STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

March 21, 2011

Douglas L. Culp, Real Estate Consultant
New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067-3900

RE: **EM-CING-007-110228** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1684 Chamberlain Hwy, Berlin, Connecticut.

Dear Mr. Culp:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated February 28, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Adam P. Salina, Mayor, Town of Berlin
Denise McNair, Interim Town Manager, Town of Berlin
Hellyn Riggins, Town Planner, Town of Berlin
Thomas J. Regan, Esq., Brown Rudnick LLP

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

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Phone: (860) 827-2935 Fax: (860) 827-2950
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Internet: ct.gov/csc

Daniel F. Caruso
Chairman

March 7, 2011

The Honorable Adam P. Salina
Mayor
Town of Berlin
240 Kensington Road
Kensington, CT 06037

RE: **EM-CING-007-110228** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1684 Chamberlain Hwy, Berlin, Connecticut.

Dear Mayor Salina:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by March 21, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Denise McNair, Interim Town Manager, Town of Berlin
Hellyn Riggins, Town Planner, Town of Berlin

EM-CING-007-110228

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant

RECEIVED
FEB 28 2011
CONNECTICUT
SITING COUNCIL

HAND DELIVERED

February 28, 2011

ORIGINAL

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing tele-communications facility located at 1684 Chamberlain Hwy. Berlin, CT (owner Sprint)

Dear Ms. Roberts:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") capability, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

UMTS technology offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the Internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than some enlarged equipment pads as may be noted in the attachments.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. Radio frequency power density may increase due to use of one or more GSM channel for UMTS transmissions. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, New Cingular Wireless respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (860) 463-5511 with questions concerning this matter. Thank you for your consideration.

Sincerely,

Douglas L. Culp
Real Estate Consultant

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

1684 Chamberlain Highway
Site Number 1031
Exempt Mod's, 06/02, 11/03, 07/06 and 05/07

Tower Owner/Manager: Sprint

Equipment configuration: Monopole

Current and/or approved:

Three EMS panel antennas @ 65 ft
Six TMA's @ 65 ft
Six runs (6) 1 5/8" Coax
Equipment Shelter

Planned Modifications:

Remove existing Flush Mounts, TMA's and Antennas
Install new triangular shaped platform
Retain Six (6) 1 5/8" Coax
Install Six (6) 1 5/8" Coax
Install six Powerwave P65-15XLH antennas (or equiv.) @ 65 ft
Install six Powerwave TMA's (TT19-08BP111-001) @ 65 ft

Power Density:

Calculations for current operations at the site indicate a cumulative radio frequency electromagnetic radiation power density, measured at the tower base, of approximately 70.5 % of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following AT&T's planned modifications would be approximately 87.6% of the standard.

Existing

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							51.64
AT&T UMTS*	65	800 Band	1	500	0.0426	0.5867	7.25
AT&T GSM *	65	1900 Band	2	427	0.0727	1.0000	7.27
AT&T GSM *	65	880 - 894	1	296	0.0252	0.5867	4.29
Total							**70.5%**

* Per CSC records.

Proposed

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users *							51.64
AT&T GSM	65	880 - 894	4	296	0.1008	0.5867	17.17
AT&T GSM	65	1900 Band	2	427	0.0727	1.0000	7.27
AT&T UMTS	65	1900 Band	1	500	0.0426	1.0000	4.26
AT&T UMTS	65	880 - 894	1	500	0.0426	0.5867	7.25
Total							**87.6%**

* Per CSC records.

Structural information:

The attached structural analysis (Paul J Ford and Co. 1/11) demonstrates that the tower and foundation have sufficient structural capacity to accommodate the proposed equipment modifications.

PROJECT INFORMATION

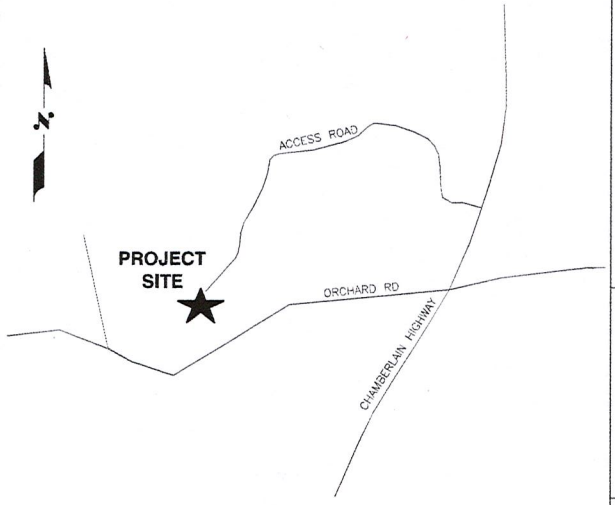
SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE ADDRESS:	1684 CHAMBERLAIN HIGHWAY BERLIN, CT 06037
LATITUDE:	41.589718° N 41° 35' 22.98" N
LONGITUDE:	-72.805562° W -72° 48' 20.02" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
NOC#	866-915-5600

SITE NUMBER: CT1031
SITE NAME: BERLIN CHAMBERLAIN HIGHWAY

DRAWING INDEX

VICINITY MAP

DIRECTIONS TO SITE:
HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD. 0.3 MILES. TURN LEFT AT CAPITAL BLVD. 0.3 MILES. TURN LEFT AT WEST ST. 0.3 MILES. TURN LEFT TO MERGE ONTO I-91 S TOWARD NEW HAVEN. 1.8 MILES. TAKE EXIT 22N TO MERGE ONTO CT-9 N TOWARD NEW BRITAIN. 3.0 MILES. TAKE EXIT 22 TOWARD US-5/CT-15 S/NEW HAVEN 0.2 MILES. TURN RIGHT AT FRONTAGE RD. 0.1 MILES. TAKE THE 1ST RIGHT ONTO CT-372 W/WORTHINGTON RIDGE. 397 FT. TURN LEFT TO MERGE ONTO CT-15 S/US-5 S/BERLIN TURNPIKE TOWARD NEW HAVEN. 2.1 MILES. SLIGHT RIGHT AT ORCHARD RD. 2.7 MILES. TURN RIGHT AT CT-71 N/CHAMBERLAIN HWY. DESTINATION WILL BE ON THE LEFT. 276 FT.



GENERAL NOTES

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

72 HOURS
BEFORE YOU DIG
CALL TOLL FREE 800-922-4455

UNDERGROUND SERVICE ALERT

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT1031
SITE NAME: BERLIN CHAMBERLAIN HIGHWAY
1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037
HARTFORD COUNTY

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

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	12/16/10	ISSUED FOR REVIEW			

SCALE: AS SHOWN DESIGNED BY: DC DRAWN BY: JG

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

AT&T
TITLE SHEET
(2ND CARRIER-FULL SWAP)

JOB NUMBER	DRAWING NUMBER	REV
1031.01	T-1	1

GROUNDING NOTES

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

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

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

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

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

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

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

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

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

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

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

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

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR – 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 UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

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

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

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

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

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

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

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

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

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

ABBREVIATIONS

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

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT1031
SITE NAME: BERLIN CHAMBERLAIN HIGHWAY
1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037
HARTFORD COUNTY

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

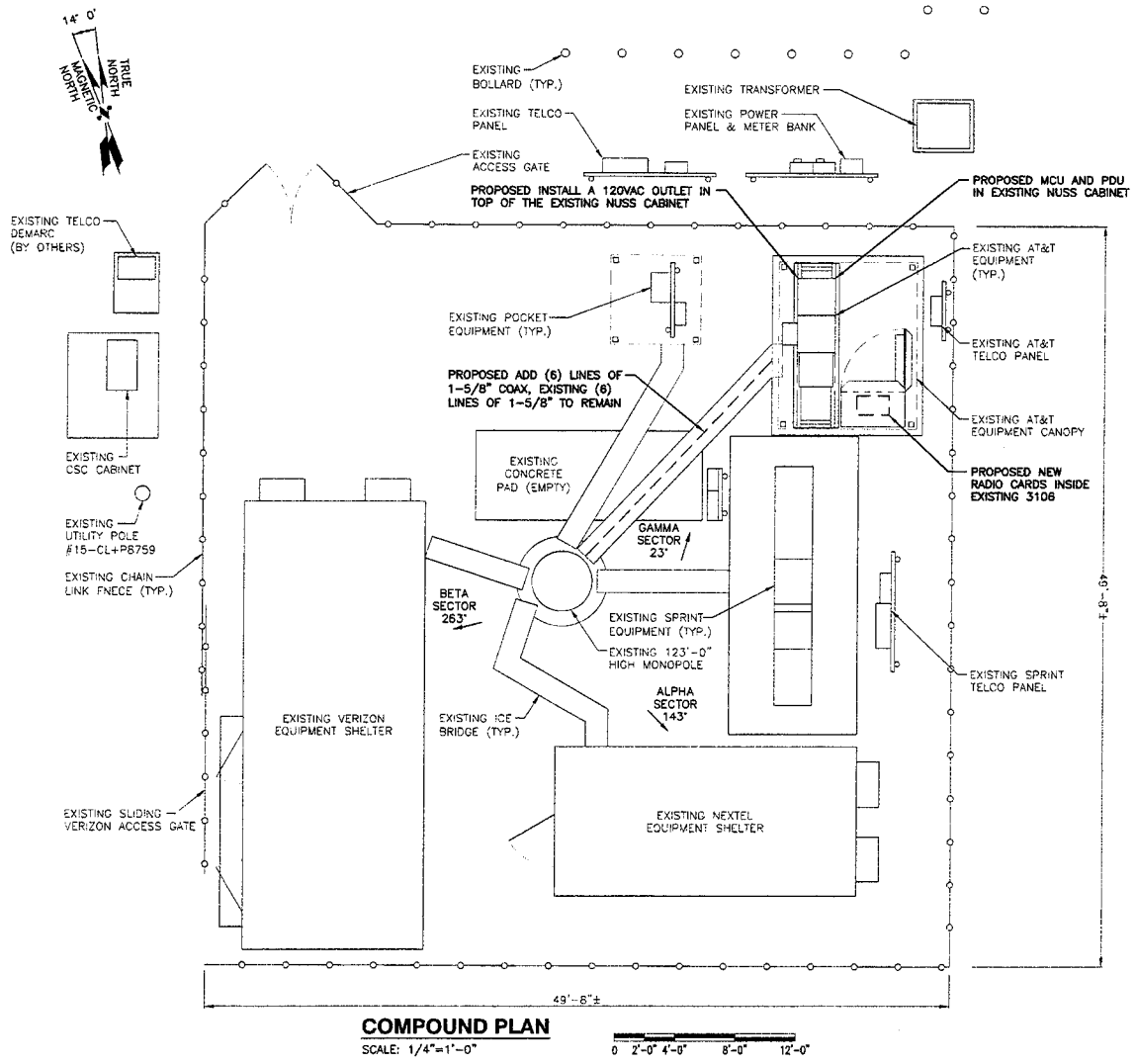
NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	12/15/10	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

GENERAL NOTES
(2ND CARRIER-FULL SWAP)

