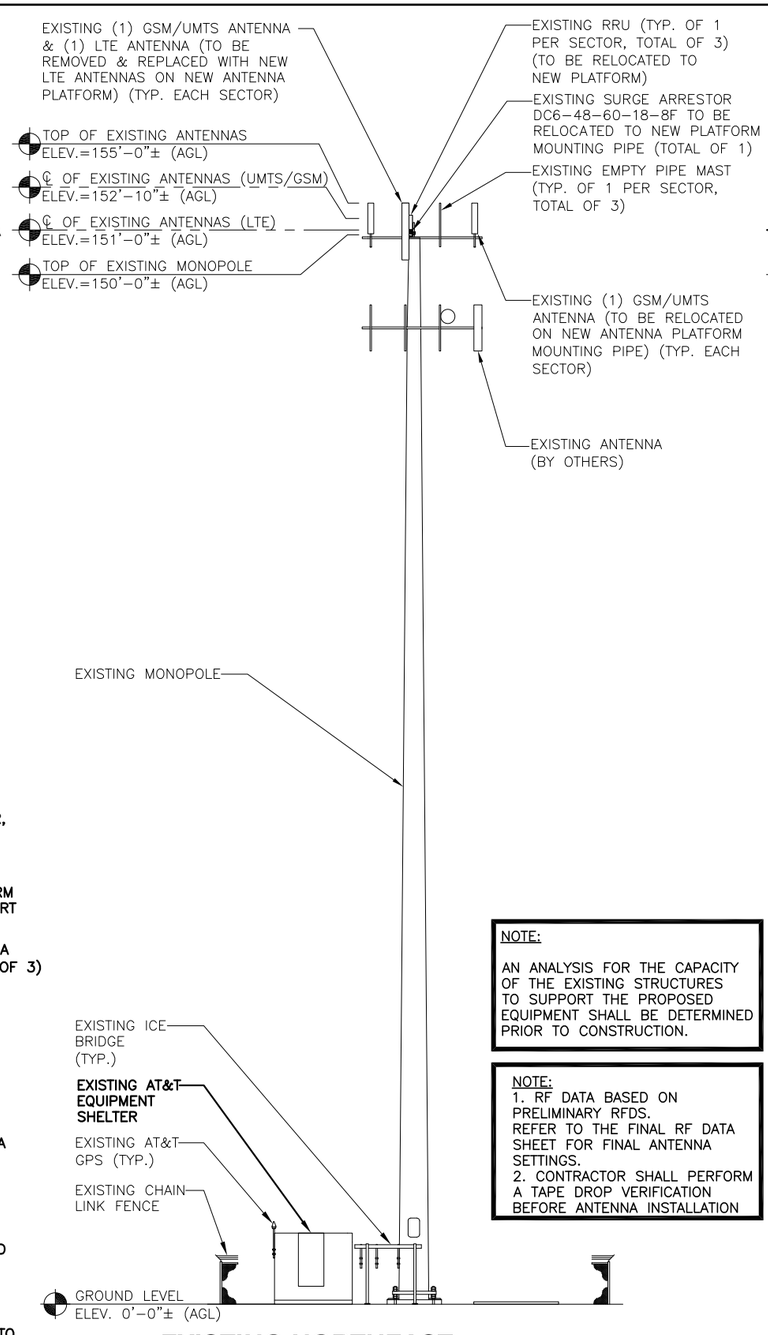
EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.



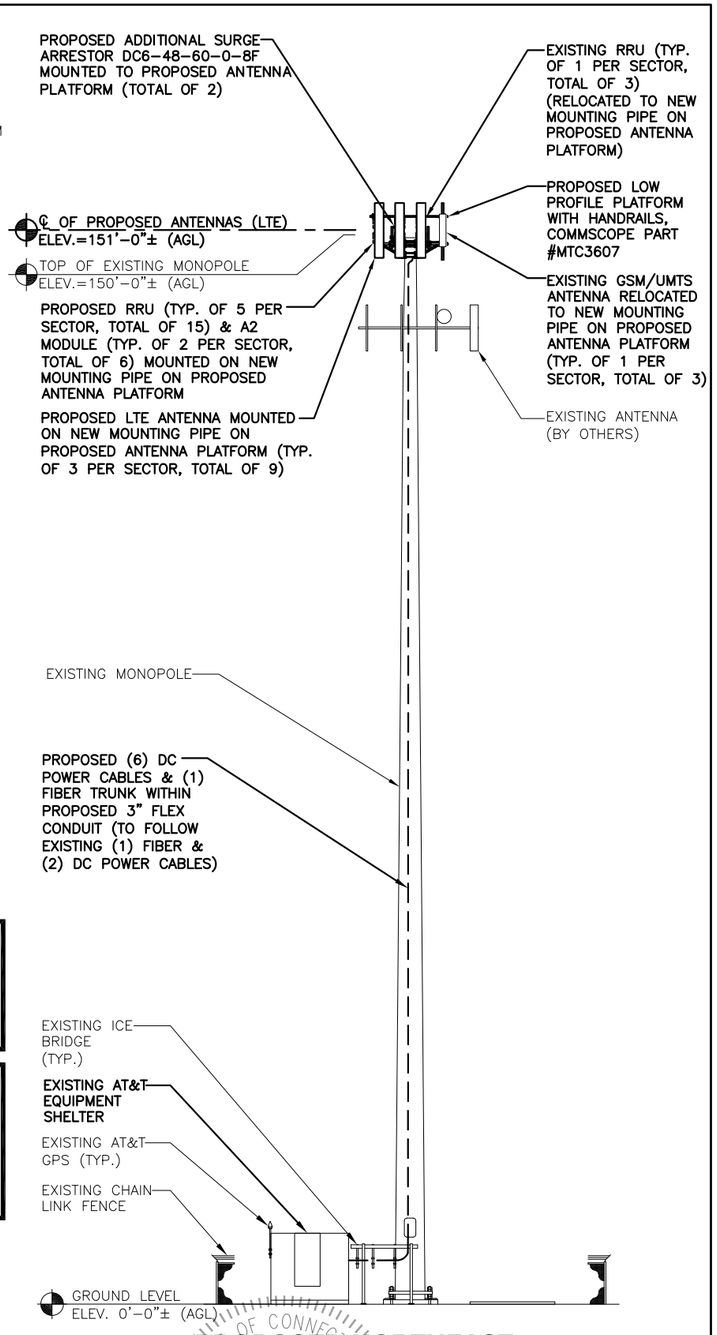
EXISTING NORTHEAST ELEVATION

SCALE: 3/32"=1'-0" 0 5'-4" 10'-8" 21'-4" 32'-0"

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

NOTE:
1. RF DATA BASED ON PRELIMINARY RFDS. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.
2. CONTRACTOR SHALL PERFORM A TAPE DROP VERIFICATION BEFORE ANTENNA INSTALLATION



PROPOSED NORTHEAST ELEVATION

SCALE: 3/32"=1'-0" 0 5'-4" 10'-8" 21'-4" 32'-0"

Hudson Design Group LLC
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smartlink
1997 ANNAPOLIS EXCHANGE PKWY
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SITE NUMBER: CT1127
SITE NAME: WATERBURY
CAPTAIN NEVILLE DR
CCI SITE #: 881534
670 CAPTAIN NEVILLE DRIVE
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at&t
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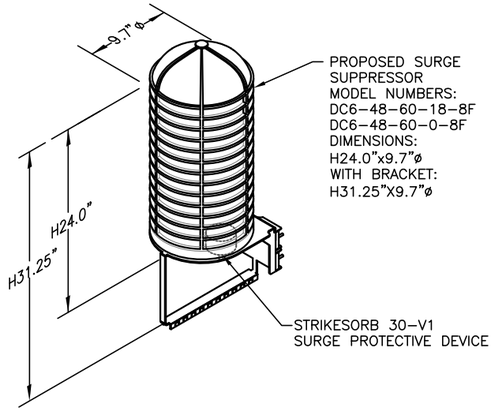
SCALE: AS SHOWN | DESIGNED BY: TH | DRAWN BY: SG

Daniel P. Hamm
No. 24178
LICENSED PROFESSIONAL ENGINEER
STATE OF CONNECTICUT

AT&T

ANTENNA LAYOUT AND ELEVATIONS (LTE-2C)

JOB NUMBER	DRAWING NUMBER	REV
1127.01	A-2	1



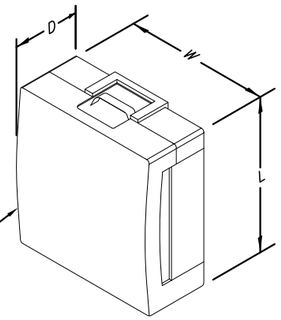
PROPOSED SURGE SUPPRESSOR
MODEL NUMBERS:
DC6-48-60-18-8F
DC6-48-60-0-8F
DIMENSIONS:
H24.0"x9.7"ø
WITH BRACKET:
H31.25"X9.7"ø

STRIKESORB 30-V1
SURGE PROTECTIVE DEVICE

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

DC SURGE SUPPRESSOR DETAIL

SCALE: N.T.S.



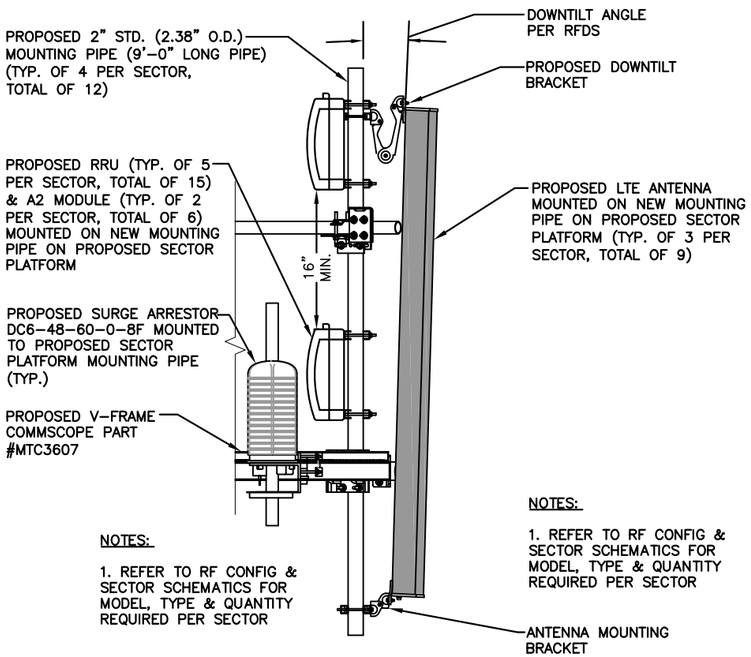
PROPOSED RRU
REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

	L	W	D
RRUS – 11	19.7"	17.0"	7.2"
RRUS – 12	20.4"	18.5"	7.5"
RRUS – 32	26.7"	12.1"	6.7"
RRUS – E2	20"	20.4"	9.5"
LTE – A2	16.4"	15.2"	3.4"

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

RRU DETAIL

SCALE: N.T.S.



