Crown Castle
12 Gill Street, Suite 5800
Woburn, MA 01801

February 23, 2017

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

RE: **Notice of Exempt Modification for Sprint / Crown Site BU: 828054**
Sprint Site ID: CT60XC014
Located at: 300 Governors Highway, South Windsor, CT 06903
Latitude: 41° 6' 6.35"/ Longitude: -73° 35' 41.45"

Dear Ms. Bachman,

Sprint currently maintains three (3) antennas at the 148-foot level of the existing 165-foot monopole at 300 Governors Highway, South Windsor, CT. The tower is owned by Crown Castle. The property is owned by Electron Technologies. Sprint now intends to replace three (3) antennas with three (3) RFS antennas. Sprint also intends to replace feedlines with three (3) hybrid lines and install three (3) 800MHz RRUs and three (3) 1900MHz RRUs. Please note that two structural analysis have been provided in order to show modifications that will be completed on the tower in order to ensure that the tower will remains at sufficient capactity. Sprint will be taking responsibility for said modification that is depecited on the other carrier's structural analysis.

A request for original zoning documents was sent to the Town of South Windsor but has not been answered.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to the Honorable Carolyn Mirek, Mayor, Town of South Windsor, Michele Lipe, Director of Planning, as well as the property owner and the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

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

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

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

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

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

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Amanda Cornwall.

Sincerely,

Amanda Cornwall
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
339-205-7017
Amanda.Cornwall@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes

Tab 2: Exhibit-2: Structural Modification Report

Tab 3: Exhibit-3: General Power Density Table report (RF Emissions Analysis Report)

cc: The Honorable Carolyn Mirek, Mayor, Town of South Windsor
1540 Sullivan Avenue
South Windsor, CT 06074

Electron Technologies Corp.
300 Governors Highway
PO Box 316
South Windsor, CT 06074

Town of South Windsor, CT

Property Listing Report

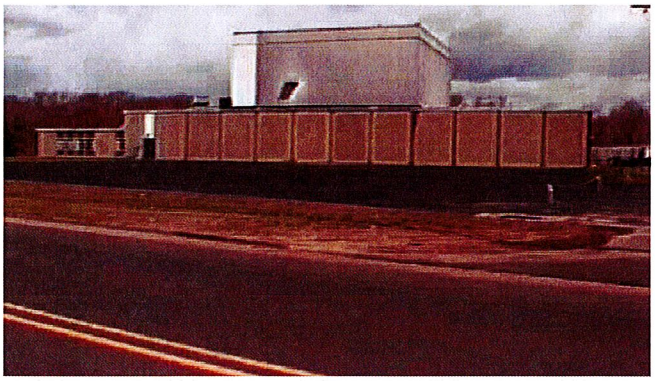
Map Block Lot 71-22 | Account 36900300

Property Information

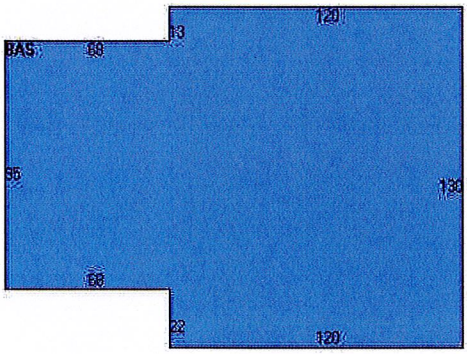
Property Location	300 GOVERNORS HIGHWAY
Owner	ELECTRON TECHNOLOGIES
Co-Owner	P.O.BOX 316
Mailing Address	300 GOVERNORS HIGHWAY SOUTH WINDSOR CT 06074
Land Use	301 Industrial
Land Class	I
Zoning Code	I
Census Tract	4874

Neighborhood	C400
Acreage	6.03
Utilities	
Lot Setting/Desc	
Water Information	MDC 860.278.7850
Trash Day	MONDAY

Photo



Sketch



Primary Construction Details

Year Built	1965
Stories	1.00
Building Style	Light Industrial
Building Use	Comm/Ind
Building Condition	C
Floors	Concrete
Total Rooms	0

Bedrooms	
Full Bathrooms	12
Half Bathrooms	
Bath Style	n/a
Kitchen Style	n/a
Roof Style	Flat
Roof Cover	Tar & Gravel

Exterior Walls	Precast Panel
Interior Walls	Minimum
Heating Type	Forced Hot Air
Heating Fuel	Gas
AC Type	
Gross Bldg Area	22060
Total Living Area	22060

Report Created On 1/20/2017

Town of South Windsor, CT

Property Listing Report | Map Block Lot 71-22 | Account 36900300

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	643400	450400
Extras	0	0
Improvements	666600	466600
Outbuildings	23200	16200
Land	318700	223100
Total	985300	689700

Outbuilding and Extra Items

Type	Description
Paving	36700.00 S.F.
Lights	1.00 UNITS
Fence	1080.00 L.F.

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	22060	22060

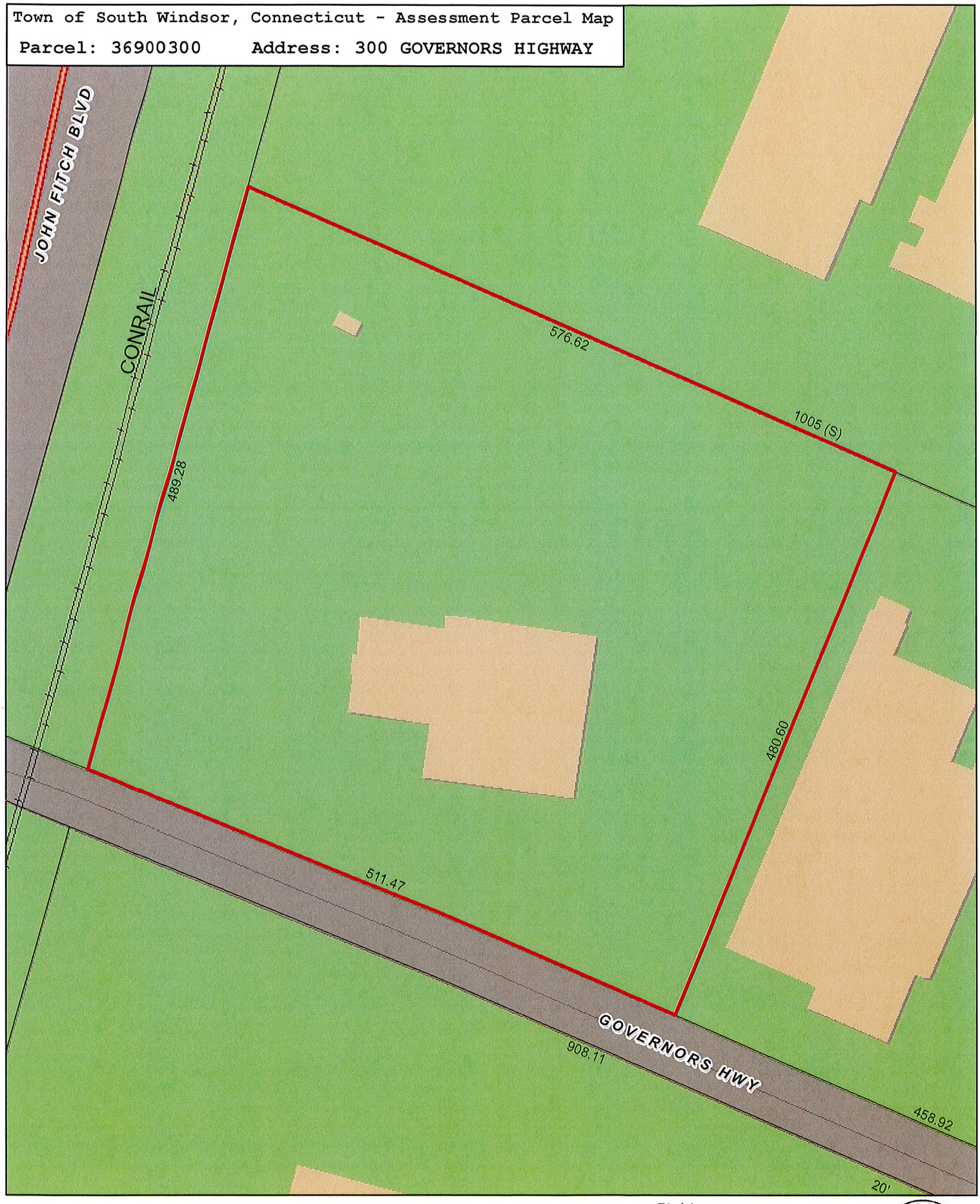
Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
ELECTRON TECHNOLOGIES CORPORATIO	540/ 418	10/4/1988	800000

Report Created On 1/20/2017

Town of South Windsor, Connecticut - Assessment Parcel Map

Parcel: 36900300 Address: 300 GOVERNORS HIGHWAY



Approximate Scale:
1 inch = 100 feet

0 80 160 240 Feet

Map Produced:
July 2012

Disclaimer:
This map is for informational purposes only.
All information is subject to verification by any user.
The Town of South Windsor and its mapping contractors assume no legal responsibility for the information contained herein.

Sprint

SPRINT SITE NUMBER: CT60XC014
SPRINT SITE NAME: ---
SITE TYPE: MONOPOLE
TOWER HEIGHT: 165'-0"

CROWN CASTLE BU #: 828054
SITE ADDRESS: 300 GOVERNORS HIGHWAY SOUTH WINDSOR, CT 06074
COUNTY: HARTFORD
JURISDICTION: TOWN OF SOUTH WINDSOR

SPRINT 2016-2017 LOCAL ASK INITIATIVE

SITE INFORMATION

CROWN CASTLE SITE NAME:	SOUTH WINDSOR/RT 5
SITE ADDRESS:	300 GOVERNORS HIGHWAY SOUTH WINDSOR, CT 06074
COUNTY:	HARTFORD
MAP/PARCEL #:	SWIN-003690-000300
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 50' 0.4"
LONGITUDE:	-72° 36' 11.0"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	70 FT.
CURRENT ZONING:	I
JURISDICTION:	TOWN OF SOUTH WINDSOR
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	VB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	ELECTRON TECHNOLOGIES CORP 300 GOVERNORS HWY, P.O. BOX 316 SOUTH WINDSOR, CT 06074
TOWER OWNER:	CCTMO LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	SPRINT 6391 SPRINT PARKWAY OVERLAND PARK, KS 66251-2650
CROWN CASTLE APPLICATION ID:	367042
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER CO (800) 286-2000
TELCO PROVIDER:	AT&T (866) 620-6900

PROJECT TEAM

CROWN CASTLE A&E FIRM:
CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317
CROWNAE.APPROVAL@CROWNCASTLE.COM

CROWN CASTLE CONTACTS:
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

MARYELLEN PERROTTA - PROJECT MANAGER
(781) 970-0057
JASON D'AMICO - CONSTRUCTION MANAGER
(860) 209-0104

WILLIAM STONE - A&E PROJECT MANAGER
WILLIAM.STONE.CONTRACTOR@CROWNCASTLE.COM
(518) 373-3543

SPRINT CONTACT:

FLORENCE NICOLAS
FLORENCE.NICOLAS@SPRINT.COM

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
T-3	GENERAL NOTES
C-1	ENLARGED SITE PLAN
C-2	EXISTING AND FINAL ELEVATION
C-3	ANTENNA PLANS AND SCHEMATIC
C-4	CONDUIT ROUTING SCHEMATIC
C-5	INSTALLATION SPECS AND DETAILS
C-6	MOUNT SPECIFICATIONS
C-7	PLUMBING DIAGRAM
E-1	ONE-LINE DIAGRAM AND PANEL SCHEDULE
G-1	GROUNDING DETAILS
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

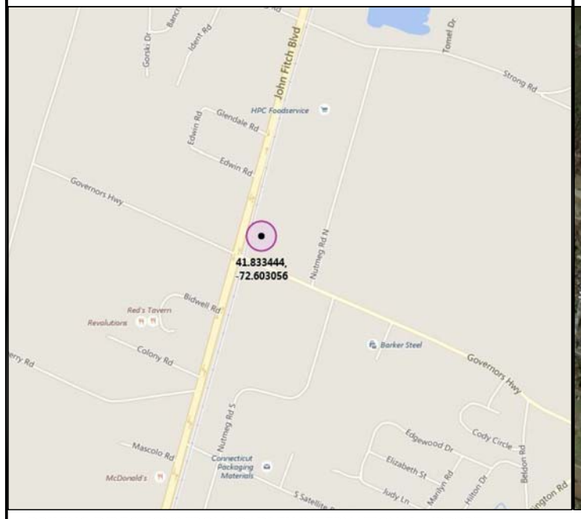
- REMOVE (3) ANTENNAS
- REMOVE (6) 1-5/8" COAX CABLES
- RELOCATE (3) RRHs FROM GROUND TO TOWER
- INSTALL (3) ANTENNAS
- INSTALL (3) 1-1/4" HYBRID CABLES
- INSTALL (3) RRHs
- INSTALL (1) T-ARM MOUNT KIT

DESIGN PACKAGE BASED ON RF DATA SHEET
VERSION: 3.12
ISSUED: 10/04/16

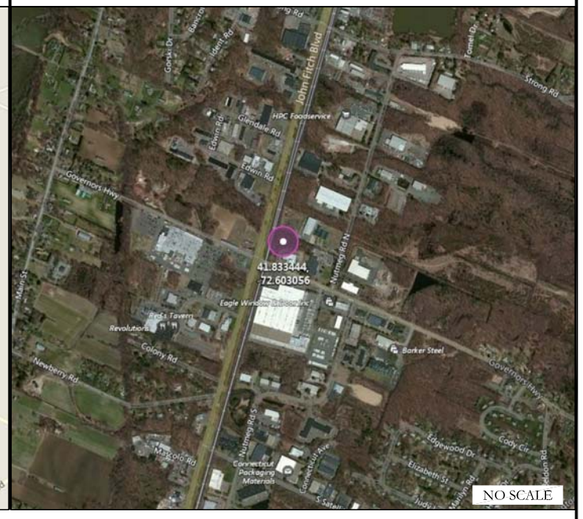
DESIGN PACKAGE BASED ON THE APPLICATION
ID: 367042
REVISION: 1

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

VICINITY MAP



AERIAL MAP



DRIVING DIRECTIONS FROM BRADLEY INTERNATIONAL AIRPORT:

EXIT BRADLEY INTERNATIONAL AIRPORT VIA SCHOEPHOESTER RD TOWARD CT-20 E. CONTINUE ONTO CT-20 E/BRADLEY INTERNATIONAL AIRPORT CON, THEN USE THE LEFT TWO LANES TO MERGE ONTO I-91 N TOWARD SPRINGFIELD. TAKE EXIT 44 FOR US-5 S TOWARD E. WINDSOR, THEN TURN RIGHT ONTO US-5 S. TURN LEFT ONTO GOVERNORS HWY, THEN TURN LEFT INTO THE FIRST PARKING LOT. SITE ACCESS IS ON THE NORTH WEST CORNER OF THE PARKING LOT.

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2016 CONNECTICUT STATE BUILDING CODE/2012 IBC W/ CT AMMENDMENTS
MECHANICAL	2016 CONNECTICUT STATE BUILDING CODE/2012 IMC W/ CT AMMENDMENTS
ELECTRICAL	2016 CONNECTICUT STATE BUILDING CODE/2014 NEC W/ CT AMMENDMENTS

REFERENCE DOCUMENTS:
STRUCTURAL ANALYSIS: BY OTHERS

CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!

811

APPROVALS

APPROVAL	SIGNATURE	DATE
SITE ACQ. & ZONING		
CONSTRUCTION MGR		
A&E MGR		
PLANNING CONSULTANT		
RF MGR		
PROPERTY OWNER		
SPRINT REP.		

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT60XC014

BU #: **828054**
SOUTH WINDSOR/RT 5

300 GOVERNORS HIGHWAY
SOUTH WINDSOR, CT 06074

EXISTING 165'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/22/16	CJ	PRELIMINARY	LR
0	01/09/17	CJ	CONSTRUCTION	LR

DocuSigned by:
Justin Linette
1B4005B2647C4D...

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED
PROFESSIONAL ENGINEER

1/10/2017 | 10:29:13 AM EST

Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: T-1
REVISION: 0

CROWN CASTLE SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED- NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA 1019 (LATEST EDITION), OSHA, AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

SPRINT CONSTRUCTION NOTES

SECTION 01 100 – SCOPE OF WORK

THE WORK:

MUST COMPLY WITH ALL APPLICABLE ADOPTED CODES AND STANDARDS, AND PORTIONS THEREOF. SPRINT METHOD OF PROCEDURE (MOP) AND SPRINT STANDARDS AT THE TIME OF CONSTRUCTION START.

PRECEDENCE:

SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS. INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. ALONG WITH SPRINT CONSTRUCTION MANAGER APPROVAL.

SITE FAMILIARITY:

CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

ON-SITE SUPERVISION:

THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE:

THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. PROVIDE ALL MATERIALS AND LABOR AS REQUIRED TO PROVIDE A COMPLETE FUNCTIONING SYSTEM. MODIFICATIONS MAY BE REQUIRED TO SUITE JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

B. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

C. MARK THE FIELD SET OF DRAWINGS IN RED, DOCUMENTING ANY CHANGES FROM THE CONSTRUCTION DOCUMENTS.

METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION:

CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS. CONTRACTOR IS RESPONSIBLE FOR DISTRIBUTION OF LATEST MOPS.

A. TOP HAT
B. HOW TO INSTALL A NEW CABINET
C. BASE BAND UNIT IN EXISTING UNIT
D. INSTALLATION OF BATTERIES
E. INSTALLATION OF FIBER CABLE
F. INSTALLATION OF RRU'S
G. CABLING
H. TS-0200 REV 5 – ANTENNA LINE ACCEPTANCE STANDARDS
I. SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.
J. COMMISSIONING MOPS

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

A. COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DRAWINGS.

B. CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT TO ENSURE IT IS PROTECTED AND HANDLED PROPERLY THROUGHOUT THE CONSTRUCTION DURATION.

C. CONTRACTOR IS RESPONSIBLE FOR RECEIPT OF SPRINT FURNISHED EQUIPMENT AT CELL SITE OR CONTRACTORS LOCATION. CONTRACTOR TO COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE. CONTRACTOR MAY BE REQUIRED TO PICK UP MATERIAL AT LOCATION PRESCRIBED BY SPRINT.

SECTION 01 300 – CELL SITE CONSTRUCTION

NOTICE TO PROCEED:

NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF WORK ORDER.

SITE CLEANLINESS:

CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

SECTION 01 400 – SUBMITTALS AND TESTS

ALTERNATIVES:

AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED.

TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. COAX SWEEPS AND FIBER TESTS PER TS-200 REV 5 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT: PROVIDE AN AUTOMATED REPORT UPLOADED TO SITERRA USING A COMMERCIAL MADE-FOR PURPOSE ELECTRONIC ANTENNA ALIGNMENT TOOL (AAT). INSTALLED AZIMUTH, CENTERLINE AND DOWNTILT MUST CONFORM WITH RF CONFIGURATION DATA.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
4. ALL TESTING REQUIRED BY APPLICABLE INSTALLATION MOPS.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:
1. AZIMUTH, DOWNTILT, AGL FROM SUNSIGHT INSTRUMENTS – ANTENNA ALIGNMENT TOOL (AAT)
2. SWEEP AND FIBER TESTS.
3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT.
4. ALL AVAILABLE JURISDICTIONAL PERMIT AND OCCUPANCY INFORMATION.
5. PDF SCAN OF REDLINES PRODUCED IN FIELD.
6. A PDF SCAN OF REDLINE MARK-UPS SUITABLE FOR USE IN ELECTRONIC AS-BUILT DRAWING PRODUCTION.
7. LIEN WAIVERS.
8. FINAL PAYMENT APPLICATION.
9. REQUIRED FINAL CONSTRUCTION PHOTOS.
10. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS.
11. APPLICABLE POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINT'S DOCUMENT REPOSITORY OF RECORD).
12. CLOSEOUT PHOTOGRAPHS AND CLOSEOUT CHECKLIST: SPRINT WILL PROVIDE SEPARATE GUIDANCE.

a. PROVIDE PHOTOGRAPHS OF FINAL PROJECT PER THE FOLLOWING LIST. ADDITIONAL PHOTOS MAY BE REQUIRED TO SUPPORT ACCEPTANCE PROCESSES
(i) BACK MAIN FIBER CABLE ROUTE (MINIMUM TWO PHOTOS)
(ii) OF EACH ANTENNA AND RRU
(iii) MANUFACTURERS NAME TAG FOR ALL SERIALIZED EQUIPMENT
(iv) PULL AND DISTRIBUTION BOXES INTERMEDIATE BETWEEN RRU'S AND RBS (DOOR OPEN)
(v) RBS CABINET WITH DOOR OPEN SHOWING MODIFICATIONS
(vi) POWER CABINET, DOORS OPEN, BATTERIES INSTALLED
(vii) BREAK OUT CYLINDERS
(viii) ASR SIGNAGE FOR SPRINT OWNED TOWERS
(ix) RADIATION EXPOSURE WARNING SIGNS
(x) PHOTOGRAPH FROM EACH SECTOR FROM APPROXIMATELY RAD CENTER OF ANY NEW ANTENNA AT HORIZON.

b. LOAD PHOTOS TO SITERRA PROJECT LIBRARY 15. IN 15 CREATE NEW CATEGORY; 2.5 DEPLOYMENT, AND SECTION; PERMANENT CONSTRUCTION. LABEL PHOTOS WITH SITE CASCADE AND VIEW BEING DEPICTED. CAMERAS USED TO TAKE PHOTOS SHALL BE GPS ENABLED SUCH THAT THE GPS COORDINATES ARE INCLUDED IN THE PHOTO MEDIA-FILE INFORMATION.

COMMISSIONING:

PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

INTEGRATION:

PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

SECTION 09 900 – PAINTING

QUALITY ASSURANCE:

A. COMPLY WITH GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

MATERIALS:

A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED PROVIDE PREMIUM GRADE, PROFESSIONAL-QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

A. EXTERIOR ANTENNAE AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAE SHALL BE NON-METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAE ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER. REFER TO ANTENNA MANUFACTURER'S INSTRUCTION WHENEVER POSSIBLE.

B. WATER TANKS: TOUCH UP – PREPARE SURFACES TO BE REPAIRED. FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES, REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.
2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK. COORDINATE WITH WORK OF OTHER SECTIONS.
3. MATCH APPROVED MOCK-UPS FOR COLOR, TEXTURE, AND PATTERN. RE-COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.
4. CLEAN UP, TOUCH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH "GALVANOX," "DRY GALV," OR "ZINC-IT."
2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

SECTION 11 700 – ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

NV FIBER CABLE:

EXISTING NV FIBER CABLE WILL BE USED AT EACH SITE. CABLE SHALL BE USED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTIONS:

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2" FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MINIMUM LENGTH FOR JUMPER SHALL BE SO AS TO ALLOW FOR THE PROPER BEND RADIUS PER MANUFACTURER OR SPRINT SPECIFICATIONS.

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH AND FEED ORIENTATION INFORMATION SHALL BE AS DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE CONSTRUCTION DRAWINGS.

FIBER CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAT THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN FIBER CABLES:

a. LATTICE AND GUYED TOWERS:

ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS. HOISTING GRIPS SHOULD BE INSTALLED AT MID-POINT IF CABLE RUN EXCEEDS 200' AS WELL AS TOP SIDE.

a. MONOPOLE:

ALL CABLES SHALL BE PERMANENTLY SUPPORTED WITH HOISTING GRIPS AT INTERVALS OF NO MORE THAN 200' (ONE HOISTING GRIP PER COAX).

1. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA). WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES.

a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.

b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

2. FASTENING OR SECURING JUMPERS SHOULD CONSIST OF STAINLESS STEEL CLIPS, 18" FROM REAR OF CONNECTOR AND 24" THEREAFTER AND AT NO TIME SHALL THEY CONTACT TOWER OR STRUCTURAL STEEL.

3. CABLE INSTALLATION:

a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE. NOTIFY THE CONSTRUCTION MANAGER.

b. CABLE ROUTING CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOPE AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.

c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.

5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 5.
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY A ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT60XC014

BU #: **828054**
SOUTH WINDSOR/RT 5

300 GOVERNORS HIGHWAY
SOUTH WINDSOR, CT 06074

EXISTING 165'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/22/16	CJ	PRELIMINARY	LR
0	01/09/17	CJ	CONSTRUCTION	LR

DocuSigned by:
Justin Linette
1B4008B2547C41D...

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER

1/10/2017 | 10:29:13 AM EST

Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: **T-2**
REVISION: **0**

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER AND COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF AMALGAMATING TAPE.
2. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
3. JMA-WPS SERIES ENCLOSURE.
4. BUTYL AND TAPE, 1 COMPLETE WRAP OF 3/4" PRE-TAPE, BUTYL WRAPPED IN HALF INCH LAP LAYERS, ENDED WITH SHINGLED DOWNWARD 3 WRAPS OF 2" TAPE, 3 WRAPS OF 3/4" TAPE SHINGLED DOWNWARD, FREE OF WRINKLES, BUCKLES AND FLAGGING.
5. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

C. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE CONSTRUCTION DRAWINGS.

FIBER CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAT THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN FIBER CABLES:

a. LATTICE AND GUYED TOWERS:

ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS. HOISTING GRIPS SHOULD BE INSTALLED AT MID-POINT IF CABLE RUN EXCEEDS 200' AS WELL AS TOP SIDE.

b. MONOPOLE:

ALL CABLES SHALL BE PERMANENTLY SUPPORTED WITH HOISTING GRIPS AT INTERVALS OF NO MORE THAN 200' (ONE HOISTING GRIP PER COAX).

2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA). WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES.

a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.

b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

3. FASTENING OR SECURING JUMPERS SHOULD CONSIST OF STAINLESS STEEL CLIPS, 18" FROM REAR OF CONNECTOR AND 24" THEREAFTER AND AT NO TIME SHALL THEY CONTACT TOWER OR STRUCTURAL STEEL.

4. CABLE INSTALLATION:

a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE. NOTIFY THE CONSTRUCTION MANAGER.

b. CABLE ROUTING CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOPE AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.

c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.

5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.

6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 5.

7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER AND COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF AMALGAMATING TAPE.
2. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
3. JMA-WPS SERIES ENCLOSURE.
4. BUTYL AND TAPE, 1 COMPLETE WRAP OF 3/4" PRE-TAPE, BUTYL WRAPPED IN HALF INCH LAP LAYERS, ENDED WITH SHINGLED DOWNWARD 3 WRAPS OF 2" TAPE, 3 WRAPS OF 3/4" TAPE SHINGLED DOWNWARD, FREE OF WRINKLES, BUCKLES AND FLAGGING.
5. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 – INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BUT NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURER'S INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING:

A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

SECTION 26 100 – BASIC ELECTRICAL REQUIREMENTS

SUMMARY:

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS.

QUALITY ASSURANCE:

A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTING ARE AVAILABLE IN THE INDUSTRY.

B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE NEW USE FOR THIS PROJECT.

C. MATERIALS AND EQUIPMENT: ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS. PROVIDE PRODUCTS BY THE FOLLOWING:

1. ALLIED TUBE AND CONDUIT.
2. B-LINE SYSTEM.
3. UNISTRUT DIVERSIFIED PRODUCTS.
4. THOMAS & BETTS

B. FASTENERS: TYPES, MATERIALS AND CONSTRUCTION FEATURES AS FOLLOWS:

1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL. DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS IN WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.

B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.

C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:

1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
2. USE VIBRATION AND SHOCK-RESISTANT FASTNERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 – ELECTRICAL MATERIALS AND EQUIPMENT

CONDUIT:

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED – SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. ALL UNDERGROUND CONDUIT OR CONDUIT IN CONCRETE SHOULD BE PVC. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATIONS C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED HUB SHALL INCLUDE LOCK NUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION

B. CABLE TERMINATION FITTINGS FOR CONDUIT

1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.

2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO – CL2075, OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION, PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMET. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO-HOLE SPADES WITH NO-OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CONSTRUCTION MANAGER FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

ADDITIONAL REQUIRED NOTES:

- GC IS RESPONSIBLE FOR HIRING ALL 3RD PARTY SPECIAL INSPECTIONS AS REQUIRED PER MUNICIPALITY
- GC IS RESPONSIBLE FOR VERIFYING ALL FIELD MEASUREMENTS PRIOR TO STARTING CONSTRUCTION
- DO NOT OPEN RRU PACKAGES IN THE RAIN
- NO OPEN FLAME ON SITE
- GC TO ENSURE HYBRIDS ARE SUPPORTED EVERY 3'-0" ON HORIZONTAL AND 4'-0" ON VERTICAL RUNS

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT60XC014

BU #: **828054**
SOUTH WINDSOR/RT 5

300 GOVERNORS HIGHWAY
SOUTH WINDSOR, CT 06074

EXISTING 165'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/22/16	CJ	PRELIMINARY	LR
0	01/09/17	CJ	CONSTRUCTION	LR

DocuSigned by:
Justin Linette
1B400BB254764JD...

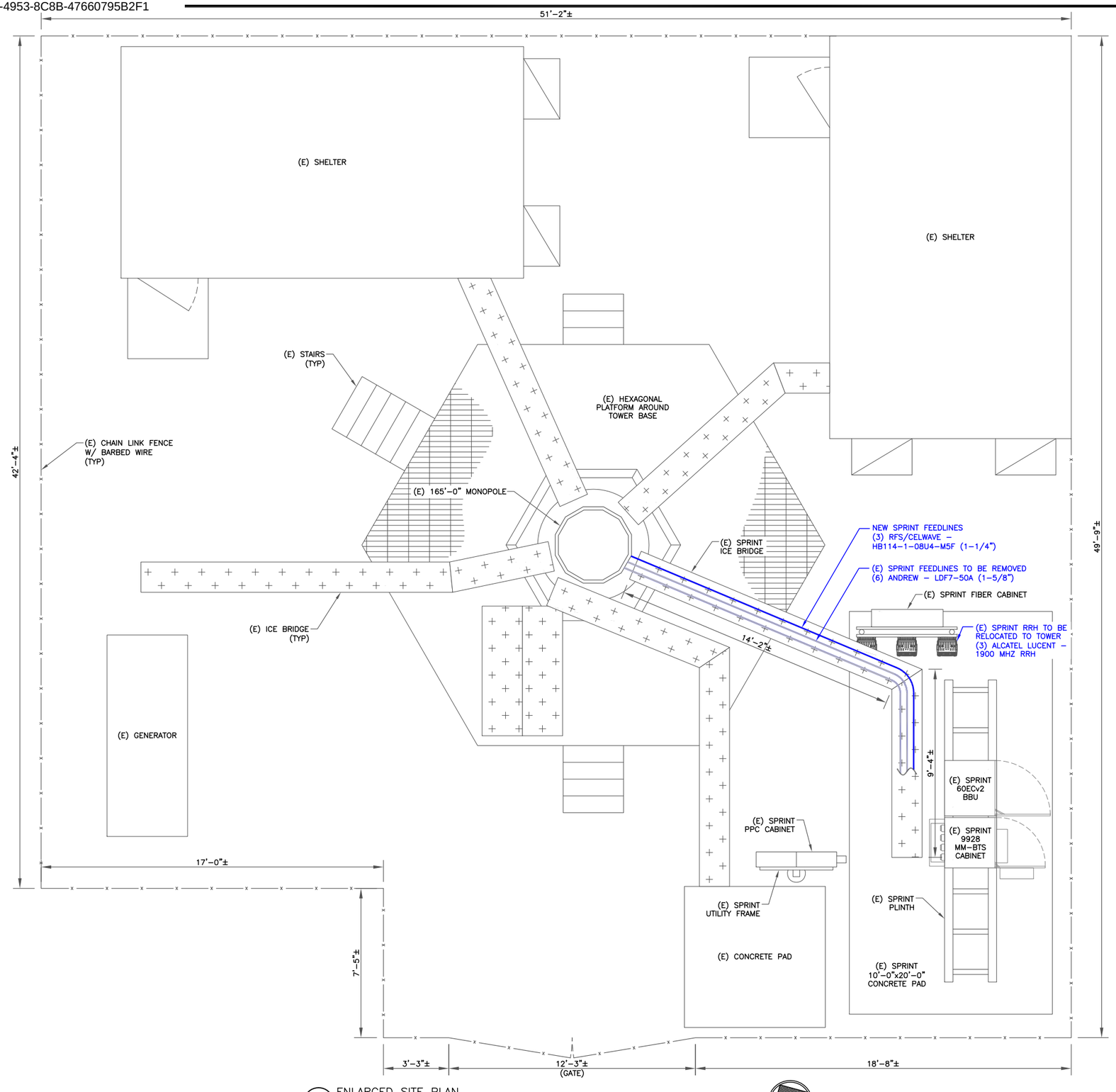
STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED
PROFESSIONAL ENGINEER

1/10/2017 | 10:29:13 AM EST

Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: T-3

REVISION: 0



1 ENLARGED SITE PLAN

SCALE: 4' 3' 2' 1' 0 4' 1/4"=1'-0" (FULL SIZE) 1/8"=1'-0" (11x17)

Sprint

CROWN CASTLE

3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT60XC014

BU #: **828054**
SOUTH WINDSOR/RT 5

300 GOVERNORS HIGHWAY
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DocuSigned by:
Justin Linette
1B4008B2547C41D...

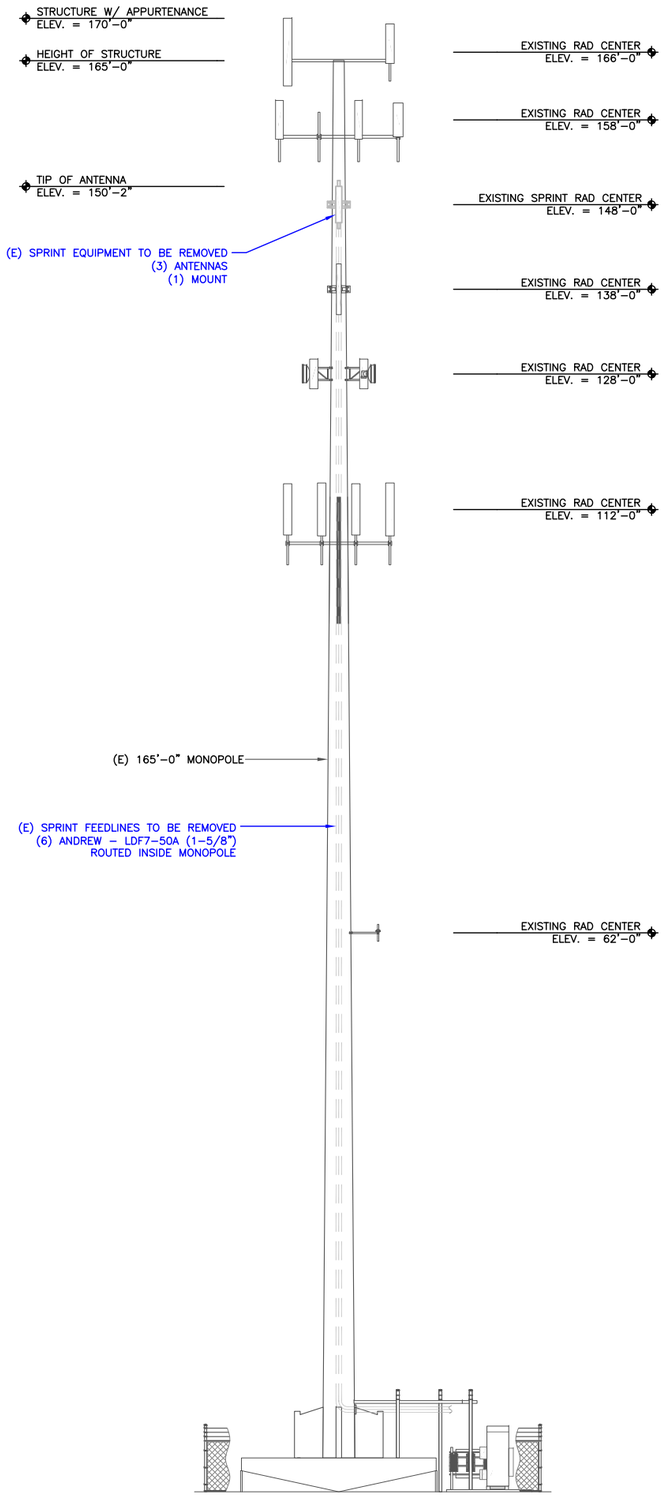
STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER

1/10/2017 | 10:29:13 AM EST

Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: C-1

REVISION: 0



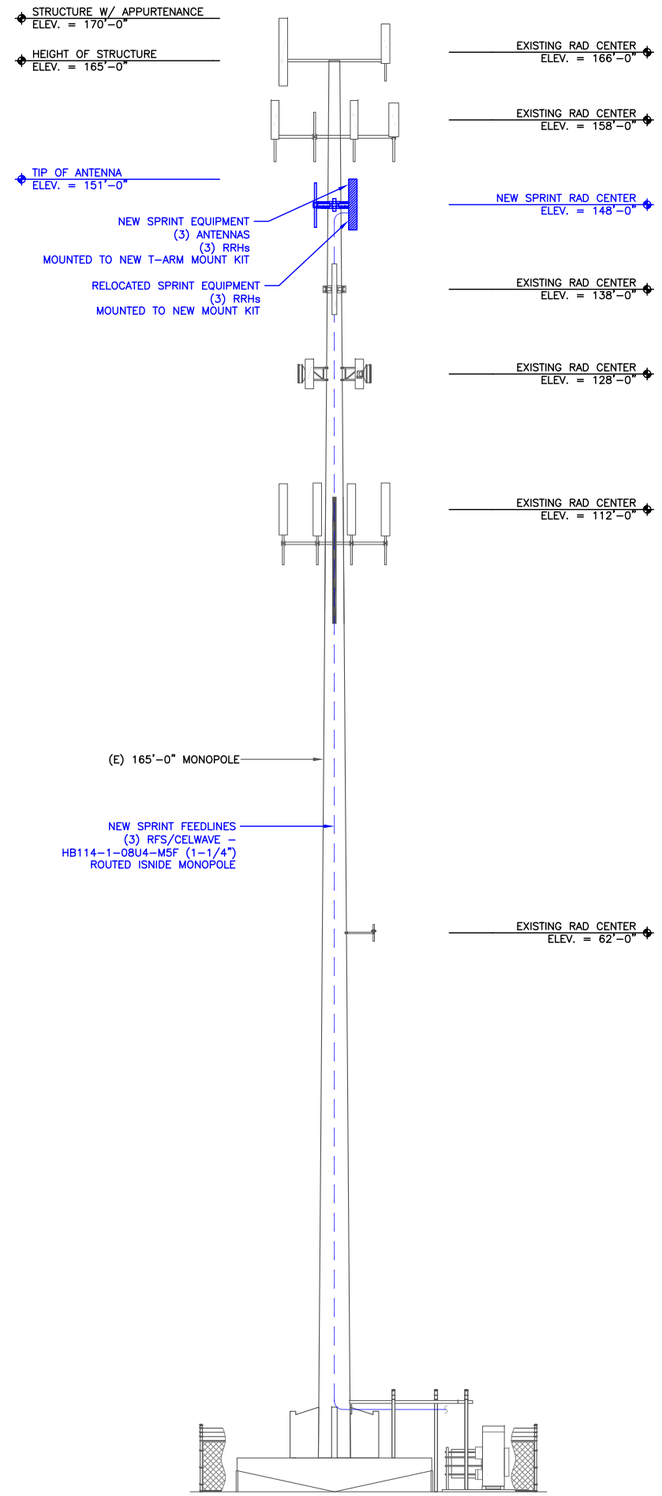
SPRINT EQUIPMENT

ANTENNA CL: 148'-0"
MOUNT CL: 148'-0"

1 EXISTING ELEVATION
SCALE: NOT TO SCALE

INSTALLER NOTE:

DIRECT TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ CLIMBING PEGS/STEPS AND SAFETY CLIMB.



SPRINT EQUIPMENT

ANTENNA CL: 148'-0"
MOUNT CL: 148'-0"

2 FINAL ELEVATION
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT60XC014

BU #: **828054**
SOUTH WINDSOR/RT 5

300 GOVERNORS HIGHWAY
SOUTH WINDSOR, CT 06074

EXISTING 165'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/22/16	CJ	PRELIMINARY	LR
0	01/09/17	CJ	CONSTRUCTION	LR

DocuSigned by:
Justin Linette
1B4008B2547C41D...

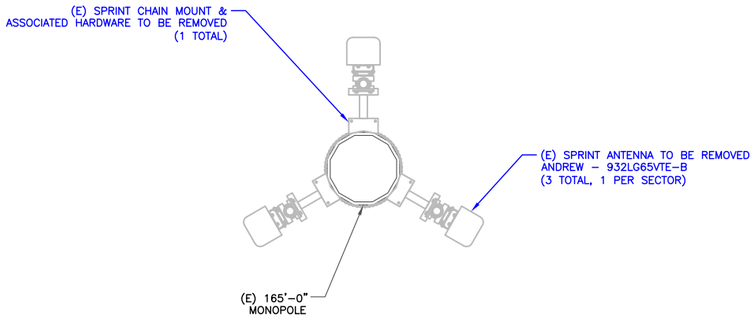
STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED
PROFESSIONAL ENGINEER

1/10/2017 | 10:29:13 AM EST

Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: C-2

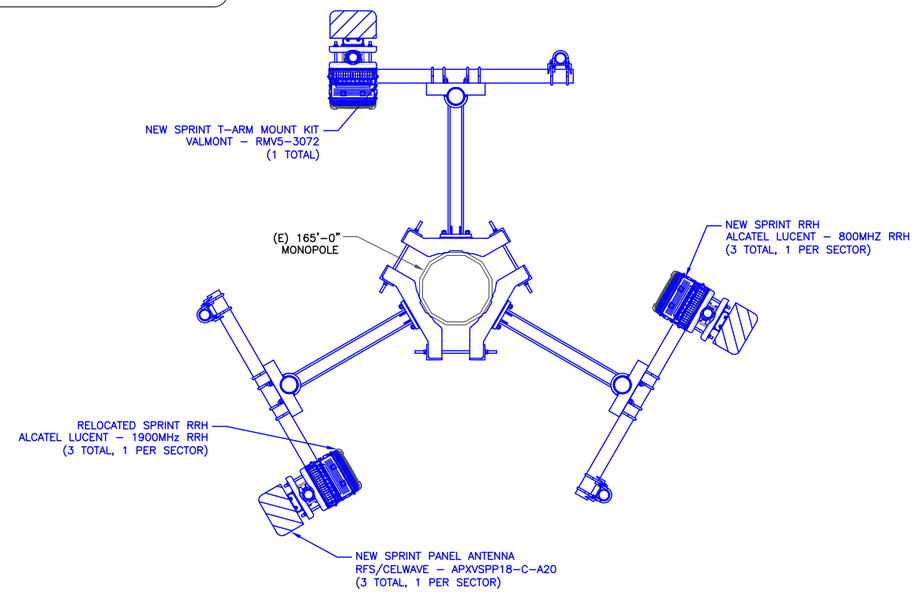
REVISION: 0



1 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE

INSTALLER NOTE:

CONTRACTOR TO REFERENCE LATEST RFDS FOR CORRECT AZIMUTHS.

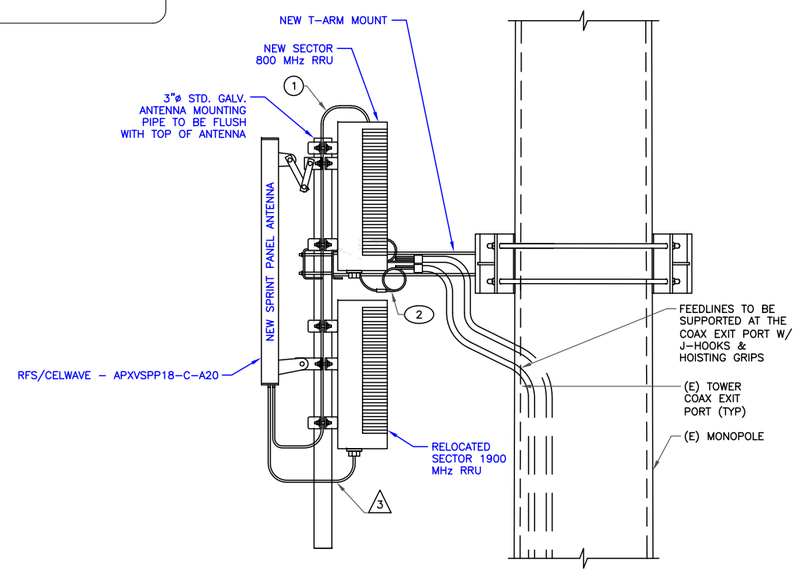


2 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

3 NOT USED
SCALE: NOT TO SCALE

KEYED CABLE LEGEND

1. 1/2" RF JUMPERS
2. ETHERNET/FIBER
3. RET



4 ANTENNA SCHEMATIC
SCALE: NOT TO SCALE

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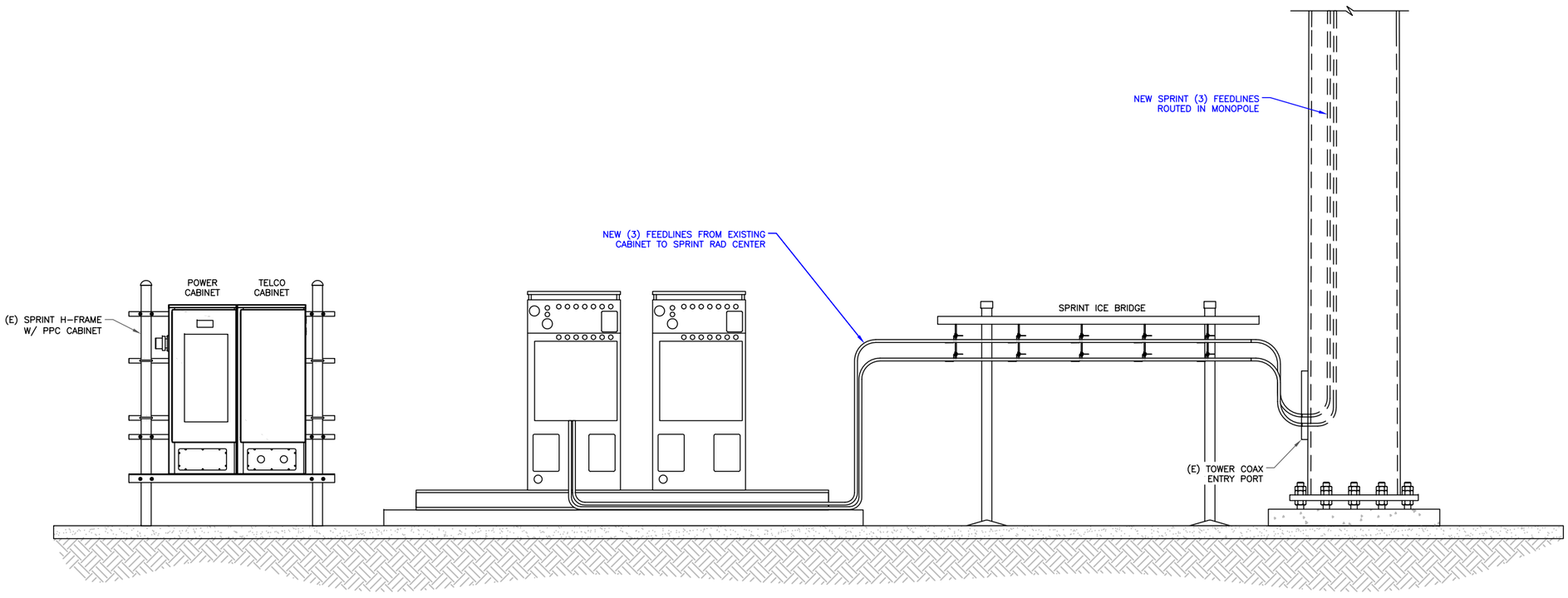
SHEET NUMBER: C-3

REVISION: 0



1 FEEDLINE ROUTING SCHEMATIC
SCALE: NOT TO SCALE

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SOUTH WINDSOR, CT 06074

EXISTING 165'-0" MONOPOLE

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SHEET NUMBER: C-4

REVISION: 0

REV. 0 7/25/16

SPRINT CONSTRUCTION SPECIFICATIONS
MINI–MACRO CELL SITES

1) BASIC REQUIREMENTS
   a) MEET ALL REQUIREMENTS OF JURISDICTIONS.
   b) IF EQUIPMENT FURNISHED BY THE COMPANY DOES NOT MATCH THE EQUIPMENT LISTED ON THE RFDS AND SHOWN ON THE PERMITTING DRAWINGS, RESOLVE DISCREPANCY THROUGH INSTALLER'S CONSTRUCTION MANAGER AND COMPANY'S POINT OF CONTACT
   c) CABLE INSTALLATIONS
      i) ALL CABLES MUST BE OUTDOOR RATED AND HAVE UV RESISTANT OUTER JACKETS
      ii) CABLE BENDS MUST NOT EXCEED MANUFACTURER'S ALLOWABLE CABLE BEND RADII
      iii) AT RADIOS INSTALL SERVICE LOOPS FOR POWER, FIBER, AND ETHERNET SECURED AT LEAST TWICE 180° TO THE STRUCTURE
      iv) SPARE FIBERS MUST BE ENCASED IN A LOW PROFILE WEATHERTIGHT ASSEMBLY
   d) FIBERS MUST BE FIELD–TERMINATED WITH LC TYPE CONNECTORS
   e) CONDUITS IN EARTH: PROVIDE PVC. CONDUITS EXPOSED IN FACILITIES: PROVIDE RGS. HAND DIG TRENCHES IN COMPOUNDS
   f) SECURE AND SUPPORT CONDUITS AND CABLES ON NO MORE THAN 48" INTERVALS
   g) ON TOWER SITES RGS CONDUITS MAY BE SURFACE MOUNTED AWAY FROM WALKWAYS AND ACCESS/EGRESS PATHS. IF INSTALLATIONS IN WALKWAYS AND ACCESS/EGRESS PATHS CANNOT BE AVOIDED, IDENTIFY THE CONDUIT ENVELOPE/TRIP HAZARD BY ALTERNATING YELLOW AND BLACK STRIPES PAINTED ON CONCRETE AND CONDUIT.

2) SPRINT – FURNISHED EQUIPMENT
   a) INSTALL THE FOLLOWING EQUIPMENT AT LOCATIONS AND AZIMUTHS SHOWN ON THE CONSTRUCTION DRAWINGS.
      i) PANEL ANTENNAS
      ii) RADIOS
      iii) GPS ANTENNAS
      iv) FILTERS
      v) 120 VOLT DIN–RAIL CIRCUIT BREAKER ASSEMBLY

3) TOWER INSTALLATIONS
   a)MEET ALL REQUIREMENTS OF THE TOWER OWNER
   b) INSTALL CORRUGATED FLEXIBLE CONDUIT UP THE TOWER TO COMPANY'S RAD CENTER
   c) PROVIDE HANGING GRIPS OR CONDUIT CLAMPS AND ENSURE CONDUITS AS WELL AS INNER CABLES ARE SUPPORTED
   d) CONDUIT RISERS: AT THE TOP OF THE TOWER TURN CONDUIT DOWN AND PROVIDE CABLE TERMINATION FITTINGS. EXTEND CABLES TO RADIOS EXPOSED AND SECURED TO THE STRUCTURE, AT CONDUIT EXIT FROM TOWER, PROVIDE DRIP LOOPS AND WEEP HOLES.
   e) AT THE ICE BRIDGE RUN CABLES IN RGS CONDUIT. UTILIZE CONDULETS TO MAKE COMPACT 90 DEGREE TURNS

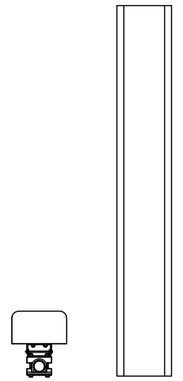
4) AC POWER TIE–IN
   a) INSTALL SPRINT'S 120 VOLT DIN–RAIL CIRCUIT BREAKER ASSEMBLY IN THE EXISTING POWER PROTECTION CABINET TELCO SECTION
   b) INSTALL A 20 AMPERE MOLDED CASE CIRCUIT BREAKER IN AVAILABLE SPACE IN THE ADJACENT PPC POWER SECTION LOAD CENTER

5) GROUNDING
   a) 120 VOLT CIRCUITS: POWER CABLES MUST BE 3–WIRE WITH EQUIPMENT GROUNDING CONDUCTOR
   b) SUPPLEMENTAL GROUNDING: ALL GROUNDING HARDWARE MUST BE UL STAMPED AS SUITABLE FOR GROUNDING HARDWARE
   c) RADIOS: BOND RADIO TO THE TOWER TOP OR SECTOR GROUND BAR WITH #6 BARE TINNED COPPER WIRE (GREEN INSULATED ON ROOFTOPS)
   d) DIN–RAIL CIRCUIT BREAKER ASSEMBLY: BOND SURGE ARRESTOR TO PPC TELCO BOARD GROUND BAR

6) MINOR MATERIALS
   a) CONDUIT
      i) RIGID GALVANIZED STEEL CONDUIT (RGS): UL LISTED, COMPLIANT WITH ANSI STANDARD C80, HOT–DIP GALVANIZED, WITH THREADED FITTINGS. MANUFACTURERS: ALLIED, REPUBLIC, WHEATLAND, OR EQUAL.
      ii)CORRUGATED FLEXIBLE CONDUIT: DURALINE OR EQUAL.
      iii) LIQUID–TIGHT FLEXIBLEMETALLIC CONDUIT (LFMC): UL LABLED, UC RESISTANT, FLAME RETARDANT PVC JACKET, HOT–DIP GALVANIZED, GREY. MANUFACTURERS: AFC, ANACONDA, SOUTHWIRE, OR EQUAL.
      iv) PVC CONDUIT: SCHEDULE 40. CARLON OR EQUAL
      v) CABINET HUBS AND CABLE TERMINATION FITTINGS: OZ GEDNEY OR ROXTEC
   b) COAXIAL CABLE JUMPERS: ½" LDF–4 MANUFACTURERS: COMMSCOPE, RFS OR FCT.
   c)FASTENERS AND HARDWARE
      i) TO SECURE RACEWAYS, UTILIZE NON CORRODING NON–MAGNETS METALLIC FASTENERS AND HARDWARE SUITABLE FOR THE PURPOSE
   d) POWER CABLES – 3/C #12 SOOW BY SOUTHWIRE OR EQUAL
   e) ETHERNET CABLES AND CONNECTORS: OUTDOOR RATED, CAT 5E, BELDEN OR EQUAL
   f) FIBER CABLES: CORNING "FREEDOM FAN OUT" OUTDOOR RISER CABLE, 4F, SINGLE MODE, OR EQUAL
   g) RF TRANSPARENT PAINT FOR ANTENNA CONCEALMENT: SELECT NO/LOW CARBON PAINTS, WITH NO/LOW TITANIUM DIOXIDE, AND WITHOUT SUSPENDED METAL PARTICLES (ALUMINUM, ZINC, COPPER, ETC)

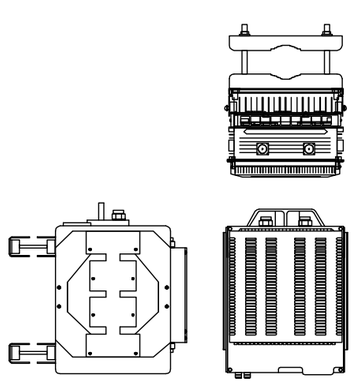
7) COLOR CODING
   a) COLOR CODE CABLES AND CONDUITS AS REQUIRED BY SPRINT STANDARD TS–0200

8) TESTING AND CONSTRUCTION COMPLETE
   a) SWEEP ALL COAXIAL CABLES ACCORDING TO SPRINT STANDARD TS–0200
   b) PANEL ANTENNA ALIGNMENT – USING ELECTRONIC ALIGNMENT TOOL. AZIMUTH/DOWNTILT +/– 1 DEGREE
   c) LEAVE EQUIPMENT DE–ENERGIZED UNTIL INSTRUCTED BY THE COMMISSIONING AND INTEGRATION TEAM TO ENERGIZE
   d) OTHER REQUIREMENTS AND DELIVERABLES MAY BE REQUIRED BEFORE THE CONSTRUCTION COMPLETE MILESTONE CAN BE ACTUALIZED IN SITERRA (SPRINT'S DATABASE–OF–RECORD).



RFS/CELWAVE – APXVSPP18–C–A20
WEIGHT (WITHOUT MOUNTING HARDWARE): 92.0 LBS
SIZE (HxWxD): 72.0x11.8x7.9 IN.
MOUNTING HARDWARE: APM40–2 DOWNTILT KIT
MOUNTING HARDWARE WEIGHT: 7.5 LBS

1 RFS/CELWAVE – APXVSPP18–C–A20
SCALE: NOT TO SCALE



ALCATEL LUCENT – 800MHZ RRH
WEIGHT (WITHOUT MOUNTING HARDWARE): 53.0 LBS
SIZE (HxWxD): 19.7x13.0x10.8 IN.

