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

July 10, 2009

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

RE: **EM-POCKET-043-090618** – Youghiogheny Communications-Northeast, LLC d/b/a Pocket Communications notice of intent to modify an existing telecommunications facility located at 100 Sunset Ridge Drive, East 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 June 17, 2009, 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/cmw

S. Derek Phelps
Executive Director

SDP/CDM/laf

c: The Honorable Melody A. Currey, Mayor, Town of East Hartford
Michael J. Dayton, Town Planner, Town of East Hartford

PULLMAN & COMLEY, LLC
ATTORNEYS AT LAW

EM-POCKET-043-090618

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

www.pullcom.com

ORIGINAL

June 17, 2009

Via Federal Express

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

Re: Notice of Exempt Modification
Town of East Hartford Telecommunications Facility
100 Sunset Ridge Drive, East 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 140-foot lattice facility owned by **Town of East Hartford** and located at **100 Sunset Ridge Drive, East 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 Melody A. Currey, Mayor, Town of East Hartford.

The existing Facility consists of a 140-foot self-supporting lattice tower capable of supporting multiple carriers within a fenced compound. The coordinates for the Facility are **Lat: 41°-46'-18" and Long: 72°–35'-26".** The tower is located in the eastern portion of East Hartford, approximately 500 feet south of Interstate 84 (I-84), and roughly 3,000 feet west of the Manchester town line (see Site Map, attached as Exhibit A). The tower currently supports T-Mobile antennas at the one hundred twenty foot (120') level centerline AGL (above ground level). The tower also currently supports two public safety whips at the one hundred thirty foot level (130') AGL. Pocket proposes to install three RFS APXV18-206517S-C flush mount antennas on the tower at the one hundred ten foot centerline (110') 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 the ice bridge. An ice bridge will run from the lease area to the tower. Utilities will be run via a proposed underground

conduit from an existing utility backboard, within the compound (See Design Drawings and Equipment Specifications, attached as Exhibits B and C respectively). To accommodate Pocket's equipment on a temporary basis, a mobile, EPA approved generator and small microwave dish antenna (approximately 14" by 14") will be used at the site to provide electricity until permanent power can be established by the utility provider. If needed at all, Pocket anticipates that the temporary generator will be in use for a maximum of eight weeks from the time of approval. The specifications on this proposed temporary generator and microwave dish are included in the Equipment Specifications, attached as Exhibit C. Due to the temporary use and low emissions from the generator, no permit is required from the Department of Environmental Protection. Pocket would propose to refuel the generator every 48 hours.

For the following reasons, the proposed modifications to the Sunset Ridge Drive 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 110 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 16.56% 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 East Hartford Facility constitutes an exempt modification under R.C.S.A. Section 16-50j-72(b)(2).

Respectfully Submitted,

Carrie L. Larson

cc: Melody A. Currey, Mayor, Town of East Hartford
Town is also underlying property owner

Hartford/72572.151/JTP/375000v1

Exhibit A

Site Map

Pocket Site HFCT0610E

100 Sunset Ridge Drive

East Hartford, Connecticut

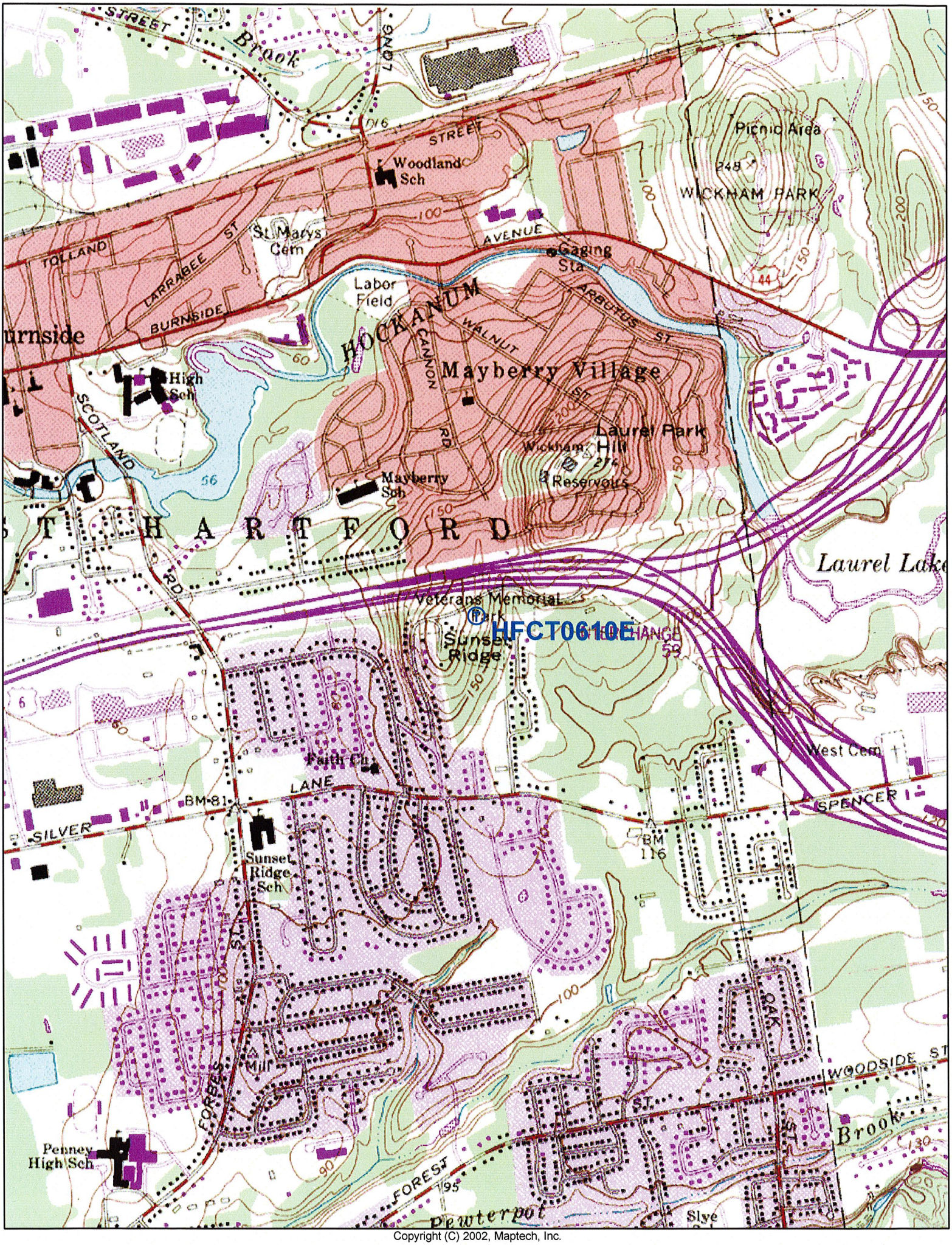


Exhibit B

Design Drawings

Pocket Site HFCT0610E

100 Sunset Ridge Drive

East Hartford, Connecticut

PROJECT INFORMATION

TOWER OWNER:	TOWN OF EAST HARTFORD 740 MAIN STREET EAST HARTFORD, CT 06108
OWNER SITE ID#:	N/A
APPLICANT:	YOUGHIOGHENY COMMUNICATIONS-NORTHEAST LLC 2819 NW LOOP 410 SAN ANTONIO, TX 78230
SITE ADDRESS:	100 SUNSET RIDGE EAST HARTFORD, CT 06108
COUNTY:	HARTFORD
LATITUDE:	41.7720°
LONGITUDE:	-72.5903°
STRUCTURE HEIGHT:	140' 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

STRUCTURAL REVIEW

FOR ADDITIONAL TOWER AND FOUNDATION INFORMATION REFER TO DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 140' SELF SUPPORT LATTICE TOWER FOR PROPOSED ANTENNA ARRANGEMENT, PREPARED BY URS CORPORATION, DATED JUNE 9, 2009. ALL REINFORCEMENT (IF REQUIRED) SHALL BE PERFORMED PRIOR TO ANY WORK UNDER THIS CONTRACT BEING PERFORMED.

APPROVALS

_____ REAL ESTATE

_____ RF

_____ OPS/CONSTRUCTION

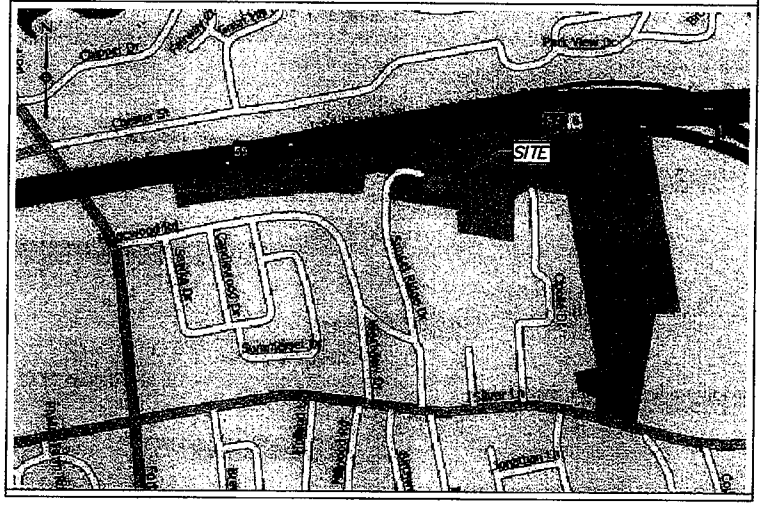
_____ LEGAL/COMPLIANCE

_____ NET DESIGN

pocket™
SMART WIRELESS

HFCT0610E
100 SUNSET RIDGE
140' LATTICE TOWER

LOCATION MAP



DRIVING DIRECTIONS

FROM HARTFORD:

TAKE I-84 EAST TO EXIT 58 (ROBERTS STREET). THEN LEFT ON SILVER LANE TO LEFT ON RIDGEWOOD ROAD. STAY STRAIGHT ONTO SUNSET RIDGE DRIVE TO TOWER AT THE END OF THE ROAD.

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.

CALL before you DIG
FOR CT 1-800-922-4455

STATE OF CONNECTICUT
IGNACIO C. ARIAS
No. 17704
LICENSED ARCHITECT

NO.	DATE	REVISIONS	BY
0	06/19/09	ISSUED FOR CONSTRUCTION	JCF

pocket SMART WIRELESS

PROJECT NAME: HFCT0610E, 100 SUNSET RIDGE ROAD

SHEET: TITLE SHEET

URS

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

CHECKED BY:	JCF
DRAWN BY:	BAL
DATE:	06/05/09
URS JOB NUMBER:	2C1077/36923997
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.

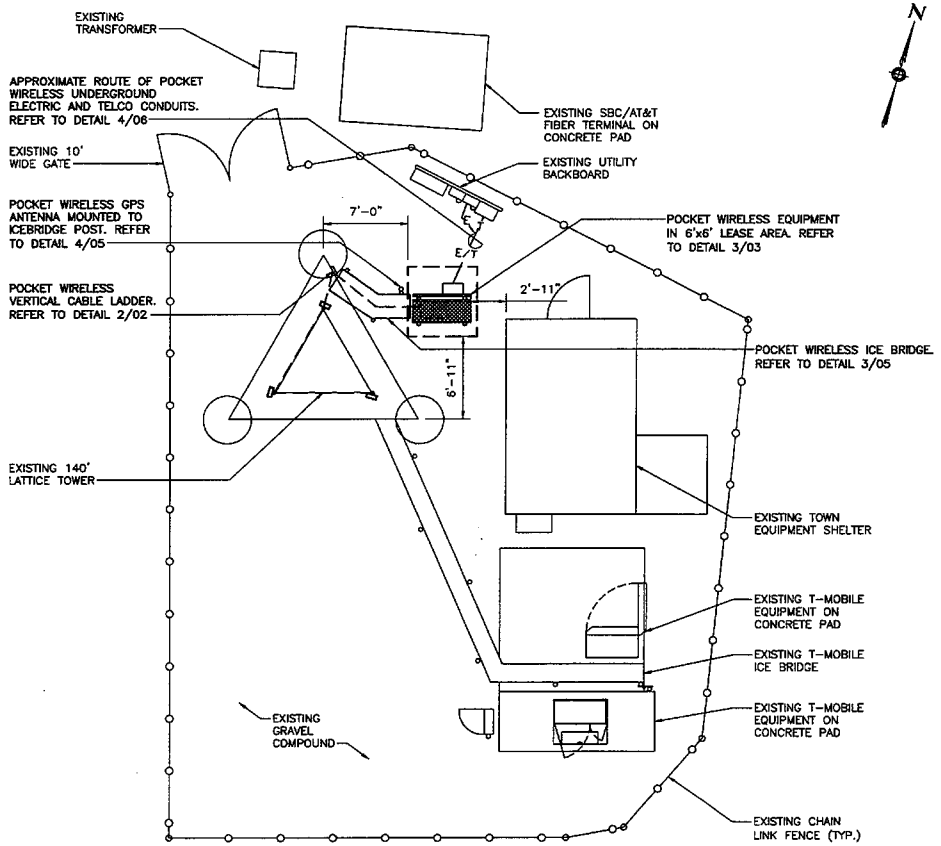
GENERAL NOTES

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.

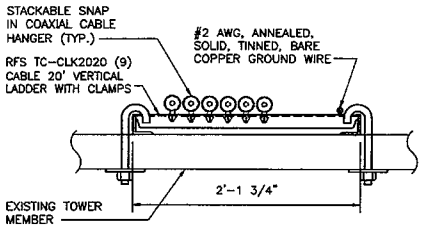
NOTE:
REFER TO DRAWING 06 FOR ADDITIONAL UTILITY INFORMATION

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 COMPOUND PLAN
SCALE: 1" = 10'-0"



2/02 VERTICAL CABLE LADDER DETAIL
SCALE: N.T.S.

STATE OF CONNECTICUT
GIACIO O. [illegible]
No. 8704
LICENSED ARCHITECT

NO.	DATE	ISSUED FOR CONSTRUCTION	JCF	BT
0	06/16/09			

pocket SMART WIRELESS

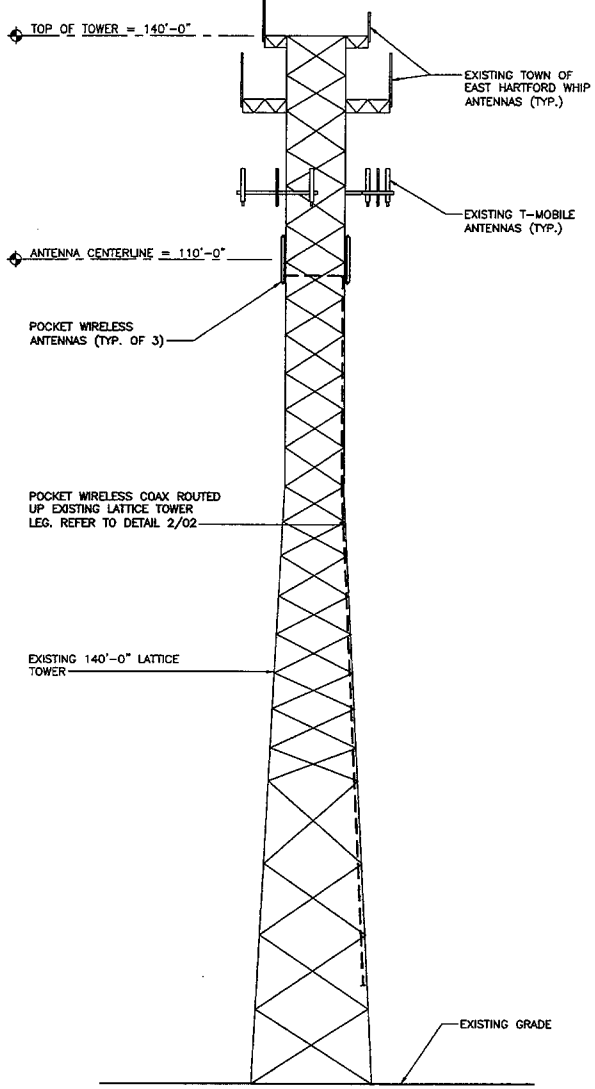
PROJECT NAME: HFCT06106, 100 SUNSET RIDGE ROAD

SHEET NAME: SITE PLAN, DETAILS AND NOTES

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

CHECKED BY:	JCF
DRAWN BY:	BAL
DATE:	06/05/09
URS JOB NUMBER:	PC1077/35923997
DRAWING NUMBER	02

FOR ADDITIONAL TOWER AND FOUNDATION INFORMATION REFER TO DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 140' SELF SUPPORT LATTICE TOWER FOR PROPOSED ANTENNA ARRANGEMENT, PREPARED BY URS CORPORATION, DATED JUNE 9, 2009. ALL REINFORCEMENT (IF REQUIRED) SHALL BE PERFORMED PRIOR TO ANY WORK UNDER THIS CONTRACT BEING PERFORMED.



1 / 03 **TOWER ELEVATION**
SCALE: 1/16" = 1'-0"

ANTENNA KEY

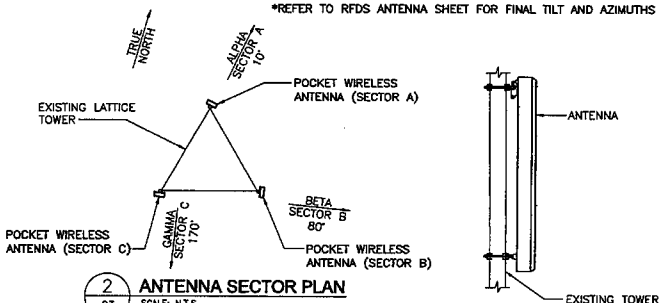
	# ANTENNAS PER SECTOR	ANTENNA NUMBER	COAX COLOR CODE	ANTENNA VENDOR	MODEL NUMBER	AZIMUTH	C/L HEIGHT	MECHANICAL DOWNTILT*	ELECTRICAL DOWNTILT*	COAX SIZE	CABLES PER ANTENNA	COAX MANUFACTURER
ALPHA	1	A-1	(1) RED BAND	RFS	APXV18-206517S-C	10°	110'-0"	0°	0°	1 5/8"ø	2 ● 145'	RFS
BETA	1	B-1	(1) BLUE BAND	RFS	APXV18-206517S-C	80°	110'-0"	0°	0°	1 5/8"ø	2 ● 125'	RFS
GAMMA	1	C-1	(1) GREEN BAND	RFS	APXV18-206517S-C	170°	110'-0"	0°	0°	1 5/8"ø	2 ● 135'	RFS
GPS	1	–	YELLOW	NORTEL	NTGB01MA	–	10'-0"	–	–	LMR400	1 ● 15'	ANDREW

*REFER TO RFDS ANTENNA SHEET FOR FINAL TILT AND AZIMUTHS

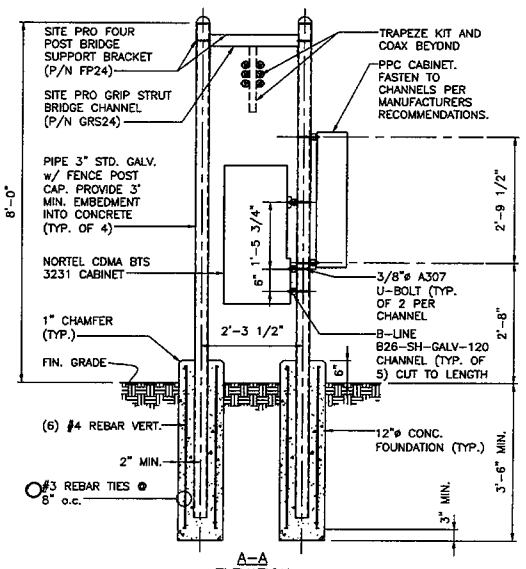
TOWER NOTES:
1. FOR DETAILED TOWER INFORMATION, REFER TO TOWER ERECTION DRAWINGS BY OTHERS. THE TOWER SHOWN ON THIS SHEET IS SHOWN FOR GENERAL CONFIGURATION PURPOSES ONLY.
2. ANTENNA CONFIGURATION IS SUBJECT TO CHANGE. VERIFY ANTENNA HEIGHT, DOWN-TILT, AND AZIMUTH WITH PROJECT MANAGER PRIOR TO CONSTRUCTION.

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.

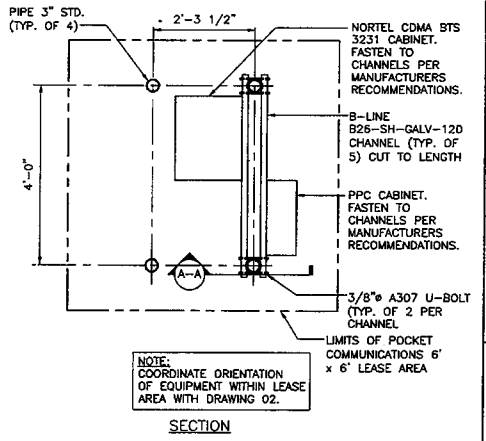
RESPONSIBLE FOR THIS COORDINATION.



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



A-A ELEVATION



NOTE:
COORDINATE ORIENTATION OF EQUIPMENT WITHIN LEASE AREA WITH DRAWING 02.

SECTION

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

STATE OF CONNECTICUT
IGNACIO C. ARIAS
No. 21704
LICENSED ARCHITECT

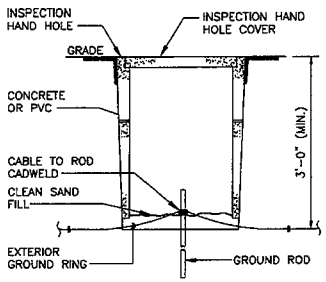
NO.	DATE	REVISIONS	BY
0	06/16/09	ISSUED FOR CONSTRUCTION	JCF

pocket. SMART WIRELESS

PROJECT NAME: HFCT0610E, 100 SUNSET RIDGE ROAD
SHEET: TOWER ELEVATION, ANTENNA PLAN AND DETAILS

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

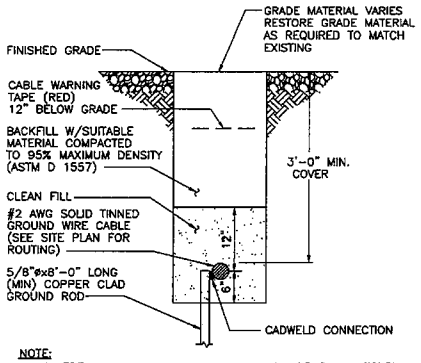
CHECKED BY:	JCF
DRAWN BY:	BAL
DATE:	06/05/09
URS JOB NUMBER:	PC1077/36923997
DRAWING NUMBER:	03



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

7 / 04 GROUND ROD WITH INSPECTION HANDHOLE

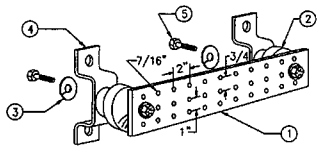
SCALE: N.T.S.