PROPOSED 2" STD. (2.38" O.D.) MOUNTING PIPE (9'-0" LONG PIPE) (TYP. OF 4 PER SECTOR, TOTAL OF 12)

DOWNTILT ANGLE PER RFDS

PROPOSED DOWNTILT BRACKET

PROPOSED RRU (TYP. OF 5 PER SECTOR, TOTAL OF 15) & A2 MODULE (TYP. OF 2 PER SECTOR, TOTAL OF 6) MOUNTED ON NEW MOUNTING PIPE ON PROPOSED SECTOR PLATFORM

PROPOSED LTE ANTENNA MOUNTED ON NEW MOUNTING PIPE ON PROPOSED SECTOR PLATFORM (TYP. OF 3 PER SECTOR, TOTAL OF 9)

PROPOSED SURGE ARRESTOR DC6-48-60-0-8F MOUNTED TO PROPOSED SECTOR PLATFORM MOUNTING PIPE (TYP.)

PROPOSED V-FRAME COMMSCOPE PART #MTC3607

NOTES:

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

NOTES:

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

ANTENNA MOUNTING BRACKET

PROPOSED LTE ANTENNA, RRU, & SURGE ARRESTOR MOUNTING DETAIL

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

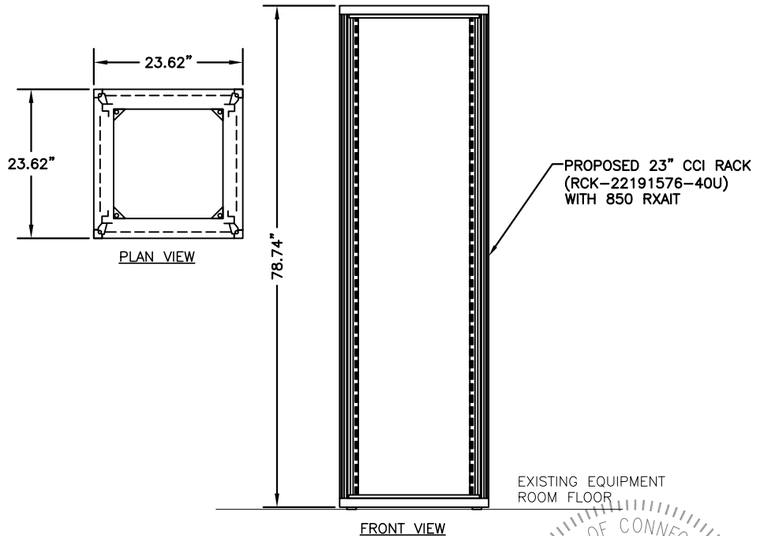
SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	KATHREIN	800-10121	54.5X10.3X5.9
	ANDREW	SBNH-1D6565C	96.4X11.9X7.1
	KATHREIN	800-10121	54.5X10.3X5.9
BETA:	KATHREIN	800-10121	54.5X10.3X5.9
	ANDREW	SBNH-1D6565C	96.4X11.9X7.1
	KATHREIN	800-10121	54.5X10.3X5.9
GAMMA:	KATHREIN	800-10121	54.5X10.3X5.9
	KMW	AM-X-CD-16-65-00T-RET	72X11.8X5.9
	KATHREIN	800-10121	54.5X10.3X5.9

PROPOSED ANTENNA SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	KATHREIN	800-10121	54.5X10.3X5.9
	CCI	HPA-65R-BUU-H8-K	92.4X14.8X7.4
	CCI	HPA-65R-BUU-H8-K	92.4X14.8X7.4
	CCI	HPA-65R-BUU-H8-K	92.4X14.8X7.4
BETA:	KATHREIN	800-10121	54.5X10.3X5.9
	CCI	HPA-65R-BUU-H8-K	92.4X14.8X7.4
	CCI	HPA-65R-BUU-H8-K	92.4X14.8X7.4
	CCI	HPA-65R-BUU-H8-K	92.4X14.8X7.4
GAMMA:	KATHREIN	800-10121	54.5X10.3X5.9
	CCI	HPA-65R-BUU-H6-K	72.4X14.8X9
	CCI	HPA-65R-BUU-H6-K	72.4X14.8X9
	CCI	HPA-65R-BUU-H6-K	72.4X14.8X9

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA:	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-E2	20.0x20.4x9.5
	ERISSSON	RRUS-32	26.7x12.1x6.7
	ERICSSON	A2 MODULE	16.4x15.2x3.4
	ERICSSON	A2 MODULE	16.4x15.2x3.4
BETA:	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-E2	20.0x20.4x9.5
	ERISSSON	RRUS-32	26.7x12.1x6.7
	ERICSSON	A2 MODULE	16.4x15.2x3.4
	ERICSSON	A2 MODULE	16.4x15.2x3.4
GAMMA:	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-12	20.4x18.5x7.5
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-11	19.7x17.0x7.2
	ERICSSON	RRUS-E2	20.0x20.4x9.5
	ERISSSON	RRUS-32	26.7x12.1x6.7
	ERICSSON	A2 MODULE	16.4x15.2x3.4
	ERICSSON	A2 MODULE	16.4x15.2x3.4



PROPOSED 23" CCI RACK (RCK-22191576-40U) WITH 850 RXAIT

PROPOSED EQUIPMENT RACK DETAIL

SCALE: N.T.S.

NOTE:

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NOTE:
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2. CONTRACTOR SHALL PERFORM A TAPE DROP VERIFICATION BEFORE ANTENNA INSTALLATION

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

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smartlink
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SITE NAME: WATERBURY
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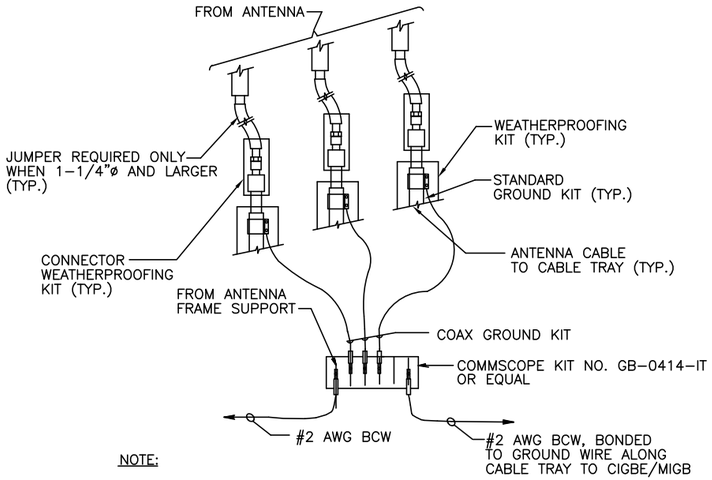
0	4/21/14	ISSUED FOR REVIEW	VP	TH	DPH
A	03/11/14	ISSUED FOR REVIEW	SG	TH	DPH

SCALE: AS SHOWN | DESIGNED BY: TH | DRAWN BY: SG

AT&T

DETAILS
(LTE-2C)

JOB NUMBER	DRAWING NUMBER	REV
1127.01	A-3	1

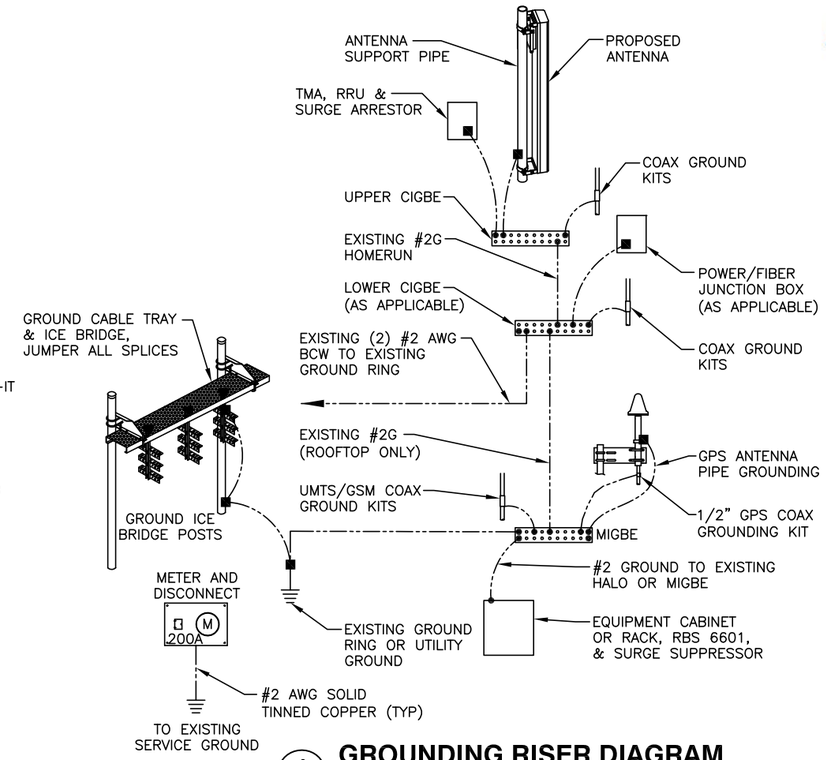


NOTE:

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

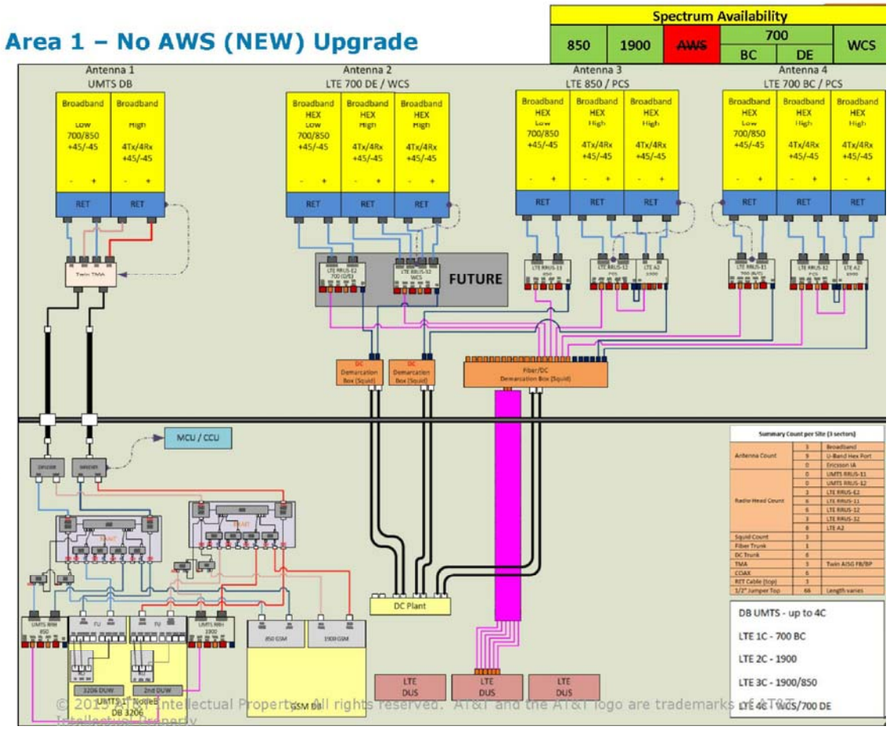
GROUND WIRE TO GROUND BAR CONNECTION DETAIL

1 — N.T.S.