2 ALCATEL LUCENT – 800MHZ RRH
SCALE: NOT TO SCALE

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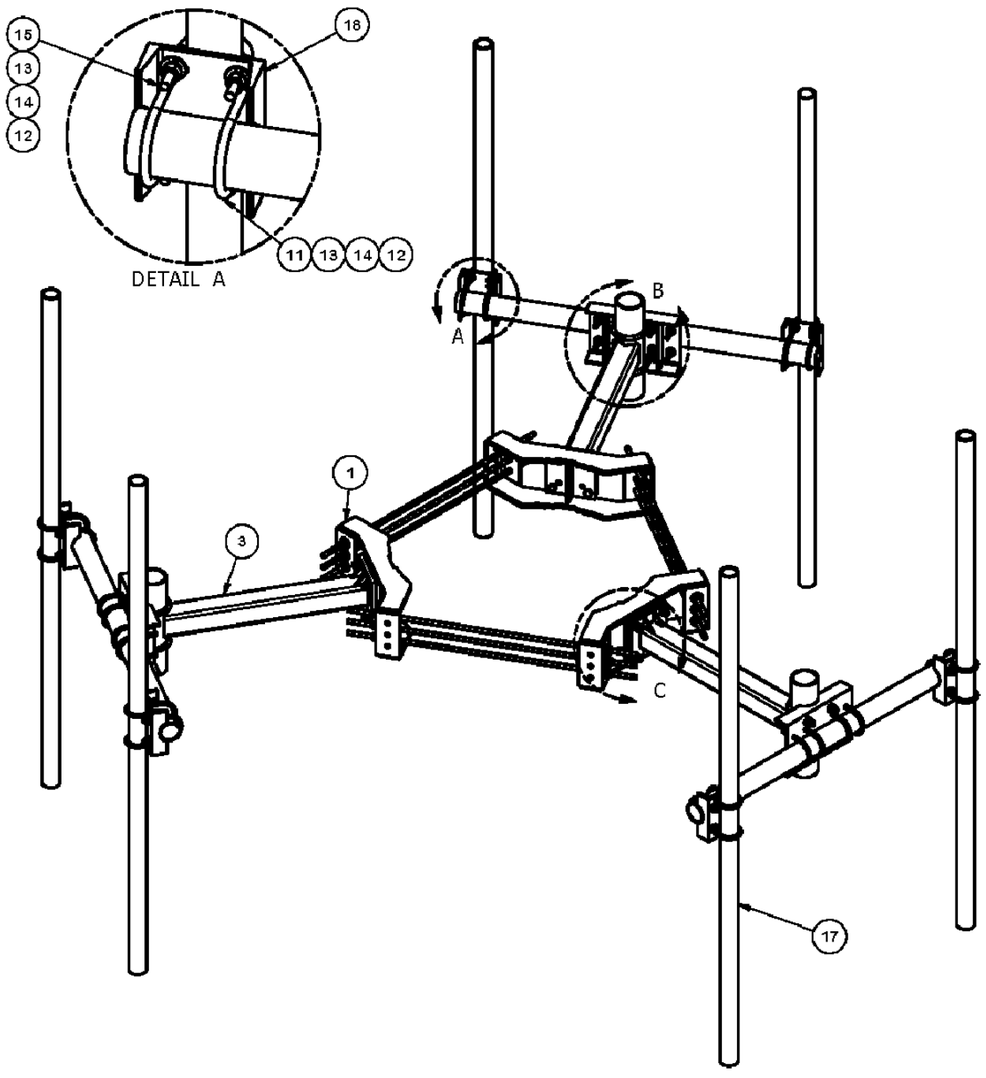
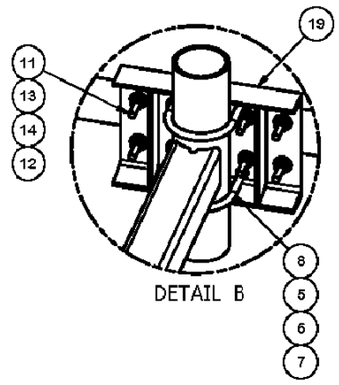
REVISION: 0



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-LWRM	RING MOUNT WELDMENT		68.16	204.48
2	9	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	18.82
2	9	G58R-48	5/8" X 48" GALV THREADED ROD		4.39	39.52
3	3	X-SV197-36	SUPPORT ARM WELDMENT - 36"		67.29	201.88
4	12	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2.75	0.36	4.27
5	12	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.41
6	42	G58LW	5/8" HDG LOCK WASHER		0.03	1.09
7	24	A58NUT	5/8" HDG A325 HEX NUT		0.13	3.11
8	6	X-UB5458	5/8" X 4-5/8" X 7" X 3' U-BOLT (HDG.)		0.66	3.94
9	18	G58FW	5/8" HDG USS FLATWASHER		0.07	1.27
10	18	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	2.34
11	24	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.66	15.75
12	66	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	4.72
13	66	G12FW	1/2" HDG USS FLATWASHER		0.03	2.25
14	66	G12LW	1/2" HDG LOCK WASHER		0.01	0.92
15	12	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.66	7.88
16	3	P360	3-1/2" X 60" SCH 40 GALVANIZED PIPE		37.97	113.90
17	6	A	B	C	D	
18	6	X-SP219	SMALL SUPPORT CROSS PLATE	8.250 in	8.61	51.66
19	3	X-SP216	LARGE SUPPORT CROSS PLATE		20.83	62.48



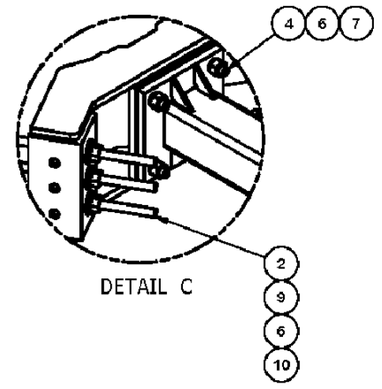


TABLE					
"ASSEMBLY NO."	PART NO. "A"	PART DESCRIPTION "B"	LENGTH "C"	UNIT WT. "D"	TOTAL WT.
RMV5-3072	P3072	2-7/8" O.D. SCH. 40 PIPE	72"	34.84	955.29
RMV5-3084	P3084	2-7/8" O.D. SCH. 40 PIPE	84"	40.65	990.15
RMV5-3096	P3096	2-7/8" O.D. SCH. 40 PIPE	96"	46.45	1,024.95

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	REMOVE FLATWASHERS FROM ARM TO CLAMP RING CONNECTION		CEK	11/4/11

REVISION HISTORY

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION				
MONOPOLE TRIPLE T-ARM FOR 6 ANTENNAS				
GPD NO. 4543	DRAWN BY CEK 4/15/2011	ENG. APPROVAL	PART NO. SEE "ASSEMBLY NO."	PAGE 1 OF 2
CLASS 81 / SUB 01	DRAWING USAGE CUSTOMER	CHECKED BY BMC 4/28/2011	DWG. NO. RMV5-3XXX	

SITE PRO 1 — A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

1 VALMONT – RMV5-3072 T-ARM MOUNT KIT
SCALE: NOT TO SCALE

Sprint

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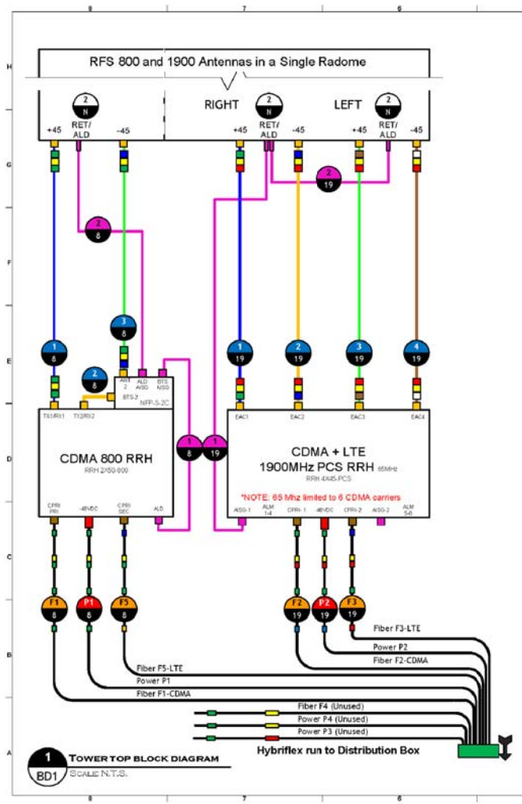
REVISION: 0



Power Feed Polarity Definition:
IF wires are BLACK AND BLACK/ WHITE STRIPE:
Black= -48VDC Feed (Battery)
Black/White Stripe= Return

IF wires are RED AND BLACK:
Red= -48VDC Feed (Battery)
Black= Return

NOTE: For power feed use the same Hybriflex OEM color designator as the fiber.

MM Pair 1= F1= Green= P1(Green)
MM Pair 2= F2= Blue= P2(Blue)
MM Pair 3= F3= Red= P3(Red)
MM Pair 4= F4= Yellow= P4(Yellow)
MM Pair 5= F5= Orange= (No P5 power feed)

2 HYBRIFLEX OEM COLOR CODE
BD1 SCALE: N.T.S.

J. STEVE WILSON
STEVE.WILSON@NCSTECH.NET
PH 9122460227

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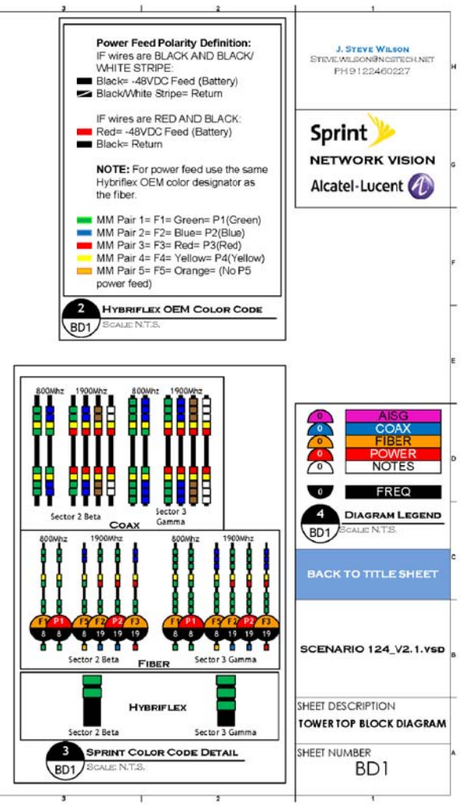
NETWORK VISION
Alcatel·Lucent



3 SPRINT COLOR CODE DETAIL
BD1 SCALE: N.T.S.

AISG
COAX
FIBER
POWER
NOTES
FREQ

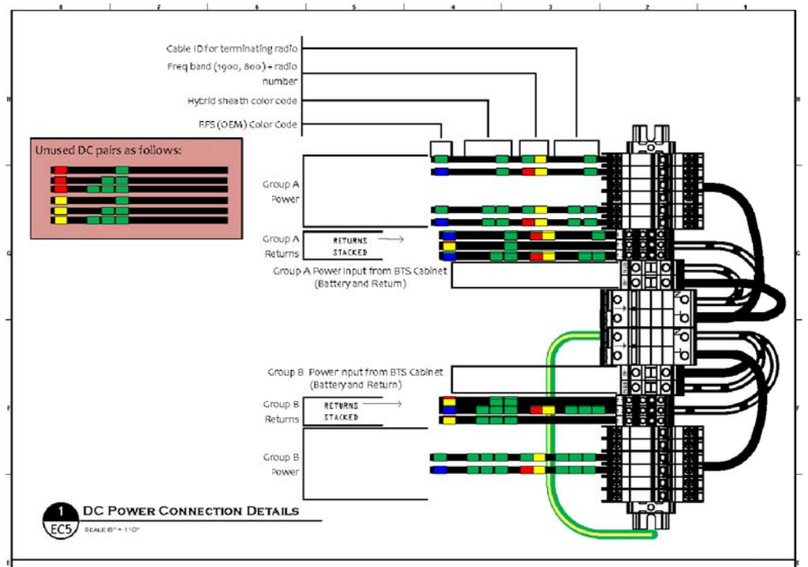
4 DIAGRAM LEGEND
BD1 SCALE: N.T.S.

BACK TO TITLE SHEET

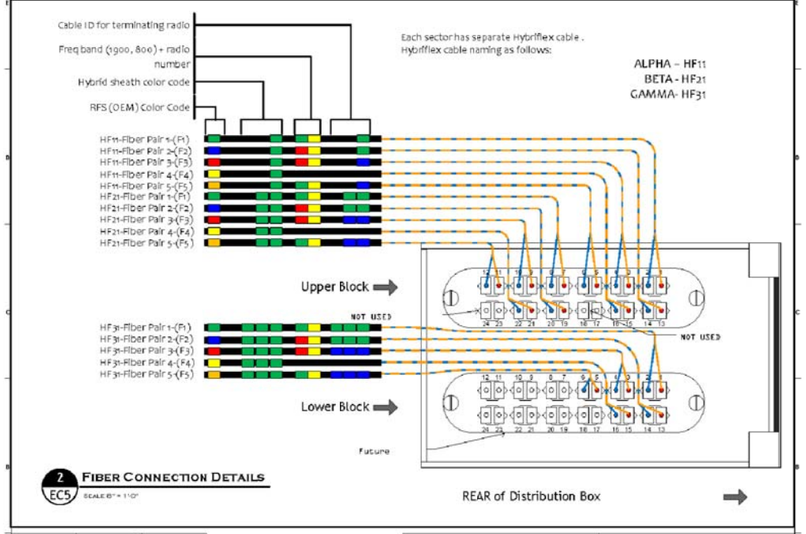
SCENARIO 124_V2.1.VSD

SHEET DESCRIPTION
TOWER TOP BLOCK DIAGRAM

SHEET NUMBER
BD1



1 EC5 DC POWER CONNECTION DETAILS
SCALE: 6" = 1'-0"



2 EC5 FIBER CONNECTION DETAILS
SCALE: 6" = 1'-0"

SHEET NUMBER: EC5
SHEET DESCRIPTION: DISTRIBUTION BOX CONNECTION DETAILS FOR TOWER MOUNTED RRH
FILE NAME: SCENARIO 124_V2.1.VSD

BACK TO TITLE SHEET

Sprint
NETWORK VISION
Alcatel·Lucent

J. STEVE WILSON
STEVE.WILSON@NCSTECH.NET
PH 9122460227

1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

Sprint

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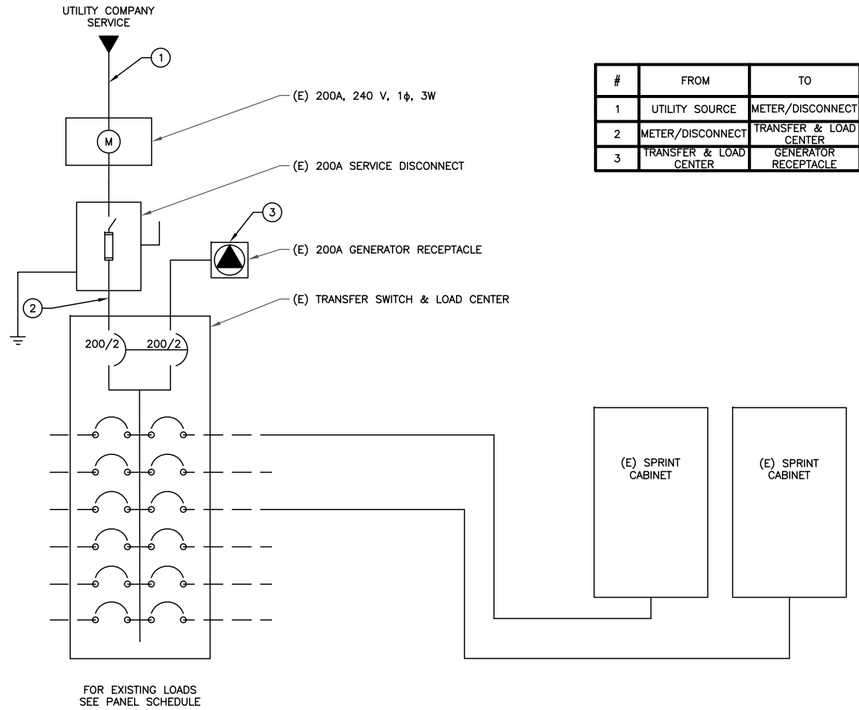

#	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/DISCONNECT	EXISTING
2	METER/DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING

1 ELECTRICAL ONE-LINE DIAGRAM
SCALE: NOT TO SCALE

EXISTING PANEL PANEL

MAIN: 200 AMP MAIN BREAKER	**VOLTAGE/PHASE**: 120/240V, 1-PHASE, 3-WIRE	**SHORT CIRCUIT CURRENT RATING**: 22,000 AMPS
MOUNTING: SURFACE	**ENCLOSURE**: NEMA 1	**SURGE PROTECTION DEVICE**: YES
SERVICE FROM: N/A	**MANUFACTURER**: NORTHERN TECHNOLOGIES, INC (SQUARE D)	**MODEL NUMBER**: QO142M200

DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	LOAD (VA) A-PHASE	LOAD (VA) B-PHASE	CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
SURGE ARRESTOR	0	NC	60	1	300		2	10	C	300	TELCO FAN
SURGE ARRESTOR	0	NC	-	3		180	4	15	NC	180	GFCI
BTS CABINET	9600	C	100	5	11760		6	30	C	2160	CLEARWIRE
BTS CABINET	9600	C	-	7		11760	8	-	C	2160	CLEARWIRE
				9	0		10				
				11		0	12				
BASE LOAD (VA) =					12060	11940					
25% OF CONTINUOUS LOAD (VA) =					3015	2940					
TOTAL LOAD (VA) =					15075	14880					
TOTAL LOAD (A) =					126	124					

"C" DESIGNATION IDENTIFIES CONTINUOUS LOADS AND MOTOR LOADS AS REQUIRED BY SECTIONS 230.42 AND 430.24 OF THE NEC

2 EXISTING PANEL SCHEDULE
SCALE: NOT TO SCALE

Sprint

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CLIFTON PARK, NY 12065

SPRINT SITE NUMBER:
CT60XC014

BU #: **828054**
SOUTH WINDSOR/RT 5

300 GOVERNORS HIGHWAY
SOUTH WINDSOR, CT 06074

EXISTING 165'-0" MONOPOLE

ISSUED FOR:

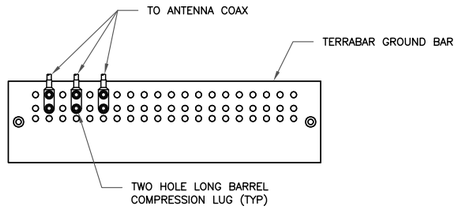
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/22/16	CJ	PRELIMINARY	LR
0	01/09/17	CJ	CONSTRUCTION	LR

DocuSigned by:
Justin Linette
1B4008B254764JD...

STATE OF CONNECTICUT
JUSTIN PETER LINETTE
No. 31965
LICENSED PROFESSIONAL ENGINEER

1/10/2017 | 10:29:13 AM EST

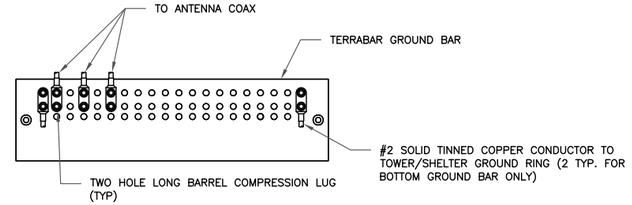
SHEET NUMBER: E-1
REVISION: 0



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

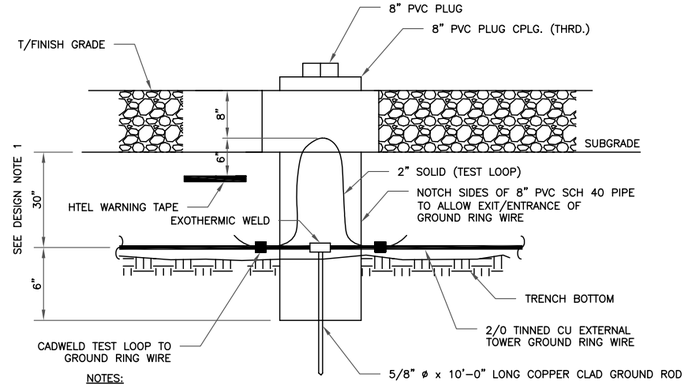
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. INSTALL GROUND BARS AT 75 FT. INTERVAL MAXIMUM.
4. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

3 INSPECTION PORT DETAIL
SCALE: NOT TO SCALE

NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF MONOPOLE, ANTENNA LOCATION AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET IN/ON THE POLE SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE 2/0 AWG. STRANDED IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM 8 FEET TO 10 FEET.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE

SINGLE CONNECTOR AT GROUND BARS

SINGLE CONNECTOR AT STEEL OBJECTS

SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE

NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

Sprint

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3 CORPORATE PARK DRIVE, SUITE 101
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Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: G-1
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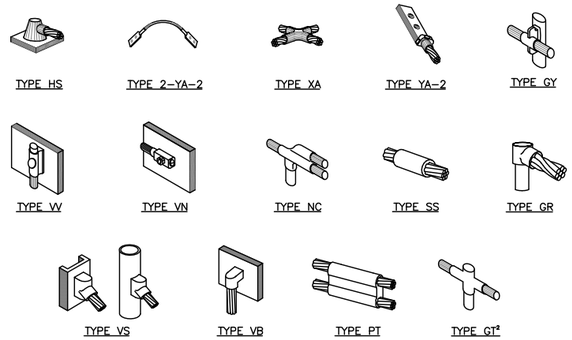
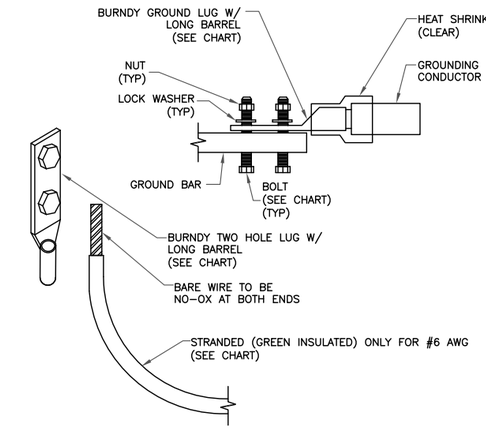


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

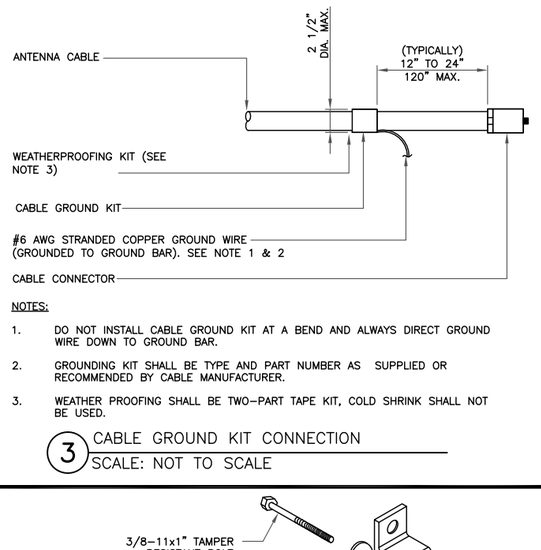
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

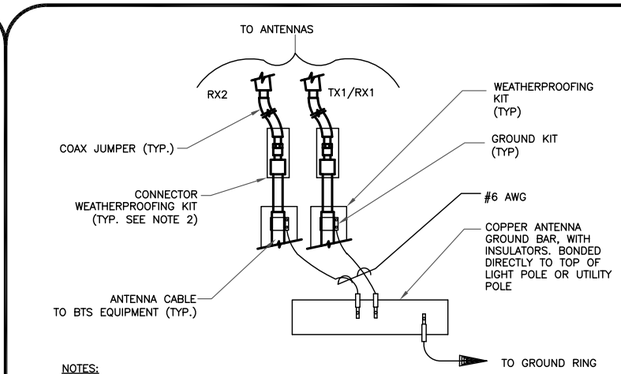
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

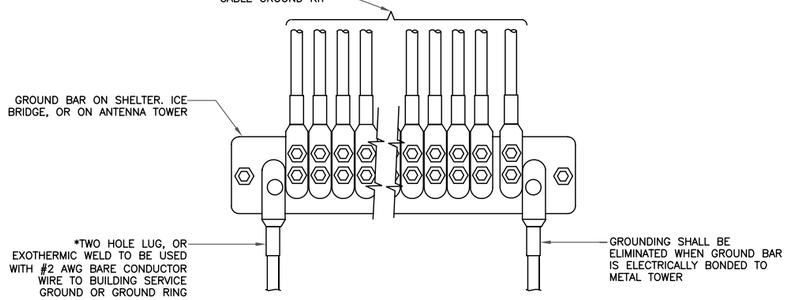
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



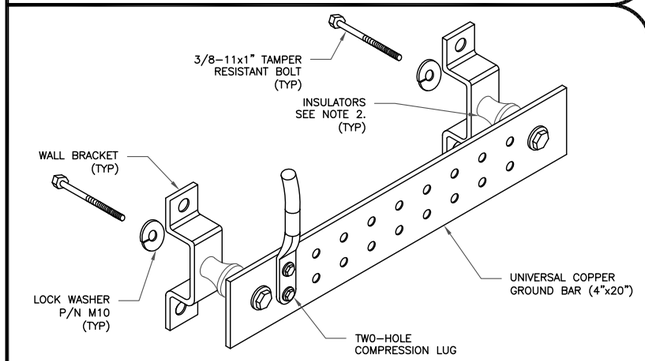
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



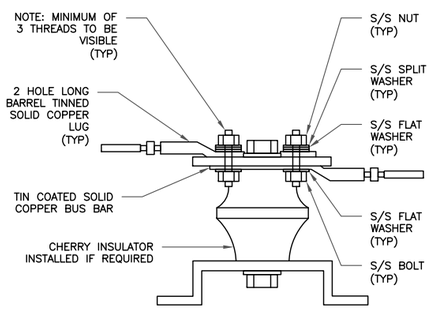
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



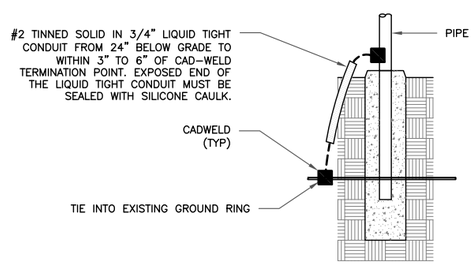
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

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LICENSED PROFESSIONAL ENGINEER

1/10/2017 | 10:29:13 AM EST

Crown Castle USA, Inc. Firm Registration #PEC.0001101

SHEET NUMBER: G-2
REVISION: 0

Date: **November 23, 2016**

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6607

SSOE Group
320 Seven Springs Way, Suite 350
Brentwood, TN 37027
(615) 661-7585
djones@ssoe.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate** **Carrier Site Number:**	 CT60XC014
Crown Castle Designation:	**Crown Castle BU Number:** **Crown Castle Site Name:** **Crown Castle JDE Job Number:** **Crown Castle Work Order Number:** **Crown Castle Application Number:**	828054 South Windsor/Rt 5 405470 1322525 367042 Rev. 2
Engineering Firm Designation:	**SSOE Group Project Number:**	017-00013-00 BC 1007
Site Data:	**300 Governors Highway, South Windsor, CT 06074, Hartford County** **Latitude *41° 50' 0.4",* Longitude *-72° 36' 11.0"*** **169 Foot – Modified EEI Monopole Tower**	

Dear Mr. Charles McGuirt,

SSOE Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 972574, in accordance with application 367042, revision 2.

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 123 mph converted to a nominal 3-second gust wind speed of 95 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C and Risk Category II were used in this analysis

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

Structural analysis prepared by: Dominique E. Jones

Respectfully submitted by:

STATE OF CONNECTICUT
BARRY W. BURGESS
NO. 26165
LICENSED PROFESSIONAL ENGINEER

Barry W. Burgess, PE
Section Manager

11/23/2016

1) INTRODUCTION

The existing 169' monopole has eighteen sides and is evenly tapered from 45.5" (flat-flat) at the base to 15.5" (flat-flat) at the top. It has four major sections, connected with slip joints. The structure is galvanized and has no tower lighting.

The tower was originally designed for Northern Technologies by Engineered Endeavors, Inc. of Mentor, Ohio for an 80 mph wind speed with 0.0" radial ice in accordance with TIA/EIA-222-F.

Modifications designed by Natcomm Consulting Engineers (Project#: 09009.C02, dated 03/19/09) which consisted of installing stiffeners to the base plate, were considered in this analysis.

Modifications designed by Centex Engineering (Job#: 10003.004, dated 6/15/10) which consisted of adding shaft reinforcement from 0.0' – 104.0', were considered in this analysis.

Modifications designed by GPD Group (Job#: 2012712.97, dated 6/29/12), which consisted of installing additional stiffeners to the base plate and replacing existing anchor bolts, were considered in this analysis.

Modifications designed by Paul J. Ford and Company (Project #: 37512-1535.002.7700, dated 12/30/14) consisted of adding shaft reinforcement from 98.5' – 113.5', installing new micro-piles at the base of tower, and removing existing stiffeners and bolts at the tower base, were considered in this analysis.

Modifications designed by Paul J. Ford and Company (Project #: 37516-2594.003.7700, dated 11/17/16), which consisted of adding shaft reinforcement from 2.25' – 47.33' and 79.5' – 89.5' and installing transition stiffeners at base plate, were considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 95 mph with no ice, 40 mph with 1" ice thickness and 60 mph under service loads, exposure category C.

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
148.0	148.0	3	Alcatel Lucent	1900MHz RRH	3	1-1/4	1
		3	Alcatel Lucent	800MHZ RRH			
		3	RFS Celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		1	Site Pro 1	RMV5-3XXX			

Notes:
1) See Appendix B for the proposed coax layout. .

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
165.0	167.0	3	Ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	7	1-5/8	
		3	Ericsson	KRY 112 144/1			
	166.0	3	Ericsson	Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe			
		3	Ericsson	RRUS 11 B12			
	165.0	1		Platform Mount [LP 601-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
156.0	158.0	1	CCI Antennas	HPA-65R-BUU-H6 w/ Mount Pipe			1
		2	CCI Antennas	HPA-65R-BUU-H8 w/ Mount Pipe			
		3	Ericsson	RRUS12/RRUS A2			
		3	CCI Antennas	DTMABP7819VG12A			
		6	Powerwave Technologies	7770.00 w/ Mount Pipe	3 12	3/8 1-5/8	
		3	CCI Antennas	DTMABP7819VG12A			
		3	Ericsson	RRUS 11			
		1	Raycap	DC6-48-60-18-8F			
	156.0	1		Platform Mount [LP 714-1]			
148.0	148.0	3	Andrew	932LG65VTE-B w/ Mount Pipe	6	1-5/8	2
		1		Side Arm Mount [SO 103-3]			
138.0	138.0	3	RFS Celwave	APXV18-206517-A w/ Mount Pipe	6	1-5/8	
		1		Pipe Mount [PM 601-3]			
128.0	128.0	3	Argus Technologies	LLPX310R w/ Mount Pipe	3 1 6	1/4 5/16 1/2	
		3	Dragonwave	A-ANT-18G-2-C			
		3	Dragonwave	HORIZON DUO			
		3	Samsung Telecomm.	WIMAX DAP HEAD			
		1		Side Arm Mount [SO 103-3]			
108.0	112.0	3	Alcatel Lucent	RRH2X60-AWS	20	1-5/8	
		3	Alcatel Lucent	RRH2X60-PCS			
		6	Andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		6	Andrew	LNX-6514DS-A1M w/ Mount Pipe			
		2	RFS Celwave	DB-T1-6Z-8AB-0Z			
	108.0	1		Platform Mount [LP 303-1]			

Notes:
1) Reserved Loading
2) Existing equipment to be removed; not considered in this analysis.

Table 3 – Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
175.0	175.0	6	EMS Wireless	EMS RR90-17	-	-
		1		Low Profile Mount		
165.0	165.0	12	EMS Wireless	EMS RR90-17	-	-
		1		Low Profile Mount		
155.0	155.0	12	EMS Wireless	EMS RR90-17	-	-
		1		Low Profile Mount		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Original Tower Drawings	Engineered Endeavors Inc. Job #: 99-1371, dated 1/31/00	Doc ID#: 3436681	Crown DMZ
Foundation Drawings	Engineered Endeavors Inc. Project #: 6253, dated 3/10/00	Doc ID#: 3436661	Crown DMZ
Geotechnical Report	Tower Engineering Professionals Project #: 47923.6344, dated 11/20/14	Doc ID#: 3436696	Crown DMZ
Modification Drawings	Natcomm Consulting Engineers Project#: 09009.C02, dated 03/19/09	Doc ID#: 3487016	Crown DMZ
Modification Drawings	Centex Engineering Job #: 10003.004, dated 6/15/10	Doc ID#: 3487016	Crown DMZ
Modification Drawings	GPD Group Job #: 2012712.97, dated 6/29/12	Doc ID#: 3793344	Crown DMZ
Modification Drawings	Paul J. Ford and Company Project #: 37512-1535.002.7700, dated 12/30/14	Doc ID#: 5431037	Crown DMZ
Modification Drawings	Paul J. Ford and Company Project #: 37516-2594.003.7700, dated 11/17/16	Doc ID#: 6563357	Crown DMZ

3.1) Analysis Method

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

3.2) Assumptions

1) The tower and foundation were constructed in accordance with their original design and maintained per the manufacturer's specifications, are in good condition, and the tower is twist free and plumb.
2) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
3) Proposed TME's are assumed to be mounted behind antennas.
4) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package, dated 11/20/14 with any adjustments as noted below.

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

4) ANALYSIS RESULTS

Table 5 – Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
169 - 164	Pole	TP16.455x15.5x0.25	Pole	3.2%	Pass
164 - 159	Pole	TP17.409x16.455x0.25	Pole	10.4%	Pass
159 - 154	Pole	TP18.364x17.409x0.25	Pole	22.2%	Pass
154 - 149	Pole	TP19.318x18.364x0.25	Pole	34.8%	Pass
149 - 144	Pole	TP20.273x19.318x0.25	Pole	47.0%	Pass
144 - 139	Pole	TP21.228x20.273x0.25	Pole	57.5%	Pass
139 - 136.66	Pole	TP22.31x21.228x0.25	Pole	62.2%	Pass
136.66 - 131.66	Pole	TP22.114x21.174x0.3125	Pole	60.6%	Pass
131.66 - 126.66	Pole	TP23.055x22.114x0.3125	Pole	68.1%	Pass
126.66 - 121.66	Pole	TP23.996x23.055x0.3125	Pole	75.7%	Pass
121.66 - 116.66	Pole	TP24.936x23.996x0.3125	Pole	82.5%	Pass
116.66 - 111.66	Pole	TP25.877x24.936x0.3125	Pole	88.7%	Pass
111.66 - 111	Pole	TP26.002x25.877x0.3125	Pole	89.5%	Pass
111 - 110.75	Pole + Reinf.	TP26.049x26.002x0.575	Reinf. 3 Tension Rupture	80.4%	Pass
110.75 - 105.75	Pole + Reinf.	TP26.989x26.049x0.5625	Reinf. 3 Tension Rupture	89.2%	Pass
105.75 - 101.5	Pole + Reinf.	TP27.789x26.989x0.55	Reinf. 3 Tension Rupture	96.1%	Pass
101.5 - 101.25	Pole + Reinf.	TP27.836x27.789x0.9875	Reinf. 1 Tension Rupture	65.6%	Pass
101.25 - 101	Pole + Reinf.	TP27.883x27.836x0.9875	Reinf. 1 Tension Rupture	65.8%	Pass
101 - 100.75	Pole + Reinf.	TP27.93x27.883x0.725	Reinf. 1 Tension Rupture	87.7%	Pass
100.75 - 95.75	Pole + Reinf.	TP28.871x27.93x0.7125	Reinf. 1 Tension Rupture	94.9%	Pass
95.75 - 92.17	Pole + Reinf.	TP30.36x28.871x0.7	Reinf. 1 Tension Rupture	99.9%	Pass
92.17 - 86.83	Pole + Reinf.	TP29.924x28.92x0.9375	Reinf. 1 Tension Rupture	83.3%	Pass
86.83 - 81.73	Pole + Reinf.	TP30.883x29.924x1.125	Reinf. 4 Tension Rupture	69.6%	Pass
81.73 - 81.55	Pole + Reinf.	TP30.918x30.883x1.125	Reinf. 4 Tension Rupture	69.8%	Pass
81.55 - 81	Pole + Reinf.	TP31.021x30.918x1.125	Reinf. 4 Tension Rupture	70.2%	Pass
81 - 80.75	Pole + Reinf.	TP31.068x31.021x0.9375	Reinf. 2 Tension Rupture	75.8%	Pass
80.75 - 75.75	Pole + Reinf.	TP32.009x31.068x0.925	Reinf. 2 Tension Rupture	79.9%	Pass
75.75 - 70.75	Pole + Reinf.	TP32.95x32.009x0.9	Reinf. 2 Tension Rupture	83.9%	Pass
70.75 - 65.75	Pole + Reinf.	TP33.892x32.95x0.875	Reinf. 2 Tension Rupture	87.7%	Pass
65.75 - 60.75	Pole + Reinf.	TP34.833x33.892x0.8625	Reinf. 2 Tension Rupture	91.4%	Pass
60.75 - 55.75	Pole + Reinf.	TP35.774x34.833x0.85	Reinf. 2 Tension Rupture	94.9%	Pass
55.75 - 50.75	Pole + Reinf.	TP36.715x35.774x0.825	Reinf. 2 Tension Rupture	98.3%	Pass
50.75 - 48.67	Pole + Reinf.	TP38.11x36.715x0.825	Reinf. 2 Tension Rupture	99.6%	Pass
48.67 - 42.34	Pole + Reinf.	TP37.546x36.356x1.0375	Reinf. 2 Tension Rupture	85.4%	Pass
42.34 - 37.34	Pole + Reinf.	TP38.485x37.546x1.025	Reinf. 2 Tension Rupture	88.1%	Pass
37.34 - 32.34	Pole + Reinf.	TP39.425x38.485x1	Reinf. 2 Tension Rupture	90.7%	Pass

32.34 - 27.34	Pole + Reinf.	TP40.364x39.425x0.975	Reinf. 2 Tension Rupture	93.2%	Pass
27.34 - 22.24	Pole + Reinf.	TP41.322x40.364x1.0375	Reinf. 2 Tension Rupture	89.4%	Pass
22.24 - 22.08	Pole + Reinf.	TP41.352x41.322x1.0375	Reinf. 2 Tension Rupture	89.5%	Pass
22.08 - 17.08	Pole + Reinf.	TP42.291x41.352x1.025	Reinf. 2 Tension Rupture	91.8%	Pass
17.08 - 12.08	Pole + Reinf.	TP43.23x42.291x1	Reinf. 2 Tension Rupture	93.9%	Pass
12.08 - 7.08	Pole + Reinf.	TP44.17x43.23x0.975	Reinf. 2 Tension Rupture	96.0%	Pass
7.08 - 5.67	Pole + Reinf.	TP44.435x44.17x0.975	Reinf. 2 Tension Rupture	96.6%	Pass
5.67 - 5.42	Pole + Reinf.	TP44.482x44.435x1.4	Reinf. 2 Tension Rupture	70.0%	Pass
5.42 - 2.25	Pole + Reinf.	TP45.077x44.482x1.375	Reinf. 2 Tension Rupture	71.1%	Pass
2.25 - 2	Pole + Reinf.	TP45.124x45.077x1.125	Reinf. 2 Tension Rupture	85.7%	Pass
2 - 0	Pole + Reinf.	TP45.5x45.124x1.1	Reinf. 2 Tension Rupture	86.5%	Pass
				Summary	
			Pole	89.5%	Pass
			Reinforcement	99.9%	Pass
			Overall	**99.9%**	**Pass**

Table 6 – Tower Component Stresses vs. Capacity – LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Foundation		97.7%	Pass

Structure Rating (max from all components) =	**99.9%**

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

5) DISCLAIMER OF WARRANTIES

SSOE Group has not performed a site visit to the tower to verify member sizes or antenna/coax loading. SSOE Group shall be contacted immediately if the existing conditions are not as represented on the tower elevation contained in this report in order to evaluate the significance of the discrepancy. SSOE Group has not performed a condition assessment of the tower foundation. This report does not replace a full tower inspection

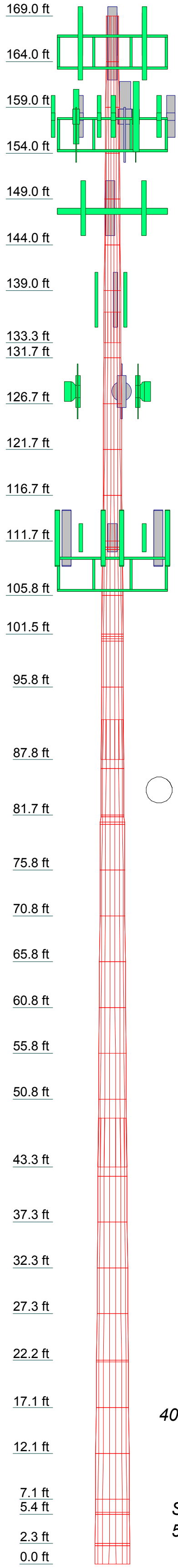
The engineering services rendered by SSOE Group in connection with this structural analysis are limited to an analysis of the tower structure and theoretical capacity of its main structural members. Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as part of our work. We recommend that material of suitable size and strength be purchased from a reputable tower manufacturer.

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	5.00	18	0.2500		15.5000	16.4546	A572-65	0.2
2	5.00	18	0.2500		16.4546	17.4092	A572-65	0.2
3	5.00	18	0.2500		17.4092	18.3638	A572-65	0.2
4	5.00	18	0.2500		18.3638	19.3183	A572-65	0.3
5	5.00	18	0.2500		19.3183	20.2729	A572-65	0.3
6	5.00	18	0.2500		20.2729	21.2275	A572-65	0.3
7	[illegible]	18	0.2500	3.33	21.2275	22.3100	A572-65	0.3
8	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	0.4
9	5.00	18	0.3125		[illegible]	[illegible]	A572-65	0.4
10	5.00	18	0.3125		23.0550	23.9956	A572-65	0.4
11	5.00	18	0.3125		23.9956	24.9362	A572-65	0.4
12	5.00	18	[illegible]		[illegible]	[illegible]	A572-65	0.4
13	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
14	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
15	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	0.7
16	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	0.6
17	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
18	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
19	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
20	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	1.0
21	[illegible]	18	0.7000	4.33	[illegible]	30.3600	A572-65	1.6
22	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	1.4
23	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	1.6
24	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
25	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
26	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
27	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	1.4
28	5.00	18	0.9000		32.0094	32.9505	A572-65	1.4
29	5.00	18	0.8750		32.9505	33.8915	A572-65	1.4
30	5.00	18	0.8625		33.8915	34.8326	A572-65	1.4
31	5.00	18	0.8500		34.8326	35.7736	A572-65	1.5
32	5.00	18	0.8250		35.7736	36.7146	A572-65	1.5
33	[illegible]	18	0.8250	5.33	36.7146	38.1100	A572-65	2.3
34	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	2.4
35	5.00	18	[illegible]		[illegible]	[illegible]	A572-65	1.9
36	5.00	18	1.0000		38.4855	39.4249	A572-65	1.9
37	5.00	18	0.9750		39.4249	40.3642	A572-65	2.0
38	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	2.2
39	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	0.1
40	[illegible]	18	[illegible]		[illegible]	[illegible]	A572-65	2.1
41	5.00	18	1.0000		42.2911	43.2305	A572-65	2.2
42	5.00	18	[illegible]		[illegible]	[illegible]	A572-65	2.2
43–47	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	A572-65	[illegible]
								42.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	800MHZ RRH	148
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	165	APXVSPP18-C-A20 w/ Mount Pipe	148
KRY 112 144/1	165	1900MHz RRH	148
RRUS 11 B12	165	800MHZ RRH	148
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	APXVSPP18-C-A20 w/ Mount Pipe	148
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	165	1900MHz RRH	148
KRY 112 144/1	165	800MHZ RRH	148
RRUS 11 B12	165	T-Arm Mount [TA 702-3]	148
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	APXV18-206517-A w/ Mount Pipe	138
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	165	APXV18-206517-A w/ Mount Pipe	138
KRY 112 144/1	165	APXV18-206517-A w/ Mount Pipe	138
RRUS 11 B12	165	Pipe Mount [PM 601-3]	138
Platform Mount [LP 601-1]	165	LLPX310R w/ Mount Pipe	128
9' Ladder	165	HORIZON DUO	128
(2) 7770.00 w/ Mount Pipe	156	WIMAX DAP HEAD	128
HPA-65R-BUU-H8 w/ Mount Pipe	156	LLPX310R w/ Mount Pipe	128
(2) DTMABP7819VG12A	156	HORIZON DUO	128
RRUS12/RRUS A2	156	WIMAX DAP HEAD	128
RRUS 11	156	LLPX310R w/ Mount Pipe	128
(2) 7770.00 w/ Mount Pipe	156	HORIZON DUO	128
HPA-65R-BUU-H8 w/ Mount Pipe	156	WIMAX DAP HEAD	128
(2) DTMABP7819VG12A	156	Side Arm Mount [SO 103-3]	128
RRUS12/RRUS A2	156	2" x 6' Mount Pipe	128
RRUS 11	156	2" x 6' Mount Pipe	128
DC6-48-60-18-8F	156	2" x 6' Mount Pipe	128
(2) 7770.00 w/ Mount Pipe	156	A-ANT-18G-2-C	128
HPA-65R-BUU-H6 w/ Mount Pipe	156	A-ANT-18G-2-C	128
(2) DTMABP7819VG12A	156	A-ANT-18G-2-C	128
RRUS12/RRUS A2	156	(2) RRH2X60-PCS	108
RRUS 11	156	(2) HBXX-6517DS-A2M w/ Mount Pipe	108
Platform Mount [LP 714-1]	156	(2) LNX-6514DS-A1M w/ Mount Pipe	108
2" x 6' Mount Pipe	156	RRH2X60-AWS	108
2" x 6' Mount Pipe	156	(2) DB-T1-6Z-8AB-0Z	108
2" x 6' Mount Pipe	156	(2) HBXX-6517DS-A2M w/ Mount Pipe	108
APXVSPP18-C-A20 w/ Mount Pipe	148	(2) LNX-6514DS-A1M w/ Mount Pipe	108
1900MHz RRH	148	RRH2X60-AWS	108
		RRH2X60-PCS	108
		Platform Mount [LP 303-1]	108
		(2) HBXX-6517DS-A2M w/ Mount Pipe	108
		(2) LNX-6514DS-A1M w/ Mount Pipe	108
		RRH2X60-AWS	108

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 99.9%

ALL REACTIONS ARE FACTORED

AXIAL 151 K
SHEAR 9 K
MOMENT 1052 kip-ft
TORQUE 0 kip-ft
40 mph WIND - 1.0000 in ICE

AXIAL 70 K
SHEAR 54 K
MOMENT 5678 kip-ft
TORQUE 2 kip-ft
REACTIONS - 95 mph WIND

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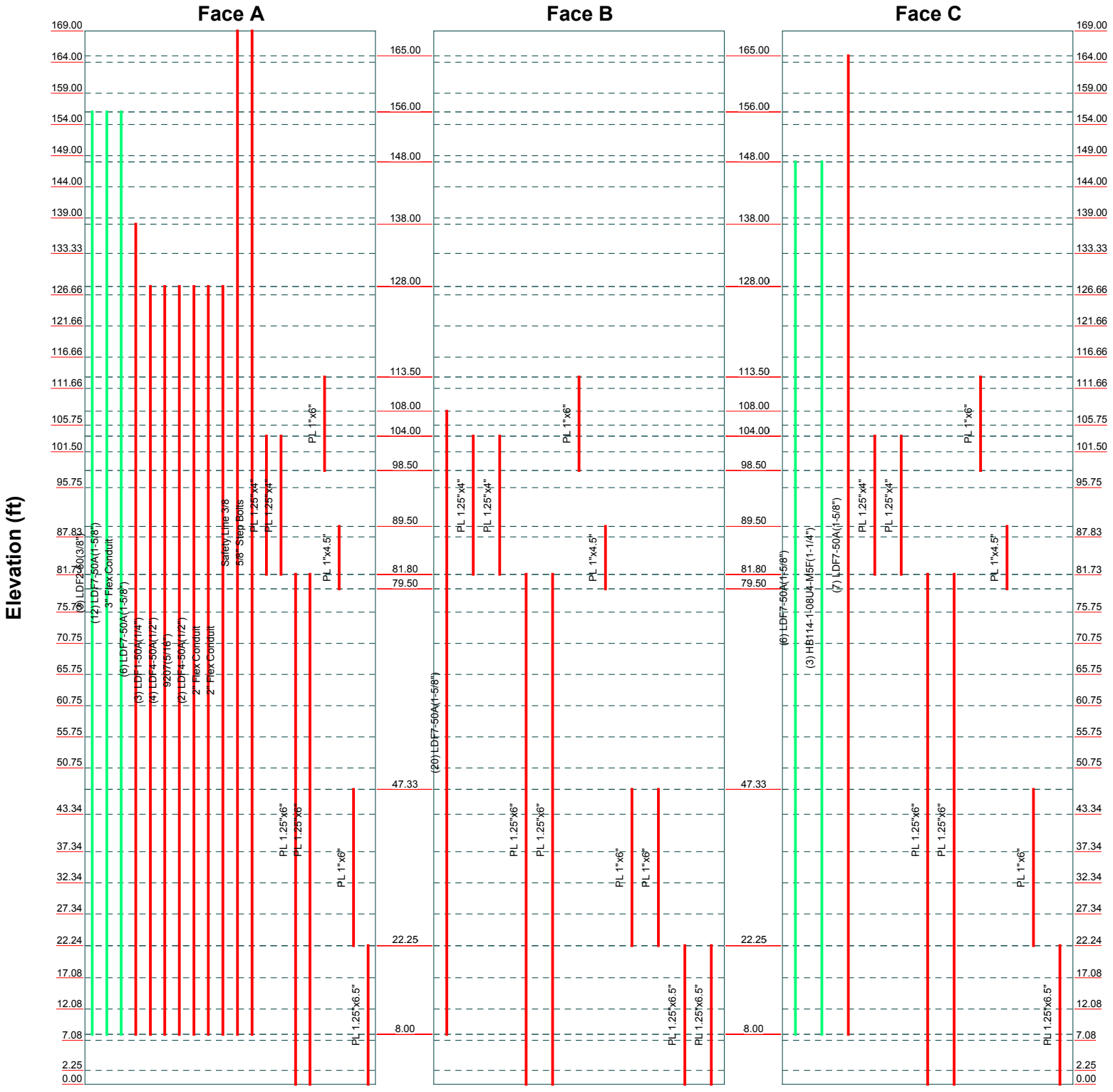
Project: **017-00013-00**		
Client: CCI	Drawn by: 15310	App'd:
Code: TIA-222-G	Date: 11/23/16	Scale: NTS
Path: G:\DEPT\Telecom\Crown Castle\Current Projects\DJ Projects\SA\828054\tnx\828054_MOD.eri		Dwg No. E-1

Feed Line Distribution Chart
0' - 169'

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



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Project: ***017-00013-00***			
Client: CCI	Drawn by: 15310	App'd:	
Code: TIA-222-G	Date: 11/23/16	Scale: NTS	
Path: G:\DEPT\Telecom\Crown Castle\Current Projects\DJ Projects\SA\828054\tnx\828054_MOD.eri		Dwg No. E-7	

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 95 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	169.00-164.00	5.00	0.00	18	15.5000	16.4546	0.2500	1.0000	A572-65 (65 ksi)
L2	164.00-159.00	5.00	0.00	18	16.4546	17.4092	0.2500	1.0000	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	159.00-154.00	5.00	0.00	18	17.4092	18.3638	0.2500	1.0000	A572-65 (65 ksi)
L4	154.00-149.00	5.00	0.00	18	18.3638	19.3183	0.2500	1.0000	A572-65 (65 ksi)
L5	149.00-144.00	5.00	0.00	18	19.3183	20.2729	0.2500	1.0000	A572-65 (65 ksi)
L6	144.00-139.00	5.00	0.00	18	20.2729	21.2275	0.2500	1.0000	A572-65 (65 ksi)
L7	139.00-133.33	5.67	3.33	18	21.2275	22.3100	0.2500	1.0000	A572-65 (65 ksi)
L8	133.33-131.66	5.00	0.00	18	21.1737	22.1143	0.3125	1.2500	A572-65 (65 ksi)
L9	131.66-126.66	5.00	0.00	18	22.1143	23.0550	0.3125	1.2500	A572-65 (65 ksi)
L10	126.66-121.66	5.00	0.00	18	23.0550	23.9956	0.3125	1.2500	A572-65 (65 ksi)
L11	121.66-116.66	5.00	0.00	18	23.9956	24.9362	0.3125	1.2500	A572-65 (65 ksi)
L12	116.66-111.66	5.00	0.00	18	24.9362	25.8769	0.3125	1.2500	A572-65 (65 ksi)
L13	111.66-111.00	0.66	0.00	18	25.8769	26.0016	0.3125	1.2500	A572-65 (65 ksi)
L14	111.00-110.75	0.25	0.00	18	26.0016	26.0487	0.5750	2.3000	A572-65 (65 ksi)
L15	110.75-105.75	5.00	0.00	18	26.0487	26.9893	0.5625	2.2500	A572-65 (65 ksi)
L16	105.75-101.50	4.25	0.00	18	26.9893	27.7888	0.5500	2.2000	A572-65 (65 ksi)
L17	101.50-101.25	0.25	0.00	18	27.7888	27.8359	0.9875	3.9500	A572-65 (65 ksi)
L18	101.25-101.00	0.25	0.00	18	27.8359	27.8829	0.9875	3.9500	A572-65 (65 ksi)
L19	101.00-100.75	0.25	0.00	18	27.8829	27.9299	0.7250	2.9000	A572-65 (65 ksi)
L20	100.75-95.75	5.00	0.00	18	27.9299	28.8706	0.7125	2.8500	A572-65 (65 ksi)
L21	95.75-87.83	7.92	4.33	18	28.8706	30.3600	0.7000	2.8000	A572-65 (65 ksi)
L22	87.83-86.83	5.33	0.00	18	28.9198	29.9235	0.9375	3.7500	A572-65 (65 ksi)
L23	86.83-81.73	5.10	0.00	18	29.9235	30.8834	1.1250	4.5000	A572-65 (65 ksi)
L24	81.73-81.55	0.18	0.00	18	30.8834	30.9178	1.1250	4.5000	A572-65 (65 ksi)
L25	81.55-81.00	0.55	0.00	18	30.9178	31.0214	1.1250	4.5000	A572-65 (65 ksi)
L26	81.00-80.75	0.25	0.00	18	31.0214	31.0684	0.9375	3.7500	A572-65 (65 ksi)
L27	80.75-75.75	5.00	0.00	18	31.0684	32.0094	0.9250	3.7000	A572-65 (65 ksi)
L28	75.75-70.75	5.00	0.00	18	32.0094	32.9505	0.9000	3.6000	A572-65 (65 ksi)
L29	70.75-65.75	5.00	0.00	18	32.9505	33.8915	0.8750	3.5000	A572-65 (65 ksi)
L30	65.75-60.75	5.00	0.00	18	33.8915	34.8326	0.8625	3.4500	A572-65 (65 ksi)
L31	60.75-55.75	5.00	0.00	18	34.8326	35.7736	0.8500	3.4000	A572-65 (65 ksi)
L32	55.75-50.75	5.00	0.00	18	35.7736	36.7146	0.8250	3.3000	A572-65 (65 ksi)
L33	50.75-43.34	7.41	5.33	18	36.7146	38.1100	0.8250	3.3000	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
									(65 ksi)
L34	43.34-42.34	6.33	0.00	18	36.3563	37.5461	1.0375	4.1500	A572-65 (65 ksi)
L35	42.34-37.34	5.00	0.00	18	37.5461	38.4855	1.0250	4.1000	A572-65 (65 ksi)
L36	37.34-32.34	5.00	0.00	18	38.4855	39.4249	1.0000	4.0000	A572-65 (65 ksi)
L37	32.34-27.34	5.00	0.00	18	39.4249	40.3642	0.9750	3.9000	A572-65 (65 ksi)
L38	27.34-22.24	5.10	0.00	18	40.3642	41.3224	1.0375	4.1500	A572-65 (65 ksi)
L39	22.24-22.08	0.16	0.00	18	41.3224	41.3517	1.0375	4.1500	A572-65 (65 ksi)
L40	22.08-17.08	5.00	0.00	18	41.3517	42.2911	1.0250	4.1000	A572-65 (65 ksi)
L41	17.08-12.08	5.00	0.00	18	42.2911	43.2305	1.0000	4.0000	A572-65 (65 ksi)
L42	12.08-7.08	5.00	0.00	18	43.2305	44.1698	0.9750	3.9000	A572-65 (65 ksi)
L43	7.08-5.67	1.41	0.00	18	44.1698	44.4347	0.9750	3.9000	A572-65 (65 ksi)
L44	5.67-5.42	0.25	0.00	18	44.4347	44.4817	1.4000	5.6000	A572-65 (65 ksi)
L45	5.42-2.25	3.17	0.00	18	44.4817	45.0773	1.3750	5.5000	A572-65 (65 ksi)
L46	2.25-2.00	0.25	0.00	18	45.0773	45.1242	1.1250	4.5000	A572-65 (65 ksi)
L47	2.00-0.00	2.00		18	45.1242	45.5000	1.1000	4.4000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152
	16.7084	12.8583	426.5776	5.7526	8.3589	51.0326	853.7164	6.4304	2.4560	9.824
L2	16.7084	12.8583	426.5776	5.7526	8.3589	51.0326	853.7164	6.4304	2.4560	9.824
	17.6777	13.6158	506.4925	6.0915	8.8439	57.2705	1013.6514	6.8092	2.6240	10.496
L3	17.6777	13.6158	506.4925	6.0915	8.8439	57.2705	1013.6514	6.8092	2.6240	10.496
	18.6470	14.3733	595.8124	6.4304	9.3288	63.8682	1192.4089	7.1880	2.7920	11.168
L4	18.6470	14.3733	595.8124	6.4304	9.3288	63.8682	1192.4089	7.1880	2.7920	11.168
	19.6164	15.1307	695.0606	6.7693	9.8137	70.8254	1391.0358	7.5668	2.9600	11.84
L5	19.6164	15.1307	695.0606	6.7693	9.8137	70.8254	1391.0358	7.5668	2.9600	11.84
	20.5857	15.8882	804.7602	7.1081	10.2986	78.1424	1610.5794	7.9456	3.1280	12.512
L6	20.5857	15.8882	804.7602	7.1081	10.2986	78.1424	1610.5794	7.9456	3.1280	12.512
	21.5550	16.6456	925.4345	7.4470	10.7836	85.8189	1852.0868	8.3244	3.2960	13.184
L7	21.5550	16.6456	925.4345	7.4470	10.7836	85.8189	1852.0868	8.3244	3.2960	13.184
	22.6542	17.5046	1076.2196	7.8313	11.3335	94.9593	2153.8554	8.7540	3.4866	13.946
L8	22.1370	20.6917	1137.6552	7.4057	10.7562	105.7671	2276.8074	10.3478	3.1766	10.165
	22.4555	21.6247	1298.5914	7.7396	11.2341	115.5940	2598.8916	10.8144	3.3421	10.695
L9	22.4555	21.6247	1298.5914	7.7396	11.2341	115.5940	2598.8916	10.8144	3.3421	10.695
	23.4106	22.5577	1474.0317	8.0736	11.7119	125.8574	2950.0029	11.2810	3.5077	11.225
L10	23.4106	22.5577	1474.0317	8.0736	11.7119	125.8574	2950.0029	11.2810	3.5077	11.225
	24.3658	23.4907	1664.6017	8.4075	12.1898	136.5573	3331.3937	11.7476	3.6732	11.754
L11	24.3658	23.4907	1664.6017	8.4075	12.1898	136.5573	3331.3937	11.7476	3.6732	11.754
	25.3209	24.4237	1870.9273	8.7414	12.6676	147.6937	3744.3165	12.2142	3.8388	12.284

