CONSTRUCTION SERVICES
of Branford, LLC

March 23, 2015

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

RE: **Notice of Exempt Modification to an existing 12' monopole tower located at 311 Old Gate Lane, Milford, Connecticut**

Latitude: 41 14 2.59 / Longitude:73 1 22.4

Dear Ms.Bachman:

Crown Castle International ("Crown") intends to perform work to reinforce the structural integrity of the existing 120'-foot monopole tower facility which it owns at the premises known as 311 Old Gate Lane, Milford, Connecticut ("Facility"). This proposed installation constitutes an exempt modification pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes Section 16-50g et seq. and Connecticut Agencies Regs § 16-50j-72(b)(2). Pursuant to R.C.S.A. 16-50j-73, Crown is providing notice to Benjamin G. Blake, Mayor of the City of Milford.

Under the Council's regulations (Conn. Agencies Regs. Sec 16-50j-72(b)), Crown's plans do not constitute a modification subject to the Council's review because Crown will not change the height of the Tower, will not extend the boundaries of the compound, will not increase the noise levels at the site, and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards.

Tower

The Facility consists of a one hundred twenty foot (120') foot high monopole tower located at 311 Old Gate Lane Drive, Milford, Connecticut . The Tower is owned by Crown. The tower currently supports Verizon Wireless antennas at the one hundred foot (100') centerline AGL, and Sprint at the one hundred seventeen foot (117') centerline AGL. The antenna locations are set forth on Drawing S-4 of the attached drawings in Exhibit A.

Structural Analysis

A structural analysis of the Tower was prepared by Paul J. Ford and Company and is attached hereto as Exhibit B. The report indicates that the Tower, with the proposed reinforcements is adequate to support the proposed loading.

(203) 488-0712 • FAX (203) 481-1135 • 1-800-870-0106 63-3 North Branford Rd. Branford, CT 06405-2848
www.csofb.com

The present request does not include and antenna or other RF work and as such, will not adversely impact the health and safety of the surrounding community or the people working on the Tower.

Conclusion

Crown's proposal does not constitute a modification subject to the Council's jurisdiction because:

Crown will not increase the height of the Tower;

Will not extend the boundaries of the site;

Will not increase the noise levels at the existing facility by six decibels or more; and

The total radio frequency electromagnetic radiation power density will stay within all applicable standards.

Respectfully submitted,
Crown Castle

By_____
Raymond J. Lemley, consultant
Ray@iwsllc.net
203-499-8631

cc: Milford Mayor, Honorable Benjamin G. Blake
Milford Building Official, Joseph D. Griffith

Exhibit A

37513-2057.007.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #876309; MILFORD JAI-ALAI

APP: 241961 REV. 1; WO: 954061

SITE ADDRESS

311 OLD GATE LANE
MILFORD, CONNECTICUT 06460
NEW HAVEN COUNTY

PROJECT NOTES

1. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT PLANS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.

2. 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.

3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

4. (A.) DTI'S REQUIRED: ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. 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 DETAILS ON SHEET S-3 FOR REQUIREMENTS ON THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

   (B.) EFFECTIVE 5/30/2012: UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-NUT" METHOD. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI. PRIOR TO STARTING WORK, CONTRACTOR SHALL CONSULT WITH CROWN ENGINEERING TO DETERMINE WHETHER THIS POLICY IS STILL IN PLACE.

   (C.) REQUIREMENT EFFECTIVE 04/20/2013, PER CROWN CASTLE DIRECTIVE: ANY AND ALL STRUCTURAL BOLTS THAT ARE TIGHTENED TO THE PRETENSIONED CONDITION USING THE AISC "TURN-OF-NUT" TENSIONING PROCEDURE (NON-TENSION CONTROLLED ["NON-TC"] BOLTS AND/OR BOLTS WITHOUT DTI'S INSTALLED) SHALL BE INSPECTED ONSITE BY AN INDEPENDENT THIRD-PARTY BOLT INSPECTOR, AS APPROVED BY CROWN. **THIS INSPECTION IS REQUIRED TO BE AN ONSITE FIELD INSPECTION.** THE THIRD-PARTY BOLT INSPECTOR SHALL FOLLOW THE PUBLISHED CROWN CASTLE INSPECTION PROCEDURE "MI NON-TC BOLT INSPECTION", DATED APRIL 2013. THE THIRD-PARTY BOLT INSPECTOR SHALL PREPARE A FULLY DOCUMENTED BOLT INSPECTION REPORT, AS SPECIFIED BY CROWN, AND SHALL SUBMIT A COPY OF THE BOLT INSPECTION REPORT TO THE MI INSPECTOR, THE EOR, AND TO CROWN CASTLE.

PROJECT CONTACTS:

MONOPOLE OWNER:
CROWN CASTLE
MOD PM: JERRY BRUNO AT JERRY.BRUNO@CROWNCASTLE.COM
PH: (781) 970-0069

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE 2005 CONNECTICUT BUILDING CODE AND THE TIA/EIA-222-F-1996 STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS, USING A DESIGN BASIC WIND SPEED OF 90 MPH (FASTEST MILE) WITH NO ICE, 37.6 MPH WITH 1-1/4 INCH ICE AND 50 MPH SERVICE LOADS.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37513-2057.007.7700), DATED 12-15-2014.

THIS PROJECT INCLUDES THE FOLLOWING REINFORCING ELEMENTS:

WELDED FLANGE BRIDGE STIFFENERS
BOLTED FLANGE BRIDGE STIFFENERS
SHAFT REINFORCING
ROCK ANCHORS
POST INSTALLED ANCHOR RODS

SHEET INDEX

3-9-15

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PH: (585) 899-3445

BU #876309; MILFORD JAI-ALAI
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	TITLE SHEET
CHECKED BY: J.W.M.	
APPROVED BY:	
DATE: 12-15-2014	T-1

CROWN CASTLE PROJECT: BU #876309; MILFORD JAI-ALAI; MILFORD, CONNECTICUT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

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 TIA/EIA-222-F-1996 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 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 12-01-2005 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 ENSURE 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. (SECTION NOT USED)

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. 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.
   (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 COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   A. GENERAL:
      (1.) PERFORM PERIODIC 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 ACI - (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. 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 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.

3.9.15

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BU #876309; MILFORD JAI-ALAI
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	GENERAL NOTES
CHECKED BY: J.W.M.	
APPROVED BY: JTK	
DATE: 12-15-2014	S-1

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 FOR 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 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.**
2. 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.
3. 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.**
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".

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30001
LICENSED PROFESSIONAL ENGINEER

39.15

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BU #876309; MILFORD JAI-ALAI
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	GENERAL NOTES
CHECKED BY: J.W.M.	
APPROVED BY: JTK	S-2
DATE: 12-15-2014	

AJAX BOLT NOTE SHEET: REV. 1.5, 5-12-2014

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 RED DURABLE SQUIRT MEDIA 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.:

PART NUMBER: 2DTIM208MGAFSIF

DESCRIPTION: P.C. 8.8 DTI SQUIRTER WASHER WITH RED DURABLE SQUIRT MEDIA DESIGNED SPECIFICALLY FOR THE AJAX M20 ONESIDE BOLT. FINISH SHALL BE ZINC GALVANIZED AS PROVIDED BY THE DTI MANUFACTURER.

DISTRIBUTOR CONTACT DETAILS:
ALLFASTENERS
15401 COMMERCE PARK DR.
BROOKPARK, OHIO 44142
PHONE: 440-232-6060
E-MAIL: SALES@ALLFASTENERS.COM

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) 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 20 MM (M20) 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.

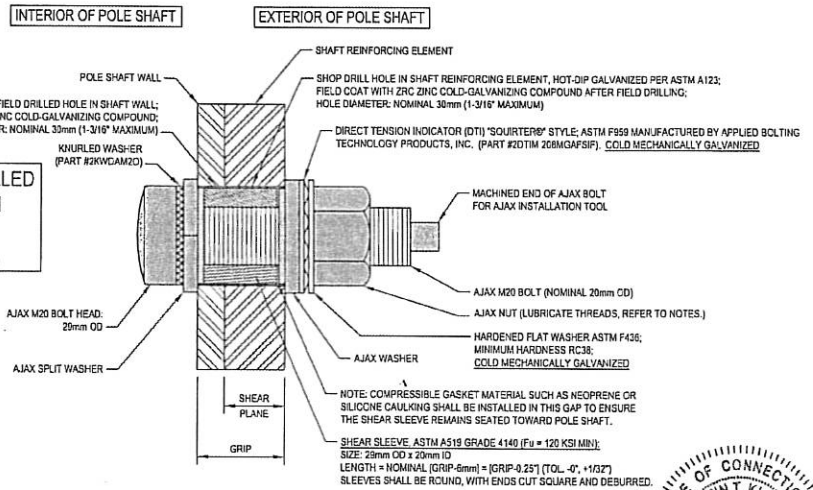
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE 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 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1/S-3

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BU #876309; MILFORD JAI-ALAI
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	AJAX BOLT DETAIL
CHECKED BY: J.W.M.	
APPROVED BY: JTK	
DATE: 12-15-2014	S-3

37513-2057.007.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	ROUND
TAPER:	N/A
SHAFT STEEL:	ASTM A53-B-42
BASE PL STEEL:	ASTM A36
ANCHOR RODS:	1 1/2"ø A354 GR BC

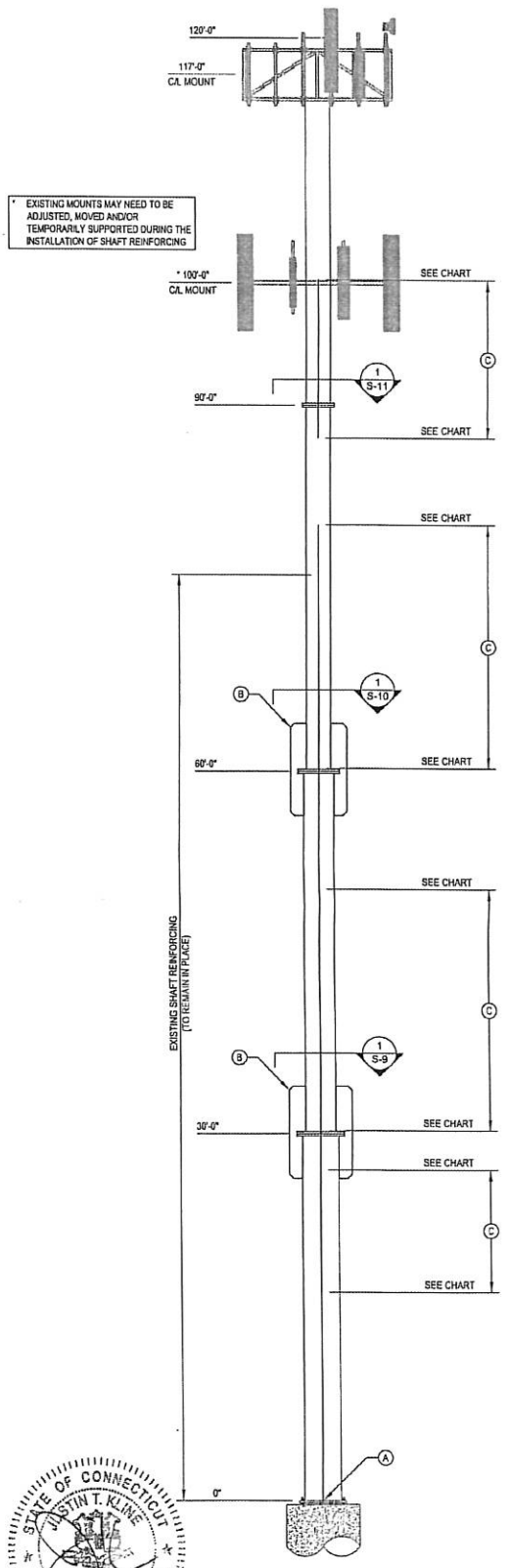
SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	30.00	0.2500		24.000	24.000
2	30.00	0.3750		24.000	24.000
3	30.00	0.3750		30.000	30.000
4	30.00	0.3750		36.000	36.000
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES					

MODIFICATIONS:

(A) INSTALL NEW ROCK ANCHORS AND BRACKETS AT BASE PLATE. SEE SHEETS S-6 TO S-8.

(B) INSTALL NEW WELDED FLANGE BRIDGE STIFFENERS AT EL. 30' AND 60'. SEE SHEETS S-9 & S-10.

(C) INSTALL NEW SHAFT REINFORCING AND BOLTED FLANGE BRIDGE STIFFENERS AT EL. 90'. SEE CHARTS ON SHEET S-5 AND DETAILS ON SHEET S-11.



POLE ELEVATION 1 / S-4

STATE OF CONNECTICUT
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PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	MONOPOLE PROFILE
CHECKED BY: J.W.M.	
APPROVED BY: JTK	S-4
DATE: 12-15-2014	

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE											
BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
17' - 0"	27' - 0"	90, 210 & 330	CCI-SFP-04007510	10' - 0"	3	13	39	4	4	16"	306 LBS.
30' - 3"	50' - 3"	90, 210 & 330	CCI-SFP-04007520	20' - 0"	3	21	63	4	4	16"	612 LBS.
60' - 3"	80' - 3"	90, 210 & 330	CCI-SFP-04007520	20' - 0"	3	21	63	4	4	16"	612 LBS.
90' - 3"	100' - 3"	90, 210 & 330	(CUSTOM) CCI-AFP-04007510	10' - 0"	3	19	57	8	6	16"	306 LBS.
							222				1836 LBS.

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO 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.
3.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6.) ALL SHIMS SHALL BE ASTM A-36.

		Jump Plate Size		Unbraced Length					Filler Plate Size					
Level	QNTY	Width (in)	Thk (in)	(Bolt Spacing at Flange) (in)	Jump Plate Length (in)	Jump Weight	Bottom Bolts	Top Bolts	Width (in)	Thk (in)	Sft Plt Thk (in)	Filler Plate Length (in)	Filler Weight	Weld Length (in)
90'	3	4	0.75	16	64	163	8	8	5	4.00		27	459	162
									5	3.25	0.75	27	373	162
					Total Jump Wt.	163	lbs					Total Jump Wt.	832	lbs
												Total Steel Weight	995	lbs
												Total Weld Length	324	in
												Total AJAX bolts	48	
				Distance from Pole to edge of Flange		4.0	in							

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO 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.
3.) ALL FILLER BARS SHALL BE ASTM A572 GR. 36
3.) ALL JUMP BARS SHALL BE ASTM A572 GR. 65
4.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.

3.9.15

CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712; 7,849,659; 8,424,269 AND PATENT PENDING

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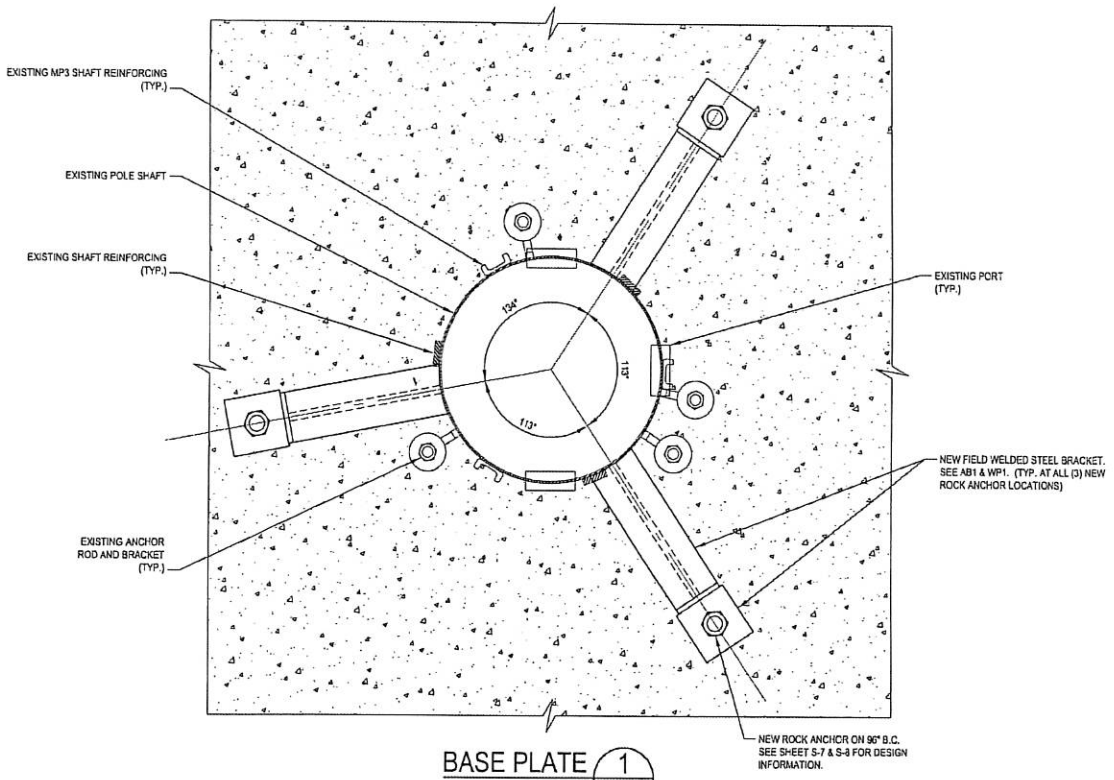
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

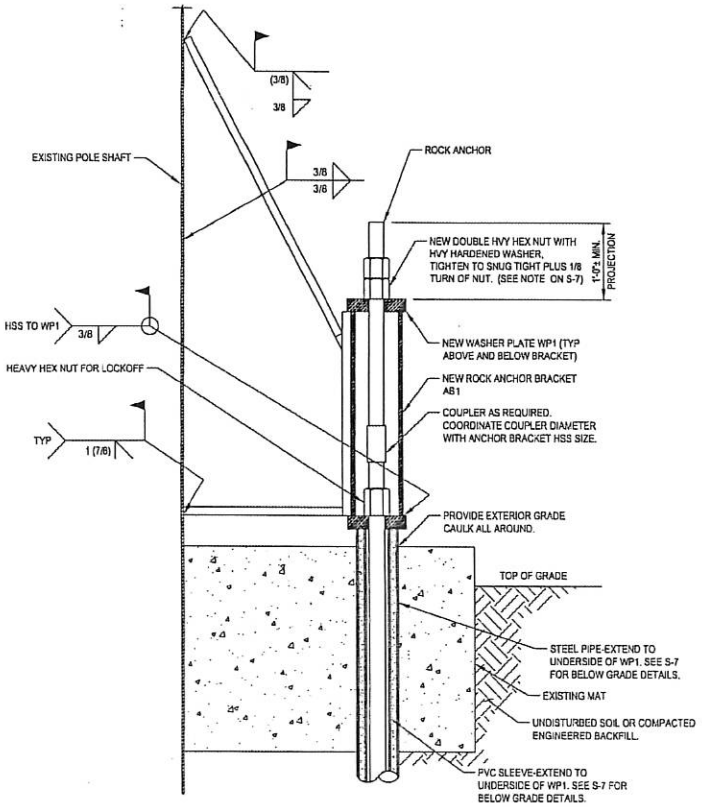
PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	SHAFT REINFORCING CHARTS
CHECKED BY: J.W.M.	
APPROVED BY: JTK	S-5
DATE: 12-15-2014	

37513-2057.007.DWG



BASE PLATE 1 S-6



NEW BRACKET DETAIL 1 S-6

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PROJECT: 37513-2057.007.7700	
DRAWN BY: B.M.S.	BASE PLATE DETAILS
CHECKED BY: J.W.M.	
APPROVED BY: JJK	S-6
DATE: 12-15-2014	

37513-2057.007.DWG

* THE DESIGN REQUIRES ROCK ANCHORS FOR THE LISTED CAPACITY IN TENSION AND PILE CAPACITY FOR COMPRESSION AS LAID OUT PER PLAN. THE CONTRACTOR/ROCK ANCHOR INSTALLER IS RESPONSIBLE FOR THE MEANS AND METHODS TO ENSURE THE NECESSARY CAPACITY AND WILL DEMONSTRATE THE INSTALLED CAPACITY PER THE SPECIFIED TESTING. THE EMBEDMENT DEPTH AND GROUT DIAMETER ARE LISTED AS A PRELIMINARY BASIS FOR BIDDING. THE INTENT IS FOR THE INSTALLER TO REVIEW THE CURRENT SOIL INFORMATION AND DESIGN REQUIREMENTS TO ENSURE THAT THE CONTRACTOR'S SPECIFIC EQUIPMENT OR INSTALLATION TECHNIQUE IS APPROPRIATE. IF THE CONTRACTOR BELIEVES THE SCOPE SHOULD CHANGE UPON REVIEW, PLEASE ADDRESS PRIOR TO BIDDING. PLEASE COORDINATE WITH ENGINEER OF RECORD PRIOR TO INSTALLATION.

