QC Development
PO Box 916
Storrs, CT 06268
860-670-9068
Mark.Roberts@QCDevelopment.net

August 19, 2016

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

Notice of Exempt Modification – New Cingular Wireless PCS, LLC (AT&T)
92 Weston Street, Hartford, CT 06120 – CT5152
N 41-47-12.20
W 72-39-44.24

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 90-foot level of the existing 110-foot Monopole at 92 Weston Street, Hartford, CT. The tower is owned by Crown Castle. The property is owned by Albemarle Weston Street LLC. AT&T now intends to replace three (3) of its existing remote radio units with three (3) new Ericsson RRUS-32. These RRUs would be installed at the 90-foot level of the tower.

This facility was approved by the City of Hartford on November 26, 1996. Communications Towers were a permitted use as of right in the underlying Industrial Zone and a Building Permit was issued, therefore there were no condition(s) that could feasibly be violated by this modification, including total facility height or mounting restrictions. This modification therefore complies with the aforementioned approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Luke Bronin, Mayor of the City of Hartford, as elected official, as well as the tower and

property owner.

The planned modifications to the 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 structure.

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

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

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

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

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

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

Please feel free to call me at (860) 670-9068 with any questions regarding this matter. Thank you for your consideration.

Sincerely,

Mark Roberts
QC Development
Consultant for AT&T

Attachments

cc: The Honorable Luke Bronin - as elected official
Albemarle Weston Street LLC – as property owner (via e-mail)
Crown Castle - as tower owner (via e-mail)

Power Density

Existing Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							0.35%
AT&T LTE	2	1313	90	0.1388	734	0.4893	2.74%
AT&T LTE	2	875	90	0.0892	1900	1.0000	0.89%
AT&T LTE	2	1791	90	0.1826	2300	1.0000	1.83%
AT&T UMTS	2	565	90	0.0576	880	0.5867	0.98%
AT&T UMTS	4	525	90	0.1070	1900	1.0000	1.07%
AT&T GSM	1	283	90	0.0144	880	0.5867	0.25%
Site Total							8.10%

*Per CSC Records (available upon request, includes calculation formulas)

** If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

Proposed Loading on Tower

Carrier	# of Channels	ERP/Ch (W)	Antenna Centerline Height (ft)	Power Density (mW/cm^2)	Freq. Band (MHz**)	Limit S (mW /cm^2)	%MPE
Other Carriers*							0.35%
AT&T LTE	2	1313	90	0.1388	734	0.4893	2.74%
AT&T LTE	2	3664	90	0.3735	1900	1.0000	3.73%
AT&T LTE	2	1791	90	0.1826	2300	1.0000	1.83%
AT&T UMTS	2	565	90	0.0576	880	0.5867	0.98%
AT&T UMTS	4	525	90	0.1070	1900	1.0000	1.07%
AT&T GSM	1	283	90	0.0144	880	0.5867	0.25%
Site Total							10.94%

*Per CSC Records (available upon request, includes calculation formulas)

** If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

Note: Proposed Loading may also include corrections to certain Existing Loading values

PROJECT INFORMATION

SCOPE OF WORK:	TELECOMMUNICATIONS FACILITY UPGRADE (BWE 2017 UPGRADE):
SITE ADDRESS:	92 WESTON STREET HARTFORD, CT 06120
LATITUDE:	41.786391 N 41° 47' 11.01" N
LONGITUDE:	72.662498° W 72° 39' 45" W
TYPE OF SITE:	MONOPOLE / OUTDOOR EQUIPMENT
TOWER HEIGHT:	110'±
RAD CENTER:	90'±
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
NOC#	800-638-2822

SITE NUMBER: CT5152

SITE NAME: HARTFORD NORTH

PROJECT: BWE 2017 UPGRADE

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
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CROWN CASTLE SITE ID: 876325

SITE NAME: WESTON SQUARE

VICINITY MAP

DIRECTIONS TO SITE:

START OUT GOING NORTHEAST ON ENTERPRISE DR TOWARD CAPITOL BLVD. 0.4 MI. TURN LEFT ONTO CAPITOL BLVD. 0.3 MI. TURN LEFT ONTO WEST ST. 0.2 MI. MERGE ONTO I-91 N VIA THE RAMP ON THE LEFT TOWARD HARTFORD. 10.6 MI. TAKE THE JENNINGS ROAD EXIT, EXIT 33. 0.3 MI. TURN RIGHT ONTO JENNINGS RD. 0.1 MI. TURN LEFT TO STAY ON JENNINGS RD. 0.4 MI. TURN LEFT ONTO WESTON ST. 0.1 MI. END AT 92 WESTON ST HARTFORD, CT 06120.

GENERAL NOTES

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

72 HOURS

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

UNDERGROUND SERVICE ALERT

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

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SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: RB

STATE OF CONNECTICUT · No. 23581 · LICENSED PROFESSIONAL ENGINEER

AT&T

TITLE SHEET
BWE

SITE NUMBER	DRAWING NUMBER	REV
5152.00	T-1	1

GROUNDING NOTES

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

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

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

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

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

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

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

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

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

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

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

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

GENERAL NOTES

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

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

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

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

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

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

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

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

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

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

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

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

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

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

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

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

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

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

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

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

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

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

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

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

    MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

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

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

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

ABBREVIATIONS

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

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

SAI
27 NORTHWESTERN DR.
SALEM, NH 03079

SITE NUMBER: CT5152
SITE NAME: HARTFORD NORTH
CROWN SITE #: 876325
92 WESTON STREET
HARTFORD, CT 06120
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
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A	06/22/16	ISSUED FOR REVIEW	RB	AT	DPH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: RB

STATE OF CONNECTICUT
DEREK J. CREASER
No. 25551
LICENSED PROFESSIONAL ENGINEER

AT&T
GENERAL NOTES
BWE

SITE NUMBER	DRAWING NUMBER	REV
5152.00	GN-1	1

NOTE:

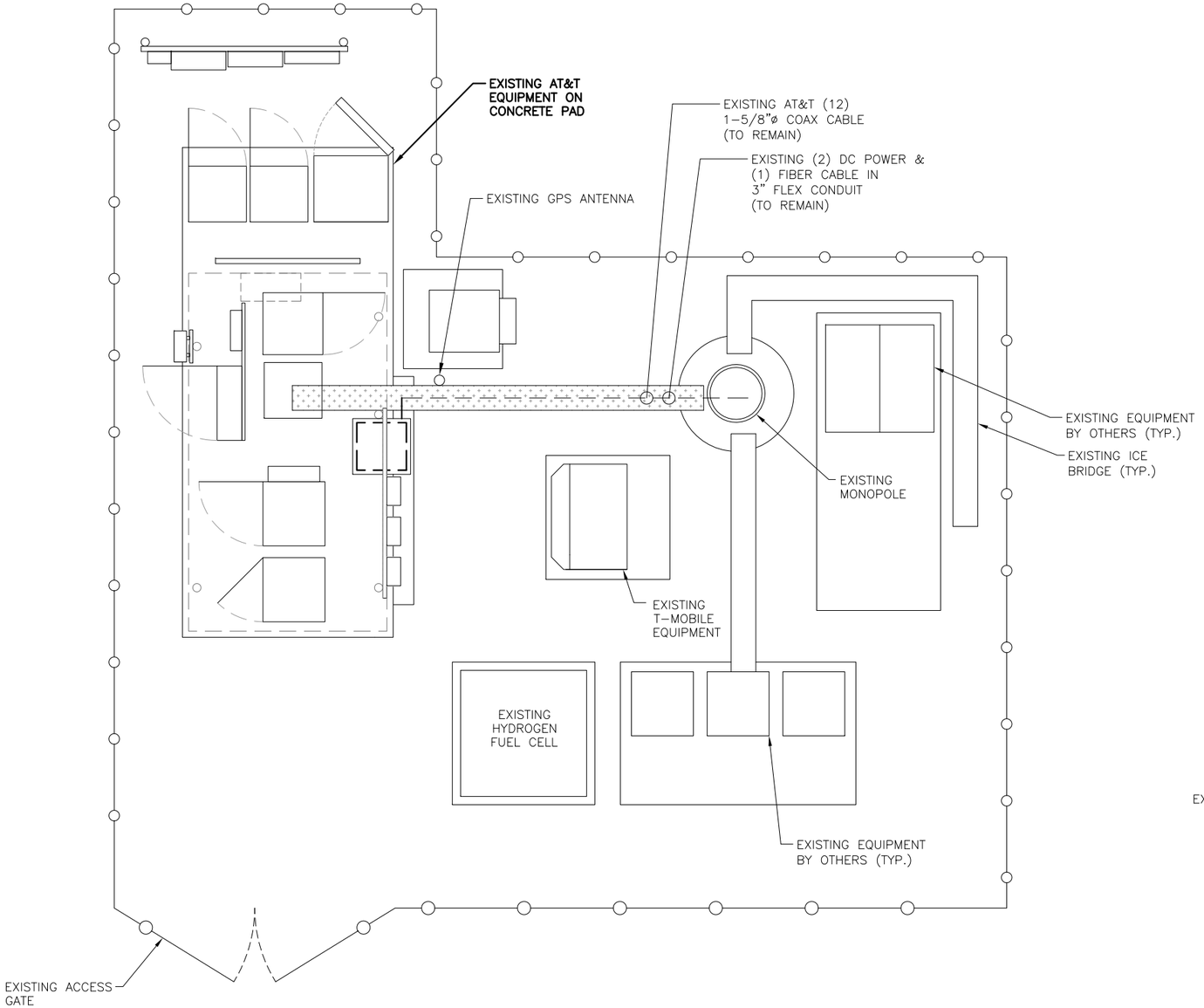
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA CONFIGURATION.

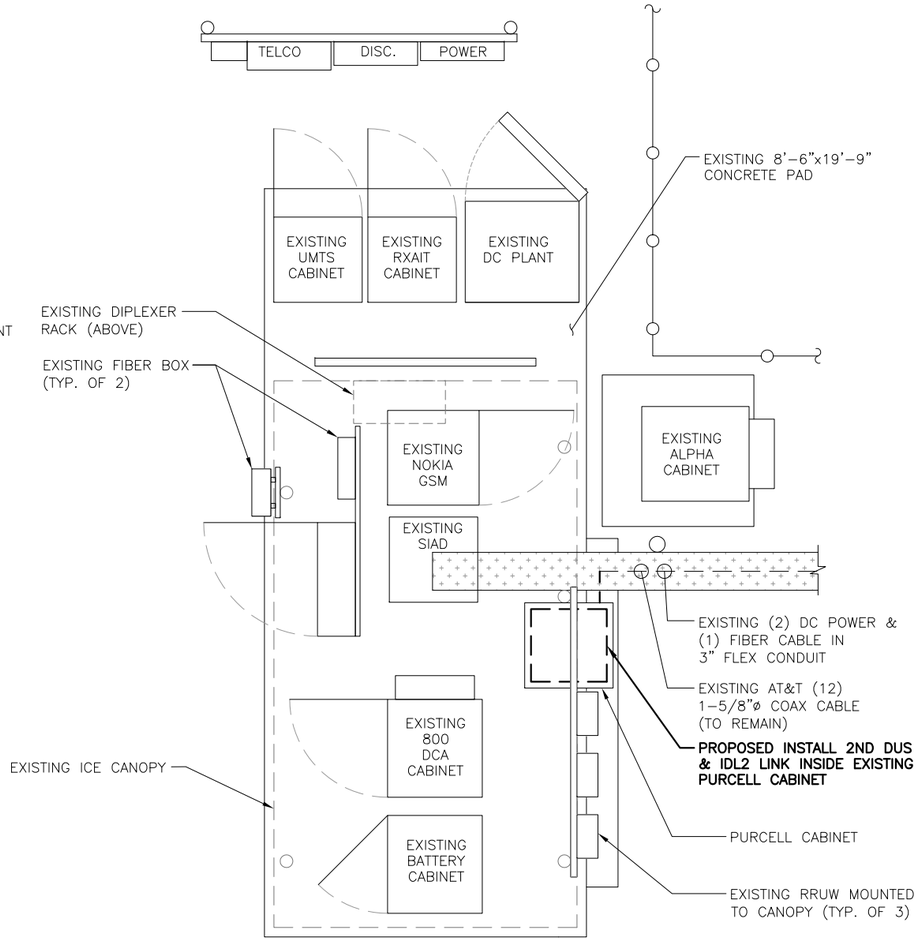
NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC.
DATED: JUNE 23, 2016

NOTE:

ALL ANTENNAS AND LINES TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.