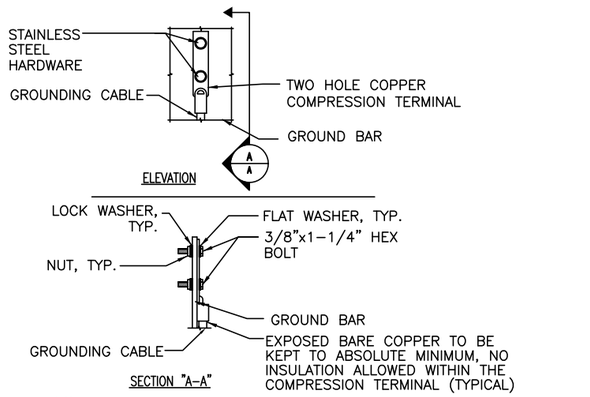
GROUNDING RISER DIAGRAM

2 — N.T.S.



PLUMBING DIAGRAM

3 — N.T.S.

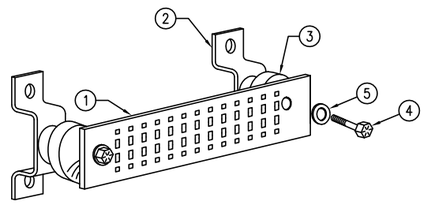


NOTE:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

4 — N.T.S.

WIRELESS SOLUTIONS INC.			
NO.	REQ.	PART NO.	DESCRIPTION
1	1	HLGB-0420-IS	SOLID GND. BAR (20"x4"x1/4")
2	2	———	WALL MTG. BRKT.
3	2	———	INSULATORS
4	4	———	5/8"-11x1" H.H.C.S.
5	4	———	5/8 LOCKWASHER



GROUND BAR - DETAIL

5 — N.T.S.

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

SECTION "P" – SURGE PRODUCERS

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

SECTION "A" – SURGE ABSORBERS

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

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SCALE: AS SHOWN | DESIGNED BY: TH | DRAWN BY: SG

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

AT&T

PLUMBING DIAGRAM & DETAILS (LTE–2C)

JOB NUMBER	DRAWING NUMBER	REV
1127.01	G–1	1

200 North Glebe Road, Suite 1000
Arlington, VA 22203-3728

Todd Oliver
Smartlink, LLC
Market Manager, NE
33 Boston Post Road, Suite 210
Marlborough, MA 01752

Reference: Smartlink LLC Site, Waterbury Captain Neville Drive, 670 Captain Neville Drive, Waterbury, CT

Date: 12 May 2014

1. This letter will address the additional RF impact that adding AT&T LTE antennas to the referenced site. Attached are two documents which cover the modeled RF emissions from the site.

2. The first report, "RF Emissions Compliance Report," for the site complied by Sitesafe, uses the antenna patterns for the antennas at the site to calculate the General Public Maximum Permissible Exposure (MPE) on the ground. The total MPE of all the carriers is 0.965% (based on the General Public MPE) based on this modeling, with AT&T antennas emitting a maximum of 0.896% of the General Public MPE on the ground.

3. The second attachment has the calculations, used by the Connecticut Siting Council, which assumes the maximum antenna gain transmits in a spherical pattern where the worst case results would be at the base of the tower. That calculation, based on the existing antennas, gives a result of 18.53% of the General Public MPE, with the AT&T antennas emitting 15.91% of the General Public MPE on the ground, using the modeling predictions used by Connecticut Siting Council.

4. In either case, the site is compliant with FCC guidelines. If you have any questions regarding this site, the compliance report, please contact me at 719-434-0700 or dcotton@sitesafe.com.

Director, RF Compliance

Attachment 1

RF EMISSIONS COMPLIANCE REPORT

Smartlink LLC on behalf of AT&T Mobility, LLC

AT&T Mobility, LLC Site FA: 10035324
AT&T Mobility, LLC USID: 140425
AT&T Mobility, LLC Site ID: CT1127
AT&T Mobility, LLC Site Name: Waterbury Captain Neville Drive
670 Captain Neville Drive
Waterbury, CT
5/12/2014

Report Status:

AT&T Mobility, LLC Is Compliant

Prepared By:

Sitesafe, Inc.

200 North Glebe Road, Suite 1000 Arlington, VA 22203 Voice 703-276-1100
Fax 703-276-1169

Engineering Statement in Re:
Electromagnetic Energy Analysis
AT&T Mobility, LLC
Waterbury, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Sitesafe, Inc. in Arlington, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by AT&T Mobility, LLC (See attached Site Summary and Carrier documents), and that AT&T Mobility, LLC's installations involve communications equipment, antennas and associated technical equipment at a location referred to as the "Waterbury Captain Neville Drive" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet, and that worst-case 100% duty cycle have been assumed; and

That in addition to the emitters specified in the worksheet, there are additional collocated point-to-point microwave facilities on this structure and, the antennas used are highly directional oriented at angles at or just below the horizontal and, that the energy present at ground level is typically so low as to be considered insignificant; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio-frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio-frequency radiation must utilize the standards set by the FCC, which is the Federal Agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," defined as situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and (2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for

licensees of AT&T Mobility, LLC's operating frequency as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is no more than 0.896% of the maximum in any accessible area on the ground and

That it is understood per FCC Guidelines and OET65 Appendix A, that regardless of the existent radio-frequency environment, only those licenses whose contributions exceed five percent of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 0.965% of the maximum in any accessible area up to two meters above the ground per OET-65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET-65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier and frequency range indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding Radio Frequency Safety.

In summary, it is stated here that the proposed operation at the site would not result in exposure of the Public to excessive levels of radio-frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307 and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals, and approved contractor personnel trained in radio-frequency safety; and that the instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower, or in the immediate proximity of the antennas.

Note: Sitesafe has used data obtained from the “Connecticut Siting Council” to create this report. The manufacturer antenna patterns for AT&T Mobility, LLC were used to determine the RF emissions from the AT&T Mobility, LLC antennas. Generic antennas were used for the other operators on the tower as this information was not available, or provided at the time the study was conducted. Sitesafe has also referenced the AT&T Mobility, LLC construction diagram for this site.

The following documents below were the primary sources of data used to create this report. The primary document was the “Connecticut Siting Council” document. The AT&T Mobility, LLC construction diagram was referenced when appropriate. Sitesafe has conducted additional FCC research on this site for the Clearwire microwaves licensed at the site, as not all of this information was included on the “Connecticut Siting Council” data. Sitesafe has included additional representative modeling for the addition of the second carrier AT&T Mobility, LLC LTE operations at the site. Please review the engineering statement above regarding RF emissions from the microwave antennas.

Connecticut Siting Council: AlphaExMPowDens 4-16-14

AT&T Mobility, LLC Construction Diagram: 10035324.AE201.140425 (CT1127) Hudson Rev 1 S&S

[1] This Power Density information was taken from the Connecticut Siting Council database dated April 16, 2014.
[2] This Power Density information is based on worse case assumptions from AT&T’s radio frequency engineers.

AT&T Mobility, LLC (Proposed)
Waterbury Captain Neville Drive
Site Summary

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.333 %
AT&T Mobility, LLC	0.18 %
AT&T Mobility, LLC (Proposed/Future)	0 %
AT&T Mobility, LLC (Proposed/Future)	0 %
AT&T Mobility, LLC (Proposed/Future)	0 %
AT&T Mobility, LLC (Proposed)	0.192 %
AT&T Mobility, LLC (Proposed)	0.191 %
Clearwire	0.028 %
WQMS225 - Clearwire/Path 1 (Microwave)	0 %
WQMS225 - Clearwire/Path 3 (Microwave)	0 %
WQMS225 - Clearwire/Path 4 (Microwave)	0 %
XM Satellite Radio	0.042 %
Composite Site MPE:	0.965 %

Attachment 2

Waterbury - 670 Captain Neville Drive

Power Density Calculations

Control Number	Site	Carrier	#Channels	ERP/Ch	Ant Ht	Power Density (mW/c	MHz	S	%MPE	Site Total
EM-CING-151-120511	Waterbury - 670 Captain Neville Drive	AT&T UMTS	2	565	150	0.0181	880	0.5867	3.08%	
EM-CING-151-120511	Waterbury - 670 Captain Neville Drive	AT&T UMTS	2	1077	150	0.0344	1900	1.0000	3.44%	
EM-CING-151-120511	Waterbury - 670 Captain Neville Drive	AT&T GSM	1	283	150	0.0045	880	0.5867	0.77%	
EM-CING-151-120511	Waterbury - 670 Captain Neville Drive	AT&T GSM	4	646	150	0.0413	1900	1.0000	4.13%	
EM-CING-151-120511	Waterbury - 670 Captain Neville Drive	AT&T LTE	1	1375	150	0.0220	734	0.4893	4.49%	
EM-Clearwire-151-090921	**Waterbury - 670 Captain Neville Drive**	**Clearwire antennas**	**2**	**153**	**140**	**0.0056**	**2496**	**1.0000**	**0.56%**	
EM-Clearwire-151-090921	**Waterbury - 670 Captain Neville Drive**	**Clearwire microwave dishes**	**1**	**211**	**140**	**0.0039**	**11 GHz**	**1.0000**	**0.39%**	
EM-Clearwire-151-090921	**Waterbury - 670 Captain Neville Drive**	**Clearwire microwave dishes**	**1**	**211**	**140**	**0.0039**	**11 GHz**	**1.0000**	**0.39%**	
EM-Clearwire-151-090921	**Waterbury - 670 Captain Neville Drive**	**Clearwire microwave dishes**	**1**	**211**	**140**	**0.0039**	**11 GHz**	**1.0000**	**0.39%**	
EM-CING-081-130-151-166-020730	**Waterbury - Captain Neville Drive**	**XM Sat Radio**	**2**	**312**	**158.5**	**0.0089**	**2337.49**	**1.0000**	**0.89%**	**18.53%**

Date: **May 15, 2014**

Patrick Byrum
Crown Castle
3530 Toringdon Way, Suite 300
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(704) 405-6532

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320 Seven Springs Way, Suite 350
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Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTLO1127
	Carrier Site Name:	Waterbury Captain Neville Driv
Crown Castle Designation:	**Crown Castle BU Number:**	881534
	Crown Castle Site Name:	Waterbury Tower
	Crown Castle JDE Job Number:	264391
	Crown Castle Work Order Number:	726219
	Crown Castle Application Number:	211782 Rev. 6
Engineering Firm Designation:	**SSOE Group Project Number:**	014-00546-00
Site Data:	**670 Captain Neville Drive, Waterbury, CT 06705, New Haven County** **Latitude *41° 32' 3.55"*, Longitude *-72° 58' 10.0"*** **150 Foot – EEI Monopole Tower**	

Dear Mr. Patrick Byrum,

SSOE Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 626441, in accordance with application 221782, revision 6.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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

Structural analysis prepared by: Brian D. Moon, EI

Respectfully submitted by:

5/15/14

Barry W. Burgess, PE
Section Manager

TABLE OF CONTENTS

1) INTRODUCTION

The existing 150' monopole has eighteen sides and is evenly tapered from 49.50" (flat-flat) at the base to 17.00" (flat-flat) at the top. It has four major sections, connected with slip joints. The structure is galvanized and has no tower lighting.

