



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

www.ct.gov/csc

July 27, 2012

Jennifer Young Gaudet
HPC Wireless Services
46 Mill Plain Road, Floor 2
Danbury, CT 06811

RE: **EM-CING-025-120713** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1119-1121 Summit Road, Cheshire, Connecticut.

Dear Ms. Gaudet:

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:

- Modifications to the tower be completed in accordance with the recommendations made in the Structural Modification Report prepared by Paul J. Ford and Company dated June 19, 2012, and stamped by Joseph Jacobs; and
- Prior to antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower and foundation will not exceed 100 percent of the post-construction structural rating.
- 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 July 12, 2012. 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.

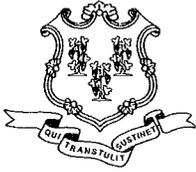
Very truly yours,



Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable Matt Hall, Council Chairman, Town of Cheshire
Michael A. Milone, Town Manager, Town of Cheshire
William S. Voelker, AICP, Town Planner, Town of Cheshire



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July 13, 2012

The Honorable Matt Hall
Council Chairman
Town of Cheshire
Town Hall
84 South Main Street
Cheshire, CT 06410

RE: **EM-CING-025-120713** – New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 1119-1121 Summit Road, Cheshire, Connecticut.

Dear Council Chairman Hall:

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 July 27, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/cm

Enclosure: Notice of Intent

c: Michael A. Milone, Town Manager, Town of Cheshire
William S. Voelker, AICP, Town Planner, Town of Cheshire

ORIGINAL

HPC Wireless Services

46 Mill Plain Rd.

Floor 2

Danbury, CT, 06811

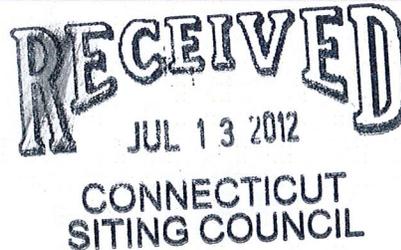
P.: 203.797.1112



July 12, 2012

VIA OVERNIGHT COURIER

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



Re: New Cingular Wireless PCS, LLC – exempt modification
1119/1121 Summit Road, Cheshire, Connecticut

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of New Cingular Wireless PCS, LLC (“AT&T”). AT&T is making modifications to certain existing sites in its Connecticut system in order to implement LTE technology. Please accept this letter and attachments as notification, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies (“R.S.C.A.”), of construction that 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 Mayor and Chairman of the Town Council of the Town of Cheshire.

AT&T plans to modify the existing wireless communications facility owned by Crown Castle and located at 1119/1121 Summit Road, Cheshire, (coordinates 41°-48 -11” N, 72°-57’-28.2” W). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration, subject to implementation of modifications detailed in the attached structural report. Also included is a power density report reflecting the modification to AT&T’s operations at the site.

The changes to the facility do not constitute a modification 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. 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. AT&T will add three (3) LTE panel antennas to the existing platform at a center line of approximately 160’, for a total of nine (9) antennas. Six (6) RRUs (remote radio units) and a surge arrestor will surround the tower at a level below the platform. AT&T

will also place a DC power and fiber run from the equipment to the antennas along the existing coaxial cable run. The changes will not extend the height of the approximately 167' structure.

2. AT&T will add related equipment to its existing shelter and mount a new GPS antenna to the existing shelter. These changes will be within the existing compound and will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six (6) decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility 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. As indicated on the attached report prepared by C Squared Systems, LLC, AT&T's operations at the site will result in a power density of approximately 1.27%; the combined site operations will result in a total power density of approximately 29.33%.

Please feel free to contact me by phone at (860) 798-7454 or by e-mail at jgaudet@hpcwireless.com with questions concerning this matter. Thank you for your consideration.

Respectfully yours,



Jennifer Young Gaudet

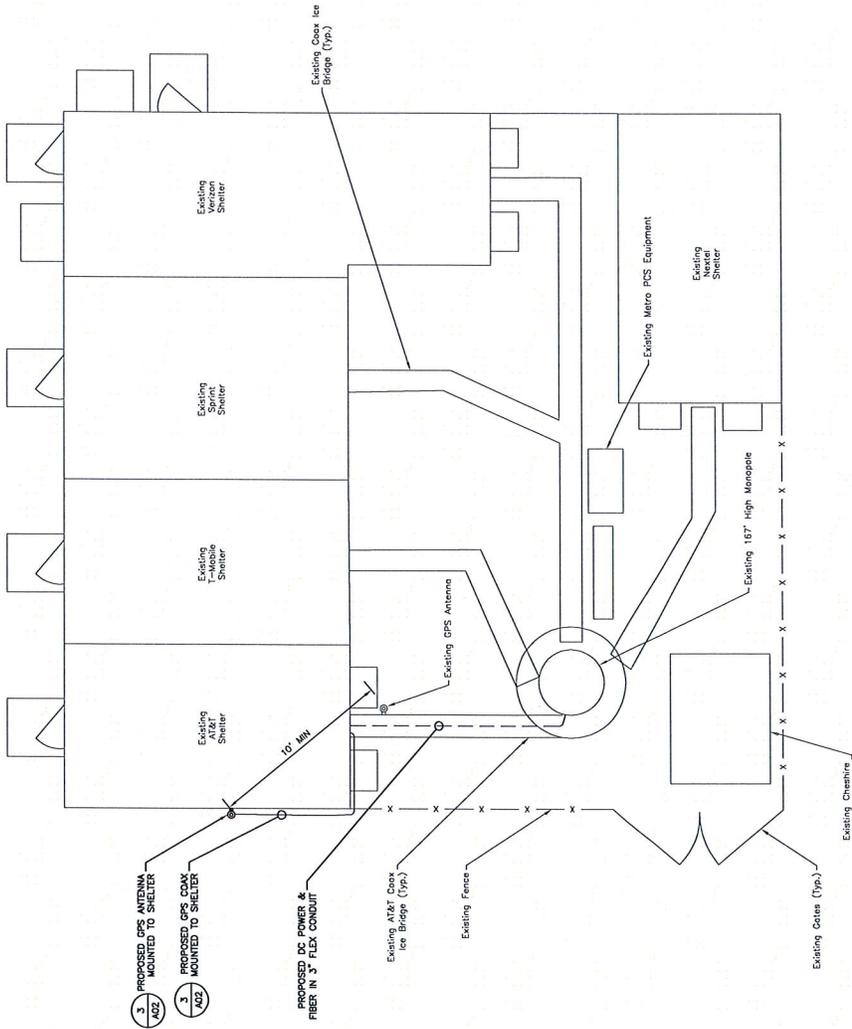
Attachments

cc: Honorable Tim Slocum, Mayor, Chairman of Cheshire Town Council, Town of Cheshire
Michael A. Milone, Town Manager, Town of Cheshire
Thomas & Joanne M. Didomizio (underlying property owners)

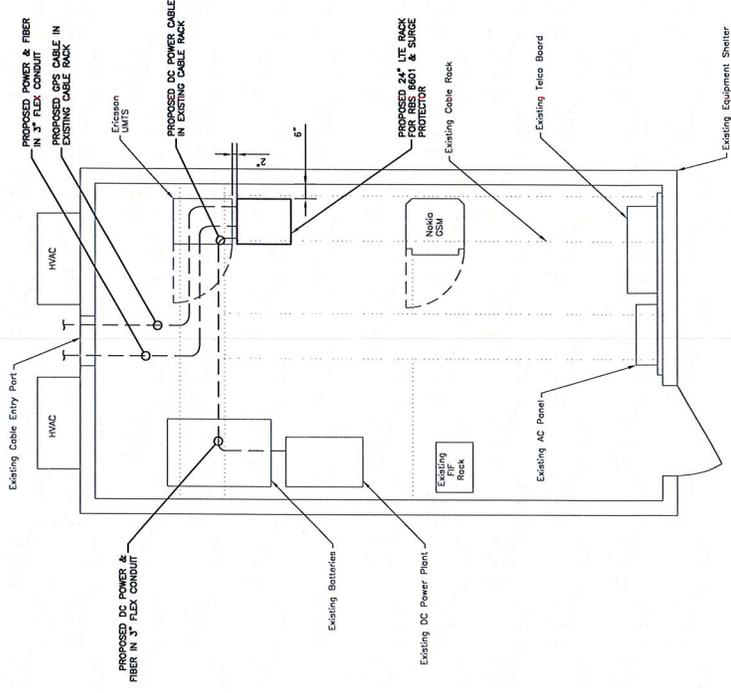


2 PROPOSED GPS ANTENNA ADJUSTED TO SHELTER

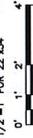
3 PROPOSED GPS COAX MOUNTED TO SHELTER



SITE PLAN
SCALE: 1"=100' FOR 11'x17'
1"=50' FOR 22'x34'



SHELTER LAYOUT DETAIL
SCALE: 1/2"=1' FOR 22'x34'



- NOTES:**
1. NORTH SHOWN AS APPROXIMATE.
 2. ALL STRUCTURAL ANALYSES IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE & FINAL AT&T RF DATA SHEET.
 3. NOT ALL INFORMATION SHOWN FOR CLARITY.

Dewberry
Dewberry Engineers Inc.
600 PARSONS ROAD
SPRINGFIELD, NJ 07084
PHONE: 973.709.8100
FAX: 973.726.9710

NEMLINK
GLOBAL SERVICES
800 MARSHALL PHELPS ROAD, #2A
WATSON, CT 06096

CHESHIRE LARSENS POND
SITE NO. CT5263
CHESHIRE LARSENS POND
CHESHIRE, CT #801367
CROWN CASTLE #801367

at&t
500 ENTERPRISE DRIVE,
SUITE 2A
ROCKY HILL, CT 06867



| | |
|----------------------------|-------------------|
| SITE PLAN & SHELTER LAYOUT | |
| REVISION | NO. |
| 2 | A01 |
| 50048347/50048412 | DRAWING NUMBER |
| DERBERRY, NO. | 50048347/50048412 |



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

Date: June 19, 2012

Andrew Bazinet
 Crown Castle USA Inc.
 349 West Commercial Street, Suite 2630
 East Rochester, NY 14445
 (585) 899-3442

Paul J. Ford and Company
 250 East Broad Street, Suite 1500
 Columbus, Ohio 43215
 (614) 221-6679
 kthorpe@pjfweb.com

Subject: Structural Modification Report

Carrier Designation: AT&T Mobility Co-Locate
 Carrier Site Number: CT5263
 Carrier Site Name: AWE-Cheshire Larsens Pond

Crown Castle Designation: Crown Castle BU Number: 801367
 Crown Castle Site Name: CT NHV-2075 CAC 801367
 Crown Castle JDE Job Number: 183554
 Crown Castle Work Order Number: 501360

Engineering Firm Designation: Paul J. Ford and Company Project Number: 37512-1657 BP Aero

Site Data: 1121 Summit Road, Cheshire, New Haven County, CT
 Latitude 41° 32' 11.2", Longitude -72° 57' 26.3"
 167 Foot - Monopole Tower

Dear Andrew Bazinet,

Paul J. Ford and Company is pleased to submit this "Structural Modification 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 469008, in accordance with application 145088, revision 1.

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:

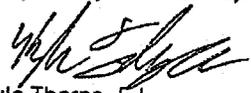
LC4.5: Modified Structure w/ Existing + Proposed Sufficient Capacity
 Note: See Table I and Table II for the proposed and existing loading, respectively.

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 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

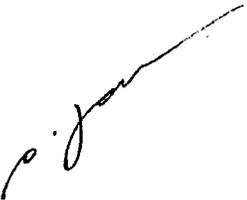
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Respectfully submitted by:


 Kyle Thorpe, E.I.
 Structural Engineer RH





JUN 21 2012

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1) INTRODUCTION

This tower is a 167 ft Monopole tower designed by SUMMIT in June of 2001.
 The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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 85 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 |
|---------------------|----------------------------|--------------------|----------------------|----------------------------|----------------------|---------------------|------|
| 158.0 | 160.0 | 3 | andrew | SBNH-1D6565C w/ Mount Pipe | 2 | 3/4 | |
| | | 1 | raycap | DC6-48-60-18-8F | | | |
| 156.0 | 156.0 | 6 | ericsson | RRUS-11 | 1 | 3/8 | |
| | | 1 | tower mounts | Side Arm Mount [SO 102-3] | | | |

Table 2 - Existing 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 |
|---------------------|----------------------------|--------------------|------------------------|--------------------------------------|----------------------|---------------------|------|
| 167.0 | 174.0 | 1 | decibel | DB222-A | 12 1 1 | 1-5/8 7/8 1/2 | 1 |
| | 171.0 | 1 | gps | GPS_A | | | |
| | 167.0 | 6 | antel | LPA-185063/8CF w/ Mount Pipe | | | |
| | | 6 | | LPA-80063/8CF w/ Mount Pipe | | | |
| | | 1 | tower mounts | Platform Mount [LP 712-1] | | | |
| 158.0 | 160.0 | 6 | powerwave technologies | 7770.00 w/ Mount Pipe | 12 | 1-5/8 | 1 |
| | | 6 | | LGP13519 | | | |
| | | 6 | | LGP21401 | | | |
| | 158.0 | 1 | tower mounts | Platform Mount [LP 712-1] | | | |
| 148.0 | 148.0 | 1 | tower mounts | Platform Mount [LP 712-1] | 6 | 1-5/8 | 1 |
| | 147.0 | 6 | decibel | DB980F65T4E-M w/ Mount Pipe | | | |
| 138.0 | 139.0 | 3 | ericsson | KRY 112 134/1 | 18 | 1-5/8 | 1 |
| | | 3 | | KRY 112 89/5 | | | |
| | | 6 | remec | S20057A-1 | | | |
| | | 3 | rfs celwave | APX16DWV-16DWV-S-E-A20 w/ Mount Pipe | | | |
| | | 3 | | APX16PV-16PVL-E w/ Mount Pipe | | | |
| | 138.0 | 1 | tower mounts | Platform Mount [LP 712-1] | | | |
| 128.0 | 128.0 | 12 | decibel | DB846G90A-XY w/ Mount Pipe | 12 | 1-1/4 | 1 |
| | | 1 | tower mounts | Platform Mount [LP 712-1] | | | |
| 120.0 | 120.0 | 1 | tower mounts | Pipe Mount [PM 601-3] | 6 | 1-5/8 | 1 |
| | 119.0 | 3 | rfs celwave | APXV18-206517S-C w/ Mount Pipe | | | |

Notes:

- 1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

| Document | Remarks | Reference | Source |
|---|---|-----------|----------|
| 4-GEOTECHNICAL REPORTS | Clough, Harbour & Associates, 8961.07.08, 05/15/2001 | 445076 | CCISITES |
| 4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS | Summit/PJF, 14620, 06/06/2001 | 842573 | CCISITES |
| 4-TOWER MANUFACTURER DRAWINGS | Summit, 14620, 06/13/2001 | 799210 | CCISITES |
| 4-TOWER STRUCTURAL ANALYSIS REPORTS | GPD, 2012775.801367.01, 04/24/2012 | 3155535 | CCISITES |

3.1) Analysis Method

tnxTower (version 6.0.3.0), 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 will be reinforced in conformance with the attached 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 4 - Section Capacity (Summary)

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P_allow (K) | % Capacity | Pass / Fail |
|-------------|----------------|----------------|--------------------------|------------------|--------|----------------|------------|-------------|
| L1 | 167 - 118.25 | Pole | TP35.36x24x0.25 | 1 | -12.25 | 1405.09 | 76.7 | Pass |
| L2 | 118.25 - 90.5 | Pole | TP41.3282x33.8114x0.3125 | 2 | -19.25 | 2114.96 | 97.1 | Pass |
| L3 | 90.5 - 77.75 | Pole | TP44.3x41.3282x0.3819 | 3 | -21.06 | 2347.81 | 95.8 | Pass |
| L4 | 77.75 - 51.5 | Pole | TP49.7851x42.2543x0.375 | 4 | -30.37 | 3057.38 | 99.0 | Pass |
| L5 | 51.5 - 45 | Pole | TP51.2985x49.7851x0.4572 | 5 | -32.49 | 3358.00 | 94.6 | Pass |
| L6 | 45 - 0 | Pole | TP61.04x51.2985x0.4375 | 6 | -47.97 | 4374.92 | 93.3 | Pass |
| | | | | | | | Summary | |
| | | | | | | Pole (L4) | 99.0 | Pass |
| | | | | | | RATING = | 99.0 | Pass |

Table 5 - Tower Component Stresses vs. Capacity - LC4.5

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|-------|----------------------------------|----------------|------------|-------------|
| 1 | Anchor Rods | 0 | 89.9 | Pass |
| 1 | Base Plate | 0 | 76.9 | Pass |
| 1,2 | Base Foundation Structural Steel | 0 | 61.5 | Pass |
| 1,2 | Base Foundation Soil Interaction | 0 | 86.9 | Pass |
| 1,3,4 | Base Foundation Structural Steel | 0 | 96.6 | Pass |
| 1,3,4 | Base Foundation Soil Interaction | 0 | 87.6 | Pass |

| | |
|---|------------|
| Structure Rating (max from all components) = | 99% |
|---|------------|

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Foundation design #1: Spread footing design
- 3) Foundation design #2: Caisson design
- 4) According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held 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.

4.1) Recommendations

See attached modification drawings.

CROWN CASTLE PROJECT: BU #801367; CT NHV-2075 CAC 801367; CHESHIRE, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TWEIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 65 MPH AND 13.5 MPH @ 3/4" RADIAL ICE

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TWEIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR THE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2008 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY CUTTING AND WELDING PLAN" (DOC # ENR-PLN-1001) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT.
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FLAWS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. "LOW HEAT" WELDING PROCEDURES - (NOT REQUIRED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10096 FOR SPECIFICATION.
 2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
 3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
 4. AN INDEPENDENT QUALIFIED INSPECTION TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
 - (A) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
 5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMPENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
 - A. GENERAL
 - (1) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
 - B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
 - C. CONCRETE TESTING PERACT - (NOT REQUIRED)
 - D. STRUCTURAL STEEL
 - (1) CHECK THE STEEL ON THE JOB WITH THE PLANS.
 - (2) CHECK MILL CERTIFICATIONS.
 - (3) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
 - (4) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
 - (5) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
 - (6) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
 - (7) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
 - (8) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
 - E. WELDING
 - (1) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATIONS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
 - (2) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
 - (3) APPROVE FIELD WELDING SEQUENCE
 - (A) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
 - (4) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
 - (A) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
 - (B) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
 - (C) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
 - (D) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
 - (E) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
 - (F) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
 - (G) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
 - (H) REVIEW THE REPORTS BY TESTING LABS.
 - (I) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
 - (J) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
 - (K) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
 - F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS - (NOT REQUIRED)
 - G. REPORTS
 - (1) COMPLETE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR ORDERING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT BELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.



JUN 2 1 2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #801367; CT NHV-2075 CAC 801367
CHESHIRE, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

| | |
|------------------------------------|------------------------------------|
| PROJECT No: 37512-1657 | ISSUE DATE OF PERMIT: 6-19-2012 |
| DRAWN BY: B.M.S. | |
| CHECKED BY: K.A.T. | |
| APPROVED BY: <i>[Signature]</i> | |
| DATE: 6-19-2012 | S-1A |

- D. **STRUCTURAL STEEL**
 - 1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
 - A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
 - (A) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL BUILDINGS."
 - (B) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
 - (C) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED)
 - B. BY THE AMERICAN WELDING SOCIETY (AWS):
 - (A) "STRUCTURAL WELDING CODE - STEEL D1.1."
 - (B) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
 - 2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
 - 3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
 - 4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E60XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 - 5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
 - 6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 - 7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION 1 NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
 - 8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
 - 9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
 - 10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
 - 11. FIELD CUTTING OF STEEL:
 - (A) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
 - (B) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
 - (C) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
- E. **BASE PLATE GROUT - (NOT REQUIRED)**
 - F. **FOUNDATION WORK - (NOT REQUIRED)**
 - G. **CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**
 - H. **EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)**
 - I. **TOUCH UP OF GALVANIZING**
 - 1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS, DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-888-831-3275 FOR PRODUCT INFORMATION. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
 - 2. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.
 - J. **HOT DIP GALVANIZING**
 - 1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
 - 2. PROPERLY PREPARE STEEL MEMBERS FOR GALVANIZING.
 - 3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
 - 4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.
 - K. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
 - 1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
 - 2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
 - 3. THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS."



AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #801367; CT NHV-2075 CAC 801367
CHESHIRE, CT
 MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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| APPROVED BY: <i>[Signature]</i> | |
| DATE: 6-19-2012 | |

AJAX BOLT NOTE SHEET: REV. 1.2, 01-23-2012

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
 4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. DTIS SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTIS):

DTIS REQUIRED: DTIS SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTIS MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTIS SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
 1413 ROCKINGHAM ROAD BELLOW FALLS, VERMONT, USA 05101
 PHONE 1-800-552-1999
 WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTIS:
[HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML](http://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML)

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTIS SHALL NOT BE HOT-DIP GALVANIZED. DTIS SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

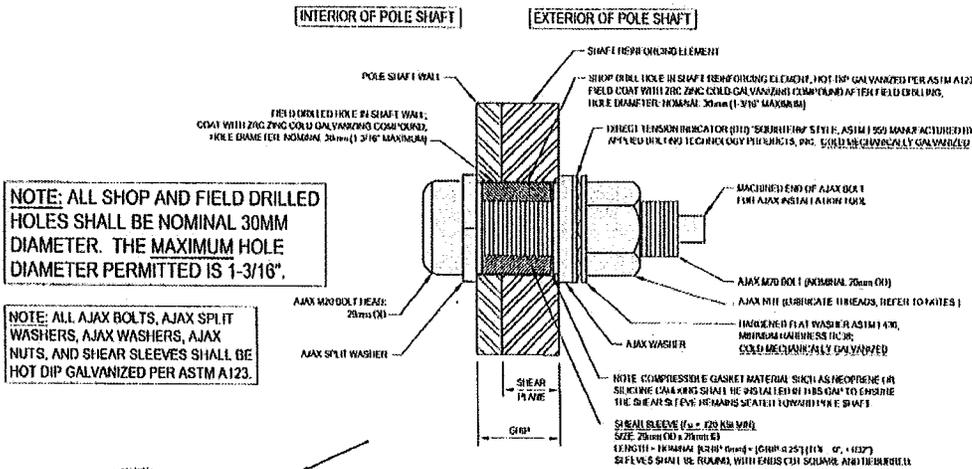
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTIS SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTIS SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTIS.



TYPICAL AJAX BOLT DETAIL 1 S-3A

AEROSOLUTIONS SHAFT REINFORCING OPTION



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BU #801367; CT NHV-2075 CAC 801367
 CHESHIRE, CT
 MONOPILE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1057
 DRAWN BY: B.M.S.
 CHECKED BY: K.A.I.
 APPROVED BY: [Signature]
 DATE: 6-19-2012

ISSUE DATE OF PERMIT: 6-19-2012

S-3A

NOTE: NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY.

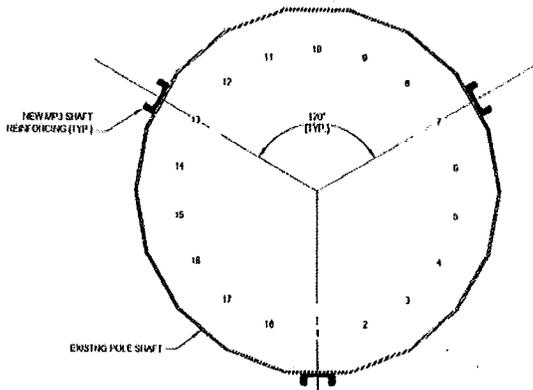
THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37512-1857), DATED 6-19-2012.

| POLE SPECIFICATIONS | |
|---------------------|-------------------------|
| POLE SHAPE TYPE: | 18 SQUARE POLYGON |
| TAPER: | 0.23324 IN/FT |
| SHAFT STEEL: | ASTM A502 GRADE 65 |
| BASE PLATE STEEL: | ASTM A572 GR 50 (54K5) |
| ANCHOR BOLTS: | 2 1/4" Ø |
| | Ø180 ASTM A315 GRADE 75 |

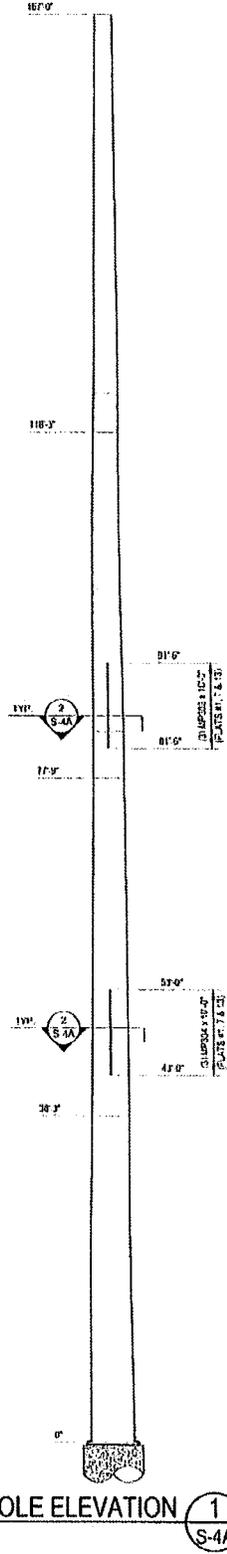
| SHAFT SECTION DATA | | | | | |
|--------------------|----------------------|----------------------|------------------|----------------------------|----------|
| SHAFT SECTION | SECTION LENGTH (F-1) | PLATE THICKNESS (IN) | LAP SPACING (IN) | DIAMETER ACROSS FLATS (IN) | |
| | | | | @ TOP | @ BOTTOM |
| 1 | 48.75 | 0.2500 | 64.00 | 74.000 | 35.300 |
| 2 | 45.00 | 0.3125 | 60.00 | 33.811 | 41.300 |
| 3 | 45.00 | 0.3750 | 61.00 | 42.363 | 52.870 |
| 4 | 45.00 | 0.4375 | 61.00 | 50.549 | 61.040 |

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

- NOTES:**
- ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRELIMINARY CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLT 19, DEC. 31, 2009
 - ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLT 19, DEC. 31, 2009
 - * ALL AXIAL BOLTS WITH SPAN NUTS SHALL BE PRE-TENSIONED AND IDENTIFIED WITH THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOWN ON THE DRAWING. TENSION HAS BEEN REACHED? SEE NOTES AND DETAIL ON SHEET S-3 FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AXIAL BOLT.
 - DTI'S REQUIRED: * ALL AXIAL BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND UNIDIRECTIONAL WASHERS. DTI'S SHALL BE THE SQUARE STYLE, MADE TO ASTM F3061A1E. STRENGTHENED UNIDIRECTIONAL WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF HRC 38 GAIN SHEIL.
 - USE LUBRICATION IS CRITICAL. * PROPERLY LUBRICATE THE THREADS OF THE BOLT OF THE AXIAL BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALVANIC CORROSION OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW THE MANUFACTURER'S INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING. REFER TO SHEET S-3.
 - AXIAL BOLT HOLE SIZE: ALL SHOWN AXIAL BOLT HOLE SIZES SHALL BE THE NOMINAL 3/8" DIA. HOLE. THE MAXIMUM HOLE DIAMETER PERMITTED IS 3/16" IN EXCESS TO SHEET S-3.
- * AS OF 6/20/12, UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AXIAL BOLTS IDENTIFIED USING AISC. * BOLT OF THE SAME METRIC BODY. INSTALLERS SHALL FOLLOW CROWN CASTLE'S FOR AISC * TURN OF THE BOLT METHOD AND A SO PROVIDE COMPLETE POSITION DOCUMENTATION IN THE FEM



SECTION 2 S-4A



POLE ELEVATION 1 S-4A

AEROSOLUTIONS SHAFT REINFORCING OPTION

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319 WEST COMMERCIAL STREET, SUITE 250, EAST WINDSOR, CT 06026
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BU #801367; CT NHV-2075 CAC 801367
CHESHIRE, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1857
DRAWN BY: B.M.S.
CHECKED BY: K.A.I.
APPROVED BY: [Signature]
DATE: 6-19-2012

ISSUE DATE OF PERMIT: 6-19-2012

S-4A

MODIFICATION INSPECTION NOTES

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. IT IS THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY REMAINS WITH THE EOR AT ALL TIMES.

ALL MIs SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (CEV) OR ENGINEERED SERVICE VENDOR (ESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-SOW-10007 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL PRODUCE THE NECESSARY REPORTS OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 - MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI, TO A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT REQUIREMENTS, CONDUCTING THE REQUIRED INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OF TOWER PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AND REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTIONS TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO ADDRESS ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI WORKER TO ENSURE ALL CONSTRUCTION ACTIVITIES ARE AT THE DISPOSAL WHEN THE MI INSPECTOR IS ON-SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF PROFITS AND/OR OTHER DAMAGES INCURRED BY THE CANCELLED OR DELAYED MI. DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LOGGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.) IF CROWN CONTACTS DIRECTLY FOR A THIRD PARTY, EXCUSES MAY BE MADE IN THE EVENT THAT THE DELAY OR CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTY'S WORKER.

CORRECTION OF FINDINGS

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI (T/F/H/M), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FINDING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENTAL MI
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-AMEND THE MODIFICATION REQUIREMENT USING THE AS-BUILT CONDITION.

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTIONS ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS BY THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTIONS MAY BE CONDUCTED BY AN INDEPENDENT AGENCY (VIA) AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED BY" REPORT FOR THE ORIGINAL PROJECT.

PHOTOGRAPHS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION (ERECTION AND INSPECTION)
 - RAW MATERIALS
 - PHOTOS OF ALL CRITICAL DETAILS
 - FOUNDATION MODIFICATIONS
 - WELD PREPARATION
 - BOX T INSTALLATION AND TORQUE
 - TOWER INSTALLED CONNECTION
 - SURFACE COATING REPAIR
- POST-CONSTRUCTION PHOTOGRAPHS
 - TOWER REBUILD CONNECTION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED NON-SUFFICIENT.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.



| MI CHECKLIST | |
|---|---|
| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR) | REPORT ITEM |
| PRE-CONSTRUCTION | |
| X | MI CHECKLIST DRAWINGS |
| X | EOR APPROVED SHOP DRAWINGS |
| X | FABRICATION INSPECTION |
| NA | FABRICATOR CERTIFIED WELD INSPECTOR |
| X | MATERIAL TEST REPORT (MTR) |
| NA | FABRICATOR NDE INSPECTION |
| NA | NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED) |
| X | PACKING SLIPS |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| CONSTRUCTION | |
| X | CONSTRUCTION INSPECTIONS |
| NA | FOUNDATION INSPECTIONS |
| NA | CONCRETE COMP. STRENGTH AND SLUMP TESTS |
| NA | POST-INSTALLED ANCHOR ROD VERIFICATION |
| NA | BASE PLATE GRADUITY VERIFICATION |
| NA | CONTRACTOR'S CERTIFIED WELD INSPECTOR |
| NA | EARTHWORK LIMIT AND DENSITY |
| X | ON-SITE COLD GALVANIZING VERIFICATION |
| NA | GUY WIRE TENSION REPORT |
| X | GC AS-BUILT DOCUMENTS |
| X | INSPECTION OF BOX T PRE-TENSION PER AS-BUILT SPEC |
| X | INSPECTION OF AXIAL BOX IS AND DITS PER REQUIREMENTS ON SHEET S-3 |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| POST-CONSTRUCTION | |
| X | MI INSPECTOR REVIEW OF RECORD DRAWINGS |
| NA | POST-INSTALLED ANCHOR ROD PULL-OUT TESTING |
| X | PHOTOGRAPHS |
| ADDITIONAL TESTING AND INSPECTIONS: | |

NOTE: X DENOTES A DOCUMENT REQUIRED FOR THE MI REPORT. NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT.

AEROSOLUTIONS SHAFT REINFORCING OPTION

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CHESHIRE, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37512-1057
DRAWN BY: B.M.S.
CHECKED BY: K.A.T.
APPROVED BY: *[Signature]*
DATE: 6-19-2012

ISSUE DATE OF PERMIT: 6-19-2012

S-5A



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Calculated Radio Frequency Emissions



at&t

CT5263 – AWE Cheshire Larsens Pond
1121 Summit Road, Cheshire, CT 06410
(a.k.a. Cheshire – 1119 Summit Road)

July 3, 2012

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the monopole tower located at 1121 Summit Road, Cheshire, CT. The coordinates of the tower are 41° 32' 11.2" N, 72° 57' 26.3" W.

AT&T is proposing the following modifications:

- 1) Install three 700 MHz LTE antennas (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times \text{EIRP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

$$R = \text{Radial Distance} = \sqrt{(H^2 + V^2)}$$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical pattern of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

| Carrier | Antenna Height (Feet) | Operating Frequency (MHz) | Number of Trans. | ERP Per Transmitter (Watts) | Power Density (mw/cm ²) | Limit | %MPE |
|----------------------|-----------------------|---------------------------|------------------|-----------------------------|-------------------------------------|--------------|---------------|
| <i>Cingular GSM</i> | 160 | 1900 | 3 | 427 | 0.0180 | 1.0000 | 1.80% |
| <i>Cingular UMTS</i> | 160 | 880 | 1 | 500 | 0.0070 | 0.5867 | 1.20% |
| Nextel | 128 | 851 | 12 | 100 | 0.0263 | 0.5673 | 4.64% |
| T-Mobile GSM | 139 | 1945 | 8 | 170 | 0.0253 | 1.0000 | 2.53% |
| T-Mobile UMTS | 139 | 2100 | 2 | 711 | 0.0265 | 1.0000 | 2.65% |
| Pocket | 118 | 2130 | 3 | 631 | 0.0489 | 1.0000 | 4.89% |
| Verizon | 168 | 880 | 9 | 200 | 0.0229 | 0.5867 | 3.91% |
| Verizon | 168 | 1900 | 3 | 200 | 0.0076 | 1.0000 | 0.76% |
| Sprint | 147.5 | 1962.5 | 11 | 477 | 0.0867 | 1.0000 | 8.67% |
| AT&T UMTS | 160 | 880 | 2 | 565 | 0.0016 | 0.5867 | 0.27% |
| AT&T UMTS | 160 | 1900 | 2 | 875 | 0.0025 | 1.0000 | 0.25% |
| AT&T LTE | 160 | 734 | 1 | 1375 | 0.0019 | 0.4893 | 0.39% |
| AT&T GSM | 160 | 880 | 1 | 283 | 0.0004 | 0.5867 | 0.07% |
| AT&T GSM | 160 | 1900 | 4 | 525 | 0.0029 | 1.0000 | 0.29% |
| | | | | | | Total | 29.33% |

Table 1: Carrier Information^{1 2 3}

¹ The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 3/29/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

² In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

³ Antenna height listed for AT&T is in reference to the GPD Group Structural Analysis Report dated April 24, 2012

5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **29.33% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

A handwritten signature in black ink, appearing to read 'Daniel L. Goulet'.

Daniel L. Goulet
C Squared Systems, LLC

July 3, 2012

Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure⁴

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (E) (A/m) | Power Density (S) (mW/cm ²) | Averaging Time E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|---|---|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | (900/f ²)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | - | - | f/300 | 6 |
| 1500-100,000 | - | - | 5 | 6 |

(B) Limits for General Population/Uncontrolled Exposure⁵

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (E) (A/m) | Power Density (S) (mW/cm ²) | Averaging Time E ² , H ² or S (minutes) |
|-----------------------|-----------------------------------|-----------------------------------|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f ²)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | - | - | f/1500 | 30 |
| 1500-100,000 | - | - | 1.0 | 30 |

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

⁴ Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure

⁵ General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

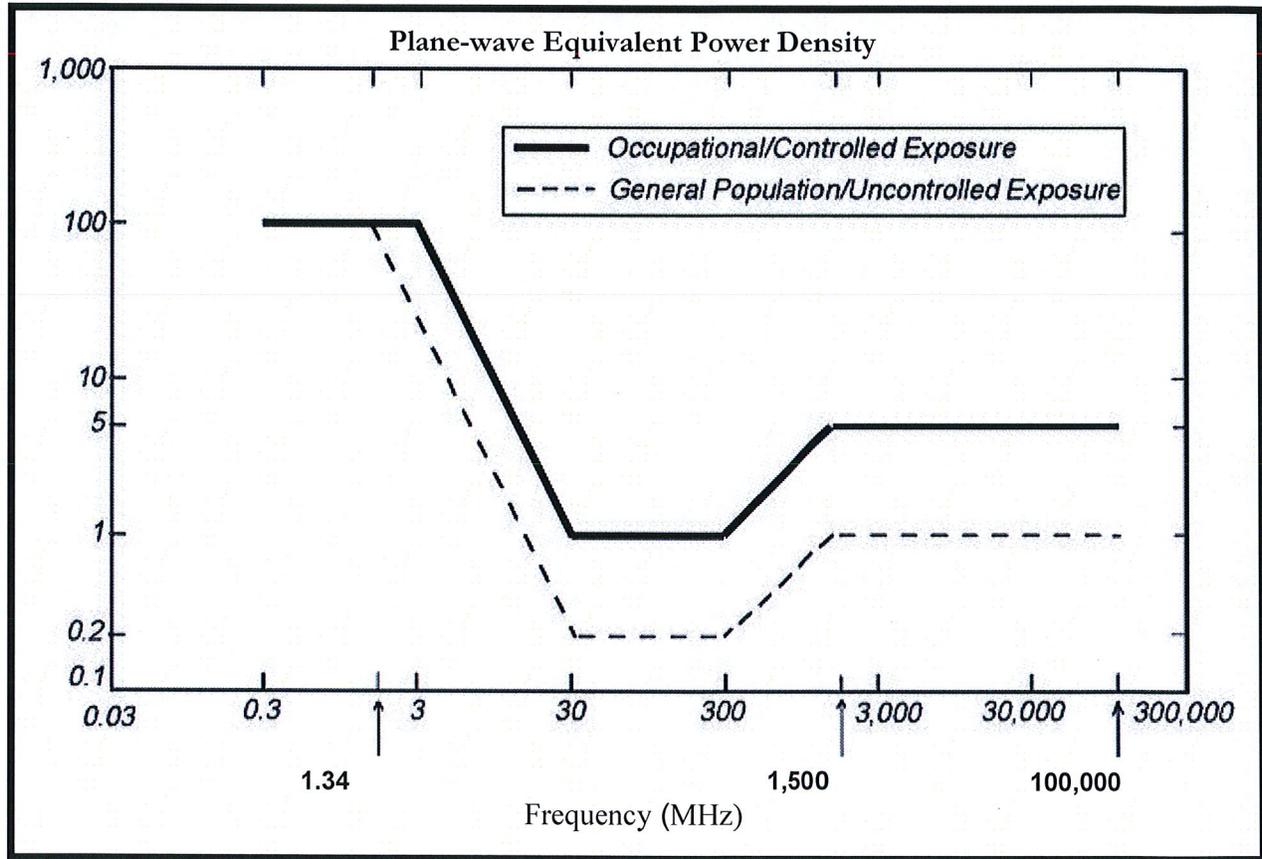
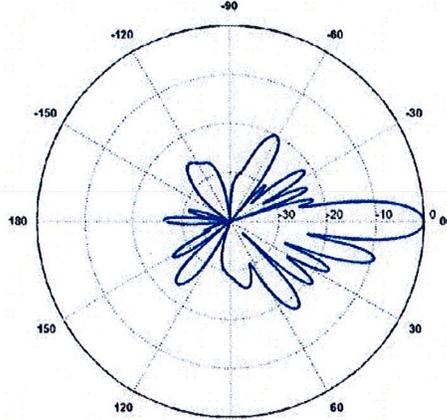
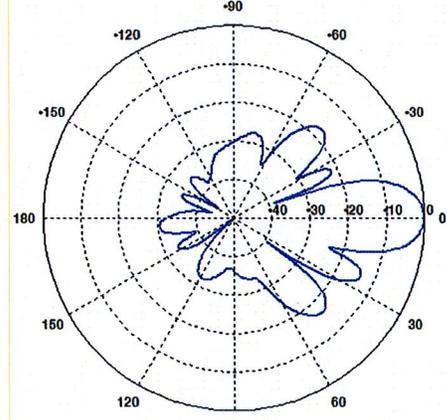
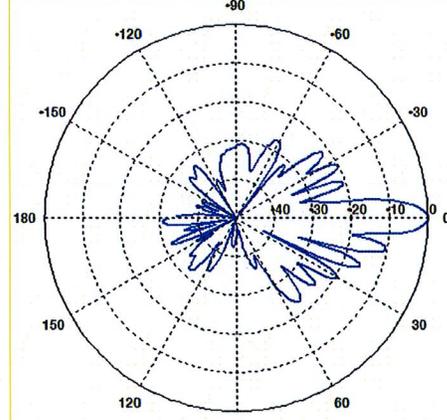


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

| | |
|--|--|
| <p>700 MHz</p> <p>Manufacturer: Commscope Model #: SBNH-1D6565C Frequency Band: 698-806 MHz Gain: 13.6 dBd Vertical Beamwidth: 8.6° Horizontal Beamwidth: 71° Polarization: ± 45° Size L x W x D: 96.42" x 11.85" x 7.1"</p> |  |
| <p>850 MHz</p> <p>Manufacturer: Powerwave Model #: 7770 Frequency Band: 824-896 MHz Gain: 11.5 dBd Vertical Beamwidth: 15° Horizontal Beamwidth: 82° Polarization: Dual Linear ±45° Size L x W x D: 55.0" x 11.0" x 5.0"</p> |  |
| <p>1900 MHz</p> <p>Manufacturer: Powerwave Model #: 7770 Frequency Band: 1850-1990 MHz Gain: 13.4 dBd Vertical Beamwidth: 7° Horizontal Beamwidth: 86° Polarization: Dual Linear ±45° Size L x W x D: 55.0" x 11.0" x 5.0"</p> |  |



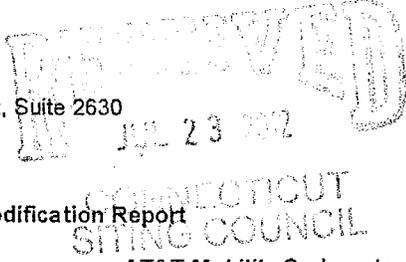
**PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS**

250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: June 19, 2012

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Subject: **Structural Modification Report**

Carrier Designation: AT&T Mobility Co-Locate
Carrier Site Number: CT5263
Carrier Site Name: AWE-Cheshire Larsens Pond

Crown Castle Designation: Crown Castle BU Number: 801367
Crown Castle Site Name: CT NHV-2075 CAC 801367
Crown Castle JDE Job Number: 183554
Crown Castle Work Order Number: 501360

Engineering Firm Designation: Paul J. Ford and Company Project Number: 37512-1657 BP Aero

Site Data: 1121 Summit Road, Cheshire, New Haven County, CT
Latitude 41° 32' 11.2", Longitude -72° 57' 26.3"
167 Foot - Monopole Tower

Dear Andrew Bazinet,

Paul J. Ford and Company is pleased to submit this "Structural Modification 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 469008, in accordance with application 145088, revision 1.