ROCK ANCHOR NOTES:

1. ALL BAR STEEL AND ASSOCIATED HARDWARE SHALL BE SUPPLIED BY WILLIAMS FORM ENGINEERING CORP. OR OWNER/EOR APPROVED EQUIVALENT.
2. ALL BAR, NUTS AND BEARING PLATES SHALL BE HOT-DIP GALVANIZED PER ASTM A123 OR A153, AS APPROPRIATE.
3. CONTACT WILLIAMS FORM ENGINEERING CORP. (OR MANUFACTURER OF APPROVED ALTERNATE) FOR MATERIALS AND INSTALLATION PROCEDURES AND RECOMMENDATIONS.
4. SPECIAL INSPECTION OF THE ROCK ANCHORS IS REQUIRED AS FOLLOWS: (1) VERIFY THAT ROCK ANCHOR AND PIPE MATERIAL, SIZE AND LENGTH COMPLY WITH THE INFORMATION SHOWN ON THIS DRAWING, (2) VERIFY PLACEMENT OF EACH ROCK ANCHOR, (3) OBSERVE DRILLING, GROUTING AND TESTING (AS APPROPRIATE) OPERATIONS FOR EACH ROCK ANCHOR AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ROCK ANCHOR.
5. CONTACT WILLIAMS FORM ENGINEERING CORP. (OR MANUFACTURER OF APPROVED ALTERNATE) TO VERIFY NUT & WASHER CONNECTION ARE COMPATIBLE WITH ROCK ANCHOR THREADS

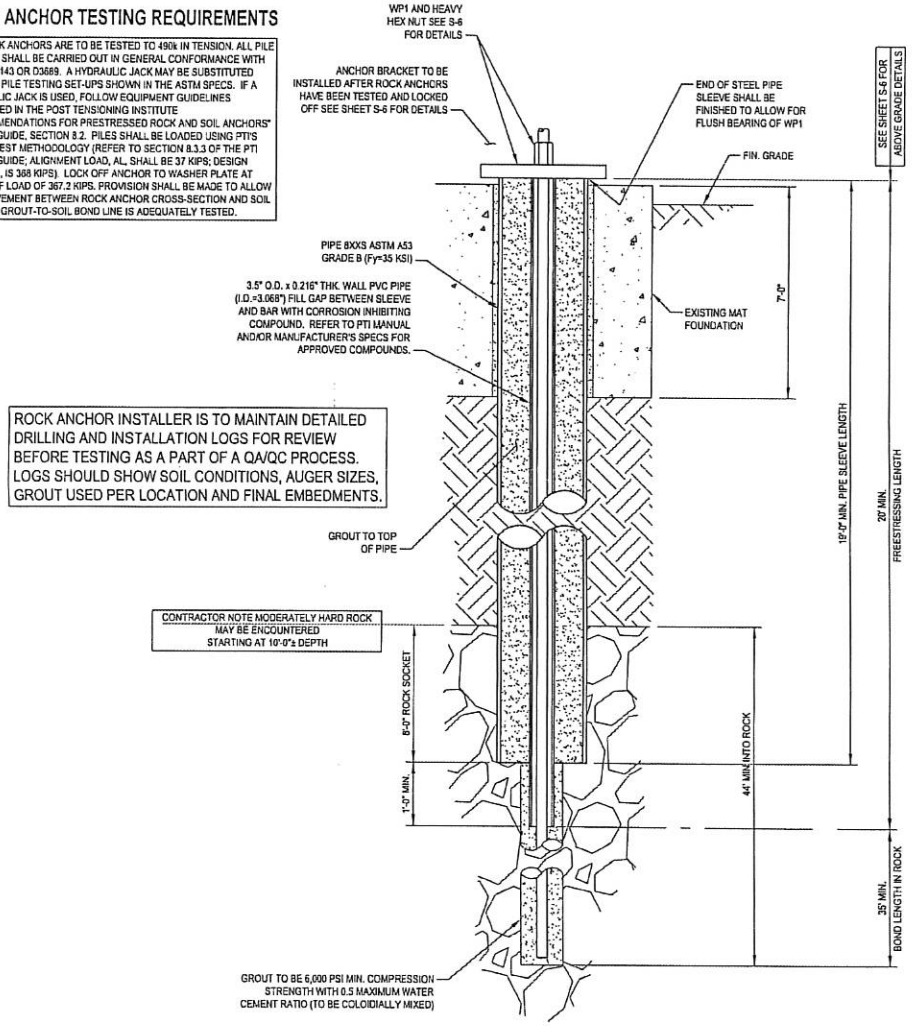
DRILLER/INSTALLER SOIL DESIGN PARAMETERS

LAYER THICKNESS	BORING LOG	ULTIMATE GROUT BOND VALUES	AUGER/CORE HOLE DESIGN SIZE
10'-0"±	SILTY SANDS	IGNORE/SLEEVE	PIPE ø
10'-0"±	WEATHERED ROCK	IGNORE/SLEEVE	PIPE ø
22'-0"±	WEATHERED ROCK	37.5 PSI	6" / 6.375"
13'-0"±	SCHIST	200 PSI	6" / 6.375"

SOIL VALUES WERE PROVIDED FROM FDH REPORT NO. 146G3C1600 DATED 12/12/2014.

ROCK ANCHOR TESTING REQUIREMENTS

ALL ROCK ANCHORS ARE TO BE TESTED TO 490k IN TENSION. ALL PILE TESTING SHALL BE CARRIED OUT IN GENERAL CONFORMANCE WITH ASTM D1143 OR D3689. A HYDRAULIC JACK MAY BE SUBSTITUTED FOR THE PILE TESTING SET-UPS SHOWN IN THE ASTM SPECS. IF A HYDRAULIC JACK IS USED, FOLLOW EQUIPMENT GUIDELINES DISCUSSED IN THE POST TENSIONING INSTITUTE "RECOMMENDATIONS FOR PRESTRESSED ROCK AND SOIL ANCHORS" DESIGN GUIDE, SECTION 8.2. PILES SHALL BE LOADED USING PTI'S PROOF TEST METHODOLOGY (REFER TO SECTION 8.3.3 OF THE PTI DESIGN GUIDE; ALIGNMENT LOAD, AL, SHALL BE 37 KIPS; DESIGN LOAD, DL, IS 368 KIPS). LOCK OFF ANCHOR TO WASHER PLATE AT LOCK OFF LOAD OF 367.2 KIPS. PROVISION SHALL BE MADE TO ALLOW FOR MOVEMENT BETWEEN ROCK ANCHOR CROSS-SECTION AND SOIL SO THAT GROUT-TO-SOIL BOND LINE IS ADEQUATELY TESTED.



PROPOSED ANCHOR DESIGN PARAMETERS (1 / S-7)
(TYPICAL)

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PILE DESIGN PARAMETER SCHEDULE

OPTIONS \ PARAMETER	ROCK ANCHOR	PILE CAPACITY ø Pn (kips)	EXTENSION ABOVE PIPE	FREESTRESSING LENGTH	FRICTION DEVELOPMENT LENGTH/BOND LENGTH	TOTAL LENGTH
ROCK ANCHOR	* 2 1/4"ø	489.6	6" MIN.	20' MIN.	35' MIN.	61' MIN.

* DESIGN BASED ON 2 1/4"ø WILLIAMS R71 (150 KSI)

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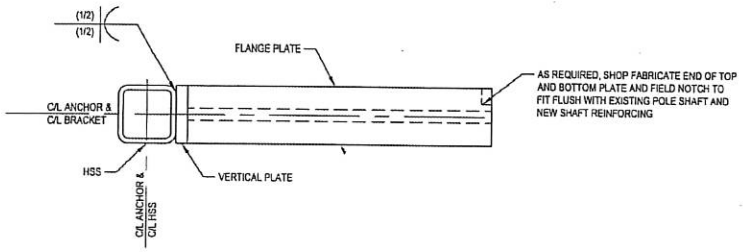
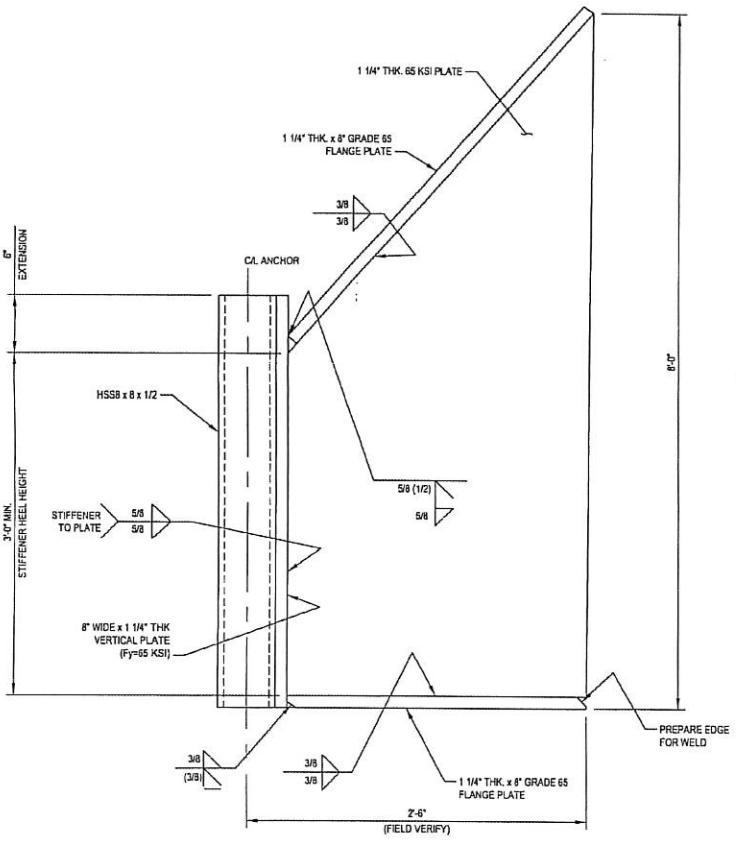
PH: (585) 999-3445

BU #876309; MILFORD JAI-ALAI
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700

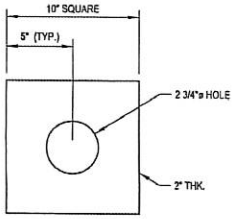
DRAWN BY: B.M.S.	ROCK ANCHOR DETAILS
CHECKED BY: J.W.M.	
APPROVED BY: JTK	S-7
DATE: 12-15-2014	





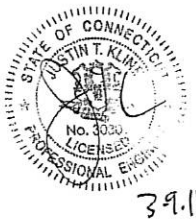
NEW ANCHOR BRACKET MK~AB1

(3 REQUIRED) (TUBE Fy = 46 KSI) (STIFFENER Fy = 65 KSI)



WASHER PLATE MK~WP1

(6 REQUIRED) (Fy = 50 KSI)



12.9.15

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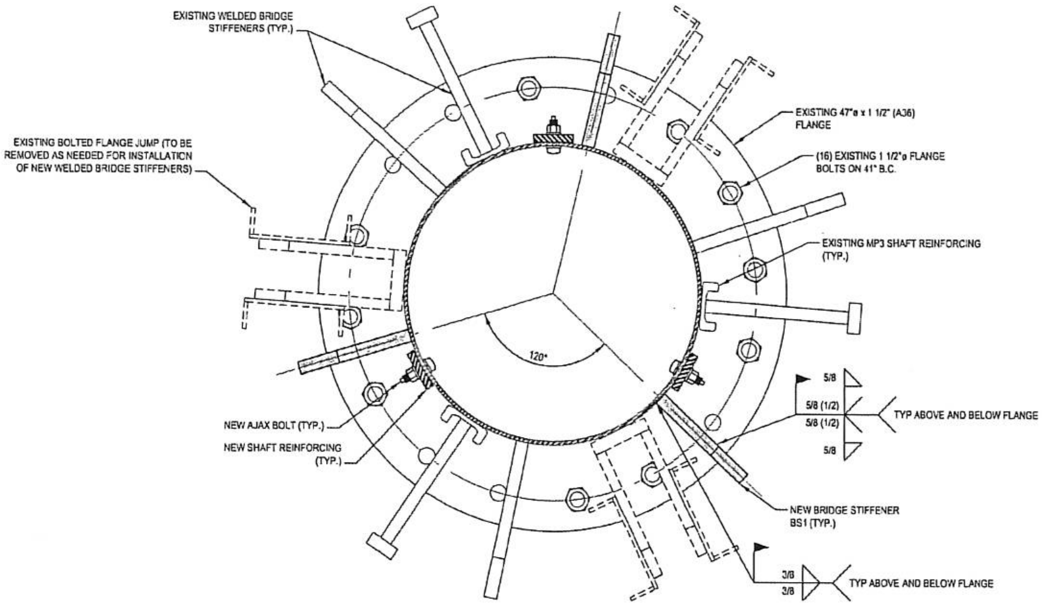
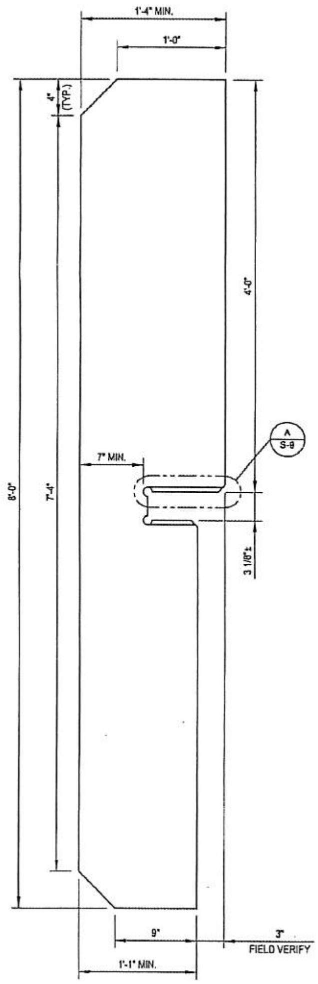
PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	ROCK ANCHOR MISC DETAILS
CHECKED BY: J.W.M.	
APPROVED BY: JTK	S-8
DATE: 12-15-2014	

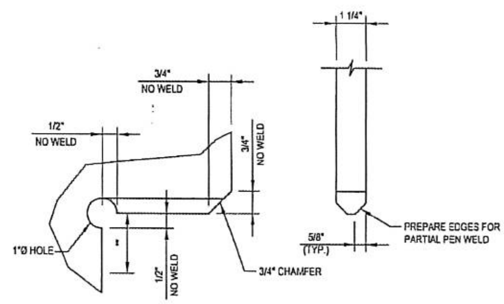
37513-2057.007.DWG



SHAFT PLAN 1 / S-9
EL. 30'



BRIDGE STIFFENER MK~BS1
(3 REQUIRED) (Fy = 65 KSI)



DETAIL A
(TYPICAL)

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30...
LICENSED
PROFESSIONAL ENG...