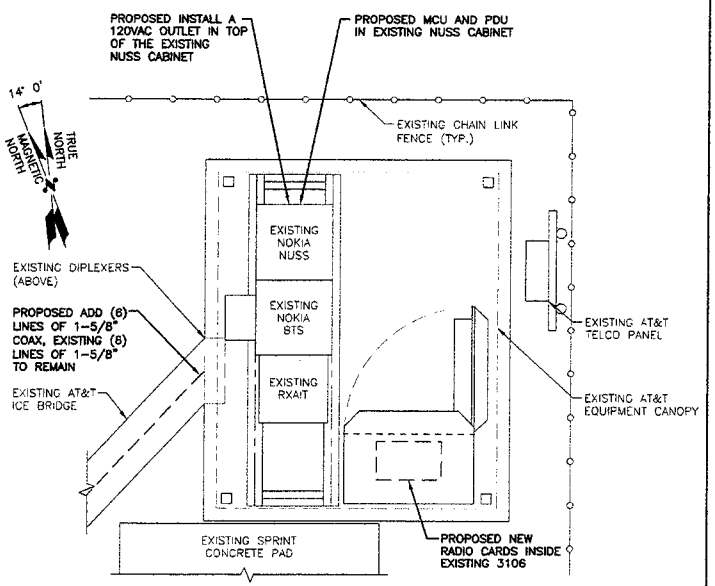
JOB NUMBER	DRAWING NUMBER	REV
1031.01	GN-1	1



COMPOUND PLAN

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

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



EQUIPMENT PLAN

SCALE: 1/2"=1'-0"

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

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT1031
SITE NAME: BERLIN
CHAMBERLAIN HIGHWAY
1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037
HARTFORD COUNTY

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

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	12/16/10	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

COMPOUND & EQUIPMENT PLAN
(2ND CARRIER-FULL SWAP)

JOB NUMBER	DRAWING NUMBER	REV
1031.01	A-1	1

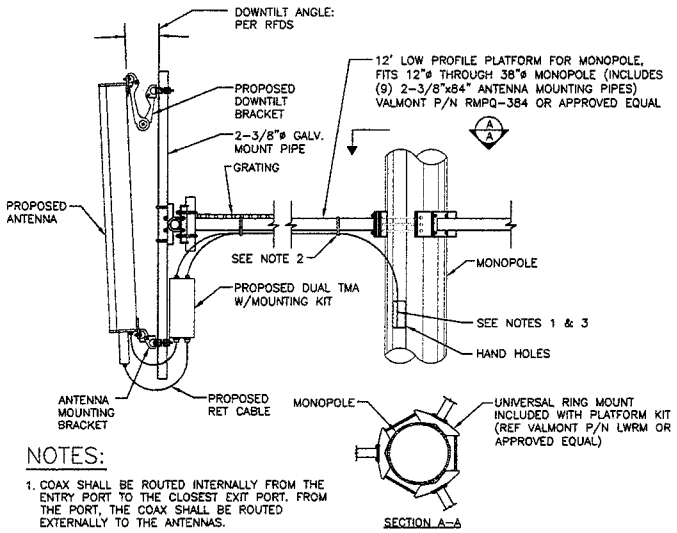
RF TABLE									
SECTOR	SECTOR NAME	ANTENNA MAKE & MODEL	ANTENNA COUNT	AZIMUTH	RAD CENTER	MECHANICAL DOWNTILT	DUAL TMA COUNT	DIPLEXER COUNT	COAX COUNT
1	ALPHA	POWERWAVE P65-15-XLH-RR	2	143°	65'-0"±	0°	0 EXIST. 2 PROP.	0 EXIST. 0 PROP.	2 EXIST. 2 PROP.
2	BETA	POWERWAVE P65-15-XLH-RR	2	263°	65'-0"±	0°	0 EXIST. 2 PROP.	0 EXIST. 0 PROP.	2 EXIST. 2 PROP.
3	GAMMA	POWERWAVE P65-15-XLH-RR	2	23°	65'-0"±	0°	0 EXIST. 2 PROP.	0 EXIST. 0 PROP.	2 EXIST. 2 PROP.

NOTE:

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

NOTE:

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

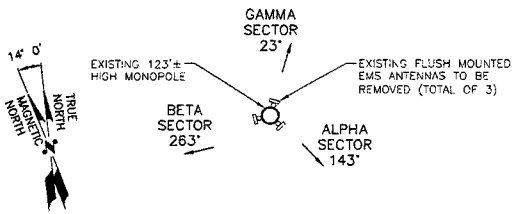


NOTES:

1. COAX SHALL BE ROUTED INTERNALLY FROM THE ENTRY PORT TO THE CLOSEST EXIT PORT. FROM THE PORT, THE COAX SHALL BE ROUTED EXTERNALLY TO THE ANTENNAS.
2. SECURE CABLES TO SUPPORT ARMS WITH TIE WRAPS AT 3'-0" O.C.
3. PROVIDE KELLUM GRIPS AROUND CABLES AND FASTEN TO EXISTING J-HOOKS INSIDE MONOPOLE.
4. ANTENNA MOUNTS AND COMPONENTS SHALL CONFORM TO TOWER STRUCTURAL CALCULATIONS AND TOWER MANUFACTURER'S RECOMMENDATIONS.

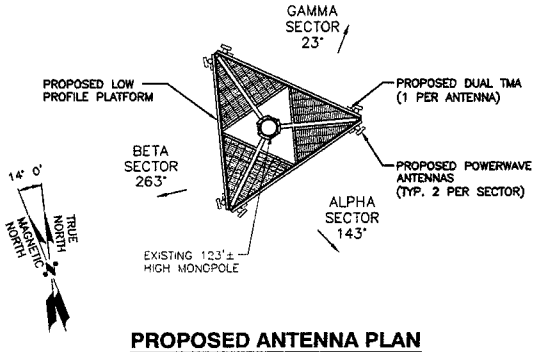
ANTENNA MOUNT DETAIL

SCALE: N.T.S.



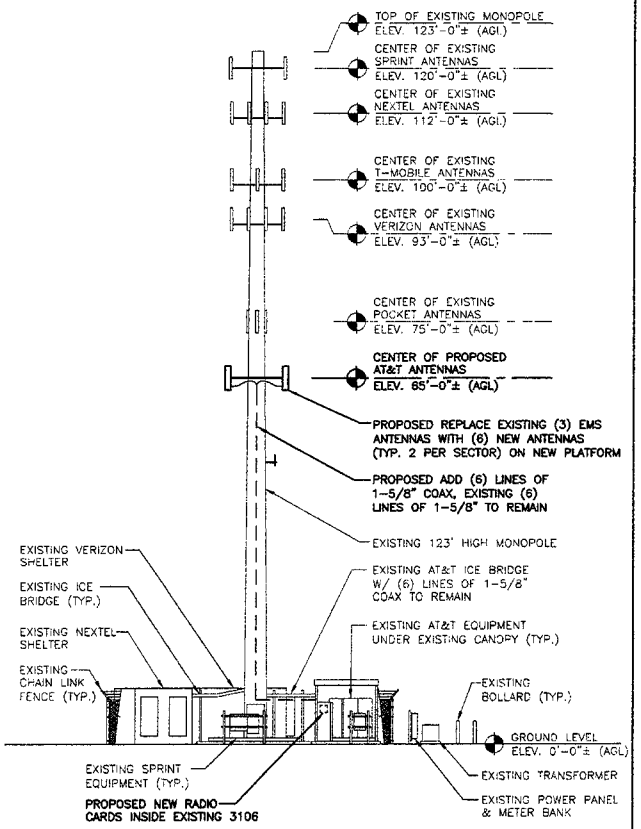
EXISTING ANTENNA PLAN

SCALE: N.T.S.



PROPOSED ANTENNA PLAN

SCALE: N.T.S.



EAST ELEVATION

SCALE: 3/32"=1'-0"

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

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAT communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT1031
SITE NAME: BERLIN CHAMBERLAIN HIGHWAY
1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037
HARTFORD COUNTY

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

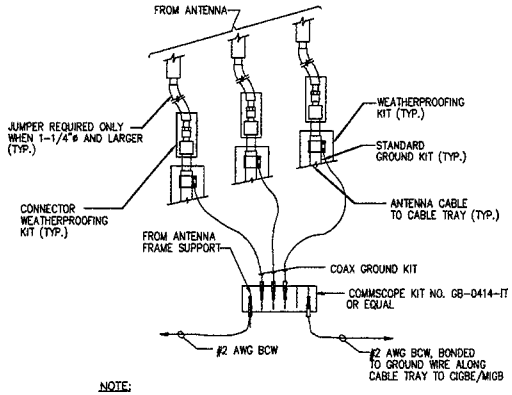
NO.	DATE	REVISIONS	BY	CHK	APP'D
1	01/25/11	ISSUED FOR CONSTRUCTION	JG	DC	DPH
0	12/16/10	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

ANTENNA LAYOUT AND ELEVATION (2ND CARRIER-FULL SWAP)

JOB NUMBER	DRAWING NUMBER	REV
1031.01	A-2	1

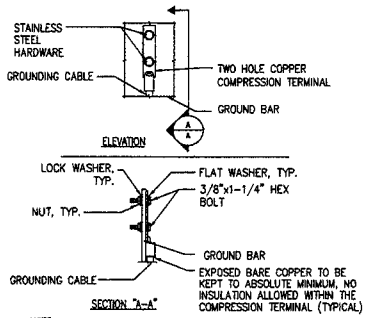


NOTE:

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

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

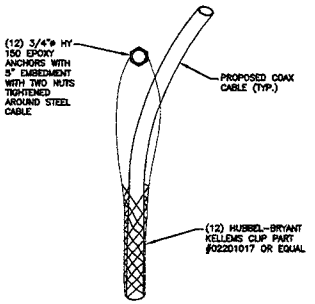
1 — N.T.S.



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

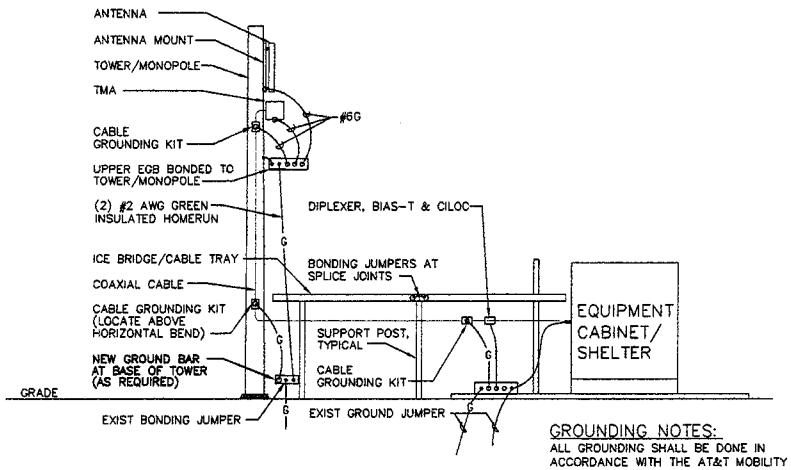
TYPICAL GROUND BAR CONNECTION DETAIL

3 — N.T.S.



KELLEMS GRIP

4 — N.T.S.

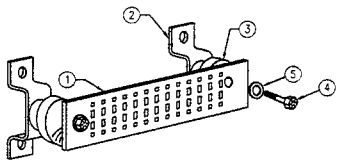


GROUNDING NOTES:
ALL GROUNDING SHALL BE DONE IN ACCORDANCE WITH THE AT&T MOBILITY GROUNDING GUIDE.

GROUNDING ONE LINE DIAGRAM

2 — N.T.S.

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



GROUND BAR - DETAIL

5 — N.T.S.

