STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

July 6, 2011

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

RE: **EM-CING-051-110614** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 3965 Congress Street, Fairfield, Connecticut.

Dear Mr. Culp:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated June 14, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,

Linda Roberts LMB

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Kenneth A. Flatto, First Selectman, Town of Fairfield
Joseph E. Devonshuk, Town Planner, Town of Fairfield

CSC
CONNECTICUT SITING COUNCIL

EM-CING-051-110614

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

Douglas L. Culp
Real Estate Consultant

HAND DELIVERED

June 14, 2011

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

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 3965 Congress Street Fairfield, CT (owner Town of Fairfield).

Dear Ms. Roberts:

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

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

LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

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

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

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

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

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

4. Radio frequency power density may increase due to use of one or more GSM channel for UMTS transmissions. Moreover, LTE will utilize additional radio frequencies newly-licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

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

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

Sincerely,

Douglas L. Culp
Real Estate Consultant

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

3965 Congress Street Fairfield, CT
Site Number CT2128
Exempt Mod

Tower Owner/Manager: Town of Fairfield

Equipment configuration: Monopole

Current and/or approved:
Six PowerWave antennas @ 127 ft
Twelve PowerWave TMA's @ 127 ft
Twelve runs 1 5/8 inch coax to 127 ft
Equipment Shelter

Planned Modifications:
Retain existing PowerWave Antenna's, TMA's @ 127 ft
Retain all Coax Cabling
Install three PowerWave P65-16 antennas or equivalent @ 127 ft
Install six remote radio heads and surge arrestor @ 127 ft
Install one fiber and two DC power cables to 127 ft

Power Density:

Worst-case calculations for existing wireless operations at the site, using standard parameters for other carriers, indicate a radio frequency electromagnetic radiation power density, measured at ground level beside the Tower, of 73.7% of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 75.9% of the standard.

Existing

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users							59.92
AT&T UMTS	127	1900 Band	1	500	0.0111	1.0000	1.11
AT&T UMTS	127	800 Band	1	500	0.0111	0.5867	1.90
AT&T GSM	127	800Band	7	296	0.0462	0.5867	7.87
AT&T UMTS	127	1900 Band	3	427	0.0286	1.0000	2.86
Total							**73.7%**

* Data for other users are from Siting Council records.

Proposed

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users							59.92
AT&T UMTS	127	800 Band	1	500	0.0111	0.5867	1.90
AT&T UMTS	127	1900 Band	1	500	0.0111	1.0000	1.11
AT&T GSM	127	880 - 894	7	296	0.0462	0.5867	7.87
AT&T GSM	127	1900 Band	3	427	0.0286	1.0000	2.86
AT&T LTE	127	740 - 746	1	500	0.0111	0.4933	2.26
Total							**75.9%**

* Data for other users are from Siting Council records

Structural information:

The attached structural analysis demonstrates that the monopole and foundation have adequate structural capacity to accommodate the proposed modifications. (Centek dated 6-3-11).

at&t

WIRELESS COMMUNICATIONS FACILITY

CT2128

FAIRFIELD - FIRE DEPT

3965 CONGRESS STREET

FAIRFIELD, CT 06824

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT — TO: 3965 CONGRESS STREET, FAIRFIELD, CONNECTICUT

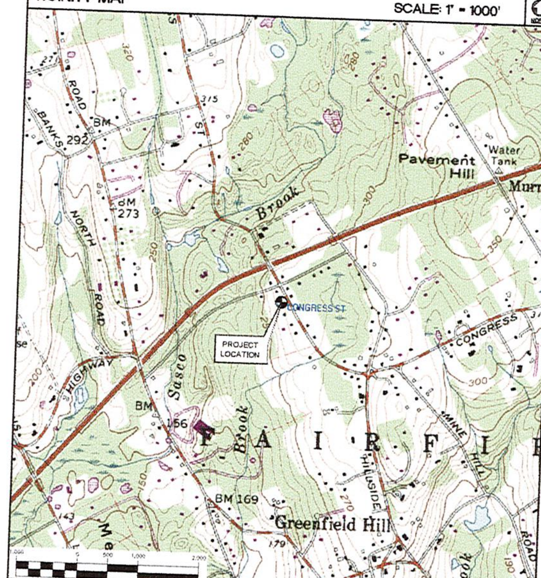
1.	Depart Enterprise Dr toward Capitol Blvd	0.4 mi.
2.	Turn left onto Capitol Blvd	0.2 mi.
3.	Turn left onto West St	0.3 mi.
4.	Take ramp left for I-91 South	9.7 mi.
5.	At exit 17, take ramp right for SR-15 South / Wilbur Cross Pkwy toward E. Main St	37.7 mi.
6.	At exit 44, take ramp right toward Fairfield / Redding	<0.1 mi.
7.	Turn left onto Congress St, and then immediately turn left onto SR-58 / Black Rock Tpke	0.2 mi.
8.	Turn right onto Congress St	2.2 mi.
9.	Arrive at 3965 Congress St, Fairfield, CT 06824-2040 on the left	

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2005 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS. COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK GENERALLY CONSISTS OF THE INSTALLATION OF ONE (1) LTE ANTENNA PER SECTOR FOR A TOTAL OF (3) LTE ANTENNAS TO THE EXISTING AT&T ANTENNA ARRAY. AN LTE BASEBAND EQUIPMENT UNIT (RBS) WILL BE INSTALLED WITHIN THE EXISTING AT&T EQUIPMENT SHELTER.
2. ADDITIONALLY, (2) REMOTE RADIO UNITS (RRUs) PER SECTOR WILL BE INSTALLED. SURGE ARRESTORS WILL BE INSTALLED AT BOTH AT&T RRU AND EQUIPMENT LOCATIONS. REFER TO THESE ACCOMPANYING DRAWINGS FOR FURTHER INFORMATION.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT2128
AT&T SITE NAME:	FAIRFIELD - FIRE DEPT
SITE ADDRESS:	3965 CONGRESS STREET FAIRFIELD, CT 06824
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-11'-18.11" N LONGITUDE: 73°-17'-56.46" W GROUND ELEVATION: ±275' AMSL

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
N-1	NOTES AND SPECIFICATIONS	1
C-1	PLANS AND ELEVATION	1
C-2	LTE SYSTEM EQUIPMENT PLANS & DETAILS	1
E-1	ELECTRICAL DETAILS AND NOTES	1
E-2	ELECTRICAL DETAILS	1

DESIGNED BY:	CFC
DRAWN BY:	DEB
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	
1	03/25/11	FLO	CFC	CONSTRUCTION
0	3/21/11	DEB	CFC	CONSTRUCTION - CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

at&t

SAI communications

CENTEK engineering — Centered on Solutions™
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
SITE NUMBER: CT2128
SITE NAME: FAIRFIELD - FIRE DEPT
3965 CONGRESS STREET
FAIRFIELD, CT 06824

DATE:	3/14/11
SCALE:	AS NOTED
JOB NO.	11021.CO19

TITLE SHEET

T-1

Sheet No. 1 of 6

STRUCTURAL SPECIFICATIONS

DESIGN BASIS

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT STATE BUILDING CODE AND 2009 AMENDMENTS.

1. DESIGN CRITERIA:
   - WIND LOAD: PER EIA/TIA 222 F-96 (ANTENNA MOUNTS): 90 MPH (FASTEST MILE), EQUIVALENT TO 110 MPH (3 SECOND GUST).
   - BASIC WIND SPEED (OTHER STRUCTURE): 110 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
   - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

GENERAL NOTES

1. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
2. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
4. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. ALL RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED OFF SITE AND BE LEGALLY DISPOSED, AT NO ADDITIONAL COST.
4. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE EQUIPMENT AND TOWER AREAS.
5. 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.
6. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
7. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
8. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

EARTHWORK NOTES

1. COMPACTED GRAVEL FILL SHALL BE FURNISHED AND PLACED AS A FOUNDATION FOR STRUCTURES, WHERE SHOWN ON THE CONTRACT DRAWINGS OR DIRECTED BY THE ENGINEER.
2. CRUSHED STONE FILL SHALL BE PLACED IN 12" MAX. LIFTS AND CONSOLIDATED USING A HAND OPERATED VIBRATORY PLATE COMPACTOR WITH A MINIMUM OF 2 PADSSES OF COMPACTOR PER LIFT.
3. COMPACTED GRAVEL FILL TO BE WELL GRADED BANK RUN GRAVEL MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1 ½"	100
No. 4	40-70
No. 100	5-20
No. 200	4-8

4. CRUSHED STONE TO BE UNIFORMLY GRADED, CLEAN, HARD PROCESS AGGREGATE MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1"	100
¾"	90-100
½"	0-15
⅜"	0-5

5. SELECT BACKFILL FOR FOUNDATION WALLS SHALL BE FREE OF ORGANIC MATERIAL, TOPSOIL, DEBRIS AND BOULDERS LARGER THAN 6".
6. GRAVEL AND GRANULAR FILL SHALL BE INSTALLED IN 8" MAX. LIFTS. COMPACTED TO 95% MIN. AT MAX. DRY DENSITY.
7. NON WOVEN GEOTEXTILE FOR SEPARATION PURPOSES SHALL BE MIRAFI 140N, OR ENGINEER APPROVED EQUAL.

FOUNDATION CONSTRUCTION NOTES

1. ALL FOOTINGS SHALL BE PLACED ON SUITABLE, COMPACTED SOIL HAVING ADEQUATE BEARING CAPACITY AND FREE OF ORGANIC CONTENT, CLAY, OR OTHER UNSUITABLE MATERIAL. ADDITIONAL EXCAVATION MAY BE REQUIRED BELOW FOOTING ELEVATIONS INDICATED IF UNSUITABLE MATERIAL IS ENCOUNTERED.
2. SUBGRADE PREPARATION: IF UNSUITABLE SOIL IS ENCOUNTERED, REMOVE ALL UNSUITABLE MATERIALS FROM BELOW PROPOSED STRUCTURE FOUNDATIONS AND COMPACT EXPOSED SOIL SURFACES. PLACE AND COMPACT APPROVED GRAVEL FILL. PLACEMENT OF ALL COMPACTED FILL MUST BE UNDER SUPERVISION OF AN APPROVED TESTING LABORATORY. FILL SHALL BE COMPACTED IN LAYERS NOT TO EXCEED 10" BEFORE COMPACTION. DETERMINE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557-70 AND MAKE ONE (1) FIELD DENSITY TEST IN ACCORDANCE WITH ASTM D2167-66 FOR EACH 50 CUBIC YARDS OF COMPACTED FILL. BUT NOT LESS THAN ONE (1) PER LAYER, TO INSURE COMPACTION TO 95% OF MAX. DRY DENSITY.
3. ALL SOIL SURROUNDING AND UNDER ALL FOOTINGS SHALL BE KEPT REASONABLY DRY AND PROTECTED FROM FREEZING AND FROST ACTION DURING THE COURSE OF CONSTRUCTION.
4. WHERE GROUNDWATER IS ENCOUNTERED, DEWATERING SHALL BE ACCOMPLISHED CONTINUOUSLY AND COMPLETELY DURING FOUNDATION CONSTRUCTION. PROVIDE CRUSHED STONE AS REQUIRED TO STABILIZE FOOTING SUBGRADE.
5. ALL FOOTINGS ARE TO REST ON FIRM SOIL, REGARDLESS OF ELEVATIONS SHOWN ON THE DRAWINGS, BUT IN NO CASE MAY FOOTING ELEVATIONS BE HIGHER THAN INDICATED ON THE FOUNDATION PLAN, UNLESS SPECIFICALLY DIRECTED BY THE ENGINEER.

CONCRETE CONSTRUCTION NOTES

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

   ACI 211 – STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.

   ACI 301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.

   ACI 302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

   ACI 304 – RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.

   ACI 306.1 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING

   ACI 318 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

2. CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

   SLABS ON GRADE 4,000 PSI
   ALL OTHER CONCRETE 3,000 PSI

   - PORTLAND CEMENT: ASTM C150, TYPE II, (540 LBS/CUBIC YARD)
   - AGGREGATE: ASTM C33, No. 67, TYPICAL
   - WATER: POTABLE WITH MAXIMUM WATER CEMENT RATIO OF .55
   - SLUMP: 3" TO 4"
   - ADMIXTURES: USE AIR ENTRAINING ADGENT CONFORMING TO ASTM C260 WITH 4 TO 6% TOTAL AIR. USE WATER REDUCING AGENT CONFORMING TO ASTM C494, TYPE A, IN ALL CONCRETE. CALCIUM CHLORIDE MAY NOT BE USED TO ACCELERATE THE CONCRETE SETTING TIME.

3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.
4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM- A-185.
5. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
6. CONCRETE COVER OVER REINFORCING SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE SHOWN:

   BOTTOM OF FOOTINGS 3 INCHES

   SURFACES NOT EXPOSED TO EARTH OR WEATHER 1-1/2 INCHES

7. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.
8. ALL REINFORCEMENT SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. SPLICES SHALL BE WELL STAGGERED. ADDITIONAL BARS AND SPECIAL BENDING DETAILS ARE REQUIRED AT INTERSECTING WALLS AND AT JOINTS. SUCH DETAILS SHALL COMPLY WITH ACI 315 RECOMMENDATIONS UNLESS OTHERWISE SHOWN.
9. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.
10. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1% CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.
11. UNLESS OTHERWISE NOTED, ALL LAP SPLICES SHALL BE 48 BAR DIAMETERS.
12. SLAB ON GRADE FINISHES:

    EXTERIOR SLAB: NON-SLIP BROOM FINISH
    INTERIOR SLAB: STEEL TROWEL FINISH

GENERAL NOTES (REFERENCE)

CONTRACTOR TO REFER TO THE GENERAL NOTES ON SHEET T-1 FOR ADDITIONAL INFORMATION.

DESIGNED BY: CFC
DRAWN BY: DEB
CHK'D BY: CFC

REV.	DATE	DRAWN BY	CHK'D BY	
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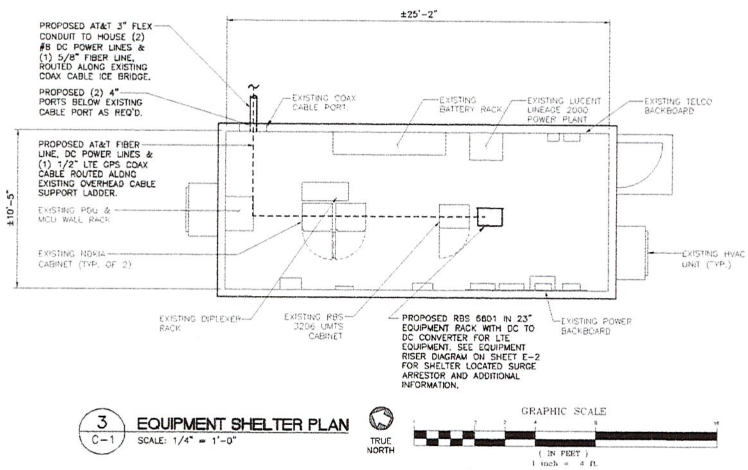
SITE NAME: FAIRFIELD - FIRE DEPT
3965 CONGRESS STREET
FAIRFIELD, CT 06824

DATE: 3/14/11
SCALE: AS NOTED
JOB NO. 11021.C019

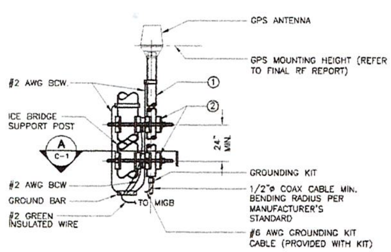
NOTES AND SPECIFICATIONS

N-1

Sheet No. 2 of 6

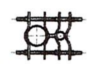


3 / C-1 **EQUIPMENT SHELTER PLAN**
SCALE: 1/4" = 1'-0"



GPS ANTENNA MOUNTING BRACKET

BILL OF MATERIALS		
ITEM	DESCRIPTION	QUANTITY
1	2-1/2"⌀ SCH. 40 x 8'-0" LG. MAX SS OR GALV. PIPE	1
2	UNIVERSAL CLAMP SET.	2

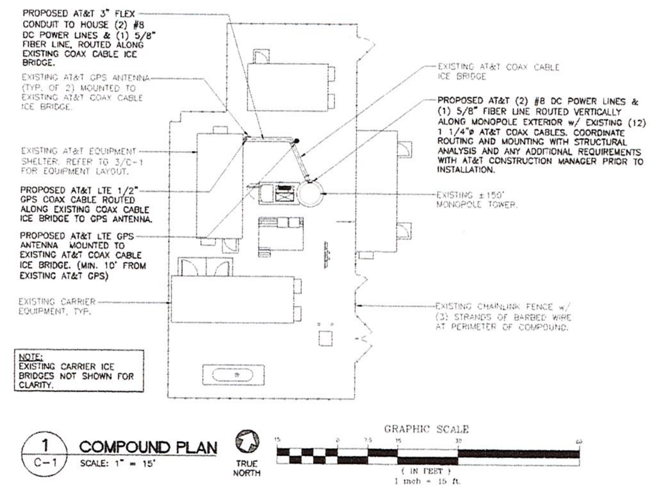


A / C-1 **SECTION**
NOT TO SCALE

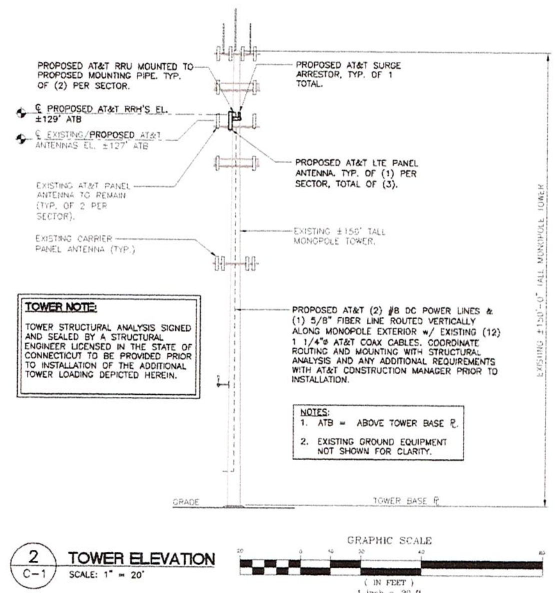
NOTES:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND COORDINATED WITH AT&T CONSTRUCTION MANAGER.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 2-1/2" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 24 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.
3. PRIOR TO INSTALLATION CONTRACTOR SHALL TEST GPS LOCATION WITH HAND HELD AND MOVE GPS ANTENNA TO OTHER ICE BRIDGE POSTS AS REQUIRED TO ACHIEVE ADEQUATE SIGNAL. FAILURE TO ACHIEVE ADEQUATE SIGNAL WITH A HAND HELD GPS SHALL BE REPORTED TO CONSTRUCTION MANAGER AND ENGINEER TO DETERMINE ALTERNATE INSTALLATION LOCATION FOR GPS ANTENNA.

