STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

Internet: ct.gov/csc

Daniel F. Caruso
Chairman

November 25, 2008

Carrie L. Larson, Esq.
Pullman & Comley, LLC
90 State House Square
Hartford, CT 06103-3702

RE: **EM-POCKET-155-081107** – Youghiogheny Communications-Northeast, LLC d/b/a Pocket Communications notice of intent to modify an existing telecommunications facility located at 457 Quaker Lane South (aka 471 So. Quaker Lane), West Hartford, Connecticut.

Dear Attorney Larson:

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.

The proposed modifications are to be implemented as specified here and in your notice dated November 6, 2008, including the placement of all necessary equipment and shelters within the tower compound. 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. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/CDM/laf

c: The Honorable Scott Slifka, Mayor, Town of West Hartford
Barry M. Feldman, Town Manager, Town of West Hartford
Mila Limson, Town Planner, Town of West Hartford
Hans Fiedler, T-Mobile

PULLMAN & COMLEY
ATTORNEYS AT LAW

EM-POCKET-155-081107

CARRIE L. LARSON
90 State House Square
Hartford, CT 06103-3702
p (860) 424-4312
f (860) 424-4370

www.pullcom.com

ORIGINAL

November 6, 2008

Via Federal Express

S. Derek Phelps, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Notice of Exempt Modification
T-Mobile Towers Telecommunications Facility
457 Quaker Lane South (aka 471 So. Quaker Lane), West Hartford, Connecticut

Dear Mr. Phelps:

Youghiogheny Communications-Northeast, LLC, doing business as Pocket Communications ("Pocket"), intends to install antennas and appurtenant equipment at the existing 120-foot monopole facility owned by T-Mobile Towers and located at 457 Quaker Lane South (aka 471 So. Quaker Lane), West Hartford, Connecticut ("Facility"). Pocket Communications provides prepaid, flat rate wireless voice and data services to more than a quarter of a million subscribers. Pocket is licensed by the Federal Communications Commission (FCC) to provide PCS wireless telecommunications service in the State of Connecticut, which includes the area to be served by the proposed installation. This installation constitutes an exempt modification pursuant to the Public Utility Environmental Standards Act, Connecticut General Statutes Section 16-50g et. seq. (PUESA), and Section 16-50j-72(b)(2) of the Regulations of the Connecticut State Agencies adopted pursuant to PUESA. In accordance with R.C.S.A. Section 16-50j-73, a copy of this notice has been sent to Scott Slifka, Mayor, Town of West Hartford.

The existing Facility consists of a 120-foot self-supporting monopole tower capable of supporting multiple carriers within a fenced compound. The coordinates for the Facility are **Lat: 41°-44'-55" and Long: 72°–43'-53".** The tower is located in the south central portion of West Hartford, approximately 100 feet south of Interstate 84 in the "Park Road curves" area of town. The Facility is roughly 380 feet west of Quaker Lane South, approximately 800 feet east of Trout Brook Drive and roughly 2,200 feet south of Park Road (see Site Map, attached as Exhibit A). The tower currently supports Verizon antennas at the one hundred foot level (100') centerline AGL (above ground level); AT&T antennas at the one hundred seven foot level (107') AGL, and T-Mobile antennas at the one hundred twenty foot (120') level AGL. According to the Structural Analysis Report (Exhibit E), Verizon relocated its antennas on this tower from the eighty foot level (80') centerline AGL to the one hundred foot level (100') centerline AGL. The reported

MPE values were updated in accordance with this relocation. Pocket proposes to install three Kathrein 742-213 antennas at the ninety foot (90') level AGL, and a Nortel CDMA Micro BTS 3231 cabinet, mounted on an "H-Frame," contained within a six foot by six foot (6'-0" x 6'-0") lease area. A small GPS antenna will be mounted to an ice bridge which will run from the lease area to the tower. Utilities will be run via a proposed underground conduit from existing utility sources at the Facility (See Design Drawings and Equipment Specifications, attached as Exhibits B and C respectively).

For the following reasons, the proposed modifications to the Quaker Lane South Facility meet the exempt modification criteria set forth in R.C.S.A. Section 16-50j-72(b)(2):

1. The proposed modification will not increase the height of the tower as Pocket's antennas will be installed at a center line height of approximately 90 feet.

2. The installation of Pocket's equipment and shelter will not require an extension of the site boundaries.

3. The proposed modifications will not increase the noise levels at the existing Facility by six decibels or more.

4. The operation of the additional antennas will not increase the total radio frequency (RF) power density, measured at the site boundary, to a level at or above the standard adopted by the Connecticut Department of Environmental Protection as set forth in Section 22a-162 of the Connecticut General Statutes and MPE limits established by the Federal Communications Commission. The worst-case RF power density calculations for the proposed Pocket antennas would be 36.73% of the FCC standard (see general power density calculations table, attached as Exhibit D).

Also attached, Exhibit E, is a structural analysis confirming that the tower can support the existing and proposed antennas and associated equipment.

For the foregoing reasons, Pocket respectfully submits that the proposed antenna installation and equipment at the West Hartford Facility constitutes an exempt modification under R.C.S.A. Section 16-50j-72(b)(2).

Respectfully Submitted,

Carrie L. Larson

cc: Scott Slifka, Mayor
The Church of St. Mark Evangelist Corp., underlying property owner

Exhibit A

Site Map

Pocket Site HFCT1349A

457 Quaker Lane South

aka 471 South Quaker Lane

West Hartford, Connecticut

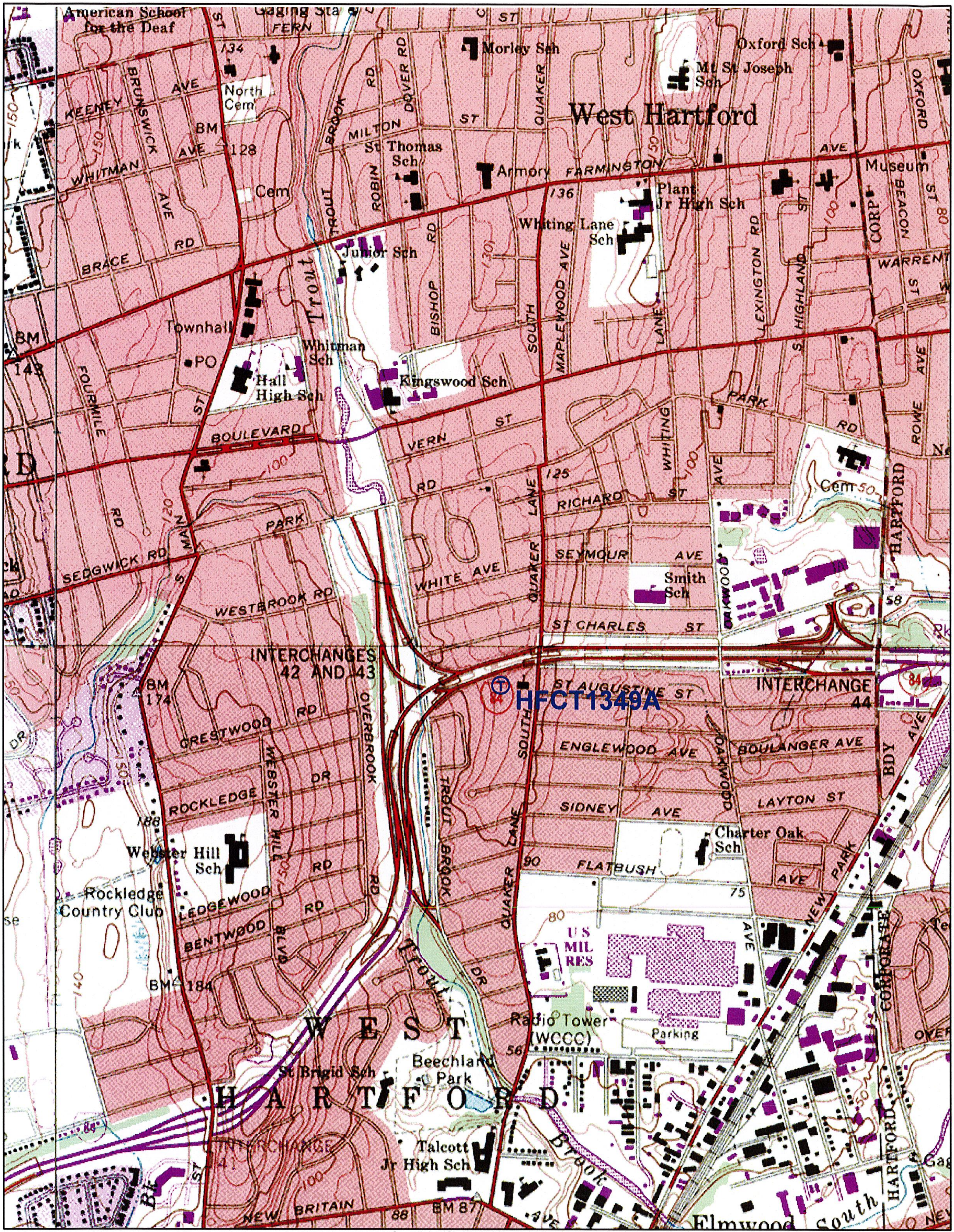

Exhibit B

Design Drawings

Pocket Site HFCT1349A

457 Quaker Lane South

aka 471 South Quaker Lane

West Hartford, Connecticut

PROJECT INFORMATION

TOWER OWNER:	T-MOBILE TOWERS 4 SYLVAN WAY PARSIPPANY, NJ 07054
OWNER SITE ID#:	CT 11178D
APPLICANT:	YOUGHIOGHENY COMMUNICATIONS-NORTHEAST LLC 2819 NW LOOP 410 SAN ANTONIO, TX 78230
SITE ADDRESS:	467 SOUTH QUAKER LANE WEST HARTFORD, CT 06110
COUNTY:	HARTFORD
LATITUDE:	41.7488
LONGITUDE:	-72.7313
STRUCTURE HEIGHT:	120' AGL
ZONING CLASSIFICATION:	N/A
ZONING JURISDICTION:	CONNECTICUT SITING COUNCIL
POWER COMPANY	CL&P 1-860-947-2121
TELEPHONE COMPANY:	AT&T 1-888-727-8368
DESIGN FIRM:	URS CORPORATION AES 500 ENTERPRISE DRIVE, SUITE 3B ROCKY HILL, CT 06067 PHONE: 860-529-8882

DRAWING INDEX

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STRUCTURAL REVIEW

FOR ADDITIONAL TOWER AND FOUNDATION INFORMATION REFER TO STRUCTURAL ANALYSIS REPORT, 120' EXISTING MONOPOLE, PREPARED BY NATCOMM CONSULTING ENGINEERS, INC. NATCOMM PROJECT NO. 08158, DATED OCTOBER 30, 2008

APPROVALS

________________ REAL ESTATE

________________ RF

________________ OPS/CONSTRUCTION

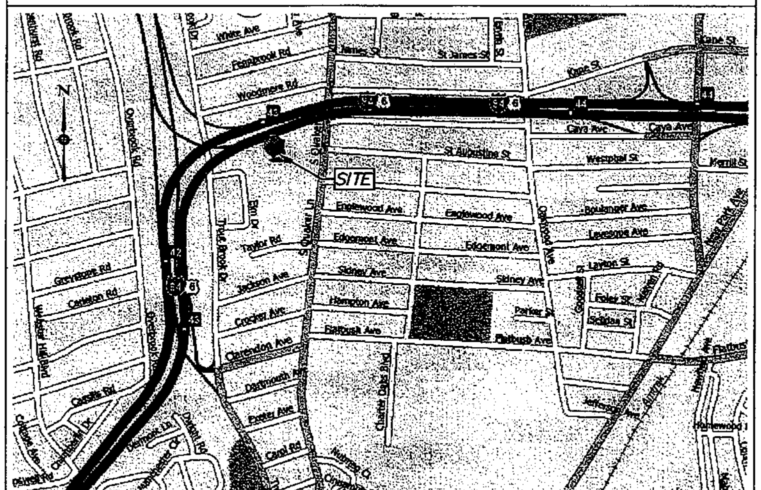
________________ LEGAL/COMPLIANCE

________________ NET DESIGN

pocket™
SMART WIRELESS

HFCT1349A
467 SOUTH QUAKER LA.
120' MONOPOLE

LOCATION MAP



DRIVING DIRECTIONS

FROM HARTFORD:

TAKE I-84 WEST TO EXIT 44 (KANE STREET). LEFT ON KANE STREET 1/4 MILE TO LEFT ON OAKWOOD AVENUE. RIGHT ON ST. AUGUSTINE. LEFT ON QUAKER LANE TO CHURCH OF ST. MARK ENTRANCE ON RIGHT. SITE IS LOCATED AT REAR OF PROPERTY BEHIND PARSONAGE.

APPLICABLE BUILDING CODES AND STANDARDS

CONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

BUILDING CODE:
CONNECTICUT STATE BUILDING CODE
2003 INTERNATIONAL BUILDING CODE
2003 INTERNATIONAL PLUMBING CODE
2003 INTERNATIONAL MECHANICAL CODE
2003 INTERNATIONAL EXISTING BUILDING CODE
2005 CONNECTICUT SUPPLEMENT

ELECTRICAL CODE:
2005 NATIONAL ELECTRICAL CODE

CONNECTICUT STATE FIRE SAFETY CODE
2003 INTERNATIONAL FIRE CODE

CONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST APPROVED EDITION OF THE FOLLOWING STANDARDS.

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARD FOR STRUCTURAL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:

TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM

IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR-1275 GENERAL INSTALLATION REQUIREMENTS

TELCORDIA GR-1503 COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION

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

SITE NOTES

1. THIS SITE IS UNMANNED AND IS RESTRICTED TO OUTDOOR EQUIPMENT. IT WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNALS FOR THE PURPOSE OF PROVIDING PUBLIC CELLULAR SERVICE.
2. POCKET COMMUNICATIONS CERTIFIES THAT THIS TELEPHONE EQUIPMENT FACILITY WILL BE SERVICED ONLY BY POCKET COMMUNICATIONS EMPLOYEES AND THE WORK ASSOCIATED WITH ANY EQUIPMENT CANNOT BE PERFORMED BY HANDICAPPED PERSONS. THIS FACILITY WILL BE FREQUENTED ONLY BY SERVICE PERSONNEL FOR REPAIR PURPOSES ONLY. THIS FACILITY IS EXEMPT FROM THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA) APPENDIX B, SECTION 4.11.(5)(B)
3. NO POTABLE WATER SUPPLY IS TO BE PROVIDED AT THIS LOCATION.
4. NO WASTE WATER WILL BE GENERATED AT THIS LOCATION.
5. NO SOLID WASTE WILL BE GENERATED AT THIS LOCATION.
6. POCKET COMMUNICATIONS MAINTENANCE CREW (TYPICALLY ONE PERSON) WILL MAKE AN AVERAGE OF ONE TRIP PER MONTH AT ONE HOUR PER VISIT.

STATE OF CONNECTICUT
IGNACIO C. AR...
No. 8704
LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
1	11/03/08	ISSUED FOR CONSTRUCTION - REVISED CABLE ROUTING	JCF
0	09/10/08	ISSUED FOR CONSTRUCTION	JCF

pocket. SMART WIRELESS

PROJECT NAME: HFCT1349A, 467 SOUTH QUAKER LANE

SHEET: TITLE SHEET

URS

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

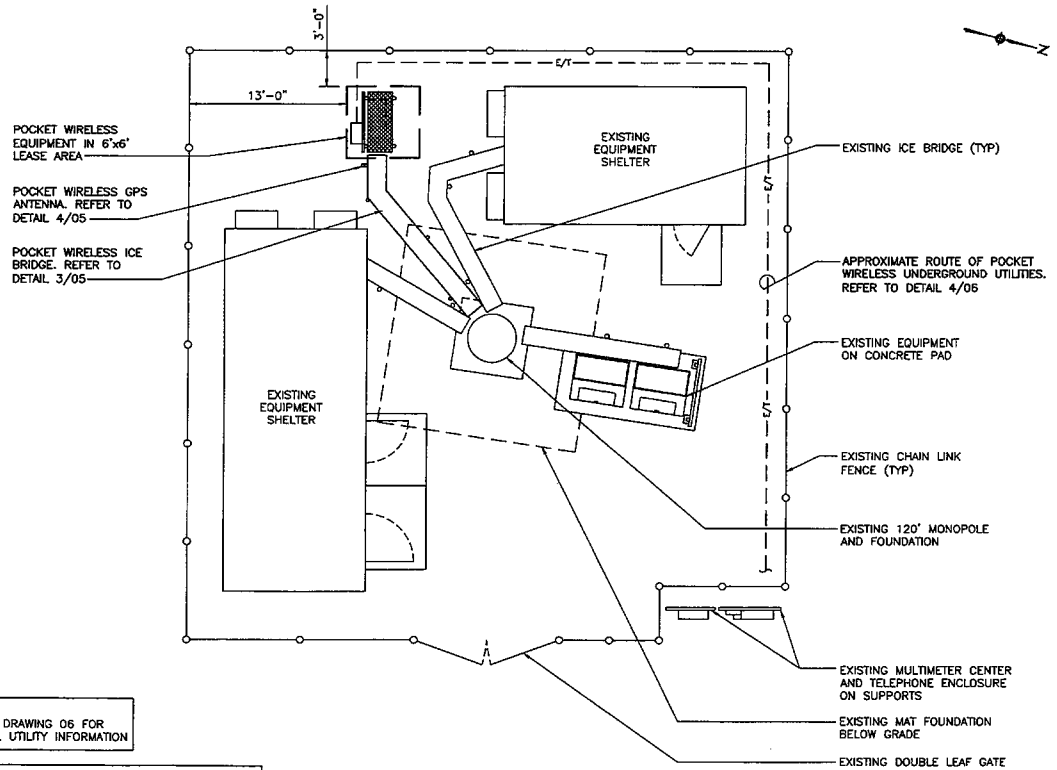
CHECKED BY: JCF
DRAWN BY: KAP
DATE: 08-19-2008
URS JOB NUMBER: PC1006-36923926
DRAWING NUMBER: 01

CONSTRUCTION NOTES

1. FIELD VERIFICATION: CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, POCKET COMMUNICATIONS ANTENNA MOUNT LOCATION AND ANTENNAS TO BE INSTALLED.
2. COORDINATION OF WORK: CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH POCKET COMMUNICATIONS.
3. GRAVEL SURFACE IN AREAS OF COMPOUND THAT ARE DISTURBED DURING CONSTRUCTION SHALL BE REPLACED TO ORIGINAL CONDITION BY CONTRACTOR.

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – POCKET COMMUNICATIONS
   OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND THE ENGINEER.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
7. CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, AND GROUNDING CABLES AS SHOWN ON THE SITE PLAN
8. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
9. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
10. CONTRACTOR TO OBTAIN REQUIRED NOTICE TO PROCEED DOCUMENTS FROM THE TOWER OWNER BEFORE COMMENCING CONSTRUCTION.



NOTE:
REFER TO DRAWING 06 FOR ADDITIONAL UTILITY INFORMATION

SITE PLAN INFORMATION

THIS SITE PLAN DRAWING WAS COMPILED FROM DATA PROVIDED BY GRAPEVINE SOLUTIONS AND AVAILABLE EXISTING DRAWINGS OF THE SUBJECT AREA.

1/02 SITE PLAN
SCALE: N.T.S.

STATE OF CONNECTICUT
IGNACIO C. ARTIS
No. 8704
LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
0	09/10/08	ISSUED FOR CONSTRUCTION	JCF
1	11/03/08	ISSUED FOR CONSTRUCTION – REVISED CABLE ROUTING	JCF

pocket WIRELESS

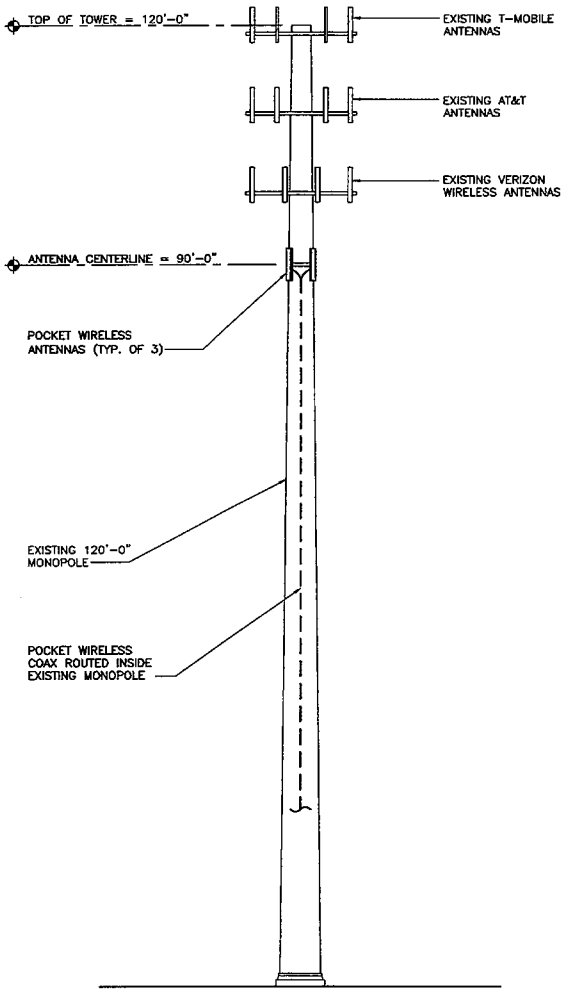
PROJECT NAME: HFCT1349A, 467 SOUTH QUAKER LANE

SHEET: SITE PLAN AND NOTES

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

CHECKED BY: JCF
DRAWN BY: KAP
DATE: 08-19-2008
URS JOB NUMBER: PC1006-36923926
DRAWING NUMBER: 02

FOR ADDITIONAL TOWER AND FOUNDATION INFORMATION REFER TO STRUCTURAL ANALYSIS REPORT, 120' EXISTING MONOPOLE, PREPARED BY NATCOMM CONSULTING ENGINEERS, INC. NATCOMM PROJECT NO. 08158, DATED OCTOBER 30, 2008



1 / 03 **TOWER ELEVATION**
SCALE: N.T.S.

ANTENNA KEY

	# ANTENNAS PER SECTOR	ANTENNA NUMBER	COAX COLOR CODE	ANTENNA VENDOR	MODEL NUMBER	AZIMUTH	C/L HEIGHT	MECHANICAL DOWNTILT*	ELECTRICAL DOWNTILT*	COAX SIZE	CABLES PER ANTENNA	COAX MANUFACTURER
ALPHA	1	A-1	(1) RED BAND	KATHREIN	742 213	30°	90'-0"	0°	0°	1 5/8"ø	2 @ 120'	RFS
BETA	1	B-1	(1) BLUE BAND	KATHREIN	742 213	150°	90'-0"	0°	0°	1 5/8"ø	2 @ 120'	RFS
GAMMA	1	C-1	(1) GREEN BAND	KATHREIN	742 213	270°	90'-0"	0°	0°	1 5/8"ø	2 @ 120'	RFS
GPS	1	-	-	NORTEL	NTGB01MA	-	9'-0"	-	-	1/2"ø	(1) @ 10'	RFS

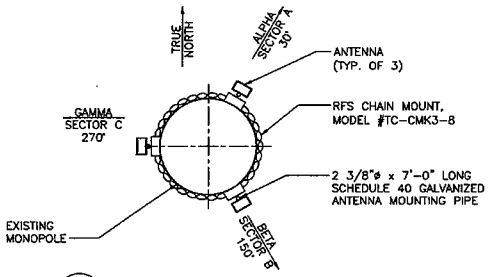
*REFER TO RFDS ANTENNA SHEET FOR FINAL TILT AND AZIMUTHS

TOWER NOTES:

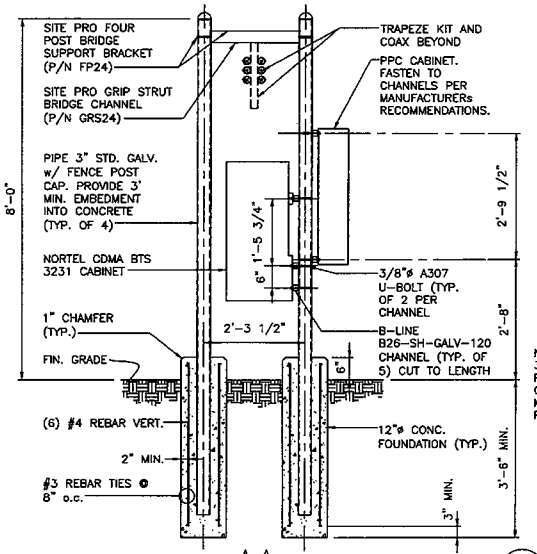
1. FOR DETAILED TOWER INFORMATION, REFER TO TOWER ERECTION DRAWINGS BY OTHERS. THE TOWER SHOWN ON THIS SHEET IS SHOWN FOR GENERAL CONFIGURATION PURPOSES ONLY.
2. ANTENNA CONFIGURATION IS SUBJECT TO CHANGE. VERIFY ANTENNA HEIGHT, DOWN-TILT, AND AZIMUTH WITH PROJECT MANAGER PRIOR TO CONSTRUCTION.

