EM-SPRINT-NEXTEL-064-130214

439-455 Homestead Ave.

Hartford

Alcatel·Lucent

1 Robbins Road
Westford, MA 01886

July 9, 2014

State of Connecticut
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: Notification of Construction Completion on telecommunication facilities

To whom it may concern:

Alcatel Lucent hereby acknowledges that the list of attached sites have completed construction per the approval granted on the specified date. Please advise if further information is needed..

Very truly yours,

Martha Powers

Martha Powers
Lead Development Manager
Alcatel-Lucent
Sprint Vision Project
1 Robbins Road
Westford, MA 01886

Cc: FST, Siterra

EM/TS #	Address	Town	Sprint ID	Decision Date
EM-SPRINT-062-130912	1065 Wintergreen Avenue	Hamden	CT03XC003	10/15/2013
EM-SPRINT-NEXTEL-060-130118	10 Tanner Marsh Road	Guilford	CT03XC022	2/14/2013
EM-SPRINT-004-130822	181 Montevideo Road	Avon	CT03XC053	9/6/2013
EM-SPRINT-NEXTEL-155-130214A	1358 New Britain Ave.	West Hartford	CT03XC057	3/1/2013
EM-SPRINT-NEXTEL-164-130201	440 Hayden Station Road	Windsor	CT03XC065	3/8/2013
EM-SPRINT-NEXTEL-132-130201	59 McGuire Road	South Windsor	CT03XC066	3/1/2013
EM-SPRINT-NEXTEL-054-130201	299 Paxton Way	Glastonbury	CT03XC081	3/1/2013
EM-SPRINT-NEXTEL-094-130214E	36 Prospect Street	Newington	CT03XC084	3/1/2013
EM-SPRINT-110-130725	10 Sparks Street	Plainville	CT03XC086	8/8/2013
EM-SPRINT-007-130314	260 Beckley Road	Kensington	CT03XC088	4/5/2013
EM-SPRINT-NEXTEL-155-130201	570 New Park Avenue	West Hartford	CT03XC091	3/1/2013
EM-SPRINT-NEXTEL-106-130201	430 Middlesex Turnpike	Old Saybrook	CT03XC102	3/1/2013
EM-SPRINT-NEXTEL-105-130201	30 Short Hills Road	Old Lyme	CT03XC104	3/1/2013
EM-SPRINT-NEXTEL-152-130201	41 Manitock Hill Road	Waterford	CT03XC105	3/1/2013
EM-SPRINT-NEXTEL-045-130201	93 Roxbury Road	East Lyme	CT03XC110	3/1/2013
EM-SPRINT-152-130114	45R Fargo Road	Waterford	CT03XC112	2/14/2013
EM-SPRINT-NEXTEL-027-130201	48 Cow Hill Road	Clinton	CT03XC156	3/1/2013
EM-SPRINT-NEXTEL-082-130201	238 Meridan Road	Middlefield	CT03XC160	3/8/2013
EM-SPRINT-047-130109	160 Plantation Road	East Windsor	CT03XC202	2/7/2013
EM-SPRINT-NEXTEL-077-130214	53 Slater Street	Manchester	CT03XC211	3/1/2013
EM-SPRINT-142-130109	497 Old Post Road	Tolland	CT03XC212	2/7/2013
EM-SPRINT-NEXTEL-042-130222	94 East High Street	East Hampton	CT03XC335	3/8/2013
EM-SPRINT-057-121226	Butternut Hollow Road	Greenwich	CT03XC343	1/11/2013
EM-SPRINT-158-130213	515 Boston Post Road	Westport	CT03XC355	3/1/2013
EM-SPRINT-046-130402	206 Everett Road	Easton	CT03XC362	4/19/2013
EM-SPRINT-085-130322	474 MAIN STREET	MONROE	CT03XC365	4/5/2013
EM-SPRINT-086-131011	57 Cook Drive	Montville	CT03XC365	10/25/2013
EM-SPRINT-118-130322	76 EAST RIDGE	RIDGEFIELD	CT03XC370	4/5/2013
EM-SPRINT-097-131230	20 Barnabas Road	Newtown	CT03XC383	1/21/2014
EM-SPRINT-051-130207	3965 Congress Street	Fairfield	CT03XC385	3/1/2013
EM-SPRINT-NEXTEL-094-130214A	123 Costello Road	Newington	CT23XC555	3/1/2013
EM-SPRINT-119-131008	699 Old Main Street	Rocky Hill	CT23XC556	10/25/2013
EM-SPRINT-077-131008	60 Adams Street	Manchester	CT23XC557	10/25/2013
EM-SPRINT-NEXTEL-080-130123	462 West Main Street	Meriden	CT25XC840	2/14/2013
EM-SPRINT-096-130920	18 Hilltop View Lane	New Milford	CT33XC095	10/4/2013
EM-SPRINT-157-130213	237 Godfrey Road	Weston	CT33XC522	3/1/2013
EM-SPRINT-018-131008	20 Vale Road	Brookfield	CT33XC525	10/25/2013
EM-SPRINT-077-130528	595 Keeney Street	Manchester	CT33XC538	6/14/2013
EM-SPRINT-NEXTEL-129-130214	400 Main Street	Somers	CT33XC554	3/1/2013
EM-SPRINT-047-130322	15 CHAMBERLAIN	BROADBROOK	CT33XC565	4/5/2013
EM-SPRINT-004-130502	277 Huckleberry Road	Avon	CT33XC589	5/17/2013

EM-SPRINT-143-130604	218 Wheeler Road	Torrington	CT33XC592	6/28/2013
EM-SPRINT-140-130724	583 Chapel Street	Thomaston	CT33XC603	8/8/2013
EM-SPRINT-103-130920	Charles Marshall Drive	Norwalk	CT33XC802	10/4/2013
EM-SPRINT-NEXTEL-064-130214	439-455 Homestead Ave.	Hartford	CT43XC805	3/1/2013
EM-SPRINT-064-130311	99 Meadow Street	Hartford	CT43XC806	4/5/2013
EM-SPRINT-083-131127	290 Preston Ave.	Middletown	CT43XC816	12/16/2013
EM-SPRINT-128-130920	530 Bushy Hill Road	Simsbury	CT43XC825	10/4/2013
EM-SPRINT-164-130405A	340 Bloomfield Avenue	Windsor	CT43XC826	4/19/2013
EM-SPRINT-077-130109	239 Middle Turnpike	Manchester	CT43XC827	2/13/2013
EM-SPRINT-165-130118	2-4 Volunteer Drive	Windsor Locks	CT43XC828	2/14/2013
EM-SPRINT-NEXTEL-139-130214	44 Fyler Place	Suffield	CT43XC829	3/8/2013
EM-SPRINT-111-130712	171 Town Hill Road	Plymouth	CT54XC712	7/26/2013
EM-SPRINT-009-130322	38 Spring Hill Road	Bethel	CT54XC749	4/5/2013
EM-SPRINT-154-131011	315 Spencer Plains Road	Westbrook	CT54XC758	10/25/2013
EM-SPRINT-023-130405	14 Canton Springs Road	Canton	CT54XC760	4/19/2013
EM-SPRINT-104-130606	153 Old Salem Road	Norwich	CT54XC775	6/28/2013
EM-SPRINT-164-130405B	99 Day Hill Road	Windsor	CT54XC787	4/19/2013
EM-SPRINT-132-130920	300 Governor's Highway	South Windsor	CT60XC014	10/4/2013
EM-SPRINT-094-130108	605 Willard Avenue	Newington	CT60XC018	1/25/2013
EM-SPRINT-146-130506	197 South Street	Vernon	CT60XC935	5/24/2013
EM-SPRINT-146-130311	777 Talcottville Road	Vernon	CT70XC147	4/5/2013
EM-SPRINT-126-130531	62 Birdseye Road	Shelton	CT73XC004	6/21/2013

CROWN CASTLE

500 West Cummings Park, Suite 3600 Woburn, Ma 01801

Telephone: 781-771-2255
Email
jeff.barbadora@crowncastle.com

June 27, 2014

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

RE: Sprint PCS-Exempt Modification - Crown Site BU: 806369
Sprint PCS Site ID: CT43XC805
Located at: 439-455 Homestead Avenue, Hartford, Connecticut

Dear Ms. Bachman:

This letter is to confirm that all construction activity has been completed. Pursuant to the Connecticut Siting Council approval of **EM-Sprint-Nextel-064-130214,** this letter is to satisfy item number three of the approval letter that the CSC will be notified in writing within 45 days after completion of construction.

Please contact me if you have any questions.

Sincerely,

Jeffrey Barbadora
781-970-0053

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

March 1, 2013

Kevin Savage
Crown Castle
3530 Torrington Way, Suite 300
Charlotte, NC 28277

RE: **EM-SPRINT-NEXTEL-064-130214** - Sprint Nextel Corporation notice of intent to modify an existing telecommunications facility located 439-455 Homestead Avenue, Hartford, Connecticut.

Dear Mr. Savage:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated February 8, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding

the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable Pedro E. Segarra, Mayor, City of Hartford
Sandra Kee Borges, Acting Chief Operating Officer, City of Hartford

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

February 19, 2013

The Honorable Pedro E. Segarra
Mayor
Hartford Municipal Building
550 Main Street
Hartford, CT 06103

RE: **EM-SPRINT-NEXTEL-064-130214** - Sprint Nextel Corporation notice of intent to modify an existing telecommunications facility located 439-455 Homestead Avenue, Hartford, Connecticut.

Dear Mayor Segarra:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by March 5, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/laf

c: Sandra Kee Borges, Acting Chief Operating Officer, City of Hartford

EM-SPRINT-NEXTEL-064-130214

CROWN CASTLE

Crown Castle
3530 Torrington Way Suite 300
Charlotte NC 28277

Tel 704-405-6560
Fax 724-416-4911
www.crowncastle.com

February 8, 2013

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

RE: Sprint Nextel-Exempt Modification Request- Crown Site BU 806369 Sprint Nextel Site CT43XC805 – Located at – 439-455 Homestead Avenue Hartford, CT 06105.

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of Sprint Nextel (Sprint). Sprint is making modifications to certain existing sites in its Connecticut system in order to implement their network vision technology. Please accept this letter and attachments as notification, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies ("R.S.C.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Mayor Pedro E. Segarra for the City of Hartford.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at 439-455 Homestead Avenue Hartford, CT 06105. Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration. Also included is a power density report reflecting the modification to Sprint's operations at the site.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Sprint's replacement antennas will be located at the same elevation on the existing tower.
2. Although the proposed modifications will involve replacing the ground-mounted equipment, the proposed change will not require the extension of the site boundaries.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

ORIGINAL

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted a safely standard. A cumulative General Power Density table for Sprint modified facility is included behind Tab 2.

Also attached is a Structural Report confirming that the tower and foundation can support Sprints proposed modifications. (See Tab 3).

For the foregoing reasons, Sprint respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b) (2).

Sincerely,

Kevin Savage

Enclosures
Copy to: Mayor Pedro E. Segarra, City of Hartford

SHEET INDEX

DRIVING DIRECTIONS

DEPART FROM SPRINT:
1 INTERNATIONAL BLVD MAHWAH, NJ 07430

1. HEAD NORTH ON INTERNATIONAL BLVD/PARK ST TOWARD QUEENSLAND RD.
2. TAKE THE 3RD RIGHT ONTO PARK LN.
3. CONTINUE STRAIGHT ONTO LEISURE LN.
4. CONTINUE ONTO NJ-17 N.
5. TAKE THE NEW JERSEY 17 N/INTERSTATE 287 N EXIT TOWARD INTERSTATE 87/NORTH Y. THRUWAY.
6. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR I-287 N/I-87/NJ-17 N/NY. THRUWAY AND MERGE ONTO I-287 N/NJ-17 N. ENTERING NEW YORK.
7. KEEP RIGHT AT THE FORK, FOLLOW SIGNS FOR I-87 S/I-287/TAPPAN ZEE. BR/NEW YORK CITY/NEW YORK THRUWAY AND MERGE ONTO I-287 E/I-87 S. CONTINUE TO FOLLOW I-87 S.
8. TAKE EXIT 8A FOR NY-119/SAW MILL PKWY N TOWARD ELMSFORD.
9. KEEP LEFT AT THE FORK AND MERGE ONTO SAW MILL RIVER PARKWAY N.
10. TAKE THE EXIT TOWARD I-684 N.
11. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR I-684/BREWSTER AND MERGE ONTO I-684 N.
12. TAKE EXIT 9E FOR INTERSTATE 84 E TOWARD DANBURY.
13. MERGE ONTO I-84 E.
14. SLIGHT RIGHT TO STAY ON I-84 E.
15. SLIGHT RIGHT TO STAY ON I-84 E.
16. TAKE EXIT 46 ON THE LEFT TOWARD SISSON AVE.
17. TURN RIGHT ONTO SISSON AVE.
18. TURN RIGHT ONTO FARMINGTON AVE.
19. TAKE THE 3RD LEFT ONTO WOODLAND ST.
20. TURN LEFT ONTO HOMESTEAD AVE.
DESTINATION WILL BE ON THE LEFT.

Sprint

NETWORK VISION MMBTS LAUNCH

NORTHERN CONNECTICUT MARKET

SITE NAME

HARTFORD/ CROWN ATLANTIC

SITE NUMBER

CT43XC805

SITE ADDRESS

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

STRUCTURE TYPE

MONOPOLE

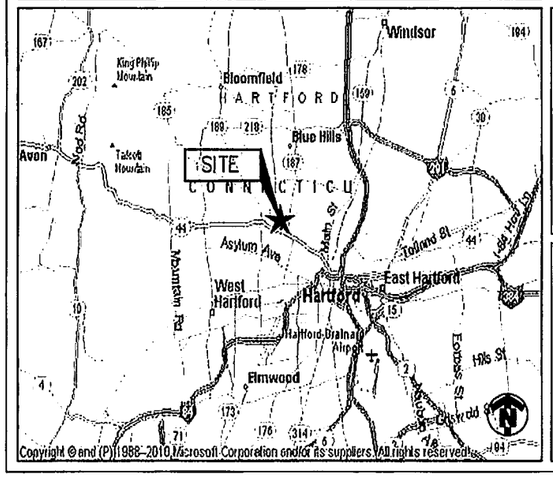
OWNER AND TENANT MAY, FROM TIME TO TIME AT TENANT'S OPTION, REPLACE THIS EXHIBIT WITH AND EXHIBIT SETTING FORTH THE LEGAL DESCRIPTION OF THE SITE, OR WITH ENGINEERED OR AS-BUILT DRAWING DEPICTING THE SITE OR ILLUSTRATING STRUCTURAL MODIFICATIONS OR CONSTRUCTION PLANS OF THE SITE. ANY VISUAL OR TEXTUAL REPRESENTATION OF THE EQUIPMENT LOCATED WITHIN THE SITE CONTAINED IN THESE OTHER DOCUMENTS IS ILLUSTRATIVE ONLY, AND DOES NOT LIMIT THE RIGHTS OF SPRINT AS PROVIDED FOR IN THE AGREEMENT. THE LOCATIONS OF ANY ACCESS AND UTILITY EASEMENTS ARE ILLUSTRATIVE ONLY. ACTUAL LOCATIONS MAY BE DETERMINED BY TENANT AND/ OR THE SERVICING UTILITY COMPANY IN COMPLIANCE WITH LOCAL LAWS AND REGULATIONS.

UNDERGROUND SERVICE ALERT
CALL TOLL FREE 1-800-922-4455
THREE WORKING DAYS BEFORE YOU DIG

PROJECT SUMMARY

SITE NAME:	HARTFORD/ CROWN ATLANTIC	
SITE NO.:	CT43XC805	
SITE ADDRESS:	439-455 HOMESTEAD AVENUE HARTFORD, CT 06105	
COUNTY:	HARTFORD	
SITE COORDINATES:		
LATITUDE:	41.78378056° N	(NAD 83)
LONGITUDE:	72.70379444° W	(NAD 83)
GROUND ELEV.:	±71'	(AMSL)
JURISDICTION:	CONNECTICUT SITING COUNCIL	
ZONING CLASSIFICATION:	RESIDENTAL	
LANDLORD:	CROWN ATLANTIC COMPANY LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317	
CONTACT:	MIKE CALLAHAN (860) 919-7278	
APPLICANT:	SPRINT 1 INTERNATIONAL BLVD. MAHWAH, NJ 07495	
PROJECT MANAGER:	ALCATEL LUCENT 1 ROBBINS ROAD WESTFORD, MA 01886	
CONTACT:	ISAM ELHALWANI (617) 851-6133	
CONSTRUCTION MANAGER:	MIKE NEGRETE (315) 439-4819	
ENGINEER:	INFINIGY 11 HERBERT DRIVE LATHAM, NY 12110	
CONTACT:	PAUL FANOS (518) 690-0790	
POWER COMPANY:	CONNECTICUT LINE AND POWER (800) 286-2000	
PHONE COMPANY:	VERIZON (800) 837-4966	
BUILDING CODE:	2003 INTERNATIONAL BUILDING CODE 2005 CONNECTICUT BUILDING CODE W/ 2009 AMENDMENT UNIFORM MECHANICAL CODE UNIFORM PLUMBING CODE LOCAL BUILDING CODE CITY/COUNTY ORDINANCES	
ELECTRICAL CODE:	2005 NATIONAL ELECTRICAL CODE	

VICINITY MAP



PROJECT TEAM

ALCATEL·LUCENT

1 ROBBINS ROAD
WESTFORD, MA 01886

PROJECT MANAGER

INFINIGY Design. Build. Deliver.

11 Herbert Drive
Latham, NY 12110
OFFICE #: (518) 690-0790
FAX #: (518) 690-0793

ENGINEER

SCOPE OF WORK:

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
- FACILITY HAS NO PLUMBING OR REFRIGERANTS
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. CABINETS, ANTENNAS/RRU AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR
- INSTALL NEW ANTENNAS/RRH'S ON EXISTING TOWER
- INSTALL NEW BTS OR RETROFIT EXISTING BTS IN EXISTING EQUIPMENT AREA
- REMOVE EXISTING CDMA ANTENNAS AND COAX CABLES
- REPLACE EXISTING BATTERY CABINET WITH NEW BATTERY CABINET IF REQUIRED
- REPLACE EXISTING GPS IF REQUIRED

ENGINEER'S LICENSE

CERTIFICATION STATEMENT:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT.

LICENSED ENGINEER – STATE OF CONNECTICUT

APPROVALS

SPRINT CONST.		DATE
ALU RF		DATE
ALU LEASING/SITE ACQ.		DATE
IN-MARKET CONSTRUCTION LEAD		DATE
SITE OWNER	NAME/COMPANY: TITLE:	DATE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	Appv'd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KMF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number 294-035

Project Title
HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For
Sprint VISION

Drawing Scale: AS NOTED
Date: 1/30/13

Drawing Title
TITLE SHEET

Drawing Number
T1

GENERAL NOTES

PART 1 – GENERAL REQUIREMENTS

1.1 THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
- B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
- C. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC").
- D. AND NFPA 101 (LIFE SAFETY CODE).
- E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM).
- F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE).

1.2 DEFINITIONS:
A: WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B: COMPANY: SPRINT NEXTEL CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D: CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E: THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

1.3 POINT OF CONTACT: COMMUNICATION BETWEEN THE COMPANY AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE COMPANY SITE DEVELOPMENT SPECIALIST OR OTHER PROJECT COORDINATOR APPOINTED TO MANAGE THE PROJECT FOR THE COMPANY.

1.4 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.5 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES, AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

1.6 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.7 NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT NEXTEL WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – EXECUTION

2.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE, POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

2.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

2.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

2.4 COMPANY FURNISHED MATERIAL AND EQUIPMENT: ALL HANDLING, STORAGE AND INSTALLATION OF COMPANY FURNISHED MATERIAL AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
A. CONTRACTOR SHALL PROCURE ALL OTHER REQUIRED WORK RELATED MATERIALS NOT PROVIDED BY SPRINT NEXTEL TO SUCCESSFULLY CONSTRUCT A WIRELESS FACILITY.

2.5 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

2.6 EXISTING CONDITIONS: NOTIFY THE COMPANY REPRESENTATIVE OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

PART 3 – RECEIPT OF MATERIAL & EQUIPMENT

3.1 RECEIPT OF MATERIAL AND EQUIPMENT: CONTRACTOR IS RESPONSIBLE FOR SPRINT NEXTEL PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
- A. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
- B. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
- C. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
- D. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT NEXTEL OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
- E. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
- F. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

PART 4 – GENERAL REQUIREMENTS FOR CONSTRUCTION

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

4.2 EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

4.3 CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
A. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
B. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

4.4 CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION.

4.5 CONDUCT TESTING AS REQUIRED HEREIN.

PART 5 – TESTS AND INSPECTIONS

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

B. CONTRACTOR SHALL COORDINATE TEST AND INSPECTION SCHEDULES WITH COMPANY'S REPRESENTATIVE WHO MUST BE ON SITE TO WITNESS SUCH TESTS AND INSPECTIONS.

C. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.

D. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
E. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.

F. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS. HYBERFLEX TESTING NOT LIMITED TO COAX SWEEPS.

G. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

PART 6 – TRENCHING AND BACKFILLING

6.1 TRENCHING AND BACKFILLING: THE CONTRACTOR SHALL PERFORM ALL EXCAVATION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED, TO THE DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS OTHERWISE SPECIFIED.

A. PROTECTION OF EXISTING UTILITIES: THE CONTRACTOR SHALL CHECK WITH THE LOCAL UTILITIES AND THE RESPECTIVE UTILITY LOCATOR COMPANIES PRIOR TO STARTING EXCAVATION OPERATIONS IN EACH RESPECTIVE AREA TO ASCERTAIN THE LOCATIONS OF KNOWN UTILITY LINES. THE LOCATIONS, NUMBER AND TYPES OF EXISTING UTILITY LINES DETAILED ON THE CONSTRUCTION DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT EXACT INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL LINES DAMAGED DURING EXCAVATION AND ALL ASSOCIATED OPERATIONS. ALL UTILITY LINES UNCOVERED DURING THE EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND ASSOCIATED OPERATIONS. ALL REPAIRS SHALL BE APPROVED BY THE UTILITY COMPANY.

B. HAND DIGGING: UNLESS APPROVED IN WRITING OTHERWISE, ALL DIGGING WITHIN AN EXISTING CELL SITE COMPOUND IS TO BE DONE BY HAND.

C. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING AND TO PREVENT SLIDES OR CAVE-INS. ALL EXCAVATED MATERIALS NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

D. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES OR OTHER EXCAVATIONS, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING OR BY OTHER APPROVED METHOD.

E. SHEETING AND SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. UNLESS OTHERWISE INDICATED, EXCAVATION SHALL BE BY OPEN CUT, EXCEPT THAT SHORT SECTIONS OF A TRENCH MAY BE TUNNELED IF, THE CONDUIT CAN BE SAFELY AND PROPERLY INSTALLED AND BACKFILL CAN BE PROPERLY TAMPED IN SUCH TUNNEL SECTIONS. EARTH EXCAVATION SHALL COMPRISE ALL MATERIALS AND SHALL INCLUDE CLAY, SILT, SAND, MUCK, GRAVEL, HARDPAN, LOOSE SHALE, AND LOOSE STONE.

F. TRENCHES SHALL BE OF NECESSARY WIDTH FOR THE PROPER LAYING OF THE CONDUIT OR CABLE, AND THE BANKS SHALL BE AS NEARLY VERTICAL AS PRACTICABLE. THE BOTTOM OF THE TRENCHES SHALL BE ACCURATELY GRADED TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE CONDUIT OR CABLE ON UNDISTURBED SOIL AT EVERY POINT ALONG ITS ENTIRE LENGTH. EXCEPT WHERE ROCK IS ENCOUNTERED, CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED. WHERE ROCK EXCAVATIONS ARE NECESSARY, THE ROCK SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF 6 INCHES BELOW THE TRENCH DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR SPECIFIED. OVER DEPTHS IN THE ROCK EXCAVATION AND UNAUTHORIZED OVER DEPTHS SHALL BE THOROUGHLY BACK FILLED AND TAMPED TO THE APPROPRIATE GRADE. WHENEVER WET OR OTHERWISE UNSTABLE SOIL THAT IS INCAPABLE OF PROPERLY SUPPORTING THE CONDUIT OR CABLE IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SUCH SOLID SHALL BE REMOVED TO A MINIMUM OVER DEPTH OF 6 INCHES AND THE TRENCH BACKFILLED TO THE PROPER GRADE WITH EARTH OF OTHER SUITABLE MATERIAL, AS HEREINAFTER SPECIFIED.

G. BACKFILLING OF TRENCHES. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL SPECIFIED TESTS HAVE BEEN PERFORMED AND ACCEPTED. WHERE COMPACTED BACKFILL IS NOT INDICATED THE TRENCHES SHALL BE CAREFULLY BACKFILLED WITH SELECT MATERIAL SUCH AS EXCAVATED SOILS THAT ARE FREE OF ICE, SNOW, ROOTS, SOD, RUBBISH OR STONES, DEPOSITED IN 6 INCH LAYERS AND THOROUGHLY AND CAREFULLY RAMMED UNTIL THE CONDUIT OR CABLE HAS A COVER OF NOT LESS THAN 1 FOOT. THE REMAINDER OF THE BACKFILL MATERIAL SHALL BE GRANULAR IN NATURE AND SHALL NOT CONTAIN ICE, SNOW ROOTS, SOD, RUBBISH, OR STONES OF 2-1/2 INCH MAXIMUM DIMENSION. BACKFILL SHALL BE CAREFULLY PLACED IN THE TRENCH AND IN 1 FOOT LAYERS AND EACH LAYER TAMPED. SETTLING THE BACKFILL WITH WATER WILL BE PERMITTED. THE SURFACE SHALL BE GRADED TO A REASONABLE UNIFORMITY AND THE MOUNDING OVER THE TRENCHES LEFT IN A UNIFORM AND NEAT CONDITION.

PROJECT INFORMATION

THIS IS AN UNMANNED AND RESTRICTED ACCESS EQUIPMENT FACILITY AND WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNALS FOR THE PURPOSE OF PROVIDING PUBLIC WIRELESS COMMUNICATIONS SERVICE.

NO POTABLE WATER SUPPLY IS TO BE PROVIDED AT THIS LOCATION.

NO WASTE WATER WILL BE GENERATED AT THIS LOCATION.

NO SOLID WASTE WILL BE GENERATED AT THIS LOCATION.

SPRINT MAINTENANCE CREW (TYPICALLY ONE PERSON) WILL MAKE AN AVERAGE OF ONE TRIP PER MONTH AT ONE HOUR PER VISIT.