3.9.15

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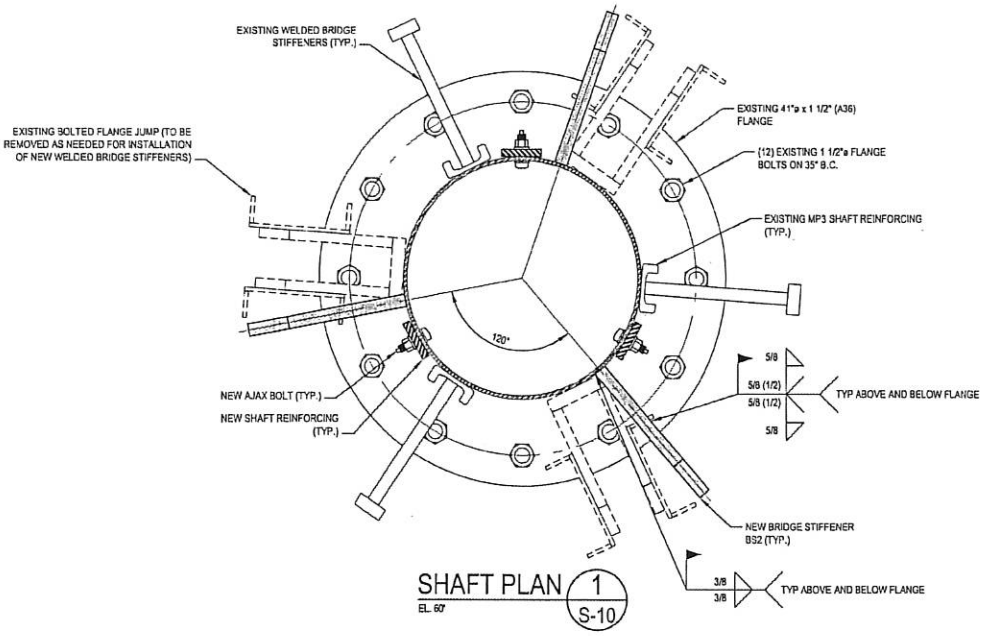
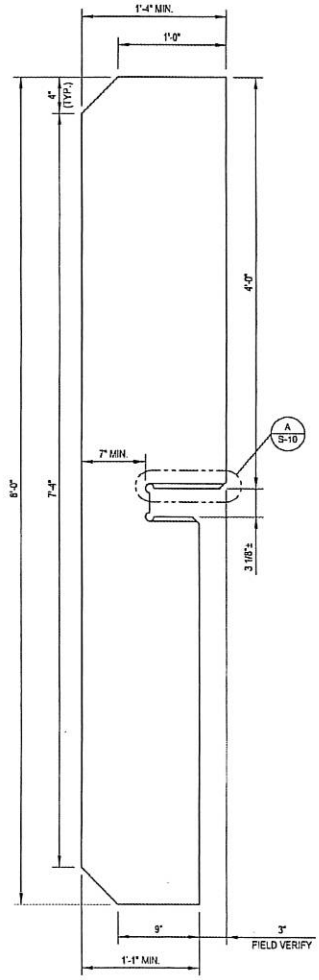
BU #876309; MILFORD JAI-ALAI
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700	
DRAWN BY: B.M.S.	WELDED BRIDGE STIFFENER DETAILS
CHECKED BY: J.W.M.	
APPROVED BY: JTK	
DATE: 12-15-2014	S-9

37513-2057.007.DWG



SHAFT PLAN 1 / S-10
EL. 60'



BRIDGE STIFFENER MK~BS2
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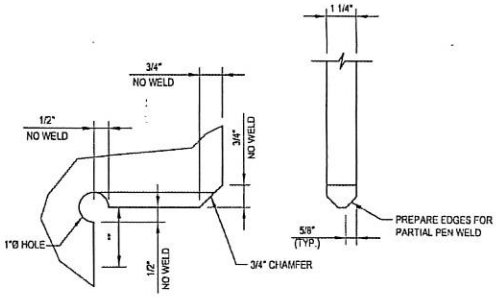

** NO WELD REGION SHOULD EXTEND BEYOND FLANGE LOCATIONS

DETAIL A
(TYPICAL)

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

3915

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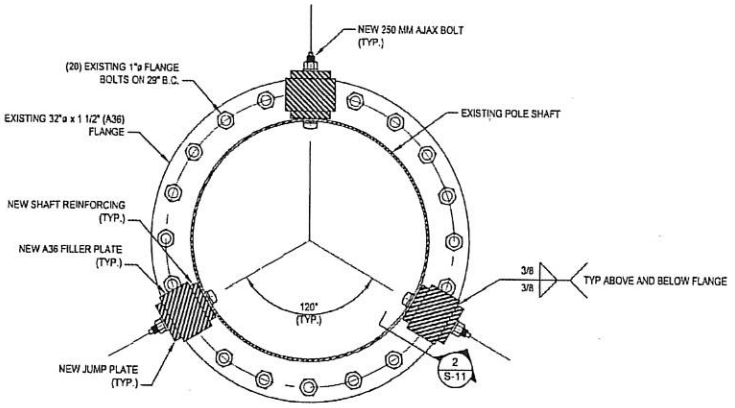
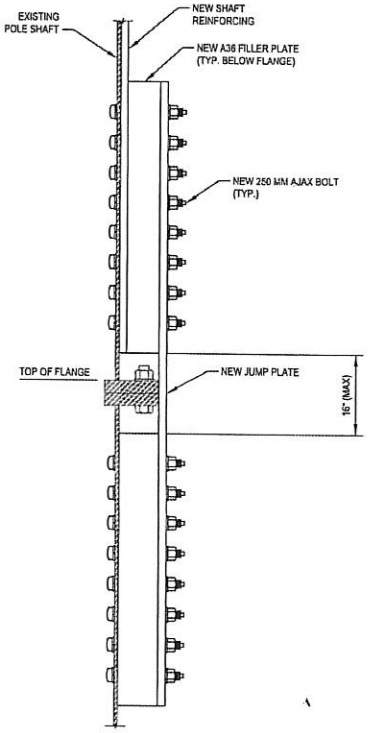
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700
DRAWN BY: B.M.S.
CHECKED BY: J.W.M.
APPROVED BY: JTK
DATE: 12-15-2014
WELDED BRIDGE STIFFENER DETAILS
S-10



SHAFT PLAN 1 / S-11
EL. 90'



SECTION 2 / S-11

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BU #876309; MILFORD JAI-ALAI
MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	BOLTED BRIDGE STIFFENER DETAILS
CHECKED BY: J.W.M.	
APPROVED BY: JTK	S-11
DATE: 12-15-2014	

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 MI'S 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 DENG-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 INSPECTION(S) 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 MI'S
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 AEV/AESV 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 REVIEW
X	FABRICATION INSPECTION
X	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
X	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	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 AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
X	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
X	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
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

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MILFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37513-2057.007.7700

DRAWN BY: B.M.S.	MI CHECKLIST
CHECKED BY: J.W.M.	
APPROVED BY: JK	S-12
DATE: 12-15-2014	

Exhibit B

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **December 15, 2014**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534

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

Subject: **Structural Modification Report**

Carrier Designation:	*Verizon Wireless* **Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Old Gate, CT
Crown Castle Designation:	**Crown Castle BU Number:**	876309
	Crown Castle Site Name:	MILFORD JAI-ALAI
	Crown Castle JDE Job Number:	283832
	Crown Castle Work Order Number:	954061
	Crown Castle Application Number:	241961 Rev. 1
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37513-2057.007.7700
Site Data:	**311 Old Gate Lane, Milford, New Haven County, CT**	
	Latitude *41° 14' 2.59"*, Longitude *-73° 1' 22.4"*	
	120 Foot - Monopole Tower	

Dear Steve Tuttle,

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 721714, in accordance with application 241961, 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:

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved 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 90 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

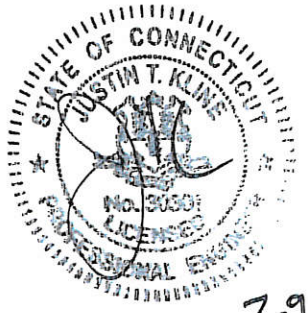
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

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

Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer

tnxTower Report - version 6.1.4.1



3-9-15

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 120 ft. monopole tower designed by ROHN in December of 1996. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E.

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 90 mph with no ice, 37.6 mph with 1.25 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
100.0	100.0	3	andrew	LNX-4514DS-A1M w/ Mount Pipe	--	--	--
		3	antel	BXA-171063-8BF-EDIN-0 w/ Mount Pipe			
		3	antel	BXA-70063-6BF-EDIN-0 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
117.0	124.0	1	andrew	VHLP1-18	3 3 2	1/4 5/16 1/2	1
		1	dragonwave	Horizon Compact			
	121.0	1	andrew	VHLP1-18			
		1	dragonwave	Horizon Compact			
	120.0	6	alcatel lucent	1900MHz RRH (65MHz)	4	1-1/4	2
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	TD-RRH8x20-25			
		9	rfs celwave	ACU-A20-N			
		1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	rfs celwave	IBC1900HB-2			
	119.0	5	rfs celwave	APXV86-906515-C w/ Mount Pipe	1 6 9	1/2 1-1/4 1-5/8	3
	117.0	5	decibel	DB950F85E-M w/Mount Pipe			
		3	samsung telecom	FDD_R6_RRH	--	--	1
		3	argus technologies	LLPX310R W/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 502-1]			
100.0	100.0	3	antel	BXA-70063-6CF-2 w/ Mount Pipe	--	--	3
		6	antel	LPA-80063/8CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L	12	1-5/8	1
		3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 303-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 08-02129G, 03/04/2008	2221322	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2010111.29, 05/23/2010	2638363	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn. 343738SA, 12/16/1996	2068407	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn. 343738SA, 12/16/1996	2068406	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Solutions, 07574.03, 11/12/2007	2217524	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37511-0052 BP, 12/28/2011	3088811	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37512-0676 BP, 03/19/2012	3139251	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 37513-2057 BP, 09/25/2013	4000292	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings. Please note that our calculations indicate that the existing bridge stiffeners designed by Vertical solutions are not adequate. Therefore, we did not consider them in this analysis.
5) The flange bolts at the 60' elevation were considered in this analysis per methodology used by Crown Castle during original design of existing welded bridge stiffeners. However, the flange bolts were not considered at the 30' elevation for the design of the new welded bridge stiffeners per new Crown Castle standards.
6) Monopole will be reinforced in conformance with the attached proposed 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	120 - 98.75	Pole	P24x0.25	1	-5.07	589.19	60.7	Pass
L2	98.75 - 90	Pole	RPS 24" x 0.38762"	2	-6.15	824.91	65.8	Pass
L3	90 - 79.25	Pole	P24x0.375	3	-7.51	934.94	87.6	Pass
L4	79.25 - 75.17	Pole	Pipe 24" x 0.51722" Reinf	4	-8.17	1232.93	76.0	Pass
L5	75.17 - 60	Pole	RPS 24" x 0.66391"	5	-11.18	1573.10	87.8	Pass
L6	60 - 49.25	Pole	RPS 30" x 0.52963"	6	-16.82	1488.73	91.1	Pass
L7	49.25 - 43	Pole	RPS 30" x 0.6427"	7	-18.29	1800.10	84.9	Pass
L8	43 - 30	Pole	RPS 30" x 0.80546"	8	-22.00	2081.56	91.2	Pass
L9	30 - 26	Pole	RPS 36" x 0.55016"	9	-27.52	1757.79	93.9	Pass
L10	26 - 20.75	Pole	RPS 36" x 0.64191"	10	-28.97	2045.62	87.4	Pass
L11	20.75 - 18	Pole	RPS 36" x 0.78214"	11	-29.87	2482.62	75.4	Pass
L12	18 - 13.5	Pole	RPS 36" x 0.68817"	12	-31.20	2190.17	90.2	Pass
L13	13.5 - 8	Pole	RPS 36" x 0.69662"	13	-32.84	2175.14	97.4	Pass
L14	8 - 6.25	Pole	RPS 36" x 0.86801"	14	-33.47	2746.17	79.5	Pass
L15	6.25 - 0	Pole	RPS 36" x 0.8575"	15	-35.71	2667.53	88.1	Pass
							Summary	
						Pole (L13)	97.4	Pass
						Rating =	97.4	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	40.2	Pass
1	Base Plate	0	36.3	Pass
1	Base Foundation Structural Steel	0	26.4	Pass
1	Base Foundation Soil Interaction	0	94.8	Pass
1,3	Flange Connection	30	47.0	Pass
1,3	Flange Connection	60	92.6	Pass
1	Flange Connection	90	57.6	Pass

Structure Rating (max from all components) =	97.4%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Worst case scenario between existing and post installed anchors.
3) See assumption #5.

4.1) Recommendations

Install the proposed modifications per the attached 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:

1) Tower is located in New Haven County, Connecticut.
2) Basic wind speed of 90.00 mph.
3) Nominal ice thickness of 1.2500 in.
4) Ice density of 56.00 pcf.
5) A wind speed of 37.60 mph is used in combination with ice.
6) Temperature drop of 50.00 °F.
7) Deflections calculated using a wind speed of 50.00 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	120.0000-98.7500	21.2500	P24x0.25	A53-B-42 (42 ksi)	
L2	98.7500-90.0000	8.7500	RPS 24" x 0.38762"	Reinf 35.87 ksi (36 ksi)	
L3	90.0000-79.2500	10.7500	P24x0.375	A53-B-42 (42 ksi)	
L4	79.2500-75.1700	4.0800	Pipe 24" x 0.51722" Reinf	Reinf 40.40 ksi (40 ksi)	
L5	75.1700-60.0000	15.1700	RPS 24" x 0.66391"	Reinf 40.41 ksi (40 ksi)	
L6	60.0000-49.2500	10.7500	RPS 30" x 0.52963"	Reinf 37.96 ksi (38 ksi)	
L7	49.2500-43.0000	6.2500	RPS 30" x 0.6427"	Reinf 37.97 ksi (38 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L8	43.0000-30.0000	13.0000	RPS 30" x 0.80546"	Reinf 35.23 ksi (35 ksi)	
L9	30.0000-26.0000	4.0000	RPS 36" x 0.55016"	Reinf 35.87 ksi (36 ksi)	
L10	26.0000-20.7500	5.2500	RPS 36" x 0.64191"	Reinf 35.87 ksi (36 ksi)	
L11	20.7500-18.0000	2.7500	RPS 36" x 0.78214"	Reinf 35.87 ksi (36 ksi)	
L12	18.0000-13.5000	4.5000	RPS 36" x 0.68817"	Reinf 35.87 ksi (36 ksi)	
L13	13.5000-8.0000	5.5000	RPS 36" x 0.69662"	Reinf 35.20 ksi (35 ksi)	
L14	8.0000-6.2500	1.7500	RPS 36" x 0.86801"	Reinf 35.84 ksi (36 ksi)	
L15	6.2500-0.0000	6.2500	RPS 36" x 0.8575"	Reinf 35.23 ksi (35 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 120.0000-98.7500				1	1	1		
L2 98.7500-90.0000				1	1	1		
L3 90.0000-79.2500				1	1	1		
L4 79.2500-75.1700				1	1	1		
L5 75.1700-60.0000				1	1	1		
L6 60.0000-49.2500				1	1	1		
L7 49.2500-43.0000				1	1	1		
L8 43.0000-30.0000				1	1	1		
L9 30.0000-26.0000				1	1	1		
L10 26.0000-20.7500				1	1	1		
L11 20.7500-18.0000				1	1	1		
L12 18.0000-13.5000				1	1	1		
L13 13.5000-8.0000				1	1	1		
L14 8.0000-6.2500				1	1	1		
L15 6.2500-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
7983A(1/2")	C	No	CaAa (Out Of Face)	117.0000 - 0.0000	2	No Ice	0.0000	0.08
						1/2" Ice	0.0000	0.74
						1" Ice	0.0000	2.01
						2" Ice	0.0000	6.39
9207(5/16")	C	No	Inside Pole	117.0000 - 0.0000	3	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
9248(1/4)	C	No	Inside Pole	117.0000 - 0.0000	3	No Ice	0.0000	0.03
						1/2" Ice	0.0000	0.03
						1" Ice	0.0000	0.03
						2" Ice	0.0000	0.03
2" Conduit	C	No	CaAa (Out Of Face)	117.0000 - 0.0000	1	No Ice	0.0000	1.16
						1/2" Ice	0.0000	2.53
						1" Ice	0.0000	4.51
						2" Ice	0.0000	10.30
2" Conduit	C	No	CaAa (Out Of Face)	117.0000 - 0.0000	1	No Ice	0.1740	1.16
						1/2" Ice	0.2740	2.53
						1" Ice	0.3740	4.51
						2" Ice	0.5740	10.30
*								
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	117.0000 - 0.0000	3	No Ice	0.0000	1.20
						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
						2" Ice	0.0000	1.20
HB114-13U3M12-XXXF(1-1/4")	C	No	Inside Pole	117.0000 - 0.0000	1	No Ice	0.0000	0.99
						1/2" Ice	0.0000	0.99
						1" Ice	0.0000	0.99
						2" Ice	0.0000	0.99
***								
561(1-5/8")	C	No	Inside Pole	100.0000 - 0.0000	12	No Ice	0.0000	1.35
						1/2" Ice	0.0000	1.35
						1" Ice	0.0000	1.35
						2" Ice	0.0000	1.35
***								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	22.0000 - 0.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00
						2" Ice	0.6528	0.00
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	44.0000 - 30.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00
						2" Ice	0.6528	0.00
***								
Aero MP3-05	C	No	CaAa (Out Of Face)	30.0000 - 0.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
Aero MP3-04	C	No	CaAa (Out Of Face)	60.0000 - 30.0000	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
Aero MP3-03	C	No	CaAa (Out Of Face)	75.1700 - 60.0000	1	No Ice	0.2625	0.00
						1/2" Ice	0.3736	0.00
						1" Ice	0.4847	0.00
						2" Ice	0.7069	0.00
***								
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	100.2500 - 90.2500	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
						2" Ice	0.5694	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.0000-	A	0.000	0.000	0.000	0.000	0.00
	98.7500	B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.363	0.15
L2	98.7500-90.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.585	0.21
L3	90.0000-79.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.871	0.25
L4	79.2500-75.1700	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.710	0.10
L5	75.1700-60.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.621	0.36
L6	60.0000-49.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.763	0.25
L7	49.2500-43.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.977	0.15
L8	43.0000-30.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.468	0.31
L9	30.0000-26.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.087	0.09
L10	26.0000-20.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.000	0.12
L11	20.7500-18.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.008	0.06
L12	18.0000-13.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.286	0.11
L13	13.5000-8.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.016	0.13
L14	8.0000-6.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.278	0.04
L15	6.2500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.563	0.15

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.0000-	A	1.250	0.000	0.000	0.000	0.000	0.00
	98.7500	B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.342	0.44
L2	98.7500-90.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.134	0.34
L3	90.0000-79.2500	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.558	0.42
L4	79.2500-75.1700	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.730	0.16
L5	75.1700-60.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	14.628	0.59