MAGNETIC NORTH 14°53' TRUE NORTH

COMPOUND PLAN (1 / A-1)
22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"

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

MAGNETIC NORTH 14°53' TRUE NORTH

EQUIPMENT PLAN (2 / A-1)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

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SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: RB

STATE OF CONNECTICUT — DEREK J. CREASER — No. 28054 — LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND & EQUIPMENT PLANS
BWE

SITE NUMBER	DRAWING NUMBER	REV
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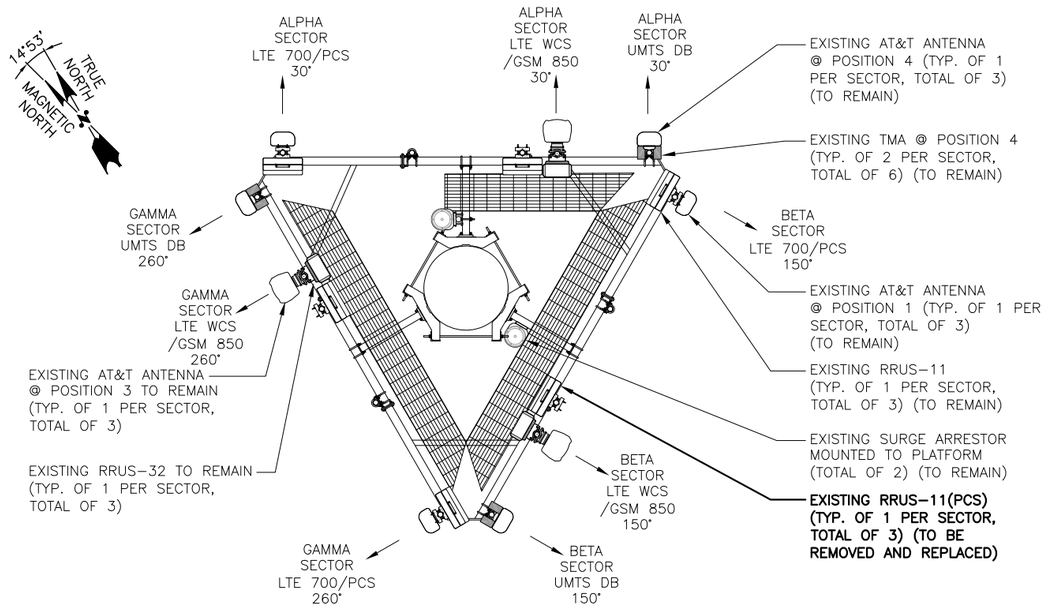


EXISTING ANTENNA LAYOUT (1 / A-2)

SCALE: N.T.S

NOTE:

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

NOTE:

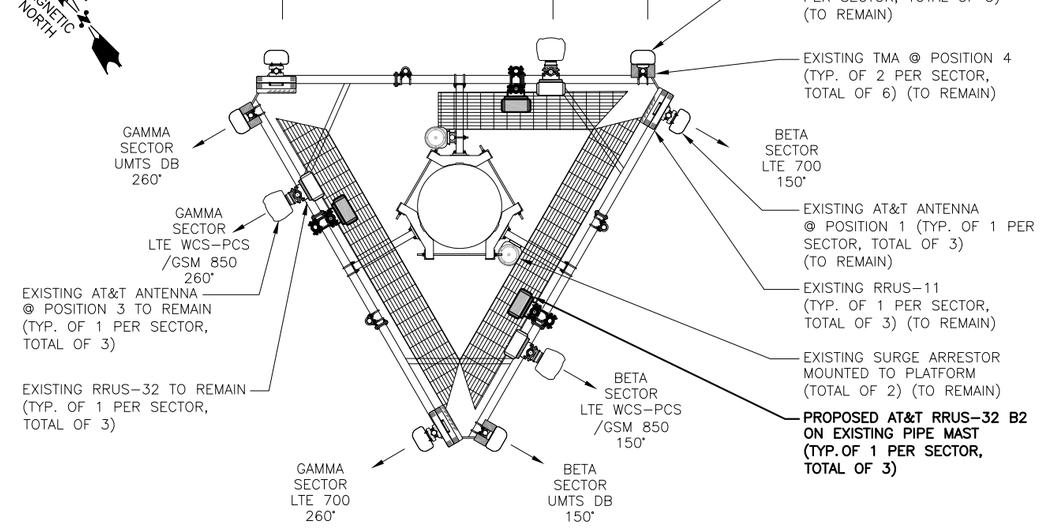
ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE AND FINAL AT&T RF DATA SHEET.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. DATED: JUNE 23, 2016

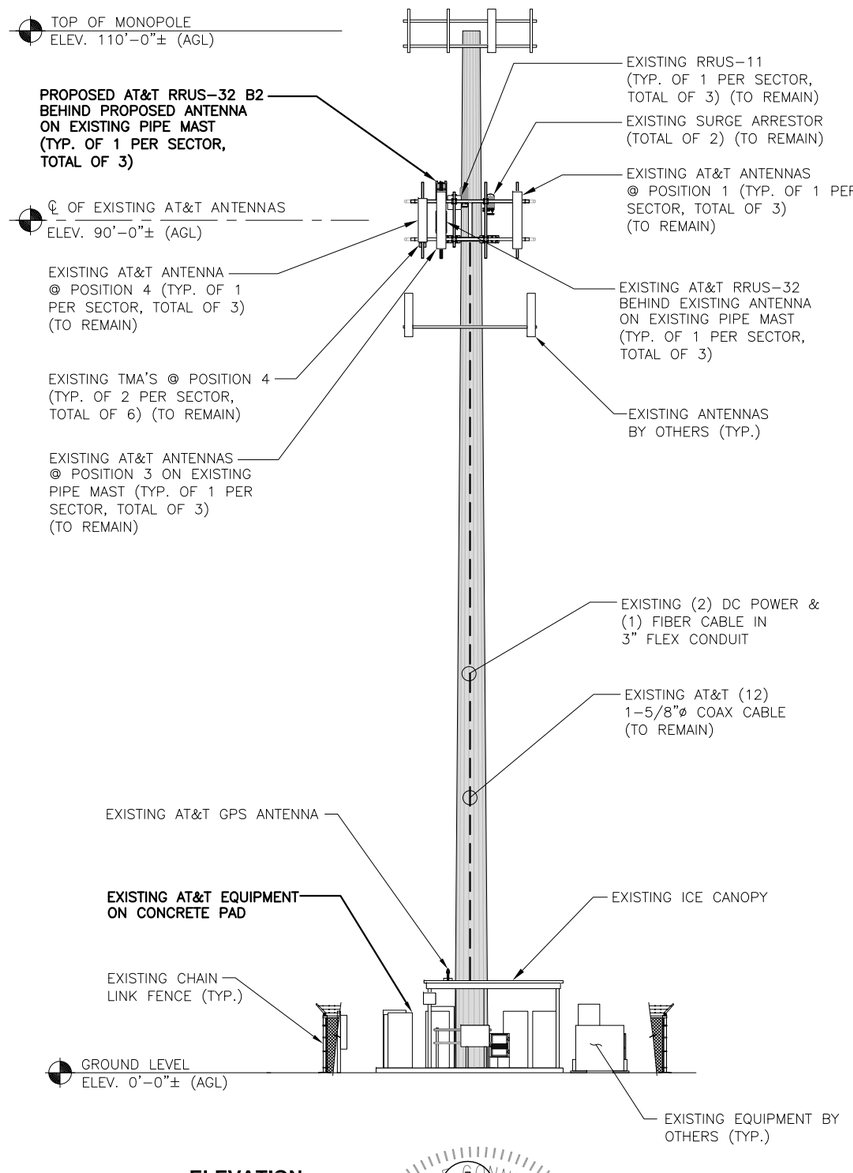
NOTE:

LAYOUTS ARE ASSUMING THAT LTE 3C PROJECT HAS BEEN INSTALLED.



PROPOSED ANTENNA LAYOUT (2 / A-2)

SCALE: N.T.S



ELEVATION (3 / A-2)

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

0 4'-0" 8'-0" 16'-0" 24'-0"

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STATE OF CONNECTICUT — DEREK P. PHELPS — No. 21655 — LICENSED PROFESSIONAL ENGINEER

AT&T

ANTENNA LAYOUTS & ELEVATION

BWE

SITE NUMBER	DRAWING NUMBER	REV
5152.00	A-2	1

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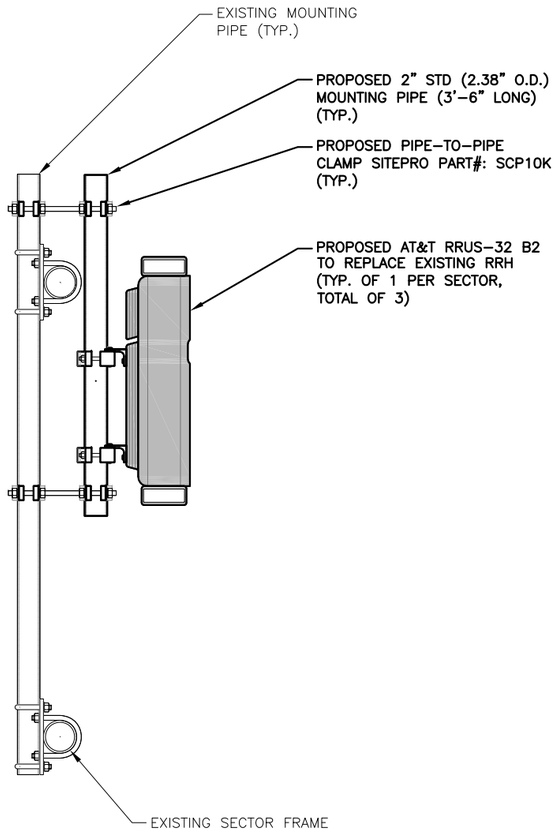
DATED: JUNE 23, 2016

NOTE:

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

EXISTING ANTENNA SCHEDULE

SECTOR	MAKE	MODEL#	SIZE (INCHES)
ALPHA	KMW	AM-X-16-65-00T-RET	72.0x11.8x5.9
	–	–	–
	QUINTEL	QS66512-2	72.0x12.0x9.6
	POWERWAVE	7700	55.0x11.0x5.0
BETA	KMW	AM-X-16-65-00T-RET	72.0x11.8x5.9
	–	–	–
	QUINTEL	QS66512-2	72.0x12.0x9.6
	POWERWAVE	7700	55.0x11.0x5.0
GAMMA	KMW	AM-X-16-65-00T-RET	72.0x11.8x5.9
	–	–	–
	QUINTEL	QS66512-2	72.0x12.0x9.6
	POWERWAVE	7700	55.0x11.0x5.0



PROPOSED RRH MOUNTING DETAIL (1 / A-3)
22x34 SCALE: 1-1/2"=1'-0"
11x17 SCALE: 3/4"=1'-0"

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

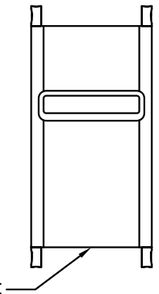
RRU CHART

QUANTITY	MODEL	L	W	D
6(E)	RRUS-11	19.7"	17.0"	7.2"
–	RRUS-12	20.4"	18.5"	7.5"
3(E)3(P)	RRUS-32	26.7"	12.1"	6.7"
–	RRUS-E2	20.4"	18.5"	7.5"
–	LTE-A2	16.4"	15.2"	3.4"

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS

NOTE:

SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER



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

NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

RRU DETAIL (2 / A-3)
SCALE: N.T.S

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

SAI
27 NORTHWESTERN DR.
SALEM, NH 03079

SITE NUMBER: CT5152
SITE NAME: HARTFORD NORTH
CROWN SITE #: 876325
92 WESTON STREET
HARTFORD, CT 06120
HARTFORD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

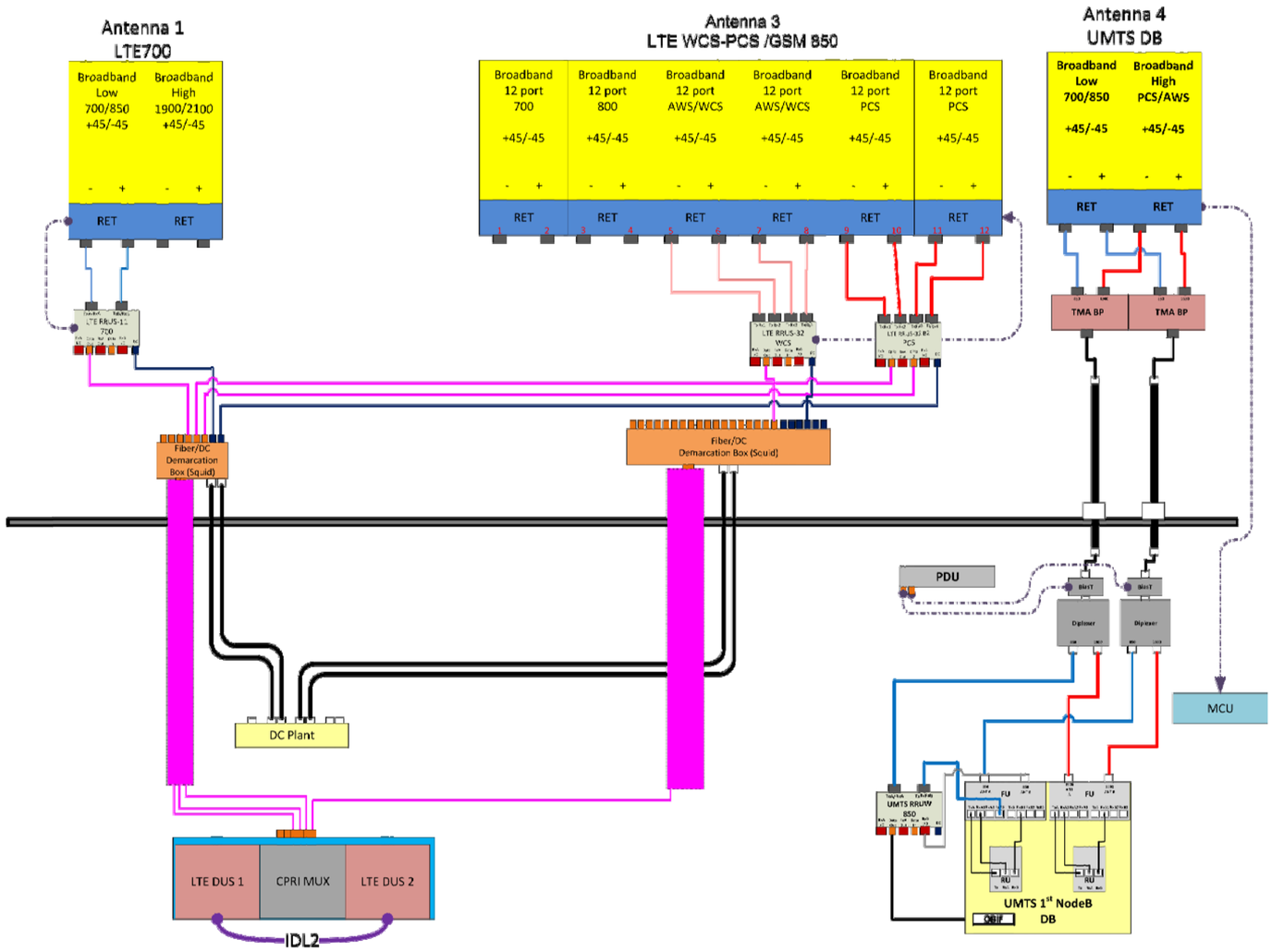
NO.	DATE	REVISIONS	BY	CHK	APP'D
1	07/12/16	ISSUED FOR CONSTRUCTION	SG	AT	DPH
A	06/22/16	ISSUED FOR REVIEW	RB	AT	DPH