Section	Tip Dia.	Area	I	r	C	I/C	J	It/Q	w	w/t
	in	in^2	in^4	in	in	in^3	in^4	in^2	in	
L12	25.3209	24.4237	1870.9273	8.7414	12.6676	147.6937	3744.3165	12.2142	3.8388	12.284
	26.2761	25.3567	2093.6343	9.0754	13.1455	159.2667	4190.0235	12.6808	4.0043	12.814
L13	26.2761	25.3567	2093.6343	9.0754	13.1455	159.2667	4190.0235	12.6808	4.0043	12.814
	26.4027	25.4804	2124.4288	9.1196	13.2088	160.8341	4251.6529	12.7426	4.0263	12.884
L14	26.4027	46.4049	3790.3404	9.0265	13.2088	286.9552	7585.6682	23.2068	3.5643	6.199
	26.4505	46.4907	3811.4125	9.0431	13.2327	288.0295	7627.8402	23.2498	3.5726	6.213
L15	26.4505	45.5023	3734.0473	9.0476	13.2327	282.1830	7473.0079	22.7555	3.5946	6.39
	27.4057	47.1817	4162.9435	9.3815	13.7106	303.6304	8331.3648	23.5954	3.7601	6.685
L16	27.4057	46.1551	4076.2124	9.3860	13.7106	297.3045	8157.7884	23.0819	3.7821	6.877
	28.2175	47.5509	4457.3128	9.6698	14.1167	315.7468	8920.4907	23.7799	3.9228	7.132
L17	28.2175	84.0041	7623.4443	9.5145	14.1167	540.0289	15256.9198	42.0100	3.1528	3.193
	28.2653	84.1515	7663.6487	9.5312	14.1406	541.9597	15337.3814	42.0838	3.1611	3.201
L18	28.2653	84.1515	7663.6487	9.5312	14.1406	541.9597	15337.3814	42.0838	3.1611	3.201
	28.3130	84.2990	7703.9941	9.5479	14.1645	543.8938	15418.1253	42.1575	3.1694	3.21
L19	28.3130	62.4944	5823.3296	9.6411	14.1645	411.1209	11654.3217	31.2531	3.6314	5.009
	28.3608	62.6027	5853.6366	9.6578	14.1884	412.5647	11714.9756	31.3073	3.6397	5.02
L20	28.3608	61.5516	5760.6452	9.6622	14.1884	406.0106	11528.8704	30.7816	3.6617	5.139
	29.3160	63.6788	6378.7941	9.9961	14.6663	434.9299	12765.9816	31.8455	3.8272	5.372
L21	29.3160	62.5894	6275.2352	10.0006	14.6663	427.8689	12558.7275	31.3006	3.8492	5.499
	30.8284	65.8986	7324.1268	10.5293	15.4229	474.8871	14657.8908	32.9556	4.1114	5.873
L22	30.1941	83.2649	8236.9732	9.9337	14.6913	560.6710	16484.7849	41.6404	3.4399	3.669
	30.3852	86.2516	9155.5124	10.2900	15.2012	602.2903	18323.0719	43.1340	3.6165	3.858
L23	30.3852	102.8324	10774.7861	10.2235	15.2012	708.8133	21563.7499	51.4260	3.2865	2.921
	31.3598	106.2598	11888.4665	10.5642	15.6888	757.7692	23792.5762	53.1400	3.4555	3.072
L24	31.3598	106.2598	11888.4665	10.5642	15.6888	757.7692	23792.5762	53.1400	3.4555	3.072
	31.3948	106.3828	11929.7929	10.5765	15.7063	759.5563	23875.2834	53.2015	3.4615	3.077
L25	31.3948	106.3828	11929.7929	10.5765	15.7063	759.5563	23875.2834	53.2015	3.4615	3.077
	31.4999	106.7524	12054.5742	10.6132	15.7589	764.9399	24125.0101	53.3864	3.4798	3.093
L26	31.4999	89.5183	10235.6720	10.6798	15.7589	649.5189	20484.8124	44.7677	3.8098	4.064
	31.5477	89.6583	10283.7736	10.6965	15.7828	651.5830	20581.0789	44.8377	3.8180	4.073
L27	31.5477	88.4996	10159.2901	10.7009	15.7828	643.6957	20331.9480	44.2582	3.8400	4.151
	32.5032	91.2624	11140.7808	11.0350	16.2608	685.1312	22296.2208	45.6399	4.0057	4.33
L28	32.5032	88.8673	10865.8534	11.0439	16.2608	668.2238	21746.0044	44.4421	4.0497	4.5
	33.4588	91.5554	11882.0320	11.3779	16.7388	709.8477	23779.6987	45.7864	4.2153	4.684
L29	33.4588	89.0816	11579.0290	11.3868	16.7388	691.7459	23173.2939	44.5493	4.2593	4.868
	34.4144	91.6951	12628.3436	11.7209	17.2169	733.4856	25273.3038	45.8563	4.4249	5.057
L30	34.4144	90.4194	12462.0823	11.7253	17.2169	723.8288	24940.5625	45.2183	4.4469	5.156
	35.3699	92.9956	13557.8977	12.0594	17.6949	766.2020	27133.6353	46.5066	4.6125	5.348
L31	35.3699	91.6815	13376.1617	12.0638	17.6949	755.9315	26769.9242	45.8495	4.6345	5.452
	36.3255	94.2204	14518.4455	12.3979	18.1730	798.9026	29055.9948	47.1191	4.8002	5.647
L32	36.3255	91.5146	14121.7161	12.4068	18.1730	777.0719	28262.0138	45.7660	4.8442	5.872
	37.2810	93.9788	15293.4444	12.7408	18.6510	819.9784	30607.0122	46.9983	5.0098	6.072
L33	37.2810	93.9788	15293.4444	12.7408	18.6510	819.9784	30607.0122	46.9983	5.0098	6.072
	38.6979	97.6326	17147.4981	13.2362	19.3599	885.7234	34317.5593	48.8256	5.2554	6.37
L34	37.9345	116.3057	18329.4717	12.5382	18.4690	992.4455	36683.0618	58.1639	4.5727	4.407
	38.1253	120.2238	20245.0204	12.9606	19.0734	1061.4257	40516.6797	60.1233	4.7821	4.609
L35	38.1253	118.8159	20021.6557	12.9650	19.0734	1049.7149	40069.6565	59.4193	4.8041	4.687
	39.0792	121.8721	21606.6954	13.2985	19.5506	1105.1665	43241.8215	60.9476	4.9694	4.848
L36	39.0792	118.9789	21121.9349	13.3073	19.5506	1080.3713	42271.6626	59.5008	5.0134	5.013
	40.0331	121.9605	22749.9923	13.6408	20.0278	1135.9190	45529.9196	60.9918	5.1788	5.179
L37	40.0331	118.9889	22224.5654	13.6497	20.0278	1109.6842	44478.3744	59.5057	5.2228	5.357
	40.9869	121.8959	23893.6060	13.9832	20.5050	1165.2557	47818.6519	60.9595	5.3881	5.526
L38	40.9869	129.5039	25304.4105	13.9610	20.5050	1234.0585	50642.1173	64.7643	5.2781	5.087
	41.9599	132.6592	27199.4053	14.3011	20.9918	1295.7169	54434.6002	66.3422	5.4467	5.25
L39	41.9599	132.6592	27199.4053	14.3011	20.9918	1295.7169	54434.6002	66.3422	5.4467	5.25
	41.9896	132.7557	27258.8138	14.3115	21.0067	1297.6267	54553.4955	66.3905	5.4519	5.255
L40	41.9896	131.1969	26955.4526	14.3160	21.0067	1283.1855	53946.3739	65.6109	5.4739	5.34
	42.9435	134.2530	28883.3874	14.6495	21.4839	1344.4218	57804.7803	67.1393	5.6392	5.502
L41	42.9435	131.0579	28230.1600	14.6583	21.4839	1314.0164	56497.4660	65.5414	5.6832	5.683
	43.8974	134.0395	30201.0440	14.9918	21.9611	1375.2078	60441.8273	67.0325	5.8486	5.849
L42	43.8974	130.7659	29498.3441	15.0007	21.9611	1343.2103	59035.5028	65.3954	5.8926	6.044
	44.8512	133.6729	31509.7281	15.3342	22.4383	1404.2845	63060.9175	66.8492	6.0579	6.213

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L43	44.8512	133.6729	31509.7281	15.3342	22.4383	1404.2845	63060.9175	66.8492	6.0579	6.213
	45.1202	134.4927	32093.0172	15.4282	22.5729	1421.7529	64228.2632	67.2591	6.1045	6.261
L44	45.1202	191.2292	44743.5202	15.2773	22.5729	1982.1829	89545.9151	95.6328	5.3565	3.826
	45.1679	191.4379	44890.1817	15.2940	22.5967	1986.5803	89839.4310	95.7371	5.3648	3.832
L45	45.1679	188.1285	44165.3687	15.3029	22.5967	1954.5043	88388.8512	94.0821	5.4088	3.934
	45.7727	190.7277	46021.3511	15.5143	22.8993	2009.7311	92103.2583	95.3820	5.5136	4.01
L46	45.7727	156.9426	38303.7355	15.6031	22.8993	1672.7064	76657.8720	78.4862	5.9536	5.292
	45.8204	157.1103	38426.6647	15.6197	22.9231	1676.3280	76903.8921	78.5701	5.9619	5.299
L47	45.8204	153.7063	37636.8207	15.6286	22.9231	1641.8717	75323.1649	76.8677	6.0059	5.46
	46.2019	155.0182	38608.7702	15.7620	23.1140	1670.3630	77268.3428	77.5238	6.0720	5.52

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 169.00-164.00				1	1	1			
L2 164.00-159.00				1	1	1			
L3 159.00-154.00				1	1	1			
L4 154.00-149.00				1	1	1			
L5 149.00-144.00				1	1	1			
L6 144.00-139.00				1	1	1			
L7 139.00-133.33				1	1	1			
L8 133.33-131.66				1	1	1			
L9 131.66-126.66				1	1	1			
L10 126.66-121.66				1	1	1			
L11 121.66-116.66				1	1	1			
L12 116.66-111.66				1	1	1			
L13 111.66-111.00				1	1	1			
L14 111.00-110.75				1	1	0.936267			
L15 110.75-105.75				1	1	0.942328			
L16 105.75-101.50				1	1	0.951692			
L17 101.50-101.25				1	1	0.894832			
L18 101.25-101.00				1	1	0.89382			
L19 101.00-100.75				1	1	0.9168			
L20 100.75-95.75				1	1	0.915958			
L21 95.75-87.83				1	1	0.920553			
L22 87.83-86.83				1	1	0.912119			
L23				1	1	0.892291			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
86.83-81.73									
L24				1	1	0.891645			
81.73-81.55									
L25				1	1	0.889712			
81.55-81.00									
L26				1	1	0.909391			
81.00-80.75									
L27				1	1	0.90568			
80.75-75.75									
L28				1	1	0.915015			
75.75-70.75									
L29				1	1	0.925836			
70.75-65.75									
L30				1	1	0.924934			
65.75-60.75									
L31				1	1	0.924798			
60.75-55.75									
L32				1	1	0.939093			
55.75-50.75									
L33				1	1	0.933863			
50.75-43.34									
L34				1	1	0.941955			
43.34-42.34									
L35				1	1	0.93839			
42.34-37.34									
L36				1	1	0.946877			
37.34-32.34									
L37				1	1	0.956551			
32.34-27.34									
L38				1	1	0.951615			
27.34-22.24									
L39				1	1	0.951186			
22.24-22.08									
L40				1	1	0.948905			
22.08-17.08									
L41				1	1	0.958759			
17.08-12.08									
L42 12.08-7.08				1	1	0.969752			
L43 7.08-5.67				1	1	0.966186			
L44 5.67-5.42				1	1	0.888028			
L45 5.42-2.25				1	1	0.895052			
L46 2.25-2.00				1	1	0.880056			
L47 2.00-0.00				1	1	0.894818			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A(1-5/8")	A	Surface Ar (CaAa)	138.00 - 8.00	6	1	-0.300 -0.100	1.9800		0.82
LDF1-50A(1/4")	A	Surface Ar (CaAa)	128.00 - 8.00	3	3	-0.400 -0.400	0.0000		0.06
LDF4-50A(1/2")	A	Surface Ar (CaAa)	128.00 - 8.00	4	4	-0.500 -0.500	0.0000		0.15

Description	Sector	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
			ft				in	in	plf
9207(5/16")	A	Surface Ar (CaAa)	128.00 - 8.00	1	1	-0.400 -0.400	0.0000		0.60
LDF4-50A(1/2")	A	Surface Ar (CaAa)	128.00 - 8.00	2	1	-0.450 -0.450	0.6300		0.15
2" Flex Conduit	A	Surface Ar (CaAa)	128.00 - 8.00	1	1	-0.400 -0.400	2.0000		0.32
2" Flex Conduit	A	Surface Ar (CaAa)	128.00 - 8.00	1	1	-0.500 -0.500	2.0000		0.32
LDF7-50A(1-5/8")	B	Surface Ar (CaAa)	108.00 - 8.00	20	9	-0.400 -0.400	1.9800		0.82
LDF7-50A(1-5/8")	C	Surface Ar (CaAa)	165.00 - 8.00	7	4	-0.500 -0.400	1.9800		0.82
Safety Line 3/8	A	Surface Ar (CaAa)	169.00 - 8.00	1	1	0.500 0.500	0.3750		0.22
5/8" Step Bolts	A	Surface Ar (CaAa)	169.00 - 8.00	1	1	0.500 0.500	0.4167		1.00
PL 1.25"x4"	A	Surface Af (CaAa)	104.00 - 81.80	1	1	0.000 0.000	4.0000	10.5000	0.00
PL 1.25"x4"	B	Surface Af (CaAa)	104.00 - 81.80	1	1	0.000 0.000	4.0000	10.5000	0.00
PL 1.25"x4"	C	Surface Af (CaAa)	104.00 - 81.80	1	1	0.000 0.000	4.0000	10.5000	0.00
PL 1.25"x4"	A	Surface Af (CaAa)	104.00 - 81.80	1	1	0.500 0.500	4.0000	10.5000	0.00
PL 1.25"x4"	B	Surface Af (CaAa)	104.00 - 81.80	1	1	0.500 0.500	4.0000	10.5000	0.00
PL 1.25"x4"	C	Surface Af (CaAa)	104.00 - 81.80	1	1	0.500 0.500	4.0000	10.5000	0.00
PL 1.25"x6"	A	Surface Af (CaAa)	81.80 - 0.00	1	1	0.000 0.000	6.0000	14.5000	0.00
PL 1.25"x6"	B	Surface Af (CaAa)	81.80 - 0.00	1	1	0.000 0.000	6.0000	14.5000	0.00
PL 1.25"x6"	C	Surface Af (CaAa)	81.80 - 0.00	1	1	0.000 0.000	6.0000	14.5000	0.00
PL 1.25"x6"	A	Surface Af (CaAa)	81.80 - 0.00	1	1	0.500 0.500	6.0000	14.5000	0.00
PL 1.25"x6"	B	Surface Af (CaAa)	81.80 - 0.00	1	1	0.500 0.500	6.0000	14.5000	0.00
PL 1.25"x6"	C	Surface Af (CaAa)	81.80 - 0.00	1	1	0.500 0.500	6.0000	14.5000	0.00
PL 1"x6"	A	Surface Af (CaAa)	113.50 - 98.50	1	1	-0.250 -0.250	6.0000	14.0000	0.00
PL 1"x6"	B	Surface Af (CaAa)	113.50 - 98.50	1	1	-0.250 -0.250	6.0000	14.0000	0.00
PL 1"x6"	C	Surface Af (CaAa)	113.50 - 98.50	1	1	-0.250 -0.250	6.0000	14.0000	0.00
PL 1"x4.5"	A	Surface Af (CaAa)	89.50 - 79.50	1	1	-0.250 -0.250	4.5000	11.0000	0.00
PL 1"x4.5"	B	Surface Af (CaAa)	89.50 - 79.50	1	1	-0.250 -0.250	4.5000	11.0000	0.00
PL 1"x4.5"	C	Surface Af (CaAa)	89.50 - 79.50	1	1	-0.250 -0.250	4.5000	11.0000	0.00
PL 1"x6"	A	Surface Af (CaAa)	47.33 - 22.25	1	1	-0.350 -0.350	6.0000	14.0000	0.00
PL 1"x6"	B	Surface Af (CaAa)	47.33 - 22.25	1	1	-0.350 -0.350	6.0000	14.0000	0.00
PL 1"x6"	B	Surface Af (CaAa)	47.33 - 22.25	1	1	0.400 0.400	6.0000	14.0000	0.00
PL 1"x6"	C	Surface Af (CaAa)	47.33 - 22.25	1	1	-0.350 -0.350	6.0000	14.0000	0.00
PL 1.25"x6.5"	A	Surface Af	22.25 - 0.00	1	1	-0.350	6.5000	15.5000	0.00

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
		(CaAa)				-0.350			
PL 1.25"x6.5"	B	Surface Af	22.25 - 0.00	1	1	-0.350	6.5000	15.5000	0.00
		(CaAa)				-0.350			
PL 1.25"x6.5"	B	Surface Af	22.25 - 0.00	1	1	0.400	6.5000	15.5000	0.00
		(CaAa)				0.400			
PL 1.25"x6.5"	C	Surface Af	22.25 - 0.00	1	1	-0.350	6.5000	15.5000	0.00
		(CaAa)				-0.350			

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
LDF2-50(3/8")	A	No	Inside Pole	156.00 - 8.00	3	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
LDF7-50A(1-5/8")	A	No	Inside Pole	156.00 - 8.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
3" Flex Conduit	A	No	Inside Pole	156.00 - 8.00	1	No Ice	0.00	0.48
						1/2" Ice	0.00	0.48
						1" Ice	0.00	0.48
LDF7-50A(1-5/8")	C	No	Inside Pole	148.00 - 8.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
HB114-1-08U4-M5F(1-1/4")	C	No	Inside Pole	148.00 - 8.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08

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	169.00-164.00	A	0.000	0.000	0.396	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.792	0.000	0.01
L2	164.00-159.00	A	0.000	0.000	0.396	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.960	0.000	0.03
L3	159.00-154.00	A	0.000	0.000	0.396	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.960	0.000	0.03
L4	154.00-149.00	A	0.000	0.000	0.396	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.960	0.000	0.03
L5	149.00-144.00	A	0.000	0.000	0.396	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.960	0.000	0.06
L6	144.00-139.00	A	0.000	0.000	0.396	0.000	0.06
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.960	0.000	0.07
L7	139.00-133.33	A	0.000	0.000	1.374	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	4.491	0.000	0.08

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
L8	133.33-131.66	A	0.000	0.000	0.462	0.000	0.03
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.320	0.000	0.02
L9	131.66-126.66	A	0.000	0.000	2.005	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.960	0.000	0.07
L10	126.66-121.66	A	0.000	0.000	3.701	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.960	0.000	0.07
L11	121.66-116.66	A	0.000	0.000	3.701	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	3.960	0.000	0.07
L12	116.66-111.66	A	0.000	0.000	5.538	0.000	0.10
		B	0.000	0.000	1.837	0.000	0.00
		C	0.000	0.000	5.797	0.000	0.07
L13	111.66-111.00	A	0.000	0.000	1.154	0.000	0.01
		B	0.000	0.000	0.663	0.000	0.00
		C	0.000	0.000	1.188	0.000	0.01
L14	111.00-110.75	A	0.000	0.000	0.435	0.000	0.00
		B	0.000	0.000	0.250	0.000	0.00
		C	0.000	0.000	0.448	0.000	0.00
L15	110.75-105.75	A	0.000	0.000	8.701	0.000	0.10
		B	0.000	0.000	9.009	0.000	0.04
		C	0.000	0.000	8.960	0.000	0.07
L16	105.75-101.50	A	0.000	0.000	10.729	0.000	0.08
		B	0.000	0.000	15.157	0.000	0.07
		C	0.000	0.000	10.949	0.000	0.06
L17	101.50-101.25	A	0.000	0.000	0.768	0.000	0.00
		B	0.000	0.000	1.029	0.000	0.00
		C	0.000	0.000	0.781	0.000	0.00
L18	101.25-101.00	A	0.000	0.000	0.768	0.000	0.00
		B	0.000	0.000	1.029	0.000	0.00
		C	0.000	0.000	0.781	0.000	0.00
L19	101.00-100.75	A	0.000	0.000	0.768	0.000	0.00
		B	0.000	0.000	1.029	0.000	0.00
		C	0.000	0.000	0.781	0.000	0.00
L20	100.75-95.75	A	0.000	0.000	12.617	0.000	0.10
		B	0.000	0.000	17.827	0.000	0.08
		C	0.000	0.000	12.877	0.000	0.07
L21	95.75-87.83	A	0.000	0.000	17.666	0.000	0.15
		B	0.000	0.000	25.914	0.000	0.13
		C	0.000	0.000	18.077	0.000	0.11
L22	87.83-86.83	A	0.000	0.000	2.823	0.000	0.02
		B	0.000	0.000	3.865	0.000	0.02
		C	0.000	0.000	2.875	0.000	0.01
L23	86.83-81.73	A	0.000	0.000	14.445	0.000	0.10
		B	0.000	0.000	19.758	0.000	0.08
		C	0.000	0.000	14.709	0.000	0.07
L24	81.73-81.55	A	0.000	0.000	0.639	0.000	0.00
		B	0.000	0.000	0.829	0.000	0.00
		C	0.000	0.000	0.648	0.000	0.00
L25	81.55-81.00	A	0.000	0.000	1.920	0.000	0.01
		B	0.000	0.000	2.493	0.000	0.01
		C	0.000	0.000	1.948	0.000	0.01
L26	81.00-80.75	A	0.000	0.000	0.873	0.000	0.00
		B	0.000	0.000	1.133	0.000	0.00
		C	0.000	0.000	0.885	0.000	0.00
L27	80.75-75.75	A	0.000	0.000	14.638	0.000	0.10
		B	0.000	0.000	19.848	0.000	0.08
		C	0.000	0.000	14.897	0.000	0.07
L28	75.75-70.75	A	0.000	0.000	13.701	0.000	0.10

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	18.910	0.000	0.08
		C	0.000	0.000	13.960	0.000	0.07
L29	70.75-65.75	A	0.000	0.000	13.701	0.000	0.10
		B	0.000	0.000	18.910	0.000	0.08
		C	0.000	0.000	13.960	0.000	0.07
L30	65.75-60.75	A	0.000	0.000	13.701	0.000	0.10
		B	0.000	0.000	18.910	0.000	0.08
		C	0.000	0.000	13.960	0.000	0.07
L31	60.75-55.75	A	0.000	0.000	13.701	0.000	0.10
		B	0.000	0.000	18.910	0.000	0.08
		C	0.000	0.000	13.960	0.000	0.07
L32	55.75-50.75	A	0.000	0.000	13.701	0.000	0.10
		B	0.000	0.000	18.910	0.000	0.08
		C	0.000	0.000	13.960	0.000	0.07
L33	50.75-43.34	A	0.000	0.000	24.310	0.000	0.14
		B	0.000	0.000	36.028	0.000	0.12
		C	0.000	0.000	24.694	0.000	0.10
L34	43.34-42.34	A	0.000	0.000	3.740	0.000	0.02
		B	0.000	0.000	5.782	0.000	0.02
		C	0.000	0.000	3.792	0.000	0.01
L35	42.34-37.34	A	0.000	0.000	18.701	0.000	0.10
		B	0.000	0.000	28.910	0.000	0.08
		C	0.000	0.000	18.960	0.000	0.07
L36	37.34-32.34	A	0.000	0.000	18.701	0.000	0.10
		B	0.000	0.000	28.910	0.000	0.08
		C	0.000	0.000	18.960	0.000	0.07
L37	32.34-27.34	A	0.000	0.000	18.701	0.000	0.10
		B	0.000	0.000	28.910	0.000	0.08
		C	0.000	0.000	18.960	0.000	0.07
L38	27.34-22.24	A	0.000	0.000	19.076	0.000	0.10
		B	0.000	0.000	29.491	0.000	0.08
		C	0.000	0.000	19.340	0.000	0.07
L39	22.24-22.08	A	0.000	0.000	0.596	0.000	0.00
		B	0.000	0.000	0.928	0.000	0.00
		C	0.000	0.000	0.605	0.000	0.00
L40	22.08-17.08	A	0.000	0.000	19.117	0.000	0.10
		B	0.000	0.000	29.743	0.000	0.08
		C	0.000	0.000	19.377	0.000	0.07
L41	17.08-12.08	A	0.000	0.000	19.117	0.000	0.10
		B	0.000	0.000	29.743	0.000	0.08
		C	0.000	0.000	19.377	0.000	0.07
L42	12.08-7.08	A	0.000	0.000	18.437	0.000	0.08
		B	0.000	0.000	28.104	0.000	0.07
		C	0.000	0.000	18.648	0.000	0.06
L43	7.08-5.67	A	0.000	0.000	4.348	0.000	0.00
		B	0.000	0.000	5.875	0.000	0.00
		C	0.000	0.000	4.348	0.000	0.00
L44	5.67-5.42	A	0.000	0.000	0.771	0.000	0.00
		B	0.000	0.000	1.042	0.000	0.00
		C	0.000	0.000	0.771	0.000	0.00
L45	5.42-2.25	A	0.000	0.000	9.774	0.000	0.00
		B	0.000	0.000	13.208	0.000	0.00
		C	0.000	0.000	9.774	0.000	0.00
L46	2.25-2.00	A	0.000	0.000	0.771	0.000	0.00
		B	0.000	0.000	1.042	0.000	0.00
		C	0.000	0.000	0.771	0.000	0.00
L47	2.00-0.00	A	0.000	0.000	6.167	0.000	0.00
		B	0.000	0.000	8.333	0.000	0.00
		C	0.000	0.000	6.167	0.000	0.00

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	169.00-164.00	A	2.351	0.000	0.000	5.098	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	1.578	0.000	0.03
L2	164.00-159.00	A	2.344	0.000	0.000	5.084	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	7.880	0.000	0.17
L3	159.00-154.00	A	2.337	0.000	0.000	5.069	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	7.871	0.000	0.17
L4	154.00-149.00	A	2.329	0.000	0.000	5.054	0.000	0.14
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	7.862	0.000	0.17
L5	149.00-144.00	A	2.321	0.000	0.000	5.039	0.000	0.14
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	7.852	0.000	0.20
L6	144.00-139.00	A	2.313	0.000	0.000	5.023	0.000	0.14
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	7.842	0.000	0.21
L7	139.00-133.33	A	2.305	0.000	0.000	8.753	0.000	0.51
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	8.880	0.000	0.23
L8	133.33-131.66	A	2.298	0.000	0.000	2.767	0.000	0.17
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	2.611	0.000	0.07
L9	131.66-126.66	A	2.292	0.000	0.000	12.866	0.000	0.60
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	7.815	0.000	0.21
L10	126.66-121.66	A	2.283	0.000	0.000	25.393	0.000	0.82
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	7.804	0.000	0.20
L11	121.66-116.66	A	2.274	0.000	0.000	25.304	0.000	0.82
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	7.792	0.000	0.20
L12	116.66-111.66	A	2.264	0.000	0.000	27.621	0.000	0.85
		B		0.000	0.000	2.410	0.000	0.04
		C		0.000	0.000	10.190	0.000	0.24
L13	111.66-111.00	A	2.259	0.000	0.000	4.205	0.000	0.12
		B		0.000	0.000	0.869	0.000	0.01
		C		0.000	0.000	1.900	0.000	0.04
L14	111.00-110.75	A	2.258	0.000	0.000	1.585	0.000	0.05
		B		0.000	0.000	0.328	0.000	0.00
		C		0.000	0.000	0.716	0.000	0.02
L15	110.75-105.75	A	2.252	0.000	0.000	31.650	0.000	0.91
		B		0.000	0.000	12.831	0.000	0.25
		C		0.000	0.000	14.318	0.000	0.30
L16	105.75-101.50	A	2.242	0.000	0.000	32.395	0.000	0.85
		B		0.000	0.000	22.991	0.000	0.45
		C		0.000	0.000	17.732	0.000	0.34
L17	101.50-101.25	A	2.238	0.000	0.000	2.132	0.000	0.05
		B		0.000	0.000	1.581	0.000	0.03
		C		0.000	0.000	1.272	0.000	0.02
L18	101.25-101.00	A	2.237	0.000	0.000	2.132	0.000	0.05
		B		0.000	0.000	1.581	0.000	0.03
		C		0.000	0.000	1.272	0.000	0.02
L19	101.00-100.75	A	2.236	0.000	0.000	2.132	0.000	0.05
		B		0.000	0.000	1.581	0.000	0.03

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
		C		0.000	0.000	1.272	0.000	0.02
L20	100.75-95.75	A	2.231	0.000	0.000	38.962	0.000	1.00
		B		0.000	0.000	27.997	0.000	0.55
		C		0.000	0.000	21.810	0.000	0.41
L21	95.75-87.83	A	2.215	0.000	0.000	58.416	0.000	1.53
		B		0.000	0.000	41.252	0.000	0.82
		C		0.000	0.000	31.454	0.000	0.60
L22	87.83-86.83	A	2.204	0.000	0.000	8.165	0.000	0.21
		B		0.000	0.000	5.997	0.000	0.12
		C		0.000	0.000	4.760	0.000	0.09
L23	86.83-81.73	A	2.197	0.000	0.000	41.455	0.000	1.04
		B		0.000	0.000	30.556	0.000	0.59
		C		0.000	0.000	24.245	0.000	0.45
L24	81.73-81.55	A	2.190	0.000	0.000	1.605	0.000	0.04
		B		0.000	0.000	1.216	0.000	0.02
		C		0.000	0.000	0.989	0.000	0.02
L25	81.55-81.00	A	2.189	0.000	0.000	4.822	0.000	0.12
		B		0.000	0.000	3.654	0.000	0.07
		C		0.000	0.000	2.973	0.000	0.05
L26	81.00-80.75	A	2.188	0.000	0.000	2.191	0.000	0.05
		B		0.000	0.000	1.661	0.000	0.03
		C		0.000	0.000	1.351	0.000	0.02
L27	80.75-75.75	A	2.180	0.000	0.000	40.015	0.000	0.98
		B		0.000	0.000	29.464	0.000	0.55
		C		0.000	0.000	23.277	0.000	0.41
L28	75.75-70.75	A	2.166	0.000	0.000	38.609	0.000	0.95
		B		0.000	0.000	28.177	0.000	0.52
		C		0.000	0.000	21.989	0.000	0.39
L29	70.75-65.75	A	2.151	0.000	0.000	38.434	0.000	0.94
		B		0.000	0.000	28.127	0.000	0.52
		C		0.000	0.000	21.940	0.000	0.39
L30	65.75-60.75	A	2.134	0.000	0.000	38.246	0.000	0.93
		B		0.000	0.000	28.074	0.000	0.51
		C		0.000	0.000	21.887	0.000	0.38
L31	60.75-55.75	A	2.117	0.000	0.000	38.045	0.000	0.92
		B		0.000	0.000	28.017	0.000	0.51
		C		0.000	0.000	21.830	0.000	0.38
L32	55.75-50.75	A	2.098	0.000	0.000	37.828	0.000	0.91
		B		0.000	0.000	27.956	0.000	0.51
		C		0.000	0.000	21.768	0.000	0.38
L33	50.75-43.34	A	2.072	0.000	0.000	61.298	0.000	1.40
		B		0.000	0.000	52.627	0.000	0.88
		C		0.000	0.000	37.803	0.000	0.62
L34	43.34-42.34	A	2.053	0.000	0.000	8.920	0.000	0.20
		B		0.000	0.000	8.403	0.000	0.14
		C		0.000	0.000	5.751	0.000	0.09
L35	42.34-37.34	A	2.038	0.000	0.000	44.175	0.000	0.96
		B		0.000	0.000	41.837	0.000	0.66
		C		0.000	0.000	28.611	0.000	0.45
L36	37.34-32.34	A	2.011	0.000	0.000	43.836	0.000	0.94
		B		0.000	0.000	41.694	0.000	0.66
		C		0.000	0.000	28.496	0.000	0.44
L37	32.34-27.34	A	1.980	0.000	0.000	43.449	0.000	0.92
		B		0.000	0.000	41.532	0.000	0.64
		C		0.000	0.000	28.364	0.000	0.44
L38	27.34-22.24	A	1.943	0.000	0.000	43.855	0.000	0.92
		B		0.000	0.000	42.170	0.000	0.65
		C		0.000	0.000	28.775	0.000	0.44
L39	22.24-22.08	A	1.922	0.000	0.000	1.346	0.000	0.03
		B		0.000	0.000	1.312	0.000	0.02
		C		0.000	0.000	0.890	0.000	0.01

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
L40	22.08-17.08	A	1.898	0.000	0.000	42.845	0.000	0.88
		B		0.000	0.000	41.936	0.000	0.63
		C		0.000	0.000	28.434	0.000	0.42
L41	17.08-12.08	A	1.843	0.000	0.000	42.155	0.000	0.84
		B		0.000	0.000	41.647	0.000	0.61
		C		0.000	0.000	28.199	0.000	0.41
L42	12.08-7.08	A	1.767	0.000	0.000	37.437	0.000	0.69
		B		0.000	0.000	38.793	0.000	0.53
		C		0.000	0.000	26.560	0.000	0.36
L43	7.08-5.67	A	1.697	0.000	0.000	5.783	0.000	0.06
		B		0.000	0.000	7.789	0.000	0.08
		C		0.000	0.000	5.783	0.000	0.06
L44	5.67-5.42	A	1.673	0.000	0.000	1.022	0.000	0.01
		B		0.000	0.000	1.376	0.000	0.01
		C		0.000	0.000	1.022	0.000	0.01
L45	5.42-2.25	A	1.613	0.000	0.000	12.841	0.000	0.12
		B		0.000	0.000	17.298	0.000	0.17
		C		0.000	0.000	12.841	0.000	0.12
L46	2.25-2.00	A	1.520	0.000	0.000	0.999	0.000	0.01
		B		0.000	0.000	1.346	0.000	0.01
		C		0.000	0.000	0.999	0.000	0.01
L47	2.00-0.00	A	1.410	0.000	0.000	7.858	0.000	0.07
		B		0.000	0.000	10.589	0.000	0.09
		C		0.000	0.000	7.858	0.000	0.07

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	169.00-164.00	0.2048	0.0468	0.1998	-0.4978
L2	164.00-159.00	0.7263	0.4532	0.6343	0.0413
L3	159.00-154.00	0.7337	0.4572	0.6534	0.0394
L4	154.00-149.00	0.7407	0.4609	0.6719	0.0377
L5	149.00-144.00	0.7472	0.4644	0.6899	0.0361
L6	144.00-139.00	0.7534	0.4677	0.7074	0.0347
L7	139.00-133.33	0.4786	0.4193	0.2920	-0.0084
L8	133.33-131.66	0.4246	0.4097	0.2119	-0.0168
L9	131.66-126.66	0.2991	0.4457	-0.1497	0.1285
L10	126.66-121.66	-0.0023	0.5299	-0.7428	0.3650
L11	121.66-116.66	-0.0015	0.5362	-0.7629	0.3755
L12	116.66-111.66	-0.0005	0.4174	-0.6923	0.3413
L13	111.66-111.00	-0.0002	0.3023	-0.5859	0.2891
L14	111.00-110.75	-0.0001	0.3029	-0.5873	0.2899
L15	110.75-105.75	0.0901	-0.1497	-0.4733	-0.0357
L16	105.75-101.50	0.1408	-0.4668	-0.2994	-0.3010
L17	101.50-101.25	0.1237	-0.4098	-0.2699	-0.2714
L18	101.25-101.00	0.1239	-0.4102	-0.2702	-0.2717
L19	101.00-100.75	0.1240	-0.4106	-0.2706	-0.2721
L20	100.75-95.75	0.1442	-0.4769	-0.2995	-0.3012
L21	95.75-87.83	0.1609	-0.5303	-0.3243	-0.3267
L22	87.83-86.83	0.1379	-0.4542	-0.2949	-0.2967
L23	86.83-81.73	0.1393	-0.4585	-0.2971	-0.3013
L24	81.73-81.55	0.1213	-0.3985	-0.2780	-0.2824
L25	81.55-81.00	0.1214	-0.3991	-0.2784	-0.2828
L26	81.00-80.75	0.1217	-0.3997	-0.2789	-0.2834
L27	80.75-75.75	0.1395	-0.4580	-0.3077	-0.3133

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L28	75.75-70.75	0.1490	-0.4879	-0.3235	-0.3306
L29	70.75-65.75	0.1518	-0.4962	-0.3292	-0.3381
L30	65.75-60.75	0.1546	-0.5044	-0.3346	-0.3456
L31	60.75-55.75	0.1574	-0.5126	-0.3396	-0.3532
L32	55.75-50.75	0.1601	-0.5206	-0.3442	-0.3609
L33	50.75-43.34	0.2659	-0.2651	-0.2104	-0.1821
L34	43.34-42.34	0.3310	-0.0957	-0.1160	-0.0541
L35	42.34-37.34	0.3347	-0.0959	-0.1125	-0.0554
L36	37.34-32.34	0.3408	-0.0963	-0.1107	-0.0565
L37	32.34-27.34	0.3469	-0.0967	-0.1081	-0.0578
L38	27.34-22.24	0.3531	-0.0970	-0.1044	-0.0593
L39	22.24-22.08	0.3694	-0.0677	-0.0884	-0.0432
L40	22.08-17.08	0.3726	-0.0677	-0.0853	-0.0440
L41	17.08-12.08	0.3787	-0.0676	-0.0772	-0.0461
L42	12.08-7.08	0.3728	0.0137	-0.0162	0.0164
L43	7.08-5.67	0.3113	0.4595	0.3242	0.4785
L44	5.67-5.42	0.3120	0.4607	0.3249	0.4796
L45	5.42-2.25	0.3136	0.4631	0.3263	0.4818
L46	2.25-2.00	0.3152	0.4655	0.3274	0.4836
L47	2.00-0.00	0.3162	0.4671	0.3278	0.4842