ANTENNA NOTES:

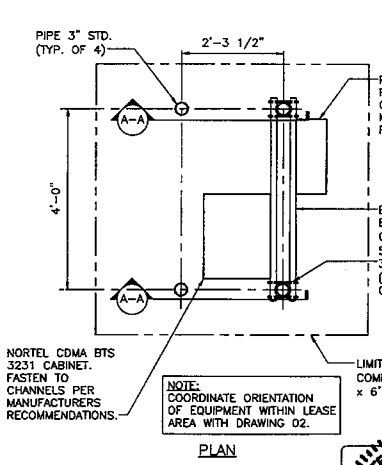
1. ALL COAX SHALL BE COLOR CODED AT THE ANTENNA AND AT THE EQUIPMENT CABINET.
2. (2) COLOR BANDS DENOTES TRANSMIT. TRANSMITS TO BE CONNECTED TO THE +45 PORTS OF THE ANTENNAS.
3. PRIOR TO ORDERING ANY ANTENNAS OR COAX, CONTRACTOR SHALL CONTACT POCKETS CONSTRUCTION MANAGER AND OBTAIN APPROVAL FOR MATERIALS LISTED. CONTRACTOR IS SOLELY RESPONSIBLE FOR THIS COORDINATION.
4. ANTENNA CONFIGURATION IS SUBJECT TO CHANGE. VERIFY ANTENNA HEIGHT, DOWN-TILT, AND AZIMUTH WITH PROJECT MANAGER PRIOR TO CONSTRUCTION.



2 / 03 **ANTENNA SECTOR PLAN**
SCALE: N.T.S.



A-A ELEVATION



PLAN

3 / 03 **CABINET SUPPORT FRAME**
SCALE: N.T.S.

STATE OF CONNECTION
IGNACIO C. APONTE
No. 9704
LICENSED ARCHITECT

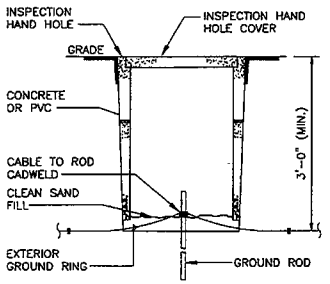
NO.	DATE	REVISIONS	BY
1	11/03/08	ISSUED FOR CONSTRUCTION - REVISED CABLE ROUTING	JCF
0	09/10/08	ISSUED FOR CONSTRUCTION	JCF

pocket SMART WIRELESS

PROJECT NAME: HFCT1349A, 467 SOUTH QUAKER LANE
SHEET: TOWER ELEVATION, ANTENNA PLAN AND DETAILS

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

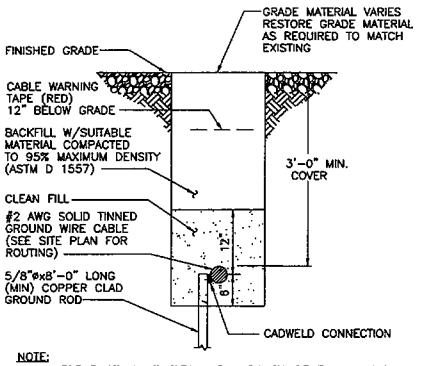
CHECKED BY: JCF
DRAWN BY: KAP
DATE: 08-19-2008
URS JOB NUMBER: PC1006-36923926
DRAWING NUMBER: 03



NOTE:
INSPECTION HAND HOLE MAY BE CONCRETE OR PVC AND SHALL BE A MINIMUM OF 8" IN WIDTH/DIAMETER

GROUND ROD WITH INSPECTION HANDHOLE

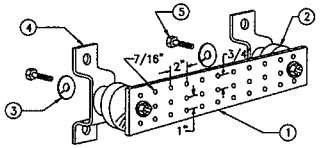
7/04 SCALE: N.T.S.



NOTE:
1. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.
2. CADWELD GROUND ROD TO GROUND RING AFTER GROUND ROD HAS BEEN DRIVEN INTO PLACE

EGR DETAIL

6/04 SCALE: N.T.S.

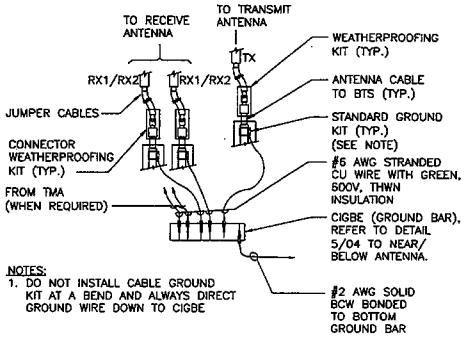


LEGEND

1- COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (ACTUAL GROUND BAR SIZE WILL VARY BASED ON NUMBER OF GROUND CONNECTIONS)
2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL
3- 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8 OR EQUAL
4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL
5- 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1 OR EQUAL

MASTER/EQUIPMENT GROUND BAR DETAIL

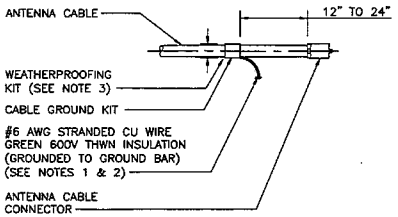
5/04 SCALE: N.T.S.



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

CONNECTION OF GROUND WIRE TO GROUND BAR

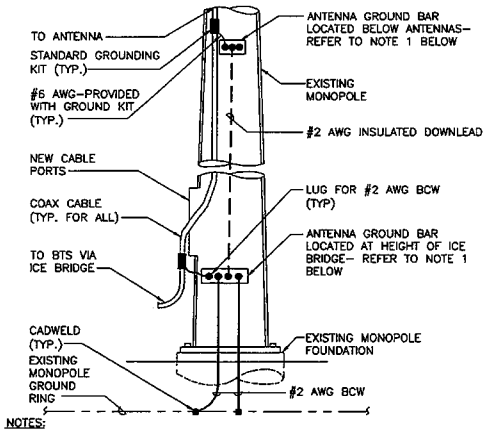
4/04 SCALE: N.T.S.



NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

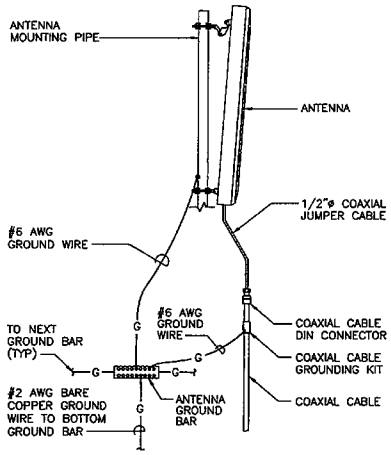
3/04 SCALE: N.T.S.



NOTES:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION & CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. NO WELDING OR DRILLING SHALL BE ALLOWED ON THE MONOPOLE.
3. DO NOT INSTALL ANTENNA GROUND KIT ON CABLE BEND (TYP.)

MONOPOLE - ANTENNA CABLE GROUNDING

2/04 SCALE: N.T.S.



TYPICAL ANTENNA GROUNDING DETAIL

1/04 SCALE: N.T.S.

NO.	DATE	REMARKS	BY
1	11/03/08	ISSUED FOR CONSTRUCTION - REVISED CABLE ROUTING	JCF
0	09/19/08	ISSUED FOR CONSTRUCTION	JCF

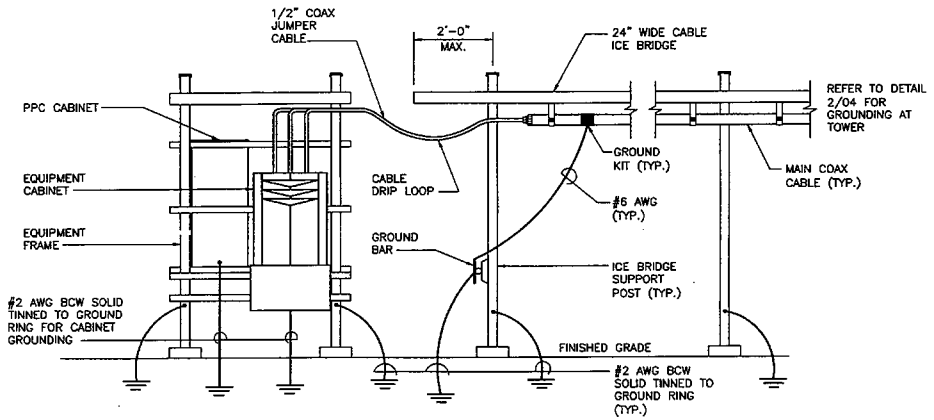
pocket SMART WIRELESS

PROJECT NAME: HFCT1349A, 467 SOUTH QUAKER LANE

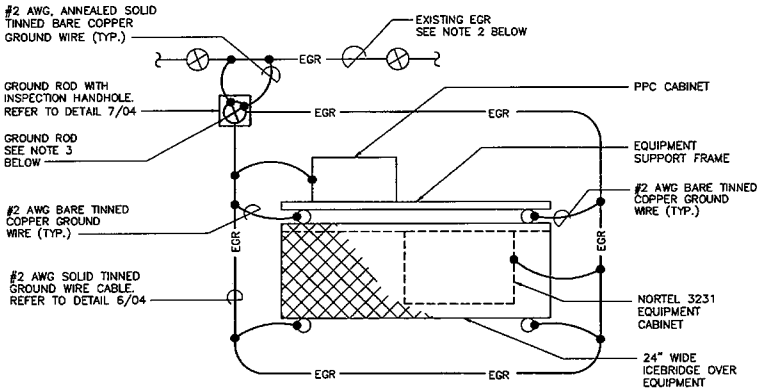
SHEET: GROUNDING DETAILS

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

CHECKED BY: JCF
DRAWN BY: KAP
DATE: 08-19-2008
URS JOB NUMBER: PC1006-36923926
DRAWING NUMBER: 04



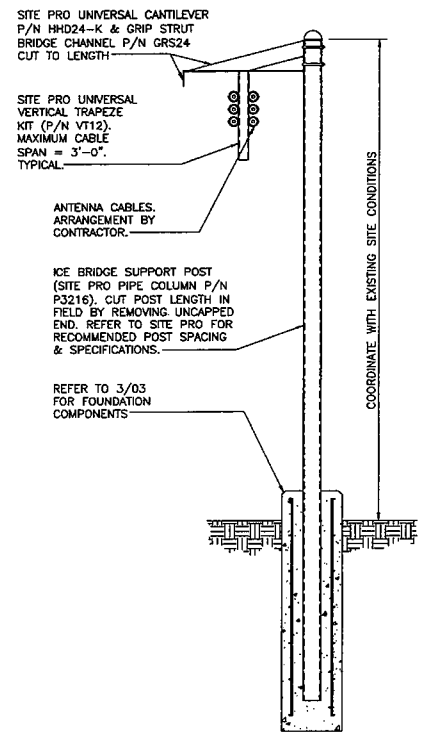
1 / 05 **GROUNDING AT EQUIPMENT CABINET**
SCALE: N.T.S.



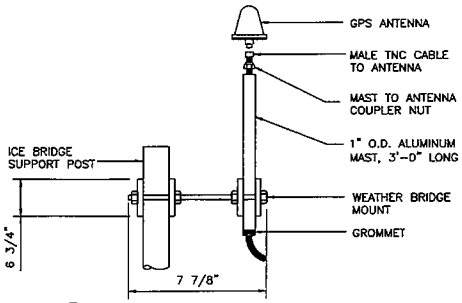
NOTES:

1. SEE SHEET 02 FOR EQUIPMENT ORIENTATION AND LOCATION.
2. EXISTING EGR. VERIFY LOCATION IN FIELD. CONTRACTOR SHALL HAND DIG AND LOCATE EXISTING EGR. IF ANY DAMAGE IS CAUSED TO EXISTING EGR, THE CONTRACTOR SHALL REPAIR THE DAMAGE AT HIS OWN COST TO THE SATISFACTION OF RESPECTIVE CELL ENGINEERS.
3. GROUNDING ELECTRODE SHALL BE 5/8" DIA. x 8'-0"L. COPPER CLAD STEEL ROD. ADJUST LOCATION OF GROUNDING ELECTRODE IF SOIL CONDITION IS NOT CONDUCTIVE (GRAVEL, SANDY SOIL, ROCKS). SPACING OF GROUNDING ELECTRODES SHALL NOT BE LESS THAN 8' O.C. ELECTRODES SHALL BE DRIVEN ONLY WITH PROPER DRIVER SLEEVE TO PREVENT MUSHROOMING TOP OF ROD. WHEN ROCK BOTTOM IS ENCOUNTERED, THE ELECTRODE SHALL BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM THE VERTICAL AWAY FROM STRUCTURES. TOP OF GROUNDING ELECTRODE SHALL BE MIN. 3'-6" BELOW FINISH GRADE. IF IT IS IMPRACTICAL TO DRIVE THE 8'-0" GROUND ROD, CONTRACTOR SHALL INSTALL THE GROUND ROD HORIZONTALLY IN A TRENCH AWAY FROM STRUCTURE, NOT LESS THEN 36" BELOW FINISHED GRADE. UNDER NO CIRCUMSTANCES SHALL THE GROUND ROD BE CUT OR MODIFIED TO ACCOMMODATE VERTICAL INSTALLATION INTO LEDGE. REFER TO THE NEC 2005, ARTICLE #250 FOR MORE INFORMATION ON GROUNDING.

2 / 05 **EQUIPMENT GROUNDING PLAN**
SCALE: N.T.S.



3 / 05 **ICE BRIDGE DETAIL**
SCALE: N.T.S.



NOTES:

1. LOCATION OF ANTENNA MUST HAVE A CLEAR VIEW OF SOUTHERN SKY AND CANNOT HAVE ANY BLOCKAGES EXCEEDING 25% OF A SURFACE AREA OF A HEMISPHERE AROUND THE GPS ANTENNA.
2. ALL GPS ANTENNA LOCATIONS MUST BE ABLE TO RECEIVE CLEAR SIGNALS FROM A MINIMUM OF 4 SATELLITES. VERIFY WITH HANDHELD GPS BEFORE FINAL LOCATION OF GPS ANTENNA.

4 / 05 **GPS MOUNTING DETAIL**
SCALE: N.T.S.

STATE OF CONNECTICUT — ANTHONY C. ALFIERI — No. 18704 — LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
1	11/03/08	ISSUED FOR CONSTRUCTION - REVISED CABLE ROUTING	JCF
0	09/10/08	ISSUED FOR CONSTRUCTION	JCF

pocket SMART WIRELESS

PROJECT NAME: HFCT1349A, 467 SOUTH QUAKER LANE

SHEET: GROUNDING PLAN AND DETAILS

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-529-8882

CHECKED BY: JCF
DRAWN BY: KAP
DATE: 08-19-2008
URS JOB NUMBER: PC1006-36923926
DRAWING NUMBER: 05

PANEL SSC

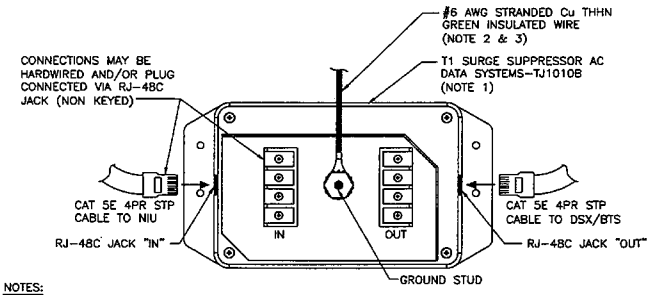
LOAD DESCRIPTION	LOAD (kVA)	BRKR SIZE	CCT NO.	PHASE A	PHASE B	CCT NO.	BRKR SIZE	LOAD (kVA)	LOAD DESCRIPTION
BTS CABINET	2.5	30/2	1			2	30/2	2.2	BTS CABINET
	2.5		3			4		2.2	
LIGHTING	1.9	10/1	5			6	20/1	0.2	GFI OUTLET
SPACE	–	–	7			8	–	–	SPACE
SPACE	–	–	9			10	–	–	SPACE
SPACE	–	–	11			12	–	–	SPACE
SPACE	–	–	13			14	–	–	SPACE
SPACE	–	–	15			16	–	–	SPACE
SPACE	–	–	17			18	–	–	SPACE
SPACE	–	–	19			20	–	–	SPACE
SPACE	–	–	21			22	–	–	SPACE
SPACE	–	–	23			24	–	–	SPACE
LOAD SUB–TOTAL	6.9	LOAD TOTAL		11.5 kVA				4.6	LOAD SUB–TOTAL

100A MCB, 120/208/240V, 1ø, 3 WIRE, 65,000 AIC		
TOTAL CONNECTED LOAD	11.5 KW	
25% OF LARGEST CONT. LOAD	1.25 KW	
TOTAL LOADS	12.75 KW	
NOTE: ALL NON–OPTIONAL BREAKERS PROVIDED BY SSC MFR		

1/06 PANEL SCHEDULE
SCALE: N.T.S.

GENERAL ELECTRIC NOTES:

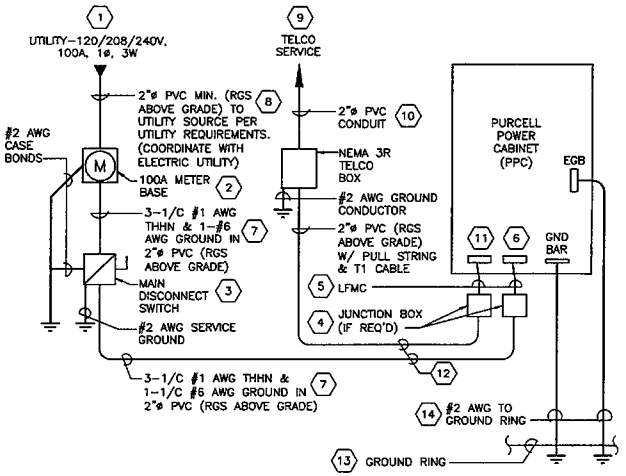
1. ALL ELECTRICAL AND GROUNDING WORK SHALL BE PERFORMED IN ACCORDANCE WITH PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONDUIT ROUTINGS ARE SCHEMATIC, CONTRACTOR SHALL VERIFY ROUTING AND LENGTHS PRIOR TO CONSTRUCTION.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
4. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
5. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES, AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.



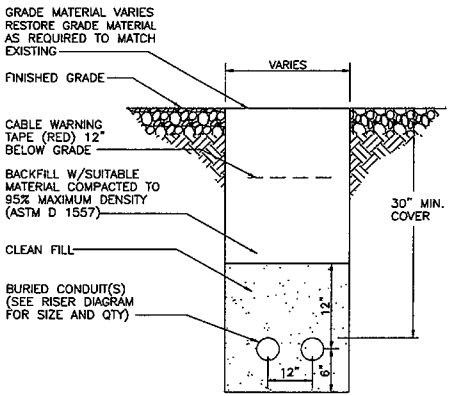
NOTES:

1. MOUNT T1–TVSS UNIT ON EQUIPMENT FRAME HOUSING THE DSX UNIT. USE APPROPRIATE STAINLESS STEEL BOLTS WITH FLAT WASHERS AND A LOCK WASHER ON THE NUT SIDE. THE TVSS MAY BE LOCATED ON THE TELCO BACKBOARD. REFER TO MANUFACTURER'S INSTRUCTIONS.
2. ATTACH RING TERMINAL FROM SUPPLIED GROUND CONDUCTOR TO TVSS GROUND STUD SECURELY FASTEN WITH SUPPLIED WASHER AND NUT. REFER TO MANUFACTURER'S INSTRUCTIONS. FOR PROPER PERFORMANCE, THE GROUND CONDUCTOR LENGTH SHOULD BE LIMITED WITH NO SHARP BENDS ON COILS.
3. WHEN TVSS IS MOUNTED ON EQUIPMENT FRAME, BOND THE GROUND CONDUCTOR TO THE EQUIPMENT FRAME GROUND. ENSURE PROPER GROUNDING SURFACES. WHEN TVSS IS MOUNTED ON THE TELCO BACK BOARD, BOND THE GROUND CONDUCTOR TO THE TELCO (BOARD) GROUND BAR OR NEAREST GROUND BAR.

3/06 TVSS DETAIL
SCALE: N.T.S.



2/06 POWER, TELCO, GROUND SINGLE LINE DIAGRAM FOR OUTDOOR CABINET
SCALE: N.T.S.



ELECTRICAL/TELEPHONE TRENCH DETAIL NOTES:

1. THE CLEAN FILL SHALL PASS THROUGH A 3/8" MESH SCREEN AND SHALL NOT CONTAIN SHARP STONES. OTHER BACKFILL SHALL NOT CONTAIN ASHES, CINDERS, SHELLS, FROZEN MATERIAL, LOOSE DEBRIS OR STONES LARGER THAN 2" IN MAXIMUM DIMENSION. THE TRENCH SHALL BE BACKFILLED IMMEDIATELY FOLLOWING PLACEMENT OF THE CONDUITS.
2. WHERE EXISTING UTILITIES ARE LIKELY TO BE ENCOUNTERED, CONTRACTOR SHALL HAND DIG AND PROTECT EXISTING UTILITIES.

4/06 TYPICAL ELECTRICAL/ TELEPHONE TRENCH DETAIL
SCALE: N.T.S.

REFERENCE NOTES:

1. ELECTRICAL DEMARCATION POINT. ELECTRICAL CONTRACTOR TO COORDINATE WITH LOCAL UTILITY COMPANY FOR SERVICE TO METER.
2. CONTRACTOR TO SUPPLY AND INSTALL A 100A, 120/208/240V 1ø, 3W METER BASE. METER BASE TO BE NEMA 3R RATED AND ACCEPTABLE TO LOCAL UTILITY. PROVIDE WITH MECHANICALLY ATTACHED ENGRAVED IDENTIFICATION LABEL INDICATING "POCKET COMMUNICATIONS METER".
3. CONTRACTOR TO SUPPLY AND INSTALL NEMA 3R 100A FUSIBLE DISCONNECT SWITCH WITH LOCKABLE HANDLE. PROVIDE WITH TWO (2) 100A FUSES. AIC RATING TO COORDINATE WITH LOCAL UTILITY REQUIREMENTS. PROVIDE WITH MECHANICALLY ATTACHED ENGRAVED IDENTIFICATION LABEL INDICATING "POCKET COMMUNCATIONS SERVICE DISCONNECT".
4. WEATHER TIGHT NEMA 3R JUNCTION BOX (IF REQUIRED). SIZE TO NEC CODE FOR APPLICATION.
5. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT W/ WEATHER TIGHT FITTINGS AND SUPPORTS. SIZE AND CONTENTS TO MATCH ASSOCIATED USE (POWER AND TELCO) SEE NOTE #5 BELOW.
6. UTILITY POWER ENTRY INTO CABINET. COORDINATE TERMINATION WITH CABINET MANUFACTURER.
7. CONTRACTOR SHALL SUPPLY AND INSTALL 2" GRC. AFG AND PVC 36" BFG C/W 3#1 & 1#6G, AWG THHN FOR UTILITY SERVICE.
8. CONTRACTOR SHALL SUPPLY AND INSTALL 2" GRC. AFG AND PVC 36" BFG C/W 3#1 & 1#6G, AWG THHN FOR UTILITY SERVICE.
9. TELCO DEMARCATION POINT. ELECTRICAL CONTRACTOR TO COORDINATE WITH LOCAL TELCO FOR SERVICE TO TELCO BOX OR CABINET.
10. CONTRACTOR TO SUPPLY AND INSTALL (1) 2" GRC AFG AND PVC 36" BFG C/W PULL CORDS FOR TELCO SERVICE TO CABINET TERMINATION POINT.
11. TELCO SERVICE ENTRY INTO CABINET. COORDINATE TERMINATION WITH CABINET MANUFACTURER.
12. CONTRACTOR TO ARRANGE AND PAY FOR UNDERGROUND UTILITY LOCATION SURVEYS FOR ALL TRENCHING. REUSE NATIVE BACKFILL AND RE–INSTATE TO ORIGINAL CONDITION. INSTALL 6" WIDE METALLIC LINED RED PLASTIC MARK TAPE 12" BELOW GRADE.
13. PORTION OF EXTERIOR GROUND RING
14. (1) #2 SOLID BARE TINNED COPPER EQUIPMENT GROUND CONDUCTOR BONDED TO 5/8"x8' COPPER CLAD STEEL GROUNDING ELECTRODES. LOCATE GROUNDING ELECTRODE ADJACENT TO CABINET. BOND GROUNDING ELECTRODE SYSTEM TO CABINET GROUND RING.

NOTES:

1. CONTRACTOR SHALL PROVIDE 100 AMP. SINGLE PHASE, 120/208/240 VAC, 60 HZ ELECTRIC SERVICE FOR SITE
2. CONTRACTOR SHALL COORDINATE WITH UTILITY COMPANY BEFORE THE START OF CONSTRUCTION. POWER AND TELCO CONDUIT SHALL BE PROVIDED AND INSTALLED PER UTILITY REQUIREMENTS.
3. FOR COMPLETE INTERNAL WIRING AND ARRANGEMENT REFER TO DRAWINGS PROVIDED BY AC OR TELCO PANEL MANUFACTURER.
4. ALL SERVICE EQUIPMENT AND INSTALLATIONS SHALL COMPLY WITH THE N.E.C. AND UTILITY COMPANY AND LOCAL CODE REQUIREMENTS.
5. CONTRACTOR SHALL INSTALL SUFFICIENT LENGTHS OF LFMC (NOT EXCEEDING 6'–0") INCLUDING ALL CONDUIT FITTINGS (NUTS, REDUCING BUSHINGS, ELBOWS, COUPLINGS, ETC.) NECESSARY FOR CONNECTION FROM IMC CONDUIT TO THE PURCELL POWER CABINET. (PPC)
6. CONTRACTOR SHALL PROVIDE ELECTRICAL SERVICE EQUIPMENT WITH FAULT CURRENT RATINGS GREATER THAN THE AVAILABLE FAULT CURRENT FROM THE POWER UTILITY.
7. CONTRACTOR SHALL VERIFY THAT THE MAIN BONDING JUMPER AND GROUNDING ELECTRODE CONDUCTOR IS INSTALLED PROPERLY IN MAIN DISCONNECT SWITCH.