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: RB

STATE OF CONNECTICUT · DEREK J. CREASER · No. 23511 · LICENSED PROFESSIONAL ENGINEER

AT&T
DETAILS
BWE

SITE NUMBER	DRAWING NUMBER	REV
5152.00	A-3	1



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

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

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

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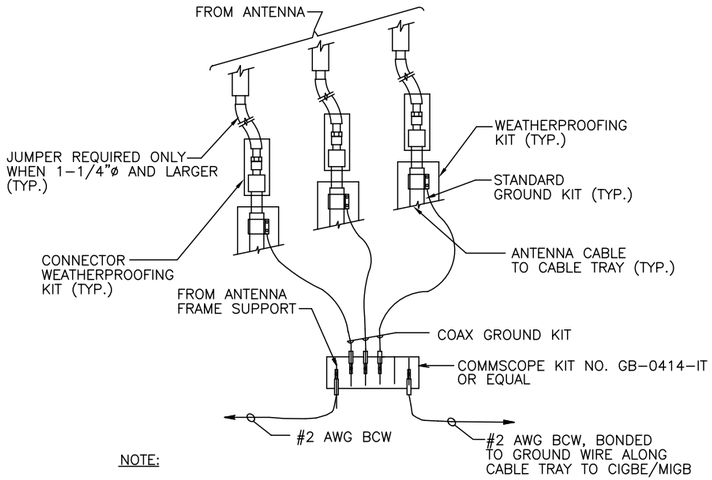
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: RB

STATE OF CONNECTICUT · DEREK J. CREASER · No. 25854 · LICENSED PROFESSIONAL ENGINEER

AT&T
RF PLUMBING DIAGRAM
BWE

SITE NUMBER	DRAWING NUMBER	REV
5152.00	RF–1	1



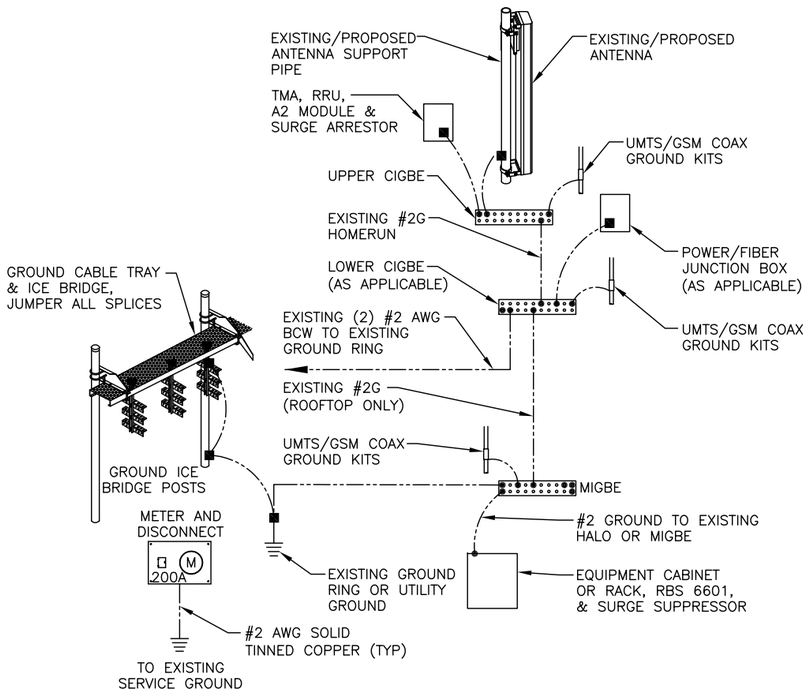
NOTE:

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

SCALE: N.T.S

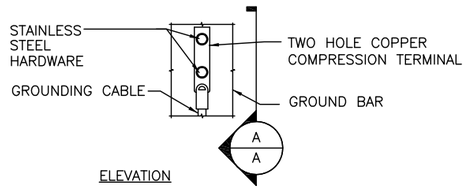
1 / G–1



GROUNDING RISER DIAGRAM

SCALE: N.T.S

2 / G–1



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

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S

3 / G–1

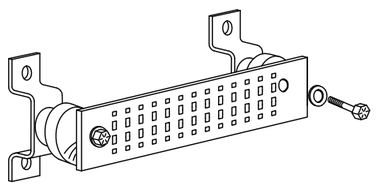
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

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

4 / G–1

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STATE OF CONNECTICUT · DEREK J. CREASEY · 30,285 · LICENSED PROFESSIONAL ENGINEER

AT&T

GROUNDING DETAILS

BWE

SITE NUMBER	DRAWING NUMBER	REV
5152.00	G–1	1

PJF PAUL J. FORD & COMPANY

Date: **June 21, 2016**

James Ravencraft
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
980-209-8241

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

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5152
	Carrier Site Name:	Hartford North
Crown Castle Designation:	**Crown Castle BU Number:**	876325
	Crown Castle Site Name:	WESTON SQUARE
	Crown Castle JDE Job Number:	383194
	Crown Castle Work Order Number:	1255303
	Crown Castle Application Number:	351189 Rev. 3
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-1244.002.7805
Site Data:	**92 Weston Street, Hartford, Hartford County, CT** **Latitude *41° 47' 12.3"*, Longitude *-72° 39' 44.42"*** **110 Foot - Monopole Tower**	

Dear James Ravencraft,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 915930, in accordance with application 351189, revision 3.

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

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Jason Martin, P.E.
Project Engineer

tnxTower Report - version 7.0.5.1

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

6-21-16

PAUL J. FORD & COMPANY

Date: **June 21, 2016**

James Ravencraft
Crown Castle
3530 Toringdon Way, Suite 300
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Subject: **Structural Analysis Report**

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	Carrier Site Number:	CT5152
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TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 110 ft Monopole tower designed by ROHN in October of 1996. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E. The tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F standard and The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 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
89.0	90.0	3	ericsson	WCS RRUS-32-B30	1 2	3/8 3/4	--
		3	ericsson	RRUS 32 B2			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			

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
107.0	108.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe	1	5/8	2
	107.0	1	tower mounts	T-Arm Mount [TA 702-3]			
		1	tower mounts	Platform Mount [LP 502-1]	--	--	3
105.0	106.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz w/Mount Pipe	--	--	3
		3	alcatel lucent	800MHz 2X50W RRH W/FILTER W/Mount pipes	--	--	1
	105.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz w/Mount Pipe			
		1	tower mounts	Side Arm Mount [SO 102-3]			
		3	alcatel lucent	TD-RRH8x20-25	--	--	2
89.0	90.0	3	ericsson	RRUS-11	1 2 6	3/8 3/4 1-5/8	1
		3	kmw	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave	LGP21401			
		3	powerwave	7750.00 w/ Mount Pipe			
		3	powerwave	7750.00 w/ Mount Pipe	6	1-5/8	3
	89.0	3	ericsson	RRUS-11			
		1	raycap	DC6-48-60-18-8F	--	--	1
		1	tower mounts	Platform Mount [LP 502-1]			
80.0	81.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	7 6 1	7/8 1-1/4 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	80.0	1	tower mounts	Platform Mount [LP 305-1]			

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

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)
--	--	--	--	--	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 07-11432G, 01/24/08	2192540	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, 34738SW, 10/18/96	1615433	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn, 34738SW, 10/17/96	1615400	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	B&T, 79760, 11/24/09	2356066	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP, 126558, 10/22/12	3187227	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 37512-1239 R1, 10/30/12	3361707	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 060671, 06/28/06	1956491	CCISITES
4-POST-MODIFICATION INSPECTION	B&T, 79760, 11/24/09	2561266	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 126558, 10/22/12	3355603	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 131001.876325, 08/06/13	4075332	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	110 - 90	Pole	P24x1/4	1	-2.91	589.19	24.5	Pass
L2	90 - 60	Pole	P24x3/8	2	-10.58	934.94	84.7	Pass
L3	60 - 39.5	Pole	30" x 0.375"	3	-13.59	1166.57	99.1	Pass
L4	39.5 - 30	Pole	RPS 30" x 0.483"	4	-15.33	1359.81	93.2	Pass
L5	30 - 18.75	Pole	P30x1/2	5	-17.82	1556.58	98.1	Pass
L6	18.75 - 8.25	Pole	RPS 30" x 0.71979"	6	-20.53	2050.43	87.9	Pass
L7	8.25 - 0	Pole	RPS 30" x 0.801"	7	-22.86	2467.02	81.8	Pass
							Summary	
						Pole (L3)	99.1	Pass
						Rating =	99.1	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	98.7	Pass
1	Base Plate	0	74.7	Pass
1	Base Foundation Structural Steel	0	99.3	Pass
1	Base Foundation Soil Interaction	0	24.9	Pass
1	Flange	90	92.2	Pass
1	Flange	60	83.8	Pass
1	Flange	30	12.7	Pass

Structure Rating (max from all components) =	99.3%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Worst case scenario between existing and post installed anchors.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1. Tower is located in Hartford County, Connecticut.
2. Basic wind speed of 80 mph.
3. Nominal ice thickness of 1.0000 in.
4. Ice thickness is considered to increase with height.
5. Ice density of 56.00 pcf.
6. A wind speed of 38 mph is used in combination with ice.
7. Deflections calculated using a wind speed of 50 mph.
8. A non-linear (P-delta) analysis was used.
9. Pressures are calculated at each section.
10. Stress ratio used in pole design is 1.333.
11. 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		

Pole Section Geometry

Section	*Elevation* ft	*Section Length* ft	*Pole Size*	*Pole Grade*	*Socket Length* ft
L1	110.0000-90.0000	20.0000	P24x1/4	A53-B-42 (42 ksi)	
L2	90.0000-60.0000	30.0000	P24x3/8	A53-B-42 (42 ksi)	
L3	60.0000-39.5000	20.5000	30" x 0.375"	A53-B-42 (42 ksi)	
L4	39.5000-30.0000	9.5000	RPS 30" x 0.483"	Reinf 37.96 ksi (38 ksi)	
L5	30.0000-18.7500	11.2500	P30x1/2	A53-B-42 (42 ksi)	
L6	18.7500-8.2500	10.5000	RPS 30" x 0.71979"	Reinf 38.72 ksi (39 ksi)	
L7	8.2500-0.0000	8.2500	RPS 30" x 0.801"	Reinf 41.98 ksi (42 ksi)	

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 110.0000-90.0000				1	1	1			
L2 90.0000-60.0000				1	1	1			
L3 60.0000-39.5000				1	1	1			
L4 39.5000-30.0000				1	1	1			
L5 30.0000-18.7500				1	1	1			
L6 18.7500-8.2500				1	1	1			
L7 8.2500-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HB114-1-08U4-M5J(1 1/4")	A	No	Inside Pole	107.0000 - 0.0000	3	No Ice	0.0000	1.08
						1/2" Ice	0.0000	1.08
						1" Ice	0.0000	1.08
						2" Ice	0.0000	1.08
						4" Ice	0.0000	1.08
HB058-M12-XXXF(5/8")	A	No	Inside Pole	107.0000 - 0.0000	1	No Ice	0.0000	0.24
						1/2" Ice	0.0000	0.24
						1" Ice	0.0000	0.24
						2" Ice	0.0000	0.24
						4" Ice	0.0000	0.24
***								
2" Rigid Conduit (1-1/2" Thick-wall Condiut)	B	No	Inside Pole	89.0000 - 0.0000	1	No Ice	0.0000	2.60
						1/2" Ice	0.0000	2.60
						1" Ice	0.0000	2.60
						2" Ice	0.0000	2.60
						4" Ice	0.0000	2.60
WR-VG86ST-BRD (3/4")	B	No	Inside Pole	89.0000 - 0.0000	2	No Ice	0.0000	0.88
						1/2" Ice	0.0000	0.88
						1" Ice	0.0000	0.88
						2" Ice	0.0000	0.88
						4" Ice	0.0000	0.88
LDF2-50A (3/8 FOAM)	B	No	Inside Pole	89.0000 - 0.0000	1	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.08
						1" Ice	0.0000	0.08
						2" Ice	0.0000	0.08
						4" Ice	0.0000	0.08
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	89.0000 - 0.0000	3	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
LDF7-50A (1-5/8 FOAM)	B	No	CaAa (Out Of Face)	89.0000 - 0.0000	1	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	0.9980	30.04
1-5/8 FOAM	B	No	CaAa (Out Of Face)	89.0000 - 0.0000	2	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
FB-L98B-002-50000(3/8")	B	No	CaAa (Out Of Face)	89.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.61
						1" Ice	0.0000	1.76
						2" Ice	0.0000	5.91
						4" Ice	0.0000	21.53
WR-VG86ST-BRD(3/4")	B	No	CaAa (Out Of Face)	89.0000 - 0.0000	2	No Ice	0.0000	0.58
						1/2" Ice	0.0000	1.38
						1" Ice	0.0000	2.78
						2" Ice	0.0000	7.41
						4" Ice	0.0000	24.02
***								
LDF5-50A(7/8")	C	No	Inside Pole	80.0000 - 0.0000	1	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
VXL6-50(1-1/4")	C	No	Inside Pole	80.0000 - 0.0000	6	No Ice	0.0000	0.50
						1/2" Ice	0.0000	0.50
						1" Ice	0.0000	0.50
						2" Ice	0.0000	0.50
						4" Ice	0.0000	0.50
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	80.0000 - 0.0000	1	No Ice	0.1625	1.07
						1/2" Ice	0.2625	2.37
						1" Ice	0.3625	4.28
						2" Ice	0.5625	9.93
						4" Ice	0.9625	28.56
810921-001(7/8")	C	No	CaAa (Out Of Face)	80.0000 - 0.0000	6	No Ice	0.0000	0.40
						1/2" Ice	0.0000	1.38
						1" Ice	0.0000	2.98
						2" Ice	0.0000	8.00
						4" Ice	0.0000	25.38
***								
Aero MP3-05	C	No	CaAa (Out Of Face)	10.5000 - 0.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00
Aero MP3-05	C	No	CaAa (Out Of Face)	21.0000 - 6.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00
Aero MP3-03	C	No	CaAa (Out Of Face)	40.5000 - 30.0000	1	No Ice	0.2625	0.00
						1/2" Ice	0.3736	0.00
						1" Ice	0.4847	0.00
						2" Ice	0.7069	0.00
						4" Ice	1.1514	0.00
***								

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	110.0000-90.0000	A	0.000	0.000	0.000	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	90.0000-60.0000	A	0.000	0.000	0.000	0.000	0.10
		B	0.000	0.000	0.000	5.742	0.31
		C	0.000	0.000	0.000	3.250	0.14
L3	60.0000-39.5000	A	0.000	0.000	0.000	0.000	0.07