4 / C-1 **GPS GROUNDING/MOUNTING BRACKET DETAILS**
NOT TO SCALE



1 / C-1 **COMPOUND PLAN**
SCALE: 1" = 15'



TOWER NOTE:
TOWER STRUCTURAL ANALYSIS SIGNED AND SEALED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF CONNECTICUT TO BE PROVIDED PRIOR TO INSTALLATION OF THE ADDITIONAL TOWER LOADING DEPICTED HEREIN.

NOTES:
1. ATB = ABOVE TOWER BASE ℄.
2. EXISTING GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

2 / C-1 **TOWER ELEVATION**
SCALE: 1" = 20'

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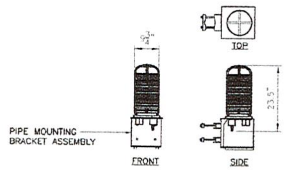
PLANS AND ELEVATION

C-1

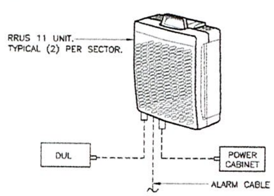
Sheet No. 3 of 6



SURGE ARRESTOR				
SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
TOWER	MAKE: RAYCAP (SQUID) MODEL: DC6-48-60-18-8F	(1) PER SITE	**TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.**	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

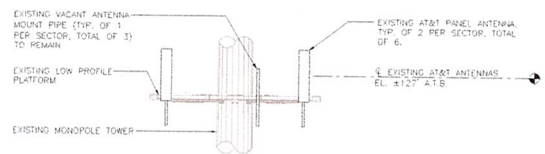
9 (C-2) SURGE ARRESTOR DETAIL
NOT TO SCALE



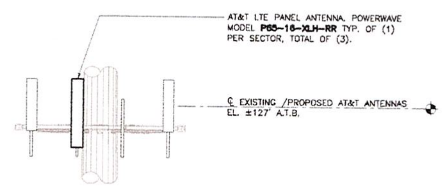
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERRICSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

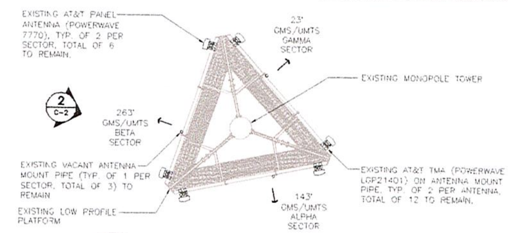
8 (C-2) RRU DETAIL
NOT TO SCALE



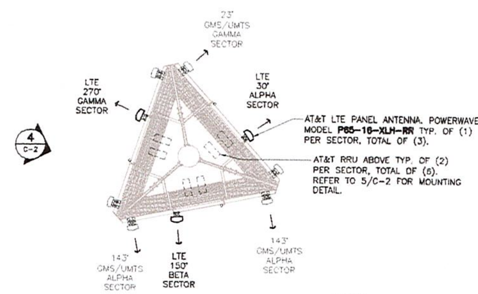
2 (C-2) EXISTING ANTENNA SECTOR ELEVATION
SCALE: 3/16" = 1'-0"



4 (C-2) PROPOSED ANTENNA SECTOR ELEVATION
SCALE: 3/16" = 1'-0"

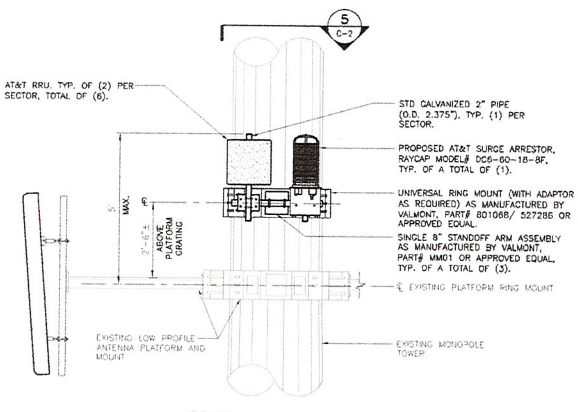


1 (C-2) EXISTING ANTENNA PLAN
SCALE: 3/16" = 1'-0"

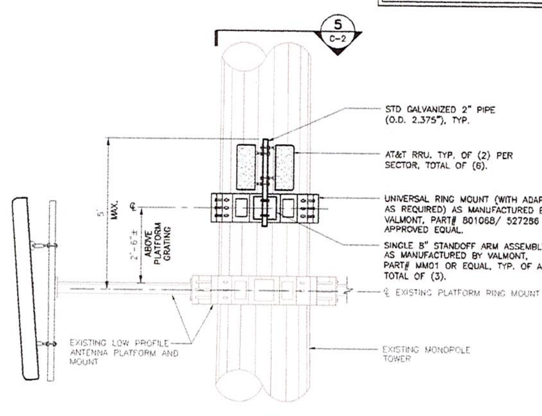


3 (C-2) PROPOSED ANTENNA PLAN
SCALE: 3/16" = 1'-0"

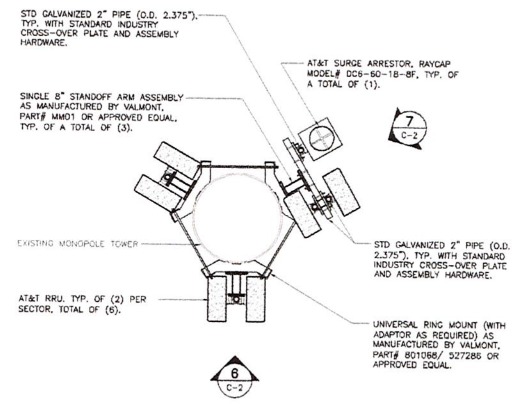
REFER TO FINAL AT&T RF ENGINEER'S RF RADIO PLAN PRIOR TO INSTALLATION OF ANTENNAS AND COAX



7 (C-2) RRU AND SURGE ARRESTOR MOUNTING DETAIL
SCALE: 1/2" = 1'- 0"



6 (C-2) RRU MOUNTING DETAIL
SCALE: 1/2" = 1'- 0"



5 (C-2) RRU AND SURGE ARRESTOR MOUNTING PLAN
SCALE: 1/2" = 1'- 0"

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DRAWN BY: DEB
CHK'D BY: CFC

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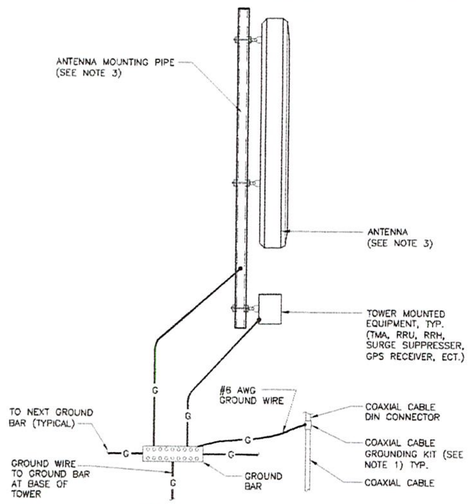
JOB NO. 11021.C019

LTE SYSTEM EQUIPMENT PLANS AND DETAILS

C-2

Sheet No. 4 of 8

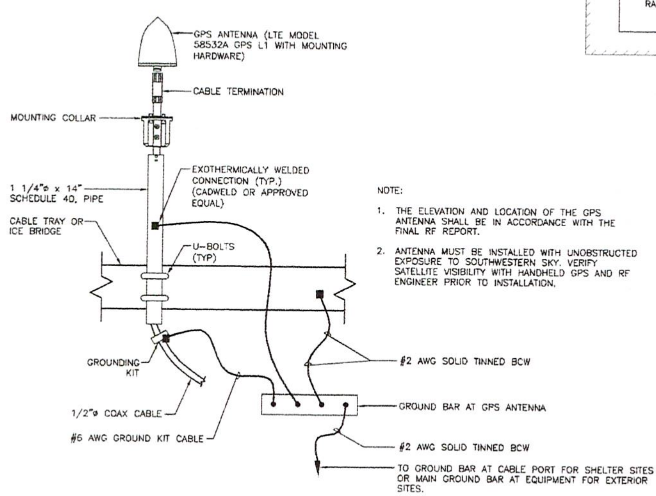


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 E-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

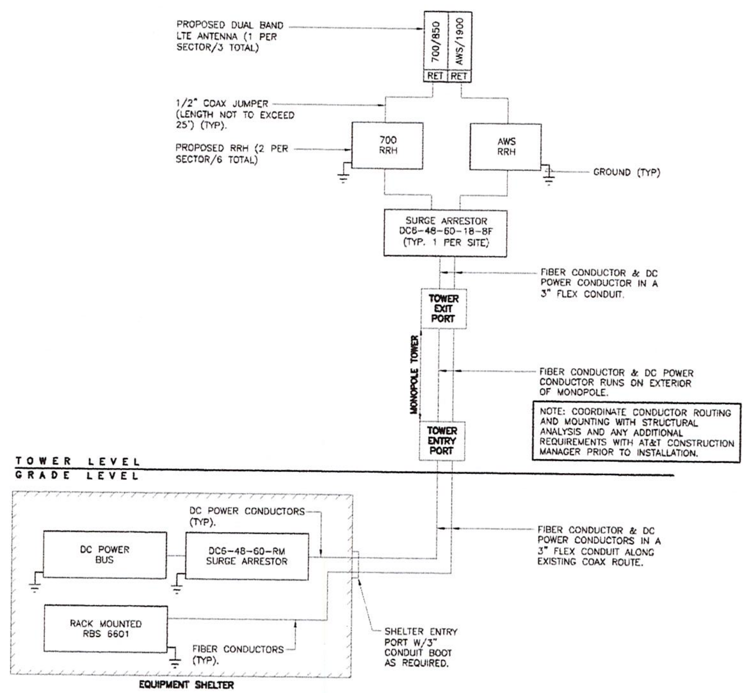


NOTE:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. ANTENNA MUST BE INSTALLED WITH UNOBSTRUCTED EXPOSURE TO SOUTHWESTERN SKY. VERIFY SATELLITE VISIBILITY WITH HANDHELD GPS AND RF ENGINEER PRIOR TO INSTALLATION.

3 E-1 GPS MOUNTED TO CABLE TRAY / ICE BRIDGE

NOT TO SCALE



NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURERS RECOMMENDATIONS.

2 E-1 LTE SCHEMATIC DIAGRAM

NOT TO SCALE

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE. PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

   TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

   THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

   1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
   2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
   3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

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DRAWN BY:	TJB
CHK'D BY:	CKD

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ELECTRICAL DETAILS AND NOTES

E-1

Sheet No. 5 of 6

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Structural Analysis Report

150-ft Existing Valmont Monopole

Proposed AT&T Antenna Upgrade

AT&T Site Ref: CT2128: Fairfield-FD

3965 Congress Street
Fairfield, CT

CENTEK Project No. 11021.CO19

Date: June 3, 2011

Prepared for:

AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by AT&T Mobility on the existing monopole (tower), owned and operated by the Town of Fairfield, located in Fairfield, CT.

The host tower is a 150-ft tall, three-section, twelve sided, tapered monopole, originally designed and manufactured by Valmont Structures. The manufacturer's drawings and calculations were unavailable for use in this report. The tower geometry and structure member sizes were obtained from a previous structural analysis report prepared by Centek (Formerly Natcomm); job no; 08007.CO1, dated February 11, 2008 and a previous structural report prepared by Paul J. Ford and Co. job no; 31298-044 dated December 3, 1998. Foundation system information was obtained from the SAC Engineering design report dated May 19, 1994. Tower reinforcement information was obtained from the Walker Engineering Inc. design drawings dated July 29, 2004.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 23.61-in at the top and 49.6-in at the base.

Antenna and appurtenance information were obtained from the previous structural analysis report prepared by Centek (Formerly Natcomm); job no; 08007.CO1, dated February 11, 2008, an AT&T RFDS sheet and visual verification conducted from grade by Centek personal on February 23, 2011.

AT&T Mobility proposes the installation of three (3) panel antennas on an existing 13-ft platform with handrails. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- TOWN (Existing):
  Antennas: One (1) DB810K Omni-directional whip antenna and two (2) 10-ft Dipole antennas mounted on the Nextel T-Arms with respective RAD center elevations of 157-ft and 154-ft above the existing tower base plate.
  Coax Cables: Three (3) 1-5/8"∅ coax cables running on the inside of the existing tower.

- NEXTEL (Existing to Remain):
  Antennas: Twelve (12) Decibel DB844H90E-XY panel antennas mounted on three (3) 12-ft T-Arms with a RAD center elevation of 149-ft above the existing tower base plate.
  Coax Cables: Twelve (12) 1-5/8" coax cables running on the inside of the existing tower.

- SPRINT (Existing):
  Antennas: Six (6) Decibel DB980H90E-M panel antennas mounted on a 13-ft platform with rails with a RAD center elevation of 138-ft above the existing tower base plate.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside of the existing tower.

- AT&T (EXISTING TO REMAIN):
  Antennas: Six (6) Powerwave 7770 panel antennas and twelve (12) Powerwave LGP TMA's mounted on a 13-ft low profile platform with a RAD center elevation of 127-ft above the existing tower base plate.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- T-MOBILE (Existing):
  Antennas: Three (3) RFS APX16DWV-16DWV-S panel antennas and six (6) 10" by 8" by 3" TMA's mounted on a 13-ft platform with rails with a RAD center elevation of 113-ft above the existing tower base plate.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables running on the exterior of the existing tower.
- TOWN (Existing):
  Antennas: Three (3) Decibel APSA685 Omni-directional whip antennas (one upright and two inverted) and one (1) PD1142-2B Omni-directional whip antenna mounted on two (2) standoffs with an elevation of 104-ft above the existing tower base plate.
  Coax Cables: Four (4) 1-5/8"∅ coax cables running on the inside of the existing tower.
- TOWN (Existing):
  Antennas: Two (2) empty standoffs with a RAD center elevation of 104-ft above the existing tower base plate.
- VERIZON (Existing):
  Antennas: Four (4) Decibel DB844H80E-XY, two (2) Decibel DB846F65ZAXY and six (6) Decibel DB948F85T2E-M panel antennas mounted on a 13-ft low profile platform with a RAD center elevation of 80-ft above the existing tower base plate.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the exterior of the existing tower.
- UNKNOWN (Existing):
  Antennas: One (1) GPS antenna on a GPS Stand-off mount with a RAD center elevation of 40-ft above the existing tower base plate.
  Coax Cables: One (1) 1/2"∅ coax cable running on the exterior of the existing tower.
- **AT&T (PROPOSED):**
  Antennas: Three (3) Powerwave P65-16-XLH-RR panel antennas mounted on a 13-ft low profile platform with a RAD center elevation of 127-ft above the existing tower base plate.
- **AT&T (PROPOSED):**
  Antennas: Six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted to one (1) universal ring mount with a RAD center elevation of 129-ft above grade level.
  Coax Cables: One (1) fiber cable and two (2) dc control cables running on the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed as indicated in this report.
- Refer to construction drawings prepared by Centek Engineering dated 3.25.11 marked Rev. 1 for RRU and Surge Arrestor mounting details.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISATower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 90 mph basic wind speed (fastest mile) with no ice and 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	Fairfield; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Fairfield; v = 110 mph (3 second gust) equivalent to v = 90 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	Appendix K wind speed criteria controls.	
Load Cases:	<u>Load Case 1</u>; 90 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	<u>Load Case 2</u>; 78 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 78 mph wind speed velocity represents 75% of the wind pressure generated by the 90 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	<u>Load Case 3</u>; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

Calculated stresses were found to be within allowable limits. In Load Case 1, per RISATower "Section Capacity Table", this tower was found to be at **97.6%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L3)	0'-54.00'	97.6%	**PASS**

Note: The wall thickness of the bottom 31-ft of the monopole was increased in the RisaTower analysis to reflect the reinforcements designed in the aforementioned structural analysis report prepared by Walker Engineering job no. 0311-428RE dated July 29, 2004.

Foundation and Anchors

The existing foundation consists of a 6.5-ft ∅ x 26.5-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned SAC Engineering design report dated May 19, 1994. The base of the tower is connected to the foundation by means of (16) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 9.2-ft into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Base Reactions	Vector	Proposed Load (kips/ft-kips)
Base	Shear	**39**
	Axial	**41**
	Moment	**3662**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	54.2%	**PASS**
	Lateral Deflection	0.35 in.(1)	**PASS**

(1) Lateral deflection typically limited to 1.0 in. for monopole tower structures. Based on service loads (V = 50 mph)

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Compression	98.8%	**PASS**
Base Plate	Bending	60.9%	**PASS**

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified AT&T antenna configuration.