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L6	60.0000-49.2500	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.436	0.42
L7	49.2500-43.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.554	0.25
L8	43.0000-30.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.940	0.51
L9	30.0000-26.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.544	0.16
L10	26.0000-20.7500	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.572	0.21
L11	20.7500-18.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.461	0.11
L12	18.0000-13.5000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.300	0.18
L13	13.5000-8.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.922	0.22
L14	8.0000-6.2500	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.839	0.07
L15	6.2500-0.0000	A	1.250	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.139	0.25

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.0000-98.7500	-0.1905	0.1100	-0.3921	0.2264
L2	98.7500-90.0000	-0.3344	0.1931	-0.7005	0.4045
L3	90.0000-79.2500	-0.2079	0.1201	-0.4185	0.2416
L4	79.2500-75.1700	-0.2079	0.1201	-0.4185	0.2416
L5	75.1700-60.0000	-0.4654	0.2687	-0.7896	0.4559
L6	60.0000-49.2500	-0.4889	0.2823	-0.8569	0.4948
L7	49.2500-43.0000	-0.5198	0.3001	-0.9064	0.5233
L8	43.0000-30.0000	-0.6713	0.3875	-1.1359	0.6558
L9	30.0000-26.0000	-0.5774	0.3334	-1.0191	0.5884
L10	26.0000-20.7500	-0.6235	0.3600	-1.0938	0.6315
L11	20.7500-18.0000	-0.7628	0.4404	-1.3088	0.7556
L12	18.0000-13.5000	-0.7628	0.4404	-1.3088	0.7556
L13	13.5000-8.0000	-0.7628	0.4404	-1.3088	0.7556
L14	8.0000-6.2500	-0.7628	0.4404	-1.3088	0.7556
L15	6.2500-0.0000	-0.7628	0.4404	-1.3088	0.7556

Discrete Tower Loads

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

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LLPX310R w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.9623 5.3512 5.7501 6.5777	2.8484 3.3668 3.9019 5.0799	0.04 0.08 0.12 0.23
(2) LLPX310R w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.9623 5.3512 5.7501 6.5777	2.8484 3.3668 3.9019 5.0799	0.04 0.08 0.12 0.23
FDD_R6_RRH	A	From Leg	4.0000 0.00 0.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.7889 1.9715 2.1627 2.5710	0.7778 0.9182 1.0673 1.3914	0.03 0.04 0.06 0.09
(2) FDD_R6_RRH	B	From Leg	4.0000 0.00 0.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.7889 1.9715 2.1627 2.5710	0.7778 0.9182 1.0673 1.3914	0.03 0.04 0.06 0.09
HORIZON COMPACT	A	From Leg	4.0000 0.00 4.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.8409 0.9658 1.0993 1.3922	0.4295 0.5249 0.6289 0.8629	0.01 0.02 0.03 0.05
HORIZON COMPACT	B	From Leg	4.0000 0.00 7.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.8409 0.9658 1.0993 1.3922	0.4295 0.5249 0.6289 0.8629	0.01 0.02 0.03 0.05
*									
APXV9ERR18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4975 9.1490 9.7672 11.0311	7.4708 8.6564 9.5559 11.3884	0.09 0.16 0.24 0.42
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4975 9.1490 9.7672 11.0311	6.9458 8.1266 9.0212 10.8440	0.08 0.15 0.23 0.41
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.4975 9.1490 9.7672 11.0311	6.9458 8.1266 9.0212 10.8440	0.08 0.15 0.23 0.41
800MHZ RRH	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.4899 2.7061 2.9310 3.4068	2.0685 2.2705 2.4812 2.9284	0.05 0.07 0.10 0.16
800MHZ RRH	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.4899 2.7061 2.9310 3.4068	2.0685 2.2705 2.4812 2.9284	0.05 0.07 0.10 0.16
800MHZ RRH	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.4899 2.7061 2.9310 3.4068	2.0685 2.2705 2.4812 2.9284	0.05 0.07 0.10 0.16
(2) 1900MHz RRH (65MHz)	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice	2.7087 2.9477 3.1953 3.7164	2.6087 2.8450 3.0899 3.6057	0.06 0.08 0.11 0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
(2) 1900MHz RRH (65MHz)	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.7087 2.9477 3.1953 3.7164	2.6087 2.8450 3.0899 3.6057	0.06 0.08 0.11 0.17
(2) 1900MHz RRH (65MHz)	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.7087 2.9477 3.1953 3.7164	2.6087 2.8450 3.0899 3.6057	0.06 0.08 0.11 0.17
(3) ACU-A20-N	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.0778 0.1210 0.1728 0.3025	0.1361 0.1890 0.2506 0.3997	0.00 0.00 0.00 0.01
(3) ACU-A20-N	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.0778 0.1210 0.1728 0.3025	0.1361 0.1890 0.2506 0.3997	0.00 0.00 0.00 0.01
(3) ACU-A20-N	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.0778 0.1210 0.1728 0.3025	0.1361 0.1890 0.2506 0.3997	0.00 0.00 0.00 0.01
800 EXTERNAL NOTCH FILTER	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.7701 0.8898 1.0181 1.3007	0.3747 0.4647 0.5634 0.7868	0.01 0.02 0.02 0.04
800 EXTERNAL NOTCH FILTER	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.7701 0.8898 1.0181 1.3007	0.3747 0.4647 0.5634 0.7868	0.01 0.02 0.02 0.04
800 EXTERNAL NOTCH FILTER	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.7701 0.8898 1.0181 1.3007	0.3747 0.4647 0.5634 0.7868	0.01 0.02 0.02 0.04
IBC1900HB-2	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.3125 1.4821 1.6603 2.0427	0.7875 0.9377 1.0965 1.4400	0.04 0.05 0.06 0.09
IBC1900HB-2	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.3125 1.4821 1.6603 2.0427	0.7875 0.9377 1.0965 1.4400	0.04 0.05 0.06 0.09
IBC1900HB-2	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.3125 1.4821 1.6603 2.0427	0.7875 0.9377 1.0965 1.4400	0.04 0.05 0.06 0.09
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	7.1342 7.6618 8.1830 9.2563	4.9591 5.7544 6.4723 8.0099	0.08 0.13 0.19 0.34
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice	7.1342 7.6618 8.1830 9.2563	4.9591 5.7544 6.4723 8.0099	0.08 0.13 0.19 0.34

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	7.1342 7.6618 8.1830 9.2563	4.9591 5.7544 6.4723 8.0099	0.08 0.13 0.19 0.34
TD-RRH8x20-25	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.7198 5.0138 5.3165 5.9478	1.7027 1.9196 2.1453 2.6224	0.07 0.10 0.13 0.20
TD-RRH8x20-25	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.7198 5.0138 5.3165 5.9478	1.7027 1.9196 2.1453 2.6224	0.07 0.10 0.13 0.20
TD-RRH8x20-25	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	4.7198 5.0138 5.3165 5.9478	1.7027 1.9196 2.1453 2.6224	0.07 0.10 0.13 0.20
(2) 2.375" OD x 6' Mount Pipe	A	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.4250 1.9250 2.2939 3.0596	1.4250 1.9250 2.2939 3.0596	0.03 0.04 0.05 0.09
(2) 2.375" OD x 6' Mount Pipe	B	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.4250 1.9250 2.2939 3.0596	1.4250 1.9250 2.2939 3.0596	0.03 0.04 0.05 0.09
(2) 2.375" OD x 6' Mount Pipe	C	From Leg	4.0000 0.00 3.00	0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	1.4250 1.9250 2.2939 3.0596	1.4250 1.9250 2.2939 3.0596	0.03 0.04 0.05 0.09
Platform Mount [LP 502-1]	C	None		0.0000	117.0000	No Ice 1/2" Ice 1" Ice 2" Ice	32.3472 45.6677 58.9882 85.6292	32.3472 45.6677 58.9882 85.6292	0.93 1.19 1.46 2.00
***									
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.1789 3.5550 3.9637 4.8533	3.3530 3.9709 4.5951 5.8933	0.03 0.06 0.10 0.19
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.1789 3.5550 3.9637 4.8533	3.3530 3.9709 4.5951 5.8933	0.03 0.06 0.10 0.19
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	3.1789 3.5550 3.9637 4.8533	3.3530 3.9709 4.5951 5.8933	0.03 0.06 0.10 0.19
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice	0.3665 0.4506 0.5433 0.7546	0.0846 0.1362 0.1965 0.3430	0.00 0.01 0.01 0.02
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice 1/2" Ice Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	0.7546	0.3430	0.02
						2" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	0.3665	0.0846	0.00
						1/2" Ice	0.4506	0.1362	0.01
							0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice			
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	7.5371	5.4600	0.04
						1/2" Ice	8.0822	6.3840	0.10
							8.6298	7.1844	0.16
						1" Ice	9.7523	8.8352	0.32
						2" Ice			
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	7.5371	5.4600	0.04
						1/2" Ice	8.0822	6.3840	0.10
							8.6298	7.1844	0.16
						1" Ice	9.7523	8.8352	0.32
						2" Ice			
BXA-70063-6BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	7.5371	5.4600	0.04
						1/2" Ice	8.0822	6.3840	0.10
							8.6298	7.1844	0.16
						1" Ice	9.7523	8.8352	0.32
						2" Ice			
LNX-4514DS-A1M w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	7.9031	4.5411	0.05
						1/2" Ice	8.4084	5.2329	0.10
							8.9164	5.9168	0.17
						1" Ice	9.9637	7.4036	0.31
						2" Ice			
LNX-4514DS-A1M w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	7.9031	4.5411	0.05
						1/2" Ice	8.4084	5.2329	0.10
							8.9164	5.9168	0.17
						1" Ice	9.9637	7.4036	0.31
						2" Ice			
LNX-4514DS-A1M w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	7.9031	4.5411	0.05
						1/2" Ice	8.4084	5.2329	0.10
							8.9164	5.9168	0.17
						1" Ice	9.9637	7.4036	0.31
						2" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
							3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
							3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice			
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
							3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	0.3665	0.0846	0.00
						1/2" Ice	0.4506	0.1362	0.01
							0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	0.3665	0.0846	0.00
						1/2" Ice	0.4506	0.1362	0.01
							0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 0.00	0.0000	100.0000	No Ice	0.3665	0.0846	0.00
						1/2" Ice	0.4506	0.1362	0.01
							0.5433	0.1965	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	0.7546	0.3430	0.02
						2" Ice			
Platform Mount [LP 303-1]	C	None		0.0000	100.0000	No Ice	14.6600	14.6600	1.25
						1/2" Ice	18.8700	18.8700	1.48
						1" Ice	23.0800	23.0800	1.71
						2" Ice	31.5000	31.5000	2.18
***									
Bridge Stiffener (35" x 10.5" x 1.25")	A	None		0.0000	60.0000	No Ice	0.6076	3.5729	0.82
						1/2" Ice	0.8483	3.8721	0.84
						1" Ice	1.0660	4.1800	0.86
						2" Ice	1.5237	4.8217	0.90
Bridge Stiffener (35" x 10.5" x 1.25")	B	None		0.0000	60.0000	No Ice	0.0000	0.0000	0.82
						1/2" Ice	0.0000	0.0000	0.84
						1" Ice	0.0000	0.0000	0.86
						2" Ice	0.0000	0.0000	0.90
Bridge Stiffener (35" x 10.5" x 1.25")	C	None		0.0000	60.0000	No Ice	0.0000	0.0000	0.82
						1/2" Ice	0.0000	0.0000	0.84
						1" Ice	0.0000	0.0000	0.86
						2" Ice	0.0000	0.0000	0.90
Bridge Stiffener (35" x 10.5" x 1.25")	A	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.82
						1/2" Ice	0.0000	0.0000	0.84
						1" Ice	0.0000	0.0000	0.86
						2" Ice	0.0000	0.0000	0.90
Bridge Stiffener (35" x 10.5" x 1.25")	B	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.82
						1/2" Ice	0.0000	0.0000	0.84
						1" Ice	0.0000	0.0000	0.86
						2" Ice	0.0000	0.0000	0.90
Bridge Stiffener (35" x 10.5" x 1.25")	C	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.82
						1/2" Ice	0.0000	0.0000	0.84
						1" Ice	0.0000	0.0000	0.86
						2" Ice	0.0000	0.0000	0.90
***									
Bridge Stiffener (58" x 14" x 1.25")	A	None		0.0000	60.0000	No Ice	1.0069	7.8944	0.35
						1/2" Ice	1.5617	8.3654	0.38
						1" Ice	2.0568	8.8451	0.42
						2" Ice	2.7770	9.8302	0.51
Bridge Stiffener (58" x 14" x 1.25")	B	None		0.0000	60.0000	No Ice	0.0000	0.0000	0.35
						1/2" Ice	0.0000	0.0000	0.38
						1" Ice	0.0000	0.0000	0.42
						2" Ice	0.0000	0.0000	0.51
Bridge Stiffener (58" x 14" x 1.25")	C	None		0.0000	60.0000	No Ice	0.0000	0.0000	0.35
						1/2" Ice	0.0000	0.0000	0.38
						1" Ice	0.0000	0.0000	0.42
						2" Ice	0.0000	0.0000	0.51
Bridge Stiffener (58" x 14" x 1.25")	A	None		0.0000	30.0000	No Ice	1.0069	7.8944	0.35
						1/2" Ice	1.5617	8.3654	0.38
						1" Ice	2.0568	8.8451	0.42
						2" Ice	2.7770	9.8302	0.51
Bridge Stiffener (58" x 14" x 1.25")	B	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.35
						1/2" Ice	0.0000	0.0000	0.38
						1" Ice	0.0000	0.0000	0.42
						2" Ice	0.0000	0.0000	0.51
Bridge Stiffener (58" x 14"	C	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.35

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
x 1.25")						1/2" Ice	0.0000	0.0000	0.38
						1" Ice	0.0000	0.0000	0.42
						2" Ice	0.0000	0.0000	0.51
***									
Bridge Stiffener (93" x 16" x 1.25")	A	None		0.0000	30.0000	No Ice	1.6146	14.4667	0.35
						1/2" Ice	2.4934	15.1775	0.41
						1" Ice	3.3846	15.8969	0.47
						2" Ice	5.1543	17.3617	0.62
Bridge Stiffener (93" x 16" x 1.25")	B	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.35
						1/2" Ice	0.0000	0.0000	0.41
						1" Ice	0.0000	0.0000	0.47
						2" Ice	0.0000	0.0000	0.62
Bridge Stiffener (93" x 16" x 1.25")	C	None		0.0000	30.0000	No Ice	0.0000	0.0000	0.35
						1/2" Ice	0.0000	0.0000	0.41
						1" Ice	0.0000	0.0000	0.47
						2" Ice	0.0000	0.0000	0.62

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP1-18	A	Paraboloid w/o Radome	From Leg	4.0000 / 0.00 / 4.00	0.0000		117.0000	1.2750	No Ice	1.2800	0.01
									1/2" Ice	1.4500	0.02
									1" Ice	1.6200	0.03
									2" Ice	1.9700	0.04
VHLP1-18	B	Paraboloid w/o Radome	From Leg	4.0000 / 0.00 / 7.00	0.0000		117.0000	1.2750	No Ice	1.2800	0.01
									1/2" Ice	1.4500	0.02
									1" Ice	1.6200	0.03
									2" Ice	1.9700	0.04

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 120.0000-98.7500	109.3750	1.408	29.20	42.500	A	0.000	42.500	42.500	100.00	0.000	0.000
					B	0.000	42.500		100.00	0.000	0.000
					C	0.000	42.500		100.00	0.000	3.363
L2 98.7500-90.0000	94.3750	1.35	28.00	17.500	A	0.000	17.500	17.500	100.00	0.000	0.000
					B	0.000	17.500		100.00	0.000	0.000
					C	0.000	17.500		100.00	0.000	2.585
L3 90.0000-79.2500	84.6250	1.309	27.14	21.500	A	0.000	21.500	21.500	100.00	0.000	0.000
					B	0.000	21.500		100.00	0.000	0.000
					C	0.000	21.500		100.00	0.000	1.871
L4 79.2500-75.1700	77.2100	1.275	26.44	8.160	A	0.000	8.160	8.160	100.00	0.000	0.000
					B	0.000	8.160		100.00	0.000	0.000

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	8.160		100.00	0.000	0.710
L5 75.1700-60.0000	67.5850	1.227	25.45	30.340	A	0.000	30.340	30.340	100.00	0.000	0.000
					B	0.000	30.340		100.00	0.000	0.000
					C	0.000	30.340		100.00	0.000	6.621
L6 60.0000-49.2500	54.6250	1.155	23.95	26.875	A	0.000	26.875	26.875	100.00	0.000	0.000
					B	0.000	26.875		100.00	0.000	0.000
					C	0.000	26.875		100.00	0.000	4.763
L7 49.2500-43.0000	46.1250	1.1	22.82	15.625	A	0.000	15.625	15.625	100.00	0.000	0.000
					B	0.000	15.625		100.00	0.000	0.000
					C	0.000	15.625		100.00	0.000	2.977
L8 43.0000-30.0000	36.5000	1.029	21.34	32.500	A	0.000	32.500	32.500	100.00	0.000	0.000
					B	0.000	32.500		100.00	0.000	0.000
					C	0.000	32.500		100.00	0.000	8.468
L9 30.0000-26.0000	28.0000	1	20.74	12.000	A	0.000	12.000	12.000	100.00	0.000	0.000
					B	0.000	12.000		100.00	0.000	0.000
					C	0.000	12.000		100.00	0.000	2.087
L10 26.0000-20.7500	23.3750	1	20.74	15.750	A	0.000	15.750	15.750	100.00	0.000	0.000
					B	0.000	15.750		100.00	0.000	0.000
					C	0.000	15.750		100.00	0.000	3.000
L11 20.7500-18.0000	19.3750	1	20.74	8.250	A	0.000	8.250	8.250	100.00	0.000	0.000
					B	0.000	8.250		100.00	0.000	0.000
					C	0.000	8.250		100.00	0.000	2.008
L12 18.0000-13.5000	15.7500	1	20.74	13.500	A	0.000	13.500	13.500	100.00	0.000	0.000
					B	0.000	13.500		100.00	0.000	0.000
					C	0.000	13.500		100.00	0.000	3.286
L13 13.5000-8.0000	10.7500	1	20.74	16.500	A	0.000	16.500	16.500	100.00	0.000	0.000
					B	0.000	16.500		100.00	0.000	0.000
					C	0.000	16.500		100.00	0.000	4.016
L14 8.0000-6.2500	7.1250	1	20.74	5.250	A	0.000	5.250	5.250	100.00	0.000	0.000
					B	0.000	5.250		100.00	0.000	0.000
					C	0.000	5.250		100.00	0.000	1.278
L15 6.2500-0.0000	3.1250	1	20.74	18.750	A	0.000	18.750	18.750	100.00	0.000	0.000
					B	0.000	18.750		100.00	0.000	0.000
					C	0.000	18.750		100.00	0.000	4.563