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
		B	0.000	0.000	0.000	4.059	0.22
		C	0.000	0.000	0.000	3.594	0.14
L4	39.5000-30.0000	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	1.881	0.10
		C	0.000	0.000	0.000	4.037	0.06
L5	30.0000-18.7500	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	2.228	0.12
		C	0.000	0.000	0.000	2.611	0.08
L6	18.7500-8.2500	A	0.000	0.000	0.000	0.000	0.04
		B	0.000	0.000	0.000	2.079	0.11
		C	0.000	0.000	0.000	6.141	0.07
L7	8.2500-0.0000	A	0.000	0.000	0.000	0.000	0.03
		B	0.000	0.000	0.000	1.634	0.09
		C	0.000	0.000	0.000	4.992	0.06

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	110.0000-90.0000	A	1.142	0.000	0.000	0.000	0.000	0.06
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	90.0000-60.0000	A	1.104	0.000	0.000	0.000	0.000	0.10
		B		0.000	0.000	0.000	12.142	0.90
		C		0.000	0.000	0.000	7.664	0.58
L3	60.0000-39.5000	A	1.050	0.000	0.000	0.000	0.000	0.07
		B		0.000	0.000	0.000	8.366	0.60
		C		0.000	0.000	0.000	8.134	0.56
L4	39.5000-30.0000	A	1.006	0.000	0.000	0.000	0.000	0.03
		B		0.000	0.000	0.000	3.793	0.26
		C		0.000	0.000	0.000	8.073	0.24
L5	30.0000-18.7500	A	1.000	0.000	0.000	0.000	0.000	0.04
		B		0.000	0.000	0.000	4.478	0.31
		C		0.000	0.000	0.000	5.555	0.29
L6	18.7500-8.2500	A	1.000	0.000	0.000	0.000	0.000	0.04
		B		0.000	0.000	0.000	4.179	0.29
		C		0.000	0.000	0.000	12.177	0.27
L7	8.2500-0.0000	A	1.000	0.000	0.000	0.000	0.000	0.03
		B		0.000	0.000	0.000	3.284	0.23
		C		0.000	0.000	0.000	9.884	0.21

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	110.0000-90.0000	0.0000	0.0000	0.0000	0.0000
L2	90.0000-60.0000	0.0938	0.1955	0.1364	0.3482
L3	60.0000-39.5000	0.0257	0.2436	0.0106	0.4337
L4	39.5000-30.0000	-0.2360	0.3740	-0.3736	0.5979
L5	30.0000-18.7500	-0.0378	0.2752	-0.0874	0.4699
L6	18.7500-8.2500	-0.3827	0.4471	-0.5856	0.6914
L7	8.2500-0.0000	-0.4003	0.4559	-0.6096	0.7021

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft	C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K

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
107									
(2) 4'x2" Pipe Mount	A	From Face	2.0000 0.00 0.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.03 0.04 0.07 0.16
(2) 4'x2" Pipe Mount	B	From Face	2.0000 0.00 0.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.03 0.04 0.07 0.16
(2) 4'x2" Pipe Mount	C	From Face	2.0000 0.00 0.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7852 1.0284 1.2809 1.8136 3.1111	0.7852 1.0284 1.2809 1.8136 3.1111	0.03 0.03 0.04 0.07 0.16
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
IBC1900HG-2A	A	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1270 1.2726 1.4269 1.7613 2.5339	0.5329 0.6471 0.7699 1.0415 1.6883	0.02 0.03 0.04 0.06 0.15
IBC1900HG-2A	B	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1270 1.2726 1.4269 1.7613 2.5339	0.5329 0.6471 0.7699 1.0415 1.6883	0.02 0.03 0.04 0.06 0.15
IBC1900HG-2A	C	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1270 1.2726 1.4269 1.7613 2.5339	0.5329 0.6471 0.7699 1.0415 1.6883	0.02 0.03 0.04 0.06 0.15
IBC1900BB-1	A	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1270 1.2726 1.4269 1.7613 2.5339	0.5329 0.6471 0.7699 1.0415 1.6883	0.02 0.03 0.04 0.06 0.15
IBC1900BB-1	B	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice	1.1270 1.2726 1.4269 1.7613	0.5329 0.6471 0.7699 1.0415	0.02 0.03 0.04 0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	2.5339	1.6883	0.15
						4" Ice			
IBC1900BB-1	C	From Face	2.0000 0.00 1.00	0.00	107.0000	No Ice	1.1270	0.5329	0.02
						1/2" Ice	1.2726	0.6471	0.03
							1.4269	0.7699	0.04
						1" Ice	1.7613	1.0415	0.06
						2" Ice	2.5339	1.6883	0.15
						4" Ice			
T-Arm Mount [TA 702-3]	C	None		0.00	107.0000	No Ice	5.6400	5.6400	0.34
						1/2" Ice	6.5500	6.5500	0.43
							7.4600	7.4600	0.52
						1" Ice	9.2800	9.2800	0.70
						2" Ice	12.9200	12.9200	1.06
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	2.0000 0.00 1.00	0.00	107.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
							8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
						2" Ice	11.5262	11.4120	0.75
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	2.0000 0.00 1.00	0.00	107.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
							8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
						2" Ice	11.5262	11.4120	0.75
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	2.0000 0.00 1.00	0.00	107.0000	No Ice	7.1342	4.9591	0.08
						1/2" Ice	7.6618	5.7544	0.13
							8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
						2" Ice	11.5262	11.4120	0.75
						4" Ice			
105									
Side Arm Mount [SO 102-3]	C	None		0.00	105.0000	No Ice	3.0000	3.0000	0.08
						1/2" Ice	3.4800	3.4800	0.11
							3.9600	3.9600	0.14
						1" Ice	4.9200	4.9200	0.20
						2" Ice	6.8400	6.8400	0.32
						4" Ice			
800MHz 2X50W RRH W/FILTER W/Mount pipes	A	From Face	2.0000 0.00 1.00	0.00	105.0000	No Ice	2.7148	2.8803	0.08
						1/2" Ice	3.0250	3.2839	0.11
							3.3485	3.7054	0.14
						1" Ice	4.0439	4.6191	0.23
						2" Ice	5.6629	6.7993	0.47
						4" Ice			
800MHz 2X50W RRH W/FILTER W/Mount pipes	B	From Face	2.0000 0.00 1.00	0.00	105.0000	No Ice	2.7148	2.8803	0.08
						1/2" Ice	3.0250	3.2839	0.11
							3.3485	3.7054	0.14
						1" Ice	4.0439	4.6191	0.23
						2" Ice	5.6629	6.7993	0.47
						4" Ice			
800MHz 2X50W RRH W/FILTER W/Mount pipes	C	From Face	2.0000 0.00 1.00	0.00	105.0000	No Ice	2.7148	2.8803	0.08
						1/2" Ice	3.0250	3.2839	0.11
							3.3485	3.7054	0.14
						1" Ice	4.0439	4.6191	0.23
						2" Ice	5.6629	6.7993	0.47
						4" Ice			
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	A	From Face	2.0000 0.00 0.00	0.00	105.0000	No Ice	3.1217	3.4768	0.07
						1/2" Ice	3.4775	3.9581	0.11
							3.8464	4.4572	0.15
						1" Ice	4.6232	5.5092	0.24
						2" Ice	6.4022	7.9717	0.51
						4" Ice			
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	B	From Face	2.0000 0.00	0.00	105.0000	No Ice	3.1217	3.4768	0.07
						1/2" Ice	3.4775	3.9581	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	3.8464	4.4572	0.15
						1" Ice	4.6232	5.5092	0.24
						2" Ice	6.4022	7.9717	0.51
						4" Ice			
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	C	From Face	2.0000 0.00 0.00	0.00	105.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1217 3.4775 3.8464 4.6232 6.4022	3.4768 3.9581 4.4572 5.5092 7.9717	0.07 0.11 0.15 0.24 0.51
TD-RRH8x20-25	A	From Leg	2.0000 0.00 0.00	0.00	105.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Leg	2.0000 0.00 0.00	0.00	105.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Leg	2.0000 0.00 0.00	0.00	105.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.7198 5.0138 5.3165 5.9478 7.3141	1.7027 1.9196 2.1453 2.6224 3.6805	0.07 0.10 0.13 0.20 0.40
89 Platform Mount [LP 502-1]	C	None		0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.3472 45.6677 58.9882 85.6292 138.9112	32.3472 45.6677 58.9882 85.6292 138.9112	0.93 1.19 1.46 2.00 3.07
6'x2" Pipe Mount	A	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2000 1.8025 2.1698 2.9321 4.5679	1.2000 1.8025 2.1698 2.9321 4.5679	0.07 0.08 0.09 0.13 0.27
6'x2" Pipe Mount	B	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2000 1.8025 2.1698 2.9321 4.5679	1.2000 1.8025 2.1698 2.9321 4.5679	0.07 0.08 0.09 0.13 0.27
6'x2" Pipe Mount	C	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2000 1.8025 2.1698 2.9321 4.5679	1.2000 1.8025 2.1698 2.9321 4.5679	0.07 0.08 0.09 0.13 0.27
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87

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
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
7750.00 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
7750.00 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
7750.00 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
RRUS-11	A	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2560 3.4982 3.7490 4.2766 5.4355	1.3790 1.5577 1.7450 2.1455 3.0504	0.05 0.07 0.09 0.15 0.31
RRUS-11	B	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2560 3.4982 3.7490 4.2766 5.4355	1.3790 1.5577 1.7450 2.1455 3.0504	0.05 0.07 0.09 0.15 0.31
RRUS-11	C	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2560 3.4982 3.7490 4.2766 5.4355	1.3790 1.5577 1.7450 2.1455 3.0504	0.05 0.07 0.09 0.15 0.31
DC6-48-60-18-8F	A	From Face	4.0000 0.00 0.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4667 1.6667 1.8778 2.3333 3.3778	1.4667 1.6667 1.8778 2.3333 3.3778	0.02 0.04 0.06 0.11 0.24
(2) LGP21401	A	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	B	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	C	From Face	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14

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
						4" Ice			
QS66512-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	8.4625 9.6573 10.6203 12.6104 16.8055	0.14 0.21 0.30 0.49 1.03
QS66512-2 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	8.4625 9.6573 10.6203 12.6104 16.8055	0.14 0.21 0.30 0.49 1.03
QS66512-2 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	8.4625 9.6573 10.6203 12.6104 16.8055	0.14 0.21 0.30 0.49 1.03
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000	0.0000 0.0000 0.0000 0.0000 0.0000	0.02 0.04 0.06 0.11 0.24
WCS RRUS-32-B30	A	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000	0.0000 0.0000 0.0000 0.0000 0.0000	0.08 0.10 0.14 0.21 0.41
WCS RRUS-32-B30	B	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.0000 0.0000 0.0000 0.0000 0.0000	0.0000 0.0000 0.0000 0.0000 0.0000	0.08 0.10 0.14 0.21 0.41
WCS RRUS-32-B30	C	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.8662 4.1506 4.4435 5.0554 6.3828	2.7616 3.0213 3.2896 3.8522 5.0811	0.08 0.10 0.14 0.21 0.41
RRUS 32 B2	A	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1866 3.4453 3.7126 4.2733 5.4983	1.8511 2.0771 2.3117 2.8069 3.9010	0.05 0.07 0.10 0.16 0.32
RRUS 32 B2	B	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1866 3.4453 3.7126 4.2733 5.4983	1.8511 2.0771 2.3117 2.8069 3.9010	0.05 0.07 0.10 0.16 0.32
RRUS 32 B2	C	From Leg	4.0000 0.00 1.00	0.00	89.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1866 3.4453 3.7126 4.2733 5.4983	1.8511 2.0771 2.3117 2.8069 3.9010	0.05 0.07 0.10 0.16 0.32
80 Platform Mount [LP 305-1]	C	None		0.00	80.0000	No Ice 1/2" Ice Ice	18.0100 23.3300 28.6500	18.0100 23.3300 28.6500	1.12 1.35 1.58

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	39.2900	39.2900	2.05
						2" Ice	60.5700	60.5700	2.97
						4" Ice			
6'x2" Pipe Mount	A	From Face	4.0000	0.00	80.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2"	1.8025	1.8025	0.08
			0.00			Ice	2.1698	2.1698	0.09
						1" Ice	2.9321	2.9321	0.13
						2" Ice	4.5679	4.5679	0.27
						4" Ice			
6'x2" Pipe Mount	B	From Face	4.0000	0.00	80.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2"	1.8025	1.8025	0.08
			0.00			Ice	2.1698	2.1698	0.09
						1" Ice	2.9321	2.9321	0.13
						2" Ice	4.5679	4.5679	0.27
						4" Ice			
6'x2" Pipe Mount	C	From Face	4.0000	0.00	80.0000	No Ice	1.2000	1.2000	0.07
			0.00			1/2"	1.8025	1.8025	0.08
			0.00			Ice	2.1698	2.1698	0.09
						1" Ice	2.9321	2.9321	0.13
						2" Ice	4.5679	4.5679	0.27
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2"	7.3471	6.4800	0.17
			1.00			Ice	7.8631	7.2567	0.23
						1" Ice	8.9261	8.8640	0.38
						2" Ice	11.1755	12.2932	0.81
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2"	7.3471	6.4800	0.17
			1.00			Ice	7.8631	7.2567	0.23
						1" Ice	8.9261	8.8640	0.38
						2" Ice	11.1755	12.2932	0.81
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.0000	0.00	80.0000	No Ice	6.8253	5.6424	0.11
			0.00			1/2"	7.3471	6.4800	0.17
			1.00			Ice	7.8631	7.2567	0.23
						1" Ice	8.9261	8.8640	0.38
						2" Ice	11.1755	12.2932	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Face	4.0000	0.00	80.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2"	7.3373	6.4717	0.17
			1.00			Ice	7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Face	4.0000	0.00	80.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2"	7.3373	6.4717	0.17
			1.00			Ice	7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Face	4.0000	0.00	80.0000	No Ice	6.8155	5.6334	0.11
			0.00			1/2"	7.3373	6.4717	0.17
			1.00			Ice	7.8532	7.2478	0.23
						1" Ice	8.9160	8.8537	0.38
						2" Ice	11.1650	12.2804	0.81
						4" Ice			
KRY 112 144/1	A	From Face	4.0000	0.00	80.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01
			1.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
KRY 112 144/1	B	From Face	4.0000	0.00	80.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
KRY 112 144/1	C	From Face	4.0000	0.00	80.0000	No Ice	0.4083	0.2042	0.01
			0.00			1/2"	0.4969	0.2733	0.01
			1.00			Ice	0.5941	0.3511	0.02
						1" Ice	0.8145	0.5326	0.03
						2" Ice	1.3590	0.9992	0.08
						4" Ice			
30									
Bridge Stiffener (72" x 11" x 1.25")	C	None		0.00	30.0000	No Ice	1.2500	7.7000	0.35
						1/2"	1.9344	8.2423	0.38
						Ice	2.6312	8.7932	0.42
						1" Ice	3.6599	9.9210	0.51
						2" Ice	5.5091	12.2802	0.77
						4" Ice			
***									