The tower was originally designed for Candid Communications by Engineered Endeavors, Inc. of Mentor, Ohio for an 85 mph wind speed with 0.5 inch radial ice in accordance with TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 38 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	150.0	3	CCI Antennas	HPA-65R-BUU-H6			
		6	CCI Antennas	HPA-65R-BUU-H8			
		3	Kathrein	800 10121			
		3	Communication Components	DTMABP7819VG12A			
		6	Ericsson	RRUS 11			
		6	Ericsson	RRUS 12 W/O SOLAR SHIELD			
		6	Ericsson	RRUS A2 MODULE			
		2	Raycap	DC6-48-60-18-8F			
		3	Ericsson	RRUS E2 B29			
		3	Ericsson	WCS RRUS-32-B30			
		1	Commscope	MTC3607R			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	150.0	1	Raycap	DC6-48-60-18-8F	12 2 1	1-5/8 3/4 3/8	
		6	Powerwave Tech	7770.00 w/ Mount Pipe			1
		2	Andrew	SBNH-1D6565C w/ Mount Pipe			
		1	KMW Communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	Powerwave Tech	LGP21401			
		6	Powerwave Tech	LGP13519			
		1		Platform Mount [LP 601-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	142.0	2	Andrew	VHLP2-11	3 3 3	1/2 1/4 5/16	
		1	Andrew	VHLP2-18			
		1	Andrew	VHLP2-23			
		4	Dragonwave	Horizon Compact			
		1	Motorola	TIMING 2000			
	140.0	3	Argus Technologies	LLPX310R w/ Mount Pipe			
		3	Samsung Telecommunications	WIMAX DAP HEAD			
		1		Platform Mount [LP 601-1]			

Notes:
1) Existing equipment to be removed, not considered in analysis.

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150.0	150.0	12	Allgon	A-800-110		
		1		Low Profile Platform Mount		
140.0	140.0	12	Allgon	A-800-110		
		1		Low Profile Platform Mount		
130.0	130.0	12	Allgon	A-800-110		
		1		Low Profile Platform Mount		
120.0	120.0	9	Allgon	A-800-110		
		1		Low Profile Platform Mount		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Original Tower Drawings	Engineered Endeavors, Job #: 6430, dated 2/17/00	Doc ID#: 1405785	Crown DMZ
Foundation Drawings	URS Greiner Woodward Clyde, Project #: F301877.00/F04, dated 1/28/00	Doc ID#:1406237	Crown DMZ
Geotechnical Reports	Clarence Welti Assoc., Project Name: Communications Tower Site, dated 11/30/99	Doc ID#: 1405752	Crown DMZ

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) The tower was constructed in accordance with its original design and maintained per the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) Mount sizes, weights, and manufacturers are best estimates based on photos provided and determined without the benefit of a site visit by SSOE.
4) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
5) All foundation steel reinforcing is assumed to have been designed to meet or exceed the load carrying capacity of the surrounding soils unless otherwise specified in this report.
6) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package, dated 3/11/14 with any adjustments as noted below.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 123.29	Pole	TP23.17x17x0.1875	1	-5.53	686.61	104.6	Pass[2]
L2	123.29 - 87.79	Pole	TP30.86x22.005x0.3125	2	-9.75	1523.31	100.2	Pass[2]
L3	87.79 - 43.21	Pole	TP40.4x29.2294x0.375	3	-17.56	2397.93	94.3	Pass
L4	43.21 - 0	Pole	TP49.5x38.3779x0.4375	4	-19.64	2830.76	84.4	Pass
							Summary	
						Pole (L1)	104.6	Pass[2]
						Rating =	104.6	Pass[2]

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Base Plate		101.2%	Pass
1	Anchor Rods		76.2%	Pass
1	Foundation		50.2%	Pass

Structure Rating (max from all components) =	104.6%[2]

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) A structure rating of 105% or less is within engineering tolerances and considered acceptable.

4.1) Recommendations

The existing tower and its foundations are sufficient for the proposed loads and do not require modifications.

5) DISCLAIMER OF WARRANTIES

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

The engineering services rendered by SSOE Group in connection with this structural analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to resist dead loads only when no other loads are applied. No allowance has been made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance has been made for any loose bolts or cracked welds.

For the purposes of this report, SSOE Group has assumed that all connections in the tower are sufficient to develop the allowable strength of the associated members. SSOE Group has not performed engineering analysis to verify adequacy of these connections.

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

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

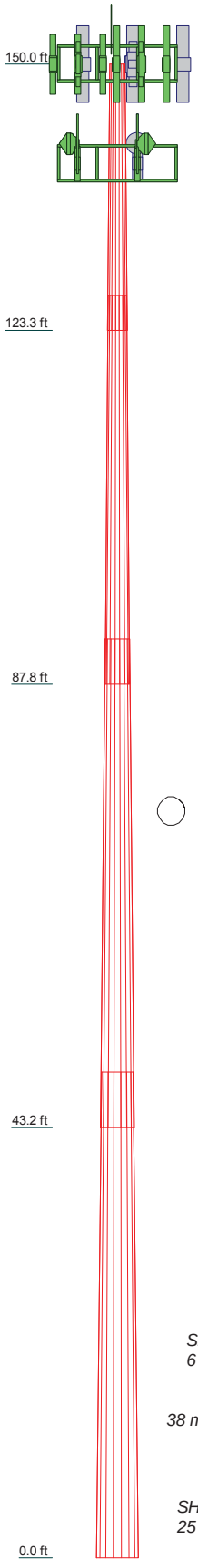
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as part of our work. We recommend that material of suitable size and strength be purchased from a reputable tower manufacturer.

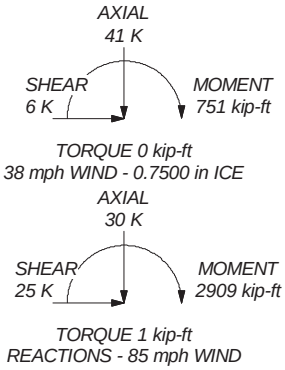
SSOE Group makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. SSOE Group will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	26.71	38.92	49.00	48.79
Number of Sides	18	18	18	18
Thickness (in)	0.1875	0.3125	0.3750	0.4375
Socket Length (ft)	3.42	4.42	5.58	
Top Dia (in)	17.0000	22.0050	29.2294	38.3779
Bot Dia (in)	23.1700	30.8600	40.4000	49.5000
Grade	A572-65			
Weight (K)	1.1	3.4	6.8	10.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 3/4" x 5'	151	RRUS E2 B29	150
Platform Mount [LP 1303-1] MTC3607R	150	(2) RRUS A2 MODULE	150
		DTMABP7819VG12A	150
(3) HPA-65R-BUU-H8	150	(2) RRUS 12 W/O SOLAR SHIELD	150
800 10121	150	DC6-48-60-18-8F	150
RRUS E2 B29	150	Platform Mount [LP 601-1]	140
RRUS 11	150	LLPX310R w/ Mount Pipe	140
WCS RRUS-32-B30	150	WIMAX DAP HEAD	140
(2) RRUS A2 MODULE	150	Horizon Compact	140
DTMABP7819VG12A	150	(3) 6' x 2" mount pipe	140
(2) RRUS 12 W/O SOLAR SHIELD	150	LLPX310R w/ Mount Pipe	140
DC6-48-60-18-8F	150	WIMAX DAP HEAD	140
(3) HPA-65R-BUU-H8	150	Horizon Compact	140
800 10121	150	(3) 6' x 2" mount pipe	140
RRUS E2 B29	150	LLPX310R w/ Mount Pipe	140
(2) RRUS 11	150	TIMING 2000	140
WCS RRUS-32-B30	150	WIMAX DAP HEAD	140
(2) RRUS A2 MODULE	150	Horizon Compact	140
DTMABP7819VG12A	150	Horizon Compact	140
(2) RRUS 12 W/O SOLAR SHIELD	150	(3) 6' x 2" mount pipe	140
DC6-48-60-18-8F	150	VHLP2-18	140
(3) HPA-65R-BUU-H6	150	VHLP2-11	140
800 10121	150	VHLP2-23	140
WCS RRUS-32-B30	150	VHLP2-11	140
(3) RRUS 11	150		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 104.6%

