



1280 Route 46 West, Suite 9, Parsippany NJ, 07054

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

Re: Notice of Exempt Modification Application  
38 Spring Hill Lane, Bethel, CT 06801

October 9, 2017

Dear Ms. Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), is submitting to the Connecticut Siting Council for a Notice of Exempt Modification for Proposed Modifications to an Existing Telecommunications Facility located at the above-referenced site. Sprint currently maintains 3 existing panel antenna and 9 remote radio units at the 115' level of the Tower. Sprint proposes to add 1 panel antenna per sector and 1 remote radio unit at 115' tower level as well as 1 fiber cable and 3 fiber jumpers, 27 antenna to RRU jumper cables, one new battery string in existing ground based battery cabinet and one new radio cabinet for future growth.

The Sprint installation was initially approved on 8/18/2004 by CT Siting Council and a Bethel Building permit was issued on 9/30/2005. The structural documents enclosed have been modified where necessary to reflect the current reality of the installations on the Tower.

If you have any questions, please feel free to contact me.

Thank you,

By: *Paul F. Sagristano*

Paul F. Sagristano  
Cherundolo Consulting  
917.841.0247  
[psagristano@lrivassoc.com](mailto:psagristano@lrivassoc.com)



1280 Route 46 West, Suite 9, Parsippany NJ, 07054

Ms. Melanie Bachman  
Executive Director  
CT Siting Council  
10 Franklin Square  
New Britain, CT 06051

October 4, 2017

Re: Notice of Exempt Modification –  
Existing Sprint Telecommunication Facility  
38 Spring Hill Lane  
Bethel, CT 06801

Latitude : N41.3622  
Longitude: W73.3967

Dear Ms. Bachman:

Sprint currently maintains 3 existing panel antenna and 9 remote radio units at the 115' centerline level of the existing monopole. Sprint proposes to add 3 panel antenna and 3 remote radio unit at 115' centerline on the tower. Sprint further proposes to add 1 fiber cable, 3 fiber jumpers, 27 antenna to RRU jumpers and 1 ground based Radio cabinet for future growth. Sprint is performing a new high-performance upgrade for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

The facility noted above was approved building by the Town of Bethel on September 30, 2005. A copy of this approval is attached. The original CSC approval for Sprint's Tower Share was August 18, 2004, also attached.

Please accept this letter as notification to the Council, pursuant to R.C.S.A. Section 16-50j-73, for construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter is being sent to Bob Rech, President of Bluesky Tower Partners, LLC, the property owner and to Matt Knickerbocker, First Selectman of the Town of Bethel and Beth Cavagna, Planning director for the Town of Bethel.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in Sprint's operations at the site. Also included is documentation of the structural sufficiency of the tower with proposed modifications to accommodate the revised antenna configuration.

## **Existing Facility**

The Bethel facility is located at 38 Spring Hill Lane, Bethel, CT, the Site coordinates are: N41. 3622, W – 73.3967. The facility is owned by Blue Sky Tower Partners, LLC., The existing facility consists of a 125' Monopole. Sprint currently operates wireless communications equipment on a concrete slab at the facility and has 3 antennas and 9 RRU's mounted on at a centerline of 115' feet.

## **Statutory Considerations**

The planned modifications to the facility fall within the activities explicitly provided for in R.C.S.A. 16-50j-72(b)(2)

1. The height of the overall structure will be unaffected.
2. The proposed changes will not require an extension of the property boundaries.
3. The proposed additions will not increase the noise level at the existing facility by six decibels or more, or to levels that exceed state and/or local criteria
4. The changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Respectfully submitted,

*Paul F. Sagristano*

Paul F. Sagristano  
Charles Cherundolo Consulting  
917-841-0247  
[psagristano@lrivassoc.com](mailto:psagristano@lrivassoc.com)

PFS/mtf

### Additional Recipients:

Town of Bethel – Matt Knickerbocker – First Selectman – Via Fed Ex  
Blue Sky Tower Partners, LLC – Jim Rech - President - Via Fed Ex  
Town of Bethel – Planning Director – Beth Cavagna – Via Fed Ex



October 13, 2017

Dear Customer:

The following is the proof-of-delivery for tracking number **770451622020**.

---

**Delivery Information:**

<b>Status:</b>	Delivered	<b>Delivered to:</b>	Receptionist/Front Desk
<b>Signed for by:</b>	A.REMILLARD	<b>Delivery location:</b>	158 MAIN ST 2 NORFOLK, MA 02056
<b>Service type:</b>	FedEx Express Saver	<b>Delivery date:</b>	Oct 12, 2017 10:42
<b>Special Handling:</b>	Deliver Weekday  Direct Signature Required		



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**Shipping Information:**

<b>Tracking number:</b>	770451622020	<b>Ship date:</b>	Oct 9, 2017
		<b>Weight:</b>	2.0 lbs/0.9 kg

**Recipient:**  
Jim Rech, President  
Blue Sky Tower Partners, LLC  
158 Main Street.  
Suite 2  
NORFOLK, MA 02056 US

**Reference**

**Shipper:**  
Paul Sagristano  
CCC  
4 Davis Road West  
Suite 5  
OLD LYME, CT 06371 US  
CT54XC749 CSC to Blue Sky

Thank you for choosing FedEx.



October 11,2017

Dear Customer:

The following is the proof-of-delivery for tracking number **770451795603**.

---

**Delivery Information:**

<b>Status:</b>	Delivered	<b>Delivered to:</b>	Receptionist/Front Desk
<b>Signed for by:</b>	P.KANSKY	<b>Delivery location:</b>	1 SCHOOL ST. BETHEL, CT 06801
<b>Service type:</b>	FedEx Express Saver	<b>Delivery date:</b>	Oct 11, 2017 12:50
<b>Special Handling:</b>	Deliver Weekday  Direct Signature Required		

---

**Shipping Information:**

<b>Tracking number:</b>	770451795603	<b>Ship date:</b>	Oct 9, 2017
		<b>Weight:</b>	2.0 lbs/0.9 kg

**Recipient:**  
Mark Knickerbocker, 1st Selectman  
Town of Bethel  
1 School St.  
BETHEL, CT 06801 US

**Shipper:**  
Paul Sagristano  
CCC  
4 Davis Road West  
Suite 5  
OLD LYME, CT 06371 US  
CT54XC749 CSC to 1st Selectman

**Reference**

Thank you for choosing FedEx.



October 11, 2017

Dear Customer:

The following is the proof-of-delivery for tracking number **770451739029**.

---

**Delivery Information:**

<b>Status:</b>	Delivered	<b>Delivered to:</b>	Receptionist/Front Desk
<b>Signed for by:</b>	N.LOBALBO	<b>Delivery location:</b>	1 SCHOOL ST. BETHEL, CT 06801
<b>Service type:</b>	FedEx Express Saver	<b>Delivery date:</b>	Oct 11, 2017 12:51
<b>Special Handling:</b>	Deliver Weekday  Direct Signature Required		



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**Shipping Information:**

<b>Tracking number:</b>	770451739029	<b>Ship date:</b>	Oct 9, 2017
		<b>Weight:</b>	2.0 lbs/0.9 kg

**Recipient:**  
Beth Cavagna  
Town of Bethel  
1 School St.  
BETHEL, CT 06801 US

**Shipper:**  
Paul Sagristano  
CCC  
4 Davis Road West  
Suite 5  
OLD LYME, CT 06371 US  
CT54XC749 CSC to Planning Dir

**Reference**

Thank you for choosing FedEx.

# Bethel, CT : Commercial Property Record Card

[ [Back to Search Results](#) ]

[ [Start a New Search](#) ] [ [Help with Printing](#) ]

## Search For Properties

Account	Map Block Lot	Street #	Street Name
<input type="text"/>	<input type="text"/>	<input type="text"/>	SPRING HILL LANE <input type="button" value="v"/>

Account	Card	Map-Block-Lot	Location	Zoning	State Class	Acres
R06064	1	32 47A 121	SPRING HILL LANE	R-40	504 - n/a	1.625

**Living Units**  
0

### Owner Information

Blue Sky Towers Llc  
Po Box 191  
Franklin MA 02038

### Deed Information

**Book/Page:** 1051/496  
**Deed Date:** 2014/10/03

### Building Information

**Building No:** 0  
**Year Built:** 0  
**No of Units:** 0  
**Structure Type:**  
**Grade:**  
**Identical Units:** 0  
**Net Leasable Area:** 0

### Valuation

**Land:** \$151,380  
**Building:** \$113,930  
**Total:** \$265,310  
**Net Assessment:** \$185,720

### Property Picture



### Sales History

Book/Page	Date	Price	Type	Validity
1051/496	2014/10/03	\$220,720	Land + Bldg	23
979/229	2009/10/02	\$240,000	Land Only	03

### Permit History

Date	Purpose	Price
2016/06/21	3 ANT EMPIRE	\$0
2015/03/31	3 ANT TMOBILE	\$0

### Out Building Information

Structure Code	Width	Lgth/SqFt	Year	RCNLD
Utility Frame	9	23	2006	\$3,130
Utility Frame	8	15	2006	\$1,810
Utility Frame	9	12	2006	\$1,630
Utility Frame	10	12	2006	\$1,810
Cell Tower 120'	0	120	2011	\$105,550

### Exterior/Interior Information

Levels Size Use Type Ext. Walls Const. Type Partitions Heating A/C Plumbing Condition Func. Utility Unadj. RCNLD

**Building Sketch**

	<u>Descriptor/Area</u>
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**Notice**

The information delivered through this on-line database is provided in the spirit of open access to government information and is intended as an enhanced service and convenience for citizens of Bethel, CT.

The providers of this database: CLT, Big Room Studios, and Bethel, CT assume no liability for any error or omission in the information provided here.

**Currently All Values Have Not Been Finalized and Are Subject To Change.**

Comments regarding this service should be directed to: [Assessor@betheltownhall.org](mailto:Assessor@betheltownhall.org)



32 47A 121

Search Results

Parcel Details

**SPRING HILL LANE**



**BLUE SKY TOWERS LLC**

PO BOX 191  
FRANKLIN, MA 02038  
Parcel ID: 32 47A 121  
Lot Size (AC): 1.63  
Parcel Value: 265310

Links

Parcel Details

Photo

Google Map

Abutter Distance:

Adjacent

Adjacent

50 ft

100 ft

200 ft

300 ft

400 ft

Abutters

Sketch

Add Parcel

Remove Parcel

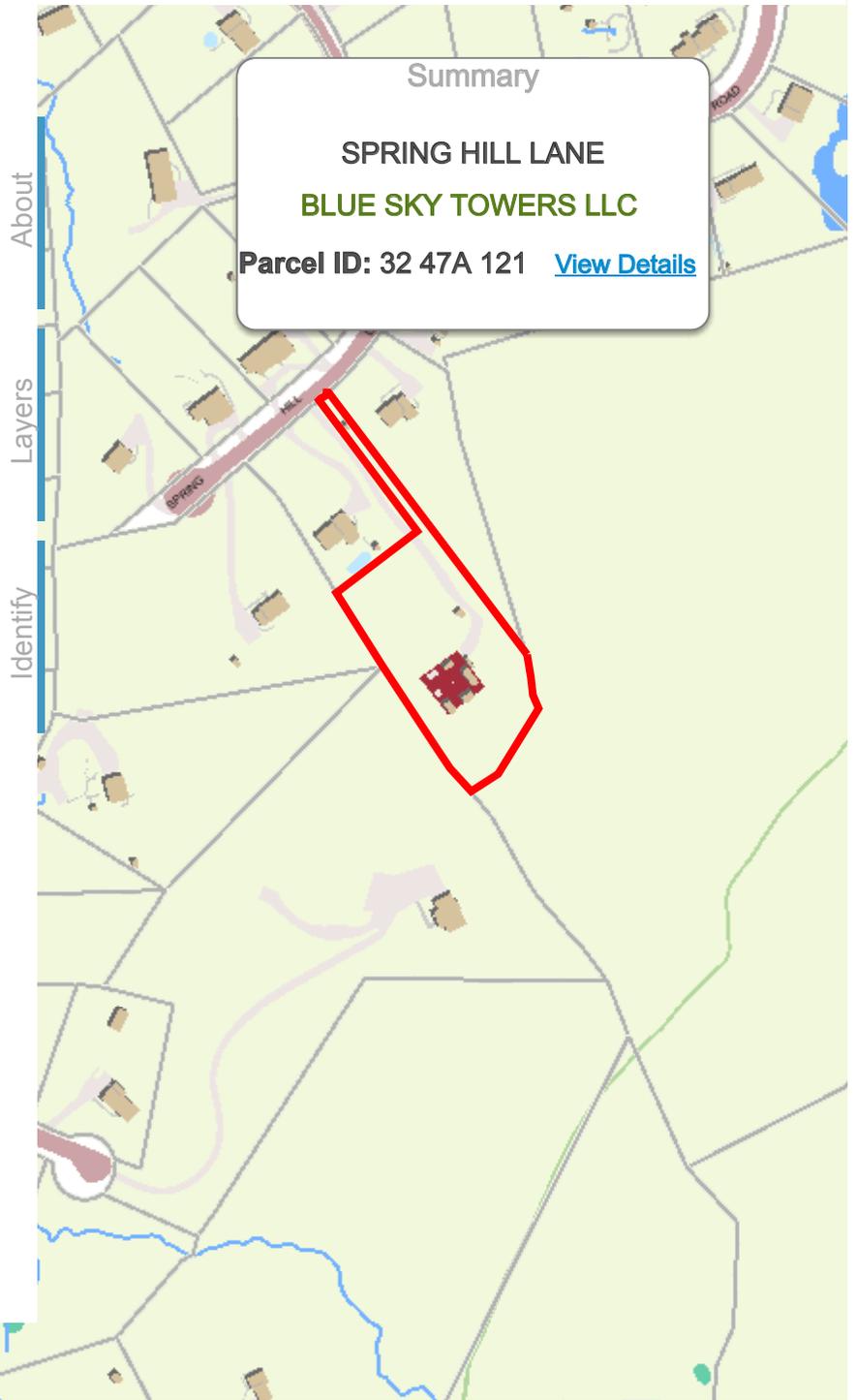
Print Labels

Export List

Parcel ID 32 47A 121

Type PARCEL

Scroll



Email Map Link

Copy and paste the following string into an email to link to the current map view:



Print Map

lat:41.3627, long:-73.3954



Size:

Scale: 1" =  ft. Title:

Print



lat:41.3627, long:-73.3954

**Tighe&Bond**



# 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@po.state.ct.us](mailto:siting.council@po.state.ct.us)

[www.ct.gov/csc](http://www.ct.gov/csc)

May 18, 2005

Christopher B. Fisher, Esq.  
Cuddy & Feder & Worby LLP  
90 Maple Avenue  
White Plains, NY 10601-5196

RE: **DOCKET NO. 288** - Valley Communications, Inc. Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility at 38 Spring Hill Lane, Bethel, Connecticut.

Dear Attorney Fisher:

At a public meeting of the Connecticut Siting Council held on May 11, 2005, the Connecticut Siting Council (Council) considered and approved the Development and Management (D&M) Plan submitted for this project on April 18, 2005.

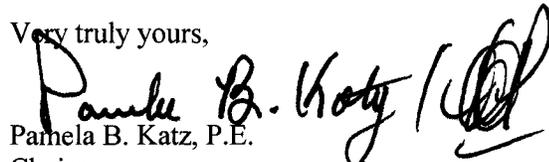
The D&M Plan requested relief of Council Decision and Order Condition 1 to accommodate the placement of one 16-foot whip antenna at the top of the monopole for use by the Bethel Police Department. The Council approved this request with the following condition: relief of Council Decision and Order Condition 1 applies only to the one whip antenna presented in the D&M Plan for use by the Bethel Police Department. No other whip antennas shall be placed at the top of the structure. The approved whip antenna shall be removed from the tower if it ceases to serve the Bethel Police Department.

This approval applies only to the D&M Plan submitted on April 18, 2005. Any changes to the D&M Plan require advance Council notification and approval.

Please be advised that deviations from this plan are enforceable under the provisions of the Connecticut General Statutes § 16-50u. Enclosed is a copy of the staff report on this D&M Plan, dated May 11, 2005.

Thank you for your attention and cooperation.

Very truly yours,

  
Pamela B. Katz, P.E.  
Chairman

Enclosure: Staff Report, dated May 11, 2005

c: Parties and Intervenor

Alice M. Hutchinson, First Selectman, Town of Bethel

Steve Palmer, Planning and Zoning Official, Town of Bethel

**DOCKET NO. 288**  
Valley Communications, Inc.  
Development and Management Plan  
Bethel, Connecticut  
Staff Report  
May 11, 2005

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On April 18, 2005, Valley Communications, Inc. submitted a Development and Management Plan (D&M Plan) for a facility at 38 Spring Hill Lane in Bethel, Connecticut. The facility was approved by the Connecticut Siting Council on August 12, 2004. The approved facility would replace an existing 90-foot guyed lattice tower located at the site to accommodate tower sharing for four wireless carriers as well as communication antennas for the Town of Bethel and several private dispatch services.

Valley Communications would construct a 125-foot monopole at the site. The tower would be capable of supporting six antenna platforms with a ten-foot vertical separation and four whip antennas mounted in various locations. Tower tenants and antenna locations are listed below:

- Town of Bethel Police Department, one 16-foot whip with a diameter of 3.5" mounted at 125 feet agl;
- New Cingular Wireless PCS, LLC, 12 panel antennas on a platform at 122 feet agl;
- Sprint Spectrum L.P., 12 panel antennas on a platform at 112 feet agl;
- Omnipoint Communications, Inc. (T-Mobile), 12 panel antennas on a platform at 102 feet agl;
- Yankee Gas, one 16-foot telewave antenna mounted on the T-Mobile platform at 102 feet agl;
- Town of Bethel and Valley Communications, two 16-foot whip antennas mounted on a platform at 92 feet agl with the platform available for future use;
- Nextel Communications, Inc., 12 panel antennas on a platform at 82 feet agl; and
- Tower space available at 72 feet agl.

In D&O Condition 1, the Council restricted the height of the tower to 125 feet agl including appurtenances. Valley Communications is requesting relief of this condition to allow the placement of one 16-foot whip antenna at the top of the tower for use by the Bethel Police Department. The police department contends that the design of the police communication system requires a 35-foot separation between the receive and transmit antennas. If the receive antenna was located at the 100-foot level to prevent the overall height of the facility from exceeding 125 feet, the transmit antenna would have to be located at the 72-foot level of the tower, within the tree line and 20 feet less than the transmit antenna's current location on the existing lattice tower, compromising system performance.

Based on the photo simulations and visibility analysis presented in the application, Valley Communications contends the placement of the receive antenna at the top of the tower would not significantly affect visibility. The photo simulations assumed the facility would consist of a 130-foot monopole with seven 16-foot long whip antennas mounted at the top.

Valley Communications would construct a 75-foot by 75-foot equipment compound at the base of the tower. Cingular would construct a 10-foot by 20-foot equipment shelter within the compound. Sprint and T-Mobile would install equipment cabinets on concrete pads within the compound. The existing equipment shelters for Nextel and Valley Communications would remain in place outside of the compound, serviced by overhead cables.

Valley Communications, in consultation with the Town of Bethel, would resurface and re-grade the access road. Privacy slats would be installed on the fencing on the west side of the compound. Large evergreens would also be planted on the west side of the compound to mitigate the view from neighboring residences. No improvements to the existing access gate are proposed.

Spring Hill Lane



# Bethel Building Department

Clifford J. Hurgin Municipal Center, 1 School Street, Bethel, CT 06801

Phone (203) 794-8517 Fax (203) 794-8595

Gary Boughton, Building Official

Joseph P. Fallo, Assistant Building Official

REV. 07/08/05

PLEASE CALL FOR INSPECTIONS. INSPECTIONS ARE REQUIRED AT THESE POINTS IN YOUR PROJECT. PLEASE KNOW YOUR PROJECT. ITEMS WE MISS AND DO NOT CHECK OFF ON THIS SHEET THAT, IN FACT, DO REQUIRE INSPECTION ARE YOUR RESPONSIBILITY TO DETERMINE.

- 1.  FOOTING (including slab before pour)
- 1a.  IF REQUIRED, TWO COPIES OF FOUNDATION AS-BUILT MUST BE RECEIVED AND APPROVED BY THE ZONING DEPARTMENT BEFORE FURTHER WORK MAY COMMENCE!
- 2.  FOOTING DRAINS
- 3.  WATERPROOFING FOUNDATION
- 4.  FOUNDATION INSULATION
- 5.  UNDERGROUND PLUMBING, PLUMBING IN SLAB, SPRINKLER UNDERGROUND
- 6.  UNDERGROUND SERVICE (ELECTRICAL CONTRACTORS SHALL DO INSTALLATION)
- 7.  TEMPORARY SERVICES
- 8.  DECK FOOTING INSPECTION WITH LEDGER BOARD AND FLASHING.
- 9.  HEARTH INSPECTION
- 10.  SMOKE SHELF INSPECTION
- 11.  FRAMING INSPECTION BEFORE MECHANICALS
- \* 12.  ELECTRICAL ROUGH \*WE DO A FULL MECHANICAL ROUGH INSPECTION AS ONE INSPECTION. ALL THESE MUST BE READY WHEN YOU CALL.
- \* 13.  PLUMBING ROUGH
- \* 14.  HEATING ROUGH (INCLUDING OIL TANK)
- 15.  INSULATION
- 16a.  POOL BONDING, STRUCTURAL STEEL/REBAR & POTTING - IF REQUIRED
- 16b.  POOL LIGHTS & POTTING (BEFORE POOL IS FILLED), GROUNDING & CONDUIT
- 16c.  POOL GATE--COMPLETE BARRIER, ALARMS--COMPLETE ELECTRIC--WE MUST HAVE ACCESS TO HOUSE TO TEST ELECTRIC.

17.  CERTIFICATE OF OCCUPANCY YOU MUST CONTACT HEALTH (794-8539), ZONING (794-8519) OR PUBLIC WORKS (794-8549) FOR THESE APPROVALS! (FOR NEW BUILDING, ITEMS BELOW MUST BE RECEIVED AT LEAST TEN BUSINESS DAYS PRIOR TO ISSUING CERTIFICATE OF OCCUPANCY) (APPROVALS MUST BE RECEIVED FROM HEALTH, & PUBLIC WORKS, & A ZONING COMPLIANCE CERTIFICATE MUST BE ISSUED, BEFORE A CERTIFICATE OF OCCUPANCY INSPECTION CAN OCCUR.)

- A) WATER TEST \_\_\_\_\_ B) WELL COMPLETION \_\_\_\_\_ C) SEPTIC AS BUILT \_\_\_\_\_
- D) SITE PLAN AS BUILT \_\_\_\_\_ E) DRIVEWAY/SOIL & EROSION/DRIVEWAY APRON \_\_\_\_\_
- F) METER(S) \_\_\_\_\_

A NEW BUILDING MUST HAVE A CERTIFICATE OF OCCUPANCY BEFORE IT IS OCCUPIED.

# BETHEL BUILDING DEPARTMENT

## BUILDING PERMIT NO. 05-605

BETHEL MUNICIPAL CENTER  
1 SCHOOL STREET  
BETHEL, CT 06801  
TEL. (203) 794-8517 FAX. (203) 794-8595

DATE OF PERMIT 9/30/2005

PERMIT TO Cell Tower Antenna

PROPOSED USE

NUMBER OF DWELLING UNITS \_\_\_\_\_

AT: (STREET & NO.) SPRING HILL LANE

ZONING DISTRICT \_\_\_\_\_

BETWEEN \_\_\_\_\_ AND \_\_\_\_\_  
SUBDIVISION \_\_\_\_\_ MAP 32 BLOCK 47A LOT 121 # \_\_\_\_\_ ASSESSOR LOT SIZE 01.63 Acr

APPLICANT \_\_\_\_\_ PHONE \_\_\_\_\_

ADDRESS 500 Enterprise Drive, Suite 3A Rocky Hill CT 06067  
(NO.) (STREET) (CITY) (STATE) (ZIP)

BUILDING IS TO BE \_\_\_\_\_ FEET WIDE BY \_\_\_\_\_ FEET LONG VOLUME \_\_\_\_\_ PERMIT FEE \$1,213.00  
CUBIC/SQ FEET

CONSTRUCTION TYPE \_\_\_\_\_ USE GROUP \_\_\_\_\_ ESTMATED COST \$100,000

**REMARKS** Install telecommunications facility including 125' mono pole and equipment shelters. run Coax to mono pole and install antennas. Facility to be fenced in and screened. Remove existing smaller tower.

OWNER VALLEY COMMUNICATIONS INC

**BUILDING DEPARTMENT  
TOWN OF BETHEL**

ADDRESS 155 WOOSTER STREET SHELTON CT 0648400 BY Gary Boughton

THIS PERMIT CONVEYS NO RIGHT TO OCCUPY ANY STREET, ALLEY OR SIDEWALK OR ANY PART THEREOF. EITHER TEMPORARILY OR PERMANENTLY. ENCROACHMENTS ON PUBLIC PROPERTY, NOT SPECIFICALLY PERMITTED UNDER THE BUILDING CODE, MUST BE APPROVED BY THE JURISDICTION. STREET OR ALLEY GRADES AS WELL AS DEPTH AND LOCATION OF PUBLIC SEWERS MAY BE OBTAINED FROM THE DEPARTMENT OF PUBLIC WORKS. THE ISSUANCE OF THIS PERMIT DOES NOT RELEASE THE APPLICANT FROM THE CONDITIONS OF ANY APPLICABLE SUBDIVISION RESTRICTIONS.

INSPECTIONS REQUIRED FOR ALL CONSTRUCTION WORK, INCLUDING:  
1. FOUNDATIONS OR FOOTINGS.  
2. FULL ROUGH, AND INSULATION PRIOR TO COVERING STRUCTURAL MEMBERS.  
3. FINAL INSPECTION BEFORE C/O.

APPROVED PLANS MUST BE RETAINED ON JOB AND THIS CARD KEPT POSTED UNTIL FINAL INSPECTION HAS BEEN MADE. **WHERE A CERTIFICATE OF OCCUPANCY IS REQUIRED, SUCH BUILDING SHALL NOT BE OCCUPIED UNTIL FINAL INSPECTION HAS BEEN MADE.**

WHERE APPLICABLE SEPARATE PERMITS ARE REQUIRED FOR ELECTRICAL, PLUMBING AND MECHANICAL INSTALLATIONS.

WORK SHALL NOT PROCEED UNTIL THE INSPECTOR HAS APPROVED THE VARIOUS STAGES OF CONSTRUCTION.

PERMIT WILL BECOME NULL AND VOID IF CONSTRUCTION WORK IS NOT STARTED WITHIN SIX MONTHS OF DATE THE PERMIT IS ISSUED AS NOTED ABOVE.

# TOWN OF BETHEL

ONE SCHOOL STREET BETHEL, CT 06801  
TEL. 203 794-8517

## BUILDING EQUIPMENT INSTALLATION

# PERMIT

This is to certify that the work described below has been inspected and approved. To the best of my knowledge the new work complies with the provisions of the Building Code of the Town of Bethel.  
It is specifically understood that this certificate becomes null and void when secured through fraud or by reason of latent violations not ascertainable at the time of inspection, or when changes are made following inspection, without inspector's approval.

DATE 9/30/2005  NEW  REPLACEMENT **BUILDING USE**  RESIDENTIAL  COMMERCIAL  INDUSTRIAL  OTHER cell tower  
JOB LOCATION SPRING HILL LANE LOT NO. 121

### TYPE OF PERMIT - CHECK ONE BOX ONLY (EXCEPT WHERE INDICATED)

<input checked="" type="checkbox"/> ELECTRIC	<input type="checkbox"/> APPLIANCE*	<input type="checkbox"/> Heating*	
<input type="checkbox"/> PLUMBING	<input type="checkbox"/> WATER HEATER*	TYPE OF SYSTEM (HEATING ONLY)	
<input type="checkbox"/> VENTILATING	<input type="checkbox"/> POOL HEATER*	Hot Water	Warm Air
<input type="checkbox"/> SPRINKLER	<input type="checkbox"/> AIR CONDITIONING*	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> WOOD STOVE	<input type="checkbox"/> OTHER*	Steam	Radiation
<input type="checkbox"/> WELL PUMP		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> WATER CONDITIONER	SPECIFY OTHER _____	Heat Pump	<input type="checkbox"/>
<input type="checkbox"/> TANK INSTALLATION		Other	<input type="checkbox"/>

TYPE OF FUEL (COMPLETE ONLY FOR ITEMS MARKED WITH A \* ABOVE)  
 ELECTRIC  GAS  OIL  SOLAR  OTHER \_\_\_\_\_

TOTAL HEAT LOSS/GAIN  BTU'S EQUIPMENT RATING \_\_\_\_\_ BTU'S ESTIMATED COST \$ \$24,000

NAME OF CONTRACTOR McPhee Electric Michael E. McPhee

ADDRESS 505 Main Street Farmington CT 06032

LICENSE NO. AND CLASS 125222 E1 TEL. NO. 860-677-9797

MAKE AND MODEL \_\_\_\_\_

Remarks / Work To Be Done  
 Permit to furnish and install 1,200 amp 120/240 volt meter center, supply power (200 amp 120/240 volt) to three new cellular carriers and re-feed existing two. Telephone conduits to each cellular carrier as well as grounding of site.

APPLICANT'S SIGNATURE \_\_\_\_\_

NAME OF OWNER VALLEY COMMUNICATIONS INC TEL. NO. 860-677-9797 Ext. 346

ADDRESS 155 WOOSTER STREET SHELTON CT 0648400

OFFICE USE ONLY		
FEE	BLDG. PERMIT NO.	DATE ISSUED
\$212.84	05-606	9/30/2005

BUILDING OFFICIAL OR FIRE MARSHAL  
 BY [Signature] DATE 9-30-05  
 AUTHORIZED SIGNATURE

**BETHEL BUILDING DEPARTMENT**

**BUILDING PERMIT NO. 05-605**

BETHEL MUNICIPAL CENTER  
1 SCHOOL STREET  
BETHEL, CT 06801  
TEL. (203) 794-8517 FAX. (203) 794-8595

DATE OF PERMIT 9/30/2005

PERMIT TO Cell Tower Antenna PROPOSED USE \_\_\_\_\_ NUMBER OF DWELLING UNITS \_\_\_\_\_

AT: (STREET & NO.) SPRING HILL LANE ZONING DISTRICT \_\_\_\_\_

BETWEEN \_\_\_\_\_ AND \_\_\_\_\_

SUBDIVISION \_\_\_\_\_ MAP 32 BLOCK 47A LOT 121 # \_\_\_\_\_ ASSESSOR LOT SIZE 01.63 Acr

APPLICANT \_\_\_\_\_ PHONE \_\_\_\_\_

ADDRESS 500 Enterprise Drive, Suite 3A Rocky Hill CT 06067  
(NO.) (STREET) (CITY) (STATE) (ZIP)

BUILDING IS TO BE \_\_\_\_\_ FEET WIDE BY \_\_\_\_\_ FEET LONG VOLUME \_\_\_\_\_ PERMIT FEE **\$1,213.00**  
CUBIC/SQ FEET

CONSTRUCTION TYPE \_\_\_\_\_ USE GROUP \_\_\_\_\_ ESTMATED COST \$100,000

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OWNER VALLEY COMMUNICATIONS INC

**BUILDING DEPARTMENT  
TOWN OF BETHEL**

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INSPECTIONS REQUIRED FOR ALL CONSTRUCTION WORK, INCLUDING:  
1. FOUNDATIONS OR FOOTINGS.  
2. FULL ROUGH, AND INSULATION PRIOR TO COVERING STRUCTURAL MEMBERS.  
3. FINAL INSPECTION BEFORE C/O.

APPROVED PLANS MUST BE RETAINED ON JOB AND THIS CARD KEPT POSTED UNTIL FINAL INSPECTION HAS BEEN MADE. WHERE A CERTIFICATE OF OCCUPANCY IS REQUIRED, SUCH BUILDING SHALL NOT BE OCCUPIED UNTIL FINAL INSPECTION HAS BEEN MADE.

WHERE APPLICABLE SEPARATE PERMITS ARE REQUIRED FOR ELECTRICAL, PLUMBING AND MECHANICAL INSTALLATIONS

PERMIT WILL BECOME NULL AND VOID IF CONSTRUCTION WORK IS NOT STARTED WITHIN SIX MONTHS OF DATE THE PERMIT IS ISSUED AS NOTED ABOVE.

WORK SHALL NOT PROCEED UNTIL THE INSPECTOR HAS APPROVED THE VARIOUS STAGES OF CONSTRUCTION.