LEGEND

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
F	NON-FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
T	TRANSFORMER
KW	KILOWATT HOUR METER
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
	UNDERGROUND UTILITIES
#	DENOTES REFERENCE NOTE
	EXOTHERMIC WELD CONNECTION
	MECHANICAL CONNECTION
OR ⊗	GROUND ROD
OR ⊠	GROUND ROD WITH INSPECTION SLEEVE
	GROUND BAR
	PIN AND SLEEVE RECEPTACLE
	120AC DUPLEX RECEPTACLE
G	GROUND CONDUCTOR
# / #	REPRESENTS DETAIL NUMBER / REF. DRAWING NUMBER

ABBREVIATIONS

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL

INFINIGY
Design. build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	Appd	Date
1	REVISED PER COMMENTS	KWF	1/30/13
0	ISSUED FOR REVIEW	KWF	11/9/12

Drawn: KWF Date: 11/5/12
Designed: A-D Date: 11/5/12
Checked: KWF Date: 11/5/12

Project Number
294-035

Project Title

HARTFORD/ CROWN ATLANTIC CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For

Sprint VISION

Drawing Scale: AS NOTED
Date: 1/30/13

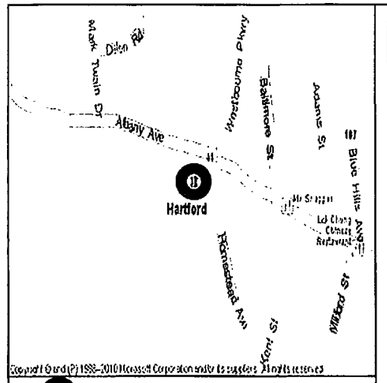
Drawing Title

GENERAL NOTES

Drawing Number

C1

INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION.



WORK AREA

LOCATION MAP
N.T.S.

OVERALL SPRINT LEASED AREA OF 8' NOT TO BE EXCEEDED

EXISTING SPRINT 9'-9"x23'-6" ELEVATED STEEL EQUIPMENT PLATFORM/ LEASE AREA

PROPOSED SPRINT FIBER/POWER JUNCTION BOX MOUNTED TO EXISTING HANDRAIL (1,2 / C7) (1,2 / C9)

PROPOSED HYBRIFLEX CABLES ROUTED FROM PROPOSED FIBER JUNCTION BOX TO PROPOSED TOWER MOUNTED RRH TO FOLLOW EXISTING CABLES (CONTRACTOR TO VERIFY) (TYP. OF (1) PER SECTOR)

EXISTING CLEARWIRE CABINET

EXISTING SPRINT PPC CABINET

PROPOSED RETROFIT OF EXISTING MODCELL 4.0 CABINET

EXISTING SPRINT MODCELL 4.0 CABINET

(6 / C4) *PROPOSED BATTERY BACKUP CABINET*

EXISTING SPRINT CABLE TRAY

EXISTING MONOPOLE

AT&T MOBILITY PAD

VERIZON WIRELESS SHELTER

EXISTING ELECTRICAL BOX

EXISTING SPRINT METER

EXISTING ICE BRIDGE (TYP.)

EXISTING 12' DOUBLE SWING ACCESS GATE

STRUCTURAL ANALYSIS NOT COMPLETED AT TIME OF ISSUANCE OF THESE DRAWINGS. THE STRUCTURAL ANALYSIS MUST BE COMPLETED PRIOR TO CONSTRUCTION.

NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.

NOTE:
1. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT: "EXHIBIT A – STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV 4.0 – 02.15.2011.DOCM"
2. REFER TO: "WEATHERPROOFING SPECS: EXCERPT EXH A – WTHRPRF – STD CONSTR SPECS._157201110421855429.DOCM"
3. REFER TO: "COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF"
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.

CALLED NORTH

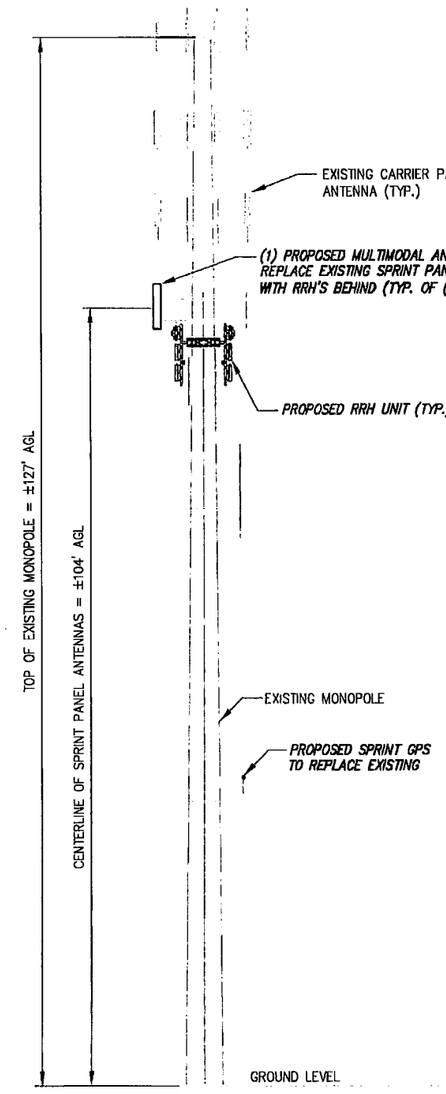
(1 / --) COMPOUND SITE PLAN
SCALE: AS NOTED

GRAPHIC SCALE

10' 5' 0 5' 10'

SCALE (11x17): 1" = 10'–0"
SCALE (22x34): 1" = 5'–0"

FOR ADDITIONAL STRUCTURAL INFORMATION SEE STRUCTURAL ANALYSIS COMPLETED BY CROWN CASTLE DATED: 10/18/12



(2 / --) SITE ELEVATION
NOT TO SCALE

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	Appr'd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KMF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number
294-035

Project Title

HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For

Sprint VISION

Drawing Scale:
AS NOTED

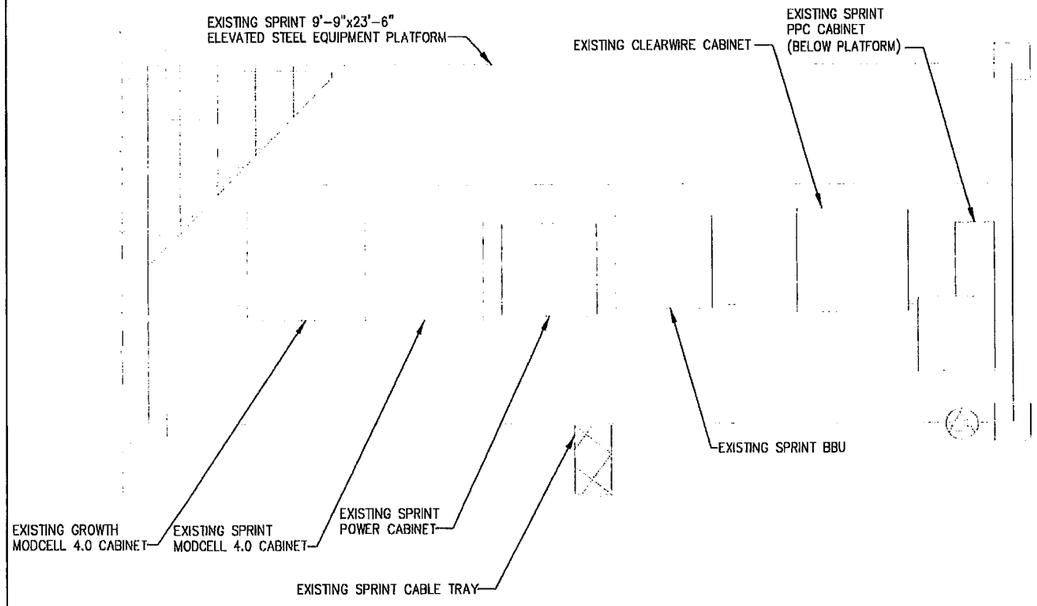
Date:
1/30/13

Drawing Title

COMPOUND SITE PLAN & ELEVATION

Drawing Number

C2

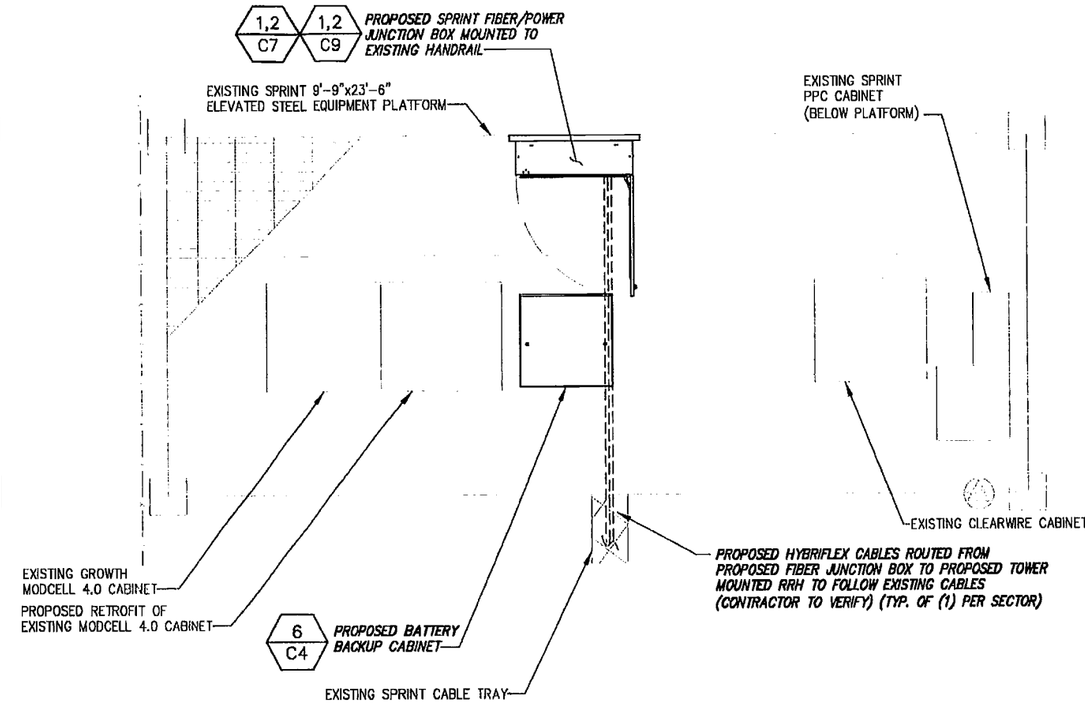


1 EQUIPMENT SITE PLAN (EXISTING)
CALLED NORTH — SCALE: AS NOTED

GRAPHIC SCALE

4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"



2 EQUIPMENT SITE PLAN (FINAL/PERMANENT)
CALLED NORTH — SCALE: AS NOTED

GRAPHIC SCALE

4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.

NOTE:
1. REFER TO: CONSTRUCTION STANDARDS-SPRINT DOCUMENT: "EXHIBIT A - STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV 4.0 - 02.15.2011.DOCM"
2. REFER TO: "WEATHERPROOFING SPECS: EXCERPT EXH A - WTHRPRF - STD CONSTR SPECS._157201110421855429.DOCM"
3. REFER TO: "COLOR CODING-SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09-08-11.PDF"
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.

STRUCTURAL ANALYSIS NOT COMPLETED AT TIME OF ISSUANCE OF THESE DRAWINGS. THE STRUCTURAL ANALYSIS MUST BE COMPLETED PRIOR TO CONSTRUCTION.

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT — JOHN S. STEVENS — No. 24705 — LICENSED PROFESSIONAL ENGINEER

No.	Submittal / Revision	Appd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KMF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number
284-035

Project Title
HARTFORD/
CROWN ATLANTIC
CT43XC805

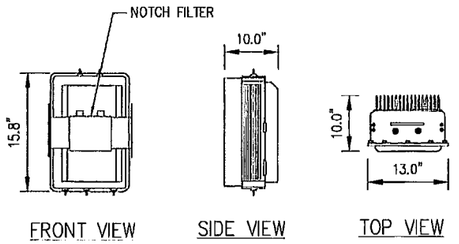
439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For
Sprint VISION

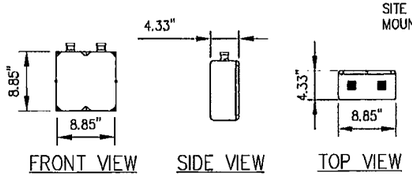
Drawing Scale:
AS NOTED
Date:
1/30/13

Drawing Title
EQUIPMENT SITE PLANS

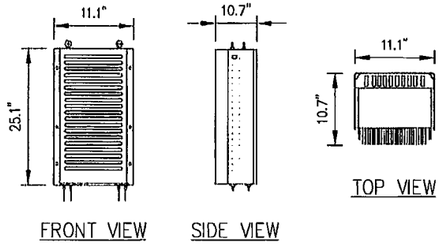
Drawing Number
C3



800 MHZ RRH
(ALU)
WEIGHT = 50.6LBS.



850 MHZ NOTCH FILTERS
WEIGHT = 11 LBS.

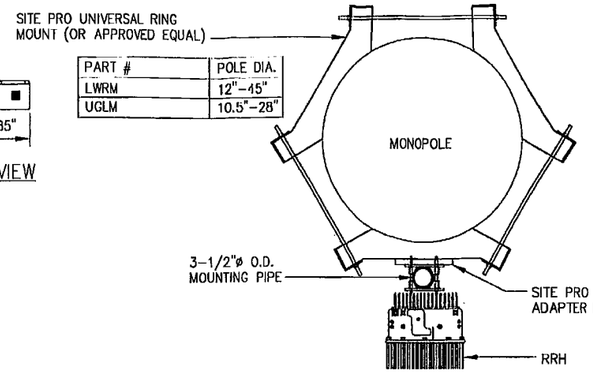


1900 MHZ RRH
(ALU)
WEIGHT = 60LBS.

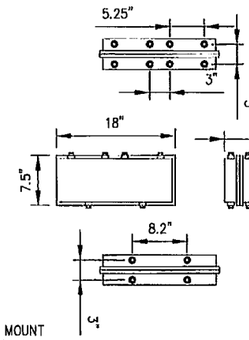
NOTE:
REFER TO R.F. SYSTEM SCHEDULE FOR EXACT RRH SPECIFICATIONS AND QUANTITIES.

1 RRH EQUIPMENT DETAILS
NOT TO SCALE

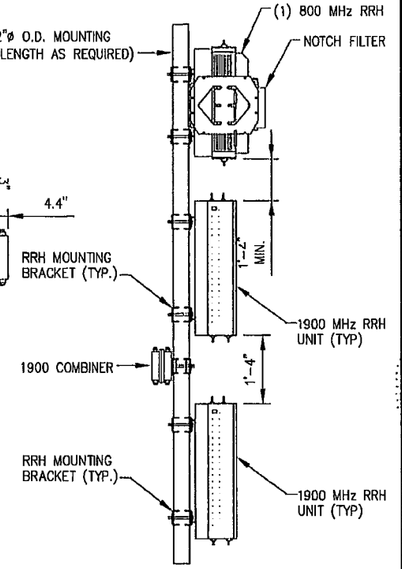
OVERALL SPRINT LEASED AREA OF 8' NOT TO BE EXCEEDED



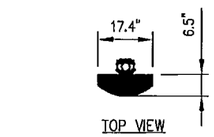
PART #	POLE DIA.
LWRM	12"-45"
UGLM	10.5"-28"



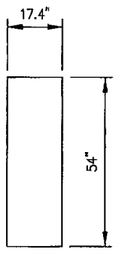
1900 RRH COMBINER
WEIGHT 40 LBS.



2 RRH MOUNTING DETAIL (TYP.)
NOT TO SCALE



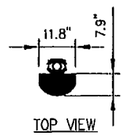
TOP VIEW



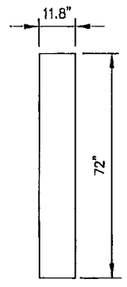
FRONT VIEW
800/1900
MULTI-MODE

POWERWAVE ANTENNA
P/N: P40-16-XLPP-RR-A

3 ANTENNA DETAILS
NOT TO SCALE



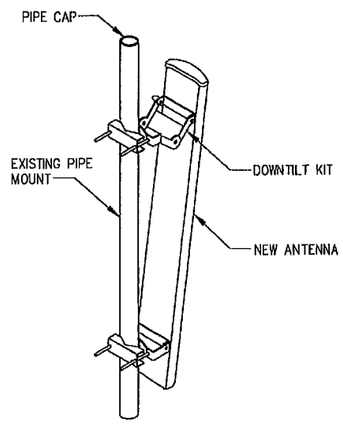
TOP VIEW



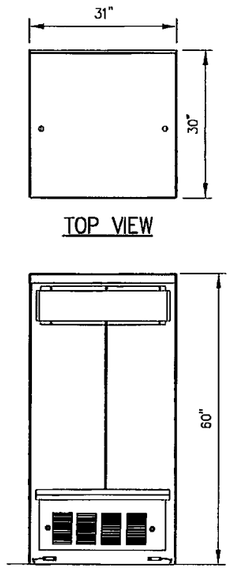
FRONT VIEW
800/1900
MULTI-MODE

RFS ANTENNA
P/N: APXV9ERR18-C-A20

4 ANTENNA DETAILS
NOT TO SCALE



5 PANEL ANTENNA MOUNT DETAIL
NOT TO SCALE



6 BATTERY CABINET PROFILE
NOT TO SCALE

DESIGN CRITERIA:

2009 INTERNATIONAL BUILDING CODE W/ STATE MODIFICATION	
WIND SPEED (ASCE-7-05)	90 MPH
EXPOSURE B	
IMPORTANCE FACTOR	1.0
SEISMIC SITE CLASS	D
Ss=0.152 S1=0.050	
SEISMIC IMPORTANCE FACTOR	1.0
SEISMIC DESIGN CATEGORY	B
CABINET WEIGHT:	
9928 MM BTS CABINET	1074 LBS.
60EC V2 BATTERY CABINET	2830 LBS.
MATERIAL SPECIFICATIONS	
C-, M-, AND ANGLE SHAPES:	ASTM A36
HIGH-STRENGTH BOLTS:	ASTM A325SC OR (A325N)
STRUCTURAL WF SHAPES:	ASTM A572-GR50
TUBE STEEL & PIPE COLUMNS:	ASTM A500, GRADE B
WELDING ELECTRODES:	E70XX
W - SHAPES:	ASTM A992, GRADE 50
U-BOLTS:	ASTM A36

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	App'd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KMF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number
294-035

Project Title
HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

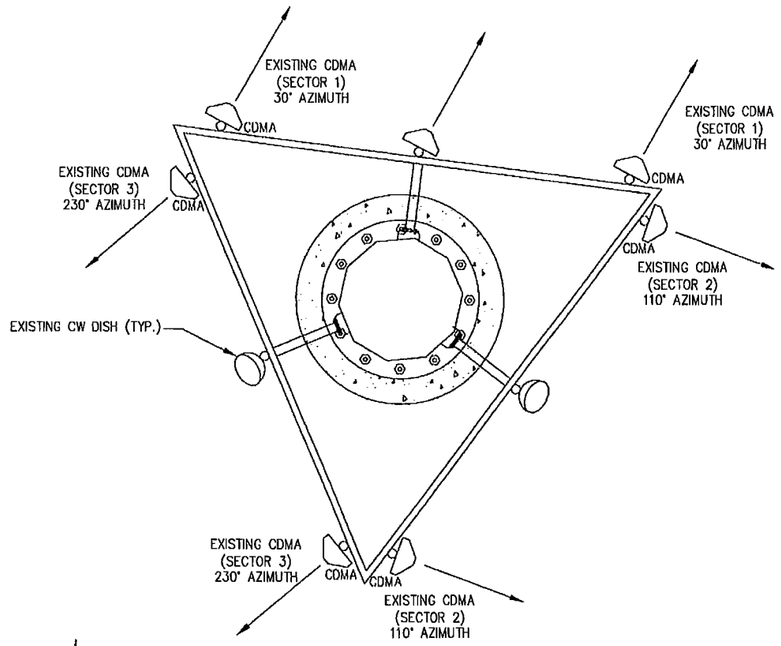
Prepared For
Sprint
VISION

Drawing Scale:
AS NOTED

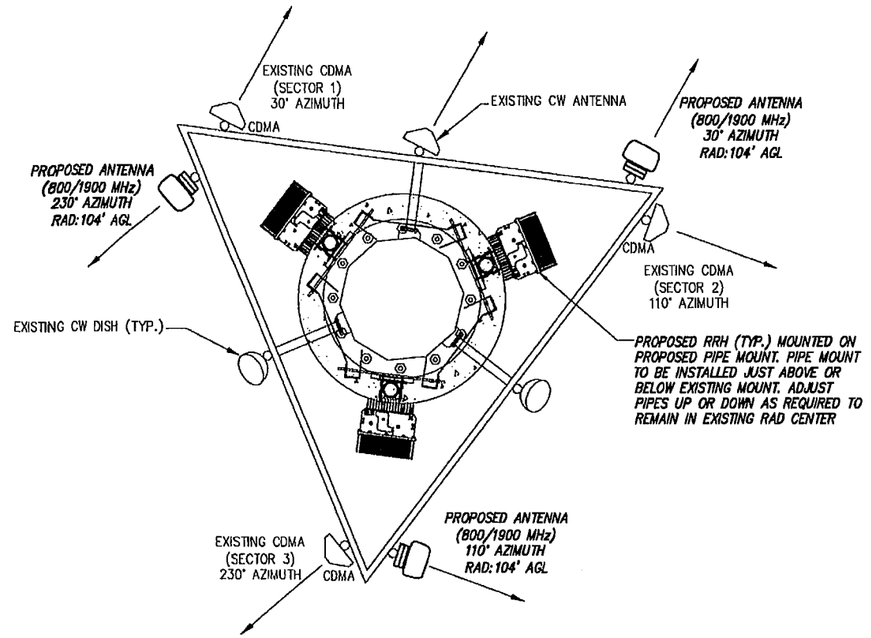
Date:
1/30/13

Drawing Title
EQUIPMENT DETAILS

Drawing Number
C4

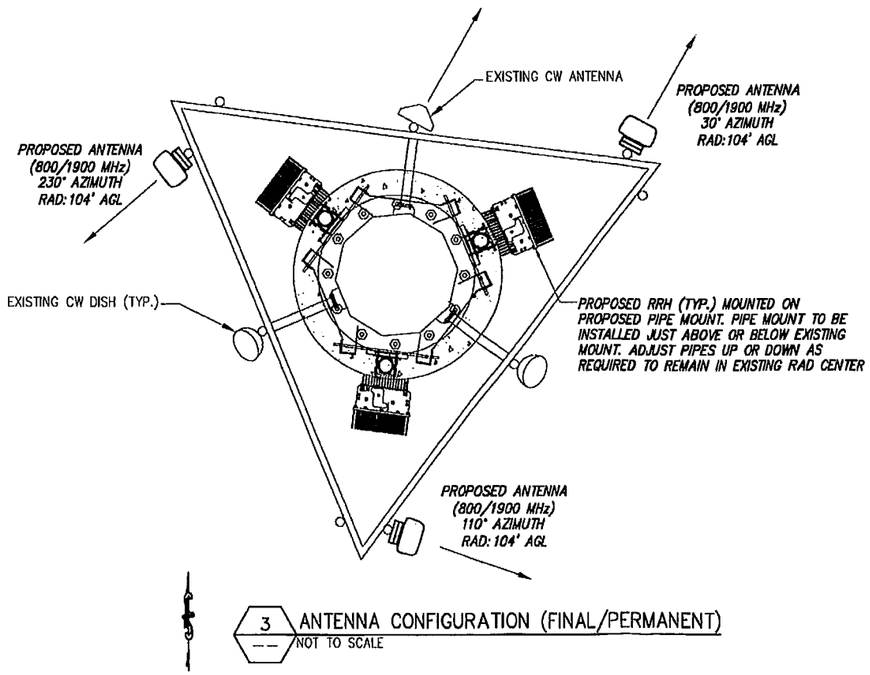


1 ANTENNA CONFIGURATION (EXISTING)
NOT TO SCALE



2 ANTENNA CONFIGURATION (INTERIM/TEMPORARY)
NOT TO SCALE

NOTE:
CONTRACTOR TO VERIFY A PASSING SIGNED AND SEALED ANTENNA MOUNT/PLATFORM STRUCTURAL ANALYSIS HAS BEEN COMPLETED FOR INTERIM AND FINAL RF CONFIGURATION. NO ANTENNA MOUNT/PLATFORM MODIFICATIONS SHOULD COMMENCE OR INSTALLATION OF ANTENNAS, RRH OR TOWER MOUNTED EQUIPMENT WITHOUT VERIFYING THE MOUNT/PLATFORM ANALYSIS HAS BEEN COMPLETED FOR THE SPECIFIC LOADING. ADDITIONALLY ALL MOUNTS, ANTENNA AND COAX TO BE INSTALLED IN ACCORDANCE WITH TOWER STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE.



3 ANTENNA CONFIGURATION (FINAL/PERMANENT)
NOT TO SCALE

NOTE:
REQUIRED PIPE MOUNTS TO BE SUPPLIED BY CONTRACTOR.

FOR ADDITIONAL STRUCTURAL INFORMATION SEE STRUCTURAL ANALYSIS COMPLETED BY CROWN CASTLE DATED: 10/18/12

RRH NOTES:

- SEE PAGE C4 FOR RRH MOUNTING INFORMATION (TYP. ALL SECTORS).
- REFER TO RF SCHEDULE ON SHEET C7 FOR RRH UNIT SPECS AND QUANTITIES.

GENERAL NOTES:

1. NEW SPRINT PANEL ANTENNAS TO MEET RF DESIGN REQUIREMENTS PER EBTS, PER APPROVED STRUCTURAL ANALYSIS.
2. CONTRACTOR TO PROVIDE EXISTING ANTENNA VERIFICATION AND TO INCLUDE MOUNTING HEIGHT, RAD CENTER, TOP AND BOTTOM OF ANTENNAS.
3. THE CONFIGURATION PLANS ARE FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR TO VERIFY FIELD CONDITIONS.
4. THE ANTENNA INSTALLATION SHALL BE DONE IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS AND ASSOCIATED DETAILS THEREIN. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO WORK ON THE STRUCTURE.
5. CONTRACTOR SHALL VERIFY NEW PARTS BEFORE ORDERING.
6. REFER TO SHEET C4 & C7 FOR ANTENNA SPECS.
7. CONTRACTOR TO USE PROPER TORQUE WHEN INSTALLING AND TIGHTENING CONNECTORS TO INSURE PROPER FIT.
8. ALL HYBRID CABLES SHALL BE MARKED WITHIN 24" OF THE END OF EACH CABLE WITH 2" WIDE VINYL TAPE. THIS INCLUDES ALL JUMPERS AND MAIN LINE HYBRID CABLES.
9. CDMA ANTENNAS SHALL NOT BE REMOVED UNTIL ALL NEW MULTI-MODE ANTENNAS ARE INSTALLED AND ON-AIR.