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Brentwood, Tennessee
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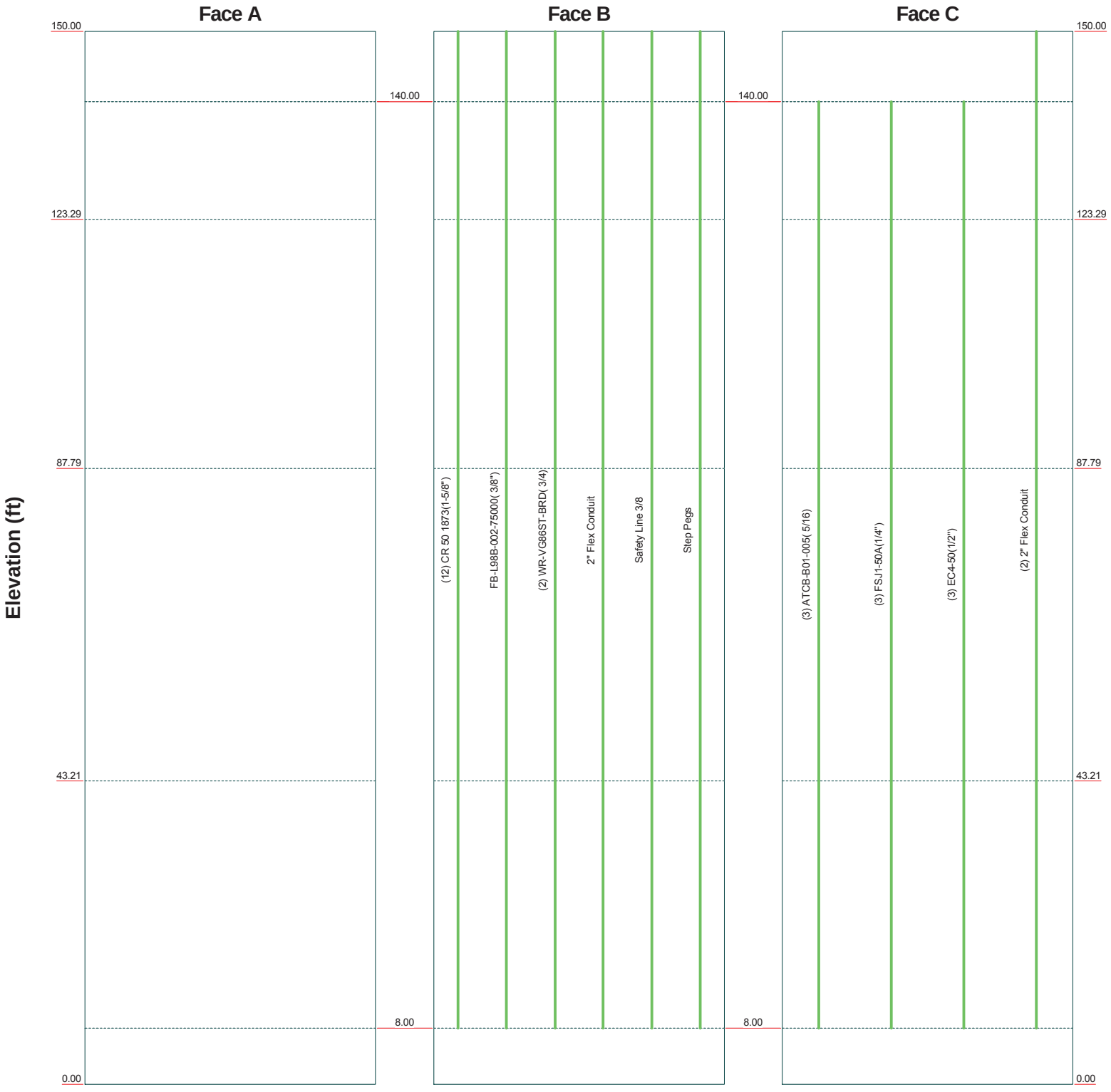
FAX: (615) 661-7569

Job: BU 881534 Waterbury Tower			
Project: 014-00546-00			
Client: CCI	Drawn by: 15264	App'd:	
Code: TIA/EIA-222-F	Date: 05/15/14	Scale: NTS	
Path: C:\Users\15264\Desktop\Jobs\BU#881534 Waterbury Tower\tnx\881534.eri		Dwg No. E-1	

Feed Line Distribution Chart
0' - 150'

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



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320 Seven Springs Way, Suite 350
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Job: BU 881534 Waterbury Tower			
Project: 014-00546-00			
Client: CCI	Drawn by: 15264	App'd:	
Code: TIA/EIA-222-F	Date: 05/15/14	Scale: NTS	
Path: C:\Users\15264\Desktop\Jobs\BU#881534 Waterbury Tower\tnx\881534.eri		Dwg No. E-7	

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

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	150.00-123.29	26.71	3.42	18	17.0000	23.1700	0.1875	0.7500	A572-65 (65 ksi)
L2	123.29-87.79	38.92	4.42	18	22.0050	30.8600	0.3125	1.2500	A572-65 (65 ksi)
L3	87.79-43.21	49.00	5.58	18	29.2294	40.4000	0.3750	1.5000	A572-65 (65 ksi)
L4	43.21-0.00	48.79		18	38.3779	49.5000	0.4375	1.7500	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	17.2623	10.0055	357.3078	5.9684	8.6360	41.3742	715.0858	5.0037	2.6620	14.197
	23.5274	13.6775	912.7198	8.1588	11.7704	77.5439	1826.6405	6.8400	3.7479	19.989
L2	23.1346	21.5162	1279.1518	7.7008	11.1785	114.4293	2559.9868	10.7602	3.3229	10.633
	31.3361	30.2993	3572.0820	10.8444	15.6769	227.8567	7148.8642	15.1525	4.8814	15.62
L3	30.7035	34.3439	3612.5208	10.2433	14.8485	243.2917	7229.7951	17.1752	4.4844	11.958
	41.0232	47.6398	9642.0563	14.2089	20.5232	469.8125	19296.7998	23.8244	6.4504	17.201
L4	40.2616	52.6850	9581.3938	13.4688	19.4960	491.4548	19175.3950	26.3475	5.9845	13.679
	50.2636	68.1294	20719.1270	17.4172	25.1460	823.9532	41465.5167	34.0712	7.9420	18.153

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
L1 150.00-123.29				1	1	1		
L2 123.29-87.79				1	1	1		
L3 87.79-43.21				1	1	1		
L4 43.21-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
CR 50 1873(1-5/8")	B	No	Inside Pole	150.00 - 8.00	12	No Ice	0.00	0.83
						1/2" Ice	0.00	0.83
						1" Ice	0.00	0.83
						2" Ice	0.00	0.83
						4" Ice	0.00	0.83
FB-L98B-002-75000(3/8")	B	No	Inside Pole	150.00 - 8.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	150.00 - 8.00	2	No Ice	0.00	0.59
						1/2" Ice	0.00	0.59
						1" Ice	0.00	0.59
						2" Ice	0.00	0.59
						4" Ice	0.00	0.59
2" Flex Conduit	B	No	Inside Pole	150.00 - 8.00	1	No Ice	0.00	0.32
						1/2" Ice	0.00	0.32
						1" Ice	0.00	0.32
						2" Ice	0.00	0.32
						4" Ice	0.00	0.32
ATCB-B01-005(5/16)	C	No	Inside Pole	140.00 - 8.00	3	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
						2" Ice	0.00	0.07
						4" Ice	0.00	0.07
FSJ1-50A(1/4")	C	No	Inside Pole	140.00 - 8.00	3	No Ice	0.00	0.04

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.00	0.04
						1" Ice	0.00	0.04
						2" Ice	0.00	0.04
						4" Ice	0.00	0.04
EC4-50(1/2")	C	No	Inside Pole	140.00 - 8.00	3	No Ice	0.00	0.16
						1/2" Ice	0.00	0.16
						1" Ice	0.00	0.16
						2" Ice	0.00	0.16
						4" Ice	0.00	0.16
2" Flex Conduit	C	No	Inside Pole	150.00 - 8.00	2	No Ice	0.00	0.32
						1/2" Ice	0.00	0.32
						1" Ice	0.00	0.32
						2" Ice	0.00	0.32
						4" Ice	0.00	0.32
Safety Line 3/8	B	No	CaAa (Out Of Face)	150.00 - 8.00	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
Step Pegs	B	No	CaAa (Out Of Face)	150.00 - 8.00	1	No Ice	0.08	2.72
						1/2" Ice	0.18	3.51
						1" Ice	0.28	4.92
						2" Ice	0.48	9.56
						4" Ice	0.88	26.18

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-123.29	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	3.138	0.39
		C	0.000	0.000	0.000	0.000	0.03
L2	123.29-87.79	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	4.171	0.51
		C	0.000	0.000	0.000	0.000	0.05
L3	87.79-43.21	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	5.238	0.64
		C	0.000	0.000	0.000	0.000	0.07
L4	43.21-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	4.137	0.51
		C	0.000	0.000	0.000	0.000	0.05

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-123.29	A	0.889	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	12.635	0.46
		C		0.000	0.000	0.000	0.000	0.03
L2	123.29-87.79	A	0.862	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	16.793	0.61
		C		0.000	0.000	0.000	0.000	0.05
L3	87.79-43.21	A	0.814	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	20.602	0.77
		C		0.000	0.000	0.000	0.000	0.07
L4	43.21-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	15.595	0.60
		C		0.000	0.000	0.000	0.000	0.05

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.00-123.29	0.1426	0.0823	0.4482	0.2588
L2	123.29-87.79	0.1450	0.0837	0.4809	0.2776
L3	87.79-43.21	0.1468	0.0847	0.4979	0.2874
L4	43.21-0.00	0.1188	0.0686	0.4051	0.2339