STATE OF CONNECTICUT
ANTHONY C. RAY
No. 18704
LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
1	11/03/08	ISSUED FOR CONSTRUCTION + REVISED CABLE ROUTING	JCF
0	09/10/08	ISSUED FOR CONSTRUCTION	JCF

pocket
SMART WIRELESS

PROJECT NAME: HFCT1349A, 467 SOUTH QUAKER LANE
SHEET: ELECTRICAL DETAILS

URS
URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(800)-828-3882

CHECKED BY: JCF
DRAWN BY: KAP
DATE: 08-19-2008
URS JOB NUMBER: PC1006-36923926
DRAWING NUMBER: 06

Exhibit C

Equipment Specifications

Pocket Site HFCT1349A

457 Quaker Lane South

aka 471 South Quaker Lane

West Hartford, Connecticut

KATHREIN
SCALA DIVISION

742 213

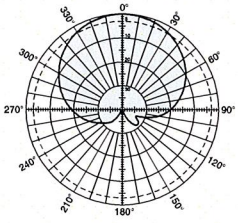
65° Panel Antenna

Kathrein's X-polarized adjustable electrical downtilt antennas offer the wireless carrier the ability to tailor polarization diversity sites for optimum performance. Using variable downtilt, only a few models need be procured to accommodate the needs of widely varying conditions. Remotely controlled downtilt is available as a retrofitable option.

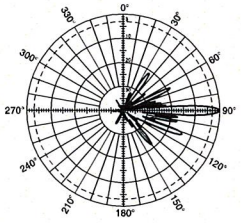
- 0-6° downtilt range.
- UV resistant pulltruded fiberglass radome.
- DC Grounded metallic parts for impulse suppression.
- No moving electrical connections.
- Wideband vector dipole technology.
- Optional remote downtilt Control.
- Will accomodate future 3G / UMTS applications.

General specifications:

Frequency range	1710–2170 MHz
VSWR	< 1.5:1
Impedance	50 ohms
Intermodulation (2x20w)	IM3: <-150 dBc
Polarization	+45° and -45°
Front-to-back ratio (180°±30°)	>30 dB (co-polar) >25 dB (total power)
Maximum input power	300 watts per input (at 50°C)
Electrical downtilt continuously adjustable	0–6 degrees
Connector	2 x 7/16 DIN female
Isolation	>30 dB
Cross polar ratio Main direction 0° Sector ±60°	 25 dB (typical) >10 dB
Weight	22 lb (10 kg)
Dimensions	76.5 x 6.1 x 2.7 inches (1942 x 155 x 69 mm)
Equivalent flat plate area	4.62 ft² (0.429 m²)
Wind survival rating*	120 mph (200 kph)
Shipping dimensions	87.2 x 6.8 x 3.6 inches (2214 x 172 x 92 mm)
Shipping weight	24.3 lb (11 kg)
Mounting	Fixed and tilt mount options are available for 2 to 4.6 inch (50 to 115 mm) OD masts.
See reverse for order information.	



Horizontal pattern
±45°- polarization



Vertical pattern
±45°- polarization

Specifications:	**1710–1880 MHz**	**1850–1990 MHz**	**1920–2170 MHz**
Gain	19 dBi	19.2 dBi	19.5 dBi
+45° and -45° polarization horizontal beamwidth	67° (half-power)	65° (half-power)	63° (half-power)
+45° and -45° polarization vertical beamwidth	4.7° (half-power)	4.5° (half-power)	4.3° (half-power)
Vertical Pattern–sidelobe suppression for first side-lobe above main beam	0° 2° 4° 6° T 18 17 15 15 dB	0° 2° 4° 6° T 18 18 17 15 dB	0° 2° 4° 6° T 18 18 17 15 dB

RoHS Lead-Free

10642-H
936.2074/h

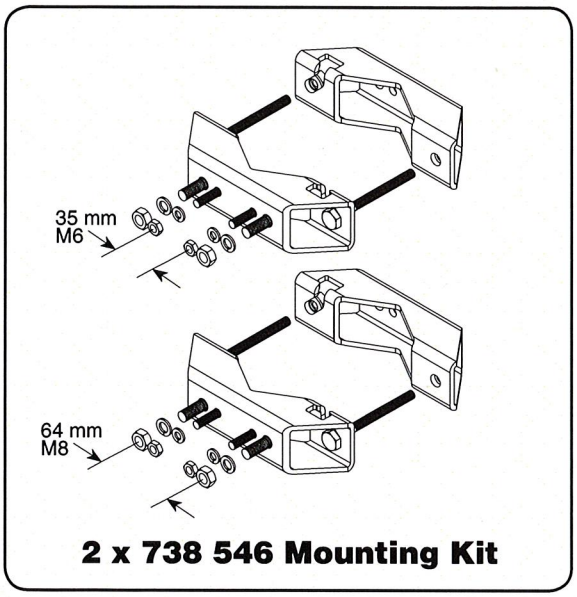
*Mechanical design is based on environmental conditions as stipulated in EIA-222-F (June 1996) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
Email: communications@kathrein.com Internet: www.kathrein-scala.com

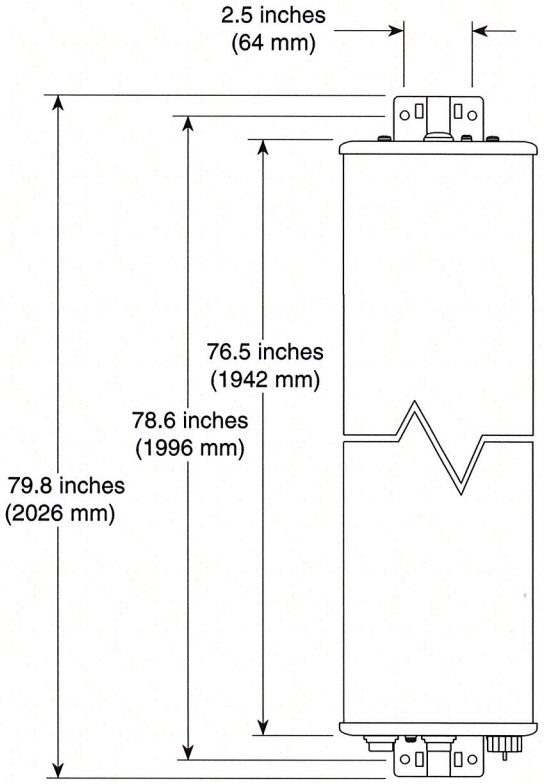
KATHREIN
SCALA DIVISION

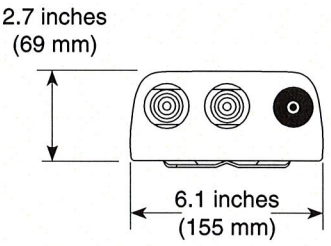
742 213

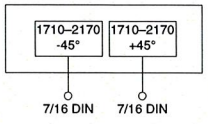
65° Panel Antenna



2 x 738 546 Mounting Kit







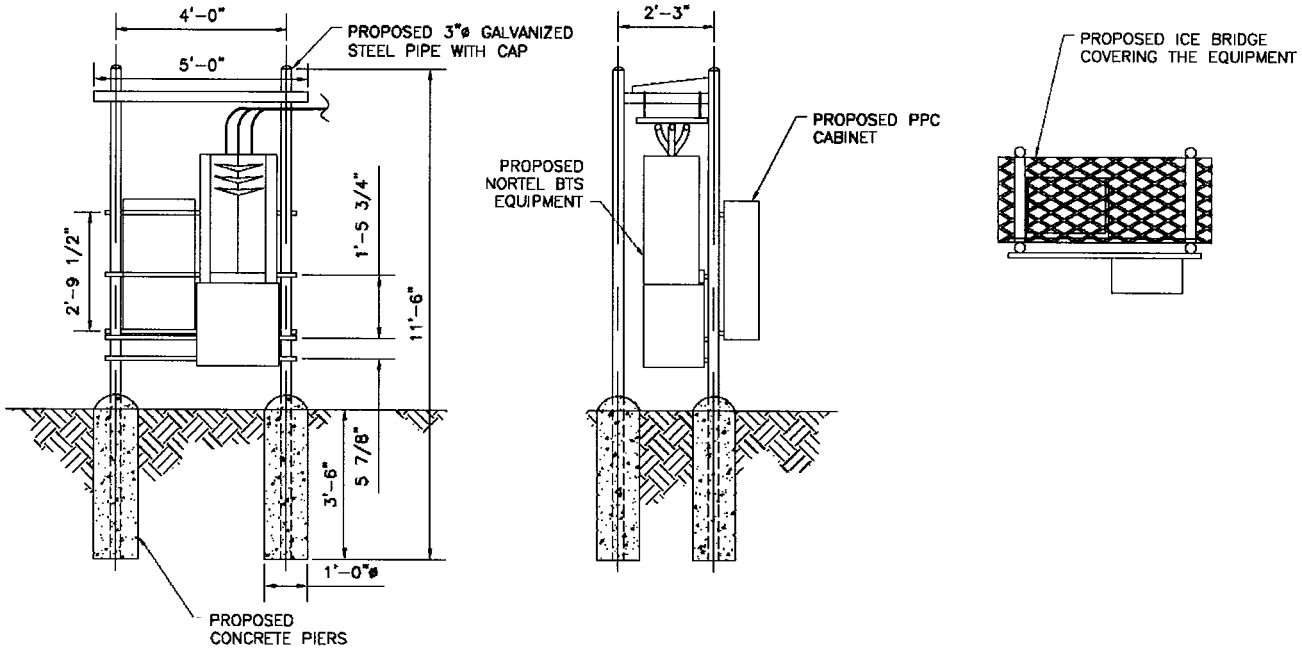
Mounting Options:

Model	Description
2 x 738 546	Mounting Kit for 2 to 4.6 inch (50 to 115 mm) OD mast.
737 978	Tilt Kit for use with the above mounting kit, 0–11 degrees downtilt angle. (requires 2 x 738 546 Mounting Kit)
742 263	Three-panel Sector Mounting Kit (120 deg. ea.) for 3.5 inch (89 mm) OD mast.

Order Information:

Model	Description
742 213	Antenna with 7/16 DIN connectors 0°–6° adjustable electrical downtilt

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
Email: communications@kathrein.com Internet: www.kathrein-scala.com



Pocket/Youghiogheny Communications – Northeast, LLC
Rack Detail

CDMA BTS 3231 AWS 1.7/2.1 GHz (Outdoor/Indoor)

CDMA BTS 3231

Industry's Highest Capacity AWS Micro BTS

The CDMA BTS 3231 is the latest extension to Nortel Networks BTS (Base Transceiver Station) portfolio providing the ideal solution for urban, sub-urban and rural deployments. The CDMA BTS 3231 is a 3-carrier, 3-sector outdoor/indoor BTS operating at the AWS band of 1.7/2.1 GHz supporting IS-95, 1XRTT and 1xEV-DO simultaneously. BTS 3231 provides flexible deployments solutions including floor, rack, and wall mount options. The power consumption of BTS3231 is industry leading consuming only 630W for 3C3S. The BTS 3231 is also very light at 240lbs making it easy to transport to hard to reach locations such as the top of a high rise building.

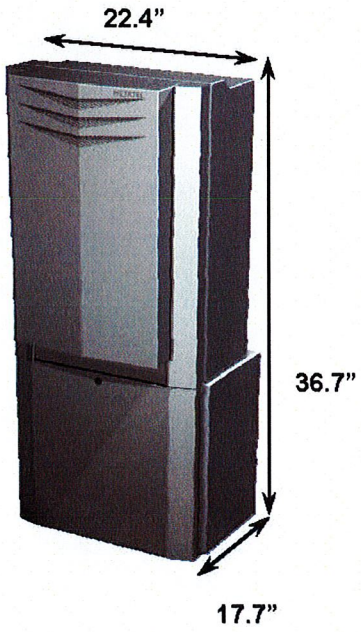


Exhibit D

Power Density Calculations

Pocket Site HFCT1349A

457 Quaker Lane South

aka 471 South Quaker Lane

West Hartford, Connecticut

C Squared Systems, LLC
920 Candia Road
Manchester, NH 03109
Phone: (603) 657 9702
E-mail:
support@csquaredsystems.com

Calculated Radio Frequency Emissions

CT-1349 aka HFCT1349

457 Quaker Lane South (aka 471 So. Quaker Ln)

West Hartford, CT

Table of Contents

List of Tables

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed Pocket antennas to be installed on the existing tower at 457 Quaker Lane South (aka 471 So. Quaker Ln), West Hartford, CT.

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are much more conservative (higher) than the actual signal levels will be from the finished installation.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (mW/ cm^2). The number of mW/cm^2 emitted is called the power density. The general population exposure limit for the cellular band is 0.567-0.593 mW/ cm^2, and the general population exposure limit for the PCS/AWS band is 1.0 mW/ cm^2. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Higher exposure limits are permitted under the occupational / controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure (through training), and they must be able to exercise control over their exposure. General population / uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals."

The FCC describes exposure to radio frequency (RF) energy in terms of percentage of maximum permissible exposure (MPE) with 100% being the maximum allowed. Rather than the FCC presenting the user specification in terms of complex power density figures over a specified surface area, this MPE measure is particularly useful, and even more so when considering that power density limits actually vary by frequency because of the different absorptive properties of the human body at different frequencies.

MPE limits are specified as time-averaged exposure limits. This means that exposure can be averaged over 30 minutes for general population / uncontrolled exposure (or 6 minutes for occupational / controlled exposure). However, for the case of exposure of the general public, time averaging is usually not applied because of uncertainties over exact exposure conditions and difficulty in controlling time of exposure. Therefore, the typical conservative approach is to assume that any RF exposure to the general public will be continuous.

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

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

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

Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit. As shown in these excerpts, each frequency band has different exposure limits, requiring power density to be reported as a percent of Maximum Permissible Exposure (MPE) when dealing with carriers transmitting in different frequency bands.

3. RF Exposure Prediction Methods

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

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

Where:

EIRP = Effective Isotropic Radiated Power

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

H = Horizontal Distance from antenna

V = Vertical Distance from bottom of antenna

Off Beam Loss is determined by the selected antenna patterns

4. Calculation Results

Table 1 below outlines the power density information for the site. All information for carriers other than Pocket was obtained from current CSC database, unless where otherwise noted[1].

Carrier	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Antenna Height (Feet)	Operating Frequency (MHz)	Total ERP (Watts)	Power Density (mw/cm^2)	Limit	%MPE
AT&T	4	275	107	1945	1100	0.0345	1.0000	3.45%
T-Mobile	8	205.15	120	1900	1641.2	0.0410	1.0000	4.10%
Verizon	9	200	100	880	1800	0.0647	0.5867	11.03%
Verizon	3	285	100	1900	855	0.0307	1.0000	3.07%
Pocket	3	631	90	2130-2133.75	1893	0.1507	1.0000	15.07%
							Total	36.73%

Table 1: Proposed Carrier Information

5. Conclusion

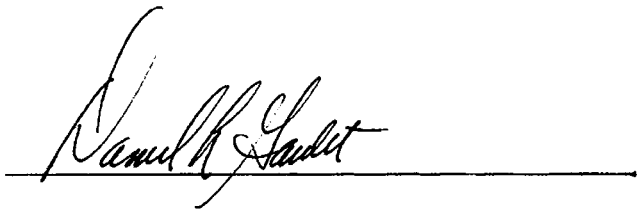
The above analysis verifies that emissions from the proposed site will be well below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at the base of the tower is 36.73% of the FCC limit.

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

[1] According to the structural analysis report submitted on October 30, 2008 by the engineering firm of NATCOMM Consulting Engineers, Verizon has relocated their antennas from 80' centerline to 100' centerline. Their reported %MPE values have been updated based on this change in centerline and included in the calculation of the total %MPE value.

6. Statement of Certification

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



November 3, 2008
Date

Daniel l. Goulet
C Squared Systems, LLC

Attachment A: References

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

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

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

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

(A) Limits for Occupational/Controlled Exposure

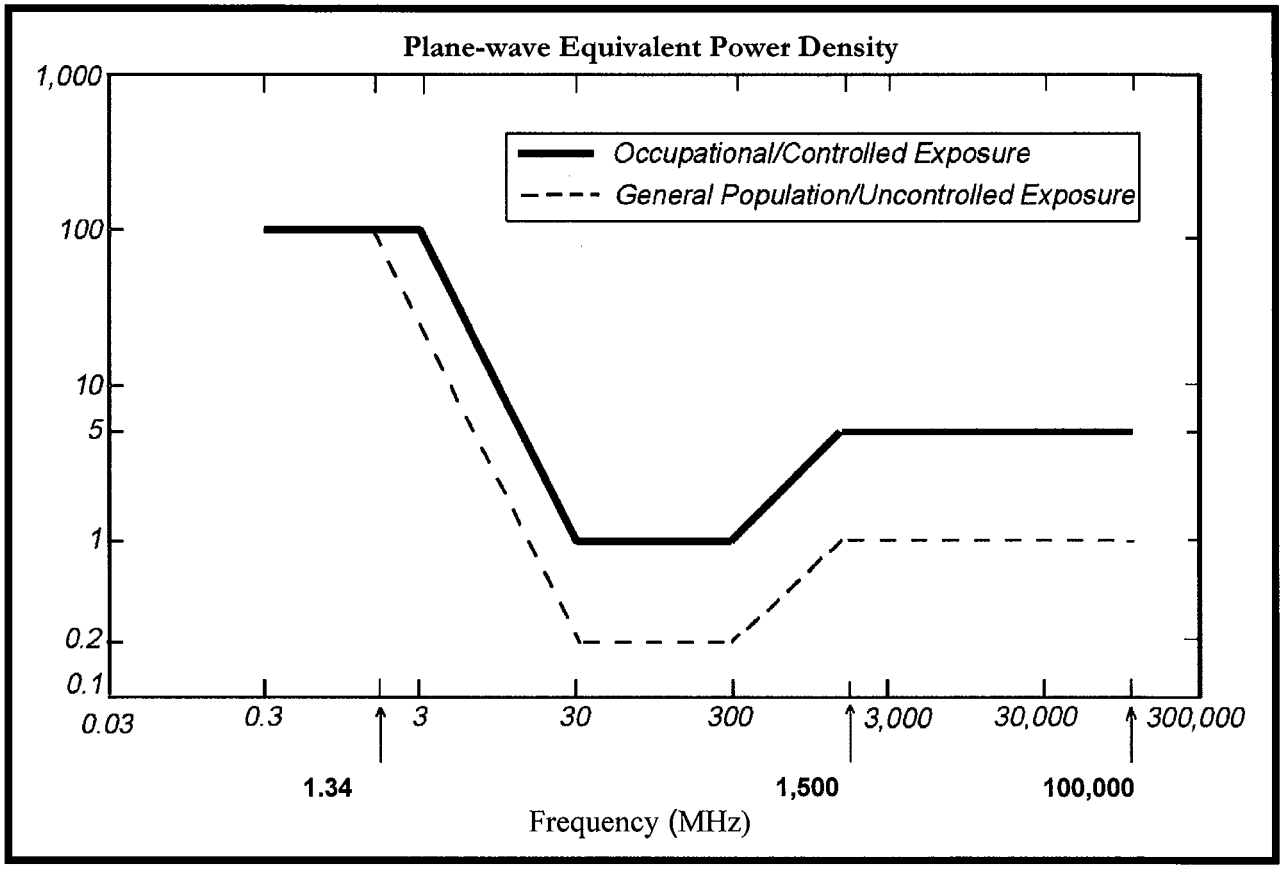
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure

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

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

NOTE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
NOTE 2: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.



• FCC Limits for Maximum Permissible Exposure (MPE)

Exhibit E

Structural Analysis

Pocket Site HFCT1349A

457 Quaker Lane South

aka 471 South Quaker Lane

West Hartford, Connecticut

APPROVED

NATCOMM INC.
CONSULTING ENGINEERS

Structural Analysis Report

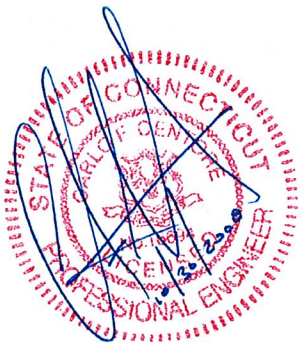
120' Existing Monopole

Pocket Wireless Site: HFCT 1349A

T-Mobile Site: CT-11-178
457 Quaker Lane South
West Hartford, CT

Natcomm Project No. 08158

Date: October 30, 2008



Prepared for:

T-Mobile Towers
4 Sylvan Way
Parsippany, NJ 07054

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w: nat-eng.com
63-2 N. Branford Rd.
Branford, CT 06405

Table of Contents

Natcomm, Inc.
Structural Monopole Analysis
120' Existing PiROD Monopole
West Hartford, CT
October 30, 2008

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 T-Mobile on behalf of Pocket Wireless on the existing monopole (tower) located in West Hartford, Connecticut.

The host tower is a 120-ft, four-section, sixteen sided, tapered monopole originally designed and manufactured by PiROD Inc., eng file no. A-116876, Revision B, dated May 05, 2000. The tower geometry, structure member sizes and foundation system information were taken from PiROD's design report. Antenna and appurtenance information were obtained from a previous structural analysis report prepared by GPD Group, signed and sealed May 1, 2006 and a Structural Analysis Worksheet (SAW) provided by T-Mobile, dated October 24, 2008.

The above reference materials are available for reference in Section 4 of this report.

The tower is made up of four (4) 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 22.27-in at the top and 49.06-in at the base.

Pocket Wireless is proposing the installation of three (3) Cellular panel antennas flush mounted to the existing monopole. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna 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:

- T-MOBILE (Existing):
  Antennas: Twelve (12) EMS RR65-19-00DP panel antennas, twelve (12) LNA's and one (1) 4-ft Dish on an existing 13' Low Profile Platform with a RAD center elevation of 120-ft above the existing tower base plate.
  Coax Cables: Twenty-five (25) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- AT&T (Existing):
  Antennas: Twelve (12) Allgon 7184.14 panel antennas on a 13' Low Profile Platform with a RAD center elevation of 110-ft above the existing tower base plate.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- VERIZON (Existing):
  Antennas: Six (6) Antel WPA-80090/4CF, six (6) Andrew DB948F85T2E-M panel antennas and one (1) GPS antenna on a 13' Low Profile Platform with a RAD center elevation of 100-ft above the existing tower base plate.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.

- **POCKET WIRELESS (Proposed):**
  Antennas: Three (3) Kathrein 742-213 panel antennas flush mounted on a universal tri-bracket assembly at a RAD center elevation of 90-ft above the existing tower base plate.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside 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 within tower.
- A new porthole will not be required.

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 80 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:	Hartford; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	West Hartford; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA wind speed controls	
Load Cases:	Load Case 1; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation. This load case typically controls the design of monopole towers.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 69 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed. This load case typically controls the design of lattice towers.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1610.1.3 of State Bldg. Code 2005] does not control in the design of this structure type*

Natcomm, Inc.
Structural Monopole Analysis
120' Existing PiROD Monopole
West Hartford, CT
October 30, 2008

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 **53%** of its total capacity.

Foundation and Anchors

The existing foundation consists of a 6-ft square reinforced concrete pedestal and 16.67-ft square reinforced concrete pad bearing directly on existing sub grade. The existing foundation was previously reinforced by installing four (4) helical anchor details of which are outlined in design drawing 'S-1' prepared by Natcomm, LLC., dated May 29, 2007 available in Section 4 of this report. The sub-grade conditions used in the analysis of the existing foundation were obtained from Jaworski Geotech, Inc's (JGI) geotechnical report JGI project no. J2075170G, dated April 24, 2007 also available in Section 4 of this report. The monopole tower is connected to the pedestal by means of twelve (33) 1-1/4" diameter, A687 anchor bolts embedded approximately 4-ft 3-in 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:
  - Shear Force @ top of pedestal = **19** kips
  - Moment @ top of pedestal = **1571** ft-kips
  - Axial Force @ top of pedestal = **29** kips
- The base plate, anchor bolts and the foundation are within allowable limits.
- Foundation resists two times the calculated wind load per the requirements of Section 3108.4.2 of the 2005 CT State Building Code Supplement to the 2003 International Building Code (IBC).
- The tower foundation was found to be at **100%** of its total capacity.