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	20	LDF7-50A(1-5/8")	164.00 - 165.00	1.0000	1.0000
L1	22	Safety Line 3/8	164.00 - 169.00	1.0000	1.0000
L1	23	5/8" Step Bolts	164.00 - 169.00	1.0000	1.0000
L2	20	LDF7-50A(1-5/8")	159.00 - 164.00	1.0000	1.0000
L2	22	Safety Line 3/8	159.00 - 164.00	1.0000	1.0000
L2	23	5/8" Step Bolts	159.00 - 164.00	1.0000	1.0000
L3	20	LDF7-50A(1-5/8")	154.00 - 159.00	1.0000	1.0000
L3	22	Safety Line 3/8	154.00 - 159.00	1.0000	1.0000
L3	23	5/8" Step Bolts	154.00 - 159.00	1.0000	1.0000
L4	20	LDF7-50A(1-5/8")	149.00 - 154.00	1.0000	1.0000
L4	22	Safety Line 3/8	149.00 - 154.00	1.0000	1.0000
L4	23	5/8" Step Bolts	149.00 - 154.00	1.0000	1.0000
L5	20	LDF7-50A(1-5/8")	144.00 - 149.00	1.0000	1.0000
L5	22	Safety Line 3/8	144.00 - 149.00	1.0000	1.0000
L5	23	5/8" Step Bolts	144.00 - 149.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L6	20	LDF7-50A(1-5/8")	139.00 - 144.00	1.0000	1.0000
L6	22	Safety Line 3/8	139.00 - 144.00	1.0000	1.0000
L6	23	5/8" Step Bolts	139.00 - 144.00	1.0000	1.0000
L7	6	LDF7-50A(1-5/8")	133.33 - 138.00	1.0000	1.0000
L7	20	LDF7-50A(1-5/8")	133.33 - 139.00	1.0000	1.0000
L7	22	Safety Line 3/8	133.33 - 139.00	1.0000	1.0000
L7	23	5/8" Step Bolts	133.33 - 139.00	1.0000	1.0000
L9	6	LDF7-50A(1-5/8")	126.66 - 131.66	1.0000	1.0000
L9	8	LDF1-50A(1/4")	126.66 - 128.00	1.0000	1.0000
L9	9	LDF4-50A(1/2")	126.66 - 128.00	1.0000	1.0000
L9	10	9207(5/16")	126.66 - 128.00	1.0000	1.0000
L9	11	LDF4-50A(1/2")	126.66 - 128.00	1.0000	1.0000
L9	12	2" Flex Conduit	126.66 - 128.00	1.0000	1.0000
L9	13	2" Flex Conduit	126.66 - 128.00	1.0000	1.0000
L9	20	LDF7-50A(1-5/8")	126.66 - 131.66	1.0000	1.0000
L9	22	Safety Line 3/8	126.66 - 131.66	1.0000	1.0000
L9	23	5/8" Step Bolts	126.66 - 131.66	1.0000	1.0000
L10	6	LDF7-50A(1-5/8")	121.66 - 126.66	1.0000	1.0000
L10	8	LDF1-50A(1/4")	121.66 - 126.66	1.0000	1.0000
L10	9	LDF4-50A(1/2")	121.66 - 126.66	1.0000	1.0000
L10	10	9207(5/16")	121.66 - 126.66	1.0000	1.0000
L10	11	LDF4-50A(1/2")	121.66 - 126.66	1.0000	1.0000
L10	12	2" Flex Conduit	121.66 - 126.66	1.0000	1.0000
L10	13	2" Flex Conduit	121.66 - 126.66	1.0000	1.0000
L10	20	LDF7-50A(1-5/8")	121.66 - 126.66	1.0000	1.0000
L10	22	Safety Line 3/8	121.66 - 126.66	1.0000	1.0000
L10	23	5/8" Step Bolts	121.66 - 126.66	1.0000	1.0000
L11	6	LDF7-50A(1-5/8")	116.66 - 121.66	1.0000	1.0000
L11	8	LDF1-50A(1/4")	116.66 - 121.66	1.0000	1.0000
L11	9	LDF4-50A(1/2")	116.66 - 121.66	1.0000	1.0000
L11	10	9207(5/16")	116.66 - 121.66	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L11	11	LDF4-50A(1/2")	116.66 - 121.66	1.0000	1.0000
L11	12	2" Flex Conduit	116.66 - 121.66	1.0000	1.0000
L11	13	2" Flex Conduit	116.66 - 121.66	1.0000	1.0000
L11	20	LDF7-50A(1-5/8")	116.66 - 121.66	1.0000	1.0000
L11	22	Safety Line 3/8	116.66 - 121.66	1.0000	1.0000
L11	23	5/8" Step Bolts	116.66 - 121.66	1.0000	1.0000
L12	6	LDF7-50A(1-5/8")	111.66 - 116.66	1.0000	1.0000
L12	8	LDF1-50A(1/4")	111.66 - 116.66	1.0000	1.0000
L12	9	LDF4-50A(1/2")	111.66 - 116.66	1.0000	1.0000
L12	10	9207(5/16")	111.66 - 116.66	1.0000	1.0000
L12	11	LDF4-50A(1/2")	111.66 - 116.66	1.0000	1.0000
L12	12	2" Flex Conduit	111.66 - 116.66	1.0000	1.0000
L12	13	2" Flex Conduit	111.66 - 116.66	1.0000	1.0000
L12	20	LDF7-50A(1-5/8")	111.66 - 116.66	1.0000	1.0000
L12	22	Safety Line 3/8	111.66 - 116.66	1.0000	1.0000
L12	23	5/8" Step Bolts	111.66 - 116.66	1.0000	1.0000
L12	40	PL 1"x6"	111.66 - 113.50	1.0000	1.0000
L12	41	PL 1"x6"	111.66 - 113.50	1.0000	1.0000
L12	42	PL 1"x6"	111.66 - 113.50	1.0000	1.0000
L13	6	LDF7-50A(1-5/8")	111.00 - 111.66	1.0000	1.0000
L13	8	LDF1-50A(1/4")	111.00 - 111.66	1.0000	1.0000
L13	9	LDF4-50A(1/2")	111.00 - 111.66	1.0000	1.0000
L13	10	9207(5/16")	111.00 - 111.66	1.0000	1.0000
L13	11	LDF4-50A(1/2")	111.00 - 111.66	1.0000	1.0000
L13	12	2" Flex Conduit	111.00 - 111.66	1.0000	1.0000
L13	13	2" Flex Conduit	111.00 - 111.66	1.0000	1.0000
L13	20	LDF7-50A(1-5/8")	111.00 - 111.66	1.0000	1.0000
L13	22	Safety Line 3/8	111.00 - 111.66	1.0000	1.0000
L13	23	5/8" Step Bolts	111.00 - 111.66	1.0000	1.0000
L13	40	PL 1"x6"	111.00 - 111.66	1.0000	1.0000
L13	41	PL 1"x6"	111.00 - 111.66	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L13	42	PL 1"x6"	111.00 - 111.66	1.0000	1.0000
L14	6	LDF7-50A(1-5/8")	110.75 - 111.00	1.0000	1.0000
L14	8	LDF1-50A(1/4")	110.75 - 111.00	1.0000	1.0000
L14	9	LDF4-50A(1/2")	110.75 - 111.00	1.0000	1.0000
L14	10	9207(5/16")	110.75 - 111.00	1.0000	1.0000
L14	11	LDF4-50A(1/2")	110.75 - 111.00	1.0000	1.0000
L14	12	2" Flex Conduit	110.75 - 111.00	1.0000	1.0000
L14	13	2" Flex Conduit	110.75 - 111.00	1.0000	1.0000
L14	20	LDF7-50A(1-5/8")	110.75 - 111.00	1.0000	1.0000
L14	22	Safety Line 3/8	110.75 - 111.00	1.0000	1.0000
L14	23	5/8" Step Bolts	110.75 - 111.00	1.0000	1.0000
L14	40	PL 1"x6"	110.75 - 111.00	1.0000	1.0000
L14	41	PL 1"x6"	110.75 - 111.00	1.0000	1.0000
L14	42	PL 1"x6"	110.75 - 111.00	1.0000	1.0000
L15	6	LDF7-50A(1-5/8")	105.75 - 110.75	1.0000	1.0000
L15	8	LDF1-50A(1/4")	105.75 - 110.75	1.0000	1.0000
L15	9	LDF4-50A(1/2")	105.75 - 110.75	1.0000	1.0000
L15	10	9207(5/16")	105.75 - 110.75	1.0000	1.0000
L15	11	LDF4-50A(1/2")	105.75 - 110.75	1.0000	1.0000
L15	12	2" Flex Conduit	105.75 - 110.75	1.0000	1.0000
L15	13	2" Flex Conduit	105.75 - 110.75	1.0000	1.0000
L15	15	LDF7-50A(1-5/8")	105.75 - 108.00	1.0000	1.0000
L15	20	LDF7-50A(1-5/8")	105.75 - 110.75	1.0000	1.0000
L15	22	Safety Line 3/8	105.75 - 110.75	1.0000	1.0000
L15	23	5/8" Step Bolts	105.75 - 110.75	1.0000	1.0000
L15	40	PL 1"x6"	105.75 - 110.75	1.0000	1.0000
L15	41	PL 1"x6"	105.75 - 110.75	1.0000	1.0000
L15	42	PL 1"x6"	105.75 - 110.75	1.0000	1.0000
L16	6	LDF7-50A(1-5/8")	101.50 - 105.75	1.0000	1.0000
L16	8	LDF1-50A(1/4")	101.50 - 105.75	1.0000	1.0000
L16	9	LDF4-50A(1/2")	101.50 - 105.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L16	10	9207(5/16")	101.50 - 105.75	1.0000	1.0000
L16	11	LDF4-50A(1/2")	101.50 - 105.75	1.0000	1.0000
L16	12	2" Flex Conduit	101.50 - 105.75	1.0000	1.0000
L16	13	2" Flex Conduit	101.50 - 105.75	1.0000	1.0000
L16	15	LDF7-50A(1-5/8")	101.50 - 105.75	1.0000	1.0000
L16	20	LDF7-50A(1-5/8")	101.50 - 105.75	1.0000	1.0000
L16	22	Safety Line 3/8	101.50 - 105.75	1.0000	1.0000
L16	23	5/8" Step Bolts	101.50 - 105.75	1.0000	1.0000
L16	27	PL 1.25"x4"	101.50 - 104.00	1.0000	1.0000
L16	28	PL 1.25"x4"	101.50 - 104.00	1.0000	1.0000
L16	29	PL 1.25"x4"	101.50 - 104.00	1.0000	1.0000
L16	30	PL 1.25"x4"	101.50 - 104.00	1.0000	1.0000
L16	31	PL 1.25"x4"	101.50 - 104.00	1.0000	1.0000
L16	32	PL 1.25"x4"	101.50 - 104.00	1.0000	1.0000
L16	40	PL 1"x6"	101.50 - 105.75	1.0000	1.0000
L16	41	PL 1"x6"	101.50 - 105.75	1.0000	1.0000
L16	42	PL 1"x6"	101.50 - 105.75	1.0000	1.0000
L17	6	LDF7-50A(1-5/8")	101.25 - 101.50	1.0000	1.0000
L17	8	LDF1-50A(1/4")	101.25 - 101.50	1.0000	1.0000
L17	9	LDF4-50A(1/2")	101.25 - 101.50	1.0000	1.0000
L17	10	9207(5/16")	101.25 - 101.50	1.0000	1.0000
L17	11	LDF4-50A(1/2")	101.25 - 101.50	1.0000	1.0000
L17	12	2" Flex Conduit	101.25 - 101.50	1.0000	1.0000
L17	13	2" Flex Conduit	101.25 - 101.50	1.0000	1.0000
L17	15	LDF7-50A(1-5/8")	101.25 - 101.50	1.0000	1.0000
L17	20	LDF7-50A(1-5/8")	101.25 - 101.50	1.0000	1.0000
L17	22	Safety Line 3/8	101.25 - 101.50	1.0000	1.0000
L17	23	5/8" Step Bolts	101.25 - 101.50	1.0000	1.0000
L17	27	PL 1.25"x4"	101.25 - 101.50	1.0000	1.0000
L17	28	PL 1.25"x4"	101.25 - 101.50	1.0000	1.0000
L17	29	PL 1.25"x4"	101.25 - 101.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L17	30	PL 1.25"x4"	101.25 - 101.50	1.0000	1.0000
L17	31	PL 1.25"x4"	101.25 - 101.50	1.0000	1.0000
L17	32	PL 1.25"x4"	101.25 - 101.50	1.0000	1.0000
L17	40	PL 1"x6"	101.25 - 101.50	1.0000	1.0000
L17	41	PL 1"x6"	101.25 - 101.50	1.0000	1.0000
L17	42	PL 1"x6"	101.25 - 101.50	1.0000	1.0000
L18	6	LDF7-50A(1-5/8")	101.00 - 101.25	1.0000	1.0000
L18	8	LDF1-50A(1/4")	101.00 - 101.25	1.0000	1.0000
L18	9	LDF4-50A(1/2")	101.00 - 101.25	1.0000	1.0000
L18	10	9207(5/16")	101.00 - 101.25	1.0000	1.0000
L18	11	LDF4-50A(1/2")	101.00 - 101.25	1.0000	1.0000
L18	12	2" Flex Conduit	101.00 - 101.25	1.0000	1.0000
L18	13	2" Flex Conduit	101.00 - 101.25	1.0000	1.0000
L18	15	LDF7-50A(1-5/8")	101.00 - 101.25	1.0000	1.0000
L18	20	LDF7-50A(1-5/8")	101.00 - 101.25	1.0000	1.0000
L18	22	Safety Line 3/8	101.00 - 101.25	1.0000	1.0000
L18	23	5/8" Step Bolts	101.00 - 101.25	1.0000	1.0000
L18	27	PL 1.25"x4"	101.00 - 101.25	1.0000	1.0000
L18	28	PL 1.25"x4"	101.00 - 101.25	1.0000	1.0000
L18	29	PL 1.25"x4"	101.00 - 101.25	1.0000	1.0000
L18	30	PL 1.25"x4"	101.00 - 101.25	1.0000	1.0000
L18	31	PL 1.25"x4"	101.00 - 101.25	1.0000	1.0000
L18	32	PL 1.25"x4"	101.00 - 101.25	1.0000	1.0000
L18	40	PL 1"x6"	101.00 - 101.25	1.0000	1.0000
L18	41	PL 1"x6"	101.00 - 101.25	1.0000	1.0000
L18	42	PL 1"x6"	101.00 - 101.25	1.0000	1.0000
L19	6	LDF7-50A(1-5/8")	100.75 - 101.00	1.0000	1.0000
L19	8	LDF1-50A(1/4")	100.75 - 101.00	1.0000	1.0000
L19	9	LDF4-50A(1/2")	100.75 - 101.00	1.0000	1.0000
L19	10	9207(5/16")	100.75 - 101.00	1.0000	1.0000
L19	11	LDF4-50A(1/2")	100.75 - 101.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L19	12	2" Flex Conduit	100.75 - 101.00	1.0000	1.0000
L19	13	2" Flex Conduit	100.75 - 101.00	1.0000	1.0000
L19	15	LDF7-50A(1-5/8")	100.75 - 101.00	1.0000	1.0000
L19	20	LDF7-50A(1-5/8")	100.75 - 101.00	1.0000	1.0000
L19	22	Safety Line 3/8	100.75 - 101.00	1.0000	1.0000
L19	23	5/8" Step Bolts	100.75 - 101.00	1.0000	1.0000
L19	27	PL 1.25"x4"	100.75 - 101.00	1.0000	1.0000
L19	28	PL 1.25"x4"	100.75 - 101.00	1.0000	1.0000
L19	29	PL 1.25"x4"	100.75 - 101.00	1.0000	1.0000
L19	30	PL 1.25"x4"	100.75 - 101.00	1.0000	1.0000
L19	31	PL 1.25"x4"	100.75 - 101.00	1.0000	1.0000
L19	32	PL 1.25"x4"	100.75 - 101.00	1.0000	1.0000
L19	40	PL 1"x6"	100.75 - 101.00	1.0000	1.0000
L19	41	PL 1"x6"	100.75 - 101.00	1.0000	1.0000
L19	42	PL 1"x6"	100.75 - 101.00	1.0000	1.0000
L20	6	LDF7-50A(1-5/8")	95.75 - 100.75	1.0000	1.0000
L20	8	LDF1-50A(1/4")	95.75 - 100.75	1.0000	1.0000
L20	9	LDF4-50A(1/2")	95.75 - 100.75	1.0000	1.0000
L20	10	9207(5/16")	95.75 - 100.75	1.0000	1.0000
L20	11	LDF4-50A(1/2")	95.75 - 100.75	1.0000	1.0000
L20	12	2" Flex Conduit	95.75 - 100.75	1.0000	1.0000
L20	13	2" Flex Conduit	95.75 - 100.75	1.0000	1.0000
L20	15	LDF7-50A(1-5/8")	95.75 - 100.75	1.0000	1.0000
L20	20	LDF7-50A(1-5/8")	95.75 - 100.75	1.0000	1.0000
L20	22	Safety Line 3/8	95.75 - 100.75	1.0000	1.0000
L20	23	5/8" Step Bolts	95.75 - 100.75	1.0000	1.0000
L20	27	PL 1.25"x4"	95.75 - 100.75	1.0000	1.0000
L20	28	PL 1.25"x4"	95.75 - 100.75	1.0000	1.0000
L20	29	PL 1.25"x4"	95.75 - 100.75	1.0000	1.0000
L20	30	PL 1.25"x4"	95.75 - 100.75	1.0000	1.0000
L20	31	PL 1.25"x4"	95.75 - 100.75	1.0000	1.0000
L20	32	PL 1.25"x4"	95.75 - 100.75	1.0000	1.0000
L20	40	PL 1"x6"	98.50 - 100.75	1.0000	1.0000
L20	41	PL 1"x6"	98.50 - 100.75	1.0000	1.0000
L20	42	PL 1"x6"	98.50 - 100.75	1.0000	1.0000
L21	6	LDF7-50A(1-5/8")	87.83 - 95.75	1.0000	1.0000
L21	8	LDF1-50A(1/4")	87.83 - 95.75	1.0000	1.0000
L21	9	LDF4-50A(1/2")	87.83 - 95.75	1.0000	1.0000
L21	10	9207(5/16")	87.83 - 95.75	1.0000	1.0000
L21	11	LDF4-50A(1/2")	87.83 - 95.75	1.0000	1.0000
L21	12	2" Flex Conduit	87.83 - 95.75	1.0000	1.0000
L21	13	2" Flex Conduit	87.83 - 95.75	1.0000	1.0000
L21	15	LDF7-50A(1-5/8")	87.83 - 95.75	1.0000	1.0000
L21	20	LDF7-50A(1-5/8")	87.83 - 95.75	1.0000	1.0000
L21	22	Safety Line 3/8	87.83 - 95.75	1.0000	1.0000
L21	23	5/8" Step Bolts	87.83 - 95.75	1.0000	1.0000
L21	27	PL 1.25"x4"	87.83 - 95.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L21	28	PL 1.25"x4"	87.83 - 95.75	1.0000	1.0000
L21	29	PL 1.25"x4"	87.83 - 95.75	1.0000	1.0000
L21	30	PL 1.25"x4"	87.83 - 95.75	1.0000	1.0000
L21	31	PL 1.25"x4"	87.83 - 95.75	1.0000	1.0000
L21	32	PL 1.25"x4"	87.83 - 95.75	1.0000	1.0000
L21	44	PL 1"x4.5"	87.83 - 89.50	1.0000	1.0000
L21	45	PL 1"x4.5"	87.83 - 89.50	1.0000	1.0000
L21	46	PL 1"x4.5"	87.83 - 89.50	1.0000	1.0000
L23	6	LDF7-50A(1-5/8")	81.73 - 86.83	1.0000	1.0000
L23	8	LDF1-50A(1/4")	81.73 - 86.83	1.0000	1.0000
L23	9	LDF4-50A(1/2")	81.73 - 86.83	1.0000	1.0000
L23	10	9207(5/16")	81.73 - 86.83	1.0000	1.0000
L23	11	LDF4-50A(1/2")	81.73 - 86.83	1.0000	1.0000
L23	12	2" Flex Conduit	81.73 - 86.83	1.0000	1.0000
L23	13	2" Flex Conduit	81.73 - 86.83	1.0000	1.0000
L23	15	LDF7-50A(1-5/8")	81.73 - 86.83	1.0000	1.0000
L23	20	LDF7-50A(1-5/8")	81.73 - 86.83	1.0000	1.0000
L23	22	Safety Line 3/8	81.73 - 86.83	1.0000	1.0000
L23	23	5/8" Step Bolts	81.73 - 86.83	1.0000	1.0000
L23	27	PL 1.25"x4"	81.80 - 86.83	1.0000	1.0000
L23	28	PL 1.25"x4"	81.80 - 86.83	1.0000	1.0000
L23	29	PL 1.25"x4"	81.80 - 86.83	1.0000	1.0000
L23	30	PL 1.25"x4"	81.80 - 86.83	1.0000	1.0000
L23	31	PL 1.25"x4"	81.80 - 86.83	1.0000	1.0000
L23	32	PL 1.25"x4"	81.80 - 86.83	1.0000	1.0000
L23	33	PL 1.25"x6"	81.73 - 81.80	1.0000	1.0000
L23	34	PL 1.25"x6"	81.73 - 81.80	1.0000	1.0000
L23	35	PL 1.25"x6"	81.73 - 81.80	1.0000	1.0000
L23	36	PL 1.25"x6"	81.73 - 81.80	1.0000	1.0000
L23	37	PL 1.25"x6"	81.73 - 81.80	1.0000	1.0000
L23	38	PL 1.25"x6"	81.73 - 81.80	1.0000	1.0000
L23	44	PL 1"x4.5"	81.73 - 86.83	1.0000	1.0000
L23	45	PL 1"x4.5"	81.73 - 86.83	1.0000	1.0000
L23	46	PL 1"x4.5"	81.73 - 86.83	1.0000	1.0000
L24	6	LDF7-50A(1-5/8")	81.55 - 81.73	1.0000	1.0000
L24	8	LDF1-50A(1/4")	81.55 - 81.73	1.0000	1.0000
L24	9	LDF4-50A(1/2")	81.55 - 81.73	1.0000	1.0000
L24	10	9207(5/16")	81.55 - 81.73	1.0000	1.0000
L24	11	LDF4-50A(1/2")	81.55 - 81.73	1.0000	1.0000
L24	12	2" Flex Conduit	81.55 - 81.73	1.0000	1.0000
L24	13	2" Flex Conduit	81.55 - 81.73	1.0000	1.0000
L24	15	LDF7-50A(1-5/8")	81.55 - 81.73	1.0000	1.0000
L24	20	LDF7-50A(1-5/8")	81.55 - 81.73	1.0000	1.0000
L24	22	Safety Line 3/8	81.55 - 81.73	1.0000	1.0000
L24	23	5/8" Step Bolts	81.55 - 81.73	1.0000	1.0000
L24	33	PL 1.25"x6"	81.55 - 81.73	1.0000	1.0000
L24	34	PL 1.25"x6"	81.55 - 81.73	1.0000	1.0000
L24	35	PL 1.25"x6"	81.55 - 81.73	1.0000	1.0000
L24	36	PL 1.25"x6"	81.55 - 81.73	1.0000	1.0000
L24	37	PL 1.25"x6"	81.55 - 81.73	1.0000	1.0000
L24	38	PL 1.25"x6"	81.55 - 81.73	1.0000	1.0000
L24	44	PL 1"x4.5"	81.55 - 81.73	1.0000	1.0000
L24	45	PL 1"x4.5"	81.55 - 81.73	1.0000	1.0000
L24	46	PL 1"x4.5"	81.55 - 81.73	1.0000	1.0000
L25	6	LDF7-50A(1-5/8")	81.00 - 81.55	1.0000	1.0000
L25	8	LDF1-50A(1/4")	81.00 - 81.55	1.0000	1.0000
L25	9	LDF4-50A(1/2")	81.00 - 81.55	1.0000	1.0000
L25	10	9207(5/16")	81.00 - 81.55	1.0000	1.0000
L25	11	LDF4-50A(1/2")	81.00 - 81.55	1.0000	1.0000
L25	12	2" Flex Conduit	81.00 - 81.55	1.0000	1.0000
L25	13	2" Flex Conduit	81.00 - 81.55	1.0000	1.0000
L25	15	LDF7-50A(1-5/8")	81.00 - 81.55	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L25	20	LDF7-50A(1-5/8")	81.00 - 81.55	1.0000	1.0000
L25	22	Safety Line 3/8	81.00 - 81.55	1.0000	1.0000
L25	23	5/8" Step Bolts	81.00 - 81.55	1.0000	1.0000
L25	33	PL 1.25"x6"	81.00 - 81.55	1.0000	1.0000
L25	34	PL 1.25"x6"	81.00 - 81.55	1.0000	1.0000
L25	35	PL 1.25"x6"	81.00 - 81.55	1.0000	1.0000
L25	36	PL 1.25"x6"	81.00 - 81.55	1.0000	1.0000
L25	37	PL 1.25"x6"	81.00 - 81.55	1.0000	1.0000
L25	38	PL 1.25"x6"	81.00 - 81.55	1.0000	1.0000
L25	44	PL 1"x4.5"	81.00 - 81.55	1.0000	1.0000
L25	45	PL 1"x4.5"	81.00 - 81.55	1.0000	1.0000
L25	46	PL 1"x4.5"	81.00 - 81.55	1.0000	1.0000
L26	6	LDF7-50A(1-5/8")	80.75 - 81.00	1.0000	1.0000
L26	8	LDF1-50A(1/4")	80.75 - 81.00	1.0000	1.0000
L26	9	LDF4-50A(1/2")	80.75 - 81.00	1.0000	1.0000
L26	10	9207(5/16")	80.75 - 81.00	1.0000	1.0000
L26	11	LDF4-50A(1/2")	80.75 - 81.00	1.0000	1.0000
L26	12	2" Flex Conduit	80.75 - 81.00	1.0000	1.0000
L26	13	2" Flex Conduit	80.75 - 81.00	1.0000	1.0000
L26	15	LDF7-50A(1-5/8")	80.75 - 81.00	1.0000	1.0000
L26	20	LDF7-50A(1-5/8")	80.75 - 81.00	1.0000	1.0000
L26	22	Safety Line 3/8	80.75 - 81.00	1.0000	1.0000
L26	23	5/8" Step Bolts	80.75 - 81.00	1.0000	1.0000
L26	33	PL 1.25"x6"	80.75 - 81.00	1.0000	1.0000
L26	34	PL 1.25"x6"	80.75 - 81.00	1.0000	1.0000
L26	35	PL 1.25"x6"	80.75 - 81.00	1.0000	1.0000
L26	36	PL 1.25"x6"	80.75 - 81.00	1.0000	1.0000
L26	37	PL 1.25"x6"	80.75 - 81.00	1.0000	1.0000
L26	38	PL 1.25"x6"	80.75 - 81.00	1.0000	1.0000
L26	44	PL 1"x4.5"	80.75 - 81.00	1.0000	1.0000
L26	45	PL 1"x4.5"	80.75 - 81.00	1.0000	1.0000
L26	46	PL 1"x4.5"	80.75 - 81.00	1.0000	1.0000
L27	6	LDF7-50A(1-5/8")	75.75 - 80.75	1.0000	1.0000
L27	8	LDF1-50A(1/4")	75.75 - 80.75	1.0000	1.0000
L27	9	LDF4-50A(1/2")	75.75 - 80.75	1.0000	1.0000
L27	10	9207(5/16")	75.75 - 80.75	1.0000	1.0000
L27	11	LDF4-50A(1/2")	75.75 - 80.75	1.0000	1.0000
L27	12	2" Flex Conduit	75.75 - 80.75	1.0000	1.0000
L27	13	2" Flex Conduit	75.75 - 80.75	1.0000	1.0000
L27	15	LDF7-50A(1-5/8")	75.75 - 80.75	1.0000	1.0000
L27	20	LDF7-50A(1-5/8")	75.75 - 80.75	1.0000	1.0000
L27	22	Safety Line 3/8	75.75 - 80.75	1.0000	1.0000
L27	23	5/8" Step Bolts	75.75 - 80.75	1.0000	1.0000
L27	33	PL 1.25"x6"	75.75 - 80.75	1.0000	1.0000
L27	34	PL 1.25"x6"	75.75 - 80.75	1.0000	1.0000
L27	35	PL 1.25"x6"	75.75 - 80.75	1.0000	1.0000
L27	36	PL 1.25"x6"	75.75 - 80.75	1.0000	1.0000
L27	37	PL 1.25"x6"	75.75 - 80.75	1.0000	1.0000
L27	38	PL 1.25"x6"	75.75 - 80.75	1.0000	1.0000
L27	44	PL 1"x4.5"	79.50 - 80.75	1.0000	1.0000
L27	45	PL 1"x4.5"	79.50 - 80.75	1.0000	1.0000
L27	46	PL 1"x4.5"	79.50 - 80.75	1.0000	1.0000
L28	6	LDF7-50A(1-5/8")	70.75 - 75.75	1.0000	1.0000
L28	8	LDF1-50A(1/4")	70.75 - 75.75	1.0000	1.0000
L28	9	LDF4-50A(1/2")	70.75 - 75.75	1.0000	1.0000
L28	10	9207(5/16")	70.75 - 75.75	1.0000	1.0000
L28	11	LDF4-50A(1/2")	70.75 - 75.75	1.0000	1.0000
L28	12	2" Flex Conduit	70.75 - 75.75	1.0000	1.0000
L28	13	2" Flex Conduit	70.75 - 75.75	1.0000	1.0000
L28	15	LDF7-50A(1-5/8")	70.75 - 75.75	1.0000	1.0000
L28	20	LDF7-50A(1-5/8")	70.75 - 75.75	1.0000	1.0000
L28	22	Safety Line 3/8	70.75 - 75.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L28	23	5/8" Step Bolts	70.75 - 75.75	1.0000	1.0000
L28	33	PL 1.25"x6"	70.75 - 75.75	1.0000	1.0000
L28	34	PL 1.25"x6"	70.75 - 75.75	1.0000	1.0000
L28	35	PL 1.25"x6"	70.75 - 75.75	1.0000	1.0000
L28	36	PL 1.25"x6"	70.75 - 75.75	1.0000	1.0000
L28	37	PL 1.25"x6"	70.75 - 75.75	1.0000	1.0000
L28	38	PL 1.25"x6"	70.75 - 75.75	1.0000	1.0000
L29	6	LDF7-50A(1-5/8")	65.75 - 70.75	1.0000	1.0000
L29	8	LDF1-50A(1/4")	65.75 - 70.75	1.0000	1.0000
L29	9	LDF4-50A(1/2")	65.75 - 70.75	1.0000	1.0000
L29	10	9207(5/16")	65.75 - 70.75	1.0000	1.0000
L29	11	LDF4-50A(1/2")	65.75 - 70.75	1.0000	1.0000
L29	12	2" Flex Conduit	65.75 - 70.75	1.0000	1.0000
L29	13	2" Flex Conduit	65.75 - 70.75	1.0000	1.0000
L29	15	LDF7-50A(1-5/8")	65.75 - 70.75	1.0000	1.0000
L29	20	LDF7-50A(1-5/8")	65.75 - 70.75	1.0000	1.0000
L29	22	Safety Line 3/8	65.75 - 70.75	1.0000	1.0000
L29	23	5/8" Step Bolts	65.75 - 70.75	1.0000	1.0000
L29	33	PL 1.25"x6"	65.75 - 70.75	1.0000	1.0000
L29	34	PL 1.25"x6"	65.75 - 70.75	1.0000	1.0000
L29	35	PL 1.25"x6"	65.75 - 70.75	1.0000	1.0000
L29	36	PL 1.25"x6"	65.75 - 70.75	1.0000	1.0000
L29	37	PL 1.25"x6"	65.75 - 70.75	1.0000	1.0000
L29	38	PL 1.25"x6"	65.75 - 70.75	1.0000	1.0000
L30	6	LDF7-50A(1-5/8")	60.75 - 65.75	1.0000	1.0000
L30	8	LDF1-50A(1/4")	60.75 - 65.75	1.0000	1.0000
L30	9	LDF4-50A(1/2")	60.75 - 65.75	1.0000	1.0000
L30	10	9207(5/16")	60.75 - 65.75	1.0000	1.0000
L30	11	LDF4-50A(1/2")	60.75 - 65.75	1.0000	1.0000
L30	12	2" Flex Conduit	60.75 - 65.75	1.0000	1.0000
L30	13	2" Flex Conduit	60.75 - 65.75	1.0000	1.0000
L30	15	LDF7-50A(1-5/8")	60.75 - 65.75	1.0000	1.0000
L30	20	LDF7-50A(1-5/8")	60.75 - 65.75	1.0000	1.0000
L30	22	Safety Line 3/8	60.75 - 65.75	1.0000	1.0000
L30	23	5/8" Step Bolts	60.75 - 65.75	1.0000	1.0000
L30	33	PL 1.25"x6"	60.75 - 65.75	1.0000	1.0000
L30	34	PL 1.25"x6"	60.75 - 65.75	1.0000	1.0000
L30	35	PL 1.25"x6"	60.75 - 65.75	1.0000	1.0000
L30	36	PL 1.25"x6"	60.75 - 65.75	1.0000	1.0000
L30	37	PL 1.25"x6"	60.75 - 65.75	1.0000	1.0000
L30	38	PL 1.25"x6"	60.75 - 65.75	1.0000	1.0000
L31	6	LDF7-50A(1-5/8")	55.75 - 60.75	1.0000	1.0000
L31	8	LDF1-50A(1/4")	55.75 - 60.75	1.0000	1.0000
L31	9	LDF4-50A(1/2")	55.75 - 60.75	1.0000	1.0000
L31	10	9207(5/16")	55.75 - 60.75	1.0000	1.0000
L31	11	LDF4-50A(1/2")	55.75 - 60.75	1.0000	1.0000
L31	12	2" Flex Conduit	55.75 - 60.75	1.0000	1.0000
L31	13	2" Flex Conduit	55.75 - 60.75	1.0000	1.0000
L31	15	LDF7-50A(1-5/8")	55.75 - 60.75	1.0000	1.0000
L31	20	LDF7-50A(1-5/8")	55.75 - 60.75	1.0000	1.0000
L31	22	Safety Line 3/8	55.75 - 60.75	1.0000	1.0000
L31	23	5/8" Step Bolts	55.75 - 60.75	1.0000	1.0000
L31	33	PL 1.25"x6"	55.75 - 60.75	1.0000	1.0000
L31	34	PL 1.25"x6"	55.75 - 60.75	1.0000	1.0000
L31	35	PL 1.25"x6"	55.75 - 60.75	1.0000	1.0000
L31	36	PL 1.25"x6"	55.75 - 60.75	1.0000	1.0000
L31	37	PL 1.25"x6"	55.75 - 60.75	1.0000	1.0000
L31	38	PL 1.25"x6"	55.75 - 60.75	1.0000	1.0000
L32	6	LDF7-50A(1-5/8")	50.75 - 55.75	1.0000	1.0000
L32	8	LDF1-50A(1/4")	50.75 - 55.75	1.0000	1.0000
L32	9	LDF4-50A(1/2")	50.75 - 55.75	1.0000	1.0000
L32	10	9207(5/16")	50.75 - 55.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L32	11	LDF4-50A(1/2")	50.75 - 55.75	1.0000	1.0000
L32	12	2" Flex Conduit	50.75 - 55.75	1.0000	1.0000
L32	13	2" Flex Conduit	50.75 - 55.75	1.0000	1.0000
L32	15	LDF7-50A(1-5/8")	50.75 - 55.75	1.0000	1.0000
L32	20	LDF7-50A(1-5/8")	50.75 - 55.75	1.0000	1.0000
L32	22	Safety Line 3/8	50.75 - 55.75	1.0000	1.0000
L32	23	5/8" Step Bolts	50.75 - 55.75	1.0000	1.0000
L32	33	PL 1.25"x6"	50.75 - 55.75	1.0000	1.0000
L32	34	PL 1.25"x6"	50.75 - 55.75	1.0000	1.0000
L32	35	PL 1.25"x6"	50.75 - 55.75	1.0000	1.0000
L32	36	PL 1.25"x6"	50.75 - 55.75	1.0000	1.0000
L32	37	PL 1.25"x6"	50.75 - 55.75	1.0000	1.0000
L32	38	PL 1.25"x6"	50.75 - 55.75	1.0000	1.0000
L33	6	LDF7-50A(1-5/8")	43.34 - 50.75	1.0000	1.0000
L33	8	LDF1-50A(1/4")	43.34 - 50.75	1.0000	1.0000
L33	9	LDF4-50A(1/2")	43.34 - 50.75	1.0000	1.0000
L33	10	9207(5/16")	43.34 - 50.75	1.0000	1.0000
L33	11	LDF4-50A(1/2")	43.34 - 50.75	1.0000	1.0000
L33	12	2" Flex Conduit	43.34 - 50.75	1.0000	1.0000
L33	13	2" Flex Conduit	43.34 - 50.75	1.0000	1.0000
L33	15	LDF7-50A(1-5/8")	43.34 - 50.75	1.0000	1.0000
L33	20	LDF7-50A(1-5/8")	43.34 - 50.75	1.0000	1.0000
L33	22	Safety Line 3/8	43.34 - 50.75	1.0000	1.0000
L33	23	5/8" Step Bolts	43.34 - 50.75	1.0000	1.0000
L33	33	PL 1.25"x6"	43.34 - 50.75	1.0000	1.0000
L33	34	PL 1.25"x6"	43.34 - 50.75	1.0000	1.0000
L33	35	PL 1.25"x6"	43.34 - 50.75	1.0000	1.0000
L33	36	PL 1.25"x6"	43.34 - 50.75	1.0000	1.0000
L33	37	PL 1.25"x6"	43.34 - 50.75	1.0000	1.0000
L33	38	PL 1.25"x6"	43.34 - 50.75	1.0000	1.0000
L33	47	PL 1"x6"	43.34 - 47.33	1.0000	1.0000
L33	48	PL 1"x6"	43.34 - 47.33	1.0000	1.0000
L33	49	PL 1"x6"	43.34 - 47.33	1.0000	1.0000
L33	50	PL 1"x6"	43.34 - 47.33	1.0000	1.0000
L35	6	LDF7-50A(1-5/8")	37.34 - 42.34	1.0000	1.0000
L35	8	LDF1-50A(1/4")	37.34 - 42.34	1.0000	1.0000
L35	9	LDF4-50A(1/2")	37.34 - 42.34	1.0000	1.0000
L35	10	9207(5/16")	37.34 - 42.34	1.0000	1.0000
L35	11	LDF4-50A(1/2")	37.34 - 42.34	1.0000	1.0000
L35	12	2" Flex Conduit	37.34 - 42.34	1.0000	1.0000
L35	13	2" Flex Conduit	37.34 - 42.34	1.0000	1.0000
L35	15	LDF7-50A(1-5/8")	37.34 - 42.34	1.0000	1.0000
L35	20	LDF7-50A(1-5/8")	37.34 - 42.34	1.0000	1.0000
L35	22	Safety Line 3/8	37.34 - 42.34	1.0000	1.0000
L35	23	5/8" Step Bolts	37.34 - 42.34	1.0000	1.0000
L35	33	PL 1.25"x6"	37.34 - 42.34	1.0000	1.0000
L35	34	PL 1.25"x6"	37.34 - 42.34	1.0000	1.0000
L35	35	PL 1.25"x6"	37.34 - 42.34	1.0000	1.0000
L35	36	PL 1.25"x6"	37.34 - 42.34	1.0000	1.0000
L35	37	PL 1.25"x6"	37.34 - 42.34	1.0000	1.0000
L35	38	PL 1.25"x6"	37.34 - 42.34	1.0000	1.0000
L35	47	PL 1"x6"	37.34 - 42.34	1.0000	1.0000
L35	48	PL 1"x6"	37.34 - 42.34	1.0000	1.0000
L35	49	PL 1"x6"	37.34 - 42.34	1.0000	1.0000
L35	50	PL 1"x6"	37.34 - 42.34	1.0000	1.0000
L36	6	LDF7-50A(1-5/8")	32.34 - 37.34	1.0000	1.0000
L36	8	LDF1-50A(1/4")	32.34 - 37.34	1.0000	1.0000
L36	9	LDF4-50A(1/2")	32.34 - 37.34	1.0000	1.0000
L36	10	9207(5/16")	32.34 - 37.34	1.0000	1.0000
L36	11	LDF4-50A(1/2")	32.34 - 37.34	1.0000	1.0000
L36	12	2" Flex Conduit	32.34 - 37.34	1.0000	1.0000
L36	13	2" Flex Conduit	32.34 - 37.34	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L36	15	LDF7-50A(1-5/8")	32.34 - 37.34	1.0000	1.0000
L36	20	LDF7-50A(1-5/8")	32.34 - 37.34	1.0000	1.0000
L36	22	Safety Line 3/8	32.34 - 37.34	1.0000	1.0000
L36	23	5/8" Step Bolts	32.34 - 37.34	1.0000	1.0000
L36	33	PL 1.25"x6"	32.34 - 37.34	1.0000	1.0000
L36	34	PL 1.25"x6"	32.34 - 37.34	1.0000	1.0000
L36	35	PL 1.25"x6"	32.34 - 37.34	1.0000	1.0000
L36	36	PL 1.25"x6"	32.34 - 37.34	1.0000	1.0000
L36	37	PL 1.25"x6"	32.34 - 37.34	1.0000	1.0000
L36	38	PL 1.25"x6"	32.34 - 37.34	1.0000	1.0000
L36	47	PL 1"x6"	32.34 - 37.34	1.0000	1.0000
L36	48	PL 1"x6"	32.34 - 37.34	1.0000	1.0000
L36	49	PL 1"x6"	32.34 - 37.34	1.0000	1.0000
L36	50	PL 1"x6"	32.34 - 37.34	1.0000	1.0000
L37	6	LDF7-50A(1-5/8")	27.34 - 32.34	1.0000	1.0000
L37	8	LDF1-50A(1/4")	27.34 - 32.34	1.0000	1.0000
L37	9	LDF4-50A(1/2")	27.34 - 32.34	1.0000	1.0000
L37	10	9207(5/16")	27.34 - 32.34	1.0000	1.0000
L37	11	LDF4-50A(1/2")	27.34 - 32.34	1.0000	1.0000
L37	12	2" Flex Conduit	27.34 - 32.34	1.0000	1.0000
L37	13	2" Flex Conduit	27.34 - 32.34	1.0000	1.0000
L37	15	LDF7-50A(1-5/8")	27.34 - 32.34	1.0000	1.0000
L37	20	LDF7-50A(1-5/8")	27.34 - 32.34	1.0000	1.0000
L37	22	Safety Line 3/8	27.34 - 32.34	1.0000	1.0000
L37	23	5/8" Step Bolts	27.34 - 32.34	1.0000	1.0000
L37	33	PL 1.25"x6"	27.34 - 32.34	1.0000	1.0000
L37	34	PL 1.25"x6"	27.34 - 32.34	1.0000	1.0000
L37	35	PL 1.25"x6"	27.34 - 32.34	1.0000	1.0000
L37	36	PL 1.25"x6"	27.34 - 32.34	1.0000	1.0000
L37	37	PL 1.25"x6"	27.34 - 32.34	1.0000	1.0000
L37	38	PL 1.25"x6"	27.34 - 32.34	1.0000	1.0000
L37	47	PL 1"x6"	27.34 - 32.34	1.0000	1.0000
L37	48	PL 1"x6"	27.34 - 32.34	1.0000	1.0000
L37	49	PL 1"x6"	27.34 - 32.34	1.0000	1.0000
L37	50	PL 1"x6"	27.34 - 32.34	1.0000	1.0000
L38	6	LDF7-50A(1-5/8")	22.24 - 27.34	1.0000	1.0000
L38	8	LDF1-50A(1/4")	22.24 - 27.34	1.0000	1.0000
L38	9	LDF4-50A(1/2")	22.24 - 27.34	1.0000	1.0000
L38	10	9207(5/16")	22.24 - 27.34	1.0000	1.0000
L38	11	LDF4-50A(1/2")	22.24 - 27.34	1.0000	1.0000
L38	12	2" Flex Conduit	22.24 - 27.34	1.0000	1.0000
L38	13	2" Flex Conduit	22.24 - 27.34	1.0000	1.0000
L38	15	LDF7-50A(1-5/8")	22.24 - 27.34	1.0000	1.0000
L38	20	LDF7-50A(1-5/8")	22.24 - 27.34	1.0000	1.0000
L38	22	Safety Line 3/8	22.24 - 27.34	1.0000	1.0000
L38	23	5/8" Step Bolts	22.24 - 27.34	1.0000	1.0000
L38	33	PL 1.25"x6"	22.24 - 27.34	1.0000	1.0000
L38	34	PL 1.25"x6"	22.24 - 27.34	1.0000	1.0000
L38	35	PL 1.25"x6"	22.24 - 27.34	1.0000	1.0000
L38	36	PL 1.25"x6"	22.24 - 27.34	1.0000	1.0000
L38	37	PL 1.25"x6"	22.24 - 27.34	1.0000	1.0000
L38	38	PL 1.25"x6"	22.24 - 27.34	1.0000	1.0000
L38	47	PL 1"x6"	22.25 - 27.34	1.0000	1.0000
L38	48	PL 1"x6"	22.25 - 27.34	1.0000	1.0000
L38	49	PL 1"x6"	22.25 - 27.34	1.0000	1.0000
L38	50	PL 1"x6"	22.25 - 27.34	1.0000	1.0000
L38	51	PL 1.25"x6.5"	22.24 - 22.25	1.0000	1.0000
L38	52	PL 1.25"x6.5"	22.24 - 22.25	1.0000	1.0000
L38	53	PL 1.25"x6.5"	22.24 - 22.25	1.0000	1.0000
L38	54	PL 1.25"x6.5"	22.24 - 22.25	1.0000	1.0000
L39	6	LDF7-50A(1-5/8")	22.08 - 22.24	1.0000	1.0000
L39	8	LDF1-50A(1/4")	22.08 - 22.24	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L39	9	LDF4-50A(1/2")	22.08 - 22.24	1.0000	1.0000
L39	10	9207(5/16")	22.08 - 22.24	1.0000	1.0000
L39	11	LDF4-50A(1/2")	22.08 - 22.24	1.0000	1.0000
L39	12	2" Flex Conduit	22.08 - 22.24	1.0000	1.0000
L39	13	2" Flex Conduit	22.08 - 22.24	1.0000	1.0000
L39	15	LDF7-50A(1-5/8")	22.08 - 22.24	1.0000	1.0000
L39	20	LDF7-50A(1-5/8")	22.08 - 22.24	1.0000	1.0000
L39	22	Safety Line 3/8	22.08 - 22.24	1.0000	1.0000
L39	23	5/8" Step Bolts	22.08 - 22.24	1.0000	1.0000
L39	33	PL 1.25"x6"	22.08 - 22.24	1.0000	1.0000
L39	34	PL 1.25"x6"	22.08 - 22.24	1.0000	1.0000
L39	35	PL 1.25"x6"	22.08 - 22.24	1.0000	1.0000
L39	36	PL 1.25"x6"	22.08 - 22.24	1.0000	1.0000
L39	37	PL 1.25"x6"	22.08 - 22.24	1.0000	1.0000
L39	38	PL 1.25"x6"	22.08 - 22.24	1.0000	1.0000
L39	51	PL 1.25"x6.5"	22.08 - 22.24	1.0000	1.0000
L39	52	PL 1.25"x6.5"	22.08 - 22.24	1.0000	1.0000
L39	53	PL 1.25"x6.5"	22.08 - 22.24	1.0000	1.0000
L39	54	PL 1.25"x6.5"	22.08 - 22.24	1.0000	1.0000
L40	6	LDF7-50A(1-5/8")	17.08 - 22.08	1.0000	1.0000
L40	8	LDF1-50A(1/4")	17.08 - 22.08	1.0000	1.0000
L40	9	LDF4-50A(1/2")	17.08 - 22.08	1.0000	1.0000
L40	10	9207(5/16")	17.08 - 22.08	1.0000	1.0000
L40	11	LDF4-50A(1/2")	17.08 - 22.08	1.0000	1.0000
L40	12	2" Flex Conduit	17.08 - 22.08	1.0000	1.0000
L40	13	2" Flex Conduit	17.08 - 22.08	1.0000	1.0000
L40	15	LDF7-50A(1-5/8")	17.08 - 22.08	1.0000	1.0000
L40	20	LDF7-50A(1-5/8")	17.08 - 22.08	1.0000	1.0000
L40	22	Safety Line 3/8	17.08 - 22.08	1.0000	1.0000
L40	23	5/8" Step Bolts	17.08 - 22.08	1.0000	1.0000
L40	33	PL 1.25"x6"	17.08 - 22.08	1.0000	1.0000
L40	34	PL 1.25"x6"	17.08 - 22.08	1.0000	1.0000
L40	35	PL 1.25"x6"	17.08 - 22.08	1.0000	1.0000
L40	36	PL 1.25"x6"	17.08 - 22.08	1.0000	1.0000
L40	37	PL 1.25"x6"	17.08 - 22.08	1.0000	1.0000
L40	38	PL 1.25"x6"	17.08 - 22.08	1.0000	1.0000
L40	51	PL 1.25"x6.5"	17.08 - 22.08	1.0000	1.0000
L40	52	PL 1.25"x6.5"	17.08 - 22.08	1.0000	1.0000
L40	53	PL 1.25"x6.5"	17.08 - 22.08	1.0000	1.0000
L40	54	PL 1.25"x6.5"	17.08 - 22.08	1.0000	1.0000
L41	6	LDF7-50A(1-5/8")	12.08 - 17.08	1.0000	1.0000
L41	8	LDF1-50A(1/4")	12.08 - 17.08	1.0000	1.0000
L41	9	LDF4-50A(1/2")	12.08 - 17.08	1.0000	1.0000
L41	10	9207(5/16")	12.08 - 17.08	1.0000	1.0000
L41	11	LDF4-50A(1/2")	12.08 - 17.08	1.0000	1.0000
L41	12	2" Flex Conduit	12.08 - 17.08	1.0000	1.0000
L41	13	2" Flex Conduit	12.08 - 17.08	1.0000	1.0000
L41	15	LDF7-50A(1-5/8")	12.08 - 17.08	1.0000	1.0000
L41	20	LDF7-50A(1-5/8")	12.08 - 17.08	1.0000	1.0000
L41	22	Safety Line 3/8	12.08 - 17.08	1.0000	1.0000
L41	23	5/8" Step Bolts	12.08 - 17.08	1.0000	1.0000
L41	33	PL 1.25"x6"	12.08 - 17.08	1.0000	1.0000
L41	34	PL 1.25"x6"	12.08 - 17.08	1.0000	1.0000
L41	35	PL 1.25"x6"	12.08 - 17.08	1.0000	1.0000
L41	36	PL 1.25"x6"	12.08 - 17.08	1.0000	1.0000
L41	37	PL 1.25"x6"	12.08 - 17.08	1.0000	1.0000
L41	38	PL 1.25"x6"	12.08 - 17.08	1.0000	1.0000
L41	51	PL 1.25"x6.5"	12.08 - 17.08	1.0000	1.0000
L41	52	PL 1.25"x6.5"	12.08 - 17.08	1.0000	1.0000
L41	53	PL 1.25"x6.5"	12.08 - 17.08	1.0000	1.0000
L41	54	PL 1.25"x6.5"	12.08 - 17.08	1.0000	1.0000
L42	6	LDF7-50A(1-5/8")	8.00 - 12.08	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L42	8	LDF1-50A(1/4")	8.00 - 12.08	1.0000	1.0000
L42	9	LDF4-50A(1/2")	8.00 - 12.08	1.0000	1.0000
L42	10	9207(5/16")	8.00 - 12.08	1.0000	1.0000
L42	11	LDF4-50A(1/2")	8.00 - 12.08	1.0000	1.0000
L42	12	2" Flex Conduit	8.00 - 12.08	1.0000	1.0000
L42	13	2" Flex Conduit	8.00 - 12.08	1.0000	1.0000
L42	15	LDF7-50A(1-5/8")	8.00 - 12.08	1.0000	1.0000
L42	20	LDF7-50A(1-5/8")	8.00 - 12.08	1.0000	1.0000
L42	22	Safety Line 3/8	8.00 - 12.08	1.0000	1.0000
L42	23	5/8" Step Bolts	8.00 - 12.08	1.0000	1.0000
L42	33	PL 1.25"x6"	7.08 - 12.08	1.0000	1.0000
L42	34	PL 1.25"x6"	7.08 - 12.08	1.0000	1.0000
L42	35	PL 1.25"x6"	7.08 - 12.08	1.0000	1.0000
L42	36	PL 1.25"x6"	7.08 - 12.08	1.0000	1.0000
L42	37	PL 1.25"x6"	7.08 - 12.08	1.0000	1.0000
L42	38	PL 1.25"x6"	7.08 - 12.08	1.0000	1.0000
L42	51	PL 1.25"x6.5"	7.08 - 12.08	1.0000	1.0000
L42	52	PL 1.25"x6.5"	7.08 - 12.08	1.0000	1.0000
L42	53	PL 1.25"x6.5"	7.08 - 12.08	1.0000	1.0000
L42	54	PL 1.25"x6.5"	7.08 - 12.08	1.0000	1.0000
L43	33	PL 1.25"x6"	5.67 - 7.08	1.0000	1.0000
L43	34	PL 1.25"x6"	5.67 - 7.08	1.0000	1.0000
L43	35	PL 1.25"x6"	5.67 - 7.08	1.0000	1.0000
L43	36	PL 1.25"x6"	5.67 - 7.08	1.0000	1.0000
L43	37	PL 1.25"x6"	5.67 - 7.08	1.0000	1.0000
L43	38	PL 1.25"x6"	5.67 - 7.08	1.0000	1.0000
L43	51	PL 1.25"x6.5"	5.67 - 7.08	1.0000	1.0000
L43	52	PL 1.25"x6.5"	5.67 - 7.08	1.0000	1.0000
L43	53	PL 1.25"x6.5"	5.67 - 7.08	1.0000	1.0000
L43	54	PL 1.25"x6.5"	5.67 - 7.08	1.0000	1.0000
L44	33	PL 1.25"x6"	5.42 - 5.67	1.0000	1.0000
L44	34	PL 1.25"x6"	5.42 - 5.67	1.0000	1.0000
L44	35	PL 1.25"x6"	5.42 - 5.67	1.0000	1.0000
L44	36	PL 1.25"x6"	5.42 - 5.67	1.0000	1.0000
L44	37	PL 1.25"x6"	5.42 - 5.67	1.0000	1.0000
L44	38	PL 1.25"x6"	5.42 - 5.67	1.0000	1.0000
L44	51	PL 1.25"x6.5"	5.42 - 5.67	1.0000	1.0000
L44	52	PL 1.25"x6.5"	5.42 - 5.67	1.0000	1.0000
L44	53	PL 1.25"x6.5"	5.42 - 5.67	1.0000	1.0000
L44	54	PL 1.25"x6.5"	5.42 - 5.67	1.0000	1.0000
L45	33	PL 1.25"x6"	2.25 - 5.42	1.0000	1.0000
L45	34	PL 1.25"x6"	2.25 - 5.42	1.0000	1.0000
L45	35	PL 1.25"x6"	2.25 - 5.42	1.0000	1.0000
L45	36	PL 1.25"x6"	2.25 - 5.42	1.0000	1.0000
L45	37	PL 1.25"x6"	2.25 - 5.42	1.0000	1.0000
L45	38	PL 1.25"x6"	2.25 - 5.42	1.0000	1.0000
L45	51	PL 1.25"x6.5"	2.25 - 5.42	1.0000	1.0000
L45	52	PL 1.25"x6.5"	2.25 - 5.42	1.0000	1.0000
L45	53	PL 1.25"x6.5"	2.25 - 5.42	1.0000	1.0000
L45	54	PL 1.25"x6.5"	2.25 - 5.42	1.0000	1.0000
L46	33	PL 1.25"x6"	2.00 - 2.25	1.0000	1.0000
L46	34	PL 1.25"x6"	2.00 - 2.25	1.0000	1.0000
L46	35	PL 1.25"x6"	2.00 - 2.25	1.0000	1.0000
L46	36	PL 1.25"x6"	2.00 - 2.25	1.0000	1.0000
L46	37	PL 1.25"x6"	2.00 - 2.25	1.0000	1.0000
L46	38	PL 1.25"x6"	2.00 - 2.25	1.0000	1.0000
L46	51	PL 1.25"x6.5"	2.00 - 2.25	1.0000	1.0000
L46	52	PL 1.25"x6.5"	2.00 - 2.25	1.0000	1.0000
L46	53	PL 1.25"x6.5"	2.00 - 2.25	1.0000	1.0000
L46	54	PL 1.25"x6.5"	2.00 - 2.25	1.0000	1.0000
L47	33	PL 1.25"x6"	0.00 - 2.00	1.0000	1.0000
L47	34	PL 1.25"x6"	0.00 - 2.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L47	35	PL 1.25"x6"	0.00 - 2.00	1.0000	1.0000
L47	36	PL 1.25"x6"	0.00 - 2.00	1.0000	1.0000
L47	37	PL 1.25"x6"	0.00 - 2.00	1.0000	1.0000
L47	38	PL 1.25"x6"	0.00 - 2.00	1.0000	1.0000
L47	51	PL 1.25"x6.5"	0.00 - 2.00	1.0000	1.0000
L47	52	PL 1.25"x6.5"	0.00 - 2.00	1.0000	1.0000
L47	53	PL 1.25"x6.5"	0.00 - 2.00	1.0000	1.0000
L47	54	PL 1.25"x6.5"	0.00 - 2.00	1.0000	1.0000

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
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 1.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
KRY 112 144/1	A	From Centroid-Leg	4.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.17 0.23 0.30	0.01 0.01 0.02
RRUS 11 B12	A	From Centroid-Leg	4.00 0.00 1.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.18 1.33 1.48	0.05 0.07 0.10
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 1.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
KRY 112 144/1	B	From Centroid-Leg	4.00 0.00 2.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.17 0.23 0.30	0.01 0.01 0.02
RRUS 11 B12	B	From Centroid-Leg	4.00 0.00 1.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.18 1.33 1.48	0.05 0.07 0.10
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 2.00	-30.0000	165.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 1.00	-30.0000	165.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
KRY 112 144/1	C	From Centroid-Leg	4.00 0.00 2.00	-30.0000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.17 0.23 0.30	0.01 0.01 0.02
RRUS 11 B12	C	From Centroid-Leg	4.00 0.00 1.00	-30.0000	165.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.18 1.33 1.48	0.05 0.07 0.10
Platform Mount [LP 601-1]	C	None		0.0000	165.00	No Ice	28.47	28.47	1.12

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
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
9' Ladder	A	From Centroid-Leg	3.00 0.00 0.00	0.0000	165.00	No Ice 1/2" Ice 1" Ice	4.50 5.50 6.50	2.25 2.75 3.25	0.08 0.12 0.17
(2) 7770.00 w/ Mount Pipe	A	From Centroid-Leg	3.76 1.37 2.00	20.0000	156.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Centroid-Leg	3.76 1.37 2.00	20.0000	156.00	No Ice 1/2" Ice 1" Ice	13.21 13.90 14.59	9.58 11.05 12.50	0.10 0.20 0.30
(2) DTMABP7819VG12A	A	From Centroid-Leg	3.76 1.37 2.00	20.0000	156.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
RRUS12/RRUS A2	A	From Centroid-Leg	3.76 1.37 2.00	20.0000	156.00	No Ice 1/2" Ice 1" Ice	3.14 3.36 3.59	1.84 2.01 2.20	0.07 0.10 0.13
RRUS 11	A	From Centroid-Leg	3.76 1.37 2.00	20.0000	156.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
(2) 7770.00 w/ Mount Pipe	B	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	13.21 13.90 14.59	9.58 11.05 12.50	0.10 0.20 0.30
(2) DTMABP7819VG12A	B	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
RRUS12/RRUS A2	B	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	3.14 3.36 3.59	1.84 2.01 2.20	0.07 0.10 0.13
RRUS 11	B	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
DC6-48-60-18-8F	B	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	2.20 2.40 2.60	2.20 2.40 2.60	0.02 0.04 0.07
(2) 7770.00 w/ Mount Pipe	C	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	5.75 6.18 6.61	4.25 5.01 5.71	0.06 0.10 0.16
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	8.11 9.30 10.21	0.08 0.16 0.25
(2) DTMABP7819VG12A	C	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	0.98 1.10 1.23	0.34 0.42 0.51	0.02 0.03 0.04
RRUS12/RRUS A2	C	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	3.14 3.36 3.59	1.84 2.01 2.20	0.07 0.10 0.13
RRUS 11	C	From Centroid-Leg	3.76 1.37 2.00	40.0000	156.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
Platform Mount [LP 714-1]	C	None		0.0000	156.00	No Ice 1/2" Ice 1" Ice	37.47 44.23 50.99	37.47 44.23 50.99	1.60 2.04 2.48
2" x 6' Mount Pipe	A	From	3.76	0.0000	156.00	No Ice	1.20	1.20	0.03

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
		Centroid-Leg	1.37			1/2" Ice	1.80	1.80	0.04
			0.00			1" Ice	2.17	2.17	0.05
2" x 6' Mount Pipe	B	From Centroid-Leg	3.76	0.0000	156.00	No Ice	1.20	1.20	0.03
			1.37			1/2" Ice	1.80	1.80	0.04
			0.00			1" Ice	2.17	2.17	0.05
2" x 6' Mount Pipe	C	From Centroid-Leg	3.76	0.0000	156.00	No Ice	1.20	1.20	0.03
			1.37			1/2" Ice	1.80	1.80	0.04
			0.00			1" Ice	2.17	2.17	0.05
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	2.99	-5.0000	148.00	No Ice	8.26	6.95	0.08
			-0.26			1/2" Ice	8.82	8.13	0.15
			0.00			1" Ice	9.35	9.02	0.23
1900MHz RRH	A	From Leg	2.99	-5.0000	148.00	No Ice	0.00	3.26	0.04
			-0.26			1/2" Ice	0.00	3.48	0.08
			0.00			1" Ice	0.00	3.72	0.11
800MHZ RRH	A	From Leg	2.99	-5.0000	148.00	No Ice	0.00	1.77	0.05
			-0.26			1/2" Ice	0.00	1.95	0.07
			0.00			1" Ice	0.00	2.13	0.10
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	2.99	0.0000	148.00	No Ice	8.26	6.95	0.08
			-0.26			1/2" Ice	8.82	8.13	0.15
			0.00			1" Ice	9.35	9.02	0.23
1900MHz RRH	B	From Leg	2.99	0.0000	148.00	No Ice	0.00	3.26	0.04
			-0.26			1/2" Ice	0.00	3.48	0.08
			0.00			1" Ice	0.00	3.72	0.11
800MHZ RRH	B	From Leg	2.99	0.0000	148.00	No Ice	0.00	1.77	0.05
			-0.26			1/2" Ice	0.00	1.95	0.07
			0.00			1" Ice	2.50	2.13	0.10
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	2.99	10.0000	148.00	No Ice	8.26	6.95	0.08
			-0.26			1/2" Ice	8.82	8.13	0.15
			0.00			1" Ice	9.35	9.02	0.23
1900MHz RRH	C	From Leg	2.99	10.0000	148.00	No Ice	0.00	3.26	0.04
			-0.26			1/2" Ice	0.00	3.48	0.08
			0.00			1" Ice	0.00	3.72	0.11
800MHZ RRH	C	From Leg	2.99	10.0000	148.00	No Ice	0.00	1.77	0.05
			-0.26			1/2" Ice	0.00	1.95	0.07
			0.00			1" Ice	0.00	2.13	0.10
T-Arm Mount [TA 702-3]	C	None		0.0000	148.00	No Ice	5.64	5.64	0.34
						1/2" Ice	6.55	6.55	0.43
						1" Ice	7.46	7.46	0.52
APXV18-206517-A w/ Mount Pipe	A	From Leg	0.94	20.0000	138.00	No Ice	5.40	4.70	0.05
			0.34			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
APXV18-206517-A w/ Mount Pipe	B	From Leg	0.94	40.0000	138.00	No Ice	5.40	4.70	0.05
			0.34			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
APXV18-206517-A w/ Mount Pipe	C	From Leg	0.94	40.0000	138.00	No Ice	5.40	4.70	0.05
			0.34			1/2" Ice	5.96	5.86	0.10
			0.00			1" Ice	6.48	6.73	0.15
Pipe Mount [PM 601-3]	C	None		0.0000	138.00	No Ice	4.39	4.39	0.20
						1/2" Ice	5.48	5.48	0.24
						1" Ice	6.57	6.57	0.28
LLPX310R w/ Mount Pipe	A	From Leg	2.82	20.0000	128.00	No Ice	4.54	2.98	0.05
			1.03			1/2" Ice	4.89	3.53	0.08
			0.00			1" Ice	5.25	4.09	0.13
HORIZON DUO	A	From Leg	2.82	20.0000	128.00	No Ice	0.00	0.29	0.01
			1.03			1/2" Ice	0.00	0.37	0.01
			0.00			1" Ice	0.00	0.44	0.02
WIMAX DAP HEAD	A	From Leg	2.82	20.0000	128.00	No Ice	1.55	0.68	0.03

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
			1.03			1/2" Ice	1.70	0.80	0.04
			0.00			1" Ice	1.87	0.92	0.06
LLPX310R w/ Mount Pipe	B	From Leg	2.82	40.0000	128.00	No Ice	4.54	2.98	0.05
			1.03			1/2" Ice	4.89	3.53	0.08
			0.00			1" Ice	5.25	4.09	0.13
HORIZON DUO	B	From Leg	2.82	40.0000	128.00	No Ice	0.00	0.29	0.01
			1.03			1/2" Ice	0.00	0.37	0.01
			0.00			1" Ice	0.00	0.44	0.02
WIMAX DAP HEAD	B	From Leg	2.82	40.0000	128.00	No Ice	1.55	0.68	0.03
			1.03			1/2" Ice	1.70	0.80	0.04
			0.00			1" Ice	1.87	0.92	0.06
LLPX310R w/ Mount Pipe	C	From Leg	2.82	40.0000	128.00	No Ice	4.54	2.98	0.05
			1.03			1/2" Ice	4.89	3.53	0.08
			0.00			1" Ice	5.25	4.09	0.13
HORIZON DUO	C	From Leg	2.82	40.0000	128.00	No Ice	0.00	0.29	0.01
			1.03			1/2" Ice	0.00	0.37	0.01
			0.00			1" Ice	0.00	0.44	0.02
WIMAX DAP HEAD	C	From Leg	2.82	40.0000	128.00	No Ice	1.55	0.68	0.03
			1.03			1/2" Ice	1.70	0.80	0.04
			0.00			1" Ice	1.87	0.92	0.06
Side Arm Mount [SO 103-3]	C	None		0.0000	128.00	No Ice	9.50	9.50	0.22
						1/2" Ice	11.80	11.80	0.32
						1" Ice	14.10	14.10	0.41
2" x 6' Mount Pipe	A	From Leg	2.82	20.0000	128.00	No Ice	1.20	1.20	0.03
			1.03			1/2" Ice	1.80	1.80	0.04
			0.00			1" Ice	2.17	2.17	0.05
2" x 6' Mount Pipe	B	From Leg	2.82	40.0000	128.00	No Ice	1.20	1.20	0.03
			1.03			1/2" Ice	1.80	1.80	0.04
			0.00			1" Ice	2.17	2.17	0.05
2" x 6' Mount Pipe	C	From Leg	2.82	40.0000	128.00	No Ice	1.20	1.20	0.03
			1.03			1/2" Ice	1.80	1.80	0.04
			0.00			1" Ice	2.17	2.17	0.05
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Centroid-Leg	4.00	0.0000	108.00	No Ice	8.77	6.96	0.07
			0.00			1/2" Ice	9.34	8.18	0.14
			4.00			1" Ice	9.89	9.14	0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	A	From Centroid-Leg	4.00	0.0000	108.00	No Ice	8.40	7.07	0.06
			0.00			1/2" Ice	8.95	8.25	0.13
			4.00			1" Ice	9.48	9.15	0.21
RRH2X60-AWS	A	From Centroid-Leg	4.00	0.0000	108.00	No Ice	3.50	1.82	0.06
			0.00			1/2" Ice	3.76	2.05	0.08
			4.00			1" Ice	4.03	2.29	0.11
(2) RRH2X60-PCS	A	From Centroid-Leg	4.00	0.0000	108.00	No Ice	0.00	1.72	0.06
			0.00			1/2" Ice	0.00	1.90	0.08
			4.00			1" Ice	0.00	2.09	0.10
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Centroid-Leg	4.00	0.0000	108.00	No Ice	8.77	6.96	0.07
			0.00			1/2" Ice	9.34	8.18	0.14
			4.00			1" Ice	9.89	9.14	0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Centroid-Leg	4.00	0.0000	108.00	No Ice	8.40	7.07	0.06
			0.00			1/2" Ice	8.95	8.25	0.13
			4.00			1" Ice	9.48	9.15	0.21
RRH2X60-AWS	B	From Centroid-Leg	4.00	0.0000	108.00	No Ice	3.50	1.82	0.06
			0.00			1/2" Ice	3.76	2.05	0.08
			4.00			1" Ice	4.03	2.29	0.11
(2) DB-T1-6Z-8AB-0Z	B	From Centroid-Leg	4.00	0.0000	108.00	No Ice	0.00	0.00	0.00
			0.00			1/2" Ice	0.00	0.00	0.00
			4.00			1" Ice	0.00	0.00	0.00
(2) HBXX-6517DS-A2M w/	C	From	4.00	0.0000	108.00	No Ice	8.77	6.96	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe		Centroid-Leg	0.00			1/2" Ice	9.34	8.18	0.14
			4.00			1" Ice	9.89	9.14	0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	C	From Centroid-Leg	4.00	0.0000	108.00	No Ice	8.40	7.07	0.06
			0.00			1/2" Ice	8.95	8.25	0.13
			4.00			1" Ice	9.48	9.15	0.21
RRH2X60-AWS	C	From Centroid-Leg	4.00	0.0000	108.00	No Ice	3.50	1.82	0.06
			0.00			1/2" Ice	3.76	2.05	0.08
			4.00			1" Ice	4.03	2.29	0.11
RRH2X60-PCS	C	From Centroid-Leg	4.00	0.0000	108.00	No Ice	0.00	1.72	0.06
			0.00			1/2" Ice	0.00	1.90	0.08
			4.00			1" Ice	0.00	2.09	0.10
Platform Mount [LP 303-1]	C	None		0.0000	108.00	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71

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
A-ANT-18G-2-C	A	Paraboloid w/Shroud (HP)	From Leg	2.82	40.0000		128.00	2.17	No Ice	3.72	0.03
				1.03					1/2" Ice	4.01	0.06
				0.00					1" Ice	4.31	0.10
A-ANT-18G-2-C	B	Paraboloid w/Shroud (HP)	From Leg	2.82	40.0000		128.00	2.17	No Ice	3.72	0.03
				1.03					1/2" Ice	4.01	0.06
				0.00					1" Ice	4.31	0.10
A-ANT-18G-2-C	C	Paraboloid w/Shroud (HP)	From Leg	2.82	40.0000		128.00	2.17	No Ice	3.72	0.03
				1.03					1/2" Ice	4.01	0.06
				0.00					1" Ice	4.31	0.10

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice

Comb. No.	Description
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	169 - 164	Pole	Max Tension	39	0.00	0.00	-0.00
			Max. Compression	26	-8.54	-0.02	0.96
			Max. Mx	8	-2.22	-8.86	0.22
			Max. My	2	-2.11	-0.01	9.31
			Max. Vy	8	4.91	-8.86	0.22
			Max. Vx	2	-5.07	-0.01	9.31
			Max. Torque	8			0.37
L2	164 - 159	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-9.35	-0.13	0.95
			Max. Mx	8	-2.50	-34.17	0.21
			Max. My	2	-2.39	-0.03	35.36
			Max. Vy	8	5.21	-34.17	0.21
			Max. Vx	2	-5.36	-0.03	35.36
			Max. Torque	8			0.37
L3	159 - 154	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-20.60	-1.12	0.53
			Max. Mx	8	-5.42	-79.62	-0.06
			Max. My	2	-5.14	0.20	82.84
			Max. Vy	8	11.42	-79.62	-0.06
			Max. Vx	2	-11.98	0.20	82.84
			Max. Torque	16			1.20
L4	154 - 149	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.52	-1.22	0.53
			Max. Mx	8	-5.83	-137.52	-0.41
			Max. My	2	-5.55	0.50	143.49
			Max. Vy	8	11.73	-137.52	-0.41
			Max. Vx	2	-12.29	0.50	143.49
			Max. Torque	16			1.31
L5	149 - 144	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-26.13	-1.32	0.54
			Max. Mx	8	-7.13	-203.72	-0.66
			Max. My	2	-6.81	0.67	212.70
			Max. Vy	8	13.73	-203.72	-0.66
			Max. Vx	2	-14.36	0.67	212.70
			Max. Torque	16			1.31
L6	144 - 139	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-27.16	-1.42	0.54
			Max. Mx	8	-7.66	-273.14	-0.86
			Max. My	2	-7.35	0.82	285.23
			Max. Vy	8	14.04	-273.14	-0.86
			Max. Vx	2	-14.67	0.82	285.23
			Max. Torque	16			1.19
L7	139 - 133.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-29.29	-1.26	0.56
			Max. Mx	8	-8.24	-307.31	-0.96
			Max. My	2	-7.87	0.93	321.24
			Max. Vy	8	15.08	-307.31	-0.96
			Max. Vx	2	-16.03	0.93	321.24
			Max. Torque	16			1.32
L8	133.33 - 131.663	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.24	-0.86	0.62
			Max. Mx	8	-9.12	-383.65	-1.18
			Max. My	2	-8.66	1.16	403.94
			Max. Vy	8	15.46	-383.65	-1.18
			Max. Vx	2	-17.07	1.16	403.94
			Max. Torque	16			1.57
L9	131.663 - 126.663	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.97	-0.32	0.65
			Max. Mx	8	-10.45	-464.10	-1.41
			Max. My	2	-9.88	1.42	494.31
			Max. Vy	8	17.60	-464.10	-1.41
			Max. Vx	2	-19.99	1.42	494.31
			Max. Torque	5			-1.97
L10	126.663 - 121.663	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.86	0.46	0.59
			Max. Mx	8	-11.22	-552.81	-1.70
			Max. My	2	-10.59	1.80	596.82
			Max. Vy	8	17.91	-552.81	-1.70
			Max. Vx	2	-21.04	1.80	596.82
			Max. Torque	5			-2.07
L11	121.663 - 116.663	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.78	1.25	0.52

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-12.02	-643.07	-1.99
			Max. My	2	-11.35	2.18	704.61
			Max. Vy	8	18.22	-643.07	-1.99
			Max. Vx	2	-22.10	2.18	704.61
			Max. Torque	5			-2.16
L12	116.663 - 111.663	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.84	2.06	0.46
			Max. Mx	8	-12.85	-734.85	-2.29
			Max. My	2	-12.16	2.57	817.69
			Max. Vy	6	18.78	-679.96	403.94
			Max. Vx	2	-23.17	2.57	817.69
			Max. Torque	5			-2.22
L13	111.663 - 111	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.13	2.17	0.45
			Max. Mx	8	-12.97	-747.13	-2.32
			Max. My	2	-12.27	2.62	833.09
			Max. Vy	6	18.88	-692.43	411.30
			Max. Vx	2	-23.31	2.62	833.09
			Max. Torque	5			-2.22
L14	111 - 110.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.27	2.21	0.45
			Max. Mx	8	-13.04	-751.77	-2.34
			Max. My	2	-12.34	2.64	838.92
			Max. Vy	6	18.91	-697.15	414.08
			Max. Vx	2	-23.36	2.64	838.92
			Max. Torque	5			-2.23
L15	110.75 - 105.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.46	3.65	1.72
			Max. Mx	8	-16.71	-873.80	-2.36
			Max. My	2	-15.92	3.42	986.93
			Max. Vy	6	24.21	-818.10	485.21
			Max. Vx	2	-29.62	3.42	986.93
			Max. Torque	5			-2.23
L16	105.75 - 101.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.26	4.29	2.08
			Max. Mx	8	-17.79	-977.97	-2.63
			Max. My	2	-17.01	3.86	1114.96
			Max. Vy	6	24.91	-922.45	546.25
			Max. Vx	2	-30.60	3.86	1114.96
			Max. Torque	4			-1.81
L17	101.5 - 101.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.47	4.33	2.10
			Max. Mx	8	-17.89	-984.20	-2.64
			Max. My	2	-17.12	3.88	1122.62
			Max. Vy	8	24.95	-984.20	-2.64
			Max. Vx	2	-30.66	3.88	1122.62
			Max. Torque	4			-1.79
L18	101.25 - 101	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.67	4.37	2.12
			Max. Mx	8	-17.99	-990.45	-2.66
			Max. My	2	-17.21	3.91	1130.30
			Max. Vy	8	25.01	-990.45	-2.66
			Max. Vx	2	-30.72	3.91	1130.30
			Max. Torque	4			-1.79
L19	101 - 100.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.86	4.41	2.14
			Max. Mx	8	-18.06	-996.71	-2.67
			Max. My	2	-17.28	3.93	1137.99
			Max. Vy	8	25.06	-996.71	-2.67

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-30.78	3.93	1137.99
			Max. Torque	4			-1.79
L20	100.75 - 95.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.46	5.18	2.57
			Max. Mx	8	-19.56	-1124.42	-2.99
			Max. My	2	-18.80	4.44	1294.93
			Max. Vy	8	26.04	-1124.42	-2.99
			Max. Vx	2	-31.97	4.44	1294.93
			Max. Torque	4			-1.79
L21	95.75 - 87.833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.00	5.74	2.89
			Max. Mx	8	-20.66	-1218.98	-3.21
			Max. My	2	-19.91	4.81	1411.02
			Max. Vy	8	26.74	-1218.98	-3.21
			Max. Vx	2	-32.79	4.81	1411.02
			Max. Torque	5			-1.76
L22	87.833 - 86.833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.67	6.57	3.36
			Max. Mx	8	-23.72	-1364.76	-3.54
			Max. My	2	-22.98	5.35	1589.78
			Max. Vy	8	27.93	-1364.76	-3.54
			Max. Vx	2	-34.20	5.35	1589.78
			Max. Torque	5			-1.71
L23	86.833 - 81.733	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.19	7.38	3.82
			Max. Mx	8	-26.00	-1509.82	-3.85
			Max. My	2	-25.27	5.88	1767.49
			Max. Vy	8	28.98	-1509.82	-3.85
			Max. Vx	2	-35.46	5.88	1767.49
			Max. Torque	5			-1.71
L24	81.733 - 81.55	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.36	7.41	3.83
			Max. Mx	8	-26.09	-1515.12	-3.86
			Max. My	2	-25.36	5.89	1773.99
			Max. Vy	8	29.01	-1515.12	-3.86
			Max. Vx	2	-35.50	5.89	1773.99
			Max. Torque	5			-1.68
L25	81.55 - 81	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.86	7.49	3.88
			Max. Mx	8	-26.33	-1531.11	-3.89
			Max. My	2	-25.61	5.95	1793.56
			Max. Vy	8	29.13	-1531.11	-3.89
			Max. Vx	2	-35.64	5.95	1793.56
			Max. Torque	5			-1.68
L26	81 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.08	7.53	3.91
			Max. Mx	8	-26.44	-1538.40	-3.91
			Max. My	2	-25.71	5.98	1802.49
			Max. Vy	8	29.18	-1538.40	-3.91
			Max. Vx	2	-35.70	5.98	1802.49
			Max. Torque	5			-1.68
L27	80.75 - 75.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.18	8.33	4.36
			Max. Mx	8	-28.44	-1686.75	-4.21
			Max. My	2	-27.74	6.49	1984.02
			Max. Vy	8	30.18	-1686.75	-4.21
			Max. Vx	2	-36.88	6.49	1984.02
			Max. Torque	5			-1.68
L28	75.75 - 70.75	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-83.24	9.14	4.83
			Max. Mx	8	-30.49	-1840.06	-4.51
			Max. My	2	-29.81	7.00	2171.37
			Max. Vy	8	31.17	-1840.06	-4.51
			Max. Vx	2	-38.03	7.00	2171.37
			Max. Torque	5			-1.65
L29	70.75 - 65.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.32	9.94	5.30
			Max. Mx	8	-32.57	-1998.30	-4.80
			Max. My	2	-31.93	7.51	2364.44
			Max. Vy	8	32.15	-1998.30	-4.80
			Max. Vx	2	-39.17	7.51	2364.44
			Max. Torque	5			-1.63
L30	65.75 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-91.41	10.75	5.78
			Max. Mx	8	-34.68	-2161.39	-5.09
			Max. My	2	-34.08	8.03	2563.15
			Max. Vy	8	33.12	-2161.39	-5.09
			Max. Vx	2	-40.29	8.03	2563.15
			Max. Torque	5			-1.60
L31	60.75 - 55.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-95.52	11.56	6.26
			Max. Mx	8	-36.82	-2329.30	-5.38
			Max. My	2	-36.27	8.54	2767.42
			Max. Vy	8	34.07	-2329.30	-5.38
			Max. Vx	2	-41.39	8.54	2767.42
			Max. Torque	5			-1.57
L32	55.75 - 50.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-99.63	12.37	6.74
			Max. Mx	8	-39.00	-2501.93	-5.67
			Max. My	2	-38.50	9.05	2977.12
			Max. Vy	8	35.01	-2501.93	-5.67
			Max. Vx	2	-42.47	9.05	2977.12
			Max. Torque	24			-1.58
L33	50.75 - 43.336	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-101.43	12.68	6.91
			Max. Mx	8	-39.92	-2575.15	-5.78
			Max. My	2	-39.44	9.26	3065.97
			Max. Vy	8	35.39	-2575.15	-5.78
			Max. Vx	2	-42.91	9.26	3065.97
			Max. Torque	24			-1.61
L34	43.336 - 42.336	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-110.01	13.62	7.42
			Max. Mx	8	-45.19	-2803.47	-6.13
			Max. My	2	-44.74	9.90	3342.72
			Max. Vy	8	36.72	-2803.47	-6.13
			Max. Vx	2	-44.44	9.90	3342.72
			Max. Torque	24			-1.69
L35	42.336 - 37.336	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-114.95	14.31	7.76
			Max. Mx	8	-47.89	-2989.25	-6.41
			Max. My	2	-47.49	10.41	3567.59
			Max. Vy	8	37.62	-2989.25	-6.41
			Max. Vx	2	-45.49	10.41	3567.59
			Max. Torque	24			-1.75
L36	37.336 - 32.336	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-119.88	14.99	8.10
			Max. Mx	8	-50.63	-3179.47	-6.68