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:

LC4.5: Modified Structure w/ Existing + Proposed Sufficient Capacity
Note: See Table I and Table II for the proposed and existing loading, respectively.

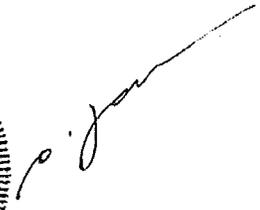
The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Respectfully submitted by:


Kyle Thorpe, E.I.
Structural Engineer 



JUN 21 2012



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

Date: **June 19, 2012**

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Subject: Structural Modification Report

Carrier Designation: **AT&T Mobility Co-Locate**
Carrier Site Number: CT5263
Carrier Site Name: AWE-Cheshire Larsens Pond

Crown Castle Designation: **Crown Castle BU Number:** 801367
Crown Castle Site Name: CT NHV-2075 CAC 801367
Crown Castle JDE Job Number: 183554
Crown Castle Work Order Number: 501360

Engineering Firm Designation: **Paul J. Ford and Company Project Number:** 37512-1657 BP Aero

Site Data: **1121 Summit Road, Cheshire, New Haven County, CT**
Latitude 41° 32' 11.2", Longitude -72° 57' 26.3"
167 Foot - Monopole Tower

Dear Andrew Bazinet,

Paul J. Ford and Company is pleased to submit this "**Structural Modification 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 469008, in accordance with application 145088, revision 1.

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:

LC4.5: Modified Structure w/ Existing + Proposed

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing loading, respectively.

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 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Respectfully submitted by:

Kyle Thorpe, E.I.
Structural Engineer

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1) INTRODUCTION

This tower is a 167 ft Monopole tower designed by SUMMIT in June of 2001.
 The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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 85 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 |
|---------------------|----------------------------|--------------------|----------------------|----------------------------|----------------------|---------------------|------|
| 158.0 | 160.0 | 3 | andrew | SBNH-1D6565C w/ Mount Pipe | 2 | 3/4 3/8 | - |
| | | 1 | raycap | DC6-48-60-18-8F | | | |
| 156.0 | 156.0 | 6 | ericsson | RRUS-11 | 1 | 3/4 3/8 | - |
| | | 1 | tower mounts | Side Arm Mount [SO 102-3] | | | |

Table 2 - Existing 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 |
|---------------------|----------------------------|-------------------------------|------------------------|--------------------------------------|----------------------|---------------------|------|
| 167.0 | 174.0 | 1 | decibel | DB222-A | 12 1 1 | 1-5/8 7/8 1/2 | 1 |
| | 171.0 | 1 | gps | GPS_A | | | |
| | 167.0 | 6 | antel | LPA-185063/8CF w/ Mount Pipe | | | |
| | | | | LPA-80063/8CF w/ Mount Pipe | | | |
| | | 1 | tower mounts | Platform Mount [LP 712-1] | | | |
| 158.0 | 160.0 | 6 | powerwave technologies | 7770.00 w/ Mount Pipe | 12 | 1-5/8 | 1 |
| | | 6 | | LGP13519 | | | |
| | | 6 | | LGP21401 | | | |
| | 158.0 | 1 | tower mounts | Platform Mount [LP 712-1] | | | |
| 148.0 | 148.0 | 1 | tower mounts | Platform Mount [LP 712-1] | 6 | 1-5/8 | 1 |
| | 147.0 | 6 | decibel | DB980F65T4E-M w/ Mount Pipe | | | |
| 138.0 | 139.0 | 3 | ericsson | KRY 112 134/1 | 18 | 1-5/8 | 1 |
| | | 3 | | KRY 112 89/5 | | | |
| | | 6 | remec | S20057A-1 | | | |
| | | 3 | rfs celwave | APX16DWV-16DWV-S-E-A20 w/ Mount Pipe | | | |
| | 3 | APX16PV-16PVL-E w/ Mount Pipe | | | | | |
| | 138.0 | 1 | tower mounts | Platform Mount [LP 712-1] | | | |
| 128.0 | 128.0 | 12 | decibel | DB846G90A-XY w/ Mount Pipe | 12 | 1-1/4 | 1 |
| | | 1 | tower mounts | Platform Mount [LP 712-1] | | | |
| 120.0 | 120.0 | 1 | tower mounts | Pipe Mount [PM 601-3] | 6 | 1-5/8 | 1 |
| | 119.0 | 3 | rfs celwave | APXV18-206517S-C w/ Mount Pipe | | | |

Notes:

- 1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

| Document | Remarks | Reference | Source |
|---|---|-----------|----------|
| 4-GEOTECHNICAL REPORTS | Clough, Harbour & Associates, 8961.07.08, 05/15/2001 | 445076 | CCISITES |
| 4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS | Summit/PJF, 14620, 06/06/2001 | 842573 | CCISITES |
| 4-TOWER MANUFACTURER DRAWINGS | Summit, 14620, 06/13/2001 | 799210 | CCISITES |
| 4-TOWER STRUCTURAL ANALYSIS REPORTS | GPD, 2012775.801367.01, 04/24/2012 | 3155535 | CCISITES |

3.1) Analysis Method

tnxTower (version 6.0.3.0), 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 will be reinforced in conformance with the attached 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 4 - Section Capacity (Summary)

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P_allow (K) | % Capacity | Pass / Fail |
|-------------|----------------|----------------|--------------------------|------------------|--------|----------------|------------|-------------|
| L1 | 167 - 118.25 | Pole | TP35.36x24x0.25 | 1 | -12.25 | 1405.09 | 76.7 | Pass |
| L2 | 118.25 - 90.5 | Pole | TP41.3282x33.8114x0.3125 | 2 | -19.25 | 2114.96 | 97.1 | Pass |
| L3 | 90.5 - 77.75 | Pole | TP44.3x41.3282x0.3819 | 3 | -21.06 | 2347.81 | 95.8 | Pass |
| L4 | 77.75 - 51.5 | Pole | TP49.7851x42.2543x0.375 | 4 | -30.37 | 3057.38 | 99.0 | Pass |
| L5 | 51.5 - 45 | Pole | TP51.2985x49.7851x0.4572 | 5 | -32.49 | 3358.00 | 94.6 | Pass |
| L6 | 45 - 0 | Pole | TP61.04x51.2985x0.4375 | 6 | -47.97 | 4374.92 | 93.3 | Pass |
| | | | | | | | Summary | |
| | | | | | | Pole (L4) | 99.0 | Pass |
| | | | | | | RATING = | 99.0 | Pass |

Table 5 - Tower Component Stresses vs. Capacity - LC4.5

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|-------|----------------------------------|----------------|------------|-------------|
| 1 | Anchor Rods | 0 | 89.9 | Pass |
| 1 | Base Plate | 0 | 76.9 | Pass |
| 1,2 | Base Foundation Structural Steel | 0 | 61.5 | Pass |
| 1,2 | Base Foundation Soil Interaction | 0 | 86.9 | Pass |
| 1,3,4 | Base Foundation Structural Steel | 0 | 96.6 | Pass |
| 1,3,4 | Base Foundation Soil Interaction | 0 | 87.6 | Pass |

| | |
|---|------------|
| Structure Rating (max from all components) = | 99% |
|---|------------|

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Foundation design #1: Spread footing design
- 3) Foundation design #2: Caisson design
- 4) According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held 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.

4.1) Recommendations

See attached modification drawings.

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:

Tower is located in New Haven County, Connecticut.

Basic wind speed of 85.00 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56.00 pcf.

A wind speed of 37.60 mph is used in combination with ice.

Temperature drop of 50.00 °F.

Deflections calculated using a wind speed of 50.00 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 Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys ✓ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing | Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check Poles ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

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 | 167.0000- 118.2500 | 48.7500 | 4.50 | 18 | 24.0000 | 35.3600 | 0.2500 | 1.0000 | A607-65 (65 ksi) |
| L2 | 118.2500- 90.5000 | 32.2500 | 0.00 | 18 | 33.8114 | 41.3282 | 0.3125 | 1.2500 | A607-65 (65 ksi) |
| L3 | 90.5000- 77.7500 | 12.7500 | 5.50 | 18 | 41.3282 | 44.3000 | 0.3819 | 1.5276 | Reinf 56.80 ksi (57 ksi) |
| L4 | 77.7500- 51.5000 | 31.7500 | 0.00 | 18 | 42.2542 | 49.7851 | 0.3750 | 1.5000 | A607-65 (65 ksi) |
| L5 | 51.5000- 45.0000 | 6.5000 | 0.00 | 18 | 49.7851 | 51.2985 | 0.4572 | 1.8287 | Reinf 56.91 ksi (57 ksi) |
| L6 | 45.0000- 0.0000 | 45.0000 | | 18 | 51.2985 | 61.0400 | 0.4375 | 1.7500 | A607-65 (65 ksi) |

Tapered Pole Properties

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | I/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|--------|
| L1 | 24.3702 | 18.8456 | 1342.9976 | 8.4313 | 12.1920 | 110.1540 | 2687.7623 | 9.4246 | 3.7840 | 15.136 |
| | 35.9055 | 27.8598 | 4338.8723 | 12.4641 | 17.9629 | 241.5466 | 8683.4538 | 13.9325 | 5.7834 | 23.133 |
| L2 | 35.3980 | 33.2267 | 4710.6979 | 11.8921 | 17.1762 | 274.2576 | 9427.5943 | 16.6165 | 5.4008 | 17.283 |
| | 41.9658 | 40.6825 | 8646.6072 | 14.5606 | 20.9947 | 411.8463 | 17304.5919 | 20.3451 | 6.7238 | 21.516 |
| L3 | 41.9658 | 49.6331 | 10513.2981 | 14.5359 | 20.9947 | 500.7586 | 21040.4298 | 24.8213 | 6.6016 | 17.286 |
| | 44.9834 | 53.2354 | 12972.5293 | 15.5909 | 22.5044 | 576.4441 | 25962.1282 | 26.6227 | 7.1247 | 18.656 |
| L4 | 44.2308 | 49.8468 | 11045.1680 | 14.8671 | 21.4652 | 514.5626 | 22104.8696 | 24.9281 | 6.7767 | 18.071 |
| | 50.5532 | 58.8104 | 18139.4408 | 17.5406 | 25.2909 | 717.2333 | 36302.7499 | 29.4108 | 8.1022 | 21.606 |
| L5 | 50.5532 | 71.5793 | 22004.4775 | 17.5114 | 25.2909 | 870.0568 | 44037.9092 | 35.7964 | 7.9575 | 17.406 |
| | 52.0898 | 73.7753 | 24092.4674 | 18.0487 | 26.0596 | 924.5133 | 48216.6363 | 36.8946 | 8.2239 | 17.988 |
| L6 | 52.0898 | 70.6268 | 23082.1546 | 18.0556 | 26.0596 | 885.7440 | 46194.6813 | 35.3201 | 8.2585 | 18.877 |
| | 61.9816 | 84.1541 | 39047.5735 | 21.5139 | 31.0083 | 1259.2612 | 78146.5267 | 42.0851 | 9.9730 | 22.796 |

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjust. Factor A _r | Adjust. Factor A _r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals | Double Angle Stitch Bolt Spacing Horizontal |
|----------------------|---------------------------|------------------|--------------|----------------------------------|----------------------------------|--------------|---|--|
| ft | ft ² | in | | | | | in | in |
| L1 167.0000-118.2500 | | | | 1 | 1 | 1 | | |
| L2 118.2500-90.5000 | | | | 1 | 1 | 1 | | |
| L3 90.5000-77.7500 | | | | 1 | 1 | 1 | | |
| L4 77.7500-51.5000 | | | | 1 | 1 | 1 | | |
| L5 51.5000-45.0000 | | | | 1 | 1 | 1 | | |
| L6 45.0000-0.0000 | | | | 1 | 1 | 1 | | |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement | Total Number | C _A A _A | Weight | |
|-----------------|-------------|--------------|----------------|-------------------|--------------|-------------------------------|--------|------|
| | | | | ft | | ft ² /ft | plf | |
| HJ7-50A(1-5/8") | C | No | Inside Pole | 167.0000 - 0.0000 | 12 | No Ice | 0.0000 | 1.04 |
| | | | | | | 1/2" Ice | 0.0000 | 1.04 |
| | | | | | | 1" Ice | 0.0000 | 1.04 |
| | | | | | | 2" Ice | 0.0000 | 1.04 |
| | | | | | | 4" Ice | 0.0000 | 1.04 |
| | | | | | | LDF4-50A(1/2") | C | No |
| 1/2" Ice | 0.0000 | 0.15 | | | | | | |
| 1" Ice | 0.0000 | 0.15 | | | | | | |
| 2" Ice | 0.0000 | 0.15 | | | | | | |
| 4" Ice | 0.0000 | 0.15 | | | | | | |
| LDF5-50A(7/8") | C | No | Inside Pole | 167.0000 - 0.0000 | 1 | No Ice | | |
| | | | | | | 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 |

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | C _A A | | Weight |
|-------------------------|-------------|--------------|--------------------|-------------------|--------------|------------------|---------------------|--------|
| | | | | | | | ft ² /ft | plf |
| LDF7-50A(1-5/8") | C | No | Inside Pole | 158.0000 - 0.0000 | 12 | 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 |
| FB-L98B-002-75000(3/8") | C | No | CaAa (Out Of Face) | 158.0000 - 0.0000 | 1 | No Ice | 0.0000 | 0.06 |
| | | | | | | 1/2" Ice | 0.0000 | 0.60 |
| | | | | | | 1" Ice | 0.0000 | 1.76 |
| | | | | | | 2" Ice | 0.0000 | 5.91 |
| | | | | | | 4" Ice | 0.0000 | 21.53 |
| WR-VG86ST-BRD(3/4) | C | No | CaAa (Out Of Face) | 158.0000 - 0.0000 | 1 | No Ice | 0.0000 | 0.59 |
| | | | | | | 1/2" Ice | 0.0000 | 1.37 |
| | | | | | | 1" Ice | 0.0000 | 2.76 |
| | | | | | | 2" Ice | 0.0000 | 7.37 |
| | | | | | | 4" Ice | 0.0000 | 23.92 |
| WR-VG86ST-BRD(3/4) | C | No | CaAa (Out Of Face) | 158.0000 - 0.0000 | 1 | No Ice | 0.0774 | 0.59 |
| | | | | | | 1/2" Ice | 0.1774 | 1.37 |
| | | | | | | 1" Ice | 0.2774 | 2.76 |
| | | | | | | 2" Ice | 0.4774 | 7.37 |
| | | | | | | 4" Ice | 0.8774 | 23.92 |
| *** | | | | | | | | |
| LDF7-50A(1-5/8") | C | No | Inside Pole | 148.0000 - 0.0000 | 6 | 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 |
| *** | | | | | | | | |
| FLC 158-50J(1-5/8") | C | No | Inside Pole | 138.0000 - 0.0000 | 14 | No Ice | 0.0000 | 0.92 |
| | | | | | | 1/2" Ice | 0.0000 | 0.92 |
| | | | | | | 1" Ice | 0.0000 | 0.92 |
| | | | | | | 2" Ice | 0.0000 | 0.92 |
| | | | | | | 4" Ice | 0.0000 | 0.92 |
| FLC 158-50J(1-5/8") | C | No | CaAa (Out Of Face) | 138.0000 - 0.0000 | 2 | No Ice | 0.0000 | 0.92 |
| | | | | | | 1/2" Ice | 0.0000 | 2.46 |
| | | | | | | 1" Ice | 0.0000 | 4.60 |
| | | | | | | 2" Ice | 0.0000 | 10.73 |
| | | | | | | 4" Ice | 0.0000 | 30.31 |
| FLC 158-50J(1-5/8") | C | No | CaAa (Out Of Face) | 138.0000 - 0.0000 | 2 | No Ice | 0.2015 | 0.92 |
| | | | | | | 1/2" Ice | 0.3015 | 2.46 |
| | | | | | | 1" Ice | 0.4015 | 4.60 |
| | | | | | | 2" Ice | 0.6015 | 10.73 |
| | | | | | | 4" Ice | 1.0015 | 30.31 |
| *** | | | | | | | | |
| LDF6-50A(1-1/4") | C | No | Inside Pole | 128.0000 - 0.0000 | 12 | No Ice | 0.0000 | 0.66 |
| | | | | | | 1/2" Ice | 0.0000 | 0.66 |
| | | | | | | 1" Ice | 0.0000 | 0.66 |
| | | | | | | 2" Ice | 0.0000 | 0.66 |
| | | | | | | 4" Ice | 0.0000 | 0.66 |
| *** | | | | | | | | |
| LCF158-50JL(1-5/8") | C | No | CaAa (Out Of Face) | 120.0000 - 0.0000 | 6 | No Ice | 0.0000 | 0.52 |
| | | | | | | 1/2" Ice | 0.0000 | 2.03 |
| | | | | | | 1" Ice | 0.0000 | 4.16 |
| | | | | | | 2" Ice | 0.0000 | 10.24 |
| | | | | | | 4" Ice | 0.0000 | 29.74 |
| ***** | | | | | | | | |
| Aero MP3-04 | C | No | CaAa (Out Of Face) | 53.0000 - 43.0000 | 1 | No Ice | 0.2690 | 0.00 |
| | | | | | | 1/2" Ice | 0.3801 | 0.00 |
| | | | | | | 1" Ice | 0.4913 | 0.00 |
| | | | | | | 2" Ice | 0.7135 | 0.00 |
| | | | | | | 4" Ice | 1.1579 | 0.00 |
| Aero MP3-03 | C | No | CaAa (Out Of Face) | 91.5000 - 81.5000 | 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 |
| *** | | | | | | | | |