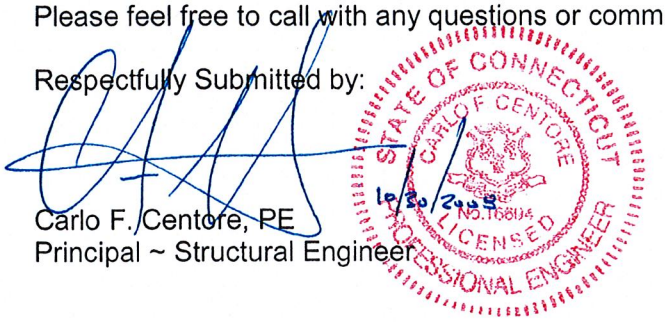
Conclusion

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

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Natcomm, 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

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 Natcomm, 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 Natcomm, 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. Natcomm, 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

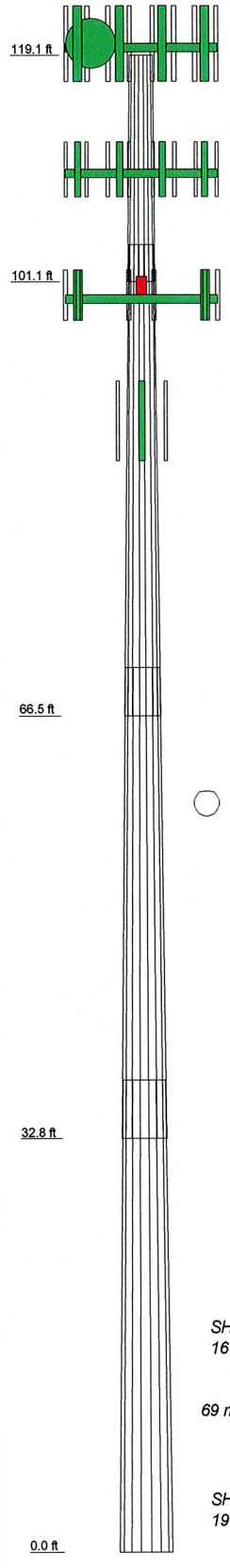
RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

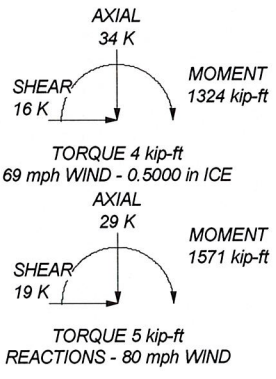
RISATower Features:

- 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	1	2	3	4
Length (ft)	18.00	37.50	37.50	37.50
Number of Sides	16	16	16	16
Thickness (in)	0.2500	0.3125	0.3750	0.3750
Lap Splice (ft)	2.92	3.83	4.67	
Top Dia (in)	22.2700	24.8949	32.5012	39.8482
Bot Dia (in)	26.0000	34.0625	41.7500	49.0625
Grade	A572-65			
Weight (K)	1.2	3.7	5.6	6.7

Total Weight (K) 17.2





TORQUE 4 kip-ft
69 mph WIND - 0.5000 in ICE

TORQUE 5 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Valmont 13' Low Profile Platform (T-Mobile)	120	Valmont 13' Low Profile Platform (ATI)	110
(4) RR65-19-00DP w/Mount Pipe (T-Mobile)	120	(2) WPA-80090/4CF (Verizon)	100
(4) RR65-19-00DP w/Mount Pipe (T-Mobile)	120	(2) WPA-80090/4CF (Verizon)	100
(4) RR65-19-00DP w/Mount Pipe (T-Mobile)	120	(2) WPA-80090/4CF (Verizon)	100
(4) TMA 10"x8"x3" (T-Mobile)	120	(2) DB948F85T2E-M (Verizon)	100
(4) TMA 10"x8"x3" (T-Mobile)	120	(2) DB948F85T2E-M (Verizon)	100
(4) TMA 10"x8"x3" (T-Mobile)	120	(2) DB948F85T2E-M (Verizon)	100
4 FT DISH	120	GPS (Verizon)	100
(4) 7184.14 (ATI)	110	Valmont 13' Low Profile Platform (Verizon)	100
(4) 7184.14 (ATI)	110	742-213 (Pocket)	90
(4) 7184.14 (ATI)	110	742-213 (Pocket)	90
		Uni-Tri Bracket (Pocket)	90
		742-213 (Pocket)	90

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 53%

NATCOMM INC
63-3 N Branford Rd
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	***120' PiROD Monopole***		
Project:	***457 Quaker Lane South, West Hartford, CT***		
Client: T-Mobile (Pocket)	Drawn by: Staff	App'd:	
Code: TIA/EIA-222-F	Date: 10/30/08	Scale: NTS	
Path: J:\Jobs\0815800 W\ERI Files\120' PiROD Monopole W Hartford, CT.eri		Dwg No. E-1	

RISATower	Job	Page
	120' PiROD Monopole	1 of 19
NATCOMM INC 63-3 N Branford Rd Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project 457 Quaker Lane South, West Hartford, CT	Date 12:24:27 10/30/08
	Client T-Mobile (Pocket)	Designed by Staff

Tower Input Data

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

Basic wind speed of 80 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

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	119.08-101.08	18.00	2.92	16	22.2700	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	101.08-66.50	37.50	3.83	16	24.8949	34.0625	0.3125	1.2500	A572-65 (65 ksi)
L3	66.50-32.83	37.50	4.67	16	32.5012	41.7500	0.3750	1.5000	A572-65 (65 ksi)
L4	32.83-0.00	37.50		16	39.8482	49.0625	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.7063	17.5609	1075.7144	7.8391	11.3577	94.7123	2167.7165	8.6830	3.9342	15.737
	26.5094	20.5356	1720.1913	9.1670	13.2600	129.7279	3466.4285	10.1538	4.6765	18.706
L2	26.1105	24.5056	1870.8049	8.7513	12.6964	147.3492	3769.9360	12.1167	4.3322	13.863
	34.7298	33.6445	4841.4606	12.0150	17.3719	278.6953	9756.2268	16.6354	6.1566	19.701
L3	34.1010	38.4309	5010.8770	11.4369	16.5756	302.3043	10097.6248	19.0021	5.7215	15.257
	42.5679	49.4948	10704.1044	14.7295	21.2925	502.7171	21570.2819	24.4726	7.5620	20.165
L4	41.7989	47.2198	9294.8799	14.0525	20.3226	457.3669	18730.4955	23.3477	7.1835	19.156
	50.0237	58.2424	17441.6971	17.3328	25.0219	697.0580	35147.4826	28.7978	9.0172	24.046

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 119.08-101.08				1	1	1		
L2 101.08-66.50				1	1	1		
L3 66.50-32.83				1	1	1		
L4 32.83-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1 5/8 (T-Mobile)	C	No	Inside Pole	119.08 - 3.00	25	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (AT&T)	B	No	Inside Pole	110.00 - 3.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1 5/8 (Verizon)	A	No	Inside Pole	100.00 - 3.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
7/8 (Verizon)	A	No	Inside Pole	100.00 - 3.00	1	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
LCF158-50JA (Pocket - proposed)	C	No	Inside Pole	90.00 - 3.00	6	No Ice	0.00	0.80
						1/2" Ice	0.00	0.80

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	119.08-101.08	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.11
		C	0.000	0.000	0.000	0.000	0.47
L2	101.08-66.50	A	0.000	0.000	0.000	0.000	0.44
		B	0.000	0.000	0.000	0.000	0.43
		C	0.000	0.000	0.000	0.000	1.01
L3	66.50-32.83	A	0.000	0.000	0.000	0.000	0.44
		B	0.000	0.000	0.000	0.000	0.42
		C	0.000	0.000	0.000	0.000	1.04

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L4	32.83-0.00	A	0.000	0.000	0.000	0.000	0.39
		B	0.000	0.000	0.000	0.000	0.37
		C	0.000	0.000	0.000	0.000	0.92

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	119.08-101.08	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.11
		C		0.000	0.000	0.000	0.000	0.47
L2	101.08-66.50	A	0.500	0.000	0.000	0.000	0.000	0.44
		B		0.000	0.000	0.000	0.000	0.43
		C		0.000	0.000	0.000	0.000	1.01
L3	66.50-32.83	A	0.500	0.000	0.000	0.000	0.000	0.44
		B		0.000	0.000	0.000	0.000	0.42
		C		0.000	0.000	0.000	0.000	1.04
L4	32.83-0.00	A	0.500	0.000	0.000	0.000	0.000	0.39
		B		0.000	0.000	0.000	0.000	0.37
		C		0.000	0.000	0.000	0.000	0.92

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Valmont 13' Low Profile Platform (T-Mobile)	C	None		0.0000	120.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
(4) RR65-19-00DP w/Mount Pipe (T-Mobile)	A	From Face	3.00 0.00 0.00	0.0000	120.00	No Ice	6.10	4.41	0.05
						1/2" Ice	6.67	5.62	0.09
(4) RR65-19-00DP w/Mount Pipe (T-Mobile)	B	From Face	3.00 0.00 0.00	0.0000	120.00	No Ice	6.10	4.41	0.05
						1/2" Ice	6.67	5.62	0.09
(4) RR65-19-00DP w/Mount Pipe (T-Mobile)	C	From Face	3.00 0.00 0.00	0.0000	120.00	No Ice	6.10	4.41	0.05
						1/2" Ice	6.67	5.62	0.09
(4) TMA 10"x8"x3" (T-Mobile)	A	From Face	3.00 0.00 0.00	0.0000	120.00	No Ice	0.78	0.29	0.02
						1/2" Ice	0.90	0.38	0.02
(4) TMA 10"x8"x3" (T-Mobile)	B	From Face	3.00 0.00 0.00	0.0000	120.00	No Ice	0.78	0.29	0.02
						1/2" Ice	0.90	0.38	0.02
(4) TMA 10"x8"x3" (T-Mobile)	C	From Face	3.00 0.00 0.00	0.0000	120.00	No Ice	0.78	0.29	0.02
						1/2" Ice	0.90	0.38	0.02
Valmont 13' Low Profile Platform	C	None		0.0000	110.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(AT&T)									
(4) 7184.14	A	From Face	3.00	0.0000	110.00	No Ice	2.85	1.43	0.01
(AT&T)			0.00			1/2" Ice	3.18	1.75	0.02
			0.00						
(4) 7184.14	B	From Face	3.00	0.0000	110.00	No Ice	2.85	1.43	0.01
(AT&T)			0.00			1/2" Ice	3.18	1.75	0.02
			0.00						
(4) 7184.14	C	From Face	3.00	0.0000	110.00	No Ice	2.85	1.43	0.01
(AT&T)			0.00			1/2" Ice	3.18	1.75	0.02
			0.00						
Valmont 13' Low Profile Platform	C	None		0.0000	100.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
(Verizon)									
(2) WPA-80090/4CF	A	From Face	3.00	0.0000	100.00	No Ice	3.73	2.71	0.01
(Verizon)			0.00			1/2" Ice	4.10	3.01	0.04
			0.00						
(2) WPA-80090/4CF	B	From Face	3.00	0.0000	100.00	No Ice	3.73	2.71	0.01
(Verizon)			0.00			1/2" Ice	4.10	3.01	0.04
			0.00						
(2) WPA-80090/4CF	C	From Face	3.00	0.0000	100.00	No Ice	3.73	2.71	0.01
(Verizon)			0.00			1/2" Ice	4.10	3.01	0.04
			0.00						
(2) DB948F85T2E-M	A	From Face	3.00	0.0000	100.00	No Ice	1.92	3.26	0.01
(Verizon)			0.00			1/2" Ice	2.22	3.62	0.03
			0.00						
(2) DB948F85T2E-M	B	From Face	3.00	0.0000	100.00	No Ice	1.92	3.26	0.01
(Verizon)			0.00			1/2" Ice	2.22	3.62	0.03
			0.00						
(2) DB948F85T2E-M	C	From Face	3.00	0.0000	100.00	No Ice	1.92	3.26	0.01
(Verizon)			0.00			1/2" Ice	2.22	3.62	0.03
			0.00						
GPS	C	From Face	3.00	0.0000	100.00	No Ice	1.00	1.00	0.01
(Verizon)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
742-213	A	From Face	1.00	0.0000	90.00	No Ice	5.14	2.87	0.02
(Pocket)			0.00			1/2" Ice	5.61	3.48	0.05
			0.00						
742-213	B	From Face	1.00	0.0000	90.00	No Ice	5.14	2.87	0.02
(Pocket)			0.00			1/2" Ice	5.61	3.48	0.05
			0.00						
742-213	C	From Face	1.00	0.0000	90.00	No Ice	5.14	2.87	0.02
(Pocket)			0.00			1/2" Ice	5.61	3.48	0.05
			0.00						
Uni-Tri Bracket	C	None		0.0000	90.00	No Ice	1.75	1.75	0.29
(Pocket)						1/2" Ice	1.94	1.94	0.31

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
4 FT DISH	C	Paraboloid w/o Radome	From Face	4.00 4.00 0.00	Worst		120.00	4.00	No Ice 1/2" Ice	12.56 13.09	0.17 0.24

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg % %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 119.08-101.08	109.85	1.41	23	36.203	A	0.000	36.203	36.203	100.00	0.000	0.000
					B	0.000	36.203		100.00	0.000	0.000
					C	0.000	36.203		100.00	0.000	0.000
L2 101.08-66.50	83.23	1.303	21	85.976	A	0.000	85.976	85.976	100.00	0.000	0.000
					B	0.000	85.976		100.00	0.000	0.000
					C	0.000	85.976		100.00	0.000	0.000
L3 66.50-32.83	49.46	1.123	18	105.493	A	0.000	105.493	105.493	100.00	0.000	0.000
					B	0.000	105.493		100.00	0.000	0.000
					C	0.000	105.493		100.00	0.000	0.000
L4 32.83-0.00	15.92	1	16	123.192	A	0.000	123.192	123.192	100.00	0.000	0.000
					B	0.000	123.192		100.00	0.000	0.000
					C	0.000	123.192		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg % %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 119.08-101.08	109.85	1.41	17	0.5000	37.703	A	0.000	37.703	37.703	100.00	0.000	0.000
						B	0.000	37.703		100.00	0.000	0.000
						C	0.000	37.703		100.00	0.000	0.000
L2 101.08-66.50	83.23	1.303	16	0.5000	88.858	A	0.000	88.858	88.858	100.00	0.000	0.000
						B	0.000	88.858		100.00	0.000	0.000
						C	0.000	88.858		100.00	0.000	0.000
L3 66.50-32.83	49.46	1.123	14	0.5000	108.299	A	0.000	108.299	108.299	100.00	0.000	0.000
						B	0.000	108.299		100.00	0.000	0.000
						C	0.000	108.299		100.00	0.000	0.000
L4 32.83-0.00	15.92	1	12	0.5000	125.928	A	0.000	125.928	125.928	100.00	0.000	0.000
						B	0.000	125.928		100.00	0.000	0.000
						C	0.000	125.928		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 119.08-101.08	109.85	1.41	9	36.203	A	0.000	36.203	36.203	100.00	0.000	0.000
					B	0.000	36.203		100.00	0.000	0.000
					C	0.000	36.203		100.00	0.000	0.000
L2 101.08-66.50	83.23	1.303	8	85.976	A	0.000	85.976	85.976	100.00	0.000	0.000
					B	0.000	85.976		100.00	0.000	0.000
					C	0.000	85.976		100.00	0.000	0.000
L3 66.50-32.83	49.46	1.123	7	105.493	A	0.000	105.493	105.493	100.00	0.000	0.000
					B	0.000	105.493		100.00	0.000	0.000
					C	0.000	105.493		100.00	0.000	0.000
L4 32.83-0.00	15.92	1	6	123.192	A	0.000	123.192	123.192	100.00	0.000	0.000
					B	0.000	123.192		100.00	0.000	0.000
					C	0.000	123.192		100.00	0.000	0.000

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 plf	Ctrl. Face
L1 119.08-101.08	0.58	1.17	A	1	0.964	1	1	1	36.203	1.36	75.69	C
			B	1	0.964	1	1	1	36.203			
			C	1	0.964	1	1	1	36.203			
L2 101.08-66.50	1.88	3.71	A	1	0.963	1	1	1	85.976	2.98	86.15	C
			B	1	0.963	1	1	1	85.976			
			C	1	0.963	1	1	1	85.976			
L3 66.50-32.83	1.90	5.61	A	1	0.968	1	1	1	105.493	3.16	93.79	C
			B	1	0.968	1	1	1	105.493			
			C	1	0.968	1	1	1	105.493			
L4 32.83-0.00	1.68	6.73	A	1	0.987	1	1	1	123.192	3.37	102.52	C
			B	1	0.987	1	1	1	123.192			
			C	1	0.987	1	1	1	123.192			
Sum Weight:	6.03	17.22						OTM	607.41 kip-ft	10.87		

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 plf	Ctrl. Face
L1 119.08-101.08	0.58	1.17	A	1	0.964	1	1	1	36.203	1.36	75.69	C
			B	1	0.964	1	1	1	36.203			
			C	1	0.964	1	1	1	36.203			
L2 101.08-66.50	1.88	3.71	A	1	0.963	1	1	1	85.976	2.98	86.15	C
			B	1	0.963	1	1	1	85.976			
			C	1	0.963	1	1	1	85.976			
L3 66.50-32.83	1.90	5.61	A	1	0.968	1	1	1	105.493	3.16	93.79	C
			B	1	0.968	1	1	1	105.493			
			C	1	0.968	1	1	1	105.493			
L4 32.83-0.00	1.68	6.73	A	1	0.987	1	1	1	123.192	3.37	102.52	C

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 plf	Ctrl. Face
			B	1	0.987	1	1	1	123.192			
			C	1	0.987	1	1	1	123.192			
Sum Weight:	6.03	17.22						OTM	607.41 kip-ft	10.87		

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 plf	Ctrl. Face
L1 119.08-101.08	0.58	1.17	A	1	0.964	1	1	1	36.203	1.36	75.69	C
			B	1	0.964	1	1	1	36.203			
			C	1	0.964	1	1	1	36.203			
L2 101.08-66.50	1.88	3.71	A	1	0.963	1	1	1	85.976	2.98	86.15	C
			B	1	0.963	1	1	1	85.976			
			C	1	0.963	1	1	1	85.976			
L3 66.50-32.83	1.90	5.61	A	1	0.968	1	1	1	105.493	3.16	93.79	C
			B	1	0.968	1	1	1	105.493			
			C	1	0.968	1	1	1	105.493			
L4 32.83-0.00	1.68	6.73	A	1	0.987	1	1	1	123.192	3.37	102.52	C
			B	1	0.987	1	1	1	123.192			
			C	1	0.987	1	1	1	123.192			
Sum Weight:	6.03	17.22						OTM	607.41 kip-ft	10.87		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.17	A	1	0.964	1	1	1	36.203	1.36	75.69	C
			B	1	0.964	1	1	1	36.203			
			C	1	0.964	1	1	1	36.203			
L2 101.08-66.50	1.88	3.71	A	1	0.963	1	1	1	85.976	2.98	86.15	C
			B	1	0.963	1	1	1	85.976			
			C	1	0.963	1	1	1	85.976			
L3 66.50-32.83	1.90	5.61	A	1	0.968	1	1	1	105.493	3.16	93.79	C
			B	1	0.968	1	1	1	105.493			
			C	1	0.968	1	1	1	105.493			
L4 32.83-0.00	1.68	6.73	A	1	0.987	1	1	1	123.192	3.37	102.52	C
			B	1	0.987	1	1	1	123.192			
			C	1	0.987	1	1	1	123.192			
Sum Weight:	6.03	17.22						OTM	607.41 kip-ft	10.87		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.44	A	1	0.964	1	1	1	37.703	1.06	59.12	C
			B	1	0.964	1	1	1	37.703			
			C	1	0.964	1	1	1	37.703			
L2 101.08-66.50	1.88	4.36	A	1	0.963	1	1	1	88.858	2.31	66.78	C
			B	1	0.963	1	1	1	88.858			
			C	1	0.963	1	1	1	88.858			
L3 66.50-32.83	1.90	6.41	A	1	0.968	1	1	1	108.299	2.43	72.21	C
			B	1	0.968	1	1	1	108.299			
			C	1	0.968	1	1	1	108.299			
L4 32.83-0.00	1.68	7.66	A	1	0.987	1	1	1	125.928	2.58	78.60	C
			B	1	0.987	1	1	1	125.928			
			C	1	0.987	1	1	1	125.928			
Sum Weight:	6.03	19.86						OTM	470.45 kip-ft	8.39		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.44	A	1	0.964	1	1	1	37.703	1.06	59.12	C
			B	1	0.964	1	1	1	37.703			
			C	1	0.964	1	1	1	37.703			
L2 101.08-66.50	1.88	4.36	A	1	0.963	1	1	1	88.858	2.31	66.78	C
			B	1	0.963	1	1	1	88.858			
			C	1	0.963	1	1	1	88.858			
L3 66.50-32.83	1.90	6.41	A	1	0.968	1	1	1	108.299	2.43	72.21	C
			B	1	0.968	1	1	1	108.299			
			C	1	0.968	1	1	1	108.299			
L4 32.83-0.00	1.68	7.66	A	1	0.987	1	1	1	125.928	2.58	78.60	C
			B	1	0.987	1	1	1	125.928			
			C	1	0.987	1	1	1	125.928			
Sum Weight:	6.03	19.86						OTM	470.45 kip-ft	8.39		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.44	A	1	0.964	1	1	1	37.703	1.06	59.12	C
			B	1	0.964	1	1	1	37.703			
			C	1	0.964	1	1	1	37.703			
L2 101.08-66.50	1.88	4.36	A	1	0.963	1	1	1	88.858	2.31	66.78	C
			B	1	0.963	1	1	1	88.858			
			C	1	0.963	1	1	1	88.858			
L3 66.50-32.83	1.90	6.41	A	1	0.968	1	1	1	108.299	2.43	72.21	C
			B	1	0.968	1	1	1	108.299			

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 plf	Ctrl. Face
			C	1	0.968	1	1	1	108.299			
L4 32.83-0.00	1.68	7.66	A	1	0.987	1	1	1	125.928	2.58	78.60	C
			B	1	0.987	1	1	1	125.928			
			C	1	0.987	1	1	1	125.928			
Sum Weight:	6.03	19.86						OTM	470.45 kip-ft	8.39		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.44	A	1	0.964	1	1	1	37.703	1.06	59.12	C
			B	1	0.964	1	1	1	37.703			
			C	1	0.964	1	1	1	37.703			
L2 101.08-66.50	1.88	4.36	A	1	0.963	1	1	1	88.858	2.31	66.78	C
			B	1	0.963	1	1	1	88.858			
			C	1	0.963	1	1	1	88.858			
L3 66.50-32.83	1.90	6.41	A	1	0.968	1	1	1	108.299	2.43	72.21	C
			B	1	0.968	1	1	1	108.299			
			C	1	0.968	1	1	1	108.299			
L4 32.83-0.00	1.68	7.66	A	1	0.987	1	1	1	125.928	2.58	78.60	C
			B	1	0.987	1	1	1	125.928			
			C	1	0.987	1	1	1	125.928			
Sum Weight:	6.03	19.86						OTM	470.45 kip-ft	8.39		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.17	A	1	0.964	1	1	1	36.203	0.53	29.57	C
			B	1	0.964	1	1	1	36.203			
			C	1	0.964	1	1	1	36.203			
L2 101.08-66.50	1.88	3.71	A	1	0.963	1	1	1	85.976	1.16	33.65	C
			B	1	0.963	1	1	1	85.976			
			C	1	0.963	1	1	1	85.976			
L3 66.50-32.83	1.90	5.61	A	1	0.968	1	1	1	105.493	1.23	36.64	C
			B	1	0.968	1	1	1	105.493			
			C	1	0.968	1	1	1	105.493			
L4 32.83-0.00	1.68	6.73	A	1	0.987	1	1	1	123.192	1.31	40.05	C
			B	1	0.987	1	1	1	123.192			
			C	1	0.987	1	1	1	123.192			
Sum Weight:	6.03	17.22						OTM	237.27 kip-ft	4.24		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.17	A	1	0.964	1	1	1	36.203	0.53	29.57	C
			B	1	0.964	1	1	1	36.203			
			C	1	0.964	1	1	1	36.203			
L2 101.08-66.50	1.88	3.71	A	1	0.963	1	1	1	85.976	1.16	33.65	C
			B	1	0.963	1	1	1	85.976			
			C	1	0.963	1	1	1	85.976			
L3 66.50-32.83	1.90	5.61	A	1	0.968	1	1	1	105.493	1.23	36.64	C
			B	1	0.968	1	1	1	105.493			
			C	1	0.968	1	1	1	105.493			
L4 32.83-0.00	1.68	6.73	A	1	0.987	1	1	1	123.192	1.31	40.05	C
			B	1	0.987	1	1	1	123.192			
			C	1	0.987	1	1	1	123.192			
Sum Weight:	6.03	17.22						OTM	237.27 kip-ft	4.24		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.17	A	1	0.964	1	1	1	36.203	0.53	29.57	C
			B	1	0.964	1	1	1	36.203			
			C	1	0.964	1	1	1	36.203			
L2 101.08-66.50	1.88	3.71	A	1	0.963	1	1	1	85.976	1.16	33.65	C
			B	1	0.963	1	1	1	85.976			
			C	1	0.963	1	1	1	85.976			
L3 66.50-32.83	1.90	5.61	A	1	0.968	1	1	1	105.493	1.23	36.64	C
			B	1	0.968	1	1	1	105.493			
			C	1	0.968	1	1	1	105.493			
L4 32.83-0.00	1.68	6.73	A	1	0.987	1	1	1	123.192	1.31	40.05	C
			B	1	0.987	1	1	1	123.192			
			C	1	0.987	1	1	1	123.192			
Sum Weight:	6.03	17.22						OTM	237.27 kip-ft	4.24		