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 110.0000-90.0000	100.0000	1.373	22.49	40.000	A	0.000	40.000	40.000	100.00	0.000	0.000
					B	0.000	40.000		100.00	0.000	0.000
					C	0.000	40.000		100.00	0.000	0.000
L2 90.0000-60.0000	75.0000	1.264	20.72	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	5.742
					C	0.000	60.000		100.00	0.000	3.250
L3 60.0000-39.5000	49.7500	1.124	18.42	51.250	A	0.000	51.250	51.250	100.00	0.000	0.000
					B	0.000	51.250		100.00	0.000	4.059
					C	0.000	51.250		100.00	0.000	3.594
L4 39.5000-30.0000	34.7500	1.015	16.63	23.750	A	0.000	23.750	23.750	100.00	0.000	0.000
					B	0.000	23.750		100.00	0.000	1.881
					C	0.000	23.750		100.00	0.000	4.037
L5 30.0000-18.7500	24.3750	1	16.38	28.125	A	0.000	28.125	28.125	100.00	0.000	0.000
					B	0.000	28.125		100.00	0.000	2.228
					C	0.000	28.125		100.00	0.000	2.611
L6 18.7500-8.2500	13.5000	1	16.38	26.250	A	0.000	26.250	26.250	100.00	0.000	0.000
					B	0.000	26.250		100.00	0.000	2.079
					C	0.000	26.250		100.00	0.000	6.141
L7 8.2500-0.0000	4.1250	1	16.38	20.625	A	0.000	20.625	20.625	100.00	0.000	0.000
					B	0.000	20.625		100.00	0.000	1.634
					C	0.000	20.625		100.00	0.000	4.992

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 110.0000-90.0000	100.0000	1.373	4.97	1.1423	43.808	A	0.000	43.808	43.808	100.00	0.000	0.000
						B	0.000	43.808		100.00	0.000	0.000
						C	0.000	43.808		100.00	0.000	0.000
L2 90.0000-	75.0000	1.264	4.58	1.1035	65.518	A	0.000	65.518	65.518	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
60.0000						B	0.000	65.518		100.00	0.000	12.142
						C	0.000	65.518		100.00	0.000	7.664
L3 60.0000-39.5000	49.7500	1.124	4.07	1.0505	54.839	A	0.000	54.839	54.839	100.00	0.000	0.000
						B	0.000	54.839		100.00	0.000	8.366
						C	0.000	54.839		100.00	0.000	8.134
L4 39.5000-30.0000	34.7500	1.015	3.67	1.0062	25.343	A	0.000	25.343	25.343	100.00	0.000	0.000
						B	0.000	25.343		100.00	0.000	3.793
						C	0.000	25.343		100.00	0.000	8.073
L5 30.0000-18.7500	24.3750	1	3.62	1.0000	30.000	A	0.000	30.000	30.000	100.00	0.000	0.000
						B	0.000	30.000		100.00	0.000	4.478
						C	0.000	30.000		100.00	0.000	5.555
L6 18.7500-8.2500	13.5000	1	3.62	1.0000	28.000	A	0.000	28.000	28.000	100.00	0.000	0.000
						B	0.000	28.000		100.00	0.000	4.179
						C	0.000	28.000		100.00	0.000	12.177
L7 8.2500-0.0000	4.1250	1	3.62	1.0000	22.000	A	0.000	22.000	22.000	100.00	0.000	0.000
						B	0.000	22.000		100.00	0.000	3.284
						C	0.000	22.000		100.00	0.000	9.884

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 110.0000-90.0000	100.0000	1.373	8.79	40.000	A	0.000	40.000	40.000	100.00	0.000	0.000
					B	0.000	40.000		100.00	0.000	0.000
					C	0.000	40.000		100.00	0.000	0.000
L2 90.0000-60.0000	75.0000	1.264	8.09	60.000	A	0.000	60.000	60.000	100.00	0.000	0.000
					B	0.000	60.000		100.00	0.000	5.742
					C	0.000	60.000		100.00	0.000	3.250
L3 60.0000-39.5000	49.7500	1.124	7.20	51.250	A	0.000	51.250	51.250	100.00	0.000	0.000
					B	0.000	51.250		100.00	0.000	4.059
					C	0.000	51.250		100.00	0.000	3.594
L4 39.5000-30.0000	34.7500	1.015	6.50	23.750	A	0.000	23.750	23.750	100.00	0.000	0.000
					B	0.000	23.750		100.00	0.000	1.881
					C	0.000	23.750		100.00	0.000	4.037
L5 30.0000-18.7500	24.3750	1	6.40	28.125	A	0.000	28.125	28.125	100.00	0.000	0.000
					B	0.000	28.125		100.00	0.000	2.228
					C	0.000	28.125		100.00	0.000	2.611
L6 18.7500-8.2500	13.5000	1	6.40	26.250	A	0.000	26.250	26.250	100.00	0.000	0.000
					B	0.000	26.250		100.00	0.000	2.079
					C	0.000	26.250		100.00	0.000	6.141
L7 8.2500-0.0000	4.1250	1	6.40	20.625	A	0.000	20.625	20.625	100.00	0.000	0.000
					B	0.000	20.625		100.00	0.000	1.634
					C	0.000	20.625		100.00	0.000	4.992

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

Comb. No.	Description
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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	110 - 90	Pole	Max Tension	21	0.00	-0.00	0.00
			Max. Compression	14	-6.03	0.00	0.00
			Max. Mx	11	-2.91	69.08	-0.01
			Max. My	2	-2.91	0.00	69.08
			Max. Vy	11	-4.49	69.08	-0.01
			Max. Vx	2	-4.49	0.00	69.08
			Max. Torque	6			-0.00
L2	90 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.36	0.12	-0.13
			Max. Mx	11	-10.58	415.15	-0.49
			Max. My	2	-10.58	-0.51	414.52
			Max. Vy	11	-13.06	415.15	-0.49
			Max. Vx	8	13.04	0.60	-414.40
			Max. Torque	2			0.67
L3	60 - 39.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.84	0.16	-0.73
			Max. Mx	11	-13.59	694.51	-0.96
			Max. My	8	-13.60	0.97	-693.43
			Max. Vy	11	-14.18	694.51	-0.96
			Max. Vx	2	-14.15	-0.88	693.37
			Max. Torque	2			0.66
L4	39.5 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.19	0.17	-0.98
			Max. Mx	11	-15.33	831.53	-1.17
			Max. My	8	-15.33	1.15	-830.29
			Max. Vy	11	-14.68	831.53	-1.17
			Max. Vx	2	-14.66	-1.05	830.14
			Max. Torque	13			0.67
L5	30 - 18.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.45	0.19	-1.29
			Max. Mx	11	-17.82	1001.72	-1.43
			Max. My	8	-17.82	1.35	-1000.30
			Max. Vy	11	-15.36	1001.72	-1.43
			Max. Vx	8	15.34	1.35	-1000.30
			Max. Torque	13			0.68
L6	18.75 - 8.25	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	14	-33.80	0.21	-1.57
			Max. Mx	11	-20.53	1165.77	-1.66
			Max. My	8	-20.53	1.53	-1164.19
			Max. Vy	11	-15.89	1165.77	-1.66
			Max. Vx	8	15.87	1.53	-1164.19
			Max. Torque	13			0.71
L7	8.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-36.64	0.22	-1.79
			Max. Mx	11	-22.86	1298.45	-1.84
			Max. My	8	-22.86	1.68	-1296.73
			Max. Vy	11	-16.28	1298.45	-1.84
			Max. Vx	8	16.26	1.68	-1296.73
			Max. Torque	13			0.73

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	36.64	0.00	-4.84
	Max. H_x	11	22.87	16.27	-0.02
	Max. H_z	2	22.87	-0.02	16.25
	Max. M_x	2	1296.31	-0.02	16.25
	Max. M_z	5	1298.36	-16.27	0.02
	Max. Torsion	13	0.73	8.12	14.07
	Min. Vert	1	22.87	0.00	0.00
	Min. H_x	5	22.87	-16.27	0.02
	Min. H_z	8	22.87	0.02	-16.25
	Min. M_x	8	-1296.73	0.02	-16.25
	Min. M_z	11	-1298.45	16.27	-0.02
	Min. Torsion	7	-0.73	-8.12	-14.07

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	22.87	0.00	0.00	0.21	0.04	0.00
Dead+Wind 0 deg - No Ice	22.87	0.02	-16.25	-1296.31	-1.60	-0.71
Dead+Wind 30 deg - No Ice	22.87	8.15	-14.08	-1123.43	-650.58	-0.49
Dead+Wind 60 deg - No Ice	22.87	14.10	-8.14	-649.47	-1125.23	-0.14
Dead+Wind 90 deg - No Ice	22.87	16.27	-0.02	-1.43	-1298.36	0.25
Dead+Wind 120 deg - No Ice	22.87	14.08	8.11	647.05	-1123.60	0.57
Dead+Wind 150 deg - No Ice	22.87	8.12	14.07	1122.21	-647.75	0.73
Dead+Wind 180 deg - No Ice	22.87	-0.02	16.25	1296.73	1.68	0.70
Dead+Wind 210 deg - No Ice	22.87	-8.15	14.08	1123.85	650.66	0.49
Dead+Wind 240 deg - No Ice	22.87	-14.10	8.14	649.88	1125.31	0.14
Dead+Wind 270 deg - No Ice	22.87	-16.27	0.02	1.84	1298.45	-0.25
Dead+Wind 300 deg - No Ice	22.87	-14.08	-8.11	-646.64	1123.68	-0.57
Dead+Wind 330 deg - No Ice	22.87	-8.12	-14.07	-1121.80	647.83	-0.73
Dead+Ice	36.64	0.00	0.00	1.79	0.22	0.00
Dead+Wind 0 deg+Ice	36.64	0.00	-4.84	-394.14	-0.15	-0.20
Dead+Wind 30 deg+Ice	36.64	2.43	-4.20	-341.28	-198.33	-0.13
Dead+Wind 60 deg+Ice	36.64	4.20	-2.43	-196.48	-343.30	-0.02
Dead+Wind 90 deg+Ice	36.64	4.85	-0.00	1.47	-396.22	0.09
Dead+Wind 120 deg+Ice	36.64	4.20	2.42	199.53	-342.91	0.18
Dead+Wind 150 deg+Ice	36.64	2.42	4.19	344.62	-197.66	0.22
Dead+Wind 180 deg+Ice	36.64	-0.00	4.84	397.87	0.63	0.20
Dead+Wind 210 deg+Ice	36.64	-2.43	4.20	345.01	198.80	0.13
Dead+Wind 240 deg+Ice	36.64	-4.20	2.43	200.21	343.77	0.02
Dead+Wind 270 deg+Ice	36.64	-4.85	0.00	2.25	396.69	-0.09
Dead+Wind 300 deg+Ice	36.64	-4.20	-2.42	-195.80	343.38	-0.18
Dead+Wind 330 deg+Ice	36.64	-2.42	-4.19	-340.89	198.13	-0.22
Dead+Wind 0 deg - Service	22.87	0.01	-6.35	-506.59	-0.60	-0.28

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 30 deg - Service	22.87	3.18	-5.50	-439.01	-254.28	-0.19
Dead+Wind 60 deg - Service	22.87	5.51	-3.18	-253.75	-439.82	-0.05
Dead+Wind 90 deg - Service	22.87	6.36	-0.01	-0.43	-507.50	0.10
Dead+Wind 120 deg - Service	22.87	5.50	3.17	253.06	-439.18	0.22
Dead+Wind 150 deg - Service	22.87	3.17	5.49	438.79	-253.17	0.29
Dead+Wind 180 deg - Service	22.87	-0.01	6.35	507.01	0.68	0.28
Dead+Wind 210 deg - Service	22.87	-3.18	5.50	439.43	254.37	0.19
Dead+Wind 240 deg - Service	22.87	-5.51	3.18	254.16	439.90	0.05
Dead+Wind 270 deg - Service	22.87	-6.36	0.01	0.85	507.58	-0.10
Dead+Wind 300 deg - Service	22.87	-5.50	-3.17	-252.64	439.27	-0.22
Dead+Wind 330 deg - Service	22.87	-3.17	-5.49	-438.37	253.26	-0.29