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

No	Submittal / Revision	App'd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/8/12

Drawn: KMF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number
294-035

Project Title

HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For

Sprint VISION

Drawing Scale:
AS NOTED

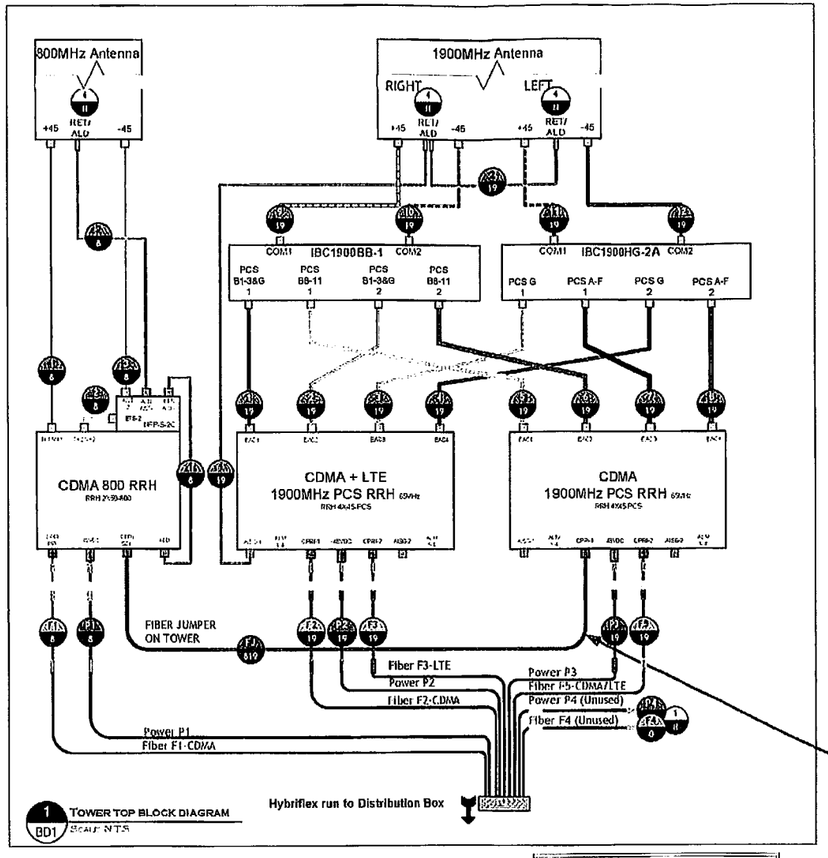
Date:
1/30/13

Drawing Title

ANTENNA PLANS

Drawing Number

C5



1 BD1 TOWER TOP BLOCK DIAGRAM
SCALE: N.T.S

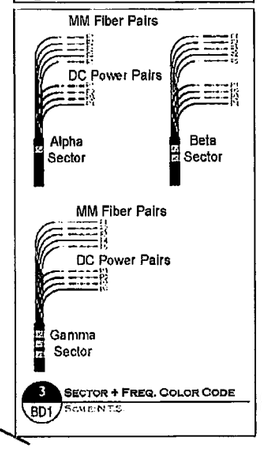
Power Feed Polarity Definition:
IF wires are BLACK AND BLACK/ WHITE STRIPE:
- Black= -48VDC Feed (Battery)
- Black/White Stripe= Return

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

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

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

2 BD1 HYBRIFLEX OEM COLOR CODE
SCALE: NTS



3 BD1 SECTOR + FREQ. COLOR CODE
SCALE: N.T.S

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

800Mhz CPRI Sec port is jumpered to 1900Mhz PCS RRH # 2 On tower

SCENARIO 127 v1.7

1 ANTENNA CABLE RISER DIAGRAM
NOT TO SCALE

INSTALLER VERIFY LATEST PLUMBING/WIRING DIAGRAMS, PRIOR TO INSTALLATION.

WEATHERPROOFING CONNECTORS AND GROUND KIT NOTES:
1. ALL CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED USING BUTYL RUBBER WEATHERPROOFING AND TAPE, THIS INSTALLATION MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION OR PER THE FOLLOWING INSTRUCTIONS (WHICHEVER IS GREATER).
2. THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE ENCOMPASSED INTO COLD SHRINK AND COMPLETELY WRAPPED WITH 2 IN. WIDE ELECTRICAL TAPE OVERLAPPING EACH ROW BY APPROXIMATELY ½" AND EXTENDING PAST THE CONNECTION BY TWO INCHES AND DISCUSSED BELOW; OR
3. THE COAXIAL ABLE CONNECTION OR GROUND KIT CAN BE WRAPPED WITH LAYERS OR ELECTRICAL/BUTYL RUBBER/ELECTRICAL TAPE AS DISCUSSED BELOW OR;
4. THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE WRAPPED WITH TWO LAYERS OF 1.5 INCH WIDE SELF-AMALGAMATING TAPE COVERED WITH TWO LAYERS OF ELECTRICAL TAPE.

RRH JUMPER NOTES:
1. FOR DISTANCES BETWEEN RRH'S AND ANTENNAS LESS THAN 10'-0" USE A 1/2" JUMPER.
2. FOR DISTANCES BETWEEN RRH'S AND ANTENNAS GREATER THAN 10'-0" USE A 7/8" JUMPER.

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT JOHN S. STEVENS No. 24705 LICENSED PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DRAWING IS A VIOLATION OF APPLICABLE STATE AND LOCAL LAWS

No	Submittal / Revision	Apv'd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KM Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AFF Date: 11/5/12

Project Number
284-035

Project Title
HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For
Sprint VISION

Drawing Scale:
AS NOTED

Date:
1/30/13

Drawing Title
ANTENNA CABLE RISER DETAILS

Drawing Number
C6

	Market	Northern Connecticut		
	Cascade ID	CT43XC805		
		SECTOR 1	SECTOR 2	SECTOR 3
	Split sector present	NO	NO	NO
1900	1900MHz_Azimuth	30	110	230
1900	1900MHz_No_of_Antennas	1	1	1
1900	1900MHz_RADCenter(ft)	104	104	104
1900	1900MHz_Antenna Make	RFS	Powerwave	RFS
1900	1900MHz_Antenna Model	APXVSPP18-C-A20	P40-16-XLPP-RR-A	APXVSPP18-C-A20
1900	1900MHz_Horizontal_Beamwidth	65	40	65
1900	1900MHz_Vertical_Beamwidth	5.5	6.5	5.5
1900	1900MHz_AntennaHeight (ft)	6	4.5	6
1900	1900MHz_AntennaGain(dBd)	15.9	15.9	15.9
1900	1900MHz_E_Tilt	0	0	-3
1900	1900MHz _M_Tilt	0	0	0
1900	1900MHz_Carrier_Forecast_Year_2013	6	6	6
1900	1900MHz_RRH Manufacturer	ALU	ALU	ALU
1900	1900MHz_RRH Model	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz
1900	1900MHz_RRH Count	2	2	2
1900	1900MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
1900	1900MHz Combiner Model	IBC1900BB-1 and IBC1900HG-2A	IBC1900BB-1 and IBC1900HG-2A	IBC1900BB-1 and IBC1900HG-2A
1900	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to	10	10	10
1900	1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main Coax	LCF12-50J	LCF12-50J	LCF12-50J
1900	1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)	6	6	6
1900	1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)	LCF12-50J	LCF12-50J	LCF12-50J
1900	1900MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
1900	1900MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main Coax)	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)	N/A	N/A	N/A
1900	1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)	N/A	N/A	N/A
800	800MHz_Azimuth	30	110	230
800	800MHz_No_of_Antennas	0	0	0
800	800MHz_RADCenter(ft)	104	104	104
800	800MHz_AntennaMake	RFS	Powerwave	RFS
800	800MHz_AntennaModel	APXVSPP18-C-A20 (Shared w/1900)	P40-16-XLPP-RR-A (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)
800	800MHz_Horizontal_Beamwidth	65	40	65
800	800MHz_Vertical_Beamwidth	11.5	16	11.5
800	800MHz_AntennaHeight (ft)	6	4.5	6
800	800MHz_AntennaGain (dBd)	13.4	14.2	13.4
800	800MHz_E_Tilt	-8	-8	-8
800	800MHz_M_Tilt	0	0	0
800	800MHz_RRH Manufacturer	ALU	ALU	ALU
800	800MHz_RRH Model	800 MHz RRH 2x50W	800 MHz RRH 2x50W	800 MHz RRH 2x50W
800	800MHz_RRH Count	1	1	1
800	800MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
800	800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	10	10	10
800	800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
800	800MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
800	800MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
800	800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	N/A	N/A	N/A
800	800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)	N/A	N/A	N/A
	Plumbing Scenario *	128	182	128
Comments	* If plumbing scenario does not match the material received, please contact your Construction Manager			
Comments	TT4 coax With 800 with LTE			
Comments	12/6/2012			

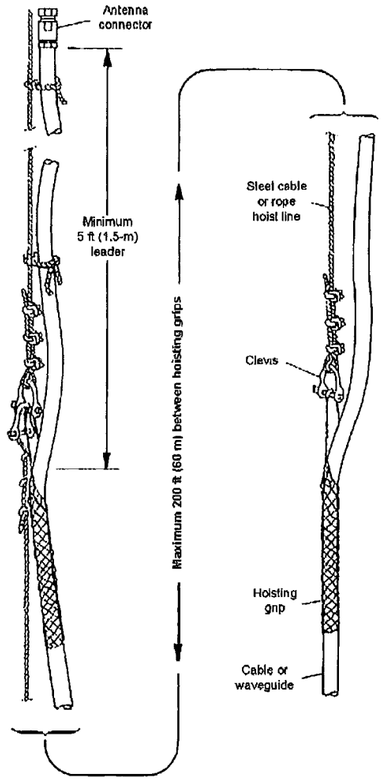
NOTE:
RFDS SHOWN PROVIDED BY SPRINT DATED 12/6/12.

NOTE:
COORDINATE RF ANTENNA INSTALLATION WITH FINAL SPRINT RFDS. COORDINATE RF MW DISH (IF APPLICABLE) INSTALLATION WITH FINAL SPRINT RFDS.

1 SPRINT RFDS
NOT TO SCALE

CHECK FST FOR LATEST VERSION OF RFDS

1. DO NOT USE ONE HOISTING GRIP FOR HOISTING TWO OR MORE CABLES OR CABLE TRAYS. THIS CAN CAUSE THE HOISTING GRIP TO BREAK OR THE CABLES OR WAVE-- GUIDES TO FALL.
2. DO NOT USE THE HOISTING GRIP FOR LOWERING CABLE OR CABLE TRAY. SNAGGING OF THE CABLE OR CABLE TRAY MAY LOOSEN THE GRIP AND POSSIBLY CAUSE THE CABLE TO CABLE TRAY TO SWAY OR FALL.
3. DO NOT REUSE HOISTING GRIPS. USED GRIPS MAY HAVE LOST ELASTICITY, STRETCHED, OR BECOME WEAKENED. REUSING A GRIP CAN CAUSE THE CABLE OR CABLE TRAY TO SLIP, BREAK, OR FALL.
4. USE HOISTING GRIPS AT INTERVALS OF NO MORE THAN 200 FT (60 M).
5. MAKE SURE THAT THE PROPER HOISTING GRIP IS USED FOR THE CABLE OR CABLE TRAY BEING INSTALLED. SLIPPAGE OR INSUFFICIENT GRIPPING STRENGTH WILL RESULT IF YOU ARE USING THE WRONG HOISTING GRIP.



2 HOIST GRIP DETAIL
NOT TO SCALE

NOTE:
1. REFER TO: CONSTRUCTION STANDARDS--SPRINT DOCUMENT: "EXHIBIT A – STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV 4.0 – 02.15.2011.DOCM"
2. REFER TO: "WEATHERPROOFING SPECS: EXCERPT EXH A – WITHRPRF – STD CONSTR SPECS._15720111042185542 9.DOCM"
3. REFER TO: "COLOR CODING--SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09--08--11.PDF"
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	Appd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KMF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number
284-035

Project Title
HARTFORD/
CROWN ATLANTIC
CT43XC805

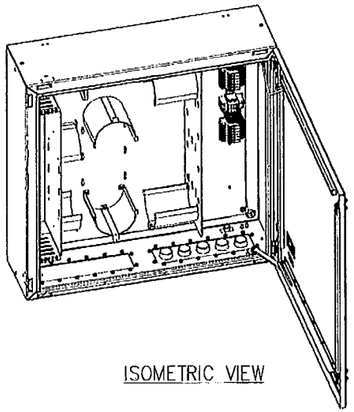
439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For
Sprint VISION

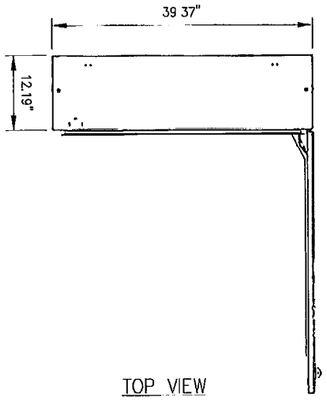
Drawing Scale:
AS NOTED
Date:
1/30/13

Drawing Title
RF AND CABLE DETAILS

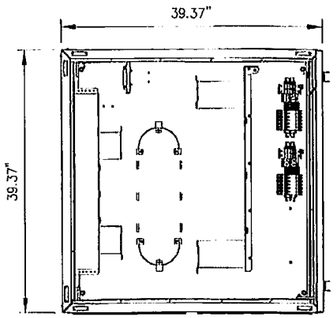
Drawing Number
C7



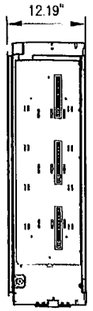
ISOMETRIC VIEW



TOP VIEW

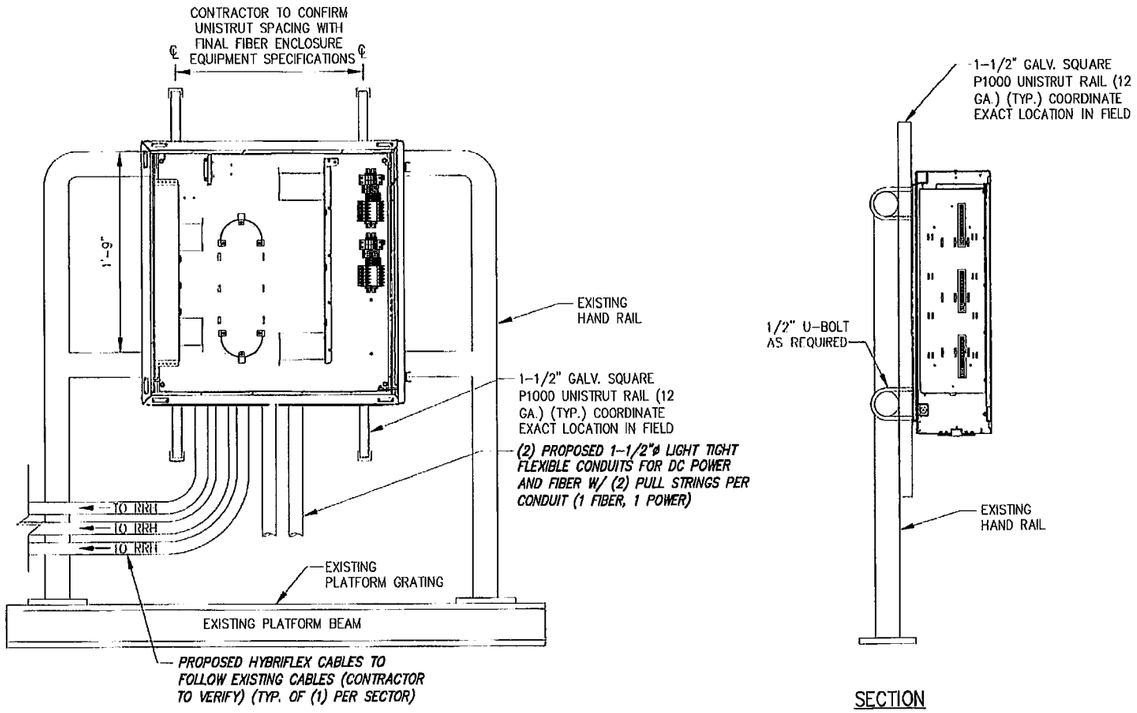


FRONT VIEW



SIDE VIEW

1 DISTRIBUTION BOX DETAIL
NOT TO SCALE



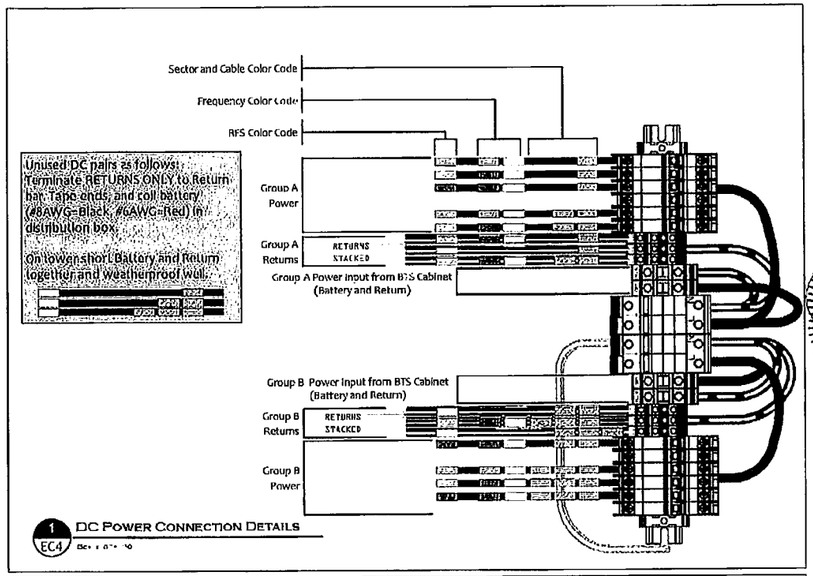
ELEVATION

SECTION

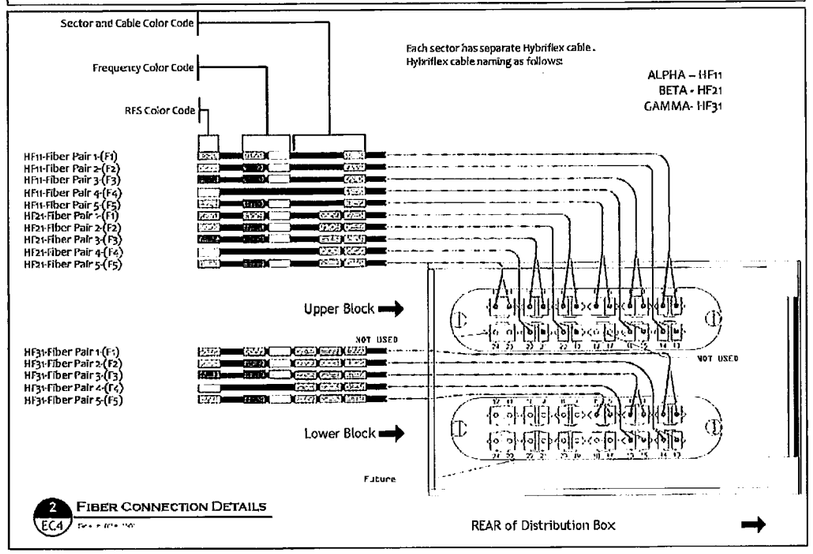
NOTE:
1. ANCHORS AND UNISTRUT CHANNEL SHALL HAVE HOT-DIPPED GALVANIZED FINISH.
2. MOUNT FIBER AND POWER DISTRIBUTION BOX WITH FOUR (4) 1/4"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS.

2 TYPICAL DISTRIBUTION BOX ON H-FRAME DETAIL
NOT TO SCALE

NOTE:
- DISTRIBUTION BOX IS KITTED WITH 50' OF 1-1/2" LIQUID-TIGHT CONDUIT AND CONNECTORS. THIS SHOULD BE:
  * SPLIT IN HALF,
  * TERMINATED TO THE DISTRIBUTION BOX AS SHOWN,
  * RAN TO AND COILED AS CLOSE TO WHERE THE CABINET IS GOING TO BE MOUNTED AS POSSIBLE.
- DISTRIBUTION BOX IS KITTED WITH 2 AWG, POWER CABLE 35' x 2EA. RUNS RED AND 2EA. RUNS BLACK. THIS SHOULD BE COILED AND LEFT INSIDE DISTRIBUTION BOX.
- BTS INSTALLATION TEAM WILL TERMINATE LIQUID-TIGHT, RUN THE FIBER JUMPERS AND POWER CABLES FROM BTS CABINET TO DISTRIBUTION BOX.



1 EC4 DC POWER CONNECTION DETAILS



2 EC4 FIBER CONNECTION DETAILS

SCENARIO 127 v1.7

3 FIBER & DC CONNECTION DETAILS
NOT TO SCALE

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (516) 690-0790
Fax # (516) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	Appd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KMF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number
294-035

Project Title
HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

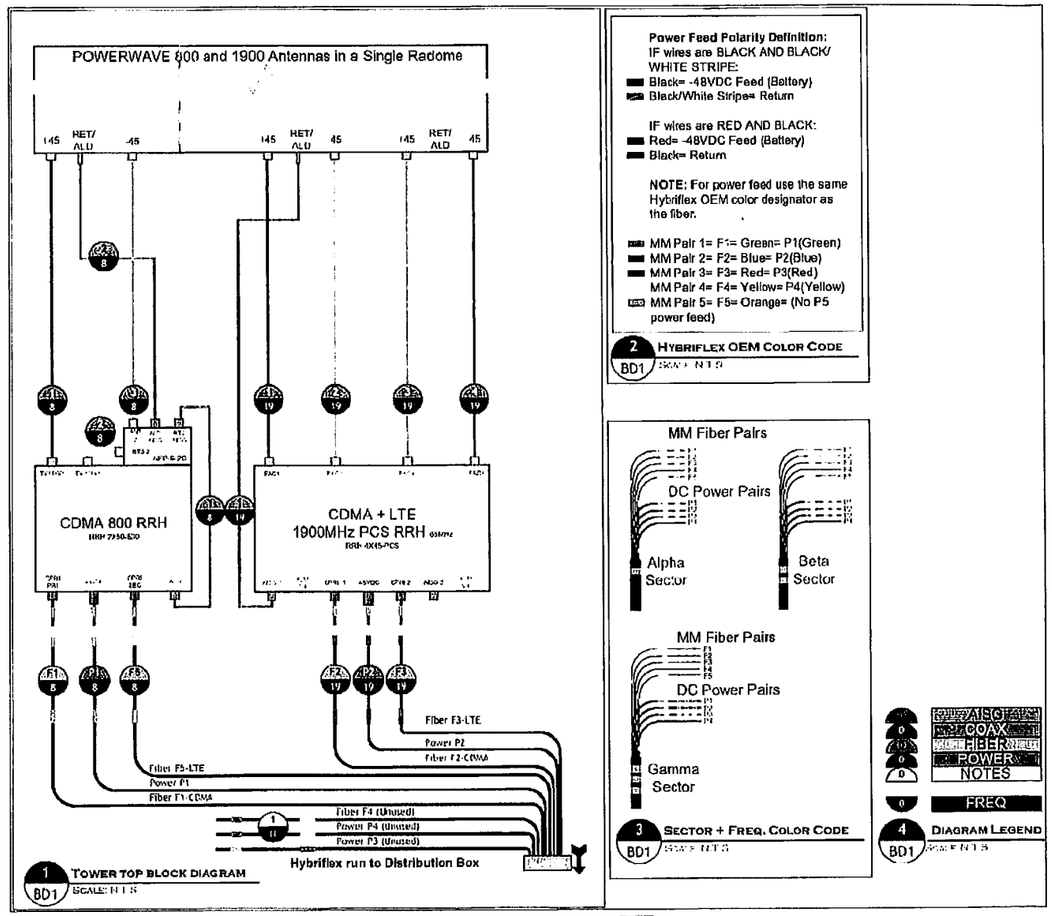
Prepared For
Sprint
VISION

Drawing Scale:
AS NOTED

Date:
1/30/13

Drawing Title
FIBER DISTRIBUTION BOX DETAILS

Drawing Number
C8



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

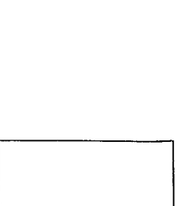
IF wires are RED AND BLACK:
- Red= -48VDC Feed (Battery)
- Black= Return

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

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

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

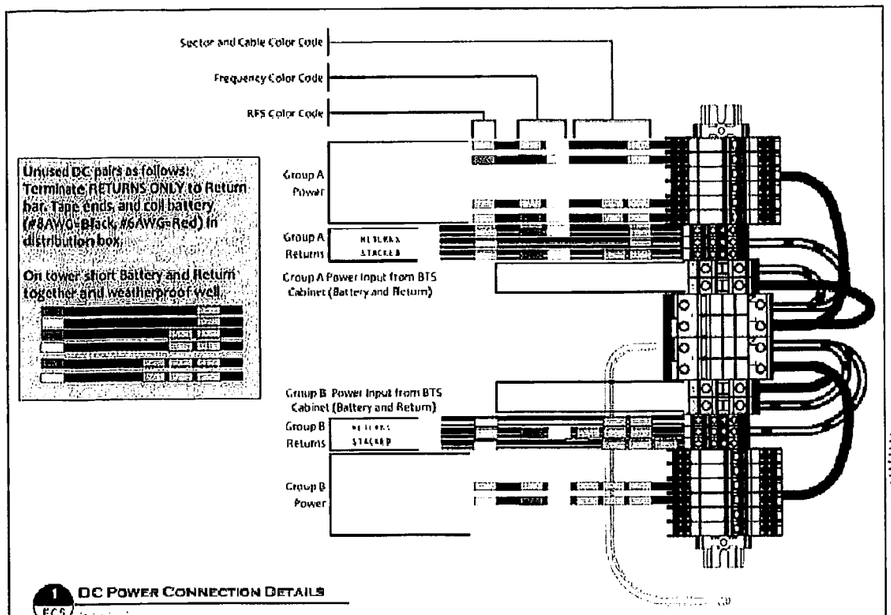
3 SECTOR + FREQ. COLOR CODE
BD1 SCALE: N.T.S



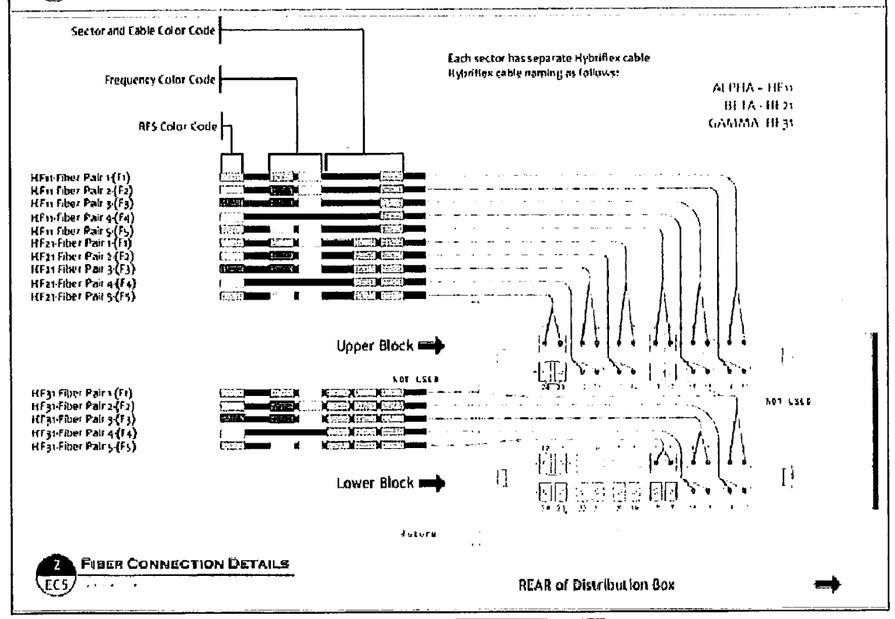
4 DIAGRAM LEGEND
BD1 SCALE: N.T.S

SCENARIO 131 v1.7

1 ANTENNA CABLE RISER DIAGRAM
-- NOT TO SCALE



1 DC POWER CONNECTION DETAILS
EC5



2 FIBER CONNECTION DETAILS
EC5

SCENARIO 131 v1.7

2 FIBER & DC CONNECTION DETAILS
-- NOT TO SCALE

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	Appd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KMF Date: 11/5/12
Designed: ASD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number
294-035

Project Title
HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For
Sprint
VISION

Drawing Scale:
AS NOTED

Date:
1/30/13

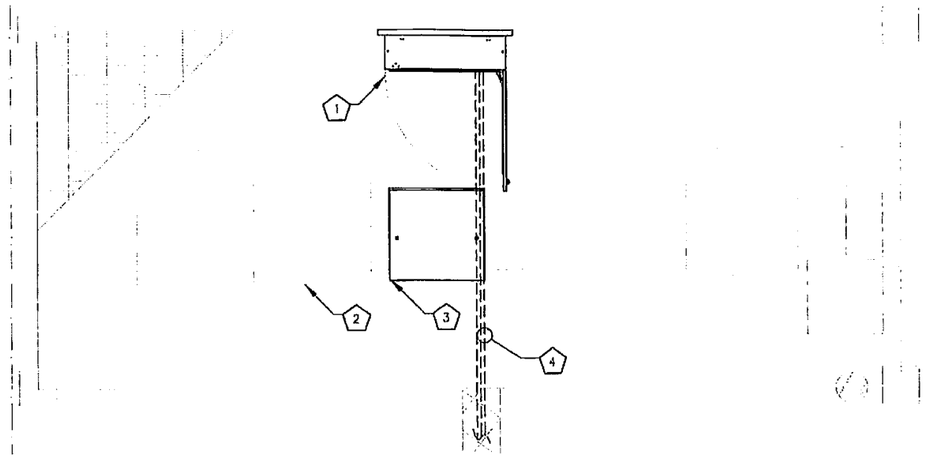
Drawing Title
FIBER & DC CONNECTION DETAILS

Drawing Number
C9

CODED NOTES:

1. *PROPOSED SPRINT FIBER/POWER JUNCTION BOX MOUNTED TO EXISTING HANDRAIL*
2. *PROPOSED RETROFIT OF EXISTING MODCELL 4.0 CABINET*
3. *PROPOSED BATTERY BACKUP CABINET*
4. *PROPOSED HYBRIFLEX CABLES ROUTED FROM PROPOSED FIBER JUNCTION BOX TO PROPOSED TOWER MOUNTED RRH TO FOLLOW EXISTING CABLES (CONTRACTOR TO VERIFY) (TYP. OF (1) PER SECTOR)*

NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.