The analysis is based, in part, on the information provided to this office by AT&T Mobility. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT CARLO F. CENTORE No.16804 LICENSED PROFESSIONAL ENGINEER

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

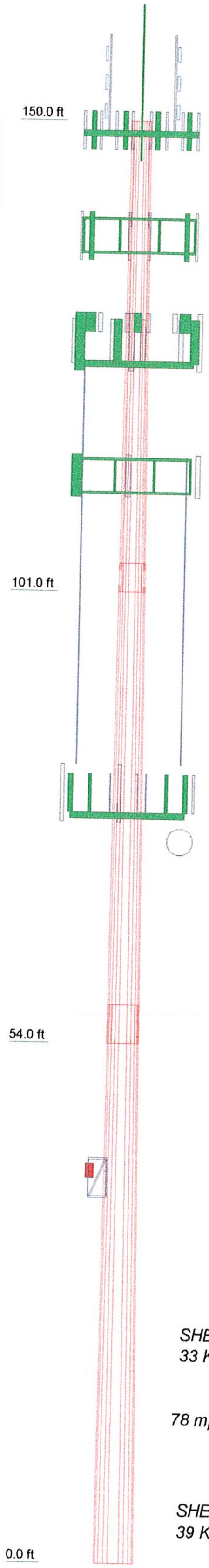
General Description of Structural Analysis Program

RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

RISATower Features:

- RISATower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	3	2	1	
Length (ft)	58.000	50.000	49.000	
Number of Sides	12	12	12	
Thickness (in)	0.438	0.375	0.281	
Socket Length (ft)		4.000	3.000	
Top Dia (in)	38.679	31.141	23.330	
Bot Dia (in)	50.910	40.150	32.250	
Grade		A572-65		
Weight (K)	12.3	7.2	4.2	23.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10-ft Dipole (Town)	149	APX16DWV-16DWV-S-E-ACU (T-Mobile Existing)	113
10-ft Dipole (Town)	149	APX16DWV-16DWV-S-E-ACU (T-Mobile Existing)	113
DB810K (Town)	149	(2) 10"x8"x3" TMA (T-Mobile Existing)	113
(4) DB844H90E-XY (Nextel Existing)	149	(2) 10"x8"x3" TMA (T-Mobile Existing)	113
(4) DB844H90E-XY (Nextel Existing)	149	(2) 10"x8"x3" TMA (T-Mobile Existing)	113
(4) DB844H90E-XY (Nextel Existing)	149	13' Platform w/Rails (T-Mobile Existing)	113
Valmont T-Arm (1) (Nextel Existing)	149	4'-6" Standoff (Town - Existing)	104
Valmont T-Arm (1) (Nextel Existing)	149	4'-6" Standoff (Town - Existing)	104
Valmont T-Arm (1) (Nextel Existing)	149	4'-6" Standoff (Town - Existing)	104
(2) DB980H90E-M (Sprint Existing)	138	4'-6" Standoff (Town - Existing)	104
(2) DB980H90E-M (Sprint Existing)	138	1142-2B (Town - Existing)	104
(2) DB980H90E-M (Sprint Existing)	138	ASPA685 (Town - Existing)	104
13' Platform w/Rails (Sprint Existing)	138	ASPA685 (Town - Existing)	104
(2) RRUS-11 (ATT - Proposed)	129	ASPA685 (Town - Existing)	104
(2) RRUS-11 (ATT - Proposed)	129	DB948F85T2E-M (Verizon Existing)	80
(2) RRUS-11 (ATT - Proposed)	129	DB948F85T2E-M (Verizon Existing)	80
DC6-48-60-18-8F Surge Arrestor (ATT - Proposed)	129	DB948F85T2E-M (Verizon Existing)	80
Valmont Uni-Tri Bracket (ATT - Proposed)	129	DB948F85T2E-M (Verizon Existing)	80
7770.00 (ATT Existing)	127	DB948F85T2E-M (Verizon Existing)	80
7770.00 (ATT Existing)	127	DB948F85T2E-M (Verizon Existing)	80
P65-16-XLH-RR (ATT - Proposed)	127	DB846F65ZAXY (Verizon Existing)	80
7770.00 (ATT Existing)	127	DB846F65ZAXY (Verizon Existing)	80
7770.00 (ATT Existing)	127	DB844H80E-XY (Verizon Existing)	80
P65-16-XLH-RR (ATT - Proposed)	127	DB844H80E-XY (Verizon Existing)	80
7770.00 (ATT Existing)	127	DB844H80E-XY (Verizon Existing)	80
7770.00 (ATT Existing)	127	DB844H80E-XY (Verizon Existing)	80
P65-16-XLH-RR (ATT - Proposed)	127	Valmont 13' Low Profile Platform (Verizon Existing)	78
(4) LGP214nn TMA (ATT Existing)	127	Stand-off	40
(4) LGP214nn TMA (ATT Existing)	127	GPS (Existing)	40
(4) LGP214nn TMA (ATT Existing)	127		
Valmont 13' Low Profile Platform (ATT Existing)	125		
APX16DWV-16DWV-S-E-ACU (T-Mobile Existing)	113		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 78 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 97.6%

AXIAL 54 K
SHEAR 33 K
MOMENT 3212 kip-ft
TORQUE 4 kip-ft
78 mph WIND - 0.500 in ICE

AXIAL 41 K
SHEAR 39 K
MOMENT 3662 kip-ft
TORQUE 4 kip-ft
REACTIONS - 90 mph WIND

Centek Engineering Inc. 63-2 North Branford Road Branford, CT 06405 Phone: 203.488.0580 FAX: 203.488.8587	Job: 11021.CO19 - CT2128 ~ Fairfield-FD		
	Project: 150-ft Valmont Monopole - Fairfield, CT		
	Client: AT&T Mobility	Drawn by: TJL	App'd:
	Code: TIA/EIA-222-F	Date: 06/03/11	Scale: NTS
	Path:		Dwg No. E-1

Tower Input Data

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

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 90 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 78 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
Add IBC .6D+W Combination

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
Use Clear Spans For Wind Area
Use Clear Spans For KL/r
Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
SR Members Have Cut Ends
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing

Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
Consider Feedline Torque
Include Angle Block Shear Check

Poles

√ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	150.000-101.000	49.000	3.000	12	23.330	32.250	0.281	1.125	A572-65 (65 ksi)
L2	101.000-54.000	50.000	4.000	12	31.141	40.150	0.375	1.500	A572-65 (65 ksi)
L3	54.000-0.000	58.000		12	38.679	50.910	0.438	1.750	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)

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	24.153	20.877	1415.634	8.251	12.085	117.140	2868.457	10.275	5.499	19.547
	33.388	28.957	3777.344	11.445	16.706	226.114	7653.922	14.252	7.889	28.045
L2	32.799	37.150	4488.466	11.014	16.131	278.248	9094.850	18.284	7.341	19.576
	41.566	48.028	9698.480	14.239	20.798	466.325	19651.749	23.638	9.755	26.014
L3	40.917	53.873	10056.224	13.691	20.036	501.911	20376.636	26.515	9.194	21.014
	52.706	71.103	23119.814	18.069	26.371	876.701	46847.011	34.995	12.471	28.506

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 150.000-101.000				1	1	1		
L2 101.000-54.000				1	1	1		
L3 54.000-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
1 5/8 (Town - Existing)	A	No	Inside Pole	149.000 - 3.000	3	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1 5/8 (Nextel - Existing)	B	No	Inside Pole	149.000 - 3.000	12	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1 5/8 (Sprint - Existing)	C	No	Inside Pole	138.000 - 3.000	6	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1 5/8 (AT&T - Existing)	A	No	Inside Pole	125.000 - 3.000	12	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1 5/8 (T-Mobile - Existing)	A	No	CaAa (Out Of Face)	110.000 - 3.000	2	No Ice 1/2" Ice	0.198 0.298	0.001 0.003
1 5/8 (T-Mobile - Existing)	A	No	CaAa (Out Of Face)	110.000 - 3.000	16	No Ice 1/2" Ice	0.000 0.000	0.001 0.003
1 5/8 (Verizon - Existing)	C	No	CaAa (Out Of Face)	77.000 - 3.000	2	No Ice 1/2" Ice	0.198 0.298	0.001 0.003
1 5/8 (Verizon - Existing)	C	No	CaAa (Out Of Face)	77.000 - 3.000	10	No Ice 1/2" Ice	0.000 0.000	0.001 0.003
7/8 (Town - Existing)	B	No	Inside Pole	104.000 - 3.000	4	No Ice 1/2" Ice	0.000 0.000	0.001 0.001
1/2 (GPS - Existing)	B	No	CaAa (Out Of Face)	40.000 - 3.000	1	No Ice 1/2" Ice	0.058 0.158	0.000 0.001
RG6-Fiber (AT&T - Propsoed)	C	No	CaAa (Out Of Face)	129.000 - 3.000	1	No Ice 1/2" Ice	0.000 0.000	0.001 0.002

Description	*Face or Leg*	*Allow Shield*	*Component Type*	*Placement* *ft*	*Total Number*		C_AA_A *ft²/ft*	*Weight* *klf*
#8 AWG Copper WIre (AT&T - Propsoed)	C	No	CaAa (Out Of Face)	129.000 - 3.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000

Feed Line/Linear Appurtenances Section Areas

Tower Section	*Tower Elevation* *ft*	*Face*	A_R *ft²*	A_F *ft²*	C_AA_A *In Face* *ft²*	C_AA_A *Out Face* *ft²*	*Weight* *K*
L1	150.000-101.000	A	0.000	0.000	0.000	3.564	0.618
		B	0.000	0.000	0.000	0.000	0.606
		C	0.000	0.000	0.000	0.000	0.262
L2	101.000-54.000	A	0.000	0.000	0.000	18.612	1.613
		B	0.000	0.000	0.000	0.000	0.688
		C	0.000	0.000	0.000	9.108	0.632
L3	54.000-0.000	A	0.000	0.000	0.000	20.196	1.750
		B	0.000	0.000	0.000	2.146	0.756
		C	0.000	0.000	0.000	20.196	1.011

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	*Tower Elevation* *ft*	*Face or Leg*	*Ice Thickness* *in*	A_R *ft²*	A_F *ft²*	C_AA_A *In Face* *ft²*	C_AA_A *Out Face* *ft²*	*Weight* *K*
L1	150.000-101.000	A	0.500	0.000	0.000	0.000	5.364	0.862
		B		0.000	0.000	0.000	0.000	0.606
		C		0.000	0.000	0.000	0.000	0.300
L2	101.000-54.000	A	0.500	0.000	0.000	0.000	28.012	2.890
		B		0.000	0.000	0.000	0.000	0.688
		C		0.000	0.000	0.000	13.708	1.114
L3	54.000-0.000	A	0.500	0.000	0.000	0.000	30.396	3.136
		B		0.000	0.000	0.000	5.846	0.780
		C		0.000	0.000	0.000	30.396	2.005

Discrete Tower Loads

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* °	*Placement* *ft*		C_AA_A *Front* *ft²*	C_AA_A *Side* *ft²*	*Weight* *K*
10-ft Dipole (Town)	A	From Face	3.000 0.000 5.000	0.000	149.000	No Ice 1/2" Ice	3.150 5.670	3.150 5.670	0.032 0.042
10-ft Dipole (Town)	B	From Face	3.000 0.000 5.000	0.000	149.000	No Ice 1/2" Ice	3.150 5.670	3.150 5.670	0.032 0.042
DB810K (Town)	C	From Face	3.000 0.000 5.000	0.000	149.000	No Ice 1/2" Ice	4.075 5.734	4.075 5.734	0.035 0.065

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* °	*Placement* *ft*		C_AA_A *Front* *ft²*	C_AA_A *Side* *ft²*	*Weight* *K*
(4) DB844H90E-XY (Nextel Existing)	A	From Face	3.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice	2.867 3.177	3.733 4.101	0.010 0.035
(4) DB844H90E-XY (Nextel Existing)	B	From Face	3.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice	2.867 3.177	3.733 4.101	0.010 0.035
(4) DB844H90E-XY (Nextel Existing)	C	From Face	3.000 0.000 0.000	0.000	149.000	No Ice 1/2" Ice	2.867 3.177	3.733 4.101	0.010 0.035
Valmont T-Arm (1) (Nextel Existing)	A	None		0.000	149.000	No Ice 1/2" Ice	10.540 14.450	10.540 14.450	0.336 0.412
Valmont T-Arm (1) (Nextel Existing)	B	None		0.000	149.000	No Ice 1/2" Ice	10.540 14.450	10.540 14.450	0.336 0.412
Valmont T-Arm (1) (Nextel Existing)	C	None		0.000	149.000	No Ice 1/2" Ice	10.540 14.450	10.540 14.450	0.336 0.412
(2) DB980H90E-M (Sprint Existing)	A	From Face	3.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice	3.799 4.178	2.194 2.556	0.009 0.029
(2) DB980H90E-M (Sprint Existing)	B	From Face	3.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice	3.799 4.178	2.194 2.556	0.009 0.029
(2) DB980H90E-M (Sprint Existing)	C	From Face	3.000 0.000 0.000	0.000	138.000	No Ice 1/2" Ice	3.799 4.178	2.194 2.556	0.009 0.029
13' Platform w/Rails (Sprint Existing)	C	None		0.000	138.000	No Ice 1/2" Ice	17.200 22.300	17.200 22.300	2.000 3.000
(2) RRUS-11 (AT&T - Proposed)	A	From Face	0.500 0.000 0.000	0.000	129.000	No Ice 1/2" Ice	3.166 3.413	1.010 1.195	0.044 0.061
(2) RRUS-11 (AT&T - Proposed)	B	From Face	0.500 0.000 0.000	0.000	129.000	No Ice 1/2" Ice	3.166 3.413	1.010 1.195	0.044 0.061
(2) RRUS-11 (AT&T - Proposed)	C	From Face	0.500 0.000 0.000	0.000	129.000	No Ice 1/2" Ice	3.166 3.413	1.010 1.195	0.044 0.061
DC6-48-60-18-8F Surge Arrestor (AT&T - Proposed)	C	From Face	0.500 0.000 0.000	0.000	129.000	No Ice 1/2" Ice	1.266 1.456	1.266 1.456	0.020 0.035
Valmont Uni-Tri Bracket (AT&T - Proposed)	C	None		0.000	129.000	No Ice 1/2" Ice	1.750 1.940	1.750 1.940	0.290 0.306
7770.00 (AT&T Existing)	A	From Face	3.000 -6.000 0.000	0.000	127.000	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068
7770.00 (AT&T Existing)	A	From Face	3.000 2.000 0.000	0.000	127.000	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068
P65-16-XLH-RR (AT&T - Proposed)	A	From Face	3.000 6.000 0.000	0.000	127.000	No Ice 1/2" Ice	8.400 8.949	4.700 5.147	0.064 0.111
7770.00 (AT&T Existing)	B	From Face	3.000 -6.000 0.000	0.000	127.000	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068
7770.00 (AT&T Existing)	B	From Face	3.000 2.000 0.000	0.000	127.000	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068
P65-16-XLH-RR (AT&T - Proposed)	B	From Face	3.000 6.000	0.000	127.000	No Ice 1/2" Ice	8.400 8.949	4.700 5.147	0.064 0.111

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
			0.000						
7770.00 (AT&T Existing)	C	From Face	3.000 -6.000 0.000	0.000	127.000	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068
7770.00 (AT&T Existing)	C	From Face	3.000 2.000 0.000	0.000	127.000	No Ice 1/2" Ice	5.882 6.314	2.928 3.273	0.035 0.068
P65-16-XLH-RR (AT&T - Proposed)	C	From Face	3.000 6.000 0.000	0.000	127.000	No Ice 1/2" Ice	8.400 8.949	4.700 5.147	0.064 0.111
(4) LGP214nn TMA (AT&T Existing)	A	From Face	3.000 0.000 0.000	0.000	127.000	No Ice 1/2" Ice	0.000 0.000	0.233 0.313	0.014 0.021
(4) LGP214nn TMA (AT&T Existing)	B	From Face	3.000 0.000 0.000	0.000	127.000	No Ice 1/2" Ice	0.000 0.000	0.233 0.313	0.014 0.021
(4) LGP214nn TMA (AT&T Existing)	C	From Face	3.000 0.000 0.000	0.000	127.000	No Ice 1/2" Ice	0.000 0.000	0.233 0.313	0.014 0.021
Valmont 13' Low Profile Platform (AT&T Existing)	C	None		0.000	125.000	No Ice 1/2" Ice	15.700 20.100	15.700 20.100	1.300 1.765
APX16DWV-16DWV-S-E-ACU (T-Mobile Existing)	A	From Face	3.000 6.000 0.000	0.000	113.000	No Ice 1/2" Ice	6.699 7.131	2.003 2.326	0.040 0.071
APX16DWV-16DWV-S-E-ACU (T-Mobile Existing)	B	From Face	3.000 6.000 0.000	0.000	113.000	No Ice 1/2" Ice	6.699 7.131	2.003 2.326	0.040 0.071
APX16DWV-16DWV-S-E-ACU (T-Mobile Existing)	C	From Face	3.000 6.000 0.000	0.000	113.000	No Ice 1/2" Ice	6.699 7.131	2.003 2.326	0.040 0.071
(2) 10"x8"x3" TMA (T-Mobile Existing)	A	From Face	3.000 6.000 0.000	0.000	113.000	No Ice 1/2" Ice	0.778 0.899	0.292 0.380	0.015 0.020
(2) 10"x8"x3" TMA (T-Mobile Existing)	B	From Face	3.000 6.000 0.000	0.000	113.000	No Ice 1/2" Ice	0.778 0.899	0.292 0.380	0.015 0.020
(2) 10"x8"x3" TMA (T-Mobile Existing)	C	From Face	3.000 6.000 0.000	0.000	113.000	No Ice 1/2" Ice	0.778 0.899	0.292 0.380	0.015 0.020
13' Platform w/Rails (T-Mobile Existing)	C	None		0.000	113.000	No Ice 1/2" Ice	17.200 22.300	17.200 22.300	2.000 3.000
4'-6" Standoff (Town - Existing)	A	From Face	3.000 0.000 0.000	0.000	104.000	No Ice 1/2" Ice	2.100 2.480	0.156 0.212	0.040 0.057
4'-6" Standoff (Town - Existing)	A	From Face	3.000 0.000 0.000	0.000	104.000	No Ice 1/2" Ice	2.100 2.480	0.156 0.212	0.040 0.057
4'-6" Standoff (Town - Existing)	B	From Face	3.000 0.000 0.000	0.000	104.000	No Ice 1/2" Ice	2.100 2.480	0.156 0.212	0.040 0.057
4'-6" Standoff (Town - Existing)	C	From Face	3.000 0.000 0.000	0.000	104.000	No Ice 1/2" Ice	2.100 2.480	0.156 0.212	0.040 0.057
1142-2B (Town - Existing)	B	From Face	5.000 0.000 4.000	0.000	104.000	No Ice 1/2" Ice	1.120 2.535	1.120 2.535	0.010 0.021