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

SECTION "P" - SURGE PRODUCERS

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

SECTION "A" - SURGE ABSORBERS

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

Hudson Design Group LLC
1600 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 304-3586

SAI communications
22 KEEWAYDIN DRIVE
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SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

PLUMBING DIAGRAM & DETAILS (2ND CARRIER-FULL SWAP)

JOB NUMBER	DRAWING NUMBER	REV
1031.01	G-1	1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

January 27, 2011
Cheryl Schultz
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6632

Structure is Adequate
Monopole is Adequate
Foundation is Adequate

Subject: Structural Analysis Report of Existing 123-Ft Monopole

Carrier Designation	**AT&T Mobility Co-Locate**	
	Carrier Site Number:	**1031**
	Carrier Site Name:	**Berlin-Chamberlain Highway**
Crown Castle Designation	**Crown Castle BU Number:**	**876382**
	Crown Castle Site Name:	**BERLIN / LAVIANA ORCHARD**
	Crown Castle JDE Job Number:	**148472**
	Crown Castle Application Number:	**115266 Rev. 1**
	Crown Castle PO Number:	**402515**
	Crown Castle WO Number:	**383660**
Engineering Firm Designation	**Paul J. Ford and Company**	**37511-0160**
Site Data	**1684 Chamberlain Highway, BERLIN, Hartford County, CT** **Latitude 41° 35' 23.1", Longitude -72° 48' 19.2"**	

Dear Cheryl Schultz,

Paul J. Ford and Company is pleased to submit this "Structural Analysis Report" to determine the structural adequacy of the above monopole. This analysis has been performed in accordance with the Crown Castle Structural "Statement of Work", the terms of the Purchase Order, and the TIA/EIA-222-F Standard for the following Basic Wind Speeds: 80 mph without ice, 37.6 mph with 1.00" radial ice, and 50 mph (Operational) without ice.

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

LC1: Existing + Reserved + Proposed Equipment — **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

Based on our analysis, we have determined that the existing monopole structure and foundation have sufficient capacity to adequately support the existing, reserved, and proposed loading. Modifications are not required at this time. **However, refer to page 5 for recommended maintenance item.**

Respectfully submitted,

Maria C. Lopez
Project Manager
mclopez@pjfweb.com

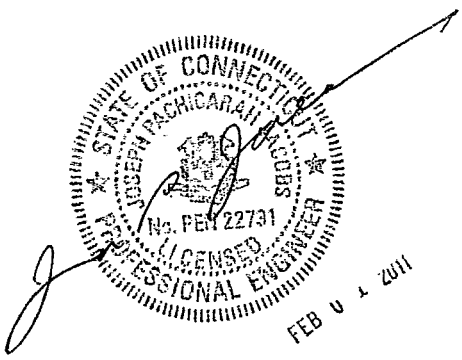


TABLE OF CONTENTS

INTRODUCTION

At the request of Crown Castle, Paul J. Ford and Company has analyzed the monopole at the BERLIN / LAVIANA ORCHARD site located in BERLIN, Hartford County, CT. This structural analysis has been performed in accordance with the TIA/EIA-222-F-1996 Standard, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures" to determine if the monopole structure has adequate capacity to support the existing, reserved, and proposed antenna loading.

ANALYSIS CRITERIA

The existing monopole has been analyzed for the antenna and coax loading listed in Tables 1 and 2 below. The monopole has been analyzed in accordance with the TIA/EIA-222-F-1996 Standard for the following fastest-mile Basic Wind Speeds: 80 mph without ice, 37.6 with 1.00" radial ice, and 50 mph without ice as recommended for Hartford County, CT.

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
65	65	6	Powerwave Technologies	P65-15-XLH-RR w/ Mount Pipe	6	1-5/8 (E)	Proposed
		6		TT19-08BP111-001			
		1	-	Side Arm Mount [SO 102-3]			

(E) Coax to be mounted externally and exposed to the wind. See coax layout in Appendix B.

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level ft	Center Line Elevation ft	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120	121*	9	EMS Wireless	FV65-14-00NA2 w/Mount Pipe	9	1-5/8 (I)	MLA
	120	1	-	Platform Mount [LP 305-1]	-	-	Existing
112	113	12	Decibel	DB844H90E-XY w/Mount Pipe	12	7/8 (I)	Existing
	112	1	-	Platform Mount [LP 402-1]			
100	101	3	EMS Wireless	RR65-18-02DP w/Mount Pipe	6	1-5/8 (I)	Existing
		3	Remec	S20057A-1			
	100	1	-	T-Arm Mount [TA 602-3]			
93	94	6	Decibel	DB844F90A-SX w/Mount Pipe	12	1-5/8 (I)	Existing
		6		DB948F85T2E-M w/ Mount Pipe			
	93	1	-	Platform Mount [LP 305-1]			
75	75	3	RFS/Celwave	RFS APXV18-206517S-C w/ mount pipe	2 4	1-5/8 (E) 1-5/8 (I)	Existing
		1	-	Side Arm Mount [SO 101-3]			
65	65	-	-	-	6	1-5/8 (I)	Existing
50	51	1	Lucent	KS24019-L112A	1	½ (I)	Existing
	50	1	-	Side Arm Mount [SO 702-1]			

* The MLA loading controls the analysis. The existing loading consists of: (6) DB980H65T2E-M, and (6) 1-1/4" coax
(E) Coax to be mounted externally and exposed to the wind. See coax layout in Appendix B.
(I) Coax to be mounted internally and shielded from the wind. See coax layout in Appendix B.

Information for the existing monopole and foundation is based on the available drawings, documents, and/or information listed in Table 3 below.

Table 3 - Reference Documents Provided

Document	Source	Reference	Remarks
Proposed Antenna Loading	Crown Castle	876382	
Existing Antenna Loading	Crown Castle	876382	
Tower Reinforcement Design/Drawings/Data	CCISITES	2611098	Vertical Solutions, 080828.04_Revision 1, 10/15/08
Geotechnical Reports	CCISITES	1629353	Dr. Clarence Welti, P.E., P.C., 05/05/00
Tower Foundation Drawings/Design/Specs	CCISITES	1629413	PJF, 29200-802, 06/06/00
Tower Manufacturer Drawings	CCISITES	1629384	Summit Manufacturing, LLC, 10083, 06/06/00
Tower Structural Analysis Reports	CCISITES	2694373	PJF, 37510-1262, 07/27/10
Tower Structural Analysis Reports	CCISITES	2611096	Vertical Solutions, 080828.11_Revision 1, 02/03/09

ANALYSIS PROCEDURE

ANALYSIS METHODS

RISA Tower (Version 5.4.2.0), a commercially available software program, was used to create a three-dimensional model of the monopole and calculate member stresses for various dead, live, wind, and ice load cases. The analysis was performed in accordance with the TIA/EIA-222-F Standard. Selected output from the analysis is included in Appendix A.

ASSUMPTIONS

1. Monopole was fabricated and installed in accordance with the manufacturer's specifications.
2. Monopole has been properly maintained in accordance with manufacturer's specifications.
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 reinforced in conformance with the referenced modification drawings.
5. Existing mounts were assumed based off pictures present on CCI sites, using the best fit mount within the Crown Castle mount catalogue.
6. The existing, post installed #18J reinforcing anchors have a minimum allowable load capacity of 170 kips (based on proof load testing to a minimum of 212 kips). Refer to Recommended Maintenance Item section of this report for further discussion.

If any of the above assumptions are not valid or have been made in error, then the results of this analysis may be affected. In that case, please notify Paul J. Ford and Company immediately so that we can review any new and/or modified information and determine its affect on the analysis results regarding the structural adequacy of the monopole and foundation.

ANALYSIS RESULTS

Our structural analysis indicates that the existing monopole structure and foundation have sufficient capacity to adequately support the existing, reserved, and proposed loading.

Table 4 - Component Stresses vs. Capacity

Notes	Component	Elevation ft	% Capacity	Pass / Fail
Risa Tower Analysis Summary:				
	L1	123 - 82.25	69.5	Pass
	L2	82.25 - 58	87.7	Pass
	L3	58 - 40.75	78.7	Pass
	L4	40.75 - 29.75	87.5	Pass
	L5	29.75 - 0	90.7	Pass
Additional Components:				
	Base Plate	0 - 0	61.2	Pass
	Anchor Rods	0 - 0	92.6	Pass
	Foundation (Soil) - PLS Caisson Methodology	0 - 0	58.2	Pass
	Foundation (Structural) - PLS Caisson Methodology	0 - 0	72.7	Pass
			Structural Rating (maximum capacity of all components) =	92.6

As summarized in Table 4 above, our analysis indicates that the existing monopole structure and foundation have sufficient capacity to adequately support the existing, reserved, and proposed loading. Modifications are not required at this time.

*Foundation Analysis Notes: According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee in January 2010, the existing caisson 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 caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.

RECOMMENDED MAINTENANCE ITEM

Unless the existing, post-installed reinforcing anchors have been previously proof loaded, PJF recommends that all of the reinforcing anchors be proof loaded to 212 kips per Crown document ENG-PRC-10119 Pull-Out Testing Post-Installed Anchor Rods_082609. Consult with Crown Engineering for agreement with this recommended course of action prior to proceeding (Especially since the recommended proof load is in excess of the maximum proof load criteria specified in the ENG-PRC-10119 document; note that it is still less than the yield capacity of the reinforcing anchor rods).

APPENDIX A

Output From Computer Programs

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* ft	*Section Length* ft	*Splice Length* ft	*Number of Sides*	*Top Diameter* in	*Bottom Diameter* in	*Wall Thickness* in	*Bend Radius* in	*Pole Grade*
L1	123.00-82.25	40.75	3.50	18	22.0000	28.1140	0.1875	0.7500	A607-60 (60 ksi)
L2	82.25-58.00	27.75	0.00	18	27.2139	31.3777	0.2500	1.0000	A607-65 (65 ksi)
L3	58.00-40.75	17.25	4.25	18	31.3777	33.9660	0.3265	1.3060	65 ksi (w/ Reinf.) (65 ksi)
L4	40.75-29.75	15.25	0.00	16	32.6753	35.1164	0.3424	1.3698	65 ksi (w/ Reinf.) (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L5	29.75-0.00	29.75		18	35.1164	39.5800	0.3844	1.5374	65 ksi (w/ Reinf.) (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	28.5477	16.6198	1637.5523	9.9139	14.2819	114.6592	3277.2593	8.3115	4.6181	24.63
L2	28.1670	21.3958	1965.3102	9.5722	13.8246	142.1599	3933.2064	10.6999	4.3496	17.399
	31.8618	24.6998	3023.6079	11.0503	15.9399	189.6884	6051.1944	12.3523	5.0825	20.33
L3	31.8618	32.1777	3919.6730	11.0232	15.9399	245.9037	7844.5037	16.0919	4.9479	15.155
	34.4900	34.8599	4983.8302	11.9420	17.2547	288.8385	9974.2183	17.4333	5.4034	16.55
L4	34.0091	35.3199	4664.6904	11.5105	16.6644	279.9192	9400.0099	17.4638	5.8209	16.998
	35.8044	37.9865	5802.9822	12.3795	17.9094	324.0196	11693.8285	18.7823	6.3067	18.417
L5	35.6581	42.3716	6457.6230	12.3299	17.8391	361.9922	12923.7430	21.1898	5.5040	14.32
	40.1906	47.8171	9281.0228	13.9145	20.1066	461.5899	18574.2577	23.9131	6.2896	16.364