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

6 / 04 EGR DETAIL

SCALE: N.T.S.

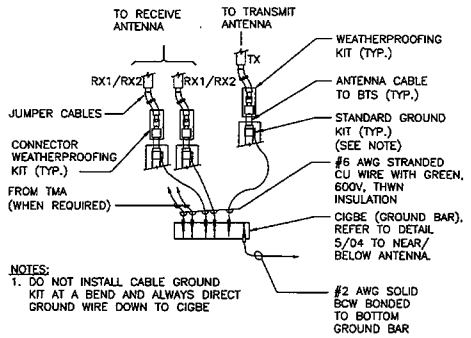


LEGEND

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

5 / 04 MASTER/EQUIPMENT GROUND BAR DETAIL

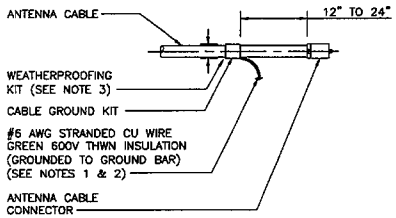
SCALE: N.T.S.



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

4 / 04 CONNECTION OF GROUND WIRE TO GROUND BAR

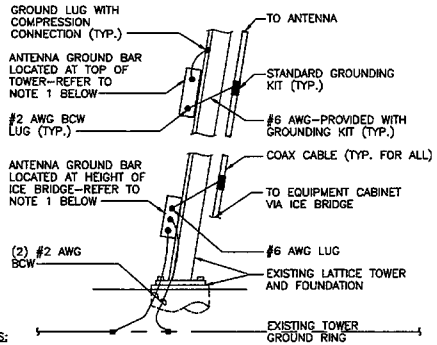
SCALE: N.T.S.



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.

3 / 04 CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

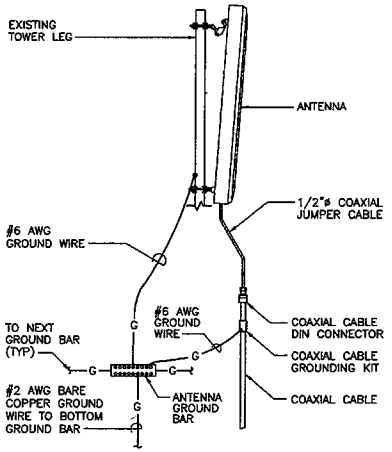
SCALE: N.T.S.



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

2 / 04 LATTICE TOWER - ANTENNA CABLE GROUNDING

SCALE: N.T.S.



1 / 04 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: N.T.S.

pocket SMART WIRELESS

HFCT06610E, 100 SUNSET RIDGE ROAD

GROUNDING DETAILS

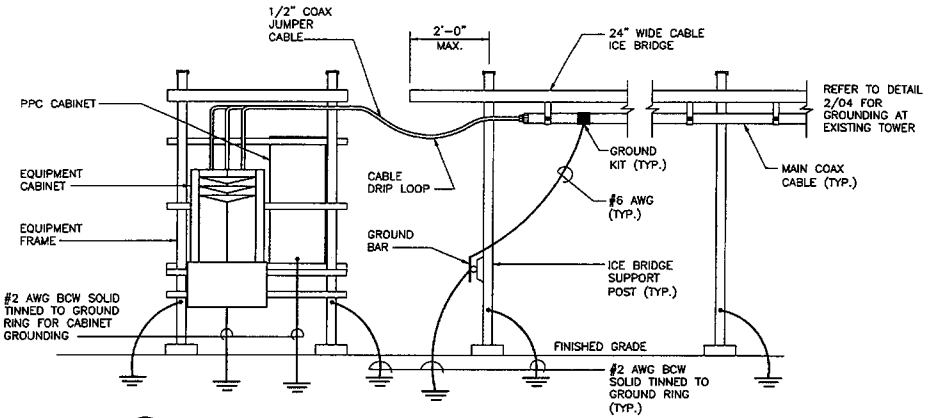
NO.	DATE	REVISIONS
0	06/15/09	ISSUED FOR CONSTRUCTION

BY: JCF

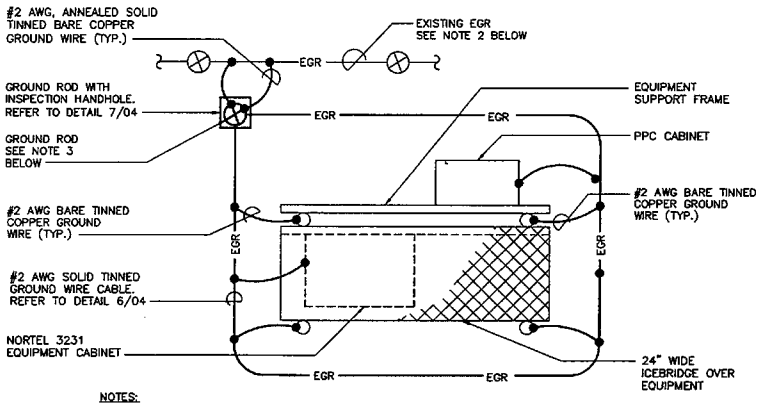
URS

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CT. 06067
1-(860)-258-4802

CHECKED BY: JCF
DRAWN BY: BAL
DATE: 06/05/09
URS JOB NUMBER: CC1077/36923997
DRAWING NUMBER: 04



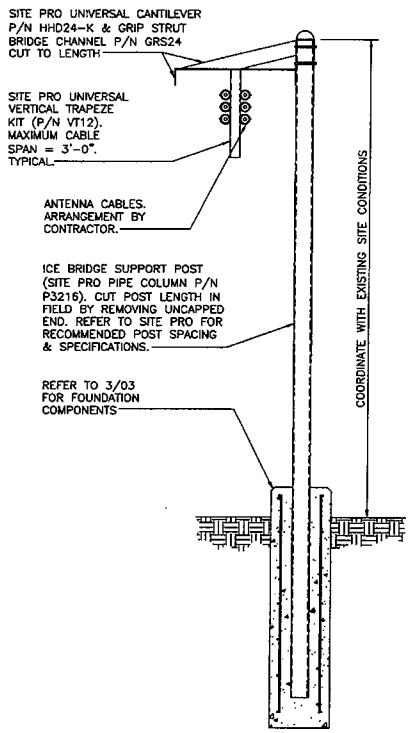
1/05 **GROUNDING AT EQUIPMENT CABINET**
SCALE: N.T.S.



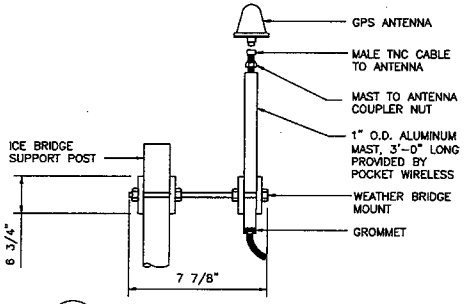
NOTES:

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.



4/05 **GPS MOUNTING 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.

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

NO.	DATE	REVISIONS	BY
0	06/19/09	ISSUED FOR CONSTRUCTION	JCF

pocket SMART WIRELESS

PROJECT NAME: HFCT0810E, 100 SUNSET RIDGE ROAD

SHEET: GROUNDING PLAN AND DETAILS

URS

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

CHECKED BY: JCF
DRAWN BY: BAL
DATE: 06/05/09
URS JOB NUMBER: 27PC1077/36923997
DRAWING NUMBER: 05

PANEL SSC

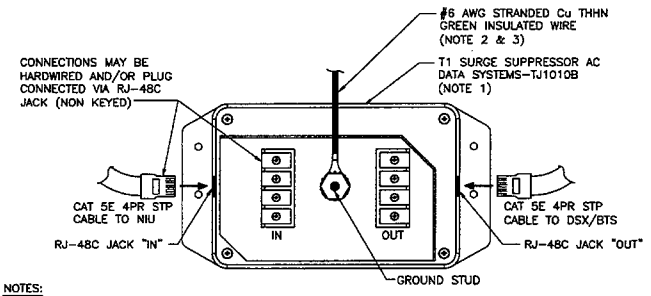
LOAD DESCRIPTION	LOAD (kVA)	BRKR SIZE	CCT NO.	PHASE A	PHASE B	CCT NO.	BRKR SIZE	LOAD (kVA)	LOAD DESCRIPTION
BTS CABINET	2.5	30/2	1			2	30/2	2.2	BTS CABINET
	2.5		3			4		2.2	
LIGHTING	1.9	10/1	5			6	20/1	0.2	GFI OUTLET
SPACE	–	–	7			8	–	–	SPACE
SPACE	–	–	9			10	–	–	SPACE
SPACE	–	–	11			12	–	–	SPACE
SPACE	–	–	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:

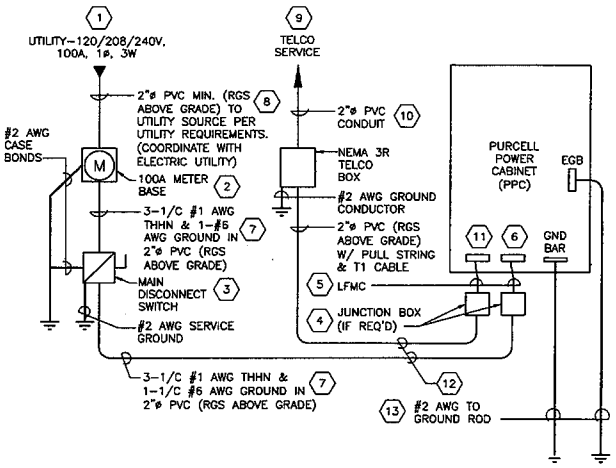
1. ALL ELECTRICAL AND GROUNDING WORK SHALL BE PERFORMED IN ACCORDANCE WITH PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONDUIT ROUTINGS ARE SCHEMATIC, CONTRACTOR SHALL VERIFY ROUTING AND LENGTHS PRIOR TO CONSTRUCTION.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY 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.



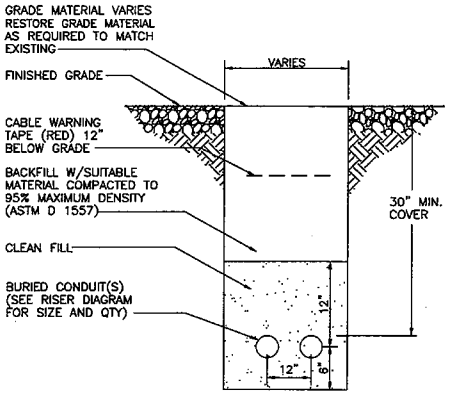
NOTES:

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 COMMUNICATIONS 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 OR 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. (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.

NO.	DATE	REVISIONS	BY
0	06/15/09	ISSUED FOR CONSTRUCTION	

pocket. SMART WIRELESS

PROJECT: HFCT06810E, 100 SUNSET RIDGE ROAD

SHEET: ELECTRICAL DETAILS

URS

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

CHECKED BY: JCF
DRAWN BY: BAL
DATE: 06/05/09
URS JOB NUMBER: PC1077/36923997
DRAWING NUMBER: 06

Exhibit C

Equipment Specifications

Pocket Site HFCT0610E

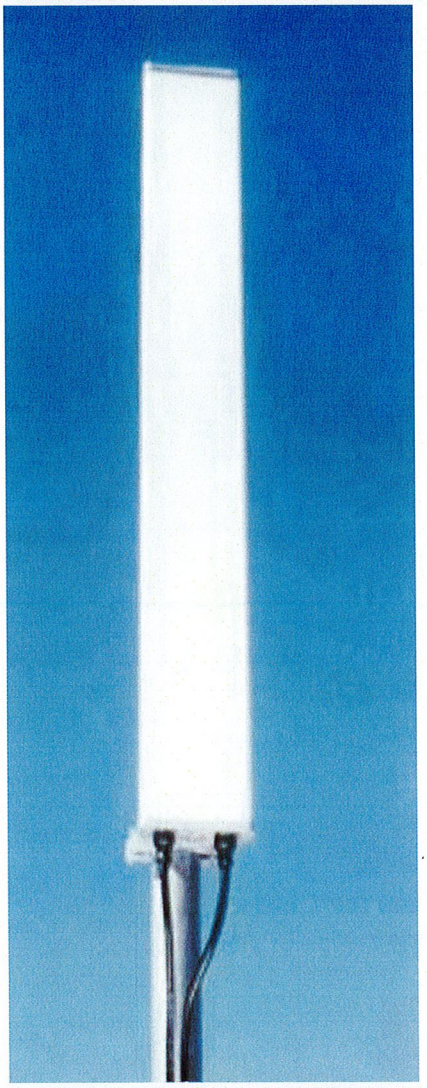
100 Sunset Ridge Drive

East Hartford, Connecticut

Technical Data Sheet | APXV18-206517S-C

Product Description

This variable tilt antenna provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features null fill and a wide downtilt range with optional remote tilt.



Features/Benefits

- Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.
- High Suppression of all Upper Sidelobes (Typically <-20dB).
- Optional remote tilt - can be retrofitted.
- Broadband design.
- Dual polarization.
- Low profile for low visual impact.

Technical Features

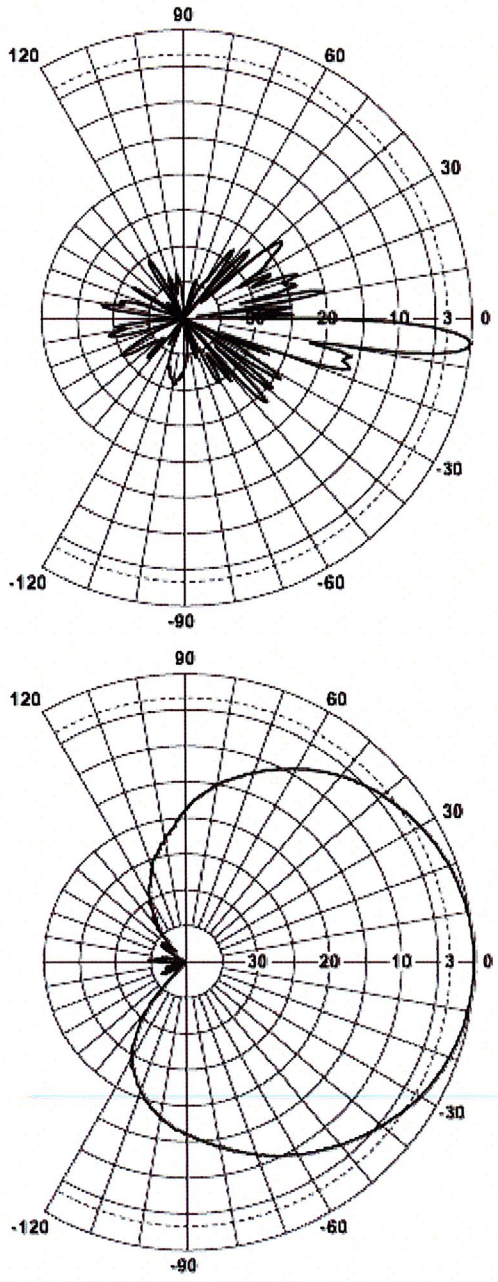
Frequency Band	3G/UMTS (Single, Broad, Dual and Triple-Band)
Horizontal Pattern	Directional
Antenna Type	Panel Dual Polarized
Electrical Down Tilt Option	Variable

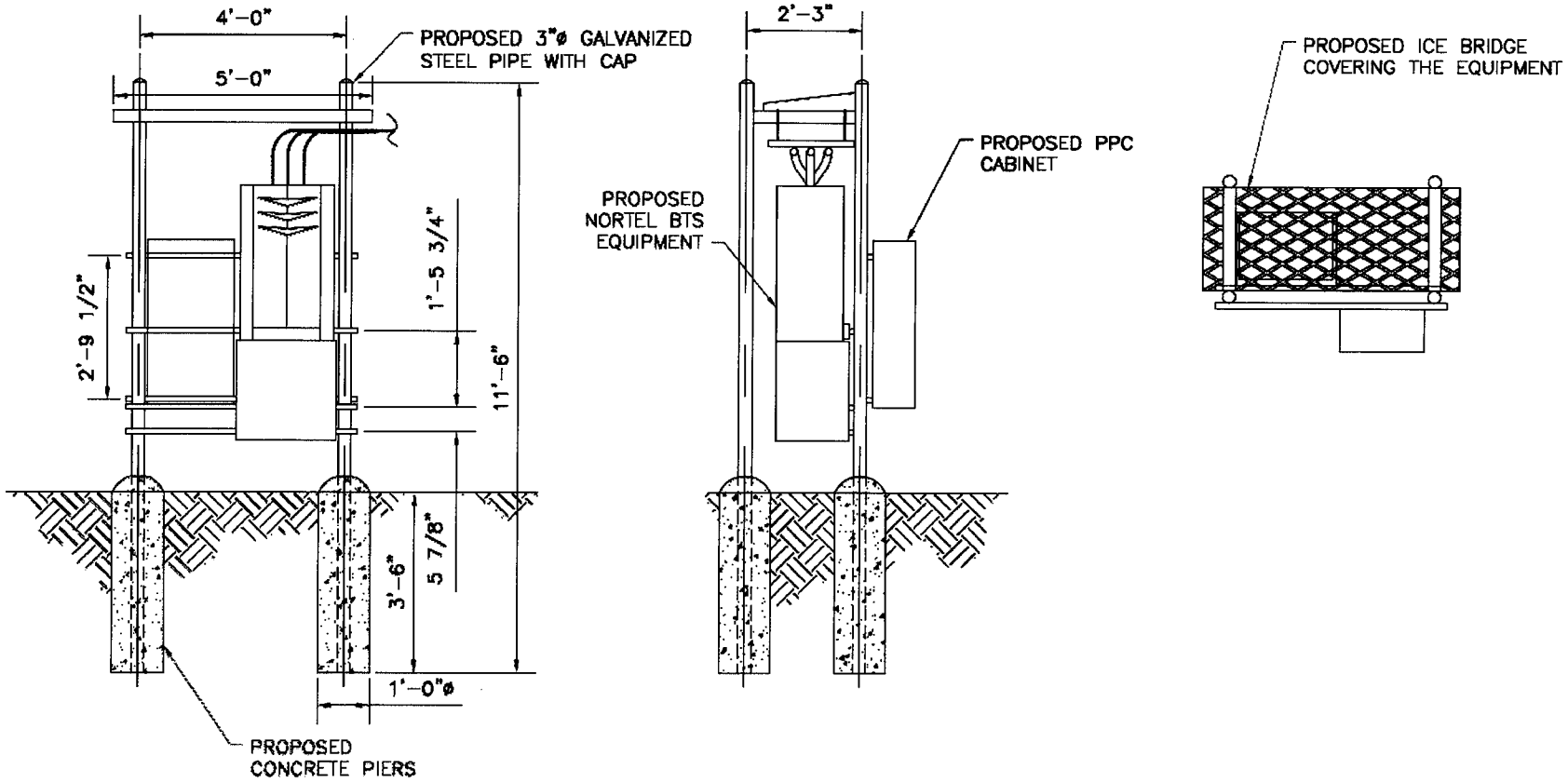
Technical Data Sheet	APXV18-206517S-C

Gain, dBi (dBd)	18.8 (16.7) , 19.0 (16.9)
Frequency Range, MHz	1710-1900, 1900-2170
Connector Type	(2) 7-16 DIN Female
Connector Location	Bottom
Mount Type	Downtilt
Electrical Downtilt, deg	0-10
Horizontal Beamwidth, deg	67 , 63
Mounting Hardware	APM40-2
Rated Wind Speed, km/h (mph)	160 (100)
VSWR	< 1.5:1
Vertical Beamwidth, deg	5.0 , 4.6
Upper Sidelobe Suppression, dB	>17 , >18 all (Typically >20)
Polarization	Dual pol +/-45°
Front-To-Back Ratio, dB	>30
Maximum Power Input, W	300
Isolation between Ports, dB	>30
Lightning Protection	Direct Ground
3rd Order IMP @ 2 x 43 dBm, dBc	>150
7th Order IMP @ 2x46 dBm, dBc	>170
Impedance, Ohms	50
Overall Length, m (ft)	1.85 (6.06)
Mounting Hardware Weight, kg (lb)	3.4 (7.5)
Dimensions - HxWxD, mm (in)	1850 x 175 x 80 (72.0 x 6.8 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	12 (26.4)
Weight w/ Mtg Hardware, kg (lb)	14.8 (32.5)
Radiating Element Material	Brass
Radome Color	Light Grey RAL7035
Radome Material	Fiberglass
Mounting Hardware Material	Diecasted Aluminum
Reflector Material	Aluminum
Max Wind Loading Area, m^2 (ft^2)	0.31 (3.3)
Survival Wind Speed, km/h (mph)	200 (125)
Maximum Thrust @ Rated Wind, N (lbf)	558 (125)
Front Thrust @ Rated Wind, N (lbf)	558 (125)
Shipping Weight, kg (lb)	18.3 (39.8)
Packing Dimensions, HxWxD, mm (in)	2021 x 260 x 200 (79.5 x 10.2 x 7.8)
Packing Dimensions - HxWxD, m (ft)	2.0 x 0.26 x 0.2 (6.6 x 0.85 x 0.65)

Notes

For additional mounting information please click "External Document Link" below.





Pocket/Youghiogheny Communications – Northeast, LLC
Rack Detail

>BUSINESS MADE **SIMPLE**

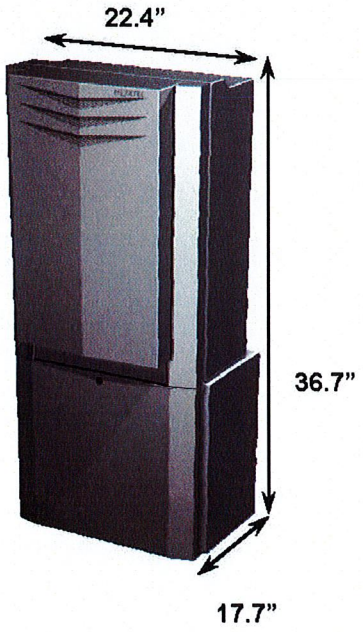
NORTEL

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.



MAGNUM PRODUCTS LLC

CH&E Power Zone

EMPOWERING REAL PEOPLE

MLG15 Lite Generator

Interim Tier IV EPA Approved Engine

Magnum recognizes environmental responsibility and continues to meet emission regulations with the addition of their Interim Tier IV Generator line. The MLG15 generator is powered by a Mitsubishi diesel engine. Proven power you can trust, while maximizing fuel efficiency and high performance.