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 ft²	F K	w plf	Ctrl. Face
L1 119.08-101.08	0.58	1.17	A	1	0.964	1	1	1	36.203	0.53	29.57	C
			B	1	0.964	1	1	1	36.203			
			C	1	0.964	1	1	1	36.203			
L2 101.08-66.50	1.88	3.71	A	1	0.963	1	1	1	85.976	1.16	33.65	C
			B	1	0.963	1	1	1	85.976			
			C	1	0.963	1	1	1	85.976			

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 plf	Ctrl. Face
L3 66.50-32.83	1.90	5.61	A	1	0.968	1	1	1	105.493	1.23	36.64	C
			B	1	0.968	1	1	1	105.493			
			C	1	0.968	1	1	1	105.493			
L4 32.83-0.00	1.68	6.73	A	1	0.987	1	1	1	123.192	1.31	40.05	C
			B	1	0.987	1	1	1	123.192			
			C	1	0.987	1	1	1	123.192			
Sum Weight:	6.03	17.22						OTM	237.27 kip-ft	4.24		

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	17.22					
Bracing Weight	0.00					
Total Member Self-Weight	17.22			0.88	0.68	
Total Weight	28.75			0.88	0.68	
Wind 0 deg - No Ice		0.00	-19.20	-1535.75	0.68	-3.35
Wind 30 deg - No Ice		9.60	-16.63	-1329.88	-767.63	-0.76
Wind 45 deg - No Ice		13.57	-13.57	-1085.68	-1085.88	0.66
Wind 60 deg - No Ice		16.63	-9.60	-767.43	-1330.08	2.03
Wind 90 deg - No Ice		19.20	0.00	0.88	-1535.95	4.28
Wind 120 deg - No Ice		16.63	9.60	769.19	-1330.08	5.38
Wind 135 deg - No Ice		13.57	13.57	1087.44	-1085.88	5.39
Wind 150 deg - No Ice		9.60	16.63	1331.64	-767.63	5.04
Wind 180 deg - No Ice		0.00	19.20	1537.50	0.68	3.35
Wind 210 deg - No Ice		-9.60	16.63	1331.64	768.99	0.76
Wind 225 deg - No Ice		-13.57	13.57	1087.44	1087.24	-0.66
Wind 240 deg - No Ice		-16.63	9.60	769.19	1331.44	-2.03
Wind 270 deg - No Ice		-19.20	0.00	0.88	1537.31	-4.28
Wind 300 deg - No Ice		-16.63	-9.60	-767.43	1331.44	-5.38
Wind 315 deg - No Ice		-13.57	-13.57	-1085.68	1087.24	-5.39
Wind 330 deg - No Ice		-9.60	-16.63	-1329.88	768.99	-5.04
Member Ice	2.65					
Total Weight Ice	33.93			1.24	0.96	
Wind 0 deg - Ice		0.00	-15.70	-1284.63	0.96	-2.62
Wind 30 deg - Ice		7.85	-13.59	-1112.36	-641.98	-0.57
Wind 45 deg - Ice		11.10	-11.10	-908.01	-908.29	0.55
Wind 60 deg - Ice		13.59	-7.85	-641.69	-1112.64	1.63
Wind 90 deg - Ice		15.70	0.00	1.24	-1284.92	3.40
Wind 120 deg - Ice		13.59	7.85	644.18	-1112.64	4.25
Wind 135 deg - Ice		11.10	11.10	910.50	-908.29	4.25
Wind 150 deg - Ice		7.85	13.59	1114.85	-641.98	3.96
Wind 180 deg - Ice		0.00	15.70	1287.12	0.96	2.62
Wind 210 deg - Ice		-7.85	13.59	1114.85	643.90	0.57
Wind 225 deg - Ice		-11.10	11.10	910.50	910.21	-0.55
Wind 240 deg - Ice		-13.59	7.85	644.18	1114.56	-1.63
Wind 270 deg - Ice		-15.70	0.00	1.24	1286.84	-3.40
Wind 300 deg - Ice		-13.59	-7.85	-641.69	1114.56	-4.25
Wind 315 deg - Ice		-11.10	-11.10	-908.01	910.21	-4.25
Wind 330 deg - Ice		-7.85	-13.59	-1112.36	643.90	-3.96
Total Weight	28.75			0.88	0.68	
Wind 0 deg - Service		0.00	-7.50	-599.37	0.68	-1.31
Wind 30 deg - Service		3.75	-6.49	-518.95	-299.44	-0.30

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 45 deg - Service		5.30	-5.30	-423.56	-423.76	0.26
Wind 60 deg - Service		6.49	-3.75	-299.24	-519.15	0.79
Wind 90 deg - Service		7.50	0.00	0.88	-599.56	1.67
Wind 120 deg - Service		6.49	3.75	301.00	-519.15	2.10
Wind 135 deg - Service		5.30	5.30	425.32	-423.76	2.11
Wind 150 deg - Service		3.75	6.49	520.71	-299.44	1.97
Wind 180 deg - Service		0.00	7.50	601.12	0.68	1.31
Wind 210 deg - Service		-3.75	6.49	520.71	300.80	0.30
Wind 225 deg - Service		-5.30	5.30	425.32	425.12	-0.26
Wind 240 deg - Service		-6.49	3.75	301.00	520.51	-0.79
Wind 270 deg - Service		-7.50	0.00	0.88	600.92	-1.67
Wind 300 deg - Service		-6.49	-3.75	-299.24	520.51	-2.10
Wind 315 deg - Service		-5.30	-5.30	-423.56	425.12	-2.11
Wind 330 deg - Service		-3.75	-6.49	-518.95	300.80	-1.97

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
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

Comb. No.	Description
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	119.08 - 101.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-7.09	0.97	-1.19
			Max. Mx	14	-4.86	89.03	-0.70
			Max. My	10	-4.86	0.57	-89.19
			Max. Vy	14	-7.21	89.03	-0.70
			Max. Vx	10	7.21	0.57	-89.19
			Max. Torque	8			-5.33
L2	101.08 - 66.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-15.57	0.98	-1.27
			Max. Mx	14	-11.80	450.68	-0.85
			Max. My	10	-11.80	0.66	-450.88
			Max. Vy	14	-12.69	450.68	-0.85
			Max. Vx	10	12.69	0.66	-450.88
			Max. Torque	8			-5.43
L3	66.5 - 32.83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-23.43	0.98	-1.27
			Max. Mx	14	-19.04	916.96	-0.90
			Max. My	10	-19.04	0.70	-917.16
			Max. Vy	14	-15.70	916.96	-0.90
			Max. Vx	10	15.70	0.70	-917.16
			Max. Torque	16			5.43
L4	32.83 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-33.93	0.98	-1.27
			Max. Mx	14	-28.74	1570.49	-0.91
			Max. My	10	-28.74	0.70	-1570.70
			Max. Vy	14	-19.21	1570.49	-0.91
			Max. Vx	10	19.21	0.70	-1570.70
			Max. Torque	16			5.43

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	33.93	-0.00	-15.70

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H_x	14	28.75	19.20	0.00
	Max. H_z	2	28.75	0.00	19.20
	Max. M_x	2	1568.87	0.00	19.20
	Max. M_z	6	1569.08	-19.20	0.00
	Max. Torsion	16	5.43	13.57	13.57
	Min. Vert	1	28.75	0.00	0.00
	Min. H_x	6	28.75	-19.20	0.00
	Min. H_z	10	28.75	0.00	-19.20
	Min. M_x	10	-1570.70	0.00	-19.20
	Min. M_z	14	-1570.49	19.20	0.00
	Min. Torsion	8	-5.43	-13.57	-13.57

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	28.75	0.00	0.00	0.88	0.68	0.00
Dead+Wind 0 deg - No Ice	28.75	0.00	-19.20	-1568.87	0.70	-3.37
Dead+Wind 30 deg - No Ice	28.75	9.60	-16.63	-1358.56	-784.19	-0.77
Dead+Wind 45 deg - No Ice	28.75	13.57	-13.57	-1109.09	-1109.30	0.66
Dead+Wind 60 deg - No Ice	28.75	16.63	-9.60	-783.98	-1358.76	2.04
Dead+Wind 90 deg - No Ice	28.75	19.20	0.00	0.91	-1569.08	4.30
Dead+Wind 120 deg - No Ice	28.75	16.63	9.60	785.80	-1358.77	5.41
Dead+Wind 135 deg - No Ice	28.75	13.57	13.57	1110.91	-1109.31	5.43
Dead+Wind 150 deg - No Ice	28.75	9.60	16.63	1360.38	-784.19	5.07
Dead+Wind 180 deg - No Ice	28.75	0.00	19.20	1570.70	0.70	3.37
Dead+Wind 210 deg - No Ice	28.75	-9.60	16.63	1360.39	785.60	0.77
Dead+Wind 225 deg - No Ice	28.75	-13.57	13.57	1110.92	1110.72	-0.66
Dead+Wind 240 deg - No Ice	28.75	-16.63	9.60	785.80	1360.18	-2.04
Dead+Wind 270 deg - No Ice	28.75	-19.20	0.00	0.91	1570.49	-4.30
Dead+Wind 300 deg - No Ice	28.75	-16.63	-9.60	-783.99	1360.18	-5.41
Dead+Wind 315 deg - No Ice	28.75	-13.57	-13.57	-1109.10	1110.71	-5.43
Dead+Wind 330 deg - No Ice	28.75	-9.60	-16.63	-1358.57	785.59	-5.07
Dead+Ice+Temp	33.93	-0.00	0.00	1.27	0.98	0.00
Dead+Wind 0 deg+Ice+Temp	33.93	0.00	-15.70	-1320.65	1.01	-2.65
Dead+Wind 30 deg+Ice+Temp	33.93	7.85	-13.59	-1143.54	-659.97	-0.58
Dead+Wind 45 deg+Ice+Temp	33.93	11.10	-11.10	-933.46	-933.75	0.56
Dead+Wind 60 deg+Ice+Temp	33.93	13.59	-7.85	-659.67	-1143.84	1.65
Dead+Wind 90 deg+Ice+Temp	33.93	15.70	-0.00	1.30	-1320.95	3.44
Dead+Wind 120 deg+Ice+Temp	33.93	13.59	7.85	662.28	-1143.84	4.30
Dead+Wind 135 deg+Ice+Temp	33.93	11.10	11.10	936.07	-933.76	4.30
Dead+Wind 150 deg+Ice+Temp	33.93	7.85	13.59	1146.16	-659.98	4.01
Dead+Wind 180 deg+Ice+Temp	33.93	0.00	15.70	1323.27	1.01	2.65
Dead+Wind 210 deg+Ice+Temp	33.93	-7.85	13.59	1146.16	661.99	0.58
Dead+Wind 225 deg+Ice+Temp	33.93	-11.10	11.10	936.08	935.78	-0.56
Dead+Wind 240 deg+Ice+Temp	33.93	-13.59	7.85	662.29	1145.86	-1.65
Dead+Wind 270 deg+Ice+Temp	33.93	-15.70	-0.00	1.30	1322.97	-3.44
Dead+Wind 300 deg+Ice+Temp	33.93	-13.59	-7.85	-659.68	1145.86	-4.30
Dead+Wind 315 deg+Ice+Temp	33.93	-11.10	-11.10	-933.46	935.77	-4.30
Dead+Wind 330 deg+Ice+Temp	33.93	-7.85	-13.59	-1143.54	661.98	-4.01
Dead+Wind 0 deg - Service	28.75	-0.00	-7.50	-612.45	0.71	-1.32
Dead+Wind 30 deg - Service	28.75	3.75	-6.49	-530.28	-305.98	-0.30
Dead+Wind 45 deg - Service	28.75	5.30	-5.30	-432.80	-433.01	0.26
Dead+Wind 60 deg - Service	28.75	6.49	-3.75	-305.77	-530.48	0.80
Dead+Wind 90 deg - Service	28.75	7.50	0.00	0.91	-612.66	1.69
Dead+Wind 120 deg - Service	28.75	6.49	3.75	307.60	-530.49	2.12

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 135 deg - Service	28.75	5.30	5.30	434.63	-433.01	2.12
Dead+Wind 150 deg - Service	28.75	3.75	6.49	532.11	-305.98	1.99
Dead+Wind 180 deg - Service	28.75	-0.00	7.50	614.29	0.71	1.32
Dead+Wind 210 deg - Service	28.75	-3.75	6.49	532.11	307.39	0.30
Dead+Wind 225 deg - Service	28.75	-5.30	5.30	434.63	434.43	-0.26
Dead+Wind 240 deg - Service	28.75	-6.49	3.75	307.60	531.90	-0.80
Dead+Wind 270 deg - Service	28.75	-7.50	0.00	0.91	614.08	-1.69
Dead+Wind 300 deg - Service	28.75	-6.49	-3.75	-305.77	531.90	-2.12
Dead+Wind 315 deg - Service	28.75	-5.30	-5.30	-432.80	434.43	-2.12
Dead+Wind 330 deg - Service	28.75	-3.75	-6.49	-530.28	307.39	-1.99

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-28.75	0.00	0.00	28.75	0.00	0.000%
2	0.00	-28.75	-19.20	0.00	28.75	19.20	0.000%
3	9.60	-28.75	-16.63	-9.60	28.75	16.63	0.000%
4	13.57	-28.75	-13.57	-13.57	28.75	13.57	0.000%
5	16.63	-28.75	-9.60	-16.63	28.75	9.60	0.000%
6	19.20	-28.75	0.00	-19.20	28.75	0.00	0.000%
7	16.63	-28.75	9.60	-16.63	28.75	-9.60	0.000%
8	13.57	-28.75	13.57	-13.57	28.75	-13.57	0.000%
9	9.60	-28.75	16.63	-9.60	28.75	-16.63	0.000%
10	0.00	-28.75	19.20	0.00	28.75	-19.20	0.000%
11	-9.60	-28.75	16.63	9.60	28.75	-16.63	0.000%
12	-13.57	-28.75	13.57	13.57	28.75	-13.57	0.000%
13	-16.63	-28.75	9.60	16.63	28.75	-9.60	0.000%
14	-19.20	-28.75	0.00	19.20	28.75	0.00	0.000%
15	-16.63	-28.75	-9.60	16.63	28.75	9.60	0.000%
16	-13.57	-28.75	-13.57	13.57	28.75	13.57	0.000%
17	-9.60	-28.75	-16.63	9.60	28.75	16.63	0.000%
18	0.00	-33.93	0.00	0.00	33.93	-0.00	0.000%
19	0.00	-33.93	-15.70	-0.00	33.93	15.70	0.000%
20	7.85	-33.93	-13.59	-7.85	33.93	13.59	0.000%
21	11.10	-33.93	-11.10	-11.10	33.93	11.10	0.000%
22	13.59	-33.93	-7.85	-13.59	33.93	7.85	0.000%
23	15.70	-33.93	0.00	-15.70	33.93	0.00	0.000%
24	13.59	-33.93	7.85	-13.59	33.93	-7.85	0.000%
25	11.10	-33.93	11.10	-11.10	33.93	-11.10	0.000%
26	7.85	-33.93	13.59	-7.85	33.93	-13.59	0.000%
27	0.00	-33.93	15.70	-0.00	33.93	-15.70	0.000%
28	-7.85	-33.93	13.59	7.85	33.93	-13.59	0.000%
29	-11.10	-33.93	11.10	11.10	33.93	-11.10	0.000%
30	-13.59	-33.93	7.85	13.59	33.93	-7.85	0.000%
31	-15.70	-33.93	0.00	15.70	33.93	0.00	0.000%
32	-13.59	-33.93	-7.85	13.59	33.93	7.85	0.000%
33	-11.10	-33.93	-11.10	11.10	33.93	11.10	0.000%
34	-7.85	-33.93	-13.59	7.85	33.93	13.59	0.000%
35	0.00	-28.75	-7.50	0.00	28.75	7.50	0.000%
36	3.75	-28.75	-6.49	-3.75	28.75	6.49	0.000%
37	5.30	-28.75	-5.30	-5.30	28.75	5.30	0.000%
38	6.49	-28.75	-3.75	-6.49	28.75	3.75	0.000%
39	7.50	-28.75	0.00	-7.50	28.75	-0.00	0.000%
40	6.49	-28.75	3.75	-6.49	28.75	-3.75	0.000%
41	5.30	-28.75	5.30	-5.30	28.75	-5.30	0.000%
42	3.75	-28.75	6.49	-3.75	28.75	-6.49	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
43	0.00	-28.75	7.50	0.00	28.75	-7.50	0.000%
44	-3.75	-28.75	6.49	3.75	28.75	-6.49	0.000%
45	-5.30	-28.75	5.30	5.30	28.75	-5.30	0.000%
46	-6.49	-28.75	3.75	6.49	28.75	-3.75	0.000%
47	-7.50	-28.75	0.00	7.50	28.75	-0.00	0.000%
48	-6.49	-28.75	-3.75	6.49	28.75	3.75	0.000%
49	-5.30	-28.75	-5.30	5.30	28.75	5.30	0.000%
50	-3.75	-28.75	-6.49	3.75	28.75	6.49	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	5	0.00000001	0.00003280
3	Yes	5	0.00000001	0.00005613
4	Yes	5	0.00000001	0.00006801
5	Yes	5	0.00000001	0.00005263
6	Yes	5	0.00000001	0.00004156
7	Yes	5	0.00000001	0.00009878
8	Yes	5	0.00000001	0.00008770
9	Yes	5	0.00000001	0.00005648
10	Yes	5	0.00000001	0.00003288
11	Yes	5	0.00000001	0.00006461
12	Yes	5	0.00000001	0.00006883
13	Yes	5	0.00000001	0.00007258
14	Yes	5	0.00000001	0.00004164
15	Yes	5	0.00000001	0.00005777
16	Yes	5	0.00000001	0.00008761
17	Yes	5	0.00000001	0.00009588
18	Yes	4	0.00000001	0.00000611
19	Yes	5	0.00000001	0.00007574
20	Yes	5	0.00000001	0.00012424
21	Yes	5	0.00000001	0.00014205
22	Yes	5	0.00000001	0.00012165
23	Yes	5	0.00000001	0.00008401
24	Yes	5	0.00000001	0.00016536
25	Yes	5	0.00000001	0.00016116
26	Yes	5	0.00000001	0.00012630
27	Yes	5	0.00000001	0.00007606
28	Yes	5	0.00000001	0.00013211
29	Yes	5	0.00000001	0.00014411
30	Yes	5	0.00000001	0.00013957
31	Yes	5	0.00000001	0.00008428
32	Yes	5	0.00000001	0.00012739
33	Yes	5	0.00000001	0.00016091
34	Yes	5	0.00000001	0.00016195
35	Yes	4	0.00000001	0.00024058
36	Yes	4	0.00000001	0.00016644
37	Yes	4	0.00000001	0.00021775
38	Yes	4	0.00000001	0.00017295
39	Yes	4	0.00000001	0.00030473
40	Yes	4	0.00000001	0.00049956
41	Yes	4	0.00000001	0.00044189
42	Yes	4	0.00000001	0.00031935
43	Yes	4	0.00000001	0.00024221

44	Yes	4	0.00000001	0.00022279
45	Yes	4	0.00000001	0.00022462
46	Yes	4	0.00000001	0.00028798
47	Yes	4	0.00000001	0.00030633
48	Yes	4	0.00000001	0.00033925
49	Yes	4	0.00000001	0.00044111
50	Yes	4	0.00000001	0.00047658

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.08 - 101.08	14.521	44	1.0418	0.0228
L2	104 - 66.5	11.293	44	0.9884	0.0141
L3	70.33 - 32.83	5.225	44	0.6920	0.0055
L4	37.5 - 0	1.516	45	0.3691	0.0021

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	4 FT DISH	44	14.521	1.0418	0.0228	26278
110.00	Valmont 13' Low Profile Platform	44	12.557	1.0140	0.0172	14470
100.00	Valmont 13' Low Profile Platform	44	10.476	0.9660	0.0123	8246
90.00	742-213	44	8.537	0.8919	0.0090	7265

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119.08 - 101.08	37.043	11	2.6509	0.0582
L2	104 - 66.5	28.825	11	2.5200	0.0359
L3	70.33 - 32.83	13.348	11	1.7671	0.0140
L4	37.5 - 0	3.875	11	0.9432	0.0054

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
120.00	4 FT DISH	11	37.043	2.6509	0.0582	10515
110.00	Valmont 13' Low Profile Platform	11	32.044	2.5843	0.0441	5790
100.00	Valmont 13' Low Profile Platform	11	26.743	2.4620	0.0314	3289
90.00	742-213	11	21.801	2.2688	0.0230	2880

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	119.08 - 101.08 (1)	TP26x22.27x0.25	18.00	0.00	0.0	39.000	20.0531	-4.86	782.07	0.006
L2	101.08 - 66.5 (2)	TP34.0625x24.8949x0.3125	37.50	0.00	0.0	39.000	32.7111	-11.80	1275.73	0.009
L3	66.5 - 32.83 (3)	TP41.75x32.5012x0.375	37.50	0.00	0.0	39.000	48.1170	-19.04	1876.56	0.010
L4	32.83 - 0 (4)	TP49.0625x39.8482x0.375	37.50	0.00	0.0	39.000	58.2424	-28.74	2271.45	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	119.08 - 101.08 (1)	TP26x22.27x0.25	89.43	8.677	39.000	0.222	0.00	0.000	39.000	0.000
L2	101.08 - 66.5 (2)	TP34.0625x24.8949x0.3125	451.11	20.553	39.000	0.527	0.00	0.000	39.000	0.000
L3	66.5 - 32.83 (3)	TP41.75x32.5012x0.375	917.39	23.177	39.000	0.594	0.00	0.000	39.000	0.000
L4	32.83 - 0 (4)	TP49.0625x39.8482x0.375	1570.93	27.044	39.000	0.693	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	119.08 - 101.08 (1)	TP26x22.27x0.25	7.21	0.360	26.000	0.028	0.55	0.026	26.000	0.001
L2	101.08 - 66.5 (2)	TP34.0625x24.8949x0.3125	12.69	0.388	26.000	0.030	0.77	0.017	26.000	0.001
L3	66.5 - 32.83 (3)	TP41.75x32.5012x0.375	15.70	0.326	26.000	0.025	0.77	0.009	26.000	0.000
L4	32.83 - 0 (4)	TP49.0625x39.8482x0.375	19.21	0.330	26.000	0.026	0.77	0.006	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

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	119.08 - 101.08 (1)	0.006	0.222	0.000	0.028	0.001	0.229 ✔	1.333	H1-3+VT ✔
L2	101.08 - 66.5 (2)	0.009	0.527	0.000	0.030	0.001	0.537 ✔	1.333	H1-3+VT ✔
L3	66.5 - 32.83 (3)	0.010	0.594	0.000	0.025	0.000	0.605 ✔	1.333	H1-3+VT ✔
L4	32.83 - 0 (4)	0.013	0.693	0.000	0.026	0.000	0.706 ✔	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	119.08 - 101.08	Pole	TP26x22.27x0.25	1	-4.86	1042.50	17.2	Pass
L2	101.08 - 66.5	Pole	TP34.0625x24.8949x0.3125	2	-11.80	1700.55	40.2	Pass
L3	66.5 - 32.83	Pole	TP41.75x32.5012x0.375	3	-19.04	2501.45	45.4	Pass
L4	32.83 - 0	Pole	TP49.0625x39.8482x0.375	4	-28.74	3027.84	53.0	Pass
							Summary	
						Pole (L4)	53.0	Pass
						RATING =	**53.0**	**Pass**

ANCHOR BOLT AND BASE PLATE ANALYSIS

Input Data

Tower Reactions:

Overturning Moment:	$OM := 1571 \cdot ft \cdot kips$	*user input*
Shear Force:	$Shear := 19 \cdot kips$	*user input*
Axial Force:	$Axial := 29 \cdot kips$	*user input*

Anchor Bolt Data:

Use ASTM A687

Number of Anchor Bolts = N	$N := 33$	*user input*
Diameter of Bolt Circle:	$D_{bc} := 54in$	*user input*
Bolt "Column" Distance:	$l := 3in$	*user input*
Bolt Ultimate Strength:	$F_u := 150 \cdot ksi$	*user input*
Bolt Yield Strength:	$Fy := 105 \cdot ksi$	*user input*
Bolt Modulus:	$E := 29000 \cdot ksi$	*user input*
Thickness Of Anchor Bolts	$D := 1.50in$	*user input*
Threads per Inch:	$n := 7$	*user input*

Base Plate Data:

Plate Yield Strength:	$Fy_{bp} := 50 \cdot ksi$	*user input*
Base Plate Thickness:	$PlateThickness := 1.25 \cdot in$	*user input*
Base Plate Diameter:	$D_{bp} := 58.00 \cdot in$	*user input*
Outer Pole Diameter:	$D_{pole} := 49.0625in$	*user input*

Gusset Data:

Gusset Thickness:	$t_{Gusset} := 0.75 \cdot in$	*user input*	
Gusset Height:	$H_{Gusset} := 6.00in$	*user input*	Note: Gusset Height x 0.5

Geometric Layout Data:

Distance from the center of gravity of the group to bolt in question = d(i)

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

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

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

$d_1 = 5.11 \cdot in$ $d_7 = 26.24 \cdot in$

$d_2 = 10.03 \cdot in$ $d_8 = 26.97 \cdot in$

$d_3 = 14.60 \cdot in$ $d_9 = 26.73 \cdot in$

$d_4 = 18.63 \cdot in$ $d_{10} = 25.52 \cdot in$

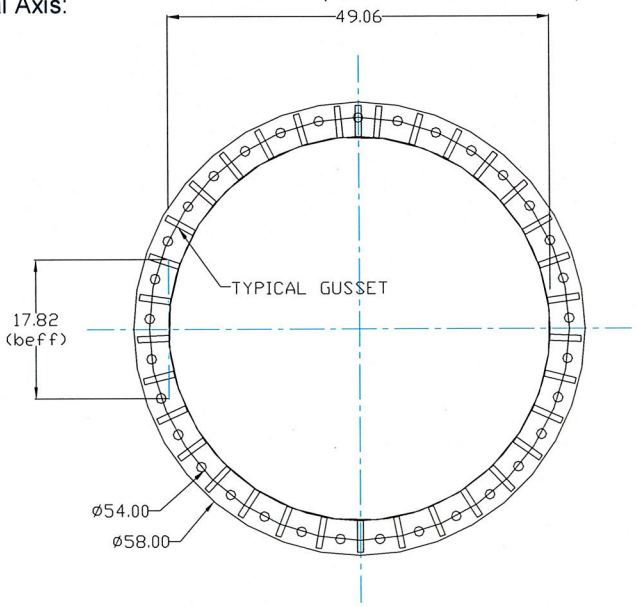
$d_5 = 21.99 \cdot in$ $d_{11} = 23.38 \cdot in$

$d_6 = 24.56 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius: $R_{pole} := \frac{D_{pole}}{2}$ $R_{pole} = 24.53 \cdot in$

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



$MA_1 = 0.00 \cdot in$ $MA_{10} = 0.98 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_{12} = 0.00 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{13} = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{14} = 0.00 \cdot in$

$MA_6 = 0.03 \cdot in$ $MA_{15} = 0.00 \cdot in$

$MA_7 = 1.71 \cdot in$ $MA_{16} = 0.00 \cdot in$

$MA_8 = 2.44 \cdot in$ $MA_{17} = 0.00 \cdot in$

$MA_9 = 2.19 \cdot in$ $MA_{18} = 0.00 \cdot in$

$EffectiveWidth := 17.82in$

Anchor Bolt Analysis:

Polar Moment of Inertia I_p:

$$I_p := \sum_i \left(d_i\right)^2 \qquad I_p = 1.203 \times 10^4 \cdot in^2$$

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 1.767 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 \qquad A_n = 1.454 \cdot in^2$$

Net Diameter:

$$D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} \qquad D_n = 1.36 \cdot in$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \qquad r = 0.34 \cdot in$$

Section Modulus of Bolt:

$$S_x := \frac{\pi \cdot D_n^{\,3}}{32} \qquad S_x = 0.247 \cdot in^3$$

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{Shear}{N}\right) \cdot l \qquad M_x = 0.144 \cdot ft \cdot kips$$

$$f_{bx} := \frac{M_x}{S_x} \qquad f_{bx} = 7.0 \cdot ksi$$

Allowable Bending

$$F_{bx} := 1.333 \cdot 0.60 \cdot Fy \qquad F_{bx} = 84.0 \cdot ksi$$

Note: 1.333 increase allowed per TIA/EIA

Check Tensile Forces:

Allowable Tensile Force:

$$AllowableTension := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) \qquad AllowableTension = 116.6 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{OM \cdot R_{bc}}{I_p} - \frac{Axial}{N} \qquad MaxTension = 41.4 \cdot kips$$

Check Stresses:

$$\frac{MaxTension}{AllowableTension} = 0.36$$

$$Condition := if\left(\frac{MaxTension}{AllowableTension} \le 1.00, "OK", "Overstressed"\right)$$

Condition = "OK"

Check Compression & Combined Stresses (if required):

Check to see if a complete combined stress analysis is required:

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."