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight K
ASPA685 (Town - Existing)	B	From Face	5.000 0.000 -10.500	0.000	104.000	No Ice 1/2" Ice	5.250 7.379	5.250 7.379	0.022 0.060
ASPA685 (Town - Existing)	A	From Face	5.000 0.000 10.500	0.000	104.000	No Ice 1/2" Ice	5.250 7.379	5.250 7.379	0.022 0.060
ASPA685 (Town - Existing)	A	From Face	5.000 0.000 -10.500	0.000	104.000	No Ice 1/2" Ice	5.250 7.379	5.250 7.379	0.022 0.060
DB948F85T2E-M (Verizon Existing)	A	From Face	3.000 -4.000 0.000	0.000	80.000	No Ice 1/2" Ice	1.920 2.219	3.256 3.617	0.009 0.028
DB948F85T2E-M (Verizon Existing)	A	From Face	3.000 4.000 0.000	0.000	80.000	No Ice 1/2" Ice	1.920 2.219	3.256 3.617	0.009 0.028
DB948F85T2E-M (Verizon Existing)	B	From Face	3.000 -4.000 0.000	0.000	80.000	No Ice 1/2" Ice	1.920 2.219	3.256 3.617	0.009 0.028
DB948F85T2E-M (Verizon Existing)	B	From Face	3.000 4.000 0.000	0.000	80.000	No Ice 1/2" Ice	1.920 2.219	3.256 3.617	0.009 0.028
DB948F85T2E-M (Verizon Existing)	C	From Face	3.000 -4.000 0.000	0.000	80.000	No Ice 1/2" Ice	1.920 2.219	3.256 3.617	0.009 0.028
DB948F85T2E-M (Verizon Existing)	C	From Face	3.000 4.000 0.000	0.000	80.000	No Ice 1/2" Ice	1.920 2.219	3.256 3.617	0.009 0.028
DB846F65ZAXY (Verizon Existing)	A	From Face	3.000 -6.000 0.000	0.000	80.000	No Ice 1/2" Ice	7.033 7.536	6.158 6.619	0.021 0.070
DB846F65ZAXY (Verizon Existing)	A	From Face	3.000 6.000 0.000	0.000	80.000	No Ice 1/2" Ice	7.033 7.536	6.158 6.619	0.021 0.070
DB844H80E-XY (Verizon Existing)	B	From Face	3.000 -6.000 0.000	0.000	80.000	No Ice 1/2" Ice	2.867 3.177	3.967 4.337	0.010 0.036
DB844H80E-XY (Verizon Existing)	B	From Face	3.000 6.000 0.000	0.000	80.000	No Ice 1/2" Ice	2.867 3.177	3.967 4.337	0.010 0.036
DB844H80E-XY (Verizon Existing)	C	From Face	3.000 -6.000 0.000	0.000	80.000	No Ice 1/2" Ice	2.867 3.177	3.967 4.337	0.010 0.036
DB844H80E-XY (Verizon Existing)	C	From Face	3.000 6.000 0.000	0.000	80.000	No Ice 1/2" Ice	2.867 3.177	3.967 4.337	0.010 0.036
Valmont 13' Low Profile Platform (Verizon Existing)	C	None		0.000	78.000	No Ice 1/2" Ice	15.700 20.100	15.700 20.100	1.300 1.765
Stand-off	A	From Face	1.000 0.000 0.000	0.000	40.000	No Ice 1/2" Ice	0.750 0.950	0.750 0.950	0.027 0.036
GPS (Existing)	A	From Face	2.000 0.000 0.000	0.000	40.000	No Ice 1/2" Ice	1.000 1.500	1.000 1.500	0.010 0.015

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	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 150.000-101.000	124.530	1.461	0.030	113.476	A	0.000	113.476	113.476	100.00	0.000	3.564
					B	0.000	113.476		100.00	0.000	0.000
					C	0.000	113.476		100.00	0.000	0.000
L2 101.000-54.000	77.089	1.274	0.026	140.671	A	0.000	140.671	140.671	100.00	0.000	18.612
					B	0.000	140.671		100.00	0.000	0.000
					C	0.000	140.671		100.00	0.000	9.108
L3 54.000-0.000	26.246	1	0.021	203.474	A	0.000	203.474	203.474	100.00	0.000	20.196
					B	0.000	203.474		100.00	0.000	2.146
					C	0.000	203.474		100.00	0.000	20.196

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 150.000-101.000	124.530	1.461	0.023	0.500	117.559	A	0.000	117.559	117.559	100.00	0.000	5.364
						B	0.000	117.559		100.00	0.000	0.000
						C	0.000	117.559		100.00	0.000	0.000
L2 101.000-54.000	77.089	1.274	0.020	0.500	144.587	A	0.000	144.587	144.587	100.00	0.000	28.012
						B	0.000	144.587		100.00	0.000	0.000
						C	0.000	144.587		100.00	0.000	13.708
L3 54.000-0.000	26.246	1	0.016	0.500	207.974	A	0.000	207.974	207.974	100.00	0.000	30.396
						B	0.000	207.974		100.00	0.000	5.846
						C	0.000	207.974		100.00	0.000	30.396

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	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 150.000-101.000	124.530	1.461	0.009	113.476	A	0.000	113.476	113.476	100.00	0.000	3.564
					B	0.000	113.476		100.00	0.000	0.000
					C	0.000	113.476		100.00	0.000	0.000
L2 101.000-54.000	77.089	1.274	0.008	140.671	A	0.000	140.671	140.671	100.00	0.000	18.612
					B	0.000	140.671		100.00	0.000	0.000
					C	0.000	140.671		100.00	0.000	9.108
L3 54.000-0.000	26.246	1	0.007	203.474	A	0.000	203.474	203.474	100.00	0.000	20.196
					B	0.000	203.474		100.00	0.000	2.146

Centek Engineering Inc.
63-2 North Branford Road
Branford, CT 06405
Phone: 203.488.0580
FAX: 203.488.8587

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	203.474		100.00	0.000	20.196

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.485	4.155	A	1	1.03	1	1	1	113.476	6.158	0.126	C
			B	1	1.03	1	1	1	113.476			
			C	1	1.03	1	1	1	113.476			
L2 101.000-54.000	2.933	7.246	A	1	1.03	1	1	1	140.671	7.675	0.163	C
			B	1	1.03	1	1	1	140.671			
			C	1	1.03	1	1	1	140.671			
L3 54.000-0.000	3.517	12.333	A	1	1.03	1	1	1	203.474	9.075	0.168	C
			B	1	1.03	1	1	1	203.474			
			C	1	1.03	1	1	1	203.474			
Sum Weight:	7.935	23.733						OTM	1596.688 kip-ft	22.908		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.485	4.155	A	1	1.03	1	1	1	113.476	6.158	0.126	C
			B	1	1.03	1	1	1	113.476			
			C	1	1.03	1	1	1	113.476			
L2 101.000-54.000	2.933	7.246	A	1	1.03	1	1	1	140.671	7.675	0.163	C
			B	1	1.03	1	1	1	140.671			
			C	1	1.03	1	1	1	140.671			
L3 54.000-0.000	3.517	12.333	A	1	1.03	1	1	1	203.474	9.075	0.168	C
			B	1	1.03	1	1	1	203.474			
			C	1	1.03	1	1	1	203.474			
Sum Weight:	7.935	23.733						OTM	1596.688 kip-ft	22.908		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.485	4.155	A	1	1.03	1	1	1	113.476	6.158	0.126	C
			B	1	1.03	1	1	1	113.476			
			C	1	1.03	1	1	1	113.476			
L2 101.000-54.000	2.933	7.246	A	1	1.03	1	1	1	140.671	7.675	0.163	C
			B	1	1.03	1	1	1	140.671			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
			C	1	1.03	1	1	1	140.671			
L3 54.000-0.000	3.517	12.333	A	1	1.03	1	1	1	203.474	9.075	0.168	C
			B	1	1.03	1	1	1	203.474			
			C	1	1.03	1	1	1	203.474			
Sum Weight:	7.935	23.733						OTM	1596.688 kip-ft	22.908		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.485	4.155	A	1	1.03	1	1	1	113.476	6.158	0.126	C
			B	1	1.03	1	1	1	113.476			
			C	1	1.03	1	1	1	113.476			
L2 101.000-54.000	2.933	7.246	A	1	1.03	1	1	1	140.671	7.675	0.163	C
			B	1	1.03	1	1	1	140.671			
			C	1	1.03	1	1	1	140.671			
L3 54.000-0.000	3.517	12.333	A	1	1.03	1	1	1	203.474	9.075	0.168	C
			B	1	1.03	1	1	1	203.474			
			C	1	1.03	1	1	1	203.474			
Sum Weight:	7.935	23.733						OTM	1596.688 kip-ft	22.908		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.768	5.023	A	1	1.03	1	1	1	117.559	4.849	0.099	C
			B	1	1.03	1	1	1	117.559			
			C	1	1.03	1	1	1	117.559			
L2 101.000-54.000	4.692	8.318	A	1	1.03	1	1	1	144.587	6.358	0.135	C
			B	1	1.03	1	1	1	144.587			
			C	1	1.03	1	1	1	144.587			
L3 54.000-0.000	5.922	13.878	A	1	1.03	1	1	1	207.974	7.582	0.140	C
			B	1	1.03	1	1	1	207.974			
			C	1	1.03	1	1	1	207.974			
Sum Weight:	12.382	27.219						OTM	1292.918 kip-ft	18.789		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.768	5.023	A	1	1.03	1	1	1	117.559	4.849	0.099	C
			B	1	1.03	1	1	1	117.559			
			C	1	1.03	1	1	1	117.559			
L2 101.000-54.000	4.692	8.318	A	1	1.03	1	1	1	144.587	6.358	0.135	C
			B	1	1.03	1	1	1	144.587			
			C	1	1.03	1	1	1	144.587			
L3 54.000-0.000	5.922	13.878	A	1	1.03	1	1	1	207.974	7.582	0.140	C
			B	1	1.03	1	1	1	207.974			
			C	1	1.03	1	1	1	207.974			
Sum Weight:	12.382	27.219						OTM	1292.918 kip-ft	18.789		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.768	5.023	A	1	1.03	1	1	1	117.559	4.849	0.099	C
			B	1	1.03	1	1	1	117.559			
			C	1	1.03	1	1	1	117.559			
L2 101.000-54.000	4.692	8.318	A	1	1.03	1	1	1	144.587	6.358	0.135	C
			B	1	1.03	1	1	1	144.587			
			C	1	1.03	1	1	1	144.587			
L3 54.000-0.000	5.922	13.878	A	1	1.03	1	1	1	207.974	7.582	0.140	C
			B	1	1.03	1	1	1	207.974			
			C	1	1.03	1	1	1	207.974			
Sum Weight:	12.382	27.219						OTM	1292.918 kip-ft	18.789		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.768	5.023	A	1	1.03	1	1	1	117.559	4.849	0.099	C
			B	1	1.03	1	1	1	117.559			
			C	1	1.03	1	1	1	117.559			
L2 101.000-54.000	4.692	8.318	A	1	1.03	1	1	1	144.587	6.358	0.135	C
			B	1	1.03	1	1	1	144.587			
			C	1	1.03	1	1	1	144.587			
L3 54.000-0.000	5.922	13.878	A	1	1.03	1	1	1	207.974	7.582	0.140	C
			B	1	1.03	1	1	1	207.974			
			C	1	1.03	1	1	1	207.974			
Sum Weight:	12.382	27.219						OTM	1292.918 kip-ft	18.789		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.485	4.155	A	1	1.03	1	1	1	113.476	1.901	0.039	C
			B	1	1.03	1	1	1	113.476			
			C	1	1.03	1	1	1	113.476			
L2 101.000-54.000	2.933	7.246	A	1	1.03	1	1	1	140.671	2.369	0.050	C
			B	1	1.03	1	1	1	140.671			
			C	1	1.03	1	1	1	140.671			
L3 54.000-0.000	3.517	12.333	A	1	1.03	1	1	1	203.474	2.801	0.052	C
			B	1	1.03	1	1	1	203.474			
			C	1	1.03	1	1	1	203.474			
Sum Weight:	7.935	23.733						OTM	492.805 kip-ft	7.070		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.485	4.155	A	1	1.03	1	1	1	113.476	1.901	0.039	C
			B	1	1.03	1	1	1	113.476			
			C	1	1.03	1	1	1	113.476			
L2 101.000-54.000	2.933	7.246	A	1	1.03	1	1	1	140.671	2.369	0.050	C
			B	1	1.03	1	1	1	140.671			
			C	1	1.03	1	1	1	140.671			
L3 54.000-0.000	3.517	12.333	A	1	1.03	1	1	1	203.474	2.801	0.052	C
			B	1	1.03	1	1	1	203.474			
			C	1	1.03	1	1	1	203.474			
Sum Weight:	7.935	23.733						OTM	492.805 kip-ft	7.070		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.485	4.155	A	1	1.03	1	1	1	113.476	1.901	0.039	C
			B	1	1.03	1	1	1	113.476			
			C	1	1.03	1	1	1	113.476			
L2 101.000-54.000	2.933	7.246	A	1	1.03	1	1	1	140.671	2.369	0.050	C
			B	1	1.03	1	1	1	140.671			
			C	1	1.03	1	1	1	140.671			
L3 54.000-0.000	3.517	12.333	A	1	1.03	1	1	1	203.474	2.801	0.052	C
			B	1	1.03	1	1	1	203.474			
			C	1	1.03	1	1	1	203.474			
Sum Weight:	7.935	23.733						OTM	492.805 kip-ft	7.070		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1 150.000-101.000	1.485	4.155	A	1	1.03	1	1	1	113.476	1.901	0.039	C
			B	1	1.03	1	1	1	113.476			
			C	1	1.03	1	1	1	113.476			
L2 101.000-54.000	2.933	7.246	A	1	1.03	1	1	1	140.671	2.369	0.050	C
			B	1	1.03	1	1	1	140.671			
			C	1	1.03	1	1	1	140.671			
L3 54.000-0.000	3.517	12.333	A	1	1.03	1	1	1	203.474	2.801	0.052	C
			B	1	1.03	1	1	1	203.474			
			C	1	1.03	1	1	1	203.474			
Sum Weight:	7.935	23.733						OTM	492.805 kip-ft	7.070		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	23.733					
Bracing Weight	0.000					
Total Member Self-Weight	23.733			-0.388	0.398	
Total Weight	41.313			-0.388	0.398	
Wind 0 deg - No Ice		-0.118	-38.534	-3525.002	10.833	-2.118
Wind 30 deg - No Ice		19.233	-33.312	-3047.576	-1758.897	-3.250
Wind 45 deg - No Ice		27.261	-27.164	-2485.288	-2493.022	-3.499
Wind 60 deg - No Ice		33.431	-19.165	-1753.658	-3057.225	-3.510
Wind 90 deg - No Ice		38.671	0.118	10.048	-3536.266	-2.830
Wind 120 deg - No Ice		33.549	19.369	1770.957	-3067.661	-1.392
Wind 135 deg - No Ice		27.428	27.331	2499.270	-2507.780	-0.503
Wind 150 deg - No Ice		19.438	33.431	3057.236	-1776.971	0.420
Wind 180 deg - No Ice		0.118	38.534	3524.227	-10.037	2.118
Wind 210 deg - No Ice		-19.233	33.312	3046.801	1759.693	3.250
Wind 225 deg - No Ice		-27.261	27.164	2484.512	2493.818	3.499
Wind 240 deg - No Ice		-33.431	19.165	1752.883	3058.021	3.510
Wind 270 deg - No Ice		-38.671	-0.118	-10.823	3537.062	2.830
Wind 300 deg - No Ice		-33.549	-19.369	-1771.732	3068.457	1.392
Wind 315 deg - No Ice		-27.428	-27.331	-2500.045	2508.576	0.503
Wind 330 deg - No Ice		-19.438	-33.431	-3058.011	1777.767	-0.420
Member Ice	3.485					
Total Weight Ice	54.077			-0.838	0.822	
Wind 0 deg - Ice		-0.097	-32.990	-3052.295	9.420	-1.830
Wind 30 deg - Ice		16.467	-28.522	-2639.178	-1522.424	-3.183
Wind 45 deg - Ice		23.338	-23.259	-2152.464	-2157.824	-3.554
Wind 60 deg - Ice		28.618	-16.411	-1519.120	-2646.116	-3.683
Wind 90 deg - Ice		33.102	0.097	7.760	-3060.563	-3.196
Wind 120 deg - Ice		28.715	16.579	1532.336	-2654.714	-1.853
Wind 135 deg - Ice		23.475	23.396	2162.947	-2169.984	-0.966
Wind 150 deg - Ice		16.635	28.618	2646.099	-1537.317	-0.013
Wind 180 deg - Ice		0.097	32.990	3050.618	-7.777	1.830
Wind 210 deg - Ice		-16.467	28.522	2637.501	1524.068	3.183