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 123.00-82.25				1	1	1		
L2 82.25-58.00				1	1	1		
L3 58.00-40.75				1	1	1		
L4 40.75-29.75				1	1	1		
L5 29.75-0.00				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
LDF7-50A (1-5/8 FOAM) (MLA)	C	No	Inside Pole	120.00 - 0.00	9	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
						4" Ice	0.00	0.82
***								
**								
LDF5-50A (7/8 FOAM) (E)	C	No	Inside Pole	112.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
***								
LDF7-50A (1-5/8 FOAM) (E)	C	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
LDF7-50A (1-5/8 FOAM) (E)	C	No	Inside Pole	93.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
***								
AVA7-50 (1-5/8 LOW DENSI. FOAM) (E)	C	No	CaAa (Out Of Face)	75.00 - 0.00	1	No Ice	0.20	0.72
						1/2" Ice	0.30	2.23
						1" Ice	0.40	4.36
						2" Ice	0.60	10.44
						4" Ice	1.00	29.94
AVA7-50 (1-5/8 LOW DENSI. FOAM) (E)	C	No	CaAa (Out Of Face)	75.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	2.23
						1" Ice	0.00	4.36
						2" Ice	0.00	10.44
						4" Ice	0.00	29.94
AVA7-50 (1-5/8 LOW DENSI. FOAM) (E)	C	No	Inside Pole	75.00 - 0.00	4	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
						2" Ice	0.00	0.72
						4" Ice	0.00	0.72
***								
LDF7-50A (1-5/8 FOAM) (E)	C	No	Inside Pole	65.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM) (P)	C	No	CaAa (Out Of Face)	65.00 - 0.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF7-50A (1-5/8 FOAM) (P)	C	No	CaAa (Out Of Face)	65.00 - 0.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
****								
LDF4P-50A (1/2 FOAM) (E)	C	No	Inside Pole	50.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

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	123.00-82.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.59
L2	82.25-58.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.366	0.78
L3	58.00-40.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.416	0.70
L4	40.75-29.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.178	0.44
L5	29.75-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.891	1.20

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	123.00-82.25	A	1.145	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.59
L2	82.25-58.00	A	1.094	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.259	1.12
L3	58.00-40.75	A	1.049	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.035	1.24
L4	40.75-29.75	A	1.008	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.486	0.79
L5	29.75-0.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.841	2.07

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	123.00-82.25	0.0000	0.0000	0.0000	0.0000
L2	82.25-58.00	-0.1738	0.1004	-0.3303	0.1907
L3	58.00-40.75	-0.2398	0.1384	-0.4364	0.2520
L4	40.75-29.75	-0.2405	0.1389	-0.4400	0.2540
L5	29.75-0.00	-0.2418	0.1396	-0.4376	0.2527

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
3/4" x 8 ft lightning rod	C	None		0.0000	123.00	No Ice	0.60	0.60	0.01
						1/2" Ice	1.41	1.41	0.02
						1" Ice	2.25	2.25	0.03
						2" Ice	3.67	3.67	0.07
						4" Ice	5.74	5.74	0.21
***									
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	A	From Face	4.00 0.00 0.00	0.0000	121.00	No Ice	8.64	6.95	0.06
						1/2" Ice	9.29	8.13	0.12
						1" Ice	9.91	9.02	0.20
						2" Ice	11.18	10.84	0.38
						4" Ice	13.83	14.85	0.89
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	B	From Face	4.00 0.00 0.00	0.0000	121.00	No Ice	8.64	6.95	0.06
						1/2" Ice	9.29	8.13	0.12
						1" Ice	9.91	9.02	0.20
						2" Ice	11.18	10.84	0.38
						4" Ice	13.83	14.85	0.89
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	C	From Face	4.00 0.00 0.00	0.0000	121.00	No Ice	8.64	6.95	0.06
						1/2" Ice	9.29	8.13	0.12
						1" Ice	9.91	9.02	0.20
						2" Ice	11.18	10.84	0.38
						4" Ice	13.83	14.85	0.89
Platform Mount [LP 305-1] (E)	C	None		0.0000	120.00	No Ice	18.01	18.01	1.12
						1/2" Ice	23.33	23.33	1.35
						1" Ice	28.65	28.65	1.58
						2" Ice	39.29	39.29	2.05
						4" Ice	60.57	60.57	2.97
**									
(4) DB844H90E-XY w/Mount Pipe (E)	A	From Face	4.00 0.00 0.00	0.0000	113.00	No Ice	3.58	5.40	0.04
						1/2" Ice	4.20	6.49	0.08
						1" Ice	4.73	7.30	0.13
						2" Ice	5.86	8.96	0.25
						4" Ice	8.27	12.49	0.62
(4) DB844H90E-XY w/Mount Pipe (E)	B	From Face	4.00 0.00 0.00	0.0000	113.00	No Ice	3.58	5.40	0.04
						1/2" Ice	4.20	6.49	0.08
						1" Ice	4.73	7.30	0.13
						2" Ice	5.86	8.96	0.25
						4" Ice	8.27	12.49	0.62
(4) DB844H90E-XY w/Mount Pipe (E)	C	From Face	4.00 0.00 0.00	0.0000	113.00	No Ice	3.58	5.40	0.04
						1/2" Ice	4.20	6.49	0.08
						1" Ice	4.73	7.30	0.13
						2" Ice	5.86	8.96	0.25
						4" Ice	8.27	12.49	0.62
Platform Mount [LP 402-1] (E)	C	None		0.0000	112.00	No Ice	33.04	33.04	2.17
						1/2" Ice	43.38	43.38	2.68
						1" Ice	53.72	53.72	3.19
						2" Ice	74.40	74.40	4.21
						4" Ice	115.76	115.76	6.26
***									
RR65-18-02DP w/Mount Pipe (E)	A	From Face	4.00 0.00 0.00	0.0000	101.00	No Ice	4.91	3.64	0.04
						1/2" Ice	5.57	4.70	0.08
						1" Ice	6.14	5.48	0.13
						2" Ice	7.32	7.08	0.25
						4" Ice	9.81	10.47	0.61

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			
RR65-18-02DP w/Mount Pipe (E)	B	From Face	4.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	0.04 0.08 0.13 0.25 0.61
RR65-18-02DP w/Mount Pipe (E)	C	From Face	4.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.91 5.57 6.14 7.32 9.81	3.64 4.70 5.48 7.08 10.47	0.04 0.08 0.13 0.25 0.61
Remec S20057A-1 (E)	A	From Face	4.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.83 0.96 1.10 1.41 2.13	0.39 0.50 0.62 0.89 1.52	0.01 0.01 0.02 0.04 0.11
Remec S20057A-1 (E)	B	From Face	4.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.83 0.96 1.10 1.41 2.13	0.39 0.50 0.62 0.89 1.52	0.01 0.01 0.02 0.04 0.11
Remec S20057A-1 (E)	C	From Face	4.00 0.00 0.00	0.0000	101.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.83 0.96 1.10 1.41 2.13	0.39 0.50 0.62 0.89 1.52	0.01 0.01 0.02 0.04 0.11
T-Arm Mount [TA 602-3] (E)	C	None		0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	0.77 0.99 1.21 1.64 2.50
***									
(2) DB844F90A-SX w/Mount Pipe (E)	A	From Face	4.00 0.00 0.00	0.0000	94.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.77 4.42 4.97 6.10 8.53	5.40 6.49 7.30 8.96 12.49	0.04 0.08 0.13 0.25 0.62
(2) DB844F90A-SX w/Mount Pipe (E)	B	From Face	4.00 0.00 0.00	0.0000	94.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.77 4.42 4.97 6.10 8.53	5.40 6.49 7.30 8.96 12.49	0.04 0.08 0.13 0.25 0.62
(2) DB844F90A-SX w/Mount Pipe (E)	C	From Face	4.00 0.00 0.00	0.0000	94.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.77 4.42 4.97 6.10 8.53	5.40 6.49 7.30 8.96 12.49	0.04 0.08 0.13 0.25 0.62
(2) DB948F85T2E-M w/ Mount Pipe (E)	A	From Face	4.00 0.00 0.00	0.0000	94.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.13 2.49 2.86 3.62 5.36	4.45 5.12 5.80 7.22 10.31	0.03 0.06 0.10 0.19 0.49

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) DB948F85T2E-M w/ Mount Pipe (E)	B	From Face	4.00 0.00 0.00	0.0000	94.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.13 2.49 2.86 3.62 5.36	4.45 5.12 5.80 7.22 10.31	0.03 0.06 0.10 0.19 0.49
(2) DB948F85T2E-M w/ Mount Pipe (E)	C	From Face	4.00 0.00 0.00	0.0000	94.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.13 2.49 2.86 3.62 5.36	4.45 5.12 5.80 7.22 10.31	0.03 0.06 0.10 0.19 0.49
Platform Mount [LP 305-1] (E)	C	None		0.0000	93.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	18.01 23.33 28.65 39.29 60.57	18.01 23.33 28.65 39.29 60.57	1.12 1.35 1.58 2.05 2.97
***									
***									
RFS APXV18-206517S-C w/ mount pipe (E)	A	From Face	1.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.45 5.99 6.51 7.57 9.95	5.05 6.06 6.93 8.71 12.48	0.07 0.11 0.17 0.31 0.72
RFS APXV18-206517S-C w/ mount pipe (E)	B	From Face	1.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.45 5.99 6.51 7.57 9.95	5.05 6.06 6.93 8.71 12.48	0.07 0.11 0.17 0.31 0.72
RFS APXV18-206517S-C w/ mount pipe (E)	C	From Face	1.00 0.00 0.00	0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.45 5.99 6.51 7.57 9.95	5.05 6.06 6.93 8.71 12.48	0.07 0.11 0.17 0.31 0.72
Side Arm Mount [SO 101-3) (E)	C	None		0.0000	75.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.50 8.90 10.30 13.10 18.70	7.50 8.90 10.30 13.10 18.70	0.25 0.33 0.41 0.58 0.90
***									
(2) P65-15-XLH-RR w/ Mount Pipe (P)	C	From Face	2.00 0.00 0.00	0.0000	65.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	6.07 6.51 6.96 7.90 9.89	4.19 4.80 5.44 6.84 9.95	0.06 0.10 0.16 0.29 0.65
(2) P65-15-XLH-RR w/ Mount Pipe (P)	C	From Face	2.00 0.00 0.00	0.0000	65.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	6.07 6.51 6.96 7.90 9.89	4.19 4.80 5.44 6.84 9.95	0.06 0.10 0.16 0.29 0.65
(2) P65-15-XLH-RR w/ Mount Pipe (P)	C	From Face	2.00 0.00 0.00	0.0000	65.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	6.07 6.51 6.96 7.90 9.89	4.19 4.80 5.44 6.84 9.95	0.06 0.10 0.16 0.29 0.65

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
						4" Ice			
(2) TT19-08BP111-001 (P)	C	From Face	2.00 0.00 0.00	0.0000	65.00	No Ice	0.64	0.52	0.02
						1/2" Ice	0.75	0.62	0.02
						1" Ice	0.87	0.73	0.03
						2" Ice	1.13	0.98	0.05
						4" Ice	1.77	1.58	0.12
(2) TT19-08BP111-001 (P)	C	From Face	2.00 0.00 0.00	0.0000	65.00	No Ice	0.64	0.52	0.02
						1/2" Ice	0.75	0.62	0.02
						1" Ice	0.87	0.73	0.03
						2" Ice	1.13	0.98	0.05
						4" Ice	1.77	1.58	0.12
(2) TT19-08BP111-001 (P)	C	From Face	2.00 0.00 0.00	0.0000	65.00	No Ice	0.64	0.52	0.02
						1/2" Ice	0.75	0.62	0.02
						1" Ice	0.87	0.73	0.03
						2" Ice	1.13	0.98	0.05
						4" Ice	1.77	1.58	0.12
Side Arm Mount [SO 102-3] (P)	C	None		0.0000	65.00	No Ice	3.00	3.00	0.08
						1/2" Ice	3.48	3.48	0.11
						1" Ice	3.96	3.96	0.14
						2" Ice	4.92	4.92	0.20
						4" Ice	6.84	6.84	0.32
***									
KS24019-L112A (E)	C	From Face	2.00 0.00 0.00	0.0000	51.00	No Ice	0.10	0.10	0.01
						1/2" Ice	0.18	0.18	0.01
						1" Ice	0.26	0.26	0.01
						2" Ice	0.42	0.42	0.01
						4" Ice	0.74	0.74	0.02
Side Arm Mount [SO 702-1] (E)	C	None		0.0000	50.00	No Ice	1.00	1.43	0.03
						1/2" Ice	1.00	2.05	0.04
						1" Ice	1.00	2.67	0.05
						2" Ice	1.00	3.91	0.07
						4" Ice	1.00	6.39	0.12