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lighting Rod 3/4" x 5'	C	From Leg	0.00 0.00 2.50	0.0000	151.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.38 0.89 1.36 1.99 3.38	0.38 0.89 1.36 1.99 3.38	0.03 0.03 0.04 0.07 0.16
Platform Mount [LP 1303-1] MTC3607R	C	None		0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	56.80 70.80 84.80 112.80 168.80	56.80 70.80 84.80 112.80 168.80	2.53 3.38 4.24 5.96 9.38
(3) HPA-65R-BUU-H8	A	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.30 13.99 14.70 16.14 19.13	7.52 8.09 8.67 9.85 12.29	0.07 0.14 0.22 0.41 0.88
800 10121	A	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.46 5.88 6.31 7.21 9.09	3.29 3.64 3.99 4.76 6.53	0.05 0.08 0.12 0.21 0.45
RRUS E2 B29	A	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.93 4.19 4.75 5.96	1.49 1.67 1.87 2.28 3.21	0.06 0.08 0.11 0.17 0.35
RRUS 11	A	From Centroid-Le	3.68 1.56	23.0000	150.00	No Ice 1/2" Ice	3.25 3.49	1.37 1.55	0.05 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		g	0.00			1" Ice	3.74	1.74	0.10
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
WCS RRUS-32-B30	A	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.87 4.15 4.44 5.06 6.38	2.76 3.02 3.29 3.85 5.08	0.08 0.10 0.14 0.21 0.41
(2) RRUS A2 MODULE	A	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.87 2.05 2.24 2.66 3.58	0.42 0.53 0.65 0.91 1.54	0.02 0.03 0.04 0.08 0.18
DTMABP7819VG12A	A	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14
(2) RRUS 12 W/O SOLAR SHIELD	A	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.89 3.11 3.35 3.85 4.95	1.00 1.15 1.31 1.66 2.46	0.06 0.08 0.10 0.15 0.29
DC6-48-60-18-8F	A	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.22 2.44 2.66 3.15 4.21	2.22 2.44 2.66 3.15 4.21	0.02 0.04 0.06 0.12 0.27
(3) HPA-65R-BUU-H8	B	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.30 13.99 14.70 16.14 19.13	7.52 8.09 8.67 9.85 12.29	0.07 0.14 0.22 0.41 0.88
800 10121	B	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.46 5.88 6.31 7.21 9.09	3.29 3.64 3.99 4.76 6.53	0.05 0.08 0.12 0.21 0.45
RRUS E2 B29	B	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.93 4.19 4.75 5.96	1.49 1.67 1.87 2.28 3.21	0.06 0.08 0.11 0.17 0.35
(2) RRUS 11	B	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.10 0.15 0.31
WCS RRUS-32-B30	B	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.87 4.15 4.44 5.06 6.38	2.76 3.02 3.29 3.85 5.08	0.08 0.10 0.14 0.21 0.41
(2) RRUS A2 MODULE	B	From Centroid-Le g	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.87 2.05 2.24 2.66	0.42 0.53 0.65 0.91	0.02 0.03 0.04 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	3.58	1.54	0.18
DTMABP7819VG12A	B	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14
(2) RRUS 12 W/O SOLAR SHIELD	B	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.89 3.11 3.35 3.85 4.95	1.00 1.15 1.31 1.66 2.46	0.06 0.08 0.10 0.15 0.29
DC6-48-60-18-8F	B	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.22 2.44 2.66 3.15 4.21	2.22 2.44 2.66 3.15 4.21	0.02 0.04 0.06 0.12 0.27
(3) HPA-65R-BUU-H6	C	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.36 10.93 11.50 12.68 15.14	6.45 6.91 7.38 8.47 10.78	0.05 0.11 0.18 0.34 0.75
800 10121	C	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.46 5.88 6.31 7.21 9.09	3.29 3.64 3.99 4.76 6.53	0.05 0.08 0.12 0.21 0.45
WCS RRUS-32-B30	C	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.87 4.15 4.44 5.06 6.38	2.76 3.02 3.29 3.85 5.08	0.08 0.10 0.14 0.21 0.41
(3) RRUS 11	C	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.10 0.15 0.31
RRUS E2 B29	C	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.93 4.19 4.75 5.96	1.49 1.67 1.87 2.28 3.21	0.06 0.08 0.11 0.17 0.35
(2) RRUS A2 MODULE	C	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.87 2.05 2.24 2.66 3.58	0.42 0.53 0.65 0.91 1.54	0.02 0.03 0.04 0.08 0.18
DTMABP7819VG12A	C	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.14 1.28 1.44 1.77 2.54	0.39 0.49 0.59 0.83 1.41	0.02 0.03 0.04 0.06 0.14
(2) RRUS 12 W/O SOLAR SHIELD	C	From Centroid-Leg	3.68 1.56 0.00	23.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.89 3.11 3.35 3.85 4.95	1.00 1.15 1.31 1.66 2.46	0.06 0.08 0.10 0.15 0.29
DC6-48-60-18-8F	C	From	3.68	23.0000	150.00	No Ice	2.22	2.22	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	1.56 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	2.44 2.66 3.15 4.21	2.44 2.66 3.15 4.21	0.04 0.06 0.12 0.27
***									
Platform Mount [LP 601-1]	C	None		0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.47 33.59 38.71 48.95 69.43	28.47 33.59 38.71 48.95 69.43	1.12 1.51 1.91 2.69 4.26
LLPX310R w/ Mount Pipe	A	From Centroid-Leg	3.46 2.00 0.00	30.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
WIMAX DAP HEAD	A	From Centroid-Leg	3.46 2.00 0.00	30.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
Horizon Compact	A	From Centroid-Leg	3.46 2.00 2.00	12.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.84 0.97 1.10 1.39 2.08	0.43 0.52 0.63 0.86 1.43	0.01 0.02 0.03 0.05 0.12
(3) 6' x 2" mount pipe	A	From Centroid-Leg	3.46 2.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.44 1.93 2.30 3.07 4.71	1.44 1.93 2.30 3.07 4.71	0.02 0.03 0.05 0.09 0.23
LLPX310R w/ Mount Pipe	B	From Centroid-Leg	3.46 2.00 0.00	30.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
WIMAX DAP HEAD	B	From Centroid-Leg	3.46 2.00 0.00	30.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
Horizon Compact	B	From Centroid-Leg	3.46 2.00 2.00	83.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.84 0.97 1.10 1.39 2.08	0.43 0.52 0.63 0.86 1.43	0.01 0.02 0.03 0.05 0.12
(3) 6' x 2" mount pipe	B	From Centroid-Leg	3.46 2.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.44 1.93 2.30 3.07 4.71	1.44 1.93 2.30 3.07 4.71	0.02 0.03 0.05 0.09 0.23
LLPX310R w/ Mount Pipe	C	From Centroid-Leg	3.46 2.00 0.00	30.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
TIMING 2000	C	From Centroid-Le	3.46 2.00	30.0000	140.00	No Ice 1/2" Ice	0.13 0.18	0.13 0.18	0.00 0.00

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 K
		g	2.00			1" Ice	0.24	0.24	0.01
						2" Ice	0.38	0.38	0.01
						4" Ice	0.78	0.78	0.05
WIMAX DAP HEAD	C	From Centroid-Le	3.46	30.0000	140.00	No Ice	1.80	0.78	0.03
		g	2.00			1/2" Ice	1.99	0.92	0.04
			0.00			1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
Horizon Compact	C	From Centroid-Le	3.46	47.0000	140.00	No Ice	0.84	0.43	0.01
		g	2.00			1/2" Ice	0.97	0.52	0.02
			2.00			1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
Horizon Compact	C	From Centroid-Le	3.46	75.0000	140.00	No Ice	0.84	0.43	0.01
		g	2.00			1/2" Ice	0.97	0.52	0.02
			2.00			1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
(3) 6' x 2" mount pipe	C	From Centroid-Le	3.46	0.0000	140.00	No Ice	1.44	1.44	0.02
		g	2.00			1/2" Ice	1.93	1.93	0.03
			2.00			1" Ice	2.30	2.30	0.05
						2" Ice	3.07	3.07	0.09
						4" Ice	4.71	4.71	0.23
***									

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 K
VHLP2-18	A	Paraboloid w/Radome	From Centroid -Leg	3.46	12.0000		140.00	2.17	No Ice	3.72	0.03
				2.00					1/2" Ice	4.01	0.05
				2.00					1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
VHLP2-11	B	Paraboloid w/Radome	From Centroid -Leg	3.46	83.0000		140.00	2.17	No Ice	3.72	0.03
				2.00					1/2" Ice	4.01	0.05
				2.00					1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
VHLP2-23	C	Paraboloid w/Radome	From Centroid -Leg	3.46	47.0000		140.00	2.17	No Ice	3.72	0.03
				2.00					1/2" Ice	4.01	0.05
				2.00					1" Ice	4.30	0.07
									2" Ice	4.88	0.11
									4" Ice	6.04	0.20
VHLP2-11	C	Paraboloid w/Radome	From Centroid -Leg	3.46	75.0000		140.00	2.17	No Ice	3.72	0.03
				2.00					1/2" Ice	4.01	0.05
				2.00					1" Ice	4.30	0.07
									2" Ice	4.88	0.11

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
									4" Ice	6.04	0.20

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 123.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-13.51	0.37	-0.41
			Max. Mx	5	-5.58	-320.11	-1.67

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	8	-5.54	-1.83	-323.98
			Max. Vy	5	15.83	-320.11	-1.67
			Max. Vx	8	16.00	-1.83	-323.98
			Max. Torque	6			-0.68
L2	123.29 - 87.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.39	0.18	-0.51
			Max. Mx	5	-9.78	-906.40	-4.07
			Max. My	8	-9.76	-5.33	-916.05
			Max. Vy	5	18.17	-906.40	-4.07
			Max. Vx	8	18.34	-5.33	-916.05
			Max. Torque	6			-0.68
L3	87.79 - 43.21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.30	-0.13	-0.68
			Max. Mx	5	-17.57	-1763.10	-7.08
			Max. My	8	-17.56	-9.77	-1780.02
			Max. Vy	5	21.25	-1763.10	-7.08
			Max. Vx	8	21.42	-9.77	-1780.02
			Max. Torque	6			-0.67
L4	43.21 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.22	-0.48	-0.87
			Max. Mx	5	-29.91	-2878.47	-10.36
			Max. My	8	-29.91	-14.65	-2903.38
			Max. Vy	5	24.44	-2878.47	-10.36
			Max. Vx	8	24.61	-14.65	-2903.38
			Max. Torque	6			-0.67

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	41.22	-0.00	0.00
	Max. H_x	11	29.93	24.31	0.04
	Max. H_z	2	29.93	0.05	24.51
	Max. M_x	2	2891.34	0.05	24.51
	Max. M_z	5	2878.47	-24.42	-0.06
	Max. Torsion	12	0.44	21.10	12.30
	Min. Vert	8	29.93	-0.09	-24.58
	Min. H_x	5	29.93	-24.42	-0.06
	Min. H_z	8	29.93	-0.09	-24.58
	Min. M_x	8	-2903.38	-0.09	-24.58
	Min. M_z	11	-2861.68	24.31	0.04
	Min. Torsion	6	-0.67	-21.18	-12.33

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	29.93	0.00	0.00	0.47	-0.27	0.00
Dead+Wind 0 deg - No Ice	29.93	-0.05	-24.51	-2891.34	8.06	0.19
Dead+Wind 30 deg - No Ice	29.93	12.18	-21.18	-2496.75	-1434.08	0.38
Dead+Wind 60 deg - No Ice	29.93	21.13	-12.20	-1436.91	-2489.64	0.51