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-22.87	0.00	0.00	22.87	0.00	0.000%
2	0.02	-22.87	-16.25	-0.02	22.87	16.25	0.000%
3	8.15	-22.87	-14.08	-8.15	22.87	14.08	0.000%
4	14.10	-22.87	-8.14	-14.10	22.87	8.14	0.000%
5	16.27	-22.87	-0.02	-16.27	22.87	0.02	0.000%
6	14.08	-22.87	8.11	-14.08	22.87	-8.11	0.000%
7	8.12	-22.87	14.07	-8.12	22.87	-14.07	0.000%
8	-0.02	-22.87	16.25	0.02	22.87	-16.25	0.000%
9	-8.15	-22.87	14.08	8.15	22.87	-14.08	0.000%
10	-14.10	-22.87	8.14	14.10	22.87	-8.14	0.000%
11	-16.27	-22.87	0.02	16.27	22.87	-0.02	0.000%
12	-14.08	-22.87	-8.11	14.08	22.87	8.11	0.000%
13	-8.12	-22.87	-14.07	8.12	22.87	14.07	0.000%
14	0.00	-36.64	0.00	0.00	36.64	0.00	0.000%
15	0.00	-36.64	-4.84	-0.00	36.64	4.84	0.000%
16	2.43	-36.64	-4.20	-2.43	36.64	4.20	0.000%
17	4.20	-36.64	-2.43	-4.20	36.64	2.43	0.000%
18	4.85	-36.64	-0.00	-4.85	36.64	0.00	0.000%
19	4.20	-36.64	2.42	-4.20	36.64	-2.42	0.000%
20	2.42	-36.64	4.19	-2.42	36.64	-4.19	0.000%
21	-0.00	-36.64	4.84	0.00	36.64	-4.84	0.000%
22	-2.43	-36.64	4.20	2.43	36.64	-4.20	0.000%
23	-4.20	-36.64	2.43	4.20	36.64	-2.43	0.000%
24	-4.85	-36.64	0.00	4.85	36.64	-0.00	0.000%
25	-4.20	-36.64	-2.42	4.20	36.64	2.42	0.000%
26	-2.42	-36.64	-4.19	2.42	36.64	4.19	0.000%
27	0.01	-22.87	-6.35	-0.01	22.87	6.35	0.000%
28	3.18	-22.87	-5.50	-3.18	22.87	5.50	0.000%
29	5.51	-22.87	-3.18	-5.51	22.87	3.18	0.000%
30	6.36	-22.87	-0.01	-6.36	22.87	0.01	0.000%
31	5.50	-22.87	3.17	-5.50	22.87	-3.17	0.000%
32	3.17	-22.87	5.49	-3.17	22.87	-5.49	0.000%
33	-0.01	-22.87	6.35	0.01	22.87	-6.35	0.000%
34	-3.18	-22.87	5.50	3.18	22.87	-5.50	0.000%
35	-5.51	-22.87	3.18	5.51	22.87	-3.18	0.000%
36	-6.36	-22.87	0.01	6.36	22.87	-0.01	0.000%
37	-5.50	-22.87	-3.17	5.50	22.87	3.17	0.000%
38	-3.17	-22.87	-5.49	3.17	22.87	5.49	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	0.00091579
3	Yes	5	0.00000001	0.00050297
4	Yes	5	0.00000001	0.00052076
5	Yes	4	0.00000001	0.00024493
6	Yes	5	0.00000001	0.00052601
7	Yes	5	0.00000001	0.00049587
8	Yes	5	0.00000001	0.00003522
9	Yes	5	0.00000001	0.00052935
10	Yes	5	0.00000001	0.00051097
11	Yes	4	0.00000001	0.00032331
12	Yes	5	0.00000001	0.00050048
13	Yes	5	0.00000001	0.00053121
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00030447
16	Yes	5	0.00000001	0.00008845
17	Yes	5	0.00000001	0.00009433
18	Yes	4	0.00000001	0.00022793
19	Yes	5	0.00000001	0.00009920
20	Yes	5	0.00000001	0.00008728
21	Yes	4	0.00000001	0.00031063
22	Yes	5	0.00000001	0.00009955
23	Yes	5	0.00000001	0.00009285
24	Yes	4	0.00000001	0.00023029
25	Yes	5	0.00000001	0.00008779
26	Yes	5	0.00000001	0.00010045
27	Yes	4	0.00000001	0.00020863
28	Yes	5	0.00000001	0.00004623
29	Yes	5	0.00000001	0.00004969
30	Yes	4	0.00000001	0.00008913
31	Yes	5	0.00000001	0.00005109
32	Yes	5	0.00000001	0.00004516
33	Yes	4	0.00000001	0.00021570
34	Yes	5	0.00000001	0.00005154
35	Yes	5	0.00000001	0.00004773
36	Yes	4	0.00000001	0.00009331
37	Yes	5	0.00000001	0.00004598
38	Yes	5	0.00000001	0.00005226

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 90	21.10	35	1.49	0.00
L2	90 - 60	14.92	35	1.44	0.00
L3	60 - 39.5	6.79	35	1.05	0.00
L4	39.5 - 30	2.95	35	0.72	0.00
L5	30 - 18.75	1.68	35	0.55	0.00
L6	18.75 - 8.25	0.65	35	0.32	0.00
L7	8.25 - 0	0.13	35	0.14	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.0000	(2) 4'x2" Pipe Mount	35	20.16	1.49	0.00	43611
105.0000	Side Arm Mount [SO 102-3]	35	19.53	1.49	0.00	43611
89.0000	Platform Mount [LP 502-1]	35	14.61	1.43	0.00	9900
80.0000	Platform Mount [LP 305-1]	35	11.97	1.34	0.00	5860
30.0000	Bridge Stiffener (72" x 11" x 1.25")	35	1.68	0.55	0.00	2982

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 90	53.90	10	3.81	0.01
L2	90 - 60	38.12	10	3.68	0.01
L3	60 - 39.5	17.35	10	2.67	0.00
L4	39.5 - 30	7.54	10	1.83	0.00
L5	30 - 18.75	4.30	10	1.41	0.00
L6	18.75 - 8.25	1.65	10	0.83	0.00
L7	8.25 - 0	0.32	10	0.37	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.0000	(2) 4'x2" Pipe Mount	10	51.50	3.81	0.01	17220
105.0000	Side Arm Mount [SO 102-3]	10	49.91	3.80	0.01	17220
89.0000	Platform Mount [LP 502-1]	10	37.35	3.67	0.01	3905
80.0000	Platform Mount [LP 305-1]	10	30.59	3.44	0.01	2308
30.0000	Bridge Stiffener (72" x 11" x 1.25")	10	4.30	1.41	0.00	1168

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	110 - 90 (1)	P24x1/4	20.0000	0.0000	0.0	23.70	18.6532	-2.91	442.00	0.007
L2	90 - 60 (2)	P24x3/8	30.0000	0.0000	0.0	25.20	27.8325	-10.58	701.38	0.015
L3	60 - 39.5 (3)	30" x 0.375"	20.5000	0.0000	0.0	25.07	34.9011	-13.59	875.15	0.016
L4	39.5 - 30 (4)	RPS 30" x 0.483"	9.5000	0.0000	0.0	22.78	44.7888	-15.33	1020.11	0.015
L5	30 - 18.75 (5)	P30x1/2	11.2500	0.0000	0.0	25.20	46.3385	-17.82	1167.73	0.015
L6	18.75 - 8.25 (6)	RPS 30" x 0.71979"	10.5000	0.0000	0.0	23.23	66.2110	-20.53	1538.21	0.013
L7	8.25 - 0 (7)	RPS 30" x 0.801"	8.2500	0.0000	0.0	25.19	73.4768	-22.86	1850.73	0.012

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	110 - 90 (1)	P24x1/4	69.08	7.56	23.70	0.319	0.00	0.00	23.70	0.000
L2	90 - 60 (2)	P24x3/8	415.43	30.80	27.72	1.111	0.00	0.00	27.72	0.000
L3	60 - 39.5 (3)	30" x 0.375"	695.06	32.67	25.07	1.303	0.00	0.00	25.07	0.000
L4	39.5 - 30 (4)	RPS 30" x 0.483"	832.20	30.70	25.05	1.225	0.00	0.00	25.05	0.000
L5	30 - 18.75 (5)	P30x1/2	1002.53	35.79	27.72	1.291	0.00	0.00	27.72	0.000
L6	18.75 - 8.25 (6)	RPS 30" x 0.71979"	1166.72	29.58	25.56	1.157	0.00	0.00	25.56	0.000
L7	8.25 - 0 (7)	RPS 30" x 0.801"	1299.49	29.85	27.71	1.077	0.00	0.00	27.71	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	110 - 90 (1)	P24x1/4	4.49	0.48	16.80	0.029	0.00	0.00	11.90	0.000
L2	90 - 60 (2)	P24x3/8	13.08	0.94	16.80	0.056	0.20	0.01	16.80	0.000
L3	60 - 39.5 (3)	30" x 0.375"	14.19	0.81	16.80	0.048	0.18	0.00	15.64	0.000
L4	39.5 - 30 (4)	RPS 30" x 0.483"	14.69	0.66	15.18	0.043	0.17	0.00	15.18	0.000
L5	30 - 18.75 (5)	P30x1/2	15.37	0.66	16.80	0.039	0.16	0.00	16.80	0.000
L6	18.75 - 8.25 (6)	RPS 30" x 0.71979"	15.90	0.48	15.49	0.031	0.15	0.00	15.49	0.000
L7	8.25 - 0 (7)	RPS 30" x 0.801"	16.29	0.44	16.79	0.026	0.14	0.00	16.79	0.000

Pole Interaction Design Data

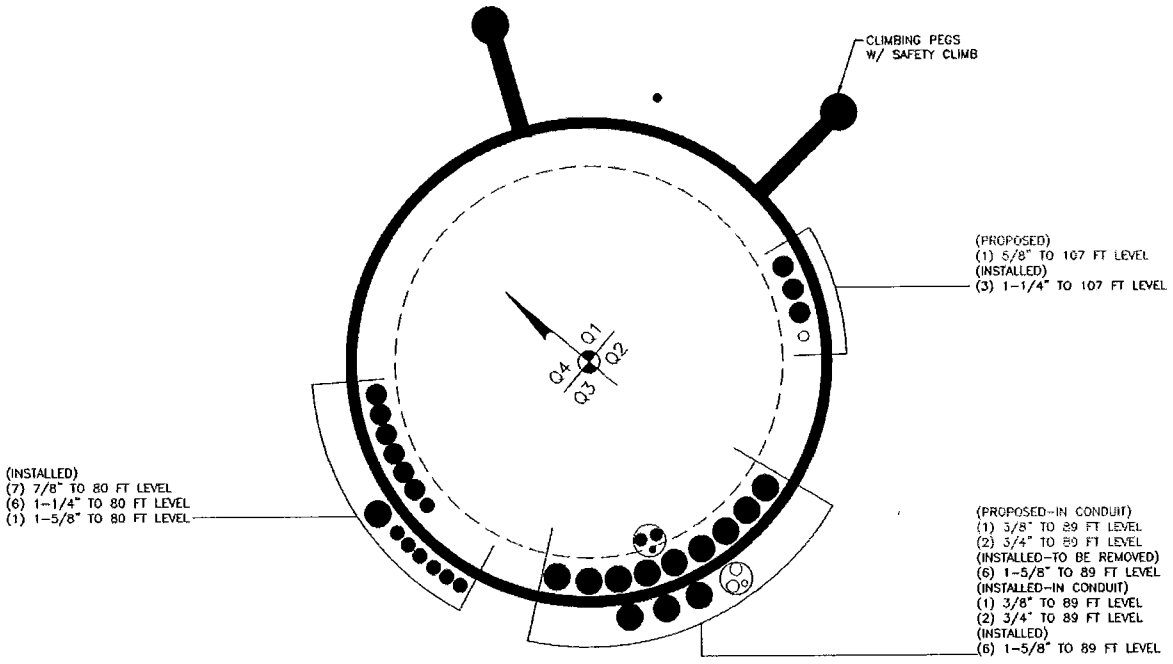
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	110 - 90 (1)	0.007	0.319	0.000	0.029	0.000	0.327 ✔	1.333	H1-3+VT ✔
L2	90 - 60 (2)	0.015	1.111	0.000	0.056	0.000	1.129 ✔	1.333	H1-3+VT ✔
L3	60 - 39.5 (3)	0.016	1.303	0.000	0.048	0.000	1.321 ✔	1.333	H1-3+VT ✔
L4	39.5 - 30 (4)	0.015	1.225	0.000	0.043	0.000	1.242 ✔	1.333	H1-3+VT ✔
L5	30 - 18.75 (5)	0.015	1.291	0.000	0.039	0.000	1.308 ✔	1.333	H1-3+VT ✔
L6	18.75 - 8.25 (6)	0.013	1.157	0.000	0.031	0.000	1.172 ✔	1.333	H1-3+VT ✔
L7	8.25 - 0 (7)	0.012	1.077	0.000	0.026	0.000	1.090 ✔	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	110 - 90	Pole	P24x1/4	1	-2.91	589.19	24.5	Pass
L2	90 - 60	Pole	P24x3/8	2	-10.58	934.94	84.7	Pass
L3	60 - 39.5	Pole	30" x 0.375"	3	-13.59	1166.57	99.1	Pass
L4	39.5 - 30	Pole	RPS 30" x 0.483"	4	-15.33	1359.81	93.2	Pass
L5	30 - 18.75	Pole	P30x1/2	5	-17.82	1556.58	98.1	Pass
L6	18.75 - 8.25	Pole	RPS 30" x 0.71979"	6	-20.53	2050.43	87.9	Pass
L7	8.25 - 0	Pole	RPS 30" x 0.801"	7	-22.86	2467.02	81.8	Pass
						Summary		
						Pole (L3)	99.1	Pass
						RATING =	**99.1**	**Pass**

APPENDIX B

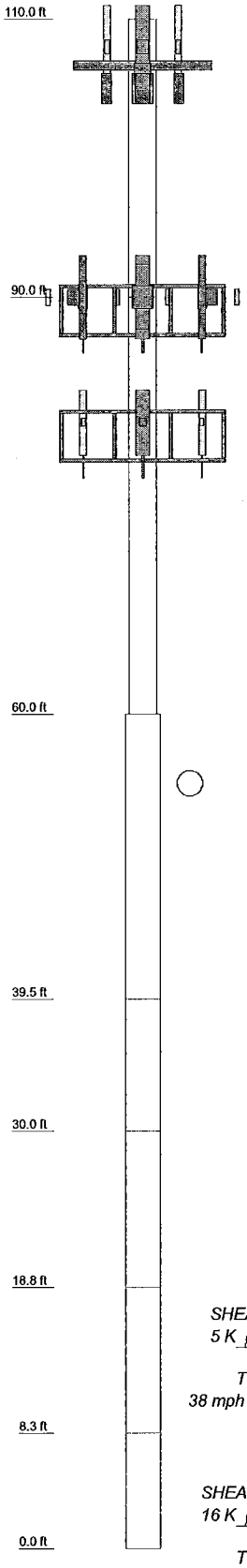
BASE LEVEL DRAWING

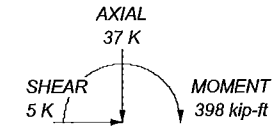


APPENDIX C

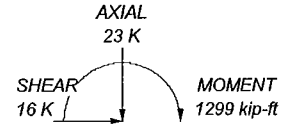
ADDITIONAL CALCULATIONS

Section	Size	Length (ft)	Grade	Weight (K)
1	P24x1/4	20.0000	A53-B-42	1.3
2	P24x3/8	30.0000		2.8
3	30" x 0.375"	20.5000		2.4
4	RPS 30" x 0.483"	9.5000	Reinf 37.96 ksi	1.4
5	P30x1/2	11.2500	A53-B-42	1.8
6	RPS 30" x 0.71979"	10.5000	Reinf 38.72 ksi	2.4
7	RPS 30" x 0.801"	8.2500	Reinf 41.98 ksi	2.1
				14.2