Tower Pressures - No Ice

$G_H = 1.690$

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 123.00-82.25	102.09	1.381	23	85.089	A	0.000	85.089	85.089	100.00	0.000	0.000
					B	0.000	85.089		100.00	0.000	0.000
					C	0.000	85.089		100.00	0.000	0.000
L2 82.25-58.00	69.88	1.239	20	59.733	A	0.000	59.733	59.733	100.00	0.000	0.000
					B	0.000	59.733		100.00	0.000	0.000
					C	0.000	59.733		100.00	0.000	3.366
L3 58.00-40.75	49.26	1.121	18	46.966	A	0.000	46.966	46.966	100.00	0.000	0.000
					B	0.000	46.966		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	46.966		100.00	0.000	3.416
L4	35.20	1.019	17	31.383	A	0.000	31.383	31.383	100.00	0.000	0.000
40.75-29.75					B	0.000	31.383		100.00	0.000	0.000
					C	0.000	31.383		100.00	0.000	2.178
L5 29.75-0.00	14.58	1	16	92.592	A	0.000	92.592	92.592	100.00	0.000	0.000
					B	0.000	92.592		100.00	0.000	0.000
					C	0.000	92.592		100.00	0.000	5.891

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	102.09	1.381	5	1.1451	92.867	A	0.000	92.867	92.867	100.00	0.000	0.000
123.00-82.25						B	0.000	92.867		100.00	0.000	0.000
						C	0.000	92.867		100.00	0.000	0.000
L2 82.25-58.00	69.88	1.239	4	1.0942	64.361	A	0.000	64.361	64.361	100.00	0.000	0.000
						B	0.000	64.361		100.00	0.000	0.000
						C	0.000	64.361		100.00	0.000	7.259
L3 58.00-40.75	49.26	1.121	4	1.0492	49.982	A	0.000	49.982	49.982	100.00	0.000	0.000
						B	0.000	49.982		100.00	0.000	0.000
						C	0.000	49.982		100.00	0.000	7.035
L4 40.75-29.75	35.20	1.019	4	1.0078	33.307	A	0.000	33.307	33.307	100.00	0.000	0.000
						B	0.000	33.307		100.00	0.000	0.000
						C	0.000	33.307		100.00	0.000	4.486
L5 29.75-0.00	14.58	1	4	1.0000	97.551	A	0.000	97.551	97.551	100.00	0.000	0.000
						B	0.000	97.551		100.00	0.000	0.000
						C	0.000	97.551		100.00	0.000	11.841

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	102.09	1.381	9	85.089	A	0.000	85.089	85.089	100.00	0.000	0.000
123.00-82.25					B	0.000	85.089		100.00	0.000	0.000
					C	0.000	85.089		100.00	0.000	0.000
L2	69.88	1.239	8	59.733	A	0.000	59.733	59.733	100.00	0.000	0.000
82.25-58.00					B	0.000	59.733		100.00	0.000	0.000
					C	0.000	59.733		100.00	0.000	3.366
L3	49.26	1.121	7	46.966	A	0.000	46.966	46.966	100.00	0.000	0.000
58.00-40.75					B	0.000	46.966		100.00	0.000	0.000
					C	0.000	46.966		100.00	0.000	3.416
L4	35.20	1.019	7	31.383	A	0.000	31.383	31.383	100.00	0.000	0.000
40.75-29.75					B	0.000	31.383		100.00	0.000	0.000
					C	0.000	31.383		100.00	0.000	2.178
L5 29.75-0.00	14.58	1	6	92.592	A	0.000	92.592	92.592	100.00	0.000	0.000
					B	0.000	92.592		100.00	0.000	0.000
					C	0.000	92.592		100.00	0.000	5.891

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
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	123 - 82.25	Pole	Max Tension	21	0.00	-0.00	0.00
			Max. Compression	14	-17.60	0.04	-0.12
			Max. Mx	11	-8.14	301.85	-0.08
			Max. My	8	-8.13	0.00	-301.97
			Max. Vy	11	-13.02	301.85	-0.08
			Max. Vx	8	13.03	0.00	-301.97
			Max. Torque	11			-0.00
L2	82.25 - 58	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-24.74	0.53	-4.44
			Max. Mx	11	-12.51	707.39	-1.60
			Max. My	8	-12.47	0.07	-712.07
			Max. Vy	11	-16.53	707.39	-1.60
			Max. Vx	8	16.95	0.07	-712.07
			Max. Torque	5			-3.05
L3	58 - 40.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.77	1.14	-4.88

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	11	-14.70	927.21	-1.71
			Max. My	8	-14.67	0.17	-937.22
			Max. Vy	11	-17.29	927.21	-1.71
			Max. Vx	8	17.71	0.17	-937.22
			Max. Torque	5			-3.06
L4	40.75 - 29.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.13	1.87	-5.35
			Max. Mx	11	-17.91	1199.02	-1.81
			Max. My	8	-17.89	0.29	-1215.25
			Max. Vy	11	-18.37	1199.02	-1.81
			Max. Vx	8	18.78	0.29	-1215.25
			Max. Torque	5			-3.08
L5	29.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.17	3.30	-6.19
			Max. Mx	11	-24.18	1765.47	-1.96
			Max. My	8	-24.18	0.55	-1793.69
			Max. Vy	11	-19.70	1765.47	-1.96
			Max. Vx	8	20.10	0.55	-1793.69
			Max. Torque	5			-3.09

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	40.17	0.00	-5.83
	Max. H_x	11	24.19	19.68	-0.00
	Max. H_z	2	24.19	0.00	20.09
	Max. M_x	2	1789.76	0.00	20.09
	Max. M_z	5	1764.37	-19.68	-0.00
	Max. Torsion	11	3.09	19.68	-0.00
	Min. Vert	1	24.19	0.00	0.00
	Min. H_x	5	24.19	-19.68	-0.00
	Min. H_z	8	24.19	0.00	-20.09
	Min. M_x	8	-1793.69	0.00	-20.09
	Min. M_z	11	-1765.47	19.68	-0.00
	Min. Torsion	5	-3.09	-19.68	-0.00

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	24.19	0.00	0.00	1.94	0.54	0.00
Dead+Wind 0 deg - No Ice	24.19	-0.00	-20.09	-1789.76	0.55	-0.10
Dead+Wind 30 deg - No Ice	24.19	9.84	-17.39	-1549.73	-881.89	1.46
Dead+Wind 60 deg - No Ice	24.19	17.05	-10.04	-893.92	-1527.90	2.63
Dead+Wind 90 deg - No Ice	24.19	19.68	0.00	1.96	-1764.37	3.09
Dead+Wind 120 deg - No Ice	24.19	17.05	10.04	897.85	-1527.91	2.73
Dead+Wind 150 deg - No Ice	24.19	9.84	17.39	1553.66	-881.90	1.63
Dead+Wind 180 deg - No Ice	24.19	-0.00	20.09	1793.69	0.55	0.10
Dead+Wind 210 deg - No Ice	24.19	-9.84	17.39	1553.66	882.99	-1.46
Dead+Wind 240 deg - No Ice	24.19	-17.05	10.04	897.85	1529.01	-2.63
Dead+Wind 270 deg - No Ice	24.19	-19.68	0.00	1.96	1765.47	-3.09
Dead+Wind 300 deg - No Ice	24.19	-17.05	-10.04	-893.92	1529.00	-2.73
Dead+Wind 330 deg - No Ice	24.19	-9.84	-17.39	-1549.73	882.99	-1.63
Dead+Ice	40.17	-0.00	0.00	6.19	3.30	0.00

Load Combination	Vertical K	Shear$_x$ K	Shear$_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 0 deg+Ice	40.17	-0.00	-5.83	-548.59	3.32	-0.05
Dead+Wind 30 deg+Ice	40.17	2.88	-5.05	-474.29	-271.63	0.42
Dead+Wind 60 deg+Ice	40.17	4.99	-2.92	-271.20	-472.91	0.77
Dead+Wind 90 deg+Ice	40.17	5.76	0.00	6.22	-546.58	0.91
Dead+Wind 120 deg+Ice	40.17	4.99	2.92	283.64	-472.91	0.81
Dead+Wind 150 deg+Ice	40.17	2.88	5.05	486.73	-271.63	0.50
Dead+Wind 180 deg+Ice	40.17	-0.00	5.83	561.04	3.32	0.05
Dead+Wind 210 deg+Ice	40.17	-2.88	5.05	486.73	278.27	-0.42
Dead+Wind 240 deg+Ice	40.17	-4.99	2.92	283.64	479.54	-0.77
Dead+Wind 270 deg+Ice	40.17	-5.76	0.00	6.22	553.22	-0.91
Dead+Wind 300 deg+Ice	40.17	-4.99	-2.92	-271.20	479.54	-0.81
Dead+Wind 330 deg+Ice	40.17	-2.88	-5.05	-474.29	278.27	-0.49
Dead+Wind 0 deg - Service	24.19	0.00	-7.85	-698.82	0.55	-0.04
Dead+Wind 30 deg - Service	24.19	3.84	-6.79	-604.94	-344.60	0.57
Dead+Wind 60 deg - Service	24.19	6.66	-3.92	-348.43	-597.27	1.03
Dead+Wind 90 deg - Service	24.19	7.69	0.00	1.98	-689.76	1.22
Dead+Wind 120 deg - Service	24.19	6.66	3.92	352.38	-597.28	1.07
Dead+Wind 150 deg - Service	24.19	3.84	6.79	608.90	-344.60	0.64
Dead+Wind 180 deg - Service	24.19	0.00	7.85	702.78	0.55	0.04
Dead+Wind 210 deg - Service	24.19	-3.84	6.79	608.90	345.70	-0.57
Dead+Wind 240 deg - Service	24.19	-6.66	3.92	352.38	598.38	-1.03
Dead+Wind 270 deg - Service	24.19	-7.69	0.00	1.98	690.86	-1.22
Dead+Wind 300 deg - Service	24.19	-6.66	-3.92	-348.43	598.37	-1.07
Dead+Wind 330 deg - Service	24.19	-3.84	-6.79	-604.94	345.70	-0.64