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-50.27	10.91	3797.60
			Max. Vy	8	38.50	-3179.47	-6.68
			Max. Vx	2	-46.49	10.91	3797.60
			Max. Torque	24			-1.81
L37	32.336 - 27.336	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-124.80	15.61	8.42
			Max. Mx	8	-53.39	-3373.98	-6.94
			Max. My	2	-53.09	11.42	4032.53
			Max. Vy	8	39.34	-3373.98	-6.94
			Max. Vx	2	-47.46	11.42	4032.53
			Max. Torque	24			-1.87
L38	27.336 - 22.236	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-129.97	16.22	8.75
			Max. Mx	8	-56.41	-3576.65	-7.21
			Max. My	2	-56.16	11.93	4277.04
			Max. Vy	8	40.18	-3576.65	-7.21
			Max. Vx	2	-48.41	11.93	4277.04
			Max. Torque	24			-1.92
L39	22.236 - 22.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-130.13	16.24	8.76
			Max. Mx	8	-56.52	-3582.92	-7.22
			Max. My	2	-56.27	11.94	4284.60
			Max. Vy	8	40.19	-3582.92	-7.22
			Max. Vx	2	-48.42	11.94	4284.60
			Max. Torque	24			-1.92
L40	22.08 - 17.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-135.19	16.82	9.07
			Max. Mx	8	-59.49	-3785.76	-7.48
			Max. My	2	-59.30	12.44	4529.06
			Max. Vy	8	40.97	-3785.76	-7.48
			Max. Vx	2	-49.32	12.44	4529.06
			Max. Torque	24			-1.98
L41	17.08 - 12.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-140.20	17.38	9.38
			Max. Mx	8	-62.51	-3992.33	-7.73
			Max. My	2	-62.38	12.94	4777.76
			Max. Vy	8	41.69	-3992.33	-7.73
			Max. Vx	2	-50.14	12.94	4777.76
			Max. Torque	24			-2.03
L42	12.08 - 7.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-144.94	17.79	9.62
			Max. Mx	8	-65.51	-4201.40	-8.01
			Max. My	2	-65.43	13.43	5030.36
			Max. Vy	8	41.98	-4201.40	-8.01
			Max. Vx	2	-50.89	13.43	5030.36
			Max. Torque	24			-2.07
L43	7.08 - 5.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-146.02	17.76	9.58
			Max. Mx	8	-66.29	-4260.60	-8.13
			Max. My	2	-66.22	13.57	5102.11
			Max. Vy	8	42.04	-4260.60	-8.13
			Max. Vx	2	-50.95	13.57	5102.11
			Max. Torque	24			-2.07
L44	5.67 - 5.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-146.25	17.76	9.57
			Max. Mx	8	-66.48	-4271.10	-8.15
			Max. My	2	-66.43	13.60	5114.84
			Max. Vy	8	42.03	-4271.10	-8.15
			Max. Vx	2	-50.93	13.60	5114.84

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	24			-2.07
L45	5.42 - 2.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-149.16	17.70	9.48
			Max. Mx	8	-68.73	-4404.57	-8.41
			Max. My	2	-68.70	13.91	5276.48
			Max. Vy	8	42.20	-4404.57	-8.41
			Max. Vx	2	-51.08	13.91	5276.48
			Max. Torque	24			-2.07
L46	2.25 - 2	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-149.35	17.69	9.48
			Max. Mx	8	-68.89	-4415.11	-8.43
			Max. My	2	-68.86	13.94	5289.25
			Max. Vy	8	42.20	-4415.11	-8.43
			Max. Vx	2	-51.08	13.94	5289.25
			Max. Torque	24			-2.07
L47	2 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-150.86	17.66	9.43
			Max. Mx	8	-70.06	-4499.58	-8.60
			Max. My	2	-70.05	14.13	5391.46
			Max. Vy	8	42.30	-4499.58	-8.60
			Max. Vx	2	-51.16	14.13	5391.46
			Max. Torque	24			-2.07

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	150.86	0.00	0.00
	Max. H_x	20	70.07	42.25	0.07
	Max. H_z	2	70.07	0.10	51.14
	Max. M_x	2	5391.46	0.10	51.14
	Max. M_z	8	4499.58	-42.28	-0.08
	Max. Torsion	12	1.78	-25.72	-44.84
	Min. Vert	23	52.55	28.71	16.90
	Min. H_x	8	70.07	-42.28	-0.08
	Min. H_z	14	70.07	-0.05	-51.12
	Min. M_x	14	-5382.12	-0.05	-51.12
	Min. M_z	20	-4496.30	42.25	0.07
	Min. Torsion	24	-2.07	25.72	44.87

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	58.39	-0.04	0.00	-2.75	0.01	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	70.07	-0.10	-51.14	-5391.46	14.14	1.67
0.9 Dead+1.6 Wind 0 deg - No Ice	52.55	-0.10	-51.14	-5334.47	13.97	1.66
1.2 Dead+1.6 Wind 30 deg - No Ice	70.07	26.76	-46.87	-4939.67	-2799.07	1.88

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
0.9 Dead+1.6 Wind 30 deg - No Ice	52.55	26.76	-46.87	-4887.35	-2770.06	1.88
1.2 Dead+1.6 Wind 60 deg - No Ice	70.07	38.50	-22.38	-2499.30	-4272.49	0.58
0.9 Dead+1.6 Wind 60 deg - No Ice	52.55	38.50	-22.38	-2471.75	-4227.06	0.58
1.2 Dead+1.6 Wind 90 deg - No Ice	70.07	42.28	0.08	8.60	-4499.58	-0.82
0.9 Dead+1.6 Wind 90 deg - No Ice	52.55	42.28	0.08	9.34	-4451.81	-0.81
1.2 Dead+1.6 Wind 120 deg - No Ice	70.07	28.75	16.87	2035.46	-3451.64	-0.76
0.9 Dead+1.6 Wind 120 deg - No Ice	52.55	28.75	16.87	2013.26	-3412.74	-0.76
1.2 Dead+1.6 Wind 150 deg - No Ice	70.07	25.72	44.84	4676.44	-2670.58	-1.78
0.9 Dead+1.6 Wind 150 deg - No Ice	52.55	25.72	44.84	4628.81	-2643.02	-1.78
1.2 Dead+1.6 Wind 180 deg - No Ice	70.07	0.05	51.12	5382.12	-8.02	-1.60
0.9 Dead+1.6 Wind 180 deg - No Ice	52.55	0.05	51.12	5326.93	-7.91	-1.59
1.2 Dead+1.6 Wind 210 deg - No Ice	70.07	-26.78	46.89	4934.57	2802.53	-1.75
0.9 Dead+1.6 Wind 210 deg - No Ice	52.55	-26.78	46.89	4884.01	2773.47	-1.75
1.2 Dead+1.6 Wind 240 deg - No Ice	70.07	-38.50	22.43	2498.94	4271.60	-0.53
0.9 Dead+1.6 Wind 240 deg - No Ice	52.55	-38.50	22.43	2473.11	4226.18	-0.53
1.2 Dead+1.6 Wind 270 deg - No Ice	70.07	-42.25	-0.07	-13.39	4496.30	1.07
0.9 Dead+1.6 Wind 270 deg - No Ice	52.55	-42.25	-0.07	-12.38	4448.58	1.07
1.2 Dead+1.6 Wind 300 deg - No Ice	70.07	-28.71	-16.90	-2046.35	3446.39	0.93
0.9 Dead+1.6 Wind 300 deg - No Ice	52.55	-28.71	-16.90	-2022.34	3407.56	0.92
1.2 Dead+1.6 Wind 330 deg - No Ice	70.07	-25.72	-44.87	-4687.12	2670.40	2.07
0.9 Dead+1.6 Wind 330 deg - No Ice	52.55	-25.72	-44.87	-4637.69	2642.85	2.06
1.2 Dead+1.0 Ice+1.0 Temp	150.86	-0.00	-0.00	-9.43	17.66	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	150.86	-0.01	-8.65	-1027.06	19.33	-0.14
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	150.86	4.27	-7.41	-887.74	-487.41	-0.11
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	150.86	6.69	-3.85	-484.44	-806.17	-0.08
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	150.86	7.74	0.01	-8.38	-918.91	-0.19
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	150.86	6.23	3.60	434.59	-749.66	-0.19
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	150.86	4.48	7.75	886.35	-499.86	0.05
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	150.86	0.00	8.64	1007.60	17.36	0.15
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	150.86	-4.27	7.41	868.99	523.65	0.14
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	150.86	-6.69	3.86	466.47	841.70	0.10

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
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	150.86	-7.73	-0.01	-10.32	954.04	0.22
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	150.86	-6.22	-3.60	-454.30	784.47	0.20
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	150.86	-4.48	-7.76	-906.03	535.50	-0.01
Dead+Wind 0 deg - Service	58.39	-0.02	-11.41	-1198.90	3.12	0.14
Dead+Wind 30 deg - Service	58.39	5.97	-10.46	-1098.88	-621.53	0.16
Dead+Wind 60 deg - Service	58.39	8.59	-4.99	-556.71	-948.14	0.11
Dead+Wind 90 deg - Service	58.39	9.43	0.02	-0.18	-998.22	-0.04
Dead+Wind 120 deg - Service	58.39	6.41	3.76	449.29	-765.44	-0.17
Dead+Wind 150 deg - Service	58.39	5.74	10.00	1035.99	-592.83	-0.14
Dead+Wind 180 deg - Service	58.39	0.01	11.40	1192.65	-1.79	-0.11
Dead+Wind 210 deg - Service	58.39	-5.97	10.46	1093.59	622.26	-0.12
Dead+Wind 240 deg - Service	58.39	-8.59	5.00	552.46	947.92	-0.08
Dead+Wind 270 deg - Service	58.39	-9.42	-0.01	-5.05	997.48	0.09
Dead+Wind 300 deg - Service	58.39	-6.41	-3.77	-455.87	764.26	0.19
Dead+Wind 330 deg - Service	58.39	-5.74	-10.01	-1042.54	592.77	0.19

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	-58.39	0.00	0.04	58.39	0.00	0.061%
2	-0.10	-70.07	-51.14	0.10	70.07	51.14	0.000%
3	-0.10	-52.55	-51.14	0.10	52.55	51.14	0.000%
4	26.76	-70.07	-46.87	-26.76	70.07	46.87	0.000%
5	26.76	-52.55	-46.87	-26.76	52.55	46.87	0.000%
6	38.50	-70.07	-22.38	-38.50	70.07	22.38	0.000%
7	38.50	-52.55	-22.38	-38.50	52.55	22.38	0.000%
8	42.28	-70.07	0.08	-42.28	70.07	-0.08	0.000%
9	42.28	-52.55	0.08	-42.28	52.55	-0.08	0.000%
10	28.75	-70.07	16.87	-28.75	70.07	-16.87	0.000%
11	28.75	-52.55	16.87	-28.75	52.55	-16.87	0.000%
12	25.72	-70.07	44.84	-25.72	70.07	-44.84	0.000%
13	25.72	-52.55	44.84	-25.72	52.55	-44.84	0.000%
14	0.05	-70.07	51.12	-0.05	70.07	-51.12	0.000%
15	0.05	-52.55	51.12	-0.05	52.55	-51.12	0.000%
16	-26.78	-70.07	46.89	26.78	70.07	-46.89	0.000%
17	-26.78	-52.55	46.89	26.78	52.55	-46.89	0.000%
18	-38.50	-70.07	22.43	38.50	70.07	-22.43	0.000%
19	-38.50	-52.55	22.43	38.50	52.55	-22.43	0.000%
20	-42.25	-70.07	-0.07	42.25	70.07	0.07	0.000%
21	-42.25	-52.55	-0.07	42.25	52.55	0.07	0.000%
22	-28.71	-70.07	-16.90	28.71	70.07	16.90	0.000%
23	-28.71	-52.55	-16.90	28.71	52.55	16.90	0.000%
24	-25.72	-70.07	-44.87	25.72	70.07	44.87	0.000%
25	-25.72	-52.55	-44.87	25.72	52.55	44.87	0.000%
26	0.00	-150.86	0.00	0.00	150.86	0.00	0.000%
27	-0.01	-150.86	-8.65	0.01	150.86	8.65	0.000%
28	4.27	-150.86	-7.41	-4.27	150.86	7.41	0.000%
29	6.69	-150.86	-3.85	-6.69	150.86	3.85	0.000%
30	7.74	-150.86	0.01	-7.74	150.86	-0.01	0.000%
31	6.23	-150.86	3.60	-6.23	150.86	-3.60	0.000%
32	4.48	-150.86	7.75	-4.48	150.86	-7.75	0.000%
33	0.00	-150.86	8.64	-0.00	150.86	-8.64	0.000%
34	-4.27	-150.86	7.41	4.27	150.86	-7.41	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
35	-6.69	-150.86	3.86	6.69	150.86	-3.86	0.000%
36	-7.73	-150.86	-0.01	7.73	150.86	0.01	0.000%
37	-6.22	-150.86	-3.60	6.22	150.86	3.60	0.000%
38	-4.48	-150.86	-7.76	4.48	150.86	7.76	0.000%
39	-0.02	-58.39	-11.41	0.02	58.39	11.41	0.000%
40	5.97	-58.39	-10.46	-5.97	58.39	10.46	0.000%
41	8.59	-58.39	-4.99	-8.59	58.39	4.99	0.000%
42	9.43	-58.39	0.02	-9.43	58.39	-0.02	0.000%
43	6.41	-58.39	3.76	-6.41	58.39	-3.76	0.000%
44	5.74	-58.39	10.00	-5.74	58.39	-10.00	0.000%
45	0.01	-58.39	11.40	-0.01	58.39	-11.40	0.000%
46	-5.97	-58.39	10.46	5.97	58.39	-10.46	0.000%
47	-8.59	-58.39	5.00	8.59	58.39	-5.00	0.000%
48	-9.42	-58.39	-0.01	9.42	58.39	0.01	0.000%
49	-6.41	-58.39	-3.77	6.41	58.39	3.77	0.000%
50	-5.74	-58.39	-10.01	5.74	58.39	10.01	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	14	0.00000001	0.00000000
2	Yes	5	0.00000001	0.00043512
3	Yes	5	0.00000001	0.00018472
4	Yes	7	0.00000001	0.00007050
5	Yes	6	0.00000001	0.00041414
6	Yes	7	0.00000001	0.00006380
7	Yes	6	0.00000001	0.00038427
8	Yes	5	0.00000001	0.00024244
9	Yes	5	0.00000001	0.00009579
10	Yes	7	0.00000001	0.00005289
11	Yes	6	0.00000001	0.00033032
12	Yes	7	0.00000001	0.00006863
13	Yes	6	0.00000001	0.00040717
14	Yes	5	0.00000001	0.00075017
15	Yes	5	0.00000001	0.00031936
16	Yes	7	0.00000001	0.00006719
17	Yes	6	0.00000001	0.00039403
18	Yes	7	0.00000001	0.00006508
19	Yes	6	0.00000001	0.00039238
20	Yes	5	0.00000001	0.00063747
21	Yes	5	0.00000001	0.00027973
22	Yes	7	0.00000001	0.00005455
23	Yes	6	0.00000001	0.00034059
24	Yes	7	0.00000001	0.00006636
25	Yes	6	0.00000001	0.00039311
26	Yes	5	0.00000001	0.00029242
27	Yes	7	0.00000001	0.00048420
28	Yes	7	0.00000001	0.00057477
29	Yes	7	0.00000001	0.00054654
30	Yes	7	0.00000001	0.00045101
31	Yes	7	0.00000001	0.00049364
32	Yes	7	0.00000001	0.00056272
33	Yes	7	0.00000001	0.00047493
34	Yes	7	0.00000001	0.00058362
35	Yes	7	0.00000001	0.00055382

36	Yes	7	0.00000001	0.00046535
37	Yes	7	0.00000001	0.00052185
38	Yes	7	0.00000001	0.00059304
39	Yes	4	0.00000001	0.00088669
40	Yes	5	0.00000001	0.00060957
41	Yes	5	0.00000001	0.00043695
42	Yes	4	0.00000001	0.00071014
43	Yes	5	0.00000001	0.00028492
44	Yes	5	0.00000001	0.00051265
45	Yes	4	0.00000001	0.00089911
46	Yes	5	0.00000001	0.00058323
47	Yes	5	0.00000001	0.00044482
48	Yes	4	0.00000001	0.00076724
49	Yes	5	0.00000001	0.00030891
50	Yes	5	0.00000001	0.00049434

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	169 - 164 (1)	TP16.4546x15.5x0.25	5.00	0.00	0.0	12.8583	-2.11	955.31	0.002
L2	164 - 159 (2)	TP17.4092x16.4546x0.25	5.00	0.00	0.0	13.6158	-2.28	1011.59	0.002
L3	159 - 154 (3)	TP18.3638x17.4092x0.25	5.00	0.00	0.0	14.3733	-4.95	1067.86	0.005
L4	154 - 149 (4)	TP19.3183x18.3638x0.25	5.00	0.00	0.0	15.1307	-5.30	1124.14	0.005
L5	149 - 144 (5)	TP20.2729x19.3183x0.25	5.00	0.00	0.0	15.8882	-6.53	1180.41	0.006
L6	144 - 139 (6)	TP21.2275x20.2729x0.25	5.00	0.00	0.0	16.6456	-7.07	1236.69	0.006
L7	139 - 133.33 (7)	TP22.31x21.2275x0.25	5.67	0.00	0.0	16.9997	-7.59	1262.99	0.006
L8	133.33 - 131.663 (8)	TP22.1143x21.1737x0.3125	5.00	0.00	0.0	21.6247	-8.37	1606.61	0.005
L9	131.663 - 126.663 (9)	TP23.055x22.1143x0.3125	5.00	0.00	0.0	22.5577	-9.59	1675.92	0.006
L10	126.663 - 121.663 (10)	TP23.9956x23.055x0.3125	5.00	0.00	0.0	23.4907	-10.31	1745.24	0.006
L11	121.663 - 116.663 (11)	TP24.9362x23.9956x0.3125	5.00	0.00	0.0	24.4237	-11.09	1814.56	0.006
L12	116.663 - 111.663 (12)	TP25.8769x24.9362x0.3125	5.00	0.00	0.0	25.3567	-11.91	1883.87	0.006
L13	111.663 - 111 (13)	TP26.0016x25.8769x0.3125	0.66	0.00	0.0	25.4804	-12.03	1893.07	0.006
L14	111 - 110.75 (14)	TP26.0487x26.0016x0.575	0.25	0.00	0.0	46.4907	-12.10	3454.03	0.004
L15	110.75 - 105.75 (15)	TP26.9893x26.0487x0.5625	5.00	0.00	0.0	47.1817	-15.66	3505.37	0.004
L16	105.75 - 101.5 (16)	TP27.7888x26.9893x0.55	4.25	0.00	0.0	47.5508	-16.76	3532.79	0.005
L17	101.5 - 101.25 (17)	TP27.8359x27.7888x0.9875	0.25	0.00	0.0	84.1515	-16.87	6252.04	0.003
L18	101.25 - 101 (18)	TP27.8829x27.8359x0.9875	0.25	0.00	0.0	84.2990	-16.97	6262.99	0.003
L19	101 - 100.75 (19)	TP27.9299x27.8829x0.725	0.25	0.00	0.0	62.6026	-17.04	4651.06	0.004
L20	100.75 - 95.75 (20)	TP28.8706x27.9299x0.7125	5.00	0.00	0.0	63.6788	-18.56	4731.02	0.004

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L21	95.75 - 87.833 (21)	TP30.36x28.8706x0.7	7.92	0.00	0.0	64.0875	-19.68	4761.38	0.004
L22	87.833 - 86.833 (22)	TP29.9235x28.9198x0.9375	5.33	0.00	0.0	86.2516	-22.74	6408.06	0.004
L23	86.833 - 81.733 (23)	TP30.8834x29.9235x1.125	5.10	0.00	0.0	106.2600	-25.03	7894.57	0.003
L24	81.733 - 81.55 (24)	TP30.9178x30.8834x1.125	0.18	0.00	0.0	106.3830	-25.12	7903.71	0.003
L25	81.55 - 81 (25)	TP31.0214x30.9178x1.125	0.55	0.00	0.0	106.7520	-25.37	7931.17	0.003
L26	81 - 80.75 (26)	TP31.0684x31.0214x0.9375	0.25	0.00	0.0	89.6583	-25.47	6661.16	0.004
L27	80.75 - 75.75 (27)	TP32.0094x31.0684x0.925	5.00	0.00	0.0	91.2624	-27.51	6780.34	0.004
L28	75.75 - 70.75 (28)	TP32.9505x32.0094x0.9	5.00	0.00	0.0	91.5554	-29.59	6802.11	0.004
L29	70.75 - 65.75 (29)	TP33.8915x32.9505x0.875	5.00	0.00	0.0	91.6951	-31.72	6812.49	0.005
L30	65.75 - 60.75 (30)	TP34.8326x33.8915x0.8625	5.00	0.00	0.0	92.9956	-33.88	6909.11	0.005
L31	60.75 - 55.75 (31)	TP35.7736x34.8326x0.85	5.00	0.00	0.0	94.2204	-36.08	7000.10	0.005
L32	55.75 - 50.75 (32)	TP36.7146x35.7736x0.825	5.00	0.00	0.0	93.9788	-38.32	6982.15	0.005
L33	50.75 - 43.336 (33)	TP38.11x36.7146x0.825	7.41	0.00	0.0	95.0044	-39.27	7058.35	0.006
L34	43.336 - 42.336 (34)	TP37.5461x36.3563x1.0375	6.33	0.00	0.0	120.2240	-44.58	8932.02	0.005
L35	42.336 - 37.336 (35)	TP38.4855x37.5461x1.025	5.00	0.00	0.0	121.8720	-47.34	9054.49	0.005
L36	37.336 - 32.336 (36)	TP39.4249x38.4855x1	5.00	0.00	0.0	121.9610	-50.14	9061.06	0.006
L37	32.336 - 27.336 (37)	TP40.3642x39.4249x0.975	5.00	0.00	0.0	121.8960	-52.98	9056.26	0.006
L38	27.336 - 22.236 (38)	TP41.3224x40.3642x1.0375	5.10	0.00	0.0	132.6590	-56.07	9855.91	0.006
L39	22.236 - 22.08 (39)	TP41.3517x41.3224x1.0375	0.16	0.00	0.0	132.7560	-56.19	9863.09	0.006
L40	22.08 - 17.08 (40)	TP42.2911x41.3517x1.025	5.00	0.00	0.0	134.2530	-59.23	9974.33	0.006
L41	17.08 - 12.08 (41)	TP43.2305x42.2911x1	5.00	0.00	0.0	134.0390	-62.33	9958.46	0.006
L42	12.08 - 7.08 (42)	TP44.1698x43.2305x0.975	5.00	0.00	0.0	133.6730	-65.40	9931.23	0.007
L43	7.08 - 5.67 (43)	TP44.4347x44.1698x0.975	1.41	0.00	0.0	134.4930	-66.20	9992.14	0.007
L44	5.67 - 5.42 (44)	TP44.4817x44.4347x1.4	0.25	0.00	0.0	191.4380	-66.41	14222.90	0.005
L45	5.42 - 2.25 (45)	TP45.0773x44.4817x1.375	3.17	0.00	0.0	190.7280	-68.69	14170.10	0.005
L46	2.25 - 2 (46)	TP45.1242x45.0773x1.125	0.25	0.00	0.0	157.1100	-68.86	11672.50	0.006
L47	2 - 0 (47)	TP45.5x45.1242x1.1	2.00	0.00	0.0	155.0180	-70.05	11517.10	0.006

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	169 - 164 (1)	TP16.4546x15.5x0.25	9.31	315.95	0.029	0.00	315.95	0.000
L2	164 - 159 (2)	TP17.4092x16.4546x0.25	36.14	354.58	0.102	0.00	354.58	0.000
L3	159 - 154 (3)	TP18.3638x17.4092x0.25	85.75	395.42	0.217	0.00	395.42	0.000
L4	154 - 149 (4)	TP19.3183x18.3638x0.25	150.16	438.50	0.342	0.00	438.50	0.000
L5	149 - 144 (5)	TP20.2729x19.3183x0.25	224.36	483.80	0.464	0.00	483.80	0.000
L6	144 - 139 (6)	TP21.2275x20.2729x0.25	302.32	531.33	0.569	0.00	531.33	0.000
L7	139 - 133.33 (7)	TP22.31x21.2275x0.25	340.99	554.30	0.615	0.00	554.30	0.000
L8	133.33 - 131.663 (8)	TP22.1143x21.1737x0.3125	429.60	715.67	0.600	0.00	715.67	0.000
L9	131.663 - 126.663 (9)	TP23.055x22.1143x0.3125	526.11	779.21	0.675	0.00	779.21	0.000
L10	126.663 - 121.663 (10)	TP23.9956x23.055x0.3125	634.79	845.46	0.751	0.00	845.46	0.000
L11	121.663 - 116.663 (11)	TP24.9362x23.9956x0.3125	748.88	914.41	0.819	0.00	914.41	0.000
L12	116.663 - 111.663 (12)	TP25.8769x24.9362x0.3125	868.41	986.06	0.881	0.00	986.06	0.000
L13	111.663 - 111 (13)	TP26.0016x25.8769x0.3125	884.68	995.77	0.888	0.00	995.77	0.000
L14	111 - 110.75 (14)	TP26.0487x26.0016x0.575	890.84	1783.27	0.500	0.00	1783.27	0.000
L15	110.75 - 105.75 (15)	TP26.9893x26.0487x0.5625	1045.03	1879.85	0.556	0.00	1879.85	0.000
L16	105.75 - 101.5 (16)	TP27.7888x26.9893x0.55	1178.62	1954.87	0.603	0.00	1954.87	0.000
L17	101.5 - 101.25 (17)	TP27.8359x27.7888x0.9875	1186.61	3355.41	0.354	0.00	3355.41	0.000
L18	101.25 - 101 (18)	TP27.8829x27.8359x0.9875	1194.62	3367.38	0.355	0.00	3367.38	0.000
L19	101 - 100.75 (19)	TP27.9299x27.8829x0.725	1202.64	2554.29	0.471	0.00	2554.29	0.000
L20	100.75 - 95.75 (20)	TP28.8706x27.9299x0.7125	1366.50	2692.76	0.507	0.00	2692.76	0.000
L21	95.75 - 87.833 (21)	TP30.36x28.8706x0.7	1487.83	2778.94	0.535	0.00	2778.94	0.000
L22	87.833 - 86.833 (22)	TP29.9235x28.9198x0.9375	1674.85	3728.93	0.449	0.00	3728.93	0.000
L23	86.833 - 81.733 (23)	TP30.8834x29.9235x1.125	1860.90	4691.54	0.397	0.00	4691.54	0.000
L24	81.733 - 81.55 (24)	TP30.9178x30.8834x1.125	1867.70	4702.60	0.397	0.00	4702.60	0.000
L25	81.55 - 81 (25)	TP31.0214x30.9178x1.125	1888.20	4735.93	0.399	0.00	4735.93	0.000
L26	81 - 80.75 (26)	TP31.0684x31.0214x0.9375	1897.54	4034.12	0.470	0.00	4034.12	0.000
L27	80.75 - 75.75 (27)	TP32.0094x31.0684x0.925	2087.73	4241.82	0.492	0.00	4241.82	0.000
L28	75.75 - 70.75 (28)	TP32.9505x32.0094x0.9	2284.21	4394.84	0.520	0.00	4394.84	0.000
L29	70.75 - 65.75 (29)	TP33.8915x32.9505x0.875	2486.88	4541.19	0.548	0.00	4541.19	0.000
L30	65.75 - 60.75 (30)	TP34.8326x33.8915x0.8625	2695.65	4743.75	0.568	0.00	4743.75	0.000
L31	60.75 - 55.75 (31)	TP35.7736x34.8326x0.85	2910.42	4946.21	0.588	0.00	4946.21	0.000
L32	55.75 - 50.75 (32)	TP36.7146x35.7736x0.825	3131.05	5076.69	0.617	0.00	5076.69	0.000
L33	50.75 - 43.336 (33)	TP38.11x36.7146x0.825	3224.57	5189.36	0.621	0.00	5189.36	0.000
L34	43.336 - 42.336 (34)	TP37.5461x36.3563x1.0375	3516.03	6571.55	0.535	0.00	6571.55	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L35	42.336 - 37.336 (35)	TP38.4855x37.5461x1.025	3752.98	6842.36	0.548	0.00	6842.36	0.000
L36	37.336 - 32.336 (36)	TP39.4249x38.4855x1	3995.45	7032.76	0.568	0.00	7032.76	0.000
L37	32.336 - 27.336 (37)	TP40.3642x39.4249x0.975	4243.22	7214.39	0.588	0.00	7214.39	0.000
L38	27.336 - 22.236 (38)	TP41.3224x40.3642x1.0375	4501.18	8022.11	0.561	0.00	8022.11	0.000
L39	22.236 - 22.08 (39)	TP41.3517x41.3224x1.0375	4509.15	8033.93	0.561	0.00	8033.93	0.000
L40	22.08 - 17.08 (40)	TP42.2911x41.3517x1.025	4767.13	8323.65	0.573	0.00	8323.65	0.000
L41	17.08 - 12.08 (41)	TP43.2305x42.2911x1	5029.67	8514.25	0.591	0.00	8514.25	0.000
L42	12.08 - 7.08 (42)	TP44.1698x43.2305x0.975	5296.37	8694.25	0.609	0.00	8694.25	0.000
L43	7.08 - 5.67 (43)	TP44.4347x44.1698x0.975	5372.14	8802.42	0.610	0.00	8802.42	0.000
L44	5.67 - 5.42 (44)	TP44.4817x44.4347x1.4	5385.58	12299.42	0.438	0.00	12299.42	0.000
L45	5.42 - 2.25 (45)	TP45.0773x44.4817x1.375	5556.24	12442.75	0.447	0.00	12442.75	0.000
L46	2.25 - 2 (46)	TP45.1242x45.0773x1.125	5569.72	10378.58	0.537	0.00	10378.58	0.000
L47	2 - 0 (47)	TP45.5x45.1242x1.1	5677.60	10341.67	0.549	0.00	10341.67	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	169 - 164 (1)	TP16.4546x15.5x0.25	5.07	472.03	0.011	0.00	632.68	0.000
L2	164 - 159 (2)	TP17.4092x16.4546x0.25	5.70	505.79	0.011	0.11	710.02	0.000
L3	159 - 154 (3)	TP18.3638x17.4092x0.25	12.55	533.93	0.024	1.12	791.82	0.001
L4	154 - 149 (4)	TP19.3183x18.3638x0.25	13.23	562.07	0.024	1.23	878.07	0.001
L5	149 - 144 (5)	TP20.2729x19.3183x0.25	15.40	590.21	0.026	1.11	968.78	0.001
L6	144 - 139 (6)	TP21.2275x20.2729x0.25	15.80	618.34	0.026	1.11	1063.95	0.001
L7	139 - 133.33 (7)	TP22.31x21.2275x0.25	17.18	631.50	0.027	1.24	1109.97	0.001
L8	133.33 - 131.663 (8)	TP22.1143x21.1737x0.3125	18.28	803.30	0.023	1.49	1433.09	0.001
L9	131.663 - 126.663 (9)	TP23.055x22.1143x0.3125	21.21	837.96	0.025	1.97	1560.33	0.001
L10	126.663 - 121.663 (10)	TP23.9956x23.055x0.3125	22.29	872.62	0.026	2.07	1692.99	0.001
L11	121.663 - 116.663 (11)	TP24.9362x23.9956x0.3125	23.38	907.28	0.026	2.16	1831.06	0.001
L12	116.663 - 111.663 (12)	TP25.8769x24.9362x0.3125	24.48	941.94	0.026	2.07	1974.53	0.001
L13	111.663 - 111 (13)	TP26.0016x25.8769x0.3125	24.62	946.53	0.026	2.08	1993.97	0.001
L14	111 - 110.75 (14)	TP26.0487x26.0016x0.575	24.67	1727.01	0.014	2.08	3570.88	0.001
L15	110.75 - 105.75 (15)	TP26.9893x26.0487x0.5625	30.91	1752.68	0.018	1.81	3764.30	0.000
L16	105.75 - 101.5 (16)	TP27.7888x26.9893x0.55	31.93	1766.40	0.018	1.80	3914.52	0.000
L17	101.5 - 101.25 (17)	TP27.8359x27.7888x0.9875	31.99	3126.02	0.010	1.79	6719.02	0.000
L18	101.25 - 101	TP27.8829x27.8359x0.9875	32.06	3131.50	0.010	1.79	6743.00	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
	(18)							
L19	101 - 100.75 (19)	TP27.9299x27.8829x0.725	32.12	2325.53	0.014	1.79	5114.83	0.000
L20	100.75 - 95.75 (20)	TP28.8706x27.9299x0.7125	33.40	2365.51	0.014	1.77	5392.11	0.000
L21	95.75 - 87.833 (21)	TP30.36x28.8706x0.7	34.29	2380.69	0.014	1.75	5564.68	0.000
L22	87.833 - 86.833 (22)	TP29.9235x28.9198x0.9375	35.80	3204.03	0.011	1.71	7466.98	0.000
L23	86.833 - 81.733 (23)	TP30.8834x29.9235x1.125	37.14	3947.29	0.009	1.69	9394.58	0.000
L24	81.733 - 81.55 (24)	TP30.9178x30.8834x1.125	37.18	3951.86	0.009	1.68	9416.67	0.000
L25	81.55 - 81 (25)	TP31.0214x30.9178x1.125	37.33	3965.59	0.009	1.68	9483.42	0.000
L26	81 - 80.75 (26)	TP31.0684x31.0214x0.9375	37.39	3330.58	0.011	1.68	8078.09	0.000
L27	80.75 - 75.75 (27)	TP32.0094x31.0684x0.925	38.66	3390.17	0.011	1.66	8494.00	0.000
L28	75.75 - 70.75 (28)	TP32.9505x32.0094x0.9	39.91	3401.05	0.012	1.63	8800.42	0.000
L29	70.75 - 65.75 (29)	TP33.8915x32.9505x0.875	41.14	3406.25	0.012	1.61	9093.50	0.000
L30	65.75 - 60.75 (30)	TP34.8326x33.8915x0.8625	42.35	3454.55	0.012	1.58	9499.08	0.000
L31	60.75 - 55.75 (31)	TP35.7736x34.8326x0.85	43.54	3500.05	0.012	1.55	9904.50	0.000
L32	55.75 - 50.75 (32)	TP36.7146x35.7736x0.825	44.70	3491.08	0.013	1.53	10165.83	0.000
L33	50.75 - 43.336 (33)	TP38.11x36.7146x0.825	45.17	3529.18	0.013	1.53	10391.42	0.000
L34	43.336 - 42.336 (34)	TP37.5461x36.3563x1.0375	46.82	4466.01	0.010	1.56	13159.17	0.000
L35	42.336 - 37.336 (35)	TP38.4855x37.5461x1.025	47.95	4527.24	0.011	1.61	13701.50	0.000
L36	37.336 - 32.336 (36)	TP39.4249x38.4855x1	49.03	4530.53	0.011	1.65	14082.75	0.000
L37	32.336 - 27.336 (37)	TP40.3642x39.4249x0.975	50.07	4528.13	0.011	1.70	14446.42	0.000
L38	27.336 - 22.236 (38)	TP41.3224x40.3642x1.0375	51.09	4927.96	0.010	1.74	16063.83	0.000
L39	22.236 - 22.08 (39)	TP41.3517x41.3224x1.0375	51.10	4931.54	0.010	1.74	16087.50	0.000
L40	22.08 - 17.08 (40)	TP42.2911x41.3517x1.025	52.07	4987.16	0.010	1.79	16667.67	0.000
L41	17.08 - 12.08 (41)	TP43.2305x42.2911x1	52.94	4979.23	0.011	1.84	17049.33	0.000
L42	12.08 - 7.08 (42)	TP44.1698x43.2305x0.975	53.75	4965.61	0.011	1.88	17409.83	0.000
L43	7.08 - 5.67 (43)	TP44.4347x44.1698x0.975	53.80	4996.07	0.011	1.88	17626.42	0.000
L44	5.67 - 5.42 (44)	TP44.4817x44.4347x1.4	53.77	7111.44	0.008	1.88	24628.92	0.000
L45	5.42 - 2.25 (45)	TP45.0773x44.4817x1.375	53.92	7085.06	0.008	1.88	24915.92	0.000
L46	2.25 - 2 (46)	TP45.1242x45.0773x1.125	53.92	5836.26	0.009	1.88	20782.50	0.000
L47	2 - 0 (47)	TP45.5x45.1242x1.1	54.00	5758.54	0.009	1.88	20708.58	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 164 (1)	0.002	0.029	0.000	0.011	0.000	0.032 ✔	1.000	4.8.2 ✔
L2	164 - 159 (2)	0.002	0.102	0.000	0.011	0.000	0.104 ✔	1.000	4.8.2 ✔
L3	159 - 154 (3)	0.005	0.217	0.000	0.024	0.001	0.222 ✔	1.000	4.8.2 ✔
L4	154 - 149 (4)	0.005	0.342	0.000	0.024	0.001	0.348 ✔	1.000	4.8.2 ✔
L5	149 - 144 (5)	0.006	0.464	0.000	0.026	0.001	0.470 ✔	1.000	4.8.2 ✔
L6	144 - 139 (6)	0.006	0.569	0.000	0.026	0.001	0.575 ✔	1.000	4.8.2 ✔
L7	139 - 133.33 (7)	0.006	0.615	0.000	0.027	0.001	0.622 ✔	1.000	4.8.2 ✔
L8	133.33 - 131.663 (8)	0.005	0.600	0.000	0.023	0.001	0.606 ✔	1.000	4.8.2 ✔
L9	131.663 - 126.663 (9)	0.006	0.675	0.000	0.025	0.001	0.682 ✔	1.000	4.8.2 ✔
L10	126.663 - 121.663 (10)	0.006	0.751	0.000	0.026	0.001	0.757 ✔	1.000	4.8.2 ✔
L11	121.663 - 116.663 (11)	0.006	0.819	0.000	0.026	0.001	0.826 ✔	1.000	4.8.2 ✔
L12	116.663 - 111.663 (12)	0.006	0.881	0.000	0.026	0.001	0.888 ✔	1.000	4.8.2 ✔
L13	111.663 - 111 (13)	0.006	0.888	0.000	0.026	0.001	0.896 ✔	1.000	4.8.2 ✔
L14	111 - 110.75 (14)	0.004	0.500	0.000	0.014	0.001	0.503 ✔	1.000	4.8.2 ✔
L15	110.75 - 105.75 (15)	0.004	0.556	0.000	0.018	0.000	0.561 ✔	1.000	4.8.2 ✔
L16	105.75 - 101.5 (16)	0.005	0.603	0.000	0.018	0.000	0.608 ✔	1.000	4.8.2 ✔
L17	101.5 - 101.25 (17)	0.003	0.354	0.000	0.010	0.000	0.356 ✔	1.000	4.8.2 ✔
L18	101.25 - 101 (18)	0.003	0.355	0.000	0.010	0.000	0.358 ✔	1.000	4.8.2 ✔
L19	101 - 100.75 (19)	0.004	0.471	0.000	0.014	0.000	0.475 ✔	1.000	4.8.2 ✔
L20	100.75 - 95.75 (20)	0.004	0.507	0.000	0.014	0.000	0.512 ✔	1.000	4.8.2 ✔
L21	95.75 - 87.833 (21)	0.004	0.535	0.000	0.014	0.000	0.540 ✔	1.000	4.8.2 ✔
L22	87.833 - 86.833 (22)	0.004	0.449	0.000	0.011	0.000	0.453 ✔	1.000	4.8.2 ✔
L23	86.833 - 81.733 (23)	0.003	0.397	0.000	0.009	0.000	0.400 ✔	1.000	4.8.2 ✔
L24	81.733 - 81.55 (24)	0.003	0.397	0.000	0.009	0.000	0.400 ✔	1.000	4.8.2 ✔
L25	81.55 - 81 (25)	0.003	0.399	0.000	0.009	0.000	0.402 ✔	1.000	4.8.2 ✔
L26	81 - 80.75 (26)	0.004	0.470	0.000	0.011	0.000	0.474 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L27	80.75 - 75.75 (27)	0.004	0.492	0.000	0.011	0.000	0.496 ✔	1.000	4.8.2 ✔
L28	75.75 - 70.75 (28)	0.004	0.520	0.000	0.012	0.000	0.524 ✔	1.000	4.8.2 ✔
L29	70.75 - 65.75 (29)	0.005	0.548	0.000	0.012	0.000	0.552 ✔	1.000	4.8.2 ✔
L30	65.75 - 60.75 (30)	0.005	0.568	0.000	0.012	0.000	0.573 ✔	1.000	4.8.2 ✔
L31	60.75 - 55.75 (31)	0.005	0.588	0.000	0.012	0.000	0.594 ✔	1.000	4.8.2 ✔
L32	55.75 - 50.75 (32)	0.005	0.617	0.000	0.013	0.000	0.622 ✔	1.000	4.8.2 ✔
L33	50.75 - 43.336 (33)	0.006	0.621	0.000	0.013	0.000	0.627 ✔	1.000	4.8.2 ✔
L34	43.336 - 42.336 (34)	0.005	0.535	0.000	0.010	0.000	0.540 ✔	1.000	4.8.2 ✔
L35	42.336 - 37.336 (35)	0.005	0.548	0.000	0.011	0.000	0.554 ✔	1.000	4.8.2 ✔
L36	37.336 - 32.336 (36)	0.006	0.568	0.000	0.011	0.000	0.574 ✔	1.000	4.8.2 ✔
L37	32.336 - 27.336 (37)	0.006	0.588	0.000	0.011	0.000	0.594 ✔	1.000	4.8.2 ✔
L38	27.336 - 22.236 (38)	0.006	0.561	0.000	0.010	0.000	0.567 ✔	1.000	4.8.2 ✔
L39	22.236 - 22.08 (39)	0.006	0.561	0.000	0.010	0.000	0.567 ✔	1.000	4.8.2 ✔
L40	22.08 - 17.08 (40)	0.006	0.573	0.000	0.010	0.000	0.579 ✔	1.000	4.8.2 ✔
L41	17.08 - 12.08 (41)	0.006	0.591	0.000	0.011	0.000	0.597 ✔	1.000	4.8.2 ✔
L42	12.08 - 7.08 (42)	0.007	0.609	0.000	0.011	0.000	0.616 ✔	1.000	4.8.2 ✔
L43	7.08 - 5.67 (43)	0.007	0.610	0.000	0.011	0.000	0.617 ✔	1.000	4.8.2 ✔
L44	5.67 - 5.42 (44)	0.005	0.438	0.000	0.008	0.000	0.443 ✔	1.000	4.8.2 ✔
L45	5.42 - 2.25 (45)	0.005	0.447	0.000	0.008	0.000	0.451 ✔	1.000	4.8.2 ✔
L46	2.25 - 2 (46)	0.006	0.537	0.000	0.009	0.000	0.543 ✔	1.000	4.8.2 ✔
L47	2 - 0 (47)	0.006	0.549	0.000	0.009	0.000	0.555 ✔	1.000	4.8.2 ✔

Section Capacity Table

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
169 - 164	Pole	TP16.455x15.5x0.25	Pole	3.2%	Pass
164 - 159	Pole	TP17.409x16.455x0.25	Pole	10.4%	Pass
159 - 154	Pole	TP18.364x17.409x0.25	Pole	22.2%	Pass
154 - 149	Pole	TP19.318x18.364x0.25	Pole	34.8%	Pass

149 - 144	Pole	TP20.273x19.318x0.25	Pole	47.0%	Pass
144 - 139	Pole	TP21.228x20.273x0.25	Pole	57.5%	Pass
139 - 136.66	Pole	TP22.31x21.228x0.25	Pole	62.2%	Pass
136.66 - 131.66	Pole	TP22.114x21.174x0.3125	Pole	60.6%	Pass
131.66 - 126.66	Pole	TP23.055x22.114x0.3125	Pole	68.1%	Pass
126.66 - 121.66	Pole	TP23.996x23.055x0.3125	Pole	75.7%	Pass
121.66 - 116.66	Pole	TP24.936x23.996x0.3125	Pole	82.5%	Pass
116.66 - 111.66	Pole	TP25.877x24.936x0.3125	Pole	88.7%	Pass
111.66 - 111	Pole	TP26.002x25.877x0.3125	Pole	89.5%	Pass
111 - 110.75	Pole + Reinf.	TP26.049x26.002x0.575	Reinf. 3 Tension Rupture	80.4%	Pass
110.75 - 105.75	Pole + Reinf.	TP26.989x26.049x0.5625	Reinf. 3 Tension Rupture	89.2%	Pass
105.75 - 101.5	Pole + Reinf.	TP27.789x26.989x0.55	Reinf. 3 Tension Rupture	96.1%	Pass
101.5 - 101.25	Pole + Reinf.	TP27.836x27.789x0.9875	Reinf. 1 Tension Rupture	65.6%	Pass
101.25 - 101	Pole + Reinf.	TP27.883x27.836x0.9875	Reinf. 1 Tension Rupture	65.8%	Pass
101 - 100.75	Pole + Reinf.	TP27.93x27.883x0.725	Reinf. 1 Tension Rupture	87.7%	Pass
100.75 - 95.75	Pole + Reinf.	TP28.871x27.93x0.7125	Reinf. 1 Tension Rupture	94.9%	Pass
95.75 - 92.17	Pole + Reinf.	TP30.36x28.871x0.7	Reinf. 1 Tension Rupture	99.9%	Pass
92.17 - 86.83	Pole + Reinf.	TP29.924x28.92x0.9375	Reinf. 1 Tension Rupture	83.3%	Pass
86.83 - 81.73	Pole + Reinf.	TP30.883x29.924x1.125	Reinf. 4 Tension Rupture	69.6%	Pass
81.73 - 81.55	Pole + Reinf.	TP30.918x30.883x1.125	Reinf. 4 Tension Rupture	69.8%	Pass
81.55 - 81	Pole + Reinf.	TP31.021x30.918x1.125	Reinf. 4 Tension Rupture	70.2%	Pass
81 - 80.75	Pole + Reinf.	TP31.068x31.021x0.9375	Reinf. 2 Tension Rupture	75.8%	Pass
80.75 - 75.75	Pole + Reinf.	TP32.009x31.068x0.925	Reinf. 2 Tension Rupture	79.9%	Pass
75.75 - 70.75	Pole + Reinf.	TP32.95x32.009x0.9	Reinf. 2 Tension Rupture	83.9%	Pass
70.75 - 65.75	Pole + Reinf.	TP33.892x32.95x0.875	Reinf. 2 Tension Rupture	87.7%	Pass
65.75 - 60.75	Pole + Reinf.	TP34.833x33.892x0.8625	Reinf. 2 Tension Rupture	91.4%	Pass
60.75 - 55.75	Pole + Reinf.	TP35.774x34.833x0.85	Reinf. 2 Tension Rupture	94.9%	Pass
55.75 - 50.75	Pole + Reinf.	TP36.715x35.774x0.825	Reinf. 2 Tension Rupture	98.3%	Pass
50.75 - 48.67	Pole + Reinf.	TP38.11x36.715x0.825	Reinf. 2 Tension Rupture	99.6%	Pass
48.67 - 42.34	Pole + Reinf.	TP37.546x36.356x1.0375	Reinf. 2 Tension Rupture	85.4%	Pass
42.34 - 37.34	Pole + Reinf.	TP38.485x37.546x1.025	Reinf. 2 Tension Rupture	88.1%	Pass
37.34 - 32.34	Pole + Reinf.	TP39.425x38.485x1	Reinf. 2 Tension Rupture	90.7%	Pass
32.34 - 27.34	Pole + Reinf.	TP40.364x39.425x0.975	Reinf. 2 Tension Rupture	93.2%	Pass
27.34 - 22.24	Pole + Reinf.	TP41.322x40.364x1.0375	Reinf. 2 Tension Rupture	89.4%	Pass
22.24 - 22.08	Pole + Reinf.	TP41.352x41.322x1.0375	Reinf. 2 Tension Rupture	89.5%	Pass
22.08 - 17.08	Pole + Reinf.	TP42.291x41.352x1.025	Reinf. 2 Tension Rupture	91.8%	Pass
17.08 - 12.08	Pole + Reinf.	TP43.23x42.291x1	Reinf. 2 Tension Rupture	93.9%	Pass
12.08 - 7.08	Pole + Reinf.	TP44.17x43.23x0.975	Reinf. 2 Tension Rupture	96.0%	Pass
7.08 - 5.67	Pole + Reinf.	TP44.435x44.17x0.975	Reinf. 2 Tension Rupture	96.6%	Pass
5.67 - 5.42	Pole + Reinf.	TP44.482x44.435x1.4	Reinf. 2 Tension Rupture	70.0%	Pass
5.42 - 2.25	Pole + Reinf.	TP45.077x44.482x1.375	Reinf. 2 Tension Rupture	71.1%	Pass
2.25 - 2	Pole + Reinf.	TP45.124x45.077x1.125	Reinf. 2 Tension Rupture	85.7%	Pass
2 - 0	Pole + Reinf.	TP45.5x45.124x1.1	Reinf. 2 Tension Rupture	86.5%	Pass
				Summary	
			Pole	89.5%	Pass
			Reinforcement	99.9%	Pass
			Overall	**99.9%**	**Pass**

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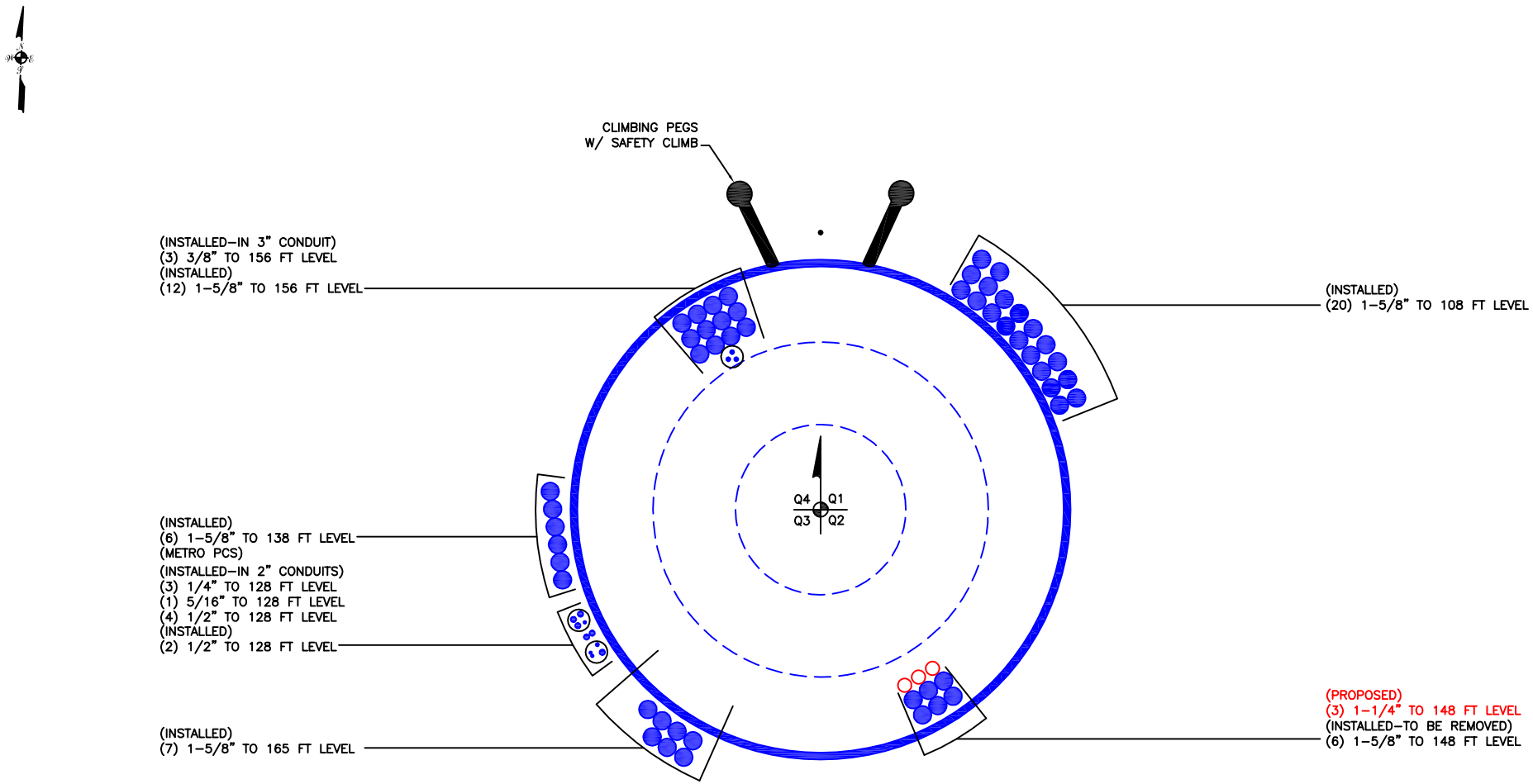
APPENDIX B

BASE LEVEL DRAWING


CLIMBING PEGS
W/ SAFETY CLIMB
(INSTALLED–IN 3" CONDUIT)
(3) 3/8" TO 156 FT LEVEL
(INSTALLED)
(12) 1–5/8" TO 156 FT LEVEL
(INSTALLED)
(20) 1–5/8" TO 108 FT LEVEL
(INSTALLED)
(6) 1–5/8" TO 138 FT LEVEL
(METRO PCS)
(INSTALLED–IN 2" CONDUITS)
(3) 1/4" TO 128 FT LEVEL
(1) 5/16" TO 128 FT LEVEL
(4) 1/2" TO 128 FT LEVEL
(INSTALLED)
(2) 1/2" TO 128 FT LEVEL
(INSTALLED)
(7) 1–5/8" TO 165 FT LEVEL
(PROPOSED)
(3) 1–1/4" TO 148 FT LEVEL
(INSTALLED–TO BE REMOVED)
(6) 1–5/8" TO 148 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- G

Site BU: 828054

Work Order: 1322525

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	169	35.67	3.333	18	15.5	22.31	0.25	1	A572-65
2	136.663	48.83	4.333	18	21.17	30.36	0.3125	1.25	A572-65
3	92.166	48.83	5.333	18	28.92	38.11	0.375	1.5	A572-65
4	48.669	48.669	0	18	36.36	45.5	0.375	1.5	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	81.8	101.5	plate	PL 1.25"x4"	6	1			1			1			1			1			1		
2	0	81.8	plate	PL 1.25"x6"	6	1			1			1			1			1			1		
3	101	111	plate	CCI-AFP-060100	3			1						1						1			
4	81	88	plate	CCI-SFP-045100	3			1						1						1			
5	22.33	44.83	plate	CCI-AFP-060100	4		1				1					1				1			
6	2.25	22.33	plate	CCI-WCFP-065125	4		1				1					1				1			
7	0	5.67	plate	TS PL 8"x1.25"	4		1				1					1				1			
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	4	1.25	5	0.625	30.000	30.000	18.000	3.438	1.1875	A572-65
2	6	1.25	7.5	0.625	36.000	36.000	12.000	5.938	1.1875	A572-65
3	6	1	6	0.5	30.000	30.000	16.000	4.750	1.1875	A572-65
4	4.5	1	4.5	0.5	18.000	18.000	20.000	3.250	1.1875	A572-65
5	6	1	6	0.5	30.000	30.000	16.000	4.750	1.1875	A572-65
6	6.5	1.25	8.125	0.625	n/a	33.000	19.000	6.563	1.1875	A572-65
7	1.25	8	10	4	n/a	n/a	0.000	10.000	0.0000	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	169 - 164	5		18	15.500	16.455	0.25	A572-65	1.000
2	164 - 159	5		18	16.455	17.409	0.25	A572-65	1.000
3	159 - 154	5		18	17.409	18.364	0.25	A572-65	1.000
4	154 - 149	5		18	18.364	19.318	0.25	A572-65	1.000
5	149 - 144	5		18	19.318	20.273	0.25	A572-65	1.000
6	144 - 139	5		18	20.273	21.228	0.25	A572-65	1.000
7	139 - 136.663	5.67	3.333	18	21.228	22.310	0.25	A572-65	1.000
8	136.663 - 131.663	5		18	21.174	22.114	0.3125	A572-65	1.000
9	131.663 - 126.663	5		18	22.114	23.055	0.3125	A572-65	1.000
10	126.663 - 121.663	5		18	23.055	23.996	0.3125	A572-65	1.000
11	121.663 - 116.663	5		18	23.996	24.936	0.3125	A572-65	1.000
12	116.663 - 111.663	5		18	24.936	25.877	0.3125	A572-65	1.000
13	111.663 - 111	0.663		18	25.877	26.002	0.3125	A572-65	1.000
14	111 - 110.75	0.25		18	26.002	26.049	0.575	A572-65	0.936
15	110.75 - 105.75	5		18	26.049	26.989	0.5625	A572-65	0.942
16	105.75 - 101.5	4.25		18	26.989	27.789	0.55	A572-65	0.952
17	101.5 - 101.25	0.25		18	27.789	27.836	0.9875	A572-65	0.895
18	101.25 - 101	0.25		18	27.836	27.883	0.9875	A572-65	0.894
19	101 - 100.75	0.25		18	27.883	27.930	0.725	A572-65	0.917
20	100.75 - 95.75	5		18	27.930	28.871	0.7125	A572-65	0.916
21	95.75 - 92.166	7.917	4.333	18	28.871	30.360	0.7	A572-65	0.921
22	92.166 - 86.833	5.333		18	28.920	29.924	0.9375	A572-65	0.912
23	86.833 - 81.733	5.1		18	29.924	30.883	1.125	A572-65	0.892
24	81.733 - 81.55	0.183		18	30.883	30.918	1.125	A572-65	0.892
25	81.55 - 81	0.55		18	30.918	31.021	1.125	A572-65	0.890
26	81 - 80.75	0.25		18	31.021	31.068	0.9375	A572-65	0.909
27	80.75 - 75.75	5		18	31.068	32.009	0.925	A572-65	0.906
28	75.75 - 70.75	5		18	32.009	32.950	0.9	A572-65	0.915
29	70.75 - 65.75	5		18	32.950	33.892	0.875	A572-65	0.926
30	65.75 - 60.75	5		18	33.892	34.833	0.8625	A572-65	0.925
31	60.75 - 55.75	5		18	34.833	35.774	0.85	A572-65	0.925
32	55.75 - 50.75	5		18	35.774	36.715	0.825	A572-65	0.939
33	50.75 - 48.669	7.414	5.333	18	36.715	38.110	0.825	A572-65	0.934
34	48.669 - 42.336	6.333		18	36.356	37.546	1.0375	A572-65	0.942
35	42.336 - 37.336	5		18	37.546	38.485	1.025	A572-65	0.938
36	37.336 - 32.336	5		18	38.485	39.425	1	A572-65	0.947
37	32.336 - 27.336	5		18	39.425	40.364	0.975	A572-65	0.957
38	27.336 - 22.236	5.1		18	40.364	41.322	1.0375	A572-65	0.952
39	22.236 - 22.08	0.156		18	41.322	41.352	1.0375	A572-65	0.951
40	22.08 - 17.08	5		18	41.352	42.291	1.025	A572-65	0.949
41	17.08 - 12.08	5		18	42.291	43.230	1	A572-65	0.959
42	12.08 - 7.08	5		18	43.230	44.170	0.975	A572-65	0.970
43	7.08 - 5.67	1.41		18	44.170	44.435	0.975	A572-65	0.966
44	5.67 - 5.42	0.25		18	44.435	44.482	1.4	A572-65	0.888
45	5.42 - 2.25	3.17		18	44.482	45.077	1.375	A572-65	0.895
46	2.25 - 2	0.25		18	45.077	45.124	1.125	A572-65	0.880
47	2 - 0	2		18	45.124	45.500	1.1	A572-65	0.895