Affordable, Reliable, Mobile

More Information

Manuals

- Operating & Parts

ALWAYS check for

Power

The MLG15 diesel generator provides just the right combination of output, flexibility, ruggedness, efficiency and affordability for on-the-go, smaller-to-midsize, single phase power needs.

Features

Tough

- Full tubular steel frame, with lockable enclosure
- Durable, fade resistant, white baked on powder coat finish
- Stainless steel hinges, exterior hardware and pad lockable door latches

Reliable

- Key switch to preheat (glow plug), start & stop
- Automatic low oil level / high temp shutdown alerts
- 70A Start limit main breaker
- 2 year - 2,000 hour warranty
- Marathon voltage regulation within +/- 1%

Ease for Your Users

- Self-priming 4 cylinder Mitsubishi engine
- External convenience outlets with individual breaker switches
- External emergency stop switch

updated parts information before placing a parts order.

Tech. Specs.

- MLG15

Literature / Sales

- Generator Lit.
- Service Kit Lit.
- Sales Support

WARRANTY

- Warranty Overview
- Warranty Claim Policy

Specifications

Output

3 Phase - Standby **kW (kVA)**	N/A
Amps **480V (208V)**	N/A
3 Phase - Prime **kW (kVA)**	N/A
Amps **480V (208V)**	N/A
1 Phase - Standby **kW (kVA)**	14.0 (14.0)
Amps **240V**	58
1 Phase - Prime **kW (kVA)**	13.0 (13.0)
Amps **240V**	54
AC Voltage 1-phase	120, 240
AC Voltage 3-phase	N/A
Frequency **Hz**	60
Power Factor	1.0 (1 Phase)
Generator - Brand / Type / Insulation	Marathon / Brushless / F
Sound (dB(A) 23 ft @ prime)	68

Size and Weight

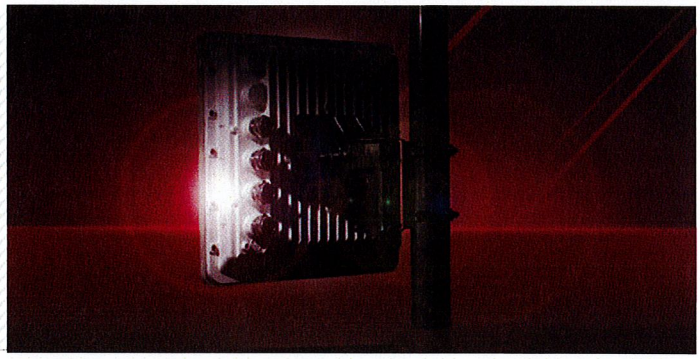
Skid Mounted - L x W x H **in (m)**	N/A
Dry Weight **lbs (kg)**	N/A
Operating Weight **lbs (kg)**	N/A
Trailer Mounted - L x W x H **in (m)**	105 x 67 x 56 (2.67 x 1.70 x 1.42)
Dry Weight **lbs (kg)**	1425 (646)

Operating Weight **lbs (kg)**	1823 (827)
Engine	
Type	Interim Tier IV
Brand	Mitsubishi
Aspiration	Natural
Power - Prime @ 1800 rpm **hp (kWm)**	22.3 (16.6)
Displacement **cubic in (L)**	107 (1.8)
Cylinders	4
Speed **rpm**	1800
Fuel Consumption - Prime **gph (Lph)**	1.30 (4.92)
Capacities	
Fuel Tank **gal (L)**	56 (212)
Approximate Run Time **hrs**	43
Coolant **qt (L)**	11.6 (11.0)
Electrical Distribution	
Battery - 12V	1 - 12V 440 CCA Wet Cell
Main Circuit Breaker Size **A**	70
Voltage Selection	N/A
Voltage Regulation	+/-1%
120V - 20A GFI Duplex Outlets - qty	2
240V - 30A Twist Lock Outlets - qty	2
240V - 50A Twist Lock Outlets - qty	2
Trailer	
Number of Axles	1
Capacity - Axle Rating **lbs (kg)**	2200 (998)
Tire Size **in**	15
Brakes	N/A
Hitch	2" Ball
Maximum Tire Pressure **psi**	50
Options	
Powertrain (Engine/Gen)	• 60/40 Coolant • Heated Fuel Filter • Engine Heater - Lower Radiator Hose • Oil Drain Valve Kit
Controls	• Battery, 720 CCA Gel Cell • Battery, 720 CCA Wet Cell • Battery, 685 CCA Gel Cell • No Battery • Battery Disconnect, Lockable • Battery Charger, 2 Amp • Alternative Outlet Panel Options (Consult factory for details)

Cabinet/Fuel Tank	• Interior Cabinet Light • Level Indicator • 56 Gallon Fuel Tank • Fuel Tank Cap - Vent w/ Lanyard • Spare Tire & Carrier • Lift Structure • Liquid Containment/Quiet Pack
Trailer	• Tube & Sleeve Jack • Combo Hitch - 2.5" Ring/2" Ball • 2.5" Ring • 3" Ring • 3" Ring (1.625 TH) • Plug Adapter, 4 Flat to 6 Round • Plug Adapter, 4 Flat to 7 Pin • Plug Adapter, 4 Flat to 7 Round Spade • Outrigger Package

Product Images (click small image to pop-up larger version)

EX-5r Series



All-Outdoor, Carrier-Class, Tri-Band 5 GHz TDD Radio System for Low, Medium and High Capacity Ethernet and TDM Applications

The EX-5r series of all-outdoor digital microwave radios is the first family of carrier-class, tri-band TDD radios available in the 5.2 – 5.8 GHz license-exempt bands. Radios in the EX-5r line support capacities ranging from 27 Mbps to an industry-leading 440 Mbps of aggregate user throughput, from zero to four T1/E1s and both 100BaseT and GbE interfaces. Featuring native TDM and native Ethernet transport and full software configurability and upgradeability, the EX-5r series was designed to meet demanding backhaul requirements of enterprise organizations and service providers seeking the performance benefits of an all-outdoor configuration.

Carrier-class TDD. The EX-5r series radios combine native TDM and native Ethernet transport with low, fixed latency to deliver guaranteed throughput and service quality. Capacity can be allocated variably between TDM and Ethernet via software, while the selectable throughput symmetry control feature enables radio capacity to efficiently match asymmetric traffic requirements.

Industry-leading Spectrum Management. The EX-5r radios include selectable channel bandwidth and 1 MHz tuning resolution, yielding up to 54 non-overlapping frequency channels and up to 415 center frequencies of operation. These capabilities, combined with selectable modulation and superior system gain, provide unparalleled interference avoidance and transmission resiliency. A built-in spectrum analyzer is even included to accelerate deployment and simplify troubleshooting.

ExaltSync Synchronization. The ExaltSync technology embedded in the EX-5r series radios allows multiple radio systems to be collocated in close proximity without self-interference, minimizing antenna separation and ensuring reuse of scarce spectrum across all collocated systems.

Security, Management and Data Networking. The EX-5r radios deliver the highest data and management security available with optional 128- and 256-bit AES encryption and secure SNMP v3 management, together with enhanced fault management and diagnostic features. The 802.1Q VLAN option provides built-in network administration and security flexibility.

EX-5r series radios are available in both integrated antenna and external antenna (connectorized) versions.

Primary Specifications		EX-5r Lite / EX-5r-c Lite	EX-5r v3 / EX-5r-c v2	EX-5r GigE / EX-5r-c GigE
Maximum Capacity[1]	TDM	4xT1/E1		
	Ethernet (Aggregate)	100 Mbps	200 Mbps	440 Mbps
Frequency (GHz)		Tri-band: 5.250-5.350, 5.470-5.725, 5.725-5.850		
Range[2]		> 30 miles at 99.999% throughput availability		

[1] Please refer to the Exalt Throughput and Range Specification document for detailed capacity information.

[2] Distance based upon FCC regulations, average climate and terrain, 6' dish antennas, 3 dB transmission system losses at each end. Longer or shorter distances will apply for alternative antennas, country regulations, transmission system losses, path topologies and radio configurations. See Exalt's link budget and path planning tool to model your scenario.

Specifications

EX-5r Series

System

Frequency Bands[1](GHz)	5.250-5.350, 5.470-5.725, 5.725-5.850			
Tuning Resolution	1 MHz			
Output Power (full power)				
5725-5850 MHz band	+24 dBm QPSK;+21 dBm 16QAM			
5250-5350 MHz band[2]	+13 dBm			
5470-5725 MHz band[2]	+13 dBm			
Output Power (min power)	Full power minus 20 dB			
Power Control Step Size	0.5 dB			
Receiver Threshold (BER=10^{-6})	8 MHz	16 MHz	32 MHz	64 MHz
QPSK	-86	-83	-80	-77
16QAM	-78	-75	-72	-69
Non-overlapping Channels				
5.250-5.350 GHz	10	5	2	1
5.470-5.725 GHz	29	14	7	3
5.725-5.850 GHz	15	7	3	1
Maximum RSL	-25 dBm error-free 0 dBm no damage			
Throughput Symmetry Control	5 modes 20/80, 80/20, 35/65, 65/35, 50/50			
Error Floor	10^{-12}			
Latency (T1/E1)	1ms, typical			
Maximum Packet Size	All 1916 bytes except GigE 9728 bytes			

System (continued)

Link Security	96-bit proprietary encryption 128-bit and 256-bit AES encryption[3]
Spectrum Analyzer	Embedded
VLAN	802.1Q
QoS	802.1p (GigE)
Management	HTTP GUI CLI/Telnet SNMP v1, 2c, v3
Compliance	FCC 15.247, FCC 15.407 EN 301-893, EN 302-502 EN 60-950, EN 301-489 IC RSS-210

System Components

Complete Link	Two terminals, each with AC adapter & accessory kit
Single Terminal	One terminal with AC adapter & accessory kit
Accessory Kit	DC power connector, rack and grounding hardware (spare)
AC Adapter	AC adapter (spare)
Mounting Kits	Available for each product (spare)
ExaltSync GPS Sync Kit	GPS receiver and mounting bracket (optional)

Specifications

	EX-5r Lite	EX-5r-c Lite	EX-5r v3	EX-5r-c v2	EX-5r GigE	EX-5r-c GigE
Physical						
Physical Configuration	Outdoor Unit (ODU)					
Dimensions (H x W x D)	14 x 14 x 3.8 in 35.6 x 35.6 x 9.7 cm	14 x 14 x 2.5 in 35.6 x 35.6 x 6.4 cm	14 x 14 x 3.8 in 35.6 x 35.6 x 9.7 cm	14 x 14 x 2.5 in 35.6 x 35.6 x 6.4 cm	14 x 14 x 3.8 in 35.6 x 35.6 x 9.7 cm	14 x 14 x 2.5 in 35.6 x 35.6 x 6.4 cm
Antenna	Integrated	2x Type-N (F) Connector	Integrated	2x Type-N (F) Connector	Integrated	2x Type-N (F) Connector
Integrated Antenna Gain/3 dB Beamwidth	23 dBi / 9 degrees	-	23 dBi / 9 degrees	-	23 dBi / 9 degrees	-
Operating Temperature	-40 to +65 °C; -40 to +149 °F					
Full Spec Temperature	-40 to +60 °C; -40 to +140 °F					
Weight	14 lbs/6.4 kg	12 lbs/5.5 kg	14 lbs/6.4 kg	12 lbs/5.5 kg	14 lbs/6.4 kg	12 lbs/5.5 kg
Environmental	NEMA 4/IP56					
Altitude	15,000 ft; 4.6 km					
Humidity	100% condensing					
Interfaces						
RF	-	2x N-type (F), 50 ohm	-	2x N-type (F), 50 ohm	-	2x N-type (F), 50 ohm
TDM T1/E1 Interfaces	RJ48C/RJ45 (F) (x4)					
T1 Impedance	100 ohms, balanced					
T1 Line Code	AMI, B8ZS, selectable per channel					
T1 Data Rate	1.544 Mbps					
T1 Compliance	ANSI T1.102-1987; ITU-T; G.823; GR-499-CORE					
E1 Impedance	120 ohms, balanced					
E1 Line Code	HDB3					
E1 Data Rate	2.048 Mbps					
E1 Compliance	CEPT-1; G.703; ITU-T-G.703					
Loopback Modes	Remote Internal; Remote External; Local Line					
Ethernet	RJ45 (F)				RJ45 Female (x2)	
Interface Speed	10/100BaseT (POE)				10/100/1000BaseT (1xPOE)	
Duplex	Half, Full, Auto-MDIX				Half, Full, Auto-MDIX	
Compliance	802.3				802.3	
ExaltSync Synchronization	RJ45 (F) Input: 1pps (GPS)				RJ45 Female (x2) Input: 1pps (GPS); Output: Sync out	
DC Power	48VDC, <50W				48VDC, <70W	
AC Power Adapter						
Input	100-240VAC, 1.5A					
Output	48VDC, 1.5A, 72W (via power injector)				48VDC, 2.08A, 100W (via power injector)	

[1] Not all frequency bands are authorized or available for use in all countries.

[2] +24 dBm output power available in EX-5r v3 and EX-5r Lite. Consult Exalt for availability in other models.

[3] Software license key upgrade.

World Headquarters
Exalt Communications Inc.
580 Division Street
Campbell, CA 95008 USA

Phone:+1 (408) 871-1804
Toll free: (888) 91EXALT
sales@exaltcom.com

www.exaltcom.com

EX-5i Series

All-Indoor, Carrier-Class, Tri-Band 5 GHz TDD Radio Systems for Low, Medium and High Capacity Ethernet and TDM Applications

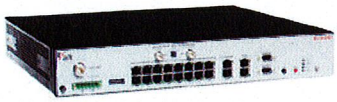
The EX-5i series of all-indoor digital microwave radios is the first family of carrier-class, tri-band TDD radios available in the 5.2 – 5.8 GHz license-exempt bands. The EX-5i line delivers up to 216 Mbps of aggregate user throughput and up to sixteen T1/E1s plus one DS3. Featuring native TDM and native Ethernet transport and full software configurability and upgradeability, the EX-5i series was designed to meet demanding backhaul requirements of enterprise organizations and service providers seeking the accessibility benefits of an all-indoor configuration.

Carrier-class TDD. The EX-5i series radios combine native TDM and native Ethernet transport with low, fixed latency to deliver guaranteed throughput and service quality. Capacity can be allocated variably between TDM and Ethernet via software, while the selectable throughput symmetry control feature enables radio capacity to efficiently match asymmetric traffic requirements. Optional 1+1 monitored hot standby (MHS) protection provides full hardware redundancy.

Industry-leading Spectrum Management. The EX-5i radios include selectable channel bandwidth and 1 MHz tuning resolution, yielding up to 54 non-overlapping frequency channels and up to 415 center frequencies of operation. These capabilities, combined with selectable modulation and superior system gain, provide unparalleled interference avoidance and transmission resiliency. A built-in spectrum analyzer is even included to accelerate deployment and simplify troubleshooting.

ExaltSync™ Synchronization. The ExaltSync technology embedded in the EX-5i series radios allows multiple radio systems to be collocated in close proximity without self-interference, minimizing antenna separation and ensuring reuse of scarce spectrum across all collocated systems.

Security, Management and Data Networking. The EX-5i radios deliver the highest data and management security available with optional 128- and 256-bit AES encryption and secure SNMP v3 management, together with enhanced fault management and diagnostic features. The 802.1Q VLAN option provides built-in network administration and security flexibility.



Primary Specifications		EX-5i Lite	EX-5i	EX-5i-16	EX-5i-DS3
Maximum Capacity[1]	TDM	4xT1/E1		16xT1/E1	16xT1/E1; 1xDS3
	Ethernet (Aggregate)	100 Mbps	200 Mbps		
Frequency (GHz)		Tri-band: 5.250-5.350, 5.470-5.725, 5.725-5.850			
Range[2]		> 30 miles at 99.999% throughput availability			

[1] Please refer to the Exalt Throughput and Range Specification document for detailed capacity information.

[2] Distance based upon FCC regulations, average climate and terrain, 6' dish antennas, 3 dB transmission system losses at each end. Longer or shorter distances will apply for alternative antennas, country regulations, transmission system losses, path topologies and radio configurations. See Exalt's path planning tool to model your scenario.

Specifications	EX-5i Series			
System				
Frequency Bands[1] (GHz)	5.250-5.350			
	5.470-5.725			
	5.725-5.850			
Tuning Resolution	1 MHz			
Output Power (full power)				
5725-5850 MHz band	+24 dBm QPSK;+21 dBm 16QAM			
5250-5350 MHz band[2]	+13 dBm			
5470-5725 MHz band[2]	+13 dBm			
Output Power (min power)	Full power minus 20 dB			
Power Control Step Size	0.5 dB			
Receiver Threshold (BER=10^{-6})	8 MHz	16 MHz	32 MHz	64 MHz[3]
QPSK	-86	-83	-80	-77
16QAM	-78	-75	-72	-69
Non-overlapping Channels				
5.250-5.350 GHz	10	5	2	1
5.470-5.725 GHz	29	14	7	3
5.725-5.850 GHz	15	7	3	1
Maximum RSL (QPSK)	-25 dBm error-free			
	0 dBm no damage			
Throughput Symmetry Control	5 modes			
	20/80, 80/20, 35/65, 65/35, 50/50			
Error Floor	10^{-12}			
Latency (T1/E1)	1ms, typical			
Link Security	96-bit proprietary encryption			
	128-bit and 256-bit AES encryption[3]			
VLAN	802.1Q			
Management	HTTP GUI			
	CLI/Telnet			
	SNMP v1, 2c, v3			
Compliance	FCC 15.247, FCC 15.407			
	EN 301-893, EN 302-502			
	EN 60-950, EN 301-489, IC RSS-210			

System Components	
Complete Link[4]	Two terminals, each with AC adapter and accessory kit
Single terminal	One terminal with AC adapter and accessory kit
Accessory Kit	DC power connector, rack and grounding hardware (spare)
AC Adapter	AC adapter (spare)
Exalt Capacity Expansion Kit	For 6 GHz Part 101 links (optional accessory kit)

[1] Not all frequency bands are authorized or available for use in all countries.

[2] +24 dBm output power. Consult Exalt for availability.

[3] Software license key upgrade.

[4] Two complete links (4 terminals) required for MHS protection along with Exalt MHS kit and protection cabling. Consult your Exalt Sales representatives for MHS availability. (MHS is not available on EX-5i or EX-5i lite).

Specifications	EX-5i Lite	EX-5i	EX-5i-16	EX-5i-DS3
Physical				
Dimensions	1RU		1.5RU	
(H x W x D)	1.75 x 17 x 14 in		2.63 x 17 x 14 in	
	4.5 x 43.2 x 35.6 cm		6.7 x 43.2 x 35.6 cm	
Physical Configuration	Single-piece Indoor Unit (IDU)			
Operating Temperature	-40 to +65 °C			
	-40 to +149 °F			
Full Spec Temperature	-25 to +60 °C			
	-13 to +140 °F			
Weight	9.5 lbs / 4.3 kg		12 lbs / 5.5 kg	
Environmental	GR-1089-CORE intra-building			
Altitude	15,000 ft; 4.6 km			
Humidity	95% non-condensing			
Interfaces				
RF	N-type(F), impedance 50 ohm			
TDM T1/E1 Interfaces	RJ48C/RJ45 (F) (x4)		RJ48C/RJ45 (F) (x16)	
T1 Impedance	100 ohms, balanced			
T1 Line Code	AMI, B8ZS, selectable per channel			
T1 Data Rate	1.544 Mbps			
T1 Compliance	ANSI T1.102-1987; ITU-T; G.823; GR-499-CORE			
E1 Impedance	120 ohms, balanced			
E1 Line Code	HDB3			
E1 Data Rate	2.048 Mbps			
E1 Compliance	CEPT-1; G.703; ITU-T-G.703			
DS3 Impedance	- BNC (F) (2x) 75 ohms, unbalanced			
DS3 Line Code	- B3ZS			
DS3 Data Rate	- 44.736 Mbps			
DS3 Compliance	-ANSI T1.102-1993; GR-499-CORE			
Loopback Modes	Remote Internal; Remote External; Local Line			
Ethernet	RJ45 (F) (x2), auto-MDIX			
Interface Speed	10/100BaseT			
Duplex	Half, Full, Auto			
Compliance	802.3			
Console (Serial)	9-pin Sub-D (F)			
Interface Speed	9600 bps			
Compliance	EIA-574 (RS-232)			
Alarm	9-pin Sub-D (F)			
Inputs (2)	TTL/Closure			
Outputs (2)	Relay (Form C)			
ExaltSync	RJ45 (F)			
Synchronization	Internal Sync 1pps (GPS)			
DC Power	6-pin barrier strip		6-pin barrier strip	
Input Voltage	±20-60VDC		±20-60VDC	
Consumption	<38.5W (48V:<0.8A, 24V:<1.6A)		< 45W (48V: <0.9A, 24V: 1.8A)	
AC Power Adapter	EIC to NEMA 5-15			
Input	100-240VAC, 1.5A			
Output	48VDC, 1.5A, 72W			

World Headquarters
Exalt Communications Inc.
580 Division Street
Campbell, CA 95008 USA

Phone:+1 (408) 871-1804
Toll free: (888) 91EXALT
sales@exaltcom.com

www.exaltcom.com

Exhibit D

Power Density Calculations

Pocket Site HFCT0610E

100 Sunset Ridge Drive

East 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

HFCT0610E

100 Sunset Ridge Drive, East Hartford, CT 06108

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 100 Sunset Ridge, East Hartford, CT 06108.

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:

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

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

1.6 = Ground Reflection Factor

4. Calculation Results

Table 1 below outlines the power density information for the site. All information for carriers other than Pocket is based on the current CSC database.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	Effective Radiated Power (ERP) Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
T-Mobile GSM	120	1935	8	175	0.0350	1.0000	3.50%
T-Mobile UMTS	120	2100	2	730	0.0365	1.0000	3.65%
Public Works							0.62%
Fire	All Town Percentages Provided by T-Mobile						0.41%
Fire Admin	No Other Information Provided						0.41%
Police Channels 1 & 2							1.02%
Parks & Rec							0.17%
Health							0.25%
800							0.24%
Pocket	110	2130-2133.75	3	631	0.0629	1.0000	6.29%
						Total	**16.56%**

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 16.56% 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.

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.