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-24.19	0.00	0.00	24.19	0.00	0.000%
2	0.00	-24.19	-20.09	0.00	24.19	20.09	0.000%
3	9.84	-24.19	-17.39	-9.84	24.19	17.39	0.000%
4	17.05	-24.19	-10.04	-17.05	24.19	10.04	0.000%
5	19.68	-24.19	0.00	-19.68	24.19	-0.00	0.000%
6	17.05	-24.19	10.04	-17.05	24.19	-10.04	0.000%
7	9.84	-24.19	17.39	-9.84	24.19	-17.39	0.000%
8	0.00	-24.19	20.09	0.00	24.19	-20.09	0.000%
9	-9.84	-24.19	17.39	9.84	24.19	-17.39	0.000%
10	-17.05	-24.19	10.04	17.05	24.19	-10.04	0.000%
11	-19.68	-24.19	0.00	19.68	24.19	-0.00	0.000%
12	-17.05	-24.19	-10.04	17.05	24.19	10.04	0.000%
13	-9.84	-24.19	-17.39	9.84	24.19	17.39	0.000%
14	0.00	-40.17	0.00	0.00	40.17	-0.00	0.000%
15	0.00	-40.17	-5.83	0.00	40.17	5.83	0.000%
16	2.88	-40.17	-5.05	-2.88	40.17	5.05	0.000%
17	4.99	-40.17	-2.92	-4.99	40.17	2.92	0.000%
18	5.76	-40.17	0.00	-5.76	40.17	-0.00	0.000%
19	4.99	-40.17	2.92	-4.99	40.17	-2.92	0.000%
20	2.88	-40.17	5.05	-2.88	40.17	-5.05	0.000%
21	0.00	-40.17	5.83	0.00	40.17	-5.83	0.000%
22	-2.88	-40.17	5.05	2.88	40.17	-5.05	0.000%
23	-4.99	-40.17	2.92	4.99	40.17	-2.92	0.000%
24	-5.76	-40.17	0.00	5.76	40.17	-0.00	0.000%
25	-4.99	-40.17	-2.92	4.99	40.17	2.92	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
26	-2.88	-40.17	-5.05	2.88	40.17	5.05	0.000%
27	0.00	-24.19	-7.85	0.00	24.19	7.85	0.000%
28	3.84	-24.19	-6.79	-3.84	24.19	6.79	0.000%
29	6.66	-24.19	-3.92	-6.66	24.19	3.92	0.000%
30	7.69	-24.19	0.00	-7.69	24.19	-0.00	0.000%
31	6.66	-24.19	3.92	-6.66	24.19	-3.92	0.000%
32	3.84	-24.19	6.79	-3.84	24.19	-6.79	0.000%
33	0.00	-24.19	7.85	0.00	24.19	-7.85	0.000%
34	-3.84	-24.19	6.79	3.84	24.19	-6.79	0.000%
35	-6.66	-24.19	3.92	6.66	24.19	-3.92	0.000%
36	-7.69	-24.19	0.00	7.69	24.19	-0.00	0.000%
37	-6.66	-24.19	-3.92	6.66	24.19	3.92	0.000%
38	-3.84	-24.19	-6.79	3.84	24.19	6.79	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	0.00035994
3	Yes	6	0.00000001	0.00004941
4	Yes	6	0.00000001	0.00004489
5	Yes	5	0.00000001	0.00015882
6	Yes	6	0.00000001	0.00005137
7	Yes	6	0.00000001	0.00004593
8	Yes	4	0.00000001	0.00036069
9	Yes	6	0.00000001	0.00004607
10	Yes	6	0.00000001	0.00005133
11	Yes	5	0.00000001	0.00015887
12	Yes	6	0.00000001	0.00004487
13	Yes	6	0.00000001	0.00004958
14	Yes	4	0.00000001	0.00000724
15	Yes	4	0.00000001	0.00058903
16	Yes	5	0.00000001	0.00029307
17	Yes	5	0.00000001	0.00024952
18	Yes	5	0.00000001	0.00010625
19	Yes	5	0.00000001	0.00032785
20	Yes	5	0.00000001	0.00026919
21	Yes	4	0.00000001	0.00060642
22	Yes	5	0.00000001	0.00027671
23	Yes	5	0.00000001	0.00033104
24	Yes	5	0.00000001	0.00010709
25	Yes	5	0.00000001	0.00025233
26	Yes	5	0.00000001	0.00030086
27	Yes	4	0.00000001	0.00018787
28	Yes	5	0.00000001	0.00013259
29	Yes	5	0.00000001	0.00011175
30	Yes	4	0.00000001	0.00083673
31	Yes	5	0.00000001	0.00014301
32	Yes	5	0.00000001	0.00011685
33	Yes	4	0.00000001	0.00018916
34	Yes	5	0.00000001	0.00011760
35	Yes	5	0.00000001	0.00014286
36	Yes	4	0.00000001	0.00083757
37	Yes	5	0.00000001	0.00011181
38	Yes	5	0.00000001	0.00013358

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	123 - 82.25	32.548	33	2.1727	0.0051
L2	85.75 - 58	16.477	33	1.8029	0.0051
L3	58 - 40.75	7.510	33	1.2168	0.0040
L4	45 - 29.75	4.570	33	0.9392	0.0027
L5	29.75 - 0	1.993	33	0.6371	0.0017

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.00	3/4" x 8 ft lightning rod	33	32.548	2.1727	0.0051	23136
121.00	(3) FV65-14-00NA2 w/Mount Pipe	33	31.637	2.1596	0.0051	23136
120.00	Platform Mount [LP 305-1]	33	31.182	2.1531	0.0051	23136
113.00	(4) DB844H90E-XY w/Mount Pipe	33	28.011	2.1050	0.0052	11567
112.00	Platform Mount [LP 402-1]	33	27.561	2.0976	0.0052	10516
101.00	RR65-18-02DP w/Mount Pipe	33	22.712	2.0030	0.0052	5257
100.00	T-Arm Mount [TA 602-3]	33	22.283	1.9927	0.0052	5028
94.00	(2) DB844F90A-SX w/Mount Pipe	33	19.762	1.9236	0.0052	3987
93.00	Platform Mount [LP 305-1]	33	19.351	1.9107	0.0052	3854
75.00	RFS APXV18-206517S-C w/ mount pipe	33	12.589	1.5968	0.0049	2714
65.00	(2) P65-15-XLH-RR w/ Mount Pipe	33	9.430	1.3753	0.0045	2428
51.00	KS24019-L112A	33	5.838	1.0641	0.0033	2888
50.00	Side Arm Mount [SO 702-1]	33	5.618	1.0429	0.0032	3008

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	123 - 82.25	82.907	8	5.5389	0.0130
L2	85.75 - 58	41.987	8	4.5958	0.0130
L3	58 - 40.75	19.150	8	3.1018	0.0102
L4	45 - 29.75	11.655	8	2.3950	0.0069
L5	29.75 - 0	5.085	8	1.6251	0.0042

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.00	3/4" x 8 ft lightning rod	8	82.907	5.5389	0.0130	9208
121.00	(3) FV65-14-00NA2 w/Mount Pipe	8	80.588	5.5055	0.0130	9208
120.00	Platform Mount [LP 305-1]	8	79.430	5.4887	0.0131	9208
113.00	(4) DB844H90E-XY w/Mount	8	71.355	5.3660	0.0131	4603

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Pipe					
112.00	Platform Mount [LP 402-1]	8	70.210	5.3473	0.0131	4184
101.00	RR65-18-02DP w/Mount Pipe	8	57.865	5.1059	0.0132	2090
100.00	T-Arm Mount [TA 602-3]	8	56.772	5.0798	0.0132	1999
94.00	(2) DB844F90A-SX w/Mount Pipe	8	50.352	4.9036	0.0131	1584
93.00	Platform Mount [LP 305-1]	8	49.308	4.8706	0.0131	1531
75.00	RFS APXV18-206517S-C w/ mount pipe	8	32.086	4.0700	0.0125	1074
65.00	(2) P65-15-XLH-RR w/ Mount Pipe	8	24.041	3.5054	0.0114	959
51.00	KS24019-L112A	8	14.889	2.7129	0.0084	1139
50.00	Side Arm Mount [SO 702-1]	8	14.326	2.6589	0.0082	1186

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	123 - 82.25 (1)	TP28.114x22x0.1875	40.75	0.00	0.0	36.000	16.3072	-8.13	587.06	0.014
L2	82.25 - 58 (2)	TP31.3777x27.2139x0.25	27.75	0.00	0.0	39.000	24.6998	-12.47	963.29	0.013
L3	58 - 40.75 (3)	TP33.966x31.3777x0.3265	17.25	0.00	0.0	39.000	34.1991	-14.67	1333.76	0.011
L4	40.75 - 29.75 (4)	TP35.1164x32.6753x0.3424	15.25	0.00	0.0	39.000	37.9865	-17.89	1481.47	0.012
L5	29.75 - 0 (5)	TP39.58x35.1164x0.3844	29.75	0.00	0.0	39.000	47.8171	-24.18	1864.87	0.013

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	123 - 82.25 (1)	TP28.114x22x0.1875	301.97	32.831	36.000	0.912	0.00	0.000	36.000	0.000
L2	82.25 - 58 (2)	TP31.3777x27.2139x0.25	712.07	45.047	39.000	1.155	0.00	0.000	39.000	0.000
L3	58 - 40.75 (3)	TP33.966x31.3777x0.3265	937.22	40.464	39.000	1.038	0.00	0.000	39.000	0.000
L4	40.75 - 29.75 (4)	TP35.1164x32.6753x0.3424	1215.24	45.006	39.000	1.154	0.00	0.000	39.000	0.000
L5	29.75 - 0 (5)	TP39.58x35.1164x0.3844	1793.69	46.631	39.000	1.196	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	123 - 82.25 (1)	TP28.114x22x0.1875	13.03	0.799	24.000	0.067	0.00	0.000	24.000	0.000
L2	82.25 - 58 (2)	TP31.3777x27.2139x0.25	16.95	0.686	26.000	0.053	0.02	0.001	26.000	0.000

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 $\frac{f_{vt}}{F_{vt}}$
L3	58 - 40.75 (3)	TP33.966x31.3777x0.3265	17.71	0.518	26.000	0.040	0.04	0.001	26.000	0.000
L4	40.75 - 29.75 (4)	TP35.1164x32.6753x0.3424	18.78	0.494	26.000	0.038	0.06	0.001	26.000	0.000
L5	29.75 - 0 (5)	TP39.58x35.1164x0.3844	20.10	0.420	26.000	0.032	0.10	0.001	26.000	0.000