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

SPRINT Existing Facility

Site ID: CT54XC749

Cingular  
38 Spring Hill Road  
Bethel, CT 06801

**September 14, 2017**

**EBI Project Number: 6217004055**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>21.84 %</b>



September 14, 2017

SPRINT

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

## Emissions Analysis for Site: **CT54XC749 – Cingular**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **38 Spring Hill Road, Bethel, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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 population 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 population 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.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 850 MHz Band is approximately  $567 \mu\text{W}/\text{cm}^2$ . The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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 SPRINT Wireless antenna facility located at **38 Spring Hill Road, Bethel, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. 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 equipment was calculated using the following assumptions:

- 1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.
- 3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.
- 4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.



- 6) 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.
- 7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 8) The antennas used in this modeling are the **RFS APXVSP18-C-A20** and the **RFS APXVTM14-ALU-120** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 9) The antenna mounting height centerlines of the proposed antennas are **115 feet** above ground level (AGL) for **Sector A**, **115 feet** above ground level (AGL) for **Sector B** and **115 feet** above ground level (AGL) for Sector C.
- 10) 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 calculations were done with respect to uncontrolled / general population threshold limits.



## SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	<b>1</b>	Antenna #:	<b>1</b>	Antenna #:	<b>1</b>
Make / Model:	RFS APXVSPPI8-C-A20	Make / Model:	RFS APXVSPPI8-C-A20	Make / Model:	RFS APXVSPPI8-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	<b>115 feet</b>	Height (AGL):	<b>115 feet</b>	Height (AGL):	<b>115 feet</b>
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	<b>2.58 %</b>	Antenna B1 MPE%	<b>2.58 %</b>	Antenna C1 MPE%	<b>2.58 %</b>
Antenna #:	<b>2</b>	Antenna #:	<b>2</b>	Antenna #:	<b>2</b>
Make / Model:	RFS APXVTM14- ALU-120	Make / Model:	RFS APXVTM14- ALU-120	Make / Model:	RFS APXVTM14- ALU-120
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	<b>115 feet</b>	Height (AGL):	<b>115 feet</b>	Height (AGL):	<b>115 feet</b>
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	<b>1.88 %</b>	Antenna B2 MPE%	<b>1.88 %</b>	Antenna C2 MPE%	<b>1.88 %</b>

Site Composite MPE%	
Carrier	MPE%
SPRINT – Max per sector	<b>4.47 %</b>
Bethel PD	0.00 %
Thomas Refuse	0.00 %
Utility Cmcns	0.00 %
Valley Cmcns	0.00 %
Yankee Gas	0.00 %
T-Mobile	4.46 %
AT&T	4.73 %
Nextel	2.44 %
Verizon Wireless	5.74 %
<b>Site Total MPE %:</b>	<b>21.84 %</b>

SPRINT Sector A Total:	4.47 %
SPRINT Sector B Total:	4.47 %
SPRINT Sector C Total:	4.47 %
<b>Site Total:</b>	<b>21.84 %</b>

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	115	1.32	850 MHz	567	0.24%
Sprint 850 MHz LTE	2	437.55	115	2.65	850 MHz	567	0.47%
Sprint 1900 MHz (PCS) CDMA	5	622.47	115	9.42	1900 MHz (PCS)	1000	0.94%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	115	9.42	1900 MHz (PCS)	1000	0.94%
Sprint 2500 MHz (BRS) LTE	8	778.09	115	18.84	2500 MHz (BRS)	1000	1.88%
<b>Total:</b>							<b>4.47%</b>



## Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	4.47 %
Sector B:	4.47 %
Sector C:	4.47 %
SPRINT Maximum Total (per sector):	4.47 %
Site Total:	21.84 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **21.84 %** of the allowable FCC established general population 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.



August 23, 2017

Tom Jupin  
Charles Cherundolo Consulting, Inc.  
1280 Rt. 46 West  
Parsippany, NJ 07054

Ramaker & Associates, Inc.  
855 Community Drive  
Sauk City, WI 53583

**SUBJECT: STRUCTURAL ASSESSMENT  
125-FOOT MONOPOLE TOWER**

**CARRIER: SPRINT**

**SITE: CINGULAR (CT54XC749-B)  
38 SPRING HILL ROAD  
BETHEL, FAIRFIELD COUNTY, CONNECTICUT 06801  
RAMAKER & ASSOCIATES PROJECT NUMBER: 28746**

**RESULTS: TOWER: 92.4% PASS  
FOUNDATION: 80.1% PASS**

Dear Tom Jupin:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this structural assessment for the above mentioned site. The purpose of this report is to determine the structural integrity of the existing structure with the existing and proposed loading. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the tower using tnxTower analysis software. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the tower loading occur.

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

*James M Alvin*  
James M. Alvin  
Structural Designer

*James R Skowronski*  
James R. Skowronski, P.E.  
Supervising Engineer



**ANALYSIS CRITERIA**

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, $V_{ult}$	120 mph (3 sec. gust)
Nominal Design Wind Speed, $V_{asd}$	93 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	3/4 inch
Exposure Category	B
Topographic Category	5 (SEAW RSM-03)
Crest Height	352 feet
Slope Distance	2932 feet

**SUPPORTING DOCUMENTATION**

- Structural analysis by Salient Associates, LLC., dated 12/14/12
- Structural analysis by Centek Engineering, project number 12124.C04, dated 3/7/13
- Structural analysis by Bennett & Pless, site number CT-5003, dated 5/25/16
- Construction drawings by RAMAKER, project number 28746
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

**TOWER LOADING**

RAMAKER understands that the loading to be used for this analysis will consist of the antenna equipment, mount, and cable configurations as shown in the following chart:

Elevation	Appurtenance	Mount	Coax	Owner	Status
122	15' Omni	Low-Profile Platform	(1) 1-5/8	AT&T	Existing
	(3) Powerwave 7770.00		(12) 1-5/8		
	(1) CCI HPA-65R-BUU-H8				
	(2) CCI HPA-65R-BUU-H6				
	(3) Powerwave P65-16-XLH-RR				
	(6) Powerwave LGP21401				
	(3) Ericsson RRUS-32 B30				
120	(6) Ericsson RRUS-11	Collar Mount			
	(2) Raycap DC6-48-60-18-8F				
115	(3) RFS APXVSP18-C	Low-Profile Platform	(3) Hybrid (1) Hybrid	Sprint	Existing
	<b>(3) RFS APXVTM14-ALU-I20</b>				<b>Proposed</b>
	<b>(3) ALU TD-RRH8x20-25</b>				
105	(6) ALU 1900MHz 4x45W RRH	Collar Mount			Existing
	(3) ALU 800MHz 2x50W RRH				
102	(6) Ericsson AIR21 B2A B4P	Low-Profile Platform	(10) 1-5/8	T-Mobile	Existing
	(3) Andrew LNX-6515DS-VTM				
	(3) Ericsson RRUS-11				
	(1) 10' Dipole				
93	(2) Antel LPA-80063-6CF-EDIN-X	Low-Profile Platform	(12) 1-5/8	Verizon	Existing
	(1) Andrew DBXNH-6565B-R2M				
	(6) Andrew LNX-6514DS-T4M				
	(2) Kathrein 800 10722				
	(1) JMA Wireless X7C-680				
	(6) Ericsson RRUS-11				
	(2) 10' Omni		(2) 1-5/8		
82	--	Low-Profile Platform	--	--	Existing
72	(1) 15' Dipole	Low-Profile Platform	(1) 1-5/8	Tower	Existing

**TOWER RESULTS**

The maximum tower member stress capacities under the loading conditions previously described are as follows:

<b>Component Type</b>	<b>Percent Capacity</b>	<b>Pass/Fail</b>
Section 1	45.4	Pass
Section 2	92.4	Pass
Section 3	86.5	Pass
Anchor Rod	80.2	Pass
Base Plate	90.4	Pass
<b>RATING</b>	<b>92.4</b>	<b>PASS</b>

Results of the analysis show that the existing tower will be stressed to a maximum of 92.4 percent of capacity. Therefore, the existing tower will pass the TIA-222-G analysis requirements under proposed loading conditions.

**FOUNDATION RESULTS**

The maximum foundation stress capacities are as follows:

<b>Component Type</b>	<b>Percent Capacity</b>	<b>Pass/Fail</b>
Soil Interaction	78.1	Pass
Structural	80.1	Pass
<b>RATING</b>	<b>80.1</b>	<b>PASS</b>

The foundations were analyzed utilizing the structural reports referenced above. Results of the analysis show that the existing foundation will be stressed to a maximum of 80.1 percent of capacity. Therefore, the existing foundation will pass the TIA-222-G analysis requirements under proposed loading conditions.

**LIMITATIONS**

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance

RAMAKER assumes no responsibility for modifications completed prior to or hereafter in which RAMAKER was not directly involved. These modifications include but are not limited to the following:

- Replacing or strengthening bracing members
- Reinforcing or extending vertical members
- Installing or removing antenna mounting gates or side arms
- Changing loading configurations

The tower owner is responsible for verifying that the existing loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

This analysis pertains only to the tower structure, and no analyses or conclusions were made regarding the antenna and equipment mounting structure(s). Analysis and certification of the antenna and equipment mounting structure(s) is performed and submitted separately.

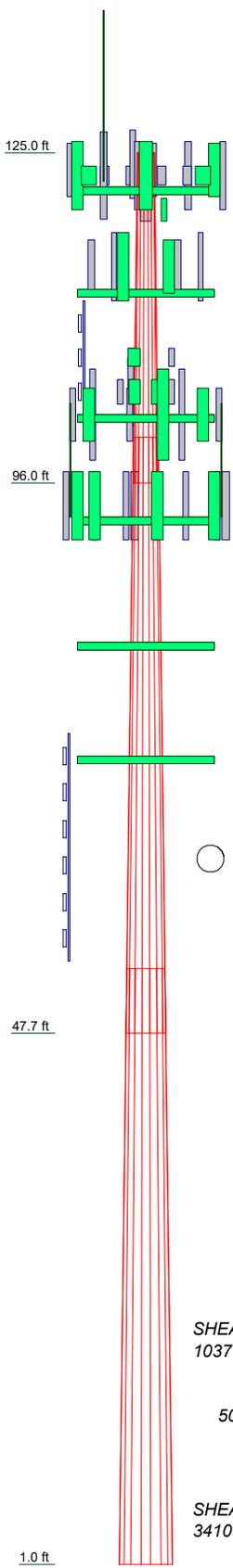
**ATTACHMENTS**

- Analysis Figures
- Analysis Calculations

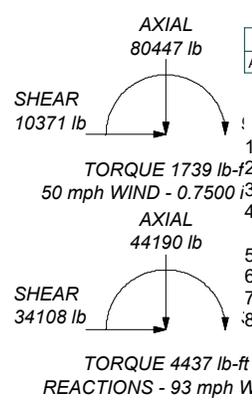
**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
15' Omni (Tower)	122	Tri-Antenna Mount (Sprint)	105
7770.00 w/Mount Pipe (ATT)	122	(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	102
7770.00 w/Mount Pipe (ATT)	122	(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	102
7770.00 w/Mount Pipe (ATT)	122	(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	102
HPA-65R-BUU-H8 w/Mount Pipe (ATT)	122	(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	102
HPA-65R-BUU-H6 w/Mount Pipe (ATT)	122	LNx-6515DS-VTM w/Mount Pipe (T-Mobile)	102
HPA-65R-BUU-H6 w/Mount Pipe (ATT)	122	LNx-6515DS-VTM w/Mount Pipe (T-Mobile)	102
P65-16-XLH-RR w/Mount Pipe (ATT)	122	LNx-6515DS-VTM w/Mount Pipe (T-Mobile)	102
P65-16-XLH-RR w/Mount Pipe (ATT)	122	RRUS-11 (T-Mobile)	102
P65-16-XLH-RR w/Mount Pipe (ATT)	122	RRUS-11 (T-Mobile)	102
(2) LGP214nn (ATT)	122	RRUS-11 (T-Mobile)	102
(2) LGP214nn (ATT)	122	10' Dipole (T-Mobile)	102
(2) LGP214nn (ATT)	122	8'x2" Antenna Mount Pipe (T-Mobile)	102
RRUS-32 B30 (ATT)	122	8'x2" Antenna Mount Pipe (T-Mobile)	102
RRUS-32 B30 (ATT)	122	8'x2" Antenna Mount Pipe (T-Mobile)	102
RRUS-32 B30 (ATT)	122	Platform Mount [LP 1201-1] (T-Mobile)	102
8'x2" Antenna Mount Pipe (ATT)	122	LPA-80063-6CF-EDIN-X w/Mount Pipe (Verizon)	93
8'x2" Antenna Mount Pipe (ATT)	122	LPA-80063-6CF-EDIN-X w/Mount Pipe (Verizon)	93
8'x2" Antenna Mount Pipe (ATT)	122	LPA-80063-6CF-EDIN-X w/Mount Pipe (Verizon)	93
Platform Mount [LP 1201-1] (ATT)	122	DBXNH-6565B-R2M w/Mount Pipe (Verizon)	93
(2) RRUS-11 (ATT)	120	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
(2) RRUS-11 (ATT)	120	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
DC6-48-60-18-8F (ATT)	120	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
DC6-48-60-18-8F (ATT)	120	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
Tri-Antenna Mount (ATT)	120	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
APXVSP18-C w/Mount Pipe (Sprint)	115	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
APXVSP18-C w/Mount Pipe (Sprint)	115	800 10722 w/Mount Pipe (Verizon)	93
APXVSP18-C w/Mount Pipe (Sprint)	115	800 10722 w/Mount Pipe (Verizon)	93
APXVTM14-ALU-120 w/Mount Pipe (Sprint)	115	X7C-680 w/Mount Pipe (Verizon)	93
APXVTM14-ALU-120 w/Mount Pipe (Sprint)	115	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
APXVTM14-ALU-120 w/Mount Pipe (Sprint)	115	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
TD-RRH8x20-25 (Sprint)	115	LNx-6514DS-T4M w/Mount Pipe (Verizon)	93
TD-RRH8x20-25 (Sprint)	115	RRUS-11 (Verizon)	93
TD-RRH8x20-25 (Sprint)	115	RRUS-11 (Verizon)	93
(2) 8'x2" Antenna Mount Pipe (Sprint)	115	RRUS-11 (Verizon)	93
(2) 8'x2" Antenna Mount Pipe (Sprint)	115	RRUS-11 (Verizon)	93
(2) 8'x2" Antenna Mount Pipe (Sprint)	115	RRUS-11 (Verizon)	93
Platform Mount [LP 1201-1] (Sprint)	115	RRUS-11 (Verizon)	93
1900MHz 4x45W RRH (Sprint)	105	RRUS-11 (Verizon)	93
1900MHz 4x45W RRH (Sprint)	105	10' Omni (Verizon)	93
1900MHz 4x45W RRH (Sprint)	105	10' Omni (Verizon)	93
1900MHz 4x45W RRH (Sprint)	105	Platform Mount [LP 1201-1] (Verizon)	93
1900MHz 4x45W RRH (Sprint)	105	Platform Mount [LP 1201-1] (Empty)	82
1900MHz 4x45W RRH (Sprint)	105	15' Dipole (Other)	72
800MHz 2x50W RRH (Sprint)	105	Platform Mount [LP 1201-1] (Other)	72
800MHz 2x50W RRH (Sprint)	105		
800MHz 2x50W RRH (Sprint)	105		

Section	1	2	3
Length (ft)	28.96	52.29	52.34
Number of Sides	18	18	18
Thickness (in)	0.1875	0.2500	0.3125
Socket Length (ft)	3.92	5.67	39.0494
Top Dia (in)	18.0000	25.3203	39.0494
Bot Dia (in)	26.9000	41.2800	55.0000
Grade		A572-65	
Weight (lb)	1305.6	4666.3	8251.9



ALL REACTIONS ARE FACTORED



**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 5 with Crest Height of 352.00 ft
8. TOWER RATING: 92.4%

**Ramaker & Associates, Inc.**  
 855 Community Drive  
 Sauk City, WI 53583  
 Phone: (608) 643-4100  
 FAX: (608) 643-7999

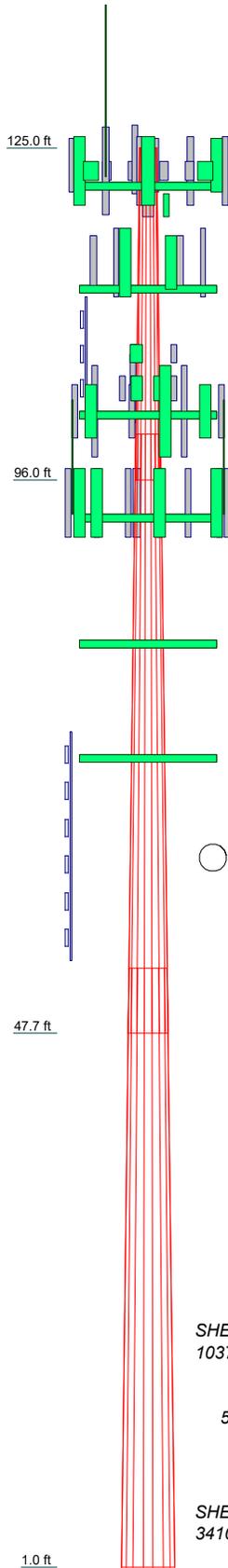
Job: **Cingular (CT54XC749)**  
 Project: **28746**  
 Client: **Sprint** Drawn by: **TEM** App'd:  
 Code: **TIA-222-G** Date: **08/23/17** Scale: **NTS**  
 Path: I:\28700\28746\Structural\Tnx\28746\_rev2.dwg Dwg No. **E-1**

### MATERIAL STRENGTH

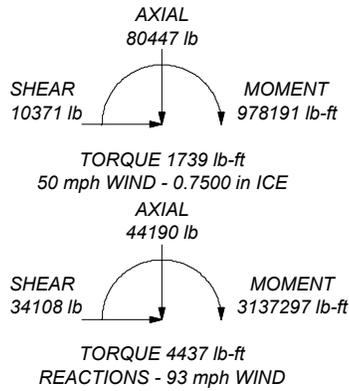
GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

### TOWER DESIGN NOTES

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7. Topographic Category 5 with Crest Height of 352.00 ft
8. TOWER RATING: 92.4%



ALL REACTIONS  
ARE FACTORED



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	28.96	18	0.1875	3.92	18.0000	26.9000		1305.6
2	52.29	18	0.2500	5.67	25.3203	41.2800	A572-65	4666.3
3	52.34	18	0.3125	39.0494	55.0000			8251.9
								14223.9

 <b>Ramaker &amp; Associates, Inc.</b> 855 Community Drive Sauk City, WI 53583 Phone: (608) 643-4100 FAX: (608) 643-7999	Job: <b>Cingular (CT54XC749)</b>		
	Project: <b>28746</b>		
	Client: <b>Sprint</b>	Drawn by: <b>TEM</b>	App'd:
	Code: <b>TIA-222-G</b>	Date: <b>08/23/17</b>	Scale: <b>NTS</b>
	Path: <b>I:\28700\28746\Structural\Itnx\28746 rev2.dwg</b>		Dwg No. <b>E-1</b>

<b>tnxTower</b>  <b>Ramaker &amp; Associates, Inc.</b> 855 Community Drive Sauk City, WI 53583 Phone: (608) 643-4100 FAX: (608) 643-7999	<b>Job</b>	Cingular (CT54XC749)	<b>Page</b>	1 of 16
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## Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).

Basic wind speed of 93 mph.

Structure Class II.

Exposure Category B.

Topographic Category 5.

Crest Height 352.00 ft.

SEAW RSM-03 procedures for wind speed-up calculations are used.

Topographic Feature: Hill.

Slope Distance L: 2932.00 ft.

Distance from Crest x: 0.00 ft.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## 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	125.00-96.04	28.96	3.92	18	18.0000	26.9000	0.1875	0.7500	A572-65 (65 ksi)
L2	96.04-47.67	52.29	5.67	18	25.3203	41.2800	0.2500	1.0000	A572-65 (65 ksi)
L3	47.67-1.00	52.34		18	39.0494	55.0000	0.3125	1.2500	A572-65 (65 ksi)

## Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	18.2777	10.6007	424.9328	6.3234	9.1440	46.4712	850.4248	5.3013	2.8380	15.136
	27.3150	15.8973	1433.1421	9.4829	13.6652	104.8753	2868.1699	7.9501	4.4044	23.49
L2	26.9258	19.8933	1579.6584	8.9000	12.8627	122.8091	3161.3953	9.9485	4.0164	16.065
	41.9168	32.5573	6924.5082	14.5657	20.9702	330.2064	13858.1278	16.2817	6.8253	27.301

<b>tnxTower</b>  <b>Ramaker &amp; Associates, Inc.</b> 855 Community Drive Sauk City, WI 53583 Phone: (608) 643-4100 FAX: (608) 643-7999	<b>Job</b>	Cingular (CT54XC749)	<b>Page</b>	2 of 16
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Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L3	41.4064	38.4222	7284.0012	13.7516	19.8371	367.1906	14577.5869	19.2147	6.3227	20.233
	55.8485	54.2432	20495.5041	19.4141	27.9400	733.5542	41017.9768	27.1267	9.1300	29.216

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft <sup>2</sup>	in					in	in	in
L1 125.00-96.04				1	1	1			
L2 96.04-47.67				1	1	1			
L3 47.67-1.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C <sub>AA</sub>	Weight
				ft		ft <sup>2</sup> /ft	plf
*****							
1 5/8 (ATT)	A	No	Inside Pole	122.00 - 1.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 1.04
HB114-1-08U4-M5J (Sprint)	B	No	Inside Pole	116.00 - 1.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 1.08 1.08
1 1/4 (Sprint)	B	No	Inside Pole	116.00 - 1.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 0.66 0.66
1 5/8 (T-Mobile)	C	No	Inside Pole	101.00 - 1.00	10	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 1.04 1.04
1 5/8 (Verizon)	C	No	Inside Pole	91.00 - 1.00	14	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 1.04 1.04
1 5/8 (Dipole)	A	No	Inside Pole	71.00 - 1.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00 1.04 1.04
*****							

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation	Face	A <sub>R</sub>	A <sub>F</sub>	C <sub>AA</sub> In Face	C <sub>AA</sub> Out Face	Weight
	ft		ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	ft <sup>2</sup>	lb

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Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
L1	125.00-96.04	A	0.000	0.000	0.000	0.000	323.98
		B	0.000	0.000	0.000	0.000	77.84
		C	0.000	0.000	0.000	0.000	51.58
L2	96.04-47.67	A	0.000	0.000	0.000	0.000	627.92
		B	0.000	0.000	0.000	0.000	188.64
		C	0.000	0.000	0.000	0.000	1133.93
L3	47.67-1.00	A	0.000	0.000	0.000	0.000	630.98
		B	0.000	0.000	0.000	0.000	182.01
		C	0.000	0.000	0.000	0.000	1164.88

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight lb
L1	125.00-96.04	A	1.889	0.000	0.000	0.000	0.000	323.98
		B		0.000	0.000	0.000	0.000	77.84
		C		0.000	0.000	0.000	0.000	51.58
L2	96.04-47.67	A	1.828	0.000	0.000	0.000	0.000	627.92
		B		0.000	0.000	0.000	0.000	188.64
		C		0.000	0.000	0.000	0.000	1133.93
L3	47.67-1.00	A	1.662	0.000	0.000	0.000	0.000	630.98
		B		0.000	0.000	0.000	0.000	182.01
		C		0.000	0.000	0.000	0.000	1164.88

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	125.00-96.04	0.0000	0.0000	0.0000	0.0000
L2	96.04-47.67	0.0000	0.0000	0.0000	0.0000
L3	47.67-1.00	0.0000	0.0000	0.0000	0.0000

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
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### Discrete Tower Loads

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub>		Weight lb	
			Horz Lateral ft	Vert ft			Front ft <sup>2</sup>	Side ft <sup>2</sup>		
***** 15' Omni (Tower)	C	From Leg	3.50 0.00 8.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	4.13 5.66 7.20	4.13 5.66 7.20	40.00 70.14 109.87
***** 7770.00 w/Mount Pipe (ATT)	A	From Face	3.50 -6.00 1.50		0.0000	122.00	No Ice 1/2" Ice 1" Ice	5.66 6.04 6.44	4.11 4.76 5.43	30.35 76.38 128.70
7770.00 w/Mount Pipe (ATT)	B	From Face	3.50 -6.00 1.50		0.0000	122.00	No Ice 1/2" Ice 1" Ice	5.66 6.04 6.44	4.11 4.76 5.43	30.35 76.38 128.70
7770.00 w/Mount Pipe (ATT)	C	From Face	3.50 -6.00 1.50		0.0000	122.00	No Ice 1/2" Ice 1" Ice	5.66 6.04 6.44	4.11 4.76 5.43	30.35 76.38 128.70
HPA-65R-BUU-H8 w/Mount Pipe (ATT)	A	From Face	3.50 0.00 1.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	13.05 13.66 14.27	9.42 10.82 12.07	97.20 192.07 296.65
HPA-65R-BUU-H6 w/Mount Pipe (ATT)	B	From Face	3.50 0.00 1.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	76.55 153.48 238.58
HPA-65R-BUU-H6 w/Mount Pipe (ATT)	C	From Face	3.50 0.00 1.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	9.90 10.47 11.01	7.18 8.36 9.26	76.55 153.48 238.58
P65-16-XLH-RR w/Mount Pipe (ATT)	A	From Face	3.50 6.00 1.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	8.13 8.59 9.05	6.13 7.07 7.90	85.90 149.07 219.94
P65-16-XLH-RR w/Mount Pipe (ATT)	B	From Face	3.50 6.00 1.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	8.13 8.59 9.05	6.13 7.07 7.90	85.90 149.07 219.94
P65-16-XLH-RR w/Mount Pipe (ATT)	C	From Face	3.50 6.00 1.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	8.13 8.59 9.05	6.13 7.07 7.90	85.90 149.07 219.94
(2) LGP214nn (ATT)	A	From Face	3.00 0.00 1.50		0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.11 1.25 1.39	0.21 0.28 0.35	14.10 21.30 30.39
(2) LGP214nn (ATT)	B	From Face	3.00 0.00 1.50		0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.11 1.25 1.39	0.21 0.28 0.35	14.10 21.30 30.39
(2) LGP214nn (ATT)	C	From Face	3.00 0.00 1.50		0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.11 1.25 1.39	0.21 0.28 0.35	14.10 21.30 30.39
RRUS-32 B30 (ATT)	A	From Face	3.00 0.00 0.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	2.69 2.91 3.14	1.59 1.78 1.97	50.80 71.33 95.01
RRUS-32 B30 (ATT)	B	From Face	3.00 0.00 0.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	2.69 2.91 3.14	1.59 1.78 1.97	50.80 71.33 95.01
RRUS-32 B30 (ATT)	C	From Face	3.00 0.00 0.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	2.69 2.91 3.14	1.59 1.78 1.97	50.80 71.33 95.01
8'x2" Antenna Mount Pipe (ATT)	A	From Face	3.50 -2.00 0.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	30.00 44.34 63.96
8'x2" Antenna Mount Pipe (ATT)	B	From Face	3.50 -2.00 0.00		0.0000	122.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.40	1.90 2.73 3.40	30.00 44.34 63.96
8'x2" Antenna Mount Pipe	C	From Face	3.50		0.0000	122.00	No Ice	1.90	1.90	30.00

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	<b>Client</b>	Sprint	<b>Designed by</b>	TEM

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight lb
(ATT)			-2.00			1/2" Ice 2.73	2.73	44.34
			0.00			1" Ice 3.40	3.40	63.96
Platform Mount [LP 1201-1]	C	None		0.0000	122.00	No Ice 23.10	23.10	2100.00
(ATT)						1/2" Ice 26.80	26.80	2500.00
						1" Ice 30.50	30.50	2900.00
*****								
(2) RRUS-11	A	From Face	0.50	0.0000	120.00	No Ice 2.78	1.19	50.71
(ATT)			0.00			1/2" Ice 2.99	1.33	71.49
			3.00			1" Ice 3.21	1.49	95.32
(2) RRUS-11	B	From Face	0.50	0.0000	120.00	No Ice 2.78	1.19	50.71
(ATT)			0.00			1/2" Ice 2.99	1.33	71.49
			3.00			1" Ice 3.21	1.49	95.32
(2) RRUS-11	C	From Face	0.50	0.0000	120.00	No Ice 2.78	1.19	50.71
(ATT)			0.00			1/2" Ice 2.99	1.33	71.49
			3.00			1" Ice 3.21	1.49	95.32
DC6-48-60-18-8F	A	From Leg	1.00	0.0000	120.00	No Ice 0.92	0.92	32.80
(ATT)			0.00			1/2" Ice 1.46	1.46	50.52
			0.00			1" Ice 1.64	1.64	70.72
DC6-48-60-18-8F	B	From Leg	1.00	0.0000	120.00	No Ice 0.92	0.92	32.80
(ATT)			0.00			1/2" Ice 1.46	1.46	50.52
			0.00			1" Ice 1.64	1.64	70.72
Tri-Antenna Mount	A	From Face	0.50	0.0000	120.00	No Ice 5.00	5.00	270.00
(ATT)			0.00			1/2" Ice 6.00	6.00	290.00
			4.00			1" Ice 7.00	7.00	310.00
*****								
APXVSP18-C w/Mount Pipe	A	From Face	3.50	0.0000	115.00	No Ice 8.31	6.95	82.55
(Sprint)			2.00			1/2" Ice 8.87	8.13	150.82
			0.00			1" Ice 9.40	9.03	227.06
APXVSP18-C w/Mount Pipe	B	From Face	3.50	0.0000	115.00	No Ice 8.31	6.95	82.55
(Sprint)			2.00			1/2" Ice 8.87	8.13	150.82
			0.00			1" Ice 9.40	9.03	227.06
APXVSP18-C w/Mount Pipe	C	From Face	3.50	0.0000	115.00	No Ice 8.31	6.95	82.55
(Sprint)			2.00			1/2" Ice 8.87	8.13	150.82
			0.00			1" Ice 9.40	9.03	227.06
APXVTM14-ALU-120 w/Mount Pipe	A	From Face	3.50	0.0000	115.00	No Ice 6.65	5.03	77.02
(Sprint)			-2.00			1/2" Ice 7.14	5.89	132.43
			0.00			1" Ice 7.60	6.63	194.59
APXVTM14-ALU-120 w/Mount Pipe	B	From Face	3.50	0.0000	115.00	No Ice 6.65	5.03	77.02
(Sprint)			-2.00			1/2" Ice 7.14	5.89	132.43
			0.00			1" Ice 7.60	6.63	194.59
APXVTM14-ALU-120 w/Mount Pipe	C	From Face	3.50	0.0000	115.00	No Ice 6.65	5.03	77.02
(Sprint)			-2.00			1/2" Ice 7.14	5.89	132.43
			0.00			1" Ice 7.60	6.63	194.59
TD-RRH8x20-25	A	From Face	3.50	0.0000	115.00	No Ice 4.05	1.53	70.00
(Sprint)			-2.00			1/2" Ice 4.30	1.71	97.14
			0.00			1" Ice 4.56	1.90	127.80
TD-RRH8x20-25	B	From Face	3.50	0.0000	115.00	No Ice 4.05	1.53	70.00
(Sprint)			-2.00			1/2" Ice 4.30	1.71	97.14
			0.00			1" Ice 4.56	1.90	127.80
TD-RRH8x20-25	C	From Face	3.50	0.0000	115.00	No Ice 4.05	1.53	70.00
(Sprint)			-2.00			1/2" Ice 4.30	1.71	97.14
			0.00			1" Ice 4.56	1.90	127.80
(2) 8"x2" Antenna Mount Pipe	A	From Face	3.50	0.0000	115.00	No Ice 1.90	1.90	30.00
(Sprint)			0.00			1/2" Ice 2.73	2.73	44.34
			-3.00			1" Ice 3.40	3.40	63.96
(2) 8"x2" Antenna Mount Pipe	B	From Face	3.50	0.0000	115.00	No Ice 1.90	1.90	30.00
(Sprint)			0.00			1/2" Ice 2.73	2.73	44.34

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	<b>Client</b>	Sprint	<b>Designed by</b>	TEM