1 UTILITY SITE PLAN
SCALE: AS NOTED

CALLED NORTH

GRAPHIC SCALE
4' 2' 0 2' 4'
SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

UNDERGROUND SERVICE ALERT
CALL TOLL FREE
1-800-922-4455
THREE WORKING DAYS BEFORE YOU DIG

NOTES:
- CONTRACTOR TO USE EXISTING SPARE CONDUITS, IF AVAILABLE. CONDUIT SIZES MUST BE EQUAL TO OR GREATER THAN THAT ALLOWED BY CODE.
- EXISTING ALARMS NEED TO BE RE-ROUTED AND VERIFIED IN PROPER WORKING CONDITION WHEN NEW MMBTS EQUIPMENT IS INSTALLED.
- REMAINING GROUND LEADS FROM REMOVED CABINETS TO BE COILED (NOT ON WALKING SURFACE).
- REMAINING UNUSED CONDUITS FROM EXISTING CABINETS TO BE COVERED WITH WATERPROOF CAPS (NOT DUCT TAPE).

ELECTRICAL NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (N.E.C.), AND APPLICABLE LOCAL CODES
2. GROUNDING SHALL COMPLY WITH THE ARTICLE 250 OF NATIONAL ELECTRICAL CODE.
3. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED.
4. ALL WIRES SHALL BE AWG MIN #12 THHN COPPER UNLESS NOTED.
5. CONDUCTORS SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT UNLESS NOTED OTHERWISE.
6. LABEL SPRINT SERVICE DISCONNECTS WITH SWITCH AND PPC CABINET WITH ENGRAVED LAMACOID LABELS, LETTERS 1" IN HEIGHT.
7. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 8" RADIUS.
8. ENGAGE AN INDEPENDENT TESTING FIRM TO TEST AND VERIFY THAT RESISTANCE DOES NOT EXCEED 10 OHMS TO GROUND. TEST GROUND RING RESISTANCE PRIOR TO MAKING FINAL GROUND CONNECTIONS TO INFRASTRUCTURE AND EQUIPMENT. GROUNDING AND OTHER OPERATIONAL TESTING SHALL BE WITNESSED BY SPRINTS REPRESENTATIVE.
9. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE REQUIRED SO THAT CONDUIT BENDS DO NOT EXCEED 360 DEGREES.
10. OBTAIN PERMITS AND PAY FEES RELATED TO ELECTRICAL WORK PERFORMED ON THIS PROJECT. DELIVER COPIES OF ALL PERMITS TO SPRINT REPRESENTATIVE.
11. SCHEDULE AND ATTEND INSPECTIONS RELATED TO ELECTRICAL WORK REQUIRED BY JURISDICTION HAVING AUTHORITY. CORRECT AND PAY FOR ANY WORK REQUIRED TO PASS ANY FAILED INSPECTION.
12. REDLINED AS-BUILTS ARE TO BE DELIVERED TO A SPRINT REPRESENTATIVE.
13. PROVIDE TWO COPIES OF OPERATION AND MAINTENANCE MANUALS IN THREE-RING BINDER.
14. FURNISH AND INSTALL THE COMPLETE ELECTRICAL SERVICE, TELCO CONDUIT, AND THE COMPLETE GROUNDING SYSTEM.
15. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND LOCAL ORDINANCES, INSTALLED IN A NEAT MANNER AND SHALL BE SUBJECT TO APPROVAL BY A SPRINT REPRESENTATIVE.
16. CONDUCT A PRE-CONSTRUCTION SITE VISIT AND VERIFY EXISTING SITE CONDITIONS AFFECTING THIS WORK. REPORT ANY OMISSIONS OR DISCREPANCIES FOR CLARIFICATION PRIOR TO THE START OF CONSTRUCTION.
17. PROTECT ADJACENT STRUCTURES AND FINISHES FROM DAMAGE, REPAIR TO ORIGINAL CONDITION ANY DAMAGED AREA.
18. REMOVE DEBRIS ON A DAILY BASIS. DEBRIS NOT REMOVED IN A TIMELY FASHION WILL BE REMOVED BY OTHERS AND THE RESPONSIBLE SUBCONTRACTOR SHALL BE CHARGED ACCORDINGLY. REMOVAL OF DEBRIS SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE. DEBRIS SHALL BE REMOVED FROM THE PROPERTY AND DISPOSED OF LEGALLY.
19. UPON COMPLETION OF WORK, THE SITE SHALL BE CLEAN AND FREE OF DUST AND FINGERPRINTS.
20. PRIOR TO ANY TRENCHING, CONTACT LOCAL UTILITY TO VERIFY LOCATION OF ANY EXISTING BURIED SERVICE CONDUITS.
21. DOCUMENT GROUND RING INSTALLATION AND CONNECTIONS TO IT WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PRESENT PHOTO ARCHIVE A SITE "PUNCH LIST" WALK TO SPRINT'S REPRESENTATIVE.

NOTE:
INFINIGY ENGINEERING HAS NOT CONDUCTED AN ELECTRICAL LOAD STUDY FOR THIS SITE. CONTRACTOR IS TO VERIFY EXISTING ELECTRICAL LOADS PRIOR TO CONSTRUCTION TO ENSURE THERE IS AMPLE SERVICE AVAILABLE TO ACCOMMODATE THE EXISTING AND PROPOSED EQUIPMENT.

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
PROFESSIONAL ENGINEER
UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	App'd	Date
1	REVISED PER COMMENTS	KMF	1/30/13
0	ISSUED FOR REVIEW	KMF	11/5/12

Drawn: KMF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number
294-035

Project Title

HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For

Sprint VISION

Drawing Scale:
AS NOTED

Date:
1/30/13

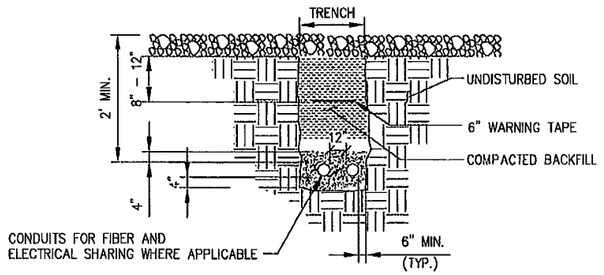
Drawing Title

UTILITY SITE PLAN

Drawing Number

E1

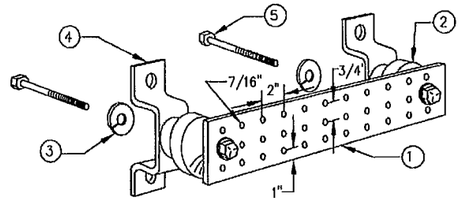
GROUNDING NOTES:
IN ADDITION TO POWER SERVICE GROUNDING AS REQUIRED BY NEC. CONTRACTOR SHALL BE RESPONSIBLE TO COORD AND INSTALL ALL SURGE AND LIGHTING PROTECTION GROUNDING AS REQUIRED AND SPECIFIED BY SPRINT.



– SEPARATION DIMENSIONS MUST BE VERIFIED WITH LOCAL UTILITY CO. REQUIREMENTS.

***HAND DIG INSIDE COMPOUND**

1 — UTILITY TRENCH DETAIL
NOT TO SCALE

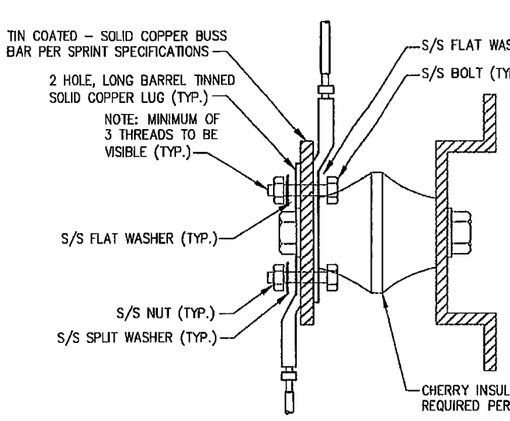


LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x4"x20", NEWTON INSTRUMENT CO., HARGER TGBI14420M, OR EQUIVALENT. HOLE CENTERS TO MATCH
2. NEMA DOUBLE LUG CONFIGURATION.
3. INSULATORS, NEWTON INSTRUMENT CO. CAT. NO. 3061-4 OR HARGER EQUIVALENT.
4. 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8 OR EQUIVALENT.
5. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A-6056 OR HARGER EQUIVALENT.
6. 5/8-11"x1" H.H.C.S. BOLTS, NEWTON INSTRUMENT CO. CAT. NO. 3012-1 OR HARGER EQUIVALENT.

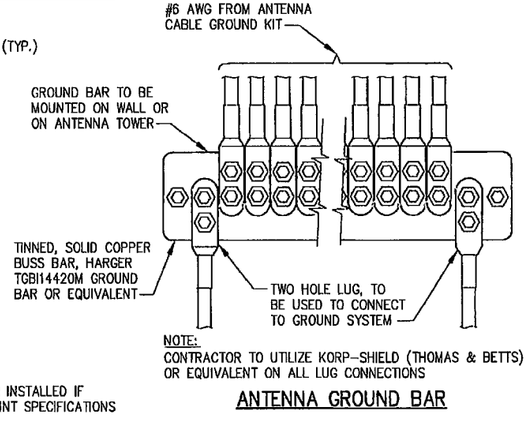
NOTE:
1) ALL MOUNTING HARDWARE CAN ALSO BE USED ON 6", 12", 18", ETC. GROUND BARS.
2) ENTIRE ESSEMBLY AVAILABLE FROM NEWTON INSTRUMENT CO. CAT. NO. 2106060010 OR AS HARGER TGBI14420M.

GROUND BAR



NOTE:
1) ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING SPLIT WASHERS.
2) COAT WIRE END WITH ANTI-OXIDATION COMPOUND PRIOR TO INSERTION INTO LUG BARREL AND CRIMPING.
3) APPLY ANTI-OXIDATION COMPOUND BETWEEN ALL LUGS AND BUSS BARS PRIOR TO MATING AND BOLTING.

GROUND LUG



NOTE:
CONTRACTOR TO UTILIZE KORP-SHIELD (THOMAS & BETTS) OR EQUIVALENT ON ALL LUG CONNECTIONS

ANTENNA GROUND BAR

2 — GROUND BAR DETAILS
NOT TO SCALE

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT — JOHN S. STEVENS — No. 24705 — LICENSED PROFESSIONAL ENGINEER

No.	Submittal / Revision	App'd	Date
1	REVISED PER COMMENTS	KWF	1/30/13
0	ISSUED FOR REVIEW	KWF	11/5/12

Drawn: KWF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: ABF Date: 11/5/12

Project Number
284-035

Project Title
HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For
Sprint VISION

Drawing Scale:
AS NOTED

Date:
1/30/13

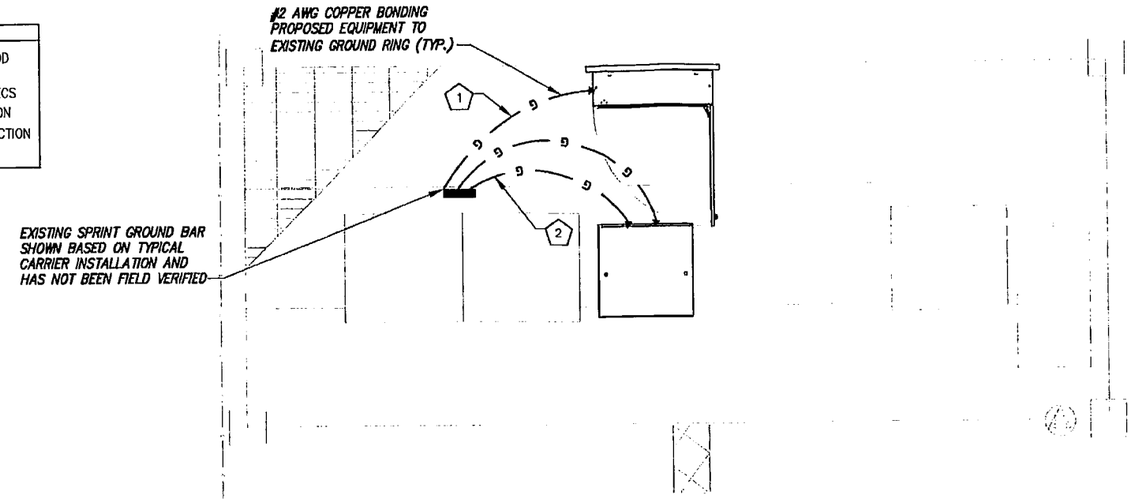
Drawing Title
DETAILS

Drawing Number
E2

CODED NOTES:

1. PROPOSED SPRINT FIBER/POWER JUNCTION BOX MOUNTED TO HANDRAIL
2. PROPOSED BATTERY BACKUP CABINET

SYMBOL	
⊗	COPPER GROUND ROD
▸	CONNECT PER MANUFACTURER SPECS
■	CADWELD CONNECTION
●	MECHANICAL CONNECTION
▬	GROUND BAR



1 EQUIPMENT GROUNDING PLAN
SCALE: AS NOTED

CALLED NORTH

GRAPHIC SCALE

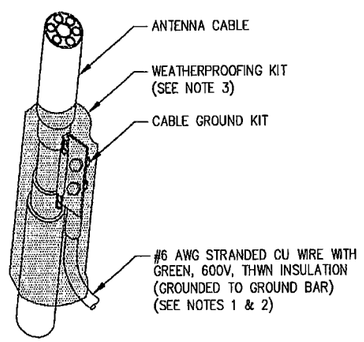
4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

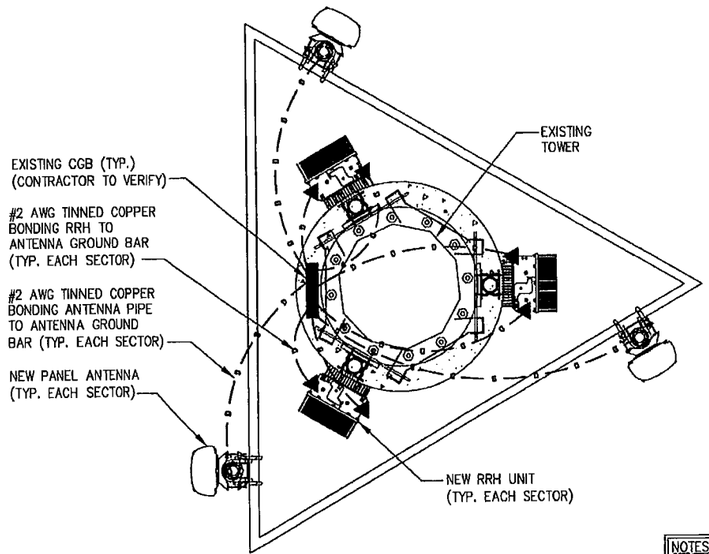
GROUNDING NOTES:

1. ALL DOWN CONDUCTORS AND GROUND RING AND CONDUCTOR SHALL BE #2 AWG, SOLID, BARE, TINNED COPPER, UNO. ALL CONNECTIONS TO GROUND RING SHALL BE EXOTHERMICALLY WELDED. CONDUCTOR SHALL BE A MINIMUM DEPTH BELOW GRADE OF 30 INCHES OR TO THE LEDGE. MINIMUM BEND RADIUS SHALL BE 8 INCHES. CONDUCTOR SHALL BE AT LEAST 24 INCHES FROM ANY FOUNDATION, UNO.
2. WHERE MECHANICAL CONDUCTOR CONNECTIONS ARE SPECIFIED, BOLTED, COMPRESSION-TYPE CLAMPS OR SPLIT-BOLT TYPE CONNECTORS SHALL BE USED.
3. GRIND OFF GALVANIZING IN AFFECTED AREA. EXOTHERMICALLY WELD #2 CONDUCTOR AT 6 INCHES ABOVE GRADE R FOUNDATION, WHICHEVER IS HIGHER. COLD-GALV AFTER. EXOTHERMICALLY WELD OTHER END TO THE GROUND.
4. GROUND CONDUCTORS ON EXTERIOR WALL OF SHELTER SHALL BE ENCASED IN PVC CONDUIT TO GRADE. MOUNT PVC WITH GALVANIZED "C" CLAMPS. SEAL TOP ENDS.
5. FOLLOWING COMPLETION OF WORK, CONDUCT GROUND TEST. SUBMIT WRITTEN TEST TO CONSTRUCTION MANAGER AND PROJECT MANAGER.
6. ALL GROUNDING WORK SHALL COMPLY WITH CARRIER(S) STANDARDS.
7. GROUNDING REQUIREMENTS SHOWN ON THIS PLAN ARE FOR ITEMS THAT ARE LOCATED NEAR GRADE LEVEL AND THAT NEED TO BE TIED TO THE BELOW GRADE GROUND RING.
8. UNLESS NOTED OTHERWISE, ALL GROUNDING SHALL BE IN ACCORDANCE WITH SPRINT'S SSEQ DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES", AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING". ALL GROUNDING SHALL ALSO COMPLY WITH ALL STATE AND LOCAL CODES, AND THE NATIONAL ELECTRICAL CODE (NEC).
9. UNLESS NOTED OTHERWISE, ALL GROUNDING CONNECTIONS SHALL BE MADE BY AN EXOTHERMIC WELD.
10. RESISTANCE TO EARTH TESTING IS REQUIRED PER SPRINT STANDARDS ON ALL NEW SITES.
11. REFER TO "ANTI-THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUND RING.

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) WEATHERPROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.



2 CONNECTION OF GROUND KIT TO ANTENNA CABLE
NOT TO SCALE



3 TYPICAL ANTENNA GROUNDING PLAN
NOT TO SCALE

NOTES:
1. CONTRACTOR TO VERIFY EXISTING LUG SPACES ARE AVAILABLE ON GROUND BAR. ADD ADDITIONAL BUS BAR IF NO LUG SPACES ARE AVAILABLE.
2. ANTENNA GROUNDING CONNECTIONS SHOWN ARE NOT EXACT TO THIS SITE. FOR EXACT ANTENNA LAYOUT REFER TO ANTENNA CONFIGURATION SHEET.

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (516) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	Appd	Date
1	REVISED PER COMMENTS	KWF	1/30/13
0	ISSUED FOR REVIEW	KWF	11/5/12

Drawn: KWF Date: 11/5/12
Designed: AJD Date: 11/5/12
Checked: AGF Date: 11/5/12

Project Number: 294-035

Project Title:
HARTFORD/
CROWN ATLANTIC
CT43XC805

439-455 HOMESTEAD AVENUE
HARTFORD, CT 06105

Prepared For:
Sprint VISION

Drawing Scale: AS NOTED
Date: 1/30/13

Drawing Title:
GROUNDING PLAN AND DETAILS

Drawing Number:
E3

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT43XC805

Hartford (Crown Atlantic)
439-455 Homestead Avenue
Hartford, CT 06105

January 2, 2013

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

January 2, 2013

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site: **CT43XC805 – Hartford (Crown Atlantic)**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 439-455 Homestead Avenue, Hartford, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. 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.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 439-455 Homestead Avenue, Hartford, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 6 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the RFS APXVSPP18-C-A20 and the Powerwave P40-16-XLPP-RR-A. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The Powerwave P40-16-XLPP-RR-A has a 15.9 dBd gain value at its main lobe at 1900 MHz and 14.2 dBd at its main lobe for 850 MHz. All `calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **104 feet** above ground level (AGL)
7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT43XC805 - Hartford (Crown Atlantic)
Site Addresss	439-455 Homestead Avenue, Hartford, CT, 06105
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	6	120	15.9	104	98	1/2 "	0.5	0	4160.8422	155.7525	15.57525%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	104	98	1/2 "	0.5	0	389.96892	14.59768	2.57455%
														Sector total Power Density Value:		18.150%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	Powerwave	P40-16-XLPP-RR-A	RRH	1900 MHz	CDMA / LTE	20	6	120	15.9	104	98	1/2 "	0.5	0	4160.8422	155.7525	15.57525%
2a	Powerwave	P40-16-XLPP-RR-A	RRH	850 MHz	CDMA / LTE	20	1	20	14.2	104	98	1/2 "	0.5	0	468.84576	17.55027	3.09529%
														Sector total Power Density Value:		18.671%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	6	120	15.9	104	98	1/2 "	0.5	0	4160.8422	155.7525	15.57525%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	104	98	1/2 "	0.5	0	389.96892	14.59768	2.57455%
														Sector total Power Density Value:		18.150%	

Site Composite MPE %	
Carrier	MPE %
Sprint	54.970%
Clearwire	1.670%
CL&P	2.100%
MetroPCS	7.700%
T-Mobile	0.210%
Verizon Wireless	17.640%
AT&T	2.390%
Total Site MPE %	**86.680%**

EBI Consulting
environmental | engineering | due diligence

Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **54.970% (18.150% each from sectors 1 and 3 and 18.671% from sector 2)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **86.680%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

Date: **October 18, 2012**

Eva Morales
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate – *Interim Load***	
	Carrier Site Number:	CT43XC805
	Carrier Site Name:	CT43XC805
Crown Castle Designation:	**Crown Castle BU Number:**	806369
	Crown Castle Site Name:	HRT 094 943225
	Crown Castle JDE Job Number:	190485
	Crown Castle Work Order Number:	541166
	Crown Castle Application Number:	165644 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	541166
Site Data:	**439-455 HOMESTEAD AVE, HARTFORD, Hartford County, CT** **Latitude *41° 47' 1.61"*, Longitude *-72° 42' 13.66"*** **140 Foot - Monopole Tower**	

Dear Eva Morales,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 541166, in accordance with application 165644, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

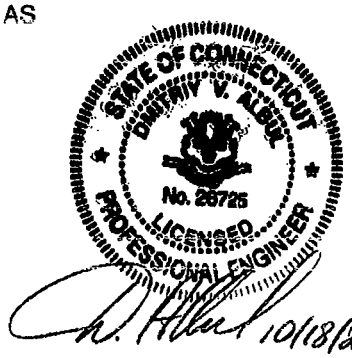
The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code based upon a wind speed of 80 mph fastest mile.