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 90 deg - No Ice	29.93	24.42	0.06	10.36	-2878.47	0.57
Dead+Wind 120 deg - No Ice	29.93	21.18	12.33	1458.74	-2498.31	0.67
Dead+Wind 150 deg - No Ice	29.93	12.29	21.33	2521.44	-1451.15	0.48
Dead+Wind 180 deg - No Ice	29.93	0.09	24.58	2903.38	-14.65	0.15
Dead+Wind 210 deg - No Ice	29.93	-12.11	21.22	2504.63	1423.99	-0.19
Dead+Wind 240 deg - No Ice	29.93	-21.04	12.21	1439.28	2475.39	-0.24
Dead+Wind 270 deg - No Ice	29.93	-24.31	-0.04	-6.57	2861.68	-0.34
Dead+Wind 300 deg - No Ice	29.93	-21.10	-12.30	-1452.26	2485.70	-0.44
Dead+Wind 330 deg - No Ice	29.93	-12.22	-21.26	-2509.85	1441.15	-0.27
Dead+Ice+Temp	41.22	0.00	-0.00	0.87	-0.48	-0.00
Dead+Wind 0 deg+Ice+Temp	41.22	-0.01	-6.07	-744.63	1.31	0.10
Dead+Wind 30 deg+Ice+Temp	41.22	3.02	-5.24	-643.04	-370.81	0.17
Dead+Wind 60 deg+Ice+Temp	41.22	5.23	-3.02	-369.92	-643.14	0.20
Dead+Wind 90 deg+Ice+Temp	41.22	6.05	0.01	3.11	-743.44	0.19
Dead+Wind 120 deg+Ice+Temp	41.22	5.25	3.05	376.47	-645.03	0.18
Dead+Wind 150 deg+Ice+Temp	41.22	3.04	5.28	650.41	-374.55	0.09
Dead+Wind 180 deg+Ice+Temp	41.22	0.02	6.08	749.18	-3.67	-0.02
Dead+Wind 210 deg+Ice+Temp	41.22	-3.00	5.25	646.60	367.63	-0.12
Dead+Wind 240 deg+Ice+Temp	41.22	-5.21	3.02	372.17	638.96	-0.14
Dead+Wind 270 deg+Ice+Temp	41.22	-6.02	-0.01	-0.52	738.66	-0.14
Dead+Wind 300 deg+Ice+Temp	41.22	-5.23	-3.04	-373.23	641.23	-0.12
Dead+Wind 330 deg+Ice+Temp	41.22	-3.03	-5.26	-645.97	371.37	-0.04
Dead+Wind 0 deg - Service	29.93	-0.02	-8.48	-1002.87	2.62	0.07
Dead+Wind 30 deg - Service	29.93	4.21	-7.33	-865.87	-497.70	0.14
Dead+Wind 60 deg - Service	29.93	7.31	-4.22	-498.17	-863.90	0.18
Dead+Wind 90 deg - Service	29.93	8.45	0.02	3.93	-998.87	0.20
Dead+Wind 120 deg - Service	29.93	7.33	4.27	506.43	-866.94	0.24
Dead+Wind 150 deg - Service	29.93	4.25	7.38	875.15	-503.65	0.17
Dead+Wind 180 deg - Service	29.93	0.03	8.51	1007.73	-5.26	0.05
Dead+Wind 210 deg - Service	29.93	-4.19	7.34	869.26	493.85	-0.07
Dead+Wind 240 deg - Service	29.93	-7.28	4.22	499.64	858.58	-0.09
Dead+Wind 270 deg - Service	29.93	-8.41	-0.02	-1.95	992.66	-0.12
Dead+Wind 300 deg - Service	29.93	-7.30	-4.25	-503.51	862.19	-0.16
Dead+Wind 330 deg - Service	29.93	-4.23	-7.36	-870.45	499.82	-0.10

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-29.93	0.00	0.00	29.93	-0.00	0.000%
2	-0.05	-29.93	-24.51	0.05	29.93	24.51	0.009%
3	12.18	-29.93	-21.18	-12.18	29.93	21.18	0.000%
4	21.13	-29.93	-12.20	-21.13	29.93	12.20	0.000%
5	24.42	-29.93	0.06	-24.42	29.93	-0.06	0.009%
6	21.18	-29.93	12.33	-21.18	29.93	-12.33	0.000%
7	12.29	-29.93	21.34	-12.29	29.93	-21.33	0.000%
8	0.09	-29.93	24.59	-0.09	29.93	-24.58	0.009%
9	-12.11	-29.93	21.22	12.11	29.93	-21.22	0.000%
10	-21.04	-29.93	12.21	21.04	29.93	-12.21	0.000%
11	-24.31	-29.93	-0.04	24.31	29.93	0.04	0.008%
12	-21.10	-29.93	-12.30	21.10	29.93	12.30	0.000%
13	-12.22	-29.93	-21.26	12.22	29.93	21.26	0.000%
14	0.00	-41.22	0.00	-0.00	41.22	0.00	0.001%
15	-0.01	-41.22	-6.07	0.01	41.22	6.07	0.003%
16	3.02	-41.22	-5.24	-3.02	41.22	5.24	0.003%
17	5.24	-41.22	-3.02	-5.23	41.22	3.02	0.003%
18	6.05	-41.22	0.01	-6.05	41.22	-0.01	0.003%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
19	5.25	-41.22	3.05	-5.25	41.22	-3.05	0.003%
20	3.04	-41.22	5.28	-3.04	41.22	-5.28	0.003%
21	0.02	-41.22	6.08	-0.02	41.22	-6.08	0.003%
22	-3.00	-41.22	5.25	3.00	41.22	-5.25	0.003%
23	-5.21	-41.22	3.02	5.21	41.22	-3.02	0.003%
24	-6.03	-41.22	-0.01	6.02	41.22	0.01	0.003%
25	-5.23	-41.22	-3.04	5.23	41.22	3.04	0.003%
26	-3.03	-41.22	-5.26	3.03	41.22	5.26	0.003%
27	-0.02	-29.93	-8.48	0.02	29.93	8.48	0.004%
28	4.21	-29.93	-7.33	-4.21	29.93	7.33	0.002%
29	7.31	-29.93	-4.22	-7.31	29.93	4.22	0.002%
30	8.45	-29.93	0.02	-8.45	29.93	-0.02	0.004%
31	7.33	-29.93	4.27	-7.33	29.93	-4.27	0.002%
32	4.25	-29.93	7.38	-4.25	29.93	-7.38	0.002%
33	0.03	-29.93	8.51	-0.03	29.93	-8.51	0.004%
34	-4.19	-29.93	7.34	4.19	29.93	-7.34	0.002%
35	-7.28	-29.93	4.22	7.28	29.93	-4.22	0.002%
36	-8.41	-29.93	-0.02	8.41	29.93	0.02	0.004%
37	-7.30	-29.93	-4.25	7.30	29.93	4.25	0.002%
38	-4.23	-29.93	-7.36	4.23	29.93	7.36	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	18	0.00005856	0.00008014
3	Yes	24	0.00000001	0.00007354
4	Yes	24	0.00000001	0.00007258
5	Yes	18	0.00005865	0.00009319
6	Yes	24	0.00000001	0.00007539
7	Yes	24	0.00000001	0.00007453
8	Yes	18	0.00005850	0.00008102
9	Yes	24	0.00000001	0.00007290
10	Yes	24	0.00000001	0.00007297
11	Yes	18	0.00005874	0.00007953
12	Yes	24	0.00000001	0.00007338
13	Yes	24	0.00000001	0.00007452
14	Yes	6	0.00000001	0.00000699
15	Yes	19	0.00008320	0.00002868
16	Yes	19	0.00008300	0.00007384
17	Yes	19	0.00008299	0.00007219
18	Yes	19	0.00008319	0.00002884
19	Yes	19	0.00008301	0.00007616
20	Yes	19	0.00008303	0.00007465
21	Yes	19	0.00008323	0.00002891
22	Yes	19	0.00008306	0.00007328
23	Yes	19	0.00008306	0.00007384
24	Yes	19	0.00008324	0.00002854
25	Yes	19	0.00008304	0.00007304
26	Yes	19	0.00008302	0.00007468
27	Yes	18	0.00006568	0.00004277
28	Yes	19	0.00000001	0.00007290
29	Yes	19	0.00000001	0.00007006
30	Yes	18	0.00006569	0.00004317
31	Yes	19	0.00000001	0.00007613

32	Yes	19	0.00000001	0.00007291
33	Yes	18	0.00006569	0.00004298
34	Yes	19	0.00000001	0.00007155
35	Yes	19	0.00000001	0.00007184
36	Yes	18	0.00006571	0.00004245
37	Yes	19	0.00000001	0.00007106
38	Yes	19	0.00000001	0.00007433

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	150 - 123.29 (1)	TP23.17x17x0.1875 H1-3+VT (1.39 CR) - 1	26.71	0.00	0.0	39.000	13.2073	-5.53	515.09	0.011
L2	123.29 - 87.79 (2)	TP30.86x22.005x0.3125 H1-3+VT (1.34 CR) - 2	38.92	0.00	0.0	39.000	29.3018	-9.75	1142.77	0.009
L3	87.79 - 43.21 (3)	TP40.4x29.2294x0.375	49.00	0.00	0.0	39.000	46.1257	-17.56	1798.90	0.010
L4	43.21 - 0 (4)	TP49.5x38.3779x0.4375	48.79	0.00	0.0	39.000	54.4514	-19.64	2123.60	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	150 - 123.29 (1)	TP23.17x17x0.1875	324.61	53.889	39.000	1.382	0.00	0.000	39.000	0.000
L2	123.29 - 87.79 (2)	TP30.86x22.005x0.3125	918.08	51.715	39.000	1.326	0.00	0.000	39.000	0.000
L3	87.79 - 43.21 (3)	TP40.4x29.2294x0.375	1783.85	48.618	39.000	1.247	0.00	0.000	39.000	0.000
L4	43.21 - 0 (4)	TP49.5x38.3779x0.4375	1904.82	43.526	39.000	1.116	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	150 - 123.29 (1)	TP23.17x17x0.1875	16.04	1.215	26.000	0.093	0.55	0.044	26.000	0.002
L2	123.29 - 87.79 (2)	TP30.86x22.005x0.3125	18.38	0.627	26.000	0.048	0.53	0.014	26.000	0.001
L3	87.79 - 43.21 (3)	TP40.4x29.2294x0.375	21.46	0.465	26.000	0.036	0.50	0.007	26.000	0.000
L4	43.21 - 0 (4)	TP49.5x38.3779x0.4375	22.07	0.405	26.000	0.031	0.50	0.006	26.000	0.000