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	169 - 164	2.1118	9.3144	5.0659
2	164 - 159	2.2842	36.138	5.697
3	159 - 154	4.9501	85.746	12.548
4	154 - 149	5.302	150.16	13.226
5	149 - 144	6.5332	224.36	15.398
6	144 - 139	7.0722	302.32	15.796
7	139 - 136.663	7.5906	340.99	17.179
8	136.663 - 131.663	8.3726	429.6	18.284
9	131.663 - 126.663	9.5919	526.11	21.212
10	126.663 - 121.663	10.315	634.79	22.294
11	121.663 - 116.663	11.088	748.88	23.376
12	116.663 - 111.663	11.91	868.41	24.479
13	111.663 - 111	12.031	884.68	24.617
14	111 - 110.75	12.1	890.84	24.67
15	110.75 - 105.75	15.664	1045	30.915
16	105.75 - 101.5	16.763	1178.6	31.934
17	101.5 - 101.25	16.874	1186.6	31.991
18	101.25 - 101	16.966	1194.6	32.058
19	101 - 100.75	17.041	1202.6	32.122
20	100.75 - 95.75	18.557	1366.5	33.396
21	95.75 - 92.166	19.676	1487.8	34.292
22	92.166 - 86.833	22.736	1674.8	35.801
23	86.833 - 81.733	25.028	1860.9	37.141
24	81.733 - 81.55	25.123	1867.7	37.181
25	81.55 - 81	25.369	1888.2	37.328
26	81 - 80.75	25.475	1897.5	37.39
27	80.75 - 75.75	27.506	2087.7	38.663
28	75.75 - 70.75	29.591	2284.2	39.912
29	70.75 - 65.75	31.716	2486.9	41.142
30	65.75 - 60.75	33.88	2695.6	42.352
31	60.75 - 55.75	36.081	2910.4	43.541
32	55.75 - 50.75	38.323	3131	44.703
33	50.75 - 48.669	39.269	3224.6	45.174
34	48.669 - 42.336	44.579	3516	46.824
35	42.336 - 37.336	47.344	3753	47.947
36	37.336 - 32.336	50.145	3995.5	49.03
37	32.336 - 27.336	52.982	4243.2	50.066
38	27.336 - 22.236	56.072	4501.2	51.089
39	22.236 - 22.08	56.2	4509.2	51.1
40	22.08 - 17.08	59.2	4767.1	52.1
41	17.08 - 12.08	62.3	5029.7	52.9
42	12.08 - 7.08	65.4	5296.4	53.7
43	7.08 - 5.67	66.2	5372.1	53.8
44	5.67 - 5.42	66.4	5385.6	53.8
45	5.42 - 2.25	68.7	5556.2	53.9
46	2.25 - 2	68.9	5569.7	53.9
47	2 - 0	70.0	5677.6	54.0

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
169 - 164	Pole	TP16.455x15.5x0.25	Pole	3.2%	Pass
164 - 159	Pole	TP17.409x16.455x0.25	Pole	10.4%	Pass
159 - 154	Pole	TP18.364x17.409x0.25	Pole	22.2%	Pass
154 - 149	Pole	TP19.318x18.364x0.25	Pole	34.8%	Pass
149 - 144	Pole	TP20.273x19.318x0.25	Pole	47.0%	Pass
144 - 139	Pole	TP21.228x20.273x0.25	Pole	57.5%	Pass
139 - 136.66	Pole	TP22.31x21.228x0.25	Pole	62.2%	Pass
136.66 - 131.66	Pole	TP22.114x21.174x0.3125	Pole	60.6%	Pass
131.66 - 126.66	Pole	TP23.055x22.114x0.3125	Pole	68.1%	Pass
126.66 - 121.66	Pole	TP23.996x23.055x0.3125	Pole	75.7%	Pass
121.66 - 116.66	Pole	TP24.936x23.996x0.3125	Pole	82.5%	Pass
116.66 - 111.66	Pole	TP25.877x24.936x0.3125	Pole	88.7%	Pass
111.66 - 111	Pole	TP26.002x25.877x0.3125	Pole	89.5%	Pass
111 - 110.75	Pole + Reinf.	TP26.049x26.002x0.575	Reinf. 3 Tension Rupture	80.4%	Pass
110.75 - 105.75	Pole + Reinf.	TP26.989x26.049x0.5625	Reinf. 3 Tension Rupture	89.2%	Pass
105.75 - 101.5	Pole + Reinf.	TP27.789x26.989x0.55	Reinf. 3 Tension Rupture	96.1%	Pass
101.5 - 101.25	Pole + Reinf.	TP27.836x27.789x0.9875	Reinf. 1 Tension Rupture	65.6%	Pass
101.25 - 101	Pole + Reinf.	TP27.883x27.836x0.9875	Reinf. 1 Tension Rupture	65.8%	Pass
101 - 100.75	Pole + Reinf.	TP27.93x27.883x0.725	Reinf. 1 Tension Rupture	87.7%	Pass
100.75 - 95.75	Pole + Reinf.	TP28.871x27.93x0.7125	Reinf. 1 Tension Rupture	94.9%	Pass
95.75 - 92.17	Pole + Reinf.	TP30.36x28.871x0.7	Reinf. 1 Tension Rupture	99.9%	Pass
92.17 - 86.83	Pole + Reinf.	TP29.924x28.92x0.9375	Reinf. 1 Tension Rupture	83.3%	Pass
86.83 - 81.73	Pole + Reinf.	TP30.883x29.924x1.125	Reinf. 4 Tension Rupture	69.6%	Pass
81.73 - 81.55	Pole + Reinf.	TP30.918x30.883x1.125	Reinf. 4 Tension Rupture	69.8%	Pass
81.55 - 81	Pole + Reinf.	TP31.021x30.918x1.125	Reinf. 4 Tension Rupture	70.2%	Pass
81 - 80.75	Pole + Reinf.	TP31.068x31.021x0.9375	Reinf. 2 Tension Rupture	75.8%	Pass
80.75 - 75.75	Pole + Reinf.	TP32.009x31.068x0.925	Reinf. 2 Tension Rupture	79.9%	Pass
75.75 - 70.75	Pole + Reinf.	TP32.95x32.009x0.9	Reinf. 2 Tension Rupture	83.9%	Pass
70.75 - 65.75	Pole + Reinf.	TP33.892x32.95x0.875	Reinf. 2 Tension Rupture	87.7%	Pass
65.75 - 60.75	Pole + Reinf.	TP34.833x33.892x0.8625	Reinf. 2 Tension Rupture	91.4%	Pass
60.75 - 55.75	Pole + Reinf.	TP35.774x34.833x0.85	Reinf. 2 Tension Rupture	94.9%	Pass
55.75 - 50.75	Pole + Reinf.	TP36.715x35.774x0.825	Reinf. 2 Tension Rupture	98.3%	Pass
50.75 - 48.67	Pole + Reinf.	TP38.11x36.715x0.825	Reinf. 2 Tension Rupture	99.6%	Pass
48.67 - 42.34	Pole + Reinf.	TP37.546x36.356x1.0375	Reinf. 2 Tension Rupture	85.4%	Pass
42.34 - 37.34	Pole + Reinf.	TP38.485x37.546x1.025	Reinf. 2 Tension Rupture	88.1%	Pass
37.34 - 32.34	Pole + Reinf.	TP39.425x38.485x1	Reinf. 2 Tension Rupture	90.7%	Pass
32.34 - 27.34	Pole + Reinf.	TP40.364x39.425x0.975	Reinf. 2 Tension Rupture	93.2%	Pass
27.34 - 22.24	Pole + Reinf.	TP41.322x40.364x1.0375	Reinf. 2 Tension Rupture	89.4%	Pass
22.24 - 22.08	Pole + Reinf.	TP41.352x41.322x1.0375	Reinf. 2 Tension Rupture	89.5%	Pass
22.08 - 17.08	Pole + Reinf.	TP42.291x41.352x1.025	Reinf. 2 Tension Rupture	91.8%	Pass
17.08 - 12.08	Pole + Reinf.	TP43.23x42.291x1	Reinf. 2 Tension Rupture	93.9%	Pass
12.08 - 7.08	Pole + Reinf.	TP44.17x43.23x0.975	Reinf. 2 Tension Rupture	96.0%	Pass
7.08 - 5.67	Pole + Reinf.	TP44.435x44.17x0.975	Reinf. 2 Tension Rupture	96.6%	Pass
5.67 - 5.42	Pole + Reinf.	TP44.482x44.435x1.4	Reinf. 2 Tension Rupture	70.0%	Pass
5.42 - 2.25	Pole + Reinf.	TP45.077x44.482x1.375	Reinf. 2 Tension Rupture	71.1%	Pass
2.25 - 2	Pole + Reinf.	TP45.124x45.077x1.125	Reinf. 2 Tension Rupture	85.7%	Pass
2 - 0	Pole + Reinf.	TP45.5x45.124x1.1	Reinf. 2 Tension Rupture	86.5%	Pass
				Summary	
			Pole	89.5%	Pass
			Reinforcement	99.9%	Pass
			Overall	99.9%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity							
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7
169 - 164	426	n/a	426	12.86	n/a	12.86	3.2%							
164 - 159	506	n/a	506	13.62	n/a	13.62	10.4%							
159 - 154	596	n/a	596	14.37	n/a	14.37	22.2%							
154 - 149	695	n/a	695	15.13	n/a	15.13	34.8%							
149 - 144	804	n/a	804	15.89	n/a	15.89	47.0%							
144 - 139	925	n/a	925	16.65	n/a	16.65	57.5%							
139 - 136.66	985	n/a	985	17.00	n/a	17.00	62.2%							
136.66 - 131.66	1298	n/a	1298	21.62	n/a	21.62	60.6%							
131.66 - 126.66	1474	n/a	1474	22.56	n/a	22.56	68.1%							
126.66 - 121.66	1664	n/a	1664	23.49	n/a	23.49	75.7%							
121.66 - 116.66	1870	n/a	1870	24.42	n/a	24.42	82.5%							
116.66 - 111.66	2093	n/a	2093	25.36	n/a	25.36	88.7%							
111.66 - 111	2124	n/a	2124	25.48	n/a	25.48	89.5%							
111 - 110.75	2135	1674	3809	25.53	18.00	43.53	49.7%			80.4%				
110.75 - 105.75	2378	1790	4169	26.46	18.00	44.46	55.2%			89.2%				
105.75 - 101.5	2599	1893	4491	27.25	18.00	45.25	59.5%			96.1%				
101.5 - 101.25	2612	5093	7705	27.30	48.00	75.30	35.0%	65.6%		56.5%				
101.25 - 101	2625	5109	7735	27.35	48.00	75.35	35.2%	65.8%		56.8%				
101 - 100.75	2639	3215	5854	27.39	30.00	57.39	46.9%	87.7%						
100.75 - 95.75	2918	3424	6342	28.33	30.00	58.33	50.8%	94.9%						
95.75 - 92.17	3129	3578	6707	28.99	30.00	58.99	53.5%	99.9%						
92.17 - 86.83	3878	5292	9170	35.17	43.50	78.67	44.6%	83.3%			78.7%			
86.83 - 81.73	4269	7606	11875	36.31	58.50	94.81	39.5%		64.1%		69.6%			
81.73 - 81.55	4283	7622	11905	36.35	58.50	94.85	39.6%		64.2%		69.8%			
81.55 - 81	4327	7671	11998	36.48	58.50	94.98	39.9%		64.6%		70.2%			
81 - 80.75	4347	5946	10292	36.53	45.00	81.53	46.8%		75.8%					
80.75 - 75.75	4759	6293	11052	37.65	45.00	82.65	49.4%		79.9%					
75.75 - 70.75	5196	6650	11846	38.77	45.00	83.77	51.9%		83.9%					
70.75 - 65.75	5660	7017	12677	39.89	45.00	84.89	54.3%		87.7%					
65.75 - 60.75	6150	7394	13544	41.01	45.00	86.01	56.6%		91.4%					
60.75 - 55.75	6668	7781	14449	42.13	45.00	87.13	58.9%		94.9%					
55.75 - 50.75	7214	8178	15392	43.25	45.00	88.25	61.0%		98.3%					
50.75 - 48.67	7450	8346	15796	43.72	45.00	88.72	61.9%		99.6%					
48.67 - 42.34	7720	12538	20258	44.24	69.00	113.24	53.9%		85.4%			82.8%		
42.34 - 37.34	8321	13148	21469	45.36	69.00	114.36	55.9%		88.1%			85.5%		
37.34 - 32.34	8951	13773	22724	46.48	69.00	115.48	58.0%		90.7%			88.1%		
32.34 - 27.34	9613	14412	24025	47.60	69.00	116.60	60.0%		93.2%			90.6%		
27.34 - 22.24	10321	16872	27192	48.74	77.50	126.24	58.0%		89.4%				85.1%	
22.24 - 22.08	10343	16895	27238	48.77	77.50	126.27	58.0%		89.5%				85.2%	
22.08 - 17.08	11070	17642	28712	49.89	77.50	127.39	59.9%		91.8%				87.4%	
17.08 - 12.08	11832	18406	30237	51.01	77.50	128.51	61.8%		93.9%				89.5%	
12.08 - 7.08	12627	19185	31812	52.12	77.50	129.62	63.6%		96.0%				91.5%	
7.08 - 5.67	12857	19408	32265	52.44	77.50	129.94	64.1%		96.6%				92.0%	
5.67 - 5.42	12898	31780	44678	52.50	117.50	170.00	46.5%		70.0%				65.3%	62.1%
5.42 - 2.25	13428	32566	45994	53.20	117.50	170.70	47.4%		71.1%				66.3%	62.9%
2.25 - 2	13470	24801	38271	53.26	85.00	138.26	57.2%		85.7%					76.7%
2 - 0	13812	25176	38988	53.71	85.00	138.71	57.9%		86.5%					77.3%

Note: Section capacity checked in 5 degree increments.

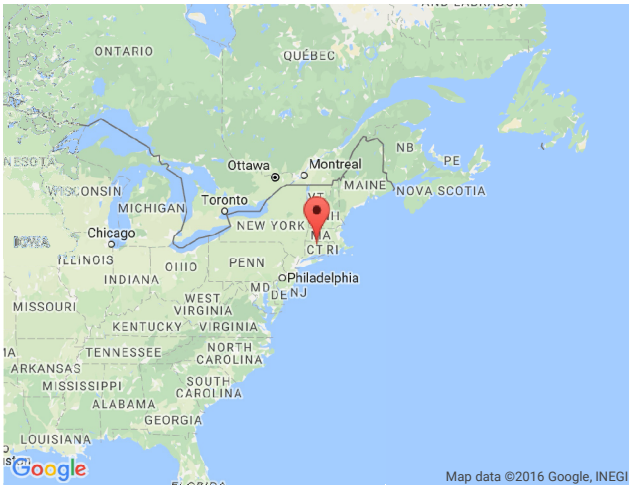
Search Results

Query Date: Mon Nov 21 2016
Latitude: 41.8334
Longitude: -72.6031

ASCE 7-10 Windspeeds
(3-sec peak gust in mph*):

Risk Category I: 112
Risk Category II: 123
Risk Category III-IV: 132
MRI 10-Year:** 76
MRI 25-Year:** 87
MRI 50-Year:** 93
MRI 100-Year:** 99

ASCE 7-05 Windspeed:
99 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
80 (fastest mile in mph)



*Miles per hour
**Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

Print your results

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BU#: 828054
Project #: 017-00013-00

Tower Reactions		
Tower Type	Monopole	
Moment	5687.0	kip-ft
Compression	70.0	kip

Micropile/Rock Anchor Design Strength		
Allowable Strength	306.3	kip

Moment of Inertia Calculation		
Number of Piles	2	
Distance from Centroid	58.75	in
Number of Piles	4	
Distance from Centroid	29.375	in
Number of Piles	0	
Distance from Centroid	0	in
Number of Piles	0	
Distance from Centroid	0	in

Micropile/ Rock Anchor Capacities		
Steel Anchor Strength Capacity	97.7%	OK

Overall Capacity	97.7%	OK

Capacity Calculations		
Compression Load		
Farest Distance from Centroid, y	58.8	in
Moment of Inheria, I	10354.7	in^2
Moment, Mu	5687.0	k-ft
Axial load due to Moment, Pu	398.9	kip <--- Controls
Axial load due to Compression, Pu	70.0	kip
Tension, Tu	0.0	kip
Steel Anchor Strength Check		
ϕ	1.33	
1.333xAllowable Stress	408.3	kip
Steel Capacity	97.7%	

PAUL J. FORD & COMPANY

Date: **November 17, 2016**

Timothy Howell
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 East Broad St, Suite 600
Columbus, OH 43215
614.221.6679

Subject: **Structural Modification Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL01135
	Carrier Site Name:	South Windsor West
Crown Castle Designation:	**Crown Castle BU Number:**	828054
	Crown Castle Site Name:	South Windsor/Rt 5
	Crown Castle JDE Job Number:	389195
	Crown Castle Work Order Number:	1324130
	Crown Castle Application Number:	356926 Rev. 5
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37516-2594.003.7700
Site Data:	**300 Governors Highway, South Windsor, Hartford County, CT**	
	Latitude *41° 50' 0.4"*, Longitude *-72° 36' 11"*	
	169 Foot - Monopole Tower	

Dear Timothy Howell,

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 968814, in accordance with application 356926, revision 5.

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II and Exposure Category C were used in this analysis.

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:

Thomas J. Dehnke, EI
Project Designer
tdehnke@pjfweb.com BKK

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

11-17-16

tnxTower Report - version 7.0.5.1

Date: **November 17, 2016**

Timothy Howell
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 East Broad St, Suite 600
Columbus, OH 43215
614.221.6679

Subject: **Structural Modification Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL01135
	Carrier Site Name:	South Windsor West
Crown Castle Designation:	**Crown Castle BU Number:**	828054
	Crown Castle Site Name:	South Windsor/Rt 5
	Crown Castle JDE Job Number:	389195
	Crown Castle Work Order Number:	1324130
	Crown Castle Application Number:	356926 Rev. 5
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37516-2594.003.7700
Site Data:	**300 Governors Highway, South Windsor, Hartford County, CT**	
	Latitude *41° 50' 0.4"*, Longitude *-72° 36' 11"*	
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Respectfully submitted by:

Thomas J. Dehnke, EI
Project Designer
tdehnke@pjfweb.com BKK

tnxTower Report - version 7.0.5.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 169 ft. monopole tower designed by Engineered Endeavors, Inc. in January of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, “Structural Standard for Antenna Supporting Structures and Antennas”, with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II and Exposure Category C were used in this analysis.

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
156.0	162.0	3	comm comp	DTMABP7819VG12A	--	--	--
	158.0	1	cci antennas	HPA-65R-BUU-H6 w/ MP			
		2	cci antennas	HPA-65R-BUU-H8 w/ MP			
	156.0	1	tower mounts	Handrail Kit [NA 510-1]			
		3	ericsson	RRUS12/RRUS A2			

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
165.0	167.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	7 (E)	1-5/8	1
		3	ericsson	KRY 112 144/1			
	166.0	3	ericsson	Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			
	165.0	1	tower mounts	Platform Mount [LP 601-1]			
156.0	162.0	1	comm comp	DTMABP7819VG12A	--	--	1
	158.0	3	css	DUO1417-8686 w/ Mount Pipe	--	--	3
		6	powerwave	7770.00 w/ Mount Pipe	3 (I)* 12 (I)	3/8 1-5/8	1
	156.0	2	comm comp	DTMABP7819VG12A			
		3	ericsson	RRUS 11			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 714-1]			
148.0	148.0	3	alcatel lucent	1900MHz RRH	3 (I)	1-1/4	2
		3	alcatel lucent	800MHZ RRH			
		3	rfs celwave	APXVSPP18-C-A20 w/ MP			
		1	tower mounts	Side Arm Mount [SO 102-3]	6 (I)	1-5/8	1
138.0	138.0	3	rfs celwave	APXV18-206517-A	6 (E)	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
128.0	128.0	3	argus	LLPX310R w/ Mount Pipe	3 (E)** 1 (E)** 4 (E)** 2 (E)	1/4 5/16 1/2 1/2	1
		3	dragonwave	A-ANT-18G-2-C			
		3	dragonwave	HORIZON DUO			
		3	samsung	WIMAX DAP HEAD			
		1	tower mounts	Side Arm Mount [SO 701-3]			
108.0	112.0	3	alcatel lucent	RRH2X60-AWS	20 (E)	1-5/8	1
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6517DS-A2M w/ MP			
		6	andrew	LNX-6514DS-A1M w/ MP			
		2	rfs celwave	DB-T1-6Z-8AB-0Z			
	108.0	1	tower mounts	Platform Mount [LP 303-1]			

Notes:
1) Existing Equipment
2) Reserved equipment
3) Equipment To Be Removed
(E) Coax mounted externally and exposed to the wind. See coax layout in Appendix B.
(I) Coax mounted internally and shielded from the wind. See coax layout in Appendix B.
*Coax installed internal to a 3" conduit.
*Coax installed internal to (2) 2" conduit.

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
--	--	--	--	--	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FPA, 99A076AR1, 01/11/2000	3436696	CCISITES
4-POST-MODIFICATION INSPECTION	ETS, 129375, 03/13/2013	3773024	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 103179, 12/03/2010	3773025	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 6255 REV 1, 03/10/2000	3436661	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 99-1371 REV. 1, 01/31/2000	3436681	CCISITES
4-POST-MODIFICATION INSPECTION	FDH Velocitel, 15BZLZ1500, 12/03/2015	6000997	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) For existing modifications: monopole was modified in conformance with the referenced modification drawings.
5) For proposed modifications: monopole will be modified in conformance with the attached proposed modification drawings.
6) All loads at the base are taken by the micropiles.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	169 - 133.33	Pole	TP22.31x15.5x0.25	1	-7.56	1263.03	64.0	Pass
L2	133.33 - 111	Pole	TP26.0013x21.1743x0.3125	2	-12.13	1893.04	86.9	Pass
L3	111 - 101.5	Pole	TP27.7884x26.0013x0.5508	3	-16.91	2217.37	92.8	Pass
L4	101.5 - 101	Pole	TP27.8825x27.7884x0.9838	4	-17.13	3328.31	64.4	Pass
L5	101 - 87.83	Pole	TP30.36x27.8825x0.6941	5	-19.97	2527.63	96.4	Pass
L6	87.83 - 81.8	Pole	TP30.8702x28.1572x0.9128	6	-25.28	3453.39	84.8	Pass
L7	81.8 - 81	Pole	TP31.0207x30.8702x1.1092	7	-25.68	4489.55	66.8	Pass
L8	81 - 43.33	Pole	TP38.11x31.0207x0.8207	8	-39.75	4382.21	93.6	Pass
L9	43.33 - 37.4	Pole	TP38.4726x35.4655x0.9971	9	-44.67	5364.83	83.5	Pass
L10	37.4 - 19.5	Pole	TP41.836x38.4726x0.9369	10	-58.11	5754.96	90.6	Pass
L11	19.5 - 9	Pole	TP43.8089x41.836x0.969	11	-64.62	6269.42	88.7	Pass
L12	9 - 7	Pole	TP44.1847x43.8089x1.003	12	-65.92	6542.56	86.0	Pass
L13	7 - 5	Pole	TP44.5605x44.1847x0.957	13	-67.19	6302.28	90.1	Pass
L14	5 - 3	Pole	TP44.9363x44.5605x1.2348	14	-68.76	8251.77	70.5	Pass
L15	3 - 2.25	Pole	TP45.0772x44.9363x1.4189	15	-69.43	9297.57	63.3	Pass
L16	2.25 - 0	Pole	TP45.5x45.0772x1.1744	16	-71.13	7703.25	76.5	Pass
							Summary	
						Pole (L5)	96.4	Pass
						RATING =	96.4	Pass

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Base Foundation	0	89.7	Pass

Structure Rating (max from all components) =	96.4%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

The monopole and its foundation will have sufficient capacity to carry the proposed loading configuration once the proposed modifications are installed.

- Install the proposed modifications per the attached drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56.00 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	169.00-133.33	35.67	3.33	18	15.5000	22.3100	0.2500	1.0000	A572-65 (65 ksi)
L2	133.33-111.00	25.66	0.00	18	21.1743	26.0013	0.3125	1.2500	A572-65 (65 ksi)
L3	111.00-101.50	9.50	0.00	18	26.0013	27.7884	0.5508	2.2032	Reinf 40.74 ksi (41 ksi)
L4	101.50-101.00	0.50	0.00	18	27.7884	27.8825	0.9838	3.9350	Reinf 34.67 ksi (35 ksi)
L5	101.00-87.83	13.17	4.33	18	27.8825	30.3600	0.6941	2.7765	Reinf 34.79 ksi (35 ksi)
L6	87.83-81.80	10.36	0.00	18	28.1572	30.8702	0.9128	3.6513	Reinf 34.81 ksi (35 ksi)
L7	81.80-81.00	0.80	0.00	18	30.8702	31.0207	1.1092	4.4367	Reinf 37.30 ksi (37 ksi)
L8	81.00-43.33	37.67	5.33	18	31.0207	38.1100	0.8207	3.2829	Reinf 40.56 ksi

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L9	43.33-37.40	11.26	0.00	18	35.4655	38.4726	0.9971	3.9885	(41 ksi) Reinf 41.32 ksi (41 ksi)
L10	37.40-19.50	17.90	0.00	18	38.4726	41.8360	0.9369	3.7474	Reinf 41.40 ksi (41 ksi)
L11	19.50-9.00	10.50	0.00	18	41.8360	43.8089	0.9690	3.8760	Reinf 41.63 ksi (42 ksi)
L12	9.00-7.00	2.00	0.00	18	43.8089	44.1847	1.0030	4.0118	Reinf 41.64 ksi (42 ksi)
L13	7.00-5.00	2.00	0.00	18	44.1847	44.5605	0.9570	3.8280	Reinf 41.63 ksi (42 ksi)
L14	5.00-3.00	2.00	0.00	18	44.5605	44.9363	1.2348	4.9392	Reinf 42.15 ksi (42 ksi)
L15	3.00-2.25	0.75	0.00	18	44.9363	45.0772	1.4189	5.6758	Reinf 41.37 ksi (41 ksi)
L16	2.25-0.00	2.25		18	45.0772	45.5000	1.1744	4.6976	Reinf 40.79 ksi (41 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	15.7391	12.1009	355.5445	5.4138	7.8740	45.1542	711.5567	6.0516	2.2880	9.152
	22.6542	17.5046	1076.2196	7.8313	11.3335	94.9593	2153.8554	8.7540	3.4866	13.946
L2	22.1370	20.6922	1137.7494	7.4059	10.7565	105.7730	2276.9958	10.3481	3.1767	10.165
	26.4024	25.4801	2124.3514	9.1195	13.2087	160.8301	4251.4980	12.7425	4.0262	12.884
L3	26.4024	44.4936	3641.0595	9.0349	13.2087	275.6569	7286.9099	22.2510	3.6068	6.548
	28.2171	47.6179	4463.1990	9.6694	14.1165	316.1684	8932.2708	23.8135	3.9214	7.119
L4	28.2171	83.6955	7597.3301	9.5157	14.1165	538.1871	15204.6570	41.8557	3.1594	3.212
	28.3126	83.9892	7677.5902	9.5491	14.1643	542.0379	15365.2828	42.0026	3.1759	3.228
L5	28.3126	59.9005	5594.1515	9.6519	14.1643	394.9471	11195.6639	29.9560	3.6856	5.31
	30.8284	65.3589	7267.0217	10.5314	15.4229	471.1845	14543.6055	32.6857	4.1217	5.938
L6	29.7430	78.9348	7402.1750	9.6717	14.3038	517.4954	14814.0900	39.4749	3.3491	3.669
	31.3464	86.7952	9841.0303	10.6349	15.6821	627.5344	19695.0097	43.4059	3.8266	4.192
L7	31.3464	104.7747	11724.3669	10.5652	15.6821	747.6294	23464.1610	52.3973	3.4810	3.138
	31.4993	105.3048	11903.1962	10.6186	15.7585	755.3491	23822.0550	52.6624	3.5075	3.162
L8	31.4993	78.6709	9064.9610	10.7210	15.7585	575.2413	18141.8500	39.3429	4.0152	4.892
	38.6979	97.1384	17064.6083	13.2377	19.3599	881.4418	34151.6708	48.5784	5.2629	6.412
L9	37.4580	109.0874	16373.9291	12.2363	18.0165	908.8320	32769.4034	54.5541	4.4870	4.5
	39.0661	118.6047	21044.2986	13.3038	19.5441	1076.7599	42116.2878	59.3136	5.0163	5.031
L10	39.0661	111.6161	19868.0414	13.3252	19.5441	1016.5751	39762.2258	55.8187	5.1223	5.468
	42.4814	121.6174	25701.6851	14.5192	21.2527	1209.3381	51437.1891	60.8203	5.7143	6.099
L11	42.4814	125.6895	26520.5337	14.5078	21.2527	1247.8673	53075.9639	62.8567	5.6577	5.839
	44.4847	131.7574	30549.9093	15.2082	22.2549	1372.7254	61140.0170	65.8912	6.0049	6.197
L12	44.4847	136.2683	31545.7393	15.1961	22.2549	1417.4719	63132.9872	68.1471	5.9452	5.928
	44.8663	137.4646	32383.8891	15.3295	22.4458	1442.7570	64810.3897	68.7454	6.0113	5.994
L13	44.8663	131.3063	30998.9894	15.3458	22.4458	1381.0574	62038.7682	65.6656	6.0922	6.366
	45.2479	132.4478	31814.485	15.4792	22.6367	1405.4359	63670.832	66.2365	6.1583	6.435

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
			3				9			
L14	45.2479	169.8059	40269.967	15.3806	22.6367	1778.9650	80592.922	84.9191	5.6694	4.591
			1				5			
	45.6295	171.2787	41326.967	15.5140	22.8276	1810.3912	82708.314	85.6556	5.7355	4.645
			8				7			
L15	45.6295	195.9899	46891.737	15.4487	22.8276	2054.1644	93845.176	98.0136	5.4115	3.814
			6				6			
	45.7726	196.6245	47348.755	15.4987	22.8992	2067.7005	94759.813	98.3309	5.4363	3.831
			5				6			
L16	45.7726	163.6484	39850.572	15.5855	22.8992	1740.2580	79753.580	81.8398	5.8667	4.996
			2				9			
	46.2019	165.2243	41012.937	15.7356	23.1140	1774.3765	82079.841	82.6279	5.9411	5.059
			9				6			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	165.00 - 0.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	165.00 - 0.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
***								
LDF2-50(3/8")	C	No	Inside Pole	156.00 - 0.00	2	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
100266(3/8")	C	No	Inside Pole	156.00 - 0.00	1	No Ice	0.00	0.09
						1/2" Ice	0.00	0.09
						1" Ice	0.00	0.09
LDF7-50A(1-5/8")	C	No	Inside Pole	156.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
3" (Nominal) Conduit	C	No	Inside Pole	156.00 - 0.00	1	No Ice	0.00	1.49
						1/2" Ice	0.00	1.49
						1" Ice	0.00	1.49
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	148.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
AVA6-50(1-1/4")	C	No	Inside Pole	148.00 - 0.00	3	No Ice	0.00	0.45
						1/2" Ice	0.00	0.45
						1" Ice	0.00	0.45
***								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	138.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
***								
LDF1-50A(1/4")	C	No	CaAa (Out Of Face)	128.00 - 0.00	3	No Ice	0.00	0.06
						1/2" Ice	0.00	0.58
						1" Ice	0.00	1.70
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	128.00 - 0.00	6	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
9207(5/16")	C	No	CaAa (Out Of Face)	128.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.57
						1" Ice	0.00	1.69
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	128.00 - 0.00	2	No Ice	0.00	0.72
						1/2" Ice	0.00	2.48
						1" Ice	0.00	4.84
***								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	108.00 - 0.00	15	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	108.00 - 0.00	3	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.40	4.46
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	108.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	2.81
						1" Ice	0.00	4.94
***								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	104.00 - 0.00	2	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	113.50 - 104.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.00 0.00 2.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.00 0.00 2.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	6.33 6.78 7.21	5.64 6.43 7.13	0.11 0.17 0.23
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	A	From Face	4.00 0.00 1.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	B	From Face	4.00 0.00 1.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	C	From Face	4.00 0.00 1.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	11.78 12.50 13.23	11.04 12.56 14.12	0.16 0.25 0.36
KRY 112 144/1	A	From Face	4.00 0.00 2.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	B	From Face	4.00 0.00 2.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
KRY 112 144/1	C	From Face	4.00 0.00 2.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	0.35 0.43 0.51	0.17 0.23 0.30	0.01 0.01 0.02
RRUS 11 B12	A	From Face	4.00 0.00 1.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	B	From Face	4.00 0.00 1.00	0.000	165.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS 11 B12	C	From Face	4.00	0.000	165.00	No Ice	2.83	1.18	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	3.04	1.33	0.07
			1.00				1" Ice	3.26	1.48	0.10
8-ft Ladder	C	None			0.000	165.00	No Ice	5.00	5.00	0.04
							1/2" Ice	7.00	7.00	0.07
							1" Ice	9.00	9.00	0.08
Platform Mount [LP 601-1]	C	None			0.000	165.00	No Ice	28.47	28.47	1.12
							1/2" Ice	33.59	33.59	1.51
							1" Ice	38.71	38.71	1.91
***										
(2) 7770.00 w/ Mount Pipe	A	From Face	4.00		0.000	156.00	No Ice	5.80	4.58	0.09
			0.00				1/2" Ice	6.27	5.51	0.14
			2.00				1" Ice	6.70	6.21	0.21
(2) 7770.00 w/ Mount Pipe	B	From Face	4.00		0.000	156.00	No Ice	5.80	4.58	0.09
			0.00				1/2" Ice	6.27	5.51	0.14
			2.00				1" Ice	6.70	6.21	0.21
(2) 7770.00 w/ Mount Pipe	C	From Face	4.00		0.000	156.00	No Ice	5.80	4.58	0.09
			0.00				1/2" Ice	6.27	5.51	0.14
			2.00				1" Ice	6.70	6.21	0.21
DTMABP7819VG12A	A	From Face	4.00		0.000	156.00	No Ice	0.98	0.34	0.02
			0.00				1/2" Ice	1.10	0.42	0.03
			6.00				1" Ice	1.23	0.51	0.04
DTMABP7819VG12A	B	From Face	4.00		0.000	156.00	No Ice	0.98	0.34	0.02
			0.00				1/2" Ice	1.10	0.42	0.03
			0.00				1" Ice	1.23	0.51	0.04
DTMABP7819VG12A	C	From Face	4.00		0.000	156.00	No Ice	0.98	0.34	0.02
			0.00				1/2" Ice	1.10	0.42	0.03
			0.00				1" Ice	1.23	0.51	0.04
RRUS 11	A	From Face	4.00		0.000	156.00	No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			0.00				1" Ice	3.21	1.50	0.10
RRUS 11	B	From Face	4.00		0.000	156.00	No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			0.00				1" Ice	3.21	1.50	0.10
RRUS 11	C	From Face	4.00		0.000	156.00	No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			0.00				1" Ice	3.21	1.50	0.10
DC6-48-60-18-8F	B	From Face	4.00		0.000	156.00	No Ice	0.92	0.92	0.02
			0.00				1/2" Ice	1.46	1.46	0.04
			0.00				1" Ice	1.64	1.64	0.06
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Face	4.00		0.000	156.00	No Ice	13.21	9.58	0.10
			0.00				1/2" Ice	13.90	11.05	0.20
			2.00				1" Ice	14.59	12.50	0.30
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Face	4.00		0.000	156.00	No Ice	13.21	9.58	0.10
			0.00				1/2" Ice	13.90	11.05	0.20
			2.00				1" Ice	14.59	12.50	0.30
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Face	4.00		0.000	156.00	No Ice	9.90	8.11	0.08
			0.00				1/2" Ice	10.47	9.30	0.16
			2.00				1" Ice	11.01	10.21	0.25
DTMABP7819VG12A	A	From Face	4.00		0.000	156.00	No Ice	0.98	0.34	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	1.10	0.42	0.03
			6.00			Ice	1.23	0.51	0.04
						1" Ice			
DTMABP7819VG12A	B	From Face	4.00	0.000	156.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			6.00			Ice	1.23	0.51	0.04
						1" Ice			
DTMABP7819VG12A	C	From Face	4.00	0.000	156.00	No Ice	0.98	0.34	0.02
			0.00			1/2"	1.10	0.42	0.03
			6.00			Ice	1.23	0.51	0.04
						1" Ice			
RRUS12/RRUS A2	A	From Face	4.00	0.000	156.00	No Ice	3.14	1.84	0.07
			0.00			1/2"	3.36	2.01	0.10
			0.00			Ice	3.59	2.20	0.13
						1" Ice			
RRUS12/RRUS A2	B	From Face	4.00	0.000	156.00	No Ice	3.14	1.84	0.07
			0.00			1/2"	3.36	2.01	0.10
			0.00			Ice	3.59	2.20	0.13
						1" Ice			
RRUS12/RRUS A2	C	From Face	4.00	0.000	156.00	No Ice	3.14	1.84	0.07
			0.00			1/2"	3.36	2.01	0.10
			0.00			Ice	3.59	2.20	0.13
						1" Ice			
Handrail Kit [NA 510-1]	C	None		0.000	156.00	No Ice	6.00	6.00	0.26
						1/2"	8.50	8.50	0.34
						Ice	11.00	11.00	0.42
						1" Ice			
Platform Mount [LP 714-1]	C	None		0.000	156.00	No Ice	37.47	37.47	1.60
						1/2"	44.23	44.23	2.04
						Ice	50.99	50.99	2.48
						1" Ice			
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.000	148.00	No Ice	8.26	6.95	0.08
			0.00			1/2"	8.82	8.13	0.15
			0.00			Ice	9.35	9.02	0.23
						1" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.000	148.00	No Ice	8.26	6.95	0.08
			0.00			1/2"	8.82	8.13	0.15
			0.00			Ice	9.35	9.02	0.23
						1" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.000	148.00	No Ice	8.26	6.95	0.08
			0.00			1/2"	8.82	8.13	0.15
			0.00			Ice	9.35	9.02	0.23
						1" Ice			
1900MHz RRH	A	From Leg	4.00	0.000	148.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			0.00			Ice	2.91	3.72	0.11
						1" Ice			
1900MHz RRH	B	From Leg	4.00	0.000	148.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			0.00			Ice	2.91	3.72	0.11
						1" Ice			
1900MHz RRH	C	From Leg	4.00	0.000	148.00	No Ice	2.49	3.26	0.04
			0.00			1/2"	2.70	3.48	0.08
			0.00			Ice	2.91	3.72	0.11
						1" Ice			
800MHZ RRH	A	From Leg	4.00	0.000	148.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			0.00			Ice	2.51	2.13	0.10
						1" Ice			
800MHZ RRH	B	From Leg	4.00	0.000	148.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			0.00			Ice	2.51	2.13	0.10
						1" Ice			
800MHZ RRH	C	From Leg	4.00	0.000	148.00	No Ice	2.13	1.77	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 0.00			1/2" Ice 1" Ice	2.32 2.51	1.95 2.13	0.07 0.10
Side Arm Mount [SO 102-3]	C	None		0.000	148.00	No Ice 1/2" Ice 1" Ice	3.00 3.48 3.96	3.00 3.48 3.96	0.08 0.11 0.14
**									
APXV18-206517-A	A	From Face	1.00 0.00 0.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	3.04 3.47 3.91	0.03 0.05 0.09
APXV18-206517-A	B	From Face	1.00 0.00 0.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	3.04 3.47 3.91	0.03 0.05 0.09
APXV18-206517-A	C	From Face	1.00 0.00 0.00	0.000	138.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	3.04 3.47 3.91	0.03 0.05 0.09
Pipe Mount [PM 601-3]	C	None		0.000	138.00	No Ice 1/2" Ice 1" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28
***									
LLPX310R w/ Mount Pipe	A	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
LLPX310R w/ Mount Pipe	B	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
LLPX310R w/ Mount Pipe	C	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	4.44 4.76 5.10	2.85 3.37 3.90	0.04 0.08 0.12
WIMAX DAP HEAD	A	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
WIMAX DAP HEAD	B	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
WIMAX DAP HEAD	C	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	1.55 1.70 1.87	0.68 0.80 0.92	0.03 0.04 0.06
HORIZON DUO	A	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.65	0.29 0.37 0.44	0.01 0.01 0.02
HORIZON DUO	B	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.65	0.29 0.37 0.44	0.01 0.01 0.02
HORIZON DUO	C	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.65	0.29 0.37 0.44	0.01 0.01 0.02
2.375" OD x 5' Mount Pipe	A	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04

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
2.375" OD x 5' Mount Pipe	B	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	C	From Face	3.00 0.00 0.00	0.000	128.00	No Ice 1/2" Ice 1" Ice	1.19 1.50 1.81	1.19 1.50 1.81	0.02 0.03 0.04
Side Arm Mount [SO 701-3]	C	None		0.000	128.00	No Ice 1/2" Ice 1" Ice	2.83 3.92 5.01	2.83 3.92 5.01	0.20 0.24 0.28
***									
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	8.77 9.34 9.89	6.96 8.18 9.14	0.07 0.14 0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	A	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	8.41 8.97 9.50	7.08 8.27 9.18	0.06 0.13 0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	B	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	8.41 8.97 9.50	7.08 8.27 9.18	0.06 0.13 0.21
(2) LNX-6514DS-A1M w/ Mount Pipe	C	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	8.41 8.97 9.50	7.08 8.27 9.18	0.06 0.13 0.21
(2) RRH2X60-PCS	A	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
RRH2X60-PCS	C	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
RRH2X60-AWS	A	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	B	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
RRH2X60-AWS	C	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	1.88 2.06 2.24	1.24 1.39 1.54	0.04 0.06 0.08
(2) DB-T1-6Z-8AB-0Z	B	From Face	4.00 0.00 4.00	0.000	108.00	No Ice 1/2" Ice 1" Ice	4.80 5.07 5.35	2.00 2.19 2.39	0.04 0.08 0.12
Platform Mount [LP 303-1]	C	None		0.000	108.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71

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
**								

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-18G-2-C	A	Paraboloid w/Radome	From Leg	3.00 0.00 0.00	0.000		128.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.04 0.05
A-ANT-18G-2-C	B	Paraboloid w/Radome	From Leg	3.00 0.00 0.00	0.000		128.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.04 0.05
A-ANT-18G-2-C	C	Paraboloid w/Radome	From Leg	3.00 0.00 0.00	0.000		128.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.04 0.05

Tower Pressures - No Ice

G_H = 1.100

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 169.00-133.33	150.20	1.379	31.54	57.062	A	0.000	57.062	57.062	100.00	0.000	0.000
					B	0.000	57.062		100.00	0.000	0.000
					C	0.000	57.062		100.00	0.000	12.541
L2 133.33-111.00	121.84	1.319	30.19	45.162	A	0.000	45.162	45.162	100.00	0.000	0.000
					B	0.000	45.162		100.00	0.000	0.000
					C	0.000	45.162		100.00	0.000	9.259
L3 111.00-101.50	106.20	1.282	29.33	21.620	A	0.000	21.620	21.620	100.00	0.000	0.000
					B	0.000	21.620		100.00	0.000	0.000
					C	0.000	21.620		100.00	0.000	9.831
L4 101.50-101.00	101.25	1.269	29.04	1.178	A	0.000	1.178	1.178	100.00	0.000	0.000
					B	0.000	1.178		100.00	0.000	0.000
					C	0.000	1.178		100.00	0.000	0.703
L5 101.00-87.83	94.32	1.25	28.61	32.454	A	0.000	32.454	32.454	100.00	0.000	0.000
					B	0.000	32.454		100.00	0.000	0.000
					C	0.000	32.454		100.00	0.000	18.526
L6 87.83-81.80	84.79	1.222	27.97	15.349	A	0.000	15.349	15.349	100.00	0.000	0.000
					B	0.000	15.349		100.00	0.000	0.000
					C	0.000	15.349		100.00	0.000	8.482
L7 81.80-81.00	81.40	1.212	27.73	2.095	A	0.000	2.095	2.095	100.00	0.000	0.000
					B	0.000	2.095		100.00	0.000	0.000
					C	0.000	2.095		100.00	0.000	1.125
L8 81.00-43.33	61.82	1.144	26.09	110.180	A	0.000	110.180	110.180	100.00	0.000	0.000
					B	0.000	110.180		100.00	0.000	0.000
					C	0.000	110.180		100.00	0.000	52.989
L9 43.33-37.40	40.34	1.045	23.92	18.908	A	0.000	18.908	18.908	100.00	0.000	0.000
					B	0.000	18.908		100.00	0.000	0.000
					C	0.000	18.908		100.00	0.000	8.342
L10 37.40-19.50	28.33	0.97	22.21	60.821	A	0.000	60.821	60.821	100.00	0.000	0.000
					B	0.000	60.821		100.00	0.000	0.000
					C	0.000	60.821		100.00	0.000	25.179
L11 19.50-9.00	14.21	0.85	19.45	38.048	A	0.000	38.048	38.048	100.00	0.000	0.000
					B	0.000	38.048		100.00	0.000	0.000
					C	0.000	38.048		100.00	0.000	14.770
L12 9.00-7.00	8.00	0.85	19.45	7.446	A	0.000	7.446	7.446	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
					B	0.000	7.446		100.00	0.000	0.000
					C	0.000	7.446		100.00	0.000	2.813
L13 7.00-5.00	6.00	0.85	19.45	7.510	A	0.000	7.510	7.510	100.00	0.000	0.000
					B	0.000	7.510		100.00	0.000	0.000
					C	0.000	7.510		100.00	0.000	2.813
L14 5.00-3.00	4.00	0.85	19.45	7.573	A	0.000	7.573	7.573	100.00	0.000	0.000
					B	0.000	7.573		100.00	0.000	0.000
					C	0.000	7.573		100.00	0.000	2.813
L15 3.00-2.25	2.62	0.85	19.45	2.856	A	0.000	2.856	2.856	100.00	0.000	0.000
					B	0.000	2.856		100.00	0.000	0.000
					C	0.000	2.856		100.00	0.000	1.055
L16 2.25-0.00	1.12	0.85	19.45	8.623	A	0.000	8.623	8.623	100.00	0.000	0.000
					B	0.000	8.623		100.00	0.000	0.000
					C	0.000	8.623		100.00	0.000	3.165

Tower Pressure - With Ice

G_H = 1.100

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 169.00-133.33	150.20	1.379	8.38	2.3273	70.898	A	0.000	70.898	70.898	100.00	0.000	0.000
						B	0.000	70.898		100.00	0.000	0.000
						C	0.000	70.898		100.00	0.000	42.023
L2 133.33-111.00	121.84	1.319	8.02	2.2791	53.823	A	0.000	53.823	53.823	100.00	0.000	0.000
						B	0.000	53.823		100.00	0.000	0.000
						C	0.000	53.823		100.00	0.000	31.339
L3 111.00-101.50	106.20	1.282	7.79	2.2480	25.180	A	0.000	25.180	25.180	100.00	0.000	0.000
						B	0.000	25.180		100.00	0.000	0.000
						C	0.000	25.180		100.00	0.000	33.135
L4 101.50-101.00	101.25	1.269	7.72	2.2373	1.364	A	0.000	1.364	1.364	100.00	0.000	0.000
						B	0.000	1.364		100.00	0.000	0.000
						C	0.000	1.364		100.00	0.000	2.319
L5 101.00-87.83	94.32	1.25	7.60	2.2215	37.330	A	0.000	37.330	37.330	100.00	0.000	0.000
						B	0.000	37.330		100.00	0.000	0.000
						C	0.000	37.330		100.00	0.000	60.785
L6 87.83-81.80	84.79	1.222	7.43	2.1979	17.581	A	0.000	17.581	17.581	100.00	0.000	0.000
						B	0.000	17.581		100.00	0.000	0.000
						C	0.000	17.581		100.00	0.000	27.831
L7 81.80-81.00	81.40	1.212	7.37	2.1890	2.387	A	0.000	2.387	2.387	100.00	0.000	0.000
						B	0.000	2.387		100.00	0.000	0.000
						C	0.000	2.387		100.00	0.000	3.655
L8 81.00-43.33	61.82	1.144	6.93	2.1296	123.551	A	0.000	123.551	123.551	100.00	0.000	0.000
						B	0.000	123.551		100.00	0.000	0.000
						C	0.000	123.551		100.00	0.000	168.864
L9 43.33-37.40	40.34	1.045	6.36	2.0406	21.013	A	0.000	21.013	21.013	100.00	0.000	0.000
						B	0.000	21.013		100.00	0.000	0.000
						C	0.000	21.013		100.00	0.000	26.582
L10 37.40-19.50	28.33	0.97	5.90	1.9697	66.697	A	0.000	66.697	66.697	100.00	0.000	0.000
						B	0.000	66.697		100.00	0.000	0.000
						C	0.000	66.697		100.00	0.000	76.106
L11 19.50-9.00	14.21	0.85	5.17	1.8384	41.265	A	0.000	41.265	41.265	100.00	0.000	0.000
						B	0.000	41.265		100.00	0.000	0.000
						C	0.000	41.265		100.00	0.000	42.652
L12 9.00-7.00	8.00	0.85	5.17	1.7357	8.024	A	0.000	8.024	8.024	100.00	0.000	0.000
						B	0.000	8.024		100.00	0.000	0.000
						C	0.000	8.024		100.00	0.000	7.828
L13 7.00-5.00	6.00	0.85	5.17	1.6865	8.072	A	0.000	8.072	8.072	100.00	0.000	0.000
						B	0.000	8.072		100.00	0.000	0.000
						C	0.000	8.072		100.00	0.000	7.685
L14 5.00-3.00	4.00	0.85	5.17	1.6195	8.113	A	0.000	8.113	8.113	100.00	0.000	0.000
						B	0.000	8.113		100.00	0.000	0.000
						C	0.000	8.113		100.00	0.000	7.492
L15 3.00-2.25	2.62	0.85	5.17	1.5527	3.050	A	0.000	3.050	3.050	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
						B	0.000	3.050		100.00	0.000	0.000
						C	0.000	3.050		100.00	0.000	2.737
L16 2.25-0.00	1.12	0.85	5.17	1.4264	9.157	A	0.000	9.157	9.157	100.00	0.000	0.000
						B	0.000	9.157		100.00	0.000	0.000
						C	0.000	9.157		100.00	0.000	7.801

Tower Pressure - Service

G_H = 1.100

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 169.00-133.33	150.20	1.379	10.80	57.062	A	0.000	57.062	57.062	100.00	0.000	0.000
					B	0.000	57.062		100.00	0.000	0.000
					C	0.000	57.062		100.00	0.000	12.541
L2 133.33-111.00	121.84	1.319	10.34	45.162	A	0.000	45.162	45.162	100.00	0.000	0.000
					B	0.000	45.162		100.00	0.000	0.000
					C	0.000	45.162		100.00	0.000	9.259
L3 111.00-101.50	106.20	1.282	10.04	21.620	A	0.000	21.620	21.620	100.00	0.000	0.000
					B	0.000	21.620		100.00	0.000	0.000
					C	0.000	21.620		100.00	0.000	9.831
L4 101.50-101.00	101.25	1.269	9.94	1.178	A	0.000	1.178	1.178	100.00	0.000	0.000
					B	0.000	1.178		100.00	0.000	0.000
					C	0.000	1.178		100.00	0.000	0.703
L5 101.00-87.83	94.32	1.25	9.79	32.454	A	0.000	32.454	32.454	100.00	0.000	0.000
					B	0.000	32.454		100.00	0.000	0.000
					C	0.000	32.454		100.00	0.000	18.526
L6 87.83-81.80	84.79	1.222	9.58	15.349	A	0.000	15.349	15.349	100.00	0.000	0.000
					B	0.000	15.349		100.00	0.000	0.000
					C	0.000	15.349		100.00	0.000	8.482
L7 81.80-81.00	81.40	1.212	9.49	2.095	A	0.000	2.095	2.095	100.00	0.000	0.000
					B	0.000	2.095		100.00	0.000	0.000
					C	0.000	2.095		100.00	0.000	1.125
L8 81.00-43.33	61.82	1.144	8.93	110.180	A	0.000	110.180	110.180	100.00	0.000	0.000
					B	0.000	110.180		100.00	0.000	0.000
					C	0.000	110.180		100.00	0.000	52.989
L9 43.33-37.40	40.34	1.045	8.19	18.908	A	0.000	18.908	18.908	100.00	0.000	0.000
					B	0.000	18.908		100.00	0.000	0.000
					C	0.000	18.908		100.00	0.000	8.342
L10 37.40-19.50	28.33	0.97	7.60	60.821	A	0.000	60.821	60.821	100.00	0.000	0.000
					B	0.000	60.821		100.00	0.000	0.000
					C	0.000	60.821		100.00	0.000	25.179
L11 19.50-9.00	14.21	0.85	6.66	38.048	A	0.000	38.048	38.048	100.00	0.000	0.000
					B	0.000	38.048		100.00	0.000	0.000
					C	0.000	38.048		100.00	0.000	14.770
L12 9.00-7.00	8.00	0.85	6.66	7.446	A	0.000	7.446	7.446	100.00	0.000	0.000
					B	0.000	7.446		100.00	0.000	0.000
					C	0.000	7.446		100.00	0.000	2.813
L13 7.00-5.00	6.00	0.85	6.66	7.510	A	0.000	7.510	7.510	100.00	0.000	0.000
					B	0.000	7.510		100.00	0.000	0.000
					C	0.000	7.510		100.00	0.000	2.813
L14 5.00-3.00	4.00	0.85	6.66	7.573	A	0.000	7.573	7.573	100.00	0.000	0.000
					B	0.000	7.573		100.00	0.000	0.000
					C	0.000	7.573		100.00	0.000	2.813
L15 3.00-2.25	2.62	0.85	6.66	2.856	A	0.000	2.856	2.856	100.00	0.000	0.000
					B	0.000	2.856		100.00	0.000	0.000
					C	0.000	2.856		100.00	0.000	1.055
L16 2.25-0.00	1.12	0.85	6.66	8.623	A	0.000	8.623	8.623	100.00	0.000	0.000
					B	0.000	8.623		100.00	0.000	0.000
					C	0.000	8.623		100.00	0.000	3.165

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	169 - 133.33	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	26	-30.40	2.93	-1.04
			Max. Mx	20	-7.56	350.86	0.06
			Max. My	2	-7.59	0.17	348.92
			Max. Vy	20	-17.46	350.86	0.06
			Max. Vx	2	-17.37	0.17	348.92
			Max. Torque	9			0.31
L2	133.33 - 111	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.32	10.12	-5.09
			Max. Mx	20	-12.13	858.11	-0.62
			Max. My	2	-12.15	0.50	853.80
			Max. Vy	20	-21.57	858.11	-0.62

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-21.51	0.50	853.80
			Max. Torque	14			-0.73
L3	111 - 101.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.20	14.58	-6.67
			Max. Mx	20	-16.91	1128.05	-1.74
			Max. My	2	-16.95	0.11	1121.48
			Max. Vy	20	-29.15	1128.05	-1.74
			Max. Vx	2	-28.96	0.11	1121.48
			Max. Torque	14			-1.13
L4	101.5 - 101	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.69	14.90	-6.85
			Max. Mx	20	-17.13	1142.67	-1.81
			Max. My	2	-17.16	0.10	1135.97
			Max. Vy	20	-29.26	1142.67	-1.81
			Max. Vx	2	-29.07	0.10	1135.97
			Max. Torque	14			-1.17
L5	101 - 87.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.59	20.62	-10.12
			Max. Mx	20	-19.97	1410.21	-3.00
			Max. My	2	-20.00	-0.33	1401.35
			Max. Vy	20	-31.22	1410.21	-3.00
			Max. Vx	2	-31.04	-0.33	1401.35
			Max. Torque	14			-1.81
L6	87.83 - 81.8	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-81.27	27.48	-14.04
			Max. Mx	20	-25.29	1747.41	-4.42
			Max. My	2	-25.31	-0.82	1735.98
			Max. Vy	20	-33.73	1747.41	-4.42
			Max. Vx	2	-33.54	-0.82	1735.98
			Max. Torque	14			-2.59
L7	81.8 - 81	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.12	28.02	-14.35
			Max. Mx	20	-25.69	1774.49	-4.53
			Max. My	2	-25.72	-0.85	1762.86
			Max. Vy	20	-33.92	1774.49	-4.53
			Max. Vx	2	-33.73	-0.85	1762.86
			Max. Torque	14			-2.65
L8	81 - 43.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-113.38	50.69	-27.35
			Max. Mx	20	-39.75	2984.35	-9.08
			Max. My	2	-39.77	-2.17	2964.37
			Max. Vy	20	-40.85	2984.35	-9.08
			Max. Vx	2	-40.67	-2.17	2964.37
			Max. Torque	12			-5.56
L9	43.33 - 37.4	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-128.15	58.73	-31.97
			Max. Mx	20	-47.96	3459.43	-10.67
			Max. My	2	-47.97	-2.60	3436.52
			Max. Vy	20	-43.35	3459.43	-10.67
			Max. Vx	2	-43.17	-2.60	3436.52
			Max. Torque	12			-6.62
L10	37.4 - 19.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-146.64	70.81	-38.92
			Max. Mx	20	-58.12	4264.82	-13.24
			Max. My	2	-58.12	-3.18	4237.14
			Max. Vy	20	-46.60	4264.82	-13.24
			Max. Vx	2	-46.41	-3.18	4237.14
			Max. Torque	12			-8.26
L11	19.5 - 9	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-157.64	77.54	-42.80
			Max. Mx	20	-64.62	4762.91	-14.75
			Max. My	2	-64.62	-3.49	4732.41
			Max. Vy	20	-48.22	4762.91	-14.75
			Max. Vx	2	-48.04	-3.49	4732.41
			Max. Torque	12			-9.16
L12	9 - 7	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-159.74	78.74	-43.49
			Max. Mx	20	-65.92	4859.72	-15.04
			Max. My	2	-65.92	-3.55	4828.68