June 8, 2009
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

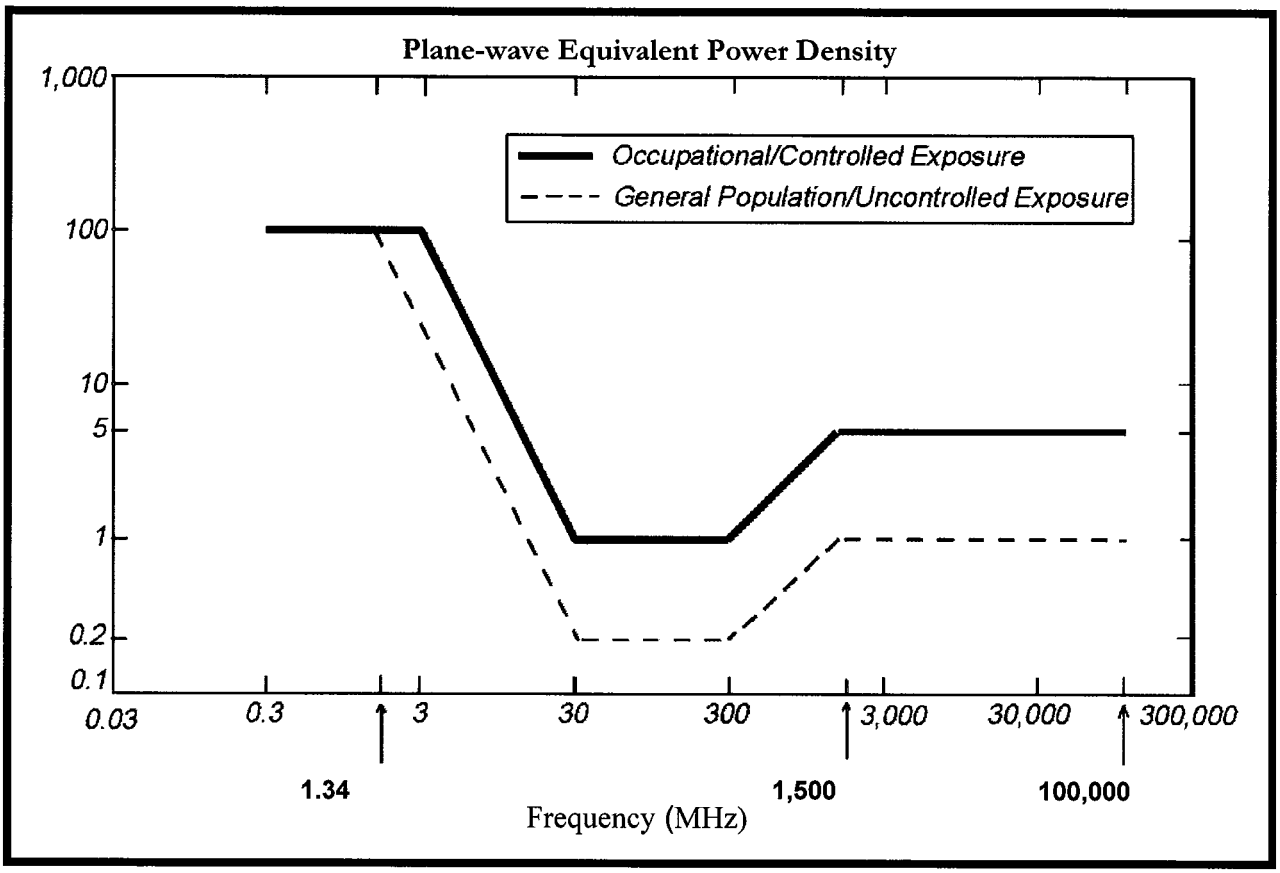
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(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 HFCT0610E

100 Sunset Ridge Drive

East Hartford, Connecticut

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 140' SELF SUPPORT LATTICE TOWER FOR PROPOSED ANTENNA ARRANGEMENT

HFCT0610E
100 Sunset Ridge Road
East Hartford, CT

prepared for

POCKET WIRELESS
2810 NW Loop 410
San Antonio, Texas 78230

prepared by

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36923997.00000
PCI-077

June 9, 2009

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 140' self support lattice tower located at 100 Sunset Ridge Road, East Hartford, CT. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 80 mph (fastest mile) and 69 mph (fastest mile) concurrent with ½" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report. The proposed Pocket Wireless modification is as follows:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Install:		
(3) RFS APXV18-206517S mounted to the tower leg (one per sector) with (6) 1-5/8" coax mounted in cable hangers	**Pocket Wireless**	**@ 110'**

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **The tower and foundation are considered structurally adequate for all the existing and proposed antenna loading with the wind load classification specified above.**

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower structure and foundation design documents prepared by Valmont Structures, job number A-121847-F-1008516 signed and sealed on February 6, 2006.
3) Site documentation and visual verification of existing appurtenances conducted from existing grade by URS during November 2008 for HPC/T-Mobile.
4) Structural analysis performed by URS Corp. for HPC/T-Mobile Job No. HPC-024 – 36917334 signed and sealed March 18, 2009.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower and connections. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation

Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/kab

cc: DR, IA, CF/Book – URS

2. INTRODUCTION

The subject tower is located at 100 Sunset Ridge Road, East Hartford, CT. The structure is a 140' self support lattice tower.

The tower geometry and structural member sizes taken from manufacturers design documents prepared by Valmont Industries, Drawing numbers 197611, signed and sealed 2/09/2006.

The inventory is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
14' Dipole	Town	3' Stand-off	147'	(1) 1"
(3) 7' Whip Antenna	Town	(3) 3' Stand-off	143'	(3) 1"
(3) 20' Dipole	Town	(3) Pipe Mounts	130'	(3) 1"
(6) APX16PV-16PVL Panel Antennas with (9) TMAs	T-Mobile	(3) Pipe Mounts	120'	(18) 1-5/8" (Three rows of six)
(3) RFS APXV18-206517S Panel Antennas	**Pocket Wireless (Proposed)**	**Leg Mount**	**110'**	**(6) 1-5/8"**

This structural analysis of the communications tower was performed by URS Corporation (URS) for Pocket Wireless. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F—Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction—Allowable Stress Design (ASD).

The analysis was conducted using RISA Tower 5.3.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 80 mph (fastest mile) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 69 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

Please note that wind pressure is a function of velocity squared. Under Load Condition 2, a 25 percent reduction in wind pressure is allowed by code to account for the unlikelihood of the full wind pressure and ice load occurring at the same time. The same results may be achieved by utilizing a lower wind pressure without taking the 25 percent reduction, as shown above.

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Stresses on the tower structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses under the proposed loading were within the allowable stresses. The anchor bolts and foundation were also within allowable limits. A summary of the results can be found in Tables 1-3. Detailed analysis and calculations for the proposed load conditions are provided in section 6 of this report.

Table 1: Proposed Tower Base Reactions

Base Reactions	Proposed Reactions
Axial Load (kips)	40
Shear per Leg (kips)	15
Total Shear (kips)	21
Uplift per Leg (kips)	97
Comp.per Leg (kips)	124
O.T. Moment (ft-kips)	1579

Table 2: Proposed Tower Component Stress vs. Capacity Summary

Component / (Section No.)	Controlling Component/ Elevation	Stress (% capacity)	Pass/Fail	Comments:
Leg (T6)	Pirod 195564 / 20' – 40'	39.2	Pass	
Diagonal (T7)	L3x3x5/8 / 0 – 20'	51.4	Pass	
Top Girt (T1)	L3x3x3/8 / 120' – 140'	1.9	Pass	
Tower Bolts	1" dia.	45.4	Pass	
Anchor Bolt	1.25" dia. / Tension	20.0	Pass	

Table 3: Foundation Summary

Foundation	Component	Stress (% capacity/FOS)	Pass/Fail	Comments:
Reinf. Concrete Pad and Pier	OTM	57.5%/3.48	Pass	Min. F.O.S of 2.0 reqd per IBC 2003 Section 3108.4.2

5. CONCLUSIONS AND RECOMMENDATIONS

The results of the analysis indicate that the tower structure has the capacity to support the proposed loading conditions. **The tower and foundation are considered structurally adequate for all the existing and proposed antenna loading with the wind load classification specified above.**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed as specified in Section 6 of this report.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

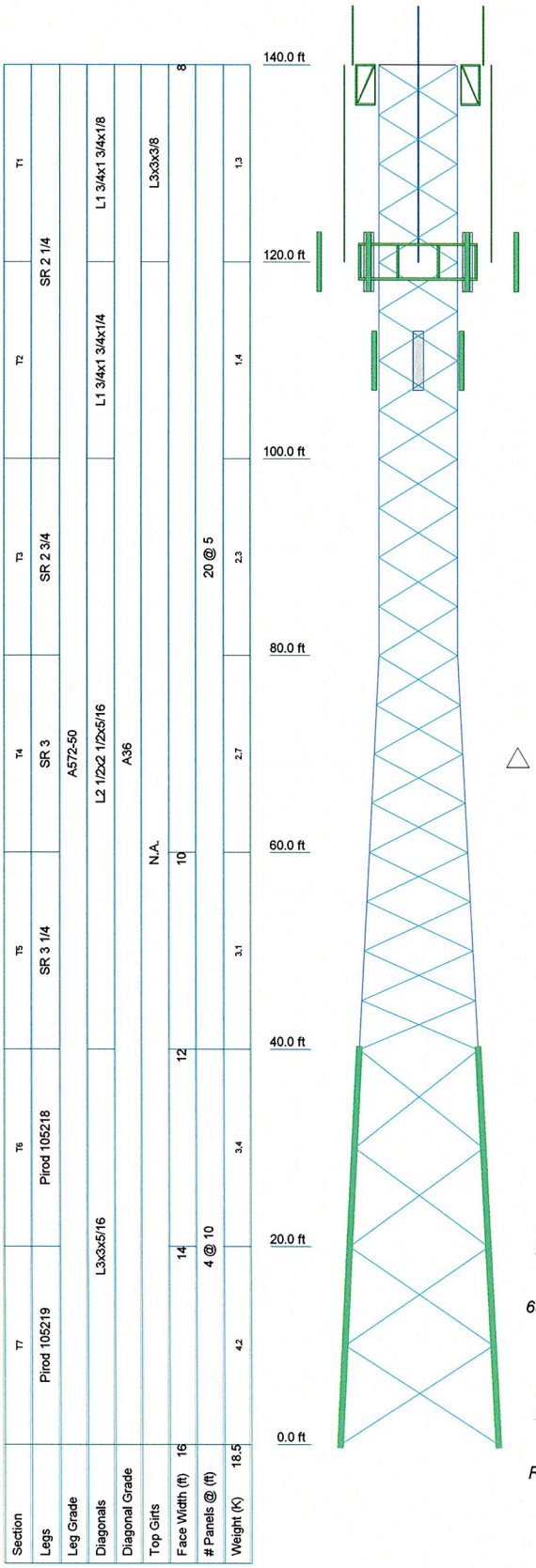
Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions.

6. DRAWINGS AND DATA

RISA TOWER INPUT/OUTPUT SUMMARY



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
14' Dipole (Town)	147	APX16PV-16PVL-C w/ mount (T-Mobile)	120
7' Whip (Town)	143		
7' Whip (Town)	143	APX16PV-16PVL-C w/ mount (T-Mobile)	120
7' Whip (Town)	143		
3' Stand-off (Town)	138	APX16PV-16PVL-C w/ mount (T-Mobile)	120
3' Stand-off (Town)	138		
3' Stand-off (Town)	138	(3) RFS - TMA (shielded) (T-Mobile)	120
20' 4-Bay Dipole (Town)	130		
20' 4-Bay Dipole (Town)	130	(3) RFS - TMA (shielded) (T-Mobile)	120
20' 4-Bay Dipole (Town)	130		
10' Boom Gate w/3 2 - 3/8" Pipe (Vertical) (3) (T-Mobile)	120	(3) RFS - TMA (shielded) (T-Mobile)	120
APX16PV-16PVL-C w/ mount (T-Mobile)	120	APXV18-206517S-C w/ mounting hardware (Pocket Wireless)	110
APX16PV-16PVL-C w/ mount (T-Mobile)	120	APXV18-206517S-C w/ mounting hardware (Pocket Wireless)	110
APX16PV-16PVL-C w/ mount (T-Mobile)	120	APXV18-206517S-C w/ mounting hardware (Pocket Wireless)	110

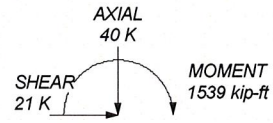
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

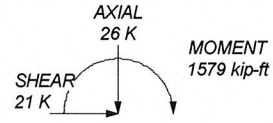
TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 51.4%

MAX. CORNER REACTIONS AT BASE:
DOWN: 124 K
UPLIFT: -97 K
SHEAR: 15 K



TORQUE 10 kip-ft
69 mph WIND - 0.5000 in ICE



TORQUE 10 kip-ft
REACTIONS - 80 mph WIND

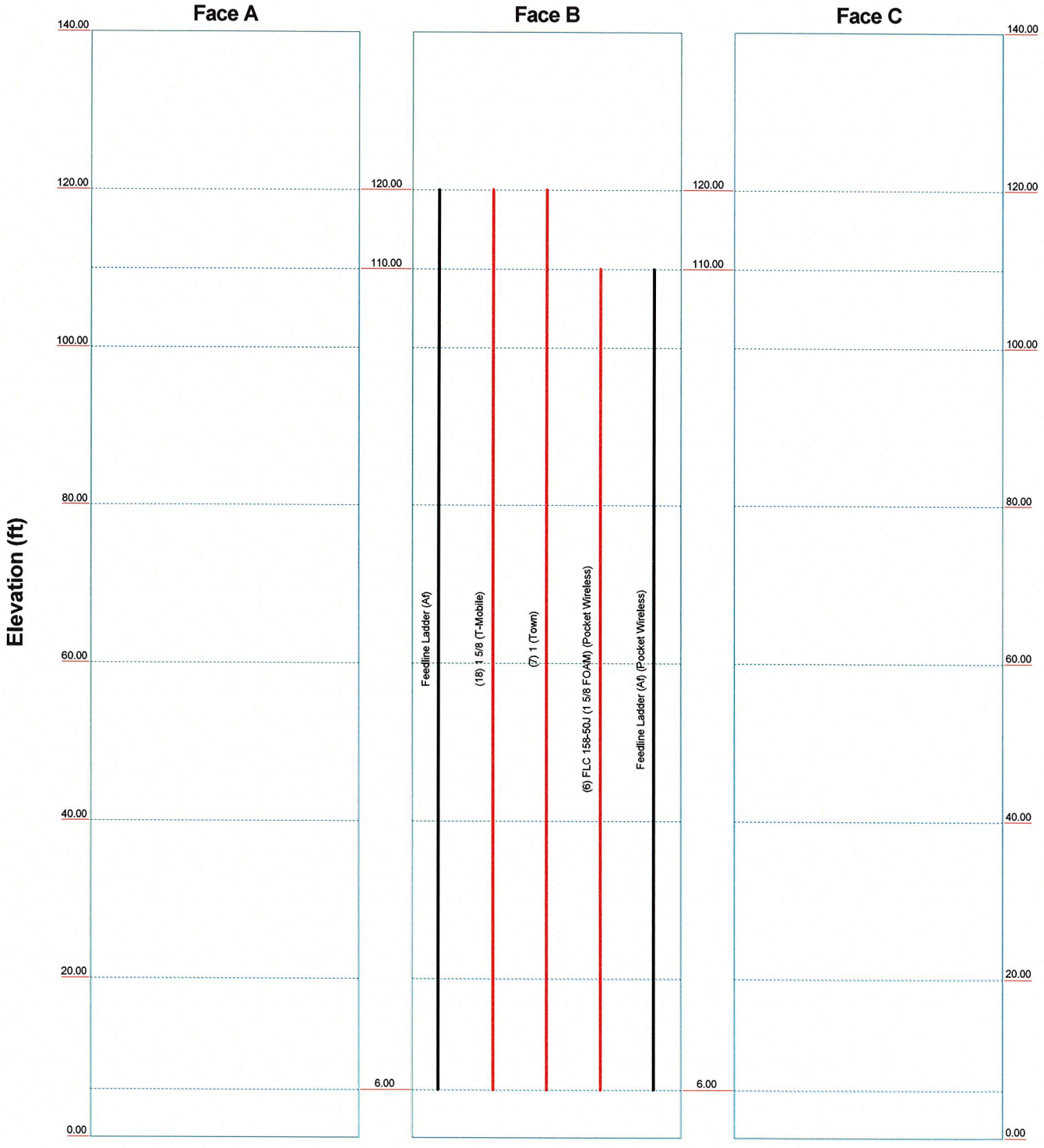
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: ***PCI-077***			
Project: ***140' Self Support Tower***			
Client: Pocket Wireless	Drawn by: Kevin Barker		App'd:
Code: TIA/EIA-222-F	Date: 06/09/09		Scale: NTS
Path: P:\08\ERI Files\PCI077 140' Valmont Tower.eri			Dwg No. E-1

RISA TOWER FEEDLINE DISTRIBUTION

Feedline Distribution Chart
0' - 140'

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



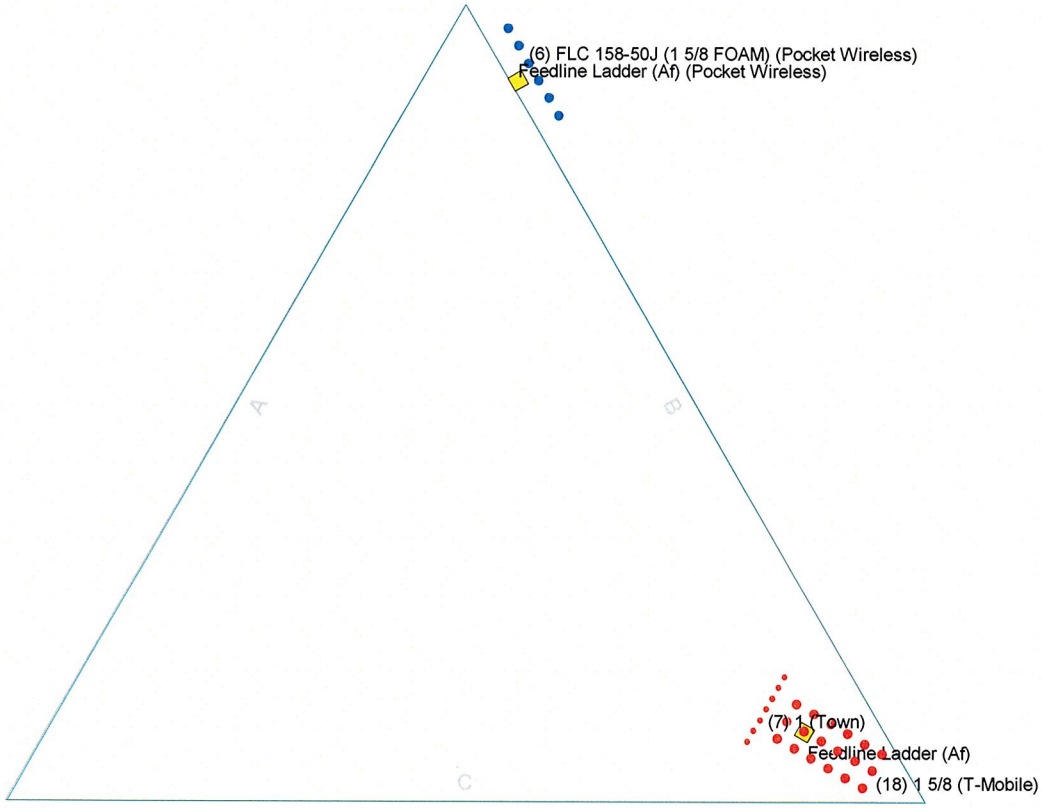
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: ***PCI-077***			
Project: ***140' Self Support Tower***			
Client: Pocket Wireless	Drawn by: Kevin Barker		App'd:
Code: TIA/EIA-222-F	Date: 06/09/09		Scale: NTS
Path: P:\08\ERI Files\PCI077 140' Valmont Tower.eri			Dwg No. E-7

RISA TOWER FEEDLINE PLAN

Feedline Plan

Round Flat App In Face App Out Face Truss-Leg



URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: (860) 529-8882
FAX: (860) 529-3991

Job: ***PCI-077***			
Project: ***140' Self Support Tower***			
Client: Pocket Wireless	Drawn by: Kevin Barker	App'd:	
Code: TIA/EIA-222-F	Date: 06/09/09	Scale: NTS	
Path: P:\08\ERI Files\PCI077 140' Valmont Tower.eri		Dwg No. E-7	

RISA TOWER DETAILED OUTPUT

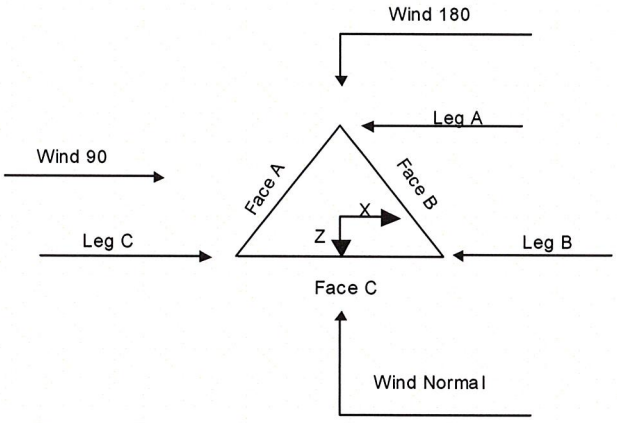
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 140.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.00 ft at the top and 16.00 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
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.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member 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		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	140.00-120.00			8.00	1	20.00
T2	120.00-100.00			8.00	1	20.00
T3	100.00-80.00			8.00	1	20.00
T4	80.00-60.00			8.00	1	20.00
T5	60.00-40.00			10.00	1	20.00
T6	40.00-20.00			12.00	1	20.00
T7	20.00-0.00			14.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	140.00-120.00	5.00	X Brace	No	No	0.0000	0.0000
T2	120.00-100.00	5.00	X Brace	No	No	0.0000	0.0000
T3	100.00-80.00	5.00	X Brace	No	No	0.0000	0.0000
T4	80.00-60.00	5.00	X Brace	No	No	0.0000	0.0000
T5	60.00-40.00	5.00	X Brace	No	No	0.0000	0.0000
T6	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T7	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 140.00-120.00	Solid Round	2 1/4	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x1/8	A36 (36 ksi)
T2 120.00-100.00	Solid Round	2 1/4	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x1/4	A36 (36 ksi)
T3 100.00-80.00	Solid Round	2 3/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T4 80.00-60.00	Solid Round	3	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T5 60.00-40.00	Solid Round	3 1/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T6 40.00-20.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T7 20.00-0.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 140.00-120.00	Equal Angle	L3x3x3/8	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