Pole Interaction Design Data

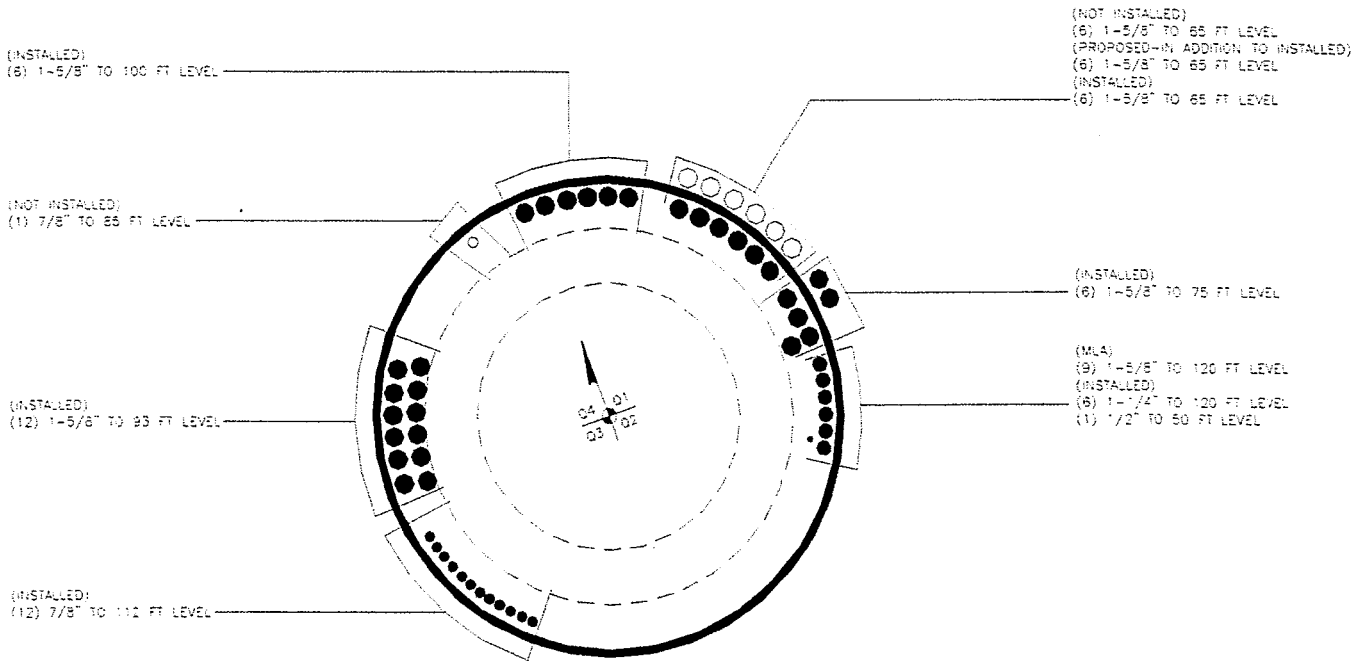
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	123 - 82.25 (1)	0.014	0.912	0.000	0.067	0.000	0.927 ✓	1.333	H1-3+VT ✓
L2	82.25 - 58 (2)	0.013	1.155	0.000	0.053	0.000	1.169 ✓	1.333	H1-3+VT ✓
L3	58 - 40.75 (3)	0.011	1.038	0.000	0.040	0.000	1.049 ✓	1.333	H1-3+VT ✓
L4	40.75 - 29.75 (4)	0.012	1.154	0.000	0.038	0.000	1.166 ✓	1.333	H1-3+VT ✓
L5	29.75 - 0 (5)	0.013	1.196	0.000	0.032	0.000	1.209 ✓	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	123 - 82.25	Pole	TP28.114x22x0.1875	1	-8.13	782.55	69.5	Pass
L2	82.25 - 58	Pole	TP31.3777x27.2139x0.25	2	-12.47	1284.07	87.7	Pass
L3	58 - 40.75	Pole	TP33.966x31.3777x0.3265	3	-14.67	1777.90	78.7	Pass
L4	40.75 - 29.75	Pole	TP35.1164x32.6753x0.3424	4	-17.89	1974.80	87.5	Pass
L5	29.75 - 0	Pole	TP39.58x35.1164x0.3844	5	-24.18	2485.87	90.7	Pass
						Summary		
						Pole (L5)	90.7	Pass
						RATING =	**90.7**	**Pass**

APPENDIX B

Cable Routing Drawing

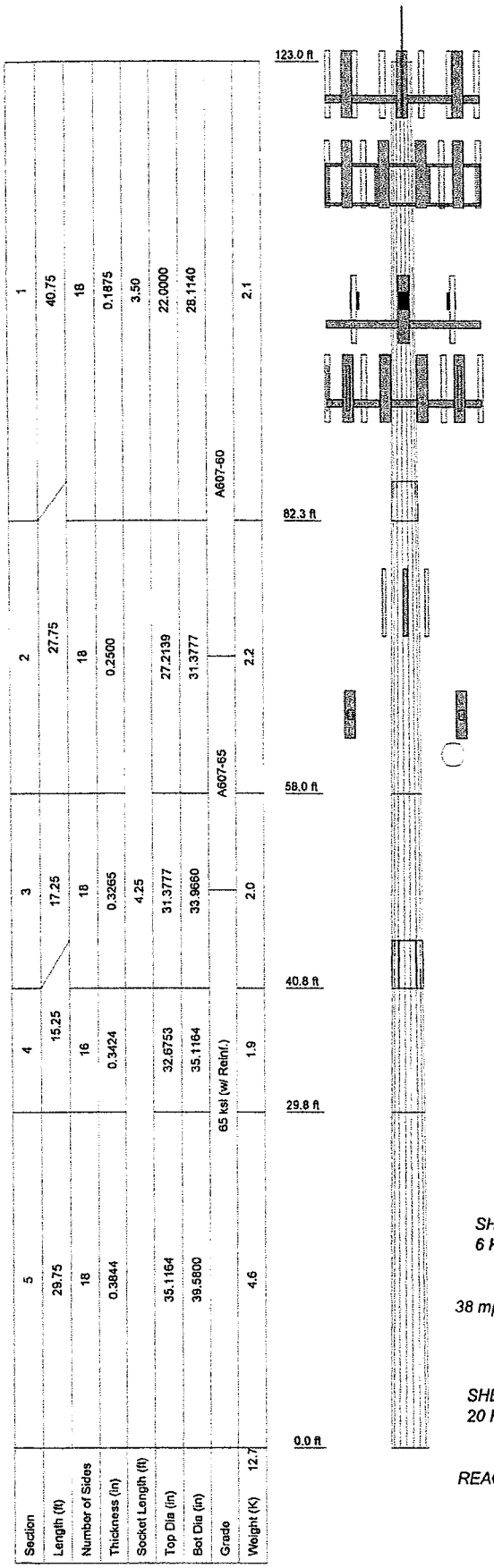


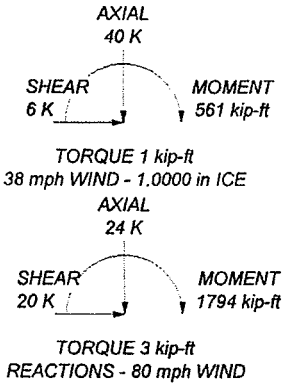
APPENDIX C

Table C1 - List of Attached Documents

Attachment
ERI Monopole Profile
Base Plate Calculations
Foundation Calculations

Program Version 5.4.2.0 - 6/17/2010 File:T:/375_Crown_Castle/2011/37511-0160 BU 876382/37511-0160.eri





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
3/4" x 8 ft lightning rod	123	(2) DB948F85T2E-M w/ Mount Pipe (E)	94
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	121	(2) DB948F85T2E-M w/ Mount Pipe (E)	94
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	121	(2) DB948F85T2E-M w/ Mount Pipe (E)	94
(3) FV65-14-00NA2 w/Mount Pipe (MLA)	121	Platform Mount [LP 305-1] (E)	93
Platform Mount [LP 305-1] (E)	120	RFS APXV18-206517S-C w/ mount pipe (E)	75
(4) DB844H90E-XY w/Mount Pipe (E)	113	RFS APXV18-206517S-C w/ mount pipe (E)	75
(4) DB844H90E-XY w/Mount Pipe (E)	113	RFS APXV18-206517S-C w/ mount pipe (E)	75
(4) DB844H90E-XY w/Mount Pipe (E)	113	Side Arm Mount [SO 101-3] (E)	75
Platform Mount [LP 402-1] (E)	112	(2) P65-15-XLH-RR w/ Mount Pipe (P)	65
RR65-18-02DP w/Mount Pipe (E)	101	(2) P65-15-XLH-RR w/ Mount Pipe (P)	65
RR65-18-02DP w/Mount Pipe (E)	101	(2) P65-15-XLH-RR w/ Mount Pipe (P)	65
RR65-18-02DP w/Mount Pipe (E)	101	(2) TT19-08BP111-001 (P)	65
Remec S20057A-1 (E)	101	(2) TT19-08BP111-001 (P)	65
Remec S20057A-1 (E)	101	(2) TT19-08BP111-001 (P)	65
Remec S20057A-1 (E)	101	Side Arm Mount [SO 102-3] (P)	65
T-Arm Mount [TA 602-3] (E)	100	KS24019-L112A (E)	51
(2) DB844F90A-SX w/Mount Pipe (E)	94	Side Arm Mount [SO 702-1] (E)	50
(2) DB844F90A-SX w/Mount Pipe (E)	94		
(2) DB844F90A-SX w/Mount Pipe (E)	94		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	65 ksi (w/ Reinf.)	65 ksi	80 ksi
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 90.7%

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *Existing 123-Ft Pole - 37511-0160*			
Project: *876382, Berlin; Hartford Co., CT*			
Client: Crown Castle	Drawn by: Maria C Lopez	App'd:	
Code: TIA/EIA-222-F	Date: 01/27/11	Scale: NTS	
Path: T:\375_Crown_Castle\2011\37511-0160 BU 876382\37511-0160 en		Dwg No. E-1	

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

Assumptions: Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48.
Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)

Site Data

BU#: *876382*
Site Name: *Laviana Orchard*
App #: *105395, Rev. 4*

Reactions		
Moment:	1197.38	ft-kips
Axial:	24	kips
Shear:	20	kips

Moment adjusted to account for additional anchor

Connection Type:	*Butt*

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Grade(Fy):	75	ksi
Bolt Circle:	46	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	44	in
Thick:	2.75	in
Grade:	55	ksi
B effective	22.73	in

Pole Data		
Diam:	39.5	in
Thick:	0.2812	in
Grade:	65	ksi

Stress Increase Factor		
ASIF:	1.333	

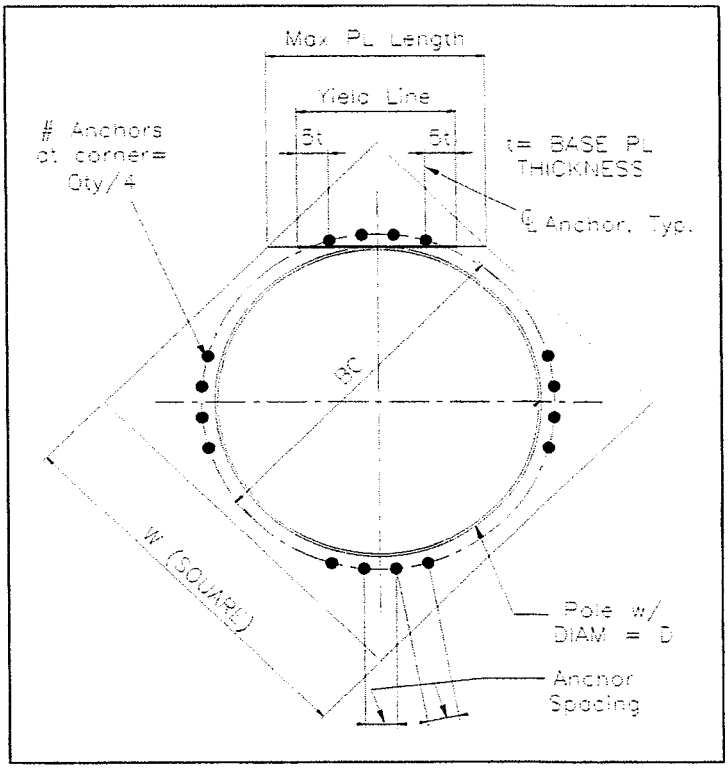
Anchor Rod Results

Maximum Rod Tension:	153.2 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	78.6% **Pass**
Additional Anchors:	92.6% Pass

Base Plate Results

Base Plate Stress:	33.7 ksi
Allowable Plate Stress:	55.0 ksi
Base Plate Stress Ratio:	61.2% **Pass**

PL Ref. Data
Yield Line (in):
22.73
Max PL Length:
22.73



PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

Date: **1/27/2011**
PJF Project: **37511-0162**
Client Ref. # **Bu876382**
Site Name: **Site Name**
Description: **Description**
Owner: **Owner**
Engineer: **MCL**