Set the clear space between the plate and bolt to zero and remove bending stresses if a combined stress analysis is not required:

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0.00\text{in} & \text{otherwise} \end{cases} \qquad l = 3.00 \cdot \text{in}$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0.0\text{ksi} & \text{otherwise} \end{cases} \qquad f_{bx} = 7.0 \cdot \text{ksi}$$

Allowable Compressive Force:

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{Fy}} \qquad C_c = 73.84$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot Fy}{\frac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} \qquad F_a = 61.7 \cdot \text{ksi}$$

$$F_a := 1.333 \cdot F_a \quad \text{Note: 1.333 increase allowed per TIA/EIA} \qquad F_a = 82.3 \cdot \text{ksi}$$

Applied Compressive Force:

$$\text{MaxCompression} := \frac{OM \cdot R_{bc}}{I_p} + \frac{\text{Axial}}{N} \qquad \text{MaxCompression} = 43.2 \cdot \text{kips}$$

$$f_a := \frac{\text{MaxCompression}}{A_n} \qquad f_a = 29.7 \cdot \text{ksi}$$

Check Combined Stresses:

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} = 0.44$$

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

Base Plate Analysis:

Force from Bolt(s):

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

$C_1 = 8.9 \cdot kips$ $C_7 = 42.0 \cdot kips$

$C_2 = 16.6 \cdot kips$ $C_8 = 43.1 \cdot kips$

$C_3 = 23.8 \cdot kips$ $C_9 = 42.8 \cdot kips$

$C_4 = 30.1 \cdot kips$ $C_{10} = 40.9 \cdot kips$

$C_5 = 35.3 \cdot kips$ $C_{11} = 37.5 \cdot kips$

$C_6 = 39.4 \cdot kips$ etc.

Bending Stress in Plate:

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(EffectiveWidth \cdot PlateThickness^2\right) + 4\left(t_{Gusset} \cdot H_{Gusset}^2\right)}$$

$f_{bp} = 13.8 \cdot ksi$

Check Stresses:

$$\frac{f_{bp}}{1.333 \cdot 0.75 Fy_{bp}} = 0.28$$

$$Condition := if\left(\frac{f_{bp}}{1.333 \cdot 0.75 Fy_{bp}} < 1.00, "OK", "Overstressed"\right)$$

Condition = "OK"

NATCOMM INC. CONSULTING ENGINEERS p: 203.488.0580 f: 203.488.8587 w: nat-eng.com 63-2 N. Branford Rd., Branford, CT 06405	Subject:	Footing
	Location:	West Hartford, CT
	Rev. 0: 10/30/08	Prepared by: J.R.M. Checked by: C.F.C. Job No. 08158

Footing Design:

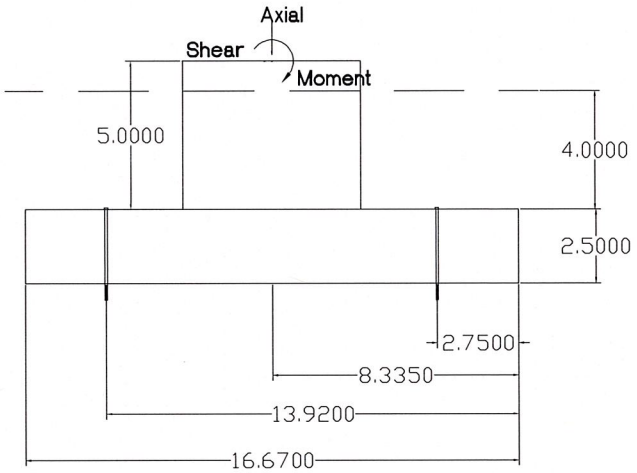
Reactions in Footing:

Axial = $Axial := 29 \cdot kips$

Shear = $Shear := 19 \cdot kips$

Moment = $Moment := 1571 \cdot ft \cdot kips$

Applied Reactions from Edge = $D_{Reac} := 8.335 \cdot ft$



Footing Properties:

Lenght of Footing = $L_f := 16.67 \cdot ft$

Width of Footing = $W_f := 16.67 \cdot ft$

Thickness of Footing = $t_f := 2.5 \cdot ft$

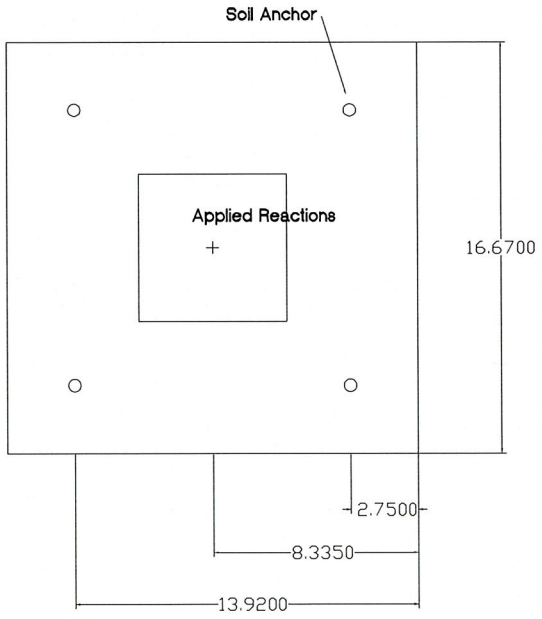
Pier Properties:

Lenght of Pier = $L_p := 6 \cdot ft$

Width of Pier = $W_p := 6ft$

Height of Pier = $H_p := 5 \cdot ft$

Height of Pier Below Grade = $H_{p.bg} := 4 \cdot ft$



Anchor Properties:

Tensile Strength of Anchor = $T := 28 \cdot kips$

Number of Anchors in Group 1 = $N_1 := 2$

Anchor Placement from Edge = $d_1 := 2.75 \cdot ft$

Number of Anchors in Group 2 = $N_2 := 2$

Anchor Placement from Edge = $d_2 := 13.92 \cdot ft$

General Properties:

Weight of Concrete = $W_c := 150 \cdot pcf$

Weight of Soil = $W_s := 120 \cdot pcf$

NATCOMM ENG
CONSULTING ENGINEERS
p: 203.488.0580 f: 203.488.8587 w: nat-eng.com
63-2 N. Branford Rd., Branford, CT 06405

Subject:	Footing
Location:	West Hartford, CT
Rev. 0: 10/30/08	Prepared by: J.R.M. Checked by: C.F.C. Job No. 08158

Area of Footing = $A_f := L_f \cdot W_f \cdot t_f = 694.722 \cdot ft^3$

Area of Pier = $A_p := L_p \cdot W_p \cdot H_p = 180 \cdot ft^3$

Weight of Footing = $Wgt_f := W_c \cdot (A_f + A_p) = 131 \cdot kips$

Weight of Soil = $Wgt_s := W_s \cdot \left[\left(L_f \cdot W_f - L_p \cdot W_p \right) \cdot H_{p.bg} \right] = 116 \cdot kips$

Passive Pressure:

Passive Pressure Coefficient = $C_p := 3.3$

Passive Pressure in Pier = $P_{p.pier} := C_p \cdot W_s \cdot \frac{H_p^2}{2} = 4950 \cdot plf$

Passive Pressure in Footing = $P_{p.footing} := C_p \cdot W_s \cdot \frac{t_f^2}{2} = 1238 \frac{lb}{ft}$

Moments in the Footing:

Overturing Moment = $M_{ot} := Moment + Shear \cdot (t_f + H_p) = 1714 \cdot ft \cdot kips$

Resisting Moment =

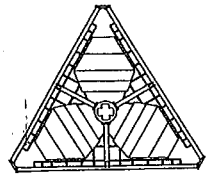
$$M_r := \left(Axial + Wgt_f + Wgt_s \right) \cdot \left(\frac{L_f}{2} \right) + T \cdot \left(N_1 \cdot d_1 + N_2 \cdot d_2 \right) + P_{p.pier} \cdot W_p \cdot \left(t_f + \frac{H_p}{3} \right) + P_{p.footing} \cdot W_f \cdot \left(\frac{t_f}{2} \right) = 3386 \cdot ft \cdot kips$$

Factor of Safety:

$$FS := \frac{M_r}{M_{ot}} = 2$$

Condition := if(FS ≥ 2, "OK" , "NG")

Condition = "NG"

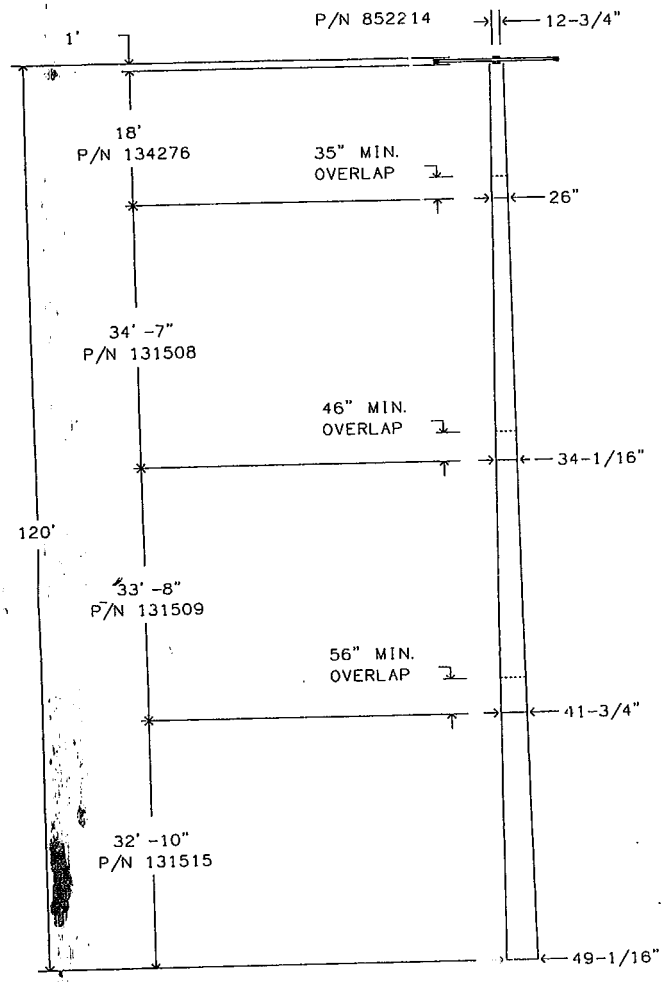


ROTATABLE TOP - TOP VIEW

TAPERED POLE SECTION DATA							
SECTION					BOLT @ BOT **		
LENGTH	PART#	SIZE	WALL	WT. *	DIAM	LENGTH	#
1'	852214	12"	N/A		1"	4-1/2"	5
18'	134276	26"	.2500"	1221#			
37'-6"	131508	34"	.3125"	3900#			
37'-6"	131509	42"	.3750"	5875#			
37'-6"	131515	49"	.3750"	7040#			

*THE WEIGHTS LISTED ARE THEORETICAL. THE ACTUAL WEIGHTS WILL VARY. ALL WEIGHTS SHOULD BE CONFIRMED IN THE FIELD PRIOR TO ERECTION.
**ALL CONNECTION BOLTS ARE A-325.

TOP 1' CONSISTS OF ROTATABLE TOP ASSEMBLY. SEE DWG # 140660-B FOR INSTALLATION DETAILS. JAM NUTS NOT REQUIRED.



REMOVABLE CLIMBING RUNGS

SEE PAGE 2 OF THIS DRAWING FOR OPENING INFORMATION.

SEE PAGE 4 OF THIS DRAWING FOR CONNECTION BOLT TIGHTENING SPECIFICATIONS.

SEE PAGE 7 OF THIS DRAWING FOR BASE SECTION INSTALL.

STATE OF CONNECTICUT
WILLIAM B. RETTIG
No 20300
LICENSED
PROFESSIONAL ENGINEER

MAY 01 2000

REV	DESCRIPTION OF REVISIONS	INI	DATE
B	ADDED FOUNDATINOS	WBR	05/01/2000
A	CHANGED PLATFORM PART NUMBER - PG 1	KWD	03/24/2000

From: 92535.DFT - 03/24/2000 09:42
Printed from: 20619818.DWG * 05/01/2000 11:00 @ 05/01/2000 11:01

VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT11178D, CONNECTICUT
TP49 X 120' ASSEMBLY DRAWING

APPROVED/ENG.	WBR	05/01/2000
APPROVED/FOUND.	N/A	
DRAWN BY	KWD	
ENG. FILE NO.	A-116876-Q-92535	
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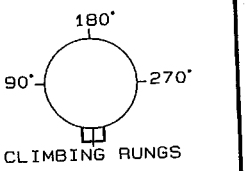
DRAWING NO. 206198-B
PAGE 1 OF 9

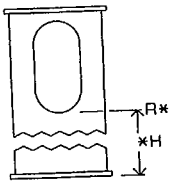
OPENINGS & BRACKETS WELDED TO POLE

NOMINAL HT AGL	HEIGHT *H	TYP	DESCRIPTION	ANGL	ASSEMBLY DRAWING#
119'-1"	18'	20	FLANGE PART NUMBER 133315		
118'	16'-11"	13	SAFETY CLIMB BRACKET	0°	
116'-9"	15'-8"	9	4" X 6" PORTHOLE EXITING UP	60°	
116'-9"	15'-8"	9	4" X 6" PORTHOLE EXITING UP	180°	
116'-9"	15'-8"	9	4" X 6" PORTHOLE EXITING UP	300°	
115'-9"	14'-8"	9	4" X 6" PORTHOLE EXITING UP	60°	
115'-9"	14'-8"	9	4" X 6" PORTHOLE EXITING UP	180°	
115'-9"	14'-8"	9	4" X 6" PORTHOLE EXITING UP	300°	
107'-9"	6'-8"	9	4" X 6" PORTHOLE EXITING UP	60°	
107'-9"	6'-8"	9	4" X 6" PORTHOLE EXITING UP	180°	
107'-9"	6'-8"	9	4" X 6" PORTHOLE EXITING UP	300°	
106'-9"	5'-8"	9	4" X 6" PORTHOLE EXITING UP	60°	
106'-9"	5'-8"	9	4" X 6" PORTHOLE EXITING UP	180°	
106'-9"	5'-8"	9	4" X 6" PORTHOLE EXITING UP	300°	
105'-9"	4'-8"	19	PAD EYES FOR FUTURE PLATFORM	SEE>	121975-B
95'-6"	29'	9	4" X 6" PORTHOLE EXITING UP	60°	
95'-6"	29'	9	4" X 6" PORTHOLE EXITING UP	180°	
95'-6"	29'	9	4" X 6" PORTHOLE EXITING UP	300°	
94'-6"	28'	9	4" X 6" PORTHOLE EXITING UP	60°	
94'-6"	28'	9	4" X 6" PORTHOLE EXITING UP	180°	
94'-6"	28'	9	4" X 6" PORTHOLE EXITING UP	300°	
93'-6"	27'	19	PAD EYES FOR FUTURE PLATFORM	SEE>	121975-B
9'-10"	9'-10"	8	TRANS. LINE BRIDGE ATTACH BRACKET	90°	
9'-10"	9'-10"	8	TRANS. LINE BRIDGE ATTACH BRACKET	180°	
9'-10"	9'-10"	8	TRANS. LINE BRIDGE ATTACH BRACKET	270°	
9'-6"	9'-6"	13	SAFETY CLIMB BRACKET	0°	
7'-4"	7'-4"	2	10" X 25" OVAL PORTHOLE	90°	132512-B
7'-4"	7'-4"	2	10" X 25" OVAL PORTHOLE	180°	132512-B
7'-4"	7'-4"	2	10" X 25" OVAL PORTHOLE	270°	
6'-9"	6'-9"	7	GROUNDING PLATE	90°	
6'-9"	6'-9"	7	GROUNDING PLATE	180°	
6'-9"	6'-9"	7	GROUNDING PLATE	270°	
1'-6"	1'-6"	2	10" X 25" OVAL PORTHOLE	180°	
1'-3"	1'-3"	18	GROUNDING ANGLES (3)	SEE>	131093-B

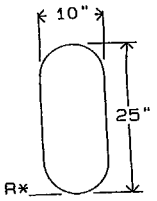


CLIMBING RUNGS

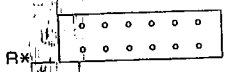
THE ANGLE TO THE OPENING IS MEASURED CLOCKWISE FROM THE CENTER-LINE OF THE CLIMBING RUNGS WHEN LOOKING DOWN.



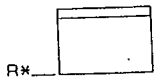
* THE HEIGHT IN THE TABLE IS THE DISTANCE FROM THE BASE OF THE CURRENT POLE SECTION TO THE OPENING REFERENCE (R*) AS SHOWN ON PAGES 2 - 3 OF THIS DRAWING.



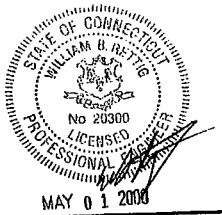
TYPE 2 OPENING



GROUNDING PLATE



LINE BRIDGE BRACKET



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VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT11178D, CONNECTICUT
TP49 X 120' OPENINGS

APPROVED/ENG.	WBR	05/01/2000
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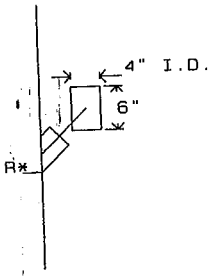
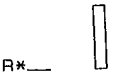
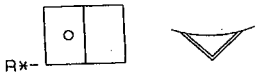


TYPE 9
OPENING



SAFETY CLIMB
BRACKET

FRONT VIEW TOP VIEW



GROUNDING ANGLE

STATE OF CONNECTICUT
WILLIAM G. RETTIG
No. 20300
LICENSED
PROFESSIONAL ENGINEER

MAY 01 2000

VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT11178D, CONNECTICUT
TP49 X 120' OPENINGS

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GENERAL NOTES

1. TOWER DESIGN CONFORMS TO STANDARD EIA/TIA-222-F FOR 80 MPH BASIC WIND SPEED WITH NO ICE.
   TOWER DESIGN CONFORMS TO STANDARD EIA/TIA-222-F FOR 80 MPH BASIC WIND SPEED WITH 0.50" RADIAL ICE WITH LOAD DUE TO WIND REDUCED BY 25% WHEN CONSIDERED SIMULTANEOUSLY WITH ICE.

2. MATERIAL: (A) SOLID RODS CONFORM TO ASTM A-572 GRADE 50 REQUIREMENTS.
   (B) ANGLES CONFORM TO ASTM A-36 REQUIREMENTS.
   (C) PIPE CONFORMS TO ASTM A-53 TYPE E, GRADE B REQUIREMENTS. (MIN YIELD STRENGTH=42 KSI)
   (D) BASE FLANGE AND GUSSETS CONFORM TO ASTM A-572 GRADE 50 REQUIREMENTS. ALL OTHER PLATE CONFORMS TO ASTM A-36 REQUIREMENTS.
   (E) TAPERED POLES CONFORM TO ASTM A-572 GRADE 65 REQUIREMENTS.
   (F) ANCHOR BOLTS CONFORM TO ASTM A-687 REQUIREMENTS.

3. BASE REACTIONS PER EIA/TIA-222-F FOR 80 MPH BASIC WIND SPEED WITH NO ICE.
   TOTAL WEIGHT= 22.8 KIPS.
   MOMENT= 1441.2 KIP-FT.
   MAXIMUM SHEAR= 16.3 KIPS TOTAL.

4. BASE REACTIONS PER EIA/TIA-222-F FOR 80 MPH BASIC WIND SPEED WITH 0.50" RADIAL ICE:
   TOTAL WEIGHT= 26.9 KIPS.
   MOMENT= 1130.9 KIP-FT.
   MAXIMUM SHEAR= 12.7 KIPS TOTAL.

5. FINISH: HOT DIPPED GALVANIZED AFTER FABRICATION.

6. ANTENNAS: 120' (12) 1'X 4' PANELS (CAAA=5.60 SQ.FT.EACH) USING 1-5/8" LINES MOUNTED ON A LOW PROFILE PLATFORM.
   110' (12) 1'X 4' PANELS (CAAA=5.60 SQ.FT.EACH) USING 1-5/8" LINES MOUNTED ON A LOW PROFILE PLATFORM.
   100' (12) 1'X 4' PANELS (CAAA=5.60 SQ.FT.EACH) USING 1-5/8" LINES MOUNTED ON A LOW PROFILE PLATFORM.

7. INSTALL BASE SECTION WITH MINIMUM OF 2" CLEARANCE ABOVE CONCRETE. SEE BASE SECTION PLACEMENT PAGE OF THIS DRAWING FOR MORE INFORMATION.

8. MIN. WELDS 5/16" UNLESS OTHERWISE SPECIFIED. ALL WELDING TO CONFORM TO AWS SPECIFICATIONS.

9. ALL BOLTS MUST BE IN PLACE WITH JAM NUTS PRIOR TO ERECTION OF THE STRUCTURE. ALL BOLTS AND NUTS MUST BE IN PLACE AND TIGHTENED BEFORE THE ADJOINING SECTION(S) ARE PLACED.

10. ALL A-325 BOLTS ARE TO BE TIGHTENED TO A SNUG TIGHT CONDITION AS DEFINED BY AISC SPECIFICATION UNLESS OTHERWISE NOTED. A MORE QUANTITATIVE ALTERNATIVE APPROACH TO ACHIEVING A SNUG TIGHT CONDITION IS TO TIGHTEN USING THE TORQUE VALUES FROM DRAWING 123107-A.

