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

Chief James Simmons
Berlin Volunteer Fire Department
1657 Berlin Turnpike
Berlin, CT 06037

Re: Notice of Exempt Modification Application
1657 Berlin Turnpike

September 25, 2017

Dear Chief Simmons:

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 antennas and 3 remote radio units at the 150' level of the existing 175' Monopole tower, located behind the Berlin Volunteer Fire Department building. Sprint proposes to add 3 panel antennas and 3 remote radio units at 150' on the aforementioned tower.

This modification was initially approved on 10/26/2014 by CT Siting Council and a Berlin Building permit was issued on 9/22/2014, pursuant to this proposed modification. The 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

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

Hon. Mark Kaczynski
Berlin Town Hall
240 Kensington Road
Berlin, CT 06037

Re: Notice of Exempt Modification Application
1657 Berlin Turnpike

September 25, 2017

Dear Mayor Kaczynski:

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 antennas and 3 remote radio units at the 150' level of the existing 175' Monopole tower, located behind the Berlin Volunteer Fire Department building. Sprint proposes to add 3 panel antennas and 3 remote radio units at 150' on the aforementioned tower.

This modification was initially approved on 10/26/2014 by CT Siting Council and a Berlin Building permit was issued on 9/22/2014, pursuant to this proposed modification. The 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,

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917.841.0247
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

September 28, 2017

Re: Notice of Exempt Modification –
Existing Sprint Telecommunication Facility
1657 Berlin Turnpike
Berlin, CT 06037

Latitude : N41.60621
Longitude: W72.47968

Dear Ms. Bachman:

Sprint currently maintains three (3) existing telecommunications antennas, 3 tower mounted amplifiers, and associated equipment at the 150' level of an existing 175' Monopole Tower at 1657 Berlin Turnpike, Berlin, CT 06037. Sprint proposes to add three (3) new panel antennas and 3 pipe mounts, as well as (3) remote radio units. 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 Berlin on September 26. 2002. A copy of this approval is attached. The original CSC approval for Sprint's Tower Share was September 26, 2002, 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 Chief James Simmons the Chief of the Berlin Volunteer Fire Department, property owner and to Hon. Mark Kaczynski , Mayor of the Town of Berlin.
.
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 Stamford facility is located at 1657 Berlin Turnpike, Berlin, CT, the Site coordinates are: N41. 06021, W – 72.74968. The facility is owned by Berlin Volunteer Fire Department, 1657 Berlin Turnpike, Berlin, CT 06037. The existing facility consists of a 175' Monopole tower. Sprint currently operates wireless communications equipment on s steel platform at the facility and has three antennas mounted on the tower at a centerline of 150' 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

PFS/mtf

Additional Recipients:
Town of Berlin Mayor, Mark Kaczynski – Via Fed Ex
Berlin Volunteer Fire Department – James Simmons - Via Fed Ex

Town of Berlin, CT

Property Listing Report

Map Block Lot	22-1-141-17	Account	1101290

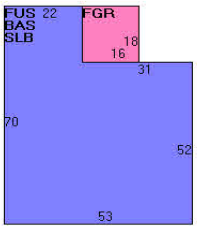
Property Information

Property Location	1657 BERLIN TPKE
Owner	BERLIN VOLUNTEER FIRE DEPT
Co-Owner	BERLIN FIREHOUSE
Mailing Address	1657 BERLIN TPKE BERLIN CT 06037
Land Use	903I Municipal MDL-96
Land Class	E
Zoning Code	BT-1
Census Tract	

Street Index	11
Acreage	0.23
Utilities	All Public
Lot Setting/Desc	Level
Additional Info	

Photo

Sketch



Primary Construction Details

Year Built	1946
Stories	2
Building Style	Other Municip
Building Use	Ind/Comm
Building Condition	C
Floors	Hardwood
Total Rooms	

Bedrooms	
Full Bathrooms	0
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	Mansard
Roof Cover	Rolled Compos

Exterior Walls	Brick Veneer
Interior Walls	Plaster/Drywal
Heating Type	Hot Air-no Duc
Heating Fuel	Oil/Gas
AC Type	Central
Gross Bldg Area	9744
Total Living Area	6304

Report Created On 9/25/2017

Town of Berlin, CT

Property Listing Report | Map Block Lot **22-1-141-17** | Account **1101290**

Valuation Summary

(Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	446900	312800
Extras	0	0
Improvements	464400	325100
Outbuildings	17500	12300
Land	78800	55200
Total	543200	380300

Outbuilding and Extra Items

Type	Description
Paving - Asphalt	5000 S.F.
Garage - Good	288 S.F.