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
T1 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T2 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T3 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T4 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T5 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T6 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000
T7 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Factors[1] Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1 140.00-120.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 120.00-100.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 100.00-80.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 80.00-60.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 60.00-40.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 40.00-20.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 20.00-0.00	No	No	1	1	1	1	1	1	1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
T6 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T7 20.00-0.00	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T6 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 20.00-0.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 140.00-120.00	Flange	0.6250 A325N	6	0.6250 A325N	1	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 120.00-100.00	Flange	0.6250 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 100.00-80.00	Flange	0.7500 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 80.00-60.00	Flange	0.8750 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 60.00-40.00	Flange	1.0000 A325N	6	0.6250 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 40.00-20.00	Flange	1.0000 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 20.00-0.00	Flange	1.0000 A325N	6	1.2500 A325N	1	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Feedline Ladder (Af)	B	No	Af (Leg)	120.00 - 6.00	0.0000	0.15	1	1	3.0000	3.0000	12.0000	8.40
1 5/8 (T-Mobile)	B	No	Ar (Leg)	120.00 - 6.00	0.0000	0.12	18	6	1.9800	1.9800		1.04
1 (Town)	B	No	Ar (Leg)	120.00 - 6.00	0.0000	0.2	7	1	1.2500	1.2500		0.58
FLC 158-50J (1 5/8 FOAM) (Pocket Wireless)	B	No	Ar (CaAa)	110.00 - 6.00	4.0000	-0.4	6	6	2.0200	2.0200		0.92
Feedline Ladder (Af) (Pocket Wireless)	B	No	Af (CfAe)	110.00 - 6.00	0.0000	-0.4	1	1	3.0000	3.0000	12.0000	8.40

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
T1	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	120.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	21.883	7.500	12.120	0.000	0.76
		C	21.883	5.000	0.000	0.000	0.00
T3	100.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	21.883	10.000	24.240	0.000	0.90
		C	21.883	5.000	0.000	0.000	0.00
T4	80.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	21.883	10.000	24.240	0.000	0.90
		C	21.883	5.000	0.000	0.000	0.00
T5	60.00-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	21.883	10.000	24.240	0.000	0.90
		C	21.883	5.000	0.000	0.000	0.00
T6	40.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	21.883	10.000	24.240	0.000	0.90
		C	21.883	5.000	0.000	0.000	0.00
T7	20.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	15.318	7.000	16.968	0.000	0.63
		C	15.318	3.500	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	140.00-120.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	120.00-100.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		33.550	9.167	18.120	0.000	1.63
		C		33.550	6.111	0.000	0.000	0.00
T3	100.00-80.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		33.550	12.222	36.240	0.000	1.89
		C		33.550	6.111	0.000	0.000	0.00
T4	80.00-60.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		33.550	12.222	36.240	0.000	1.89
		C		33.550	6.111	0.000	0.000	0.00
T5	60.00-40.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		33.550	12.222	36.240	0.000	1.89
		C		33.550	6.111	0.000	0.000	0.00
T6	40.00-20.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		33.550	12.222	36.240	0.000	1.89
		C		33.550	6.111	0.000	0.000	0.00
T7	20.00-0.00	A	0.500	0.000	0.000	0.000	0.000	0.00
		B		23.485	8.556	25.368	0.000	1.32
		C		23.485	4.278	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	140.00-120.00	0.0000	0.0000	0.0000	0.0000
T2	120.00-100.00	7.0341	-0.9157	6.9408	-0.8311
T3	100.00-80.00	5.4475	-3.7850	5.5297	-3.7434
T4	80.00-60.00	5.8929	-4.1015	6.0051	-4.0713
T5	60.00-40.00	6.7707	-4.7243	6.9282	-4.7075
T6	40.00-20.00	6.9784	-4.8780	6.8546	-4.6648
T7	20.00-0.00	6.2989	-4.4081	6.1939	-4.2194

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
APX16PV-16PVL-C w/ mount (T-Mobile)	A	From Leg	4.00 5.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 7.08	2.90 3.48	0.05 0.10
APX16PV-16PVL-C w/ mount (T-Mobile)	B	From Leg	4.00 5.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 7.08	2.90 3.48	0.05 0.10
APX16PV-16PVL-C w/ mount (T-Mobile)	C	From Leg	4.00 5.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 7.08	2.90 3.48	0.05 0.10
20' 4-Bay Dipole (Town)	A	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10
20' 4-Bay Dipole (Town)	B	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10
20' 4-Bay Dipole (Town)	C	From Leg	4.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice	4.00 6.00	4.00 6.00	0.06 0.10
7' Whip (Town)	A	From Leg	3.00 0.00 0.00	0.0000	143.00	No Ice 1/2" Ice	1.74 2.60	1.74 2.60	0.04 0.05
7' Whip (Town)	B	From Leg	3.00 0.00 0.00	0.0000	143.00	No Ice 1/2" Ice	1.74 2.60	1.74 2.60	0.04 0.05
7' Whip (Town)	C	From Leg	3.00 0.00 0.00	0.0000	143.00	No Ice 1/2" Ice	1.74 2.60	1.74 2.60	0.04 0.05
14' Dipole (Town)	A	From Leg	2.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice	2.80 4.22	2.80 4.22	0.07 0.10
10' Boom Gate w/3 2 - 3/8" Pipe (Vertical) (3) (T-Mobile)	C	None		0.0000	120.00	No Ice 1/2" Ice	39.20 51.70	39.20 51.70	1.50 2.10
APX16PV-16PVL-C w/ mount (T-Mobile)	A	From Leg	4.00 -5.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 7.08	2.90 3.48	0.05 0.10
APX16PV-16PVL-C w/ mount (T-Mobile)	B	From Leg	4.00 -5.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 7.08	2.90 3.48	0.05 0.10

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
APX16PV-16PVL-C w/ mount	C	From Leg	4.00 -5.00 0.00	0.0000	120.00	No Ice 1/2" Ice	6.65 7.08	2.90 3.48	0.05 0.10
(T-Mobile)									
3' Stand-off (Town)	A	From Leg	1.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
3' Stand-off (Town)	B	From Leg	1.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
3' Stand-off (Town)	C	From Leg	1.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	1.00 1.20	2.00 2.70	0.05 0.07
(3) RFS - TMA (shielded) (T-Mobile)	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.13 0.21	0.47 0.57	0.02 0.02
(3) RFS - TMA (shielded) (T-Mobile)	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.13 0.21	0.47 0.57	0.02 0.02
(3) RFS - TMA (shielded) (T-Mobile)	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice	0.13 0.21	0.47 0.57	0.02 0.02
APXV18-206517S-C w/ mounting hardware (Pocket Wireless)	A	From Leg	0.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	5.17 5.62	4.46 5.39	0.05 0.09
APXV18-206517S-C w/ mounting hardware (Pocket Wireless)	B	From Leg	0.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	5.17 5.62	4.46 5.39	0.05 0.09
APXV18-206517S-C w/ mounting hardware (Pocket Wireless)	C	From Leg	0.50 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	5.17 5.62	4.46 5.39	0.05 0.09

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
Pirod 105218	2263.4687	3690.8612	0.72	0.46	7.8593	12.8155	7.2158
Pirod 105219	2441.8688	3942.2854	0.94	0.49	8.4787	13.6885	9.4248

Tower Pressures - No Ice

$G_H = 1.138$

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
T1 140.00-120.00	130.00	1.48	24	163.750	A	12.701	7.500	7.500	37.13	0.000	0.000
					B	12.701	7.500		37.13	0.000	0.000
					C	12.701	7.500		37.13	0.000	0.000
T2 120.00-100.00	110.00	1.411	23	163.750	A	10.748	7.500	7.500	41.10	0.000	0.000
					B	18.248	29.383		15.75	12.120	0.000
					C	15.748	29.383		16.62	0.000	0.000
T3 100.00-80.00	90.00	1.332	22	164.583	A	15.283	9.167	9.167	37.49	0.000	0.000
					B	25.283	31.050		16.27	24.240	0.000
					C	20.283	31.050		17.86	0.000	0.000
T4 80.00-60.00	70.00	1.24	20	185.006	A	16.695	10.017	10.017	37.50	0.000	0.000
					B	26.695	31.900		17.09	24.240	0.000
					C	21.695	31.900		18.69	0.000	0.000
T5 60.00-40.00	50.00	1.126	18	225.423	A	19.652	10.851	10.851	35.57	0.000	0.000
					B	29.652	32.735		17.39	24.240	0.000
					C	24.652	32.735		18.91	0.000	0.000
T6 40.00-20.00	30.00	1	16	282.945	A	15.378	26.241	26.241	63.05	0.000	0.000
					B	25.378	48.125		35.70	24.240	0.000
					C	20.378	48.125		38.31	0.000	0.000
T7 20.00-0.00	10.00	1	16	323.362	A	16.830	28.309	28.309	62.72	0.000	0.000
					B	23.830	43.628		41.97	16.968	0.000
					C	20.330	43.628		44.26	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.138$

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
T1 140.00-120.00	130.00	1.48	18	0.5000	165.417	A	12.701	17.626	10.833	35.72	0.000	0.000
						B	12.701	17.626		35.72	0.000	0.000
						C	12.701	17.626		35.72	0.000	0.000
T2 120.00-100.00	110.00	1.411	17	0.5000	165.417	A	10.748	16.975	10.833	39.08	0.000	0.000
						B	19.915	50.525		15.38	18.120	0.000
						C	16.859	50.525		16.08	0.000	0.000
T3 100.00-80.00	90.00	1.332	16	0.5000	166.250	A	15.283	18.613	12.500	36.88	0.000	0.000
						B	27.505	52.163		15.69	36.240	0.000
						C	21.394	52.163		16.99	0.000	0.000
T4 80.00-60.00	70.00	1.24	15	0.5000	186.675	A	16.695	20.033	13.356	36.36	0.000	0.000
						B	28.917	53.583		16.19	36.240	0.000
						C	22.806	53.583		17.48	0.000	0.000
T5 60.00-40.00	50.00	1.126	14	0.5000	227.092	A	19.652	22.051	14.190	34.03	0.000	0.000
						B	31.874	55.601		16.22	36.240	0.000
						C	25.763	55.601		17.44	0.000	0.000
T6 40.00-20.00	30.00	1	12	0.5000	284.614	A	15.378	47.915	42.789	67.61	0.000	0.000
						B	27.600	81.465		39.23	36.240	0.000
						C	21.489	81.465		41.56	0.000	0.000
T7 20.00-0.00	10.00	1	12	0.5000	325.031	A	16.830	51.314	45.704	67.07	0.000	0.000
						B	25.385	74.799		45.62	25.368	0.000
						C	21.108	74.799		47.65	0.000	0.000

Tower Pressure - Service

$G_H = 1.138$

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
T1 140.00-120.00	130.00	1.48	9	163.750	A	12.701	7.500	7.500	37.13	0.000	0.000
					B	12.701	7.500		37.13	0.000	0.000
					C	12.701	7.500		37.13	0.000	0.000
T2 120.00-100.00	110.00	1.411	9	163.750	A	10.748	7.500	7.500	41.10	0.000	0.000
					B	18.248	29.383		15.75	12.120	0.000
					C	15.748	29.383		16.62	0.000	0.000
T3 100.00-80.00	90.00	1.332	9	164.583	A	15.283	9.167	9.167	37.49	0.000	0.000
					B	25.283	31.050		16.27	24.240	0.000
					C	20.283	31.050		17.86	0.000	0.000
T4 80.00-60.00	70.00	1.24	8	185.006	A	16.695	10.017	10.017	37.50	0.000	0.000
					B	26.695	31.900		17.09	24.240	0.000
					C	21.695	31.900		18.69	0.000	0.000
T5 60.00-40.00	50.00	1.126	7	225.423	A	19.652	10.851	10.851	35.57	0.000	0.000
					B	29.652	32.735		17.39	24.240	0.000
					C	24.652	32.735		18.91	0.000	0.000
T6 40.00-20.00	30.00	1	6	282.945	A	15.378	26.241	26.241	63.05	0.000	0.000
					B	25.378	48.125		35.70	24.240	0.000
					C	20.378	48.125		38.31	0.000	0.000
T7 20.00-0.00	10.00	1	6	323.362	A	16.830	28.309	28.309	62.72	0.000	0.000
					B	23.830	43.628		41.97	16.968	0.000
					C	20.330	43.628		44.26	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
T1 140.00-120.00	0.00	1.31	A	0.123	2.872	0.578	1	1	17.035	1.35	67.48	C
			B	0.123	2.872	0.578	1	1	17.035			
			C	0.123	2.872	0.578	1	1	17.035			
T2 120.00-100.00	0.76	1.44	A	0.111	2.918	0.576	1	1	15.071	2.53	126.61	B
			B	0.291	2.321	0.613	1	1	36.265			
			C	0.276	2.363	0.609	1	1	33.635			
T3 100.00-80.00	0.90	2.34	A	0.149	2.777	0.581	1	1	20.611	3.04	152.02	B
			B	0.342	2.19	0.63	1	1	44.837			
			C	0.312	2.265	0.62	1	1	39.522			
T4 80.00-60.00	0.90	2.67	A	0.144	2.792	0.581	1	1	22.511	2.98	149.10	B
			B	0.317	2.252	0.621	1	1	46.510			
			C	0.29	2.324	0.613	1	1	41.243			
T5 60.00-40.00	0.90	3.14	A	0.135	2.826	0.579	1	1	25.939	2.97	148.30	B
			B	0.277	2.36	0.609	1	1	49.590			
			C	0.255	2.424	0.603	1	1	44.393			
T6 40.00-20.00	0.90	3.35	A	0.147	2.782	0.581	1	1	30.625	2.90	144.90	B
			B	0.26	2.408	0.604	1	1	54.465			
			C	0.242	2.461	0.6	1	1	49.247			
T7 20.00-0.00	0.63	4.21	A	0.14	2.81	0.58	1	1	33.248	2.69	134.71	B
			B	0.209	2.567	0.592	1	1	49.666			
			C	0.198	2.603	0.59	1	1	46.068			
Sum Weight:	5.00	18.46						OTM	1198.54 kip-ft	18.46		

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
T1 140.00-120.00	0.00	1.31	A	0.123	2.872	0.578	0.825	1	14.812	1.17	58.68	C
			B	0.123	2.872	0.578	0.825	1	14.812			
			C	0.123	2.872	0.578	0.825	1	14.812			
T2 120.00-100.00	0.76	1.44	A	0.111	2.918	0.576	0.825	1	13.190	2.34	116.86	B
			B	0.291	2.321	0.613	0.825	1	33.071			
			C	0.276	2.363	0.609	0.825	1	30.879			
T3 100.00-80.00	0.90	2.34	A	0.149	2.777	0.581	0.825	1	17.937	2.80	139.99	B
			B	0.342	2.19	0.63	0.825	1	40.412			
			C	0.312	2.265	0.62	0.825	1	35.973			
T4 80.00-60.00	0.90	2.67	A	0.144	2.792	0.581	0.825	1	19.589	2.74	136.94	B
			B	0.317	2.252	0.621	0.825	1	41.838			
			C	0.29	2.324	0.613	0.825	1	37.447			
T5 60.00-40.00	0.90	3.14	A	0.135	2.826	0.579	0.825	1	22.500	2.71	135.44	B
			B	0.277	2.36	0.609	0.825	1	44.401			
			C	0.255	2.424	0.603	0.825	1	40.079			
T6 40.00-20.00	0.90	3.35	A	0.147	2.782	0.581	0.825	1	27.934	2.70	134.93	B
			B	0.26	2.408	0.604	0.825	1	50.024			
			C	0.242	2.461	0.6	0.825	1	45.681			
T7 20.00-0.00	0.63	4.21	A	0.14	2.81	0.58	0.825	1	30.302	2.49	124.72	B
			B	0.209	2.567	0.592	0.825	1	45.496			
			C	0.198	2.603	0.59	0.825	1	42.510			
Sum Weight:	5.00	18.46						OTM	1094.69 kip-ft	16.95		

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
T1 140.00-120.00	0.00	1.31	A	0.123	2.872	0.578	0.8	1	14.494	1.15	57.42	C
			B	0.123	2.872	0.578	0.8	1	14.494			
			C	0.123	2.872	0.578	0.8	1	14.494			
T2 120.00-100.00	0.76	1.44	A	0.111	2.918	0.576	0.8	1	12.921	2.31	115.47	B
			B	0.291	2.321	0.613	0.8	1	32.615			
			C	0.276	2.363	0.609	0.8	1	30.486			
T3 100.00-80.00	0.90	2.34	A	0.149	2.777	0.581	0.8	1	17.555	2.77	138.27	B
			B	0.342	2.19	0.63	0.8	1	39.780			
			C	0.312	2.265	0.62	0.8	1	35.465			
T4 80.00-60.00	0.90	2.67	A	0.144	2.792	0.581	0.8	1	19.172	2.70	135.20	B
			B	0.317	2.252	0.621	0.8	1	41.171			
			C	0.29	2.324	0.613	0.8	1	36.904			
T5 60.00-40.00	0.90	3.14	A	0.135	2.826	0.579	0.8	1	22.008	2.67	133.60	B
			B	0.277	2.36	0.609	0.8	1	43.659			
			C	0.255	2.424	0.603	0.8	1	39.463			
T6 40.00-20.00	0.90	3.35	A	0.147	2.782	0.581	0.8	1	27.549	2.67	133.50	B
			B	0.26	2.408	0.604	0.8	1	49.389			
			C	0.242	2.461	0.6	0.8	1	45.172			
T7 20.00-0.00	0.63	4.21	A	0.14	2.81	0.58	0.8	1	29.882	2.47	123.30	B

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
			B	0.209	2.567	0.592	0.8	1	44.900			
			C	0.198	2.603	0.59	0.8	1	42.002			
Sum Weight:	5.00	18.46						OTM	1079.85 kip-ft	16.74		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.00	1.31	A	0.123	2.872	0.578	0.85	1	15.129	1.20	59.94	C
			B	0.123	2.872	0.578	0.85	1	15.129			
			C	0.123	2.872	0.578	0.85	1	15.129			
T2 120.00-100.00	0.76	1.44	A	0.111	2.918	0.576	0.85	1	13.459	2.37	118.26	B
			B	0.291	2.321	0.613	0.85	1	33.528			
			C	0.276	2.363	0.609	0.85	1	31.273			
T3 100.00-80.00	0.90	2.34	A	0.149	2.777	0.581	0.85	1	18.319	2.83	141.71	B
			B	0.342	2.19	0.63	0.85	1	41.044			
			C	0.312	2.265	0.62	0.85	1	36.480			
T4 80.00-60.00	0.90	2.67	A	0.144	2.792	0.581	0.85	1	20.007	2.77	138.67	B
			B	0.317	2.252	0.621	0.85	1	42.506			
			C	0.29	2.324	0.613	0.85	1	37.989			
T5 60.00-40.00	0.90	3.14	A	0.135	2.826	0.579	0.85	1	22.991	2.75	137.28	B
			B	0.277	2.36	0.609	0.85	1	45.142			
			C	0.255	2.424	0.603	0.85	1	40.695			
T6 40.00-20.00	0.90	3.35	A	0.147	2.782	0.581	0.85	1	28.318	2.73	136.35	B
			B	0.26	2.408	0.604	0.85	1	50.658			
			C	0.242	2.461	0.6	0.85	1	46.191			
T7 20.00-0.00	0.63	4.21	A	0.14	2.81	0.58	0.85	1	30.723	2.52	126.15	B
			B	0.209	2.567	0.592	0.85	1	46.092			
			C	0.198	2.603	0.59	0.85	1	43.019			
Sum Weight:	5.00	18.46						OTM	1109.52 kip-ft	17.17		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.00	1.87	A	0.183	2.653	0.587	1	1	23.051	1.27	63.26	C
			B	0.183	2.653	0.587	1	1	23.051			
			C	0.183	2.653	0.587	1	1	23.051			
T2 120.00-100.00	1.63	1.93	A	0.168	2.708	0.584	1	1	20.667	2.48	123.98	B
			B	0.426	2.015	0.662	1	1	53.387			
			C	0.407	2.05	0.655	1	1	49.935			
T3 100.00-80.00	1.89	2.98	A	0.204	2.583	0.591	1	1	26.287	2.95	147.53	B
			B	0.479	1.928	0.687	1	1	63.348			
			C	0.442	1.986	0.67	1	1	56.335			
T4 80.00-	1.89	3.38	A	0.197	2.607	0.59	1	1	28.509	2.86	143.02	B

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
60.00			B	0.442	1.987	0.67	1	1	64.797			
			C	0.409	2.046	0.655	1	1	57.925			
T5 60.00-40.00	1.89	3.95	A	0.184	2.652	0.587	1	1	32.601	2.81	140.28	B
			B	0.385	2.094	0.646	1	1	67.775			
			C	0.358	2.153	0.635	1	1	61.096			
T6 40.00-20.00	1.89	5.26	A	0.222	2.523	0.595	1	1	43.898	2.86	142.91	B
			B	0.383	2.098	0.645	1	1	80.136			
			C	0.362	2.145	0.637	1	1	73.360			
T7 20.00-0.00	1.32	6.26	A	0.21	2.564	0.592	1	1	47.229	2.63	131.68	B
			B	0.308	2.274	0.618	1	1	71.645			
			C	0.295	2.309	0.614	1	1	67.065			
Sum Weight:	10.51	25.64						OTM	1155.37 kip-ft	17.85		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.00	1.87	A	0.183	2.653	0.587	0.825	1	20.828	1.14	57.16	C
			B	0.183	2.653	0.587	0.825	1	20.828			
			C	0.183	2.653	0.587	0.825	1	20.828			
T2 120.00-100.00	1.63	1.93	A	0.168	2.708	0.584	0.825	1	18.786	2.34	117.05	B
			B	0.426	2.015	0.662	0.825	1	49.902			
			C	0.407	2.05	0.655	0.825	1	46.984			
T3 100.00-80.00	1.89	2.98	A	0.204	2.583	0.591	0.825	1	23.613	2.78	138.89	B
			B	0.479	1.928	0.687	0.825	1	58.534			
			C	0.442	1.986	0.67	0.825	1	52.591			
T4 80.00-60.00	1.89	3.38	A	0.197	2.607	0.59	0.825	1	25.588	2.69	134.30	B
			B	0.442	1.987	0.67	0.825	1	59.737			
			C	0.409	2.046	0.655	0.825	1	53.934			
T5 60.00-40.00	1.89	3.95	A	0.184	2.652	0.587	0.825	1	29.162	2.62	131.08	B
			B	0.385	2.094	0.646	0.825	1	62.197			
			C	0.358	2.153	0.635	0.825	1	56.588			
T6 40.00-20.00	1.89	5.26	A	0.222	2.523	0.595	0.825	1	41.207	2.72	135.83	B
			B	0.383	2.098	0.645	0.825	1	75.306			
			C	0.362	2.145	0.637	0.825	1	69.600			
T7 20.00-0.00	1.32	6.26	A	0.21	2.564	0.592	0.825	1	44.284	2.49	124.61	B
			B	0.308	2.274	0.618	0.825	1	67.203			
			C	0.295	2.309	0.614	0.825	1	63.371			
Sum Weight:	10.51	25.64						OTM	1081.65 kip-ft	16.78		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 140.00-	0.00	1.87	A	0.183	2.653	0.587	0.8	1	20.510	1.13	56.28	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
120.00			B	0.183	2.653	0.587	0.8	1	20.510			
			C	0.183	2.653	0.587	0.8	1	20.510			
T2 120.00-100.00	1.63	1.93	A	0.168	2.708	0.584	0.8	1	18.518	2.32	116.07	B
			B	0.426	2.015	0.662	0.8	1	49.404			
			C	0.407	2.05	0.655	0.8	1	46.563			
T3 100.00-80.00	1.89	2.98	A	0.204	2.583	0.591	0.8	1	23.231	2.75	137.65	B
			B	0.479	1.928	0.687	0.8	1	57.847			
			C	0.442	1.986	0.67	0.8	1	52.056			
T4 80.00-60.00	1.89	3.38	A	0.197	2.607	0.59	0.8	1	25.171	2.66	133.06	B
			B	0.442	1.987	0.67	0.8	1	59.014			
			C	0.409	2.046	0.655	0.8	1	53.364			
T5 60.00-40.00	1.89	3.95	A	0.184	2.652	0.587	0.8	1	28.670	2.60	129.77	B
			B	0.385	2.094	0.646	0.8	1	61.400			
			C	0.358	2.153	0.635	0.8	1	55.943			
T6 40.00-20.00	1.89	5.26	A	0.222	2.523	0.595	0.8	1	40.822	2.70	134.81	B
			B	0.383	2.098	0.645	0.8	1	74.616			
			C	0.362	2.145	0.637	0.8	1	69.063			
T7 20.00-0.00	1.32	6.26	A	0.21	2.564	0.592	0.8	1	43.863	2.47	123.60	B
			B	0.308	2.274	0.618	0.8	1	66.568			
			C	0.295	2.309	0.614	0.8	1	62.843			
Sum Weight:	10.51	25.64						OTM	1071.11 kip-ft	16.62		