11. EIA GROUNDING FOR TOWER.

12. OUTSIDE CLIMB RUNGS WITH SAFETY CLIMB.

13. MONOPOLE TO BE PAINTED SLATE GRAY.

MAY 01 2000

VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT11178D, CONNECTICUT
TP49 X 120' NOTES

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From: 92535.OFT - 03/24/2000 09:42
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FOUNDATION NOTES

1. SOIL AS PER REPORT BY DR. CLARENCE WELTI, PE, PC, DATED 4/4/00.
2. CONCRETE TO BE 3000 PSI @ 28 DAYS. REINFORCING BAR TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS. CONCRETE INSTALLATION TO CONFORM TO ACI-318 BUILDING REQUIREMENTS FOR REINFORCED CONCRETE. ALL CONCRETE TO BE PLACED AGAINST UNDISTURBED EARTH FREE OF WATER AND ALL FOREIGN OBJECTS AND MATERIALS. A MINIMUM OF THREE INCHES OF CONCRETE SHALL COVER ALL REINFORCEMENT. WELDING OF REBAR NOT PERMITTED.
3. A COLD JOINT IS PERMISSIBLE UPON CONSULTATION WITH PIROD. ALL COLD JOINTS SHALL BE COATED WITH BONDING AGENTS PRIOR TO SECOND POUR.
4. ALL FILL SHOULD BE PLACED IN LOOSE LEVEL LIFTS OF NO MORE THAN 95" THICK. FILL MATERIALS SHOULD BE CLEAN AND FREE OF ORGANIC AND FROZEN MATERIALS OR ANY OTHER DELETERIOUS METERIALS. COMPACT FILL TO 97% OF MODIFIED PROCTOR MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557.
5. GROUTING OF POLE BASE IS OPTIONAL. IF GROUT IS USED, DRAINAGE MUST BE PROVIDED FROM THE INTERIOR OF THE POLE. REFER TO DRAWING # 118492-B FOR BASE SECTION INSTALLATION.
6. BENDING, STRAIGHTENING OR REALIGNING (HOT OR COLD) OF THE ANCHOR BOLTS BY ANY METHOD IS PROHIBITED.
7. CROWN TOP OF FOUNDATION FOR PROPER DRAINAGE.
8. INSTALL BASE SECTION WITH MINIMUM OF 2" CLEARANCE ABOVE CONCRETE. SEE PAGE 9 OF THIS DRAWING FOR MORE INFORMATION.
9. THE FOUNDATION MUST BEAR ENTIRELY ON COMPETENT SOIL. THE FOUNDATION IS NOT TO BEAR ON ANY COMBINATION OF SOIL AND BEDROCK AS THIS MAY CAUSE EXCESSIVE DIFFERENTIAL SETTLEMENT.
10. REFERENCE PARAGRAPH 7.1 OF THE SOIL REPORT FOR BACKFILL REQUIREMENTS.

STATE OF CONNECTICUT
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MAY 01 2000

VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT11178D, CONNECTICUT
TP49 X 120' NOTES

REV	DESCRIPTION OF REVISIONS	INI	DATE
B	ADDED FOUNDATINOS	WBR	05/01/2000

APPROVED/ENG.	WBR	05/01/2000
APPROVED/FOUND.	WBR	05/01/2000
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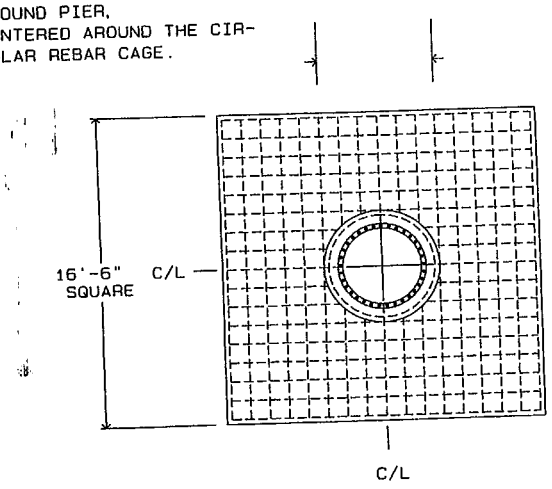
6' ROUND PIER,
CENTERED AROUND THE CIRCULAR REBAR CAGE.



BASE FLANGE MUST BE CENTERED IN PIER WITHIN +/- 10% OF PIER DIAMETER.

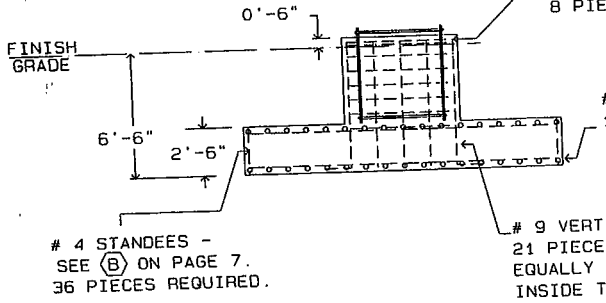
ALL REBAR REQUIRES MINIMUM OF 3" CONCRETE COVERAGE.

FOR ANCHOR STEEL IDENTIFICATION AND PLACEMENT INFORMATION, SEE PAGE 8.

FOR BASE SECTION INSTALLATION, SEE PAGE 9 OF THIS DRAWING

GROUTING OF POLE BASE IS OPTIONAL. IF GROUT IS USED, DRAINAGE MUST BE PROVIDED FROM THE INTERIOR OF POLE.

CROWN TOP OF FOUNDATION TO FACILITATE DRAINAGE.



4 HORIZONTAL TIES - SEE (D) ON PAGE 7.
8 PIECES REQUIRED, EQUALLY SPACED.

7 HORIZONTAL BARS - SEE (A) ON PAGE 7.
17 PIECES EACH WAY PER GRID.
(ONE GRID AT TOP OF PAD & ONE AT BOTTOM)

4 STANDEES -
SEE (B) ON PAGE 7.
36 PIECES REQUIRED.

9 VERTICAL REBAR - SEE (C) ON PAGE 7.
21 PIECES REQUIRED PER PIER,
EQUALLY SPACED, TO BE PLACED
INSIDE TIES.

TOWER FOUNDATION

29.9 CUBIC YARDS CONCRETE REQUIRED
FOR INSTALLATION SPECIFICATIONS AND
ADDITIONAL INFORMATION, SEE PAGE 5
OF THIS DRAWING.

STATE OF CONNECTICUT
WILLIAM B. RETTIG
No. 20300
LICENSED PROFESSIONAL ENGINEER
MAY 01 2000

VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT11178D, CONNECTICUT
TP49 X 120' BASE FOUNDATION

REV	DESCRIPTION OF REVISIONS	INI	DATE
B	ADDED FOUNDATINOS	WBR	05/01/2000

APPROVED/ENG.	WBR	05/01/2000
APPROVED/FOUND	WBR	05/01/2000
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ARCHIVE	F-0092535	

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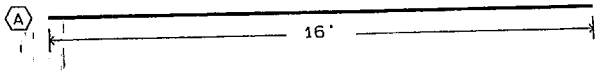
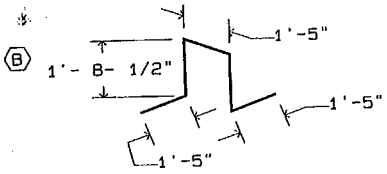
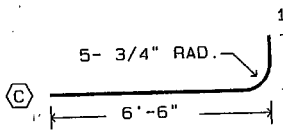


7 REBAR - 68 PIECES REQ. TOTAL
APPROX WT = 32.7# EACH, 2224# TOTAL

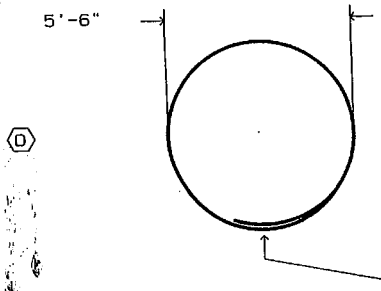
REBAR SUPPORTS MAY CONSIST OF ANY ACCEPTABLE MEANS OF SECURELY SUPPORTING THE TOP REINFORCEMENT GRID ABOVE THE BOTTOM REINFORCEMENT GRID WHILE MAINTAINING A SEPARATION OF 2' (OUTSIDE REBAR TO OUTSIDE REBAR).

4 REBAR - 36 PIECES REQUIRED TOTAL
TYPE 26 STANDEE PLACED BETWEEN REBAR GRIDS ON NOMINAL 4' SPACING THROUGHOUT
APPROX UNBENT LENGTH = 7'- 8"
APPROX WT = 5.1# EACH, 184# TOTAL





9 REBAR - 21 PIECES REQUIRED TOTAL
APPROX UNBENT LENGTH = 7'-10- 7/8"
APPROX WT = 26.9# EACH, 565# TOTAL

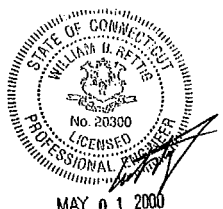


4 REBAR - 8 PIECES REQUIRED TOTAL
APPROX UNBENT LENGTH = 19'- 0- 3/4"
APPROX WT = 12.7# EACH, 102# TOTAL

LAP DIMENSION: 1'- 9- 3/8"
PLACE REBAR RINGS SO THAT LAPS ON ADJACENT RINGS ARE 180 DEGREES APART. PLACE ONE RING AT TOP OF PAD AND TWO RINGS AT TOP OF PIER REBAR. EQUALLY SPACE REMAINING RINGS ALONG PIER.

REBAR DETAIL

TOTAL APPROX REBAR WEIGHT = 3075#
REINFORCING BAR TO CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS.



MAY 0 1 2000

REV	DESCRIPTION OF REVISIONS	INI	DATE
B	ADDED FOUNDATINOS	WBR	05/01/2000

From: F0092535.DFT - 05/01/2000 07:44
Printed from: 20619878.DWG - 05/01/2000 11:00 @ 05/01/2000 11:01$

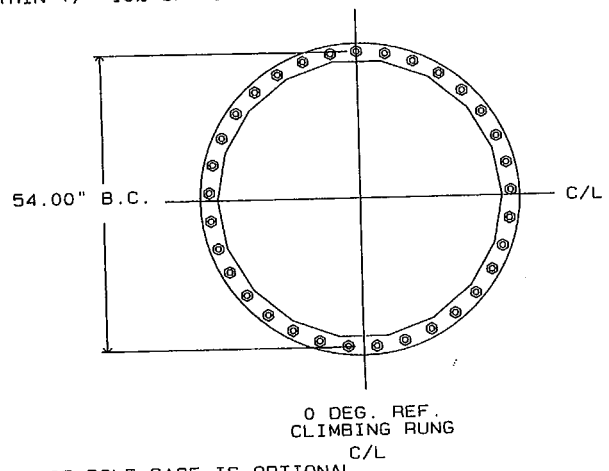
VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT11178D, CONNECTICUT
TP49 X 120' REBAR DETAIL

APPROVED/ENG.	WBR	05/01/2000
APPROVED/FOUND	WBR	05/01/2000
DRAWN BY	KWD	
ENG. FILE NO.	A-116876-	
ARCHIVE	F-0092535	

PiROD INC.
1545 Pidco Dr.
Plymouth, IN 46563-0128
219-936-4221

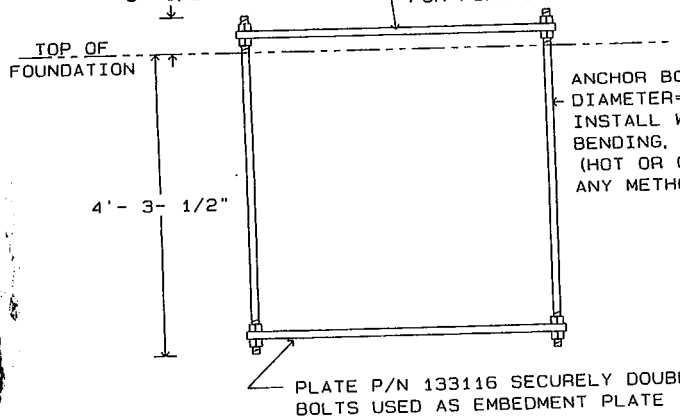
DRAWING NO. 206198-B
PAGE 7 OF 9

BASE FLANGE MUST BE CENTERED IN PIER WITHIN +/- 10% OF PIER DIAMETER.



GROUTING OF POLE BASE IS OPTIONAL. IF GROUT IS USED, DRAINAGE MUST BE PROVIDED FROM THE INTERIOR OF POLE.

FOUNDATION PLATE P/N 133116 MUST BE SECURELY DOUBLE-NUTTED TO ANCHOR BOLTS DURING CONCRETE INSTALLATION AND MUST BE LEVEL +/- 1/8". PLACE BASE FLANGE AS DEPICTED ABOVE. REMOVE FOUNDATION PLATE PRIOR TO TOWER PLACEMENT. SEE DRAWING #118492-B AND PAGE 9 OF THIS DRAWING FOR FURTHER DETAILS OF BASE SECTION PLACEMENT.



ANCHOR BOLT P/N 103183 - 33 REQUIRED
DIAMETER= 1.25" COLOR CODE= PINK/WHITE
INSTALL WITH 8.5" OF THREADS EXPOSED.
BENDING, STRAIGHTENING OR REALIGNING (HOT OR COLD) OF THE ANCHOR BOLTS BY ANY METHOD IS PROHIBITED.

PLATE P/N 133116 SECURELY DOUBLE-NUTTED TO ANCHOR BOLTS USED AS EMBEDMENT PLATE IN CONCRETE.

TOWER ANCHOR STEEL PLACEMENT

STATE OF CONNECTICUT
WILLIAM B. METTE
No. 20300
LICENSED PROFESSIONAL ENGINEER
MAY 01 2000

VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT111780, CONNECTICUT
TP49 X 120' ANCHOR STEEL

REV	DESCRIPTION OF REVISIONS	INI	DATE
B	ADDED FOUNDATINOS	WBR	05/01/2000

APPROVED/ENG.	WBR	05/01/2000
APPROVED/FOUND	WBR	05/01/2000
DRAWN BY	KWD	
ENG. FILE NO.	A-116876-	
ARCHIVE	F-0092535	

PIROD INC.
1545 Pidco Dr.
Plymouth, IN 46563-0128
219-936-4221

DRAWING NO. 206198-B
PAGE 8 OF 9

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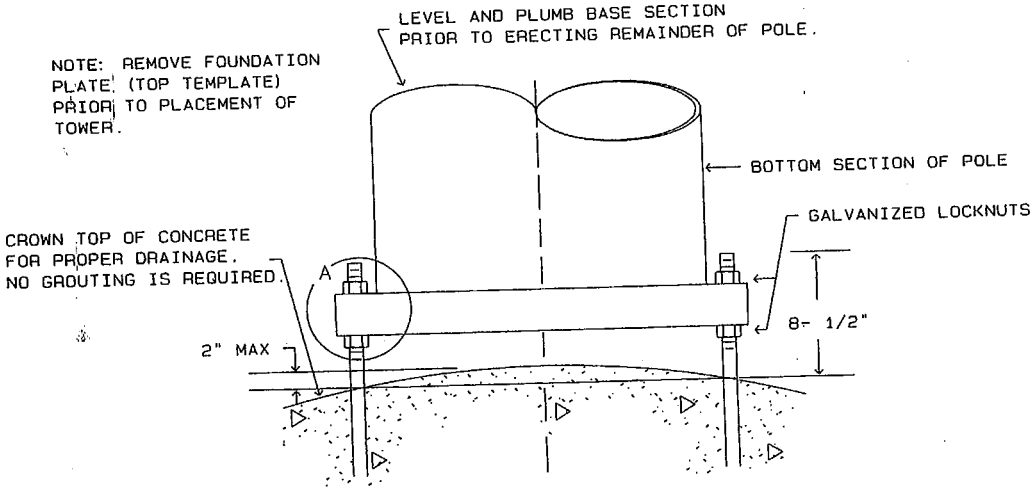
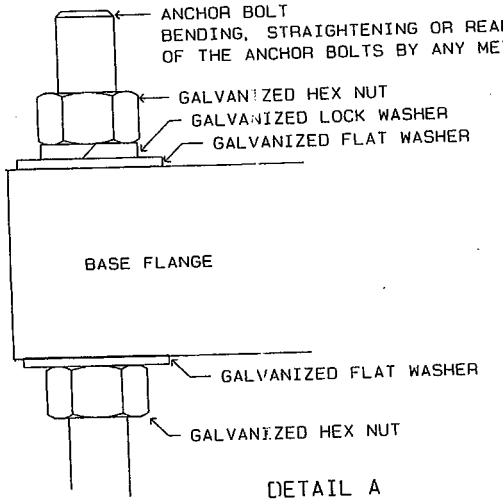




DETAIL A

TOWER BASE SECTION PLACEMENT

STATE OF CONNECTICUT
WILLIAM B. RETTIG
No. 20300
LICENSED
PROFESSIONAL ENGINEER

MAY 01 2000

VOICE STREAM WIRELESS
ST. MARK'S CHURCH CT11178D, CONNECTICUT
TP49 X 120' BASE SECTION PLACEMENT

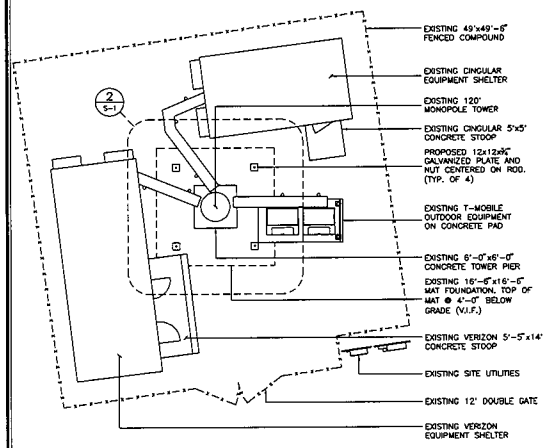
REV	DESCRIPTION OF REVISIONS	INI	DATE
B	ADDED FOUNDATINOS	WBR	05/01/2000

APPROVED/ENG.	WBR	05/01/2000
APPROVED/FOUND	WBR	05/01/2000
DRAWN BY	KWD	
ENG. FILE NO.	A-116876-	
ARCHIVE	F-0092535	

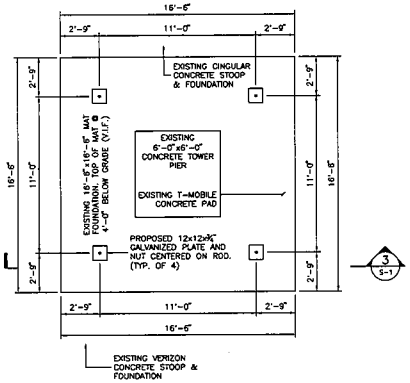
PiROD INC.
1545 Pidco Dr.
Plymouth, IN 46563-0128
219-936-4221

DRAWING NO. 206198-B
PAGE 9 OF 9

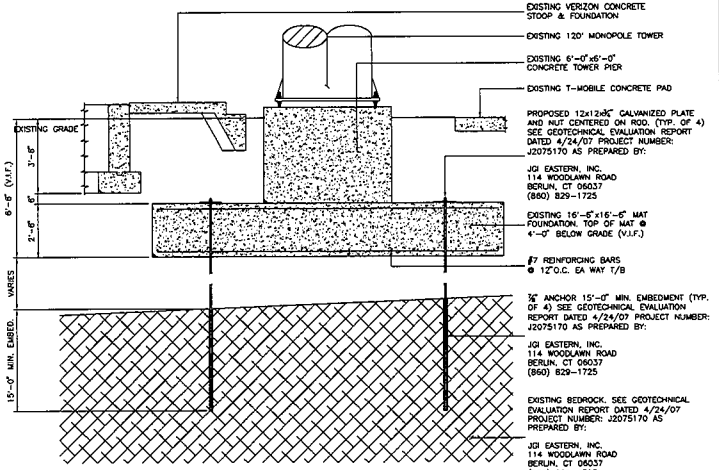
From: F0092535.DFT - 05/01/2000 07:44
Printed from: 20619898.DWG - 05/01/2000 11:00 @ 05/01/2000 11:01:5



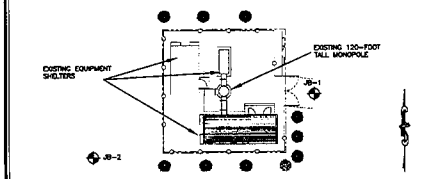
1 S-1 **COMPOUND PLAN** SCALE: 1/8" = 1'-0"



2 S-1 **TOWER FOUNDATION PLAN** SCALE: 1/8" = 1'-0"



2 S-1 **TOWER FOUNDATION SECTION** SCALE: 1/8" = 1'-0"



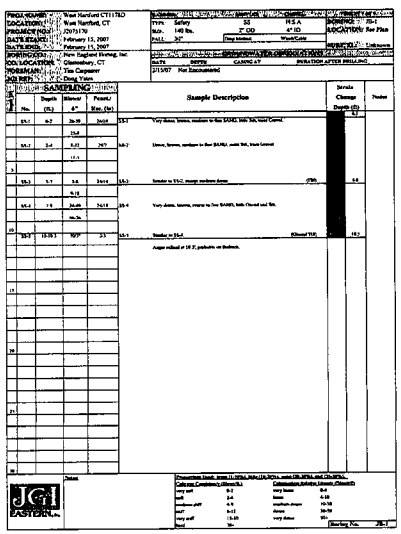
NOTES:

1. THIS PLAN WAS PREPARED FROM A PDF DOCUMENT PROVIDED BY NATCOMM, LLC.
2. THE TEST BORINGS SHOWN AS JB-1 AND JB-2 WERE ADVANCED ON FEBRUARY 15, 2007 UNDER THE DIRECTION OF JGI WITH EQUIPMENT OWNED AND OPERATED BY NEW ENGLAND BORING CONTRACTORS, INC. OF GLASTONBURY, CONNECTICUT.
3. THE APPROXIMATE LOCATIONS OF THE TEST BORINGS WERE TAPED FROM EXISTING SITE FEATURES. ALL DIMENSIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. USE OF THIS PLAN IS LIMITED TO THE ILLUSTRATION OF THE APPROXIMATE LOCATIONS OF THE TEST BORINGS AND OTHER PERTINENT SITE FEATURES. ANY OTHER USE OF THIS PLAN WITHOUT PERMISSION FROM JGI EASTERN INC. IS PROHIBITED.

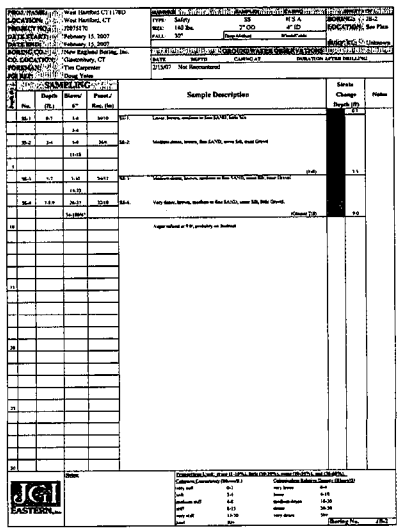
THIS CHART TAKEN FROM GEOTECHNICAL EVALUATION REPORT DATED 4/24/07 PROJECT NUMBER: J2075170 AS PREPARED BY:

JGI EASTERN, INC.
114 WOODLAWN ROAD
BERLIN, CT 06037
(860) 829-1725

TEST BORING LOG



TEST BORING LOG



NOTES:

1. TEMPORAY CONSTRUCTION SLOPES SHALL BE DESIGNED IN COMPLIANCE WITH CURRENT GOVERNING REGULATIONS. CONSTRUCTION SLOPES SHALL BE CUT TO A STABLE INCLINE OR BRACED, DEPENDING ON THE EXCAVATION DEPTH AND SUBSURFACE CONDITIONS.
2. WHEN EXCAVATING TO EXPOSE THE TOP OF THE EXISTING TOWER FOUNDATION, SHORING WILL BE USED TO PREVENT UNDERMINING OF EXISTING FOUNDATIONS AND SLABS.
3. THE CONTRACTOR IS RESPONSIBLE FOR CUT SLOPES AND SHORING FOR SAFE CONSTRUCTION PRACTICES DURING CONSTRUCTION.
4. ALL EXCAVATION WORK WILL BE DONE BY HAND AS TO NOT DISTURB THE EXISTING GROUND RINGS, AND UTILITIES. ALL EXPOSED GROUND RINGS SHALL BE TESTED PRIOR TO BACKFILL UPON COMPLETION OF CONSTRUCTION.
5. EXISTING FOUNDATION CONDITIONS ARE ASSUMED TO BE ACCURATE AND WERE TAKEN FROM PIROD, INC. OF PLYMOUTH INDIANA, PROJECT NO. A-116876 DRAWING NO. 206198-B TITLED "TOWER FOUNDATION" DATED 05/01/00.

REVISIONS		
00	05/29/07	CONSTRUCTION

Cellco Partnership
d.b.a. verizon wireless

Natcomm, LLC - Engineering Consultants
NATCOMM
Natcomm, LLC.
63-2 North Branford Road
Branford, Connecticut 06405
T/A (203) 488-0580
Fax (203) 488-8587
Consulting Engineers - Project Management
Civil - Structural - Mechanical - Electrical

PROFESSIONAL ENGINEER SEAL

WEST HARTFORD II

457 QUAKER LANE SOUTH
WEST HARTFORD, CT 06110

PROJECT NO:	06115
DRAWN BY:	AAJ
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	11/29/06

TOWER FOUNDATION REINFORCEMENT

S-1

DWG. 1 OF 1

JGI EASTERN, Inc.