Pole Interaction Design Data

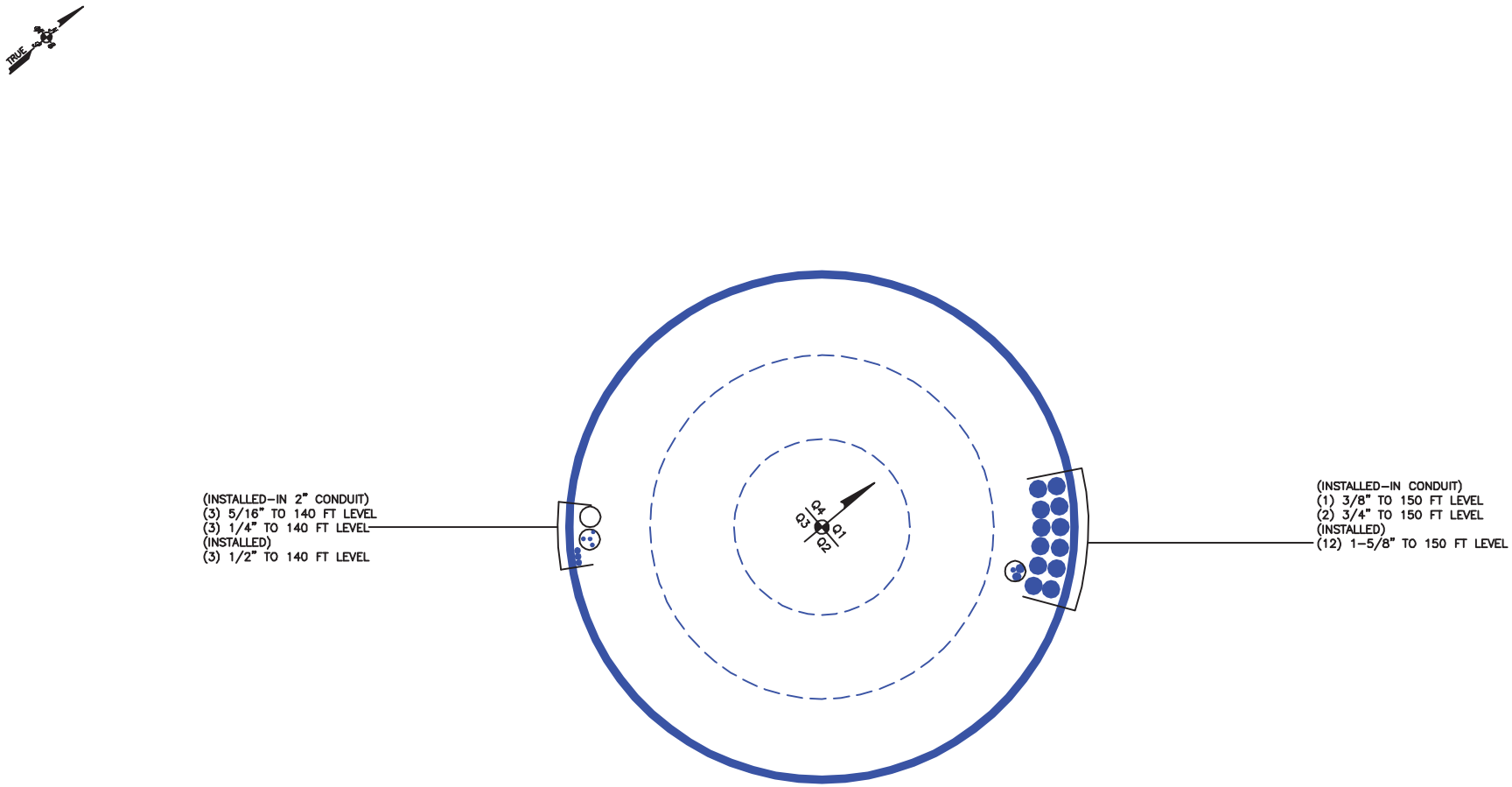
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 123.29 (1)	0.011	1.382	0.000	0.093	0.002	1.395 ✔	1.333	H1-3+VT ✔
L2	123.29 - 87.79 (2)	0.009	1.326	0.000	0.048	0.001	1.335 ✔	1.333	H1-3+VT ✔
L3	87.79 - 43.21 (3)	0.010	1.247	0.000	0.036	0.000	1.257 ✔	1.333	H1-3+VT ✔
L4	43.21 - 0 (4)	0.009	1.116	0.000	0.031	0.000	1.126 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	150 - 123.29	Pole	TP23.17x17x0.1875	1	-5.53	686.61	104.6	Pass[2]
L2	123.29 - 87.79	Pole	TP30.86x22.005x0.3125	2	-9.75	1523.31	100.2	Pass[2]
L3	87.79 - 43.21	Pole	TP40.4x29.2294x0.375	3	-17.56	2397.93	94.3	Pass
L4	43.21 - 0	Pole	TP49.5x38.3779x0.4375	4	-19.64	2830.76	84.4	Pass
						Summary	ELC:	LC5
						Pole (L1)	104.6	Pass[2]
						Rating =	104.6	Pass[2]

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 881534 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: *881534*
Site Name: *Waterbury Tower*
App #: *211782 Rev. 6*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2909.21	ft-kips
Axial:	29.93	kips
Shear:	24.62	kips

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	58	in

Plate Data		
Diam:	64	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.82	in

Stiffener Data (Welding at both sides)		
Config:		*
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

Pole Data		
Diam:	49.5	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

Maximum Rod Tension:	148.6 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	76.2% **Pass**	Fty*ASIF

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	60.7 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	101.2% **Pass**	Y.L. Length: 30.23

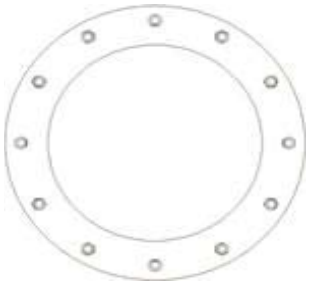
n/a

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



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

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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: *881534*
Site Name: *Waterbury Tower*
App #: *211782 Rev. 6*

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Pad & Pier Data		
Base PL Dist. Above Pier:	3	in
Pier Dist. Above Grade:	12	in
Pad Bearing Depth, D:	8	ft
Pad Thickness, T:	4.5	ft
Pad Width=Length, L:	26	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	6.5	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	42.25	ft^2
Pier Height:	4.50	ft
Soil (above pad) Height:	3.50	ft

Soil Parameters		
Unit Weight, γ:	125.0	pcf
Ultimate Bearing Capacity, qn:	8.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	34.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	6.00	ksf
Passive Pres. Coeff., Kp	3.54	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	33.2	kips
Pad Force Location Above D:	1.96	ft
ϕ(Passive Pressure Moment):	65.03	ft-kips
Factored O.T. M(WL), "1.6W":	4234.9	ft-kips
Factored OT (MW-Msoil), M1	4169.85	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	2.36	ft
Sum of Soil Wedges Wt:	26.01	kips
Soil Wedges ecc, K1:	11.23	ft
Ftg+Soil above Pad wt:	762.1	kips
Unfactored (Total ftg-soil Wt):	788.10	kips
1.2D. **No Soil Wedges**.	950.42	kips
0.9D. **With Soil Wedges**	736.23	kips

Resistance due to Cohesion (Vertical)		
ϕ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	29.93	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	24.62	kips
Unfactored WL Moment, M:	2909.21	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	35.916	kips
0.90	0.9D+1.6W, Pu:	26.937	kips
1.35	Vu:	33.237	kips
	Mu:	3927.434	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	950.42	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	4169.85	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	4.39	ft
Orthogonal qu=	2.35	ksf
qu/ϕ*qn Ratio=	**39.25%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	3.10	ft
Diagonal qu=	2.43	ksf
qu/ϕ*qn Ratio=	**40.42%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	736.23	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	3907.03	ft-kips

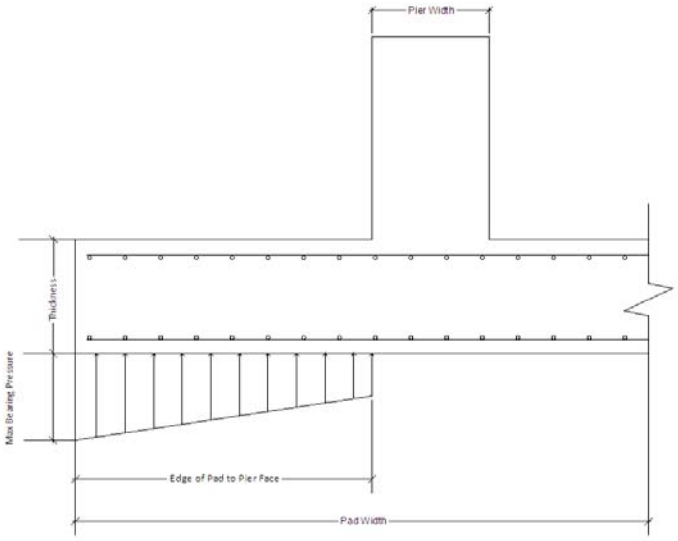
Orthogonal ecc3 = M2/P2 =	5.31	ft
Ortho Non Bearing Length,NBL=	10.61	ft
Orthogonal qu=	1.98	ksf
Diagonal qu=	2.15	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	2909.21		
M Orthogonal:	5856.77	**49.67%**	**Pass**
M Diagonal:	5796.79	**50.19%**	**Pass**

Monopole or Self Support Pad Foundation Reinforcing
Waterbury Tower BU#: 881534
SSOE Project Number: 014-00546-00

Analysis Code	F	
Compression	29.93	k
Uplift	0	k

Overall Capacity	31.5%	OK



Pad Geometry & Reinforcing		
Pad Length	26	ft
Pad Width	26	ft
Pad Thickness	4.5	ft
Pad Top Rebar Size	# 7	
Pad Top Rebar Quantity	51	
Pad Bottom Rebar Size	# 7	
Pad Bottom Rebar Quantity	51	
Clear Cover	3	in
f_c'	3	ksi
Rebar Fy	60	ksi
Minimum Steel Assumed?	NO	
Pier Shape	Square	
Pier Rebar Size	# 8	
Pier Rebar Quantity	36	
Pier Width	6.5	ft
Anchor Rod Circle	58	in
Anchor Rod Embedment	102	in
Pier Tie Size	# 5	

Bearing Calculation		
Max Bearing Pressure	2.35	ksf
Edge of Pad to Pier Face	9.75	ft
Distance Between Piers	0	ft
ecc3 (From Crown Spreadsheet)	5.31	
Non-Bearing Length	10.62	ft

Reinforcing Calculations		
Minimum Reinforcement Check		
A_s Min =	1.1664	in^2/ft
As =	2.3538462	in^2/ft
		OK
Punching Shear		
φ (Shear) =	0.75	
V_u =	38.91	k
ϕV_c =	5546.12	k
Shear Capacity	0.7%	OK
Pad Flexure		
φ (Tension) =	0.9	
M_u	114.52	k-ft
ϕM_n =	364.11	k-ft
Moment Capacity	31.5%	OK
Beam Shear		
V_u	14.01	k
ϕV_n =	65.15	k
Shear Capacity	21.5%	OK
Pier Compression		
P_u	38.909	k
ϕP_n =	11859.611	k
Compression Capacity	0.3%	OK
Pier Tension		
Pu=	0.00	k
ϕPn=	2042.56	k
Tension Capacity =	0.0%	OK
Plain Concrete Interaction		
Moment Capacity	N/A	OK
Shear Capacity	N/A	OK
Pier Compression Capacity	N/A	OK