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
T1 140.00-120.00	0.00	1.87	A	0.183	2.653	0.587	0.85	1	21.145	1.16	58.03	C
			B	0.183	2.653	0.587	0.85	1	21.145			
			C	0.183	2.653	0.587	0.85	1	21.145			
T2 120.00-100.00	1.63	1.93	A	0.168	2.708	0.584	0.85	1	19.055	2.36	118.04	B
			B	0.426	2.015	0.662	0.85	1	50.400			
			C	0.407	2.05	0.655	0.85	1	47.406			
T3 100.00-80.00	1.89	2.98	A	0.204	2.583	0.591	0.85	1	23.995	2.80	140.12	B
			B	0.479	1.928	0.687	0.85	1	59.222			
			C	0.442	1.986	0.67	0.85	1	53.126			
T4 80.00-60.00	1.89	3.38	A	0.197	2.607	0.59	0.85	1	26.005	2.71	135.55	B
			B	0.442	1.987	0.67	0.85	1	60.460			
			C	0.409	2.046	0.655	0.85	1	54.504			
T5 60.00-40.00	1.89	3.95	A	0.184	2.652	0.587	0.85	1	29.653	2.65	132.40	B
			B	0.385	2.094	0.646	0.85	1	62.993			
			C	0.358	2.153	0.635	0.85	1	57.232			
T6 40.00-20.00	1.89	5.26	A	0.222	2.523	0.595	0.85	1	41.591	2.74	136.84	B
			B	0.383	2.098	0.645	0.85	1	75.996			
			C	0.362	2.145	0.637	0.85	1	70.137			
T7 20.00-0.00	1.32	6.26	A	0.21	2.564	0.592	0.85	1	44.705	2.51	125.62	B
			B	0.308	2.274	0.618	0.85	1	67.837			
			C	0.295	2.309	0.614	0.85	1	63.898			
Sum Weight:	10.51	25.64						OTM	1092.18 kip-ft	16.93		

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
T1 140.00-120.00	0.00	1.31	A	0.123	2.872	0.578	1	1	17.035	0.53	26.36	C
			B	0.123	2.872	0.578	1	1	17.035			
			C	0.123	2.872	0.578	1	1	17.035			
T2 120.00-100.00	0.76	1.44	A	0.111	2.918	0.576	1	1	15.071	0.99	49.46	B
			B	0.291	2.321	0.613	1	1	36.265			
			C	0.276	2.363	0.609	1	1	33.635			
T3 100.00-80.00	0.90	2.34	A	0.149	2.777	0.581	1	1	20.611	1.19	59.38	B
			B	0.342	2.19	0.63	1	1	44.837			
			C	0.312	2.265	0.62	1	1	39.522			
T4 80.00-60.00	0.90	2.67	A	0.144	2.792	0.581	1	1	22.511	1.16	58.24	B
			B	0.317	2.252	0.621	1	1	46.510			
			C	0.29	2.324	0.613	1	1	41.243			
T5 60.00-40.00	0.90	3.14	A	0.135	2.826	0.579	1	1	25.939	1.16	57.93	B
			B	0.277	2.36	0.609	1	1	49.590			
			C	0.255	2.424	0.603	1	1	44.393			
T6 40.00-20.00	0.90	3.35	A	0.147	2.782	0.581	1	1	30.625	1.13	56.60	B
			B	0.26	2.408	0.604	1	1	54.465			
			C	0.242	2.461	0.6	1	1	49.247			
T7 20.00-0.00	0.63	4.21	A	0.14	2.81	0.58	1	1	33.248	1.05	52.62	B
			B	0.209	2.567	0.592	1	1	49.666			
			C	0.198	2.603	0.59	1	1	46.068			
Sum Weight:	5.00	18.46						OTM	468.18 kip-ft	7.21		

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
T1 140.00-120.00	0.00	1.31	A	0.123	2.872	0.578	0.825	1	14.812	0.46	22.92	C
			B	0.123	2.872	0.578	0.825	1	14.812			
			C	0.123	2.872	0.578	0.825	1	14.812			
T2 120.00-100.00	0.76	1.44	A	0.111	2.918	0.576	0.825	1	13.190	0.91	45.65	B
			B	0.291	2.321	0.613	0.825	1	33.071			
			C	0.276	2.363	0.609	0.825	1	30.879			
T3 100.00-80.00	0.90	2.34	A	0.149	2.777	0.581	0.825	1	17.937	1.09	54.68	B
			B	0.342	2.19	0.63	0.825	1	40.412			
			C	0.312	2.265	0.62	0.825	1	35.973			
T4 80.00-60.00	0.90	2.67	A	0.144	2.792	0.581	0.825	1	19.589	1.07	53.49	B
			B	0.317	2.252	0.621	0.825	1	41.838			
			C	0.29	2.324	0.613	0.825	1	37.447			
T5 60.00-40.00	0.90	3.14	A	0.135	2.826	0.579	0.825	1	22.500	1.06	52.91	B
			B	0.277	2.36	0.609	0.825	1	44.401			
			C	0.255	2.424	0.603	0.825	1	40.079			
T6 40.00-20.00	0.90	3.35	A	0.147	2.782	0.581	0.825	1	27.934	1.05	52.71	B
			B	0.26	2.408	0.604	0.825	1	50.024			
			C	0.242	2.461	0.6	0.825	1	45.681			
T7 20.00-0.00	0.63	4.21	A	0.14	2.81	0.58	0.825	1	30.302	0.97	48.72	B
			B	0.209	2.567	0.592	0.825	1	45.496			
			C	0.198	2.603	0.59	0.825	1	42.510			
Sum Weight:	5.00	18.46						OTM	427.61	6.62		

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
									kip-ft			

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.00	1.31	A	0.123	2.872	0.578	0.8	1	14.494	0.45	22.43	C
			B	0.123	2.872	0.578	0.8	1	14.494			
			C	0.123	2.872	0.578	0.8	1	14.494			
T2 120.00-100.00	0.76	1.44	A	0.111	2.918	0.576	0.8	1	12.921	0.90	45.11	B
			B	0.291	2.321	0.613	0.8	1	32.615			
			C	0.276	2.363	0.609	0.8	1	30.486			
T3 100.00-80.00	0.90	2.34	A	0.149	2.777	0.581	0.8	1	17.555	1.08	54.01	B
			B	0.342	2.19	0.63	0.8	1	39.780			
			C	0.312	2.265	0.62	0.8	1	35.465			
T4 80.00-60.00	0.90	2.67	A	0.144	2.792	0.581	0.8	1	19.172	1.06	52.81	B
			B	0.317	2.252	0.621	0.8	1	41.171			
			C	0.29	2.324	0.613	0.8	1	36.904			
T5 60.00-40.00	0.90	3.14	A	0.135	2.826	0.579	0.8	1	22.008	1.04	52.19	B
			B	0.277	2.36	0.609	0.8	1	43.659			
			C	0.255	2.424	0.603	0.8	1	39.463			
T6 40.00-20.00	0.90	3.35	A	0.147	2.782	0.581	0.8	1	27.549	1.04	52.15	B
			B	0.26	2.408	0.604	0.8	1	49.389			
			C	0.242	2.461	0.6	0.8	1	45.172			
T7 20.00-0.00	0.63	4.21	A	0.14	2.81	0.58	0.8	1	29.882	0.96	48.16	B
			B	0.209	2.567	0.592	0.8	1	44.900			
			C	0.198	2.603	0.59	0.8	1	42.002			
Sum Weight:	5.00	18.46						OTM	421.82 kip-ft	6.54		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
T1 140.00-120.00	0.00	1.31	A	0.123	2.872	0.578	0.85	1	15.129	0.47	23.41	C
			B	0.123	2.872	0.578	0.85	1	15.129			
			C	0.123	2.872	0.578	0.85	1	15.129			
T2 120.00-100.00	0.76	1.44	A	0.111	2.918	0.576	0.85	1	13.459	0.92	46.19	B
			B	0.291	2.321	0.613	0.85	1	33.528			
			C	0.276	2.363	0.609	0.85	1	31.273			
T3 100.00-80.00	0.90	2.34	A	0.149	2.777	0.581	0.85	1	18.319	1.11	55.35	B
			B	0.342	2.19	0.63	0.85	1	41.044			
			C	0.312	2.265	0.62	0.85	1	36.480			
T4 80.00-60.00	0.90	2.67	A	0.144	2.792	0.581	0.85	1	20.007	1.08	54.17	B
			B	0.317	2.252	0.621	0.85	1	42.506			
			C	0.29	2.324	0.613	0.85	1	37.989			
T5 60.00-	0.90	3.14	A	0.135	2.826	0.579	0.85	1	22.991	1.07	53.62	B

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
40.00			B	0.277	2.36	0.609	0.85	1	45.142			
			C	0.255	2.424	0.603	0.85	1	40.695			
T6 40.00-	0.90	3.35	A	0.147	2.782	0.581	0.85	1	28.318	1.07	53.26	B
20.00			B	0.26	2.408	0.604	0.85	1	50.658			
			C	0.242	2.461	0.6	0.85	1	46.191			
T7 20.00-0.00	0.63	4.21	A	0.14	2.81	0.58	0.85	1	30.723	0.99	49.28	B
			B	0.209	2.567	0.592	0.85	1	46.092			
			C	0.198	2.603	0.59	0.85	1	43.019			
Sum Weight:	5.00	18.46						OTM	433.41 kip-ft	6.71		

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	10.98					
Bracing Weight	7.49					
Total Member Self-Weight	18.46			-0.11	-15.12	
Total Weight	26.10			-0.11	-15.12	
Wind 0 deg - No Ice		0.00	-21.43	-1562.07	-15.12	9.10
Wind 30 deg - No Ice		10.07	-17.44	-1275.72	-751.59	4.52
Wind 45 deg - No Ice		14.08	-14.08	-1031.15	-1046.16	1.97
Wind 60 deg - No Ice		17.06	-9.85	-721.75	-1265.03	-0.66
Wind 90 deg - No Ice		20.13	0.00	-0.11	-1488.07	-5.67
Wind 120 deg - No Ice		18.56	10.71	780.87	-1367.82	-9.78
Wind 135 deg - No Ice		14.08	14.08	1030.93	-1046.16	-9.90
Wind 150 deg - No Ice		10.07	17.44	1275.49	-751.59	-10.19
Wind 180 deg - No Ice		0.00	19.70	1443.16	-15.12	-8.29
Wind 210 deg - No Ice		-10.07	17.44	1275.49	721.35	-4.52
Wind 225 deg - No Ice		-14.08	14.08	1030.93	1015.91	-1.97
Wind 240 deg - No Ice		-18.56	10.71	780.87	1337.57	0.68
Wind 270 deg - No Ice		-20.13	0.00	-0.11	1457.82	5.67
Wind 300 deg - No Ice		-17.06	-9.85	-721.75	1234.79	8.95
Wind 315 deg - No Ice		-14.08	-14.08	-1031.15	1015.91	9.90
Wind 330 deg - No Ice		-10.07	-17.44	-1275.72	721.35	10.19
Member Ice	7.18					
Total Weight Ice	40.09			2.80	-33.05	
Wind 0 deg - Ice		0.00	-20.69	-1501.68	-33.05	8.84
Wind 30 deg - Ice		9.88	-17.12	-1245.39	-753.70	4.51
Wind 45 deg - Ice		13.87	-13.87	-1008.90	-1044.75	2.00
Wind 60 deg - Ice		16.85	-9.73	-707.31	-1263.00	-0.60
Wind 90 deg - Ice		19.77	0.00	2.80	-1474.34	-5.54
Wind 120 deg - Ice		17.92	10.34	755.03	-1335.97	-9.44
Wind 135 deg - Ice		13.87	13.87	1014.49	-1044.75	-9.78
Wind 150 deg - Ice		9.88	17.12	1250.98	-753.70	-10.05
Wind 180 deg - Ice		0.00	19.46	1423.01	-33.05	-8.26
Wind 210 deg - Ice		-9.88	17.12	1250.98	687.59	-4.51
Wind 225 deg - Ice		-13.87	13.87	1014.49	978.64	-2.00
Wind 240 deg - Ice		-17.92	10.34	755.03	1269.86	0.60
Wind 270 deg - Ice		-19.77	0.00	2.80	1408.23	5.54
Wind 300 deg - Ice		-16.85	-9.73	-707.31	1196.89	8.85
Wind 315 deg - Ice		-13.87	-13.87	-1008.90	978.64	9.78
Wind 330 deg - Ice		-9.88	-17.12	-1245.39	687.59	10.05
Total Weight	26.10			-0.11	-15.12	

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 0 deg - Service		0.00	-8.37	-610.64	0.00	3.56
Wind 30 deg - Service		3.93	-6.81	-498.78	-287.68	1.77
Wind 45 deg - Service		5.50	-5.50	-403.25	-402.75	0.77
Wind 60 deg - Service		6.67	-3.85	-282.39	-488.25	-0.26
Wind 90 deg - Service		7.86	0.00	-0.50	-575.37	-2.21
Wind 120 deg - Service		7.25	4.19	304.57	-528.40	-3.82
Wind 135 deg - Service		5.50	5.50	402.25	-402.75	-3.87
Wind 150 deg - Service		3.93	6.81	497.79	-287.68	-3.98
Wind 180 deg - Service		0.00	7.70	563.28	0.00	-3.24
Wind 210 deg - Service		-3.93	6.81	497.79	287.68	-1.77
Wind 225 deg - Service		-5.50	5.50	402.25	402.75	-0.77
Wind 240 deg - Service		-7.25	4.19	304.57	528.40	0.26
Wind 270 deg - Service		-7.86	0.00	-0.50	575.37	2.21
Wind 300 deg - Service		-6.67	-3.85	-282.39	488.25	3.50
Wind 315 deg - Service		-5.50	-5.50	-403.25	402.75	3.87
Wind 330 deg - Service		-3.93	-6.81	-498.78	287.68	3.98

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	140 - 120	Leg	Max Tension	5	2.08	0.00	-0.00
			Max. Compression	19	-3.76	0.01	0.05
			Max. Mx	6	-0.58	-0.08	-0.00
			Max. My	17	-0.47	0.04	0.07
			Max. Vy	23	-0.16	0.00	0.00
			Max. Vx	19	0.15	0.00	0.02
		Diagonal	Max Tension	21	0.78	0.00	0.00
			Max. Compression	30	-0.82	0.00	0.00
			Max. Mx	22	-0.26	0.01	-0.00
			Max. My	6	-0.65	0.00	0.00
			Max. Vy	22	0.01	0.01	-0.00
			Max. Vx	6	-0.00	0.00	0.00
		Top Girt	Max Tension	7	0.12	0.00	0.00
			Max. Compression	22	-0.16	0.00	0.00
			Max. Mx	18	-0.02	-0.08	0.00
			Max. My	26	-0.02	0.00	-0.00
			Max. Vy	18	0.04	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
T2	120 - 100	Leg	Max Tension	5	14.08	-0.00	-0.00
			Max. Compression	24	-19.94	-0.06	-0.04
			Max. Mx	6	-1.44	-0.09	-0.01
			Max. My	3	-1.43	-0.05	0.09
			Max. Vy	6	-0.65	-0.02	-0.05
			Max. Vx	2	0.67	0.01	0.05
		Diagonal	Max Tension	9	2.59	0.00	0.00
			Max. Compression	17	-2.62	0.00	0.00
			Max. Mx	23	1.26	0.02	-0.00
			Max. My	9	-1.62	0.01	0.00
			Max. Vy	23	-0.01	0.02	-0.00
			Max. Vx	9	-0.00	0.01	0.00
T3	100 - 80	Leg	Max Tension	5	34.78	-0.01	0.01
			Max. Compression	24	-44.22	-0.11	-0.08
			Max. Mx	6	-2.80	-0.15	-0.02
			Max. My	20	-5.27	-0.05	0.14
			Max. Vy	6	0.07	-0.15	-0.02
			Max. Vx	2	-0.06	-0.06	0.13
		Diagonal	Max Tension	9	3.80	0.00	0.00
			Max. Compression	9	-3.90	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	23	1.55	0.04	-0.00
			Max. My	6	-3.46	0.00	0.01
			Max. Vy	23	-0.02	0.04	-0.00
			Max. Vx	6	-0.00	0.00	0.01
T4	80 - 60	Leg	Max Tension	5	51.49	-0.05	0.00
			Max. Compression	24	-64.98	0.04	0.01
			Max. Mx	24	-49.88	0.14	0.02
			Max. My	6	-3.57	-0.02	0.17
			Max. Vy	30	0.05	0.13	0.00
			Max. Vx	6	-0.07	-0.02	0.17
		Diagonal	Max Tension	34	3.01	0.00	0.00
			Max. Compression	17	-2.96	0.00	0.00
			Max. Mx	23	1.62	0.04	-0.00
			Max. My	26	-2.63	0.00	0.01
			Max. Vy	22	0.02	0.04	0.00
			Max. Vx	26	-0.00	0.00	0.00
T5	60 - 40	Leg	Max Tension	5	66.48	-0.06	0.00
			Max. Compression	24	-84.20	0.04	0.01
			Max. Mx	32	59.92	-0.31	-0.02
			Max. My	6	-5.60	-0.01	0.38
			Max. Vy	32	0.09	-0.31	-0.02
			Max. Vx	6	-0.13	-0.01	0.38
		Diagonal	Max Tension	34	3.46	0.00	0.00
			Max. Compression	34	-3.45	0.00	0.00
			Max. Mx	23	1.23	0.05	-0.00
			Max. My	26	-2.97	0.02	0.01
			Max. Vy	23	0.03	0.05	-0.00
			Max. Vx	26	-0.00	0.00	0.00
T6	40 - 20	Leg	Max Tension	5	78.67	-2.21	-0.01
			Max. Compression	24	-101.23	-1.24	0.00
			Max. Mx	22	73.71	-5.27	-0.02
			Max. My	6	-6.18	-0.16	2.90
			Max. Vy	32	0.57	-5.21	-0.03
			Max. Vx	23	-0.35	1.37	2.88
		Diagonal	Max Tension	34	5.17	0.00	0.00
			Max. Compression	17	-4.63	0.00	0.00
			Max. Mx	22	2.78	0.09	-0.01
			Max. My	26	-4.17	0.03	0.01
			Max. Vy	22	0.04	0.09	0.01
			Max. Vx	26	-0.00	0.00	0.00
T7	20 - 0	Leg	Max Tension	5	92.74	-2.20	-0.02
			Max. Compression	24	-121.86	0.00	-0.00
			Max. Mx	24	-108.76	7.33	-0.02
			Max. My	6	-7.96	-0.24	3.53
			Max. Vy	32	-0.97	-5.21	-0.03
			Max. Vx	23	0.45	5.22	3.50
		Diagonal	Max Tension	33	7.37	0.00	0.00
			Max. Compression	34	-6.05	0.00	0.00
			Max. Mx	22	1.42	0.12	0.01
			Max. My	33	-5.91	0.08	-0.02
			Max. Vy	22	0.05	0.12	0.01
			Max. Vx	33	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	13	120.73	12.12	-7.01
	Max. H_x	13	120.73	12.12	-7.01
	Max. H_z	22	-91.43	-13.00	7.56
	Min. Vert	5	-96.65	-9.94	5.78
	Min. H_x	22	-91.43	-13.00	7.56
	Min. H_z	13	120.73	12.12	-7.01
Leg B	Max. Vert	24	124.46	-8.46	-5.31
	Max. H_x	32	-87.29	12.79	7.73
	Max. H_z	33	-84.52	12.38	7.80
	Min. Vert	15	-94.76	9.76	6.00
	Min. H_x	7	122.63	-11.98	-7.34
	Min. H_z	7	122.63	-11.98	-7.34
Leg A	Max. Vert	19	122.09	0.38	9.93
	Max. H_x	14	8.71	1.16	0.76
	Max. H_z	2	121.69	0.35	14.02
	Min. Vert	10	-95.69	-0.28	-11.48
	Min. H_x	7	-47.78	-1.21	-5.89
	Min. H_z	27	-89.66	-0.25	-15.00