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	20	-48.53	4859.72	-15.04
			Max. Vx	2	-48.35	-3.55	4828.68
			Max. Torque	12			-9.34
L13	7 - 5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-161.77	79.89	-44.16
			Max. Mx	20	-67.19	4957.15	-15.32
			Max. My	2	-67.19	-3.60	4925.58
			Max. Vy	20	-48.84	4957.15	-15.32
			Max. Vx	2	-48.66	-3.60	4925.58
			Max. Torque	12			-9.52
L14	5 - 3	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-164.08	81.00	-44.80
			Max. Mx	20	-68.76	5055.22	-15.61
			Max. My	2	-68.76	-3.65	5023.10
			Max. Vy	20	-49.16	5055.22	-15.61
			Max. Vx	2	-48.98	-3.65	5023.10
			Max. Torque	12			-9.70
L15	3 - 2.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-165.00	81.39	-45.03
			Max. Mx	20	-69.43	5092.17	-15.72
			Max. My	2	-69.43	-3.67	5059.85
			Max. Vy	20	-49.28	5092.17	-15.72
			Max. Vx	2	-49.10	-3.67	5059.85
			Max. Torque	12			-9.77
L16	2.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-167.41	82.47	-45.65
			Max. Mx	20	-71.13	5203.56	-16.04
			Max. My	2	-71.13	-3.73	5170.63
			Max. Vy	20	-49.65	5203.56	-16.04
			Max. Vx	2	-49.48	-3.73	5170.63
			Max. Torque	12			-9.97

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 133.33	34.14	47	2.056	0.002
L2	136.66 - 111	20.87	47	1.730	0.001
L3	111 - 101.5	12.90	47	1.189	0.001
L4	101.5 - 101	10.67	47	1.048	0.000
L5	101 - 87.83	10.56	47	1.043	0.000
L6	92.16 - 81.8	8.73	47	0.932	0.000
L7	81.8 - 81	6.80	47	0.839	0.000
L8	81 - 43.33	6.66	47	0.832	0.000
L9	48.66 - 37.4	2.32	47	0.451	0.000
L10	37.4 - 19.5	1.34	47	0.361	0.000
L11	19.5 - 9	0.34	47	0.176	0.000
L12	9 - 7	0.07	47	0.075	0.000
L13	7 - 5	0.04	47	0.056	0.000
L14	5 - 3	0.02	47	0.037	0.000
L15	3 - 2.25	0.01	47	0.022	0.000
L16	2.25 - 0	0.00	47	0.017	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	47	32.41	2.031	0.002	18950
156.00	(2) 7770.00 w/ Mount Pipe	47	28.57	1.966	0.002	7288
148.00	APXVSPP18-C-A20 w/ Mount Pipe	47	25.26	1.890	0.001	4511

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	APXV18-206517-A	47	21.37	1.753	0.001	3081
128.00	A-ANT-18G-2-C	47	17.86	1.557	0.001	2784
108.00	(2) HBXX-6517DS-A2M w/ Mount Pipe	47	12.16	1.135	0.001	3040

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	169 - 133.33	159.59	20	9.637	0.017
L2	136.66 - 111	97.63	20	8.111	0.014
L3	111 - 101.5	60.35	18	5.571	0.011
L4	101.5 - 101	49.94	18	4.911	0.011
L5	101 - 87.83	49.43	18	4.890	0.011
L6	92.16 - 81.8	40.87	18	4.367	0.010
L7	81.8 - 81	31.82	18	3.933	0.009
L8	81 - 43.33	31.17	18	3.899	0.009
L9	48.66 - 37.4	10.85	18	2.114	0.005
L10	37.4 - 19.5	6.29	18	1.690	0.004
L11	19.5 - 9	1.60	18	0.823	0.002
L12	9 - 7	0.31	18	0.349	0.001
L13	7 - 5	0.18	18	0.263	0.001
L14	5 - 3	0.09	18	0.174	0.000
L15	3 - 2.25	0.03	18	0.104	0.000
L16	2.25 - 0	0.02	18	0.082	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	20	151.52	9.519	0.016	4253
156.00	(2) 7770.00 w/ Mount Pipe	20	133.57	9.218	0.016	1633
148.00	APXVSPP18-C-A20 w/ Mount Pipe	20	118.11	8.862	0.015	1008
138.00	APXV18-206517-A	20	99.94	8.219	0.015	685
128.00	A-ANT-18G-2-C	20	83.54	7.298	0.013	613
108.00	(2) HBXX-6517DS-A2M w/ Mount Pipe	18	56.90	5.317	0.011	659

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	169 - 133.33 (1)	TP22.31x15.5x0.25	35.67	0.00	0.0	17.0001	-7.56	1263.03	0.006
L2	133.33 - 111 (2)	TP26.0013x21.1743x0.3125	25.66	0.00	0.0	25.4801	-12.13	1893.04	0.006
L3	111 - 101.5 (3)	TP27.7884x26.0013x0.5508	9.50	0.00	0.0	47.6179	-16.91	2217.37	0.008
L4	101.5 - 101 (4)	TP27.8825x27.7884x0.9838	0.50	0.00	0.0	83.9892	-17.13	3328.31	0.005
L5	101 - 87.83 (5)	TP30.36x27.8825x0.6941	13.17	0.00	0.0	63.5643	-19.97	2527.63	0.008
L6	87.83 - 81.8 (6)	TP30.8702x28.1572x0.9128	10.36	0.00	0.0	86.7952	-25.28	3453.39	0.007
L7	81.8 - 81 (7)	TP31.0207x30.8702x1.1092	0.80	0.00	0.0	105.3050	-25.68	4489.55	0.006
L8	81 - 43.33 (8)	TP38.11x31.0207x0.8207	37.67	0.00	0.0	94.5254	-39.75	4382.21	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L9	43.33 - 37.4 (9)	TP38.4726x35.4655x0.9971	11.26	0.00	0.0	113.5920	-44.67	5364.83	0.008
L10	37.4 - 19.5 (10)	TP41.836x38.4726x0.9369	17.90	0.00	0.0	121.6170	-58.11	5754.96	0.010
L11	19.5 - 9 (11)	TP43.8089x41.836x0.969	10.50	0.00	0.0	131.7570	-64.62	6269.42	0.010
L12	9 - 7 (12)	TP44.1847x43.8089x1.003	2.00	0.00	0.0	137.4650	-65.92	6542.56	0.010
L13	7 - 5 (13)	TP44.5605x44.1847x0.957	2.00	0.00	0.0	132.4480	-67.19	6302.28	0.011
L14	5 - 3 (14)	TP44.9363x44.5605x1.2348	2.00	0.00	0.0	171.2790	-68.76	8251.77	0.008
L15	3 - 2.25 (15)	TP45.0772x44.9363x1.4189	0.75	0.00	0.0	196.6250	-69.43	9297.57	0.007
L16	2.25 - 0 (16)	TP45.5x45.0772x1.1744	2.25	0.00	0.0	165.2240	-71.13	7703.25	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	169 - 133.33 (1)	TP22.31x15.5x0.25	350.86	554.33	0.633	0.00	554.33	0.000
L2	133.33 - 111 (2)	TP26.0013x21.1743x0.3125	858.11	995.74	0.862	0.00	995.74	0.000
L3	111 - 101.5 (3)	TP27.7884x26.0013x0.5508	1128.06	1226.88	0.919	0.00	1226.88	0.000
L4	101.5 - 101 (4)	TP27.8825x27.7884x0.9838	1142.68	1789.98	0.638	0.00	1789.98	0.000
L5	101 - 87.83 (5)	TP30.36x27.8825x0.6941	1410.54	1475.87	0.956	0.00	1475.87	0.000
L6	87.83 - 81.8 (6)	TP30.8702x28.1572x0.9128	1748.32	2080.68	0.840	0.00	2080.68	0.000
L7	81.8 - 81 (7)	TP31.0207x30.8702x1.1092	1775.45	2683.63	0.662	0.00	2683.63	0.000
L8	81 - 43.33 (8)	TP38.11x31.0207x0.8207	2987.16	3222.65	0.927	0.00	3222.65	0.000
L9	43.33 - 37.4 (9)	TP38.4726x35.4655x0.9971	3208.82	3882.78	0.826	0.00	3882.78	0.000
L10	37.4 - 19.5 (10)	TP41.836x38.4726x0.9369	4269.32	4768.84	0.895	0.00	4768.84	0.000
L11	19.5 - 9 (11)	TP43.8089x41.836x0.969	4768.02	5443.21	0.876	0.00	5443.21	0.000
L12	9 - 7 (12)	TP44.1847x43.8089x1.003	4864.94	5722.27	0.850	0.00	5722.27	0.000
L13	7 - 5 (13)	TP44.5605x44.1847x0.957	4962.49	5572.92	0.890	0.00	5572.92	0.000
L14	5 - 3 (14)	TP44.9363x44.5605x1.2348	5060.68	7268.33	0.696	0.00	7268.33	0.000
L15	3 - 2.25 (15)	TP45.0772x44.9363x1.4189	5097.67	8147.76	0.626	0.00	8147.76	0.000
L16	2.25 - 0 (16)	TP45.5x45.0772x1.1744	5209.19	6893.89	0.756	0.00	6893.89	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	169 - 133.33 (1)	TP22.31x15.5x0.25	17.46	631.51	0.028	0.16	1110.03	0.000
L2	133.33 - 111 (2)	TP26.0013x21.1743x0.3125	21.57	946.52	0.023	0.25	1993.92	0.000
L3	111 - 101.5 (3)	TP27.7884x26.0013x0.5508	29.15	1108.68	0.026	0.11	2456.78	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L4	101.5 - 101 (4)	TP27.8825x27.7884x0.9838	29.26	1664.15	0.018	0.13	3584.34	0.000
L5	101 - 87.83 (5)	TP30.36x27.8825x0.6941	31.28	1263.82	0.025	0.57	2955.34	0.000
L6	87.83 - 81.8 (6)	TP30.8702x28.1572x0.9128	33.78	1726.70	0.020	0.57	4166.46	0.000
L7	81.8 - 81 (7)	TP31.0207x30.8702x1.1092	33.97	2244.78	0.015	0.57	5373.81	0.000
L8	81 - 43.33 (8)	TP38.11x31.0207x0.8207	40.90	2191.10	0.019	0.57	6453.18	0.000
L9	43.33 - 37.4 (9)	TP38.4726x35.4655x0.9971	42.46	2706.09	0.016	0.57	7775.07	0.000
L10	37.4 - 19.5 (10)	TP41.836x38.4726x0.9369	46.64	2877.48	0.016	0.57	9549.33	0.000
L11	19.5 - 9 (11)	TP43.8089x41.836x0.969	48.27	3134.71	0.015	0.57	10899.75	0.000
L12	9 - 7 (12)	TP44.1847x43.8089x1.003	48.58	3271.28	0.015	0.57	11458.58	0.000
L13	7 - 5 (13)	TP44.5605x44.1847x0.957	48.89	3151.14	0.016	0.57	11159.50	0.000
L14	5 - 3 (14)	TP44.9363x44.5605x1.2348	49.21	4125.89	0.012	0.57	14554.42	0.000
L15	3 - 2.25 (15)	TP45.0772x44.9363x1.4189	49.33	4648.78	0.011	0.57	16315.42	0.000
L16	2.25 - 0 (16)	TP45.5x45.0772x1.1744	49.70	3851.62	0.013	0.57	13804.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	169 - 133.33 (1)	0.006	0.633	0.000	0.028	0.000	0.640 ✔	1.000	4.8.2 ✔
L2	133.33 - 111 (2)	0.006	0.862	0.000	0.023	0.000	0.869 ✔	1.000	4.8.2 ✔
L3	111 - 101.5 (3)	0.008	0.919	0.000	0.026	0.000	0.928 ✔	1.000	4.8.2 ✔
L4	101.5 - 101 (4)	0.005	0.638	0.000	0.018	0.000	0.644 ✔	1.000	4.8.2 ✔
L5	101 - 87.83 (5)	0.008	0.956	0.000	0.025	0.000	0.964 ✔	1.000	4.8.2 ✔
L6	87.83 - 81.8 (6)	0.007	0.840	0.000	0.020	0.000	0.848 ✔	1.000	4.8.2 ✔
L7	81.8 - 81 (7)	0.006	0.662	0.000	0.015	0.000	0.668 ✔	1.000	4.8.2 ✔
L8	81 - 43.33 (8)	0.009	0.927	0.000	0.019	0.000	0.936 ✔	1.000	4.8.2 ✔
L9	43.33 - 37.4 (9)	0.008	0.826	0.000	0.016	0.000	0.835 ✔	1.000	4.8.2 ✔
L10	37.4 - 19.5 (10)	0.010	0.895	0.000	0.016	0.000	0.906 ✔	1.000	4.8.2 ✔
L11	19.5 - 9 (11)	0.010	0.876	0.000	0.015	0.000	0.887 ✔	1.000	4.8.2 ✔
L12	9 - 7 (12)	0.010	0.850	0.000	0.015	0.000	0.860 ✔	1.000	4.8.2 ✔
L13	7 - 5 (13)	0.011	0.890	0.000	0.016	0.000	0.901 ✔	1.000	4.8.2 ✔
L14	5 - 3 (14)	0.008	0.696	0.000	0.012	0.000	0.705 ✔	1.000	4.8.2 ✔
L15	3 - 2.25 (15)	0.007	0.626	0.000	0.011	0.000	0.633 ✔	1.000	4.8.2 ✔
L16	2.25 - 0 (16)	0.009	0.756	0.000	0.013	0.000	0.765 ✔	1.000	4.8.2 ✔

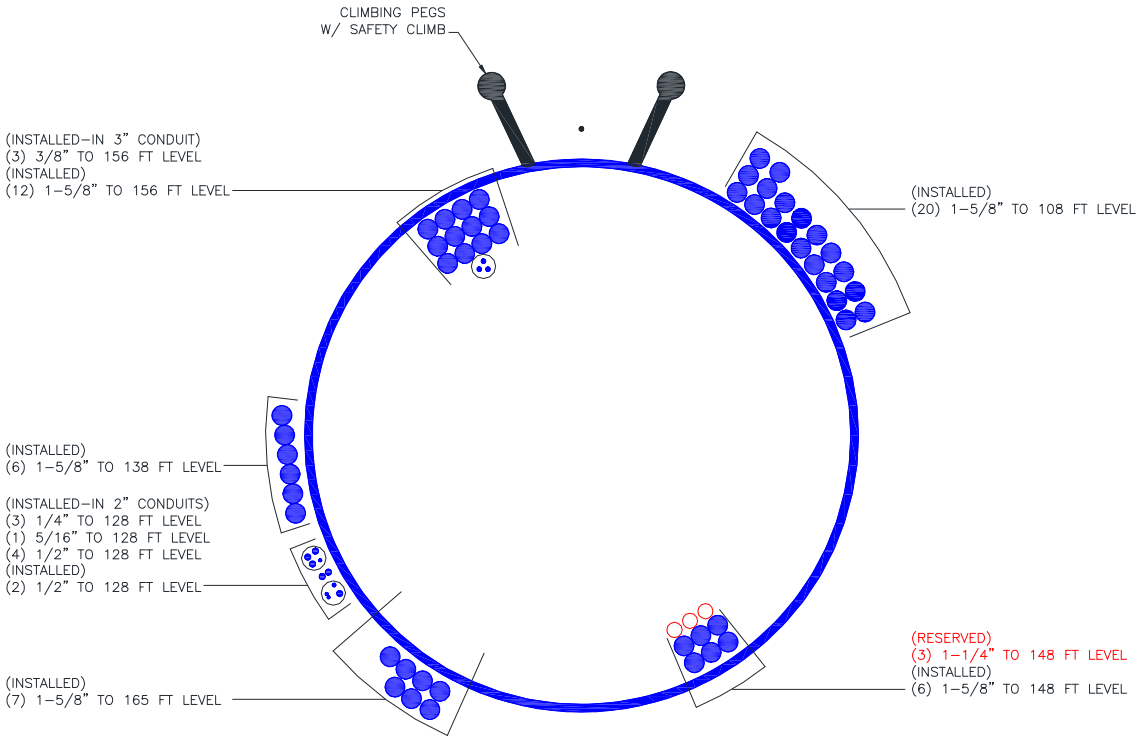
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	169 - 133.33	Pole	TP22.31x15.5x0.25	1	-7.56	1263.03	64.0	Pass
L2	133.33 - 111	Pole	TP26.0013x21.1743x0.3125	2	-12.13	1893.04	86.9	Pass
L3	111 - 101.5	Pole	TP27.7884x26.0013x0.5508	3	-16.91	2217.37	92.8	Pass
L4	101.5 - 101	Pole	TP27.8825x27.7884x0.9838	4	-17.13	3328.31	64.4	Pass
L5	101 - 87.83	Pole	TP30.36x27.8825x0.6941	5	-19.97	2527.63	96.4	Pass
L6	87.83 - 81.8	Pole	TP30.8702x28.1572x0.9128	6	-25.28	3453.39	84.8	Pass
L7	81.8 - 81	Pole	TP31.0207x30.8702x1.1092	7	-25.68	4489.55	66.8	Pass
L8	81 - 43.33	Pole	TP38.11x31.0207x0.8207	8	-39.75	4382.21	93.6	Pass
L9	43.33 - 37.4	Pole	TP38.4726x35.4655x0.9971	9	-44.67	5364.83	83.5	Pass
L10	37.4 - 19.5	Pole	TP41.836x38.4726x0.9369	10	-58.11	5754.96	90.6	Pass
L11	19.5 - 9	Pole	TP43.8089x41.836x0.969	11	-64.62	6269.42	88.7	Pass
L12	9 - 7	Pole	TP44.1847x43.8089x1.003	12	-65.92	6542.56	86.0	Pass
L13	7 - 5	Pole	TP44.5605x44.1847x0.957	13	-67.19	6302.28	90.1	Pass
L14	5 - 3	Pole	TP44.9363x44.5605x1.2348	14	-68.76	8251.77	70.5	Pass
L15	3 - 2.25	Pole	TP45.0772x44.9363x1.4189	15	-69.43	9297.57	63.3	Pass
L16	2.25 - 0	Pole	TP45.5x45.0772x1.1744	16	-71.13	7703.25	76.5	Pass
							Summary	
						Pole (L5)	96.4	Pass
						RATING =	**96.4**	**Pass**

APPENDIX B

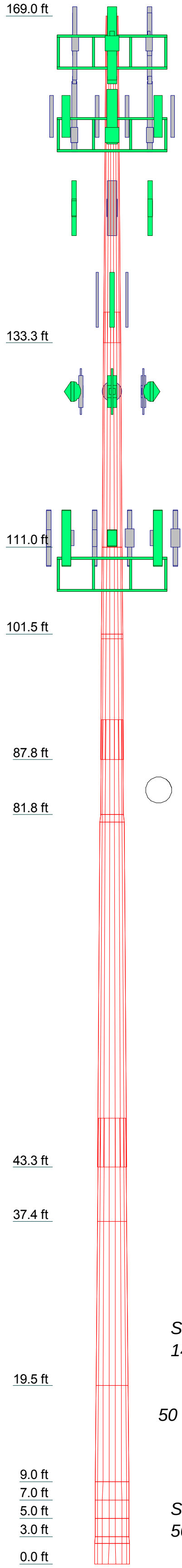
BASE LEVEL DRAWING


CLIMBING PEGS
W/ SAFETY CLIMB
(INSTALLED–IN 3" CONDUIT)
(3) 3/8" TO 156 FT LEVEL
(INSTALLED)
(12) 1–5/8" TO 156 FT LEVEL
(INSTALLED)
(20) 1–5/8" TO 108 FT LEVEL
(INSTALLED)
(6) 1–5/8" TO 138 FT LEVEL
(INSTALLED–IN 2" CONDUITS)
(3) 1/4" TO 128 FT LEVEL
(1) 5/16" TO 128 FT LEVEL
(4) 1/2" TO 128 FT LEVEL
(INSTALLED)
(2) 1/2" TO 128 FT LEVEL
(RESERVED)
(3) 1–1/4" TO 148 FT LEVEL
(INSTALLED)
(6) 1–5/8" TO 148 FT LEVEL
(INSTALLED)
(7) 1–5/8" TO 165 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	35.67	18	0.2500	3.33	15.5000	22.3100	A572-65	1.8
2	25.66	18	0.3125		21.1743	26.0013	A572-65	2.0
3	9.50	18	0.5508		26.0013	27.7884	Reinf 40.74 ksi	1.5
4	0.50	18	0.9838		27.7884	27.8825	Reinf 34.67 ksi	0.1
5	13.17	18	0.6941	4.33	27.8825	30.3600	Reinf 34.79 ksi	2.8
6	10.36	18	0.9128		30.1572	30.8702	Reinf 34.81 ksi	2.9
7	0.80	18	1.1092		30.8702	31.0207		0.3
8	37.67	18	0.8207	5.33	31.0207	38.1100	Reinf 37.30 ksi / Reinf 40.56 ksi	11.3
9	11.26	18	0.9971		35.4655	38.4726		4.4
10	17.90	18	0.9369		38.4726	41.8360	Reinf 41.32 ksi	7.1
11	10.50	18	0.9690		41.8360	43.8089	Reinf 41.40 ksi	4.6
12–16	[illegible]	18	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]		[illegible]					43.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	APXVSPP18-C-A20 w/ Mount Pipe	148
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	APXVSPP18-C-A20 w/ Mount Pipe	148
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	165	1900MHz RRH	148
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	165	1900MHz RRH	148
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	165	1900MHz RRH	148
Ericsson Air 21 B4A B12P-B5P 8FT w/ Mount Pipe	165	800MHZ RRH	148
KRY 112 144/1	165	800MHZ RRH	148
KRY 112 144/1	165	800MHZ RRH	148
KRY 112 144/1	165	Side Arm Mount [SO 102-3]	148
RRUS 11 B12	165	APXV18-206517-A	138
RRUS 11 B12	165	APXV18-206517-A	138
RRUS 11 B12	165	APXV18-206517-A	138
8-ft Ladder	165	Pipe Mount [PM 601-3]	138
Platform Mount [LP 601-1]	165	LLPX310R w/ Mount Pipe	128
(2) 7770.00 w/ Mount Pipe	156	LLPX310R w/ Mount Pipe	128
(2) 7770.00 w/ Mount Pipe	156	LLPX310R w/ Mount Pipe	128
(2) 7770.00 w/ Mount Pipe	156	WIMAX DAP HEAD	128
DTMABP7819VG12A	156	WIMAX DAP HEAD	128
DTMABP7819VG12A	156	WIMAX DAP HEAD	128
DTMABP7819VG12A	156	HORIZON DUO	128
RRUS 11	156	HORIZON DUO	128
RRUS 11	156	HORIZON DUO	128
RRUS 11	156	2.375" OD x 5' Mount Pipe	128
DC6-48-60-18-8F	156	2.375" OD x 5' Mount Pipe	128
HPA-65R-BUU-H8 w/ Mount Pipe	156	2.375" OD x 5' Mount Pipe	128
HPA-65R-BUU-H8 w/ Mount Pipe	156	Side Arm Mount [SO 701-3]	128
HPA-65R-BUU-H6 w/ Mount Pipe	156	A-ANT-18G-2-C	128
DTMABP7819VG12A	156	A-ANT-18G-2-C	128
DTMABP7819VG12A	156	A-ANT-18G-2-C	128
DTMABP7819VG12A	156	(2) LNX-6514DS-A1M w/ Mount Pipe	108
RRUS12/RRUS A2	156	(2) LNX-6514DS-A1M w/ Mount Pipe	108
RRUS12/RRUS A2	156	(2) LNX-6514DS-A1M w/ Mount Pipe	108
RRUS12/RRUS A2	156	(2) RRH2X60-PCS	108
Handrail Kit [NA 510-1]	156	RRH2X60-PCS	108
Platform Mount [LP 714-1]	156	RRH2X60-AWS	108
APXVSPP18-C-A20 w/ Mount Pipe	148	RRH2X60-AWS	108
		RRH2X60-AWS	108
		(2) DB-T1-6Z-8AB-0Z	108
		Platform Mount [LP 303-1]	108
		(2) HBXX-6517DS-A2M w/ Mount Pipe	108
		(2) HBXX-6517DS-A2M w/ Mount Pipe	108
		(2) HBXX-6517DS-A2M w/ Mount Pipe	108

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 41.32 ksi	41 ksi	52 ksi
Reinf 40.74 ksi	41 ksi	51 ksi	Reinf 41.40 ksi	41 ksi	52 ksi
Reinf 34.67 ksi	35 ksi	44 ksi	Reinf 41.63 ksi	42 ksi	53 ksi
Reinf 34.79 ksi	35 ksi	44 ksi	Reinf 41.64 ksi	42 ksi	53 ksi
Reinf 34.81 ksi	35 ksi	44 ksi	Reinf 42.15 ksi	42 ksi	53 ksi
Reinf 37.30 ksi	37 ksi	47 ksi	Reinf 41.37 ksi	41 ksi	52 ksi
Reinf 40.56 ksi	41 ksi	51 ksi	Reinf 40.79 ksi	41 ksi	51 ksi

ALL REACTIONS ARE FACTORED

AXIAL 167 K
SHEAR 14 K
MOMENT 1759 kip-ft
TORQUE 5 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 71 K
SHEAR 50 K
MOMENT 5209 kip-ft
TORQUE 10 kip-ft
REACTIONS - 97 mph WIND

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 96.4%

PJF
Paul J. Ford and Company
250 East Broad St, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX:

Job: **165-Ft Monopole / South Windsor/Rt 5**		
Project: **PJF 37516-2594 / BU 828054**		
Client: Crown Castle	Drawn by: TDehnke	App'd:
Code: TIA-222-G	Date: 11/17/16	Scale: NTS
Path:		Dwg No. E-1

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

v4.4 - Effective 7-12-13

Date: 11/17/2016
PJF Project: 37516-2594.002.7805
Client Ref. # 828054
Site Name: South Windsor/Rt 5
Description: 169' Pole
Owner: Crown Castle
Engineer: JWM

Asymmetric Anchor Rod Analysis

Moment =	5209	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	71.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9	
Shear =	50.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	6							

**** 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	0.000	Other	Titan	103/78	0.0	117.50	5.51	5.51	366.49	342.82	366.49	408.40	408.40	89.7%
2	0.000	Other	Titan	103/78	60.0	117.50	5.51	5.51	366.49	342.82	366.49	408.40	408.40	89.7%
3	0.000	Other	Titan	103/78	120.0	117.50	5.51	5.51	366.49	342.82	366.49	408.40	408.40	89.7%
4	0.000	Other	Titan	103/78	180.0	117.50	5.51	5.51	366.49	342.82	366.49	408.40	408.40	89.7%
5	0.000	Other	Titan	103/78	240.0	117.50	5.51	5.51	366.49	342.82	366.49	408.40	408.40	89.7%
6	0.000	Other	Titan	103/78	300.0	117.50	5.51	5.51	366.49	342.82	366.49	408.40	408.40	89.7%
								33.06						

MODIFICATION OF AN EXISTING 169' MONOPOLE
ENGINEERED ENDEAVORS #99-1371
BU #828054; SOUTH WINDSOR/RT 5

300 GOVERNORS HIGHWAY
SOUTH WINDSOR, CONNECTICUT 06074
HARTFORD COUNTY
LAT: 41° 50' 0.4"; LONG: -72° 36' 11.0"
APP: 356926 REV. 5; WO: 1324130

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

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

PROJECT CONTACTS

STRUCTURE OWNER:
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MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
SHAFT REINFORCING
REMOVE AND REPLACE STEP BOLTS AS REQUIRED
FIELD WELDED STIFFENERS

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
T-2	MI CHECKLIST
S-1	GENERAL NOTES
S-2A	FORGBOLT™ DETAILS
S-2B	NEXGEN2™ BOLT DETAIL
S-2C	AJAX ONESIDE™ BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	MONOPOLE SECTIONS
S-5	BASE PLATE DETAILS

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2016 CONNECTICUT STATE BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	125 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	97 MPH
ICE THICKNESS	1.0 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	C
Kzt	1.0

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD & COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT RIGGING@PJFWEB.COM.

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1310938

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	
DATE:	11-17-2016

TITLE SHEET

T-1

37516-2594.003.DWG

MODIFICATION INSPECTION NOTES:

1. GENERAL

1.1. 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 EOR.

1.2. 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.

1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.

1.4. 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 CASTLE POINT OF CONTACT (POC).

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

2. MI INSPECTOR

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

2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.

2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.

2.1.3. THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL 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 CASTLE.

3. GENERAL CONTRACTOR

3.1. 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:

3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.

3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.

3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.

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

4. RECOMMENDATIONS

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

4.1.1. 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.

4.1.2. THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.

4.1.3. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.

4.1.4. 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.

4.1.5. 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.

5. CANCELLATION OR DELAYS IN SCHEDULED MI

5.1. IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN CASTLE 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 CASTLE 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.

6. CORRECTION OF FAILING MI'S

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

6.1.1. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.

6.1.2. OR, WITH CROWN CASTLE'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

7. MI VERIFICATION INSPECTIONS

7.1. CROWN CASTLE 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.

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

7.3. 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.

8. PHOTOGRAPHS

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

8.1.1. PRECONSTRUCTION GENERAL SITE CONDITION

8.1.2. PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION

8.1.3. RAW MATERIALS

8.1.4. PHOTOS OF ALL CRITICAL DETAILS

8.1.5. FOUNDATION MODIFICATIONS

8.1.6. WELD PREPARATION

8.1.7. BOLT INSTALLATION AND TORQUE

8.1.8. FINAL INSTALLED CONDITION

8.1.9. SURFACE COATING REPAIR

8.1.10. POST CONSTRUCTION PHOTOGRAPHS

8.1.11. FINAL INFIELD CONDITION

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

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

9. INSPECTION AND TESTING

9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.

9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.

9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.

9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED AND RETAINED FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.

9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.

9.4.2. 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.

9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND 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.

9.6. GENERAL

9.6.1. PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.

9.7. FOUNDATIONS AND SOIL PREPARATION - (NOT REQUIRED)

9.8. CONCRETE TESTING PER ACI - (NOT REQUIRED)

9.9. STRUCTURAL STEEL

9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.

9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.

9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.

9.9.4. INSPECT 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.

9.9.5. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.

9.9.6. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.

9.9.7. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.

9.9.8. CHECK THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.

9.9.9. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

9.10. WELDING:

9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.

9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.

9.10.3. APPROVE FIELD WELDING SEQUENCE.

9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.

9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:

9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.

9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.

9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.

9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.

9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.

9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.

9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.

9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.

9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.

9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.

9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.

9.11. REPORTS:

9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.

9.11.2. 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 OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.

9.11.3. 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 CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.

9.11.4. 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.

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
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
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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MODIFICATION OF AN EXISTING 169' MONOPOLE

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
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MI CHECKLIST

T-2

37516-2594.003.DWG

MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 3, 02/05/2015)

1. GENERAL NOTES

1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED AND EXISTING LOADS FROM THE ATTACHED STRUCTURAL MODIFICATION REPORT AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY NEW LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.

1.2. THESE DRAWINGS WERE PREPARED FROM INFORMATION PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. PRIOR TO FABRICATION AND INSTALLATION CONTRACTOR SHALL VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT DRAWINGS AND THEIR FIELD VERIFIED CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE BEFORE PROCEEDING WITH THE WORK. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GENERAL CONTRACTOR AND/OR THE FABRICATOR

1.3. 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.

1.4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE 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.

1.5. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-1019 (LATEST EDITION), OSHA AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

1.6. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ACHIEVING GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.

1.7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL 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 CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

1.8. 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.

1.9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.

1.10. 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 RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.

1.11. 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.

1.12. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.

1.13. FOR STANDARD CROWN PARTS SEE THE MOST RECENT VERSION OF THE "CCI APPROVED REINFORCEMENT COMPONENTS" CATALOG.

1.14. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG PRODUCTS. CONTACT DETAILS:
3434 ENCRETE LANE, MORAINE, OHIO 45439
PHONE: 937-299-1213 EMAIL: TUFTUG@AOL.COM

2. STRUCTURAL STEEL

2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
2.1.1.2. "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):
2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."
2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"

2.2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS', DEC. 31, 2009.

2.3. 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.

2.4. 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.

2.5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

2.6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.

2.7. 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.

2.8. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.

2.9. FIELD CUTTING OF STEEL:
2.9.1. IMPORTANT CUTTING AND WELDING 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. 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 SAFETY PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". 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.
2.9.2. 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. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

3. BASE PLATE GROUT - (NOT REQUIRED)

4. FOUNDATION WORK - (NOT REQUIRED)

5. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

6. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

7. TOUCH UP OF GALVANIZING

7.1. THE CONTRACTOR SHALL TOUCH UP ANY AND 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 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.

7.2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.

7.3. CROWN CASTLE'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 ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

8. HOT-DIP GALVANIZING

8.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.

8.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.

8.3. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

9. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.

9.2. ANY 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 EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED 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 CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.

9.3. CROWN CASTLE SHALL REFER TO ANSI/TIA-222-G-2-2009, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR 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 ANSI/TIA-222-G-2-2009 SECTION 14.2: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

10. FIELD NDE MINIMUM REQUIREMENTS

10.1. ALL NDE SHALL BE IN ACCORDANCE WITH AWS D1.1.

10.2. FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.

10.3. FOR NEW FLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'-0".

10.4. FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD, GC SHALL REFERENCE THE MI CHECKLIST FOR APPLICABILITY. PLEASE SEE ENG-SOW-10033: 'TOWER BASE PLATE NDE, AND ENG-BUL-10051: 'NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE'. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE.

10.5. ALL TESTING LIMITATIONS SHALL BE DETAILED IN THE NDE REPORT.

PJF PAUL J. FORD & COMPANY
250 E Broad St. Ste 600- Columbus, OH 43215
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CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 169' MONOPOLE

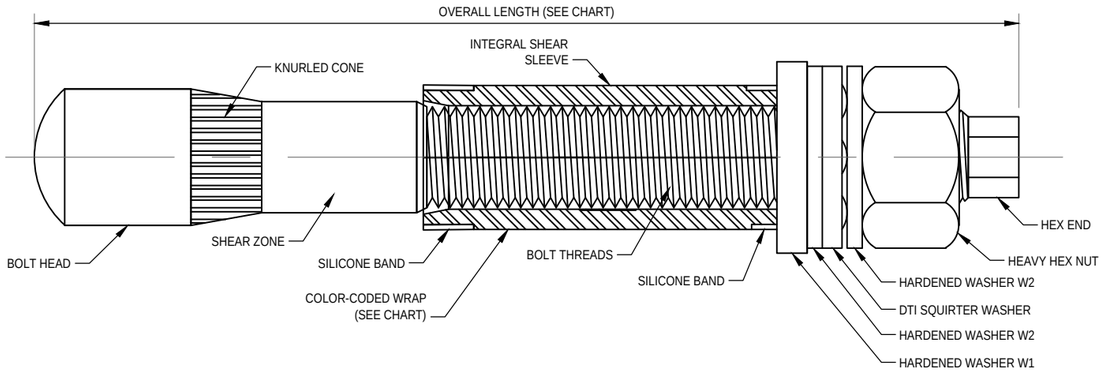
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	
DATE:	11-17-2016

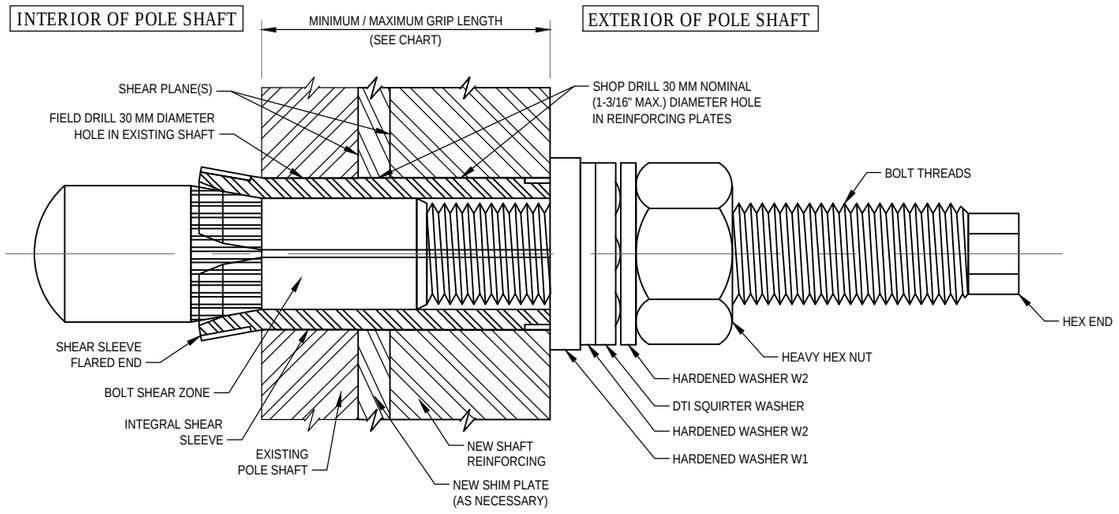
GENERAL NOTES

S-1

37516-2594.003.DWG



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1 / S-2A



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2 / S-2A

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP A	FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8 1	**135**	5.31	1.3	3/8" to 1"	--	**RED**
2	**160**	6.30	1.6	3/4" to 1-1/2"	--	**GREEN**
3	**195**	7.68	1.9	1-1/4" to 2-1/4"	--	**BLUE**
4	**260**	10.24	2.6	2" to 3-1/2"	Splice Bolt	**YELLOW**
5	**365**	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	**ORANGE**
6	**440**	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	**BLACK**
DTI Note	Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

INSTALLATION NOTES:
1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

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

BOLT TIGHTENING AND INSPECTION 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.

AISC GROUP A MATERIAL: ASTM A325 AND PC8.8
(Fu = 120 KSI MIN. TENSILE STRESS)

CONTAINS PROPRIETARY INFORMATION PATENT PENDING

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
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WEB: www.precisiontowerproducts.com

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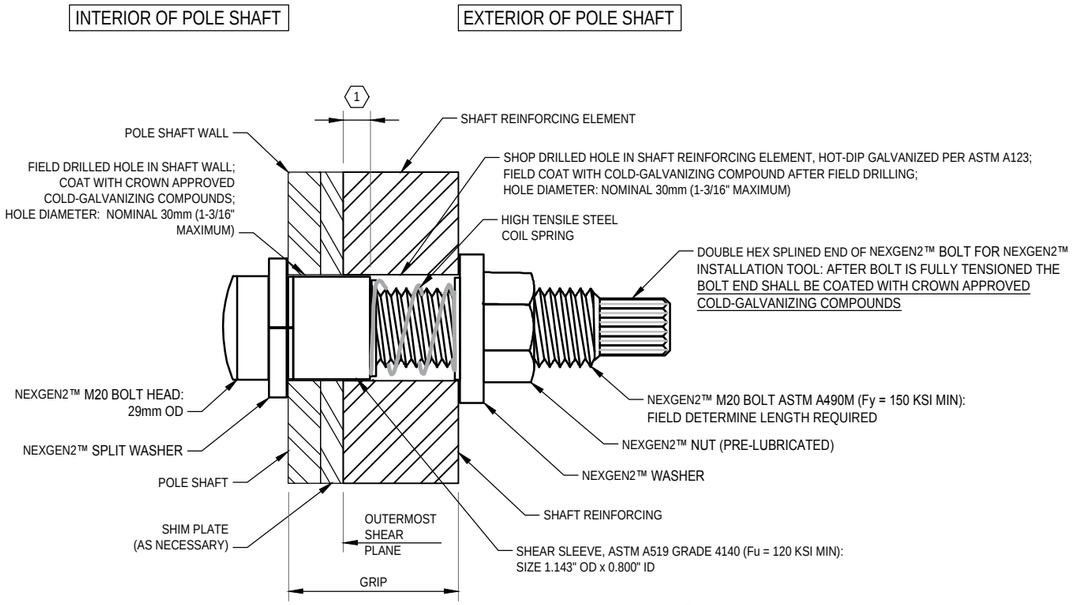
MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	
DATE:	11-17-2016

FORGBolt™ DETAILS

S-2A

1 NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING NEXGEN2™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL NEXGEN2™ BOLT DETAIL 1 / S-2B

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

BOLT HOLE NOTES:

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

BOLT TIGHTENING AND INSPECTION NOTES:

1. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.3: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL NEXGEN2™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND..

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
M20x36	M20x95	11/16"	15/16"	1 7/16"
M20x48	M20x95	1 3/16"	1 7/16"	1 7/8"
M20x57	M20x95	1 5/8"	1 7/8"	2 1/4"
M20x68	M20x135	2"	2 1/4"	2 11/16"
M20x96	M20x135	2 7/16"	2 11/16"	3 3/4"
M20x127	M20x165	3"	3 3/4"	5"
M20x212	M20x250	4"	5"	8 5/16"

NOTE: NEXGEN2™ BOLT ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AND MANUFACTURER SPECIFICATIONS.

NOTE: INSTALL NEXGEN2™ BOLT ASSEMBLY PER MANUFACTURER'S INSTRUCTIONS.

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

PAUL J. FORD & COMPANY
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CROWN CASTLE
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PH: (724) 416-2000

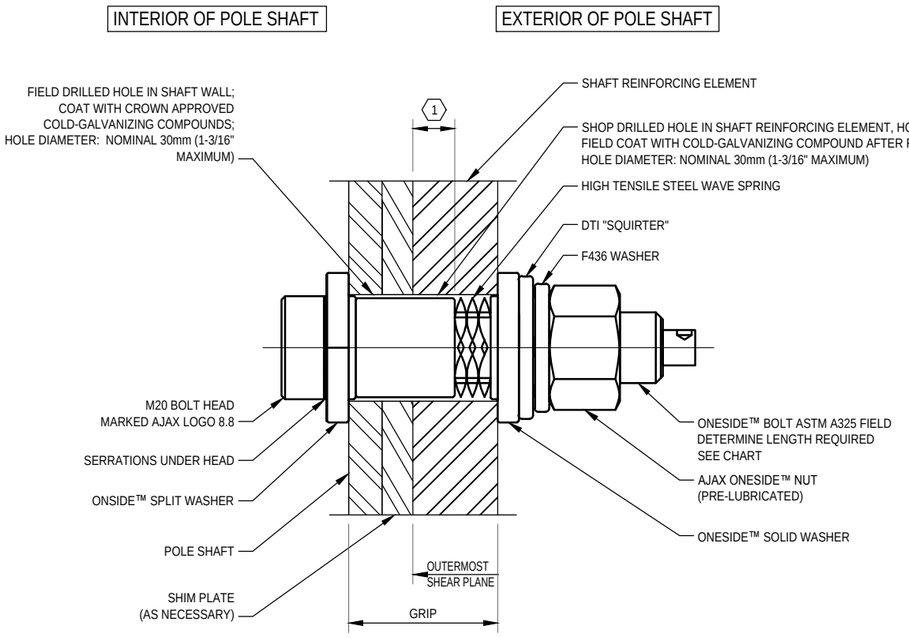
MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	
DATE:	11-17-2016

NEXGEN2™ BOLT DETAIL

S-2B

1 NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING AJAX ONESIDE™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL AJAX ONESIDE™ BOLT DETAIL 1 / S-2C

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

BOLT HOLE NOTES:

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

BOLT TIGHTENING AND INSPECTION NOTES:

1. ALL AJAX ONESIDE™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.4 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.4: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL AJAX ONESIDE™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.4 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL AJAX ONESIDE™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL AJAX ONESIDE™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX ONESIDE™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DIRECT TENSION INDICATOR WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED.
4. A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX ONESIDE™/DTI BOLT ASSEMBLY IN THE REINFORCING MEMBERS. A FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSION.
5. INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND CROWN DOCUMENT ENG-SOW-10007: *MODIFICATION INSPECTION SOW*.

BOLT ASSEMBLY AND INSTALLATION:

1. BOLT MUST BE PURCHASED PRE-ASSEMBLED.
2. FOLLOW BOLT AND DTI MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.

AJAX ONESIDE™ BOLT DETAIL

CODE	SIZE	COLOR	SLEEVE LENGTH	GRIP	GRIP IMP
OSBA20.65-6	M20 x 65	ORANGE	6.0 (0.236")	12.5 / 20.0	0.500" / 0.787"
OSBA20.95-14	M20 x 95	BLACK	14.0 (0.551")	20.0 / 32.0	0.787" / 1.259"
OSBA20.95-22	M20 x 95	GREEN	22.0 (0.866")	30.0 / 50.0	1.181" / 1.968"
OSBA20.95-30	M20 x 95	YELLOW	30.0 (1.181")	40.5 / 50.0	1.595" / 1.968"
OSBA20.135-39	M20 x 135	BLUE	39.0 (1.535")	49.0 / 77.0	1.929" / 3.031"
OSBA20.135-48	M20 x 135	BROWN	48.0 (1.889")	60.5 / 77.0	2.375" / 3.031"
OSBA20.135-57	M20 x 135	PURPLE	57.0 (2.244")	67.0 / 90.0	2.637" / 3.543"
OSBA20.165-76	M20 x 165	RED	76.0 (3.000")	87.0 / 120.0	3.425" / 4.724"
OSBA20.250	M20 x 250	SILVER	MTO	121.0 / 211.0	4.724" / 8.310"

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MANUFATURER
AJAX FASTENERS
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MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

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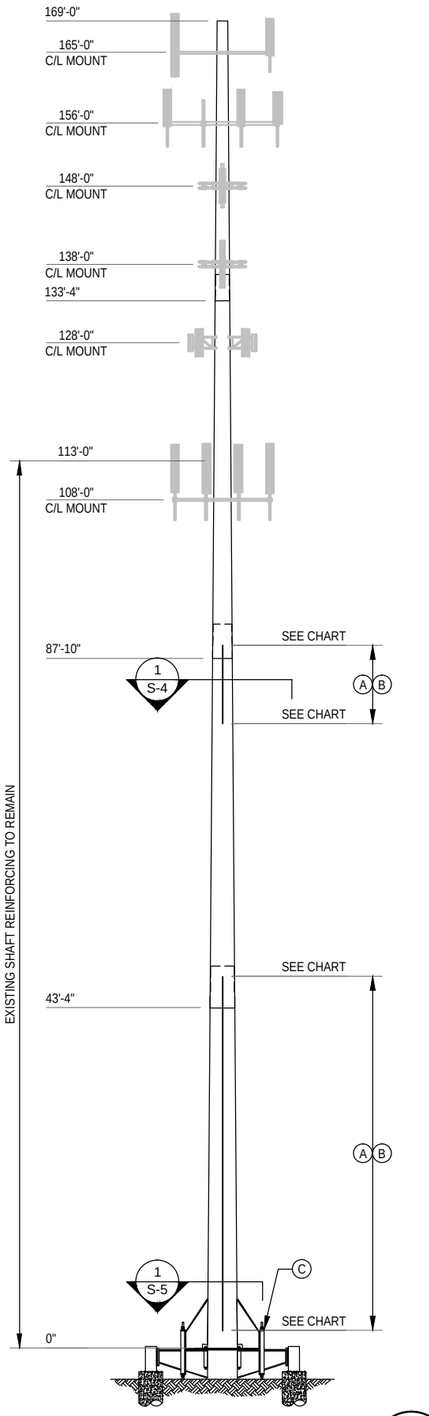
AJAX ONESIDE™ BOLT DETAIL

S-2C



POLE ELEVATION 1 S-3

NOTE: SHAFT REINFORCING MAY NEED TO BE INSTALLED OFF-CENTER OF FLAT FOR FIT UP. OFFSETS THAT RESULT IN THE FASTENER BEING LOCATED LESS THAN 1 1/2" FROM THE APEX OF THE FLAT MUST BE APPROVED BY THE ENGINEER OF RECORD.

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE BOLTS PER ELEMENT	APPROXIMATE TOTAL BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
2' - 3"	22' - 3"	F2, F6, F11 & F15	CCI-WCFP-06512520 #1	20' - 0"	4	19	76	0	11	19"	2212 LBS.
22' - 4"	47' - 4"	F2, F6, F11 & F15	CCI-CFP-06010025 #2	25' - 0"	4	36	144	11	11	16"	2042 LBS.
79' - 6"	89' - 6"	F3, F9 & F15	CCI-SFP-04510010	10' - 0"	3	16	48	6	6	20"	459 LBS.
							268				4713 LBS.

NOTES:

1.) 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.
2.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
3.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
4.) HOLES FOR BOLTS ARE 30mm UNLESS NOTED OTHERWISE.
5.) ALL SHIMS SHALL BE ASTM A-36.
6.) ALL HOLES ARE TO BE DRILLED, DO NOT BURN OR PUNCH.
7.) FOR PLATES STARTING AT 6", THE BOTTOM OF THE FLAT PLATE SHALL BEGIN AT 6" ± 1". FOR SINGLE PLATES OR MULTIPLE PLATES SPLICED TOGETHER, THE BOTTOM OF THE FLAT PLATE SHALL BEGIN AT THE PROPOSED ELEVATION ± 3". FOR MULTIPLE PLATES SPLICED TOGETHER, THE TOP OF THE FLAT PLATE IS TO BE PLACED SUCH THAT THERE IS NO MORE THAN 3" DIFFERENCE BETWEEN THE ACTUAL OVERALL LENGTH OF THE SPAN AND THE PROPOSED OVERALL LENGTH OF THE SPAN, FROM THE BOTTOM OF THE PLATE TO THE TOP OF THE PLATE.

SPLICE PLATE INSTALLATION CHART

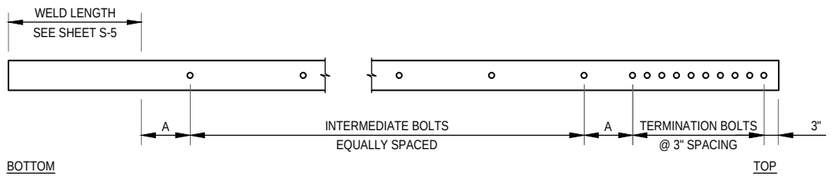
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
22' - 4"	1"	6"	6' - 1"	4	0"	0"	22	497 LBS.
						0"		497 LBS.

* BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

NEW SHIM CHART

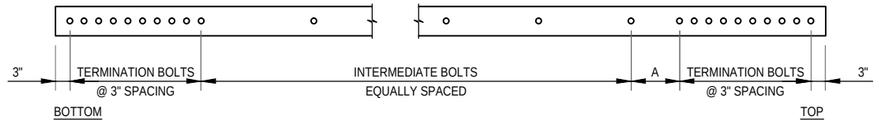
1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
12	3	4-1/2"	4-1/2"	1-1/4"
16	8	6"	6"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY, FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.



CUSTOM WELDED BAR DETAIL

NOTE: "A" DIMENSION MAY VARY, NOT TO EXCEED MAXIMUM INTERMEDIATE BOLT SPACING



CUSTOM BOLTED BAR DETAIL

NOTE: "A" DIMENSION MAY VARY, NOT TO EXCEED MAXIMUM INTERMEDIATE BOLT SPACING

SHAFT SECTION DATA

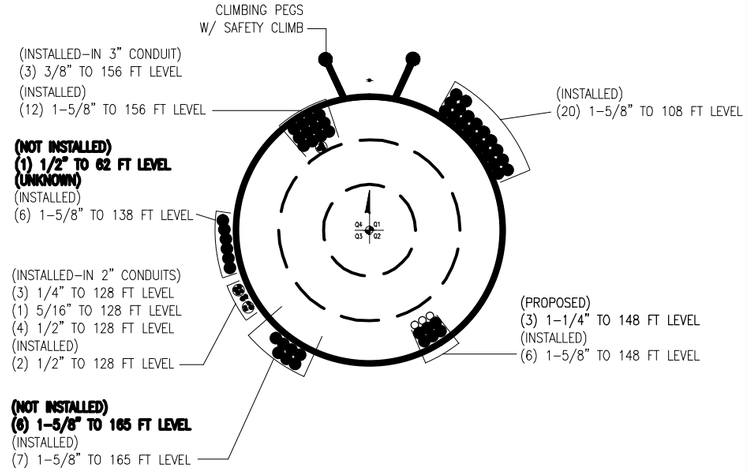
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM	POLE GRADE (ksi)	POLE SHAPE
1	35.67	0.2500	40.00	15.500	22.310	65	18-SIDED
2	48.83	0.3125	52.00	21.174	30.360	65	18-SIDED
3	48.83	0.3750	64.00	28.921	38.110	65	18-SIDED
4	48.66	0.3750		36.357	45.500	65	18-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

ASTM A36 SHIMS FOR MONOPOLE REINFORCEMENT MEMBERS SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED. FINGER SHIMS AND HORSESHOE SHIMS ARE PERMITTED. STACKED SHIMS SHALL BE NO GREATER THAN 1/4" WITHOUT ENGINEER OF RECORD APPROVAL.

TOWER MODIFICATION SCHEDULE

	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
A	2'-3" TO 47'-4", 79'-6" TO 89'-6"	INSTALL NEW SHAFT REINFORCING	S-3 TO S-5
B	2'-3" TO 47'-4", 79'-6" TO 89'-6"	REMOVE AND REPLACE SAFETY CLIMB BRACKETS AS REQUIRED FOR REINFORCING INSTALLATION. INSTALL NEW SAFETY CLIMB. COORDINATE WITH TUF-TUG. SEE NOTE 1.14 ON S-1.	S-3
C	0'	INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE	S-5



BASE LEVEL

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

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 169' MONOPOLE

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

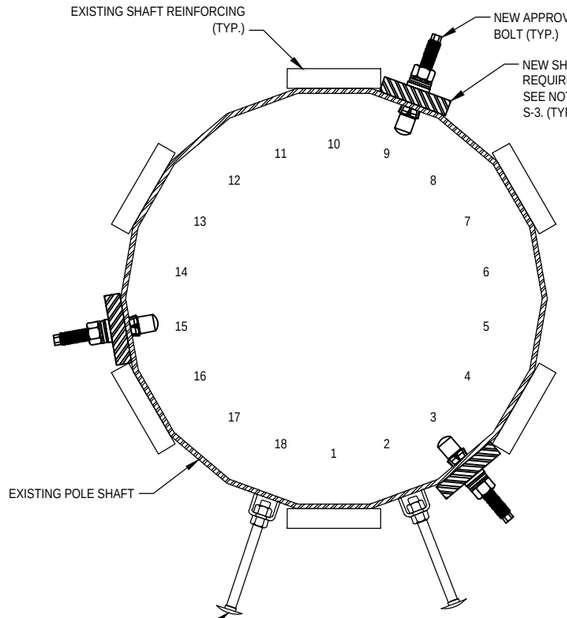
PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	
DATE:	11-17-2016

MONOPOLE PROFILE

S-3

37516-2594.003.DWG

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



SECTION 1 / S-4
EL: 80'-0"

NOTE: FLAT LOCATION OF THE EXISTING STEP BOLTS MAY DIFFER FROM SHOWN DEPENDING ON ELEVATION. CONTRACTOR SHALL REMOVE AND REPLACE STEP BOLTS AS REQUIRED FOR REINFORCING INSTALLATION

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MODIFICATION OF AN EXISTING 169' MONOPOLE

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
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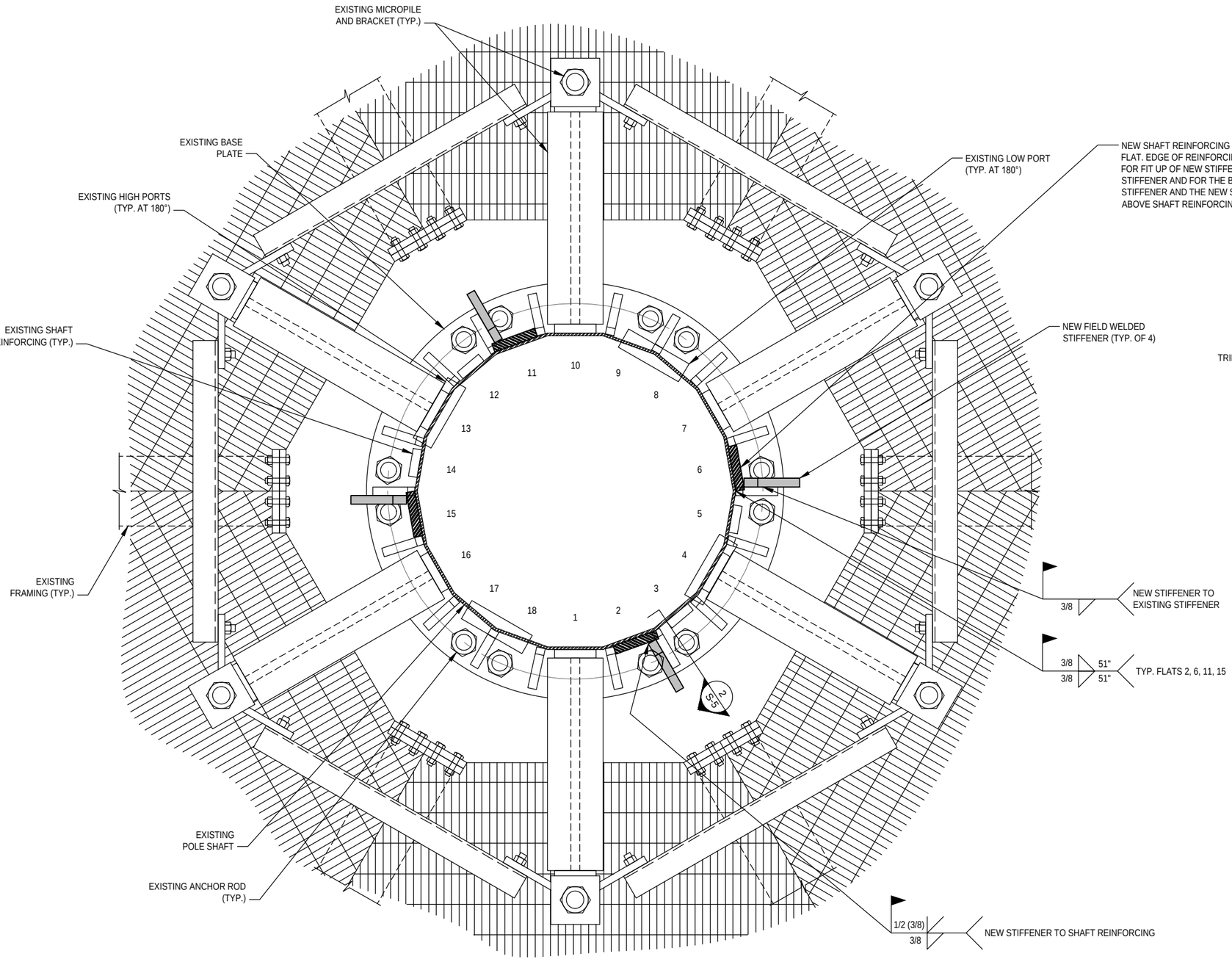
CHECKED BY:	
DATE:	11-17-2016

MONOPOLE SECTIONS

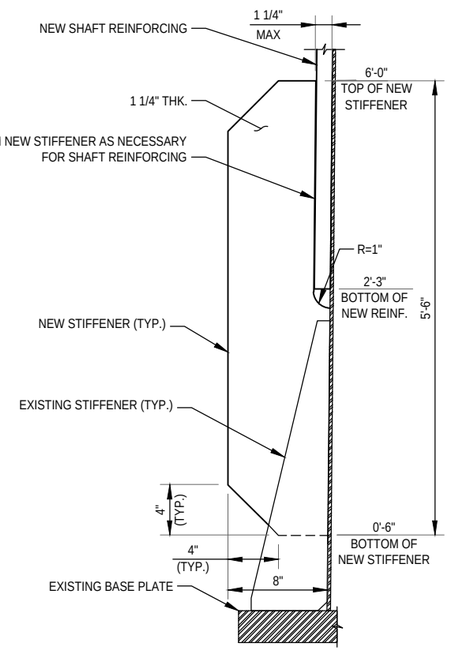
S-4

37516-2594.003.DWG

BASE SPECIFICATIONS	
BASE PLATE:	60"ø; 2 1/2" THK.; Fy=60 KSI
ANCHOR RODS:	(12) 2 1/4"ø; A354-BD; 54" B.C.