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Upper Story, Finished	3152	3152
Slab	3152	0
First Floor	3152	3152
Garage, Attached	288	0
Total Area	9744	6304

Sales History

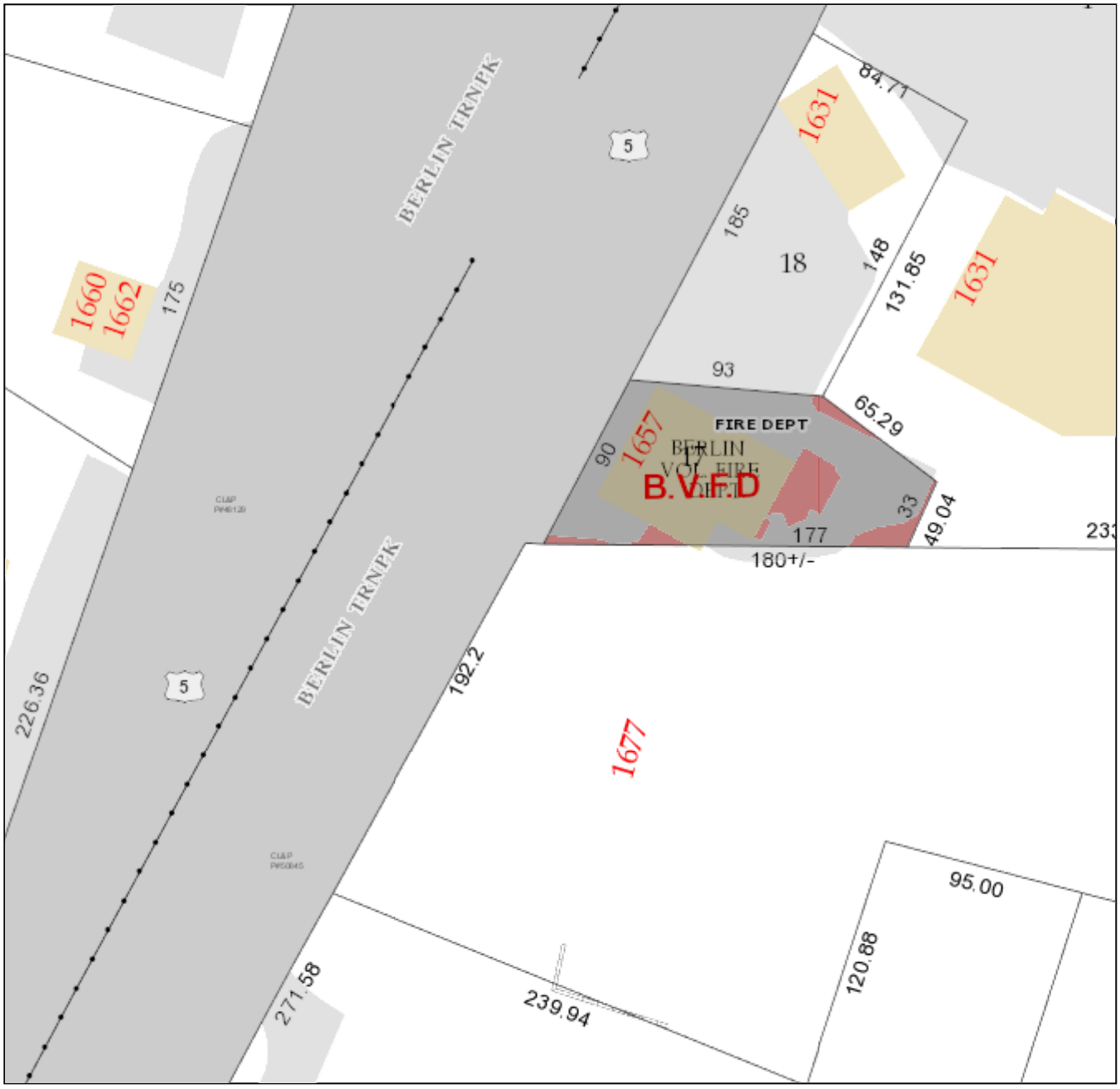
Owner of Record	Book/ Page	Sale Date	Sale Price
BERLIN VOLUNTEER FIRE DEPT	114/ 272	6/27/1956	0