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert</i> <i>ft ft ft</i>	<i>Azimuth Adjustment</i> <i>°</i>	<i>Placement</i> <i>ft</i>	<i>C<sub>AA</sub> Front</i> <i>ft<sup>2</sup></i>	<i>C<sub>AA</sub> Side</i> <i>ft<sup>2</sup></i>	<i>Weight</i> <i>lb</i>
(2) 8"x2" Antenna Mount Pipe (Sprint)	C	From Face	-3.00 3.50 0.00	0.0000	115.00	1" Ice 3.40 No Ice 1.90 1/2" Ice 2.73	3.40 1.90 2.73	63.96 30.00 44.34
Platform Mount [LP 1201-1] (Sprint)	C	From Leg	-3.00 0.00 0.00 -2.00	0.0000	115.00	1" Ice 3.40 No Ice 23.10 1/2" Ice 26.80 1" Ice 30.50	3.40 23.10 26.80 30.50	63.96 2100.00 2500.00 2900.00
*****								
1900MHz 4x45W RRH (Sprint)	A	From Face	1.00 -1.00 -1.00	0.0000	105.00	No Ice 2.32 1/2" Ice 2.53 1" Ice 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x45W RRH (Sprint)	A	From Face	1.00 1.00 -1.00	0.0000	105.00	No Ice 2.32 1/2" Ice 2.53 1" Ice 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x45W RRH (Sprint)	B	From Face	1.00 -1.00 -1.00	0.0000	105.00	No Ice 2.32 1/2" Ice 2.53 1" Ice 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x45W RRH (Sprint)	B	From Face	1.00 1.00 -1.00	0.0000	105.00	No Ice 2.32 1/2" Ice 2.53 1" Ice 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x45W RRH (Sprint)	C	From Face	1.00 -1.00 -1.00	0.0000	105.00	No Ice 2.32 1/2" Ice 2.53 1" Ice 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x45W RRH (Sprint)	C	From Face	1.00 1.00 -1.00	0.0000	105.00	No Ice 2.32 1/2" Ice 2.53 1" Ice 2.74	2.24 2.44 2.65	59.50 82.62 108.98
800MHz 2x50W RRH (Sprint)	A	From Face	1.00 1.00 2.00	0.0000	105.00	No Ice 2.06 1/2" Ice 2.24 1" Ice 2.43	1.93 2.11 2.29	64.00 86.12 111.30
800MHz 2x50W RRH (Sprint)	B	From Face	1.00 1.00 2.00	0.0000	105.00	No Ice 2.06 1/2" Ice 2.24 1" Ice 2.43	1.93 2.11 2.29	64.00 86.12 111.30
800MHz 2x50W RRH (Sprint)	C	From Face	1.00 1.00 2.00	0.0000	105.00	No Ice 2.06 1/2" Ice 2.24 1" Ice 2.43	1.93 2.11 2.29	64.00 86.12 111.30
Tri-Antenna Mount (Sprint)	A	From Face	0.50 0.00 -1.00	0.0000	105.00	No Ice 5.00 1/2" Ice 6.00 1" Ice 7.00	5.00 6.00 7.00	270.00 290.00 310.00
*****								
(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	A	From Face	3.50 0.00 0.00	0.0000	102.00	No Ice 6.37 1/2" Ice 6.85 1" Ice 7.30	5.74 6.59 7.31	104.90 162.47 226.82
(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	B	From Face	3.50 0.00 0.00	0.0000	102.00	No Ice 6.37 1/2" Ice 6.85 1" Ice 7.30	5.74 6.59 7.31	104.90 162.47 226.82
(2) AIR 21 B2A B4P w/Mount Pipe (T-Mobile)	C	From Face	3.50 0.00 0.00	0.0000	102.00	No Ice 6.37 1/2" Ice 6.85 1" Ice 7.30	5.74 6.59 7.31	104.90 162.47 226.82
LNx-6515DS-VTM w/Mount Pipe (T-Mobile)	A	From Face	3.50 -1.50 0.00	0.0000	102.00	No Ice 11.64 1/2" Ice 12.36 1" Ice 13.08	9.84 11.36 12.90	83.12 172.54 271.91
LNx-6515DS-VTM w/Mount Pipe (T-Mobile)	B	From Face	3.50 -1.50 0.00	0.0000	102.00	No Ice 11.64 1/2" Ice 12.36 1" Ice 13.08	9.84 11.36 12.90	83.12 172.54 271.91
LNx-6515DS-VTM w/Mount Pipe (T-Mobile)	C	From Face	3.50 -1.50 0.00	0.0000	102.00	No Ice 11.64 1/2" Ice 12.36 1" Ice 13.08	9.84 11.36 12.90	83.12 172.54 271.91

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
RRUS-11 (T-Mobile)	A	From Face	3.50	0.0000	102.00	No Ice	2.78	1.19	50.71
			-1.50			1/2" Ice	2.99	1.33	71.49
			0.00			1" Ice	3.21	1.49	95.32
RRUS-11 (T-Mobile)	B	From Face	3.50	0.0000	102.00	No Ice	2.78	1.19	50.71
			-1.50			1/2" Ice	2.99	1.33	71.49
			0.00			1" Ice	3.21	1.49	95.32
RRUS-11 (T-Mobile)	C	From Face	3.50	0.0000	102.00	No Ice	2.78	1.19	50.71
			-1.50			1/2" Ice	2.99	1.33	71.49
			0.00			1" Ice	3.21	1.49	95.32
10' Dipole (T-Mobile)	A	From Face	3.50	0.0000	102.00	No Ice	3.00	3.00	30.00
			-3.00			1/2" Ice	4.03	4.03	51.79
			5.00			1" Ice	5.03	5.03	80.14
8'x2" Antenna Mount Pipe (T-Mobile)	A	From Face	3.50	0.0000	102.00	No Ice	1.90	1.90	30.00
			0.00			1/2" Ice	2.73	2.73	44.34
			0.00			1" Ice	3.40	3.40	63.96
8'x2" Antenna Mount Pipe (T-Mobile)	B	From Face	3.50	0.0000	102.00	No Ice	1.90	1.90	30.00
			0.00			1/2" Ice	2.73	2.73	44.34
			0.00			1" Ice	3.40	3.40	63.96
8'x2" Antenna Mount Pipe (T-Mobile)	C	From Face	3.50	0.0000	102.00	No Ice	1.90	1.90	30.00
			0.00			1/2" Ice	2.73	2.73	44.34
			0.00			1" Ice	3.40	3.40	63.96
Platform Mount [LP 1201-1] (T-Mobile)	C	None		0.0000	102.00	No Ice	23.10	23.10	2100.00
						1/2" Ice	26.80	26.80	2500.00
						1" Ice	30.50	30.50	2900.00
*****									
LPA-80063-6CF-EDIN-X w/Mount Pipe (Verizon)	A	From Face	3.50	0.0000	93.00	No Ice	9.99	10.27	40.15
			6.00			1/2" Ice	10.57	11.45	133.56
			1.00			1" Ice	11.11	12.35	235.48
LPA-80063-6CF-EDIN-X w/Mount Pipe (Verizon)	B	From Face	3.50	0.0000	93.00	No Ice	9.99	10.27	40.15
			6.00			1/2" Ice	10.57	11.45	133.56
			1.00			1" Ice	11.11	12.35	235.48
DBXNH-6565B-R2M w/Mount Pipe (Verizon)	C	From Face	3.50	0.0000	93.00	No Ice	8.40	7.07	71.85
			6.00			1/2" Ice	8.95	8.25	140.85
			1.00			1" Ice	9.48	9.15	217.87
LNX-6514DS-T4M w/Mount Pipe (Verizon)	A	From Face	3.50	0.0000	93.00	No Ice	8.41	7.08	64.16
			4.50			1/2" Ice	8.97	8.27	133.31
			1.00			1" Ice	9.50	9.18	210.50
LNX-6514DS-T4M w/Mount Pipe (Verizon)	B	From Face	3.50	0.0000	93.00	No Ice	8.41	7.08	64.16
			4.50			1/2" Ice	8.97	8.27	133.31
			1.00			1" Ice	9.50	9.18	210.50
LNX-6514DS-T4M w/Mount Pipe (Verizon)	C	From Face	3.50	0.0000	93.00	No Ice	8.41	7.08	64.16
			4.50			1/2" Ice	8.97	8.27	133.31
			1.00			1" Ice	9.50	9.18	210.50
800 10722 w/Mount Pipe (Verizon)	A	From Face	3.50	0.0000	93.00	No Ice	8.26	6.36	82.75
			-1.00			1/2" Ice	8.82	7.54	148.01
			1.00			1" Ice	9.35	8.43	221.17
800 10722 w/Mount Pipe (Verizon)	B	From Face	3.50	0.0000	93.00	No Ice	8.26	6.36	82.75
			-1.00			1/2" Ice	8.82	7.54	148.01
			1.00			1" Ice	9.35	8.43	221.17
X7C-680 w/Mount Pipe (Verizon)	C	From Face	3.50	0.0000	93.00	No Ice	8.64	7.00	67.95
			-1.00			1/2" Ice	9.21	8.19	138.05
			1.00			1" Ice	9.73	9.08	216.17
LNX-6514DS-T4M w/Mount Pipe (Verizon)	A	From Face	3.50	0.0000	93.00	No Ice	8.41	7.08	64.16
			-6.00			1/2" Ice	8.97	8.27	133.31
			1.00			1" Ice	9.50	9.18	210.50
LNX-6514DS-T4M w/Mount Pipe (Verizon)	B	From Face	3.50	0.0000	93.00	No Ice	8.41	7.08	64.16
			-6.00			1/2" Ice	8.97	8.27	133.31
			1.00			1" Ice	9.50	9.18	210.50

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Vert						ft
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
LNX-6514DS-T4M w/Mount Pipe (Verizon)	C	From Face	1.00		0.0000	93.00	1" Ice	9.50	9.18	210.50
			3.50				No Ice	8.41	7.08	64.16
			-6.00				1/2" Ice	8.97	8.27	133.31
RRUS-11 (Verizon)	A	From Face	1.00		0.0000	93.00	1" Ice	9.50	9.18	210.50
			3.00				No Ice	2.78	1.19	50.71
			-1.00				1/2" Ice	2.99	1.33	71.49
RRUS-11 (Verizon)	B	From Face	2.00		0.0000	93.00	1" Ice	3.21	1.49	95.32
			3.00				No Ice	2.78	1.19	50.71
			-1.00				1/2" Ice	2.99	1.33	71.49
RRUS-11 (Verizon)	C	From Face	2.00		0.0000	93.00	1" Ice	3.21	1.49	95.32
			3.00				No Ice	2.78	1.19	50.71
			-1.00				1/2" Ice	2.99	1.33	71.49
RRUS-11 (Verizon)	A	From Face	2.00		0.0000	93.00	1" Ice	3.21	1.49	95.32
			3.00				No Ice	2.78	1.19	50.71
			-6.00				1/2" Ice	2.99	1.33	71.49
RRUS-11 (Verizon)	B	From Face	2.00		0.0000	93.00	1" Ice	3.21	1.49	95.32
			3.00				No Ice	2.78	1.19	50.71
			-6.00				1/2" Ice	2.99	1.33	71.49
RRUS-11 (Verizon)	C	From Face	2.00		0.0000	93.00	1" Ice	3.21	1.49	95.32
			3.00				No Ice	2.78	1.19	50.71
			-6.00				1/2" Ice	2.99	1.33	71.49
10' Omni (Verizon)	B	From Leg	5.00		0.0000	93.00	1" Ice	3.21	1.49	95.32
			6.50				No Ice	2.75	2.75	30.00
			0.00				1/2" Ice	3.78	3.78	50.21
10' Omni (Verizon)	C	From Leg	5.00		0.0000	93.00	1" Ice	4.83	4.83	76.96
			6.50				No Ice	2.75	2.75	30.00
			0.00				1/2" Ice	3.78	3.78	50.21
Platform Mount [LP 1201-1] (Verizon)	C	None	5.00		0.0000	93.00	1" Ice	4.83	4.83	76.96
							No Ice	23.10	23.10	2100.00
							1/2" Ice	26.80	26.80	2500.00
*****										
Platform Mount [LP 1201-1] (Empty)	C	None			0.0000	82.00	1" Ice	30.50	30.50	2900.00
							No Ice	23.10	23.10	2100.00
							1/2" Ice	26.80	26.80	2500.00
*****										
15' Dipole (Other)	A	From Face	3.50		0.0000	72.00	1" Ice	7.58	7.58	114.58
			-5.00				No Ice	4.50	4.50	40.00
			-8.00				1/2" Ice	6.03	6.03	72.48
Platform Mount [LP 1201-1] (Other)	C	None			0.0000	72.00	1" Ice	30.50	30.50	2900.00
							No Ice	23.10	23.10	2100.00
							1/2" Ice	26.80	26.80	2500.00
*****										

### Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M <sub>x</sub>	Sum of Overturning Moments, M <sub>z</sub>	Sum of Torques
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Leg Weight	14223.89					

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Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M <sub>x</sub> lb-ft	Sum of Overturning Moments, M <sub>z</sub> lb-ft	Sum of Torques lb-ft
Bracing Weight	0.00					
Total Member Self-Weight	14223.89			945.53	3068.19	
Total Weight	36825.00			945.53	3068.19	
Wind 0 deg - No Ice		-10.43	-21313.95	-1876942.33	4340.92	-2790.96
Wind 30 deg - No Ice		10637.16	-18453.21	-1624716.70	-933945.89	-1977.47
Wind 60 deg - No Ice		18434.54	-10647.94	-936896.18	-1621160.53	-634.11
Wind 90 deg - No Ice		21292.40	10.43	2218.26	-1873164.40	879.15
Wind 120 deg - No Ice		18444.97	10666.01	940991.68	-1622433.27	2156.85
Wind 150 deg - No Ice		10655.23	18463.64	1627880.48	-936150.33	2856.62
Wind 180 deg - No Ice		10.43	21313.95	1878833.38	1795.45	2790.96
Wind 210 deg - No Ice		-10637.16	18453.21	1626607.75	940082.26	1977.47
Wind 240 deg - No Ice		-18434.54	10647.94	938787.23	1627296.90	634.11
Wind 270 deg - No Ice		-21292.40	-10.43	-327.21	1879300.78	-879.15
Wind 300 deg - No Ice		-18444.97	-10666.01	-939100.62	1628569.64	-2156.85
Wind 330 deg - No Ice		-10655.23	-18463.64	-1625989.43	942286.70	-2856.62
Member Ice	10286.25					
Total Weight Ice	72189.20			2474.32	6388.87	
Wind 0 deg - Ice		-0.86	-10371.33	-881086.39	6494.27	-1686.58
Wind 30 deg - Ice		5180.84	-8981.40	-762659.00	-434935.49	-1120.25
Wind 60 deg - Ice		8974.34	-5184.92	-439214.76	-758112.74	-253.75
Wind 90 deg - Ice		10363.17	0.86	2579.71	-876442.40	680.75
Wind 120 deg - Ice		8975.20	5186.41	444345.95	-758218.13	1432.84
Wind 150 deg - Ice		5182.33	8982.26	767713.04	-435118.04	1801.00
Wind 180 deg - Ice		0.86	10371.33	886035.03	6283.48	1686.58
Wind 210 deg - Ice		-5180.84	8981.40	767607.64	447713.23	1120.25
Wind 240 deg - Ice		-8974.34	5184.92	444163.40	770890.48	253.75
Wind 270 deg - Ice		-10363.17	-0.86	2368.92	889220.14	-680.75
Wind 300 deg - Ice		-8975.20	-5186.41	-439397.31	770995.88	-1432.84
Wind 330 deg - Ice		-5182.33	-8982.26	-762764.40	447895.78	-1801.00
Total Weight	36825.00			945.53	3068.19	
Wind 0 deg - Service		-3.89	-7937.72	-698415.74	3542.18	-1039.41
Wind 30 deg - Service		3961.48	-6872.33	-604482.11	-345893.73	-736.45
Wind 60 deg - Service		6865.38	-3965.50	-348324.62	-601825.58	-236.16
Wind 90 deg - Service		7929.70	3.89	1419.52	-695676.63	327.41
Wind 120 deg - Service		6869.26	3972.23	351036.65	-602299.57	803.25
Wind 150 deg - Service		3968.21	6876.21	606847.15	-346714.71	1063.86
Wind 180 deg - Service		3.89	7937.72	700306.80	2594.19	1039.41
Wind 210 deg - Service		-3961.48	6872.33	606373.16	352030.11	736.45
Wind 240 deg - Service		-6865.38	3965.50	350215.67	607961.95	236.16
Wind 270 deg - Service		-7929.70	-3.89	471.53	701813.00	-327.41
Wind 300 deg - Service		-6869.26	-3972.23	-349145.60	608435.94	-803.25
Wind 330 deg - Service		-3968.21	-6876.21	-604956.10	352851.08	-1063.86

### Load Combinations

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

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

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	125 - 96.04	Pole	Max Tension	20	0.06	-0.01	1.39
			Max. Compression	26	-31929.01	6230.14	-1520.22
			Max. Mx	20	-13061.18	236909.03	-285.08
			Max. My	14	-13066.51	2553.58	-233999.19
			Max. Vy	20	-17884.17	236909.03	-285.08
			Max. Vx	14	17861.65	2553.58	-233999.19
			Max. Torque	15			-3376.46
L2	96.04 - 47.67	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61381.61	8182.85	-3103.61
			Max. Mx	20	-29580.13	1459146.40	48.65
			Max. My	14	-29579.07	2630.63	-1457341.53
			Max. Vy	20	-30040.24	1459146.40	48.65

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L3	47.67 - 1	Pole	Max. Vx	14	30073.70	2630.63	-1457341.53
			Max. Torque	25			4454.64
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-80446.51	8337.01	-3162.08
			Max. Mx	20	-44157.82	3135889.00	925.88
			Max. My	14	-44157.79	1813.14	-3135883.72
			Max. Vy	20	-34109.55	3135889.00	925.88
			Max. Vx	14	34144.02	1813.14	-3135883.72
		Max. Torque	25			4444.19	

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	36	80446.51	10363.31	0.86
	Max. H <sub>x</sub>	20	44190.00	34067.86	16.69
	Max. H <sub>z</sub>	2	44190.00	16.69	34102.33
	Max. M <sub>x</sub>	2	3133441.83	16.69	34102.33
	Max. M <sub>z</sub>	8	3127966.64	-34067.84	-16.69
	Max. Torsion	25	4436.80	17048.37	29541.83
	Min. Vert	19	33142.50	29495.27	-17036.71
	Min. H <sub>x</sub>	9	33142.50	-34067.84	-16.69
	Min. H <sub>z</sub>	14	44190.00	-16.69	-34102.33
	Min. M <sub>x</sub>	14	-3135883.72	-16.69	-34102.33
	Min. M <sub>z</sub>	20	-3135889.00	34067.86	16.69
	Min. Torsion	13	-4436.12	-17048.37	-29541.83

### Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>z</sub> lb	Overturning Moment, M <sub>x</sub> lb-ft	Overturning Moment, M <sub>z</sub> lb-ft	Torque lb-ft
Dead Only	36825.00	-0.00	0.00	997.52	3240.10	0.11
1.2 Dead+1.6 Wind 0 deg - No Ice	44190.00	-16.69	-34102.33	-3133441.83	6097.56	-4319.00
0.9 Dead+1.6 Wind 0 deg - No Ice	33142.50	-16.69	-34102.33	-3098781.55	5013.97	-4345.32
1.2 Dead+1.6 Wind 30 deg - No Ice	44190.00	17019.46	-29525.13	-2712407.51	-1560154.84	-3075.05
0.9 Dead+1.6 Wind 30 deg - No Ice	33142.50	17019.46	-29525.13	-2682448.84	-1543753.13	-3089.55
1.2 Dead+1.6 Wind 60 deg - No Ice	44190.00	29495.27	-17036.71	-1564256.81	-2707303.56	-1007.36
0.9 Dead+1.6 Wind 60 deg - No Ice	33142.50	29495.27	-17036.71	-1547114.34	-2678094.75	-1006.28
1.2 Dead+1.6 Wind 90 deg - No Ice	44190.00	34067.84	16.69	3359.35	-3127966.64	1330.03
0.9 Dead+1.6 Wind 90 deg - No Ice	33142.50	34067.84	16.69	3006.29	-3094055.03	1346.49
1.2 Dead+1.6 Wind 120 deg - No Ice	44190.00	29511.96	17065.62	1570396.16	-2709437.68	3311.02
0.9 Dead+1.6 Wind 120 deg - No Ice	33142.50	29511.96	17065.62	1552555.25	-2680199.91	3338.38
1.2 Dead+1.6 Wind 150 deg - No Ice	44190.00	17048.37	29541.83	2716977.23	-1563863.03	4405.18
0.9 Dead+1.6 Wind 150 deg - No Ice	33142.50	17048.37	29541.83	2686340.69	-1547410.92	4436.12
1.2 Dead+1.6 Wind 180 deg - No Ice	44190.00	16.69	34102.33	3135883.72	1811.89	4319.40
0.9 Dead+1.6 Wind 180 deg - No Ice	33142.50	16.69	34102.33	3100573.27	786.04	4345.67
1.2 Dead+1.6 Wind 210 deg - No Ice	44190.00	-17019.46	29525.13	2714861.50	1568076.56	3076.18
0.9 Dead+1.6 Wind 210 deg - No Ice	33142.50	-17019.46	29525.13	2684249.94	1549562.81	3090.73
1.2 Dead+1.6 Wind 240 deg - No Ice	44190.00	-29495.27	17036.71	1566706.35	2715241.76	1008.34
0.9 Dead+1.6 Wind 240 deg - No Ice	33142.50	-29495.27	17036.71	1548911.86	2683917.26	1007.13
1.2 Dead+1.6 Wind 270 deg - No Ice	44190.00	-34067.86	-16.69	-926.26	3135889.00	-1329.98

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Load Combination	Vertical lb	Shear <sub>x</sub> lb	Shear <sub>y</sub> lb	Overturning Moment, M <sub>x</sub> lb-ft	Overturning Moment, M <sub>y</sub> lb-ft	Torque lb-ft
0.9 Dead+1.6 Wind 270 deg - No Ice	33142.50	-34067.84	-16.69	-1221.65	3099880.72	-1346.55
1.2 Dead+1.6 Wind 300 deg - No Ice	44190.00	-29511.96	-17065.62	-1567975.27	2717367.73	-3311.57
0.9 Dead+1.6 Wind 300 deg - No Ice	33142.50	-29511.96	-17065.62	-1550780.05	2686015.92	-3339.14
1.2 Dead+1.6 Wind 330 deg - No Ice	44190.00	-17048.37	-29541.83	-2714551.88	1571776.60	-4405.63
0.9 Dead+1.6 Wind 330 deg - No Ice	33142.50	-17048.37	-29541.83	-2684561.91	1553214.09	-4436.80
1.2 Dead+1.0 Ice+1.0 Temp	80446.51	-0.02	0.01	3162.08	8337.01	0.40
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	80446.51	-0.87	-10371.46	-966777.72	8551.73	-1633.57
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	80446.51	5180.90	-8981.51	-836764.11	-476054.03	-1090.63
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	80446.51	8974.45	-5184.98	-481685.28	-830840.59	-255.36
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	80446.51	10363.30	0.86	3316.76	-960745.45	648.46
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	80446.51	8975.31	5186.48	488288.26	-830961.09	1378.60
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	80446.51	5182.40	8982.38	843282.86	-476261.23	1739.41
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	80446.51	0.86	10371.46	973179.37	8314.92	1634.28
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	80446.51	-5180.91	8981.51	843169.88	492925.94	1091.38
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	80446.51	-8974.45	5184.98	488088.57	847718.70	256.15
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	80446.51	-10363.31	-0.86	3079.93	977624.48	-647.60
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	80446.51	-8975.32	-5186.48	-481895.70	847834.86	-1377.74
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	80446.51	-5182.40	-8982.38	-836887.81	493128.81	-1738.66
Dead+Wind 0 deg - Service	36825.00	-3.89	-7937.73	-724186.58	3796.64	-1020.31
Dead+Wind 30 deg - Service	36825.00	3961.48	-6872.33	-626779.97	-358554.91	-725.92
Dead+Wind 60 deg - Service	36825.00	6865.38	-3965.50	-361156.01	-623947.19	-237.00
Dead+Wind 90 deg - Service	36825.00	7929.70	3.89	1511.60	-721268.74	315.44
Dead+Wind 120 deg - Service	36825.00	6869.26	3972.23	364046.53	-624442.47	783.39
Dead+Wind 150 deg - Service	36825.00	3968.21	6876.21	629308.08	-359412.81	1041.48
Dead+Wind 180 deg - Service	36825.00	3.89	7937.73	726219.69	2806.14	1020.55
Dead+Wind 210 deg - Service	36825.00	-3961.48	6872.33	628813.65	365158.26	726.19
Dead+Wind 240 deg - Service	36825.00	-6865.38	3965.50	363189.48	630551.30	237.25
Dead+Wind 270 deg - Service	36825.00	-7929.70	-3.89	521.10	727873.03	-315.23
Dead+Wind 300 deg - Service	36825.00	-6869.26	-3972.23	-362014.39	631046.20	-783.21
Dead+Wind 330 deg - Service	36825.00	-3968.21	-6876.21	-627275.73	366015.77	-1041.29

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-36825.00	0.00	0.00	36825.00	-0.00	0.000%
2	-16.69	-44190.00	-34102.33	16.69	44190.00	34102.33	0.000%
3	-16.69	-33142.50	-34102.33	16.69	33142.50	34102.33	0.000%
4	17019.46	-44190.00	-29525.13	-17019.46	44190.00	29525.13	0.000%
5	17019.46	-33142.50	-29525.13	-17019.46	33142.50	29525.13	0.000%
6	29495.27	-44190.00	-17036.71	-29495.27	44190.00	17036.71	0.000%
7	29495.27	-33142.50	-17036.71	-29495.27	33142.50	17036.71	0.000%
8	34067.84	-44190.00	16.69	-34067.84	44190.00	-16.69	0.000%
9	34067.84	-33142.50	16.69	-34067.84	33142.50	-16.69	0.000%
10	29511.96	-44190.00	17065.62	-29511.96	44190.00	-17065.62	0.000%
11	29511.96	-33142.50	17065.62	-29511.96	33142.50	-17065.62	0.000%
12	17048.37	-44190.00	29541.83	-17048.37	44190.00	-29541.83	0.000%
13	17048.37	-33142.50	29541.83	-17048.37	33142.50	-29541.83	0.000%
14	16.69	-44190.00	34102.33	-16.69	44190.00	-34102.33	0.000%
15	16.69	-33142.50	34102.33	-16.69	33142.50	-34102.33	0.000%
16	-17019.46	-44190.00	29525.13	17019.46	44190.00	-29525.13	0.000%
17	-17019.46	-33142.50	29525.13	17019.46	33142.50	-29525.13	0.000%
18	-29495.27	-44190.00	17036.71	29495.27	44190.00	-17036.71	0.000%
19	-29495.27	-33142.50	17036.71	29495.27	33142.50	-17036.71	0.000%
20	-34067.84	-44190.00	-16.69	34067.84	44190.00	16.69	0.000%
21	-34067.84	-33142.50	-16.69	34067.84	33142.50	16.69	0.000%
22	-29511.96	-44190.00	-17065.62	29511.96	44190.00	17065.62	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
23	-29511.96	-33142.50	-17065.62	29511.96	33142.50	17065.62	0.000%
24	-17048.37	-44190.00	-29541.83	17048.37	44190.00	29541.83	0.000%
25	-17048.37	-33142.50	-29541.83	17048.37	33142.50	29541.83	0.000%
26	0.00	-80446.51	0.00	0.02	80446.51	-0.01	0.000%
27	-0.86	-80446.51	-10371.33	0.87	80446.51	10371.46	0.000%
28	5180.84	-80446.51	-8981.40	-5180.90	80446.51	8981.51	0.000%
29	8974.34	-80446.51	-5184.92	-8974.45	80446.51	5184.98	0.000%
30	10363.17	-80446.51	0.86	-10363.30	80446.51	-0.86	0.000%
31	8975.20	-80446.51	5186.41	-8975.31	80446.51	-5186.48	0.000%
32	5182.33	-80446.51	8982.26	-5182.40	80446.51	-8982.38	0.000%
33	0.86	-80446.51	10371.33	-0.86	80446.51	-10371.46	0.000%
34	-5180.84	-80446.51	8981.40	5180.91	80446.51	-8981.51	0.000%
35	-8974.34	-80446.51	5184.92	8974.45	80446.51	-5184.98	0.000%
36	-10363.17	-80446.51	-0.86	10363.31	80446.51	0.86	0.000%
37	-8975.20	-80446.51	-5186.41	8975.32	80446.51	5186.48	0.000%
38	-5182.33	-80446.51	-8982.26	5182.40	80446.51	8982.38	0.000%
39	-3.89	-36825.00	-7937.72	3.89	36825.00	7937.73	0.000%
40	3961.48	-36825.00	-6872.33	-3961.48	36825.00	6872.33	0.000%
41	6865.38	-36825.00	-3965.50	-6865.38	36825.00	3965.50	0.000%
42	7929.70	-36825.00	3.89	-7929.70	36825.00	-3.89	0.000%
43	6869.26	-36825.00	3972.23	-6869.26	36825.00	-3972.23	0.000%
44	3968.21	-36825.00	6876.21	-3968.21	36825.00	-6876.21	0.000%
45	3.89	-36825.00	7937.72	-3.89	36825.00	-7937.73	0.000%
46	-3961.48	-36825.00	6872.33	3961.48	36825.00	-6872.33	0.000%
47	-6865.38	-36825.00	3965.50	6865.38	36825.00	-3965.50	0.000%
48	-7929.70	-36825.00	-3.89	7929.70	36825.00	3.89	0.000%
49	-6869.26	-36825.00	-3972.23	6869.26	36825.00	3972.23	0.000%
50	-3968.21	-36825.00	-6876.21	3968.21	36825.00	6876.21	0.000%

## Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00020023
3	Yes	5	0.00000001	0.00009201
4	Yes	6	0.00000001	0.00006362
5	Yes	5	0.00000001	0.00051786
6	Yes	6	0.00000001	0.00006938
7	Yes	5	0.00000001	0.00056655
8	Yes	5	0.00000001	0.00005491
9	Yes	4	0.00000001	0.00064188
10	Yes	6	0.00000001	0.00007275
11	Yes	5	0.00000001	0.00059536
12	Yes	6	0.00000001	0.00006279
13	Yes	5	0.00000001	0.00051040
14	Yes	5	0.00000001	0.00019487
15	Yes	5	0.00000001	0.00008956
16	Yes	6	0.00000001	0.00007324
17	Yes	5	0.00000001	0.00059783
18	Yes	6	0.00000001	0.00006694
19	Yes	5	0.00000001	0.00054396
20	Yes	4	0.00000001	0.00097519
21	Yes	4	0.00000001	0.00058361
22	Yes	6	0.00000001	0.00006458
23	Yes	5	0.00000001	0.00052419

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24	Yes	6	0.00000001	0.00007509
25	Yes	5	0.00000001	0.00061436
26	Yes	4	0.00000001	0.00005735
27	Yes	5	0.00000001	0.00036652
28	Yes	5	0.00000001	0.00054618
29	Yes	5	0.00000001	0.00057262
30	Yes	5	0.00000001	0.00033164
31	Yes	5	0.00000001	0.00061678
32	Yes	5	0.00000001	0.00055408
33	Yes	5	0.00000001	0.00037177
34	Yes	5	0.00000001	0.00064969
35	Yes	5	0.00000001	0.00060846
36	Yes	5	0.00000001	0.00034443
37	Yes	5	0.00000001	0.00057907
38	Yes	5	0.00000001	0.00065639
39	Yes	4	0.00000001	0.00023960
40	Yes	4	0.00000001	0.00034458
41	Yes	4	0.00000001	0.00042611
42	Yes	4	0.00000001	0.00007187
43	Yes	4	0.00000001	0.00049970
44	Yes	4	0.00000001	0.00035092
45	Yes	4	0.00000001	0.00023987
46	Yes	4	0.00000001	0.00052420
47	Yes	4	0.00000001	0.00039867
48	Yes	4	0.00000001	0.00007223
49	Yes	4	0.00000001	0.00036786
50	Yes	4	0.00000001	0.00056063

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 96.04	19.518	48	1.4129	0.0101
L2	99.96 - 47.67	12.392	48	1.2466	0.0057
L3	53.34 - 1	3.190	48	0.5797	0.0015

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
122.00	15' Omni	48	18.633	1.3977	0.0096	24095
120.00	(2) RRUS-11	48	18.045	1.3874	0.0092	24095
115.00	APXVSP18-C w/Mount Pipe	48	16.584	1.3599	0.0082	12047
105.00	1900MHz 4x45W RRH	48	13.751	1.2916	0.0065	6023
102.00	(2) AIR 21 B2A B4P w/Mount Pipe	48	12.935	1.2659	0.0060	5268
93.00	LPA-80063-6CF-EDIN-X w/Mount Pipe	48	10.618	1.1696	0.0048	4525
82.00	Platform Mount [LP 1201-1]	48	8.079	1.0203	0.0035	4138
72.00	15' Dipole	48	6.075	0.8670	0.0027	3839

### Maximum Tower Deflections - Design Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 96.04	83.725	20	6.0344	0.0436
L2	99.96 - 47.67	53.287	20	5.3506	0.0244
L3	53.34 - 1	13.746	22	2.4985	0.0065