TORQUE 0 kip-ft
38 mph WIND - 1.0000 in ICE



TORQUE 1 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 4'x2" Pipe Mount	107	7750.00 w/ Mount Pipe	89
(2) 4'x2" Pipe Mount	107	7750.00 w/ Mount Pipe	89
(2) 4'x2" Pipe Mount	107	7750.00 w/ Mount Pipe	89
APXVSPP18-C-A20 w/ Mount Pipe	107	RRUS-11	89
APXVSPP18-C-A20 w/ Mount Pipe	107	RRUS-11	89
APXVSPP18-C-A20 w/ Mount Pipe	107	RRUS-11	89
IBC1900HG-2A	107	DC6-48-60-18-8F	89
IBC1900HG-2A	107	(2) LGP21401	89
IBC1900HG-2A	107	(2) LGP21401	89
IBC1900BB-1	107	(2) LGP21401	89
IBC1900BB-1	107	QS66512-2 w/ Mount Pipe	89
IBC1900BB-1	107	QS66512-2 w/ Mount Pipe	89
T-Arm Mount [TA 702-3]	107	QS66512-2 w/ Mount Pipe	89
APXVTM14-C-120 w/ Mount Pipe	107	DC6-48-60-18-8F	89
APXVTM14-C-120 w/ Mount Pipe	107	WCS RRUS-32-B30	89
APXVTM14-C-120 w/ Mount Pipe	107	WCS RRUS-32-B30	89
Side Arm Mount [SO 102-3]	105	WCS RRUS-32-B30	89
800MHz 2X50W RRH W/FILTER W/Mount pipes	105	RRUS 32 B2	89
		RRUS 32 B2	89
800MHz 2X50W RRH W/FILTER W/Mount pipes	105	RRUS 32 B2	89
		Platform Mount [LP 305-1]	80
800MHz 2X50W RRH W/FILTER W/Mount pipes	105	6'x2" Pipe Mount	80
		6'x2" Pipe Mount	80
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	105	6'x2" Pipe Mount	80
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	105	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	80
PCS 1900MHz 4x45W-65MHz w/Mount Pipe	105	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	80
TD-RRH8x20-25	105	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	80
TD-RRH8x20-25	105	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	80
TD-RRH8x20-25	105	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	80
Platform Mount [LP 502-1]	89	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	80
6'x2" Pipe Mount	89	KRY 112 144/1	80
6'x2" Pipe Mount	89	KRY 112 144/1	80
6'x2" Pipe Mount	89	KRY 112 144/1	80
AM-X-CD-16-65-00T-RET w/ Mount Pipe	89	Bridge Stiffener (72" x 11" x 1.25")	30
AM-X-CD-16-65-00T-RET w/ Mount Pipe	89		
AM-X-CD-16-65-00T-RET w/ Mount Pipe	89		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	Reinf 38.72 ksi	39 ksi	49 ksi
Reinf 37.96 ksi	38 ksi	48 ksi	Reinf 41.98 ksi	42 ksi	53 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.1%

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

Job: 110' MP / WESTON SQUARE		
Project: PJF# 37516-1244 / BU# 876325		
Client: CCI	Drawn by: Jason Martin, P.E.	App'd:
Code: TIA/EIA-222-F	Date: 06/20/16	Scale: NTS
Path: G:\TOWER\375 Crown Castle\37516-1244 876325 Weston Square\37516-1244 092 7805 SA 1\37516-1244 092 7805.eri		Dwg No. E-1

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876325*
Site Name: *Weston Square*
App #:

Pole Manufacturer:	Rohn

Reactions		
Moment:	69.08	ft-kips
Axial:	2.91	kips
Shear:	4.49	kips
Elevation:	90	feet

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

Bolt Data			
Qty:	20		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle (in.):	29		

Plate Data		
Diam:	32	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	24	in
Thick:	0.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333333	

Flange Bolt Results

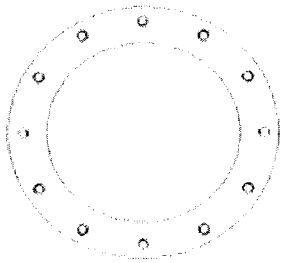
			Rigid
Bolt Tension Capacity, **B**:	46.08	kips	Service, ASD
Max Bolt directly applied T:	5.57	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	2.018	in	
Min PL "treq" for actual **T w/ Pry**:	0.535	in	
Min PL "t1" for actual **T w/o Pry**:	0.702	in	
T allowable with Prying:	35.76	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	5.57	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	12.1%	**Pass**	

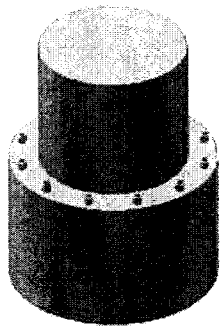
Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 16.28
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	12.7% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876325*
Site Name: *Weston Square*
App #:

Pole Manufacturer:	Rohn

Bolt Data			
Qty:	20		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle (in.):	29		

Plate Data		
Diam:	32	in
Thick, t:	1.5	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.77	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333333	

Reactions		
Moment:	69.08	ft-kips
Axial:	2.91	kips
Shear:	4.49	kips
Elevation:	90	feet

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

Flange Bolt Results | Rigid

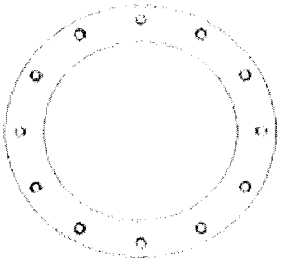
Bolt Tension Capacity, **B**:	46.08 kips	Service, ASD
Max Bolt directly applied T:	5.57 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	2.018 in	
Min PL "treq" for actual **T w/ Pry**:	0.535 in	
Min PL "t1" for actual **T w/o Pry**:	0.702 in	
T allowable with Prying:	35.76 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	5.57 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	12.1% **Pass**	

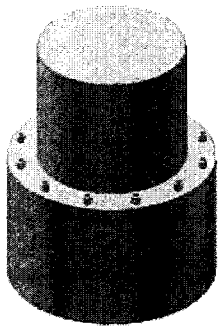
Exterior Flange Plate Results Flexural Check | Rigid

Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length: 16.28
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	12.7% **Pass**	

n/a

Stiffener Results	N/A for Rohn / Pirod
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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876325*
Site Name: *Weston Square*
App #:

Pole Manufacturer:	Rohn

Reactions		
Moment:	415.43	ft-kips
Axial:	10.58	kips
Shear:	13.08	kips
Elevation:	60	feet

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

Bolt Data			
Qty:	12		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle (in.):	35		

Plate Data		
Diam:	41	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	6.28	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	103.67	kips	Service, ASD
Max Bolt directly applied T:	46.60	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	3.614	in	
Min PL "treq" for actual **T w/ Pry**:	1.831	in	
Min PL "t1" for actual **T w/o Pry**:	2.423	in	
T allowable with Prying:	55.60	kips	α'>1 case
Prying Force, Q:	18.81	kips	
Total Bolt Tension=T+Q:	65.41	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	63.1%	**Pass**	

Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
Prying Occurs, PL Check:		25.48
Tension Side Stress Ratio, (treq/t)^2:	83.8% **Pass**	

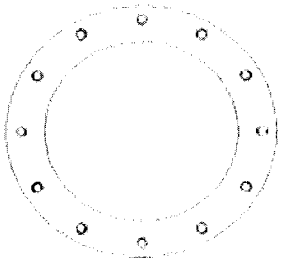
n/a

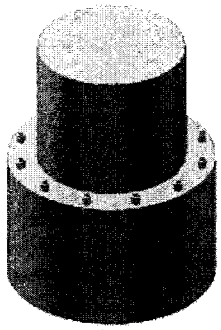
Stiffener Results — N/A for Rohn / Pirod

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

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *876325*
Site Name: *Weston Square*
App #:

Pole Manufacturer:	Rohn

Bolt Data			
Qty:	12		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	0	<-- Disregard	Bolt Fty: 44.00
N/A:	0	<-- Disregard	
Circle (in.):	35		

Plate Data		
Diam:	41	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	7.85	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	30	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333333	

Reactions		
Moment:	415.43	ft-kips
Axial:	10.58	kips
Shear:	13.08	kips
Elevation:	60	feet

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

Flange Bolt Results

Rigid
Service, ASD
Fty*ASIF

Bolt Tension Capacity, **B**:	103.67 kips	
Max Bolt directly applied T:	46.60 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.962 in	
Min PL "treq" for actual **T w/ Pry**:	0.980 in	
Min PL "t1" for actual **T w/o Pry**:	1.315 in	
T allowable w/o Prying:	103.67 kips	α'<0 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	46.60 kips	
Non-Prying Bolt Stress Ratio, T/B:	44.9% **Pass**	

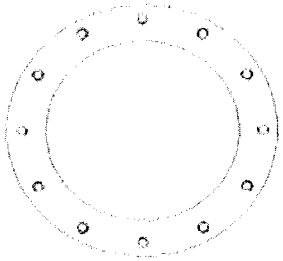
Exterior Flange Plate Results Flexural Check

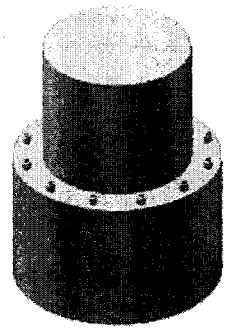
Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length: 18.03

Compression Side Plate Stress:	Rohn/Pirod, OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Pirod, OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	24.0% **Pass**

n/a

Stiffener Results	N/A for Rohn / Pirod
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

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

v2.0, Effective Date: 1-12-12

Date: 6/20/2016
Project No: 37516-1244.002.7805
Site Name: Weston Square
Site Number/BUN: 876325
Description:
Owner:
Engineer:

Welded Bridge Stiffener Analysis per TIA/EIA-222-F & AISC 9th Ed. (Green)

General Parameters and Loading:

Flange Elevation:	30.00	ft
TIA Reference Standard:	TIA/EIA-222-F	
AISC Manual:	9th Ed. (Green)	
Method:	ASD	
ASD Stress Increase, ASIF:	1.333333333	
Moment, Mf:	832.2	k-ft
Axial, Pf:	15.3	kips
Shear, Vf:	14.7	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	30.00	30.00	in
Pole Thickness, tp:	0.3750	0.5000	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	41.00	41.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	0	
Upper Weld Length, L1:	34.00	0.00	in
Lower Weld Length, L2:	32.38	0.00	in
Weld Size, w:	0.3750	0.0000	in
Electrode:	E70	E70	
Effective Stiffener Width, Ws:	5.00	0.00	in
Stiffener Thickness, ts:	1.25	0.00	in
Notch, n:	0.50	0.00	in
Stiffener Fy:	65	0	ksi
Stiffener Fu:	80	0	ksi
Unbraced Length, L:	5.63	0.00	in
K:	0.80	0.00	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Stiffener Circle:	47.00	41.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	8.50	5.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	8.50	5.50	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	35.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

Weld Analysis per AISC Table XIX & pg. 4-72:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	0	Num. of Sixteenths in Weld
a:	0.2500	0.0000	= e1 / L1
k:	0	0	
C:	1.2600	0.0000	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	288.5	0.0	kips
Allowable Axial, Pa:	342.7	0.0	kips = ASIF C C1 D L
Ratio:	84.2%	0.0%	
Lower Pole			
D:	6	0	Num. of Sixteenths in Weld
a:	0.2625	0.0000	= e2 / L2
k:	0	0	
C:	1.2299	0.0000	Tabulated Cofficient
C1:	1.0000	1.0000	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	288.5	0.0	kips
Allowable Axial, Pa:	318.5	0.0	kips = ASIF C C1 D L
Ratio:	90.6%	0.0%	

Pole Analysis per AISC Sect. F4:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, P:	288.5	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fv:	4.2	0.0	kips/in= P / (2 L1)
Section Modulus, S:	385.3	0.0	$in^2 = L1^2 / 3$
Bending Stress, fb:	6.4	0.0	kips/in = P e1 / S
Combined Stress, f:	7.6	0.0	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	0.0000	
Allowable Stress, F:	8.4	0.0	kips/in = ASIF (0.4 Fy) tp
Ratio:	91.1%	0.0%	
Lower Pole			
Stiffener Axial, P:	288.5	0.0	kips
Effective Throat, te:	0.2651	0.0000	in = 0.707 w
Shear Stress, fv:	4.5	0.0	ksi = P / (2 L2)
Section Modulus, S:	349.4	0.0	$in^2 = L2^2 / 3$
Bending Stress, fb:	7.0	0.0	ksi = P e2 / S
Combined Stress, f:	8.3	0.0	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	0.0000	
Allowable Stress, F:	11.2	0.0	kips/in = ASIF (0.4 Fy) tp
Ratio:	74.2%	0.0%	

Stiffener 1 Analysis per AISC Sect. D1, E2, F1.2 & App. B

	Stiffener Type 1	
Gross Area, Ag:	6.2500	in^2
Net Area, An:	6.2500	in^2
Stiffener Axial, P:	288.5	kips
Stiffener Stress, f:	46.2	ksi = P / Ag
b:	11.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	8.8000	in
Q, Where Qa = 1.0:	1.0000	
r:	0.3608	in^3
K L / r:	12.4708	
ASIF:	1.3333	
Allowable Axial, Fa:	50.05	ksi = ASIF [1 - (K L / r) / 2 Cc^2] Fy / [5/3 + 3(K L / r) / 8 Cc - (K L / r)^3 / 8 Cc^3]
ASIF:	1.3333	
Allowable Bending, Fb:	52.00	ksi = ASIF 0.6 Fy
ASIF:	1.3333	
Allowable Net Tension, Ft:	53.33	ksi = ASIF 0.5 Fu
Ratio:	92.2%	