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	26.10	0.00	0.00	-0.11	-15.12	0.00
Dead+Wind 0 deg - No Ice	26.10	-0.00	-21.43	-1565.66	-15.17	9.14
Dead+Wind 30 deg - No Ice	26.10	10.07	-17.44	-1278.65	-753.32	4.55
Dead+Wind 45 deg - No Ice	26.10	14.08	-14.08	-1033.52	-1048.57	1.99
Dead+Wind 60 deg - No Ice	26.10	17.06	-9.85	-723.43	-1267.99	-0.64
Dead+Wind 90 deg - No Ice	26.10	20.13	0.00	-0.11	-1491.49	-5.66
Dead+Wind 120 deg - No Ice	26.10	18.56	10.71	782.65	-1370.97	-9.80
Dead+Wind 135 deg - No Ice	26.10	14.08	14.08	1033.29	-1048.58	-9.93
Dead+Wind 150 deg - No Ice	26.10	10.07	17.44	1278.42	-753.34	-10.22
Dead+Wind 180 deg - No Ice	26.10	-0.00	19.70	1446.53	-15.17	-8.33
Dead+Wind 210 deg - No Ice	26.10	-10.07	17.44	1278.43	723.00	-4.55
Dead+Wind 225 deg - No Ice	26.10	-14.08	14.08	1033.30	1018.25	-1.99
Dead+Wind 240 deg - No Ice	26.10	-18.56	10.71	782.66	1340.64	0.66
Dead+Wind 270 deg - No Ice	26.10	-20.13	0.00	-0.12	1461.17	5.66
Dead+Wind 300 deg - No Ice	26.10	-17.06	-9.85	-723.45	1237.66	8.97
Dead+Wind 315 deg - No Ice	26.10	-14.08	-14.08	-1033.53	1018.23	9.92
Dead+Wind 330 deg - No Ice	26.10	-10.07	-17.44	-1278.66	722.99	10.22
Dead+Ice+Temp	40.09	-0.00	-0.00	2.80	-33.10	-0.00
Dead+Wind 0 deg+Ice+Temp	40.09	-0.00	-20.69	-1506.49	-33.22	8.92
Dead+Wind 30 deg+Ice+Temp	40.09	9.88	-17.12	-1249.37	-756.11	4.58
Dead+Wind 45 deg+Ice+Temp	40.09	13.87	-13.87	-1012.12	-1048.10	2.06
Dead+Wind 60 deg+Ice+Temp	40.09	16.85	-9.73	-709.57	-1267.04	-0.55
Dead+Wind 90 deg+Ice+Temp	40.09	19.77	0.00	2.81	-1479.05	-5.53
Dead+Wind 120 deg+Ice+Temp	40.09	17.92	10.34	757.41	-1340.27	-9.47
Dead+Wind 135 deg+Ice+Temp	40.09	13.87	13.87	1017.73	-1048.10	-9.82
Dead+Wind 150 deg+Ice+Temp	40.09	9.88	17.12	1254.98	-756.12	-10.11
Dead+Wind 180 deg+Ice+Temp	40.09	-0.00	19.46	1427.57	-33.18	-8.33
Dead+Wind 210 deg+Ice+Temp	40.09	-9.88	17.12	1254.99	689.77	-4.58
Dead+Wind 225 deg+Ice+Temp	40.09	-13.87	13.87	1017.71	981.84	-2.06
Dead+Wind 240 deg+Ice+Temp	40.09	-17.92	10.34	757.45	1273.92	0.56
Dead+Wind 270 deg+Ice+Temp	40.09	-19.77	0.00	2.79	1412.72	5.53
Dead+Wind 300 deg+Ice+Temp	40.09	-16.85	-9.73	-709.59	1200.70	8.89
Dead+Wind 315 deg+Ice+Temp	40.09	-13.87	-13.87	-1012.14	981.75	9.83

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 330 deg+Ice+Temp	40.09	-9.88	-17.12	-1249.38	689.77	10.11
Dead+Wind 0 deg - Service	26.10	-0.00	-8.37	-611.65	-15.16	3.57
Dead+Wind 30 deg - Service	26.10	3.93	-6.81	-499.54	-303.51	1.78
Dead+Wind 45 deg - Service	26.10	5.50	-5.50	-403.79	-418.84	0.78
Dead+Wind 60 deg - Service	26.10	6.66	-3.85	-282.65	-504.53	-0.25
Dead+Wind 90 deg - Service	26.10	7.86	0.00	-0.11	-591.85	-2.21
Dead+Wind 120 deg - Service	26.10	7.25	4.19	305.66	-544.77	-3.83
Dead+Wind 135 deg - Service	26.10	5.50	5.50	403.57	-418.84	-3.88
Dead+Wind 150 deg - Service	26.10	3.93	6.81	499.31	-303.51	-4.00
Dead+Wind 180 deg - Service	26.10	-0.00	7.70	564.96	-15.16	-3.25
Dead+Wind 210 deg - Service	26.10	-3.93	6.81	499.32	273.18	-1.78
Dead+Wind 225 deg - Service	26.10	-5.50	5.50	403.56	388.52	-0.78
Dead+Wind 240 deg - Service	26.10	-7.25	4.19	305.66	514.45	0.26
Dead+Wind 270 deg - Service	26.10	-7.86	0.00	-0.11	561.53	2.21
Dead+Wind 300 deg - Service	26.10	-6.66	-3.85	-282.65	474.21	3.50
Dead+Wind 315 deg - Service	26.10	-5.50	-5.50	-403.79	388.51	3.88
Dead+Wind 330 deg - Service	26.10	-3.93	-6.81	-499.54	273.18	4.00

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	-26.10	0.00	-0.00	26.10	-0.00	0.000%
2	0.00	-26.10	-21.43	0.00	26.10	21.43	0.002%
3	10.07	-26.10	-17.44	-10.07	26.10	17.44	0.002%
4	14.08	-26.10	-14.08	-14.08	26.10	14.08	0.002%
5	17.06	-26.10	-9.85	-17.06	26.10	9.85	0.000%
6	20.13	-26.10	0.00	-20.13	26.10	-0.00	0.002%
7	18.56	-26.10	10.71	-18.56	26.10	-10.71	0.002%
8	14.08	-26.10	14.08	-14.08	26.10	-14.08	0.002%
9	10.07	-26.10	17.44	-10.07	26.10	-17.44	0.002%
10	0.00	-26.10	19.70	0.00	26.10	-19.70	0.000%
11	-10.07	-26.10	17.44	10.07	26.10	-17.44	0.002%
12	-14.08	-26.10	14.08	14.08	26.10	-14.08	0.002%
13	-18.56	-26.10	10.71	18.56	26.10	-10.71	0.002%
14	-20.13	-26.10	0.00	20.13	26.10	-0.00	0.002%
15	-17.06	-26.10	-9.85	17.06	26.10	9.85	0.000%
16	-14.08	-26.10	-14.08	14.08	26.10	14.08	0.002%
17	-10.07	-26.10	-17.44	10.07	26.10	17.44	0.002%
18	0.00	-40.09	0.00	0.00	40.09	0.00	0.000%
19	0.00	-40.09	-20.69	0.00	40.09	20.69	0.000%
20	9.88	-40.09	-17.12	-9.88	40.09	17.12	0.000%
21	13.87	-40.09	-13.87	-13.87	40.09	13.87	0.000%
22	16.85	-40.09	-9.73	-16.85	40.09	9.73	0.000%
23	19.77	-40.09	0.00	-19.77	40.09	-0.00	0.000%
24	17.92	-40.09	10.34	-17.92	40.09	-10.34	0.000%
25	13.87	-40.09	13.87	-13.87	40.09	-13.87	0.000%
26	9.88	-40.09	17.12	-9.88	40.09	-17.12	0.000%
27	0.00	-40.09	19.46	0.00	40.09	-19.46	0.000%
28	-9.88	-40.09	17.12	9.88	40.09	-17.12	0.000%
29	-13.87	-40.09	13.87	13.87	40.09	-13.87	0.000%
30	-17.92	-40.09	10.34	17.92	40.09	-10.34	0.000%
31	-19.77	-40.09	0.00	19.77	40.09	-0.00	0.000%
32	-16.85	-40.09	-9.73	16.85	40.09	9.73	0.000%
33	-13.87	-40.09	-13.87	13.87	40.09	13.87	0.000%
34	-9.88	-40.09	-17.12	9.88	40.09	17.12	0.000%
35	0.00	-26.10	-8.37	0.00	26.10	8.37	0.001%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
36	3.93	-26.10	-6.81	-3.93	26.10	6.81	0.001%
37	5.50	-26.10	-5.50	-5.50	26.10	5.50	0.001%
38	6.67	-26.10	-3.85	-6.66	26.10	3.85	0.001%
39	7.86	-26.10	0.00	-7.86	26.10	-0.00	0.001%
40	7.25	-26.10	4.19	-7.25	26.10	-4.19	0.001%
41	5.50	-26.10	5.50	-5.50	26.10	-5.50	0.001%
42	3.93	-26.10	6.81	-3.93	26.10	-6.81	0.001%
43	0.00	-26.10	7.70	0.00	26.10	-7.70	0.001%
44	-3.93	-26.10	6.81	3.93	26.10	-6.81	0.001%
45	-5.50	-26.10	5.50	5.50	26.10	-5.50	0.001%
46	-7.25	-26.10	4.19	7.25	26.10	-4.19	0.001%
47	-7.86	-26.10	0.00	7.86	26.10	-0.00	0.001%
48	-6.67	-26.10	-3.85	6.66	26.10	3.85	0.001%
49	-5.50	-26.10	-5.50	5.50	26.10	5.50	0.001%
50	-3.93	-26.10	-6.81	3.93	26.10	6.81	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	8	0.00000001	0.00013307
3	Yes	8	0.00000001	0.00014334
4	Yes	8	0.00000001	0.00014958
5	Yes	9	0.00000001	0.00004449
6	Yes	8	0.00000001	0.00014302
7	Yes	8	0.00000001	0.00013294
8	Yes	8	0.00000001	0.00013629
9	Yes	8	0.00000001	0.00014294
10	Yes	9	0.00000001	0.00004452
11	Yes	8	0.00000001	0.00014332
12	Yes	8	0.00000001	0.00013652
13	Yes	8	0.00000001	0.00013293
14	Yes	8	0.00000001	0.00014299
15	Yes	9	0.00000001	0.00004448
16	Yes	8	0.00000001	0.00014930
17	Yes	8	0.00000001	0.00014291
18	Yes	6	0.00000001	0.00010016
19	Yes	9	0.00000001	0.00005952
20	Yes	9	0.00000001	0.00006250
21	Yes	9	0.00000001	0.00006432
22	Yes	9	0.00000001	0.00006496
23	Yes	9	0.00000001	0.00006229
24	Yes	9	0.00000001	0.00005945
25	Yes	9	0.00000001	0.00006030
26	Yes	9	0.00000001	0.00006224
27	Yes	9	0.00000001	0.00006499
28	Yes	9	0.00000001	0.00006245
29	Yes	9	0.00000001	0.00006044
30	Yes	9	0.00000001	0.00005939
31	Yes	9	0.00000001	0.00006216
32	Yes	9	0.00000001	0.00006482
33	Yes	9	0.00000001	0.00006406
34	Yes	9	0.00000001	0.00006216
35	Yes	8	0.00000001	0.00013509
36	Yes	8	0.00000001	0.00013866

37	Yes	8	0.00000001	0.00014096
38	Yes	8	0.00000001	0.00014175
39	Yes	8	0.00000001	0.00013849
40	Yes	8	0.00000001	0.00013516
41	Yes	8	0.00000001	0.00013579
42	Yes	8	0.00000001	0.00013823
43	Yes	8	0.00000001	0.00014155
44	Yes	8	0.00000001	0.00013834
45	Yes	8	0.00000001	0.00013558
46	Yes	8	0.00000001	0.00013473
47	Yes	8	0.00000001	0.00013787
48	Yes	8	0.00000001	0.00014115
49	Yes	8	0.00000001	0.00014028
50	Yes	8	0.00000001	0.00013794

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	2.175	40	0.1148	0.0138
T2	120 - 100	1.689	40	0.1137	0.0131
T3	100 - 80	1.207	40	0.1046	0.0116
T4	80 - 60	0.786	40	0.0868	0.0096
T5	60 - 40	0.453	40	0.0648	0.0068
T6	40 - 20	0.205	40	0.0445	0.0039
T7	20 - 0	0.056	40	0.0196	0.0019

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	14' Dipole	40	2.175	0.1148	0.0138	Inf
143.00	7' Whip	40	2.175	0.1148	0.0138	Inf
138.00	3' Stand-off	40	2.126	0.1149	0.0138	Inf
130.00	20' 4-Bay Dipole	40	1.932	0.1149	0.0135	901898
120.00	APX16PV-16PVL-C w/ mount	40	1.689	0.1137	0.0131	671557
110.00	APXV18-206517S-C w/ mounting hardware	40	1.444	0.1103	0.0124	164984

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	140 - 120	5.485	7	0.2892	0.0359
T2	120 - 100	4.260	7	0.2863	0.0335
T3	100 - 80	3.047	7	0.2633	0.0298
T4	80 - 60	1.985	7	0.2187	0.0246
T5	60 - 40	1.146	7	0.1634	0.0175

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T6	40 - 20	0.520	7	0.1122	0.0101
T7	20 - 0	0.143	7	0.0494	0.0049

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	14' Dipole	7	5.485	0.2892	0.0359	738291
143.00	7' Whip	7	5.485	0.2892	0.0359	738291
138.00	3' Stand-off	7	5.363	0.2893	0.0356	738291
130.00	20' 4-Bay Dipole	7	4.874	0.2893	0.0348	369142
120.00	APX16PV-16PVL-C w/ mount	7	4.260	0.2863	0.0335	279613
110.00	APXV18-206517S-C w/ mounting hardware	7	3.644	0.2777	0.0319	65077

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	140	Leg	A325N	0.6250	6	0.02	13.50	0.001 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	0.78	4.08	0.191 ✓	1.333	Member Bearing
		Top Girt	A325N	0.6250	1	0.16	6.44	0.025 ✓	1.333	Bolt Shear
T2	120	Leg	A325N	0.6250	6	0.66	13.50	0.049 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	2.62	6.44	0.407 ✓	1.333	Bolt Shear
T3	100	Leg	A325N	0.7500	6	3.09	19.44	0.159 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3.90	6.44	0.605 ✓	1.333	Bolt Shear
T4	80	Leg	A325N	0.8750	6	6.64	26.46	0.251 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3.01	6.44	0.468 ✓	1.333	Bolt Shear
T5	60	Leg	A325N	1.0000	6	9.20	34.56	0.266 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.6250	1	3.46	6.44	0.537 ✓	1.333	Bolt Shear
T6	40	Leg	A325N	1.0000	6	11.90	34.56	0.344 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	5.17	20.39	0.253 ✓	1.333	Member Bearing
T7	20	Leg	A325N	1.0000	6	14.36	34.56	0.416 ✓	1.333	Bolt Tension
		Diagonal	A325N	1.2500	1	7.37	20.39	0.361 ✓	1.333	Member Bearing

Compression Checks

Leg Design Data (Compression)

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 $\frac{P}{P_a}$
T1	140 - 120	2 1/4	20.00	5.00	106.7 K=1.00	13.124	3.9761	-3.76	52.18	0.072 ✓
T2	120 - 100	2 1/4	20.00	5.00	106.7 K=1.00	13.124	3.9761	-19.94	52.18	0.382 ✓
T3	100 - 80	2 3/4	20.00	5.00	87.3 K=1.00	17.519	5.9396	-44.22	104.05	0.425 ✓
T4	80 - 60	3	20.03	5.01	80.1 K=1.00	18.986	7.0686	-64.98	134.20	0.484 ✓
T5	60 - 40	3 1/4	20.03	5.01	74.0 K=1.00	20.191	8.2958	-84.20	167.50	0.503 ✓
T6	40 - 20	Pirod 105218	20.03	10.02	32.4 K=1.00	26.848	7.2158	-101.23	193.73	0.523 ✓
T7	20 - 0	Pirod 105219	20.03	10.02	28.4 K=1.00	27.351	9.4248	-121.86	257.78	0.473 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T6	40 - 20	0.5	1.46	119.0	10.423	0.1963	0.59	2.29	0.258 ✓
T7	20 - 0	0.625	1.45	94.4	13.671	0.3068	0.98	4.69	0.208 ✓

Diagonal Design Data (Compression)

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 $\frac{P}{P_a}$
T1	140 - 120	L1 3/4x1 3/4x1/8	9.43	4.61	159.4 K=1.00	5.878	0.4219	-0.82	2.48	0.330 ✓
T2	120 - 100	L1 3/4x1 3/4x1/4	9.43	4.61	161.9 K=1.00	5.695	0.8125	-2.62	4.63	0.566 ✓
T3	100 - 80	L2 1/2x2 1/2x5/16	9.43	4.58	112.4 K=1.00	11.341	1.4600	-3.90	16.56	0.235 ✓
T4	80 - 60	L2 1/2x2 1/2x5/16	10.96	5.48	134.5 K=1.00	8.260	1.4600	-2.96	12.06	0.245 ✓
T5	60 - 40	L2 1/2x2 1/2x5/16	12.77	6.37	156.4 K=1.00	6.104	1.4600	-3.33	8.91	0.373 ✓
T6	40 - 20	L3x3x5/16	16.80	8.09	164.8 K=1.00	5.496	1.7800	-4.63	9.78	0.473 ✓
T7	20 - 0	L3x3x5/16	17.62	8.52	173.5 K=1.00	4.960	1.7800	-6.05	8.83	0.685 ✓

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 $\frac{P}{P_a}$
										✓

Top Girt Design Data (Compression)

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 $\frac{P}{P_a}$
T1	140 - 120	L3x3x3/8	8.00	7.81	159.7 K=1.00	5.854	2.1100	-0.16	12.35	0.013 ✓

Tension Checks

Leg Design Data (Tension)

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 $\frac{P}{P_a}$
T1	140 - 120	2 1/4	20.00	5.00	106.7	30.000	3.9761	2.08	119.28	0.017 ✓
T2	120 - 100	2 1/4	20.00	5.00	106.7	30.000	3.9761	14.08	119.28	0.118 ✓
T3	100 - 80	2 3/4	20.00	5.00	87.3	30.000	5.9396	34.78	178.19	0.195 ✓
T4	80 - 60	3	20.03	5.01	80.1	30.000	7.0686	51.49	212.06	0.243 ✓
T5	60 - 40	3 1/4	20.03	5.01	74.0	30.000	8.2958	66.48	248.87	0.267 ✓
T6	40 - 20	Pirod 105218	20.03	10.02	32.4	30.000	7.2158	78.67	216.47	0.363 ✓
T7	20 - 0	Pirod 105219	20.03	10.02	28.4	30.000	9.4248	92.74	282.74	0.328 ✓

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	F_a ksi	A in^2	Actual V K	Allow. V_a K	Stress Ratio
T6	40 - 20	0.5	1.46	119.0	10.423	0.1963	0.59	2.29	0.258 ✓
T7	20 - 0	0.625	1.45	94.4	13.671	0.3068	0.98	4.69	0.208 ✓

Diagonal Design Data (Tension)

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 $\frac{P}{P_a}$
T1	140 - 120	L1 3/4x1 3/4x1/8	9.43	4.61	101.3	29.000	0.2461	0.78	7.14	0.109 ✓
T2	120 - 100	L1 3/4x1 3/4x1/4	9.43	4.61	104.5	29.000	0.4688	2.59	13.59	0.190 ✓
T3	100 - 80	L2 1/2x2 1/2x5/16	9.43	4.58	72.3	29.000	0.9192	3.80	26.66	0.143 ✓
T4	80 - 60	L2 1/2x2 1/2x5/16	10.96	5.48	86.4	29.000	0.9192	3.01	26.66	0.113 ✓
T5	60 - 40	L2 1/2x2 1/2x5/16	12.77	6.37	100.5	29.000	0.9192	3.46	26.66	0.130 ✓
T6	40 - 20	L3x3x5/16	16.80	8.09	105.3	29.000	1.0127	5.17	29.37	0.176 ✓
T7	20 - 0	L3x3x5/16	18.45	8.93	116.2	21.600	1.7800	7.37	38.45	0.192 ✓

Top Girt Design Data (Tension)

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 $\frac{P}{P_a}$
T1	140 - 120	L3x3x3/8	8.00	7.81	102.7	29.000	1.3716	0.12	39.78	0.003 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	140 - 120	Leg	2 1/4	3	-3.76	69.56	5.4	Pass
		Diagonal	L1 3/4x1 3/4x1/8	12	-0.82	3.31	24.7	Pass
		Top Girt	L3x3x3/8	5	-0.16	16.47	1.0	Pass
							1.9 (b)	
T2	120 - 100	Leg	2 1/4	32	-19.94	69.56	28.7	Pass
		Diagonal	L1 3/4x1 3/4x1/4	37	-2.62	6.17	42.5	Pass
T3	100 - 80	Leg	2 3/4	59	-44.22	138.70	31.9	Pass
		Diagonal	L2 1/2x2 1/2x5/16	63	-3.90	22.07	17.7	Pass
							45.4 (b)	
T4	80 - 60	Leg	3	86	-64.98	178.89	36.3	Pass
		Diagonal	L2 1/2x2 1/2x5/16	91	-2.96	16.08	18.4	Pass
							35.1 (b)	
T5	60 - 40	Leg	3 1/4	113	-84.20	223.28	37.7	Pass
		Diagonal	L2 1/2x2 1/2x5/16	118	-3.33	11.88	28.0	Pass
							40.3 (b)	
T6	40 - 20	Leg	Pirod 105218	140	-101.23	258.24	39.2	Pass
		Diagonal	L3x3x5/16	145	-4.63	13.04	35.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T7	20 - 0	Leg	Pirod 105219	155	-121.86	343.62	35.5	Pass
		Diagonal	L3x3x5/16	166	-6.05	11.77	51.4	Pass
							Summary	
						Leg (T6)	39.2	Pass
						Diagonal (T7)	51.4	Pass
						Top Girt (T1)	1.9	Pass
						Bolt Checks	45.4	Pass
						RATING =	**51.4**	**Pass**

ANCHOR BOLT ANALYSIS

ANCHOR BOLT ANALYSIS

Input Data

Max Pier Reactions:

Uplift:	Uplift := 97·kips	*user input*
Shear:	Shear := 15·kips	*user input*
Compression:	Compression := 124·kips	*user input*

Anchor Bolt Data:

Use ASTM A687

Number of Anchor Bolts = N	N := 6	*user input*	
Bolt Ultimate Strength:	F_u := 150·ksi	*user input*	
Bolt Yield Strength:	Fy := 105·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1.25in	*user input*	
Threads per Inch:	n := 7	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4}\cdot D^2 \qquad A_g = 1.227\cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2 \qquad A_n = 0.969\cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.333\cdot\left(0.33\cdot A_g\cdot F_u\right) \qquad AllowableTension = 81.0\cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.333\cdot\left(0.60\cdot A_n\cdot Fy\right) \qquad F_{net.area} = 81.4\cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 16.2\cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.20$$

$$Condition1 := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed"\right)$$

Condition1 = "OK"

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 1.2 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 0.5 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 5.8 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed"\right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.2$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed"\right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.1$$

Condition3 = "OK"

FOUNDATION ANALYSIS

URS

Job	140' Lattice Tower - East Hartford, CT	Project No.	PCI-077	Page	of
Description	Foundation Analysis	Computed by	KAB	Sheet 1	of 10
		Checked by		Date	06/09/09

PIER AND MAT FOUNDATION ANALYSIS - 3 PIERS

TOWER FORCES:

Moment Caused by Tower	$M_t := 1579 \cdot kip \cdot ft$
Shear at Base of Tower	$S_t := 21 \cdot kip$
Max Compressive Force	$C_t := 124 \cdot kip$
Max Uplift	$U_t := 97 \cdot kip$
Height of Tower	$H_t := 140 \cdot ft$
Width of Tower at Base	$W_t := 16 \cdot ft$
Weight of Tower	$WT_t := 1.0 \cdot kip$

NOTE: Weight of Tower is incorporated into the other loads listed above and is therefore set equal to one for programming.