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 225 deg - Ice		-23.338	23.259	2150.787	2159.468	3.554
Wind 240 deg - Ice		-28.618	16.411	1517.443	2647.759	3.683
Wind 270 deg - Ice		-33.102	-0.097	-9.437	3062.206	3.196
Wind 300 deg - Ice		-28.715	-16.579	-1534.013	2656.358	1.853
Wind 315 deg - Ice		-23.475	-23.396	-2164.624	2171.627	0.966
Wind 330 deg - Ice		-16.635	-28.618	-2647.776	1538.960	0.013
Total Weight	41.313			-0.388	0.398	
Wind 0 deg - Service		-0.036	-11.893	-1088.232	3.619	-0.654
Wind 30 deg - Service		5.936	-10.282	-940.878	-542.594	-1.003
Wind 45 deg - Service		8.414	-8.384	-767.332	-769.176	-1.080
Wind 60 deg - Service		10.318	-5.915	-541.520	-943.313	-1.083
Wind 90 deg - Service		11.935	0.036	2.833	-1091.165	-0.873
Wind 120 deg - Service		10.355	5.978	546.324	-946.534	-0.430
Wind 135 deg - Service		8.465	8.436	771.112	-773.731	-0.155
Wind 150 deg - Service		5.999	10.318	943.323	-548.173	0.130
Wind 180 deg - Service		0.036	11.893	1087.456	-2.823	0.654
Wind 210 deg - Service		-5.936	10.282	940.103	543.390	1.003
Wind 225 deg - Service		-8.414	8.384	766.557	769.972	1.080
Wind 240 deg - Service		-10.318	5.915	540.745	944.109	1.083
Wind 270 deg - Service		-11.935	-0.036	-3.608	1091.961	0.873
Wind 300 deg - Service		-10.355	-5.978	-547.099	947.330	0.430
Wind 315 deg - Service		-8.465	-8.436	-771.887	774.527	0.155
Wind 330 deg - Service		-5.999	-10.318	-944.098	548.969	-0.130

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp

Comb. No.	Description
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 101	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-18.109	0.000	-0.151
			Max. Mx	14	-11.714	525.317	0.124
			Max. My	10	-11.718	0.009	-525.300
			Max. Vy	14	-18.728	525.317	0.124
			Max. Vx	2	-18.726	0.113	525.220
			Max. Torque	30			1.721
L2	101 - 54	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-33.077	0.686	0.760
			Max. Mx	14	-23.152	1662.829	4.078
			Max. My	2	-23.163	4.058	1658.538
			Max. Vy	14	-29.962	1662.829	4.078
			Max. Vx	2	-29.823	4.058	1658.538
			Max. Torque	30			-3.538
L3	54 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	18	-54.077	0.822	0.838
			Max. Mx	14	-41.269	3655.450	11.121
			Max. My	2	-41.269	11.136	3643.078
			Max. Vy	14	-38.717	3655.450	11.121
			Max. Vx	2	-38.580	11.136	3643.078
			Max. Torque	30			-3.731

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	31	54.077	33.102	0.097
	Max. H_x	14	41.313	38.671	0.118
	Max. H_z	2	41.313	0.118	38.534
	Max. M_x	2	3643.078	0.118	38.534
	Max. M_z	6	3654.617	-38.671	-0.118
	Max. Torsion	22	3.725	-28.618	16.411
	Min. Vert	1	41.313	0.000	0.000
	Min. H_x	6	41.313	-38.671	-0.118
	Min. H_z	10	41.313	-0.118	-38.534
	Min. M_x	10	-3642.264	-0.118	-38.534
	Min. M_z	14	-3655.450	38.671	0.118
	Min. Torsion	30	-3.727	28.618	-16.411

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	41.313	0.000	0.000	-0.388	0.398	0.000
Dead+Wind 0 deg - No Ice	41.313	-0.118	-38.534	-3643.078	11.135	-2.122
Dead+Wind 30 deg - No Ice	41.313	19.233	-33.312	-3149.697	-1817.847	-3.253
Dead+Wind 45 deg - No Ice	41.313	27.261	-27.164	-2568.576	-2576.540	-3.503
Dead+Wind 60 deg - No Ice	41.313	33.431	-19.165	-1812.437	-3159.610	-3.513
Dead+Wind 90 deg - No Ice	41.313	38.671	0.118	10.339	-3654.617	-2.833
Dead+Wind 120 deg - No Ice	41.313	33.549	19.369	1830.212	-3170.291	-1.394
Dead+Wind 135 deg - No Ice	41.313	27.428	27.331	2582.920	-2591.665	-0.506
Dead+Wind 150 deg - No Ice	41.313	19.438	33.431	3159.586	-1836.397	0.418
Dead+Wind 180 deg - No Ice	41.313	0.118	38.534	3642.264	-10.324	2.119
Dead+Wind 210 deg - No Ice	41.313	-19.233	33.312	3148.901	1818.650	3.254
Dead+Wind 225 deg - No Ice	41.313	-27.261	27.164	2567.789	2577.346	3.504
Dead+Wind 240 deg - No Ice	41.313	-33.431	19.165	1811.657	3160.424	3.516
Dead+Wind 270 deg - No Ice	41.313	-38.671	-0.118	-11.120	3655.450	2.836
Dead+Wind 300 deg - No Ice	41.313	-33.549	-19.369	-1831.011	3171.132	1.394
Dead+Wind 315 deg - No Ice	41.313	-27.428	-27.331	-2583.728	2592.503	0.504
Dead+Wind 330 deg - No Ice	41.313	-19.438	-33.431	-3160.401	1837.228	-0.421
Dead+Ice+Temp	54.077	0.000	0.000	-0.838	0.822	0.000
Dead+Wind 0 deg+Ice+Temp	54.077	-0.097	-32.990	-3196.463	9.805	-1.852
Dead+Wind 30 deg+Ice+Temp	54.077	16.467	-28.522	-2763.868	-1594.347	-3.220
Dead+Wind 45 deg+Ice+Temp	54.077	23.338	-23.259	-2254.173	-2259.727	-3.595
Dead+Wind 60 deg+Ice+Temp	54.077	28.618	-16.411	-1590.920	-2771.045	-3.725
Dead+Wind 90 deg+Ice+Temp	54.077	33.102	0.097	8.061	-3204.989	-3.232
Dead+Wind 120 deg+Ice+Temp	54.077	28.715	16.579	1604.622	-2779.938	-1.875
Dead+Wind 135 deg+Ice+Temp	54.077	23.475	23.396	2265.016	-2272.322	-0.978
Dead+Wind 150 deg+Ice+Temp	54.077	16.635	28.618	2770.995	-1609.794	-0.015
Dead+Wind 180 deg+Ice+Temp	54.077	0.097	32.990	3194.665	-8.070	1.850
Dead+Wind 210 deg+Ice+Temp	54.077	-16.467	28.522	2762.091	1596.067	3.220
Dead+Wind 225 deg+Ice+Temp	54.077	-23.338	23.259	2252.409	2261.449	3.596
Dead+Wind 240 deg+Ice+Temp	54.077	-28.618	16.411	1589.165	2772.774	3.727
Dead+Wind 270 deg+Ice+Temp	54.077	-33.102	-0.097	-9.814	3206.744	3.235
Dead+Wind 300 deg+Ice+Temp	54.077	-28.715	-16.579	-1606.396	2781.709	1.875
Dead+Wind 315 deg+Ice+Temp	54.077	-23.475	-23.396	-2266.801	2274.090	0.977
Dead+Wind 330 deg+Ice+Temp	54.077	-16.635	-28.618	-2772.791	1611.553	0.013
Dead+Wind 0 deg - Service	41.313	-0.036	-11.893	-1126.140	3.731	-0.659
Dead+Wind 30 deg - Service	41.313	5.936	-10.282	-973.663	-561.492	-1.012
Dead+Wind 45 deg - Service	41.313	8.414	-8.384	-794.076	-795.958	-1.089
Dead+Wind 60 deg - Service	41.313	10.318	-5.915	-560.402	-976.152	-1.093
Dead+Wind 90 deg - Service	41.313	11.935	0.036	2.908	-1129.140	-0.881

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 120 deg - Service	41.313	10.355	5.978	565.328	-979.464	-0.434
Dead+Wind 135 deg - Service	41.313	8.465	8.436	797.947	-800.643	-0.157
Dead+Wind 150 deg - Service	41.313	5.999	10.318	976.160	-567.231	0.130
Dead+Wind 180 deg - Service	41.313	0.036	11.893	1125.323	-2.897	0.659
Dead+Wind 210 deg - Service	41.313	-5.936	10.282	972.848	562.326	1.012
Dead+Wind 225 deg - Service	41.313	-8.414	8.384	793.262	796.792	1.090
Dead+Wind 240 deg - Service	41.313	-10.318	5.915	559.589	976.986	1.093
Dead+Wind 270 deg - Service	41.313	-11.935	-0.036	-3.721	1129.976	0.882
Dead+Wind 300 deg - Service	41.313	-10.355	-5.978	-566.143	980.301	0.434
Dead+Wind 315 deg - Service	41.313	-8.465	-8.436	-798.763	801.480	0.157
Dead+Wind 330 deg - Service	41.313	-5.999	-10.318	-976.977	568.067	-0.130

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.000	-41.313	0.000	0.000	41.313	0.000	0.000%
2	-0.118	-41.313	-38.534	0.118	41.313	38.534	0.000%
3	19.233	-41.313	-33.312	-19.233	41.313	33.312	0.000%
4	27.261	-41.313	-27.164	-27.261	41.313	27.164	0.000%
5	33.431	-41.313	-19.165	-33.431	41.313	19.165	0.000%
6	38.671	-41.313	0.118	-38.671	41.313	-0.118	0.000%
7	33.549	-41.313	19.369	-33.549	41.313	-19.369	0.000%
8	27.428	-41.313	27.331	-27.428	41.313	-27.331	0.000%
9	19.438	-41.313	33.431	-19.438	41.313	-33.431	0.000%
10	0.118	-41.313	38.534	-0.118	41.313	-38.534	0.000%
11	-19.233	-41.313	33.312	19.233	41.313	-33.312	0.000%
12	-27.261	-41.313	27.164	27.261	41.313	-27.164	0.000%
13	-33.431	-41.313	19.165	33.431	41.313	-19.165	0.000%
14	-38.671	-41.313	-0.118	38.671	41.313	0.118	0.000%
15	-33.549	-41.313	-19.369	33.549	41.313	19.369	0.000%
16	-27.428	-41.313	-27.331	27.428	41.313	27.331	0.000%
17	-19.438	-41.313	-33.431	19.438	41.313	33.431	0.000%
18	0.000	-54.077	0.000	0.000	54.077	0.000	0.000%
19	-0.097	-54.077	-32.990	0.097	54.077	32.990	0.000%
20	16.467	-54.077	-28.522	-16.467	54.077	28.522	0.000%
21	23.338	-54.077	-23.259	-23.338	54.077	23.259	0.000%
22	28.618	-54.077	-16.411	-28.618	54.077	16.411	0.000%
23	33.102	-54.077	0.097	-33.102	54.077	-0.097	0.000%
24	28.715	-54.077	16.579	-28.715	54.077	-16.579	0.000%
25	23.475	-54.077	23.396	-23.475	54.077	-23.396	0.000%
26	16.635	-54.077	28.618	-16.635	54.077	-28.618	0.000%
27	0.097	-54.077	32.990	-0.097	54.077	-32.990	0.000%
28	-16.467	-54.077	28.522	16.467	54.077	-28.522	0.000%
29	-23.338	-54.077	23.259	23.338	54.077	-23.259	0.000%
30	-28.618	-54.077	16.411	28.618	54.077	-16.411	0.000%
31	-33.102	-54.077	-0.097	33.102	54.077	0.097	0.000%
32	-28.715	-54.077	-16.579	28.715	54.077	16.579	0.000%
33	-23.475	-54.077	-23.396	23.475	54.077	23.396	0.000%
34	-16.635	-54.077	-28.618	16.635	54.077	28.618	0.000%
35	-0.036	-41.313	-11.893	0.036	41.313	11.893	0.000%
36	5.936	-41.313	-10.282	-5.936	41.313	10.282	0.000%
37	8.414	-41.313	-8.384	-8.414	41.313	8.384	0.000%
38	10.318	-41.313	-5.915	-10.318	41.313	5.915	0.000%
39	11.935	-41.313	0.036	-11.935	41.313	-0.036	0.000%
40	10.355	-41.313	5.978	-10.355	41.313	-5.978	0.000%
41	8.465	-41.313	8.436	-8.465	41.313	-8.436	0.000%

Load Comb.	*Sum of Applied Forces PX K*	*PY K*	*PZ K*	*Sum of Reactions PX K*	*PY K*	*PZ K*	*% Error*
42	5.999	-41.313	10.318	-5.999	41.313	-10.318	0.000%
43	0.036	-41.313	11.893	-0.036	41.313	-11.893	0.000%
44	-5.936	-41.313	10.282	5.936	41.313	-10.282	0.000%
45	-8.414	-41.313	8.384	8.414	41.313	-8.384	0.000%
46	-10.318	-41.313	5.915	10.318	41.313	-5.915	0.000%
47	-11.935	-41.313	-0.036	11.935	41.313	0.036	0.000%
48	-10.355	-41.313	-5.978	10.355	41.313	5.978	0.000%
49	-8.465	-41.313	-8.436	8.465	41.313	8.436	0.000%
50	-5.999	-41.313	-10.318	5.999	41.313	10.318	0.000%

Non-Linear Convergence Results

Load Combination	*Converged?*	*Number of Cycles*	*Displacement Tolerance*	*Force Tolerance*
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00061286
3	Yes	5	0.00000001	0.00045482
4	Yes	5	0.00000001	0.00052359
5	Yes	5	0.00000001	0.00049273
6	Yes	4	0.00000001	0.00067781
7	Yes	5	0.00000001	0.00046705
8	Yes	5	0.00000001	0.00052506
9	Yes	5	0.00000001	0.00047381
10	Yes	4	0.00000001	0.00046641
11	Yes	5	0.00000001	0.00049078
12	Yes	5	0.00000001	0.00052339
13	Yes	5	0.00000001	0.00045287
14	Yes	4	0.00000001	0.00082842
15	Yes	5	0.00000001	0.00048461
16	Yes	5	0.00000001	0.00052574
17	Yes	5	0.00000001	0.00047783
18	Yes	4	0.00000001	0.00000001
19	Yes	5	0.00000001	0.00018285
20	Yes	5	0.00000001	0.00094502
21	Yes	6	0.00000001	0.00006149
22	Yes	6	0.00000001	0.00005695
23	Yes	5	0.00000001	0.00019100
24	Yes	5	0.00000001	0.00096187
25	Yes	6	0.00000001	0.00006163
26	Yes	5	0.00000001	0.00098329
27	Yes	5	0.00000001	0.00018056
28	Yes	6	0.00000001	0.00005654
29	Yes	6	0.00000001	0.00006146
30	Yes	5	0.00000001	0.00093952
31	Yes	5	0.00000001	0.00019505
32	Yes	6	0.00000001	0.00005637
33	Yes	6	0.00000001	0.00006182
34	Yes	5	0.00000001	0.00098266
35	Yes	4	0.00000001	0.00008824
36	Yes	4	0.00000001	0.00056145
37	Yes	4	0.00000001	0.00071519
38	Yes	4	0.00000001	0.00068406
39	Yes	4	0.00000001	0.00011258
40	Yes	4	0.00000001	0.00059131
41	Yes	4	0.00000001	0.00070996
42	Yes	4	0.00000001	0.00061077

43	Yes	4	0.00000001	0.00008170
44	Yes	4	0.00000001	0.00067567
45	Yes	4	0.00000001	0.00071456
46	Yes	4	0.00000001	0.00055763
47	Yes	4	0.00000001	0.00011949
48	Yes	4	0.00000001	0.00064888
49	Yes	4	0.00000001	0.00071350
50	Yes	4	0.00000001	0.00062476

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
L1	150 - 101	31.677	48	1.713	0.003
L2	104 - 54	16.080	48	1.423	0.004
L3	58 - 0	5.046	48	0.812	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
149.000	10-ft Dipole	48	31.321	1.708	0.003	48958
138.000	(2) DB980H90E-M	48	27.415	1.657	0.004	20399
129.000	(2) RRUS-11	48	24.269	1.611	0.004	11656
127.000	7770.00	48	23.580	1.599	0.004	10642
125.000	Valmont 13' Low Profile Platform	48	22.896	1.587	0.004	9791
113.000	APX16DWV-16DWV-S-E-ACU	48	18.906	1.503	0.004	6614
104.000	4'-6" Standoff	48	16.080	1.423	0.004	5346
80.000	DB948F85T2E-M	48	9.506	1.131	0.003	3849
78.000	Valmont 13' Low Profile Platform	48	9.033	1.103	0.003	3762
40.000	Stand-off	48	2.687	0.554	0.001	4450

Maximum Tower Deflections - Design Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
L1	150 - 101	102.195	15	5.532	0.013
L2	104 - 54	51.926	15	4.597	0.013
L3	58 - 0	16.312	15	2.625	0.005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.000	10-ft Dipole	15	101.047	5.518	0.013	15418
138.000	(2) DB980H90E-M	15	88.461	5.354	0.013	6423
129.000	(2) RRUS-11	15	78.324	5.202	0.014	3668
127.000	7770.00	15	76.104	5.165	0.014	3349
125.000	Valmont 13' Low Profile Platform	15	73.898	5.127	0.014	3080
113.000	APX16DWV-16DWV-S-E-ACU	15	61.037	4.856	0.014	2079
104.000	4'-6" Standoff	15	51.926	4.597	0.013	1678
80.000	DB948F85T2E-M	15	30.713	3.653	0.009	1202
78.000	Valmont 13' Low Profile Platform	15	29.185	3.563	0.009	1174
40.000	Stand-off	15	8.691	1.790	0.003	1380