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 120.0000-98.7500	109.3750	1.408	5.10	1.2500	46.927	A	0.000	46.927	46.927	100.00	0.000	0.000
						B	0.000	46.927		100.00	0.000	0.000
						C	0.000	46.927		100.00	0.000	8.342
L2 98.7500-90.0000	94.3750	1.35	4.89	1.2500	19.323	A	0.000	19.323	19.323	100.00	0.000	0.000
						B	0.000	19.323		100.00	0.000	0.000
						C	0.000	19.323		100.00	0.000	7.134
L3 90.0000-79.2500	84.6250	1.309	4.74	1.2500	23.740	A	0.000	23.740	23.740	100.00	0.000	0.000
						B	0.000	23.740		100.00	0.000	0.000
						C	0.000	23.740		100.00	0.000	4.558
L4 79.2500-75.1700	77.2100	1.275	4.61	1.2500	9.010	A	0.000	9.010	9.010	100.00	0.000	0.000
						B	0.000	9.010		100.00	0.000	0.000
						C	0.000	9.010		100.00	0.000	1.730
L5 75.1700-60.0000	67.5850	1.227	4.44	1.2500	33.500	A	0.000	33.500	33.500	100.00	0.000	0.000
						B	0.000	33.500		100.00	0.000	0.000
						C	0.000	33.500		100.00	0.000	14.628
L6 60.0000-49.2500	54.6250	1.155	4.18	1.2500	29.115	A	0.000	29.115	29.115	100.00	0.000	0.000
						B	0.000	29.115		100.00	0.000	0.000
						C	0.000	29.115		100.00	0.000	10.436
L7 49.2500-43.0000	46.1250	1.1	3.98	1.2500	16.927	A	0.000	16.927	16.927	100.00	0.000	0.000
						B	0.000	16.927		100.00	0.000	0.000
						C	0.000	16.927		100.00	0.000	6.554
L8 43.0000-	36.5000	1.029	3.72	1.2500	35.208	A	0.000	35.208	35.208	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
30.0000						B	0.000	35.208		100.00	0.000	0.000
						C	0.000	35.208		100.00	0.000	18.940
L9 30.0000-26.0000	28.0000	1	3.62	1.2500	12.833	A	0.000	12.833	12.833	100.00	0.000	0.000
						B	0.000	12.833		100.00	0.000	0.000
						C	0.000	12.833		100.00	0.000	4.544
L10 26.0000-20.7500	23.3750	1	3.62	1.2500	16.844	A	0.000	16.844	16.844	100.00	0.000	0.000
						B	0.000	16.844		100.00	0.000	0.000
						C	0.000	16.844		100.00	0.000	6.572
L11 20.7500-18.0000	19.3750	1	3.62	1.2500	8.823	A	0.000	8.823	8.823	100.00	0.000	0.000
						B	0.000	8.823		100.00	0.000	0.000
						C	0.000	8.823		100.00	0.000	4.461
L12 18.0000-13.5000	15.7500	1	3.62	1.2500	14.438	A	0.000	14.438	14.438	100.00	0.000	0.000
						B	0.000	14.438		100.00	0.000	0.000
						C	0.000	14.438		100.00	0.000	7.300
L13 13.5000-8.0000	10.7500	1	3.62	1.2500	17.646	A	0.000	17.646	17.646	100.00	0.000	0.000
						B	0.000	17.646		100.00	0.000	0.000
						C	0.000	17.646		100.00	0.000	8.922
L14 8.0000-6.2500	7.1250	1	3.62	1.2500	5.615	A	0.000	5.615	5.615	100.00	0.000	0.000
						B	0.000	5.615		100.00	0.000	0.000
						C	0.000	5.615		100.00	0.000	2.839
L15 6.2500-0.0000	3.1250	1	3.62	1.2500	20.052	A	0.000	20.052	20.052	100.00	0.000	0.000
						B	0.000	20.052		100.00	0.000	0.000
						C	0.000	20.052		100.00	0.000	10.139

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 120.0000-98.7500	109.3750	1.408	9.01	42.500	A	0.000	42.500	42.500	100.00	0.000	0.000
					B	0.000	42.500		100.00	0.000	0.000
					C	0.000	42.500		100.00	0.000	3.363
L2 98.7500-90.0000	94.3750	1.35	8.64	17.500	A	0.000	17.500	17.500	100.00	0.000	0.000
					B	0.000	17.500		100.00	0.000	0.000
					C	0.000	17.500		100.00	0.000	2.585
L3 90.0000-79.2500	84.6250	1.309	8.38	21.500	A	0.000	21.500	21.500	100.00	0.000	0.000
					B	0.000	21.500		100.00	0.000	0.000
					C	0.000	21.500		100.00	0.000	1.871
L4 79.2500-75.1700	77.2100	1.275	8.16	8.160	A	0.000	8.160	8.160	100.00	0.000	0.000
					B	0.000	8.160		100.00	0.000	0.000
					C	0.000	8.160		100.00	0.000	0.710
L5 75.1700-60.0000	67.5850	1.227	7.85	30.340	A	0.000	30.340	30.340	100.00	0.000	0.000
					B	0.000	30.340		100.00	0.000	0.000
					C	0.000	30.340		100.00	0.000	6.621
L6 60.0000-49.2500	54.6250	1.155	7.39	26.875	A	0.000	26.875	26.875	100.00	0.000	0.000
					B	0.000	26.875		100.00	0.000	0.000
					C	0.000	26.875		100.00	0.000	4.763
L7 49.2500-43.0000	46.1250	1.1	7.04	15.625	A	0.000	15.625	15.625	100.00	0.000	0.000
					B	0.000	15.625		100.00	0.000	0.000
					C	0.000	15.625		100.00	0.000	2.977
L8 43.0000-30.0000	36.5000	1.029	6.59	32.500	A	0.000	32.500	32.500	100.00	0.000	0.000
					B	0.000	32.500		100.00	0.000	0.000
					C	0.000	32.500		100.00	0.000	8.468
L9 30.0000-26.0000	28.0000	1	6.40	12.000	A	0.000	12.000	12.000	100.00	0.000	0.000
					B	0.000	12.000		100.00	0.000	0.000
					C	0.000	12.000		100.00	0.000	2.087
L10 26.0000-20.7500	23.3750	1	6.40	15.750	A	0.000	15.750	15.750	100.00	0.000	0.000
					B	0.000	15.750		100.00	0.000	0.000
					C	0.000	15.750		100.00	0.000	3.000
L11 20.7500-	19.3750	1	6.40	8.250	A	0.000	8.250	8.250	100.00	0.000	0.000

Section Elevation ft	z ft	K_z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
18.0000					B	0.000	8.250		100.00	0.000	0.000
					C	0.000	8.250		100.00	0.000	2.008
L12 18.0000-13.5000	15.7500	1	6.40	13.500	A	0.000	13.500	13.500	100.00	0.000	0.000
					B	0.000	13.500		100.00	0.000	0.000
					C	0.000	13.500		100.00	0.000	3.286
L13 13.5000-8.0000	10.7500	1	6.40	16.500	A	0.000	16.500	16.500	100.00	0.000	0.000
					B	0.000	16.500		100.00	0.000	0.000
					C	0.000	16.500		100.00	0.000	4.016
L14 8.0000-6.2500	7.1250	1	6.40	5.250	A	0.000	5.250	5.250	100.00	0.000	0.000
					B	0.000	5.250		100.00	0.000	0.000
					C	0.000	5.250		100.00	0.000	1.278
L15 6.2500-0.0000	3.1250	1	6.40	18.750	A	0.000	18.750	18.750	100.00	0.000	0.000
					B	0.000	18.750		100.00	0.000	0.000
					C	0.000	18.750		100.00	0.000	4.563

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	120 - 98.75	Pole	Max Tension	5	0.00	0.00	0.00
			Max. Compression	14	-12.65	-1.89	0.05
			Max. Mx	5	-5.09	-167.48	-2.77
			Max. My	2	-5.09	4.39	167.86
			Max. Vy	11	-12.48	166.95	4.20
			Max. Vx	8	12.50	-3.62	-167.75
			Max. Torque	8			1.84
L2	98.75 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.19	-1.76	-0.03
			Max. Mx	5	-6.17	-279.27	-4.11
			Max. My	2	-6.17	6.48	280.03
			Max. Vy	11	-13.14	279.04	6.00
			Max. Vx	8	13.15	-5.05	-279.99
			Max. Torque	8			1.82
L3	90 - 79.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-16.04	-1.60	-0.13
			Max. Mx	11	-7.52	423.95	8.20
			Max. My	8	-7.52	-6.79	-425.07
			Max. Vy	11	-13.82	423.95	8.20
			Max. Vx	8	13.83	-6.79	-425.07
			Max. Torque	8			1.80
L4	79.25 - 75.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-16.89	-1.53	-0.17
			Max. Mx	11	-8.19	480.83	9.04
			Max. My	8	-8.18	-7.44	-482.02
			Max. Vy	11	-14.07	480.83	9.04
			Max. Vx	8	14.09	-7.44	-482.02
			Max. Torque	8			1.79
L5	75.17 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.58	-1.28	-0.31
			Max. Mx	11	-11.20	702.41	12.15
			Max. My	8	-11.20	-9.89	-703.85
			Max. Vy	11	-15.13	702.41	12.15
			Max. Vx	8	15.14	-9.89	-703.85
			Max. Torque	8			1.78
L6	60 - 49.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.23	-1.06	-0.43
			Max. Mx	11	-16.83	875.85	14.36
			Max. My	8	-16.83	-11.62	-877.47
			Max. Vy	11	-16.53	875.85	14.36
			Max. Vx	8	16.54	-11.62	-877.47
			Max. Torque	8			1.74
L7	49.25 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.04	-0.94	-0.50
			Max. Mx	11	-18.30	980.47	15.64
			Max. My	8	-18.30	-12.62	-982.19
			Max. Vy	11	-16.96	980.47	15.64
			Max. Vx	8	16.98	-12.62	-982.19
			Max. Torque	8			1.71
L8	43 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.43	-0.67	-0.64
			Max. Mx	11	-22.01	1206.80	18.29
			Max. My	8	-22.01	-14.69	-1208.74
			Max. Vy	11	-17.86	1206.80	18.29
			Max. Vx	8	17.87	-14.69	-1208.74
			Max. Torque	8			1.69
L9	30 - 26	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.10	-0.58	-0.70
			Max. Mx	11	-27.52	1282.21	19.10
			Max. My	8	-27.52	-15.32	-1284.21
			Max. Vy	11	-18.99	1282.21	19.10
			Max. Vx	8	19.01	-15.32	-1284.21
			Max. Torque	8			1.63
L10	26 - 20.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.88	-0.45	-0.77
			Max. Mx	11	-28.97	1382.83	20.17
			Max. My	8	-28.97	-16.15	-1384.92
			Max. Vy	11	-19.35	1382.83	20.17

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	8	19.37	-16.15	-1384.92
			Max. Torque	8			1.61
L11	20.75 - 18	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.95	-0.38	-0.80
			Max. Mx	11	-29.87	1436.32	20.72
			Max. My	8	-29.87	-16.58	-1438.45
			Max. Vy	11	-19.56	1436.32	20.72
			Max. Vx	8	19.58	-16.58	-1438.45
			Max. Torque	8			1.59
L12	18 - 13.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.55	-0.27	-0.86
			Max. Mx	11	-31.20	1525.05	21.63
			Max. My	8	-31.20	-17.29	-1527.25
			Max. Vy	11	-19.89	1525.05	21.63
			Max. Vx	8	19.90	-17.29	-1527.25
			Max. Torque	8			1.58
L13	13.5 - 8	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.53	-0.14	-0.94
			Max. Mx	11	-32.84	1635.42	22.72
			Max. My	8	-32.84	-18.14	-1637.71
			Max. Vy	11	-20.26	1635.42	22.72
			Max. Vx	8	20.28	-18.14	-1637.71
			Max. Torque	8			1.55
L14	8 - 6.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-47.27	-0.10	-0.96
			Max. Mx	11	-33.47	1670.97	23.07
			Max. My	8	-33.47	-18.41	-1673.29
			Max. Vy	11	-20.39	1670.97	23.07
			Max. Vx	8	20.41	-18.41	-1673.29
			Max. Torque	8			1.52
L15	6.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-49.88	0.05	-1.05
			Max. Mx	11	-35.71	1799.67	24.31
			Max. My	8	-35.71	-19.37	-1802.09
			Max. Vy	11	-20.81	1799.67	24.31
			Max. Vx	8	20.83	-19.37	-1802.09
			Max. Torque	8			1.51

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	49.88	0.00	0.00
	Max. H_x	11	35.72	20.80	0.20
	Max. H_z	2	35.72	0.23	20.81
	Max. M_x	2	1801.35	0.23	20.81
	Max. M_z	5	1796.61	-20.77	-0.15
	Max. Torsion	8	1.48	-0.16	-20.82
	Min. Vert	11	35.72	20.80	0.20
	Min. H_x	5	35.72	-20.77	-0.15
	Min. H_z	8	35.72	-0.16	-20.82
	Min. M_x	8	-1802.09	-0.16	-20.82
	Min. M_z	11	-1799.67	20.80	0.20
	Min. Torsion	2	-1.36	0.23	20.81

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	35.72	-0.00	0.00	0.07	-0.39	0.00
Dead+Wind 0 deg - No Ice	35.72	-0.23	-20.81	-1801.35	28.08	1.36
Dead+Wind 30 deg - No Ice	35.72	10.26	-17.90	-1545.13	-883.07	1.13
Dead+Wind 60 deg - No Ice	35.72	17.92	-10.25	-881.99	-1547.59	0.68
Dead+Wind 90 deg - No Ice	35.72	20.77	0.15	17.94	-1796.61	0.03
Dead+Wind 120 deg - No Ice	35.72	18.07	10.60	925.18	-1565.76	-0.71
Dead+Wind 150 deg - No Ice	35.72	10.50	18.13	1572.72	-912.47	-1.25
Dead+Wind 180 deg - No Ice	35.72	0.16	20.82	1802.09	-19.37	-1.48
Dead+Wind 210 deg - No Ice	35.72	-10.23	17.95	1551.69	878.66	-1.29
Dead+Wind 240 deg - No Ice	35.72	-17.96	10.28	885.24	1552.74	-0.65
Dead+Wind 270 deg - No Ice	35.72	-20.80	-0.20	-24.31	1799.67	0.13
Dead+Wind 300 deg - No Ice	35.72	-18.11	-10.54	-917.44	1570.27	0.80
Dead+Wind 330 deg - No Ice	35.72	-10.59	-18.08	-1566.45	922.49	1.23
Dead+Ice+Temp	49.88	-0.00	-0.00	1.05	0.05	0.00
Dead+Wind 0 deg+Ice+Temp	49.88	-0.04	-5.07	-452.98	5.50	0.30
Dead+Wind 30 deg+Ice+Temp	49.88	2.51	-4.37	-389.20	-223.77	0.27
Dead+Wind 60 deg+Ice+Temp	49.88	4.37	-2.51	-222.56	-390.68	0.19
Dead+Wind 90 deg+Ice+Temp	49.88	5.06	0.02	4.11	-452.74	0.05
Dead+Wind 120 deg+Ice+Temp	49.88	4.40	2.57	232.86	-393.79	-0.12
Dead+Wind 150 deg+Ice+Temp	49.88	2.55	4.41	396.70	-228.64	-0.25
Dead+Wind 180 deg+Ice+Temp	49.88	0.03	5.07	455.30	-3.33	-0.32
Dead+Wind 210 deg+Ice+Temp	49.88	-2.50	4.38	392.91	222.81	-0.30
Dead+Wind 240 deg+Ice+Temp	49.88	-4.38	2.52	225.48	392.01	-0.18
Dead+Wind 270 deg+Ice+Temp	49.88	-5.07	-0.04	-3.49	453.57	-0.02
Dead+Wind 300 deg+Ice+Temp	49.88	-4.41	-2.56	-228.87	394.96	0.14
Dead+Wind 330 deg+Ice+Temp	49.88	-2.57	-4.40	-393.06	231.13	0.25
Dead+Wind 0 deg - Service	35.72	-0.07	-6.42	-556.27	8.38	0.43
Dead+Wind 30 deg - Service	35.72	3.17	-5.52	-477.17	-273.03	0.35
Dead+Wind 60 deg - Service	35.72	5.53	-3.16	-272.32	-478.21	0.21
Dead+Wind 90 deg - Service	35.72	6.41	0.05	5.59	-555.17	0.01
Dead+Wind 120 deg - Service	35.72	5.58	3.27	285.78	-483.85	-0.22
Dead+Wind 150 deg - Service	35.72	3.24	5.59	485.82	-282.13	-0.39
Dead+Wind 180 deg - Service	35.72	0.05	6.42	556.60	-6.27	-0.46
Dead+Wind 210 deg - Service	35.72	-3.16	5.54	479.25	271.06	-0.40
Dead+Wind 240 deg - Service	35.72	-5.54	3.17	273.43	479.23	-0.21
Dead+Wind 270 deg - Service	35.72	-6.42	-0.06	-7.46	555.54	0.04
Dead+Wind 300 deg - Service	35.72	-5.59	-3.25	-283.32	484.72	0.25
Dead+Wind 330 deg - Service	35.72	-3.27	-5.58	-483.72	284.61	0.39