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

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

Structural analysis prepared by: Jesse J. Fresch, EIT / AS

Respectfully submitted by:



Dmitriy V. Albul, P.E.
Engineer II

tnxTower Report - version 6.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 140 ft Monopole tower designed by VALMONT in August of 1999. The tower was originally designed for a wind speed of 125 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
102.0	104.0	1	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe	3	1-1/4	-
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
100.0	100.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	-
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Collar Mount [SO 102-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	140.0	1	tower mounts	Platform Mount (LP 101-1)	12	7/8	1
	137.0	3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/1C-3L			
		3	antel	BXA-171063/8CFx2 w/ Mount Pipe	-	-	2
		4	antel	LPA-80063/4CF w/ Mount Pipe			
		2	swedcom	SC-E 6014 rev2 w/ Mount Pipe			
126.0	128.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
	126.0	1	tower mounts	Platform Mount [LP 1001-1]	12	1-5/8	1
115.0	117.0	6	ericsson	RRUS-11	12	1-5/8	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	2 1	3/4 3/8	
		2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
	116.0	6	powerwave technologies	7770.00 w/ Mount Pipe			
		12	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	115.0	1	tower mounts	Platform Mount [LP 712-1]			
102.0	108.0	1	andrew	VHLP2-180	6 3 3 3	1-5/8 1/2 1/4 5/16	1
		1	andrew	VHLP2.5-11			
		2	dragonwave	HORIZON COMPACT			
	104.0	3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
		6	decibel	950F40T4E-M w/ Mount Pipe			
		3	samsung telecommunications	WIMAX DAP HEAD			
	102.0	1	tower mounts	Platform Mount [LP 602-1]			
94.0	94.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
74.0	80.0	1	antel	BCD-87010	1	7/8	1
	74.0	1	tower mounts	Side Arm Mount [SO 701-1]			
40.0	41.0	1	lucent	KS24019-L112A	1	1/2	1
	40.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
137	137	12	swedcom	ALP 9212-N	-	-
124	124	6	rfs celwave	APN199015	-	-
114	114	9	allgon	7184.15	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Tower Engineering Professionals	2294838	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Tower Engineering Professionals (Mapping)	2294380	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Tower Engineering Professionals (Mapping)	2294379	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Valmont Industries, Inc.	823121	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	140 - 86.8333	Pole	TP39.223x26.216x0.3125	1	-17.03	1962.96	44.9	Pass
L2	86.8333 - 38	Pole	TP50.56x37.2117x0.4063	2	-29.75	3294.14	65.0	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-47.52	4900.57	65.3	Pass
							Summary	
						Pole (L3)	65.3	Pass
						Rating =	65.3	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	69.9	Pass
1	Base Plate	0	32.6	Pass
1	Base Foundation	0	49.8	Pass

Structure Rating (max from all components) =	69.9%

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

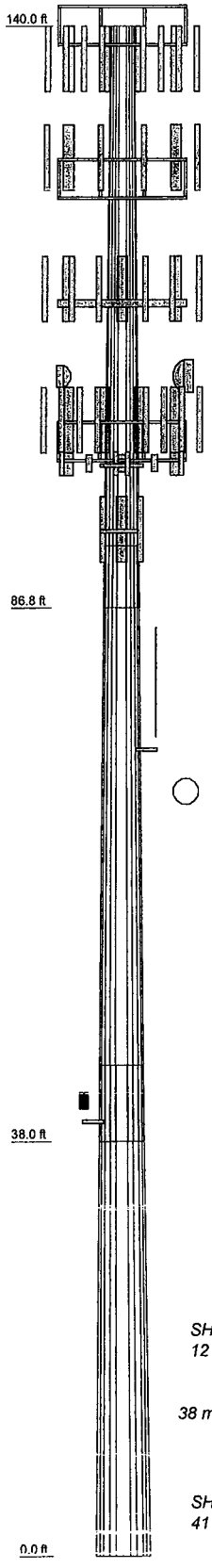
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	53'2-1/32"	12	0.3125	5'8-1/32"	26.2160	39.2230		5.9
2	54'6"	12	0.4063	7'	37.2117	50.5600	A572-65	10.5
3	45'	12	0.5000		48.0330	59.0500		13.1
								29.5



AXIAL
77 K

SHEAR
12 K

MOMENT
1121 kip-ft

TORQUE 1 kip-ft
38 mph WIND - 1.0000 in ICE

AXIAL
48 K

SHEAR
41 K

MOMENT
3757 kip-ft

TORQUE 2 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BXA-70063/6CF w/ Mount Pipe	140	(2) RRUS-11	115
BXA-70063/6CF w/ Mount Pipe	140	(2) RRUS-11	115
BXA-70063/6CF w/ Mount Pipe	140	8'x2" Antenna Mount Pipe	115
(2) FD9R6004/1C-3L	140	8'x2" Antenna Mount Pipe	115
(2) FD9R6004/1C-3L	140	8'x2" Antenna Mount Pipe	115
(2) FD9R6004/1C-3L	140	Platform Mount [LP 712-1]	115
BXA-171063/8CFx2 w/ Mount Pipe	140	APXVSPP18-C-A20 w/ Mount Pipe	102
BXA-171063/8CFx2 w/ Mount Pipe	140	IBC1900BB-1	102
BXA-171063/8CFx2 w/ Mount Pipe	140	IBC1900HG-2A	102
(2) LPA-80063/4CF w/ Mount Pipe	140	P40-16-XLPP-RR-A w/ Mount Pipe	102
(2) LPA-80063/4CF w/ Mount Pipe	140	IBC1900BB-1	102
(2) SC-E 6014 rev2 w/ Mount Pipe	140	IBC1900HG-2A	102
Platform Mount (LP 101-1)	140	APXVSPP18-C-A20 w/ Mount Pipe	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	IBC1900BB-1	102
		IBC1900HG-2A	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	LLPX310R-V1 w/ Mount Pipe	102
		LLPX310R-V1 w/ Mount Pipe	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	LLPX310R-V1 w/ Mount Pipe	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	(2) 950F40T4E-M w/ Mount Pipe	102
		(2) 950F40T4E-M w/ Mount Pipe	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	(2) 950F40T4E-M w/ Mount Pipe	102
		WIMAX DAP HEAD	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	WIMAX DAP HEAD	102
		WIMAX DAP HEAD	102
ATMAA1412D-1A20	126	HORIZON COMPACT	102
ATMAA1412D-1A20	126	HORIZON COMPACT	102
ATMAA1412D-1A20	126	Platform Mount [LP 602-1]	102
(2) 6' x 2" Mount Pipe	126	VHLP2.5-11	102
(2) 6' x 2" Mount Pipe	126	VHLP2-180	102
(2) 6' x 2" Mount Pipe	126	800MHz 2X50W RRH W/FILTER	100
Platform Mount [LP 1001-1]	126	(2) PCS 1900MHz 4x45W-65MHz	100
(2) 7770.00 w/ Mount Pipe	115	800MHz 2X50W RRH W/FILTER	100
(2) 7770.00 w/ Mount Pipe	115	(2) PCS 1900MHz 4x45W-65MHz	100
(2) 7770.00 w/ Mount Pipe	115	Collar Mount [SO 102-3]	100
(4) LGP21401	115	800MHz 2X50W RRH W/FILTER	100
(4) LGP21401	115	(2) PCS 1900MHz 4x45W-65MHz	100
(4) LGP21401	115	742 213 w/ Mount Pipe	94
P65-17-XLH-RR w/ Mount Pipe	115	Side Arm Mount [SO 102-3]	94
AM-X-CD-16-65-00T-RET w/ Mount Pipe	115	742 213 w/ Mount Pipe	94
		742 213 w/ Mount Pipe	94
P65-17-XLH-RR w/ Mount Pipe	115	BCD-87010	74
DC6-48-60-18-8F	115	Side Arm Mount [SO 701-1]	74
(2) RRUS-11	115	KS24019-L112A	40
		Side Arm Mount [SO 701-1]	40

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 65.3%

CROWN CASTLE
We Are Solutions

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX: (724) 416-4425

Job: BU# 806369			
Project:			
Client: Crown Castle	Drawn by: Jesse Fresch	App'd:	
Code: TIA/EIA-222-F	Date: 10/16/12	Scale: NTS	
Path: R:\SA Models - Letters\Work Area\J-Fresch\806369-WO541156\806369.en		Dwg No. E-1	

Tower Input Data

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

3) Tower is located in Hartford County, Connecticut.
4) Basic wind speed of 80 mph.
5) Nominal ice thickness of 1.0000 in.
6) Ice thickness is considered to increase with height.
7) Ice density of 56.00 pcf.
8) A wind speed of 38 mph is used in combination with ice.
9) Temperature drop of 50 °F.
10) Deflections calculated using a wind speed of 50 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in pole design is 1.333.
14) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	140'-86'9-31/32"	53'2-1/32"	5'8-1/32"	12	26.2160	39.2230	0.3125	1.2500	A572-65 (65 ksi)
L2	86'9-31/32"-38'	54'6"	7'	12	37.2117	50.5600	0.4063	1.6250	A572-65 (65 ksi)
L3	38'-0'	45'		12	48.0330	59.0500	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	27.1408	26.0654	2232.3752	9.2735	13.5799	164.3883	4523.3974	12.8286	6.1884	19.803
	40.6066	39.1537	7566.4519	13.9300	20.3175	372.4103	15331.683 0	19.2703	9.6743	30.958

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L2	39.9612	48.1461	8324.7399	13.1763	19.2756	431.8786	16868.1799	23.6960	8.8840	21.868
	52.3436	65.6074	21064.2222	17.9550	26.1901	804.2825	42681.8251	32.2900	12.4613	30.674
L3	51.5017	76.5282	22069.8048	17.0168	24.8811	887.0104	44719.4079	37.6648	11.5329	23.066
	61.1331	94.2655	41247.0150	20.9609	30.5879	1348.4749	83577.6350	46.3946	14.4854	28.971

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 140'-86'9-31/32"				1	1	1		
L2 86'9-31/32"-38'				1	1	1		
L3 38'-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
HJ5-50A(7/8")	A	No	Inside Pole	140' - 0'	0.0000	0	12	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
*										
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	No	CaAa (Out Of Face)	126' - 0'	0.0000	0	1	No Ice	0.16	0.00
								1/2" Ice	0.26	0.00
								1" Ice	0.36	0.00
								2" Ice	0.56	0.01
								4" Ice	0.96	0.03
FLC 158-50J(1-5/8")	A	No	Inside Pole	126' - 0'	0.0000	0	4	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
LCF158-50JA-A0(1 5/8")	A	No	Inside Pole	126' - 0'	0.0000	0	8	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
*										
LDF7-50A(1-5/8")	C	No	Inside Pole	115' - 0'	0.0000	0	12	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
FB-L98B-002-75000(3/8")	C	No	Inside Pole	115' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	115' - 0'	0.0000	0	2	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
*								4" Ice	0.00	0.00
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
ATCB-B01-005(5/16)	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	3	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
LDF1-50A(1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	3	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
2" Rigid Conduit	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.20	0.00
								1/2" Ice	0.30	0.00
								1" Ice	0.40	0.01
								2" Ice	0.60	0.01
								4" Ice	1.00	0.03
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	1	No Ice	0.15	0.00
								1/2" Ice	0.25	0.00
								1" Ice	0.35	0.00
								2" Ice	0.55	0.01
								4" Ice	0.95	0.03
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.03
LDF7-50A(1-5/8")	A	No	Inside Pole	102' - 0'	0.0000	0	6	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
*								4" Ice	0.00	0.00
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	94' - 0'	0.0000	0	2	No Ice	0.20	0.00
								1/2" Ice	0.30	0.00
								1" Ice	0.40	0.00
								2" Ice	0.60	0.01
								4" Ice	1.00	0.03
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	94' - 0'	0.0000	0	4	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.03
*										
LDF5-50A(7/8")	B	No	CaAa (Out Of Face)	74' - 0'	0.0000	0	1	No Ice	0.11	0.00
								1/2" Ice	0.21	0.00
								1" Ice	0.31	0.00
								2" Ice	0.51	0.01
								4" Ice	0.91	0.03
*										
LDF4-50A(1/2")	C	No	Inside Pole	40' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
*										
Thin Flat Bar Climbing Ladder	C	No	CaAa (Out Of Face)	115' - 105'	30.0000	0	1	No Ice	0.33	0.00
								1/2" Ice	0.44	0.01
								1" Ice	0.56	0.01
								2" Ice	0.78	0.01
								4" Ice	1.22	0.02
*										

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140'-86'9-31/32"	A	0.000	0.000	0.000	14.767	1.41
		B	0.000	0.000	0.000	2.881	0.03
		C	0.000	0.000	0.000	3.333	0.35
L2	86'9-31/32"-38'	A	0.000	0.000	0.000	34.989	1.88
		B	0.000	0.000	0.000	23.555	0.22
		C	0.000	0.000	0.000	0.000	0.54
L3	38'-0'	A	0.000	0.000	0.000	27.227	1.46
		B	0.000	0.000	0.000	19.418	0.17
		C	0.000	0.000	0.000	0.000	0.43

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140'-86'9-31/32"	A	1.158	0.000	0.000	0.000	34.376	2.22
		B		0.000	0.000	0.000	6.201	0.23
		C		0.000	0.000	0.000	5.907	0.39
L2	86'9-31/32"-38'	A	1.079	0.000	0.000	0.000	80.230	4.15
		B		0.000	0.000	0.000	54.514	1.70
		C		0.000	0.000	0.000	0.000	0.54
L3	38'-0'	A	1.000	0.000	0.000	0.000	60.017	3.01
		B		0.000	0.000	0.000	44.011	1.23
		C		0.000	0.000	0.000	0.000	0.43

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	140'-86'9-31/32"	-0.0009	-0.3178	0.0212	-0.6329
L2	86'9-31/32"-38'	0.4765	-0.5374	0.8144	-0.9030
L3	38'-0'	0.5224	-0.5442	0.9154	-0.9129

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.70 6.85 7.71 9.50 13.26	0.04 0.10 0.17 0.33 0.80
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.70 6.85 7.71 9.50 13.26	0.04 0.10 0.17 0.33 0.80
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.98 8.62 9.23 10.47 13.08	5.70 6.85 7.71 9.50 13.26	0.04 0.10 0.17 0.33 0.80
(2) FD9R6004/1C-3L	A	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/1C-3L	B	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/1C-3L	C	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
BXA-171063/8CFx2 w/ Mount Pipe	A	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.52 3.92 4.80 6.71	3.51 4.13 4.76 6.06 9.09	0.03 0.06 0.10 0.20 0.49
BXA-171063/8CFx2 w/ Mount Pipe	B	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.52 3.92 4.80 6.71	3.51 4.13 4.76 6.06 9.09	0.03 0.06 0.10 0.20 0.49
BXA-171063/8CFx2 w/ Mount Pipe	C	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.52 3.92 4.80 6.71	3.51 4.13 4.76 6.06 9.09	0.03 0.06 0.10 0.20 0.49
(2) LPA-80063/4CF w/ Mount Pipe	A	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.25 7.72 8.20 9.19 11.32	7.26 7.96 8.67 10.16 13.39	0.04 0.10 0.18 0.34 0.80
(2) LPA-80063/4CF w/ Mount Pipe	B	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice	7.25 7.72 8.20 9.19 11.32	7.26 7.96 8.67 10.16 13.39	0.04 0.10 0.18 0.34 0.80

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
(2) SC-E 6014 rev2 w/ Mount Pipe	C	From Leg	4.00 0' -3'	0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.78 4.18 4.59 5.44 7.29	4.40 5.01 5.64 6.96 9.90	0.03 0.07 0.11 0.22 0.54
Platform Mount (LP 101-1)	C	None		0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	36.21 42.82 49.43 62.65 89.09	36.21 42.82 49.43 62.65 89.09	1.50 2.30 3.10 4.70 7.89
*									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ATMAA1412D-1A20	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice	0.47 0.57 0.69	1.17 1.31 1.47	0.01 0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	0.95	1.81	0.06
						2" Ice	1.57	2.58	0.14
						4" Ice			
(2) 6' x 2" Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	126'	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
						4" Ice	4.70	4.70	0.23
(2) 6' x 2" Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	126'	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
						4" Ice	4.70	4.70	0.23
(2) 6' x 2" Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	126'	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
						4" Ice	4.70	4.70	0.23
Platform Mount [LP 1001-1] *	C	None		0.0000	126'	No Ice	47.70	47.70	3.02
						1/2" Ice	59.50	59.50	3.62
						1" Ice	71.30	71.30	4.22
						2" Ice	94.90	94.90	5.43
						4" Ice	142.10	142.10	7.85
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice	6.12	4.25	0.06
						1/2" Ice	6.63	5.01	0.10
						1" Ice	7.13	5.71	0.16
						2" Ice	8.16	7.16	0.29
						4" Ice	10.36	10.41	0.66
(4) LGP21401	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice	1.29	0.23	0.01
						1/2" Ice	1.45	0.31	0.02
						1" Ice	1.61	0.40	0.03
						2" Ice	1.97	0.61	0.05
						4" Ice	2.79	1.12	0.14
(4) LGP21401	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice	1.29	0.23	0.01
						1/2" Ice	1.45	0.31	0.02
						1" Ice	1.61	0.40	0.03
						2" Ice	1.97	0.61	0.05
						4" Ice	2.79	1.12	0.14
(4) LGP21401	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice	1.29	0.23	0.01
						1/2" Ice	1.45	0.31	0.02
						1" Ice	1.61	0.40	0.03
						2" Ice	1.97	0.61	0.05
						4" Ice	2.79	1.12	0.14
P65-17-XLH-RR w/ Mount	A	From Leg	4.00	0.0000	115'	No Ice	11.70	8.94	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe			0' 2'			1/2" Ice	12.42 13.15	10.45 11.99	0.17 0.27
						1" Ice	14.64	14.31	0.50
						2" Ice	17.91	19.14	1.13
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	115'	No Ice 1/2" Ice	8.50 9.15	6.30 7.48	0.07 0.14
						1" Ice	9.77 11.03	8.37 10.18	0.21 0.38
						2" Ice	13.68	14.02	0.87
						4" Ice			
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	115'	No Ice 1/2" Ice	11.70 12.42	8.94 10.45	0.09 0.17
						1" Ice	13.15 14.64	11.99 14.31	0.27 0.50
						2" Ice	17.91	19.14	1.13
						4" Ice			
DC6-48-60-18-8F	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	0.02 0.04
						1" Ice	1.66 2.09	1.66 2.09	0.05 0.10
						2" Ice	3.10	3.10	0.21
						4" Ice			
(2) RRUS-11	A	From Leg	4.00 0' 2'	0.0000	115'	No Ice 1/2" Ice	3.25 3.49	1.37 1.55	0.05 0.07
						1" Ice	3.74 4.27	1.74 2.14	0.09 0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) RRUS-11	B	From Leg	4.00 0' 2'	0.0000	115'	No Ice 1/2" Ice	3.25 3.49	1.37 1.55	0.05 0.07
						1" Ice	3.74 4.27	1.74 2.14	0.09 0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) RRUS-11	C	From Leg	4.00 0' 2'	0.0000	115'	No Ice 1/2" Ice	3.25 3.49	1.37 1.55	0.05 0.07
						1" Ice	3.74 4.27	1.74 2.14	0.09 0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
8'x2" Antenna Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	115'	No Ice 1/2" Ice	1.90 2.73	1.90 2.73	0.03 0.04
						1" Ice	3.40 4.40	3.40 4.40	0.06 0.12
						2" Ice	6.50	6.50	0.30
						4" Ice			
8'x2" Antenna Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	115'	No Ice 1/2" Ice	1.90 2.73	1.90 2.73	0.03 0.04
						1" Ice	3.40 4.40	3.40 4.40	0.06 0.12
						2" Ice	6.50	6.50	0.30
						4" Ice			
8'x2" Antenna Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	115'	No Ice 1/2" Ice	1.90 2.73	1.90 2.73	0.03 0.04
						1" Ice	3.40 4.40	3.40 4.40	0.06 0.12
						2" Ice	6.50	6.50	0.30
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.0000	115'	No Ice 1/2" Ice	24.53 29.94	24.53 29.94	1.34 1.65
						1" Ice	35.35 46.17	35.35 46.17	1.96 2.58
						2" Ice	67.81	67.81	3.82
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
*									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.22
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
IBC1900BB-1	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.13	0.53	0.02
						1/2" Ice	1.27	0.65	0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
IBC1900HG-2A	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.13	0.53	0.02
						1/2" Ice	1.27	0.65	0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
P40-16-XLPP-RR-A w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice	10.74	4.83	0.07
						1/2" Ice	11.29	5.57	0.14
						1" Ice	11.85	6.27	0.21
						2" Ice	12.99	7.80	0.39
						4" Ice	15.39	11.11	0.86
IBC1900BB-1	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.13	0.53	0.02
						1/2" Ice	1.27	0.65	0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
IBC1900HG-2A	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.13	0.53	0.02
						1/2" Ice	1.27	0.65	0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice	8.50	6.95	0.08
						1/2" Ice	9.15	8.13	0.15
						1" Ice	9.77	9.02	0.22
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
IBC1900BB-1	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.13	0.53	0.02
						1/2" Ice	1.27	0.65	0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
IBC1900HG-2A	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.13	0.53	0.02
						1/2" Ice	1.27	0.65	0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice	5.07	2.98	0.05
						1/2" Ice	5.48	3.53	0.08
						1" Ice	5.91	4.09	0.13
						2" Ice	6.79	5.31	0.23
						4" Ice	8.70	8.13	0.54
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice	5.07	2.98	0.05
						1/2" Ice	5.48	3.53	0.08
						1" Ice	5.91	4.09	0.13
						2" Ice	6.79	5.31	0.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	8.70	8.13	0.54
						4" Ice			
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice	5.07	2.98	0.05
						1/2" Ice	5.48	3.53	0.08
						1" Ice	5.91	4.09	0.13
						2" Ice	6.79	5.31	0.23
						4" Ice	8.70	8.13	0.54
(2) 950F40T4E-M w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice	7.24	6.15	0.04
						1/2" Ice	7.79	7.04	0.10
						1" Ice	8.33	7.86	0.17
						2" Ice	9.45	9.56	0.33
						4" Ice	11.79	13.17	0.78
(2) 950F40T4E-M w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice	7.24	6.15	0.04
						1/2" Ice	7.79	7.04	0.10
						1" Ice	8.33	7.86	0.17
						2" Ice	9.45	9.56	0.33
						4" Ice	11.79	13.17	0.78
(2) 950F40T4E-M w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice	7.24	6.15	0.04
						1/2" Ice	7.79	7.04	0.10
						1" Ice	8.33	7.86	0.17
						2" Ice	9.45	9.56	0.33
						4" Ice	11.79	13.17	0.78
WIMAX DAP HEAD	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.80	0.78	0.03
						1/2" Ice	1.99	0.92	0.04
						1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
WIMAX DAP HEAD	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.80	0.78	0.03
						1/2" Ice	1.99	0.92	0.04
						1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
WIMAX DAP HEAD	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice	1.80	0.78	0.03
						1/2" Ice	1.99	0.92	0.04
						1" Ice	2.18	1.07	0.06
						2" Ice	2.59	1.39	0.09
						4" Ice	3.51	2.14	0.20
HORIZON COMPACT	B	From Leg	4.00 0' 6'	0.0000	102'	No Ice	0.84	0.43	0.01
						1/2" Ice	0.97	0.52	0.02
						1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
HORIZON COMPACT	C	From Leg	4.00 0' 6'	0.0000	102'	No Ice	0.84	0.43	0.01
						1/2" Ice	0.97	0.52	0.02
						1" Ice	1.10	0.63	0.03
						2" Ice	1.39	0.86	0.05
						4" Ice	2.08	1.43	0.12
Platform Mount [LP 602-1]	C	None		0.0000	102'	No Ice	32.03	32.03	1.34
						1/2" Ice	38.71	38.71	1.80
						1" Ice	45.39	45.39	2.26
						2" Ice	58.75	58.75	3.17
						4" Ice	85.47	85.47	5.00
*									
800MHz 2X50W RRH W/FILTER	A	From Leg	2.00 0'	0.0000	100'	No Ice	2.40	2.25	0.06
						1/2" Ice	2.61	2.46	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0'			Ice	2.83	2.68	0.11
						1" Ice	3.30	3.13	0.17
						2" Ice	4.34	4.15	0.34
						4" Ice			
(2) PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.71	2.61	0.06
						1/2"	2.95	2.85	0.08
						Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.40	2.25	0.06
						1/2"	2.61	2.46	0.09
						Ice	2.83	2.68	0.11
						1" Ice	3.30	3.13	0.17
						2" Ice	4.34	4.15	0.34
						4" Ice			
(2) PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.71	2.61	0.06
						1/2"	2.95	2.85	0.08
						Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.40	2.25	0.06
						1/2"	2.61	2.46	0.09
						Ice	2.83	2.68	0.11
						1" Ice	3.30	3.13	0.17
						2" Ice	4.34	4.15	0.34
						4" Ice			
(2) PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.71	2.61	0.06
						1/2"	2.95	2.85	0.08
						Ice	3.20	3.09	0.11
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
Collar Mount [SO 102-3]	C	None		0.0000	100'	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice	4.92	4.92	0.20
						2" Ice	6.84	6.84	0.32
						4" Ice			
*									
742 213 w/ Mount Pipe	A	From Leg	0.50 0' 0'	0.0000	94'	No Ice	5.37	4.62	0.05
						1/2"	5.95	6.00	0.09
						Ice	6.50	6.98	0.14
						1" Ice	7.61	8.85	0.28
						2" Ice	9.93	12.79	0.68
						4" Ice			
742 213 w/ Mount Pipe	B	From Leg	0.50 0' 0'	0.0000	94'	No Ice	5.37	4.62	0.05
						1/2"	5.95	6.00	0.09
						Ice	6.50	6.98	0.14
						1" Ice	7.61	8.85	0.28
						2" Ice	9.93	12.79	0.68
						4" Ice			
742 213 w/ Mount Pipe	C	From Leg	0.50 0' 0'	0.0000	94'	No Ice	5.37	4.62	0.05
						1/2"	5.95	6.00	0.09
						Ice	6.50	6.98	0.14
						1" Ice	7.61	8.85	0.28
						2" Ice	9.93	12.79	0.68
						4" Ice			
Side Arm Mount [SO 102-3]	C	None		0.0000	94'	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice	4.92	4.92	0.20
						2" Ice	6.84	6.84	0.32
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
*									
BCD-87010	B	From Leg	2.00 0' 6'	0.0000	74'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.90 4.05 5.21 7.01 9.85	2.90 4.05 5.21 7.01 9.85	0.03 0.05 0.08 0.16 0.41
Side Arm Mount [SO 701-1]	B	From Leg	1.00 0' 0'	0.0000	74'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
*									
KS24019-L112A	C	From Leg	2.00 0' 1'	0.0000	40'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	0.01 0.01 0.01 0.01 0.02
Side Arm Mount [SO 701-1]	C	From Leg	1.00 0' 0'	0.0000	40'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
*									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0' 6'	-20.0000		102'	2.92	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.68 7.07 7.46 8.23 9.78	0.03 0.04 0.05 0.07 0.11
VHLP2-180	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0' 6'	10.0000		102'	2.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.41 3.67 4.21 5.28	0.03 0.04 0.06 0.09 0.16
*											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	140 - 86.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.41	-0.47	1.67
			Max. Mx	11	-17.03	659.22	1.97
			Max. My	2	-17.05	1.45	656.35
			Max. Vy	11	-26.06	659.22	1.97
			Max. Vx	8	25.80	-1.89	-656.01
			Max. Torque	6			1.37
L2	86.8333 - 38	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.33	-3.37	4.65
			Max. Mx	11	-29.75	2078.30	6.68
			Max. My	2	-29.76	3.98	2064.16
			Max. Vy	11	-33.73	2078.30	6.68
			Max. Vx	8	33.49	-7.21	-2063.14
			Max. Torque	2			-1.37
L3	38 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-77.18	-5.90	8.05
			Max. Mx	11	-47.52	3751.92	11.49
			Max. My	2	47.52	6.86	3727.83
			Max. Vy	11	-40.60	3751.92	11.49
			Max. Vx	8	40.37	-12.07	-3725.75
			Max. Torque	2			-1.55

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	18	77.18	-11.82	-0.02
	Max. H_x	11	47.54	40.58	0.09
	Max. H_z	2	47.54	0.07	40.34
	Max. M_x	2	3727.83	0.07	40.34
	Max. M_z	5	3749.47	-40.54	-0.07
	Max. Torsion	6	1.53	-35.18	-20.19
	Min. Vert	1	47.54	0.00	0.00
	Min. H_x	5	47.54	-40.54	-0.07
	Min. H_z	8	47.54	-0.10	-40.35
	Min. M_x	8	-3725.75	-0.10	-40.35
	Min. M_z	11	-3751.92	40.58	0.09
	Min. Torsion	2	-1.55	0.07	40.34

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	47.54	0.00	0.00	-1.50	-0.69	0.00
Dead+Wind 0 deg - No Ice	47.54	-0.07	-40.34	-3727.83	6.86	1.55
Dead+Wind 30 deg - No Ice	47.54	20.28	-34.88	-3221.97	-1875.83	1.08
Dead+Wind 60 deg - No Ice	47.54	35.11	-20.06	-1852.31	-3246.56	-0.08
Dead+Wind 90 deg - No Ice	47.54	40.54	0.07	6.18	-3749.47	-0.89
Dead+Wind 120 deg - No Ice	47.54	35.18	20.19	1863.88	-3254.44	-1.53
Dead+Wind 150 deg - No Ice	47.54	20.40	34.94	3225.96	-1889.13	-1.47
Dead+Wind 180 deg - No Ice	47.54	0.10	40.35	3725.75	-12.07	-1.49
Dead+Wind 210 deg - No Ice	47.54	-20.29	34.84	3215.05	1875.32	-0.97
Dead+Wind 240 deg - No Ice	47.54	-35.13	20.05	1848.35	3248.32	0.05
Dead+Wind 270 deg - No Ice	47.54	-40.58	-0.09	-11.49	3751.92	0.83
Dead+Wind 300 deg - No Ice	47.54	-35.22	-20.22	-1870.22	3257.88	1.34
Dead+Wind 330 deg - No Ice	47.54	-20.47	-34.95	-3229.84	1895.13	1.23
Dead+Ice+Temp	77.18	0.00	-0.00	-8.05	-5.90	0.00
Dead+Wind 0 deg+Ice+Temp	77.18	-0.02	-11.77	-1117.14	-4.01	0.54
Dead+Wind 30 deg+Ice+Temp	77.18	5.91	-10.18	-966.82	-563.67	0.31
Dead+Wind 60 deg+Ice+Temp	77.18	10.24	-5.86	-559.42	-971.46	-0.10
Dead+Wind 90 deg+Ice+Temp	77.18	11.82	0.02	-6.14	-1121.09	-0.40
Dead+Wind 120 deg+Ice+Temp	77.18	10.26	5.89	546.89	-973.63	-0.61
Dead+Wind 150 deg+Ice+Temp	77.18	5.94	10.19	952.31	-567.25	-0.59
Dead+Wind 180 deg+Ice+Temp	77.18	0.03	11.77	1100.96	-9.02	-0.52
Dead+Wind 210 deg+Ice+Temp	77.18	-5.91	10.17	949.37	551.82	-0.28
Dead+Wind 240 deg+Ice+Temp	77.18	-10.24	5.85	542.74	960.19	0.09
Dead+Wind 270 deg+Ice+Temp	77.18	-11.83	-0.02	-10.89	1109.99	0.39
Dead+Wind 300 deg+Ice+Temp	77.18	-10.27	-5.90	-564.18	962.79	0.57
Dead+Wind 330 deg+Ice+Temp	77.18	-5.96	10.20	-968.95	557.11	0.52
Dead+Wind 0 deg - Service	47.54	-0.03	-15.76	-1457.64	2.25	0.61
Dead+Wind 30 deg - Service	47.54	7.92	-13.62	-1259.97	-733.44	0.42
Dead+Wind 60 deg - Service	47.54	13.71	-7.84	-724.75	-1269.07	-0.03
Dead+Wind 90 deg - Service	47.54	15.84	0.03	1.48	-1465.60	-0.35
Dead+Wind 120 deg - Service	47.54	13.74	7.89	727.41	-1272.15	-0.60
Dead+Wind 150 deg - Service	47.54	7.97	13.65	1259.66	-738.64	-0.58
Dead+Wind 180 deg -	47.54	0.04	15.76	1454.96	-5.14	-0.59