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	150 - 101 (1)	TP32.25x23.33x0.281	49.000	0.000	0.0	39.000	28.462	-11.713	1110.020	0.011
L2	101 - 54 (2)	TP40.15x31.141x0.375	50.000	0.000	0.0	39.000	47.158	-23.146	1839.160	0.013
L3	54 - 0 (3)	TP50.91x38.679x0.438	58.000	0.000	0.0	39.000	71.103	-41.269	2773.020	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	150 - 101 (1)	TP32.25x23.33x0.281	525.360	28.863	39.000	0.740	0.000	0.000	39.000	0.000
L2	101 - 54 (2)	TP40.15x31.141x0.375	1665.12 5	44.453	39.000	1.140	0.000	0.000	39.000	0.000
L3	54 - 0 (3)	TP50.91x38.679x0.438	3661.78 3	50.121	39.000	1.285	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	150 - 101 (1)	TP32.25x23.33x0.281	18.730	0.658	26.000	0.051	0.215	0.006	26.000	0.000
L2	101 - 54 (2)	TP40.15x31.141x0.375	30.032	0.637	26.000	0.050	1.398	0.018	26.000	0.001
L3	54 - 0 (3)	TP50.91x38.679x0.438	38.785	0.545	26.000	0.043	1.394	0.009	26.000	0.000

Pole Interaction Design Data

Section No.	*Elevation* *ft*	*Ratio* $\frac{P}{P_a}$	*Ratio* $\frac{f_{bx}}{F_{bx}}$	*Ratio* $\frac{f_{by}}{F_{by}}$	*Ratio* $\frac{f_v}{F_v}$	*Ratio* $\frac{f_{vt}}{F_{vt}}$	*Comb. Stress Ratio*	*Allow. Stress Ratio*	*Criteria*
L1	150 - 101 (1)	0.011	0.740	0.000	0.051	0.000	0.751 ✔	1.333	H1-3+VT ✔
L2	101 - 54 (2)	0.013	1.140	0.000	0.050	0.001	1.153 ✔	1.333	H1-3+VT ✔
L3	54 - 0 (3)	0.015	1.285	0.000	0.043	0.000	1.301 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	*Elevation ft*	*Component Type*	*Size*	*Critical Element*	*P K*	*SF*P$_{allow}$ K*	*% Capacity*	*Pass Fail*
L1	150 - 101	Pole	TP32.25x23.33x0.281	1	-11.713	1479.657	56.4	Pass
L2	101 - 54	Pole	TP40.15x31.141x0.375	2	-23.146	2451.600	86.5	Pass
L3	54 - 0	Pole	TP50.91x38.679x0.438	3	-41.269	3696.436	97.6	Pass
							Summary	
						Pole (L3)	97.6	Pass
						RATING =	**97.6**	**Pass**

Program Version 5.4.2.0 - 6/17/2010 File:J:/Jobs/1102100.WI/CO-19 - CT2128 - 3965 Congress Street Fairfield, CT/Structural/Calcs/ERI Files/150' Monopole_ Fairfield_CT.eri

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 3662 \cdot ft \cdot kips$	(Input From RisaTower)
Shear Force =	$Shear := 39 \cdot kips$	(Input From RisaTower)
Axial Force =	$Axial := 41 \cdot kips$	(Input From RisaTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	$N := 16$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 57.85 \cdot in$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strenght =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yeild Strenght =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Base Plate Data:

Use ASTM A633 Gr. 60

Plate Yield Strength =	$Fy_{bp} := 60 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 2.75 \cdot in$	(User Input)
Base Plate Diameter =	$D_{bp} := 63.85 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 49.6 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 28.925 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \begin{vmatrix} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{vmatrix}$$

$d_1 = 11.07 \cdot in$ $\quad d_7 = 11.07 \cdot in$

$d_2 = 20.45 \cdot in$ $\quad d_8 = 0.00 \cdot in$

$d_3 = 26.72 \cdot in$ $\quad d_9 = -11.07 \cdot in$

$d_4 = 28.93 \cdot in$ $\quad d_{10} = -20.45 \cdot in$

$d_5 = 26.72 \cdot in$ $\quad d_{11} = -26.72 \cdot in$

$d_6 = 20.45 \cdot in$ $\quad$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 24.8 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if(d_i \geq R_{pole}, d_i - R_{pole}, 0in)$

$MA_1 = 0.00 \cdot in$ $\quad MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $\quad MA_8 = 0.00 \cdot in$

$MA_3 = 1.92 \cdot in$ $\quad MA_9 = 0.00 \cdot in$

$MA_4 = 4.12 \cdot in$ $\quad MA_{10} = 0.00 \cdot in$

$MA_5 = 1.92 \cdot in$ $\quad MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ $\quad$ etc

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 32.2 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 6.693 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 187.3 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) = 174.9 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot (0.60 \cdot A_n \cdot F_y) = 194.812 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 96.2 \cdot \%$ Bolts are "upset bolts". Use net area per AISC

Condition1 = Condition1 := if$\left(\frac{T_{Max}}{T_{ALL.Net}} \leq 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.609 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 8.9 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot ksi$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force = $C_{Max} := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = 192.5 \cdot kips$

Maximum Compressive Stress = $f_a := \frac{C_{Max}}{A_n} = 59.3 \cdot ksi$

$K := 0.65$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \frac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \frac{K \cdot l}{r} > C_c \end{cases} = 45 \cdot ksi$$

Allowable Compressive Stress = $F_a := 1.333 \cdot F_a = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity = $\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) = 98.8 \cdot \%$

Condition 2 = $Condition2 := if\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 75.2 \cdot kips$	$C_7 = 75.2 \cdot kips$
$C_2 = 136.8 \cdot kips$	$C_8 = 2.6 \cdot kips$
$C_3 = 178.0 \cdot kips$	$C_9 = -70.1 \cdot kips$
$C_4 = 192.5 \cdot kips$	$C_{10} = -131.7 \cdot kips$
$C_5 = 178.0 \cdot kips$	$C_{11} = -172.9 \cdot kips$
$C_6 = 136.8 \cdot kips$	etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} t_{bp}^2\right)} = 36.5 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 59.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 60.9 \cdot \%$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

Caisson Foundation:

Input Data:

Shear Force =	$S := 39k$	*USER INPUT-FROM PLS-Pole*
Overturning Moment =	$M := 3662ft \cdot k$	*USER INPUT-FROM PLS-Pole*
Applied Axial Load =	$A1 := 41k$	*USER INPUT-FROM PLS-Pole*
Bending Moment =	$Mu := 3837ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 9389ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 6.6ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 26.5ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 1ft$	*USER INPUT*
Number of Rebar =	$n := 40$	*USER INPUT*
Area of Rebar =	$Ar := 1.56in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3.0ksi$	*USER INPUT*

Check Foundation Depth:

Depth of Caisson Below Ground Level = $LD := L_c - L_{pag} = 25.5\,ft$ (TIA/EIA-222-F 7.2.5)

Depth Required = $$LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft^{.5}\left(\frac{M \cdot ft}{3 \cdot kd} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5} = 32.7\,ft$$

DepthCheck := if(LD1 ≤ LD, "OK", "NO GOOD")

DepthCheck = "NO GOOD"

Note: Result not applicable. Actual soil is better than normal soil as defined in TIA/EIA 222 F. Refer to L-Pile analysis.

Check Moment Capacity:

Factor of Safety = $FS := \frac{Mn}{Mu} = 2.4$

Factor of Safety Required = $FS_{reqd} := 1.3$

FOSCheck := if($FS \geq FS_{reqd}$, "OK", "NO GOOD")

FOSCheck = "OK"

Check Axial Capacity:

Concrete Weight = $A2 := .150\frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 130.9 \cdot kips$

Total Axial Load = $AT := A1 + A2 = 171.9 \cdot kips$

Area of Concrete = $Ag := \pi \cdot \frac{d^2}{4} = 34.21ft^2$

Axial Capacity = $Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c = 16147.5 \cdot kips$

AxialCheck := if(AT ≤ Po, "OK", "NO GOOD")

AxialCheck = "OK"

==

LPILE Plus for Windows, Version 5.0 (5.0.39)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

==

This program is licensed to:

Staff
Natcomm, Inc.

Path to file locations: J:\Jobs\1102100.WI\CO-19 - CT2128 - 3965 Congress Street Fairfield, CT\Structural\Calcs\MathCad\Foundation\
Name of input data file: Caisson Analysis.lpd
Name of output file: Caisson Analysis.lpo
Name of plot output file: Caisson Analysis.lpp
Name of runtime file: Caisson Analysis.lpr

Time and Date of Analysis

Date: June 3, 2011   Time: 10:30:35

Problem Title

11021.CO19 - Fairfield-FD

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment
  Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments   =   100
- Maximum number of iterations allowed =   100

- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 318.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	78.00000000	1816972.	4778.4000	3122018.
2	318.0000	78.00000000	1816972.	4778.4000	3122018.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 48.000 in
p-y subgrade modulus k for top of soil layer = 10.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 10.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 48.000 in
Distance from top of pile to bottom of layer = 114.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 114.000 in
Distance from top of pile to bottom of layer = 318.000 in
p-y subgrade modulus k for top of soil layer = 27.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 27.000 lbs/in**3

(Depth of lowest layer extends .00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 6 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	.05700
2	48.00	.05700
3	48.00	.06900
4	114.00	.06900
5	114.00	.06100
6	318.00	.06100

Shear Strength of Soils

Shear strength parameters with depth defined using 6 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	.00000	30.00	------	------
2	48.000	.00000	30.00	------	------
3	48.000	.00000	35.00	------	------
4	114.000	.00000	35.00	------	------
5	114.000	.00000	30.00	------	------
6	318.000	.00000	30.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 39000.000 lbs
Bending moment at pile head = 43944000.000 in-lbs
Axial load at pile head = 41000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 12000.000 lbs
Bending moment at pile head = 13584000.000 in-lbs
Axial load at pile head = 41000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 78.0000 in

Material Properties:

Compressive Strength of Concrete = 3.000 kip/in**2
Yield Stress of Reinforcement = 60. kip/in**2
Modulus of Elasticity of Reinforcement = 29000. kip/in**2
Number of Reinforcing Bars = 40
Area of Single Bar = 1.56000 in**2
Number of Rows of Reinforcing Bars = 21
Area of Steel = 62.400 in**2
Area of Shaft = 4778.362 in**2
Percentage of Steel Reinforcement = 1.306 percent
Cover Thickness (edge to bar center) = 4.000 in

Unfactored Axial Squash Load Capacity = 15769.70 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	35.000
2	3.120	34.569
3	3.120	33.287
4	3.120	31.185
5	3.120	28.316
6	3.120	24.749
7	3.120	20.572
8	3.120	15.890
9	3.120	10.816
10	3.120	5.475
11	3.120	0.000
12	3.120	-5.475
13	3.120	-10.816
14	3.120	-15.890
15	3.120	-20.572
16	3.120	-24.749
17	3.120	-28.316
18	3.120	-31.185

19	3.120	-33.287
20	3.120	-34.569
21	1.560	-35.000

Axial Thrust Force = 50000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
5671823.	6.806188E+12	8.333333E-07	.00003561	42.73798344	109.26386	936.16793
11278245.	6.766947E+12	.00000167	.00006824	40.94377175	207.11671	1785.61563
16818920.	6.727568E+12	.00000250	.00010084	40.33701190	302.90347	2634.43336
22296491.	6.688947E+12	.00000333	.00013353	40.05937788	396.93944	3485.73986
22296491.	5.351158E+12	.00000417	.00010160	24.38487366	301.95074	5995.16110
22296491.	4.459298E+12	.00000500	.00012021	24.04262558	355.06107	7243.81929
22296491.	3.822256E+12	.00000583	.00013885	23.80357727	407.62769	8491.56151
22296491.	3.344474E+12	.00000667	.00015753	23.62907329	459.64810	9738.37916
22296491.	2.972865E+12	.00000750	.00017623	23.49763682	511.11975	10984.26399
22296491.	2.675579E+12	.00000833	.00019500	23.39999977	562.12384	12228.33339
22296491.	2.432344E+12	.00000917	.00021404	23.34956333	613.22287	13464.57441
22296491.	2.229649E+12	.00001000	.00023283	23.28331509	663.00050	14707.83862
22891329.	2.113046E+12	.00001083	.00025166	23.23051223	712.22433	15950.08074
24564831.	2.105557E+12	.00001167	.00027053	23.18830481	760.89157	17191.29021
26235261.	2.098821E+12	.00001250	.00028943	23.15460071	808.99928	18431.45724
27902592.	2.092694E+12	.00001333	.00030837	23.12783316	856.54456	19670.57118
29566800.	2.087068E+12	.00001417	.00032735	23.10680500	903.52448	20908.62095
31227857.	2.081857E+12	.00001500	.00034636	23.09058407	949.93599	22145.59593
32885739.	2.076994E+12	.00001583	.00036541	23.07843813	995.77616	23381.48382
34540416.	2.072425E+12	.00001667	.00038450	23.06977674	1041.04177	24616.27457
36191859.	2.068106E+12	.00001750	.00040362	23.06412569	1085.72972	25849.95621
37840041.	2.064002E+12	.00001833	.00042279	23.06109676	1129.83681	27082.51689
39484936.	2.060084E+12	.00001917	.00044199	23.06037149	1173.35990	28313.94351
41126510.	2.056326E+12	.00002000	.00046123	23.06168023	1216.29556	29544.22547
42764737.	2.052707E+12	.00002083	.00048052	23.06480214	1258.64056	30773.34871
44399584.	2.049212E+12	.00002167	.00049984	23.06954661		

1300.39143	32001.30155	46031023.	2.045823E+12	.00002250	.00051920	23.07575557
1341.54482	33228.06949	47659014.	2.042529E+12	.00002333	.00053861	23.08328721
1382.09701	34453.64232	49283537.	2.039319E+12	.00002417	.00055806	23.09202996
1422.04473	35678.00234	50904550.	2.036182E+12	.00002500	.00057755	23.10187688
1461.38410	36901.13926	52522022.	2.033111E+12	.00002583	.00059708	23.11274198
1500.11155	38123.03747	54135925.	2.030097E+12	.00002667	.00061665	23.12455085
1538.22345	39343.68068	55746214.	2.027135E+12	.00002750	.00063627	23.13723144
1575.71574	40563.05793	57352860.	2.024219E+12	.00002833	.00065594	23.15072796
1612.58470	41781.15186	58955823.	2.021343E+12	.00002917	.00067565	23.16498694
1648.82630	42997.94855	60555075.	2.018502E+12	.00003000	.00069540	23.17996654
1684.43671	44213.42911	62150570.	2.015694E+12	.00003083	.00071520	23.19562259
1719.41166	45427.58080	63742265.	2.012914E+12	.00003167	.00073504	23.21191791
1753.74689	46640.38872	65330136.	2.010158E+12	.00003250	.00075494	23.22882691
1787.43851	47851.83064	68494213.	2.004709E+12	.00003417	.00079487	23.26436278
1852.87278	50270.56054	71642474.	1.999325E+12	.00003583	.00083499	23.30204192
1915.67906	52683.62811	74774578.	1.993989E+12	.00003750	.00087531	23.34171554
1975.82054	55090.88435	77890155.	1.988685E+12	.00003917	.00091584	23.38326046
2033.25864	57492.18000	80919005.	1.981690E+12	.00004083	.00095550	23.39999977
2086.49712	59918.83361	83524817.	1.965290E+12	.00004250	.00099450	23.39999977
2136.01046	60000.00000	85704780.	1.940486E+12	.00004417	.00103190	23.36387345
2180.81817	60000.00000	87468794.	1.908410E+12	.00004583	.00106693	23.27852413
2220.37475	60000.00000	89105531.	1.875906E+12	.00004750	.00110145	23.18851402
2257.15073	60000.00000	90517114.	1.841026E+12	.00004917	.00113491	23.08301058
2290.68679	60000.00000	91908591.	1.808038E+12	.00005083	.00116842	22.98537585
2322.22962	60000.00000	93011435.	1.771646E+12	.00005250	.00120035	22.86381188
2350.33612	60000.00000	94108058.	1.737380E+12	.00005417	.00123239	22.75174847
2376.68229	60000.00000	95198369.	1.705045E+12	.00005583	.00126453	22.64836970
2401.24983	60000.00000	96059043.	1.670592E+12	.00005750	.00129526	22.52634779
2422.94672	60000.00000	96886896.	1.637525E+12	.00005917	.00132591	22.40968636
2442.87629	60000.00000	97709493.	1.606183E+12	.00006083	.00135665	22.30106333
2461.16556	60000.00000	98526753.	1.576428E+12	.00006250	.00138749	22.19986036
2477.79800	60000.00000	99263122.	1.546958E+12	.00006417	.00141808	22.10000101
2492.58936	60000.00000	99865270.	1.516941E+12	.00006583	.00145012	22.02711144