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustmen t ° | Placement ft | C _{AA} Front ft ² | C _{AA} Side ft ² | Weight K | |
|-------------------------------------|-------------------|----------------|---|--------------------------------|---------------------|---|--|-----------------|------|
| Lightning Rod 5/8x4' | C | From Face | 0.0000 | 0.0000 | 167.0000 | No Ice | 0.2500 | 0.2500 | 0.03 |
| | | | 0.00 | | | 1/2" | 0.6635 | 0.6635 | 0.03 |
| | | | 2.00 | | | Ice | 0.9732 | 0.9732 | 0.04 |
| | | | | | | 1" Ice | 1.4936 | 1.4936 | 0.06 |
| | | | | | | 2" Ice | 2.6833 | 2.6833 | 0.14 |
| | | | | | | 4" Ice | | | |
| *** | | | | | | | | | |
| (2) LPA-80063/8CF w/ Mount Pipe | A | From Face | 4.0000 | 0.0000 | 167.0000 | No Ice | 14.2025 | 14.2813 | 0.07 |
| | | | 0.00 | | | 1/2" | 15.0210 | 15.8533 | 0.19 |
| | | | 0.00 | | | Ice | 15.8484 | 17.4820 | 0.32 |
| | | | | | | 1" Ice | 17.4457 | 20.0257 | 0.62 |
| | | | | | | 2" Ice | 20.7567 | 25.3281 | 1.40 |
| | | | | | | 4" Ice | | | |
| (2) LPA-80063/8CF w/ Mount Pipe | B | From Face | 4.0000 | 0.0000 | 167.0000 | No Ice | 14.2025 | 14.2813 | 0.07 |
| | | | 0.00 | | | 1/2" | 15.0210 | 15.8533 | 0.19 |
| | | | 0.00 | | | Ice | 15.8484 | 17.4820 | 0.32 |
| | | | | | | 1" Ice | 17.4457 | 20.0257 | 0.62 |
| | | | | | | 2" Ice | 20.7567 | 25.3281 | 1.40 |
| | | | | | | 4" Ice | | | |
| (2) LPA-80063/8CF w/ Mount Pipe | C | From Face | 4.0000 | 0.0000 | 167.0000 | No Ice | 14.2025 | 14.2813 | 0.07 |
| | | | 0.00 | | | 1/2" | 15.0210 | 15.8533 | 0.19 |
| | | | 0.00 | | | Ice | 15.8484 | 17.4820 | 0.32 |
| | | | | | | 1" Ice | 17.4457 | 20.0257 | 0.62 |
| | | | | | | 2" Ice | 20.7567 | 25.3281 | 1.40 |
| | | | | | | 4" Ice | | | |
| (2) LPA-185063/8CF w/ Mount Pipe | A | From Face | 4.0000 | 0.0000 | 167.0000 | No Ice | 3.2768 | 3.9037 | 0.03 |
| | | | 0.00 | | | 1/2" | 3.6794 | 4.5067 | 0.06 |
| | | | 0.00 | | | Ice | 4.1034 | 5.1421 | 0.10 |
| | | | | | | 1" Ice | 4.9831 | 6.5243 | 0.20 |
| | | | | | | 2" Ice | 6.8800 | 9.5596 | 0.51 |
| | | | | | | 4" Ice | | | |
| (2) LPA-185063/8CF w/ Mount Pipe | B | From Face | 4.0000 | 0.0000 | 167.0000 | No Ice | 3.2768 | 3.9037 | 0.03 |
| | | | 0.00 | | | 1/2" | 3.6794 | 4.5067 | 0.06 |
| | | | 0.00 | | | Ice | 4.1034 | 5.1421 | 0.10 |
| | | | | | | 1" Ice | 4.9831 | 6.5243 | 0.20 |
| | | | | | | 2" Ice | 6.8800 | 9.5596 | 0.51 |
| | | | | | | 4" Ice | | | |
| (2) LPA-185063/8CF w/ Mount Pipe | C | From Face | 4.0000 | 0.0000 | 167.0000 | No Ice | 3.2768 | 3.9037 | 0.03 |
| | | | 0.00 | | | 1/2" | 3.6794 | 4.5067 | 0.06 |
| | | | 0.00 | | | Ice | 4.1034 | 5.1421 | 0.10 |
| | | | | | | 1" Ice | 4.9831 | 6.5243 | 0.20 |
| | | | | | | 2" Ice | 6.8800 | 9.5596 | 0.51 |
| | | | | | | 4" Ice | | | |
| DB222-A | B | From Face | 4.0000 | 0.0000 | 167.0000 | No Ice | 1.6000 | 1.6000 | 0.02 |
| | | | 0.00 | | | 1/2" | 2.8800 | 2.8800 | 0.02 |
| | | | 7.00 | | | Ice | 4.1600 | 4.1600 | 0.03 |
| | | | | | | 1" Ice | 6.7200 | 6.7200 | 0.04 |
| | | | | | | 2" Ice | 11.8400 | 11.8400 | 0.05 |
| | | | | | | 4" Ice | | | |
| GPS_A | C | From Face | 4.0000 | 0.0000 | 167.0000 | No Ice | 0.2975 | 0.2975 | 0.00 |
| | | | 0.00 | | | 1/2" | 0.3739 | 0.3739 | 0.00 |
| | | | 4.00 | | | Ice | 0.4589 | 0.4589 | 0.01 |
| | | | | | | 1" Ice | 0.6549 | 0.6549 | 0.02 |
| | | | | | | 2" Ice | 1.1506 | 1.1506 | 0.08 |
| | | | | | | 4" Ice | | | |
| Platform Mount [LP 712-1] | C | None | | 0.0000 | 167.0000 | No Ice | 24.5300 | 24.5300 | 1.34 |
| | | | | | | 1/2" | 29.9400 | 29.9400 | 1.65 |
| | | | | | | Ice | 35.3500 | 35.3500 | 1.96 |
| | | | | | | 1" Ice | 46.1700 | 46.1700 | 2.58 |
| | | | | | | 2" Ice | 67.8100 | 67.8100 | 3.82 |
| | | | | | | 4" Ice | | | |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustmen t ° | Placement ft | | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K |
|----------------------------|-------------|-------------|--|-----------------------------|-----------------|--------|---|--|-------------|
| (2) 7770.00 w/ Mount Pipe | A | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 6.1194 | 4.2543 | 0.06 |
| | | | | | | 1/2" | 6.6258 | 5.0137 | 0.10 |
| | | | | | | Ice | 7.1283 | 5.7109 | 0.16 |
| | | | | | | 1" Ice | 8.1643 | 7.1553 | 0.29 |
| | | | | | | 2" Ice | 10.3599 | 10.4117 | 0.66 |
| | | | | | | 4" Ice | | | |
| (2) 7770.00 w/ Mount Pipe | B | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 6.1194 | 4.2543 | 0.06 |
| | | | | | | 1/2" | 6.6258 | 5.0137 | 0.10 |
| | | | | | | Ice | 7.1283 | 5.7109 | 0.16 |
| | | | | | | 1" Ice | 8.1643 | 7.1553 | 0.29 |
| | | | | | | 2" Ice | 10.3599 | 10.4117 | 0.66 |
| | | | | | | 4" Ice | | | |
| (2) 7770.00 w/ Mount Pipe | C | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 6.1194 | 4.2543 | 0.06 |
| | | | | | | 1/2" | 6.6258 | 5.0137 | 0.10 |
| | | | | | | Ice | 7.1283 | 5.7109 | 0.16 |
| | | | | | | 1" Ice | 8.1643 | 7.1553 | 0.29 |
| | | | | | | 2" Ice | 10.3599 | 10.4117 | 0.66 |
| | | | | | | 4" Ice | | | |
| (2) LGP13519 | A | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 0.3379 | 0.2074 | 0.01 |
| | | | | | | 1/2" | 0.4220 | 0.2804 | 0.01 |
| | | | | | | Ice | 0.5147 | 0.3621 | 0.01 |
| | | | | | | 1" Ice | 0.7260 | 0.5513 | 0.02 |
| | | | | | | 2" Ice | 1.2523 | 1.0335 | 0.07 |
| | | | | | | 4" Ice | | | |
| (2) LGP13519 | B | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 0.3379 | 0.2074 | 0.01 |
| | | | | | | 1/2" | 0.4220 | 0.2804 | 0.01 |
| | | | | | | Ice | 0.5147 | 0.3621 | 0.01 |
| | | | | | | 1" Ice | 0.7260 | 0.5513 | 0.02 |
| | | | | | | 2" Ice | 1.2523 | 1.0335 | 0.07 |
| | | | | | | 4" Ice | | | |
| (2) LGP13519 | C | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 0.3379 | 0.2074 | 0.01 |
| | | | | | | 1/2" | 0.4220 | 0.2804 | 0.01 |
| | | | | | | Ice | 0.5147 | 0.3621 | 0.01 |
| | | | | | | 1" Ice | 0.7260 | 0.5513 | 0.02 |
| | | | | | | 2" Ice | 1.2523 | 1.0335 | 0.07 |
| | | | | | | 4" Ice | | | |
| (2) LGP21401 | A | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 1.2880 | 0.2326 | 0.01 |
| | | | | | | 1/2" | 1.4453 | 0.3134 | 0.02 |
| | | | | | | Ice | 1.6112 | 0.4028 | 0.03 |
| | | | | | | 1" Ice | 1.9690 | 0.6076 | 0.05 |
| | | | | | | 2" Ice | 2.7882 | 1.1210 | 0.14 |
| | | | | | | 4" Ice | | | |
| (2) LGP21401 | B | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 1.2880 | 0.2326 | 0.01 |
| | | | | | | 1/2" | 1.4453 | 0.3134 | 0.02 |
| | | | | | | Ice | 1.6112 | 0.4028 | 0.03 |
| | | | | | | 1" Ice | 1.9690 | 0.6076 | 0.05 |
| | | | | | | 2" Ice | 2.7882 | 1.1210 | 0.14 |
| | | | | | | 4" Ice | | | |
| (2) LGP21401 | C | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 1.2880 | 0.2326 | 0.01 |
| | | | | | | 1/2" | 1.4453 | 0.3134 | 0.02 |
| | | | | | | Ice | 1.6112 | 0.4028 | 0.03 |
| | | | | | | 1" Ice | 1.9690 | 0.6076 | 0.05 |
| | | | | | | 2" Ice | 2.7882 | 1.1210 | 0.14 |
| | | | | | | 4" Ice | | | |
| SBNH-1D6565C w/ Mount Pipe | A | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 11.7232 | 10.2839 | 0.11 |
| | | | | | | 1/2" | 12.4417 | 11.8087 | 0.20 |
| | | | | | | Ice | 13.1478 | 13.1559 | 0.31 |
| | | | | | | 1" Ice | 14.6079 | 15.4926 | 0.55 |
| | | | | | | 2" Ice | 17.8745 | 20.3658 | 1.21 |
| | | | | | | 4" Ice | | | |
| SBNH-1D6565C w/ Mount Pipe | B | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | No Ice | 11.7232 | 10.2839 | 0.11 |
| | | | | | | 1/2" | 12.4417 | 11.8087 | 0.20 |
| | | | | | | Ice | 13.1478 | 13.1559 | 0.31 |
| | | | | | | 1" Ice | 14.6079 | 15.4926 | 0.55 |
| | | | | | | 2" Ice | 17.8745 | 20.3658 | 1.21 |
| | | | | | | 4" Ice | | | |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment t ° | Placement ft | C _A A _{Front} ft ² | C _A A _{Side} ft ² | Weight K | |
|--|-------------|-------------|-------------------------------------|------------------------|--------------|---|--|----------|------|
| SBNH-1D6565C w/ Mount Pipe | C | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | 4" Ice | | | |
| | | | | | | No Ice | 11.7232 | 10.2839 | 0.11 |
| | | | | | | 1/2" Ice | 12.4417 | 11.8087 | 0.20 |
| | | | | | | 1" Ice | 13.1478 | 13.1559 | 0.31 |
| | | | | | | 2" Ice | 14.6079 | 15.4926 | 0.55 |
| DC6-48-60-18-8F | A | From Face | 4.0000 0.00 2.00 | 0.0000 | 158.0000 | 4" Ice | | | |
| | | | | | | No Ice | 2.5667 | 4.3167 | 0.02 |
| | | | | | | 1/2" Ice | 2.7978 | 4.5965 | 0.05 |
| | | | | | | 1" Ice | 3.0377 | 4.8849 | 0.09 |
| | | | | | | 2" Ice | 3.5432 | 5.4877 | 0.17 |
| Platform Mount [LP 712-1] | C | None | | 0.0000 | 158.0000 | 4" Ice | | | |
| | | | | | | No Ice | 24.5300 | 24.5300 | 1.34 |
| | | | | | | 1/2" Ice | 29.9400 | 29.9400 | 1.65 |
| | | | | | | 1" Ice | 35.3500 | 35.3500 | 1.96 |
| | | | | | | 2" Ice | 46.1700 | 46.1700 | 2.58 |
| *** (2) RRUS-11 | A | From Face | 2.0000 0.00 0.00 | 0.0000 | 156.0000 | 4" Ice | | | |
| | | | | | | No Ice | 3.2486 | 1.3726 | 0.05 |
| | | | | | | 1/2" Ice | 3.4905 | 1.5510 | 0.07 |
| | | | | | | 1" Ice | 3.7411 | 1.7380 | 0.09 |
| | | | | | | 2" Ice | 4.2682 | 2.1381 | 0.15 |
| (2) RRUS-11 | B | From Face | 2.0000 0.00 0.00 | 0.0000 | 156.0000 | 4" Ice | | | |
| | | | | | | No Ice | 3.2486 | 1.3726 | 0.05 |
| | | | | | | 1/2" Ice | 3.4905 | 1.5510 | 0.07 |
| | | | | | | 1" Ice | 3.7411 | 1.7380 | 0.09 |
| | | | | | | 2" Ice | 4.2682 | 2.1381 | 0.15 |
| (2) RRUS-11 | C | From Face | 2.0000 0.00 0.00 | 0.0000 | 156.0000 | 4" Ice | | | |
| | | | | | | No Ice | 3.2486 | 1.3726 | 0.05 |
| | | | | | | 1/2" Ice | 3.4905 | 1.5510 | 0.07 |
| | | | | | | 1" Ice | 3.7411 | 1.7380 | 0.09 |
| | | | | | | 2" Ice | 4.2682 | 2.1381 | 0.15 |
| Side Arm Mount [SO 102-3] | C | None | | 0.0000 | 156.0000 | 4" Ice | | | |
| | | | | | | No Ice | 3.0000 | 3.0000 | 0.08 |
| | | | | | | 1/2" Ice | 3.4800 | 3.4800 | 0.11 |
| | | | | | | 1" Ice | 3.9600 | 3.9600 | 0.14 |
| | | | | | | 2" Ice | 4.9200 | 4.9200 | 0.20 |
| *** (2) DB980F65T4E-M w/ Mount Pipe | A | From Face | 4.0000 0.00 -1.00 | 0.0000 | 148.0000 | 4" Ice | | | |
| | | | | | | No Ice | 4.1333 | 3.7167 | 0.03 |
| | | | | | | 1/2" Ice | 4.5970 | 4.5791 | 0.06 |
| | | | | | | 1" Ice | 5.0462 | 5.3180 | 0.11 |
| | | | | | | 2" Ice | 5.9730 | 6.8458 | 0.22 |
| (2) DB980F65T4E-M w/ Mount Pipe | B | From Face | 4.0000 0.00 -1.00 | 0.0000 | 148.0000 | 4" Ice | | | |
| | | | | | | No Ice | 4.1333 | 3.7167 | 0.03 |
| | | | | | | 1/2" Ice | 4.5970 | 4.5791 | 0.06 |
| | | | | | | 1" Ice | 5.0462 | 5.3180 | 0.11 |
| | | | | | | 2" Ice | 5.9730 | 6.8458 | 0.22 |
| (2) DB980F65T4E-M w/ Mount Pipe | C | From Face | 4.0000 0.00 -1.00 | 0.0000 | 148.0000 | 4" Ice | | | |
| | | | | | | No Ice | 4.1333 | 3.7167 | 0.03 |
| | | | | | | 1/2" Ice | 4.5970 | 4.5791 | 0.06 |
| | | | | | | 1" Ice | 5.0462 | 5.3180 | 0.11 |
| | | | | | | 2" Ice | 5.9730 | 6.8458 | 0.22 |
| Platform Mount [LP 712-1] | C | None | | 0.0000 | 148.0000 | 4" Ice | | | |
| | | | | | | No Ice | 24.5300 | 24.5300 | 1.34 |
| | | | | | | 1/2" Ice | 29.9400 | 29.9400 | 1.65 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustmen t ° | Placement ft | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K | |
|--------------------------------------|-------------|-------------|---|-----------------------------|-----------------|---|--|-------------|------|
| | | | | | | Ice | 35.3500 | 35.3500 | 1.96 |
| | | | | | | 1" Ice | 46.1700 | 46.1700 | 2.58 |
| | | | | | | 2" Ice | 67.8100 | 67.8100 | 3.82 |
| | | | | | | 4" Ice | | | |
| *** | | | | | | | | | |
| APX16DWV-16DWV-S-E-A20 w/ Mount Pipe | A | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 7.4657 | 3.4938 | 0.06 |
| | | | | | | 1/2" Ice | 7.9944 | 4.2631 | 0.11 |
| | | | | | | Ice | 8.5176 | 4.9598 | 0.16 |
| | | | | | | 1" Ice | 9.5949 | 6.4031 | 0.30 |
| | | | | | | 2" Ice | 11.8728 | 9.4897 | 0.68 |
| | | | | | | 4" Ice | | | |
| APX16DWV-16DWV-S-E-A20 w/ Mount Pipe | B | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 7.4657 | 3.4938 | 0.06 |
| | | | | | | 1/2" Ice | 7.9944 | 4.2631 | 0.11 |
| | | | | | | Ice | 8.5176 | 4.9598 | 0.16 |
| | | | | | | 1" Ice | 9.5949 | 6.4031 | 0.30 |
| | | | | | | 2" Ice | 11.8728 | 9.4897 | 0.68 |
| | | | | | | 4" Ice | | | |
| APX16DWV-16DWV-S-E-A20 w/ Mount Pipe | C | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 7.4657 | 3.4938 | 0.06 |
| | | | | | | 1/2" Ice | 7.9944 | 4.2631 | 0.11 |
| | | | | | | Ice | 8.5176 | 4.9598 | 0.16 |
| | | | | | | 1" Ice | 9.5949 | 6.4031 | 0.30 |
| | | | | | | 2" Ice | 11.8728 | 9.4897 | 0.68 |
| | | | | | | 4" Ice | | | |
| APX16PV-16PVL-E w/ Mount Pipe | A | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 6.9361 | 3.2893 | 0.06 |
| | | | | | | 1/2" Ice | 7.4389 | 3.9953 | 0.10 |
| | | | | | | Ice | 7.9415 | 4.6615 | 0.16 |
| | | | | | | 1" Ice | 8.9779 | 6.0439 | 0.28 |
| | | | | | | 2" Ice | 11.1750 | 9.0230 | 0.65 |
| | | | | | | 4" Ice | | | |
| APX16PV-16PVL-E w/ Mount Pipe | B | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 6.9361 | 3.2893 | 0.06 |
| | | | | | | 1/2" Ice | 7.4389 | 3.9953 | 0.10 |
| | | | | | | Ice | 7.9415 | 4.6615 | 0.16 |
| | | | | | | 1" Ice | 8.9779 | 6.0439 | 0.28 |
| | | | | | | 2" Ice | 11.1750 | 9.0230 | 0.65 |
| | | | | | | 4" Ice | | | |
| APX16PV-16PVL-E w/ Mount Pipe | C | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 6.9361 | 3.2893 | 0.06 |
| | | | | | | 1/2" Ice | 7.4389 | 3.9953 | 0.10 |
| | | | | | | Ice | 7.9415 | 4.6615 | 0.16 |
| | | | | | | 1" Ice | 8.9779 | 6.0439 | 0.28 |
| | | | | | | 2" Ice | 11.1750 | 9.0230 | 0.65 |
| | | | | | | 4" Ice | | | |
| KRY 112 134/1 | A | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 1.0082 | 0.4869 | 0.01 |
| | | | | | | 1/2" Ice | 1.1488 | 0.6009 | 0.02 |
| | | | | | | Ice | 1.2980 | 0.7236 | 0.03 |
| | | | | | | 1" Ice | 1.6223 | 0.9950 | 0.05 |
| | | | | | | 2" Ice | 2.3747 | 1.6413 | 0.13 |
| | | | | | | 4" Ice | | | |
| KRY 112 134/1 | B | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 1.0082 | 0.4869 | 0.01 |
| | | | | | | 1/2" Ice | 1.1488 | 0.6009 | 0.02 |
| | | | | | | Ice | 1.2980 | 0.7236 | 0.03 |
| | | | | | | 1" Ice | 1.6223 | 0.9950 | 0.05 |
| | | | | | | 2" Ice | 2.3747 | 1.6413 | 0.13 |
| | | | | | | 4" Ice | | | |
| KRY 112 134/1 | C | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 1.0082 | 0.4869 | 0.01 |
| | | | | | | 1/2" Ice | 1.1488 | 0.6009 | 0.02 |
| | | | | | | Ice | 1.2980 | 0.7236 | 0.03 |
| | | | | | | 1" Ice | 1.6223 | 0.9950 | 0.05 |
| | | | | | | 2" Ice | 2.3747 | 1.6413 | 0.13 |
| | | | | | | 4" Ice | | | |
| KRY 112 89/5 | A | From Face | 4.0000 0.00 1.00 | 0.0000 | 138.0000 | No Ice | 0.2333 | 0.4278 | 0.02 |
| | | | | | | 1/2" Ice | 0.3025 | 0.5293 | 0.02 |
| | | | | | | Ice | 0.3802 | 0.6395 | 0.03 |
| | | | | | | 1" Ice | 0.5617 | 0.8858 | 0.05 |
| | | | | | | 2" Ice | 1.0284 | 1.4821 | 0.11 |
| | | | | | | 4" Ice | | | |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment t ° | Placement ft | C _A A | | Weight K | |
|--|-------------|-------------|-----------------------------------|------------------------|------------------------------|-----------------|--------------------------|-------------------------|-------------|------|
| | | | Horz Lateral ft ft ft | Vert ft ft ft | | | Front ft ² | Side ft ² | | |
| KRY 112 89/5 | B | From Face | 4.0000 | 0.0000 | 0.0000 | 138.0000 | No Ice | 0.2333 | 0.4278 | 0.02 |
| | | | 0.00 | | | | 1/2" | 0.3025 | 0.5293 | 0.02 |
| | | | 1.00 | | | | Ice | 0.3802 | 0.6395 | 0.03 |
| | | | | | | | 1" Ice | 0.5617 | 0.8858 | 0.05 |
| | | | | | | | 2" Ice | 1.0284 | 1.4821 | 0.11 |
| KRY 112 89/5 | C | From Face | 4.0000 | 0.0000 | 0.0000 | 138.0000 | No Ice | 0.2333 | 0.4278 | 0.02 |
| | | | 0.00 | | | | 1/2" | 0.3025 | 0.5293 | 0.02 |
| | | | 1.00 | | | | Ice | 0.3802 | 0.6395 | 0.03 |
| | | | | | | | 1" Ice | 0.5617 | 0.8858 | 0.05 |
| | | | | | | | 2" Ice | 1.0284 | 1.4821 | 0.11 |
| (2) S20057A-1 | A | From Face | 4.0000 | 0.0000 | 0.0000 | 138.0000 | No Ice | 0.8286 | 0.3942 | 0.01 |
| | | | 0.00 | | | | 1/2" | 0.9610 | 0.5048 | 0.01 |
| | | | 1.00 | | | | Ice | 1.1019 | 0.6242 | 0.02 |
| | | | | | | | 1" Ice | 1.4098 | 0.8887 | 0.04 |
| | | | | | | | 2" Ice | 2.1292 | 1.5216 | 0.11 |
| (2) S20057A-1 | B | From Face | 4.0000 | 0.0000 | 0.0000 | 138.0000 | No Ice | 0.8286 | 0.3942 | 0.01 |
| | | | 0.00 | | | | 1/2" | 0.9610 | 0.5048 | 0.01 |
| | | | 1.00 | | | | Ice | 1.1019 | 0.6242 | 0.02 |
| | | | | | | | 1" Ice | 1.4098 | 0.8887 | 0.04 |
| | | | | | | | 2" Ice | 2.1292 | 1.5216 | 0.11 |
| (2) S20057A-1 | C | From Face | 4.0000 | 0.0000 | 0.0000 | 138.0000 | No Ice | 0.8286 | 0.3942 | 0.01 |
| | | | 0.00 | | | | 1/2" | 0.9610 | 0.5048 | 0.01 |
| | | | 1.00 | | | | Ice | 1.1019 | 0.6242 | 0.02 |
| | | | | | | | 1" Ice | 1.4098 | 0.8887 | 0.04 |
| | | | | | | | 2" Ice | 2.1292 | 1.5216 | 0.11 |
| Platform Mount [LP 712-1] | C | None | | | 0.0000 | 138.0000 | No Ice | 24.5300 | 24.5300 | 1.34 |
| | | | | | | | 1/2" | 29.9400 | 29.9400 | 1.65 |
| | | | | | | | Ice | 35.3500 | 35.3500 | 1.96 |
| | | | | | | | 1" Ice | 46.1700 | 46.1700 | 2.58 |
| | | | | | | | 2" Ice | 67.8100 | 67.8100 | 3.82 |
| 6'x2" Pipe Mount | A | From Face | 4.0000 | 0.0000 | 0.0000 | 138.0000 | 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 |
| 6'x2" Pipe Mount | B | From Face | 4.0000 | 0.0000 | 0.0000 | 138.0000 | 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 |
| 6'x2" Pipe Mount | C | From Face | 4.0000 | 0.0000 | 0.0000 | 138.0000 | 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) DB846G90A-XY w/ Mount Pipe | A | From Face | 4.0000 | 0.0000 | 0.0000 | 128.0000 | No Ice | 5.2292 | 7.5292 | 0.04 |
| | | | 0.00 | | | | 1/2" | 5.7831 | 8.7153 | 0.09 |
| | | | 0.00 | | | | Ice | 6.3025 | 9.6153 | 0.16 |
| | | | | | | | 1" Ice | 7.3652 | 11.4489 | 0.32 |
| | | | | | | | 2" Ice | 9.6937 | 15.6025 | 0.77 |
| (4) DB846G90A-XY w/ Mount Pipe | B | From Face | 4.0000 | 0.0000 | 0.0000 | 128.0000 | No Ice | 5.2292 | 7.5292 | 0.04 |
| | | | 0.00 | | | | 1/2" | 5.7831 | 8.7153 | 0.09 |
| | | | 0.00 | | | | Ice | 6.3025 | 9.6153 | 0.16 |
| | | | | | | | 1" Ice | 7.3652 | 11.4489 | 0.32 |
| | | | | | | | 2" Ice | 9.6937 | 15.6025 | 0.77 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment t ° | Placement ft | C _{AA} Front ft ² | C _{AA} Side ft ² | Weight K | |
|---------------------------------------|-------------|-------------|--|------------------------------|-----------------|--|---|-------------|------|
| (4) DB846G90A-XY w/ Mount Pipe | C | From Face | 4.0000 0.00 0.00 | 0.0000 | 128.0000 | 2" Ice | 9.6937 | 15.6025 | 0.77 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 5.2292 | 7.5292 | 0.04 |
| | | | | | | 1/2" Ice | 5.7831 | 8.7153 | 0.09 |
| | | | | | | Ice | 6.3025 | 9.6153 | 0.16 |
| | | | | | | 1" Ice | 7.3652 | 11.4489 | 0.32 |
| Platform Mount [LP 712-1] | C | None | | 0.0000 | 128.0000 | 2" Ice | 9.6937 | 15.6025 | 0.77 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 24.5300 | 24.5300 | 1.34 |
| | | | | | | 1/2" Ice | 29.9400 | 29.9400 | 1.65 |
| | | | | | | Ice | 35.3500 | 35.3500 | 1.96 |
| | | | | | | 1" Ice | 46.1700 | 46.1700 | 2.58 |
| *** APXV18-206517S-C w/ Mount Pipe | A | From Face | 1.0000 0.00 -1.00 | 0.0000 | 120.0000 | 2" Ice | 67.8100 | 67.8100 | 3.82 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 5.4042 | 4.7000 | 0.05 |
| | | | | | | 1/2" Ice | 5.9597 | 5.8600 | 0.09 |
| | | | | | | Ice | 6.4808 | 6.7338 | 0.15 |
| | | | | | | 1" Ice | 7.5467 | 8.5150 | 0.28 |
| APXV18-206517S-C w/ Mount Pipe | B | From Face | 1.0000 0.00 -1.00 | 0.0000 | 120.0000 | 2" Ice | 9.9193 | 12.2774 | 0.68 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 5.4042 | 4.7000 | 0.05 |
| | | | | | | 1/2" Ice | 5.9597 | 5.8600 | 0.09 |
| | | | | | | Ice | 6.4808 | 6.7338 | 0.15 |
| | | | | | | 1" Ice | 7.5467 | 8.5150 | 0.28 |
| APXV18-206517S-C w/ Mount Pipe | C | From Face | 1.0000 0.00 -1.00 | 0.0000 | 120.0000 | 2" Ice | 9.9193 | 12.2774 | 0.68 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 5.4042 | 4.7000 | 0.05 |
| | | | | | | 1/2" Ice | 5.9597 | 5.8600 | 0.09 |
| | | | | | | Ice | 6.4808 | 6.7338 | 0.15 |
| | | | | | | 1" Ice | 7.5467 | 8.5150 | 0.28 |
| Pipe Mount [PM 601-3] | C | None | | 0.0000 | 120.0000 | 2" Ice | 13.1100 | 13.1100 | 0.53 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 4.3900 | 4.3900 | 0.20 |
| | | | | | | 1/2" Ice | 5.4800 | 5.4800 | 0.24 |
| | | | | | | Ice | 6.5700 | 6.5700 | 0.28 |
| | | | | | | 1" Ice | 8.7500 | 8.7500 | 0.36 |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| L1 | 167 - 118.25 | 42.708 | 34 | 2.3058 | 0.0025 |
| L2 | 122.75 - 90.5 | 22.774 | 34 | 1.8579 | 0.0012 |
| L3 | 90.5 - 77.75 | 11.934 | 34 | 1.3032 | 0.0006 |
| L4 | 83.25 - 51.5 | 10.044 | 34 | 1.1858 | 0.0005 |
| L5 | 51.5 - 45 | 3.680 | 34 | 0.6920 | 0.0003 |
| L6 | 45 - 0 | 2.799 | 34 | 0.6039 | 0.0002 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|---------------------------|-----------------|------------------|-----------|------------|---------------------------|
| 167.0000 | Lightning Rod 5/8x4' | 34 | 42.708 | 2.3058 | 0.0025 | 29206 |
| 158.0000 | (2) 7770.00 w/ Mount Pipe | 34 | 38.422 | 2.2352 | 0.0022 | 16225 |