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
Service						
Dead+Wind 210 deg - Service	47.54	-7.92	13.61	1255.39	732.38	-0.38
Dead+Wind 240 deg - Service	47.54	-13.72	7.83	721.34	1268.90	0.02
Dead+Wind 270 deg - Service	47.54	-15.85	-0.04	-5.42	1465.70	0.32
Dead+Wind 300 deg - Service	47.54	-13.76	-7.90	-731.76	1272.64	0.53
Dead+Wind 330 deg - Service	47.54	-7.99	-13.65	-1263.05	740.12	0.48

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-47.54	0.00	0.00	47.54	0.00	0.000%
2	-0.07	-47.54	-40.34	0.07	47.54	40.34	0.000%
3	20.28	-47.54	-34.88	-20.28	47.54	34.88	0.000%
4	35.11	-47.54	-20.06	-35.11	47.54	20.06	0.000%
5	40.54	-47.54	0.07	-40.54	47.54	-0.07	0.000%
6	35.18	-47.54	20.19	-35.18	47.54	-20.19	0.000%
7	20.40	-47.54	34.94	-20.40	47.54	-34.94	0.000%
8	0.10	-47.54	40.35	-0.10	47.54	-40.35	0.000%
9	-20.29	-47.54	34.84	20.29	47.54	-34.84	0.000%
10	-35.13	-47.54	20.05	35.13	47.54	-20.05	0.000%
11	-40.58	-47.54	-0.09	40.58	47.54	0.09	0.000%
12	-35.22	-47.54	-20.22	35.22	47.54	20.22	0.000%
13	-20.47	-47.54	-34.95	20.47	47.54	34.95	0.000%
14	0.00	-77.18	0.00	-0.00	77.18	0.00	0.000%
15	-0.02	-77.18	-11.77	0.02	77.18	11.77	0.000%
16	5.91	-77.18	-10.18	-5.91	77.18	10.18	0.000%
17	10.24	-77.18	-5.86	-10.24	77.18	5.86	0.000%
18	11.82	-77.18	0.02	-11.82	77.18	-0.02	0.000%
19	10.26	-77.18	5.89	-10.26	77.18	-5.89	0.000%
20	5.94	-77.18	10.19	-5.94	77.18	-10.19	0.000%
21	0.03	-77.18	11.77	-0.03	77.18	-11.77	0.000%
22	-5.91	-77.18	10.17	5.91	77.18	-10.17	0.000%
23	-10.24	-77.18	5.85	10.24	77.18	-5.85	0.000%
24	-11.83	-77.18	-0.02	11.83	77.18	0.02	0.000%
25	-10.27	-77.18	-5.90	10.27	77.18	5.90	0.000%
26	-5.96	-77.18	-10.20	5.96	77.18	10.20	0.000%
27	-0.03	-47.54	-15.76	0.03	47.54	15.76	0.000%
28	7.92	-47.54	-13.62	-7.92	47.54	13.62	0.000%
29	13.71	-47.54	-7.84	-13.71	47.54	7.84	0.000%
30	15.84	-47.54	0.03	-15.84	47.54	-0.03	0.000%
31	13.74	-47.54	7.89	-13.74	47.54	-7.89	0.000%
32	7.97	-47.54	13.65	-7.97	47.54	-13.65	0.000%
33	0.04	-47.54	15.76	-0.04	47.54	-15.76	0.000%
34	-7.92	-47.54	13.61	7.92	47.54	-13.61	0.000%
35	-13.72	-47.54	7.83	13.72	47.54	-7.83	0.000%
36	-15.85	-47.54	-0.04	15.85	47.54	0.04	0.000%
37	-13.76	-47.54	-7.90	13.76	47.54	7.90	0.000%
38	-7.99	-47.54	-13.65	7.99	47.54	13.65	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00005811

3	Yes	5	0.00000001	0.00002567
4	Yes	5	0.00000001	0.00002507
5	Yes	4	0.00000001	0.00003911
6	Yes	4	0.00000001	0.00099340
7	Yes	5	0.00000001	0.00002604
8	Yes	4	0.00000001	0.00006718
9	Yes	4	0.00000001	0.00099445
10	Yes	5	0.00000001	0.00002494
11	Yes	4	0.00000001	0.00004599
12	Yes	5	0.00000001	0.00002603
13	Yes	5	0.00000001	0.00002496
14	Yes	4	0.00000001	0.00000601
15	Yes	4	0.00000001	0.00062339
16	Yes	4	0.00000001	0.00068143
17	Yes	4	0.00000001	0.00068167
18	Yes	4	0.00000001	0.00062498
19	Yes	4	0.00000001	0.00067592
20	Yes	4	0.00000001	0.00067495
21	Yes	4	0.00000001	0.00061387
22	Yes	4	0.00000001	0.00066525
23	Yes	4	0.00000001	0.00066744
24	Yes	4	0.00000001	0.00061925
25	Yes	4	0.00000001	0.00068024
26	Yes	4	0.00000001	0.00067895
27	Yes	4	0.00000001	0.00001766
28	Yes	4	0.00000001	0.00009723
29	Yes	4	0.00000001	0.00009310
30	Yes	4	0.00000001	0.00001498
31	Yes	4	0.00000001	0.00008859
32	Yes	4	0.00000001	0.00009926
33	Yes	4	0.00000001	0.00001800
34	Yes	4	0.00000001	0.00008917
35	Yes	4	0.00000001	0.00009191
36	Yes	4	0.00000001	0.00001515
37	Yes	4	0.00000001	0.00009940
38	Yes	4	0.00000001	0.00009089

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	20.184	37	1.1750	0.0024
L2	92.5 - 38	9.221	37	0.9381	0.0008
L3	45 - 0	2.168	37	0.4340	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140'	BXA-70063/6CF w/ Mount Pipe	37	20.184	1.1750	0.0026	59778
126'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	37	16.760	1.1252	0.0020	21349
115'	(2) 7770.00 w/ Mount Pipe	37	14.141	1.0787	0.0015	11955
108'	VHLP2.5-11	37	12.534	1.0428	0.0012	9339
102'	APXVSPP18-C-A20 w/ Mount Pipe	37	11.207	1.0069	0.0010	7864
100'	800MHz 2X50W RRH W/FILTER	37	10.776	0.9937	0.0010	7471
94'	742 213 w/ Mount Pipe	37	9.524	0.9500	0.0008	6519
74'	BCD-87010	37	5.856	0.7601	0.0005	5355
40'	KS24019-L112A	37	1.753	0.3806	0.0002	4885

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	51.612	12	3.0055	0.0062
L2	92.5 - 38	23.587	12	2.3998	0.0020
L3	45 - 0	5.546	12	1.1105	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140'	BXA-70063/6CF w/ Mount Pipe	12	51.612	3.0055	0.0068	23503
126'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	12	42.859	2.8783	0.0051	8393
115'	(2) 7770.00 w/ Mount Pipe	12	36.165	2.7592	0.0039	4699
108'	VHLP2.5-11	12	32.058	2.6676	0.0031	3670
102'	APXVSPP18-C-A20 w/ Mount Pipe	12	28.664	2.5758	0.0026	3090
100'	800MHz 2X50W RRH W/FILTER	12	27.563	2.5421	0.0025	2935
94'	742 213 w/ Mount Pipe	12	24.362	2.4304	0.0021	2560
74'	BCD-87010	12	14.980	1.9445	0.0012	2099
40'	KS24019-L112A	12	4.484	0.9739	0.0006	1910

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.3125	53'2-1/32"	0'	0.0	39.000	37.7587	-17.03	1472.59	0.012
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	54'6"	0'	0.0	39.000	63.3646	-29.75	2471.22	0.012
L3	38 - 0 (3)	TP59.05x48.033x0.5	45'	0'	0.0	39.000	94.2655	-47.52	3676.35	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.3125	660.33	22.885	39.000	0.587	0.00	0.000	39.000	0.000
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	2081.00	33.295	39.000	0.854	0.00	0.000	39.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	3756.53	33.429	39.000	0.857	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.3125	26.09	0.691	26.000	0.054	0.61	0.010	26.000	0.000
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	33.76	0.533	26.000	0.042	1.03	0.008	26.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	40.63	0.431	26.000	0.034	1.34	0.006	26.000	0.000

Pole Interaction Design Data

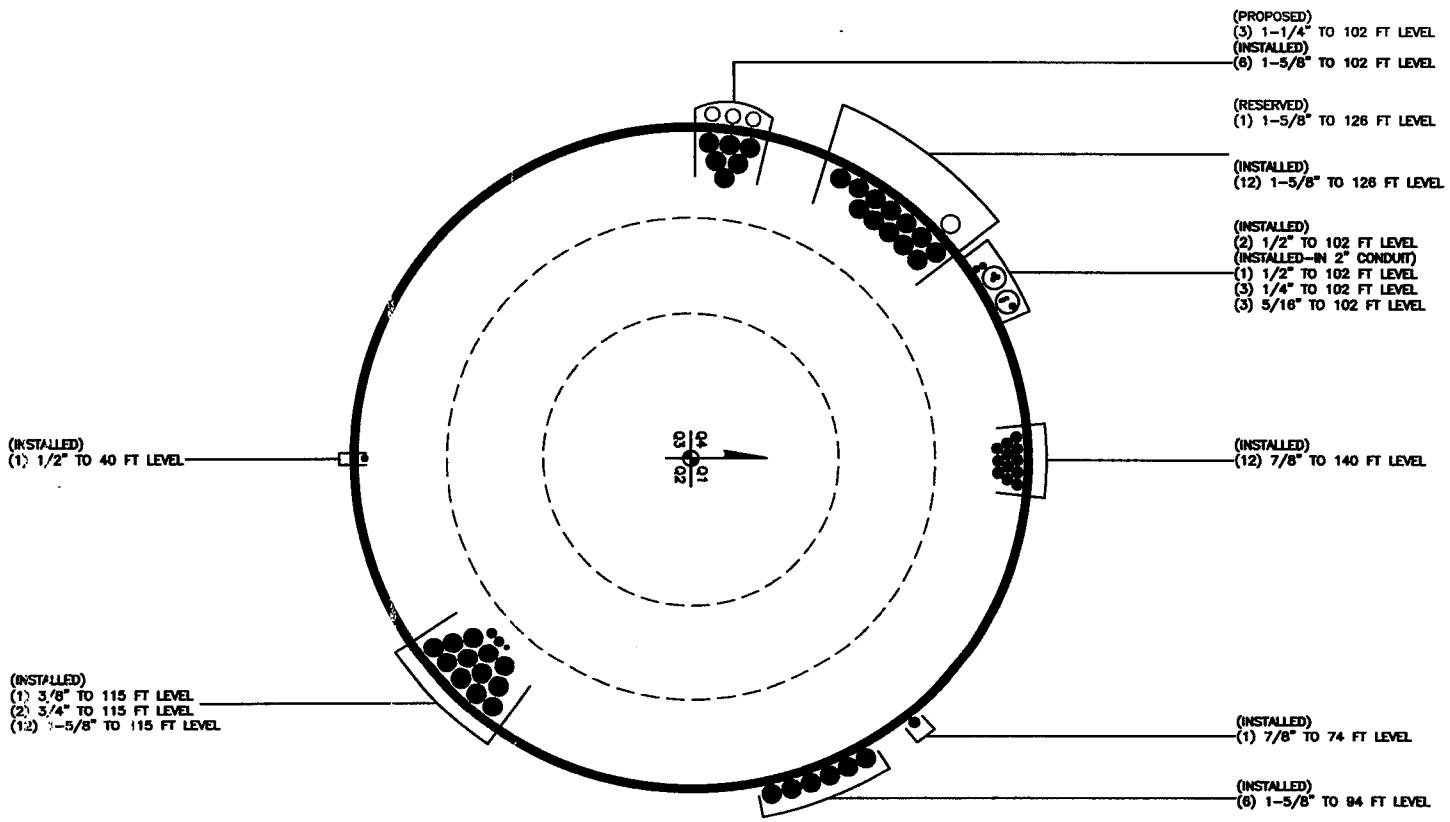
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 86.8333 (1)	0.012	0.587	0.000	0.054	0.000	0.599 ✓	1.333	H1-3+VT ✓
L2	86.8333 - 38 (2)	0.012	0.854	0.000	0.042	0.000	0.866 ✓	1.333	H1-3+VT ✓
L3	38 - 0 (3)	0.013	0.857	0.000	0.034	0.000	0.870 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	140 - 86.8333	Pole	TP39.223x26.216x0.3125	1	-17.03	1962.96	44.9	Pass
L2	86.8333 - 38	Pole	TP50.56x37.2117x0.4063	2	-29.75	3294.14	65.0	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-47.52	4900.57	65.3	Pass
							Summary	
							Pole (L3) 65.3	Pass
							RATING = **65.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806369 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *806369*
Site Name: *HRT 094 943225*
App #: *165644 rev1*

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	7.5	ft
Concrete Area =	6361.7	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	3	
Vert. Cage Diameter =	6.83	ft
Vert. Cage Diameter =	81.98	in
Vertical Bar Size =	10	
Bar Diameter =	1.27	in
Bar Area =	1.27	in^2
Number of Bars =	52	
As Total=	66.04	in^2
A s/ Aconc, Rho:	0.0104	1.04%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.04%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	10408.53	kips
at Mu=(ϕ=0.65)Mn=	6794.66	ft-kips
Max Tu, (φ=0.9) Tn =	3566.16	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	4092.517	ft-kips (* Note)
Max. Service Shaft P:	48	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.30	Mu:	5320.272	ft-kips
1.30	Pu:	62.4	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code= 2002

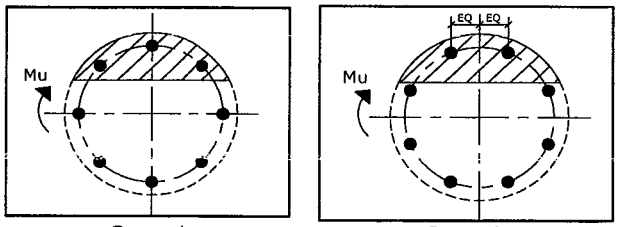
Seismic Properties

Seismic Design Category = B
Seismic Risk = **Low**

Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **18.75** in
Extreme Steel Strain, εt: **0.0108**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	62.40	kips
Drilled Shaft Moment Capacity, φMn:	**10674.38**	ft-kips
Drilled Shaft Superimposed Mu:	**5320.27**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**49.8%**

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

TIA Rev F

Site Data

BU#: *806369*
Site Name: *HRT 094 943225*
App #: *165644 rev1*

Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	65.05	in

Plate Data		
Diam:	71.05	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	9.49	in

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

Pole Data		
Diam:	59.05	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	3757	ft-kips
Axial:	48	kips
Shear:	41	kips

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

Anchor Rod Results

		Rigid
Maximum Rod Tension:	136.2 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	69.9% Pass	

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	19.6 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	32.6% Pass	Y.L. Length: 27.29

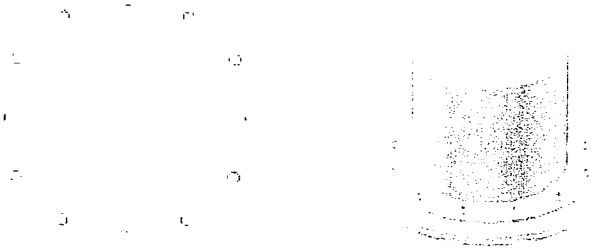
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

Monopole Drilled Pier

Checks capacity of a single drilled shaft foundation for a monopole

BU#: 806369
Site Name: *HRT 094 943225*
App Number: *165644 rev1*

CROWN CASTLE

ACI 318 Version:	2002

Design Reactions		
Shear, **S**:	41.00	kips
Moment, **Mt**:	3757.00	ft-kips
Tower Weight, **Wt**:	48.00	kips
Tower Height, **H**:	140	ft
Base Diameter, **BD**:	59.05	in

Foundation Dimensions		
Caisson Diameter, **CD**:	7.5	ft
Ext. Above Grade, **E**:	0.0	ft
Depth Below Grade, **L**:	47.0	ft
Neglected Depth, **N**:	5.0	ft
Rebar Size, **Sp**:	10	
Rebar Quantity, **mp**:	52	
Tie Size, **tp**:	3	

Material Properties		
Rebar Tensile, **Fy**:	60	ksi
Concrete Strength, **F'c**:	3000	psi
Concrete Density, **δx**:	100.9	pcf
Clear Cover, **cc**:	3	in

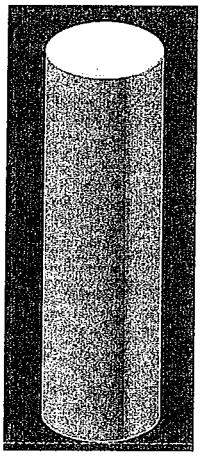
Soil Properties		
Soil Unit Weight, **γ**:	51.1	pcf
Allowable Bearing, **Bc**:	4.500	ksf
Seismic Design Cat, **z**:	B	

Caisson Analysis		
Depth to Zero Shear:	8.1	ft
Max Factored Moment:	5320.27	ft-kips
Overturning FOS:	6.37	

Depth		Shear		Moment	
0	ft	41.1	kips	3758.2	ft-kips
4.7	ft	41.1	kips	3951.3	ft-kips
9.4	ft	-15.1	kips	4020.8	ft-kips

Design Checks	*Capacity/ Availability*	*Demand/ Limits*	*Check*
Minimum Req'd Dia. 1 (ft):	7.50	3.69	OK
Minimum Req'd Dia. 2 (ft):	7.50	6.42	OK
Bearing (ksf):	4.50	1.09	OK
Rebar Area (in²):	66.04	21.21	OK
Pier moment capacity (k-ft):	10674.38	5320.27	OK
Rebar spacing (in):	3.80	2 < Bs <18	OK
Development Length (in):	463.35	12.00	OK
Soil moment capacity (FOS):	6.37	2.00	OK

☐ **Assume 0.33% Minimum Steel?**



Bearing: 24.1%

Steel: 49.8%

Soil: 31.4%

Equivalent Silty Soil Parameter Tool

Note:
This tool determines the equivalent soil parameters for silty soil (having both cohesion and angle of friction), according to the CCI Foundations ongoing discussions (2010), Criteria Item DS-7 . The equivalent parameters results are to be input in the PLS-Caisson Software to account for the combined resistance of the granular and cohesive parameters simultaneously present in silty and similar soils

Site Data

BU#: *806369*
Site Name: *HRT 094 943225*
App #: *165644 rev1*

Neglect Top Layer: Y Y/N
# of Layers: 8

Input the data in the "shaded" columns. If soil layer is submerged, then enter the saturated density (buoyant unit weight)

Layer:	Layer Thickness (ft)	From (ft)	To (ft)	Unit Weight of Soil (pcf)	Cohesion (psf)	Internal Friction Angle (deg)	K_p	Depth to Mid-Layer (ft)	Overburden (psf)	Sand Resistance (ksf)	Clay Resistance (ksf)	P_p total (ksf)	Equivalent Parameters for PLS Caisson Input: Equivalent Cohesion (psf)	Equivalent K_p
1	2	0	2	105			0.000	1	105	0.000	0.00	0.000	**0**	**0.00**
2	3	2	5	100			0.000	3.5	360	0.000	0.00	0.000	**0**	**0.00**
3	5	5	10	100	500	30	3.000	7.5	760	6.840	4.00	10.840	**1355**	**4.75**
4	5	10	15	36	100	27	2.663	12.5	1100	8.788	0.80	9.588	**1198**	**2.91**
5	5	15	20	36	100	27	2.663	17.5	1280	10.226	0.80	11.026	**1378**	**2.87**
6	5	20	25	36	100	27	2.663	22.5	1460	11.664	0.80	12.464	**1558**	**2.85**
7	5	25	30	36	100	27	2.663	27.5	1640	13.102	0.80	13.902	**1738**	**2.83**
8	5	30	35	36	100	27	2.663	32.5	1820	14.540	0.80	15.340	**1917**	**2.81**

Calculation Notes:
1- Sand Resistance = 3 * Kp * Overburden ----> (Per equations used in PLS-Caisson Software)
2- Cohesion Resistance = 8 * C ----------> (Per equations used in PLS-Caisson Software, Full 8CD approach)
3- Total Resistance = Sand Resistance + Cohesion Resistance
4- Equivalent Kp= Total / Overburden / 3
5- Equivalent C= Total / 8

CAISSON Version 10.40 4:17:24 PM Tuesday, October 16, 2012
Crown Castle USA

Project Title: 806369
Project Notes:

Calculation Method: Full 8CD

******* I N P U T D A T A

Pier Properties

Diameter (ft)	Distance of Top of Pier above Ground (ft)	Concrete Strength (ksi)	Steel Yield Strength (ksi)
7.50	0.00	3.00	60.00

Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Clay	2.00	0.00	105.0			
2	Clay	3.00	2.00	100.0			
3	Clay	5.00	5.00	100.0	1355.0		
4	Clay	5.00	10.00	36.0	1198.0		
5	Clay	5.00	15.00	36.0	1378.0		
6	Clay	5.00	20.00	36.0	1558.0		
7	Clay	5.00	25.00	36.0	1738.0		
8	Clay	5.00	30.00	36.0	1917.0		
9	Clay	10.00	35.00	41.0	200.0		
10	Sand	2.00	45.00	41.0		3.255	32.00

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against Soil Failure
3757.0	48.0	41.00	6.37

******* R E S U L T S

Calculated Pier Properties

Length (ft)	Weight (kips)	End Bearing Pressure (psf)
47.000	311.459	1086.5

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Clay	0.00	2.00	105.0			0.00	1.00
Clay	2.00	3.00	100.0			0.00	3.50
Clay	5.00	5.00	100.0	1355.0		406.50	7.50
Clay	10.00	5.00	36.0	1198.0		359.40	12.50
Clay	15.00	5.00	36.0	1378.0		413.40	17.50
Clay	20.00	5.00	36.0	1558.0		467.40	22.50
Clay	25.00	0.85	36.0	1738.0		88.64	25.43
Clay	25.85	4.15	36.0	1738.0		-432.76	27.93
Clay	30.00	5.00	36.0	1917.0		-575.10	32.50
Clay	35.00	10.00	41.0	200.0		-120.00	40.00
Sand	45.00	2.00	41.0		3.255	-345.83	46.01

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear (with Safety Factor) (kips)	Moment (with Safety Factor) (ft-k)	Shear (without Safety Factor) (kips)	Moment (without Safety Factor) (ft-k)
0.00	261.6	23939.8	41.1	3758.2
4.70	261.6	25169.6	41.1	3951.3
9.40	-96.1	25612.3	-15.1	4020.8
14.10	-439.6	24342.0	-69.0	3821.3
18.80	-818.4	21404.2	-128.5	3360.2
23.50	-1244.8	16578.2	-195.4	2602.5
28.20	-1228.6	10215.6	-192.9	1603.7
32.90	-707.4	5638.0	-111.0	885.1
37.60	-434.6	3235.5	-68.2	507.9
42.30	-378.2	1325.3	-59.4	208.1
47.00	-321.8	-319.8	-50.5	-50.2

Date: **October 18, 2012**

Eva Morales
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT43XC805
	Carrier Site Name:	CT43XC805
Crown Castle Designation:	**Crown Castle BU Number:**	806369
	Crown Castle Site Name:	HRT 094 943225
	Crown Castle JDE Job Number:	190485
	Crown Castle Work Order Number:	541166
	Crown Castle Application Number:	165644 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	541166
Site Data:	**439-455 HOMESTEAD AVE, HARTFORD, Hartford County, CT** **Latitude *41° 47' 1.61"*, Longitude *-72° 42' 13.66"*** **140 Foot - Monopole Tower**	

Dear Eva Morales,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 541166, in accordance with application 165644, revision 1.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code based upon a wind speed of 80 mph fastest mile.