ASYMMETRIC ANCHOR ROD ANALYSIS

Degree =	359.000	
y-bar =	0.000	in = ∑ A y / ∑ A
x-bar =	0.000	in = ∑ A x / ∑ A

Item	Anchor Dia., in	Location, degrees	Bolt Circle, in	Area, in^2	Moment, ft-kips	Max Load, kips
1	**2.250**	**37.5**	**46.00**	3.98	**1794**	153.18
2	**2.250**	**52.5**	**46.00**	3.98	1794	153.18
3	**2.250**	**127.5**	**46.00**	3.98	1794	153.18
4	**2.250**	**142.5**	**46.00**	3.98	1794	153.18
5	**2.250**	**217.5**	**46.00**	3.98	1794	153.18
6	**2.250**	**232.5**	**46.00**	3.98	1794	153.18
7	**2.250**	**307.5**	**46.00**	3.98	1794	153.18
8	**2.250**	**322.5**	**46.00**	3.98	1794	153.18
9	**2.250**	**0.0**	**47.25**	3.98	1794	157.35
10	**2.250**	**90.0**	**47.25**	3.98	1794	157.35
11	**2.250**	**180.0**	**47.25**	3.98	1794	157.35
12	**2.250**	**270.0**	**47.25**	3.98	1794	157.35
				47.71		

4 Existing Rods

< 170 K · OK

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Job Number:	37511-0160	**Page:**	1
Site Number:	876382	**By:**	mcl
Site Name:	Site Name	**Date:**	1/27/2011

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

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	1794.0		k-ft
Shear, V =	20.0		kips
Axial Load, P =	24.0		kips
OTM =	1804.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole
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 =	6 ft
Height Above Grade =	0.5 ft
Depth Below Grade =	20 ft
fc' =	3 ksi
εc =	0.003 in/in
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. ≥ Compression
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 =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#5
Side Clear Cover to Ties =	4 in

Soil Parameters

Water Table Depth =	15.00 ft
Depth to Ignore Soil =	3.00 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)

Maximum Capacity Ratios

Maximum Soil Ratio =	110.0%
Maximum Steel Ratio =	105.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = 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	5	135		38	Sand				5
2	10	135		38	Sand		600		15
3	5	135		38	Sand	40000	600		20
4	10	135		38	Sand	40000	1200		30
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	14.33 ft, from Grade	Shear, V =	20.00 kips
Bending Moment, M =	2090.67 k-ft, from COR	Resisting Shear, Va =	34.35 kips
Resisting Moment, Ma =	3590.39 k-ft, from COR		
MOMENT RATIO =	**58.2% OK**	**SHEAR RATIO =**	**58.2% OK**

Soil Results: Uplift

Uplift, T =	0.00 kips
Allowable Uplift Cap., Ta =	62.50 kips
UPLIFT RATIO =	**0.0% OK**

Soil Results: Compression

Compression, C =	24.00 kips
Allowable Comp. Cap., Ca =	639.71 kips
COMPRESSION RATIO =	**3.8% OK**

Steel Results (ACI 318-02):

Minimum Steel Area =	20.36 sq in
Actual Steel Area =	24.96 sq in
Allowable Min Axial, Pa =	-1036.80 kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	4726.51 kips, Where Ma = 0 k-ft
Axial Load, P =	44.15 kips @ 4.25 ft Below Grade
Moment, M =	1881.06 k-ft @ 4.25 ft Below Grade
Allowable Moment, Ma =	2588.13 k-ft
MOMENT RATIO =	**72.7% OK**

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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#: *876382*
Site Name: *Site Name*
App #:

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	1881.06	ft-kips (* Note)
Max. Service Shaft P:	44.15	kips
Max Axial Force Type:	Comp.	

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

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

Load Factor	Shaft Factored Loads		
1.30	Mu:	2445.378	ft-kips
1.30	Pu:	57.395	kips

Pier Properties

Concrete:

Pier Diameter =	6.0	ft
Concrete Area =	4071.5	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	5.11	ft
Vert. Cage Diameter =	61.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	16	
As Total=	24.96	in^2
A s/ Aconc, Rho:	0.0061	0.61%

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

ACI 10.5 , ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tesnion Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027	
200 / Fy:	0.0033	
IBC 1810.1.2:	0.0050	SDC D, E, or F
Governing:	0.0050	**0.50%**

ACI 10.8 and 10.9

Min As for Columns, Comp. Controlled, Shafts:

Min As: 0.0100 **1.00%**

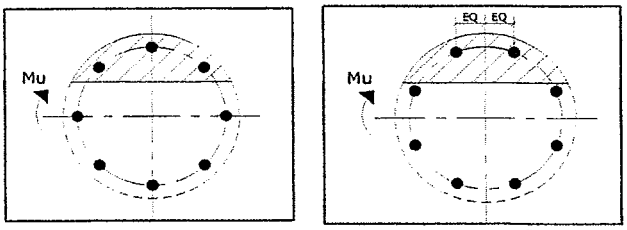
Minimum Rho Check:

Actual Req'd Min. Rho:	0.50%	Flexural Member
Provided Rho:	0.61%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	6144.47	kips
at Mu=(ϕ=0.65)Mn=	3164.92	ft-kips
Max Tu, (φ=0.9) Tn =	1347.84	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Extreme Steel Strain, εt: **0.0127**

εt > 0.0050, Tension Controlled

Reduction Factor,φ: **0.900**

Dist. From Edge to Neutral Axis: **12.59** in

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu =	57.39	kips
Drilled Shaft Moment Capacity, φMn:	**3364.59**	ft-kips
Drilled Shaft Superimposed Mu:	**2445.38**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	72.68%

P65-15-XLH-RR | Dual Broadband Antennas

POLARIZATION: Dual linear ±45°
FREQUENCY (MHz): 698-894, 1710-2170
HORIZONTAL BEAM WIDTH (°): 65, 65
GAIN (dBi/dBd): 14.7/12.6, 17.0/14.9
TILT: 0-13, 0-9
LENGTH: 51"

ELECTRICAL SPECIFICATIONS*

Frequency range (MHz)	698-894		1710-2170		
Frequency band (MHz)	698-806	806-894	1710-1880	1850-1990	1900-2170
Gain (dBi/dBd)	14/11.9	14.7/12.6	16.4/14.3	16.7/14.6	17.0/14,9
Polarization	Dual Linear +/- 45			Dual Linear +/- 45	
Nominal Impedance (Ω)	50			50	
VSWR	< 1.5:1			< 1.5:1	
Horizontal beam width, -3 dB (°)	73	63	65	61	60
Vertical beam width, -3 dB (°)	17			7.5	
Electrical down tilt (°)	0-13			0-9	
Side lobe suppression, vertical 1st upper (dB)	> 14			>20	
Isolation between inputs (dB)	>30			> 30	
Inter band Isolation (dB)	> 40			> 40	
Tracking, horizontal plane ±60° (dB)	< 2			< 2	
Vertical beam squint (°)	<1.25			< 0.5	
Front to back ratio (dB) 180°±30° copolar	> 25			> 28	
Front to back ratio (dB) 180°±30° total power	> 25			> 25	
Cross polar discrimination (XPD) 0° (dB)	> 15			> 15	
Cross polar discrimination (XPD) ±60° (dB)	> 10			> 10	
IM3, 2xTx@43dBm (dBc)	<-153			<-153	
Power handling, average per input (W)	500			300	
Power handling, average total (W)	1000			600	

MECHANICAL SPECIFICATIONS*

Connector	4 X 7/16 DIN Female, IP67
Connector position	Bottom
Dimensions, HxWxD, in (mm)	51" x 12" x 6" (1295 x 305 x 152)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, lbs (kg)	41 (19)
Weight, without brackets, lbs (kg)	30 (14)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.0 (N)	920
Maximum operational wind speed, mph (m/s)	100 (45)
Survival wind speed, mph (m/s)	150 (67)
Lightning protection	DC Ground
Operating Temperature	-40°C to +60°C
Radome material	PVC, IP55
Packet size, HxWxD, in (mm)	60" x 16" x 10" (1524 x 400 x 255)
Radome colour	Light Grey
Shipping weight, lbs (kg)	52 (24)
RET	iRET AISGv1.1, MET and AISGv2.0
Brackets	7256.00, 7454.00

*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data

ANTENNA PATTERNS*

For detailed patterns visit http://www.powerwave.com/rpa/.

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All specifications are subject to change without notice. Please contact your Powerwave representative for complete performance data

TT19-08BP111-001 TMA Twin 1900 with 850 Bypass 12 dB AISG 1.1

ELECTRICAL SPECIFICATIONS

UL Frequency Range (MHz)	1850-1910 with 824-894 bypass
UL Rejection	>77 dB
UL Gain(dB)	12
UL Return Loss	>18
UL Noise Figure	<1.7 dB, Typical
UL Output 3rd Order Intercept Point(dBm)	>+23
UL Bypass Loss(dB)	2.5, Typical
UL Max Input Power (dBm)	+14 dBm
DL Frequency Range (MHz)	1930-1990 with 824-894 bypass
DL Return Loss	>18
DL Insertion Loss (dB)	850 MHz, <0.3; 1900 MHz, <0.5
Intermodulation	@ 2 x +43 dBm TX carriers, in receive band, <160 dBc, reffered to antenna port
Input Voltage (V)	AISG Mode: 10-30; Current alarm mode: 8 -17
Alarm Functionality	AISG compatible or in case of no AISG command received, current alarm mode 170-190 mA
Power Consumption	<1.1W @12V
Power Handling, RMS	850: >57 dBm; 1900: >55 dBm
AISG Compatibility	AISG 1.1 fully upgreadable to AISG 2.0 (AISG version only dependent on loaded SW version) TT19-08BP112-001 has AISG 2.0 loaded from factory

MECHANICAL SPECIFICATIONS

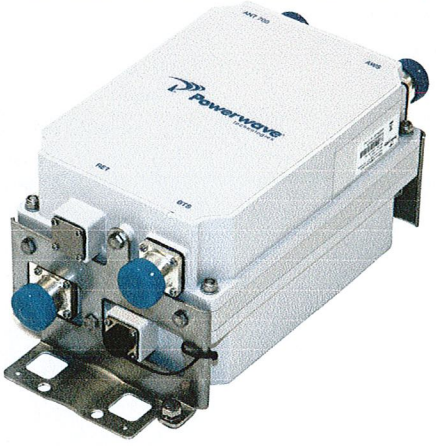
Dimension HxWxD mm(ft)	250x169x137 mm (9.9"x6.7"x5.4")
Weight(lbs)	<16
Colors	Off white (NCS 1502-R)
RF Connectors	DIN 7/16 female, long neck
Mounting Kit	Mounting kit for pole and wall is included

ENVIRONMENTAL SPECIFICATIONS

Temperature Range	-40° C to +65° C (-40° F to +149° F)
Operational	ETS 300 019-1-4
Transportation	ETS 300 019-1-2
Storage	ETS 300 019-1-1
Lightning Protection	3 kA 10/350 µs; 20 kA (Shield)
Housing	Aluminum
MTBF	>1 million hours per TMA
Ingress Protection	IP65 and IP68

APPROVAL AND TESTS

Safety	EN60950
EMC	3GPP: TS 25.113



*All specifications subject to change without notice. Contact your Powerwave representative for complete performance data.

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All specifications are subject to change without notice. Please contact your Powerwave representative for complete performance data.

New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant

February 28, 2011

Denise M. McNair
Town Manager, Town of Berlin
Berlin Town Hall
240 Kensington Road
Berlin, CT 06037

Re: Telecommunications Facility - 1684 Chamberlain Hwy. Berlin, CT

Dear Ms. McNair:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") capability, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review AT&T's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes AT&T's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at (860) 463-5511 or Linda Roberts, Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Douglas L. Culp
Real Estate Consultant

Enclosure