Report Created On 9/25/2017

Town of Berlin

Geographic Information System (GIS)

Date Printed: 9/25/2017



MAP DISCLAIMER - NOTICE OF LIABILITY

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The Town of Berlin and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 75 feet

0 75 Feet

N W E S

October 2,2017

Dear Customer:

The following is the proof-of-delivery for tracking number **770385154484**.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	M.MATTHEWS	**Delivery location:**	TEN FRANKLIN SQUARE NEW BRITAIN, CT 06051
Service type:	FedEx Express Saver	**Delivery date:**	Oct 2, 2017 10:10
Special Handling:	Deliver Weekday Direct Signature Required		

Shipping Information:

Tracking number:	770385154484	**Ship date:**	Sep 29, 2017
		Weight:	1.0 lbs/0.5 kg

Recipient:
Ms. Melanie Bachman, Exec. Dir.
CT Siting Council
Ten Franklin Square
NEW BRITAIN, CT 06051 US

Shipper:
Paul Sagristano
Charles Cherundolo Consulting
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US

Reference
CT43XC846 - CSC Submission

Thank you for choosing FedEx.

PROP NO. 101290 PERMIT NO. B 3786

TOWN OF BERLIN

240 Kensington Road
Berlin, CT. 06037

Nicholas G. Chirico
(860) 828-7012

BUILDING PERMIT

LOCATION: 1657 WILBUR CROSS HWY
OWNER..... BERLIN VOLUNTEER FIRE DEPT
PERMIT ISSUED TO:

RED SPRINT PCS/ M. ROGAN
637 WILBUR CR HWY

BERLIN, CT. 06037
250-0350

TENANT:
HOME OWNER ADDRESS:

BERLIN VOLUNTEER FIRE DEPT
1657 WILBUR CR HWY

BERLIN, CT. 06037

Build (use#:	437	AAC NonRes	EST. VALUE:	0		Issue Date:	9/26/2002
Prop Type:	COMM	Commercial	BLDG PRMT:	B	3786	Application Date:	9/19/2002
Prop Class:	PRIV	Priv Owned					
Bldg Type:	41	Comm Tower					
Bldg Frame:	3	Metal Fr					
No. Buildings:	1						
No. Res/Units:	1						

Distance E Side:
Distance W Side:
Distance S Side:
Distance N Side:

Comments.....

INSTALLATION OF COMMUNICATION TOWER, RAISED STEEL DECK & RELATED EQUIPMENT, AT BERLIN FIRE DEPT. HEADQUARTERS.

Receipt.

TOTAL RECEIPTS:

TOTAL AMOUNT

Building Inspection Division

Inspector: Nicholas G. Chirico

Permission must be obtained from the Engineering Division before Building Material can be placed in the highway. Surface or subsurface drains, roof drains and sump pumps must not be connected with the sanitary sewer.