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

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

Structural analysis prepared by: Jesse J. Fresch, EIT / AS

Respectfully submitted by:

STATE OF CONNECTICUT
DMITRIY V. ALBUL
No. 26725
LICENSED
PROFESSIONAL ENGINEER

10/18/2012

Dmitriy V. Albul, P.E.
Engineer II

tnxTower Report - version 6.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 140 ft Monopole tower designed by VALMONT in August of 1999. The tower was originally designed for a wind speed of 125 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
102.0	104.0	1	powerwave technologies	P40-16-XLPP-RR-A w/ Mount Pipe	3	1-1/4	-
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
100.0	100.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	-
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Collar Mount [SO 102-3]			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	140.0	1	tower mounts	Platform Mount (LP 101-1)	12	7/8	1
	137.0	3	antel	BXA-70063/6CF w/ Mount Pipe			
		6	rfs celwave	FD9R6004/1C-3L			
		3	antel	BXA-171063/8CFx2 w/ Mount Pipe	-	-	2
		4	antel	LPA-80063/4CF w/ Mount Pipe			
		2	swedcom	SC-E 6014 rev2 w/ Mount Pipe			
126.0	128.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
	126.0	1	tower mounts	Platform Mount [LP 1001-1]	12	1-5/8	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
115.0	117.0	6	ericsson	RRUS-11	12 2 1	1-5/8 3/4 3/8	1
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
	116.0	6	powerwave technologies	7770.00 w/ Mount Pipe			
		12	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
	115.0	1	tower mounts	Platform Mount [LP 712-1]			
102.0	108.0	1	andrew	VHLP2-180	3 3 3	1/2 1/4 5/16	1
		1	andrew	VHLP2.5-11			
		2	dragonwave	HORIZON COMPACT			
	104.0	3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
		3	samsung telecommunications	WIMAX DAP HEAD			
		6	decibel	950F40T4E-M w/ Mount Pipe	6	1-5/8	3
	102.0	1	tower mounts	Platform Mount [LP 602-1]	-	-	1
94.0	94.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
74.0	80.0	1	antel	BCD-87010	1	7/8	1
	74.0	1	tower mounts	Side Arm Mount [SO 701-1]			
40.0	41.0	1	lucent	KS24019-L112A	1	1/2	1
	40.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed, Not Considered in This Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
137	137	12	swedcom	ALP 9212-N	-	-
124	124	6	rfs celwave	APN199015	-	-
114	114	9	allgon	7184.15	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Tower Engineering Professionals	2294838	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Tower Engineering Professionals (Mapping)	2294380	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Tower Engineering Professionals (Mapping)	2294379	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Valmont Industries, Inc.	823121	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	140 - 86.8333	Pole	TP39.223x26.216x0.3125	1	-16.92	1962.96	43.8	Pass
L2	86.8333 - 38	Pole	TP50.56x37.2117x0.4063	2	-29.38	3294.14	62.3	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-46.87	4900.57	62.7	Pass
							Summary	
						Pole (L3)	62.7	Pass
						Rating =	62.7	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	67.0	Pass
1	Base Plate	0	31.3	Pass
1	Base Foundation	0	47.8	Pass

Structure Rating (max from all components) =	67.0%

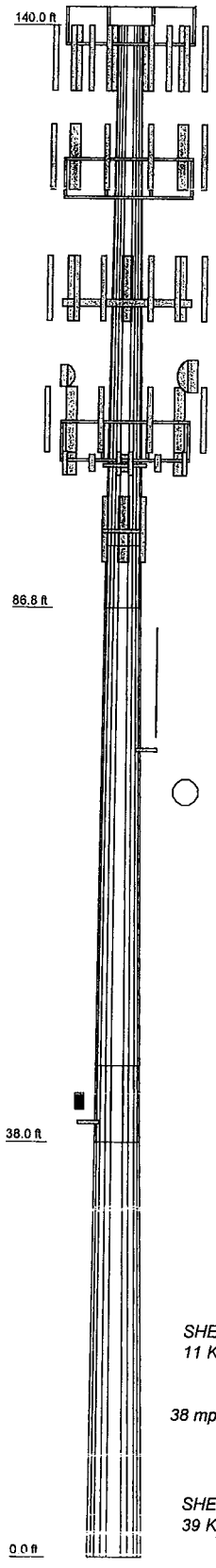
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

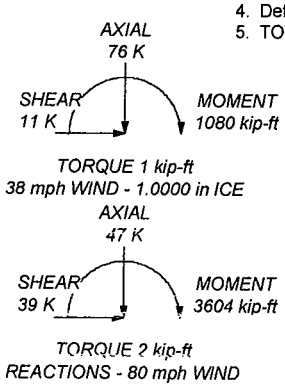
The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT



Section	1	2	3
Length (ft)	53'2-1/32"	54'6"	45'
Number of Sides	12	12	12
Thickness (in)	0.3125	0.4063	0.5000
Socket Length (ft)	5'8-1/32"	7'	
Top Dia (in)	26.2160	37.2117	48.0330
Bot Dia (in)	39.2230	50.5600	59.0500
Grade	A572-65		
Weight (K)	5.9	10.5	13.1



TORQUE 1 kip-ft
38 mph WIND - 1.0000 in ICE

TORQUE 2 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BXA-70063/6CF w/ Mount Pipe	140	(2) RRUS-11	115
BXA-70063/6CF w/ Mount Pipe	140	(2) RRUS-11	115
BXA-70063/6CF w/ Mount Pipe	140	8'x2" Antenna Mount Pipe	115
(2) FD9R6004/1C-3L	140	8'x2" Antenna Mount Pipe	115
(2) FD9R6004/1C-3L	140	8'x2" Antenna Mount Pipe	115
(2) FD9R6004/1C-3L	140	Platform Mount [LP 712-1]	115
BXA-171063/8CFx2 w/ Mount Pipe	140	APXVSPP18-C-A20 w/ Mount Pipe	102
BXA-171063/8CFx2 w/ Mount Pipe	140	IBC1900BB-1	102
BXA-171063/8CFx2 w/ Mount Pipe	140	IBC1900HG-2A	102
(2) LPA-80063/4CF w/ Mount Pipe	140	P40-16-XLPP-RR-A w/ Mount Pipe	102
(2) LPA-80063/4CF w/ Mount Pipe	140	IBC1900BB-1	102
(2) SC-E 6014 rev2 w/ Mount Pipe	140	IBC1900HG-2A	102
Platform Mount (LP 101-1)	140	APXVSPP18-C-A20 w/ Mount Pipe	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	IBC1900BB-1	102
		IBC1900HG-2A	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	LLPX310R-V1 w/ Mount Pipe	102
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	126	LLPX310R-V1 w/ Mount Pipe	102
		LLPX310R-V1 w/ Mount Pipe	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	WIMAX DAP HEAD	102
		WIMAX DAP HEAD	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	WIMAX DAP HEAD	102
		HORIZON COMPACT	102
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	126	HORIZON COMPACT	102
		Platform Mount [LP 602-1]	102
ATMAA1412D-1A20	126	5' x 2" Pipe Mount	102
ATMAA1412D-1A20	126	5' x 2" Pipe Mount	102
ATMAA1412D-1A20	126	5' x 2" Pipe Mount	102
(2) 6' x 2" Mount Pipe	126	VHLP2.5-11	102
(2) 6' x 2" Mount Pipe	126	VHLP2-180	102
(2) 6' x 2" Mount Pipe	126	800MHz 2X50W RRH W/FILTER	100
Platform Mount [LP 1001-1]	126	(2) PCS 1900MHz 4x45W-65MHz	100
(2) 7770.00 w/ Mount Pipe	115	800MHz 2X50W RRH W/FILTER	100
(2) 7770.00 w/ Mount Pipe	115	(2) PCS 1900MHz 4x45W-65MHz	100
(2) 7770.00 w/ Mount Pipe	115	Collar Mount [SO 102-3]	100
(4) LGP21401	115	800MHz 2X50W RRH W/FILTER	100
(4) LGP21401	115	(2) PCS 1900MHz 4x45W-65MHz	100
(4) LGP21401	115	742 213 w/ Mount Pipe	94
P65-17-XLH-RR w/ Mount Pipe	115	Side Arm Mount [SO 102-3]	94
AM-X-CD-16-65-00T-RET w/ Mount Pipe	115	742 213 w/ Mount Pipe	94
		742 213 w/ Mount Pipe	94
P65-17-XLH-RR w/ Mount Pipe	115	BCD-87010	74
DC6-48-60-18-8F	115	Side Arm Mount [SO 701-1]	74
(2) RRUS-11	115	KS24019-L112A	40
		Side Arm Mount [SO 701-1]	40

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 62.7%

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
We Are Solutions
Phone: (724) 416-2000
FAX: (724) 416-4425

Job: BU# 806369			
Project:			
Client: Crown Castle	Drawn by: Jesse Fresch	App'd:	
Code: TIA/EIA-222-F	Date: 10/16/12	Scale: NTS	
Path: R:\SA Models - Letters\Work Area\JFresch\806369-WO541186\Final\806369.gr		Dwg No. E-1	

Tower Input Data

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

4) Tower is located in Hartford County, Connecticut.
5) Basic wind speed of 80 mph.
6) Nominal ice thickness of 1.0000 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56.00 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.333.
15) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	140'-86'9-31/32"	53'2-1/32"	5'8-1/32"	12	26.2160	39.2230	0.3125	1.2500	A572-65 (65 ksi)
L2	86'9-31/32"-38'	54'6"	7'	12	37.2117	50.5600	0.4063	1.6250	A572-65 (65 ksi)
L3	38'-0'	45'		12	48.0330	59.0500	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	27.1408	26.0654	2232.3752	9.2735	13.5799	164.3883	4523.3974	12.8286	6.1884	19.803
	40.6066	39.1537	7566.4519	13.9300	20.3175	372.4103	15331.683 0	19.2703	9.6743	30.958

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L2	39.9612	48.1461	8324.7399	13.1763	19.2756	431.8786	16868.1799	23.6960	8.8840	21.868
	52.3436	65.6074	21064.2222	17.9550	26.1901	804.2825	42681.8251	32.2900	12.4613	30.674
L3	51.5017	76.5282	22069.8046	17.0168	24.8811	887.0104	44719.4076	37.6648	11.5329	23.066
	61.1331	94.2655	41247.0150	20.9609	30.5879	1348.4749	83577.6350	46.3946	14.4854	28.971

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 140'-86'9-31/32"				1	1	1		
L2 86'9-31/32"-38'				1	1	1		
L3 38'-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
HJ5-50A(7/8")	A	No	Inside Pole	140' - 0'	0.0000	0	12	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
*										
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	No	CaAa (Out Of Face)	126' - 0'	0.0000	0	1	No Ice	0.16	0.00
								1/2" Ice	0.26	0.00
								1" Ice	0.36	0.00
								2" Ice	0.56	0.01
								4" Ice	0.96	0.03
FLC 158-50J(1-5/8")	A	No	Inside Pole	126' - 0'	0.0000	0	4	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
LCF158-50JA-A0(1 5/8")	A	No	Inside Pole	126' - 0'	0.0000	0	8	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
*										
LDF7-50A(1-5/8")	C	No	Inside Pole	115' - 0'	0.0000	0	12	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
FB-L98B-002-75000(3/8")	C	No	Inside Pole	115' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	115' - 0'	0.0000	0	2	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
*										
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
ATCB-B01-005(5/16)	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	3	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
LDF1-50A(1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	3	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.02
2" Rigid Conduit	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.20	0.00
								1/2" Ice	0.30	0.00
								1" Ice	0.40	0.01
								2" Ice	0.60	0.01
								4" Ice	1.00	0.03
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	1	No Ice	0.15	0.00
								1/2" Ice	0.25	0.00
								1" Ice	0.35	0.00
								2" Ice	0.55	0.01
								4" Ice	0.95	0.03
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	102' - 0'	0.0000	0	2	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.03
*										
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	94' - 0'	0.0000	0	2	No Ice	0.20	0.00
								1/2" Ice	0.30	0.00
								1" Ice	0.40	0.00
								2" Ice	0.60	0.01
								4" Ice	1.00	0.03
AVA7-50(1-5/8)	B	No	CaAa (Out Of Face)	94' - 0'	0.0000	0	4	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.01
								4" Ice	0.00	0.03
*										
LDF5-50A(7/8")	B	No	CaAa (Out Of Face)	74' - 0'	0.0000	0	1	No Ice	0.11	0.00
								1/2" Ice	0.21	0.00
								1" Ice	0.31	0.00
								2" Ice	0.51	0.01
								4" Ice	0.91	0.03
*										
LDF4-50A(1/2")	C	No	Inside Pole	40' - 0'	0.0000	0	1	No Ice	0.00	0.00
								1/2" Ice	0.00	0.00
								1" Ice	0.00	0.00
								2" Ice	0.00	0.00
								4" Ice	0.00	0.00
*										
Thin Flat Bar Climbing	C	No	CaAa (Out Of Face)	115' - 105'	30.0000	0	1	No Ice	0.33	0.00
								1/2" Ice	0.44	0.01

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight klf
Ladder								1" Ice	0.56	0.01
								2" Ice	0.78	0.01
								4" Ice	1.22	0.02
*										

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140'-86'9-31/32"	A	0.000	0.000	0.000	14.767	1.34
		B	0.000	0.000	0.000	2.881	0.03
		C	0.000	0.000	0.000	3.333	0.35
L2	86'9-31/32"-38'	A	0.000	0.000	0.000	34.989	1.64
		B	0.000	0.000	0.000	23.555	0.22
		C	0.000	0.000	0.000	0.000	0.54
L3	38'-0'	A	0.000	0.000	0.000	27.227	1.27
		B	0.000	0.000	0.000	19.418	0.17
		C	0.000	0.000	0.000	0.000	0.43

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140'-86'9-31/32"	A	1.158	0.000	0.000	0.000	34.376	2.14
		B		0.000	0.000	0.000	6.201	0.23
		C		0.000	0.000	0.000	5.907	0.39
L2	86'9-31/32"-38'	A	1.079	0.000	0.000	0.000	80.230	3.91
		B		0.000	0.000	0.000	54.514	1.70
		C		0.000	0.000	0.000	0.000	0.54
L3	38'-0'	A	1.000	0.000	0.000	0.000	60.017	2.83
		B		0.000	0.000	0.000	44.011	1.23
		C		0.000	0.000	0.000	0.000	0.43

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	140'-86'9-31/32"	-0.0009	-0.3178	0.0212	-0.6329
L2	86'9-31/32"-38'	0.4765	-0.5374	0.8144	-0.9030
L3	38'-0'	0.5224	-0.5442	0.9154	-0.9129

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
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0'	0.0000	140'	No Ice 1/2"	7.98 8.62	5.70 6.85	0.04 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-3'			Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33
						2" Ice	13.08	13.26	0.80
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0' -3'	0.0000	140'	No Ice	7.98	5.70	0.04
						1/2"	8.62	6.85	0.10
						Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33
						2" Ice	13.08	13.26	0.80
						4" Ice			
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0' -3'	0.0000	140'	No Ice	7.98	5.70	0.04
						1/2"	8.62	6.85	0.10
						Ice	9.23	7.71	0.17
						1" Ice	10.47	9.50	0.33
						2" Ice	13.08	13.26	0.80
						4" Ice			
(2) FD9R6004/1C-3L	A	From Leg	4.00 0' -3'	0.0000	140'	No Ice	0.37	0.08	0.00
						1/2"	0.45	0.14	0.01
						Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/1C-3L	B	From Leg	4.00 0' -3'	0.0000	140'	No Ice	0.37	0.08	0.00
						1/2"	0.45	0.14	0.01
						Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/1C-3L	C	From Leg	4.00 0' -3'	0.0000	140'	No Ice	0.37	0.08	0.00
						1/2"	0.45	0.14	0.01
						Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
BXA-171063/8CFx2 w/ Mount Pipe	A	From Leg	4.00 0' -3'	0.0000	140'	No Ice	3.14	3.51	0.03
						1/2"	3.52	4.13	0.06
						Ice	3.92	4.76	0.10
						1" Ice	4.80	6.06	0.20
						2" Ice	6.71	9.09	0.49
						4" Ice			
BXA-171063/8CFx2 w/ Mount Pipe	B	From Leg	4.00 0' -3'	0.0000	140'	No Ice	3.14	3.51	0.03
						1/2"	3.52	4.13	0.06
						Ice	3.92	4.76	0.10
						1" Ice	4.80	6.06	0.20
						2" Ice	6.71	9.09	0.49
						4" Ice			
BXA-171063/8CFx2 w/ Mount Pipe	C	From Leg	4.00 0' -3'	0.0000	140'	No Ice	3.14	3.51	0.03
						1/2"	3.52	4.13	0.06
						Ice	3.92	4.76	0.10
						1" Ice	4.80	6.06	0.20
						2" Ice	6.71	9.09	0.49
						4" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	A	From Leg	4.00 0' -3'	0.0000	140'	No Ice	7.25	7.26	0.04
						1/2"	7.72	7.96	0.10
						Ice	8.20	8.67	0.18
						1" Ice	9.19	10.16	0.34
						2" Ice	11.32	13.39	0.80
						4" Ice			
(2) LPA-80063/4CF w/ Mount Pipe	B	From Leg	4.00 0' -3'	0.0000	140'	No Ice	7.25	7.26	0.04
						1/2"	7.72	7.96	0.10
						Ice	8.20	8.67	0.18
						1" Ice	9.19	10.16	0.34
						2" Ice	11.32	13.39	0.80
						4" Ice			
(2) SC-E 6014 rev2 w/	C	From Leg	4.00	0.0000	140'	No Ice	3.78	4.40	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0' -3'			1/2" Ice 1" Ice 2" Ice 4" Ice	4.18 4.59 5.44 7.29	5.01 5.64 6.96 9.90	0.07 0.11 0.22 0.54
Platform Mount (LP 101-1) *	C	None		0.0000	140'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	36.21 42.82 49.43 62.65 89.09	36.21 42.82 49.43 62.65 89.09	1.50 2.30 3.10 4.70 7.89
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ATMAA1412D-1A20	A	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	B	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	C	From Leg	4.00 0' 2'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice	0.47 0.57 0.69 0.95 1.57	1.17 1.31 1.47 1.81 2.58	0.01 0.02 0.03 0.06 0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
(2) 6' x 2" Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
(2) 6' x 2" Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
(2) 6' x 2" Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
Platform Mount [LP 1001-1]	C	None		0.0000	126'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	47.70 59.50 71.30 94.90 142.10	47.70 59.50 71.30 94.90 142.10	3.02 3.62 4.22 5.43 7.85
*									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(4) LGP21401	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(4) LGP21401	B	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
(4) LGP21401	C	From Leg	4.00 0' 1'	0.0000	115'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.01 0.02 0.03 0.05 0.14
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	115'	No Ice 1/2" Ice	11.70 12.42 13.15	8.94 10.45 11.99	0.09 0.17 0.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	14.64	14.31	0.50
						2" Ice	17.91	19.14	1.13
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	115'	No Ice	8.50	6.30	0.07
						1/2" Ice	9.15	7.48	0.14
						1" Ice	9.77	8.37	0.21
						2" Ice	11.03	10.18	0.38
						4" Ice	13.68	14.02	0.87
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	115'	No Ice	11.70	8.94	0.09
						1/2" Ice	12.42	10.45	0.17
						1" Ice	13.15	11.99	0.27
						2" Ice	14.64	14.31	0.50
						4" Ice	17.91	19.14	1.13
DC6-48-60-18-8F	A	From Leg	4.00 0' 1'	0.0000	115'	No Ice	1.27	1.27	0.02
						1/2" Ice	1.46	1.46	0.04
						1" Ice	1.66	1.66	0.05
						2" Ice	2.09	2.09	0.10
						4" Ice	3.10	3.10	0.21
(2) RRUS-11	A	From Leg	4.00 0' 2'	0.0000	115'	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
(2) RRUS-11	B	From Leg	4.00 0' 2'	0.0000	115'	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
(2) RRUS-11	C	From Leg	4.00 0' 2'	0.0000	115'	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
8'x2" Antenna Mount Pipe	A	From Leg	4.00 0' 0'	0.0000	115'	No Ice	1.90	1.90	0.03
						1/2" Ice	2.73	2.73	0.04
						1" Ice	3.40	3.40	0.06
						2" Ice	4.40	4.40	0.12
						4" Ice	6.50	6.50	0.30
8'x2" Antenna Mount Pipe	B	From Leg	4.00 0' 0'	0.0000	115'	No Ice	1.90	1.90	0.03
						1/2" Ice	2.73	2.73	0.04
						1" Ice	3.40	3.40	0.06
						2" Ice	4.40	4.40	0.12
						4" Ice	6.50	6.50	0.30
8'x2" Antenna Mount Pipe	C	From Leg	4.00 0' 0'	0.0000	115'	No Ice	1.90	1.90	0.03
						1/2" Ice	2.73	2.73	0.04
						1" Ice	3.40	3.40	0.06
						2" Ice	4.40	4.40	0.12
						4" Ice	6.50	6.50	0.30
Platform Mount [LP 712-1]	C	None		0.0000	115'	No Ice	24.53	24.53	1.34
						1/2" Ice	29.94	29.94	1.65
						1" Ice	35.35	35.35	1.96
						2" Ice	46.17	46.17	2.58
						4" Ice	67.81	67.81	3.82
* APXVSPP18-C-A20 w/	A	From Leg	4.00	0.0000	102'	No Ice	8.50	6.95	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0' 2'			1/2" Ice	9.15 9.77	8.13 9.02	0.15 0.22
						1" Ice	11.03	10.84	0.41
						2" Ice	13.68	14.85	0.91
						4" Ice			
IBC1900BB-1	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	1.13 1.27	0.53 0.65	0.02 0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
IBC1900HG-2A	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	1.13 1.27	0.53 0.65	0.02 0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
P40-16-XLPP-RR-A w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	10.74 11.29	4.83 5.57	0.07 0.14
						1" Ice	11.85	6.27	0.21
						2" Ice	12.99	7.80	0.39
						4" Ice	15.39	11.11	0.86
IBC1900BB-1	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	1.13 1.27	0.53 0.65	0.02 0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
IBC1900HG-2A	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	1.13 1.27	0.53 0.65	0.02 0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	8.50 9.15	6.95 8.13	0.08 0.15
						1" Ice	9.77	9.02	0.22
						2" Ice	11.03	10.84	0.41
						4" Ice	13.68	14.85	0.91
IBC1900BB-1	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	1.13 1.27	0.53 0.65	0.02 0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
IBC1900HG-2A	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	1.13 1.27	0.53 0.65	0.02 0.03
						1" Ice	1.43	0.77	0.04
						2" Ice	1.76	1.04	0.06
						4" Ice	2.53	1.69	0.15
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	5.07 5.48	2.98 3.53	0.05 0.08
						1" Ice	5.91	4.09	0.13
						2" Ice	6.79	5.31	0.23
						4" Ice	8.70	8.13	0.54
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice	5.07 5.48	2.98 3.53	0.05 0.08
						1" Ice	5.91	4.09	0.13
						2" Ice	6.79	5.31	0.23
						4" Ice	8.70	8.13	0.54

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.07 5.48 5.91 6.79 8.70	2.98 3.53 4.09 5.31 8.13	0.05 0.08 0.13 0.23 0.54
WIMAX DAP HEAD	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
WIMAX DAP HEAD	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
WIMAX DAP HEAD	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.80 1.99 2.18 2.59 3.51	0.78 0.92 1.07 1.39 2.14	0.03 0.04 0.06 0.09 0.20
HORIZON COMPACT	B	From Leg	4.00 0' 6'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.84 0.97 1.10 1.39 2.08	0.43 0.52 0.63 0.86 1.43	0.01 0.02 0.03 0.05 0.12
HORIZON COMPACT	C	From Leg	4.00 0' 6'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.84 0.97 1.10 1.39 2.08	0.43 0.52 0.63 0.86 1.43	0.01 0.02 0.03 0.05 0.12
Platform Mount [LP 602-1]	C	None		0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.03 38.71 45.39 58.75 85.47	32.03 38.71 45.39 58.75 85.47	1.34 1.80 2.26 3.17 5.00
5' x 2" Pipe Mount	A	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.03 0.04 0.05 0.08 0.20
5' x 2" Pipe Mount	B	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.03 0.04 0.05 0.08 0.20
5' x 2" Pipe Mount	C	From Leg	4.00 0' 2'	0.0000	102'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.00 1.39 1.70 2.35 3.78	1.00 1.39 1.70 2.35 3.78	0.03 0.04 0.05 0.08 0.20
*									
800MHz 2X50W RRH W/FILTER	A	From Leg	2.00 0' 0'	0.0000	100'	No Ice 1/2" Ice 1" Ice	2.40 2.61 2.83 3.30	2.25 2.46 2.68 3.13	0.06 0.09 0.11 0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	4.34	4.15	0.34
						4" Ice			
(2) PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.40	2.25	0.06
						1/2" Ice	2.61	2.46	0.09
						1" Ice	2.83	2.68	0.11
						2" Ice	3.30	3.13	0.17
						4" Ice	4.34	4.15	0.34
(2) PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.40	2.25	0.06
						1/2" Ice	2.61	2.46	0.09
						1" Ice	2.83	2.68	0.11
						2" Ice	3.30	3.13	0.17
						4" Ice	4.34	4.15	0.34
(2) PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 0' 0'	0.0000	100'	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
Collar Mount [SO 102-3]	C	None		0.0000	100'	No Ice	3.00	3.00	0.08
						1/2" Ice	3.48	3.48	0.11
						1" Ice	3.96	3.96	0.14
						2" Ice	4.92	4.92	0.20
						4" Ice	6.84	6.84	0.32
*									
742 213 w/ Mount Pipe	A	From Leg	0.50 0' 0'	0.0000	94'	No Ice	5.37	4.62	0.05
						1/2" Ice	5.95	6.00	0.09
						1" Ice	6.50	6.98	0.14
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	B	From Leg	0.50 0' 0'	0.0000	94'	No Ice	5.37	4.62	0.05
						1/2" Ice	5.95	6.00	0.09
						1" Ice	6.50	6.98	0.14
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	C	From Leg	0.50 0' 0'	0.0000	94'	No Ice	5.37	4.62	0.05
						1/2" Ice	5.95	6.00	0.09
						1" Ice	6.50	6.98	0.14
						2" Ice	7.61	8.85	0.28
						4" Ice	9.93	12.79	0.68
Side Arm Mount [SO 102-3]	C	None		0.0000	94'	No Ice	3.00	3.00	0.08
						1/2" Ice	3.48	3.48	0.11
						1" Ice	3.96	3.96	0.14
						2" Ice	4.92	4.92	0.20
						4" Ice	6.84	6.84	0.32
*									
BCD-87010	B	From Leg	2.00	0.0000	74'	No Ice	2.90	2.90	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0' 6'			1/2" Ice 1" Ice 2" Ice 4" Ice	4.05 5.21 7.01 9.85	4.05 5.21 7.01 9.85	0.05 0.08 0.16 0.41
Side Arm Mount [SO 701-1]	B	From Leg	1.00 0' 0'	0.0000	74'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
*									
KS24019-L112A	C	From Leg	2.00 0' 1'	0.0000	40'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	0.01 0.01 0.01 0.01 0.02
Side Arm Mount [SO 701-1]	C	From Leg	1.00 0' 0'	0.0000	40'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18
*									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0' 6'	-20.0000		102'	2.92	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.68 7.07 7.46 8.23 9.78	0.03 0.04 0.05 0.07 0.11
VHLP2-180	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0' 6'	10.0000		102'	2.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.41 3.67 4.21 5.28	0.03 0.04 0.06 0.09 0.16
*											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	140 - 86.8333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.35	-0.46	1.67
			Max. Mx	11	-16.92	641.94	1.97
			Max. My	2	-16.94	1.45	639.07
			Max. Vy	11	-24.60	641.94	1.97
			Max. Vx	8	24.34	-1.89	-638.73
			Max. Torque	6			1.37
L2	86.8333 - 38	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.05	-3.36	4.65
			Max. Mx	11	-29.38	1991.39	6.68
			Max. My	2	-29.39	3.97	1977.25
			Max. Vy	11	-32.27	1991.39	6.68
			Max. Vx	8	32.03	-7.21	-1976.23
			Max. Torque	2			-1.37
L3	38 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-75.68	-5.90	8.05
			Max. Mx	11	-46.87	3599.83	11.49
			Max. My	2	-46.87	6.86	3575.75
			Max. Vy	11	-39.17	3599.83	11.49
			Max. Vx	8	38.94	-12.06	-3573.66
			Max. Torque	2			-1.55

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	18	75.68	-11.44	-0.02
	Max. H_x	11	46.89	39.15	0.09
	Max. H_z	2	46.89	0.07	38.91
	Max. M_x	2	3575.75	0.07	38.91
	Max. M_z	5	3597.39	-39.12	-0.07
	Max. Torsion	6	1.53	-33.94	-19.48
	Min. Vert	1	46.89	0.00	0.00
	Min. H_x	5	46.89	-39.12	-0.07
	Min. H_z	8	46.89	-0.10	-38.92
	Min. M_x	8	-3573.66	-0.10	-38.92
	Min. M_z	11	-3599.83	39.15	0.09
	Min. Torsion	2	-1.55	0.07	38.91