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-35.72	0.00	0.00	35.72	-0.00	0.000%
2	-0.23	-35.72	-20.81	0.23	35.72	20.81	0.002%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
3	10.26	-35.72	-17.90	-10.26	35.72	17.90	0.000%
4	17.92	-35.72	-10.25	-17.92	35.72	10.25	0.000%
5	20.77	-35.72	0.15	-20.77	35.72	-0.15	0.004%
6	18.07	-35.72	10.60	-18.07	35.72	-10.60	0.000%
7	10.50	-35.72	18.13	-10.50	35.72	-18.13	0.000%
8	0.16	-35.72	20.82	-0.16	35.72	-20.82	0.002%
9	-10.23	-35.72	17.95	10.23	35.72	-17.95	0.000%
10	-17.96	-35.72	10.28	17.96	35.72	-10.28	0.000%
11	-20.80	-35.72	-0.20	20.80	35.72	0.20	0.004%
12	-18.11	-35.72	-10.54	18.11	35.72	10.54	0.000%
13	-10.59	-35.72	-18.08	10.59	35.72	18.08	0.000%
14	0.00	-49.88	0.00	0.00	49.88	0.00	0.001%
15	-0.04	-49.88	-5.07	0.04	49.88	5.07	0.001%
16	2.51	-49.88	-4.37	-2.51	49.88	4.37	0.001%
17	4.37	-49.88	-2.51	-4.37	49.88	2.51	0.001%
18	5.06	-49.88	0.02	-5.06	49.88	-0.02	0.001%
19	4.40	-49.88	2.57	-4.40	49.88	-2.57	0.001%
20	2.55	-49.88	4.41	-2.55	49.88	-4.41	0.001%
21	0.03	-49.88	5.07	-0.03	49.88	-5.07	0.001%
22	-2.50	-49.88	4.38	2.50	49.88	-4.38	0.001%
23	-4.38	-49.88	2.52	4.38	49.88	-2.52	0.001%
24	-5.07	-49.88	-0.04	5.07	49.88	0.04	0.001%
25	-4.41	-49.88	-2.56	4.41	49.88	2.56	0.001%
26	-2.57	-49.88	-4.40	2.57	49.88	4.40	0.001%
27	-0.07	-35.72	-6.42	0.07	35.72	6.42	0.003%
28	3.17	-35.72	-5.53	-3.17	35.72	5.52	0.001%
29	5.53	-35.72	-3.16	-5.53	35.72	3.16	0.003%
30	6.41	-35.72	0.05	-6.41	35.72	-0.05	0.003%
31	5.58	-35.72	3.27	-5.58	35.72	-3.27	0.003%
32	3.24	-35.72	5.59	-3.24	35.72	-5.59	0.001%
33	0.05	-35.72	6.42	-0.05	35.72	-6.42	0.003%
34	-3.16	-35.72	5.54	3.16	35.72	-5.54	0.003%
35	-5.54	-35.72	3.17	5.54	35.72	-3.17	0.003%
36	-6.42	-35.72	-0.06	6.42	35.72	0.06	0.003%
37	-5.59	-35.72	-3.25	5.59	35.72	3.25	0.001%
38	-3.27	-35.72	-5.58	3.27	35.72	5.58	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00000001	0.00007154
3	Yes	18	0.00000001	0.00006538
4	Yes	17	0.00000001	0.00014656
5	Yes	14	0.00004776	0.00006860
6	Yes	18	0.00000001	0.00006527
7	Yes	18	0.00000001	0.00007082
8	Yes	15	0.00000001	0.00013672
9	Yes	17	0.00000001	0.00014202
10	Yes	18	0.00000001	0.00006427
11	Yes	14	0.00004776	0.00012116
12	Yes	18	0.00000001	0.00006960
13	Yes	18	0.00000001	0.00006380
14	Yes	6	0.00000001	0.00002448
15	Yes	15	0.00000001	0.00012418
16	Yes	15	0.00000001	0.00014276
17	Yes	15	0.00000001	0.00014127
18	Yes	15	0.00000001	0.00012416
19	Yes	15	0.00000001	0.00014549
20	Yes	15	0.00000001	0.00014707
21	Yes	15	0.00000001	0.00012493
22	Yes	15	0.00000001	0.00014009
23	Yes	15	0.00000001	0.00014184
24	Yes	15	0.00000001	0.00012299

25	Yes	15	0.00000001	0.00014449
26	Yes	15	0.00000001	0.00014313
27	Yes	13	0.00011581	0.00007526
28	Yes	14	0.00000001	0.00007564
29	Yes	13	0.00000001	0.00011250
30	Yes	13	0.00011583	0.00005462
31	Yes	13	0.00011564	0.00012162
32	Yes	14	0.00000001	0.00008449
33	Yes	13	0.00011581	0.00008528
34	Yes	13	0.00000001	0.00010198
35	Yes	13	0.00000001	0.00013935
36	Yes	13	0.00011579	0.00005639
37	Yes	14	0.00000001	0.00007779
38	Yes	13	0.00011562	0.00011450

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 98.75	18.522	31	1.3856	0.0071
L2	98.75 - 90	12.509	31	1.2752	0.0044
L3	90 - 79.25	10.246	31	1.1874	0.0035
L4	79.25 - 75.17	7.756	31	1.0129	0.0024
L5	75.17 - 60	6.917	31	0.9501	0.0021
L6	60 - 49.25	4.258	31	0.7085	0.0013
L7	49.25 - 43	2.817	31	0.5664	0.0009
L8	43 - 30	2.128	31	0.4855	0.0007
L9	30 - 26	1.017	31	0.3248	0.0004
L10	26 - 20.75	0.764	31	0.2788	0.0003
L11	20.75 - 18	0.488	31	0.2229	0.0003
L12	18 - 13.5	0.367	31	0.1972	0.0002
L13	13.5 - 8	0.204	31	0.1474	0.0002
L14	8 - 6.25	0.071	31	0.0833	0.0001
L15	6.25 - 0	0.044	31	0.0659	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	VHLP1-18	31	18.522	1.3856	0.0074	24818
121.0000	VHLP1-18	31	18.522	1.3856	0.0074	24818
117.0000	LLPX310R w/ Mount Pipe	31	17.652	1.3735	0.0070	24818
100.0000	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	31	12.846	1.2844	0.0047	6241
60.0000	Bridge Stiffener (35" x 10.5" x 1.25")	31	4.258	0.7085	0.0013	3678
30.0000	Bridge Stiffener (35" x 10.5" x 1.25")	31	1.017	0.3248	0.0004	4647

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 98.75	59.781	6	4.4700	0.0232
L2	98.75 - 90	40.403	6	4.1178	0.0143
L3	90 - 79.25	33.104	6	3.8356	0.0115
L4	79.25 - 75.17	25.068	6	3.2733	0.0079

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L5	75.17 - 60	22.358	6	3.0705	0.0069
L6	60 - 49.25	13.769	6	2.2908	0.0041
L7	49.25 - 43	9.112	6	1.8318	0.0029
L8	43 - 30	6.882	6	1.5701	0.0023
L9	30 - 26	3.291	6	1.0507	0.0013
L10	26 - 20.75	2.472	6	0.9018	0.0011
L11	20.75 - 18	1.579	6	0.7212	0.0008
L12	18 - 13.5	1.187	6	0.6381	0.0007
L13	13.5 - 8	0.661	6	0.4771	0.0005
L14	8 - 6.25	0.230	6	0.2695	0.0003
L15	6.25 - 0	0.141	6	0.2132	0.0002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
124.0000	VHLP1-18	6	59.781	4.4700	0.0237	7856
121.0000	VHLP1-18	6	59.781	4.4700	0.0237	7856
117.0000	LLPX310R w/ Mount Pipe	6	56.977	4.4315	0.0222	7856
100.0000	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	6	41.490	4.1473	0.0149	1973
60.0000	Bridge Stiffener (35" x 10.5" x 1.25")	6	13.769	2.2908	0.0043	1143
30.0000	Bridge Stiffener (35" x 10.5" x 1.25")	6	3.291	1.0507	0.0014	1438

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	120 - 98.75 (1)	P24x0.25	21.2500	0.0000	0.0	23.696	18.6532	-5.07	442.00	0.011
L2	98.75 - 90 (2)	RPS 24" x 0.38762"	8.7500	0.0000	0.0	21.522	28.7538	-6.15	618.84	0.010
L3	90 - 79.25 (3)	P24x0.375	10.7500	0.0000	0.0	25.200	27.8325	-7.51	701.38	0.011
L4	79.25 - 75.17 (4)	Pipe 24" x 0.51722" Reinf	4.0800	0.0000	0.0	24.240	38.1570	-8.17	924.93	0.009
L5	75.17 - 60 (5)	RPS 24" x 0.66391"	15.1700	0.0000	0.0	24.246	48.6729	-11.18	1180.12	0.009
L6	60 - 49.25 (6)	RPS 30" x 0.52963"	10.7500	0.0000	0.0	22.776	49.0352	-16.82	1116.83	0.015
L7	49.25 - 43 (7)	RPS 30" x 0.6427"	6.2500	0.0000	0.0	22.782	59.2754	-18.29	1350.41	0.014
L8	43 - 30 (8)	RPS 30" x 0.80546"	13.0000	0.0000	0.0	21.138	73.8747	-22.00	1561.56	0.014
L9	30 - 26 (9)	RPS 36" x 0.55016"	4.0000	0.0000	0.0	21.522	61.2707	-27.52	1318.67	0.021
L10	26 - 20.75 (10)	RPS 36" x 0.64191"	5.2500	0.0000	0.0	21.522	71.3038	-28.97	1534.60	0.019
L11	20.75 - 18 (11)	RPS 36" x 0.78214"	2.7500	0.0000	0.0	21.522	86.5361	-29.87	1862.43	0.016
L12	18 - 13.5 (12)	RPS 36" x 0.68817"	4.5000	0.0000	0.0	21.522	76.3424	-31.20	1643.04	0.019
L13	13.5 - 8 (13)	RPS 36" x 0.69662"	5.5000	0.0000	0.0	21.120	77.2613	-32.84	1631.76	0.020
L14	8 - 6.25 (14)	RPS 36" x 0.86801"	1.7500	0.0000	0.0	21.504	95.8026	-33.47	2060.14	0.016
L15	6.25 - 0 (15)	RPS 36" x 0.8575"	6.2500	0.0000	0.0	21.138	94.6709	-35.71	2001.15	0.018

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	120 - 98.75 (1)	P24x0.25	171.01	18.722	23.696	0.790	0.00	0.000	23.696	0.000
L2	98.75 - 90 (2)	RPS 24" x 0.38762"	284.44	20.434	23.674	0.863	0.00	0.000	23.674	0.000
L3	90 - 79.25 (3)	P24x0.375	430.98	31.953	27.720	1.153	0.00	0.000	27.720	0.000
L4	79.25 - 75.17 (4)	Pipe 24" x 0.51722" Reinf	488.49	26.731	26.664	1.003	0.00	0.000	26.664	0.000
L5	75.17 - 60 (5)	RPS 24" x 0.66391"	712.38	30.936	26.671	1.160	0.00	0.000	26.671	0.000
L6	60 - 49.25 (6)	RPS 30" x 0.52963"	887.47	29.998	25.054	1.197	0.00	0.000	25.054	0.000
L7	49.25 - 43 (7)	RPS 30" x 0.6427"	993.04	27.978	25.060	1.116	0.00	0.000	25.060	0.000
L8	43 - 30 (8)	RPS 30" x 0.80546"	1221.34	27.911	23.252	1.200	0.00	0.000	23.252	0.000
L9	30 - 26 (9)	RPS 36" x 0.55016"	1297.35	29.108	23.674	1.230	0.00	0.000	23.674	0.000
L10	26 - 20.75 (10)	RPS 36" x 0.64191"	1398.76	27.105	23.674	1.145	0.00	0.000	23.674	0.000
L11	20.75 - 18 (11)	RPS 36" x 0.78214"	1452.66	23.376	23.674	0.987	0.00	0.000	23.674	0.000
L12	18 - 13.5 (12)	RPS 36" x 0.68817"	1542.06	27.982	23.674	1.182	0.00	0.000	23.674	0.000
L13	13.5 - 8 (13)	RPS 36" x 0.69662"	1653.24	29.656	23.232	1.277	0.00	0.000	23.232	0.000
L14	8 - 6.25 (14)	RPS 36" x 0.86801"	1689.05	24.668	23.654	1.043	0.00	0.000	23.654	0.000
L15	6.25 - 0 (15)	RPS 36" x 0.8575"	1818.67	26.863	23.252	1.155	0.00	0.000	23.252	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	120 - 98.75 (1)	P24x0.25	12.64	1.355	16.800	0.081	1.05	0.057	11.901	0.005
L2	98.75 - 90 (2)	RPS 24" x 0.38762"	13.29	0.925	14.348	0.064	1.03	0.037	14.348	0.003
L3	90 - 79.25 (3)	P24x0.375	13.97	1.004	16.800	0.060	1.02	0.038	16.800	0.002
L4	79.25 - 75.17 (4)	Pipe 24" x 0.51722" Reinf	14.23	0.746	16.160	0.046	1.02	0.028	16.160	0.002
L5	75.17 - 60 (5)	RPS 24" x 0.66391"	15.28	0.628	16.164	0.039	0.97	0.021	16.164	0.001
L6	60 - 49.25 (6)	RPS 30" x 0.52963"	16.68	0.680	15.184	0.045	0.94	0.016	15.184	0.001
L7	49.25 - 43 (7)	RPS 30" x 0.6427"	17.11	0.577	15.188	0.038	0.92	0.013	15.188	0.001
L8	43 - 30 (8)	RPS 30" x 0.80546"	18.01	0.488	14.092	0.035	0.87	0.010	14.092	0.001
L9	30 - 26 (9)	RPS 36" x 0.55016"	19.15	0.625	14.348	0.044	0.85	0.010	14.348	0.001
L10	26 - 20.75 (10)	RPS 36" x 0.64191"	19.51	0.547	14.348	0.038	0.83	0.008	14.348	0.001
L11	20.75 - 18 (11)	RPS 36" x 0.78214"	19.72	0.456	14.348	0.032	0.82	0.007	14.348	0.000
L12	18 - 13.5 (12)	RPS 36" x 0.68817"	20.04	0.525	14.348	0.037	0.79	0.007	14.348	0.000
L13	13.5 - 8 (13)	RPS 36" x 0.69662"	20.42	0.528	14.080	0.038	0.76	0.007	14.080	0.000
L14	8 - 6.25 (14)	RPS 36" x 0.86801"	20.54	0.429	14.336	0.030	0.75	0.005	14.336	0.000
L15	6.25 - 0 (15)	RPS 36" x 0.8575"	20.96	0.443	14.092	0.031	0.71	0.005	14.092	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	120 - 98.75 (1)	0.011	0.790	0.000	0.081	0.005	0.809	1.333	H1-3+VT

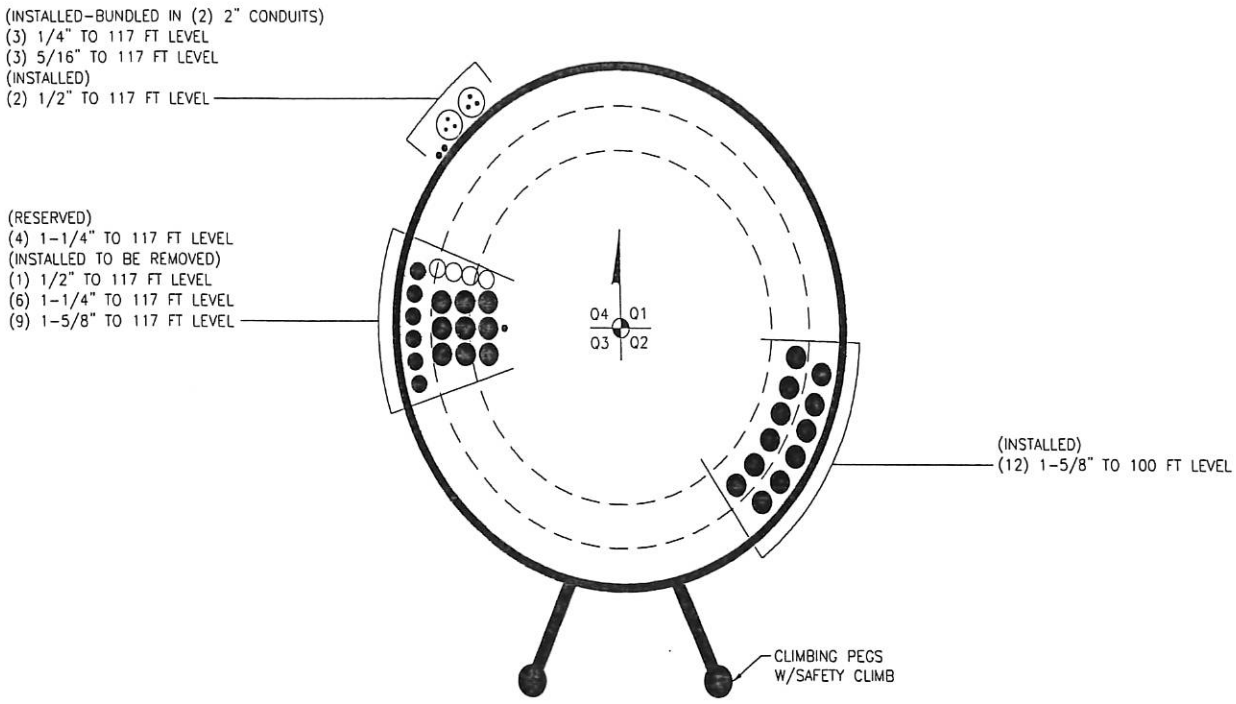
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	98.75 - 90 (2)	0.010	0.863	0.000	0.064	0.003	0.878 ✓	1.333	H1-3+VT ✓
L3	90 - 79.25 (3)	0.011	1.153	0.000	0.060	0.002	1.167 ✓	1.333	H1-3+VT ✓
L4	79.25 - 75.17 (4)	0.009	1.003	0.000	0.046	0.002	1.014 ✓	1.333	H1-3+VT ✓
L5	75.17 - 60 (5)	0.009	1.160	0.000	0.039	0.001	1.171 ✓	1.333	H1-3+VT ✓
L6	60 - 49.25 (6)	0.015	1.197	0.000	0.045	0.001	1.215 ✓	1.333	H1-3+VT ✓
L7	49.25 - 43 (7)	0.014	1.116	0.000	0.038	0.001	1.131 ✓	1.333	H1-3+VT ✓
L8	43 - 30 (8)	0.014	1.200	0.000	0.035	0.001	1.216 ✓	1.333	H1-3+VT ✓
L9	30 - 26 (9)	0.021	1.230	0.000	0.044	0.001	1.252 ✓	1.333	H1-3+VT ✓
L10	26 - 20.75 (10)	0.019	1.145	0.000	0.038	0.001	1.165 ✓	1.333	H1-3+VT ✓
L11	20.75 - 18 (11)	0.016	0.987	0.000	0.032	0.000	1.004 ✓	1.333	H1-3+VT ✓
L12	18 - 13.5 (12)	0.019	1.182	0.000	0.037	0.000	1.202 ✓	1.333	H1-3+VT ✓
L13	13.5 - 8 (13)	0.020	1.277	0.000	0.038	0.000	1.298 ✓	1.333	H1-3+VT ✓
L14	8 - 6.25 (14)	0.016	1.043	0.000	0.030	0.000	1.060 ✓	1.333	H1-3+VT ✓
L15	6.25 - 0 (15)	0.018	1.155	0.000	0.031	0.000	1.174 ✓	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	120 - 98.75	Pole	P24x0.25	1	-5.07	589.19	60.7	Pass
L2	98.75 - 90	Pole	RPS 24" x 0.38762"	2	-6.15	824.91	65.8	Pass
L3	90 - 79.25	Pole	P24x0.375	3	-7.51	934.94	87.6	Pass
L4	79.25 - 75.17	Pole	Pipe 24" x 0.51722" Reinf	4	-8.17	1232.93	76.0	Pass
L5	75.17 - 60	Pole	RPS 24" x 0.66391"	5	-11.18	1573.10	87.8	Pass
L6	60 - 49.25	Pole	RPS 30" x 0.52963"	6	-16.82	1488.73	91.1	Pass
L7	49.25 - 43	Pole	RPS 30" x 0.6427"	7	-18.29	1800.10	84.9	Pass
L8	43 - 30	Pole	RPS 30" x 0.80546"	8	-22.00	2081.56	91.2	Pass
L9	30 - 26	Pole	RPS 36" x 0.55016"	9	-27.52	1757.79	93.9	Pass
L10	26 - 20.75	Pole	RPS 36" x 0.64191"	10	-28.97	2045.62	87.4	Pass
L11	20.75 - 18	Pole	RPS 36" x 0.78214"	11	-29.87	2482.62	75.4	Pass
L12	18 - 13.5	Pole	RPS 36" x 0.68817"	12	-31.20	2190.17	90.2	Pass
L13	13.5 - 8	Pole	RPS 36" x 0.69662"	13	-32.84	2175.14	97.4	Pass
L14	8 - 6.25	Pole	RPS 36" x 0.86801"	14	-33.47	2746.17	79.5	Pass
L15	6.25 - 0	Pole	RPS 36" x 0.8575"	15	-35.71	2667.53	88.1	Pass
							Summary	
						Pole (L13)	97.4	Pass
						RATING =	**97.4**	**Pass**