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT43XC846

Berlin/Rt 15/Fire Dept
1657 Wilbur Cross
Berlin, CT 06037

August 18, 2017

EBI Project Number: 6217003655

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	10.35 %

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

EBI Consulting
environmental | engineering | due diligence

August 18, 2017

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

Emissions Analysis for Site: **CT43XC846 – Berlin/Rt 15/Fire Dept**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **1657 Wilbur Cross, Berlin, 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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 ($\mu W/cm^2$). The general population exposure limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **1657 Wilbur Cross, Berlin, 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 APXVSPP18-C-A20 and RFS APXV9TM14-C-I20** 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 **150 feet** above ground level (AGL) for **Sector A**, **150 feet** above ground level (AGL) for **Sector B** and **150 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 #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 feet**
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%	**1.48 %**	Antenna B1 MPE%	**1.48 %**	Antenna C1 MPE%	**1.48 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APXV9TM14-C-I20	Make / Model:	RFS APXV9TM14-C-I20	Make / Model:	RFS APXV9TM14-C-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**150 feet**	Height (AGL):	**150 feet**	Height (AGL):	**150 feet**
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%	**1.08 %**	Antenna B2 MPE%	**1.08 %**	Antenna C2 MPE%	**1.08 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.56 %**
Police Channel	0.04 %
Fire Main	0.06 %
Fire Intercity	0.06 %
Highway	0.04 %
Fire Ground	0.01 %
SP Hotline	0.05 %
RAFS	0.01 %
960 Link	0.01 %
Clearwire	0.09 %
AT&T	1.65 %
T-Mobile	0.72 %
Verizon	5.05 %
Site Total MPE %:	**10.35 %**

SPRINT Sector A Total:	2.56 %
SPRINT Sector B Total:	2.56 %
SPRINT Sector C Total:	2.56 %
Site Total:	10.35 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	150	0.76	850 MHz	567	0.13%
Sprint 850 MHz LTE	2	437.55	150	1.52	850 MHz	567	0.27%
Sprint 1900 MHz (PCS) CDMA	5	622.47	150	5.40	1900 MHz (PCS)	1000	0.54%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	150	5.40	1900 MHz (PCS)	1000	0.54%
Sprint 2500 MHz (BRS) LTE	8	778.09	150	10.79	2500 MHz (BRS)	1000	1.08%
						Total:	**2.56%**

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:	2.56 %
Sector B:	2.56 %
Sector C:	2.56 %
SPRINT Maximum Total (per sector):	2.56 %
Site Total:	10.35 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **10.35 %** 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.

RAMAKER & ASSOCIATES, INC.

September 11, 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**
175-FOOT MONOPOLE TOWER

CARRIER: **SPRINT**

SITE: **BERLIN/RT15/FIRE DEPT (CT43XC846-A)**
1657 WILBUR CROSS
BERLIN, HARTFORD COUNTY, CONNECTICUT 06037
RAMAKER & ASSOCIATES PROJECT NUMBER: 28744

RESULTS:	**TOWER:**	**70.0%**	**PASS**
	FOUNDATION:		**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.

Thomas E. Moore
Project Engineer

James R. Skowronski, P.E.
Supervising Engineer

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
No. 26266
LICENSED
PROFESSIONAL ENGINEER

ANALYSIS CRITERIA

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Structure Class	II
Ultimate Design Wind Speed, V_{ult}	125 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	97 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	1 inch
Exposure Category	B
Topographic Category	1
Crest Height	N/A

SUPPORTING DOCUMENTATION

- Structural analysis by Destek, job number 1629028, dated 11/18/16
- Structural analysis by Destek, job number 1629028, dated 3/3/16
- Structural analysis by URS, Site name Berlin Fire Dept., dated 11/11/13
- Structural analysis by Tectonic, Site No. CT43XC846 (Sprint), dated 11/16/12
- Structural analysis by URS, Site No. CT-HFD0126A (Clearwire), dated 4/7/10
- Structural analysis by URS, Site name Berlin Fire Dept., dated 9/29/15
- Structural analysis by URS, Site No. CT-375 (AT&T), dated 10/18/02
- Construction drawings by RAMAKER, project number 28744
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

- The tower was not mapped, but all loading was provided by the latest AT&T filing (Destek analysis, dated 11/18/16) and confirmed by the landlord.