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	46.89	0.00	0.00	-1.50	-0.69	0.00
Dead+Wind 0 deg - No Ice	46.89	-0.07	-38.91	-3575.75	6.86	1.55
Dead+Wind 30 deg - No Ice	46.89	19.56	-33.64	-3090.27	-1799.78	1.08
Dead+Wind 60 deg - No Ice	46.89	33.87	-19.34	-1776.27	-3114.85	-0.08
Dead+Wind 90 deg - No Ice	46.89	39.12	0.07	6.18	-3597.39	-0.89
Dead+Wind 120 deg - No Ice	46.89	33.94	19.48	1787.84	-3122.73	-1.53
Dead+Wind 150 deg - No Ice	46.89	19.69	33.70	3094.25	-1813.09	-1.47
Dead+Wind 180 deg - No Ice	46.89	0.10	38.92	3573.66	-12.06	-1.49
Dead+Wind 210 deg - No Ice	46.89	-19.57	33.60	3083.34	1799.28	-0.97
Dead+Wind 240 deg - No Ice	46.89	-33.90	19.34	1772.31	3116.61	0.04
Dead+Wind 270 deg - No Ice	46.89	-39.15	-0.09	-11.49	3599.83	0.83
Dead+Wind 300 deg - No Ice	46.89	-33.98	-19.51	-1794.18	3126.17	1.34
Dead+Wind 330 deg - No Ice	46.89	-19.75	-33.71	-3098.13	1819.08	1.23
Dead+Ice+Temp	75.68	0.00	-0.00	-8.05	-5.90	0.00
Dead+Wind 0 deg+Ice+Temp	75.68	-0.02	-11.39	-1075.64	-4.01	0.54
Dead+Wind 30 deg+Ice+Temp	75.68	5.72	-9.85	-930.87	-542.91	0.31
Dead+Wind 60 deg+Ice+Temp	75.68	9.91	-5.67	-538.66	-935.51	-0.10
Dead+Wind 90 deg+Ice+Temp	75.68	11.44	0.02	-6.13	-1079.58	-0.40
Dead+Wind 120 deg+Ice+Temp	75.68	9.93	5.70	526.14	-937.68	-0.61
Dead+Wind 150 deg+Ice+Temp	75.68	5.76	9.87	916.37	-546.49	-0.59
Dead+Wind 180 deg+Ice+Temp	75.68	0.03	11.40	1059.46	-9.02	-0.52
Dead+Wind 210 deg+Ice+Temp	75.68	-5.72	9.84	913.44	531.07	-0.28
Dead+Wind 240 deg+Ice+Temp	75.68	-9.92	5.66	521.99	924.24	0.09
Dead+Wind 270 deg+Ice+Temp	75.68	-11.45	-0.02	-10.88	1068.49	0.39
Dead+Wind 300 deg+Ice+Temp	75.68	-9.94	-5.71	-543.42	926.85	0.57
Dead+Wind 330 deg+Ice+Temp	75.68	-5.77	-9.87	-933.00	536.36	0.52
Dead+Wind 0 deg - Service	46.89	-0.03	-15.20	-1396.17	2.25	0.61
Dead+Wind 30 deg - Service	46.89	7.64	-13.14	-1208.47	-703.70	0.42
Dead+Wind 60 deg - Service	46.89	13.23	-7.56	-695.02	-1217.57	-0.03
Dead+Wind 90 deg - Service	46.89	15.28	0.03	1.48	-1406.13	-0.35
Dead+Wind 120 deg - Service	46.89	13.26	7.61	697.68	-1220.65	-0.60
Dead+Wind 150 deg - Service	46.89	7.69	13.17	1208.16	-708.90	-0.58
Dead+Wind 180 deg -	46.89	0.04	15.20	1395.49	-5.14	-0.59

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
Service						
Dead+Wind 210 deg - Service	46.89	-7.65	13.13	1203.90	702.65	-0.38
Dead+Wind 240 deg - Service	46.89	-13.24	7.55	691.61	1217.41	0.02
Dead+Wind 270 deg - Service	46.89	-15.29	-0.04	-5.42	1406.23	0.32
Dead+Wind 300 deg - Service	46.89	-13.28	-7.62	-702.02	1221.14	0.53
Dead+Wind 330 deg - Service	46.89	-7.72	-13.17	-1211.55	710.39	0.48

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-46.89	0.00	0.00	46.89	0.00	0.000%
2	-0.07	-46.89	-38.91	0.07	46.89	38.91	0.000%
3	19.56	-46.89	-33.64	-19.56	46.89	33.64	0.000%
4	33.87	-46.89	-19.34	-33.87	46.89	19.34	0.000%
5	39.12	-46.89	0.07	-39.12	46.89	-0.07	0.000%
6	33.94	-46.89	19.48	-33.94	46.89	-19.48	0.000%
7	19.69	-46.89	33.70	-19.69	46.89	-33.70	0.000%
8	0.10	-46.89	38.92	-0.10	46.89	-38.92	0.000%
9	-19.57	-46.89	33.60	19.57	46.89	-33.60	0.000%
10	-33.90	-46.89	19.34	33.90	46.89	-19.34	0.000%
11	-39.15	-46.89	-0.09	39.15	46.89	0.09	0.000%
12	-33.98	-46.89	-19.51	33.98	46.89	19.51	0.000%
13	-19.75	-46.89	-33.71	19.75	46.89	33.71	0.000%
14	0.00	-75.68	0.00	-0.00	75.68	0.00	0.000%
15	-0.02	-75.68	-11.39	0.02	75.68	11.39	0.000%
16	5.72	-75.68	-9.85	-5.72	75.68	9.85	0.000%
17	9.91	-75.68	-5.67	-9.91	75.68	5.67	0.000%
18	11.44	-75.68	0.02	-11.44	75.68	-0.02	0.000%
19	9.93	-75.68	5.70	-9.93	75.68	-5.70	0.000%
20	5.76	-75.68	9.87	-5.76	75.68	-9.87	0.000%
21	0.03	-75.68	11.40	-0.03	75.68	-11.40	0.000%
22	-5.72	-75.68	9.84	5.72	75.68	-9.84	0.000%
23	-9.92	-75.68	5.66	9.92	75.68	-5.66	0.000%
24	-11.45	-75.68	-0.02	11.45	75.68	0.02	0.000%
25	-9.94	-75.68	-5.71	9.94	75.68	5.71	0.000%
26	-5.77	-75.68	-9.87	5.77	75.68	9.87	0.000%
27	-0.03	-46.89	-15.20	0.03	46.89	15.20	0.000%
28	7.64	-46.89	-13.14	-7.64	46.89	13.14	0.000%
29	13.23	-46.89	-7.56	-13.23	46.89	7.56	0.000%
30	15.28	-46.89	0.03	-15.28	46.89	-0.03	0.000%
31	13.26	-46.89	7.61	-13.26	46.89	-7.61	0.000%
32	7.69	-46.89	13.17	-7.69	46.89	-13.17	0.000%
33	0.04	-46.89	15.20	-0.04	46.89	-15.20	0.000%
34	-7.65	-46.89	13.13	7.65	46.89	-13.13	0.000%
35	-13.24	-46.89	7.55	13.24	46.89	-7.55	0.000%
36	-15.29	-46.89	-0.04	15.29	46.89	0.04	0.000%
37	-13.28	-46.89	-7.62	13.28	46.89	7.62	0.000%
38	-7.72	-46.89	-13.17	7.72	46.89	13.17	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00005655

3	Yes	4	0.00000001	0.00093670
4	Yes	4	0.00000001	0.00091408
5	Yes	4	0.00000001	0.00003794
6	Yes	4	0.00000001	0.00089515
7	Yes	4	0.00000001	0.00095133
8	Yes	4	0.00000001	0.00006501
9	Yes	4	0.00000001	0.00089632
10	Yes	4	0.00000001	0.00090895
11	Yes	4	0.00000001	0.00004437
12	Yes	4	0.00000001	0.00095135
13	Yes	4	0.00000001	0.00091146
14	Yes	4	0.00000001	0.00000597
15	Yes	4	0.00000001	0.00059141
16	Yes	4	0.00000001	0.00064276
17	Yes	4	0.00000001	0.00064303
18	Yes	4	0.00000001	0.00059297
19	Yes	4	0.00000001	0.00063762
20	Yes	4	0.00000001	0.00063639
21	Yes	4	0.00000001	0.00058204
22	Yes	4	0.00000001	0.00062715
23	Yes	4	0.00000001	0.00062933
24	Yes	4	0.00000001	0.00058733
25	Yes	4	0.00000001	0.00064155
26	Yes	4	0.00000001	0.00064048
27	Yes	4	0.00000001	0.00001683
28	Yes	4	0.00000001	0.00008712
29	Yes	4	0.00000001	0.00008317
30	Yes	4	0.00000001	0.00001422
31	Yes	4	0.00000001	0.00007889
32	Yes	4	0.00000001	0.00008906
33	Yes	4	0.00000001	0.00001713
34	Yes	4	0.00000001	0.00007944
35	Yes	4	0.00000001	0.00008204
36	Yes	4	0.00000001	0.00001438
37	Yes	4	0.00000001	0.00008918
38	Yes	4	0.00000001	0.00008104

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	19.417	37	1.1357	0.0024
L2	92.5 - 38	8.843	37	0.9006	0.0008
L3	45 - 0	2.078	37	0.4160	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140'	BXA-70063/6CF w/ Mount Pipe	37	19.417	1.1357	0.0026	60919
126'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	37	16.111	1.0852	0.0020	21756
115'	(2) 7770.00 w/ Mount Pipe	37	13.584	1.0385	0.0015	12183
108'	VHLP2.5-11	37	12.034	1.0030	0.0012	9518
102'	APXVSPP18-C-A20 w/ Mount Pipe	37	10.755	0.9678	0.0010	8015
100'	800MHz 2X50W RRH W/FILTER	37	10.340	0.9549	0.0010	7614
94'	742 213 w/ Mount Pipe	37	9.135	0.9123	0.0008	6645
74'	BCD-87010	37	5.611	0.7289	0.0005	5528
40'	KS24019-L112A	37	1.681	0.3649	0.0002	5113

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 86.8333	49.655	12	2.9050	0.0062
L2	92.5 - 38	22.621	12	2.3042	0.0020
L3	45 - 0	5.318	12	1.0645	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140'	BXA-70063/6CF w/ Mount Pipe	12	49.655	2.9050	0.0068	23941
126'	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	12	41.203	2.7760	0.0051	8550
115'	(2) 7770.00 w/ Mount Pipe	12	34.743	2.6567	0.0039	4786
108'	VHLP2.5-11	12	30.781	2.5660	0.0031	3739
102'	APXVSPP18-C-A20 w/ Mount Pipe	12	27.510	2.4758	0.0026	3148
100'	800MHz 2X50W RRH W/FILTER	12	26.449	2.4428	0.0025	2990
94'	742 213 w/ Mount Pipe	12	23.367	2.3339	0.0021	2609
74'	BCD-87010	12	14.354	1.8648	0.0012	2166
40'	KS24019-L112A	12	4.301	0.9336	0.0006	1999

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.3125	53'2-1/32"	0'	0.0	39.000	37.7587	-16.92	1472.59	0.011
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	54'6"	0'	0.0	39.000	63.3646	-29.38	2471.22	0.012
L3	38 - 0 (3)	TP59.05x48.033x0.5	45'	0'	0.0	39.000	94.2655	-46.87	3676.35	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.3125	643.05	22.287	39.000	0.571	0.00	0.000	39.000	0.000
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	1994.08	31.904	39.000	0.818	0.00	0.000	39.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	3604.44	32.076	39.000	0.822	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	140 - 86.8333 (1)	TP39.223x26.216x0.3125	24.63	0.652	26.000	0.051	0.61	0.010	26.000	0.000
L2	86.8333 - 38 (2)	TP50.56x37.2117x0.4063	32.30	0.510	26.000	0.040	1.03	0.008	26.000	0.000
L3	38 - 0 (3)	TP59.05x48.033x0.5	39.21	0.416	26.000	0.033	1.34	0.006	26.000	0.000

Pole Interaction Design Data

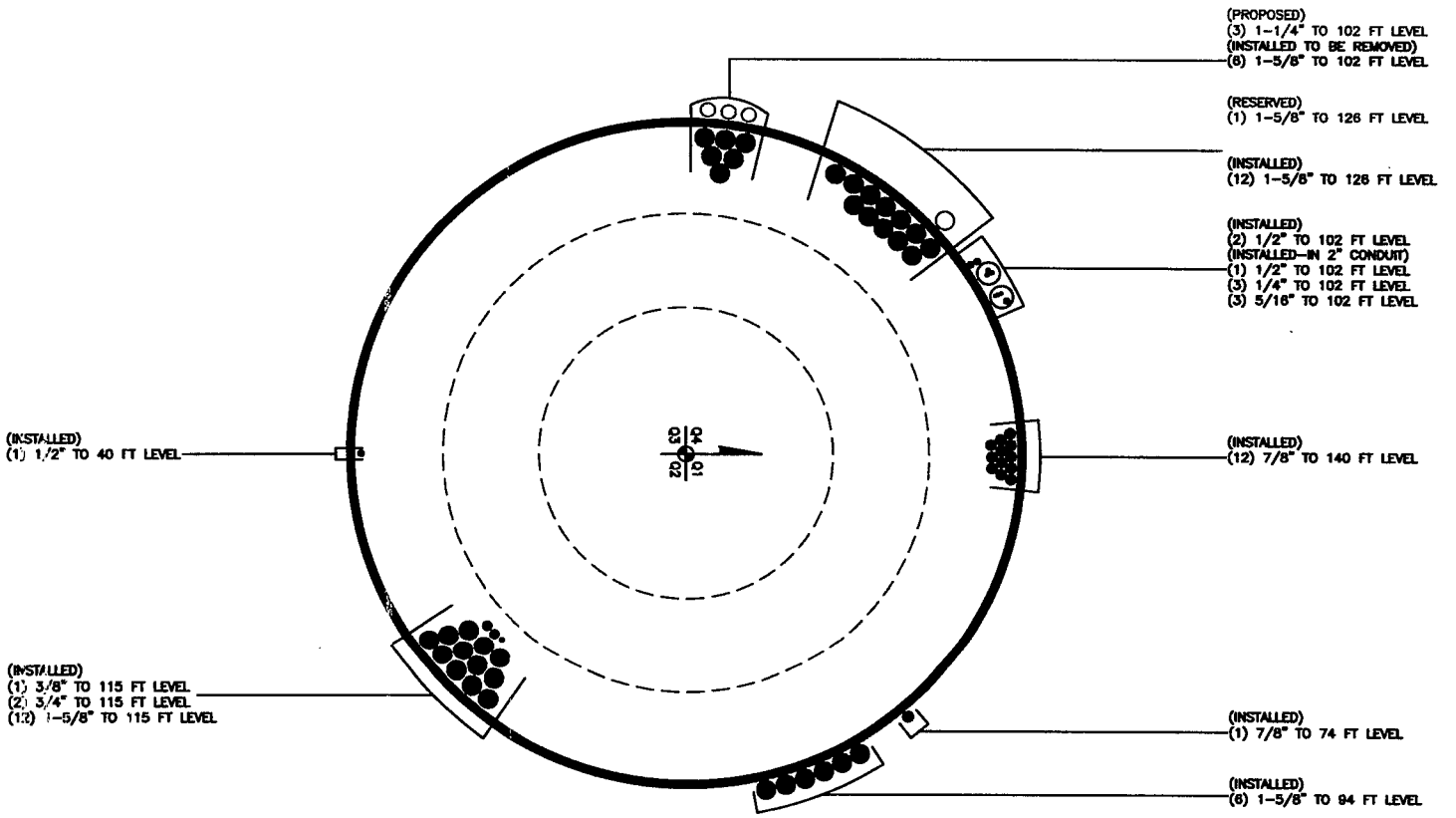
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	140 - 86.8333 (1)	0.011	0.571	0.000	0.051	0.000	0.584 ✓	1.333	H1-3+VT ✓
L2	86.8333 - 38 (2)	0.012	0.818	0.000	0.040	0.000	0.830 ✓	1.333	H1-3+VT ✓
L3	38 - 0 (3)	0.013	0.822	0.000	0.033	0.000	0.835 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	140 - 86.8333	Pole	TP39.223x26.216x0.3125	1	-16.92	1962.96	43.8	Pass
L2	86.8333 - 38	Pole	TP50.56x37.2117x0.4063	2	-29.38	3294.14	62.3	Pass
L3	38 - 0	Pole	TP59.05x48.033x0.5	3	-46.87	4900.57	62.7	Pass
						Summary		
						Pole (L3)	62.7	Pass
						RATING =	**62.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 806369 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *806369*
Site Name: *HRT 094 943225*
App #: *165644 rev1*

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	7.5	ft
Concrete Area =	6361.7	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	3	
Vert. Cage Diameter =	6.83	ft
Vert. Cage Diameter =	81.98	in
Vertical Bar Size =	10	
Bar Diameter =	1.27	in
Bar Area =	1.27	in^2
Number of Bars =	52	
As Total=	66.04	in^2
A s/ Aconc, Rho:	0.0104	1.04%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.04%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	10408.53	kips
at Mu=(ϕ=0.65)Mn=	6794.66	ft-kips
Max Tu, (φ=0.9) Tn =	3566.16	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	3924.434	ft-kips (* Note)
Max. Service Shaft P:	47	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

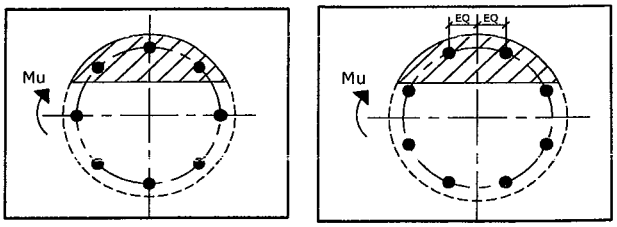
Load Factor	Shaft Factored Loads		
1.30	Mu:	5101.764	ft-kips
1.30	Pu:	61.1	kips

Material Properties		
Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	
ACI 318 Code		
Select Analysis ACI Code=	2002	
Seismic Properties		
Seismic Design Category =	B	
Seismic Risk =	Low	

Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **18.74** in
Extreme Steel Strain, εt: **0.0108**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	61.10	kips
Drilled Shaft Moment Capacity, φMn:	**10671.42**	ft-kips
Drilled Shaft Superimposed Mu:	**5101.76**	ft-kips
(Mu/φMn, Drilled Shaft Flexure CSR:	**47.8%**	

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

TIA Rev F

Site Data

BU#: *806369*
Site Name: *HRT 094 943225*
App #: *165644 rev1*

Pole Manufacturer:	*Other*

Reactions		
Moment:	3604	ft-kips
Axial:	47	kips
Shear:	39	kips

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	65.05	in

Plate Data		
Diam:	71.05	in
Thick:	3	in
Grade:	60	ksi
Single-Rod B-eff:	9.49	in

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

Pole Data		
Diam:	59.05	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

		Rigid
Maximum Rod Tension:	130.6 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	67.0% Pass	

Base Plate Results Flexural Check

		Rigid
Base Plate Stress:	18.8 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	31.3% Pass	Y.L. Length: 27.29

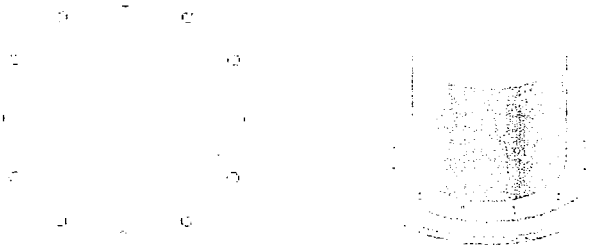
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

Monopole Drilled Pier

Checks capacity of a single drilled shaft foundation for a monopole

BU#: 806369
Site Name: *HRT 094 943225*
App Number: *165644 rev1*

CROWN CASTLE

ACI 318 Version:	2002

Design Reactions		
Shear, S:	39.00	kips
Moment, Mt:	3604.00	ft-kips
Tower Weight, Wt:	47.00	kips
Tower Height, H:	140	ft
Base Diameter, BD:	59.05	in

Foundation Dimensions		
Caisson Diameter, CD:	7.5	ft
Ext. Above Grade, E:	0.0	ft
Depth Below Grade, L:	47.0	ft
Neglected Depth, N:	5.0	ft
Rebar Size, Sp:	10	
Rebar Quantity, mp:	52	
Tie Size, tp:	3	

Material Properties		
Rebar Tensile, Fy:	60	ksi
Concrete Strength, F'c:	3000	psi
Concrete Density, δx:	100.9	pcf
Clear Cover, cc:	3	in

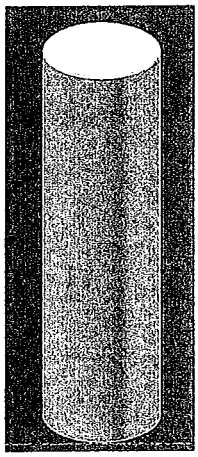
Soil Properties		
Soil Unit Weight, γ:	51.1	pcf
Allowable Bearing, Bc:	4.500	ksf
Seismic Design Cat, z:	B	

Caisson Analysis		
Depth to Zero Shear:	8.1	ft
Max Factored Moment:	5101.76	ft-kips
Overturning FOS:	6.65	

Depth		Shear		Moment	
0	ft	39.1	kips	3607.4	ft-kips
4.7	ft	39.1	kips	3791	ft-kips
9.4	ft	-14.7	kips	3856.2	ft-kips

Design Checks	Capacity/ Availability	Demand/ Limits	Check
Minimum Req'd Dia. 1 (ft):	7.50	3.65	OK
Minimum Req'd Dia. 2 (ft):	7.50	6.42	OK
Bearing (ksf):	4.50	1.06	OK
Rebar Area (in²):	66.04	21.21	OK
Pier moment capacity (k-ft):	10671.42	5101.76	OK
Rebar spacing (in):	3.80	2 < Bs <18	OK
Development Length (in):	463.61	12.00	OK
Soil moment capacity (FOS):	6.65	2.00	OK

☐ **Assume 0.33% Minimum Steel?**



Bearing: 23.6%

Steel: 47.8%

Soil: 30.1%

Equivalent Silty Soil Parameter Tool

Note:
This tool determines the equivalent soil parameters for silty soil (having both cohesion and angle of friction), according to the CCI Foundations ongoing discussions (2010), Criteria Item DS-7 . The equivalent parameters results are to be input in the PLS-Caisson Software to account for the combined resistance of the granular and cohesive parameters simultaneously present in silty and similar soils

Site Data

BU#: *806369*
Site Name: *HRT 094 943225*
App #: *165644 rev1*

Neglect Top Layer: Y Y/N
# of Layers: 8

Input the data in the "shaded" columns. If soil layer is submerged, then enter the saturated density (buoyant unit weight)

Layer:	Layer Thickness (ft)	From (ft)	To (ft)	Unit Weight of Soil (pcf)	Cohesion (psf)	Internal Friction Angle (deg)	K_p	Depth to Mid-Layer (ft)	Overburden (psf)	Sand Resistance (ksf)	Clay Resistance (ksf)	P_p total (ksf)	Equivalent Parameters for PLS Caisson Input: Equivalent Cohesion (psf)	Equivalent K_p
1	2	0	2	105			0.000	1	105	0.000	0.00	0.000	**0**	**0.00**
2	3	2	5	100			0.000	3.5	360	0.000	0.00	0.000	**0**	**0.00**
3	5	5	10	100	500	30	3.000	7.5	760	6.840	4.00	10.840	**1355**	**4.75**
4	5	10	15	36	100	27	2.663	12.5	1100	8.788	0.80	9.588	**1198**	**2.91**
5	5	15	20	36	100	27	2.663	17.5	1280	10.226	0.80	11.026	**1378**	**2.87**
6	5	20	25	36	100	27	2.663	22.5	1460	11.664	0.80	12.464	**1558**	**2.85**
7	5	25	30	36	100	27	2.663	27.5	1640	13.102	0.80	13.902	**1738**	**2.83**
8	5	30	35	36	100	27	2.663	32.5	1820	14.540	0.80	15.340	**1917**	**2.81**

Calculation Notes:
1- Sand Resistance = 3 * Kp * Overburden ----> (Per equations used in PLS-Caisson Software)
2- Cohesion Resistance = 8 * C ----------> (Per equations used in PLS-Caisson Software, Full 8CD approach)
3- Total Resistance = Sand Resistance + Cohesion Resistance
4- Equivalent Kp= Total / Overburden / 3
5- Equivalent C= Total / 8

CAISSON Version 10.40 4:47:04 PM Tuesday, October 16, 2012
Crown Castle USA

Project Title: 806369
Project Notes:

Calculation Method: Full 8CD

******* I N P U T D A T A

Pier Properties

Diameter (ft)	Distance of Top of Pier above Ground (ft)	Concrete Strength (ksi)	Steel Yield Strength (ksi)
7.50	0.00	3.00	60.00

Soil Properties

Layer	Type	Thickness (ft)	Depth at Top of Layer (ft)	Density (lbs/ft^3)	CU (psf)	KP	PHI (deg)
1	Clay	2.00	0.00	105.0			
2	Clay	3.00	2.00	100.0			
3	Clay	5.00	5.00	100.0	1355.0		
4	Clay	5.00	10.00	36.0	1198.0		
5	Clay	5.00	15.00	36.0	1378.0		
6	Clay	5.00	20.00	36.0	1558.0		
7	Clay	5.00	25.00	36.0	1738.0		
8	Clay	5.00	30.00	36.0	1917.0		
9	Clay	10.00	35.00	41.0	200.0		
10	Sand	2.00	45.00	41.0		3.255	32.00

Design (Factored) Loads at Top of Pier

Moment (ft-k)	Axial Load (kips)	Shear Load (kips)	Additional Safety Factor Against Soil Failure
3604.0	47.0	39.00	6.65

******* R E S U L T S

Calculated Pier Properties

Length (ft)	Weight (kips)	End Bearing Pressure (psf)
47.000	311.459	1063.9

Ultimate Resisting Forces Along Pier

Type	Distance of Top of Layer to Top of Pier (ft)	Thickness (ft)	Density (lbs/ft^3)	CU (psf)	KP	Force (kips)	Arm (ft)
Clay	0.00	2.00	105.0			0.00	1.00
Clay	2.00	3.00	100.0			0.00	3.50
Clay	5.00	5.00	100.0	1355.0		406.50	7.50
Clay	10.00	5.00	36.0	1198.0		359.40	12.50
Clay	15.00	5.00	36.0	1378.0		413.40	17.50
Clay	20.00	5.00	36.0	1558.0		467.40	22.50
Clay	25.00	0.84	36.0	1738.0		87.68	25.42
Clay	25.84	4.16	36.0	1738.0		-433.72	27.92
Clay	30.00	5.00	36.0	1917.0		-575.10	32.50
Clay	35.00	10.00	41.0	200.0		-120.00	40.00
Sand	45.00	2.00	41.0		3.255	-345.83	46.01

Shear and Moments Along Pier

Distance below Top of Pier (ft)	Shear (with Safety Factor) (kips)	Moment (with Safety Factor) (ft-k)	Shear (without Safety Factor) (kips)	Moment (without Safety Factor) (ft-k)
0.00	259.7	23989.3	39.1	3607.4
4.70	259.7	25210.0	39.1	3791.0
9.40	-98.0	25643.8	-14.7	3856.2
14.10	-441.5	24364.5	-66.4	3663.8
18.80	-820.3	21417.7	-123.4	3220.7
23.50	-1246.7	16582.7	-187.5	2493.6
28.20	-1228.6	10215.6	-184.8	1536.2
32.90	-707.4	5638.0	-106.4	847.8
37.60	-434.6	3235.5	-65.4	486.5
42.30	-378.2	1325.3	-56.9	199.3
47.00	-321.8	-319.8	-48.4	-48.1