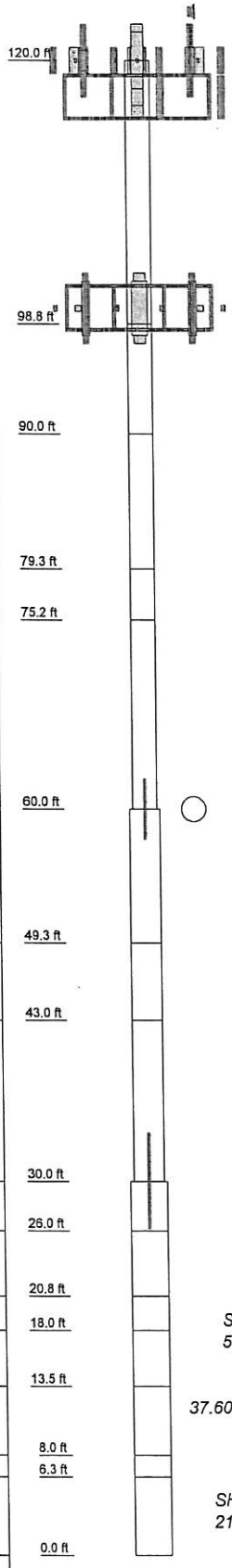
APPENDIX B

BASE LEVEL DRAWING

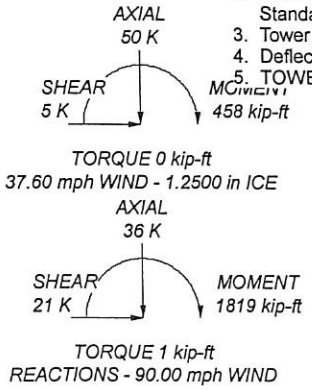

(INSTALLED-BUNDLED IN (2) 2" CONDUITS)
(3) 1/4" TO 117 FT LEVEL
(3) 5/16" TO 117 FT LEVEL
(INSTALLED)
(2) 1/2" TO 117 FT LEVEL
(RESERVED)
(4) 1-1/4" TO 117 FT LEVEL
(INSTALLED TO BE REMOVED)
(1) 1/2" TO 117 FT LEVEL
(6) 1-1/4" TO 117 FT LEVEL
(9) 1-5/8" TO 117 FT LEVEL
04
01
03
02
(INSTALLED)
(12) 1-5/8" TO 100 FT LEVEL
CLIMBING PEGS
W/SAFETY CLIMB

APPENDIX C

ADDITIONAL CALCULATIONS



Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Size	P24x0.25	RPS 24" x 0.38762"	Reinf 24x0.375	RPS 24" x 0.51722"	RPS 24" x 0.66395"	RPS 30" x 0.52963"	RPS 30" x 0.64278"	RPS 30" x 0.80546"	RPS 30" x 0.55016"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	RFS 36RP3.857x0.5
Length (ft)	21.2500	8.7500	10.7500	4.0800	15.1700	10.7500	6.2500	13.0000	4.0000	5.2500	2.7500	4.5000	5.5000	1.7500	6.2500
Grade	A53-B-42	Reinf 35.87 ksi	A53-B-42	Reinf 40.40 ksi	Reinf 40.41 ksi	Reinf 37.96 ksi	Reinf 37.97 ksi	Reinf 35.23 ksi	Reinf 35.87 ksi	[illegible]	[illegible]	[illegible]	Reinf 35.20 ksi	[illegible]	[illegible]
Weight (K)	1.3	0.9	1.0	0.5	2.5	1.8	1.3	3.3	0.8	1.3	0.8	1.2	1.4	0.6	2.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LLPX310R w/ Mount Pipe	117	(2) FD9R6004/2C-3L	100
(2) LLPX310R w/ Mount Pipe	117	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100
FDD_R6_RRH	117		
(2) FDD_R6_RRH	117	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100
HORIZON COMPACT	117		
HORIZON COMPACT	117	BXA-70063-6BF-EDIN-0 w/ Mount Pipe	100
APXV9ERR18-C-A20 w/ Mount Pipe	117		
APXVSPP18-C-A20 w/ Mount Pipe	117	LNX-4514DS-A1M w/ Mount Pipe	100
APXVSPP18-C-A20 w/ Mount Pipe	117	LNX-4514DS-A1M w/ Mount Pipe	100
800MHZ RRH	117	LNX-4514DS-A1M w/ Mount Pipe	100
800MHZ RRH	117	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100
800MHZ RRH	117		
(2) 1900MHz RRH (65MHz)	117	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100
(2) 1900MHz RRH (65MHz)	117	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	100
(2) 1900MHz RRH (65MHz)	117		
(3) ACU-A20-N	117	(2) FD9R6004/2C-3L	100
(3) ACU-A20-N	117	(2) FD9R6004/2C-3L	100
(3) ACU-A20-N	117	(2) FD9R6004/2C-3L	100
800 EXTERNAL NOTCH FILTER	117	Platform Mount [LP 303-1]	100
800 EXTERNAL NOTCH FILTER	117	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100
800 EXTERNAL NOTCH FILTER	117		
IBC1900HB-2	117	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100
IBC1900HB-2	117		
IBC1900HB-2	117	Bridge Stiffener (35" x 10.5" x 1.25")	60
APXVTM14-C-120 w/ Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	60
APXVTM14-C-120 w/ Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	60
APXVTM14-C-120 w/ Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	60
TD-RRH8x20-25	117	Bridge Stiffener (35" x 10.5" x 1.25")	60
TD-RRH8x20-25	117	Bridge Stiffener (35" x 10.5" x 1.25")	60
TD-RRH8x20-25	117	Bridge Stiffener (35" x 10.5" x 1.25")	30
(2) 2.375" OD x 6' Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	30
(2) 2.375" OD x 6' Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	30
(2) 2.375" OD x 6' Mount Pipe	117	Bridge Stiffener (58" x 14" x 1.25")	30
Platform Mount [LP 502-1]	117	Bridge Stiffener (93" x 16" x 1.25")	30
VHLP1-18	117	Bridge Stiffener (93" x 16" x 1.25")	30
VHLP1-18	117	Bridge Stiffener (93" x 16" x 1.25")	30
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	100	Bridge Stiffener (35" x 10.5" x 1.25")	30
(2) FD9R6004/2C-3L	100	Bridge Stiffener (35" x 10.5" x 1.25")	30
(2) FD9R6004/2C-3L	100		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi	Reinf 37.97 ksi	38 ksi	48 ksi
Reinf 35.87 ksi	36 ksi	45 ksi	Reinf 35.23 ksi	35 ksi	45 ksi
Reinf 40.40 ksi	40 ksi	51 ksi	Reinf 35.20 ksi	35 ksi	44 ksi
Reinf 40.41 ksi	40 ksi	51 ksi	Reinf 35.84 ksi	36 ksi	45 ksi
Reinf 37.96 ksi	38 ksi	48 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 90.00 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 1.25 in ice.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 97.4%

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

Job: *120 ft Monopole / Jai-Alai*			
Project: *PJF 37513-2057 / BU 876309*			
Client: CCI	Drawn by: Joey Meinerding	App'd:	
Code: TIA/EIA-222-F	Date: 12/30/14	Scale: NTS	
Path: T:\375 Crown Castle\2013\37513-2057 BU 876309\WO 954081 BU 876309 - 907 SDO\37513-2057 007 7700 e		Dwg No. E-1	

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: 12/16/2014
PJF Project: 37513-2057.007.7700
Client Ref. # 876309
Site Name: Milford Jai-Alai
Description: 90' Flange
Owner: CCI
Engineer: JWM

v4.4 - Effective 7-12-13

Asymmetric Bolt Analysis

Moment =	284	k-ft	TIA Ref.	F	Location =	Flange Plate		
Axial =	6.2	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	13.3	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	23							

**** For Flange Plates: Prying action is not considered in the bolt loads. ****

Item	Nominal Bolt Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Bolt Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.000	A325	92	120	0.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
2	1.000	A325	92	120	18.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
3	1.000	A325	92	120	36.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
4	1.000	A325	92	120	54.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
5	1.000	A325	92	120	72.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
6	1.000	A325	92	120	90.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
7	1.000	A325	92	120	108.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
8	1.000	A325	92	120	126.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
9	1.000	A325	92	120	144.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
10	1.000	A325	92	120	162.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
11	1.000	A325	92	120	180.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
12	1.000	A325	92	120	198.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
13	1.000	A325	92	120	216.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
14	1.000	A325	92	120	234.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
15	1.000	A325	92	120	252.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
16	1.000	A325	92	120	270.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
17	1.000	A325	92	120	288.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
18	1.000	A325	92	120	306.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
19	1.000	A325	92	120	324.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
20	1.000	A325	92	120	342.0	29.00	0.00	0.79	13.80	13.40	13.40	0.00	46.08	29.1%
21	0.000	CCI 4 x 0.75 (65 ksi)	65	80	90.0	32.75	3.00	3.00	59.42	57.91	59.42	103.13	103.13	57.6%
22	0.000	CCI 4 x 0.75 (65 ksi)	65	80	210.0	32.75	3.00	3.00	59.42	57.91	59.42	103.13	103.13	57.6%
23	0.000	CCI 4 x 0.75 (65 ksi)	65	80	330.0	32.75	3.00	3.00	59.42	57.91	59.42	103.13	103.13	57.6%
								24.71						

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

Site Data

BU#: *876309*
Site Name: *Milford Jai-Alai*
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	164.3	ft-kips
Axial:	3.9	kips
Shear:	8.5	kips
Elevation:	90	feet

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

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

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

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

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

Stress Increase Factor		
ASIF:	1.3333333	

Flange Bolt Results

			Rigid
Bolt Tension Capacity, B:	46.08	kips	Service, ASD
Max Bolt directly applied T:	13.40	Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	2.018	in	
Min PL "treq" for actual T w/ Pry:	0.830	in	
Min PL "t1" for actual T w/o Pry:	1.089	in	
T allowable with Prying:	35.76	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	13.40	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	29.1%	**Pass**	

Exterior Flange Plate Results — Flexural Check

			Rigid
Compression Side Plate Stress:	14.1	ksi	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	39.1%	**Pass**	Comp. Y.L. Length: 16.28
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	30.7%	**Pass**	

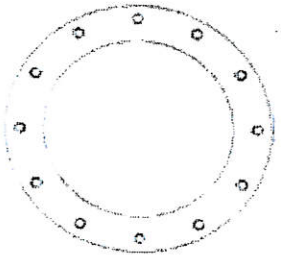
n/a

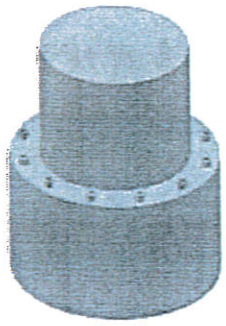
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Site Data

BU#: *876309*
Site Name: *Milford Jai-Alai*
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	164.3	ft-kips
Axial:	3.9	kips
Shear:	8.5	kips
Elevation:	90	feet

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

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

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

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

Stress Increase Factor		
ASIF:	1.3333333	

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

Flange Bolt Results

			Rigid
Bolt Tension Capacity, B:	46.08	kips	Service, ASD
Max Bolt directly applied T:	13.40	Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	2.018	in	
Min PL "treq" for actual T w/ Pry:	0.830	in	
Min PL "t1" for actual T w/o Pry:	1.089	in	
T allowable with Prying:	35.76	kips	0≤α'≤1 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	13.40	kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	29.1%	**Pass**	

Exterior Flange Plate Results — Flexural Check

			Rigid
Compression Side Plate Stress:	14.1	ksi	Service ASD
Allowable Plate Stress:	36.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	39.1%	**Pass**	Comp. Y.L. Length:
No Prying			16.28
Tension Side Stress Ratio, (treq/t)^2:	30.7%	**Pass**	

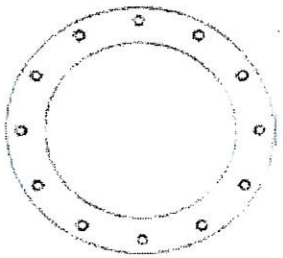
n/a

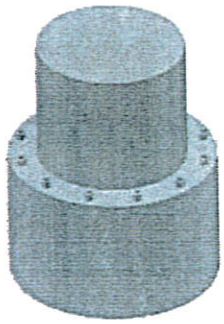
Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a





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

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

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

Date: 9/18/2014
Project No: 37513-2057.005.7700
Site Name: Milford Jai-Alai
Site Number/BUN: 876309
Description:
Owner:
Engineer:

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

General Parameters and Loading:

Flange Elevation:	60.00	ft
TIA Reference Standard:	TIA/EIA-222-F	
AISC Manual:	9th Ed. (Green)	
Method:	ASD	
ASD Stress Increase, ASIF:	1.333333333	
Moment, Mf:	712.4	k-ft
Axial, Pf:	11.2	kips
Shear, Vf:	15.3	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	24.00	30.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	41.00	41.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	25.00	47.25	in
Lower Weld Length, L2:	22.00	44.13	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E80	
Effective Stiffener Width, Ws:	6.68	7.00	in
Stiffener Thickness, ts:	1.34	1.25	in
Notch, n:	1.00	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	11.75	4.63	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	75	degrees
Stiffener Circle:	49.68	49.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	12.84	12.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	9.84	9.50	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

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

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

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	6	Num. of Sixteenths in Weld
a:	0.5136	0.2646	= e1 / L1
k:	0	0	
C:	0.7715	1.2251	Tabulated Cofficient
C1:	1.0000	1.1400	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	119.6	115.3	kips
Allowable Axial, Pa:	154.3	527.9	kips = ASIF C C1 D L
Ratio:	77.5%	21.8%	
Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.4473	0.2153	= e2 / L2
k:	0	0	
C:	0.8671	1.3502	Tabulated Cofficient
C1:	1.0000	1.1400	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	119.6	115.3	kips
Allowable Axial, Pa:	152.6	543.4	kips = ASIF C C1 D L
Ratio:	78.3%	21.2%	

Pole Analysis per AISC Sect. F4:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, P:	119.6	115.3	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fv:	2.4	1.2	kips/in= P / (2 L1)
Section Modulus, S:	208.3	744.2	$in^2 = L1^2 / 3$
Bending Stress, fb:	7.4	1.9	kips/in = P e1 / S
Combined Stress, f:	7.7	2.3	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	1.3333	
Allowable Stress, F:	8.4	8.4	kips/in = ASIF (0.4 Fy) tp
Ratio:	92.2%	27.3%	
Lower Pole			
Stiffener Axial, P:	119.6	115.3	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fv:	2.7	1.3	ksi = P / (2 L2)
Section Modulus, S:	161.3	649.0	$in^2 = L2^2 / 3$
Bending Stress, fb:	7.3	1.7	ksi = P e2 / S
Combined Stress, f:	7.8	2.1	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	1.3333	
Allowable Stress, F:	8.4	8.4	kips/in = ASIF (0.4 Fy) tp
Ratio:	92.6%	25.4%	

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

	Stiffener Type 1	
Gross Area, Ag:	8.9512	in^2
Net Area, An:	8.9512	in^2
Stiffener Axial, P:	119.6	kips
Stiffener Stress, f:	13.4	ksi = P / Ag
b:	16.1800	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.0746	in
Q, Where Qa = 1.0:	0.9049	= Qa 1.340 - 0.00447 (b / ts) $Fy^{1/2}$
r:	0.3868	in^3
K L / r:	24.3004	
ASIF:	1.3333	
Allowable Axial, Fa:	43.28	ksi = ASIF Q [1 - (K L / r) / 2 Cc^2] Fy / [5/3 + 3(K L / r) / 8 Cc' - (K L / r)^3 / 8 Cc^3]
ASIF:	1.3333	
Allowable Bending, Fb:	47.05	ksi = ASIF 0.6 Fy Q
ASIF:	1.3333	
Allowable Net Tension, Ft:	53.33	ksi = ASIF 0.5 Fu
Ratio:	30.9%	