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
180	(1) 10' Omni (2) Scala MF-900B (2) 4' Omni (2) Motorola MTI1669/WB2900 (2) 20' Dipole	(1) LP Platform	(4) 7/8 (3) 1-1/4 (2) CAT5E	--	Existing
170	(3) Kathrein 800 10121 (3) CCI HPA-65R-BUU-H6 (6) Kathrein 860-10025 (6) Powerwave LGP21401 (6) Ericsson RRUS-11 (3) Ericsson RRUS-A2 (1) Raycap DC6-48-60-18-8F	(1) Platform w/Handrail	(6) 1-5/8 (1) Fiber (2) Power	AT&T	Existing
164.42	(1) 3' Dipole (1) 4' Grid Dish	(1) Standoff	(2) 7/8	--	Existing
163.25	(6) Ericsson KRC 118 057/1 (3) Andrew LNX-6515DS-VTM (3) Ericsson RRUS 11 B12 (3) 1710 TMA	(3) T-Arm	(12) 1-5/8 (1) Fiber	T-Mobile	Existing
153.83	**(3) RFS APXV9TM14-ALU-120**	(1) LP Platform	**(1) Fiber** (3) Hybrid	Sprint	**Proposed**
	(3) ALU TD-RRH8x20-25				
	(3) RFS APXVSPP18-C-A20				Existing
	(3) ALU 1900MHz 4x45W RRH				
	(3) ALU 800MHz 2x50W RRH				
	(2) Kathrein 840 10054B			Clearwire	**Remove**
	(1) Argus LLPX310R-V1				
	(3) Samsung RRH2WB0				
	(3) Andrew VHLP2-11		(4) 1/2		Existing
	(2) Andrew VHLP800-11				
135.75	(1) 10' Dipole (1) Motorola MTI1669	(1) Standoff	(1) 1/2 (1) CAT5E	--	Existing
115.92	(3) Antel BXA-171063-12CF-EDIN-X (3) Antel BXA-185060-12CF-EDIN-X (3) Andrew LNX-6514DS-T4M (3) Antel BXA-70063-6BF-EDIN-X (3) ALU RRH2x40-AWS	(1) LP Platform	(12) 1-5/8 (6) 1-5/8 (E) (1) Fiber (E)	Verizon	Existing
104.83	(1) 4' Grid Dish (1) 10' Dipole (1) Motorola MTI1669	(1) Standoff	(1) 1/2 (1) 7/8 (1) CAT5E	--	Existing
78.08	(1) GPS Antenna	(1) Standoff	(1) 1/2	--	Existing
35.25	(1) GPS Antenna	(1) Standoff	(1) 1/2	--	Existing

E = exterior mounted coax.

TOWER RESULTS

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

Component Type	Percent Capacity	Pass/Fail
Section 1	50.2	Pass
Section 2	68.0	Pass
Section 3	67.3	Pass
Section 4	62.4	Pass
Anchor Rod	70.0	Pass
Base Plate	53.4	Pass
RATING	**70.0**	**PASS**

Results of the analysis show that the existing tower will be stressed to a maximum of 70.0 percent of capacity. Therefore, the existing tower will pass the TIA-222-G analysis requirements under proposed loading conditions.

DISH TWIST/SWAY RESULTS

The twist/sway results for a 60 mph service wind speed are as follows:

Elevation	Dish	Deflection (in)	Tilt (deg)	Twist (deg)
180	MF-900B	26.365	1.3943	0.0113
164.42	4' Grid Dish	23.008	1.3400	0.0085
157.83	VHLP800-11	21.131	1.3065	0.0071
156.83	VHLP2-11	20.849	1.3011	0.0069
155.83	VHLP2-11	20.569	1.2957	0.0067
104.83	4' Grid Dish	8.648	0.8519	0.0022

FOUNDATION REACTIONS

The maximum tower reactions correlated to maximum moment are as follows:

Load Type	ASD Design	Modified ASD	Proposed Model
Axial (k)	49.6	67.0	59.8
Shear (k)	34.94	47.2	33.3
Moment (k-ft)	4306.5	5813.8	4259.9

The TIA-222-G code in Section 15.5.1 allows the original ASD design reactions to be multiplied by 1.35 when comparing them with reactions determined using the TIA-222-G code.

All proposed model foundation reactions are less than the modified ASD design reactions. Therefore, it was determined that the existing foundation will provide adequate strength 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