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|---|-----------------------|------------------|-----------|------------|------------------------------|
| 156.0000 | (2) RRUS-11 | 34 | 37.475 | 2.2190 | 0.0021 | 13275 |
| 148.0000 | (2) DB980F65T4E-M w/ Mount Pipe | 34 | 33.732 | 2.1503 | 0.0019 | 7685 |
| 138.0000 | APX16DWV-16DWV-S-E-A20 w/ Mount Pipe | 34 | 29.199 | 2.0516 | 0.0016 | 5034 |
| 128.0000 | (4) DB846G90A-XY w/ Mount Pipe | 34 | 24.905 | 1.9317 | 0.0013 | 3742 |
| 120.0000 | APXV18-206517S-C w/ Mount Pipe | 34 | 21.696 | 1.8158 | 0.0011 | 3276 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|----------------|-----------------|---------------------------|-----------------------|-----------|------------|
| L1 | 167 - 118.25 | 122.745 | 9 | 6.6369 | 0.0070 |
| L2 | 122.75 - 90.5 | 65.534 | 9 | 5.3497 | 0.0033 |
| L3 | 90.5 - 77.75 | 34.370 | 9 | 3.7540 | 0.0017 |
| L4 | 83.25 - 51.5 | 28.932 | 9 | 3.4162 | 0.0015 |
| L5 | 51.5 - 45 | 10.607 | 9 | 1.9944 | 0.0008 |
| L6 | 45 - 0 | 8.066 | 9 | 1.7404 | 0.0007 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|---|-----------------------|------------------|-----------|------------|------------------------------|
| 167.0000 | Lightning Rod 5/8x4' | 9 | 122.745 | 6.6369 | 0.0070 | 10389 |
| 158.0000 | (2) 7770.00 w/ Mount Pipe | 9 | 110.448 | 6.4341 | 0.0062 | 5771 |
| 156.0000 | (2) RRUS-11 | 9 | 107.732 | 6.3875 | 0.0060 | 4721 |
| 148.0000 | (2) DB980F65T4E-M w/ Mount Pipe | 9 | 96.992 | 6.1902 | 0.0053 | 2731 |
| 138.0000 | APX16DWV-16DWV-S-E-A20 w/ Mount Pipe | 9 | 83.983 | 5.9065 | 0.0044 | 1787 |
| 128.0000 | (4) DB846G90A-XY w/ Mount Pipe | 9 | 71.654 | 5.5620 | 0.0037 | 1326 |
| 120.0000 | APXV18-206517S-C w/ Mount Pipe | 9 | 62.440 | 5.2287 | 0.0031 | 1158 |

Compression Checks

Pole Design Data

| Section No. | Elevation ft | Size | L ft | L _u ft | KI/r | F _a ksi | A in ² | Actual P K | Allow. P _a K | Ratio P P _a |
|----------------|-----------------|-------------------------|---------|----------------------|------|-----------------------|----------------------|------------------|-------------------------------|------------------------------|
| L1 | 167 - 118.25 | TP35.36x24x0.25 | 48.7500 | 0.0000 | 0.0 | 39.000 | 27.0277 | -12.25 | 1054.08 | 0.012 |
| L2 | 118.25 - 90.5 | TP41.3282x33.8114x0.312 | 32.2500 | 0.0000 | 0.0 | 39.000 | 40.6825 | -19.25 | 1586.62 | 0.012 |
| L3 | 90.5 - 77.75 | TP44.3x41.3282x0.3819 | 12.7500 | 0.0000 | 0.0 | 34.080 | 51.6814 | -21.06 | 1761.30 | 0.012 |
| L4 | 77.75 - 51.5 | TP49.7851x42.2543x0.375 | 31.7500 | 0.0000 | 0.0 | 39.000 | 58.8104 | -30.37 | 2293.61 | 0.013 |

| 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 $\frac{P}{P_a}$ |
|-------------|-----------------|------------------------------|---------|-------------|--------|--------------|----------------------|---------------|-------------------|--------------------------|
| L5 | 51.5 - 45 (5) | TP51.2985x49.7851x0.457 2 | 6.5000 | 0.0000 | 0.0 | 34.146 | 73.7753 | -32.49 | 2519.13 | 0.013 |
| L6 | 45 - 0 (6) | TP61.04x51.2985x0.4375 | 45.0000 | 0.0000 | 0.0 | 39.000 | 84.1541 | -47.97 | 3282.01 | 0.015 |

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 | 167 - 118.25 (1) | TP35.36x24x0.25 | 745.36 | 39.353 | 39.000 | 1.009 | 0.00 | 0.000 | 39.000 | 0.000 |
| L2 | 118.25 - 90.5 (2) | TP41.3282x33.8114x0.31 25 | 1715.1 | 49.974 | 39.000 | 1.281 | 0.00 | 0.000 | 39.000 | 0.000 |
| L3 | 90.5 - 77.75 (3) | TP44.3x41.3282x0.3819 | 1949.6 | 43.075 | 34.080 | 1.264 | 0.00 | 0.000 | 34.080 | 0.000 |
| L4 | 77.75 - 51.5 (4) | TP49.7851x42.2543x0.37 5 | 3045.2 | 50.950 | 39.000 | 1.306 | 0.00 | 0.000 | 39.000 | 0.000 |
| L5 | 51.5 - 45 (5) | TP51.2985x49.7851x0.45 72 | 3282.6 | 42.608 | 34.146 | 1.248 | 0.00 | 0.000 | 34.146 | 0.000 |
| L6 | 45 - 0 (6) | TP61.04x51.2985x0.4375 2 | 5031.3 | 47.946 | 39.000 | 1.229 | 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 | 167 - 118.25 (1) | TP35.36x24x0.25 | 27.49 | 1.017 | 26.000 | 0.078 | 0.88 | 0.023 | 26.000 | 0.001 |
| L2 | 118.25 - 90.5 (2) | TP41.3282x33.8114x0.31 25 | 31.95 | 0.785 | 26.000 | 0.060 | 0.96 | 0.014 | 26.000 | 0.001 |
| L3 | 90.5 - 77.75 (3) | TP44.3x41.3282x0.3819 | 32.75 | 0.634 | 22.720 | 0.056 | 0.98 | 0.011 | 22.720 | 0.000 |
| L4 | 77.75 - 51.5 (4) | TP49.7851x42.2543x0.37 5 | 36.16 | 0.615 | 26.000 | 0.047 | 1.08 | 0.009 | 26.000 | 0.000 |
| L5 | 51.5 - 45 (5) | TP51.2985x49.7851x0.45 72 | 36.87 | 0.500 | 22.764 | 0.044 | 1.11 | 0.007 | 22.764 | 0.000 |
| L6 | 45 - 0 (6) | TP61.04x51.2985x0.4375 | 40.87 | 0.486 | 26.000 | 0.037 | 1.24 | 0.006 | 26.000 | 0.000 |

Pole Interaction Design Data

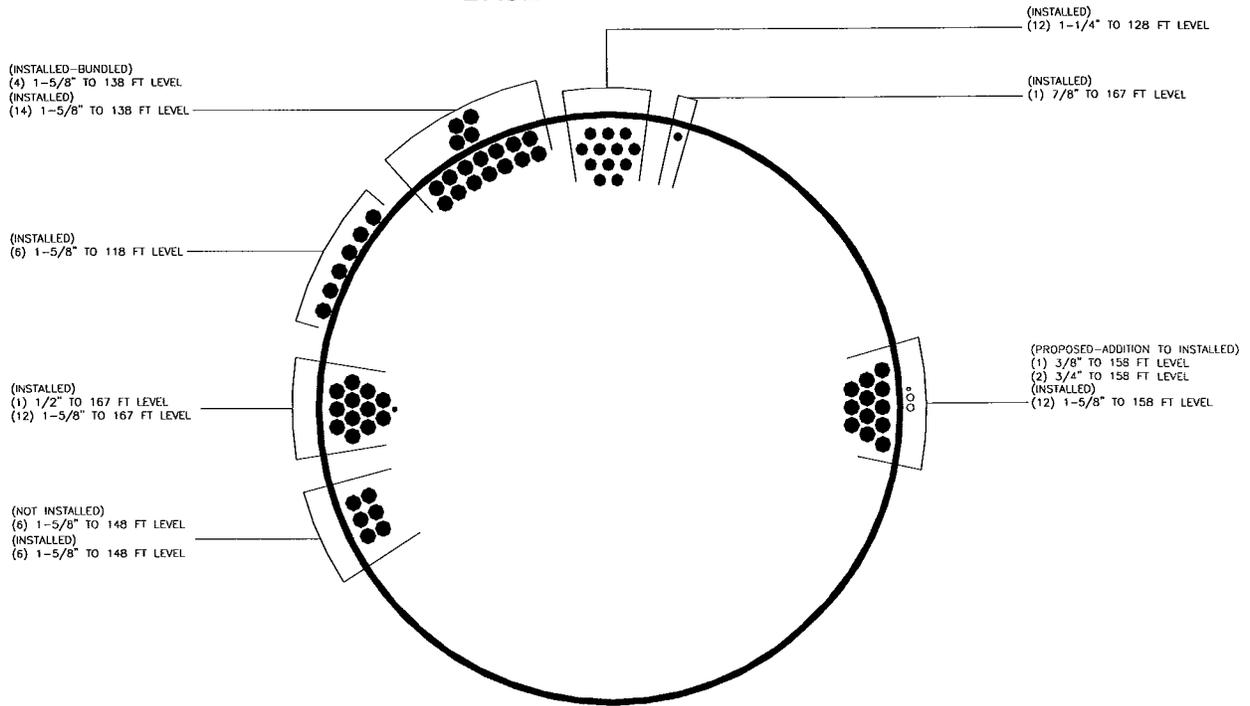
| Section No. | Elevation ft | Ratio $\frac{P}{P_a}$ | Ratio $\frac{f_{bx}}{F_{bx}}$ | Ratio $\frac{f_{by}}{F_{by}}$ | Ratio $\frac{f_v}{F_v}$ | Ratio $\frac{f_{vt}}{F_{vt}}$ | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|----------------------|--------------------------|----------------------------------|----------------------------------|----------------------------|----------------------------------|--------------------|---------------------|-----------|
| L1 | 167 - 118.25 (1) | 0.012 | 1.009 | 0.000 | 0.078 | 0.001 | 1.022 | 1.333 | H1-3+VT ✓ |
| L2 | 118.25 - 90.5 (2) | 0.012 | 1.281 | 0.000 | 0.060 | 0.001 | 1.294 | 1.333 | H1-3+VT ✓ |
| L3 | 90.5 - 77.75 (3) | 0.012 | 1.264 | 0.000 | 0.056 | 0.000 | 1.277 | 1.333 | H1-3+VT ✓ |
| L4 | 77.75 - 51.5 (4) | 0.013 | 1.306 | 0.000 | 0.047 | 0.000 | 1.320 | 1.333 | H1-3+VT ✓ |
| L5 | 51.5 - 45 (5) | 0.013 | 1.248 | 0.000 | 0.044 | 0.000 | 1.261 | 1.333 | H1-3+VT ✓ |

| 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 |
|-------------|--------------|-----------------------|-------------------------------|-------------------------------|-------------------------|-------------------------------|--------------------|---------------------|-----------|
| L6 | 45 - 0 (6) | 0.015 | 1.229 | 0.000 | 0.037 | 0.000 | 1.244 | 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 | 167 - 118.25 | Pole | TP35.36x24x0.25 | 1 | -12.25 | 1405.09 | 76.7 | Pass |
| L2 | 118.25 - 90.5 | Pole | TP41.3282x33.8114x0.3125 | 2 | -19.25 | 2114.96 | 97.1 | Pass |
| L3 | 90.5 - 77.75 | Pole | TP44.3x41.3282x0.3819 | 3 | -21.06 | 2347.81 | 95.8 | Pass |
| L4 | 77.75 - 51.5 | Pole | TP49.7851x42.2543x0.375 | 4 | -30.37 | 3057.38 | 99.0 | Pass |
| L5 | 51.5 - 45 | Pole | TP51.2985x49.7851x0.4572 | 5 | -32.49 | 3358.00 | 94.6 | Pass |
| L6 | 45 - 0 | Pole | TP61.04x51.2985x0.4375 | 6 | -47.97 | 4374.92 | 93.3 | Pass |
| Summary | | | | | | | | |
| Pole (L4) | | | | | | | 99.0 | Pass |
| RATING = | | | | | | | 99.0 | Pass |