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
122.00	15' Omni	20	79.950	5.9732	0.0411	5872
120.00	(2) RRUS-11	20	77.438	5.9315	0.0394	5872
115.00	APXVSPP18-C w/Mount Pipe	20	71.204	5.8203	0.0353	2935
105.00	1900MHz 4x45W RRH	20	59.099	5.5390	0.0277	1465
102.00	(2) AIR 21 B2A B4P w/Mount Pipe	20	55.610	5.4316	0.0257	1280
93.00	LPA-80063-6CF-EDIN-X w/Mount Pipe	20	45.688	5.0253	0.0204	1090
82.00	Platform Mount [LP 1201-1]	20	34.793	4.3892	0.0151	985
72.00	15' Dipole	22	26.177	3.7330	0.0114	905

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> lb	φP <sub>n</sub> lb	Ratio $\frac{P_u}{\phi P_n}$
L1	125 - 96.04 (1)	TP26.9x18x0.1875	28.96	0.00	0.0	15.1803	-13061.20	1026070.00	0.013
L2	96.04 - 47.67 (2)	TP41.28x25.3203x0.25	52.29	0.00	0.0	31.1841	-29578.50	1984880.00	0.015
L3	47.67 - 1 (3)	TP55x39.0494x0.3125	52.34	0.00	0.0	54.2432	-44157.80	3272700.00	0.013

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> lb-ft	φM <sub>ux</sub> lb-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M <sub>uy</sub> lb-ft	φM <sub>uy</sub> lb-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	125 - 96.04 (1)	TP26.9x18x0.1875	236909.17	538469.17	0.440	0.00	538469.17	0.000
L2	96.04 - 47.67 (2)	TP41.28x25.3203x0.25	1459325.00	1606425.00	0.908	0.00	1606425.00	0.000
L3	47.67 - 1 (3)	TP55x39.0494x0.3125	3137300.00	3688183.33	0.851	0.00	3688183.33	0.000

### Pole Shear Design Data

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Section No.	Elevation ft	Size	Actual $V_u$ lb	$\phi V_n$ lb	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ lb-ft	$\phi T_n$ lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	125 - 96.04 (1)	TP26.9x18x0.1875	17884.20	513034.00	0.035	375.72	1078258.33	0.000
L2	96.04 - 47.67 (2)	TP41.28x25.3203x0.25	30063.40	992442.00	0.030	3318.81	3216775.00	0.001
L3	47.67 - 1 (3)	TP55x39.0494x0.3125	34132.60	1636350.00	0.021	3311.55	7385383.33	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	125 - 96.04 (1)	0.013	0.440	0.000	0.035	0.000	0.454 ✓	1.000	4.8.2 ✓
L2	96.04 - 47.67 (2)	0.015	0.908	0.000	0.030	0.001	0.924 ✓	1.000	4.8.2 ✓
L3	47.67 - 1 (3)	0.013	0.851	0.000	0.021	0.000	0.865 ✓	1.000	4.8.2 ✓

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$\phi P_{allow}$ lb	% Capacity	Pass Fail	
L1	125 - 96.04	Pole	TP26.9x18x0.1875	1	-13061.20	1026070.00	45.4	Pass	
L2	96.04 - 47.67	Pole	TP41.28x25.3203x0.25	2	-29578.50	1984880.00	92.4	Pass	
L3	47.67 - 1	Pole	TP55x39.0494x0.3125	3	-44157.80	3272700.00	86.5	Pass	
							Summary		
							Pole (L2)	92.4	Pass
							<b>RATING =</b>	<b>92.4</b>	<b>Pass</b>

## Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Material

**TIA Rev G** Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)\*(Rod Diameter)

Site Data	
Project #:	28746
Site Name:	CT54XC749
Pole Manufacturer:	Other

Anchor Rod Data	
Qty:	12
Diam:	2.25 in
Rod Material:	A615-J
Strength (Fu):	100 ksi
Yield (Fy):	75 ksi
Bolt Circle:	63 in

Plate Data	
Diam:	69 in
Thick:	1.75 in
Grade:	60 ksi
Single-Rod B-eff:	14.55 in

Stiffener Data (Welding at both sides)	
Config:	0 *
Weld Type:	Fillet
Groove Depth:	<-- Disregard
Groove Angle:	<-- Disregard
Fillet H. Weld:	0.4375 in
Fillet V. Weld:	0.25 in
Width:	6.5 in
Height:	20 in
Thick:	1.5 in
Notch:	1 in
Grade:	50 ksi
Weld str.:	70 ksi

Pole Data	
Diam:	55 in
Thick:	0.3125 in
Grade:	65 ksi
# of Sides:	18 "0" IF Round
Fu	80 ksi
Reinf. Fillet Weld	0 "0" if None

Reactions		
Mu:	3137.3	ft-kips
Axial, Pu:	44.2	kips
Shear, Vu:	34.1	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

If No stiffeners, Criteria: **AISC LRFD** <-Only Applicable to Unstiffened Cases

**Anchor Rod Results**  
 Max Rod (Cu+ Vu/η): 208.6 Kips  
 Allowable Axial, Φ\*Fu\*Anet: 260.0 Kips  
 Anchor Rod Stress Ratio: 80.2% **Pass**

Non-Rigid
AISC LRFD
φ*Tn

**Base Plate Results**  
 Base Plate Stress: 48.8 ksi  
 Allowable Plate Stress: 54.0 ksi  
 Base Plate Stress Ratio: 90.4% **Pass**

Flexural Check  
 48.8 ksi  
 54.0 ksi  
 90.4% **Pass**

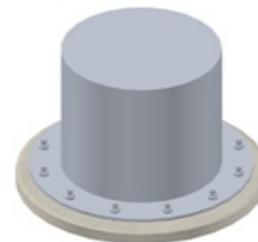
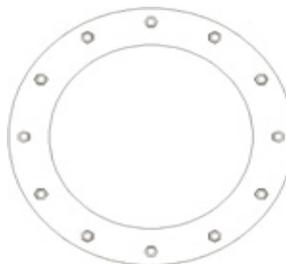
Non-Rigid
AISC LRFD
φ*Fy
Y.L. Length: 30.72

**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

Horiz. weld fails with stiffeners added. Therefore, they were conservatively ignored.

**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

# Pier and Pad Foundation

Project #: CT54XC749-B  
 Site Name: 28746

TIA-222 Revision: G  
 Tower Type: Monopole

Block Foundation?:

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	44.2	kips
Base Shear, $V_{u\_comp}$ :	34.1	kips
Moment, $M_u$ :	3137.3	ft-kips
Tower Height, $H$ :	125	ft
BP Dist. Above Fdn, $bp_{dist}$ :	3	in

Foundation Analysis Checks				
	Capacity	Demand	Rating	Check
<i>Lateral (Sliding) (kips)</i>	166.85	34.10	20.4%	Pass
<i>Bearing Pressure (ksf)</i>	4.50	2.20	49.0%	Pass
<i>Overturing (kip*ft)</i>	4266.88	3333.38	78.1%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	3957.05	3171.40	80.1%	Pass
<i>Pier Compression (kip)</i>	18370.97	51.13	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	6074.46	1319.27	21.7%	Pass
<i>Pad Shear - 1-way (kips)</i>	1215.32	171.62	14.1%	Pass
<i>Pad Shear - 2-way (kips)</i>	3393.17	51.13	1.5%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, $dpier$ :	7.0	ft
Ext. Above Grade, $E$ :	1	ft
Pier Rebar Size, $S_c$ :	9	
Pier Rebar Quantity, $mc$ :	24	
Pier Tie/Spiral Size, $S_t$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	3	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	3	in

Soil Rating:	78.1%
Structural Rating:	80.1%

Pad Properties		
Depth, $D$ :	4.5	ft
Pad Width, $W$ :	25.0	ft
Pad Thickness, $T$ :	4.5	ft
Pad Rebar Size, $S_p$ :	9	
Pad Rebar Quantity, $mp$ :	28	
Pad Clear Cover, $cc_{pad}$ :	3	in

Material Properties		
Rebar Grade, $F_y$ :	60000	psi
Concrete Compressive Strength, $F'_c$ :	3000	psi
Dry Concrete Density, $\delta_c$ :	150	pcf

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	100	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	6.000	ksf
Cohesion, $C_u$ :	0.000	ksf
Friction Angle, $\phi$ :	30	degrees
SPT Blow Count, $N_{blows}$ :		
Base Friction, $\mu$ :	0.45	
Neglected Depth, $N$ :	3.3	ft
Groundwater Depth, $gw$ :	None	ft

<--Toggle between Gross and Net



August 23, 2017

Tom Jupin  
Charles Cherundolo Consulting, Inc.  
1280 Rt. 46 West  
Parsippany, NJ 07054

Ramaker & Associates, Inc.  
855 Community Drive  
Sauk City, WI 53583

**SUBJECT: MOUNT ASSESSMENT**

**CARRIER: SPRINT**

**SITE: CINGULAR (CT54XC749-B)  
38 SPRING HILL ROAD  
BETHEL, FAIRFIELD COUNTY, CONNECTICUT 06801  
RAMAKER & ASSOCIATES PROJECT NUMBER: 28746**

**RESULTS: MOUNT: PASS**

Dear Tom Jupin:

Ramaker & Associates, Inc. (RAMAKER) respectfully submits this mount assessment for the above mentioned site. The purpose of this report is to determine the structural integrity of the mounting structure with the proposed loading configurations. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER developed a finite element model of the mount(s) using RISA analysis software. All information contained herein is valid only for the described structure configuration and loading conditions. RAMAKER reserves the right to modify our recommendations should alterations to the mount loading occur.

If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

  
James M. Alvin  
Structural Designer

  
James R. Skowronski, P.E.  
Supervising Engineer



**ANALYSIS CRITERIA**

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Risk Category	II
Ultimate Design Wind Speed, $V_{ult}$	120 mph (3 sec. gust)
Nominal Design Wind Speed, $V_{asd}$	93 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	3/4 inch
Exposure Category	B
Topographic Category	5 (Hill)
Crest Height	352 FT

**SUPPORTING DOCUMENTATION**

- Construction drawings by RAMAKER, project number 28746
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

**MOUNT LOADING**

RAMAKER understands that the loading to be used for this analysis will consist of the antennas and equipment configurations as shown in the following chart(s):

Antenna Mount – All Sectors				
Elevation	Position	Appurtenance	Mount Type	Status
115	1	--	Platform	--
	2	(1) RFS APXVTM14-ALU-I20		Proposed
		(1) ALU TD-RRH8x20-25		
	3	(1) RFS APXVSP18-C-A20		Existing
4	--	--		

Antenna Mount – All Sectors				
Elevation	Position	Appurtenance	Mount Type	Status
105	--	(2) ALU RRH1900-4x45	Collar Mount	Existing
		(1) ALU RRH2x50-800		

**MOUNT RESULTS**

By engineering calculation and inspection, the antenna and equipment mounting structure(s) are capable of supporting the proposed loading configurations without causing an overstress condition in the antenna and equipment mounting structure(s).

**LIMITATIONS**

The recommendations contained within this report were developed using the supporting documentation as previously described. All recommendations pertain only to the proposed antenna installation activities as described in this report. RAMAKER assumes no responsibility for failures caused by factors beyond our control. These include but are not limited to the following:

- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance
- Member grades less than assumed grades show below:

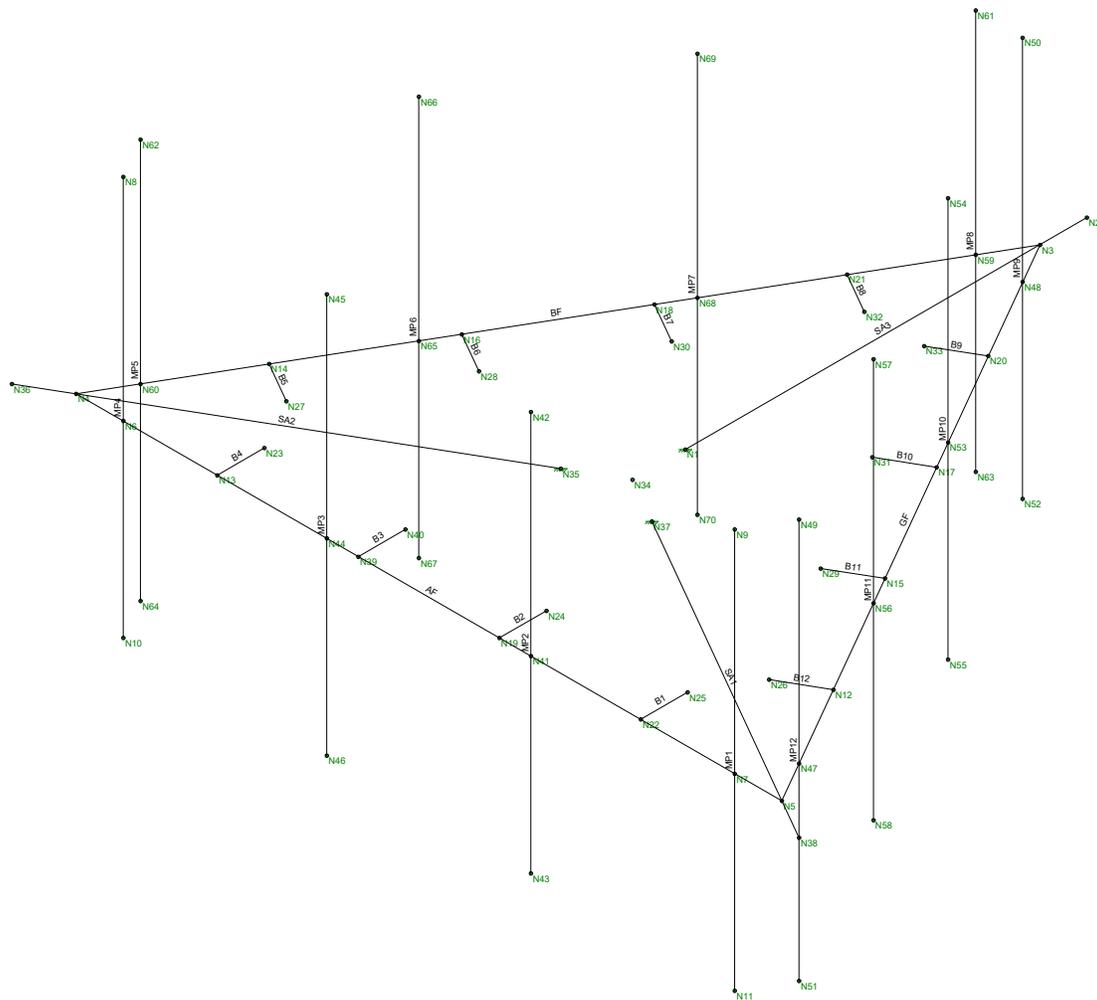
<b>Assumed Steel Member Grades</b>	
Angles/Plates	ASTM A36, 36 ksi
HSS (Square Tube)	ASTM A36, 36 ksi
Pipes	ASTM A53 Gr. B, 35 ksi

RAMAKER is not responsible for verifying that the loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication and erection deficiencies, this report should be disregarded and RAMAKER should be contacted immediately. RAMAKER is not liable for any representation, recommendation, or conclusion not expressly stated herein.

This analysis pertains only to the mounting structure, and no analyses or conclusions were made regarding the supporting structure. Analysis and certification of the supporting structure is performed and submitted separately.

**ATTACHMENTS**

- Analysis Figures
- Analysis Calculations

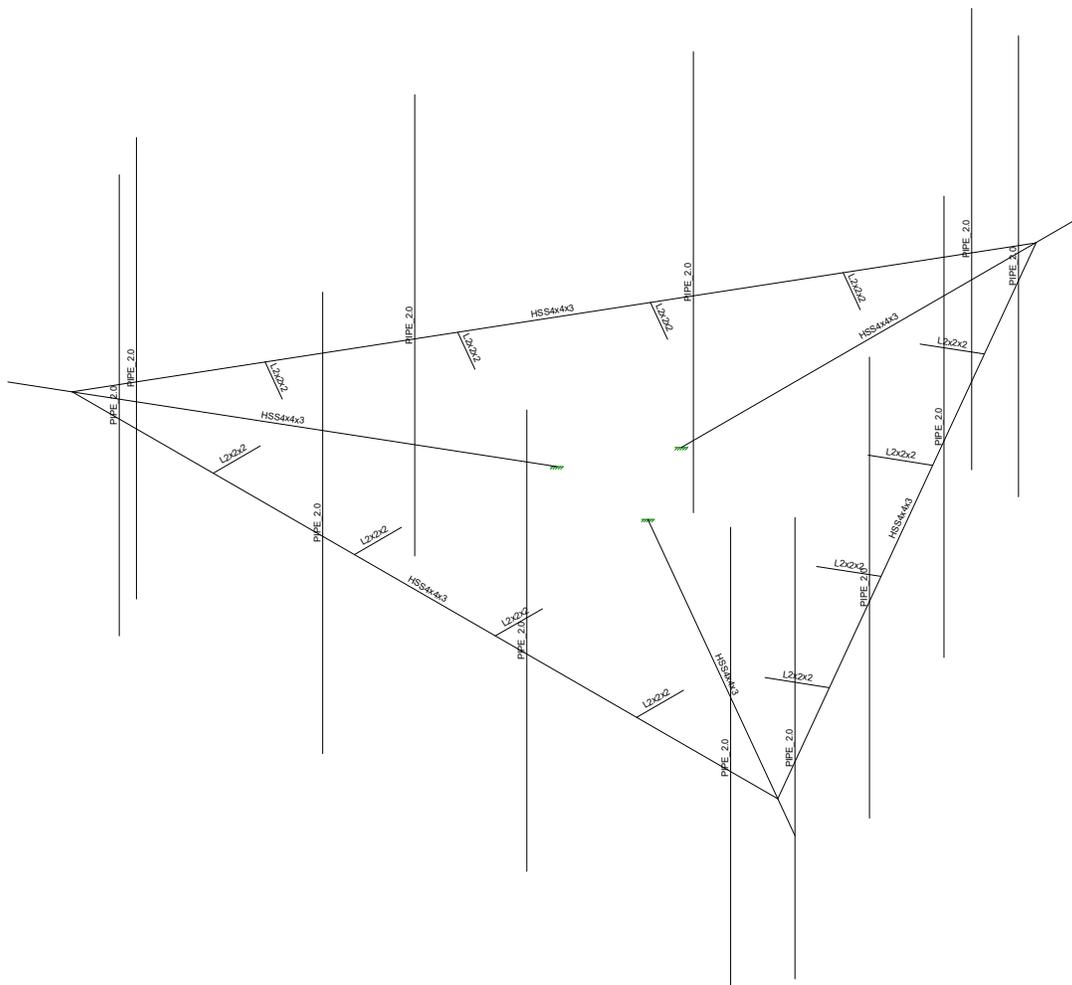


Envelope Only Solution

Ramaker & Associates
JMA
28746

Cingular (CT54XC749-B)

SK - 1
Aug 17, 2017 at 11:18 AM
28746 Mount.r3d



Envelope Only Solution

Ramaker & Associates

JMA

28746

Cingular (CT54XC749-B)

SK - 2

Aug 17, 2017 at 11:18 AM

28746 Mount.r3d

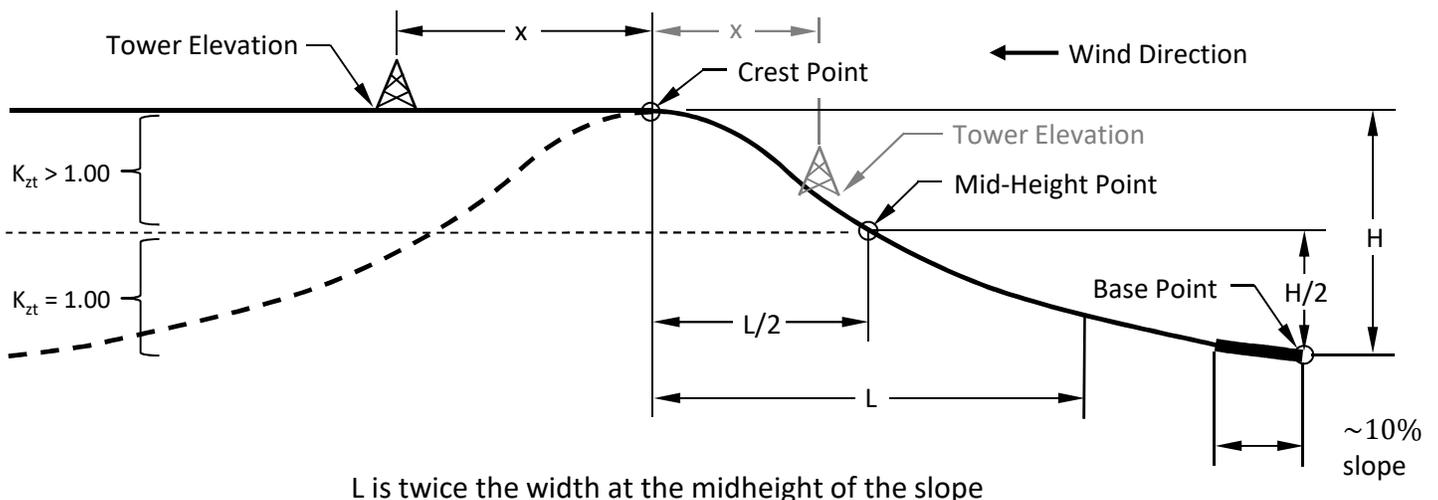
## Topographical Multipliers

### 2.6.2 Topographic Factor KT

Elevations are Above Mean Sea Level

Method = SEAW RSM-03  
 Topographic Feature = Hill

Exp =	B	Exposure Category	<u>Override z Value</u>
Original Input z =	115 ft	Height of antennas above ground level	ft
CP Elev =	811 ft	Crest Point Elevation	
BP Elev =	459 ft	Base Point Elevation	
MHP Elev =	635 ft	Mid-Height Point Elevation	
L/2 =	1466 ft	Crest to Mid-Height Distance	
TP Elev =	811 ft	Tower Point Elevation	<u>Potential Tower Dist. x</u>
x =	0 ft	Tower Distance from Crest Line	0.0 ft
H =	352 ft	Crest Height	
L =	2932 ft	Slope Distance	
x =	0 ft	Distance from Crest Line	
KT =	1.37	Topographic Factor at z = 115.0 ft	



L is twice the width at the midheight of the slope

**Wind Load on Antennas TIA-222-G**

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	B	Exposure Category
V:	93 mph	Basic Wind Speed (Annex B)
z:	115 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K <sub>z</sub> :	1.03	Velocity Pressure Coefficient (2.6.5.2)
K <sub>zt</sub> :	1.37	Topographic Factor (2.6.6.4)
K <sub>d</sub> :	0.95	Wind Direction Probability Factor (Table 2-2)
q <sub>z</sub> :	29.5 psf	Velocity Pressure at Height z
G <sub>h</sub> :	1.00	Strength Design of Appurtenances and their Connections

**Mount & Antenna Wind Loads**

Appurtenance	Height	Width	h/D	Shape	C <sub>a</sub>	A <sub>f</sub>	Force	Force
	<i>in</i>	<i>in</i>				<i>sq ft</i>	<i>lb</i>	<i>plf</i>
APXVTM14-ALU-I20	56.3	12.6	4.5	Flat	1.287	4.93	187.3	
TD-RRH8x20-25	26.1	18.6	1.4	Flat	1.200	3.37	119.5	
APXVSPP18-C-A20	72.0	11.9	6.1	Flat	1.358	5.95	238.5	
1900MHz 4x45W RRH	25.1	11.1	2.3	Flat	1.200	1.93	68.6	
800MHz 2x50W RRH	19.0	13.0	1.5	Flat	1.200	1.72	60.8	
HSS4X4X3/16 x 15 ft	180.0	4.0	45.0	Flat	2.000	5.00	295.3	19.7
HSS4X4X3/16 x 8.54 ft	102.5	4.0	25.6	Flat	2.000	2.85	168.2	19.7
Pipe2STD x 8.5 ft	102.0	2.4	42.9	Round	1.200	1.68	59.6	7.0
L2X2X1/8 x 1 ft	12.0	2.0	6.0	Flat	1.356	0.17	6.7	6.7

**Wind Load on Antennas TIA-222-G**

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	B	Exposure Category
V:	93 mph	Basic Wind Speed (Annex B)
z:	115 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K <sub>z</sub> :	1.03	Velocity Pressure Coefficient (2.6.5.2)
K <sub>zt</sub> :	1.37	Topographic Factor (2.6.6.4)
K <sub>d</sub> :	0.95	Wind Direction Probability Factor (Table 2-2)
q <sub>z</sub> :	29.5 psf	Velocity Pressure at Height z
G <sub>h</sub> :	1.00	Strength Design of Appurtenances and their Connections

**Mount & Antenna Wind Loads**

Appurtenance	Height <i>in</i>	Depth <i>in</i>	h/D	Shape	C <sub>a</sub>	A <sub>f</sub> <i>sq ft</i>	Force <i>lb</i>	Force <i>plf</i>
APXVTM14-ALU-I20	56.3	6.3	8.9	Flat	1.465	2.46	106.5	
TD-RRH8x20-25	26.1	6.7	3.9	Flat	1.262	1.21	45.3	
APXVSPP18-C-A20	72.0	7.0	10.3	Flat	1.509	3.50	156.2	
1900MHz 4x45W RRH	25.1	10.7	2.3	Flat	1.200	1.86	66.0	
800MHz 2x50W RRH	19.0	12.2	1.6	Flat	1.200	1.61	57.1	
HSS4X4X3/16 x 15 ft	180.0	4.0	45.0	Flat	2.000	5.00	295.3	19.7
HSS4X4X3/16 x 8.54 ft	102.5	4.0	25.6	Flat	2.000	2.85	168.2	19.7
Pipe2STD x 8.5 ft	102.0	2.4	42.9	Round	1.200	1.68	59.6	7.0
L2X2X1/8 x 1 ft	12.0	2.0	6.0	Flat	1.356	0.17	6.7	6.7

**Ice Wind Load on Antennas TIA-222-G**

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	B	Exposure Category
V <sub>i</sub> :	50 mph	Basic Wind Speed (Annex B)
z:	115 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K <sub>z</sub> :	1.03	Velocity Pressure Coefficient (2.6.5.2)
K <sub>zt</sub> :	1.37	Topographic Factor (2.6.6.4)
K <sub>d</sub> :	0.95	Wind Direction Probability Factor (Table 2-2)
q <sub>z</sub> :	8.54 psf	Velocity Pressure at Height z
G <sub>h</sub> :	1.00	Strength Design of Appurtenances and their Connections
K <sub>iz</sub> :	1.13	Height Escalation Factor for Ice Thickness
t <sub>iz</sub> :	1.90 in	Factored Thickness of Radial Glaze Ice at Height z

**Mount & Antenna Ice Wind Loads**

Appurtenance	Height	Width	h/D	Shape	C <sub>a</sub>	A <sub>f</sub>	Force	Force
	<i>in</i>	<i>in</i>				<i>sq ft</i>	<i>lb</i>	<i>plf</i>
APXVTM14-ALU-I20	60.1	16.4	3.7	Flat	1.252	6.84	73.1	
TD-RRH8x20-25	29.9	22.4	1.3	Flat	1.200	4.65	47.6	
APXVSPP18-C-A20	75.8	15.7	4.8	Flat	1.304	8.25	91.9	
1900MHz 4x45W RRH	28.9	14.9	1.9	Flat	1.200	2.99	30.6	
800MHz 2x50W RRH	22.8	16.8	1.4	Flat	1.200	2.66	27.2	
HSS4X4X3/16 x 15 ft	183.8	7.8	23.6	Flat	1.953	9.94	165.8	10.8
HSS4X4X3/16 x 8.54 ft	106.3	7.8	13.6	Flat	1.621	5.75	79.6	9.0
Pipe2STD x 8.5 ft	105.8	6.2	17.2	Round	1.026	4.53	39.7	4.5
L2X2X1/8 x 1 ft	15.8	5.8	2.7	Flat	1.210	0.63	6.6	5.0

**Ice Wind Load on Antennas TIA-222-G**

$$q_z = 0.00256 K_z K_{zt} K_d V^2 I$$

$$F = q_z G_h C_a A_a$$

Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	B	Exposure Category
V <sub>i</sub> :	50 mph	Basic Wind Speed (Annex B)
z:	115 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K <sub>z</sub> :	1.03	Velocity Pressure Coefficient (2.6.5.2)
K <sub>zt</sub> :	1.37	Topographic Factor (2.6.6.4)
K <sub>d</sub> :	0.95	Wind Direction Probability Factor (Table 2-2)
q <sub>z</sub> :	8.54 psf	Velocity Pressure at Height z
G <sub>h</sub> :	1.00	Strength Design of Appurtenances and their Connections
K <sub>iz</sub> :	1.13	Height Escalation Factor for Ice Thickness
t <sub>iz</sub> :	1.90 in	Factored Thickness of Radial Glaze Ice at Height z

**Mount & Antenna Ice Wind Loads**

Appurtenance	Height <i>in</i>	Depth <i>in</i>	h/D	Shape	C <sub>a</sub>	A <sub>f</sub> <i>sq ft</i>	Force <i>lb</i>	Force <i>plf</i>
APXVTM14-ALU-I20	60.1	10.1	6.0	Flat	1.354	4.21	48.7	
TD-RRH8x20-25	29.9	10.5	2.8	Flat	1.216	2.18	22.6	
APXVSPP18-C-A20	75.8	10.8	7.0	Flat	1.401	5.68	68.0	
1900MHz 4x45W RRH	28.9	14.5	2.0	Flat	1.200	2.91	29.8	
800MHz 2x50W RRH	22.8	16.0	1.4	Flat	1.200	2.53	25.9	
HSS4X4X3/16 x 15 ft	183.8	7.8	23.6	Flat	1.953	9.94	165.8	10.8
HSS4X4X3/16 x 8.54 ft	106.3	7.8	13.6	Flat	1.621	5.75	79.6	9.0
Pipe2STD x 8.5 ft	105.8	6.2	17.2	Round	1.026	4.53	39.7	4.5
L2X2X1/8 x 1 ft	15.8	5.8	2.7	Flat	1.210	0.63	6.6	5.0

**Ice Load on Antennas TIA-222-G**

Ice Weight:	56 pcf	Ice Density
t <sub>i</sub> :	0.75	Design Ice Thickness
Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	B	Exposure Category
V <sub>i</sub> :	50 mph	Basic Wind Speed (Annex B)
z:	115 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K <sub>iz</sub> :	1.13	Height Escalation Factor for Ice Thickness
K <sub>zt</sub> :	1.37	Topographic Factor (2.6.6.4)
t <sub>iz</sub> :	1.90 in	Factored Thickness of Radial Glaze Ice at Height z

Platform Grating: **Bar**  
 Ice Load: 13.5 psf

**Mount & Antenna Ice Wind Loads**

Appurtenance	Height	Width	Depth	Diam.	Area	Perim.	Ice Weight	
	<i>in</i>	<i>in</i>	<i>in</i>	<i>in</i>	<i>sq in</i>	<i>in</i>	<i>lb</i>	<i>plf</i>
APXVTM14-ALU-I20	60.1	16.4	10.1	14.09	95.15	45.38	173.6	
TD-RRH8x20-25	29.9	22.4	10.5	19.77	128.99	58.18	109.1	
APXVSPP18-C-A20	75.8	15.7	10.8	13.80	93.45	45.38	218.1	
1900MHz 4x45W RRH	28.9	14.9	14.5	15.41	103.03	51.16	83.8	
800MHz 2x50W RRH	22.8	16.8	16.0	17.83	117.42	57.98	72.3	
HSS4X4X3/16 x 15 ft	183.8	7.8	7.8	5.31	42.88	28.67	250.1	16.7
HSS4X4X3/16 x 8.54 ft	106.3	7.8	7.8	5.31	42.88	28.67	142.4	16.7
Pipe2STD x 8.5 ft	105.8	6.2	6.2	2.38	25.42	13.41	84.0	9.9
L2X2X1/8 x 1 ft	15.8	5.8	5.8	2.83	28.12	15.58	10.9	10.9



### Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	60	1.2
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	Gr. 33	29000	11154	.3	.65	.49	33	1.5	58	1.2
4	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
5	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
6	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
7	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3

### Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	pipe 2.0	PIPE 2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
2	grating angle	L2x2x2	Beam	Single Angle	A36 Gr.36	Typical	.491	.189	.189	.003
3	face/standoff	HSS4x4x3	Beam	SquareTube	A36 Gr.36	Typical	2.58	6.21	6.21	10

### Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	SA3	N1	N2			face/standoff	Beam	SquareTube	A36 Gr.36	Typical
2	BF	N4	N3			face/standoff	Beam	SquareTube	A36 Gr.36	Typical
3	GF	N5	N3			face/standoff	Beam	SquareTube	A36 Gr.36	Typical
4	AF	N4	N5			face/standoff	Beam	SquareTube	A36 Gr.36	Typical
5	MP1	N11	N9			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
6	MP4	N10	N8			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
7	B1	N22	N25		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
8	B2	N19	N24		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
9	B4	N13	N23		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
10	B5	N14	N27		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
11	B6	N16	N28		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
12	B7	N18	N30		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
13	B8	N21	N32		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
14	B9	N20	N33		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
15	B10	N17	N31		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
16	B11	N15	N29		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
17	B12	N12	N26		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
18	SA2	N35	N36			face/standoff	Beam	SquareTube	A36 Gr.36	Typical
19	SA1	N37	N38			face/standoff	Beam	SquareTube	A36 Gr.36	Typical
20	B3	N39	N40		90	grating angle	Beam	Single Angle	A36 Gr.36	Typical
21	MP2	N43	N42			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
22	MP3	N46	N45			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
23	MP9	N52	N50			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
24	MP12	N51	N49			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
25	MP10	N55	N54			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
26	MP11	N58	N57			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
27	MP5	N64	N62			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
28	MP8	N63	N61			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
29	MP6	N67	N66			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
30	MP7	N70	N69			pipe 2.0	Beam	Pipe	A53 Gr. B	Typical

### Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Mem...	Surface(PI...
1	Dead Load	None		-1			15		3
2	Antenna Wind 0	None					30		



**Basic Load Cases (Continued)**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Mem...	Surface(PI...
3	Antenna Wind 30	None					30		
4	Antenna Wind 45	None					30		
5	Antenna Wind 60	None					30		
6	Antenna Wind 90	None					30		
7	Antenna Wind 120	None					30		
8	Antenna Wind 135	None					30		
9	Antenna Wind 150	None					30		
10	Antenna Wind 180	None					30		
11	Antenna Wind 210	None					30		
12	Antenna Wind 225	None					30		
13	Antenna Wind 240	None					30		
14	Antenna Wind 270	None					30		
15	Antenna Wind 300	None					30		
16	Antenna Wind 315	None					30		
17	Antenna Wind 330	None					30		
18	Antenna Ice Dead Load	None					15		
19	Antenna Wind w/Ice 0	None					30		
20	Antenna Wind w/Ice 30	None					30		
21	Antenna Wind w/Ice 45	None					30		
22	Antenna Wind w/Ice 60	None					30		
23	Antenna Wind w/Ice 90	None					30		
24	Antenna Wind w/Ice 120	None					30		
25	Antenna Wind w/Ice 135	None					30		
26	Antenna Wind w/Ice 150	None					30		
27	Antenna Wind w/Ice 180	None					30		
28	Antenna Wind w/Ice 210	None					30		
29	Antenna Wind w/Ice 225	None					30		
30	Antenna Wind w/Ice 240	None					30		
31	Antenna Wind w/Ice 270	None					30		
32	Antenna Wind w/Ice 300	None					30		
33	Antenna Wind w/Ice 315	None					30		
34	Antenna Wind w/Ice 330	None					30		
35	Member Wind 0	None						60	
36	Member Wind 30	None						60	
37	Member Wind 45	None						60	
38	Member Wind 60	None						60	
39	Member Wind 90	None						60	
40	Member Wind 120	None						60	
41	Member Wind 135	None						60	
42	Member Wind 150	None						60	
43	Member Wind 180	None						60	
44	Member Wind 210	None						60	
45	Member Wind 225	None						60	
46	Member Wind 240	None						60	
47	Member Wind 270	None						60	
48	Member Wind 300	None						60	
49	Member Wind 315	None						60	
50	Member Wind 330	None						60	
51	Member Ice Dead Load	None						30	3
52	Member Wind w/Ice 0	None						60	
53	Member Wind w/Ice 30	None						60	
54	Member Wind w/Ice 45	None						60	
55	Member Wind w/Ice 60	None						60	
56	Member Wind w/Ice 90	None						60	
57	Member Wind w/Ice 120	None						60	
58	Member Wind w/Ice 135	None						60	
59	Member Wind w/Ice 150	None						60	



**Basic Load Cases (Continued)**

BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Mem...Surface(PI...
60 Member Wind w/Ice 180	None						60
61 Member Wind w/Ice 210	None						60
62 Member Wind w/Ice 225	None						60
63 Member Wind w/Ice 240	None						60
64 Member Wind w/Ice 270	None						60
65 Member Wind w/Ice 300	None						60
66 Member Wind w/Ice 315	None						60
67 Member Wind w/Ice 330	None						60
68 Live Load - Area	None						3
69 Live Load - Point 1	None					3	
70 Live Load - Point 2	None					1	
71 Live Load - Point 3	None					1	
72 Railing Dist. LL z	None						
73 Railing Dist. LL x	None						
74 Railing Point LL z	None						
75 Railing Point LL x	None						
76 BLC 1 Transient Area ...	None						12

**Load Combinations**

Description	So...P...	S...	BLC Fac...										
1 1.4D	Y	1	1.4										
2 0.9D + 1.6 (0-Wind)	Y	1	.9	2	1.6	35	1.6						
3 0.9D + 1.6 (30-Wind)	Y	1	.9	3	1.6	36	1.6						
4 0.9D + 1.6 (45-Wind)	Y	1	.9	4	1.6	37	1.6						
5 0.9D + 1.6 (60-Wind)	Y	1	.9	5	1.6	38	1.6						
6 0.9D + 1.6 (90-Wind)	Y	1	.9	6	1.6	39	1.6						
7 0.9D + 1.6 (120-Wi...	Y	1	.9	7	1.6	40	1.6						
8 0.9D + 1.6 (135-Wi...	Y	1	.9	8	1.6	41	1.6						
9 0.9D + 1.6 (150-Wi...	Y	1	.9	9	1.6	42	1.6						
10 0.9D + 1.6 (180-Wi...	Y	1	.9	10	1.6	43	1.6						
11 0.9D + 1.6 (210-Wi...	Y	1	.9	11	1.6	44	1.6						
12 0.9D + 1.6 (225-Wi...	Y	1	.9	12	1.6	45	1.6						
13 0.9D + 1.6 (240-Wi...	Y	1	.9	13	1.6	46	1.6						
14 0.9D + 1.6 (270-Wi...	Y	1	.9	14	1.6	47	1.6						
15 0.9D + 1.6 (300-Wi...	Y	1	.9	15	1.6	48	1.6						
16 0.9D + 1.6 (315-Wi...	Y	1	.9	16	1.6	49	1.6						
17 0.9D + 1.6 (330-Wi...	Y	1	.9	17	1.6	50	1.6						
18 1.2D + 1.6 (0-Wind)	Y	1	1.2	2	1.6	35	1.6						
19 1.2D + 1.6 (30-Wind)	Y	1	1.2	3	1.6	36	1.6						
20 1.2D + 1.6 (45-Wind)	Y	1	1.2	4	1.6	37	1.6						
21 1.2D + 1.6 (60-Wind)	Y	1	1.2	5	1.6	38	1.6						
22 1.2D + 1.6 (90-Wind)	Y	1	1.2	6	1.6	39	1.6						
23 1.2D + 1.6 (120-Wi...	Y	1	1.2	7	1.6	40	1.6						
24 1.2D + 1.6 (135-Wi...	Y	1	1.2	8	1.6	41	1.6						
25 1.2D + 1.6 (150-Wi...	Y	1	1.2	9	1.6	42	1.6						
26 1.2D + 1.6 (180-Wi...	Y	1	1.2	10	1.6	43	1.6						
27 1.2D + 1.6 (210-Wi...	Y	1	1.2	11	1.6	44	1.6						
28 1.2D + 1.6 (225-Wi...	Y	1	1.2	12	1.6	45	1.6						
29 1.2D + 1.6 (240-Wi...	Y	1	1.2	13	1.6	46	1.6						
30 1.2D + 1.6 (270-Wi...	Y	1	1.2	14	1.6	47	1.6						
31 1.2D + 1.6 (300-Wi...	Y	1	1.2	15	1.6	48	1.6						
32 1.2D + 1.6 (315-Wi...	Y	1	1.2	16	1.6	49	1.6						
33 1.2D + 1.6 (330-Wi...	Y	1	1.2	17	1.6	50	1.6						
34 1.2D + 1.0Di + 1.0 (...)	Y	1	1.2	18	1	51	1	19	1	52	1		
35 1.2D + 1.0Di + 1.0 (...)	Y	1	1.2	18	1	51	1	20	1	53	1		



**Load Combinations (Continued)**

Description	So...	P...	S...	BLC Fac...										
36	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	21	1	54	1	
37	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	22	1	55	1	
38	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	23	1	56	1	
39	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	24	1	57	1	
40	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	25	1	58	1	
41	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	26	1	59	1	
42	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	27	1	60	1	
43	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	28	1	61	1	
44	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	29	1	62	1	
45	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	30	1	63	1	
46	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	31	1	64	1	
47	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	32	1	65	1	
48	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	33	1	66	1	
49	1.2D + 1.0Di + 1.0 (...)	Y		1	1.2	18	1	51	1	34	1	67	1	
50	1.0D + 1.5LL + 1.5 (...)	Y		1	1	68	1.5	72	1.5					
51	1.0D + 1.5LL + 1.5 (...)	Y		1	1	68	1.5	73	1.5					
52	1.0D + 1.5LL + 1.5 (...)	Y		1	1	68	1.5	74	1.5					
53	1.0D + 1.5LL + 1.5 (...)	Y		1	1	68	1.5	75	1.5					
54	1.0D + 1.5LL + 1.5 (...)	Y		1	1	69	1.5	72	1.5					
55	1.0D + 1.5LL + 1.5 (...)	Y		1	1	69	1.5	73	1.5					
56	1.0D + 1.5LL + 1.5 (...)	Y		1	1	69	1.5	74	1.5					
57	1.0D + 1.5LL + 1.5 (...)	Y		1	1	69	1.5	75	1.5					
58	1.0D + 1.5LL + 1.5 (...)	Y		1	1	70	1.5	72	1.5					
59	1.0D + 1.5LL + 1.5 (...)	Y		1	1	70	1.5	73	1.5					
60	1.0D + 1.5LL + 1.5 (...)	Y		1	1	70	1.5	74	1.5					
61	1.0D + 1.5LL + 1.5 (...)	Y		1	1	70	1.5	75	1.5					
62	1.0D + 1.5LL + 1.5 (...)	Y		1	1	71	1.5	72	1.5					
63	1.0D + 1.5LL + 1.5 (...)	Y		1	1	71	1.5	73	1.5					
64	1.0D + 1.5LL + 1.5 (...)	Y		1	1	71	1.5	74	1.5					
65	1.0D + 1.5LL + 1.5 (...)	Y		1	1	71	1.5	75	1.5					
66	Serviceability (0-Wi...)	Yes	Y	1	1	2	.373	35	.373					
67	Serviceability (30-...	Yes	Y	1	1	3	.373	36	.373					
68	Serviceability (45-...	Yes	Y	1	1	4	.373	37	.373					
69	Serviceability (60-...	Yes	Y	1	1	5	.373	38	.373					
70	Serviceability (90-...	Yes	Y	1	1	6	.373	39	.373					
71	Serviceability (120-...	Yes	Y	1	1	7	.373	40	.373					
72	Serviceability (135-...	Yes	Y	1	1	8	.373	41	.373					
73	Serviceability (150-...	Yes	Y	1	1	9	.373	42	.373					
74	Serviceability (180-...	Yes	Y	1	1	10	.373	43	.373					
75	Serviceability (210-...	Yes	Y	1	1	11	.373	44	.373					
76	Serviceability (225-...	Yes	Y	1	1	12	.373	45	.373					
77	Serviceability (240-...	Yes	Y	1	1	13	.373	46	.373					
78	Serviceability (270-...	Yes	Y	1	1	14	.373	47	.373					
79	Serviceability (300-...	Yes	Y	1	1	15	.373	48	.373					
80	Serviceability (315-...	Yes	Y	1	1	16	.373	49	.373					
81	Serviceability (330-...	Yes	Y	1	1	17	.373	50	.373					

**Envelope Joint Reactions**

Joint	X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC		
1	N1	max	205.717	78	634.861	66	628.466	66	2705.945	66	619.545	70	139.599	70
2		min	-205.716	70	497	74	-628.136	74	1984.232	74	-619.549	78	-122.777	78
3	N35	max	543.407	77	634.858	77	315.535	69	-949.395	67	619.545	81	-1721.357	70
4		min	-543.136	69	496.997	69	-315.724	77	-1381.256	75	-619.549	73	-2348.766	78
5	N37	max	544.829	79	634.858	71	312.602	79	-958.483	81	619.545	75	2338.811	71
6		min	-545.129	71	496.998	79	-312.743	71	-1401.199	73	-619.549	67	1714.583	79



Company : Ramaker & Associates  
 Designer : JMA  
 Job Number : 28746  
 Model Name : Cingular (CT54XC749-B)

Aug 17, 2017  
 11:19 AM  
 Checked By: \_\_\_\_\_

**Envelope Joint Reactions (Continued)**

Joint	X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
7	Totals: max	1199.073	78	1697.273	66	1199.074	66					
8	min	-1199.073	70	1697.273	74	-1199.074	74					

**Envelope AISC 13th(360-05): LRFD Steel Code Checks**

Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc.....	L..phi*Pn...	phi*Pn...	phi*M...	phi*M.....	Eqn			
1	SA3	HSS4x4x3	.299	0	78	.041	0	y	70	66435...	83592	9909	9909	2..H1-1b
2	BF	HSS4x4x3	.160	0	71	.038	0	y	71	41153...	83592	9909	9909	3 H1-1b
3	GF	HSS4x4x3	.161	15	68	.038	15	y	77	41153...	83592	9909	9909	3 H1-1b
4	AF	HSS4x4x3	.160	15	66	.038	15	y	66	41153...	83592	9909	9909	3 H1-1b
5	MP1	PIPE_2.0	.017	4.073	73	.001	4.0...		73	13511...	32130	1871....	1871....	1..H1-1b
6	MP4	PIPE_2.0	.017	4.073	75	.001	4.0...		75	13511...	32130	1871....	1871....	1..H1-1b
7	B1	L2x2x2	.013	0	70	.002	0	z	79	13860...	15908.44	402.563	844.628	2..H2-1
8	B2	L2x2x2	.023	0	70	.003	0	z	70	13860...	15908.44	402.563	844.628	2..H2-1
9	B4	L2x2x2	.013	0	70	.002	0	z	69	13860...	15908.44	402.563	844.628	2..H2-1
10	B5	L2x2x2	.013	0	75	.002	0	z	68	13860...	15908.44	402.563	844.628	2..H2-1
11	B6	L2x2x2	.023	0	75	.003	0	z	68	13860...	15908.44	402.563	844.628	2..H2-1
12	B7	L2x2x2	.023	0	75	.003	0	z	68	13860...	15908.44	402.563	844.628	2..H2-1
13	B8	L2x2x2	.013	0	75	.002	0	z	68	13860...	15908.44	402.563	844.628	2..H2-1
14	B9	L2x2x2	.013	0	81	.002	0	z	80	13860...	15908.44	402.563	844.628	2..H2-1
15	B10	L2x2x2	.023	0	81	.003	0	z	80	13860...	15908.44	402.563	844.628	2..H2-1
16	B11	L2x2x2	.023	0	81	.003	0	z	80	13860...	15908.44	402.563	844.628	2..H2-1
17	B12	L2x2x2	.013	0	81	.002	0	z	80	13860...	15908.44	402.563	844.628	2..H2-1
18	SA2	HSS4x4x3	.302	0	80	.041	0	y	80	66435...	83592	9909	9909	2..H1-1b
19	SA1	HSS4x4x3	.300	0	68	.041	0	y	75	66435...	83592	9909	9909	2..H1-1b
20	B3	L2x2x2	.023	0	70	.003	0	z	70	13860...	15908.44	402.563	844.628	2..H2-1
21	MP2	PIPE_2.0	.160	4.073	74	.011	4.0...		74	13511...	32130	1871....	1871....	1..H1-1b
22	MP3	PIPE_2.0	.135	4.073	74	.007	4.0...		74	13511...	32130	1871....	1871....	1..H1-1b
23	MP9	PIPE_2.0	.017	4.073	68	.001	4.0...		68	13511...	32130	1871....	1871....	1..H1-1b
24	MP12	PIPE_2.0	.017	4.073	70	.001	4.0...		70	13511...	32130	1871....	1871....	1..H1-1b
25	MP10	PIPE_2.0	.160	4.073	69	.011	4.0...		69	13511...	32130	1871....	1871....	1..H1-1b
26	MP11	PIPE_2.0	.135	4.073	69	.007	4.0...		69	13511...	32130	1871....	1871....	1..H1-1b
27	MP5	PIPE_2.0	.017	4.073	78	.001	4.0...		78	13511...	32130	1871....	1871....	1..H1-1b
28	MP8	PIPE_2.0	.017	4.073	80	.001	4.0...		80	13511...	32130	1871....	1871....	1..H1-1b
29	MP6	PIPE_2.0	.160	4.073	79	.011	4.0...		79	13511...	32130	1871....	1871....	1..H1-1b
30	MP7	PIPE_2.0	.135	4.073	79	.007	4.0...		79	13511...	32130	1871....	1871....	1..H1-1b



PROJECT: DO MACRO UPGRADE  
 SITE NAME: CINGULAR  
 SITE CASCADE: CT54XC749-B  
 SITE ADDRESS: 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 SITE TYPE: 125'-0" MONOPOLE



6580 SPRINT PARKWAY  
 OVERLAND PARK, KANSAS 66251



855 Community Drive, Sauk City, WI 53583  
 Phone: 608-643-4100 Fax: 608-643-7999  
 www.Ramaker.com

**Charles Cherundolo  
 Consulting, Inc.**

713 Clover Lane, Moscow, PA 18444  
 Phone: 570-840-5084 Fax: 570-842-5592

Certification & Seal:  
 I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



*James R. Skowronski*  
 Signature: \_\_\_\_\_ Date: 8/23/2017

**SITE INFORMATION**

**PROPERTY OWNER:**  
 SPRING HILL LANE PROPERTIES LLC

**SITE ADDRESS:**  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

**GEOGRAPHIC COORDINATES:**  
 LATITUDE: 41.36221388° (41° 21' 43.97" N)  
 LONGITUDE: 73.39668333° (73° 23' 48.06" W)

**ZONING JURISDICTION:**  
 TOWN OF BETHEL

**ZONING DISTRICT:**  
 R80 RESIDENTIAL

**POWER COMPANY:**  
 CONNECTICUT LIGHT & POWER  
 PH.: (800) 286-2000

**AAV PROVIDER:**  
 AT&T  
 PH.: (210) 821-4105

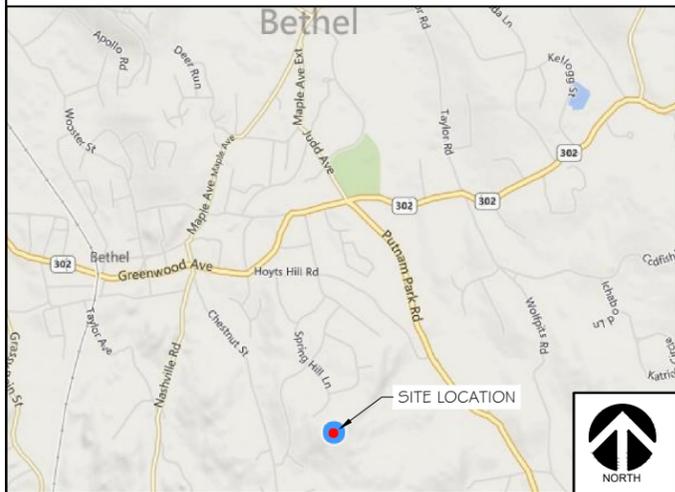
**SPRINT CONSTRUCTION MANAGER:**  
 NAME: GARY WOOD  
 PHONE: (860) 940-9168  
 E-MAIL: gary.wood@sprint.com

**EQUIPMENT SUPPLIER:**  
 ALCATEL-LUCENT  
 600-700 MOUNTAIN AVENUE  
 MURRAY HILL, NJ 07974  
 PH.: (908) 508-8080

**SITE ACQUISITION:**  
 CHARLES CHERUNDOLO CONSULTING, INC.  
 1280 RT. 46 WEST  
 PARSIPPANY, NJ 07054  
 CONTACT: TOM JUPIN, PMP, PROJECT MANAGER  
 CELL: (973) 819-9033  
 EMAIL: tom.jupin@cherundoloconsulting.com

**PLANS PREPARED BY:**  
 RAMAKER & ASSOCIATES, INC.  
 CONTACT: KEITH BOHNSACK, PROJECT MANAGER  
 PH.: (608) 643-4100  
 EMAIL: kbohnsack@ramaker.com

**AREA MAP**



**LOCATION MAP**



**PROJECT DESCRIPTION**

- INSTALL NEW 9929 GROWTH CABINET
- INSTALL NEW BATTERY STRING IN EXISTING BATTERY CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRH'S ON TOWER
- INSTALL (1) FIBER CABLE AND (3) FIBER JUMPERS
- INSTALL (27) ANTENNA / RRH JUMPERS

**APPLICABLE CODES**

- \* ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.
1. INTERNATIONAL BUILDING CODE
  2. ANSI/TIA-222 STRUCTURAL STANDARD FOR ANTENNA STRUCTURES
  3. NFPA 780 - LIGHTNING PROTECTION CODE
  4. NATIONAL ELECTRIC CODE



**SHEET INDEX**

SHT NO:	SHEET TITLE:	REV:	ENGINEER:
T-1	TITLE SHEET	-	JRS
SP-1	SPRINT SPECIFICATIONS	-	JRS
SP-2	SPRINT SPECIFICATIONS	-	JRS
SP-3	SPRINT SPECIFICATIONS	-	JRS
A-1	SITE PLAN	-	JRS
A-2	EQUIPMENT PLAN	-	JRS
A-3	BUILDING ELEVATION & ANTENNA DETAILS	-	JRS
A-4	RF DATA SHEET	-	JRS
A-5	FIBER PLUMBING DIAGRAM	-	JRS
A-6	CABLE COLOR CODING	-	JRS
A-7	ANTENNA & HYBRID CABLE DETAILS	-	JRS
A-8	EQUIPMENT DETAILS	-	JRS
A-9	EQUIPMENT DETAILS	-	JRS
E-1	EQUIPMENT UTILITY & GROUNDING PLAN	-	JRS
E-2	GROUNDING DETAILS	-	JRS
E-3	DC POWER DETAILS & PANEL SCHEDULES	-	JRS

MARK	DATE	DESCRIPTION
ISSUE	FINAL	DATE ISSUED 08/23/2017

PROJECT TITLE:  
**CINGULAR  
 CT54XC749-B**

PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

SHEET TITLE:  
**TITLE SHEET**

SCALE: NONE

PROJECT NUMBER: 28746  
 SHEET NUMBER: T-1

**SECTION 01 100 - SCOPE OF WORK**

**THE WORK:**  
THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE CONSTRUCTION DRAWINGS AND ASSOCIATED OUTLINE SPECIFICATIONS AND THE SITE SPECIFIC WORK ORDER, DESCRIBE THE WORK TO BE PERFORMED BY THIS CONSTRUCTION CONTRACTOR (SUPPLIER).

**RELATED DOCUMENTS:**

- A. THE REQUIREMENTS OF EACH SECTION OF THIS SPECIFICATION APPLY TO ALL SECTIONS, INDIVIDUALLY AND COLLECTIVELY.
- B. RELATED DOCUMENTS: THE CONTRACTOR SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE FOLLOWING SUPPLEMENTAL REQUIREMENTS FOR INSTALLATION AND TESTING.
  - 1. EN-201 2-001 : (FIBER OPTIC, DC CABLE, AND DC CIRCUIT BREAKER TAGGING STANDARDS)
  - 2. TS-0200 - (TRANSMISSION ANTENNA LINE ACCEPTANCE STANDARDS)
  - 3. EL-0568: (FIBER TESTING POLICY)
  - 4. NP-312-201 : (EXTERIOR GROUNDING SYSTEM TESTING)
  - 5. NP-760-500: ETHERNET, MICROWAVE, TESTING AND ACCEPTANCE

**PRECEDENCE:**

SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

**NATIONALLY RECOGNIZED CODES AND STANDARDS:**

- THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL 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. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY -GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
  - D. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE - "NEC") AND NFPA 101 (LIFE SAFETY CODE).
  - E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
  - F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
  - G. AMERICAN CONCRETE INSTITUTE (ACI)
  - H. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
  - I. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
  - J. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
  - K. PORTLAND CEMENT ASSOCIATION (PCA)
  - L. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
  - M. BRICK INDUSTRY ASSOCIATION (BIA)
  - N. AMERICAN WELDING SOCIETY (AWS)
  - O. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
  - P. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
  - Q. DOOR AND HARDWARE INSTITUTE (DHI)
  - R. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
  - 5. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

**DEFINITIONS:**

- A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
- B. COMPANY: "SPRINT"; SPRINT NEXTEL CORPORATION AND ITS OPERATING ENTITIES.
- C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E", THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
- D. CONTRACTOR: CONSTRUCTION CONTRACTOR, SUPPLIER, 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.
- F. CONSTRUCTION MANAGER - ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT.

**SITE FAMILIARITY:**

CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

**POINT OF CONTACT:**

COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

**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.

**DRAWINGS REQUIRED AT JOBSITE:**

- THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
- A. THE JOBSITE DRAWINGS SHALL BE CLEARLY MARKED DAILY IN RED 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.
  - B. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

**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.

**UTILITY SERVICES:**

WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

**PERMITS/FEEES:**

WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

**CONTRACTOR:**

CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

**USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:**

CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

**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 LESSOR'S OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

**ACCESS TO WORK:**

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

**DIMENSIONS:**

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

**EXISTING CONDITIONS:**

NOTIFY THE SPRINT CONSTRUCTION MANAGER 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.

**SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT**

**FURNISHED MATERIALS:**

COMPANY FURNISHED MATERIALS AND EQUIPMENT TO BE INSTALLED BY THE CONTRACTOR (OFC) IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

**RECEIPT OF MATERIAL AND EQUIPMENT:**

A. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:

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

**DELIVERABLES:**

- A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.
- B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

**SECTION 01 300 - CELL SITE CONSTRUCTION**

**NOTICE TO PROCEED:**

- A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S ISSUANCE OF THE WORK ORDER.
- B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

**GENERAL REQUIREMENTS FOR CONSTRUCTION:**

- A. 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.
- B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
- C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
  - 1. 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.
  - 2. 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.
- D. 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

**FUNCTIONAL REQUIREMENTS:**

- A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. CONTRACTOR SHALL TAKE ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.
- B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.
- C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES
- D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
  - 1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
  - 2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
  - 3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND BACKHAUL (FIBER, COPPER, OR MICROWAVE).
  - 4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
  - 5. INSTALL ABOVE GROUND GROUNDING SYSTEMS, CONDUIT AND BOXES.
  - 6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
  - 7. INSTALL "H-FRAMES", CABINETS AND PADS AND PLATFORMS AS INDICATED.
  - 8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
  - 9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.

- 10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
- 11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
- 12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
- 13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
- 14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER.
- 15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
- 16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
- 17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
- 18. CONDUCT ALL REQUIRED TESTS AND INSPECTIONS
- 19. PERFORM, DOCUMENT, AND CLOSE OUT ALL JURISDICTIONAL PERMITTING REQUIREMENTS AND ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
- 20. PERFORM ALL ADDITIONAL WORK AS IDENTIFIED IN SCOPE OF SERVICES ATTACHED TO THE SUPPLIER AGREEMENT FOR THIS PROJECT. THIS WORK MAY INCLUDE COMMISSIONING, INTEGRATION, SPECIAL WAREHOUSING, REVERSE LOGISTICS ACTIVITIES, ETC. PERFORM COMMISSIONING AND INTEGRATION ACTIVITIES PER APPLICABLE MOPS.

**DELIVERABLES:**

- A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEST REPORTS AND DOCUMENTATION INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
  - 1. PRODUCT SPECIFICATIONS FOR MATERIALS OR SPECIAL CONSTRUCTION IF REQUESTED BY SPRINT
  - 2. ACTUALIZE ALL CONSTRUCTION RELATED MILESTONES IN SITERRA AND COMPLETE ALL ON-LINE FORMS AND COMPLETE DOCUMENT UP-LOADS. UPLOAD ALL REQUIRED CLOSEOUT DOCUMENTS AND FINAL SITE PHOTOS
  - 3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT LEFT ON SITE INSIDE BASE OF MAIN RF CABINET IN A PROTECTIVE POUCH.
  - 4. ALL REQUIRED TEST REPORTS.
  - 5. REQUIRED CLOSEOUT DOCUMENTATION INCLUDING BUT NOT LIMITED TO:
    - a. ALL JURISDICTIONAL PERMITTING AND OCCUPANCY INFORMATION
    - b. PDF SCAN OF REDLINES PRODUCED IN THE FIELD
    - c. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS
    - d. LIEN WAIVERS
    - e. FINAL PAYMENT APPLICATION
    - f. REQUIRED FINAL CONSTRUCTION PHOTOS
    - g. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
    - h. LISTS OF SUBCONTRACTORS
- B. PROVIDE ADDITIONAL DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
  - 1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
  - 2. PROJECT PROGRESS REPORTS.
  - 3. PRE-CONSTRUCTION MEETING NOTES.

**SECTION 01 400 - TESTS, INSPECTIONS, SUBMITTALS, AND PROJECT CLOSEOUT**

**TESTS AND INSPECTIONS:**

- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
  - 1. COAX SWEEPS AND FIBER TESTS PER TS-0200 (CURRENT VERSION) ANTENNA LINE ACCEPTANCE STANDARDS
  - 2. POST CONSTRUCTION HEIGHT VERIFICATION, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
  - 3. CONCRETE BREAK TESTS
  - 4. SITE RESISTANCE TO EARTH TEST
  - 5. STRUCTURAL BACKFILL COMPACTION TESTS
  - 6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
  - 7. ADDITIONAL TESTING AS REQUIRED ELSEWHERE IN THIS SPECIFICATION.

**SUBMITTALS:**

- A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.
- B. UPLOAD THE FOLLOWING TO SITERRA AS APPLICABLE INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
  - 1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
  - 2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
  - 3. CHEMICAL GROUNDING SYSTEM
  - 4. REINFORCEMENT CERTIFICATIONS
  - 5. STRUCTURAL BACKFILL TEST RESULTS
  - 6. SWEEP AND FIBER TESTS
  - 7. ANTENNA AZIMUTH AND DOWN-TILT VERIFICATION
  - 8. POST CONSTRUCTION HEIGHT VERIFICATION
  - 9. ADDITIONAL SUBMITTALS MAY BE REQUIRED FOR SPECIAL CONSTRUCTION OR MINOR MATERIALS
- C. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

**TESTING BY THIRD PARTY AGENCY:**

- A. EMPLOY AN AGENCY OF ENGINEERS AND SCIENTISTS WHO IS REGULARLY ENGAGED IN FIELD AND LABORATORY TESTING AND ANALYSIS. AGENCY SHALL HAVE BEEN IN BUSINESS A MINIMUM OF FIVE YEARS, AND BE LICENSED AS PROFESSIONAL ENGINEERS IN THE STATE WHERE THE PROJECT IS LOCATED. AGENCY IS SUBJECT TO APPROVAL BY COMPANY.
  - 1. AGENCY MUST HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
  - 2. 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.
  - 3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASHTO, AND OTHER METHODS IS NEEDED.
- B. REQUIRED THIRD PARTY TESTS:
  - 1. SITE RESISTANCE TO EARTH TEST PER NP-31 2-201
  - 2. CONCRETE CYLINDER BREAK TESTS FOR TOWER PIER AND ANCHORS PER NATIONALLY RECOGNIZED STANDARDS
  - 3. STRUCTURAL SOILS COMPACTION TESTS PER NATIONALLY RECOGNIZED STANDARDS
  - 4. REBAR PLACEMENT VERIFICATION WITH REPORT
  - 5. TESTING TENSION STUDY FOR ROCK ANCHORS
  - 6. ALL THIRD PARTY TESTS AS REQUIRED BY LOCAL JURISDICTION
- C. REQUIRED TESTS BY CONTRACTOR
  - 1. COAX SWEEP TESTS PER SPRINT STANDARD TS-0200
  - 2. FIBER TESTS PER SPRINT STANDARD EL-0568
  - 3. MICROWAVE LINK TESTS PER NP-760-500
  - 4. ANTENNA AZIMUTHS AND DOWN TILT USING ELECTRONIC ALIGNMENT TOOL PER ANTENNA INSTALLATION SPECIFICATION HEREIN.