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

	Stiffener Type 2	
Gross Area, Ag:	8.7500	in^2
Net Area, An:	8.7500	in^2
Stiffener Axial, P:	115.3	kips
Stiffener Stress, f:	13.2	ksi = P / Ag
b:	16.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.8000	in
Q, Where Qa = 1.0:	0.8787	= Qa 1.340 - 0.00447 (b / ts) $Fy^{1/2}$
r:	0.3608	in^3
K L / r:	10.2537	
ASIF:	1.3333	
Allowable Axial, Fa:	44.43	ksi = ASIF Q [1 - (K L / r) / 2 Cc^2] Fy / [5/3 + 3(K L / r) / 8 Cc' - (K L / r)^3 / 8 Cc^3]
ASIF:	1.3333	
Allowable Bending, Fb:	45.69	ksi = ASIF 0.6 Fy Q
ASIF:	1.3333	
Allowable Net Tension, Ft:	53.33	ksi = ASIF 0.5 Fu
Ratio:	29.7%	

Analysis Summary:

Bridge Stiffener Type 1	Bridge Stiffener Type 2
Weld Analysis Ratio: 78.3% PASS	Weld Analysis Ratio: 21.8% PASS
Pole Analysis Ratio: 92.6% PASS	Pole Analysis Ratio: 27.3% PASS
Stiffener Analysis Ratio: 30.9% PASS	Stiffener Analysis Ratio: 29.7% PASS

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

Date: 9/18/2014
Project No: 37513-2057.005.7700
Site Name: Milford Jai-Alai
Site Number/BUN: 876309
Description:
Owner:
Engineer:

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

General Parameters and Loading:

Flange Elevation:	30.00	ft
TIA Reference Standard:	TIA/EIA-222-F	
AISC Manual:	9th Ed. (Green)	
Method:	ASD	
ASD Stress Increase, ASIF:	1.333333333	
Moment, Mf:	1221.3	k-ft
Axial, Pf:	22.0	kips
Shear, Vf:	18.0	kips

Pole Parameters:

	Upper Pole	Lower Pole	
Pole Diameter, Dp:	30.00	36.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	42	42	ksi
Pole Fu:	63	63	ksi
Flange Diameter, Df:	47.00	47.00	in

Bridge Stiffener Parameters:

	Stiffener Type 1	Stiffener Type 2	
Qty. Stiffeners:	3	3	
Upper Weld Length, L1:	45.25	47.25	in
Lower Weld Length, L2:	42.25	44.13	in
Weld Size, w:	0.3750	0.3750	in
Electrode:	E70	E80	
Effective Stiffener Width, Ws:	7.00	7.00	in
Stiffener Thickness, ts:	1.25	1.25	in
Notch, n:	0.50	0.50	in
Stiffener Fy:	65	65	ksi
Stiffener Fu:	80	80	ksi
Unbraced Length, L:	5.63	4.63	in
K:	0.80	0.80	
Stiffener Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	22.5	75	degrees
Stiffener Circle:	55.00	55.00	in = Df + 2 n + Ws
Upper Eccentricity, e1:	12.50	12.50	in = (Df - Dp) / 2 + n + Ws / 2
Lower Eccentricity, e2:	9.50	9.50	in = (Df - Dp) / 2 + n + Ws / 2

Flange Bolt Parameters:

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	0	0	
Bolt Diameter:	1.50	0.00	in
Bolt Circle:	41.00	0.00	in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0	0	degrees
Bolt Area, Ag:	0.0000	0.0000	in
Max. Tension:	0.00	0.00	kips
Max. Net Tension:	0.00	0.00	kips
Max. Net Compression:	0.00	0.00	kips
Moment to Bolt Circle:	0.00	0.00	k-ft
Axial to Bolt Circle:	0.00	0.00	kips
Shear to Bolt Circle:	0.00	0.00	kips
Equivalent Bolt Circle:	0.00	0.00	in

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

Upper Pole	Stiffener Type 1	Stiffener Type 2	
D:	6	6	Num. of Sixteenths in Weld
a:	0.2762	0.2646	= e1 / L1
k:	0	0	
C:	1.1970	1.2251	Tabulated Cofficient
C1:	1.0000	1.1400	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	181.4	181.4	kips
Allowable Axial, Pa:	433.3	527.9	kips = ASIF C C1 D L
Ratio:	41.9%	34.4%	

Lower Pole			
D:	6	6	Num. of Sixteenths in Weld
a:	0.2249	0.2153	= e2 / L2
k:	0	0	
C:	1.3254	1.3502	Tabulated Cofficient
C1:	1.0000	1.1400	Coefficient for Electrode
ASIF:	1.3333	1.3333	
Stiffener Axial, Ps:	181.4	181.4	kips
Allowable Axial, Pa:	448.0	543.4	kips = ASIF C C1 D L
Ratio:	40.5%	33.4%	

Pole Analysis per AISC Sect. F4:

Upper Pole	Stiffener Type 1	Stiffener Type 2	
Stiffener Axial, P:	181.4	181.4	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fv:	2.0	1.9	kips/in= P / (2 L1)
Section Modulus, S:	682.5	744.2	$in^2 = L1^2 / 3$
Bending Stress, fb:	3.3	3.0	kips/in = P e1 / S
Combined Stress, f:	3.9	3.6	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	1.3333	
Allowable Stress, F:	8.4	8.4	kips/in = ASIF (0.4 Fy) tp
Ratio:	46.2%	42.9%	

Lower Pole			
Stiffener Axial, P:	181.4	181.4	kips
Effective Throat, te:	0.2651	0.2651	in = 0.707 w
Shear Stress, fv:	2.1	2.1	ksi = P / (2 L2)
Section Modulus, S:	595.0	649.0	$in^2 = L2^2 / 3$
Bending Stress, fb:	2.9	2.7	ksi = P e2 / S
Combined Stress, f:	3.6	3.4	kips/in = $(fv^2 + fb^2)^{1/2}$
ASIF:	1.3333	1.3333	
Allowable Stress, F:	8.4	8.4	kips/in = ASIF (0.4 Fy) tp
Ratio:	42.9%	40.0%	

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

	Stiffener Type 1	
Gross Area, Ag:	8.7500	in^2
Net Area, An:	8.7500	in^2
Stiffener Axial, P:	181.4	kips
Stiffener Stress, f:	20.7	ksi = P / Ag
b:	16.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.8000	in
Q, Where Qa = 1.0:	0.8787	= Qa 1.340 - 0.00447 (b / ts) $Fy^{1/2}$
r:	0.3608	in^3
K L / r:	12.4708	
ASIF:	1.3333	
Allowable Axial, Fa:	44.11	ksi = ASIF Q [1 - (K L / r) / 2 Cc'^2] Fy / [5/3 + 3(K L / r) / 8 Cc' - $(K L / r)^3$ / 8 Cc'^3]
ASIF:	1.3333	
Allowable Bending, Fb:	45.69	ksi = ASIF 0.6 Fy Q
ASIF:	1.3333	
Allowable Net Tension, Ft:	53.33	ksi = ASIF 0.5 Fu
Ratio:	47.0%	

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

	Stiffener Type 2	
Gross Area, Ag:	8.7500	in^2
Net Area, An:	8.7500	in^2
Stiffener Axial, P:	181.4	kips
Stiffener Stress, f:	20.7	ksi = P / Ag
b:	16.0000	in = (Df - Dp) / 2 + n + Ws, Upper Pole
b / ts:	12.8000	in
Q, Where Qa = 1.0:	0.8787	= Qa 1.340 - 0.00447 (b / ts) $Fy^{1/2}$
r:	0.3608	in^3
K L / r:	10.2537	
ASIF:	1.3333	
Allowable Axial, Fa:	44.43	ksi = ASIF Q [1 - (K L / r) / 2 Cc'^2] Fy / [5/3 + 3(K L / r) / 8 Cc' - $(K L / r)^3$ / 8 Cc'^3]
ASIF:	1.3333	
Allowable Bending, Fb:	45.69	ksi = ASIF 0.6 Fy Q
ASIF:	1.3333	
Allowable Net Tension, Ft:	53.33	ksi = ASIF 0.5 Fu
Ratio:	46.7%	

Analysis Summary:

Bridge Stiffener Type 1	Bridge Stiffener Type 2
Weld Analysis Ratio: 41.9% PASS	Weld Analysis Ratio: 34.4% PASS
Pole Analysis Ratio: 46.2% PASS	Pole Analysis Ratio: 42.9% PASS
Stiffener Analysis Ratio: 47.0% PASS	Stiffener Analysis Ratio: 46.7% PASS

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v4.4 - Effective 7-12-13

Date: 12/16/2014
PJF Project: 37513-2057.007.7700
Client Ref. # 876309
Site Name: Milford Jai-Alai
Description: 120' Pole
Owner: CCI
Engineer: JWM

Asymmetric Anchor Rod Analysis

Moment =	1819	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	36.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	21.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	23							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	1.500	A354 Gr BC	109	125	0.0	41.00	0.00	1.77	34.61	32.03	32.03	0.00	97.19	33.0%
2	1.500	A354 Gr BC	109	125	22.5	41.00	0.00	1.77	34.12	31.54	31.54	0.00	97.19	32.4%
3	1.500	A354 Gr BC	109	125	45.0	41.00	0.00	1.77	35.06	32.48	32.48	0.00	97.19	33.4%
4	1.500	A354 Gr BC	109	125	67.5	41.00	0.00	1.77	37.23	34.64	34.64	0.00	97.19	35.6%
5	1.500	A354 Gr BC	109	125	90.0	41.00	0.00	1.77	39.63	37.04	37.04	0.00	97.19	38.1%
6	1.500	A354 Gr BC	109	125	112.5	41.00	0.00	1.77	41.16	38.58	38.58	0.00	97.19	39.7%
7	1.500	A354 Gr BC	109	125	135.0	41.00	0.00	1.77	41.16	38.58	38.58	0.00	97.19	39.7%
8	1.500	A354 Gr BC	109	125	157.5	41.00	0.00	1.77	39.58	36.99	36.99	0.00	97.19	38.1%
9	1.500	A354 Gr BC	109	125	180.0	41.00	0.00	1.77	37.01	34.43	34.43	0.00	97.19	35.4%
10	1.500	A354 Gr BC	109	125	202.5	41.00	0.00	1.77	34.56	31.98	31.98	0.00	97.19	32.9%
11	1.500	A354 Gr BC	109	125	225.0	41.00	0.00	1.77	33.36	30.78	30.78	0.00	97.19	31.7%
12	1.500	A354 Gr BC	109	125	247.5	41.00	0.00	1.77	33.78	31.20	31.20	0.00	97.19	32.1%
13	1.500	A354 Gr BC	109	125	270.0	41.00	0.00	1.77	35.14	32.56	32.56	0.00	97.19	33.5%
14	1.500	A354 Gr BC	109	125	292.5	41.00	0.00	1.77	36.32	33.74	33.74	0.00	97.19	34.7%
15	1.500	A354 Gr BC	109	125	315.0	41.00	0.00	1.77	36.55	33.97	33.97	0.00	97.19	35.0%
16	1.500	A354 Gr BC	109	125	337.5	41.00	0.00	1.77	35.77	33.19	33.19	0.00	97.19	34.1%
17	1.750	Dywidag (150 ksi)	127.7	150	101.3	47.00	0.00	2.71	70.53	66.56	66.56	0.00	178.99	37.2%
18	1.750	Dywidag (150 ksi)	127.7	150	221.3	47.00	0.00	2.71	58.67	54.70	54.70	0.00	178.99	30.6%
19	0.000	Dywidag (150 ksi)	0	0	341.3	47.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
20	2.000	A193 Gr B7	105	125	326.3	47.00	0.00	3.14	74.11	69.52	69.52	0.00	172.79	40.2%
21	2.250	Williams R71	127.7	150	56.3	96.00	0.00	4.14	189.39	183.33	183.33	0.00	273.50	67.0%
22	2.250	Williams R71	127.7	150	191.3	96.00	0.00	4.14	189.26	183.20	183.20	0.00	273.50	67.0%
23	2.250	Williams R71	127.7	150	303.8	96.00	0.00	4.14	204.31	198.25	198.25	0.00	273.50	72.5%
								49.27						

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

TIA Rev F

Site Data

BU#: *876309*
Site Name: *Milford Jai-Alai*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	544.9	ft-kips
Axial:	20.7	kips
Shear:	12.1	kips

Reactions adjusted to account for additional anchor rods/micropiles.

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

Anchor Rod Data		
Qty:	16	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	41	in

Plate Data		
Diam:	47	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.07	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Groove	
Groove Depth:	0.4375	in **
Groove Angle:	45	degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:	0.25	in
Width:	5.5	in
Height:	18	in
Thick:	1	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	58	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	38.6 Kips	Service, ASD
		Fty*ASIF

Base Plate Results

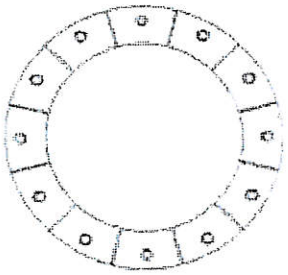
	Flexural Check	Stiffened
Base Plate Stress:	13.1 ksi	Service, ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	36.3% **Pass**	Y.L. Length: N/A, Roark

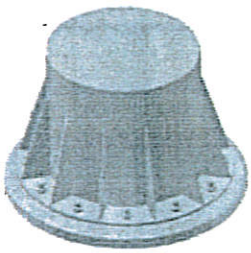
Stiffener Results

Horizontal Weld :	35.5% **Pass**
Vertical Weld:	18.7% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	2.4% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	15.4% **Pass**
Plate Comp. (AISC Bracket):	15.6% **Pass**

Pole Results

Pole Punching Shear Check:	4.9% **Pass**





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

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

PJF job no. **37513-2057.007.7700** Project name **Milford Jai-Alai**

foundation loads

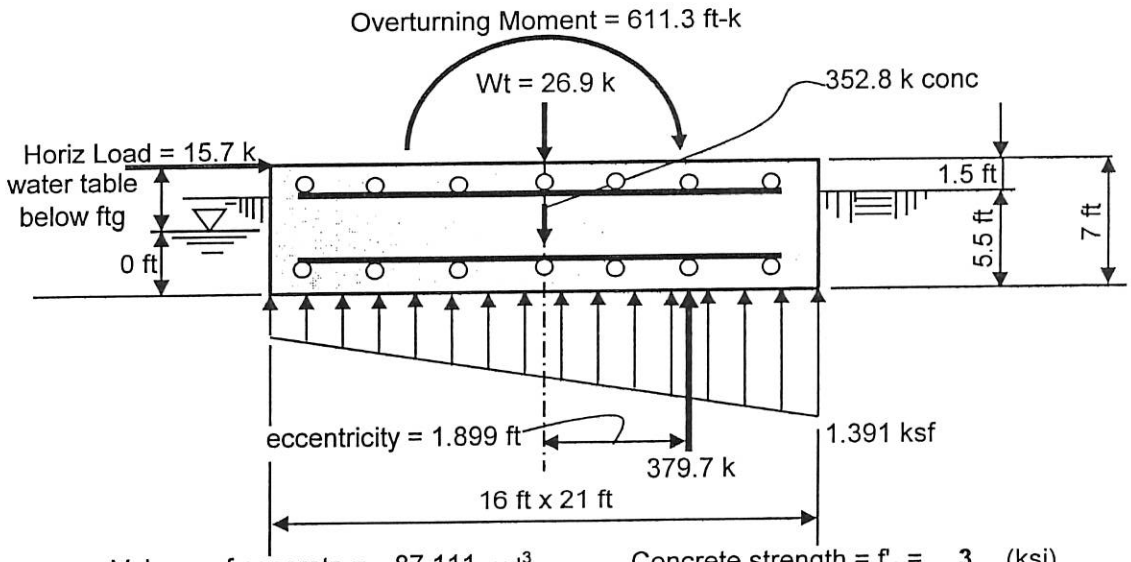
Tower or Pole Weight =	**26.9**	kips
Total Horizontal Force =	**15.7**	kips
Overturning Moment =	**611.3**	ft-kips

soil properties

Safety factor against overturning =	**2**	
Soil density =	**130**	pcf
Allowable soil bearing =	**10**	ksf
Depth to water table =	**6.7**	ft

mat dimensions

depth to bottom of footing =	**5.5**	ft
Footing thickness =	**7**	ft
Footing Width =	**16**	ft
Footing Length =	**21**	ft
Tower/Pole Center Offset =	**0**	ft



Volume of concrete = 87.111 yd^3 Concrete strength = f'_c = **3** (ksi)

Rebar = (34) #8 x 15.5 ft long plus (34) #8 x 20.5 ft long

reinforcing steel = **(17) #8 by 15.5 long @ 15.38 in o.c. top and bot short bars**

reinforcing steel = **(17) #8 by 20.5 long @ 11.63 in o.c. top and bot long bars**

Summary of analysis results

Rebar strength = F_y = **60** (ksi)

minimum cover over rebar = **3** inches

Overturning Moment: (Stress Ratio = 0.475) **< CONTROLLING CRITERIA**

Calculated Overturning Moment = 721.2 ft-kips

Resisting Moment = 3037.6 ft-kips

Factor of Safety against overturning = 4.212 **> 2 okay**

Soil Bearing (Stress Ratio = 0.139)

Net Soil Bearing Resistance = 10 ksf

Calculated Soil Bearing Pressure = 1.391 **ksf < 10 ksf okay**

Bending Moment (Stress Ratio = 0.128)

Ultimate Bending Moment Resistance = 4755 ft-kips

Calculated Ultimate Bending Moment = 610 **ft-kips < 4755 ft-kips okay**

Bending Shear (Stress Ratio = 0.08)

Ultimate Bending Shear Resistance = 1254 kips

Calculated Ultimate Bending Shear = 100 **kips < 1254 kips okay**