Stiffener 2 Analysis per AISC Sect. D1, E2, F1.2 & App. B

	Stiffener Type 2	
Gross Area, Ag:	0.0000	in^2
Net Area, An:	0.0000	in^2
Stiffener Axial, P:	0.0	kips
Stiffener Stress, f:	0.0	ksi = P / Ag
b:	0.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	0.0000	in
Q, Where Qa = 1.0:	0.0000	
r:	0.0000	in^3
K L / r:	0.0000	
ASIF:	0.0000	
Allowable Axial, Fa:	0.00	ksi = ASIF [1 - (K L / r) / 2 Cc^2] Fy / [5/3 + 3(K L / r) / 8 Cc - (K L / r)^3 / 8 Cc^3]
ASIF:	0.0000	
Allowable Bending, Fb:	0.00	ksi = ASIF 0.6 Fy
ASIF:	0.0000	
Allowable Net Tension, Ft:	0.00	ksi = ASIF 0.5 Fu
Ratio:	0.0%	

Analysis Summary:

Bridge Stiffener Type 1	*Bridge Stiffener Type 2*
Weld Analysis Ratio: 90.6% PASS	Weld Analysis Ratio: 0.0% PASS
Pole Analysis Ratio: 91.1% PASS	Pole Analysis Ratio: 0.0% PASS
Stiffener Analysis Ratio: 92.2% PASS	Stiffener Analysis Ratio: 0.0% PASS

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

v4.4 - Effective 7-12-13

Date: 6/20/2016
PJF Project: 37516-1244.002.7805
Client Ref. # BU 876325
Site Name: Weston Square
Description: 110-ft MP
Owner: CCI
Engineer: JCM

Asymmetric Anchor Rod Analysis

Moment =	1299	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	23.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	16.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	15							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.500	A354 Gr BC	109	125	0.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
2	1.500	A354 Gr BC	109	125	30.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
3	1.500	A354 Gr BC	109	125	60.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
4	1.500	A354 Gr BC	109	125	90.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
5	1.500	A354 Gr BC	109	125	120.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
6	1.500	A354 Gr BC	109	125	150.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
7	1.500	A354 Gr BC	109	125	180.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
8	1.500	A354 Gr BC	109	125	210.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
9	1.500	A354 Gr BC	109	125	240.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
10	1.500	A354 Gr BC	109	125	270.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
11	1.500	A354 Gr BC	109	125	300.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
12	1.500	A354 Gr BC	109	125	330.0	35.00	0.00	1.77	93.01	90.24	90.24	0.00	97.19	92.8%
13	1.750	Dywidag (150 ksi)	127.7	150	15.0	44.50	0.00	2.71	180.91	176.66	176.66	0.00	178.99	98.7%
14	1.750	Dywidag (150 ksi)	127.7	150	135.0	44.50	0.00	2.71	180.91	176.66	176.66	0.00	178.99	98.7%
15	1.750	Dywidag (150 ksi)	127.7	150	255.0	44.50	0.00	2.71	180.91	176.66	176.66	0.00	178.99	98.7%
								29.34						

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

TIA Rev F

Site Data

BU#: *876325*
Site Name:
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	806.3708	ft-kips
Axial:	23	kips
Shear:	16	kips

Moment adjusted to account for additional anchor rods.

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

Anchor Rod Data		
Qty:	12	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	35	in

Plate Data		
Diam:	41	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.85	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	5	in
Height:	10	in
Thick:	0.5	in
Notch:	0.75	in
Grade:	65	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	30	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	90.2 Kips	Service, ASD
Allowable Tension:	97.2 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	92.9% Pass	

Base Plate Results

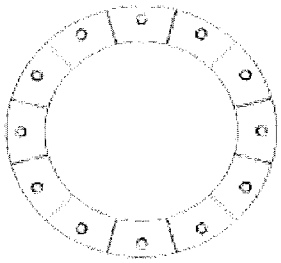
	Flexural Check	Stiffened
Base Plate Stress:	26.9 ksi	Service, ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	74.7% Pass	Y.L. Length: N/A, Roark

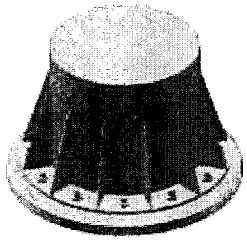
Stiffener Results

Horizontal Weld :	70.6% Pass
Vertical Weld:	38.1% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	20.1% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	42.7% Pass
Plate Comp. (AISC Bracket):	54.6% Pass

Pole Results

Pole Punching Shear Check:	15.8% Pass





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

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

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250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number:	37516-1244.002.7805	**Page:**	1
Site Number:	876325	**By:**	JCM
Site Name:	Weston Square	**Date:**	6/20/2016

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	1299.0		k-ft
Shear, V =	16.0		kips
Axial Load, P =	23.0		kips
OTM =	1307.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	5	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	37	ft
fc' =	3	ksi
εc =	0.003	in/in
L / D Ratio =	7.50	> 6
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

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

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00 + Effective Soil Wt. - Buoyant Conc. Wt. ≥ Comp.
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	16	
Rebar Size =	#9	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#4	
Side Clear Cover to Ties =	3	in

Soil Parameters

Water Table Depth =	15.00	ft
Depth to Ignore Soil =	3.33	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

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

Maximum Capacity Ratios

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

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

Define Soil Layers

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

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	2	120	1000		Clay		946	946	2
2	4	110		30	Sand		946	946	6
3	7	110	750		Clay		946	946	13
4	2	105		30	Sand		946	946	15
5	13	115		32	Sand		946	946	28
6	5	100	750		Clay		946	946	33
7	7	120	1500		Clay	9100	946	946	40
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	22.57	ft, from Grade
Bending Moment, M =	1668.18	k-ft, from COR
Resisting Moment, Ma =	6689.09	k-ft, from COR

MOMENT RATIO = 24.9% OK

Shear, V =	16.00	kips
Resisting Shear, Va =	64.16	kips

SHEAR RATIO = 24.9% OK

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	316.93	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	23.00	kips
Allowable Comp. Cap., Ca =	310.22	kips

COMPRESSION RATIO = 7.4% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	9.42	sq in
Actual Steel Area =	16.00	sq in
Allowable Min Axial, Pa =	-664.62	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	3251.66	kips, Where Ma = 0 k-ft

Axial Load, P =	33.22	kips @ 8.25 ft Below Grade
Moment, M =	1401.91	k-ft @ 8.25 ft Below Grade
Allowable Moment, Ma =	1411.76	k-ft

MOMENT RATIO = 99.3% OK

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

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

Site Data

BU#: *876325*
Site Name: *Weston Square*
App #:

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	5.0	ft
Concrete Area =	2827.4	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	4	
Vert. Cage Diameter =	4.32	ft
Vert. Cage Diameter =	51.87	in
Vertical Bar Size =	9	
Bar Diameter =	1.13	in
Bar Area =	1	in^2
Number of Bars =	16	
As Total=	16	in^2
A s/ Aconc, Rho:	0.0057	0.57%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.57%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	4227.16	kips
at Mu=(ϕ=0.65)Mn=	1823.95	ft-kips
Max Tu, (φ=0.9) Tn =	864	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	1401.91	ft-kips **(* Note)**
Max. Service Shaft P:	33.22	kips
Max Axial Force Type:	Comp.	

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

Load Factor	Shaft Factored Loads		
1.30	Mu:	1822.483	ft-kips
1.30	Pu:	43.186	kips

Material Properties

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

ACI 318 Code

Select Analysis ACI Code= 2002

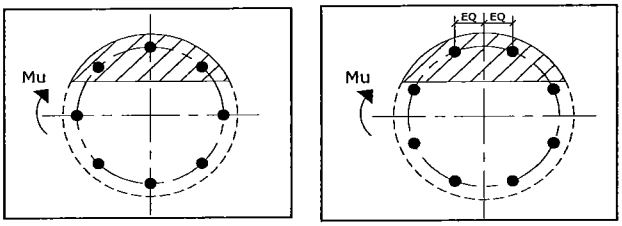
Seismic Properties

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

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

Results:

Governing Orientation Case: **1**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **10.00** in
Extreme Steel Strain, εt: **0.0138**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	43.19	kips
Drilled Shaft Moment Capacity, φMn:	**1835.29**	ft-kips
Drilled Shaft Superimposed Mu:	**1822.48**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR: 99.3%

CITY OF HARTFORD

DEPARTMENT OF DEVELOPMENT SERVICES
Division of Development Services
250 Constitution Plaza, 4th Floor
Hartford, Connecticut 06103

Telephone: (860) 757- 9040
Fax: (860) 722-6402
www.hartford.gov

LUKE BRONIN
MAYOR

SEAN FITZPATRICK
DIRECTOR OF
DEVELOPMENT SERVICES

JAMIE BRÄTT
DIRECTOR OF PLANNING &
ECONOMIC DEVELOPMENT
DIVISION

June 7, 2016

Mr. Mark Roberts
QC Development
PO Box 916
Storrs, CT 06268
860-670-9068

RE: 92 Weston Street Cell Tower Approvals

Dear Mr. Roberts:

Regarding your inquiry relative to the Cell Tower located at 92 Weston Street, the Planning Division was unable to produce an original Zoning Approval Document. However, at the time of the tower installation in 1996, the Zoning Regulations in effect permitted communications towers as a matter of right in the Industrial Zones. A building permit was issued 11/26/1996 for said tower. A copy of the building permit is attached for your convenience.

Should you require any further assistance relative to this matter, please do not hesitate to contact me at 860-757-9015.

Sincerely,

James S. Tanner

1022500 1024250 848500 847100

BOCE BARLOW WAY
JENNINGS RD
WESTON ST
WEST SERVICE ROAD CONNECTOR

286074004 1.172 Ac
286074003 309046 sf
286074002 20.83 Ac
286074001 2.21 Ac
286129005 2.492 Ac
286129006 1.123 Ac
286173007 187334.4531 sf
286173008 10608 sf
286173009 2.74 Ac

UNAPPROVED LOT

125 111 100 93 98 92 89 81H 80 65

City of Hartford Assessor Map

Legend

- Parcel ID
- Duplicate Parcel ID
- Exempt ID
- Building ID
- Air Right ID
- Parcels
- Tax Map Grid
- City Boundary Line
- Building
- Building Under Construction
- House Trailer
- Foundation
- Greenhouse
- Cement Pad
- Deck
- Patio
- Pool
- Swamp
- Water
- River or Stream
- Tree
- Hedge
- Vegetation
- 161507165 Parcel ID
- *7500 sf or Ac* Parcel Area
- 88 Street Address
- *11-19* Condo Lot Range
- *11D* Condo Unit
- Road Edge Paved
- Road Edge Unpaved
- Driveway and Parking Lot Paved
- Driveway and Parking Lot Unpaved
- Sidewalk
- Private Sidewalk and Steps
- Runway
- Bridge
- Wharf and Pier
- Fuel Tank
- Water Tank
- Tunnel
- Trail
- Railroad
- Abandoned Railroad
- Fence
- Ruins

262	285	306
263	286	307
264	287	308

Key Map

Horizontal Datum: Connecticut State Plane Coordinates (NAD 83 feet)
Vertical Datum: North American Vertical Datum (NAVD 88 feet)

N W E S

Date: September 7, 2012

0 25 50 100 150 200 Feet

1 inch = 50 feet

Map Sheet 286

Unofficial Property Record Card - City of Hartford, CT

General Property Data

Parcel Identification 286-173-007

Property Owner ALBEMARLE WESTON STREET LLC

Property Location 0092 WESTON ST HARTFORD

Property Use WAREHOUSE

Mailing Address 942 MAIN ST STE 300

Most Recent Sale Date 2/4/2005

Legal Reference 05252-0168

City HARTFORD

Grantor WESTON SQUARE ASSOCIATES LLC,

Mailing State CT **Zip** 06103-1217

Sale Price 2,795,000

ParcelZoning ID-1

Land Area 4.301 acres

Current Property Assessment

Fiscal Year 2015

Total Value 1,330,000

Land Value 835,310

Building Value 459,410

Building Description

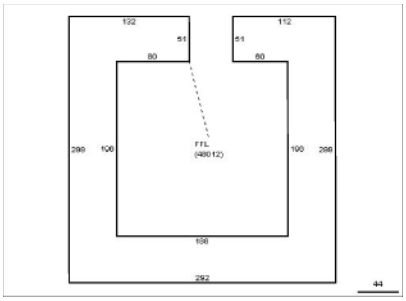
Building Style OFFICE/WHS	**Foundation Type** Concrete	**Flooring Type** COMBINATION
# of Living Units 0	**Frame Type** Steel	**Basement Floor** N/A
Year Built 1978	**Roof Structure** FLAT	**Heating Type** Warm Air
Building Grade Average	**Roof Cover** Metal	**Heating Fuel** Gas
Building Condition Average	**Siding** Brick	**Air Conditioning** 30%
Finished Area (SF) 48012	**Interior Walls** DRYWALL	**# of Bsmt Garages** 0
Number Rooms 0	**Number Beds** 0	**# of Full Baths** 0
# of 3/4 Baths 0	**# of 1/2 Baths** 0	**# of Other Fixtures** 0

Legal Description

Narrative Description of Property

This property contains 4.301 acres of land mainly classified as WAREHOUSE with a(n) OFFICE/WHS style building, built about 1978 , having Brick exterior and Metal roof cover, with 0 unit(s), 0 room(s), 0 bedroom(s), 0 bath(s), 0 half bath(s).

Property Images



Disclaimer: This information is believed to be correct but is subject to change and is not warranteed.

DIV. SITE ACQUISITION, LLC
27 NORTHWESTERN DRIVE
SALEM, NH 03079

BANK OF AMERICA 54-49/114

54666

Pay: **********Six hundred twenty-five dollars and no cents

DATE	CHECK NO.	AMOUNT
August 12, 2016	54666	$********625.00

PAY TO THE ORDER OF

Connecticut Siting Council
10 Franklin Sq
New Britain, CT 06051

⑈054666⑈ ⑆011400495⑆ 000089877441⑈

CONN03 Connecticut Siting Council

SAI
DIV. SITE ACQUISITION, LLC

54666

DATE	INVOICE NO.	DESCRIPTION	INVOICE AMOUNT	DEDUCTION	BALANCE
8-12-16	CR081216	CT5152-CSC Filing Fe	625.00		625.00

CHECK DATE	8-12-16	CHECK NUMBER	54666	TOTALS	625.00		625.00