FOOTING DIMENSIONS:

Width of Footing	$W_f := 24.5 \cdot ft$
Overall Depth of Footing	$D_f := 6.0 ft$
Length of Pier	$L_p := 3.5 \cdot ft$
Extension of Pier Above Grade	$L_{pag} := 0.5 \cdot ft$
Diameter of Pier	$d_p := 4.0 \cdot ft$
Thickness of Footing	$T_f := 3.0 \cdot ft$
Reinforcement Cover:	$Cvr := 3 in$

MATERIAL PROPERTIES:

Compressive Strength of Concrete	$fc := 3000 \cdot psi$	Unit Weight of Soil	$\gamma_{soil} := 125 \cdot pcf$
Yield Strength of Steel Reinforcement	$fy := 60000 \cdot psi$	Unit Weight of Concrete	$\gamma_{conc} := 150 \cdot pcf$
Internal Friction Angle of Soil	$\phi_s := 35 \cdot deg$	Depth to Neglect	$n := 1 \cdot ft$
Allowable Bearing Capacity	$q_s := 5000 \cdot psf$	Cohesion of Clay Type Soil Note: Use 0 for Sandy Soil	$c := 0 \cdot ksf$

Coefficient of Lateral Soil Pressure: $K_p := \frac{1 + \sin(\phi_s)}{1 - \sin(\phi_s)}$ $K_p = 3.6902$

Is foundation subject to bouyancy (Yes=1/N=0): $Bouyancy := 0$

What is Position of Center of Tower with respect to Center of Pad? 1=Offset 2=Not Offset $Pos_{tower} := 1$

Adjusted Unit Weights: $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc})$ $\gamma_c = 150 \cdot pcf$

$\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil})$ $\gamma_s = 125 \cdot pcf$

STEEL REINFORCING:

PIER REINFORCEMENT:

Bar Size	$BSpier := 8$	Bar Diameter	$d_{bpier} := 1.000 \cdot in$
Number of Bars	$NBpier := 16$	Bar Area	$A_{bpier} := 0.790 \cdot in^2$

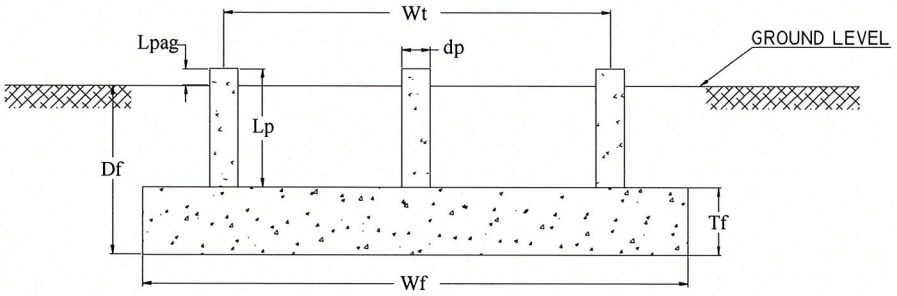
PAD REINFORCEMENT:

Bar Size	$BS_{pad} := 9$	Bar Diameter	$d_{bpad} := 1.128 \cdot in$
Number of Bars	$NB_{pad} := 27$	Bar Area	$A_{bpad} := 1.000 \cdot in^2$

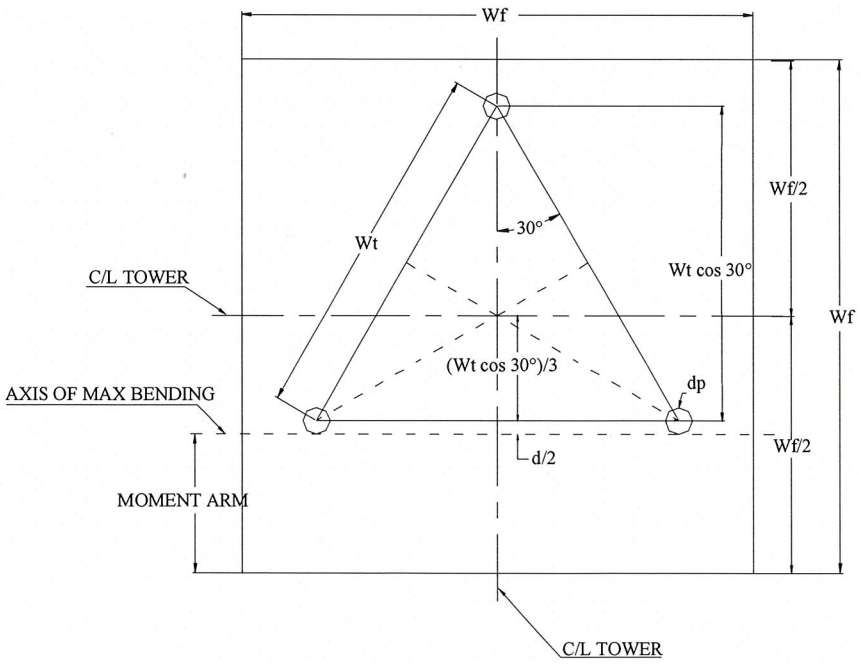
URS

Job	140' Lattice Tower - East Hartford, CT	Project No.	PCI-077	Page	of
Description	Foundation Analysis	Computed by	KAB	Sheet 2	of 10
		Checked by		Date 06/09/09	
				Date	

FOUNDATION OVERVIEW



ELEVATION



PLAN

STABILITY OF FOOTING

Factor of Safety Req'd: $FS_{req} := 2.0$

Passive Pressure:

$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p}$ $\quad P_{pn} = 0.4613 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p}$ $\quad P_{pt} = 1.3838 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}]$ $\quad P_{top} = 1.3838 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p}$ $\quad P_{bot} = 2.7676 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2}$ $\quad P_{ave} = 2.0757 \cdot ksf$

Shear:

$T_{pp} := if[n < (D_f - T_f), T_f, (D_f - n)]$ $\quad T_{pp} = 3 \cdot ft$

$A_{pp} := W_f \cdot T_{pp}$ $\quad A_{pp} = 73.5 \cdot ft^2$

Ultimate Shear:

$S_u := P_{ave} \cdot A_{pp}$ $\quad S_u = 152.5656 \cdot kip$

Weight of Concrete Pad:

$WT_c := (W_f^2 \cdot T_f) \cdot \gamma_c$ $\quad WT_c = 270.1125 \cdot kip$

Weight of Soil above Footing:

$WT_{s1} := W_f^2 (|D_f - T_f - n|) \cdot \gamma_s$ $\quad WT_{s1} = 150.0625 \cdot kip$

Weight of Soil Wedge at back face:

$WT_{s2} := \left[\frac{(D_f - n)^2 \cdot \tan(\phi_s)}{2} \cdot W_f \right] \cdot \gamma_s$ $\quad WT_{s2} = 26.8048 \cdot kip$

Distance to center of Tower Leg from Edge of Footing:

$X_{t1} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot deg)}{2}$ $\quad X_{t2} := \frac{W_f}{2} - \frac{W_t \cdot \cos(30 \cdot deg)}{3}$

$X_t := if(Pos_{tower} = 1, X_{t1}, X_{t2})$ $\quad X_t = 5.3218 \cdot ft$

Additional Offset of Footing:

$X_{off1} := \frac{W_f}{2} - \left(\frac{W_t \cdot \cos(30 \cdot deg)}{3} + X_t \right)$ $\quad X_{off2} := 0$

$X_{off} := if(Pos_{tower} = 1, X_{off1}, X_{off2})$ $\quad X_{off} = 2.3094 \cdot ft$

Resisting Moment:

$M_r := (WT_c + WT_{s1}) \cdot \frac{W_f}{2} + WT_t \cdot \left(\frac{W_f}{2} - X_{off} \right) + S_u \cdot \frac{T_{pp}}{3} + WT_{s2} \cdot \left(W_f + \frac{T_{pp} \cdot \tan(\phi_s)}{3} \right)$

$M_r = 5985.1369 \cdot kip \cdot ft$

Overturning Moment:

$M_{ot} := M_t + S_t \cdot (L_p + T_f) + WT_t \cdot X_{off}$ $\quad M_{ot} = 1717.8094 \cdot kip \cdot ft$

Factor of Safety:

$FS := \frac{M_r}{M_{ot}}$ $\quad FS = 3.48$

$SafetyCheck := if(FS > FS_{req}, "Okay", "No Good")$ $\quad SafetyCheck = "Okay"$

BEARING PRESSURE CHECK:

Pressure Applied:

$LOAD_{tot} := WT_c + WT_{s1} + WT_t$ $\quad LOAD_{tot} = 421.175 \cdot kip$

$A_{mat} := W_f^2$ $\quad A_{mat} = 600.25 \cdot ft^2$

$S := \frac{W_f^3}{6}$ $\quad S = 2451.0208 \cdot ft^3$

$P_{max} := \frac{LOAD_{tot}}{A_{mat}} + \frac{M_{ot}}{S}$ $\quad P_{max} = 1.4025 \cdot ksf$

$P_{min} := \frac{LOAD_{tot}}{A_{mat}} - \frac{M_{ot}}{S}$ $\quad P_{min} = 0.0008 \cdot ksf$

$MaxPressure := if(P_{max} < q_s, "Okay", "No Good")$ $\quad MaxPressure = "Okay"$

$MinPressure := if[(P_{min} \geq 0) \cdot (P_{min} < q_s), "Okay", "No Good"]$ $\quad MinPressure = "Okay"$

Distance to Resultant of Pressure Distribution:

$$X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3}$$ $\quad X_p = 8.1714 \cdot ft$

Distance to Kern:

$X_k := \frac{W_f}{3}$ $\quad X_k = 8.1667 \cdot ft$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity:

$e := \frac{M_{ot}}{LOAD_{tot}}$ $\quad e = 4.0786$

Adjusted Soil Pressure:

$$q_a := \frac{2 \cdot LOAD_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)}$$ $\quad q_a = 1.4025 \cdot ksf$

Revised Maximum:

$q_{max} := if(X_p < X_k, q_a, P_{max})$ $\quad q_{max} = 1.4025 \cdot kip$

$PressureCheck := if(q_{max} < q_s, "Okay", "No Good")$ $\quad PressureCheck = "Okay"$

CHECK PUNCHING AND BEAM SHEAR:

Load Factor: (EIA 3.1.1) $LF := \text{if}\left[H_t \le 700\cdot ft, 1.333, \text{if}\left[H_t \ge 1200, 1.7, 1.333 + \left(\frac{H_t - 700}{1200 - 700}\right)\cdot 0.4\right]\right]$ $LF = 1.333$

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := .85$ (ACI 9.3.2.3)

$d := T_f - Cvr - .5\cdot in$ $d = 32.5\cdot in$

Factored load: $FL := LF\cdot\frac{C_t}{W_f^2}$ $FL = 0.2754\cdot ksf$

$V_{req} := \frac{FL\cdot\left(X_t - 0.5\cdot d_p - d\right)\cdot W_f}{\phi_c}$ $V_{req} = 4.8692\cdot kip$

ACI 11.3.1.1 $V_{Avail} := 2\cdot\sqrt{f'c\cdot psi}\cdot W_f\cdot d$ $V_{Avail} = 1046.6978\cdot kip$

$BeamShearCheck := \text{if}\left(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"}\right)$ $BeamShearCheck = \text{"Okay"}$

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.12.2.1)

$b_o := \left(d_p + d\right)\cdot\pi$ $b_o = 21.0749\cdot ft$

$V_{req} := FL\cdot\frac{W_f^2 - \left(d_p + d\right)^2\cdot\frac{\pi}{4}}{\phi_c}$ $V_{req} = 183.0108\cdot kip$

$V_{Avail} := 4\cdot\sqrt{f'c\cdot psi}\cdot b_o\cdot d$ $V_{Avail} = 1800.7347\cdot kip$

$PunchingShearCheck := \text{if}\left(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"}\right)$ $PunchingShearCheck = \text{"Okay"}$

TENSILE REINFORCEMENT IN PAD:

$\phi_m := .90$ per ACI 9.3.2.2

Applied Moments:

$$M_{nT} := LF\cdot\left[U_t\cdot\left(W_t\cdot\sin(60\cdot deg) - \frac{d_p}{2}\right) + S_t\cdot\left(D_f + L_{pag}\right)\right] - WT_t\cdot X_{off}$$

$$M_{nS} := -1\cdot\left[\frac{1}{2}\cdot\left(\frac{W_f}{2} + \frac{W_t}{3}\cdot\cos(30\cdot deg) - \frac{d_p}{2}\right)^2\cdot W_t\cdot\left[\gamma_s\cdot\left(T_{pp} - T_f\right)\right] + WT_{s2}\cdot\left[\frac{W_f}{2} + \frac{W_t}{3}\cdot\cos(30\cdot deg) - \frac{d_p}{2} + \left(D_f - n\right)\cdot\tan\left(\phi_s\right)\right]\right]$$

$$M_{nC} := -1\cdot\left[\frac{1}{2}\cdot\left(\frac{W_f}{2} + \frac{W_t}{3}\cdot\cos(30\cdot deg) - \frac{d_p}{2}\right)^2\cdot W_t\cdot\left(\gamma_c\cdot T_f\right)\right]$$

Design Moment: $M_n := \dfrac{M_{nT} + M_{nS} + M_{nC}}{\phi_m}$ $M_n = 471.5527\cdot kips\cdot ft$

Required Reinforcement:

ACI 10.2.7.3 $\beta := \text{if}\left[f'c \le 4000\cdot psi, .85, \text{if}\left[f'c \ge 8000\cdot psi, .65, .85 - \left(\dfrac{\frac{f'c}{psi} - 4000}{1000}\right)\cdot .05\right]\right]$ $\beta = 0.85$

Effective Width: $b_{eff} := W_t\cdot\cos(30\cdot deg) + d_p$ $b_{eff} = 214.2769\cdot in$

$A_s := \dfrac{M_n}{\phi_m\cdot fy\cdot d}$ $A_s = 3.2243\cdot in^2$

$a := \dfrac{A_s\cdot fy}{\beta\cdot f'c\cdot b_{eff}}$ $a = 0.3541\cdot in$

$A_s := \dfrac{M_n}{fy\cdot\left(d - \frac{a}{2}\right)}$ $A_s = 2.9178\cdot in^2$

$\rho := \dfrac{A_s}{b_{eff}\, d}$ $\rho = 0.0004$

Temperature and Shrinkage: (ACI 7.12.2.1b)

$\rho_{sh} := if(fy \geq 60000 \cdot psi, 0.0018, 0.0020)$ $\rho_{sh} = 0.0018$

Area Required: $As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh} \cdot \frac{b_{eff}}{2} \cdot d\right)$ $As = 6.2676 \cdot in^2$

Area Provided: $As_{prov} := A_{bpad} \cdot NB_{pad}$ $As_{prov} = 27 \cdot in^2$

$PadReinforcement := if(As_{prov} > As, "Okay", "No Good")$ $PadReinforcement = "Okay"$

DEVELOPMENT LENGTH OF PAD REINFORCEMENT:

TENSION (ACI 12.2.3)

Bar Spacing: $B_{sPad} := \frac{W_f - 2 \cdot Cvr - NB_{pad} \cdot d_{bpad}}{NB_{pad} - 1}$ $B_{sPad} = 9.9055 \cdot in$

Development Length Factors:

Reinforcement Location Factor	$\alpha := 1.0$
Coating Factor	$\beta := 1.0$
Concrete strength Factor	$\lambda := 1.0$
Reinforcement Size Factor	$\gamma := 1.0$

Spacing or Cover Dimension: $c := if\left(Cvr < \frac{B_{sPad}}{2}, Cvr, \frac{B_{sPad}}{2}\right)$ $c = 3 \cdot in$

Transverse Reinforcement Inde As allowed by ACI 12.2.4 $k_{tr} := 0$

Development Length: $L_{dbt} := \frac{3}{40} \cdot \frac{fy}{\sqrt{f'c \cdot psi}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{\frac{c + k_{tr}}{d_{bpad}}} \cdot d_{bpad}$ $L_{dbt} = 34.8457 \cdot in$

$L_{dbmin} := 12 \cdot in$

Minimum Development Length: (ACI 12.2.1) $L_{dbtCheck} := if(L_{dbt} \geq L_{dbmin}, "Use L.dbt", "Use L.dbmin")$ $L_{dbtCheck} = "Use L.dbt"$

Available Length in Pad: $L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr$ $L_{Pad} = 48 \cdot in$

$LpadTension := if(L_{Pad} > L_{dbt}, "Okay", "No Good")$ $LpadTension = "Okay"$

REINFORCEMENT IN PIER:

Pier Area:

$$A_p := \frac{\pi \cdot d_p^{\,2}}{4} \qquad A_p = 1809.5574 \cdot in^2$$

(ACI 10.8.4 and 10.9.1)

$$A_{smin} := 0.01 \cdot 0.5 \cdot A_p \qquad A_{smin} = 9.0478 \cdot in^2$$

$$A_{sprov} := NBpier \cdot A_{bpier} \qquad A_{sprov} = 12.64 \cdot in^2$$

$$SteelAreaCheck := if(A_{sprov} > A_{smin}, "Okay", "No Good") \qquad SteelAreaCheck = "Okay"$$

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

Bar Spacing In Pier:

$$B_{sPier} := \frac{d_p \cdot \pi}{NBpier} - d_{bpier} \qquad B_{sPier} = 8.4248 \cdot in$$

Diamter of Reinforcement Cage:

$$Diam_{cage} := d_p - 2 \cdot Cvr \qquad Diam_{cage} = 42 \cdot in$$

Maximum Moment in Pier:

$$M_p := (S_t \cdot L_p) \cdot LF \qquad M_p = 1175.706 \cdot kips \cdot in$$

Pier Check evaluated from outside program and results are listed below;

(defined variables)

$$(f_c \;\; f_y \;\; cl \;\; Spiral) = (3 \;\; 60 \;\; 4 \;\; 0)$$

The required input is column diameter in inches, number of reinforcing bars, bar size number, factored axial load in kips and moment in kip inches:

$$(D \;\; N \;\; n \;\; P_u \;\; M_{xu}) := (48 \;\; 16 \;\; 8 \;\; 41.9 \;\; 2554)$$

Clears any previous output:

$$(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho) := (0 \;\; 0 \;\; 0 \;\; 0)$$

$$(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho) := \phi P'_n(D, N, n, P_u, M_{xu})^T$$

The Output is given as useable axial load in kips, moment capacity in kip inches, splicing stress in ksi, and reinforcement ratio:

$$(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho) = (251.5849 \;\; 15335.2733 \;\; -60 \;\; 0.007)$$

Column size and reinforcement may be changed to match capacity to the applied load.

$$AxialLoadCheck := if(\phi P_n \geq P_u, "Okay", "No Good") \qquad AxialLoadCheck = "Okay"$$

$$BendingCheck := if(\phi M_{xn} \geq M_{xu}, "Okay", "No Good") \qquad BendingCheck = "Okay"$$

DEVELOPMENT LENGTH OF PIER REINFORCEMENT:

TENSION (ACI 12.2.3)

Spacing and Cover: $Cvr = 3\cdot in$ $B_{sPier} = 8.4248\cdot in$

Factors for development:

Reinforcement Location Factor	$\alpha := 1.0$
Coating Factor	$\beta := 1.0$
Concrete strength Factor	$\lambda := 1.0$
Reinforcement Size Factor	$\gamma := 1.0$

Spacing or Cover Dimension: $c := if\left(Cvr < \frac{B_{sPier}}{2}, Cvr, \frac{B_{sPier}}{2}\right)$ $c = 3\cdot in$

Transverse Reinforcement: As allowed by ACI 12.2.4 $k_{tr} := 0$

$$L_{dbt} := \frac{3}{40}\cdot\frac{fy}{\sqrt{f'c\cdot psi}}\cdot\frac{\alpha\cdot\beta\cdot\gamma\cdot\lambda}{\frac{c+k_{tr}}{d_{bpier}}}\cdot d_{bpier} \qquad L_{dbt} = 27.3861\cdot in$$

Minimum Development Length: (ACI 12.2.1) $L_{dbmin} := 12\cdot in$

$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, "Use\ L.dbt", "Use\ L.dbmin"\right)$ $L_{dbtCheck} = "Use\ L.dbt"$

COMPRESSION: (ACI 12.3.2)

$$L_{dbc1} := \frac{.02\cdot d_{bpier}\cdot fy}{\sqrt{f'c\cdot psi}} \qquad L_{dbc1} = 21.9089\cdot in$$

$L_{dbmin} := 0.0003\cdot\frac{in^2}{lb}\cdot\left(d_{bpier}\cdot fy\right)$ $L_{dbmin} = 18\cdot in$

$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right)$ $L_{dbc} = 21.9089\cdot in$

URS

Job	140' Lattice Tower - East Hartford, CT	Project No.	PCI-077	Page	of
Description	Foundation Analysis	Computed by	KAB	Sheet 10	of 10
		Checked by		Date	06/09/09
				Date	

Available Length in Pier:

$L_{pier} := L_p - 3 \cdot in$ $\quad L_{pier} = 39 \cdot in$

$L_{piertension} := if(L_{pier} > L_{dbt}, "Okay", "No Good")$ $\quad L_{piertension} = "Okay"$

$L_{piercompression} := if(L_{pier} > L_{dbc}, "Okay", "No Good")$ $\quad L_{piercompression} = "Okay"$

Available Length in Pad:

$L_{pad} := T_f - 3 \cdot in$ $\quad L_{pad} = 33 \cdot in$

$L_{padtension} := if(L_{pad} > L_{dbt}, "Okay", "No Good")$ $\quad L_{padtension} = "Okay"$

$L_{padcompression} := if(L_{pad} > L_{dbc}, "Okay", "No Good")$ $\quad L_{padcompression} = "Okay"$

NOTE: Anchor bolts and plate provided, OK