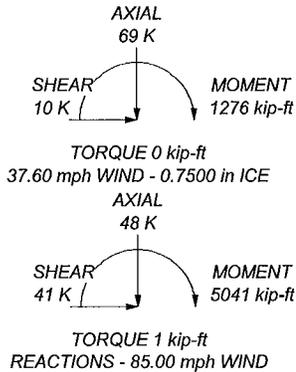
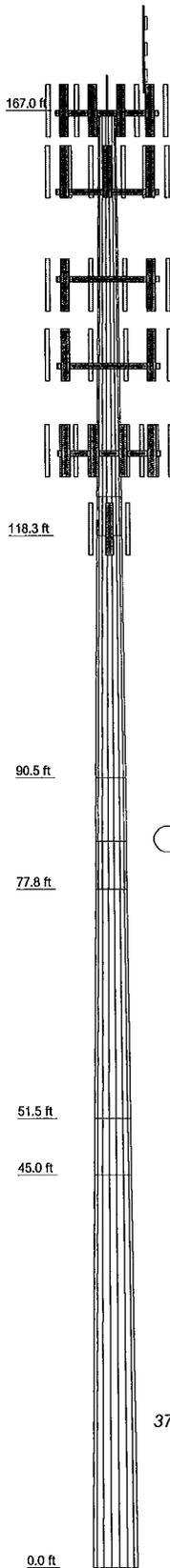
APPENDIX B BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Program Version 6.0.3.0 - 12/7/2011 File:G:/TOWER/375_Crown_Castle/2012/37512-1657 BU 801367/Aero/37512-1657 BP Aero.eri

| | | | | | | |
|--------------------|---------|---------|-----------------|---------|-----------------|---------|
| Section | 1 | 2 | 3 | 4 | 5 | 6 |
| Length (ft) | 48.7500 | 32.2500 | 12.7500 | 31.7500 | 6.5000 | 45.0000 |
| Number of Sides | 18 | 18 | 18 | 18 | 18 | 18 |
| Thickness (in) | 0.2500 | 0.3125 | 0.3819 | 0.3750 | 0.4572 | 0.4375 |
| Socket Length (ft) | 4.5000 | | 5.5000 | | | |
| Top Dia (in) | 24.0000 | 33.8114 | 41.3282 | 42.2542 | 49.7851 | 51.2985 |
| Bot Dia (in) | 35.3600 | 41.3282 | 44.3000 | 49.7851 | 51.2985 | 61.0400 |
| Grade | A607-65 | A607-65 | Reinf 56.80 ksi | A607-65 | Reinf 56.91 ksi | A607-65 |
| Weight (K) | 3.9 | 4.1 | 2.2 | 5.9 | 1.6 | 11.9 |



DESIGNED APPURTENANCE LOADING

| TYPE | ELEVATION | TYPE | ELEVATION |
|----------------------------------|-----------|--------------------------------------|-----------|
| Lightning Rod 5/8x4' | 167 | Platform Mount [LP 712-1] | 148 |
| (2) LPA-80063/8CF w/ Mount Pipe | 167 | APX16DWW-16DWW-S-E-A20 w/ Mount Pipe | 138 |
| (2) LPA-80063/8CF w/ Mount Pipe | 167 | | |
| (2) LPA-80063/8CF w/ Mount Pipe | 167 | APX16DWW-16DWW-S-E-A20 w/ Mount Pipe | 138 |
| (2) LPA-185063/8CF w/ Mount Pipe | 167 | | |
| (2) LPA-185063/8CF w/ Mount Pipe | 167 | APX16DWW-16DWW-S-E-A20 w/ Mount Pipe | 138 |
| (2) LPA-185063/8CF w/ Mount Pipe | 167 | | |
| (2) LPA-185063/8CF w/ Mount Pipe | 167 | APX16PV-16PVL-E w/ Mount Pipe | 138 |
| DB222-A | 167 | APX16PV-16PVL-E w/ Mount Pipe | 138 |
| GPS_A | 167 | APX16PV-16PVL-E w/ Mount Pipe | 138 |
| Platform Mount [LP 712-1] | 167 | KRY 112 134/1 | 138 |
| (2) 7770.00 w/ Mount Pipe | 158 | KRY 112 134/1 | 138 |
| (2) 7770.00 w/ Mount Pipe | 158 | KRY 112 89/5 | 138 |
| (2) LGP13519 | 158 | KRY 112 89/5 | 138 |
| (2) LGP13519 | 158 | KRY 112 89/5 | 138 |
| (2) LGP13519 | 158 | (2) S20057A-1 | 138 |
| (2) LGP21401 | 158 | (2) S20057A-1 | 138 |
| (2) LGP21401 | 158 | (2) S20057A-1 | 138 |
| (2) LGP21401 | 158 | Platform Mount [LP 712-1] | 138 |
| SBNH-1D6565C w/ Mount Pipe | 158 | 6"x2" Pipe Mount | 138 |
| SBNH-1D6565C w/ Mount Pipe | 158 | 6"x2" Pipe Mount | 138 |
| SBNH-1D6565C w/ Mount Pipe | 158 | 6"x2" Pipe Mount | 138 |
| DC6-48-60-18-8F | 158 | (4) DB846G90A-XY w/ Mount Pipe | 128 |
| Platform Mount [LP 712-1] | 158 | (4) DB846G90A-XY w/ Mount Pipe | 128 |
| (2) RRRUS-11 | 156 | (4) DB846G90A-XY w/ Mount Pipe | 128 |
| (2) RRRUS-11 | 156 | Platform Mount [LP 712-1] | 128 |
| (2) RRRUS-11 | 156 | APXV18-206517S-C w/ Mount Pipe | 120 |
| Side Arm Mount [SO 102-3] | 156 | APXV18-206517S-C w/ Mount Pipe | 120 |
| (2) DB980F65T4E-M w/ Mount Pipe | 148 | APXV18-206517S-C w/ Mount Pipe | 120 |
| (2) DB980F65T4E-M w/ Mount Pipe | 148 | Pipe Mount [PM 601-3] | 120 |
| (2) DB980F65T4E-M w/ Mount Pipe | 148 | | |

MATERIAL STRENGTH

| GRADE | Fy | Fu | GRADE | Fy | Fu |
|-----------------|--------|--------|-----------------|--------|--------|
| A607-65 | 65 ksi | 80 ksi | Reinf 56.91 ksi | 57 ksi | 72 ksi |
| Reinf 56.80 ksi | 57 ksi | 71 ksi | | | |

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 99.2%

| | | | |
|---|---|------------------------------|--------------------|
|  <p>Paul J. Ford and Company 250 East Broad Street, Suite 1500 Columbus, Ohio 43215 Phone: (614) 221-6679 FAX: (614) 448-4118</p> | Job: Ex. 167-ft Monopole / Cheshire, CT | | |
| | Project: BU# 801367 / PJ# 37512-1657 | | |
| | Client: Crown Castle | Drawn by: Kyle Thorpe | App'd: |
| | Code: TIA/EIA-222-F | Date: 06/21/12 | Scale: NTS |
| | Path: G:\TOWER\375_Crown_Castle\2012\37512-1657_BU_801367\Amd\37512-1657_BP_Auto.dwg | | Dwg No. E-1 |

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

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

Site Data

BU#: _____
 Site Name: _____
 App #: _____

| Anchor Rod Data | | |
|-----------------|--------|-----|
| Qty: | 20 | |
| Diam: | 2.25 | in |
| Rod Material: | A615-J | |
| Yield, Fy: | 75 | ksi |
| Strength, Fu: | 100 | ksi |
| Bolt Circle: | 68 | in |
| Anchor Spacing: | 6 | in |

| Plate Data | | |
|----------------|----|-----|
| W=Side: | 67 | in |
| Thick: | 3 | in |
| Grade: | 55 | ksi |
| Clip Distance: | 14 | in |

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

| Pole Data | | |
|-------------|--------|--------------|
| Diam: | 61.04 | in |
| Thick: | 0.4375 | in |
| Grade: | 65 | ksi |
| # of Sides: | 18 | "0" IF Round |

| Stress Increase Factor | | |
|------------------------|-------|--|
| ASD ASIF: | 1.333 | |

| Base Reactions | | |
|-----------------------|------|---------|
| TIA Revision: | F | |
| Unfactored Moment, M: | 5031 | ft-kips |
| Unfactored Axial, P: | 48 | kips |
| Unfactored Shear, V: | 41 | kips |

Anchor Rod Results

TIA F --> Maximum Rod Tension: 175.2 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 89.9% Pass

Base Plate Results

Base Plate Stress: 42.3 ksi
 Allowable PL Bending Stress: 55.0 ksi
 Base Plate Stress Ratio: 76.9% Pass

Flexural Check

| PL Ref. Data | |
|------------------|-------|
| Yield Line (in): | 33.71 |
| Max PL Length: | 33.71 |

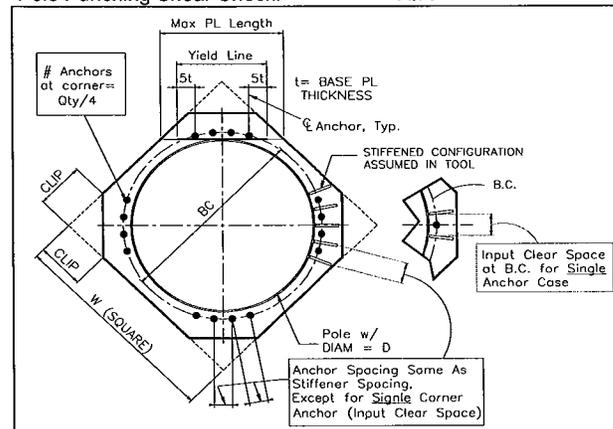
N/A - Unstiffened

Stiffener Results

Horizontal Weld : N/A
 Vertical Weld: N/A
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: N/A
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: N/A
 Plate Comp. (AISC Bracket): N/A

Pole Results

Pole Punching Shear Check: N/A



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

Foundation Loads:

Pole weight or tower leg compression = 48 (kips)
 Horizontal load at top of pier = 41 (kips)
 Overturning moment at top of pier = 5031 (ft-kips)

Design criteria:

Safety factor against overturning = 1.5

Soil Properties:

Soil density = 100 (pcf)
 Allowable soil bearing = 8 (ksf)
 Depth to water table = 99 (ft)

Dimensions:

Pier shape (round or square) R ("R" or "S")
 Pier width = 8 (ft)
 Pier height above grade = 0.5 (ft)
 Pier depth to bottom of footing = 7 (ft)
 Footing thickness = 4 (ft)
 Footing width = 26 (ft)
 Footing length = 26 (ft)

Concrete:

Concrete strength = 3 (ksi)
 Rebar strength = 60 (ksi)
 ultimate load factor = 1.3

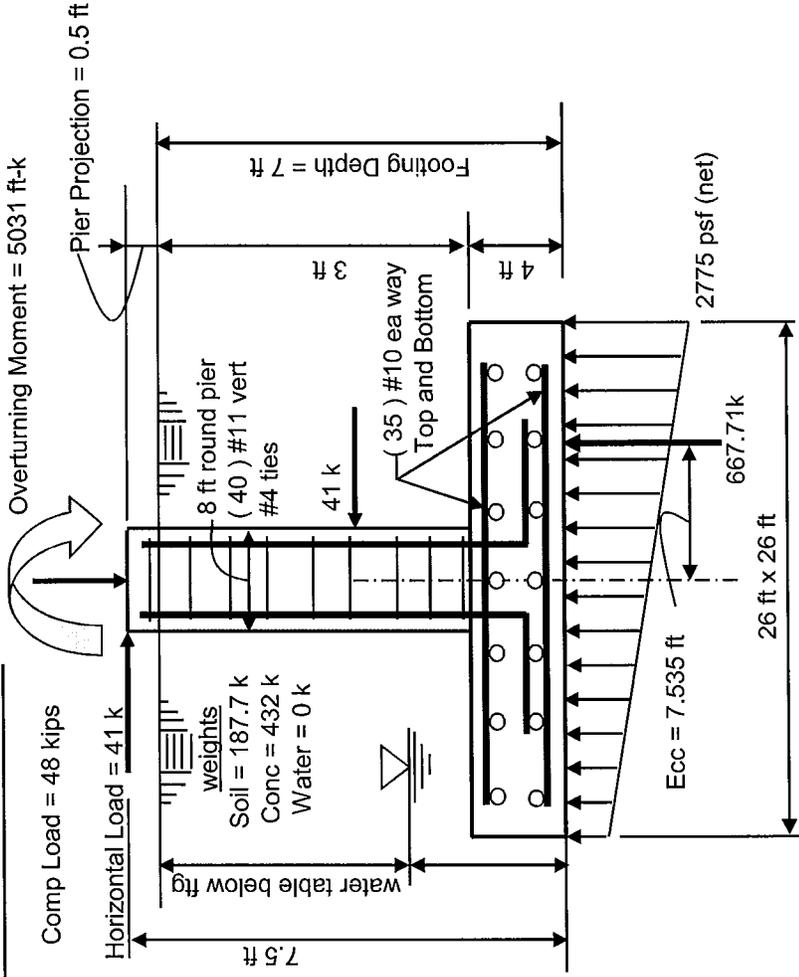
Reinforcing Steel:

minimum cover over rebar = 3 inches
 size of pad rebar = #10 bar
 quantity of pad rebar = 35 (ea direction)

Reinforcing Steel:

size of vert rebar in pier = #11 bar
 vertical rebar quantity = 40
 size of pier ties = #4 bar
 minimum cover over rebar = 3 inches