SERVICES
- Geotechnical
- Environmental
- Construction Monitoring
- Materials Testing

April 24, 2007

Mr. Carlo Centore
NATCOMM, LLC
63-2 North Branford Road
Branford, CT 06405

Advance Copy by Email

Re: Geotechnical Evaluation
T Mobile Communications Tower - West Hartford CT11178D
457 South Quaker Lane
West Hartford, Connecticut

JGI Project No. J2075170

Dear Mr. Centore:

This report, prepared by JGI EASTERN, Inc. (JGI), a Terracon Company, presents our geotechnical engineering evaluation of subsurface conditions as they relate to foundation design and earthwork construction for the proposed communications tower addition. Our services were conducted in accordance with our general agreement and your email authorization dated February 12, 2007. This report is subject to the limitations contained herein.

SITE AND PROJECT DESCRIPTION

The existing tower site is located approximately 300 feet northwest of St. Mark the Evangelist Church in West Hartford, Connecticut. An approximately 120-foot steel monopole tower and associated equipment shelters are located within the existing fenced compound area. We understand the existing tower was constructed in 2000. The area surrounding the tower is wooded and relatively flat.

The project involves adding additional communications antennas to the existing tower. Access to the site is provided by an existing gravel drive that extends from the church parking lot. The proposed tower development and exploration locations are shown on Figure 1, Subsurface Exploration Location Plan.

77 Sundial Avenue, Suite 401W
Manchester, NH 03103
(603) 647-9700 Fax 647-4432

114 Woodlawn Road
Berlin, CT 06037-1535
(860) 829-1725 Fax 829-1745

15 Holly Street, Unit 105
Scarborough, ME 04074
(207) 396-5374 Fax 396-5394

www.jgieastern.com

SUBSURFACE EXPLORATIONS AND CONDITIONS

Two test borings (JB-1 and JB-2) were advanced on February 15, 2007, under the supervision of JGI, using an ATV mounted drill rig owned and operated by New England Boring Contractors, Inc. of Glastonbury, Connecticut. The test borings were advanced to refusal on bedrock at depths ranging from 9.0 to 10.3 feet below existing grade.

The test borings were advanced to the east and southwest of the tower center with 4-inch inside diameter hollow stem augers (HSA). Soil samples were obtained semi-continuously with a standard 2.0-inch outside diameter split-barrel sampler. Standard Penetration Tests (SPTs) were performed at sampling intervals, in general accordance with ASTM D1586. The approximate exploration locations shown on Figure 1.

The subsurface profile consists of fill underlain by glacial till over bedrock. The fill has a thickness of about 5.5 to 6.0 feet and consists of loose to very dense, brown, medium to fine sand, little to some silt, and trace gravel. The glacial till was encountered below the fill, extending to depths ranging from 9.0 to 10.3 feet. The glacial till consists of medium dense to very dense, brown, course to fine sand, little to some silt, trace to little gravel. The bedrock was implied by consistent auger refusal at both boring locations at depths ranging from 9.0 to 10.3 feet.

At the time of the exploration program, groundwater was not observed. Groundwater levels vary depending upon season, precipitation and other conditions that may be different from those at the time of drilling. In addition, groundwater may seasonally perch above the relatively impermeable bedrock surface.

Because of approximately 18 inches of frost at the time of drilling, field resistivity testing could not be completed. A bulk sample of the on-site soil was collected and submitted for laboratory resistivity testing, in accordance with ASTM G57 using a soil test box and a 16gl Earth Resistivity Meter. The test results indicated that the bulk sample of fill has a saturated resistivity value of about 128,700 ohm-cm and a dry resistivity value of about 300,000 ohm-cm.

FOUNDATION TYPE AND DESIGN RECOMMENDATIONS

Tower

Based on available plans, the existing tower foundation is a 16.5-foot square, 2.5-foot thick, double reinforced concrete pad buried 6.5-feet below grade and extended to the surface with a 4-foot square reinforced concrete pier. Based on our analysis of the overturning factor of safety (FOS), using the new tower loadings for moment (1,530 kips*ft), shear (19 kips), and compression (26 kips), the FOS for the existing foundation is below the minimum FOS of 1.5. As such, we recommend that rock anchors be installed to provide additional uplift (overturning) and sliding resistance. Rock anchors (epoxied full length with RE500, or equivalent) should be drilled through the existing concrete footing, soil, and bedrock to a minimum depth of 15 feet into the underlying bedrock, which was

encountered at depths ranging from 9 to 10.3 feet below existing grade. Total rock anchor length should be around 25 feet. Spin-Lock Rock Anchors, or equivalent, should be used to mechanically connect the anchor to the bedrock. Following installation, the anchors should be proof tested in accordance with manufacturers specifications to a load of 60 kips. Following proof testing, the anchors should be post-tensioned to a load of 20 kips. The rock anchor details are shown on Figure 2, Rock Anchor Location and Detail Plan. 12-inch square, ¾-inch thick steel plates will transmit the load from the rock anchors to the foundation.

In order to install the anchors, soil from above the existing foundation will be excavated to uncover the footing. As such, weight will be removed from above the foundation, decreasing the temporary overturning resistance of the existing foundation. Temporary guy wires, or additional other appropriate means of temporary support, should be used to maintain the towers integrity during construction activities. The responsibility to maintain the tower integrity during construction lies solely with the contractor. Furthermore, the anchors were designed to increase the overturning moment of the foundation (in addition to the soil placed as backfill over the foundation) and were not designed to provide all of the overturning resistance. Control of backfill compaction above the foundation following anchor installation will be required to provide sufficient uplift resistance.

Seismic Design Criteria

Seismic design requirements for the State of Connecticut are based on the Connecticut State Building Code, which incorporates the Seismic Design Category approach from the 20003 International Building Code. The Seismic Design Category determination is based on:

- Building Importance (grouping based on use of building)
- Mapping factors (expected maximum considered ground motions)
- Site classification (soil type)

From our test borings, we consider that the site subsurface conditions match the General Soil Description of "rock". The Site Class is therefore B. We understand that this particular tower will not be designated for emergency preparedness or communications in the event of an earthquake. Therefore we expect that the communications tower will be classified as Category I Seismic Use Group. Based on the above, and a review of USGS National Seismic Hazard Mapping, we consider the facility to be in Seismic Design Category B. This determination should be confirmed by the structural engineer. The site is not susceptible to liquefaction in the event of an earthquake.

CONSTRUCTION RECOMMENDATIONS

Temporary Excavation and Dewatering

Excavations greater than 4 feet deep will be required during rock anchor installation. Temporary construction slopes should be designed in compliance with recent governing regulations. Construction slopes should be cut to a stable incline or braced, depending upon the excavation depth and encountered subsurface conditions. When excavating to expose the top of the existing tower foundation, care should be taken to prevent undermining or disturbing of the existing equipment cabinet slabs and/or foundations.

Construction slopes should be reviewed for signs of mass movement. If movement/potential stability problems are observed, work should cease; the geotechnical engineer should be immediately contacted. The responsibility for excavation safety and stability of temporary construction slopes should lie solely with the contractor.

We do not anticipate significant construction dewatering. The contractor should prevent groundwater, if encountered, and surface water runoff from collecting in excavations.

LIMITATIONS

The analyses and recommendations submitted in this report are based upon the data obtained from both test borings. The nature and extent of variations from the conditions observed within the explorations may not become evident until construction. If variations then appear evident, JGI should re-evaluate the recommendations of this report.

We request the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of our recommendations. In the event that changes in the nature, design, or location of the proposed development are planned, the conclusions and recommendations contained in this report shall not be considered valid unless we review the changes, and conclusions of the report are modified or verified by us in writing.

A geotechnical engineer should be retained to provide testing and monitoring services during the earthwork phases of the project. This is to observe compliance with our design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

This report has been prepared for the exclusive use of NATCOMM, LLC. in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made. This report has been prepared for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to evaluation only.

If you have questions, please contact us. It was a pleasure working with you on this project and we look forward to working with you in the future.

Very truly yours,

JGI EASTERN, Inc.

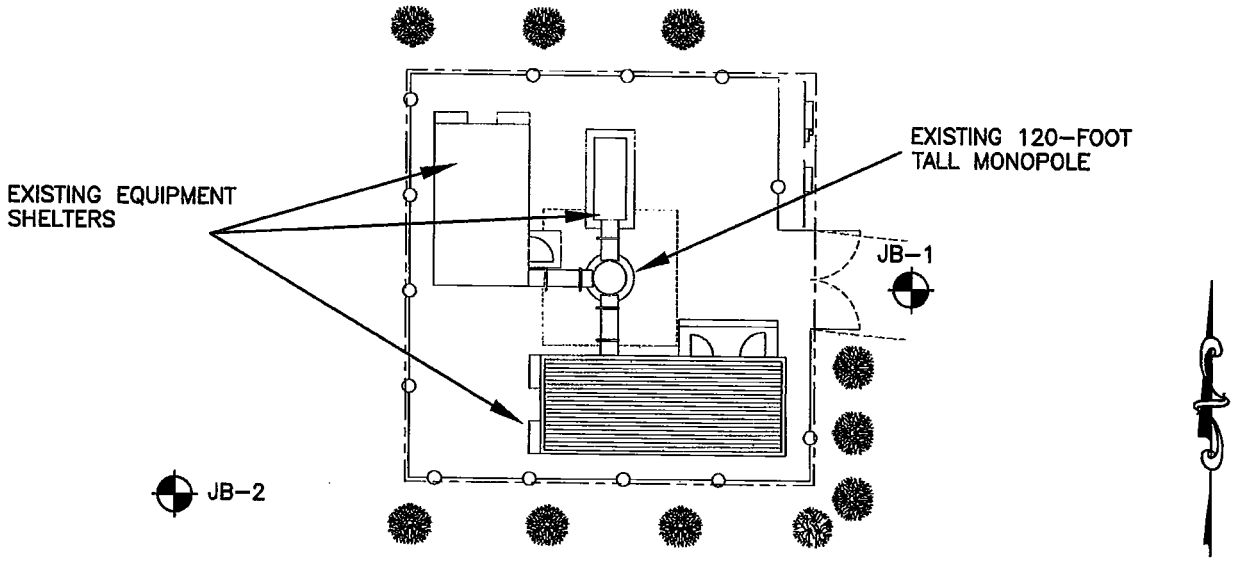
Robert W. Olah, EIT
Engineer II

Ryan R. Roy, P.E.
Principal/Senior Engineer

/ekc/J2075170

Attachments: Figure 1 – Subsurface Exploration Location Plan
Figure 2 – Rock Anchor Location and Detail Plan
Test Boring Logs, JB-1 and JB-2

INTERSTATE 84



NOTES:

1. THIS PLAN WAS PREPARED FROM A PDF DOCUMENT PROVIDED BY NATCOMM, LLC.
2. THE TEST BORINGS SHOWN AS JB–1 AND JB–2 WERE ADVANCED ON FEBRUARY 15, 2007 UNDER THE DIRECTION OF JGI WITH EQUIPMENT OWNED AND OPERATED BY NEW ENGLAND BORING CONTRACTORS, INC. OF GLASTONBURY, CONNECTICUT.
3. THE APPROXIMATE LOCATIONS OF THE TEST BORINGS WERE TAPED FROM EXISTING SITE FEATURES. THE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.
4. USE OF THIS PLAN IS LIMITED TO THE ILLUSTRATION OF THE APPROXIMATE LOCATIONS OF THE TEST BORINGS AND OTHER PERTINENT SITE FEATURES. ANY OTHER USE OF THIS PLAN WITHOUT PERMISSION FROM JGI EASTERN INC. IS PROHIBITED.

LEGEND

JB–1 ⊕ TEST BORING LOCATION

GRAPHIC SCALE

10 0 10 20 40

(IN FEET)

T MOBILE COMMUNICATIONS TOWER – WEST HARTFORD CT1178D

WEST HARTFORD, CONNECTICUT

PREPARED FOR:
NATCOMM, LLC
63–2 NORTH BRANFORD RD
BRANFORD, CT 06405

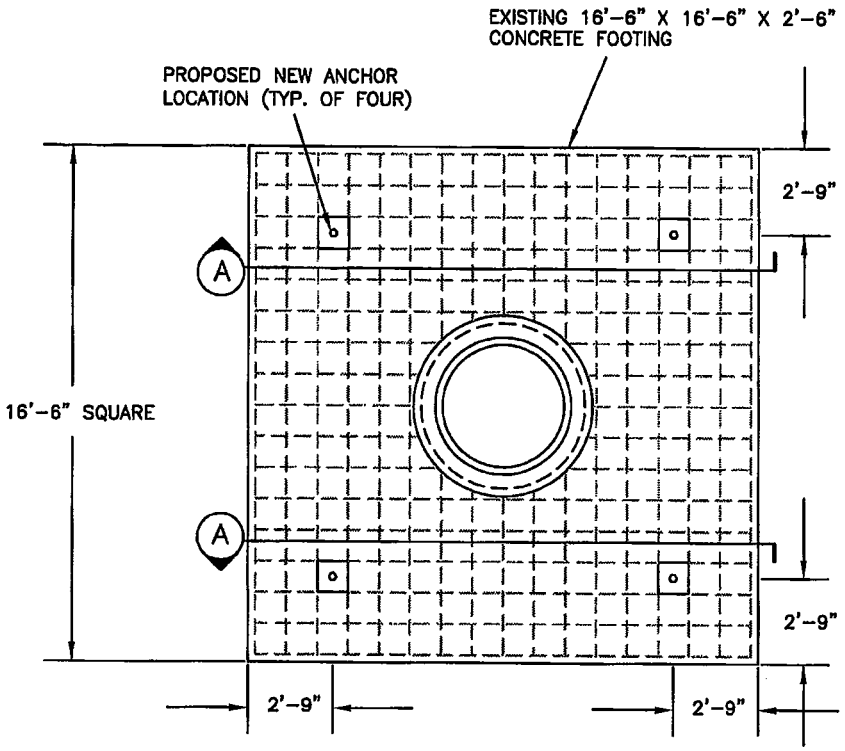
DATE: APRIL 2007
SCALE: 1" = 20'
PROJECT NO: J2075170

FIGURE 1

SUBSURFACE EXPLORATION LOCATION PLAN

JGI EASTERN, Inc.
114 Woodlawn Road
Berlin, Connecticut 06037

J2075170



PLAN VIEW – EXISTING TOWER CONCRETE FOOTING
NOT TO SCALE

NOTES:

1. EXISTING FOUNDATION CONDITIONS ARE ASSUMED TO BE ACCURATE AND WERE TAKEN FROM PIROD, INC. OF PLYMOUTH, INDIANA PROJECT NUMBER: A-116876 DRAWING NUMBER: 206198-B TITLED: "TOWER FOUNDATION" DATED: 5/1/2000.

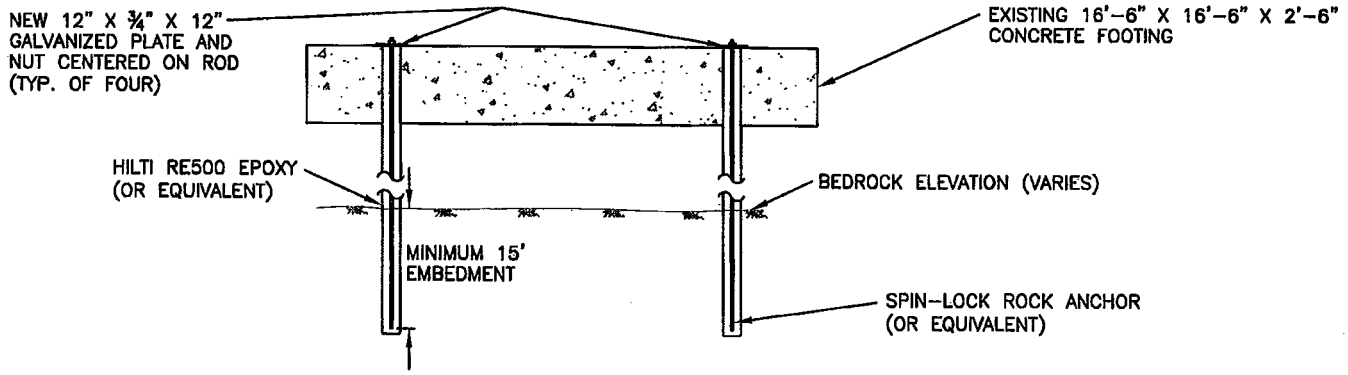
2. ANCHORS TO BE MINIMUM NO. 7 REINFORCING STEEL (TOP 5" THREADED) OR ⅞" THREADED ROD (FyMin = 60ksi), GALVANIZED.

3. HOLE SHALL BE DRILLED THROUGH EXISTING CONCRETE FOOTING, SOIL, AND BEDROCK TO A MINIMUM DEPTH OF 15' BELOW BEDROCK SURFACE. HOLE SHALL HAVE A MINIMUM ½" CLEARANCE ON ALL SIDES. EXISTING REINFORCING STEEL SHALL NOT BE CUT DURING DRILLING OPERATIONS. IF SLOUGHING OR CAVING SOILS ARE ENCOUNTERED DURING DRILLING THROUGH THE EXISTING SOILS, THE HOLE(S) SHALL BE CASED.

4. ANCHORS SHALL BE EPOXIED FULL LENGTH, WITH HILTI RE500, OR EQUIVALENT.

5. NEW GALVANIZED STEEL PLATE TO BE ASTM A36.

6. ALL ANCHORS SHALL BE PROOF-TESTED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS TO A LOAD OF 60 KIPS. FOLLOWING PROOF-TESTING, ANCHORS SHALL BE LOCKED OFF AT 20 KIPS.



SECTION A
NOT TO SCALE

T MOBILE COMMUNICATIONS TOWER – WEST HARTFORD CT1178D
WEST HARTFORD, CONNECTICUT

PREPARED FOR:
NATCOMM, LLC
63-2 NORTH BRANFORD RD
BRANFORD, CT 06405

DATE: APRIL 2007
SCALE: N.T.S.
PROJECT NO: J2075170

FIGURE 2
ROCK ANCHOR LOCATION AND DETAIL PLAN

EASTERN, Inc.
114 Woodlawn Road
Berlin, Connecticut 06037

J2075170

TEST BORING LOG

PROJ. NAME:	West Hartford CT1178D	HAMMER		SAMPLER	CASING	SHEET 1 OF 1	
LOCATION:	West Hartford, CT	TYPE:	Safety	SS	H S A	BORING:	JB-1
PROJECT NO.:	J2075170	SIZE:	140 lbs.	2" OD	4" ID	LOCATION:	See Plan
DATE START:	February 15, 2007	FALL:	30"	Drop Method:	Winch/Cable		
DATE END:	February 15, 2007					SURF. EL.:	Unknown
BORING CO.:	New England Boring, Inc.	GROUNDWATER OBSERVATIONS					
CO. LOCATION:	Glastonbury, CT	DATE	DEPTH	CASING AT	DURATION AFTER DRILLING		
FOREMAN:	Tim Carpenter	2/15/07	Not Encountered				
JGI REP.:	Doug Yates						

Depth (ft)	SAMPLING No.	Depth (ft.)	Blows/ 6"	Penet./ Rec. (in)	Sample Description	Strata Change Depth (ft)	Notes
						0.3	
	SS-1	0-2	28-59	24/14	SS-1: Very dense, brown, medium to fine SAND, little Silt, trace Gravel.		
			23-8				
	SS-2	2-4	8-32	24/7	SS-2: Dense, brown, medium to fine SAND, some Silt, trace Gravel.		
			11-5				
5							
	SS-3	5-7	5-8	24/14	SS-3: Similar to SS-2, except medium dense. (Fill)	6.0	
			9-18				
	SS-4	7-9	24-49	24/18	SS-4: Very dense, brown, coarse to fine SAND, little Gravel and Silt.		
			66-26				
10							
	SS-5	10-10.3	70/3"	3/3	SS-5: Similar to SS-4. (Glacial Till)	10.5	
					Auger refusal at 10.5', probably on Bedrock.		
15							
20							
25							
30							

EASTERN, Inc.

Notes:

Proportions Used: trace (1-10%), little (10-20%), some (20-35%), and (35-50%).

Cohesive Consistency (Blows/ft.)		Cohesionless Relative Density (Blows/ft)	
very soft	0-2	very loose	0-4
soft	2-4	loose	4-10
medium stiff	4-8	medium dense	10-30
stiff	8-15	dense	30-50
very stiff	15-30	very dense	50+
hard	30+		

Boring No. JB-1

TEST BORING LOG

PROJ. NAME:	West Hartford CT1178D	HAMMER		SAMPLER	CASING	SHEET 1 OF 1	
LOCATION:	West Hartford, CT	TYPE:	Safety	SS	H S A	BORING:	JB-2
PROJECT NO.:	J2075170	SIZE:	140 lbs.	2" OD	4" ID	LOCATION:	See Plan
DATE START:	February 15, 2007	FALL:	30"	Drop Method:	Winch/Cable		
DATE END:	February 15, 2007					SURF. EL.:	Unknown
BORING CO.:	New England Boring, Inc.	GROUNDWATER OBSERVATIONS					
CO. LOCATION:	Glastonbury, CT	DATE	DEPTH	CASING AT	DURATION AFTER DRILLING		
FOREMAN:	Tim Carpenter	2/15/07	Not Encountered				
JGI REP.:	Doug Yates						

Depth (ft)	SAMPLING No.	Depth (ft.)	Blows/ 6"	Penet./ Rec. (in)	Sample Description	Strata Change Depth (ft)	Notes
						0.3	
	SS-1	0-2	3-4	24/10	SS-1: Loose, brown, medium to fine SAND, little Silt.		
			3-4				
	SS-2	2-4	5-9	24/8	SS-2: Medium dense, brown, fine SAND, some Silt, trace Gravel.		
			11-18				
5					(Fill)	5.5	
	SS-3	5-7	3-10	24/12	SS-3: Medium dense, brown, medium to fine SAND, some Silt, trace Gravel.		
			14-32				
	SS-4	7-8.9	26-37	22/10	SS-4: Very dense, brown, medium to fine SAND, some Silt, little Gravel.		
			34-100/4"		(Glacial Till)	9.0	
10					Auger refusal at 9.0', probably on Bedrock.		
15							
20							
25							
30							

EASTERN, Inc.

Notes:

Proportions Used: trace (1-10%), little (10-20%), some (20-35%), and (35-50%).

Cohesive Consistency (Blows/ft.)		Cohesionless Relative Density (Blows/ft)	
very soft	0-2	very loose	0-4
soft	2-4	loose	4-10
medium stiff	4-8	medium dense	10-30
stiff	8-15	dense	30-50
very stiff	15-30	very dense	50+
hard	30+		

Boring No. JB-2

T-Mobile
Tower Asset Management

Structural Analysis Worksheet (SAW)

Date: 10/24/08	**TMO Site ID: CT11178**	**TMO Site Name: W HARTFORD**
Applicant: POCKET	**TMO Project Manager: Jackie Donahue**	
Analysis Request: Initial	**Previous Analysis by:**	**Previous Analysis Date:**
Structure Type: Monopole	**Structure Height: 120'**	**Tower Manufacturer: PiRod**
Foundation Type:	**Manufacturer ID#:**	**FCC ID#:**

Additional Structure info:

Structural Loading:

Existing/ Proposed	Elevation (Ft)	Qty	Antenna Model (Provide cut-sheet if non-standard)	Mount Type	Qty Coax	Coax Size	Coax Location*	Owner/Tenant
Existing	120'	12	Standard T-Mobile loading including (12) LNAs	13' LP Pltfm	25	1 5/8	Internal	T Mobile
Existing	110’	12	Algon 7184.14	LP platform	12	1 5/8	Internal	AT&T
Existing	100’	12	(6) Antel WPA-80090/4CF (6) DB948F85T2E-M	LP Platform	12	1 5/8”	Internal	Verizon
Existing	100’	1	GPS	On platform	1	7/8	Internal	Verizon
Proposed	**90’**	**3**	**Kathrein 7421 213**	**Flush Mount**	**6**	**1 5/8”**	**Internal**	**Pocket**

T-Mobile
Tower Asset Management

* See coax diagram below for SST and Guy towers

Structural Loading Cont:

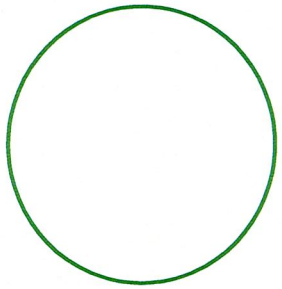
Existing/ Proposed	Elevation (Ft)	Qty	Antennas	Mount Type	Qty Coax	Coax Size	Coax Location*	Owner/Tenant

* See coax diagram below for SST and Guy towers

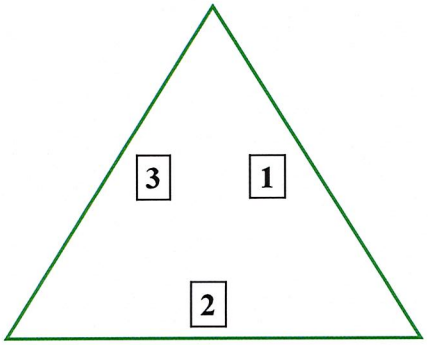
Additional Loading Notes:

Tower Diagrams for Coax stacking detail (North towards top of page)

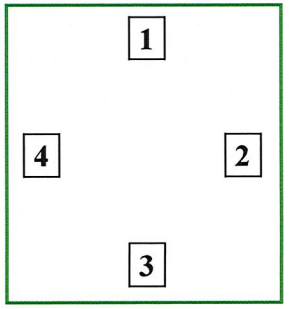
Monopole



3 Leg SST/Guy Tower



4 Leg SST



CT11178 / W HARTFORD : POCKET
10/24/08