2506.28413	60000.00000					
		1.004555E+08	1.488230E+12	.00006750	.00147907	21.91213301
2517.02042	60000.00000					
		1.010416E+08	1.460843E+12	.00006917	.00150811	21.80405161
2526.27485	60000.00000					
		1.016234E+08	1.434684E+12	.00007083	.00153725	21.70240465
2534.03254	60000.00000					
		1.022009E+08	1.409668E+12	.00007250	.00156649	21.60676906
2540.27815	60000.00000					
		1.026842E+08	1.384507E+12	.00007417	.00159489	21.50417134
2544.86485	60000.00000					
		1.030923E+08	1.359459E+12	.00007583	.00162264	21.39743587
2547.94184	60000.00000					
		1.034968E+08	1.335443E+12	.00007750	.00165047	21.29641423
2549.63948	60000.00000					
		1.038968E+08	1.312381E+12	.00007917	.00167839	21.20075771
2548.67034	60000.00000					
		1.042915E+08	1.290204E+12	.00008083	.00170640	21.11015251
2545.15662	60000.00000					
		1.046835E+08	1.268891E+12	.00008250	.00173451	21.02431038
2547.96712	60000.00000					
		1.050728E+08	1.248389E+12	.00008417	.00176270	20.94296399
2549.58020	60000.00000					
		1.054589E+08	1.228647E+12	.00008583	.00179100	20.86596224
2549.25179	60000.00000					
		1.055803E+08	1.206632E+12	.00008750	.00182000	20.79999992
2544.73421	60000.00000					
		1.061549E+08	1.190522E+12	.00008917	.00185196	20.76965949
2546.82022	60000.00000					
		1.064080E+08	1.171464E+12	.00009083	.00187828	20.67829415
2548.71987	60000.00000					
		1.066596E+08	1.153077E+12	.00009250	.00190467	20.59100381
2549.77211	60000.00000					
		1.069090E+08	1.135317E+12	.00009417	.00193115	20.50776055
2548.99119	60000.00000					
		1.071558E+08	1.118148E+12	.00009583	.00195774	20.42856672
2545.27721	60000.00000					
		1.074014E+08	1.101553E+12	.00009750	.00198439	20.35270402
2543.99398	60000.00000					
		1.076458E+08	1.085504E+12	.00009917	.00201110	20.28001669
2546.56202	60000.00000					
		1.081308E+08	1.054935E+12	.00010250	.00206472	20.14357308
2549.57072	60000.00000					
		1.086093E+08	1.026229E+12	.00010583	.00211865	20.01870355
2546.88654	60000.00000					
		1.090484E+08	9.989166E+11	.00010917	.00217221	19.89814147
2542.84727	60000.00000					
		1.093564E+08	9.720569E+11	.00011250	.00222347	19.76416656
2547.16343	60000.00000					
		1.096619E+08	9.467211E+11	.00011583	.00227490	19.63944116
2549.52613	60000.00000					
		1.099639E+08	9.227737E+11	.00011917	.00232656	19.52357009
2548.23203	60000.00000					
		1.103295E+08	9.006492E+11	.00012250	.00238851	19.49801365
2540.78639	60000.00000					
		1.106149E+08	8.790591E+11	.00012583	.00243906	19.38328627
2543.77677	60000.00000					
		1.108989E+08	8.585722E+11	.00012917	.00248975	19.27550474
2547.25380	60000.00000					
		1.111814E+08	8.391049E+11	.00013250	.00254058	19.17415765
2549.33496	60000.00000					
		1.114623E+08	8.205813E+11	.00013583	.00259154	19.07883355
2549.82833	60000.00000					
		1.117307E+08	8.028552E+11	.00013917	.00264322	18.99319831
2544.94409	60000.00000					
		1.119654E+08	7.857220E+11	.00014250	.00269484	18.91114756

					2540.07040	60000.00000
1.120916E+08	7.686284E+11	.00014583	.00274567	18.82743707	2539.07854	60000.00000
1.122115E+08	7.522561E+11	.00014917	.00279693	18.75037953	2543.32032	60000.00000
1.123305E+08	7.365936E+11	.00015250	.00284831	18.67742255	2546.53753	60000.00000
1.124486E+08	7.215953E+11	.00015583	.00289980	18.60831508	2548.71521	60000.00000
1.125658E+08	7.072195E+11	.00015917	.00295140	18.54282930	2549.83796	60000.00000
1.126756E+08	6.933881E+11	.00016250	.00300358	18.48355481	2548.05331	60000.00000
1.127577E+08	6.799459E+11	.00016583	.00305770	18.43840912	2543.50002	60000.00000
1.128391E+08	6.670291E+11	.00016917	.00311193	18.39566007	2538.92839	60000.00000
1.129197E+08	6.546071E+11	.00017250	.00316627	18.35517749	2534.33818	60000.00000
1.129996E+08	6.426516E+11	.00017583	.00322071	18.31684515	2537.57948	60000.00000
1.130786E+08	6.311365E+11	.00017917	.00327527	18.28055146	2541.95392	60000.00000
1.131569E+08	6.200376E+11	.00018250	.00332993	18.24620113	2545.39755	60000.00000
1.132343E+08	6.093324E+11	.00018583	.00338471	18.21369883	2547.89597	60000.00000
1.134064E+08	5.995052E+11	.00018917	.00344283	18.20000008	2549.57550	60000.00000
1.136443E+08	5.903599E+11	.00019250	.00350350	18.20000008	2548.72471	60000.00000
1.138690E+08	5.814588E+11	.00019583	.00356417	18.20000008	2543.78409	60000.00000
1.140886E+08	5.728299E+11	.00019917	.00362483	18.20000008	2538.84346	60000.00000
1.142071E+08	5.639854E+11	.00020250	.00368550	18.20000008	2533.90284	60000.00000
1.143187E+08	5.553947E+11	.00020583	.00374617	18.20000008	2528.96222	60000.00000
1.143187E+08	5.465437E+11	.00020917	.00380516	18.19199887	2534.68763	60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =
112668.03402 in-kip

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 39000.000 lbs
Specified moment at pile head = 43944000.000 in-lbs
Specified axial load at pile head = 41000.000 lbs

Non-zero moment for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment)condition.

Depth	Deflect.	Moment	Shear	Slope	Total	Flx. Rig.	Soil Res.	Es*h
X	y	M	V	S	Stress	EI	p	F/L
in	in	lbs-in	lbs	Rad.	lbs/in**2	lbs-in**2	lbs/in	

0.000	1.836	4.39E+07	39000.	-.010860	951.807	2.05E+12	0.000	0.000
25.440	1.566	4.49E+07	37531.	-.010309	973.201	2.05E+12	-210.507	427.392
50.880	1.311	4.58E+07	26888.	-.009745	991.703	2.05E+12	-1275.750	3094.089
76.320	1.071	4.60E+07	-21359.	-.009173	994.907	2.05E+12	-2514.001	7467.760
101.760	.844395	4.45E+07	-99871.	-.008609	963.332	2.05E+12	-3624.423	13650.
127.200	.632241	4.09E+07	-1.73E+05	-.008078	886.114	2.06E+12	-2082.676	10475.
152.640	.432914	3.58E+07	-2.22E+05	-.007604	777.999	2.07E+12	-1723.429	12660.
178.080	.244771	2.97E+07	-2.59E+05	-.007201	646.186	2.09E+12	-1142.562	14844.
203.520	.065824	2.28E+07	-2.78E+05	-.006891	498.730	4.24E+12	-352.471	17028.
228.960	-.108406	1.57E+07	-2.75E+05	-.006814	346.622	6.73E+12	654.951	19212.
254.400	-.281118	9.10E+06	-2.43E+05	-.006768	203.872	6.78E+12	1891.508	21397.
279.840	-.452951	3.68E+06	-1.77E+05	-.006744	87.660	6.81E+12	3358.811	23581.
305.280	-.624416	4.56E+05	-70153.	-.006738	18.372	6.81E+12	5059.194	25765.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection              =     1.83557402 in
Computed slope at pile head       =     -.01086045
Maximum bending moment            =      46043904. lbs-in
Maximum shear force               =  -280034.54151 lbs
Depth of maximum bending moment   =    66.78000000 in
Depth of maximum shear force      =      213.06000 in
Number of iterations              =             24
Number of zero deflection points  =              1
```

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)

```
Specified shear force at pile head   =      12000.000 lbs
Specified moment at pile head        =   13584000.000 in-lbs
Specified axial load at pile head    =      41000.000 lbs
```

Non-zero moment for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment)condition.

Depth X in	Es*h F/L	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in
0.000	0.000	.350100	1.36E+07	12000.	-.001948	300.151	6.75E+12	0.000
25.440	427.392	.301199	1.39E+07	11718.	-.001896	306.720	6.74E+12	-40.481
50.880	9216.484	.253631	1.42E+07	8886.758	-.001843	312.733	6.74E+12	-735.090
76.320	16497.	.207420	1.41E+07	-14581.	-.001790	311.626	6.74E+12	-1076.068
101.760	23778.	.162559	1.34E+07	-44142.	-.001738	295.799	6.75E+12	-1215.529
127.200	10475.	.118975	1.19E+07	-63508.	-.001690	265.026	6.76E+12	-391.918
152.640	12660.	.076533	1.02E+07	-72482.	-.001648	227.830	6.77E+12	-304.677
178.080	14844.	.035066	8.29E+06	-78551.	-.001613	186.462	6.78E+12	-163.682
203.520	17028.	-.005612	6.26E+06	-80360.	-.001586	142.880	6.80E+12	30.049
228.960	19212.	-.045693	4.25E+06	-76575.	-.001566	99.775	6.81E+12	276.060
254.400	21397.	-.085369	2.42E+06	-65867.	-.001554	60.563	6.81E+12	574.405
279.840	23581.	-.124811	9.70E+05	-46898.	-.001548	29.391	6.81E+12	925.526
305.280	25765.	-.164157	1.19E+05	-18320.	-.001546	11.136	6.81E+12	1330.048

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:

```
Pile-head deflection                =      .35010027 in
Computed slope at pile head         =     -.00194802
Maximum bending moment              =      14220086. lbs-in
Maximum shear force                 =   -80412.36046 lbs
Depth of maximum bending moment     =    60.42000000 in
Depth of maximum shear force        =      200.34000 in
Number of iterations                =              5
Number of zero deflection points    =              1
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment,
Type 2 = Shear and Slope,
Type 3 = Shear and Rot. Stiffness,
Type 4 = Deflection and Moment,
Type 5 = Deflection and Slope,

y = pile-head displacment in
M = Pile-head Moment lbs-in
V = Pile-head Shear Force lbs
S = Pile-head Slope, radians
R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 39000.	M= 4.39E+07	41000.0000	1.8356	4.6044E+07	-280035.
1	V= 12000.	M= 1.36E+07	41000.0000	.3501003	1.4220E+07	-80412.3605

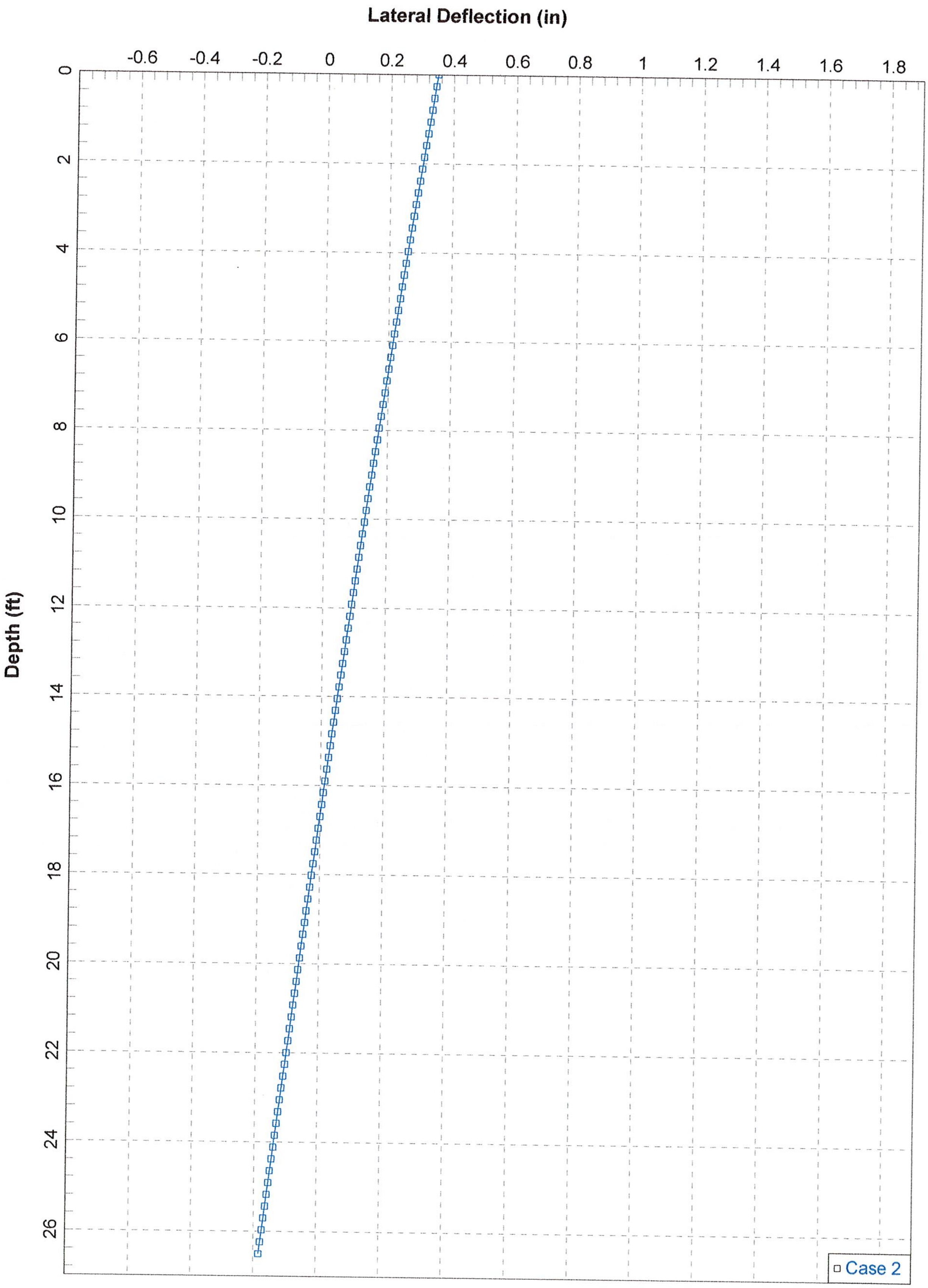
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
.00386204	3900.00006	677694.93974	1009828.	1.754758E+08
.01162591	11740.16983	2040065.	1009828.	1.754758E+08
.01842663	18607.72893	3233427.	1009828.	1.754758E+08
.02325182	23480.33966	4080130.	1009828.	1.754758E+08
.02699452	27259.83017	4736884.	1009828.	1.754758E+08
.03005253	30347.89877	5273492.	1009828.	1.754758E+08
.03263805	32958.82356	5727187.	1009828.	1.754758E+08
.03487860	35220.50949	6120153.	1009803.	1.754702E+08
.03685574	37215.45787	6466733.	1009760.	1.754607E+08
.03862489	39000.00000	6776731.	1009712.	1.754498E+08

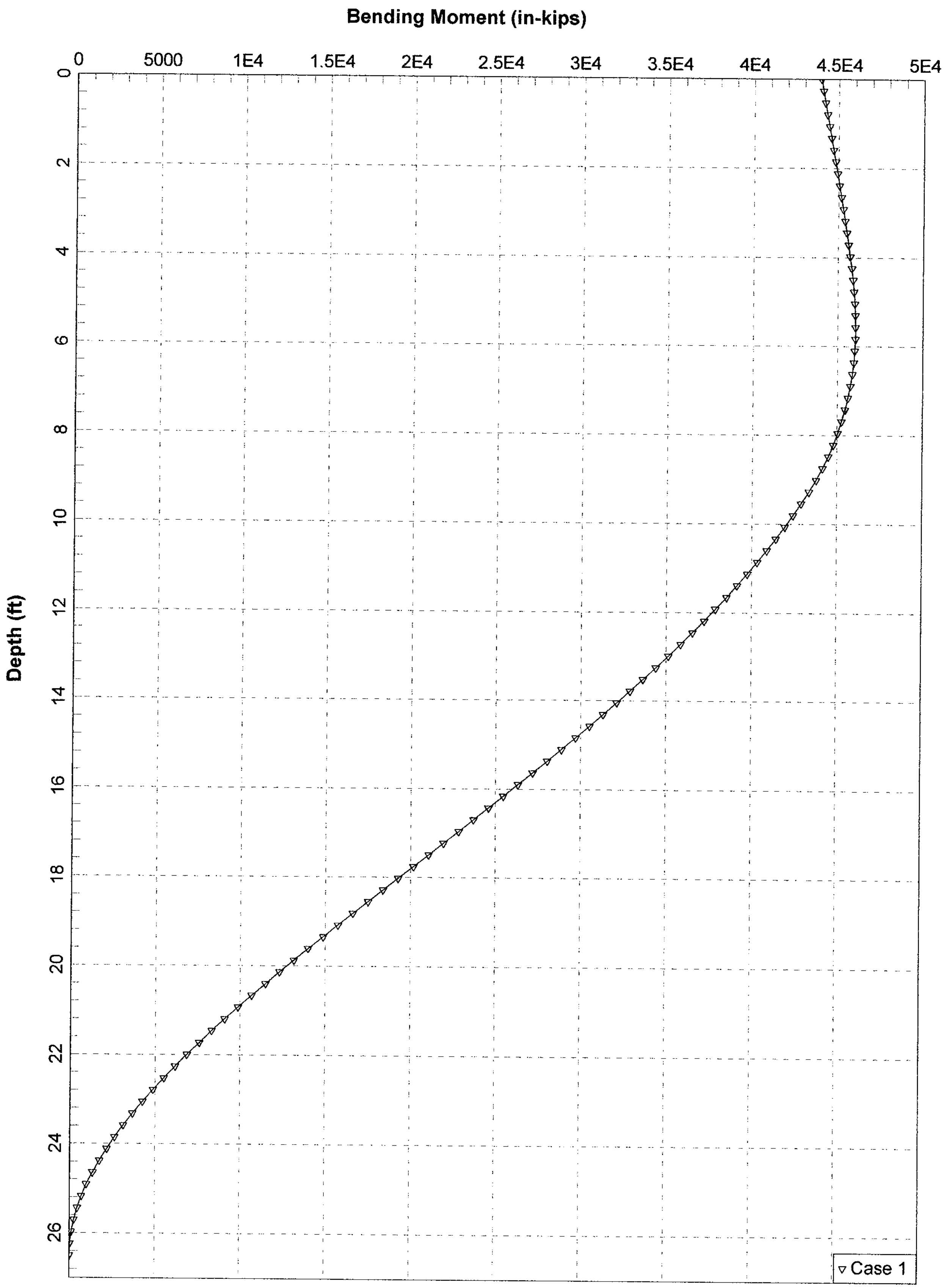
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
.00011400	20004.82618	4394400.	1.754758E+08	3.854623E+10
.00034390	60227.57338	13228462.	1.751291E+08	3.846557E+10
.00054645	95475.44001	20966616.	1.747197E+08	3.836884E+10
.00088737	121059.42246	26456924.	1.364243E+08	2.981485E+10
.00121752	142399.98239	30715538.	1.169593E+08	2.522800E+10
.00145570	160257.23495	34195079.	1.100893E+08	2.349043E+10
.00163694	175265.64961	37136988.	1.070688E+08	2.268678E+10
.00179439	188417.32100	39685386.	1.050035E+08	2.211636E+10
.00192749	199942.56453	41933233.	1.037321E+08	2.175537E+10
.00204731	210322.25731	43944000.	1.027308E+08	2.146422E+10