Total volume of concrete = #### cu yd



Summary of analysis results

| | |
|---|---|
| Maximum Net Soil Bearing = 2.775 ksf Allowable Net Soil Bearing = 8 ksf Soil Bearing Stress Ratio = 0.35 Okay | Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 33 psi Bending Shear Stress Ratio = 0.3 Okay |
| Ftg Overturning Resistance = 8680 ft-kips Overturning Moment = 5031 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 1.725 Ratio = 0.87 Okay | Pad Bending Moment Capacity = 8291 ft-k Pad Bending Moment = 2272 ft-k Bending Moment Stress Ratio = 0.27 OK |

```

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                        spColumn v4.80 (TM)
    Computer program for the Strength Design of Reinforced Concrete Sections
                        Copyright © 1988-2011, STRUCTUREPOINT, LLC.
                        All rights reserved
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General Information:

=====
File Name: G:\TOWER\375_Crown_Castle\2012\37512-1657 BU 801367\Aero\37512-1657 BP Aero.col
Project:
Column: Engineer:
Code: ACI 318-02 Units: English

Run Option: Investigation Slenderness: Not considered
Run Axis: X-axis Column Type: Structural

Material Properties:

=====
f'c = 3 ksi fy = 60 ksi
Ec = 3122.02 ksi Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:

=====
Circular: Diameter = 96 in

Gross section area, Ag = 7238.23 in^2
Ix = 4.16922e+006 in^4 Iy = 4.16922e+006 in^4
rx = 24 in ry = 24 in
Xo = 0 in Yo = 0 in

Reinforcement:

=====
Bar Set: ASTM A615
Size Diam (in) Area (in^2) Size Diam (in) Area (in^2) Size Diam (in) Area (in^2)

3 0.38 0.11 # 4 0.50 0.20 # 5 0.63 0.31
6 0.75 0.44 # 7 0.88 0.60 # 8 1.00 0.79
9 1.13 1.00 # 10 1.27 1.27 # 11 1.41 1.56
14 1.69 2.25 # 18 2.26 4.00

Confinement: Tied; #4 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Circular
Pattern: All Sides Equal (Cover to transverse reinforcement)
Total steel area: As = 62.40 in^2 at rho = 0.86% (Note: rho < 1.0%)
Minimum clear spacing = 5.46 in

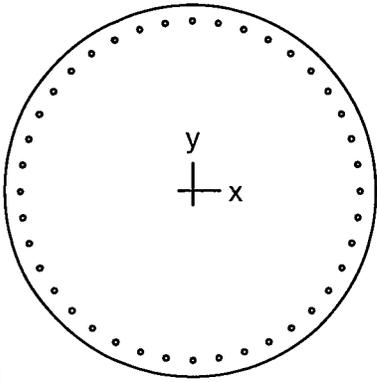
40 #11 Cover = 3 in

Factored Loads and Moments with Corresponding Capacities:

=====
No. Pu Mux PhiMnx PhiMn/Mu NA depth Dt depth eps_t Phi
kip k-ft k-ft in in

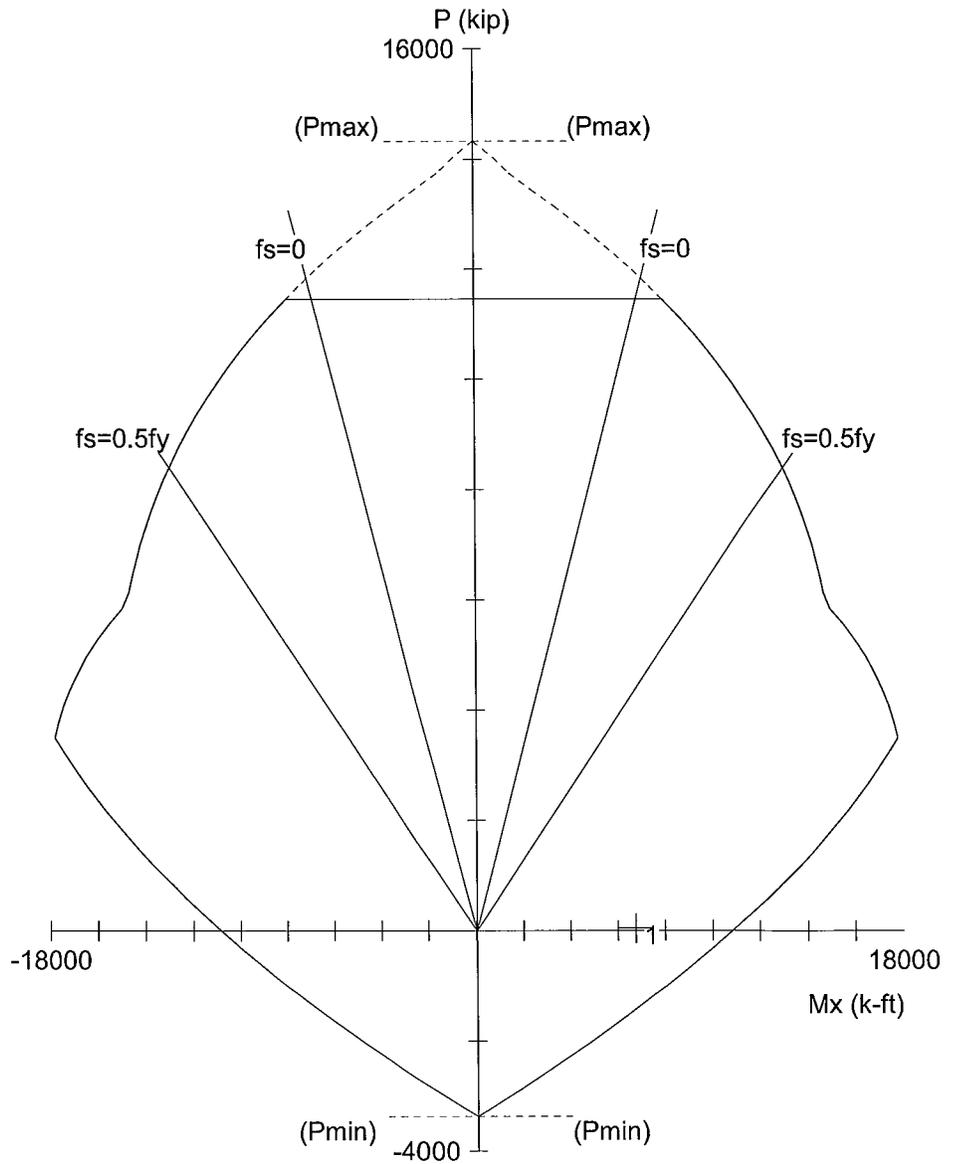
1 43.20 6727.00 10936.97 1.626 18.24 91.79 0.01210 0.900

*** End of output ***



96 in diam.

Code: ACI 318-02
 Units: English
 Run axis: About X-axis
 Run option: Investigation
 Slenderness: Not considered
 Column type: Structural
 Bars: ASTM A615
 Date: 06/21/12
 Time: 08:36:21



spColumn v4.80. Licensed to: Paul J. Ford and Company - Columbus. License ID: 58800-1028985-4-1E6CD-1E8DD

File: G:\TOWER\375_Crown_Castle\2012\37512-1657 BU 801367\Aero\37512-1657 BP Aero.col

Project:

Column:

$f_c = 3$ ksi

$f_y = 60$ ksi

Engineer:

$A_g = 7238.23$ in²

40 #11 bars

$E_c = 3122$ ksi

$E_s = 29000$ ksi

$A_s = 62.40$ in²

$\rho = 0.86\%$

$f_c = 2.55$ ksi

$X_o = 0.00$ in

$I_x = 4.16922e+006$ in⁴

$e_u = 0.003$ in/in

$Y_o = 0.00$ in

$I_y = 4.16922e+006$ in⁴

Beta1 = 0.85

Min clear spacing = 5.46 in

Clear cover = 3.50 in

Confinement: Tied

$\phi(a) = 0.8, \phi(b) = 0.9, \phi(c) = 0.65$



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

Unfactored Base Reactions from RISA

| | Comp. (+) | Tension (-) | |
|-----------------|-----------|-------------|---------------|
| Moment, M = | 5031.0 | | k-ft |
| Shear, V = | 41.0 | | kips |
| Axial Load, P = | 48.0 | | kips |
| OTM = | 5051.5 | 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 = | 8 | ft |
| Height Above Grade = | 0.5 | ft |
| Depth Below Grade = | 23 | ft |
| fc' = | 3 | ksi |
| ec = | 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

- Ult. Skin Friction/2.00 + Ult. End Bearing/2.00 + Effective Soil Wt. - Buoyant Conc. Wt. \geq Compression
- Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 \geq Uplift
- Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 \geq Uplift

Steel Parameters

| | | |
|----------------------------|-------|-----|
| Number of Bars = | 24 | |
| 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 = | 99.00 | ft |
| Depth to Ignore Soil = | 4.00 | 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 = | 100.0% |
| Maximum Steel Ratio = | 100.0% |

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 | 13.5 | 135 | 0 | 35 | Sand | | | | 13.5 |
| 2 | 15.5 | 150 | 0 | 35 | Sand | 80000 | | | 29 |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |
| 9 | | | | | | | | | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | | |

Soil Results: Overturning

| | | |
|------------------------|---------|----------------|
| Depth to COR = | 16.86 | ft, from Grade |
| Bending Moment, M = | 5742.56 | k-ft, from COR |
| Resisting Moment, Ma = | 6554.74 | k-ft, from COR |

| | | |
|-----------------------|-------|------|
| Shear, V = | 41.00 | kips |
| Resisting Shear, Va = | 46.80 | kips |

MOMENT RATIO = 87.6% OK

SHEAR RATIO = 87.6% OK

Soil Results: Uplift

| | | |
|-----------------------------|--------|------|
| Uplift, T = | 0.00 | kips |
| Allowable Uplift Cap., Ta = | 141.75 | kips |

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

| | | |
|----------------------------|---------|------|
| Compression, C = | 48.00 | kips |
| Allowable Comp. Cap., Ca = | 1996.67 | kips |

COMPRESSION RATIO = 2.4% OK

Steel Results (ACI 318-02):

| | | |
|----------------------|-------|-------|
| Minimum Steel Area = | 36.19 | sq in |
| Actual Steel Area = | 37.44 | sq in |

| | | |
|---------------------------|----------|----------------------------|
| Allowable Min Axial, Pa = | -1555.20 | kips, Where Ma = 0 k-ft |
| Allowable Max Axial, Pa = | 8243.37 | kips, Where Ma = 0 k-ft |
| Axial Load, P = | 87.58 | kips @ 4.75 ft Below Grade |
| Moment, M = | 5239.99 | k-ft @ 4.75 ft Below Grade |
| Allowable Moment, Ma = | 5422.44 | k-ft |

MOMENT RATIO = 96.6% 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#: 801367
 Site Name: CT NHV-2075 CAC 801367
 App #:

Enter Load Factors Below:

| | | |
|------------|-----|--------------------|
| For M (WL) | 1.3 | <---- Enter Factor |
| For P (DL) | 1.3 | <---- Enter Factor |

Pier Properties

Concrete:

Pier Diameter = 8.0 ft
 Concrete Area = 7238.2 in²

Reinforcement:

Clear Cover to Tie = 4.00 in
 Horiz. Tie Bar Size = 5
 Vert. Cage Diameter = 7.11 ft
 Vert. Cage Diameter = 85.34 in
Vertical Bar Size = 11
 Bar Diameter = 1.41 in
 Bar Area = 1.56 in²
 Number of Bars = 24
 As Total = 37.44 in²
 A s/ Aconc, Rho: 0.0052 0.52%

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
 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
 Provided Rho: 0.52% **OK**

<--- Comment Box

| Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn): | |
|--|-----------------|
| Max Pu = ($\phi=0.65$) Pn. | |
| Pn per ACI 318 (10-2) | 10716.37 kips |
| at Mu=($\phi=0.65$)Mn= | 7467.49 ft-kips |
| Max Tu, ($\phi=0.9$) Tn = | 2021.76 kips |
| at Mu= $\phi=(0.90)$ Mn= | 0.00 ft-kips |

| Maximum Shaft Superimposed Forces | | |
|-----------------------------------|---------|------------------|
| TIA Revision: | F | |
| Max. Service Shaft M: | 5239.99 | ft-kips (* Note) |
| Max. Service Shaft P: | 87.58 | 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: | 6811.987 ft-kips |
| 1.30 | Pu: | 113.854 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

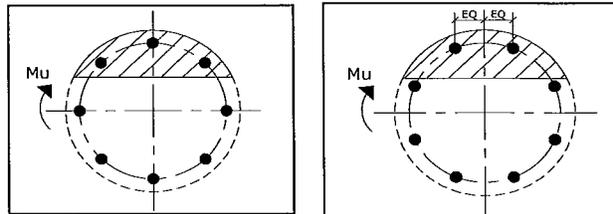
Seismic Properties

Seismic Design Category = D
 Seismic Risk = High

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

Results:

Governing Orientation Case: 2



Case 1

Case 2

Dist. From Edge to Neutral Axis: 15.06 in

Extreme Steel Strain, ϵ_t : 0.0150

$\epsilon_t > 0.0050$, Tension Controlled

Reduction Factor, ϕ : 0.900

Output Note: Negative Pu=Tension
 For Axial Compression, ϕ Pn = Pu: 113.85 kips
 Drilled Shaft Moment Capacity, ϕ Mn: 7049.16 ft-kips
 Drilled Shaft Superimposed Mu: 6811.99 ft-kips

(Mu/ ϕ Mn, Drilled Shaft Flexure CSR): 96.64%

CROWN CASTLE PROJECT: BU #801367, CT NHV-2075 CAC 801367, CHESHIRE, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIA/EIA-222-F-1998 STANDARD FOR WIND SPEEDS OF 65 MPH AND 13.6 M/PH @ 34' RADIAL ICE

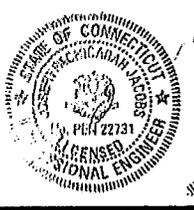
A. GENERAL NOTES

- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHALL BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
- THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
- IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED OR NOTED SHALL BE PROVIDED.
- THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE AUDITION OF WINDVEL TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2008 CROWN CASTLE DIRECTIVE, "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY CUTTING AND WELDING PLAN" (DOC # ENG-PLN-1001) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT.
- THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
- ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSIDERED AS SUPERVISION OF CONSTRUCTION.
- ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND WORKS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
- ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPAIRED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
- ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCING SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

D. "LOW HEAT" WELDING PROCEDURES - (NOT REQUIRED)

C. SPECIAL INSPECTION AND TESTING

- ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-1000 FOR SPECIFICATION
- ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSIDERED AS SUPERVISION OF CONSTRUCTION.
- OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
- AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
 - ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
 - THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
- THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND CHECK THEM AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
 - GENERAL:
 - PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR
 - FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
 - CONCRETE TESTING PER A.C.I. - (NOT REQUIRED)
 - STRUCTURAL STEEL:
 - CHECK THE STEEL ON THE JOB WITH THE PLANS.
 - CHECK MILL CERTIFICATIONS.
 - CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
 - INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED EDGES.
 - CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
 - CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
 - CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
 - CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
 - WELDING:
 - VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1
 - INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
 - APPROVE FIELD WELDING SEQUENCE.
 - A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
 - INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
 - INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
 - VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
 - INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
 - VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
 - SPOT TEST AT LEAST ONE FLETT WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
 - INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS
 - VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
 - REVIEW THE REPORTS BY TESTING LABS.
 - CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
 - INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
 - CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
 - SPECIAL INSPECTION OF EXISTING SHAF-T TO FLANGE WELD CONNECTIONS - (NOT REQUIRED)
 - REPORTS:
 - COMPLETE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
- THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DETERMINE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
- AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
- RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATION. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.



JUN 9, 2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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 53 TURTLE CREEK RD. ENGINEEERS
 204 East Second Street, Suite 1100, Colchester, CT 06423
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 39 WEST CHESHIRE STREET, SUITE 200, EAST HARTFORD, CT 06103
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BU #801367; CT NHV-2075 CAC 801367
CHESHIRE, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

| | |
|---------------------------|------------------------------------|
| PROJECT No: 37512-1657 | ISSUE DATE OF PERMIT: 6-19-2012 |
| DRAWN BY: B.M.S. | |
| CHECKED BY: K.A.L. | |
| APPROVED BY: | |
| DATE: 6-19-2012 | S-1A |

- D. STRUCTURAL STEEL**
1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
 - A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)
 - (A) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL BUILDINGS."
 - (B) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
 - (C) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
 - B. BY THE AMERICAN WELDING SOCIETY (AWS)
 - (A) "STRUCTURAL WELDING CODE - STEEL D1.1."
 - (B) "SYMBOLS FOR WELDING AND NON DESTRUCTIVE TESTING"
 2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
 3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
 4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E60XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
 6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
 8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS IF ANY.
 9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
 10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
 11. FIELD CUTTING OF STEEL:
 - (A) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
 - (B) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE. DURING THE CUTTING WORK, ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
 - (C) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GRIND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
- E. BASE PLATE GROUT - (NOT REQUIRED)**
- F. FOUNDATION WORK - (NOT REQUIRED)**

- G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**
- H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)**
- I. TOUCH UP OF GALVANIZING**
1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR REMOVED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZINC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER'S) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
 2. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZINC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.
- J. HOT DIP GALVANIZING**
1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
 2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
 3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
 4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.
- K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
 2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZINC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
 3. THE OWNER SHALL REFER TO TABLE 222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO TABLE 222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS"

P. J. Ford



25th Nov 2012

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #801367; CT NHV-2075 CAC 801367
 CHESHIRE, CT
 MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

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|------------------------------------|---------------------------------|
| PROJECT No: 37512-1657 | ISSUE DATE OF PERMIT: 6-19-2012 |
| DRAWN BY: D.M.S. | |
| CHECKED BY: K.A.L. | |
| APPROVED BY: <i>[Signature]</i> | |
| DATE: 6-19-2012 | S-2A |

AJAX BOLT NOTE SHEET: REV. 1.2, 01-23-2012

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC 31, 2009.
 2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
 4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
 1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
 PHONE 1-800-562-1999
 WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
[HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML](http://www.appliedbolting.com/applied-bolting-distributors.html)

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

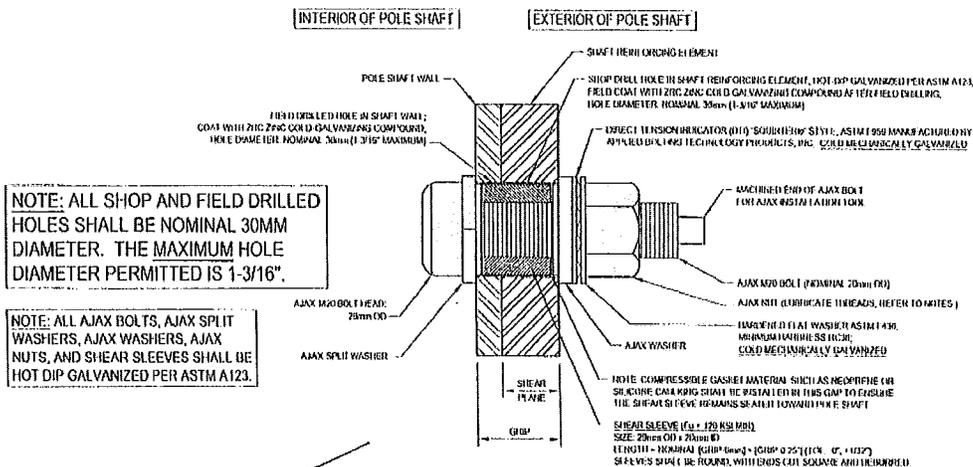
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123.

TYPICAL AJAX BOLT DETAIL 1 S-3A



AEROSOLUTIONS SHAFT REINFORCING OPTION

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|---|--|-----------------------------------|--|
| <p>PAUL J. FORD AND COMPANY STRUCTURAL ENGINEERS 280 East Street, Suite 1100, Cheshire, CT 06112 (814) 221-6079 www.pjfe.com</p> | <p>BU #801367; CT NHV-2075 CAC 801367 CHESHIRE, CT MONOPOLE REINFORCEMENT AND RETROFIT PROJECT</p> | <p>PROJECT No: 37512-1657</p> | <p>ISSUE DATE OF PERMIT: 6-19-2012</p> |
| | | <p>DRAWN BY: B.M.S.</p> | |
| <p>CROWN CASTLE 319 WEST COMMERCIAL STREET, SUITE 2600, EAST ROCHESTER, NY 14185 TEL: (585) 899-3142 FAX: (585) 899-3408</p> | <p>APPROVED BY: K.H.</p> | <p>DATE: 6-19-2012</p> | <p>S-3A</p> |

NOTE: NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY.

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37512-1657), DATED 6-19-2012.

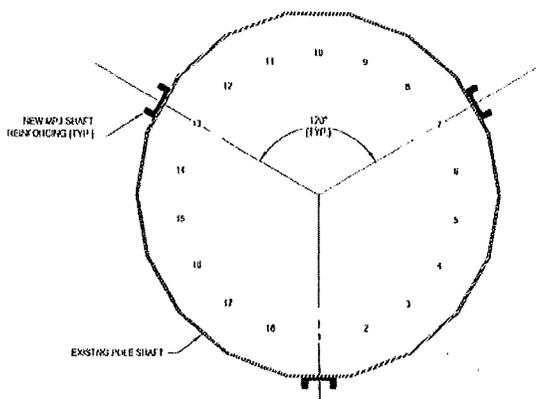
| POLE SPECIFICATIONS | |
|---------------------|--------------------------|
| POLE SHAPE TYPE: | 18 SHEET POLYGRAPH |
| TAPER: | 0.233024 IN/FT |
| SHAFT SHEEL: | ASTM A607 GRADE 65 |
| BASE PL SHEEL: | ASTM A375 GR 55 (55 KSI) |
| ANCHOR BARS: | 8102 ASTM A615 GRADE 75 |

| SHAFT SECTION DATA | | | | | |
|--------------------|-------------------|----------------------|------------------|-------------------------------|----------|
| SHAFT SECTION | SUCRGALENGTH (FT) | PLATE THICKNESS (IN) | LAP SPACING (IN) | PARAMETER CROSS SECTIONS (IN) | |
| | | | | Ø TOP | Ø BOTTOM |
| 1 | 48.75 | 0.2500 | | 74.000 | 35.300 |
| 2 | 45.00 | 0.3125 | 54.00 | 33.811 | 44.300 |
| 3 | 45.00 | 0.3750 | 66.00 | 42.303 | 52.870 |
| 4 | 45.00 | 0.4375 | 81.00 | 50.919 | 61.610 |

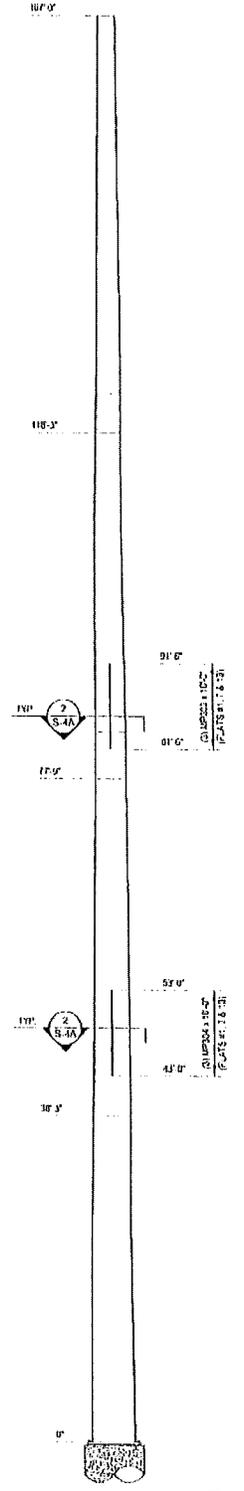
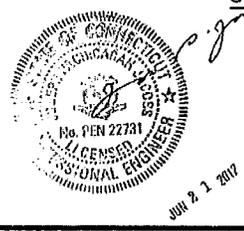
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

- NOTES:**
- ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PROPER TIGHTENING CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS, (AISC 31, 2009)
 - ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS, (AISC 31, 2009)
 - *ALL AXIAL BOLT BOLTS WITH SERRATED SERVES SHALL BE PROVIDED AND INSTALLED WITH THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOWN THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL ON SHEET S-3 FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AXIAL BOLT BOLTS
 - *IF REQUIRED: *ALL AXIAL BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI) AND UNCOATED WASHERS (DTI) SHALL BE THE SAME TYPE, MAKE, TO ASTM F590 (LATEST REVISION), AND UNCOATED WASHERS SHALL CLEAR OVER TO ASTM F44 AND HAVE A THICKNESS OF 1/16" OR GREATER.
 - *PROPERLY LUBRICATE THE THREADS OF THE AXIAL BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALVANIC CORROSION ON THE BOLT THREADS. CONSULTATION SHALL BE REQUIRED FOR THE MANUFACTURER'S INSTRUCTIONS ON PROPER LUBRICATION AND TIGHTENING. REFER TO SHEET S-3