6580 SPRINT PARKWAY  
OVERLAND PARK, KANSAS 66251



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**Certification & Seal:**  
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



Signature: *James R. Skowronski* Date: 8/23/2017

MARK	DATE	DESCRIPTION
ISSUE PHASE	FINAL	DATE ISSUED 08/23/2017

PROJECT TITLE:  
**CINGULAR CT54XC749-B**

PROJECT INFORMATION:  
38 SPRING HILL ROAD  
BETHEL, CT 06801  
FAIRFIELD COUNTY

SHEET TITLE:  
**SPRINT SPECIFICATIONS**

SCALE: NONE

PROJECT NUMBER	28746
SHEET NUMBER	SP-1

5. POST CONSTRUCTION HEIGHT VERIFICATION AS REQUIRED HERewith IN THE TOWER INSTALLATION SPECIFICATIONS.
  6. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED HERewith IN THE ASPHALT PAVING SPECIFICATIONS.
  7. FIELD QUALITY CONTROL TESTING AS SPECIFIED HERewith IN THE CONCRETE PAVING SPECIFICATIONS.
  8. TESTING REQUIRED HERewith UNDER SPECIFICATIONS FOR AGGREGATE BASE FOR ROADWAYS
  9. ALL OTHER TESTS REQUIRED BY LOCAL JURISDICTION
- D. INSPECTIONS BY COMPANY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN INSPECTION ACTIVITIES, FINAL ACCEPTANCE / PUNCH WALK REVIEW, AND/OR AS A RESULT OF TESTING
- E. SPRINT RESERVES THE RIGHT TO INSPECT THE CONSTRUCTION SITE AT ANY TIME VIA SITE WALKS AND/OR PHOTO REVIEWS. CONTRACTOR SHALL GIVE SPRINT 24 HOURS NOTICE PRIOR TO THE COMMENCEMENT OF THE FOLLOWING CONSTRUCTION ACTIVITIES AND PHOTOGRAPHS OF THE IN-PROGRESS WORK.
1. GROUNDING SYSTEM AND BURIED UTILITIES INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
  2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
  3. COMPACTION OF BACKFILL MATERIALS, AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS, ASPHALT PAVING, AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
  4. PRE AND POST CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES. PRIOR TO CONSTRUCTION ACTIVITIES AND AFTER CONSTRUCTION IS COMPLETE, PROVIDE PHOTOGRAPHIC DOCUMENTATION OF ROOF, FLASHINGS, AND PARAPETS, BOTH BEFORE AND AFTER CONSTRUCTION IS COMPLETE.
  5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
  6. TOWER TOP AND INACCESSIBLE EQUIPMENT (RRUS, ANTENNAS, AND CABLING): PROVIDE PHOTOS OF THE BACKS OF ALL ANTENNAS, RRUS, COMBINERS, FILTERS, FIBER AND DC CABLING, CABLE COLOR CODING, EQUIPMENT GROUNDING AND CONNECTOR WATER PROOFING INCLUDING NAME PLATE AND SERIAL NUMBER FOR ALL SERIALIZED EQUIPMENT.

**PROJECT CLOSEOUT:**

- A. FINAL ACCEPTANCE PUNCH WALK AND INSPECTION: AS IDENTIFIED IN THE SCOPE OF SERVICES, SPRINT WILL CONDUCT A FINAL PUNCH WALK OR FINAL DESK TOP PHOTO REVIEW (SITE MODIFICATIONS). PUNCH WALKS MUST BE SCHEDULED IN ADVANCE AS REQUIRED. AT THE PUNCH WALK / REVIEW, SPRINT MAY IDENTIFY CRITICAL DEFICIENCIES WHICH MUST BE CORRECTED PRIOR TO PUTTING SITE ON AIR. MINOR DEFICIENCIES MUST BE CORRECTED WITHIN 30 DAYS EXCEPT AS OTHERWISE REQUIRED. VERIFICATIONS OF CORRECTIONS MAY BE MADE BY COMPANY DURING A REPEAT SITE WALK OR DESK TOP PHOTO REVIEW AT COMPANY'S SOLE DISCRETION.
- B. CLOSEOUT DOCUMENTATION: ALL CLOSEOUT DOCUMENTATION AND PHOTOGRAPHS SHALL BE UPLOADED PRIOR TO FINAL ACCEPTANCE. SPRINT WILL REVIEW CLOSEOUT DOCUMENTATION FOR PRESENCE AND CONTENT. CLOSEOUT DOCUMENTATION SHALL INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING AS APPLICABLE:
1. COAX SWEEP TESTS:
  2. FIBER TESTS:
  3. JURISDICTION FINAL INSPECTION DOCUMENTATION
  4. REINFORCEMENT CERTIFICATION (MILL CERTIFICATION)
  5. CONCRETE MIX DESIGN AND PRODUCT DATA (TOWER FOUNDATION)
  6. LIEN WAIVERS AND RELEASES.
  7. POST -CONSTRUCTION HEIGHT VERIFICATION
  8. JURISDICTION CERTIFICATE OF OCCUPANCY
  9. ELECTRONIC ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
  10. STRUCTURAL BACKFILL TEST RESULTS (IF APPLICABLE)
  11. CELL SITE UTILITY SETUP
  12. AS-BUILT REDLINE CONSTRUCTION DRAWINGS (PDF SCAN OF FIELD MARKS)
  13. AS-BUILT CONSTRUCTION DRAWINGS IN DWG AND PDF FORMATS
  14. LIST OF SUB CONTRACTORS
  15. APPROVED PERMITTING DOCUMENTS
  16. FINAL SITE PHOTOS UP-LOADED TO SITERRA. INCLUDE THE FOLLOWING AS APPLICABLE:
    - a. TOWER, ANTENNAS, RRUS, AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX/CABLE LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNAS); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING - TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
    - b. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
    - c. SITE LAYOUT - PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
    - d. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

**PROJECT PHOTOGRAPHS:**

- A. PROVIDE PROJECT CLOSEOUT GENERAL ARRANGEMENT PHOTOS OF ALL NEW WORK. THE FOLLOWING LIST REPRESENTS MINIMUM REQUIREMENTS AND MINIMUM QUANTITY. ADDITIONAL PHOTOS MAY BE REQUIRED TO ADEQUATELY DOCUMENT THE WORK.
1. ASR AND RF MPE SIGNAGE (IF NOT IN PLACE, SUPPLIER NOTIFIES EMS FIELD REPRESENTATIVE)
  2. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR)
  3. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR) CLOSE UP SHOWING WEATHERPROOFING AND GROUNDING (AS REQUIRED). CLOSE-UP OF BACK SIDE OF EACH PERMANENT RRU SHOWING SERIAL NUMBER/BAR CODE.
  4. VIEW (1 EACH SECTOR) ALONG THE AZIMUTH AND TILT OF THE ANTENNAS
  5. TOP OF TOWER FROM GROUND, 1 EACH SECTOR
  6. MAINLINE HYBRID CABLE ROUTE DOWN TOWER SHOWING FASTENERS AND SUPPORT
  7. MAINLINE/HYBRID CABLE ROUTE ALONG ICE BRIDGE OR IN CABLE TRAY SHOWING FASTENERS AND SUPPORT
  8. GROUND MOUNTED RRU RACKS (FRONT AND BACK)
  9. FRONT, SIDE AND BACK ELEVATIONS OF ALL GROUND CABINETS
  10. VIEW OF COMPOUND FROM A DISTANCE
  11. VIEW OF EACH GROUND CABINET (POWER, RF, FIBER SPOOL, PPC POWER, PPC TELCO WITH DOOR OPEN)
  12. BACKHAUL FIBER MEET-ME-POINT AND CONDUIT ROUTE (MICROWAVE INSTALLATION IF NOT FIBER)
  13. AAV NETWORK INTERFACE DEVICE OR MICROWAVE RADIO INSTALLATION

**DEFICIENCY CORRECTIONS:**

CONTRACTOR IS RESPONSIBLE FOR ALL CORRECTIONS TO DEFICIENCIES IDENTIFIED THROUGH TESTING, REVIEW OF SUBMITTALS, INSPECTIONS AND CLOSEOUT REVIEWS.

**SECTION 01 500 - PROJECT REPORTING**

**WEEKLY REPORTS:**

- A. CONTRACTOR SHALL REPORT TO SPRINT AT MINIMUM ON A WEEKLY BASIS VIA SITERRA BY UPDATING ALL APPLICABLE POST END KEEPING MILESTONES WITH ACTUAL AND FORECASTED COMPLETION DATES.
- B. ADDITIONAL REQUIREMENTS FOR REPORTING MAY BE IDENTIFIED ELSEWHERE OR REQUIRED BY THE SCOPE OF SERVICES OR SPRINTS LOCAL MARKET CONSTRUCTION MANAGER. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

**PROJECT CONFERENCE CALLS:**

SPRINT MAY HOLD PERIODIC PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

**FINAL PROJECT ACCEPTANCE:** PRIOR TO SPRINTS FINAL PROJECT ACCEPTANCE. ALL REQUIRED MILESTONE ACTUALS MUST BE UPDATED IN SITERRA AND ALL REQUIRED REPORTING TASKS MUST BE COMPLETE.

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

**SUMMARY:**

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRUS, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

**ANTENNAS AND RRUS:**

THE NUMBER AND TYPE OF ANTENNAS AND RRUS TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

**HYBRID CABLE:**

HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

**JUMPERS AND CONNECTORS:**

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 1 2-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRUS AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MIN. LENGTH FOR JUMPER SHALL BE 10'-0".

**REMOTE ELECTRICAL TILT (RET) CABLES:**

**MISCELLANEOUS:**

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

**ANTENNA INSTALLATION:**

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

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

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

**HYBRID CABLE INSTALLATION:**

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

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

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

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE INSTALLED INSIDE MONOPOLE WITH CABLE SUPPORT GRIPS AS REQUIRED BY THE MANUFACTURER.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
  - a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
  - b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
4. CABLE INSTALLATION:
  - a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
  - b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
  - c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.
5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 (CURRENT VERSION).
7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1

**WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:**

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

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

1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

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

**SUMMARY:**

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

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

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

**DC CIRCUIT BREAKER LABELING**

A. NEW DC CIRCUIT IS REQUIRED IN MMBS CABINET SHALL BE CLEARLY IDENTIFIED AS TO RRU BEING SERVICED.

**SECTION 26 100 - BASIC ELECTRICAL REQUIREMENTS**

**SUMMARY:**

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS

**QUALITY ASSURANCE:**

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

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

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

**SUPPORTING DEVICES:**

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

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

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

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



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**Certification & Seal:**

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



Signature: *James R. Skowronski* Date: 8/23/2017


MARK	DATE	DESCRIPTION
ISSUE PHASE	FINAL	DATE ISSUED 08/23/2017

PROJECT TITLE:  
**CINGULAR  
CT54XC749-B**

PROJECT INFORMATION:  
38 SPRING HILL ROAD  
BETHEL, CT 06801  
FAIRFIELD COUNTY

SHEET TITLE:  
**SPRINT SPECIFICATIONS**

SCALE: NONE

PROJECT NUMBER: 28746  
SHEET NUMBER: SP-2

SUPPORTING DEVICES:

- A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.
- B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.
- C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:
  - 1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
  - 2. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

- A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.
- B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

- A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.
- B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.
- C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.
- D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.
- E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6- FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.
- F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

- A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.
- B. CABLE TERMINATION FITTINGS FOR CONDUIT
  - 1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.
  - 2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.
- C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS. CROUSE-HINDS WAB SERIES OR EQUAL.
- D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.
- E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

- A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.
- B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO-OX.
- C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

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

CONDUIT AND CONDUCTOR INSTALLATION:

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



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*James R. Skowronski*  
 Signature: \_\_\_\_\_ Date: 8/23/2017


MARK	DATE	DESCRIPTION
ISSUE	FINAL	DATE ISSUED 08/23/2017

PROJECT TITLE:  
**CINGULAR  
 CT54XC749-B**

PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

SHEET TITLE:  
**SPRINT SPECIFICATIONS**

SCALE: NONE

PROJECT NUMBER	28746
SHEET NUMBER	SP-3



**Sprint**

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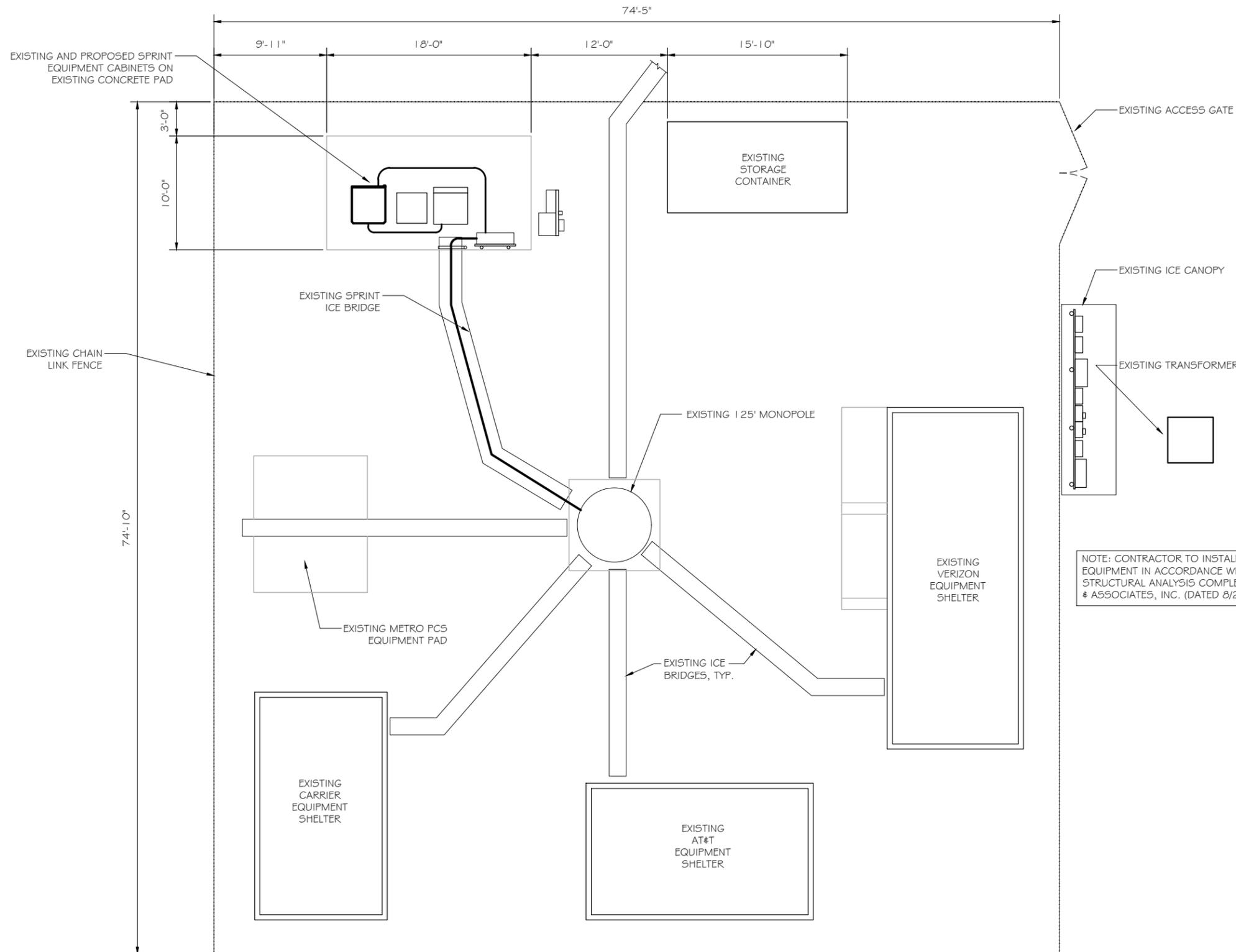
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 Signature: \_\_\_\_\_ Date: 8/23/2017



NOTE: CONTRACTOR TO INSTALL ALL PROPOSED EQUIPMENT IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS COMPLETED BY RAMAKER & ASSOCIATES, INC. (DATED 8/23/17)

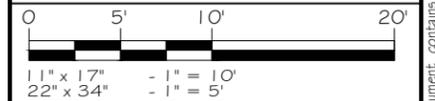
**SITE PLAN**  
 SCALE: 1" = 10'

MARK	DATE	DESCRIPTION
ISSUE	FINAL	DATE ISSUED 08/23/2017

PROJECT TITLE:  
**CINGULAR CT54XC749-B**

PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

SHEET TITLE:  
**SITE PLAN**



PROJECT NUMBER: **28746**  
 SHEET NUMBER: **A-1**

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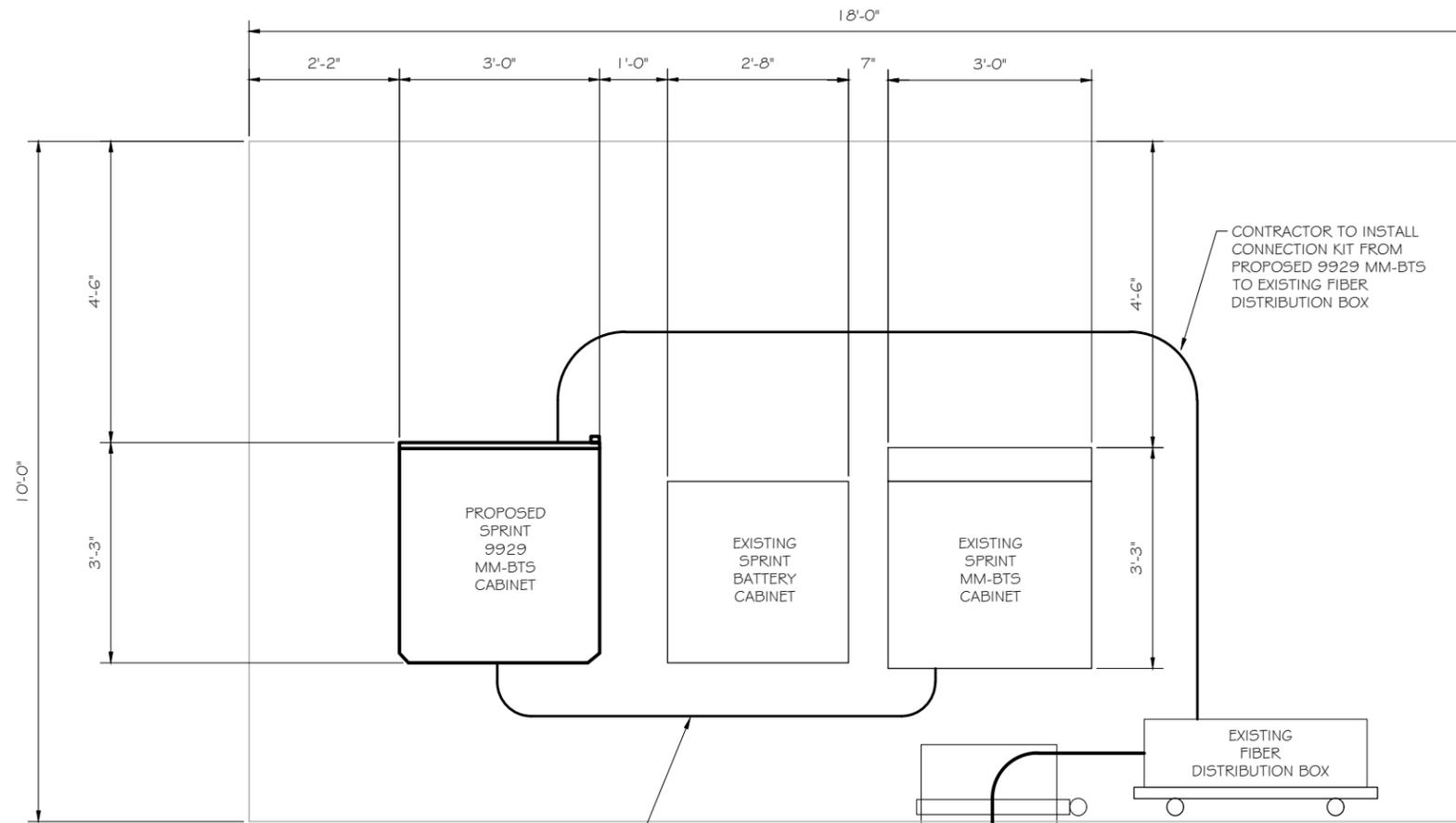
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CONTRACTOR TO INSTALL CONNECTION KIT FROM EXISTING MM-BTS TO PROPOSED MT-BTS CABINET

(1) PROPOSED 5/8" FIBER CABLE TO BE ROUTED ALONG EXISTING COAX THROUGH ICE BRIDGE TO SECTOR ANTENNAS. USE SNAP-IN HANGERS, SPACED MAX. 4'-0" O.C. AS NEEDED.

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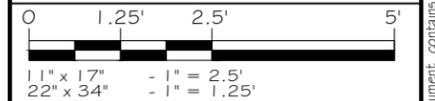
**EQUIPMENT PLAN**  
 SCALE: 1" = 2.5'

MARK	DATE	DESCRIPTION
ISSUE	FINAL	DATE ISSUED 08/23/2017

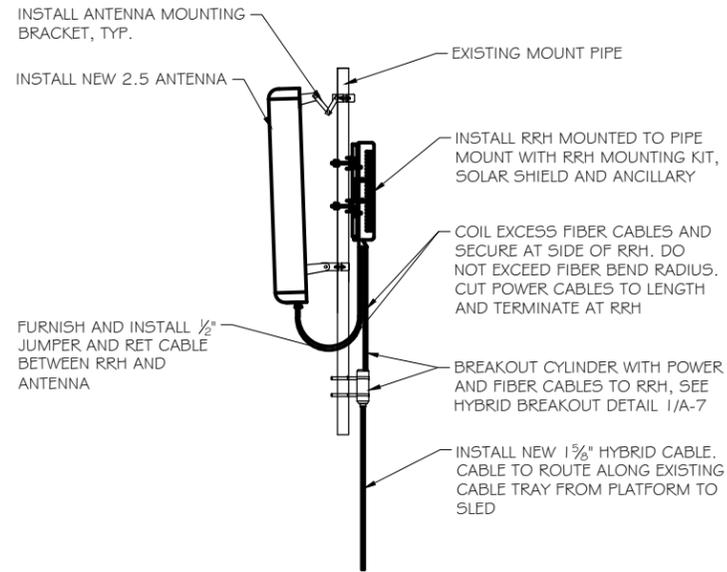
PROJECT TITLE:  
**CINGULAR  
 CT54XC749-B**

PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

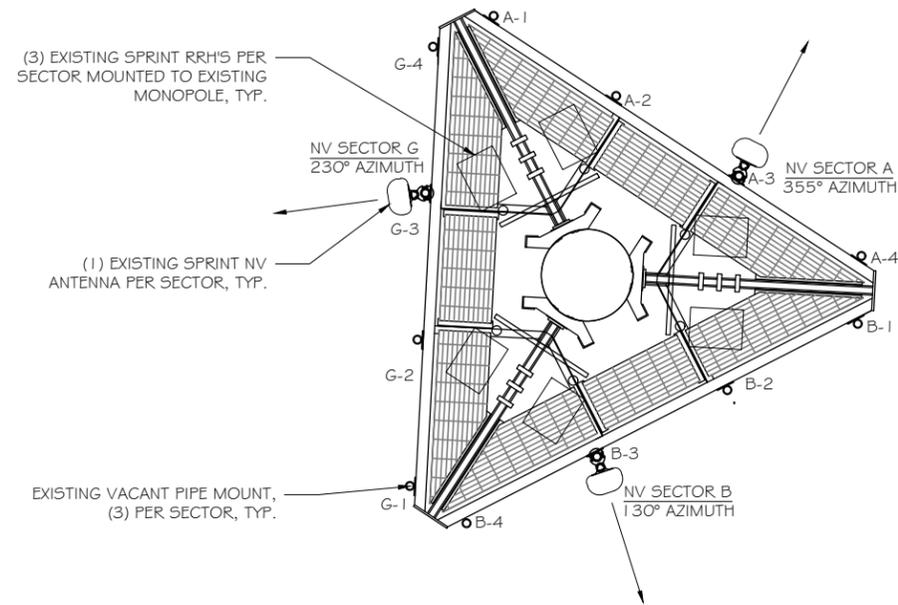
SHEET TITLE:  
**EQUIPMENT PLAN**



PROJECT NUMBER: **28746**  
 SHEET NUMBER: **A-2**



ANTENNA & RRH MOUNTING DETAILS  
 SCALE: NTS



EXISTING ANTENNA ARRAY  
 SCALE: NTS



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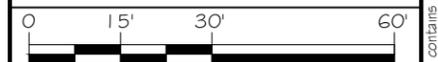
Signature: *James R. Skowronski* Date: 8/23/2017

MARK	DATE	DESCRIPTION
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PROJECT TITLE:  
**CINGULAR CT54XC749-B**

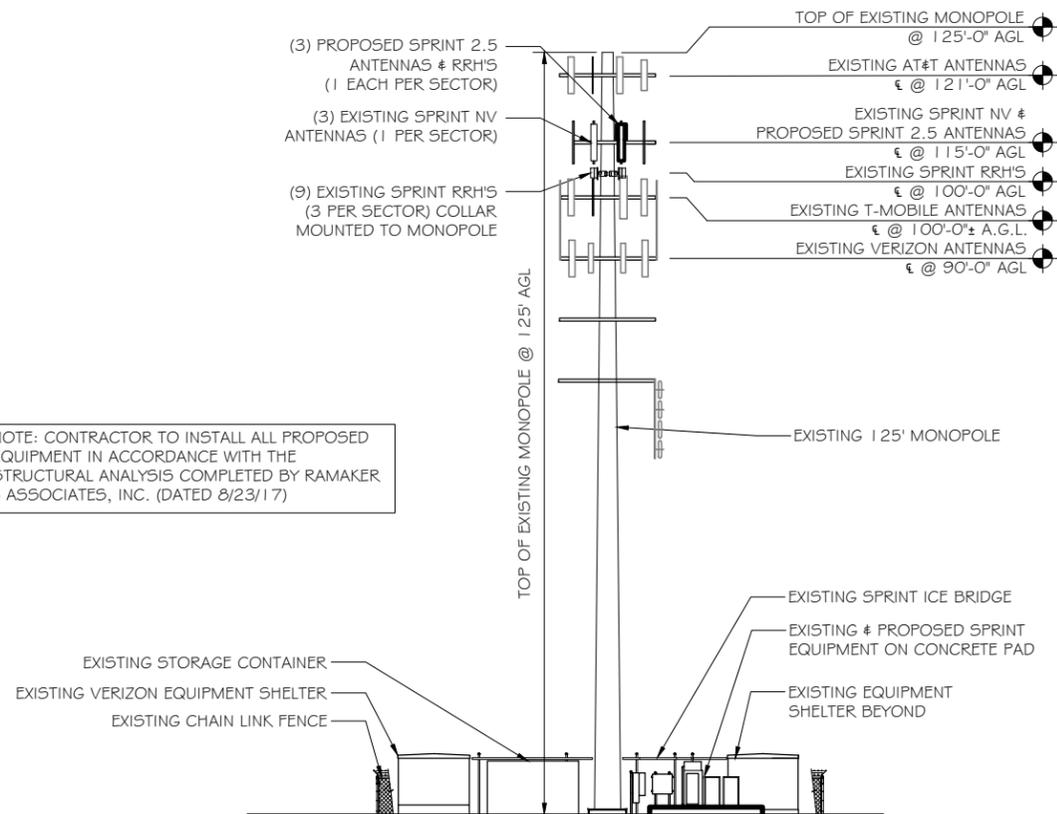
PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

SHEET TITLE:  
**BUILDING ELEVATIONS & ANTENNA DETAILS**

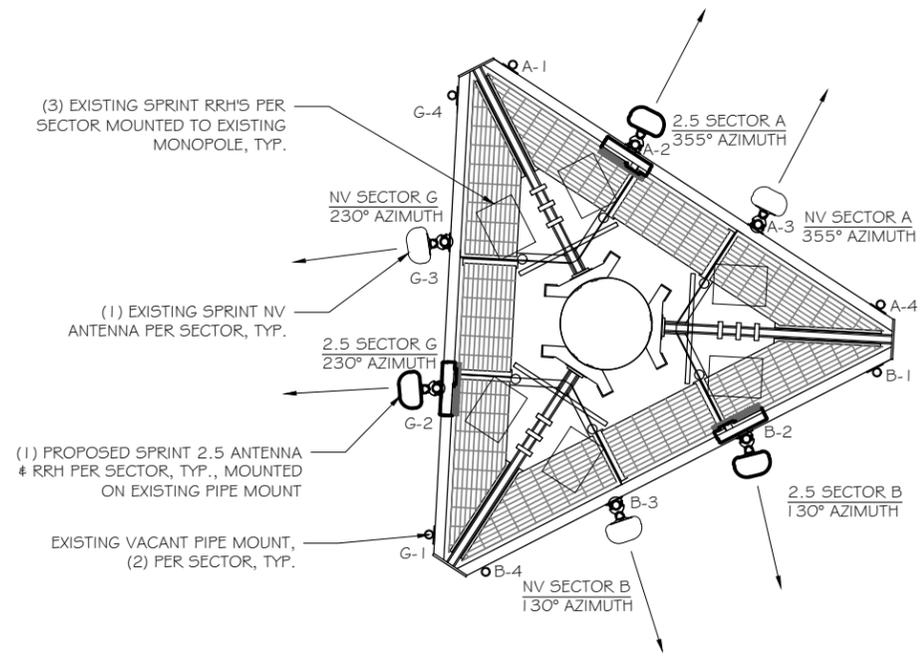


11" x 17" - 1" = 30"  
 22" x 34" - 1" = 15"

PROJECT NUMBER: 28746  
 SHEET NUMBER: A-3



BUILDING ELEVATION  
 SCALE: 1" = 30'



PROPOSED ANTENNA ARRAY  
 SCALE: NTS

NOTE: CONTRACTOR TO INSTALL ALL PROPOSED EQUIPMENT IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS COMPLETED BY RAMAKER & ASSOCIATES, INC. (DATED 8/23/17)

## RFDS Sheet

### General Site Information

Site ID	CT54XC749	Equipment Vendor	Alcatel-Lucent
Market	Southern Connecticut	Latitude	41.3622
Region	Northeast	Longitude	-73.3955
MLA	N/A	LL SITE ID	N/A
Structure Type	Monopole		
BTS Type			

Solution ID		Siterra SR Equipment type		Incremental Power Draw needed by added Equipment	
		Equipment Vendor	Alcatel-Lucent		100

### Base Equipment

BBU Kit	ALU BBU Kit	Top Hat	None
BBU Kit Qty	1	Top Hat Qty	N/A
Growth Cabinet	9929 Growth Cabinet	Top Hat Dimenstions	N/A
Growth Cabinet Qty	1	Top Hat Weight (lbs)	N/A
Growth Cabinet Dimensions	75.8" x 35.4" x 37.8"		
Growth Cabinet Weight	1000		

### RF Path Information

RRH	TD-RRH8x20-25
RRH Qty	3
RRH Dimensions	26.1"x18.6"x6.7"
RRH Weight. lbs.	70
RRH Mount Weight. Lbs.	10
Power and Fiber Cable	ALU Fiber Only
Cable Qty	1
Weight per foot. Lbs.	0.242
Diameter. Inches.	0.73
Length Ft.	150 (calculated as antenna height plus 20%)
Coax Jumper	TBD
Coax Jumper Qty	27
Coax Jumper Length. Feet.	8
Coax Jumper Weight	1.7
Coax Jumper Diameter. Inches	0.5
AISG Cable	Commscope ATCB-B01-006
AISG Cable Qty	3
AISG Diameter. Inches.	0.315
AISG Cable length.	8
Weight of entire AISG cable. Lbs.	1.3

### Antenna Sector Information

	XREF		
	Sector 1	Sector 2	Sector 3
Antenna make/model	RFS APXVTM14-ALU-I20	RFS APXVTM14-ALU-I20	RFS APXVTM14-ALU-I20
Antenna qty	1	1	1
Antenna Dimensions. Inches	56.3"x12.6"x6.3"	56.3"x12.6"x6.3"	56.3"x12.6"x6.3"
Antenna Weight. Lbs	55.12	55.12	55.12
Antenna Mounting Kit Weight. Lbs.	11	11	11
CL Height	115	115	115
Antenna Azimuth	355	130	230
Antenna Mechanical Downtilt	0	0	0
Antenna etilt	5	0	3

\*RFDS SHEET WAS GENERATED BY RAMAKER & ASSOCIATES FROM PLAN OF RECORD (POR) PROVIDED BY SPRINT. CONTRACTOR SHALL VERIFY AND OBTAIN FINAL RFDS FROM SPRINT CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.