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

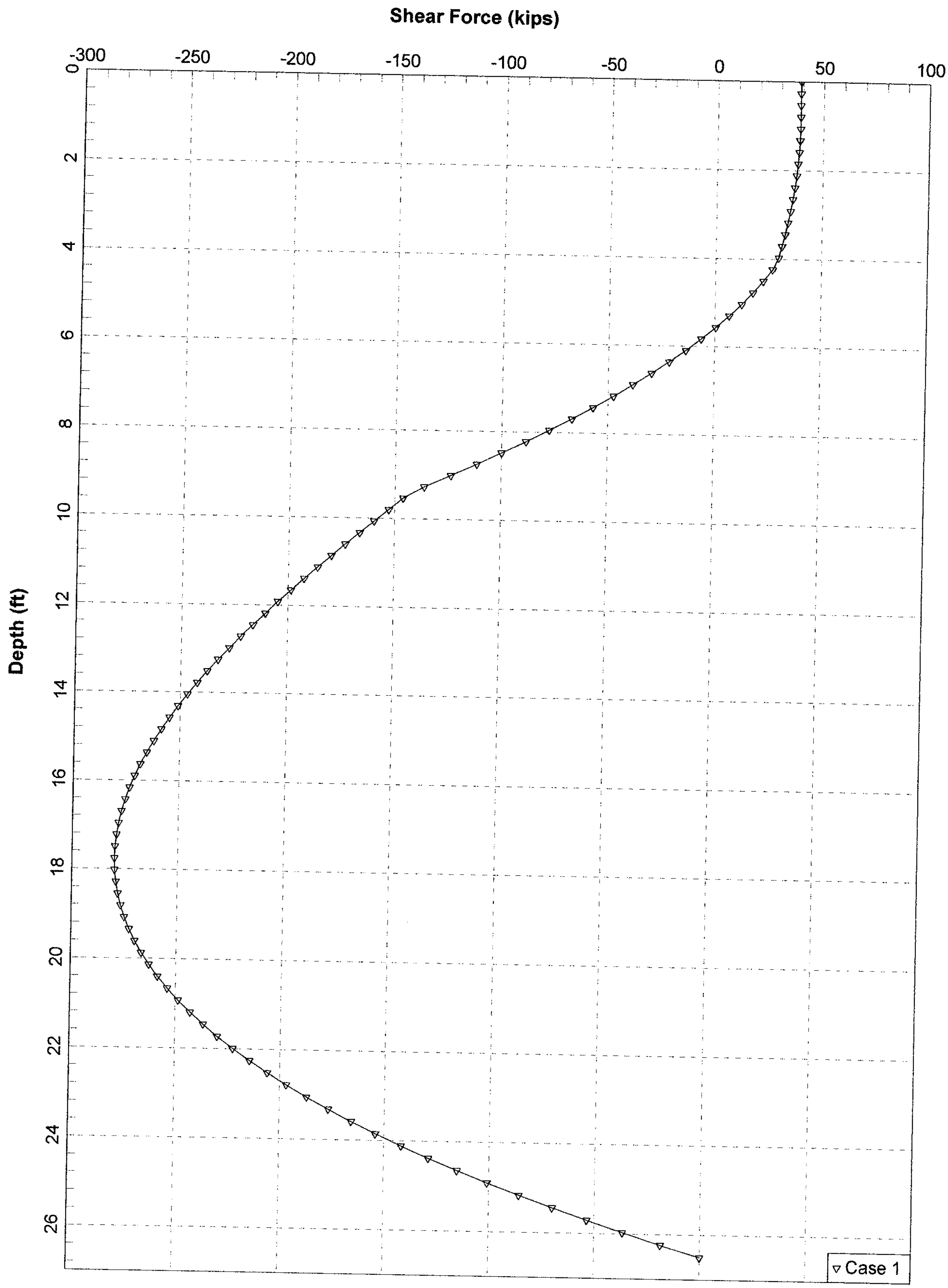
The analysis ended normally.



Lateral Deflection (in)
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Case 2



Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
4.5E4
5E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Case 1



Shear Force (kips)
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
Case 1

P65-16-XLH-RR | Dual Broadband Antennas

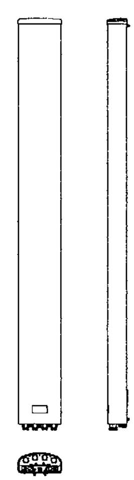
POLARIZATION: Dual linear ±45°
FREQUENCY (MHz): 698-894, 1710-2170
HORIZONTAL BEAM WIDTH (°): 65, 65
GAIN (dBi/dBd): 15.5/13.4 17.5/15.4
TILT: 1-12, 0-8
LENGTH: 72"

ELECTRICAL SPECIFICATIONS*

Frequency range (MHz)	698-894		1710-2170		
Frequency band (MHz)	698-806	806-894	1710-1880	1850-1990	1900-2170
Gain (dBi/dBd)	14.8/12.7	15.5/13.4	16.9/14.8	17.2/15.1	17.5/15.4
Polarization	Dual Linear +/- 45		Dual Linear +/- 45		
Nominal Impedance (Ω)	50		50		
VSWR	< 1.5:1		< 1.5:1		
Horizontal beam width, -3 dB (°)	66	65	60	63	63
Vertical beam width, -3 dB (°)	14.7	12.5	6.8	6.4	5.7
Electrical down tilt (°)	1 to 12		0 to 8		
Side lobe suppression, vertical 1st upper (dB)	> 16	>16	> 16		
	>16	>16			
Isolation between inputs (dB)	> 30	> 30	> 30	> 30	
Inter band Isolation (dB)	> 40		> 40		
Tracking, horizontal plane ±60° (dB)	< 2		< 2	< 2	< 2
First null fill (dB)			>-20	>-20	>-20
Vertical beam squint (°)	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
Front to back ratio (dB) 180°±30° copolar	>24	>24	> 30	>30	>28
Front to back ratio (dB) 180°±30° total power					
Cross polar discrimination (XPD) 0° (dB)	> 15	> 15	> 15	> 15	> 15
Cross polar discrimination (XPD) ±60° (dB)	> 10	> 10	> 10	> 10	> 10
Far field coupling					
IM3, 2xTx@43dBm (dBc)	<-153		<-153		
IM7, 2xTx@43dBm (dBc)					
Power handling, average per input (W)	500		250		
Power handling, average total (W)	1000		500		

MECHANICAL SPECIFICATIONS*

Connector	4 X 7/16 DIN Female, IP67
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	72" x 12" x 6" (1829 x 305 x 152)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, kg (lbs)	29 (64)
Weight, without brackets, kg (lbs)	24 (53)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	1380
Maximum operational wind speed, m/s (mph)	100 (45)
Survival wind speed, m/s (mph)	150 (67)
Lightning protection	DC Ground
Operating Temperature	-40C to +60C
Radome material	PVC, IP55
Packet size, HxWxD, mm (ft)	87" x 16" x 10" (2225 x 400 x 225)
Radome colour	Light Grey
Shipping weight, kg (lbs)	34 (75)
RET	iRET AISGv1.1, MET and AISGv2.0
Brackets	7256.00, 7454.00A



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

ANTENNA PATTERNS*

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

RRUS 11 – Dual PA RRU.

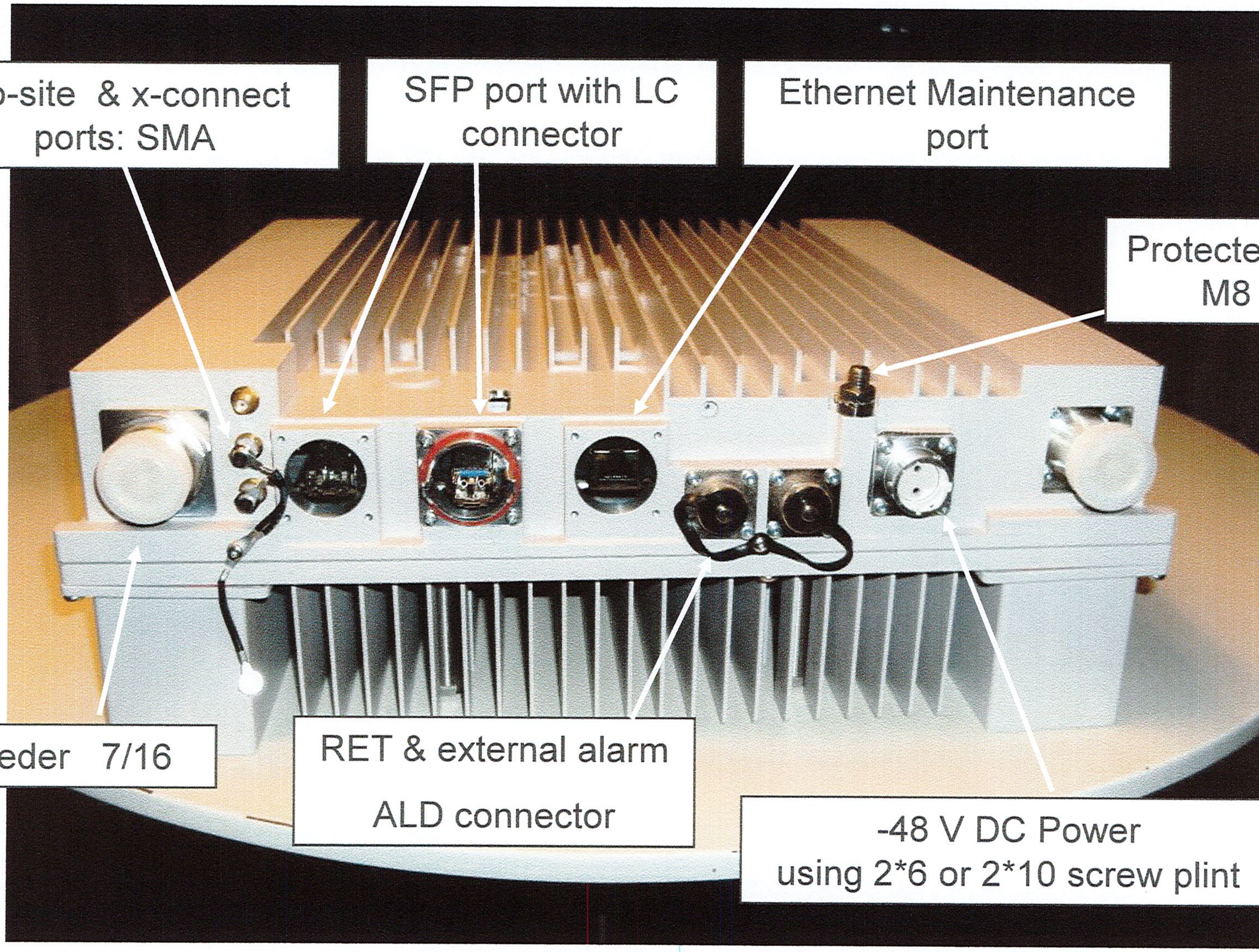
Technical Data

RBS6000

- Multi standard
- RF: 2x30 Watts
- Carrier BW: 1.4 – 20 MHz
- Alarms: 2
- Dimensions (with sunshield):
  - Width: 17.0 in
  - Height: 17.8 in
  - Depth: 7.2 in
  - Weight: 55 lbs (Band 12)
  - Weight: 50 lbs (Band 4)
- Temperature: -40 to +131 F
- Cooling: Self convection
- Power: -48 VDC
- Rec. fuse size 20 Amp
  - Rec. DC cable:
    - 6 mm^2 up to 60 meters
    - 10 mm^2 over 60 meters
    - Shielded
- Power Cons: 200 Watts typ.

RRUS-11 I/F

RBS6000



POWER

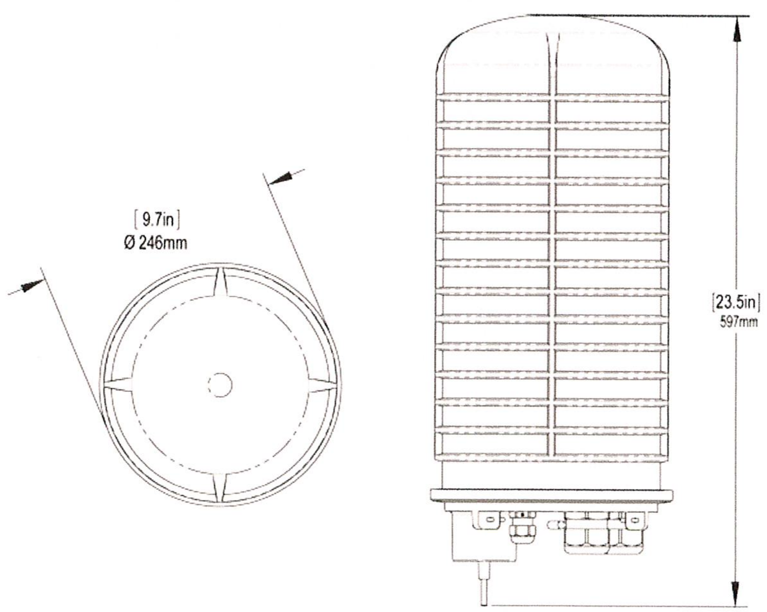
DC6-48-60-18-8F

DC Surge Suppression Solution

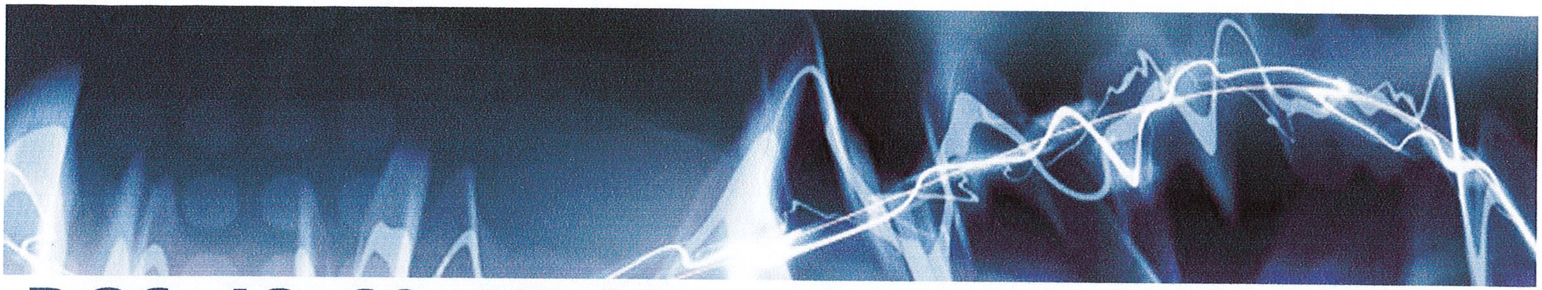
The DC6-48-60-18 is a dual chambered, DC surge suppression system for use in multi-circuit, Distributed Antenna Systems. The system will protect up to 6 Remote Radio Heads from voltage surges and lightning, and connect up to 18 fiber pairs. The system is enclosed in a NEMA 4 rated, waterproof enclosure.

FEATURES

- Protects up to 6 Remote Radio Heads, each with its own protection circuit.
- Flexible design allows for installation at the top of a tower for Remote Radio Head protection.
- Includes fiber connections for up to 18 pairs of fiber.
- LED indicators on individual circuits provide visual indication of suppressor status.
- Form 'C' relays allow for remote monitoring of the suppressor status.
- Patented Strikesorb technology provides over 60 kA of surge current capacity per circuit.
- Strikesorb suppression modules are fully recognized to UL 1449-3rd Edition Safety Standard, meeting all intermediate and high current fault requirements to facilitate use in OEM applications.
- Raycap recommends that DC protection system be installed within 2 meters or 6 feet of the radio.
- Dome design is lightweight and aerodynamic providing maximum flexibility for installation on top of towers.



Raycap



DC6-48-60-18-8F

DC Power Surge Protection

Electrical Specifications	
Model Number	DC6-48-60-18-8F
Nominal Operating Voltage	48 VDC
Nominal Discharge Current (I_n)	20 kA 8/20 µs
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs
Maximum Continuous Operating Voltage (U_c)	75 VDC
Voltage Protection Rating	400 V

Mechanical Specifications	
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum
Fiber Connection Method	LC-LC Single mode duplex
Environmental Rating	IP 68, 7m 72hrs
Operating Temperature	-40° C to + 80° C
Storage Temperature	-70° C to + 80° C
Cold Temperature Cycling	IEC 61300-2-22e -30° C to + 60° C 200 hrs @ 5 psi
Resistance to Aggressive Materials	CEI IEC 61073-2 including acids and bases
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs
Weight	20 lbs without Mounting Bracket

STANDARDS

Strikesorb modules are compliant to the following Surge Protection Device (SPD) Standards:

- ANSI/UL 1449 – 3rd Edition
- IEEE C62.41
- NEMA LS-1, IEC 61643-1:2005 2nd Edition:2005
- IEC 61643-12
- EN 61643-11:2002 (including A11:2007)

GSA
GS-07F-0435V

ANAB
Certified to ISO 9001:2000

TÜV
TUV Rheinland of North America

Raycap, Inc. 806 W. Clearwater Loop • Post Falls • Idaho • 83854 • USA
Phone 208.777.1166 • Toll Free 800.890.2569 • Fax 208.777.4466 • www.raycapsurgeprotection.com

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

Douglas L. Culp
Real Estate Consultant

June 14, 2011

Honorable Sherri Steeneck
1st Selectman, Town of Fairfield
Sullivan Independence Hall
725 Old Post Road
Fairfield, CT 06824

Re: Telecommunications Facility – 3965 Congress Street Fairfield, CT

Dear Selectman Steeneck:

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

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

The accompanying letter to the Siting Council fully describes Cingular's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures; please call me at (860) 463-5511 or Ms. Linda Roberts, Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Douglas L. Culp
Real Estate Consultant

Enclosure