 - *AXIAL BOLT BOLT SIZE: ALL SHAFT AND BOLT HOLE HOLES SHALL BE NOMINAL 30MM DIA. THE MAXIMUM HOLE DIA. FOR BOLT IS 1/16" IN. REFER TO SHEET S-3.

AS OF 5/20/2012 DATE FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AXIAL BOLT BOLTS TIGHTENED USING AISC "TURN OF THE NUT" METHODOLOGY. INSTALLERS SHALL FOLLOW CROWN CASTLE'S FOR AISC "TURN OF THE NUT" METHOD AND PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PM



SECTION 2 S-4A



POLE ELEVATION 1 S-4A

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #801367; CT NHV-2075 CAC 801367
CHESHIRE, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37612-1657
DRAWN BY: B.M.S.
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APPROVED BY: K.H.
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S-4A

MODIFICATION INSPECTION NOTES

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF (LOWER) MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNATED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF. HOWEVER, THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN, OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND THE INTEGRITY OF THE SALES WITH THE EOR AT ALL TIMES.

ALL MIs SHALL BE CONDUCTED BY A CROWN CASTLE FIELD ENGINEER (FE) OR LICENSED SURVEYOR (LS) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE ENGINEER-REGISTERED OR APPROVED MODIFICATIONS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS YOUR DUTY THAT THE GENERAL CONTRACTOR (GC) AND THE FIELD ENGINEER (FE) COMMUNICATING AND COORDINATING AS SOON AS A PHOTO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROVIDING INFORMATION OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN CASTLE POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 MODIFICATION INSPECTION SHOW UP FOR THE MI TASKS AND REQUIRED METS.

MI DISCRETION

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PHOTO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI REPORT
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ACCORDANCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE REQUIRED INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PHOTO FOR THE MODIFICATION INSTALLATION OF THEIR PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI REPORT
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTIONS AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND REPORT THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI REPORT AND ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DETAILING AND REPORTING:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PRIOR TO THE MI INSPECTIONS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS RECOMMENDED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL LOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTIONS TO CONDUCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS RECOMMENDED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFECTS CORRECTED DURING THE VISUAL MI. THEREFORE, THE GC MAY CHOOSE TO DEBRISATE THE MATERIALS TO ENSURE ALL CONSTRUCTION MATERIALS ARE AT THE DISPOSAL WHEN THE MI INSPECTOR IS ON-SITE.

CANCELLATION OR DELAYS IN CONSTRUCTION

IF THE GC AND MI INSPECTOR AGREE TO DATE ON WHICH THE MI WILL BE CONDUCTED AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF PROFITS AND/OR OTHER DAMAGES THAT MAY BE INCURRED BY THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY AT ANY TIME (E.G. TRAVEL AND LOGGING, COSTS OF RE-ENGINEERING OR SITE, ETC.) IF CROWN CANCELS DIRECTLY FOR A THIRD PARTY, SUCH AS THIS MAY BE MADE BY THE EOR, THE CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTY'S WORK.

CORRECTION OF TYPING ERRORS

IF THE MODIFICATION INSTALLATION WORK FOR THE MI (FIELD MI), THE GC SHALL WORK WITH CROWN TO CORRECT ANY TYPING ERRORS IN PLACE IN ONE OF THE DRAWINGS.

- CORRECT TYPING ERRORS TO CORRY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUBMITTAL TO THE EOR.
- OR, WITH CROWN'S APPROVAL, THE GC MAY PRINT WITH THE EOR TO RE-APPROVE THE MODIFICATION REPORT EVENT USING THE AS-BUILT CORRECTION.

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONTACT A VERIFICATION INSPECTOR TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTIONS OR LOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AGENCY (EOR) AFTER A MODIFICATION PROJECT IS COMPLETED, AS MONITORED BY THE DATE OF AN ACCEPTED "PASSING" OR "PASS AS BUILT" REPORT FOR THE ORIGINAL PROJECT.

PHOTOGRAPHS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND PROVIDED BY THE MI REPORT:

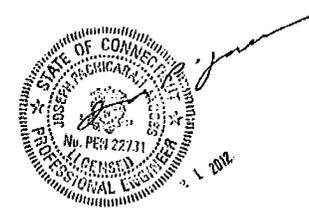
- PRE-CONSTRUCTION GENERAL SITE CONDITIONS
- PHOTOGRAPHS DURING THE MI (INCLUDE THE VERIFICATION CONSTRUCTION INSPECTION AND INSPECTION)
 - RAW MATERIALS
 - PHOTOS OF ALL CRITICAL DETAILS
 - FOUNDATION MODIFICATIONS
 - YIELD STRENGTH TESTS
 - DOT INSTALLATION AND TORQUE
 - TORN INSTALLED CONNECTION
 - SURFACE CORROSION REPORT
- POST CONSTRUCTION PHOTOGRAPHS
 - FINAL AS-BUILT DRAWING

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

| MI CHECKLIST | |
|--|---|
| CONSTRUCTION INSTALLATION INSPECTIONS AND TESTING REPORTS (COMPLETED BY EOR) | REPORT ITEM |
| PRE-CONSTRUCTION | |
| X | MI CHECKLIST DRAWINGS |
| X | EOR APPROVED SHOP DRAWINGS |
| X | FOUNDATION INSPECTION |
| NA | FABRICATION CERTIFICATION INSPECTION |
| X | MATERIAL TEST REPORT (MTR) |
| NA | FABRICATION INSPECTION |
| NA | FIELD REPORT OF MONOPOLE BASE PLATE (AS REQUIRED) |
| X | PACKING SLIPS |
| ADDITIONAL TESTING AND INSPECTIONS | |
| CONSTRUCTION | |
| X | CONSTRUCTION INSPECTIONS |
| NA | FOUNDATION INSPECTIONS |
| NA | CONCRETE COMP. STRENGTH AND SLUMP TESTS |
| NA | POST INSTALLATION ANCHOR VERIFICATION |
| NA | BASE PLATE GROUT VERIFICATION |
| NA | CONTRACTORS CERTIFIED WITH INSPECTION |
| NA | FOUNDATION TIGHT AND DENSITY |
| X | ON-SITE GUY WIRE VERIFICATION |
| NA | GUY WIRE TENSION REPORT |
| X | GC AS-BUILT DOCUMENTS |
| X | INSPECTION OF DOT TENSION PER ASSOCIATION SPEC |
| X | INSPECTION OF ANCHORS AND TIGHTS PER ASSOCIATION SPEC |
| ADDITIONAL TESTING AND INSPECTIONS | |
| POST-CONSTRUCTION | |
| X | MI INSPECTION REVIEW OF THE MI DRAWINGS |
| NA | POST INSTALLATION ANCHOR REPORT TESTING |
| X | PHOTOGRAPHS |
| ADDITIONAL TESTING AND INSPECTIONS | |

NOTE: X DENOTES A DOCUMENT AFFECTED FOR THE MI REPORT. NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT.



AEROSOLUTIONS SHAFT REINFORCING OPTION

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|--|--|---|-----------------------------------|--|
| <p>PAUL J. FORD AND COMPANY STRUCTURAL ENGINEERS 100 East Main Street, Suite 1000 Colchester, CT 06422 (860) 421-2211 www.pjf.com</p> | <p>BU #801367; CT NHV-2075 CAC 801367 CHESHIRE, CT MONOPOLE REINFORCEMENT AND RETROFIT PROJECT</p> | | <p>PROJECT No: 37512-1607</p> | <p>ISSUE DATE OF PERMIT: 6-19-2012</p> |
| | <p>CROWN CASTLE 319 WEST COMMERCIAL STREET, SUITE 300, EAST ROCKFORD, IL 61419 PH: (815) 899-3412 FAX: (815) 899-3418</p> | <p>DRAWN BY: B.M.S.</p> <p>CHECKED BY: K.A.T.</p> <p>APPROVED BY: <i>[Signature]</i></p> <p>DATE: 6-19-2012</p> | <p>S-5A</p> | |

CROWN CASTLE PROJECT: BU #801367, CT NHV-2075 CAC 801367; CHESHIRE, CT
 MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIAEIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 85 MPH AND 13.6 MPH + 3/4" RADIAL ICE

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIAEIA-222-F BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR THE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT. **IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES:** THE CONTRACTOR SHALL FOLLOW ALL CURRENT CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT."
5. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL BE NEW AND OF GOOD QUALITY. FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS, ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED, AND/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. "LOW HEAT" WELDING PROCEDURES - (NOT REQUIRED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
 2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
 3. OBSERVATION VISITS TO THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
 4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
 - (A) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
 - (B) THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
 5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND CONFORMANT WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
 - A. GENERAL:
 - (1) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
 - B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
 - C. CONCRETE TESTING PER A31 - (NOT REQUIRED)
 - D. STRUCTURAL STEEL
 - (1) CHECK THE STEEL ON THE JOB WITH THE PLANS.
 - (2) CHECK MILL CERTIFICATIONS.
 - (3) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
 - (4) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
 - (5) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
 - (6) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
 - (7) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
 - (8) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
 - E. WELDING
 - (1) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
 - (2) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
 - (3) APPROVE FIELD WELDING SEQUENCE:
 - (A) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
 - (4) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
 - (A) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
 - (B) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
 - (C) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
 - (D) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
 - (E) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
 - (F) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
 - (G) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
 - (H) REVIEW THE REPORTS BY TESTING LABS.
 - (I) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
 - (J) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
 - (K) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
 - F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS - (NOT REQUIRED)
 - G. REPORTS
 - (1) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
6. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATION. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #801367; CT NHV-2075 CAC 801367
CHESHIRE, CT
 MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No:
37512-1657
 DRAWN BY:
B.M.S.
 CHECKED BY:
K.A.T.
 APPROVED BY:
 DATE:
6-19-2012

ISSUE DATE OF
PERMIT: 6-19-2012

S-1A

- D. STRUCTURAL STEEL**
1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
 - A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
 - (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL BUILDINGS."
 - (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
 - (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
 - B. BY THE AMERICAN WELDING SOCIETY (AWS):
 - (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
 - (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"
 2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
 3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/8 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
 4. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
 6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 7. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH-UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
 8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
 9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
 10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
 11. FIELD CUTTING OF STEEL:
 - (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
 - (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE. DURING THE CUTTING WORK, ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
 - (C.) ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
- E. BASE PLATE GROUT - (NOT REQUIRED)**
- F. FOUNDATION WORK - (NOT REQUIRED)**

- G. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**
- H. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)**
- I. TOUCH UP OF GALVANIZING**
1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
 2. THE OWNER'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.
- J. HOT DIP GALVANIZING**
1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
 2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
 3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
 4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.
- K. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
 2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE CONNECTED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
- THE OWNER SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. PAUL J. FORD & COMPANY RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #801367; CT NHV-2075 CAC 801367
CHESHIRE, CT
 MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

| | |
|---------------------------|------------------------------------|
| PROJECT No: 37512-1657 | ISSUE DATE OF PERMIT: 6-19-2012 |
| DRAWN BY: B.M.S. | S-2A |
| CHECKED BY: K.A.T. | |
| APPROVED BY: | |
| DATE: 6-19-2012 | |

AJAX BOLT NOTE SHEET: REV. 1.2, 01-23-2012

- NOTES:**
1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
 3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
 4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURER'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
 1413 ROCKINGHAM ROAD BELLOWS FALLS, VERMONT, USA 05101
 PHONE 1-800-552-1999
 WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
[HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML](http://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML)

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

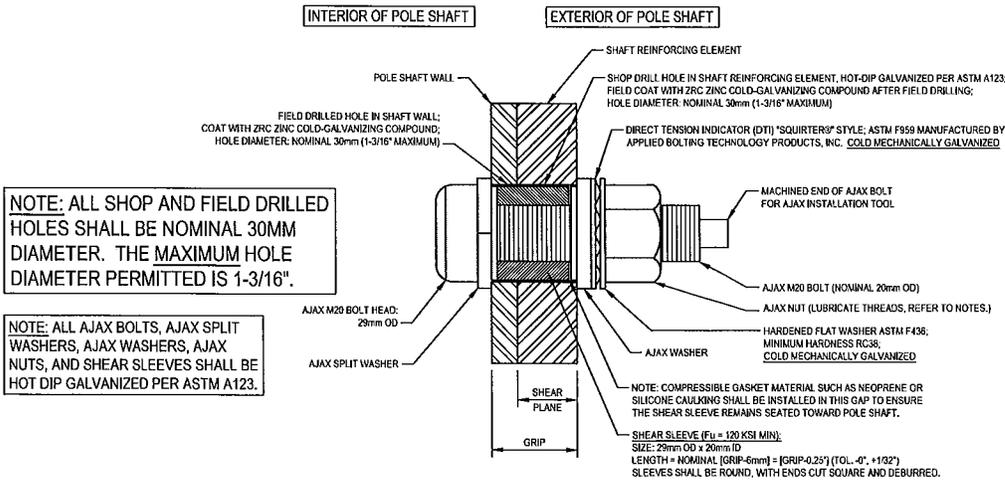
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



TYPICAL AJAX BOLT DETAIL 1
 S-3A

AEROSOLUTIONS SHAFT REINFORCING OPTION

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BU #801367; CT NHV-2075 CAC 801367
 CHESHIRE, CT
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NOTE: NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY.

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37512-1657), DATED 6-19-2012.

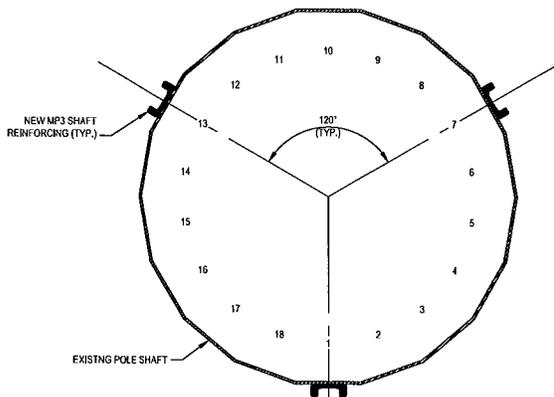
| POLE SPECIFICATIONS | |
|---------------------|------------------------------------|
| POLE SHAPE TYPE: | 18-SIDED POLYGON |
| TAPER: | 0.233274 IN/FT |
| SHAFT STEEL: | ASTM A607 GRADE 85 |
| BASE PL. STEEL: | ASTM A572 GR. 55 (55 KSI) |
| ANCHOR RODS: | 2 1/4"Ø #18J ASTM A615 GRADE 75 |

| SHAFT SECTION DATA | | | | | |
|--------------------|---------------------|----------------------|-----------------|----------------------------|----------|
| SHAFT SECTION | SECTION LENGTH (FT) | PLATE THICKNESS (IN) | LAP SPLICE (IN) | DIAMETER ACROSS FLATS (IN) | |
| | | | | @ TOP | @ BOTTOM |
| 1 | 48.75 | 0.2500 | 54.00 | 24.000 | 35.360 |
| 2 | 45.00 | 0.3125 | 60.00 | 33.811 | 44.300 |
| 3 | 45.00 | 0.3750 | 61.00 | 42.393 | 52.870 |
| 4 | 45.00 | 0.4375 | 61.00 | 50.549 | 61.040 |

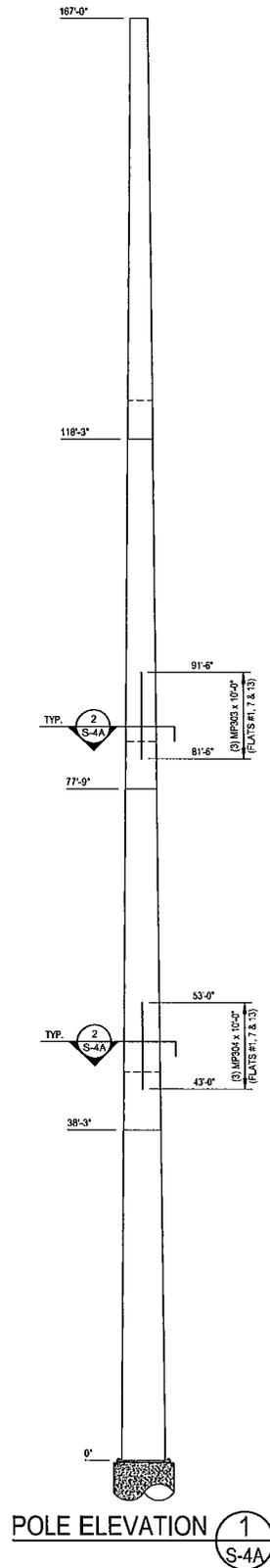
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

- NOTES:
- ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009.
 - ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS, DEC. 31, 2009.
 - * ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL ON SHEET S-3 FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.
 - DTIS REQUIRED: * ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTIS) AND HARDENED WASHERS. DTIS SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF RC 38 OR HIGHER.
 - NUT LUBRICATION REQUIRED: * PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING. REFER TO SHEET S-3.
 - AJAX BOLT HOLE SIZE: ALL SHOP- AND FIELD-DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16". REFER TO SHEET S-3.

* AS OF 5/30/2012, UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-THE-NUT" METHODOLOGY. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-THE-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PML



SECTION 2 S-4A



POLE ELEVATION 1 S-4A

AEROSOLUTIONS SHAFT REINFORCING OPTION

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MODIFICATION INSPECTION NOTES:

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF. NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MFS SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AN ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTIONS TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON-SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MFS

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ('FAILED MI'), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT ADVISEE/FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED 'PASSING MI' OR 'PASS AS NOTED MI' REPORT FOR THE ORIGINAL PROJECT.

PHOTOGRAPHS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
 - RAW MATERIALS
 - PHOTOS OF ALL CRITICAL DETAILS
 - FOUNDATION MODIFICATIONS
 - WELD PREPARATION
 - BOLT INSTALLATION AND TORQUE
 - FINAL INSTALLED CONDITION
 - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
 - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

MI CHECKLIST

| CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR) | REPORT ITEM |
|---|---|
| PRE-CONSTRUCTION | |
| X | MI CHECKLIST DRAWINGS |
| X | EOR APPROVED SHOP DRAWINGS |
| X | FABRICATION INSPECTION |
| NA | FABRICATOR CERTIFIED WELD INSPECTION |
| X | MATERIAL TEST REPORT (MTR) |
| NA | FABRICATOR NDE INSPECTION |
| NA | NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED) |
| X | PACKING SLIPS |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| CONSTRUCTION | |
| X | CONSTRUCTION INSPECTIONS |
| NA | FOUNDATION INSPECTIONS |
| NA | CONCRETE COMP. STRENGTH AND SLUMP TESTS |
| NA | POST INSTALLED ANCHOR ROD VERIFICATION |
| NA | BASE PLATE GROUT VERIFICATION |
| NA | CONTRACTOR'S CERTIFIED WELD INSPECTION |
| NA | EARTHWORK: LIFT AND DENSITY |
| X | ON SITE COLD GALVANIZING VERIFICATION |
| NA | GUY WIRE TENSION REPORT |
| X | GC AS-BUILT DOCUMENTS |
| X | INSPECTION OF BOLT PRETENSION PER AISC BOLT SPEC. |
| X | INSPECTION OF AJAX BOLTS AND DTFS PER REQUIREMENTS ON SHEET S-3 |
| ADDITIONAL TESTING AND INSPECTIONS: | |
| POST-CONSTRUCTION | |
| X | MI INSPECTOR REDLINE OR RECORD DRAWING(S) |
| NA | POST INSTALLED ANCHOR ROD PULL-OUT TESTING |
| X | PHOTOGRAPHS |
| ADDITIONAL TESTING AND INSPECTIONS: | |

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

AEROSOLUTIONS SHAFT REINFORCING OPTION


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BU #801367; CT NHV-2075 CAC 801367
CHESHIRE, CT
 MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

| | |
|---------------------------|---------------------------------|
| PROJECT No: 37512-1657 | ISSUE DATE OF PERMIT: 6-19-2012 |
| DRAWN BY: B.M.S. | |
| CHECKED BY: K.A.T. | |
| APPROVED BY: | |
| DATE: 6-19-2012 | S-5A |