### NOTES:

- GENERAL CONTRACTOR TO FIELD VERIFY AZIMUTH AND C/L HEIGHT AND MECHANICAL DOWNTILT. IF DIFFERENT THAN CALLED OUT BELOW, HALT ANTENNA WORK FOR ONE HOUR, CALL SPRINT RF ENGINEER (OR MANAGER IF RF ENGINEER DOES NOT ANSWER, BUT STILL LEAVE A MESSAGE TO RF ENGINEER) USING CONTACT INFORMATION ABOVE FOR FURTHER INSTRUCTIONS. IF SPRINT DOES NOT RESPOND WITHIN ONE HOUR, PLACE 2.5GHZ ANTENNA AT SAME C/L HEIGHT AS 1.9GHZ ANTENNA AND EMAIL CORRECT C/L HEIGHT AND AZIMUTH TO SPRINT RF ENGINEER. UPDATE AS-BUILT DRAWING WITH CORRECT C/L HEIGHT. ALSO EMAIL CORRECT 1.9GHZ AND 800MHZ ANTENNA C/L HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
- AISG TESTS TO VERIFY OPERATION IS TO BE PERFORMED AFTER FINAL INSTALLATION OF ANTENNAS AND AISG CABLES HAVE BEEN CONNECTED. VERIFY OPERATION OF ALL EXISTING SPRINT AISG EQUIPMENT INCLUDING 800MHZ, 1.9GHZ AND 2.5GHZ. TEST TO INCLUDE COMPLETE DOWNTILT, AZIMUTH (IF APPLICABLE) AND BEAMWIDTH SWINGS (IF APPLICABLE). DOCUMENT AISG TEST RESULTS IN COAX SWEEP TEST SPREADSHEET.
- GENERAL CONTRACTOR MUST ENSURE THAT NO OBJECT IS LOCATED WITHIN 45 DEGREES OF LEFT AND RIGHT OF FRONT OF ANTENNA OR 7 DEGREES UP AND DOWN FROM CENTER OF ANTENNA. IF THIS IS NOT POSSIBLE, CONTACT RF ENGINEER FOR FURTHER INSTRUCTION. IN ADDITION, 2.5GHZ ANTENNA IS NOT TO BE PLACED IN FRONT OF ANY OTHER ANTENNA USING THE SAME 45 DEGREE RULE. THIS INCLUDES SPRINT AND NON-SPRINT ANTENNAS.
- 2.5GHZ ANTENNA MUST BE AT LEAST 6" FROM 1.9GHZ ANTENNA, 30" FROM 800MHZ ANTENNA AND 30" FROM DUAL BAND 1.9GHZ AND 800MHZ ANTENNA.
- GENERAL CONTRACTOR IS REQUIRED TO USE A DIGITAL ALIGNMENT TOOL TO SET AZIMUTH, ROLL AND DOWNTILT. AZIMUTH ACCURACY IS TO BE WITHIN 1 DEGREE. DOWNTILT AND ROLL (LEFT TO RIGHT TILT) IS TO BE WITHIN 0.1 DEGREES. IF FOR SOME REASON THIS ACCURACY CANNOT BE ACHIEVED, UPDATE AS-BUILT DRAWINGS AND EMAIL SPRINT RF ENGINEER WITH AS-BUILT SETTINGS. USE 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL.



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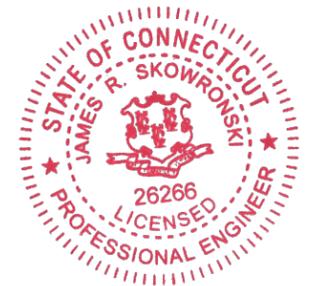


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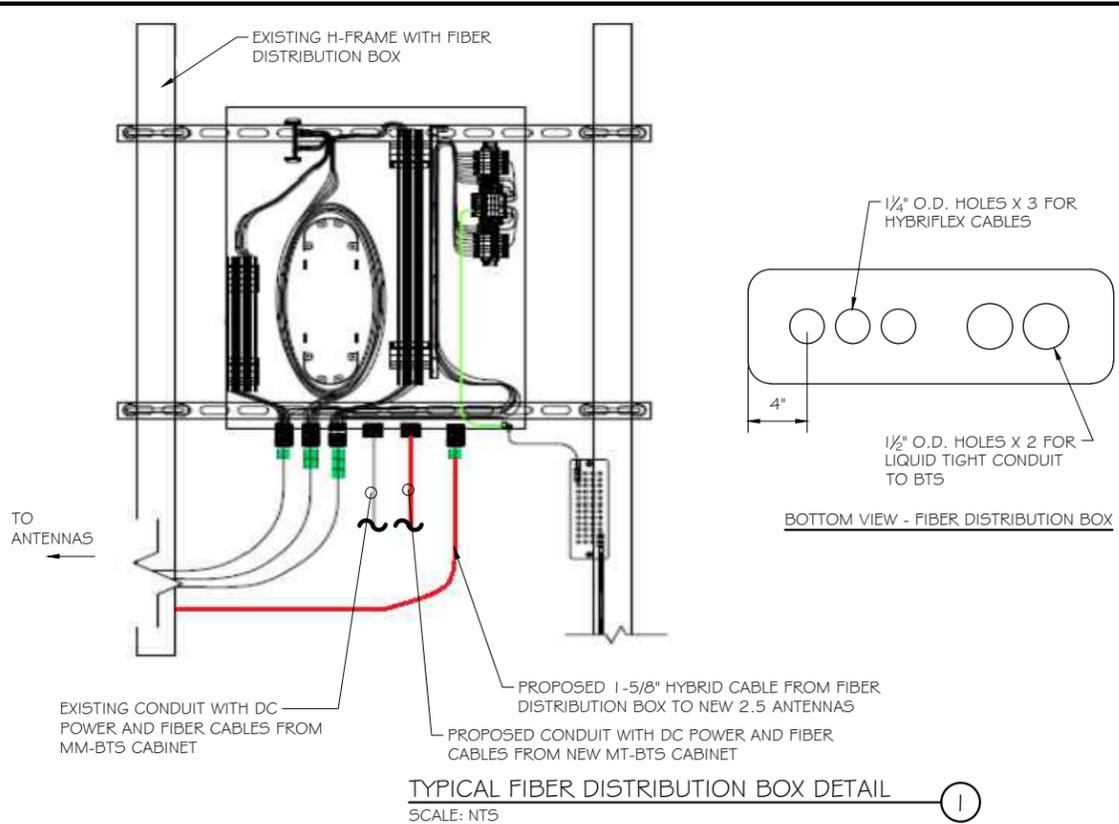
PROJECT TITLE:  
**CINGULAR CT54XC749-B**

PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

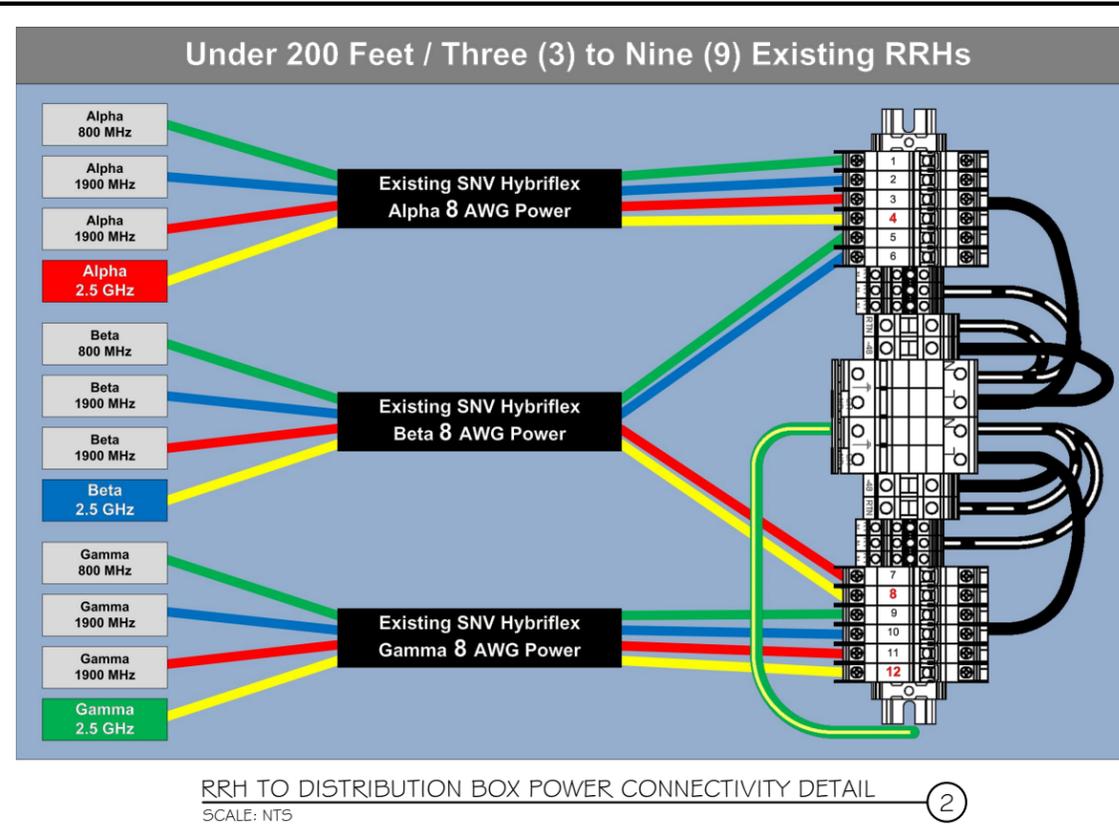
SHEET TITLE:  
**RF DATA SHEET**

SCALE: NONE

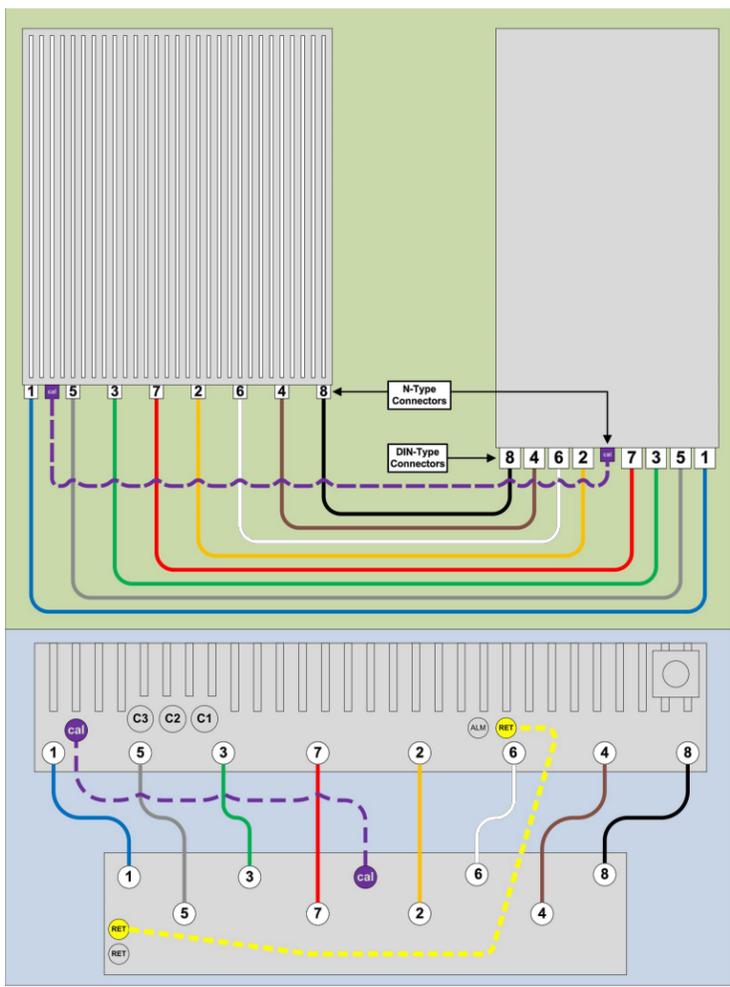
PROJECT NUMBER: 28746  
 SHEET NUMBER: A-4



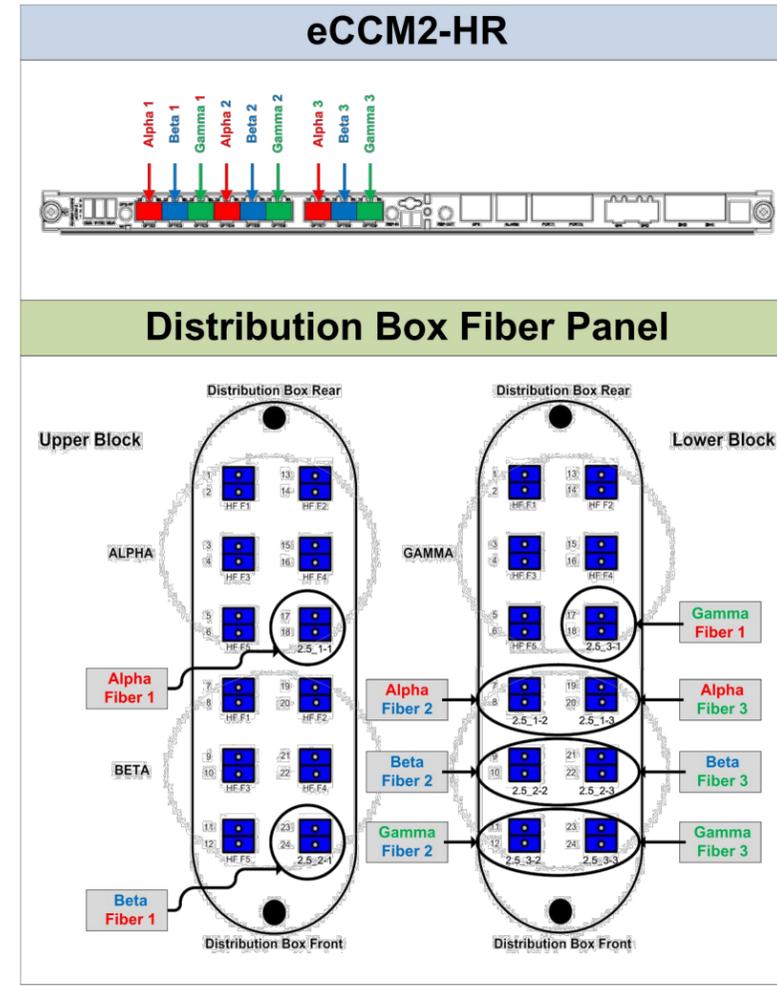
TYPICAL FIBER DISTRIBUTION BOX DETAIL  
 SCALE: NTS



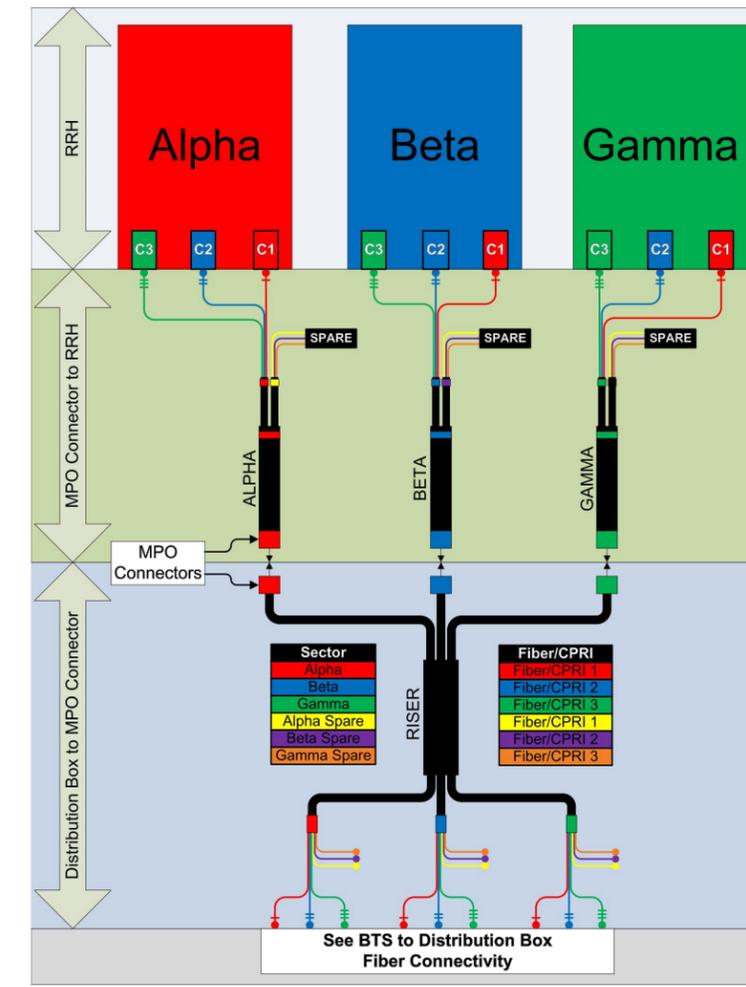
RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL  
 SCALE: NTS



8T8R DETAIL  
 SCALE: NTS



BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL  
 SCALE: NTS



RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL  
 SCALE: NTS



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PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
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 FAIRFIELD COUNTY

SHEET TITLE:  
**FIBER PLUMBING DIAGRAM**

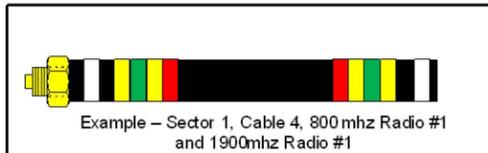
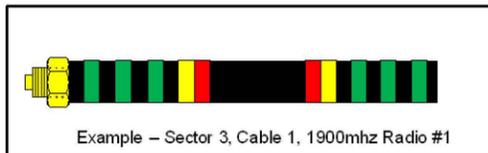
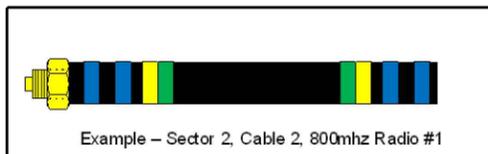
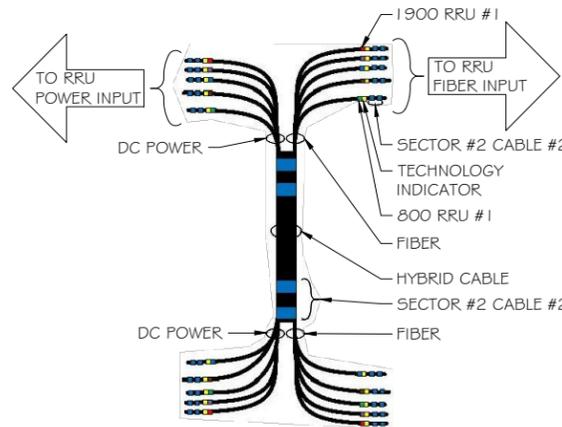
SCALE: NONE

PROJECT NUMBER: 28746  
 SHEET NUMBER: A-5

2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

Sector	Cable	First Ring	Second Ring	Third Ring
<b>1 Alpha</b>	<b>1</b>	Green	No Tape	No Tape
<b>1</b>	<b>2</b>	Blue	No Tape	No Tape
<b>1</b>	<b>3</b>	Brown	No Tape	No Tape
<b>1</b>	<b>4</b>	White	No Tape	No Tape
<b>1</b>	<b>5</b>	Red	No Tape	No Tape
<b>1</b>	<b>6</b>	Grey	No Tape	No Tape
<b>1</b>	<b>7</b>	Purple	No Tape	No Tape
<b>1</b>	<b>8</b>	Orange	No Tape	No Tape
<b>2 Beta</b>	<b>1</b>	Green	Green	No Tape
<b>2</b>	<b>2</b>	Blue	Blue	No Tape
<b>2</b>	<b>3</b>	Brown	Brown	No Tape
<b>2</b>	<b>4</b>	White	White	No Tape
<b>2</b>	<b>5</b>	Red	Red	No Tape
<b>2</b>	<b>6</b>	Grey	Grey	No Tape
<b>2</b>	<b>7</b>	Purple	Purple	No Tape
<b>2</b>	<b>8</b>	Orange	Orange	No Tape
<b>3 Gamma</b>	<b>1</b>	Green	Green	Green
<b>3</b>	<b>2</b>	Blue	Blue	Blue
<b>3</b>	<b>3</b>	Brown	Brown	Brown
<b>3</b>	<b>4</b>	White	White	White
<b>3</b>	<b>5</b>	Red	Red	Red
<b>3</b>	<b>6</b>	Grey	Grey	Grey
<b>3</b>	<b>7</b>	Purple	Purple	Purple
<b>3</b>	<b>8</b>	Orange	Orange	Orange



COLOR CODING CHARTS  
SCALE: NTS

CABLE MARKING NOTES

- ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
- THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAKOUT UNIT. THERE SHALL BE 1" SPACE BETWEEN EACH RING.
- A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
- THE 2" COLORED TAPE(S) SHALL BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
- SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE SECOND CABLE IDENTIFIED BY BLUE BANDS OF TAPE
- HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.
- HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
- INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.



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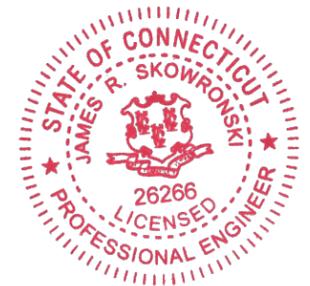


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CINGULAR  
CT54XC749-B

PROJECT INFORMATION:  
38 SPRING HILL ROAD  
BETHEL, CT 06801  
FAIRFIELD COUNTY

SHEET TITLE:

CABLE COLOR CODING

SCALE: NONE

PROJECT NUMBER 28746  
SHEET NUMBER A-6

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE  
 MANUF:RFS

CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
Fiber Only	Varies	Use NV Hybriflex	5/8"
Hybriflex	<200'	8 AWG	1-1/4"
Hybriflex	225-300'	6 AWG	1-1/4"
Hybriflex	325-375'	4 AWG	1-1/4"

RFS HYBRIFLEX RISER CABLE SCHEDULE

FIBER ONLY (EXISTING DC POWER)	Hybrid cable	
MN-HB058-M12-050F	12x multi-mode fiber pairs, Top:Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50 ft	50 ft
MN-HB058-M12-075F		75 ft
MN-HB058-M12-100F		100 ft
MN-HB058-M12-125F		125 ft
MN-HB058-M12-150F		150 ft
MN-HB058-M12-175F		175 ft
MN-HB058-M12-200F		200 ft

8 AWG Power	Hybrid cable	
MN-HB114-08U3M12-050F	3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors, 1 1/4 cable, 50 ft	50 ft
MN-HB114-08U3M12-075F		75 ft
MN-HB114-08U3M12-100F		100 ft
MN-HB114-08U3M12-125F		125 ft
MN-HB114-08U3M12-150F		150 ft
MN-HB114-08U3M12-175F		175 ft
MN-HB114-08U3M12-200F		200 ft

6 AWG Power	Hybrid cable	
MN-HB114-13U3M12-225F	3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors, 1 1/4 cable, 225 ft	225 ft
MN-HB114-13U3M12-250F		250 ft
MN-HB114-13U3M12-275F		275 ft
MN-HB114-13U3M12-300F		300 ft

4 AWG Power	Hybrid cable	
MN-HB114-21U3M12-325F	3x 4 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors, 1 1/4 cable, 325 ft	325 ft
MN-HB114-21U3M12-350F		350 ft
MN-HB114-21U3M12-375F		375 ft

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

FIBER ONLY	Hybrid Jumper cable	
MN-HBF012-M3-5F1	5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
MN-HBF012-M3-10F1		10 ft
MN-HBF012-M3-15F1		15 ft

SPECIAL INSTALLATION NOTE:  
 JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'  
 NOTIFY SPRINT CM OF ANY DISCREPANCY

8 AWG POWER	Hybrid Jumper cable	
MN-HBF058-08U1M3-5F1	5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable	5 ft
MN-HBF058-08U1M3-10F1		10 ft
MN-HBF058-08U1M3-15F1		15 ft

SPECIAL INSTALLATION NOTE:  
 JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'  
 NOTIFY SPRINT CM OF ANY DISCREPANCY

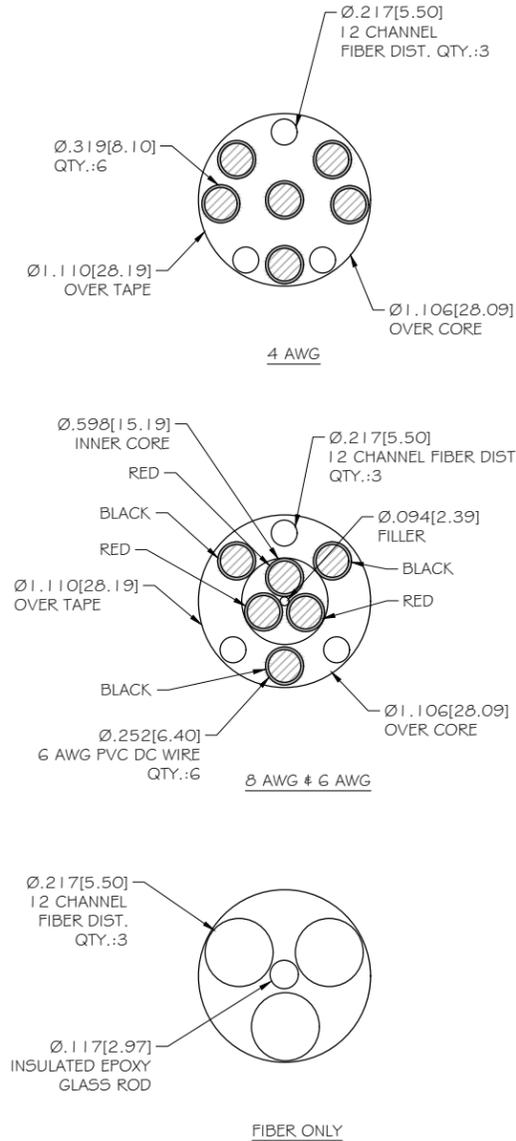
6 AWG POWER	Hybrid Jumper cable	
MN-HBF058-13U1M3-5F1	5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable	5 ft
MN-HBF058-13U1M3-10F1		10 ft
MN-HBF058-13U1M3-15F1		15 ft

SPECIAL INSTALLATION NOTE:  
 JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'  
 NOTIFY SPRINT CM OF ANY DISCREPANCY

4 AWG POWER	Hybrid Jumper cable	
MN-HBF078-21U1M3-5F1	5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 7/8 cable	5 ft
MN-HBF078-21U1M3-10F1		10 ft
MN-HBF078-21U1M3-15F1		15 ft

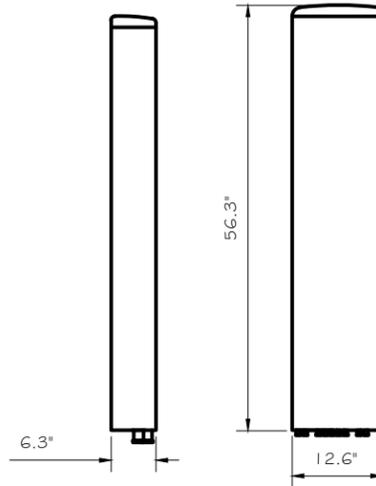
SPECIAL INSTALLATION NOTE:  
 JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15'  
 NOTIFY SPRINT CM OF ANY DISCREPANCY

HYBRID CABLE CROSS SECTION & DATA  
 SCALE: NTS

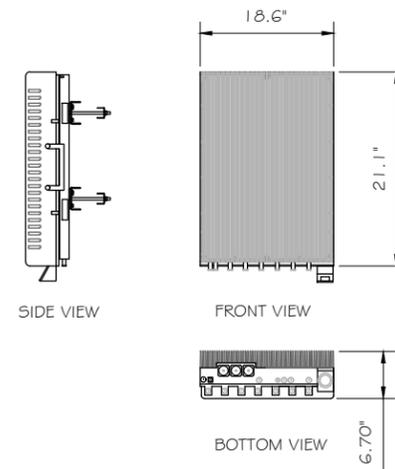


RFS: APXVTM | 4-ALU- | 20

DIMENSIONS, HxWxD: 56.3" x 12.6" x 7.3"  
 WEIGHT, WITHOUT PRE-MOUNTED BRACKETS: 55.12 lbs.  
 CONNECTOR: (9) MINI-DIN FEMALE/BOTTOM



2.5 ANTENNA DETAIL  
 SCALE: NTS



ALCATEL-LUCENT: TD-RRH&x20  
 HxWxD = (26.1" x 18.6" x 6.7")  
 WEIGHT = 70 lbs.