BASE PLATE 1 S-5



SECTION 2 S-5

PAUL J. FORD & COMPANY
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Phone 614.221.6679 www.pauljford.com
CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 169' MONOPOLE

BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	
DATE:	11-17-2016

BASE PLATE DETAILS

S-5

37516-2594.003.DWG

MODIFICATION OF AN EXISTING 169' MONOPOLE
ENGINEERED ENDEAVORS #99-1371
BU #828054; SOUTH WINDSOR/RT 5

300 GOVERNORS HIGHWAY
SOUTH WINDSOR, CONNECTICUT 06074
HARTFORD COUNTY
LAT: 41° 50' 0.4"; LONG: -72° 36' 11.0"
APP: 356926 REV. 5; WO: 1324130

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

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: JASON D'AMICO AT JASON.D'AMICO@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
SHAFT REINFORCING
REMOVE AND REPLACE STEP BOLTS AS REQUIRED
FIELD WELDED STIFFENERS

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
T-2	MI CHECKLIST
S-1	GENERAL NOTES
S-2A	FORGBOLT™ DETAILS
S-2B	NEXGEN2™ BOLT DETAIL
S-2C	AJAX ONESIDE™ BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	MONOPOLE SECTIONS
S-5	BASE PLATE DETAILS

WIND DESIGN DATA	
REFERENCE STANDARD	ANSI/TIA-222-G-2-2009
LOCAL CODE	2016 CONNECTICUT STATE BUILDING CODE
ULTIMATE WIND SPEED (3-SECOND GUST)	125 MPH
CONVERTED NOMINAL WIND SPEED (3-SECOND GUST)	97 MPH
ICE THICKNESS	1.0 IN
ICE WIND SPEED	50 MPH
SERVICE WIND SPEED	60 MPH
RISK CATEGORY	II
EXPOSURE CATEGORY	C
Kzt	1.0

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD & COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT RIGGING@PJFWEB.COM.

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1310938

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
11-17-16

MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	BKK
DATE:	11-17-2016

TITLE SHEET

T-1

37516-2594.003.DWG

MODIFICATION INSPECTION NOTES:

1. **GENERAL**
   - 1.1. 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 EOR.
   - 1.2. 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.
   - 1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.
   - 1.4. 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 CASTLE POINT OF CONTACT (POC).
   - 1.5. REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

2. **MI INSPECTOR**
   - 2.1. THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:
     - 2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 2.1.3. THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL 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 CASTLE.

3. **GENERAL CONTRACTOR**
   - 3.1. 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:
     - 3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.
     - 3.1.4. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

4. **RECOMMENDATIONS**
   - 4.1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:
     - 4.1.1. 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.
     - 4.1.2. THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
     - 4.1.3. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
     - 4.1.4. 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.
     - 4.1.5. 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.

5. **CANCELLATION OR DELAYS IN SCHEDULED MI**
   - 5.1. IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN CASTLE 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 CASTLE 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.

6. **CORRECTION OF FAILING MI'S**
   - 6.1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN CASTLE TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:
     - 6.1.1. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
     - 6.1.2. OR, WITH CROWN CASTLE'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

7. **MI VERIFICATION INSPECTIONS**
   - 7.1. CROWN CASTLE 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.
   - 7.2. ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.
   - 7.3. 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.

8. **PHOTOGRAPHS**
   - 8.1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
     - 8.1.1. PRECONSTRUCTION GENERAL SITE CONDITION
     - 8.1.2. PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
     - 8.1.3. RAW MATERIALS
     - 8.1.4. PHOTOS OF ALL CRITICAL DETAILS
     - 8.1.5. FOUNDATION MODIFICATIONS
     - 8.1.6. WELD PREPARATION
     - 8.1.7. BOLT INSTALLATION AND TORQUE
     - 8.1.8. FINAL INSTALLED CONDITION
     - 8.1.9. SURFACE COATING REPAIR
     - 8.1.10. POST CONSTRUCTION PHOTOGRAPHS
     - 8.1.11. FINAL INFIELD CONDITION
     - 8.1.12. PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.
     - 8.1.13. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

9. **INSPECTION AND TESTING**
   - 9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
   - 9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.
   - 9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
   - 9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED AND RETAINED FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
     - 9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
     - 9.4.2. 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.
   - 9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND 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.
   - 9.6. GENERAL
     - 9.6.1. PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   - 9.7. FOUNDATIONS AND SOIL PREPARATION - (NOT REQUIRED)
   - 9.8. CONCRETE TESTING PER ACI - (NOT REQUIRED)
   - 9.9. STRUCTURAL STEEL
     - 9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.
     - 9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.
     - 9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
     - 9.9.4. INSPECT 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.
     - 9.9.5. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
     - 9.9.6. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
     - 9.9.7. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
     - 9.9.8. CHECK THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.
     - 9.9.9. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - 9.10. WELDING:
     - 9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
     - 9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.
     - 9.10.3. APPROVE FIELD WELDING SEQUENCE.
     - 9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.
     - 9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
       - 9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.
       - 9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
       - 9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
       - 9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.
       - 9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.
       - 9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.
       - 9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
       - 9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.
       - 9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
       - 9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
       - 9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   - 9.11. REPORTS:
     - 9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.
     - 9.11.2. 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 OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.
     - 9.11.3. 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 CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
     - 9.11.4. 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.

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
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
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

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER
11-17-16

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CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE, NC 28277
PH: (724) 416-2000

MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	BKK
DATE:	11-17-2016

MI CHECKLIST

T-2

37516-2594.003.DWG

MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 3, 02/05/2015)

1. GENERAL NOTES

1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED AND EXISTING LOADS FROM THE ATTACHED STRUCTURAL MODIFICATION REPORT AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY NEW LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.

1.2. THESE DRAWINGS WERE PREPARED FROM INFORMATION PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. PRIOR TO FABRICATION AND INSTALLATION CONTRACTOR SHALL VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT DRAWINGS AND THEIR FIELD VERIFIED CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE BEFORE PROCEEDING WITH THE WORK. ANY WORK PERFORMED WITHOUT A PREFABRICATION MAPPING IS DONE AT THE RISK OF THE GENERAL CONTRACTOR AND/OR THE FABRICATOR

1.3. 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.

1.4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE 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.

1.5. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-1019 (LATEST EDITION), OSHA AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

1.6. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ACHIEVING GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.

1.7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL 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 CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

1.8. 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.

1.9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.

1.10. 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 RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.

1.11. 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.

1.12. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.

1.13. FOR STANDARD CROWN PARTS SEE THE MOST RECENT VERSION OF THE "CCI APPROVED REINFORCEMENT COMPONENTS" CATALOG.

1.14. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG PRODUCTS. CONTACT DETAILS:
3434 ENCRETE LANE, MORAINE, OHIO 45439
PHONE: 937-299-1213 EMAIL: TUFTUG@AOL.COM

2. STRUCTURAL STEEL

2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
2.1.1.2. "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):
2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."
2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"

2.2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS', DEC. 31, 2009.

2.3. 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.

2.4. 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.

2.5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

2.6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.

2.7. 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.

2.8. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.

2.9. FIELD CUTTING OF STEEL:
2.9.1. IMPORTANT CUTTING AND WELDING 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. 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 SAFETY PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". 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.
2.9.2. 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. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

3. BASE PLATE GROUT - (NOT REQUIRED)

4. FOUNDATION WORK - (NOT REQUIRED)

5. CAST-IN-PLACE CONCRETE - (NOT REQUIRED)

6. EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)

7. TOUCH UP OF GALVANIZING

7.1. THE CONTRACTOR SHALL TOUCH UP ANY AND 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 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.

7.2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.

7.3. CROWN CASTLE'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 ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

8. HOT-DIP GALVANIZING

8.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.

8.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.

8.3. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

9. PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER

9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.

9.2. ANY 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 EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED 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 CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.

9.3. CROWN CASTLE SHALL REFER TO ANSI/TIA-222-G-2-2009, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR 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 ANSI/TIA-222-G-2-2009 SECTION 14.2: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

10. FIELD NDE MINIMUM REQUIREMENTS

10.1. ALL NDE SHALL BE IN ACCORDANCE WITH AWS D1.1.

10.2. FOR NEW BASE STIFFENERS (INCLUSIVE OF TRANSITION STIFFENERS) AND ANCHOR ROD BRACKETS, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT.

10.3. FOR NEW FLAT PLATE REINFORCEMENT AT THE BASE OF THE TOWER, COMPLETE JOINT PENETRATION WELDS SHALL BE 100% INSPECTED BY UT. ALL PARTIAL JOINT PENETRATION AND FILLET WELDS SHALL BE 100% INSPECTED BY MT, BUT MAY BE LIMITED TO A HEIGHT OF 10'-0".

10.4. FOR NDE OF THE EXISTING BASE PLATE CIRCUMFERENTIAL WELD, GC SHALL REFERENCE THE MI CHECKLIST FOR APPLICABILITY. PLEASE SEE ENG-SOW-10033: 'TOWER BASE PLATE NDE, AND ENG-BUL-10051: 'NDE REQUIREMENTS FOR MONOPOLE BASE PLATE TO PREVENT CONNECTION FAILURE'. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE.

10.5. ALL TESTING LIMITATIONS SHALL BE DETAILED IN THE NDE REPORT.

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MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

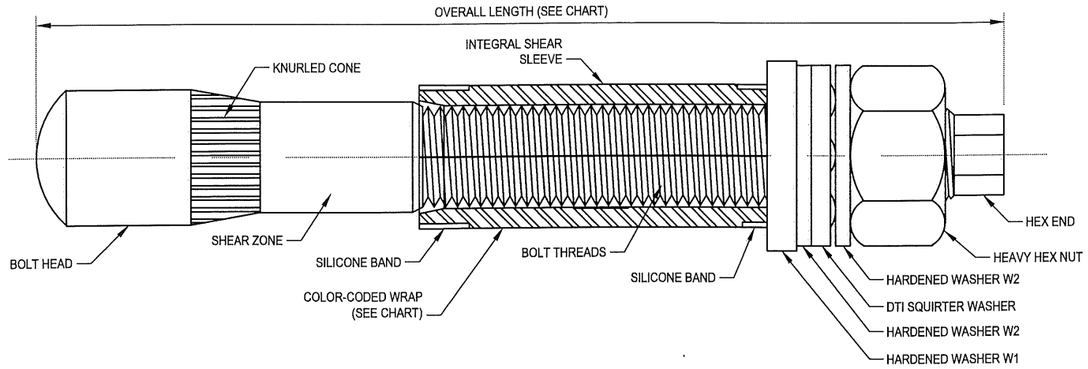
PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	BKK
DATE:	11-17-2016

GENERAL NOTES

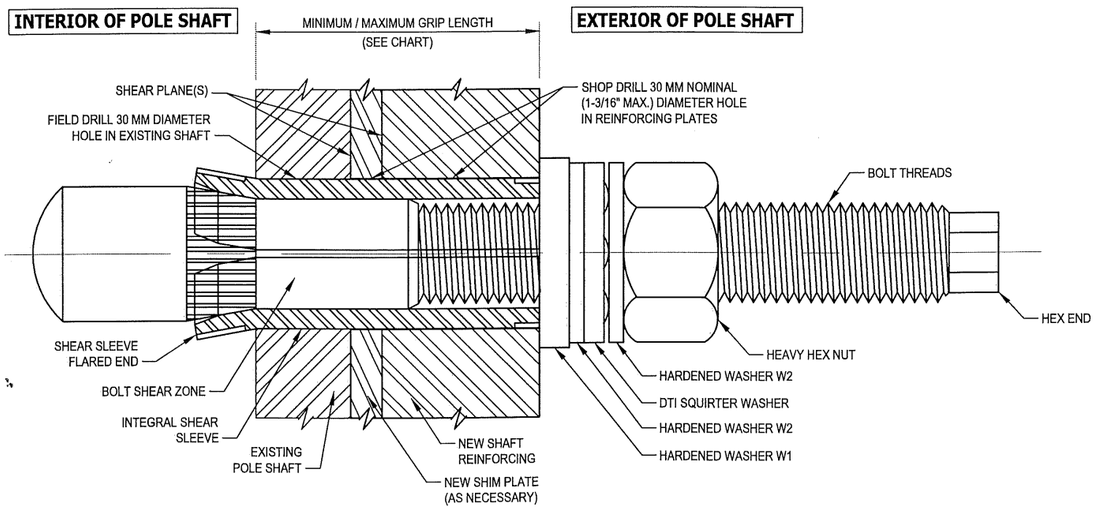
S-1

37516-2594.003.DWG

FORGBolt™ NOTE SHEET: A325/PC8.8 PORTRAIT VERSION DATE 04/24/2015



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1 S-2A



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2 S-2A

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)					
GROUP A		FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8	1	135	5.31	1.3	3/8" to 1"	--	RED
	2	160	6.30	1.6	3/4" to 1-1/2"	--	GREEN
	3	195	7.68	1.9	1-1/4" to 2-1/4"	--	BLUE
	4	260	10.24	2.6	2" to 3-1/2"	Splice Bolt	YELLOW
	5	365	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	ORANGE
	6	440	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	BLACK
DTI Note		Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

INSTALLATION NOTES:
1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

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

BOLT TIGHTENING AND INSPECTION 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.

AISC GROUP A MATERIAL: ASTM A325 AND PC8.8
(Fu = 120 KSI MIN. TENSILE STRESS)

CONTAINS PROPRIETARY INFORMATION PATENT PENDING

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
PHONE: 888-926-4857
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

STATE OF CONNECTICUT JUSTIN T. KLINE No. 30301 LICENSED PROFESSIONAL ENGINEER
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MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	BKK
DATE:	11-17-2016

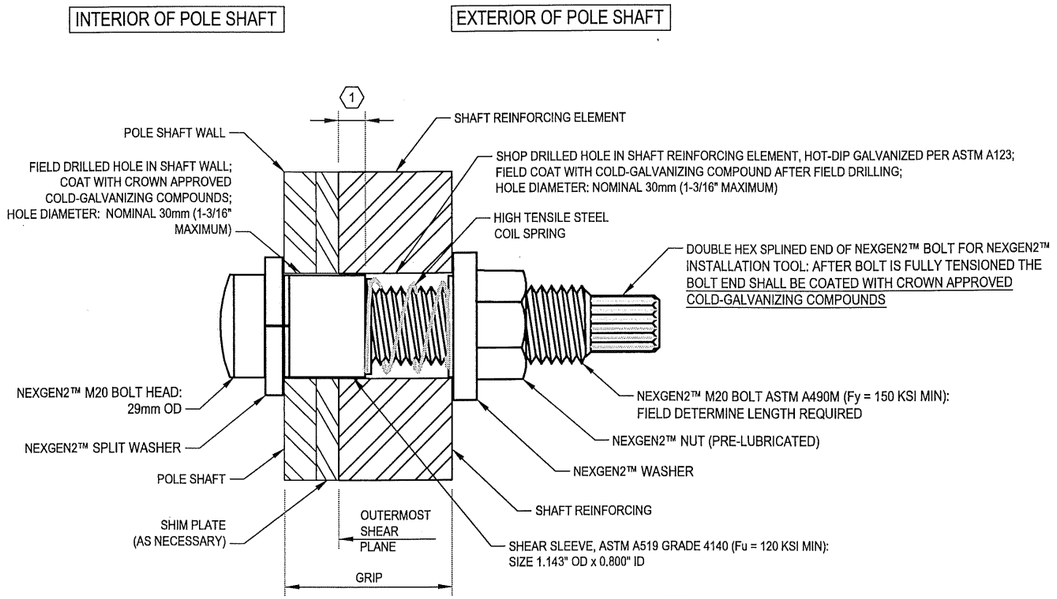
FORGBolt™ DETAILS

S-2A

37516-2594.003.DWG

NEXGEN2™ BOLT NOTE SHEET: REV. 1.01, 04-15-2015

<1> NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING NEXGEN2™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL NEXGEN2™ BOLT DETAIL 1 / S-2B

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

BOLT HOLE NOTES:

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

BOLT TIGHTENING AND INSPECTION NOTES:

1. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.3: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL NEXGEN2™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND..

PART NUMBER	BOLT LENGTH	SLEEVE LENGTH	MIN GRIP RANGE	MAX GRIP RANGE
M20x36	M20x95	11/16"	15/16"	1 7/16"
M20x48	M20x95	1 3/16"	1 7/16"	1 7/8"
M20x57	M20x95	1 5/8"	1 7/8"	2 1/4"
M20x68	M20x135	2"	2 1/4"	2 11/16"
M20x96	M20x135	2 7/16"	2 11/16"	3 3/4"
M20x127	M20x165	3"	3 3/4"	5"
M20x212	M20x250	4"	5"	8 5/16"

NOTE: NEXGEN2™ BOLT ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AND MANUFACTURER SPECIFICATIONS.

NOTE: INSTALL NEXGEN2™ BOLT ASSEMBLY PER MANUFACTURER'S INSTRUCTIONS.

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

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 3030
LICENSED PROFESSIONAL ENGINEER
11-17-16

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MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

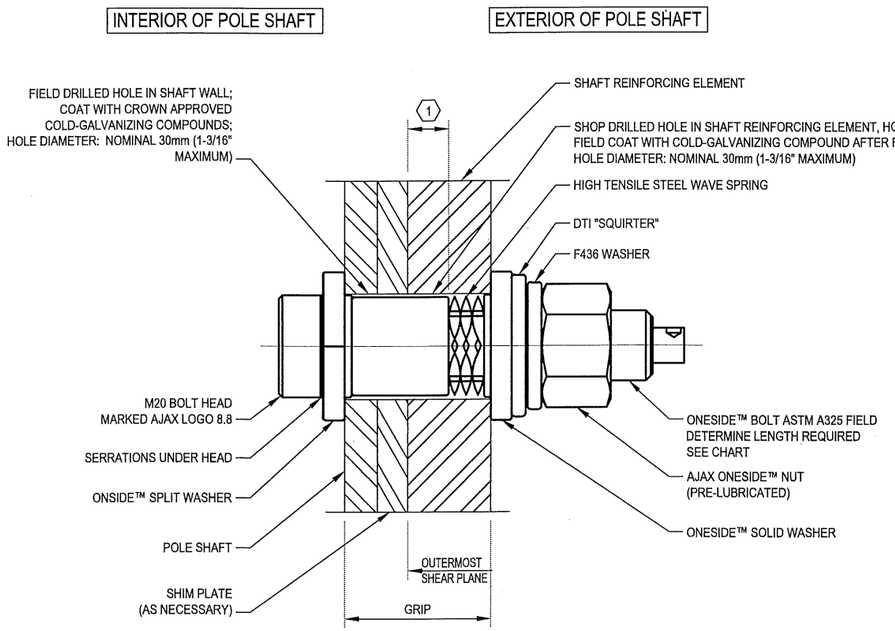
PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	BKK
DATE:	11-17-2016

NEXGEN2™ BOLT DETAIL

S-2B

37516-2594.003.DWG

<1> NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING AJAX ONESIDE™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL AJAX ONESIDE™ BOLT DETAIL 1 / S-2C

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

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

BOLT TIGHTENING AND INSPECTION NOTES:
1. ALL AJAX ONESIDE™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.4 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.4: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL AJAX ONESIDE™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.4 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL AJAX ONESIDE™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL AJAX ONESIDE™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX ONESIDE™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DIRECT TENSION INDICATOR WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED.
4. A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI PROTRUSIONS SHALL BE ENGAGED IN ANY AJAX ONESIDE™/DTI BOLT ASSEMBLY IN THE REINFORCING MEMBERS. A FEELER GAGE MAY BE USED TO VERIFY PROTRUSION COMPRESSION.
5. INSPECTIONS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS REQUIREMENTS AND CROWN DOCUMENT ENG-SOW-10007: *MODIFICATION INSPECTION SOW*.

BOLT ASSEMBLY AND INSTALLATION:
1. BOLT MUST BE PURCHASED PRE-ASSEMBLED.
2. FOLLOW BOLT AND DTI MANUFACTURERS INSTRUCTIONS FOR INSTALLATION.

AJAX ONESIDE™ BOLT DETAIL

CODE	SIZE	COLOR	SLEEVE LENGTH	GRIP	GRIP IMP
OSBA20.65-6	M20 x 65	ORANGE	6.0 (0.236")	12.5 / 20.0	0.500" / 0.787"
OSBA20.95-14	M20 x 95	BLACK	14.0 (0.551")	20.0 / 32.0	0.787" / 1.259"
OSBA20.95-22	M20 x 95	GREEN	22.0 (0.866")	30.0 / 50.0	1.181" / 1.968"
OSBA20.95-30	M20 x 95	YELLOW	30.0 (1.181")	40.5 / 50.0	1.595" / 1.968"
OSBA20.135-39	M20 x 135	BLUE	39.0 (1.535")	49.0 / 77.0	1.929" / 3.031"
OSBA20.135-48	M20 x 135	BROWN	48.0 (1.889")	60.5 / 77.0	2.375" / 3.031"
OSBA20.135-57	M20 x 135	PURPLE	57.0 (2.244")	67.0 / 90.0	2.637" / 3.543"
OSBA20.165-76	M20 x 165	RED	76.0 (3.000")	87.0 / 120.0	3.425" / 4.724"
OSBA20.250	M20 x 250	SILVER	MTO	121.0 / 211.0	4.724" / 8.310"

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JOHN KILLAM - JOHN@IRASVENS.COM
PHONE: (530) 647-8225
FAX: (530) 647-8229

MANUFATURER
AJAX FASTENERS
SALES + TECH: ONESIDE@AJAXFAST.COM.AU

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MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

PROJECT No:	37516-2594.003.7700
DRAWN BY:	I.M.
DESIGNED BY:	T.J.D.
CHECKED BY:	BKK
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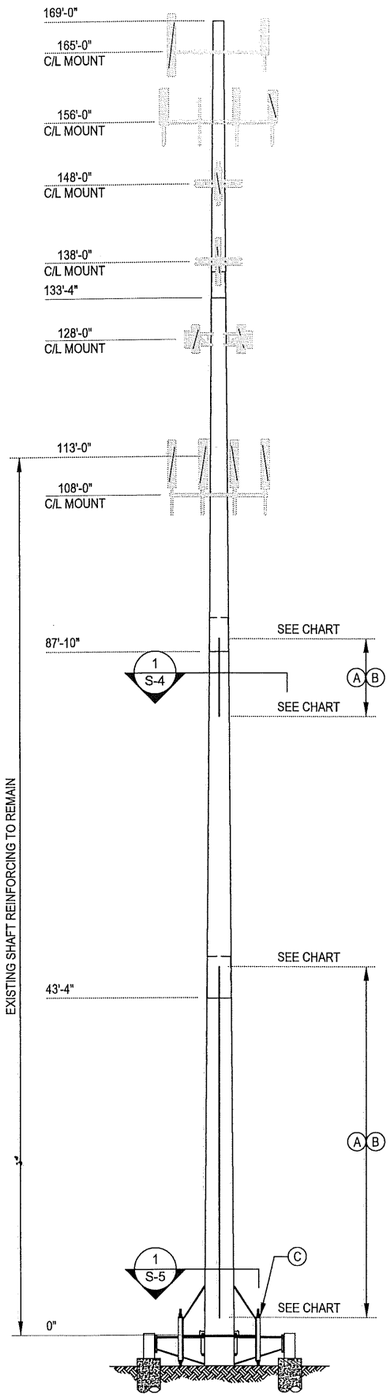
AJAX ONESIDE™ BOLT DETAIL

S-2C

37516-2594.003.DWG



POLE ELEVATION 1 S-3

NOTE: SHAFT REINFORCING MAY NEED TO BE INSTALLED OFF-CENTER OF FLAT FOR FIT UP. OFFSETS THAT RESULT IN THE FASTENER BEING LOCATED LESS THAN 1 1/2" FROM THE APEX OF THE FLAT MUST BE APPROVED BY THE ENGINEER OF RECORD.

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE BOLTS PER ELEMENT	APPROXIMATE TOTAL BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
2' - 3"	22' - 3"	F2, F6, F11 & F15	CCI-WCFP-06512520 #1	20' - 0"	4	19	76	0	11	19"	2212 LBS.
22' - 4"	47' - 4"	F2, F6, F11 & F15	CCI-CFP-06010025 #2	25' - 0"	4	36	144	11	11	16"	2042 LBS.
79' - 6"	89' - 6"	F3, F9 & F15	CCI-SFP-04510010	10' - 0"	3	16	48	6	6	20"	459 LBS.
							268				4713 LBS.

NOTES:

1.) 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.

2.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.

3.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.

4.) HOLES FOR BOLTS ARE 30mm UNLESS NOTED OTHERWISE.

5.) ALL SHIMS SHALL BE ASTM A-36.

6.) ALL HOLES ARE TO BE DRILLED, DO NOT BURN OR PUNCH.

7.) FOR PLATES STARTING AT 6", THE BOTTOM OF THE FLAT PLATE SHALL BEGIN AT 6" ± 1". FOR SINGLE PLATES OR MULTIPLE PLATES SPLICED TOGETHER, THE BOTTOM OF THE FLAT PLATE SHALL BEGIN AT THE PROPOSED ELEVATION ± 3". FOR MULTIPLE PLATES SPLICED TOGETHER, THE TOP OF THE FLAT PLATE IS TO BE PLACED SUCH THAT THERE IS NO MORE THAN 3" DIFFERENCE BETWEEN THE ACTUAL OVERALL LENGTH OF THE SPAN AND THE PROPOSED OVERALL LENGTH OF THE SPAN, FROM THE BOTTOM OF THE PLATE TO THE TOP OF THE PLATE.

SPLICE PLATE INSTALLATION CHART

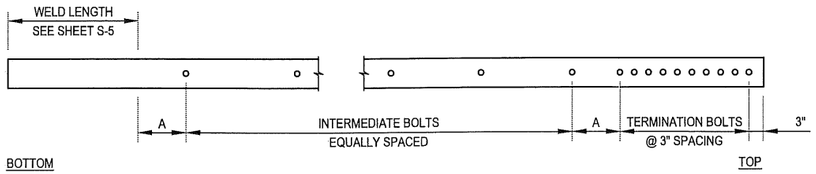
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
22' - 4"	1"	6"	6' - 1"	4	0"	0"	22	497 LBS.
						0"		497 LBS.

* BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

NEW SHIM CHART

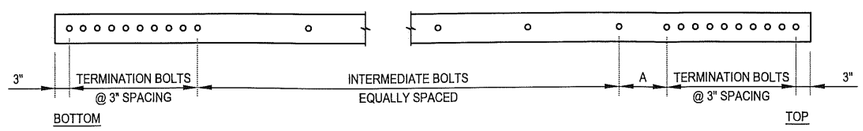
1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
12	3	4-1/2"	4-1/2"	1-1/4"
16	8	6"	6"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY, FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.



CUSTOM WELDED BAR DETAIL

NOTE: "A" DIMENSION MAY VARY, NOT TO EXCEED MAXIMUM INTERMEDIATE BOLT SPACING



CUSTOM BOLTED BAR DETAIL

NOTE: "A" DIMENSION MAY VARY, NOT TO EXCEED MAXIMUM INTERMEDIATE BOLT SPACING

SHAFT SECTION DATA

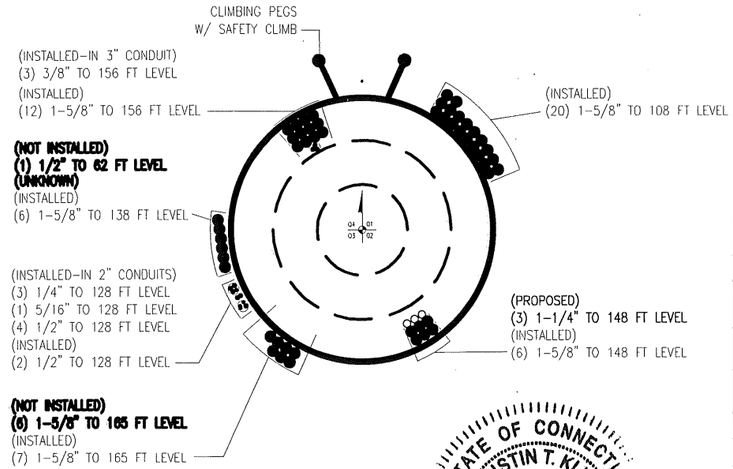
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM	POLE GRADE (ksi)	POLE SHAPE
1	35.67	0.2500	40.00	15.500	22.310	65	18-SIDED
2	48.83	0.3125	52.00	21.174	30.360	65	18-SIDED
3	48.83	0.3750	64.00	28.921	38.110	65	18-SIDED
4	48.66	0.3750		36.357	45.500	65	18-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

ASTM A36 SHIMS FOR MONOPOLE REINFORCEMENT MEMBERS SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED. FINGER SHIMS AND HORSESHOE SHIMS ARE PERMITTED. STACKED SHIMS SHALL BE NO GREATER THAN 1/4" WITHOUT ENGINEER OF RECORD APPROVAL.

TOWER MODIFICATION SCHEDULE

	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
A	2'-3" TO 47'-4", 79'-6" TO 89'-6"	INSTALL NEW SHAFT REINFORCING	S-3 TO S-5
B	2'-3" TO 47'-4", 79'-6" TO 89'-6"	REMOVE AND REPLACE SAFETY CLIMB BRACKETS AS REQUIRED FOR REINFORCING INSTALLATION. INSTALL NEW SAFETY CLIMB. COORDINATE WITH TUF-TUG. SEE NOTE 1.14 ON S-1.	S-3
C	0'	INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE	S-5



BASE LEVEL

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 3030
LICENSED
PROFESSIONAL ENGINEER

11-17-16

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

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MODIFICATION OF AN EXISTING 169' MONOPOLE
BU #828054; SOUTH WINDSOR/RT 5
SOUTH WINDSOR, CONNECTICUT

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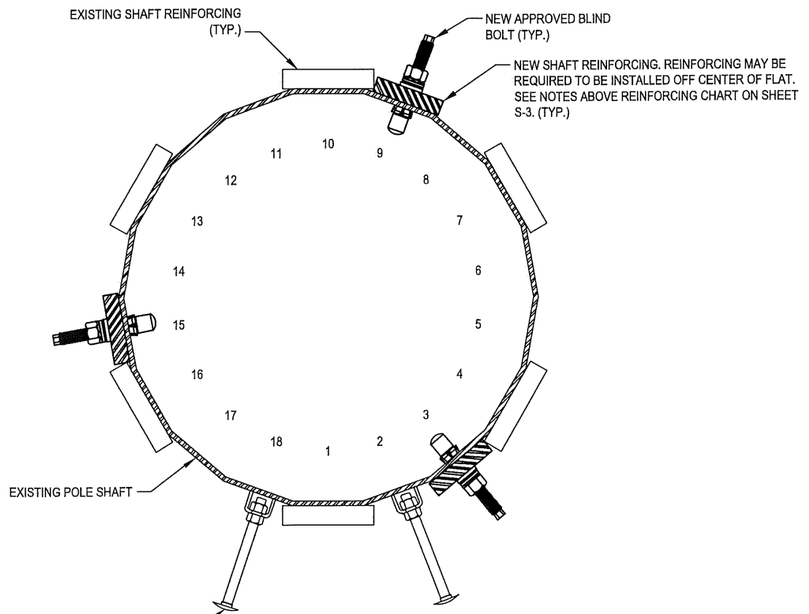
DATE:	11-17-2016

MONOPOLE PROFILE

S-3

37516-2594.003.DWG



SECTION 1
EL: 80'-0" S-4

NOTE: FLAT LOCATION OF THE EXISTING STEP BOLTS MAY DIFFER FROM SHOWN DEPENDING ON ELEVATION. CONTRACTOR SHALL REMOVE AND REPLACE STEP BOLTS AS REQUIRED FOR REINFORCING INSTALLATION

11-17-16

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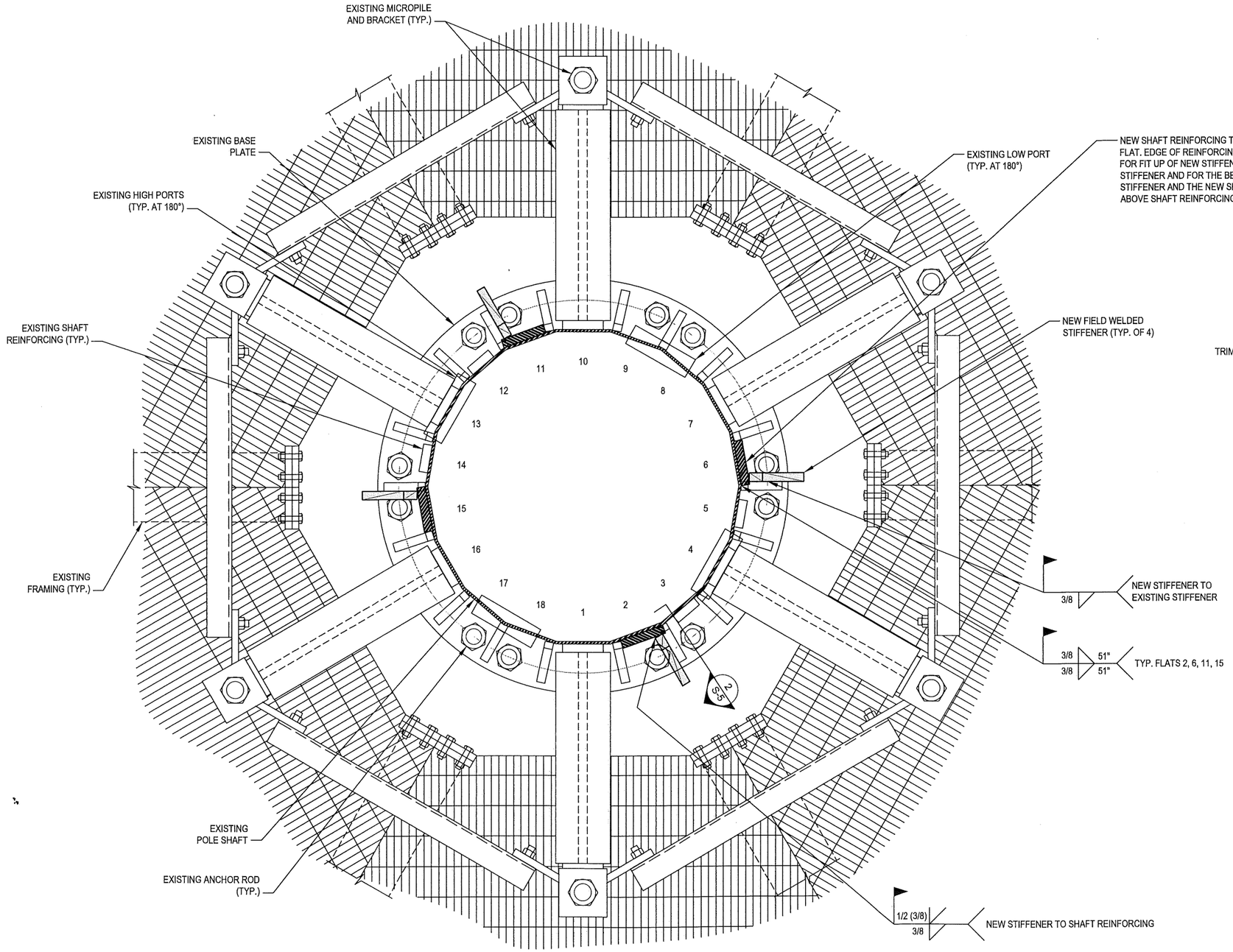
MONOPOLE SECTIONS

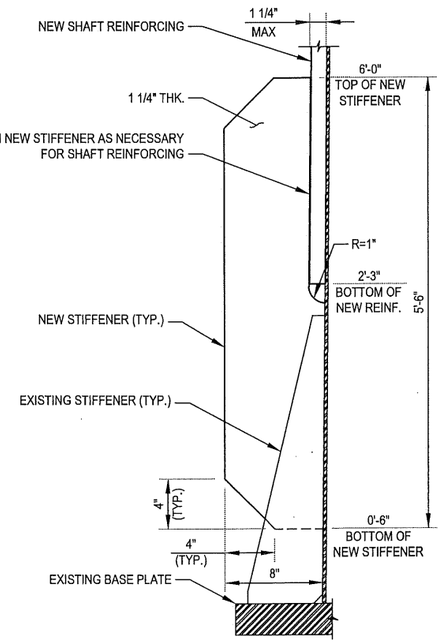
S-4

37516-2594.003.DWG

BASE SPECIFICATIONS	
BASE PLATE:	60"ø; 2 1/2" THK.; Fy=60 KSI
ANCHOR RODS:	(12) 2 1/4"ø; A354-BD; 54" B.C.



BASE PLATE 1 / S-5



SECTION 2 / S-5

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BASE PLATE DETAILS

S-5

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

11.17.16

37516-2594.003.DWG

Radio Frequency – Electromagnetic Energy (RF-EME) Compliance Report

Site No. CT60XC014
South Windsor/Rt 5
300 Governors Highway
South Windsor, Connecticut 06074
Hartford County
41.833444; -72.603056 NAD83
Monopole

EBI Project No. 6217000113
January 13, 2017

Prepared for:

Sprint Nextel
c/o Alcatel-Lucent
600-700 Mountain Avenue
Room 6A-744
Murray Hill, NJ 07974

Prepared by:

EBI Consulting
environmental | engineering | due diligence

EXECUTIVE SUMMARY

Purpose of Report

EnviroBusiness Inc. (dba EBI Consulting) has been contracted by Sprint to conduct radio frequency electromagnetic (RF-EME) modeling for Sprint Site CT60XC014 located at 300 Governors Highway in South Windsor, Connecticut to determine RF-EME exposure levels from proposed Sprint wireless communications equipment at this site. As described in greater detail in Appendix A of this report, the Federal Communications Commission (FCC) has developed Maximum Permissible Exposure (MPE) Limits for general public exposures and occupational exposures. This report summarizes the results of RF-EME modeling in relation to relevant FCC RF-EME compliance standards for limiting human exposure to RF-EME fields.

This report contains a detailed summary of the RF EME analysis for the site.

This document addresses the compliance of Sprint's proposed transmitting facilities independently and in relation to all existing collocated facilities at the site.

Modeling results included in this report are based on drawings dated January 9, 2017 as provided to EBI Consulting. Subsequent changes to the drawings or site design may yield changes in the MPE levels or FCC Compliance recommendations.

Maximum Permissible Exposure (MPE) Summary			
Location	**% of FCC General Public/Uncontrolled Exposure Limit**	**% of FCC Occupational/Controlled Exposure Limit**	**Power Density (mW/cm^2)**
All Carrier Equipment			
Ground	3.00	0.60	0.01600
Sprint Equipment			
Ground	1.60	0.32	0.00853

Statement of Compliance

Based on worst-case predictive modeling, there are no modeled exposures on any accessible ground-level walking/working surface related to Sprint's proposed equipment in the area that exceed the FCC's occupational and/or general public exposure limits at this site. As such, the proposed Sprint project is in compliance with FCC rules and regulations.

Signage is recommended at the site as presented in Section 9.0. Posting of the signage brings the site into compliance with FCC rules and regulations.

1.0 LOCATION OF ALL EXISTING ANTENNAS AND FACILITIES AND EXISTING RF LEVELS

Sprint proposes the replacement of three (3) wireless telecommunication antennas on a monopole in South Windsor, Connecticut. The proposed modification will result in a total of three (3) Sprint antennas at the site. There are three sectors (A, B and C) proposed at the site, with one (1) proposed antenna per sector.

Based on drawings and aerial photography review, unknown carrier wireless antennas are also present on the monopole. These antennas were included in the modeling analysis.

2.0 LOCATION OR ALL APPROVED (BUT NOT INSTALLED) ANTENNAS AND FACILITIES AND EXPECTED RF LEVELS FROM THE APPROVED FACILITIES

There are no antennas or facilities that are approved and not installed based on information provided to EBI and Sprint at the time of this report.

3.0 NUMBER AND TYPES OF WIRELESS TELECOMMUNICATION SITES (WTS) WITHIN 100 FEET OF THE PROPOSED SITE

There are no other Wireless Telecommunication Service (WTS) sites observed within 100 feet of the proposed site.

4.0 LOCATION AND NUMBER OF THE SPRINT ANTENNAS AND BACK-UP FACILITIES PER STRUCTURE AND NUMBER AND LOCATION OF OTHER TELECOMMUNICATION FACILITIES ON THE PROPERTY

Sprint proposes the replacement of three (3) wireless telecommunication antennas on a monopole in South Windsor, Connecticut. The proposed modification will result in a total of three (3) Sprint antennas at the site. There are three sectors (A, B and C) proposed at the site, with one (1) proposed antenna per sector. In each sector, there is proposed to be one antenna transmitting in the 800 MHz and the 1900 MHz frequency ranges. The Sector A antennas were assumed to be oriented 0° from true north. The Sector B antennas were assumed to be oriented 120° from true north. The Sector C antennas were assumed to be oriented 240° from true north. The bottoms of the Sector A, B, and C antennas will be 145 feet above ground level.

Based on drawings and aerial photography review, unknown carrier wireless antennas are also present on the monopole. These antennas were included in the modeling analysis.

5.0 POWER RATING FOR ALL EXISTING AND PROPOSED BACKUP EQUIPMENT SUBJECT TO THE APPLICATION

The operating power of each frequency, for modeling purposes, was assumed to be the following:

Sprint Operating Powers Per Sector		
Frequency (MHz)	**Power (Watts)**	**# of Transmitters**
1900	20	6
800	20	1

Additional transmitter information used in the modeling of Sprint antennas is summarized in the RoofView® export file presented in Appendix C.

6.0 TOTAL NUMBER OF WATTS PER INSTALLATION AND THE TOTAL NUMBER OF WATTS FOR ALL INSTALLATIONS ON THE STRUCTURE

The Effective Radiated Power (ERP) for each carrier and frequency is summarized below:

Effective Radiated Power (ERP) per Frequency	
Frequency (MHz)	**ERP (Watts)**
1900	11,811
800	1,107
Other Carriers (Total)*	11,915

* Other carrier ERPs were not provided. The ERP calculation is based on worst-case assumptions of other carrier operating powers.

7.0 PREFERRED METHOD OF ATTACHMENT OF PROPOSED ANTENNA WITH PLOT OR ROOF PLAN INCLUDING: DIRECTIONALITY OF ANTENNAS, HEIGHT OF ANTENNAS ABOVE NEAREST WALKING SURFACE, DISCUSS NEARBY INHABITED BUILDINGS

Based on the information provided to EBI, the proposed antennas are to be pipe-mounted to the monopole antenna array and operating in the directions, frequencies, and heights mentioned in section 4.0 above. There is a large building approximately 213 feet to the south of the proposed site that appears to be of commercial use.

8.0 ESTIMATED AMBIENT RADIO FREQUENCY FIELDS FOR THE PROPOSED SITE

Based on worst-case predictive modeling, there are no modeled exposures on any accessible ground-level walking/working surface related to Sprint's proposed equipment in the area that exceed the FCC's occupational and/or general public exposure limits at this site. As such, the proposed Sprint project is in compliance with FCC rules and regulations.

Maximum Permissible Exposure (MPE) Summary			
Location	**% of FCC General Public/Uncontrolled Exposure Limit**	**% of FCC Occupational/Controlled Exposure Limit**	**Power Density (mW/cm^2)**
All Carrier Equipment			
Ground	3.00	0.60	0.01600
Sprint Equipment			
Ground	1.60	0.32	0.00853

The inputs used in the modeling are summarized in the RoofView® export file presented in Appendix C.

There are no modeled areas on the ground that exceed the FCC's limits for general public or occupational exposure in front of the other carrier antennas.

9.0 SIGNAGE AT THE FACILITY IDENTIFYING ALL WTS EQUIPMENT AND SAFETY PRECAUTIONS FOR PEOPLE NEARING THE EQUIPMENT AS MAY BE REQUIRED BY THE APPLICABLE FCC ADOPTED STANDARDS (DISCUSS SIGNAGE FOR THOSE WHO SPEAK LANGUAGES OTHER THAN ENGLISH)

Signs are the primary means for control of access to areas where RF exposure levels may potentially exceed the MPE. It is recommended that Notice signs be installed for the new antennas making people aware of the antennas locations. There are no exposures above the FCC limits in front of the proposed antennas and therefore barriers are not recommended.

Workers that are elevated above the ground may be exposed to power densities greater than the occupational limit. Workers should be informed about the presence of antennas and their associated fields and practice RF Safety Procedures.

Access to this site is accomplished via a gate in the fence surrounding the monopole. Workers must be elevated to antenna level to access them, so these antennas are not accessible to the general public.

10.0 STATEMENT ON WHO PRODUCED THIS REPORT AND QUALIFICATIONS

Please see the certifications attached in Appendix B below.

11.0 LIMITATIONS

This report was prepared for the use of Sprint. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by EBI are based solely on the information provided by the client. The observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to EBI so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

12.0 SUMMARY AND CONCLUSIONS

EBI has prepared this Radiofrequency Emissions Compliance Report for the proposed Sprint telecommunications equipment at the site located at 300 Governors Highway in South Windsor, Connecticut.

EBI has conducted theoretical modeling to estimate the worst-case power density from proposed Sprint antennas and the other carriers' existing antennas to document potential MPE levels at this location and ensure that site control measures are adequate to meet FCC and OSHA requirements. As presented in the preceding sections, based on worst-case predictive modeling, there are no modeled exposures on any accessible ground-level walking/working surface related to Sprint's proposed equipment in the area that exceed the FCC's occupational and/or general public exposure limits at this site. As such, the proposed Sprint project is in compliance with FCC rules and regulations.

Signage is recommended at the site as presented in Section 9.0. Posting of the signage brings the site into compliance with FCC rules and regulations.

Appendix A

Federal Communications

Commission (FCC) Requirements

The FCC has established Maximum Permissible Exposure (MPE) limits for human exposure to Radiofrequency Electromagnetic (RF-EME) energy fields, based on exposure limits recommended by the National Council on Radiation Protection and Measurements (NCRP) and, over a wide range of frequencies, the exposure limits developed by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) and adopted by the American National Standards Institute (ANSI) to replace the 1982 ANSI guidelines. Limits for localized absorption are based on recommendations of both ANSI/IEEE and NCRP.

The FCC guidelines incorporate two separate tiers of exposure limits that are based upon occupational/controlled exposure limits (for workers) and general public/uncontrolled exposure limits for members of the general public.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/ controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general public/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

General public/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment-related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Table 1 and Figure 1 (below), which are included within the FCC's OET Bulletin 65, summarize the MPE limits for RF emissions. These limits are designed to provide a substantial margin of safety. They vary by frequency to take into account the different types of equipment that may be in operation at a particular facility and are "time-averaged" limits to reflect different durations resulting from controlled and uncontrolled exposures.

The FCC's MPEs are measured in terms of power (mW) over a unit surface area (cm^2). Known as the power density, the FCC has established an occupational MPE of 5 milliwatts per square centimeter (mW/cm^2) and an uncontrolled MPE of 1 mW/cm2 for equipment operating in the 1900 MHz frequency range. For the Sprint equipment operating at 800 MHz, the FCC's occupational MPE is 2.66 mW/cm^2 and an uncontrolled MPE of 0.53 mW/cm^2. These limits are considered protective of these populations.

Table 1: Limits for Maximum Permissible Exposure (MPE)

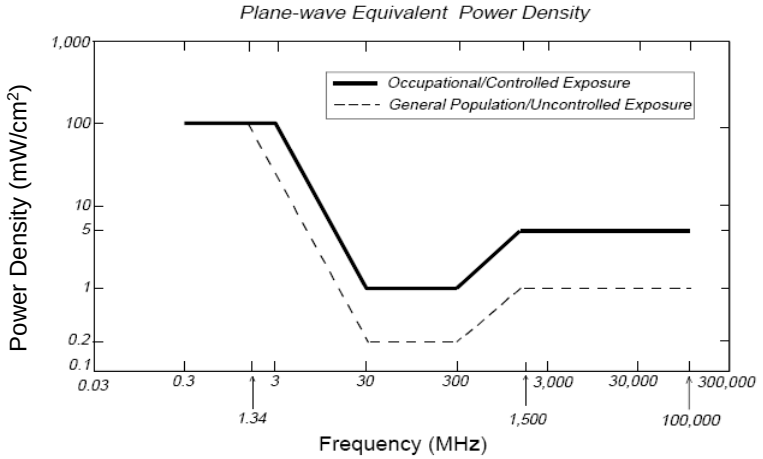
(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $[E]^2$, $[H]^2$, or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6

(B) Limits for General Public/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (E) (V/m)**	**Magnetic Field Strength (H) (A/m)**	**Power Density (S) (mW/cm^2)**	**Averaging Time $[E]^2$, $[H]^2$, or S (minutes)**
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

f = Frequency in (MHz)
* Plane-wave equivalent power density

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)



Based on the above, the most restrictive thresholds for exposures of unlimited duration to RF energy for several personal wireless services are summarized below:

Personal Wireless Service	Approximate Frequency	Occupational MPE	Public MPE
Personal Communication Services (PCS)	1,950 MHz	5.00 mW/cm^2	1.00 mW/cm^2
Cellular Telephone	870 MHz	2.90 mW/cm^2	0.58 mW/cm^2
Specialized Mobile Radio	855 MHz	2.85 mW/cm^2	0.57 mW/cm^2
Most Restrictive Freq, Range	30-300 MHz	1.00 mW/cm^2	0.20 mW/cm^2

MPE limits are designed to provide a substantial margin of safety. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

Personal Communication Services (PCS) facilities used by Sprint in this area operate within a frequency range of 800-1900 MHz. Facilities typically consist of: 1) electronic transceivers (the radios or cabinets) connected to wired telephone lines; and 2) antennas that send the wireless signals created by the transceivers to be received by individual subscriber units (PCS telephones). Transceivers are typically connected to antennas by coaxial cables.

Because of the short wavelength of PCS services, the antennas require line-of-site paths for good propagation, and are typically installed above ground level. Antennas are constructed to concentrate energy towards the horizon, with as little energy as possible scattered towards the ground or the sky. This design, combined with the low power of PCS facilities, generally results in no possibility for exposure to approach Maximum Permissible Exposure (MPE) levels, with the exception of areas directly in front of the antennas.

FCC Compliance Requirement

A site is considered out of compliance with FCC regulations if there are areas that exceed the FCC exposure limits and there are no RF hazard mitigation measures in place. Any carrier which has an installation that contributes more than 5% of the applicable MPE must participate in mitigating these RF hazards.

Appendix B

Certifications

Preparer Certification

I, Alexandra Vest, state that:

- I am an employee of EnviroBusiness Inc. (d/b/a EBI Consulting), which provides RF-EME safety and compliance services to the wireless communications industry.
- I have successfully completed RF-EME safety training, and I am aware of the potential hazards from RF-EME and would be classified "occupational" under the FCC regulations.
- I am familiar with the FCC rules and regulations as well as OSHA regulations both in general and as they apply to RF-EME exposure.
- I have reviewed the data provided by the client and incorporated it into this Site Compliance Report such that the information contained in this report is true and accurate to the best of my knowledge.

Appendix C

Roofview® Export File / Antenna Inventory

StartMapDefinition

Roof Max X	Roof Max Y	Map Max X	Map Max Y	X Offset	Y Offset	Number of envelope		List Of Area
120	100	150	120	20	20	1	$AE$81:$D $AE$81:$DZ$200	$AE$81:$D

StartSettingsData

Standard	Method	Uptime	Scale Facto	Low Thr	Low Color	Mid Thr	Mid Color	Hi Thr	Hi Color	Over Color	Ap Ht Mult	Ap Ht Method
4	2	1	1	5	1	500	6	5000	6	6	1.5	1

StartAntennaData It is advisable to provide an ID (ant 1) for all antennas

ID	Name	(MHz) Freq	Trans Power	Trans Count	Coax Len	Coax Type	Other Loss	Input Power	Calc Power	Mfg	Model	(ft) X	(ft) Y	(ft) Z	Type	(ft) Aper	dBd Gain	BWdth Pt Dir	Uptime Profile	ON flag
SPT A1	Sprint	800	20	1	10	1/2 LDF	0.5		16.8667	RFS	APXVSPP18	16	33	145			6	13.4 65;0		ON•
SPT A1	Sprint	1900	20	6	10	1/2 LDF	0.5		101.2002	RFS	APXVSPP18	16	33	145			6	15.9 65;0		ON•
SPT B1	Sprint	800	20	1	10	1/2 LDF	0.5		16.8667	RFS	APXVSPP18	39	17	145			6	13.4 65;120		ON•
SPT B1	Sprint	1900	20	6	10	1/2 LDF	0.5		101.2002	RFS	APXVSPP18	39	17	145			6	15.9 65;120		ON•
SPT C1	Sprint	800	20	1	10	1/2 LDF	0.5		16.8667	RFS	APXVSPP18	11	8	145			6	13.4 65;240		ON•
SPT C1	Sprint	1900	20	6	10	1/2 LDF	0.5		101.2002	RFS	APXVSPP18	11	8	145			6	15.9 65;240		ON•
UNK 1 A1	Unknown 1	850	50	1			3		25.05936	Unknown	Unknown	9	30	164			4	12 63;0		ON•
UNK 1 A2	Unknown 1	850	50	1			3		25.05936	Unknown	Unknown	34	31	164			4	12 63;0		ON•
UNK 1 B1	Unknown 1	850	50	1			3		25.05936	Unknown	Unknown	38	24	164			4	12 63;120		ON•
UNK 1 B2	Unknown 1	850	50	1			3		25.05936	Unknown	Unknown	27	6	164			4	12 63;120		ON•
UNK 1 C1	Unknown 1	850	50	1			3		25.05936	Unknown	Unknown	17	6	164			4	12 63;240		ON•
UNK 1 C2	Unknown 1	850	50	1			3		25.05936	Unknown	Unknown	6	21	164			4	12 63;240		ON•
UNK 2 A1	Unknown 2	850	33	1			3		16.53918	Unknown	Unknown	9	30	156			4	12 63;0		ON•
UNK 2 A2	Unknown 2	850	34	1			3		17.04037	Unknown	Unknown	28	31	156			4	12 63;0		ON•
UNK 2 A3	Unknown 2	850	33	1			3		16.53918	Unknown	Unknown	34	31	156			4	12 63;0		ON•
UNK 2 B1	Unknown 2	850	33	1			3		16.53918	Unknown	Unknown	38	24	156			4	12 63;120		ON•
UNK 2 B2	Unknown 2	850	34	1			3		17.04037	Unknown	Unknown	32	14	156			4	12 63;120		ON•
UNK 2 B3	Unknown 2	850	33	1			3		16.53918	Unknown	Unknown	27	6	156			4	12 63;120		ON•
UNK 2 C1	Unknown 2	850	33	1			3		16.53918	Unknown	Unknown	17	6	156			4	12 63;240		ON•
UNK 2 C2	Unknown 2	850	34	1			3		17.04037	Unknown	Unknown	8	17	156			4	12 63;240		ON•
UNK 2 C3	Unknown 2	850	33	1			3		16.53918	Unknown	Unknown	5	21	156			4	12 63;240		ON•
UNK 3 A1	Unknown 3	850	100	1			3		50.11872	Unknown	Unknown	22	13	136			4	12 63;0		ON•
UNK 3 B1	Unknown 3	850	100	1			3		50.11872	Unknown	Unknown	25	18	136			4	12 63;120		ON•
UNK 3 C1	Unknown 3	850	100	1			3		50.11872	Unknown	Unknown	18	18	136			4	12 63;240		ON•
UNK 4 A1	Unknown 4	850	100	1			3		50.11872	Unknown	Unknown	22	25	126			4	12 63;0		ON•
UNK 4 B1	Unknown 4	850	100	1			3		50.11872	Unknown	Unknown	28	17	126			4	12 63;120		ON•
UNK 4 C1	Unknown 4	850	100	1			3		50.11872	Unknown	Unknown	16	17	126			4	12 63;240		ON•
UNK 5 A1	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	8	31	110			4	12 63;0		ON•
UNK 5 A2	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	17	31	110			4	12 63;0		ON•
UNK 5 A3	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	27	31	110			4	12 63;0		ON•
UNK 5 A4	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	34	31	110			4	12 63;0		ON•
UNK 5 B1	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	38	31	110			4	12 63;120		ON•
UNK 5 B2	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	35	18	110			4	12 63;120		ON•
UNK 5 B3	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	30	10	110			4	12 63;120		ON•
UNK 5 B4	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	26	5	110			4	12 63;120		ON•
UNK 5 C1	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	17	6	110			4	12 63;240		ON•
UNK 5 C2	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	13	11	110			4	12 63;240		ON•
UNK 5 C3	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	8	17	110			4	12 63;240		ON•
UNK 5 C4	Unknown 5	850	25	1			3		12.52968	Unknown	Unknown	5	21	110			4	12 63;240		ON•

StartSymbolData

Sym	Map Marke	Roof X	Roof Y	Map Label	Description (notes for this table only)
Sym		5	35	AC Unit	Sample symbols
Sym		14	5	Roof Access	
Sym		45	5	AC Unit	
Sym		45	20	Ladder	