2.5 RRH DETAIL  
 SCALE: NTS



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Signature: *James R. Skowronski* Date: 8/23/2017

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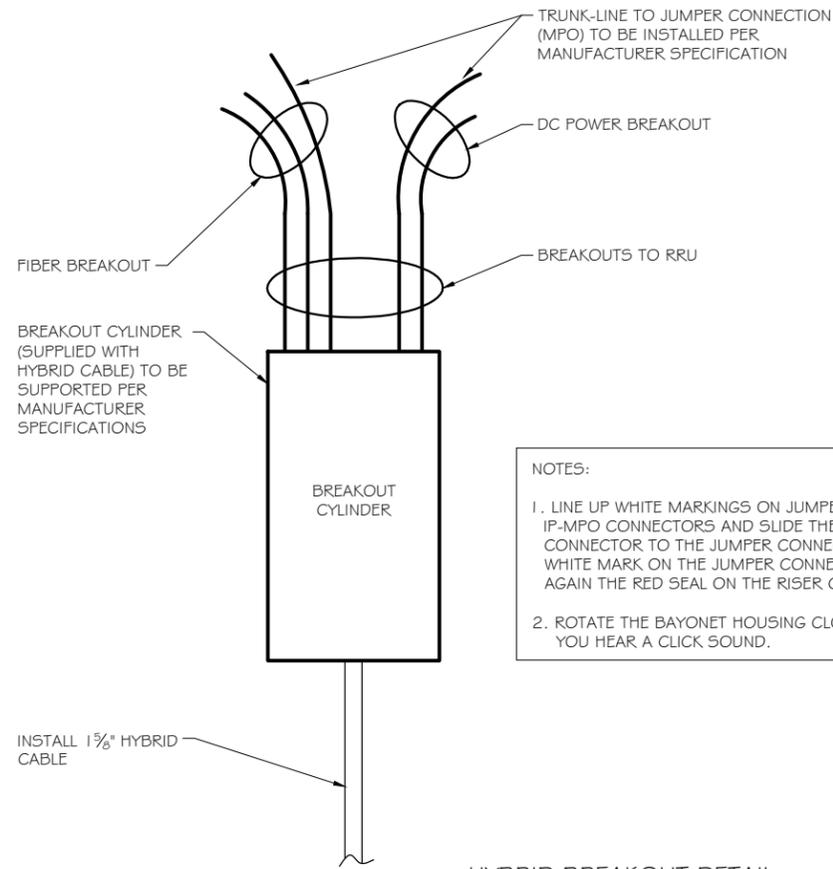
PROJECT TITLE:  
**CINGULAR CT54XC749-B**

PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

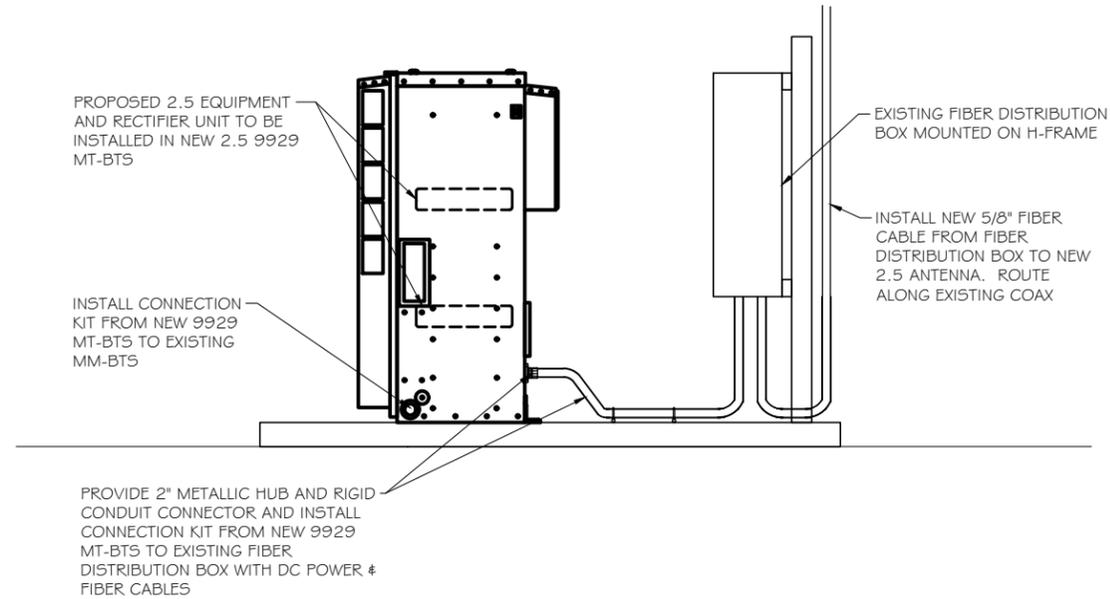
SHEET TITLE:  
**ANTENNA & HYBRID CABLE DETAILS**

SCALE: NONE

PROJECT NUMBER: 28746  
 SHEET NUMBER: A-7



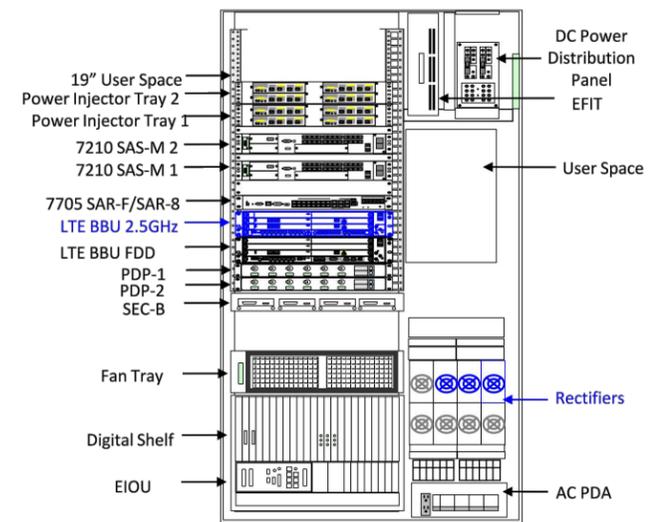
HYBRID BREAKOUT DETAIL ①  
 SCALE: NTS



CABLE ROUTE FROM CABINET ②  
 SCALE: NTS



EXISTING BBU CABINET ③  
 SCALE: NTS



EXISTING MMBS CABINET ④  
 SCALE: NTS



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SHEET TITLE:

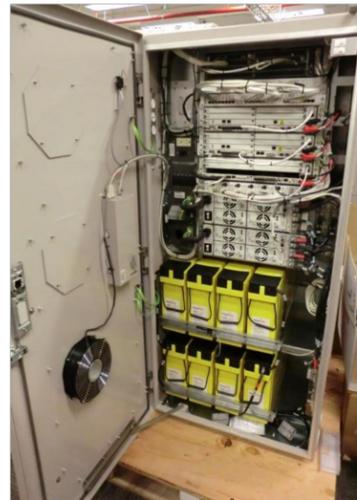
EQUIPMENT DETAILS

SCALE: NONE

PROJECT NUMBER 28746  
 SHEET NUMBER A-8

# ALCATEL-LUCENT 9929 MULTI TECHNOLOGY BTS OUTDOOR CABINET

In order to help network operators to improve TCO for distributed radio based sites with extended battery backup requirements, Alcatel-Lucent proposes the 9929 Multi Technology Outdoor Cabinet for CDMA/LTE/WCDMA multi-standard configurations



### 9929 MT-BTS OUTDOOR CABINET

- The 9929 MT-BTS cabinet is designed to provide, in a single footprint, a full site support with a capability to host 3G and 4G Telecom equipment with internal power and battery support.
- The 9929 MT-BTS Outdoor Cabinet offers 17.5 U of user space capable of hosting 19" rack based telecom equipment and rectification. The 9929 MT-BTS supports distributed RF deployment scenarios with the hosting of Digital base band unit and transport equipment.
- The 9929 MT-BTS cabinet can host up of 2 strings of batteries.
- The 9929 MT-BTS is AC powered and can deliver up to 10.5kW of -48V DC power thanks to its internal N+1 redundant rectifier.
- The 19" modules could have either front-back or side-side cooling. The cabinet uses direct air-cooling (fresh air filter) technology on front door to provide 8000 W of cooling capacity. A wide temperature operating range (-40°C to +50°C full operation) allows the deployment of this cabinet in various locations.
- The 9929 MT-BTS cabinet is compliant with Zone 4 earthquake regulations.
- As an matter of example the following configuration is supported by the cabinet:
  - ✓ Distributed configuration: AC configuration with up to 10.5kW DC Power, up to 3 baseband units, 2U service aggregation router, 2U of microwave transport equipment, up to 2 battery of 190AH.

### FEATURES

- Can host BBU(s) for CDMA/WCDMA/LTE
- Supports standard 19" Telecom equipment
- Uses Direct Air Cooling (no air conditioning) with fan speed control based upon temperature
- Support of up to two 190 Ah or up to two 145AH battery strings that can provide backup for 8 hours for up to 2375 W, or 4 hour backup for up to 4150
- Convenience AC outlet (2)

### TECHNICAL SPECIFICATIONS

#### INTERFACE:

- CPRI (up to 9 RRH modules)
- Backhaul (Gigabit Ethernet or T1)
- External user alarms (up to 32 user alarms)
- AC Power input
- DC Power input for RRH (up to 9 RRH's)

#### PHYSICAL DIMENSIONS

- Height: 1617 mm (63.65 in)
- Width: 800 mm (31.5 in)
- Depth: 900 mm (35.5 in)

#### WEIGHT

- 197 kg (434 lbs) unloaded
- Up to 725 kg (1600 lbs) fully loaded

#### POWER

- Power supply:
- 48 VDC
  - 230V AC (single phase or 3 phases)
- Rectifier:
- up to 10.5kW DC -48V output power
  - Rectifier redundancy N+1

#### SUPPORTED TELECOM EQUIPMENT

- LTE 9926 BBU
- CDMA 9926 BBU
- WDMA 9926 BBU
- SAR Aggregation router
- Microwave Indoor Unit

#### OPERATING ENVIRONMENT

- Outdoor temperature range: -40°C to +50°C
- Direct Air Cooling
- Enclosure:
- IP55 (International Protection rating)
- Zone 4 Earthquake

#### STANDARDS COMPLIANCY

- UL 60950-1 / CAN/CSA C22.2 No. 60950-1-07
- UL 50/50E CSA C22.2 No. 94.1- 07/94.2-07
- EN50272-2
- EIA-310-D

#### EMC & ENVIRONMENTAL CONDITIONS

- FCC Part 15 class B
- GR-63-CORE,
- GR-487-CORE,
- GR-1089-CORE

.....Alcatel-Lucent   
 AT THE SPEED OF IDEAS™

9929 Multi Technology Outdoor BTS  
 ALCATEL-LUCENT DATA SHEET  
 2



PROPOSED 9929 MT-BTS OUTDOOR CABINET   
 SCALE: NTS



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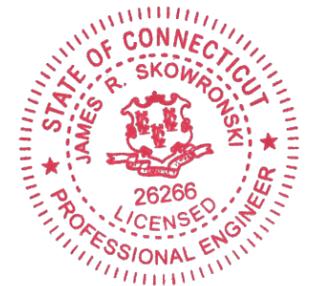


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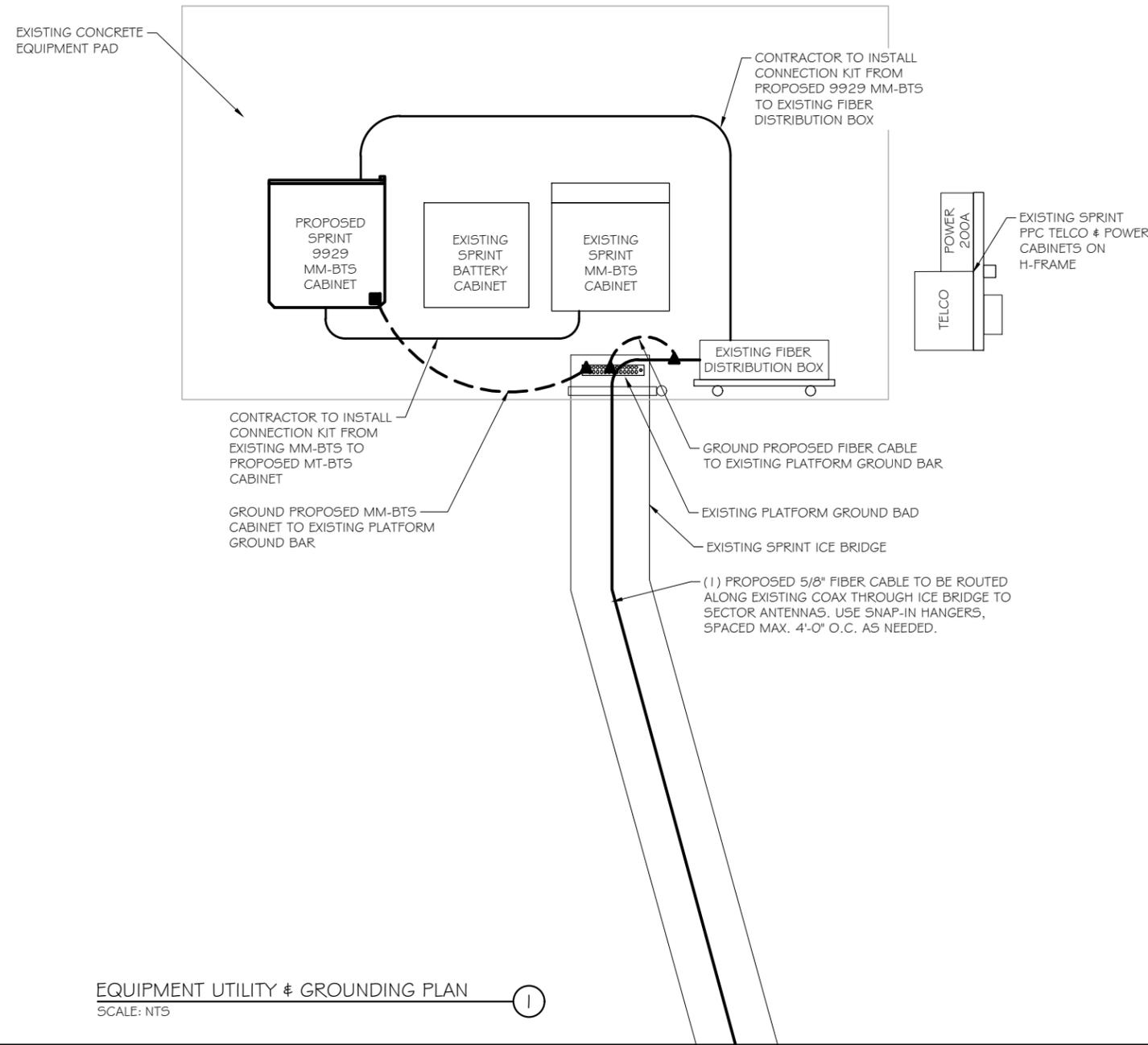
PROJECT TITLE:  
 CINGULAR  
 CT54XC749-B

PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

SHEET TITLE:  
 EQUIPMENT DETAILS

SCALE: NONE

PROJECT NUMBER: 28746  
 SHEET NUMBER: A-9



EQUIPMENT UTILITY & GROUNDING PLAN  
 SCALE: NTS

EXISTING SPRINT NETWORK VISION ANTENNA (TYP. OF 1 PER SECTOR)

PROVIDE NEW GROUND FOR HYBRID BREAKOUT UNIT TO EXISTING SECTOR GROUND BAR

PROVIDE NEW GROUND FOR PIPE MOUNT TO EXISTING SECTOR GROUND BAR

PROVIDE NEW GROUND FOR 2.5 ANTENNA TO EXISTING SECTOR GROUND BAR

INSTALL SPRINT 2.5 ANTENNA & RRU UNIT (TYP. PER SECTOR)

PROVIDE NEW GROUND FOR NEW RRH TO EXISTING SECTOR GROUND BAR

EXISTING SPRINT SECTOR GROUND BAR TO BE UTILIZED, TYP.

ANTENNA GROUNDING DETAIL  
 SCALE: NTS

GROUNDING NOTES:

1. CONTRACTOR TO ENSURE PROPER SEQUENCING OF GROUNDING AND UNDERGROUND CONDUIT INSTALLATION TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM AND/OR DAMAGE TO THE CONDUIT.
2. ALL EXTERIOR GROUND CONDUCTORS SHALL BE #2 AWG SOLID TINNED COPPER UNLESS NOTED OTHERWISE.
3. ALL GROUND CONNECTIONS BELOW GRADE SHALL BE EXOTHERMIC (CADWELD).
4. ALL GROUND CONNECTIONS ABOVE GRADE AND/OR INTERIOR SHALL BE COMPRESSION TYPE, TWO-HOLE LUGS OR DOUBLE-CRIMP "C" TAPS.
5. CONTACT AREAS WHERE CONNECTIONS ARE MADE SHALL BE PREPARED TO A BARE BRIGHT FINISH AND COATED WITH AN ANTI-OXIDATION MATERIAL BEFORE CONNECTIONS ARE MADE.
6. MAXIMUM RESISTANCE OF THE COMPLETED GROUND SYSTEM SHALL NOT EXCEED 5 OHMS.
7. WHERE GROUNDING CONNECTIONS ARE MADE TO PAINTED METAL SURFACES, PAINT SHALL BE REMOVED TO BARE METAL TO ENSURE PROPER CONTACT AND RESTORED/PAINTED TO ORIGINAL FINISH.
8. GROUND DEPTH SHALL BE 30" MINIMUM BELOW FINISHED GRADE, OR 6" BELOW FROST LINE, WHICHEVER IS GREATER.

LEGEND:	
---	EXISTING GROUND CABLE
---	PROPOSED GROUND CABLE
▲	MECHANICAL CONNECTION
■	EXOTHERMIC CONNECTION
—E—E—E—E—E—	PROPOSED ELECTRIC



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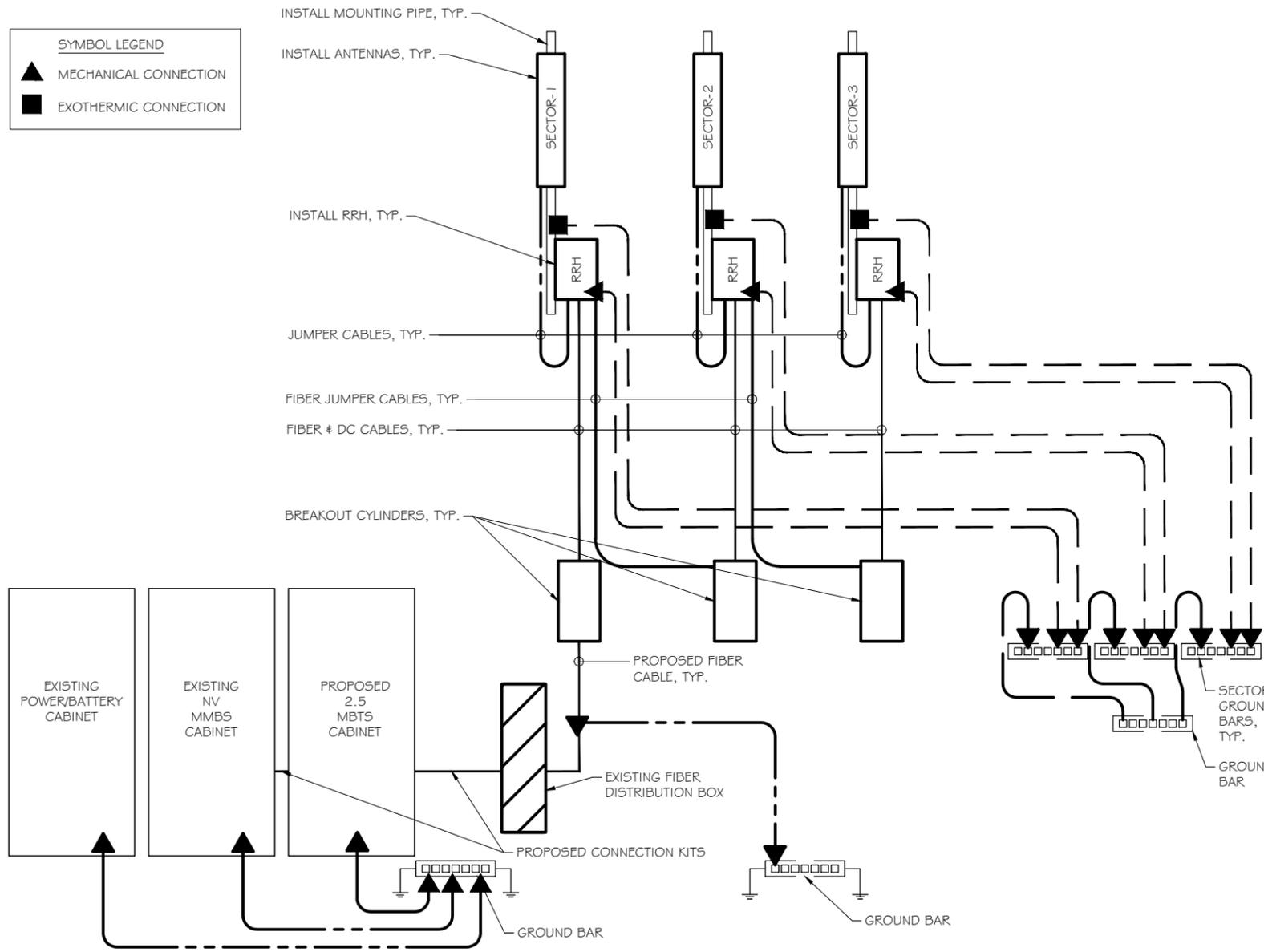
PROJECT TITLE:  
**CINGULAR CT54XC749-B**

PROJECT INFORMATION:  
 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

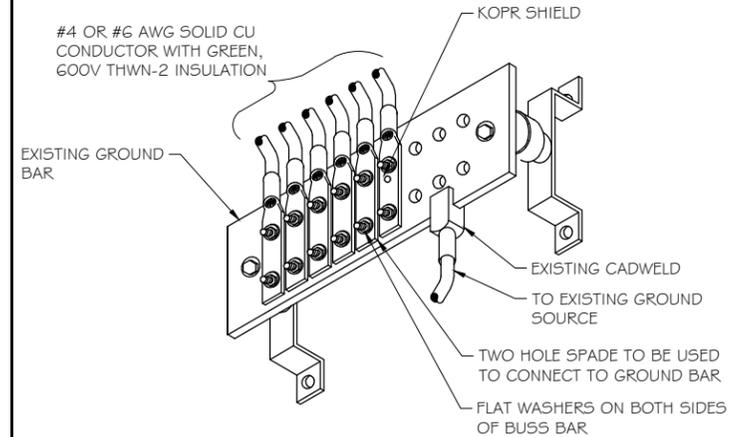
SHEET TITLE:  
**EQUIPMENT UTILITY & GROUNDING PLAN**

SCALE: NONE

PROJECT NUMBER: 28746  
 SHEET NUMBER: E-1

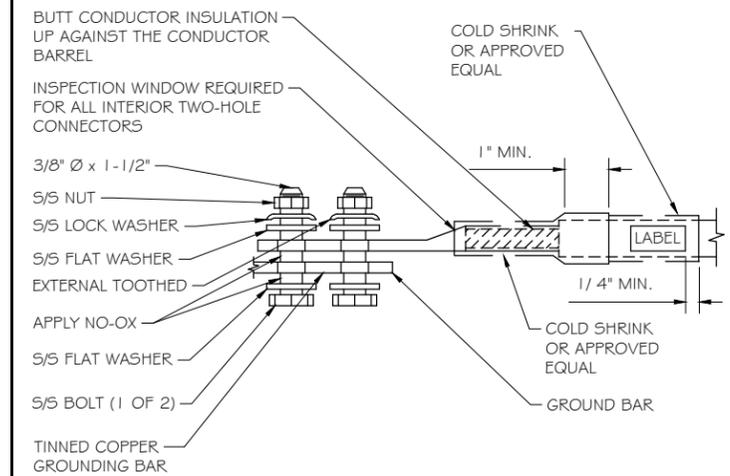


**GROUNDING RISER DIAGRAM**  
 SCALE: NTS



- NOTES:**
1. APPLY NO-OX TO LUG AND GROUND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
  2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

**GROUNDING CONDUCTOR INSTALLATION**  
 SCALE: NTS



**TWO-HOLE LUG**  
 SCALE: NTS



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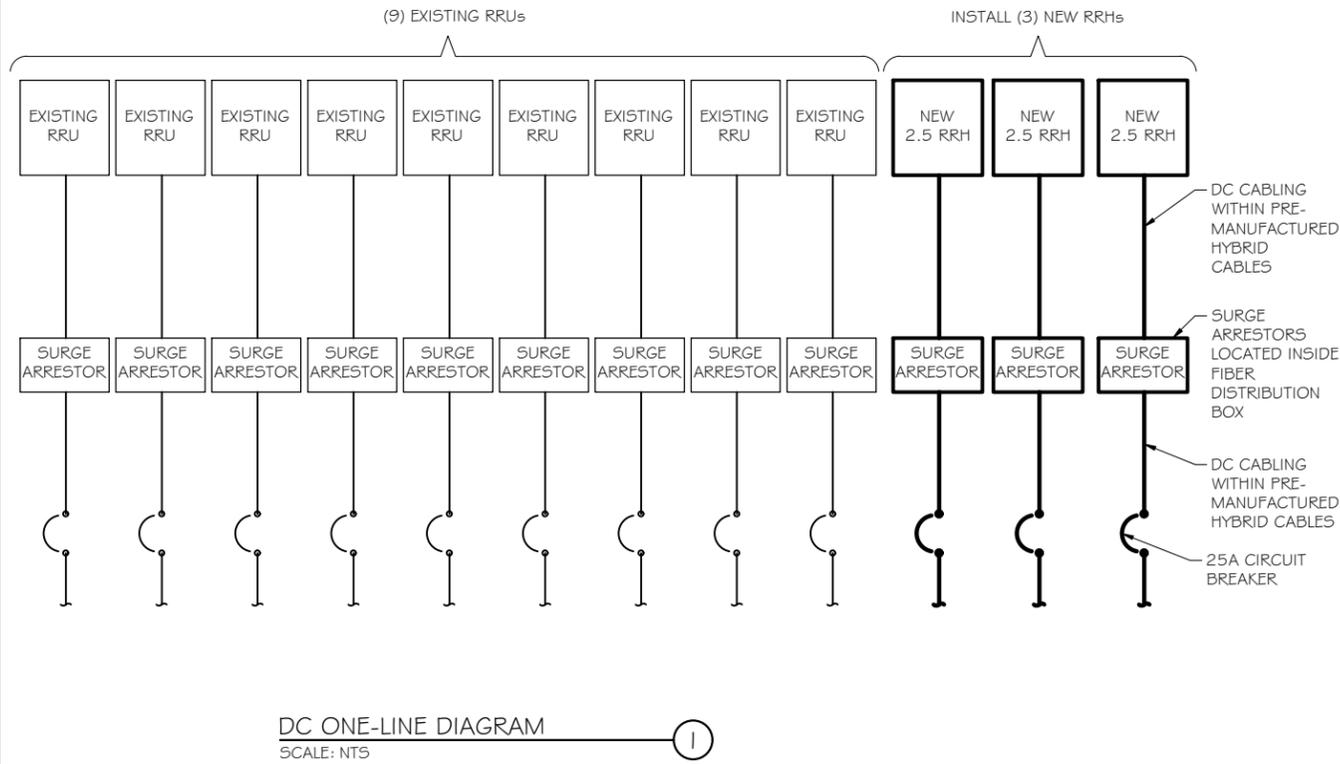
PROJECT TITLE:  
**CINGULAR CT54XC749-B**

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 38 SPRING HILL ROAD  
 BETHEL, CT 06801  
 FAIRFIELD COUNTY

SHEET TITLE:  
**GROUNDING DETAILS**

SCALE: NONE

PROJECT NUMBER: 28746  
 SHEET NUMBER: E-2



### A/C PANEL SCHEDULE

VOLTAGE:	240V/120	PANEL STATUS:	EXISTING	N TO GROUND BOND:	YES
MAIN BREAKER:	200 AMP	MODEL NUMBER:	TBD	INTERNAL TVSS:	YES
MOUNT:	GROUND	PHASE:	1	WIRE:	3
ENCLOSURE TYPE:	NEMA 3R	BUSS RATING:	200 AMP	GROUND BAR:	YES
		NEUTRAL BAR:	YES		

CKT	DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	PHASE A VA	PHASE B VA	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	DESCRIPTION	CKT
1	SURGE ARRESTOR	60	2	ON			ON	1	10	FAN	13
2							ON	1	15	GFI	14
3	<b>NEW 2.5 CABINET</b>	<b>100</b>	<b>2</b>	<b>ON</b>			ON	2	100	BT5	15
4											16
5	BLANK (UNUSED)	-	-	-			ON	1	15	NID OUTLET	17
6	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	18
7	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	19
8	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	20
9	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	21
10	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	22
11	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	23
12	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	24

AC PANEL SCHEDULE  
 SCALE: NTS

**Sprint**

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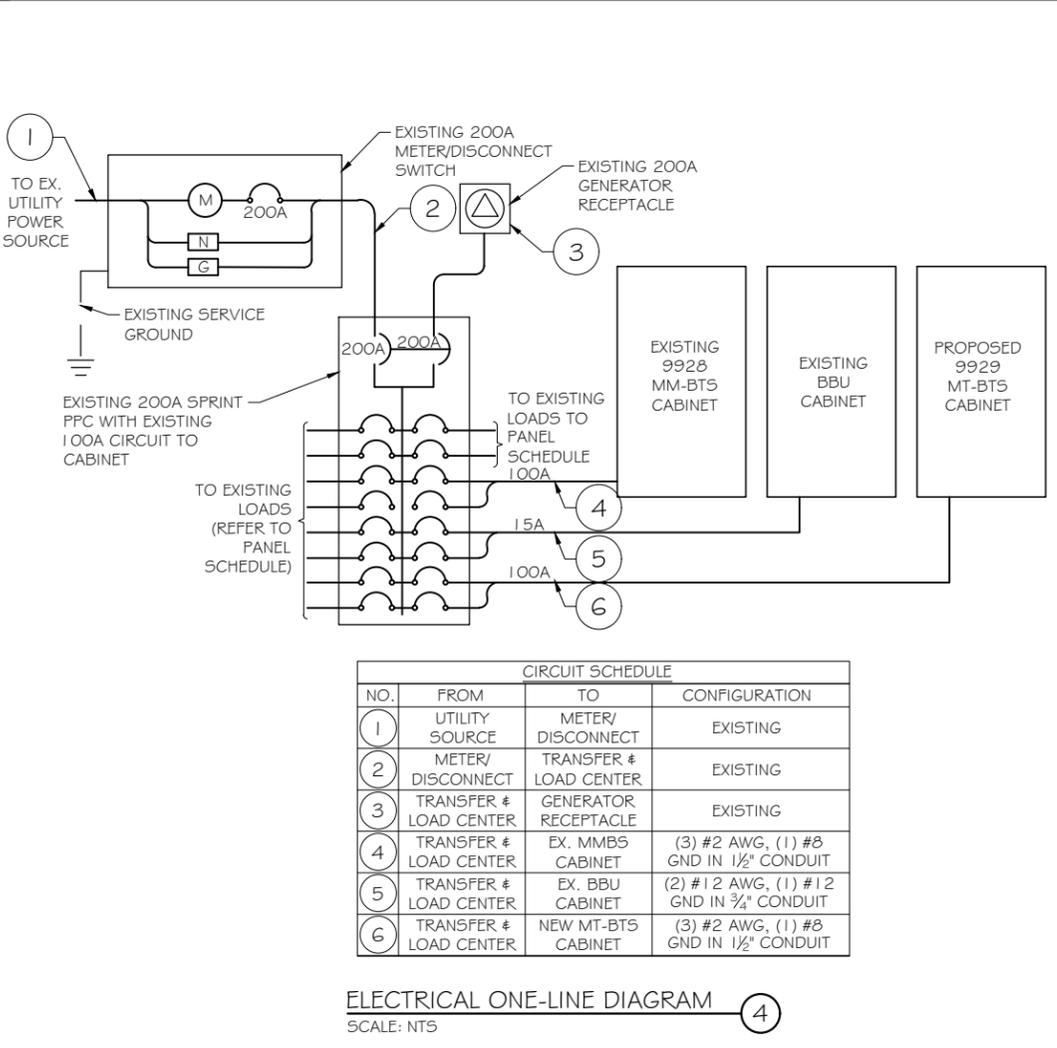
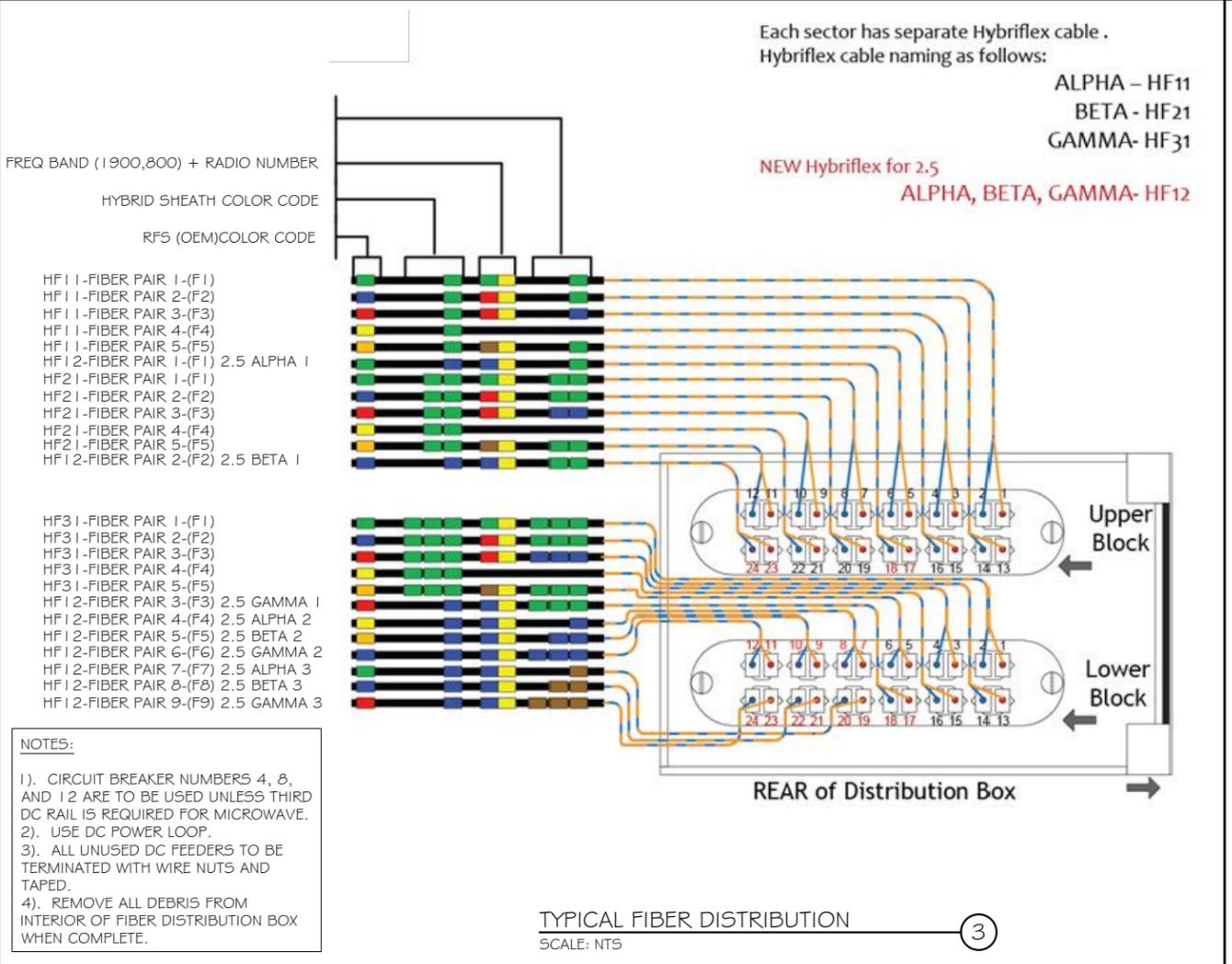
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STATE OF CONNECTICUT  
 JAMES R. SKOWRONSKI  
 26266  
 LICENSED PROFESSIONAL ENGINEER

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SHEET TITLE:  
**DC POWER DETAILS & PANEL SCHEDULES**

SCALE: NONE

PROJECT NUMBER: 28746  
 SHEET NUMBER: E-3