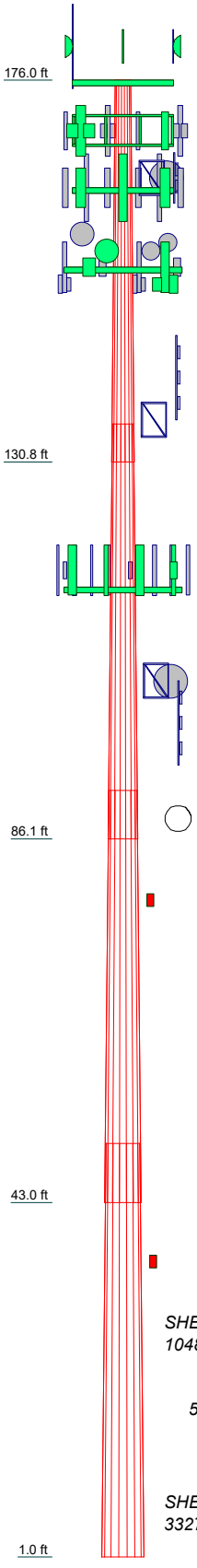
The tower owner is responsible for verifying that the existing loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication 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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	45.25	18	0.2500	4.50	21.0000	31.8000		3195.0
2	49.13	18	0.3125	5.75	30.2260	41.8200		5921.5
3	48.87	18	0.3750	7.00	39.8381	51.3600		8951.3
4	49.00	18	0.4375		48.9596	60.5000		12570.6
							A572-65	30638.4



ALL REACTIONS ARE FACTORED

AXIAL 113539 lb

SHEAR 10485 lb

MOMENT 1432

TORQUE 2292 lb-ft

50 mph WIND - 1.0000 in ICE

AXIAL 59831 lb

SHEAR 33272 lb

MOMENT 4259927 lb-ft

TORQUE 4910 lb-ft

REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10' x 2" Omni	176	1900MHz 4x45W RRH	153.83
4' x 1.5" Omni w/Mount Pipe	176	1900MHz 4x45W RRH	153.83
(2) MTI1669/WB2900	176	800MHz 2x50W RRH	153.83
4' x 2" Omni	176	800MHz 2x50W RRH	153.83
(2) 20' 4-Bay Dipole	176	800MHz 2x50W RRH	153.83
Valmont 13'-5" Platform	176	Valmont 13'-5" Platform (Sprint)	153.83
MF-900B	176	APXV9TM14-ALU-I20 w/Mount Pipe	153.83
MF-900B	176	APXV9TM14-ALU-I20 w/Mount Pipe	153.83
800 10121	170	APXV9TM14-ALU-I20 w/Mount Pipe	153.83
(2) 860-10025	170	VHLP2-11	153.83
(2) 860-10025	170	VHLP2-11	153.83
(2) 860-10025	170	VHLP2-11	153.83
HPA-65R-BUU-H6	170	VHLP800-11	153.83
HPA-65R-BUU-H6	170	VHLP800-11	153.83
HPA-65R-BUU-H6	170	10' Dipole	135.75
(2) LGP214nn	170	MTI1669	135.75
(2) LGP214nn	170	6' Standoff	135.75
(2) LGP214nn	170	LNX-6514DS-T4M w/Mount Pipe	115.92
RRUS-11 + RRUS-A2	170	BXA-70063-6BF-EDIN-X w/Mount Pipe	115.92
RRUS-11 + RRUS-A2	170	BXA-70063-6BF-EDIN-X w/Mount Pipe	115.92
RRUS-11 + RRUS-A2	170	BXA-70063-6BF-EDIN-X w/Mount Pipe	115.92
RRUS-11	170	RRH2x40-AWS	115.92
RRUS-11	170	RRH2x40-AWS	115.92
RRUS-11	170	RRH2x40-AWS	115.92
DC6-48-60-18-8F	170	Platform Mount [LP 304-1] (Verizon)	115.92
Platform Mount [LP 1301-1] (ATT)	170	BXA-185060-12CF-EDIN-X w/Mount Pipe	115.92
800 10121	170	LNX-6514DS-T4M w/Mount Pipe	115.92
800 10121	170	LNX-6514DS-T4M w/Mount Pipe	115.92
3' Dipole	164.42	BXA-171063-12CF-EDIN-X w/Mount Pipe	115.92
6' Standoff	164.42	BXA-171063-12CF-EDIN-X w/Mount Pipe	115.92
4' Grid Dish	164.42	BXA-171063-12CF-EDIN-X w/Mount Pipe	115.92
LNX-6515DS-VTM w/Mount Pipe	163.25	BXA-185060-12CF-EDIN-X w/Mount Pipe	115.92
LNX-6515DS-VTM w/Mount Pipe	163.25	BXA-185060-12CF-EDIN-X w/Mount Pipe	115.92
LNX-6515DS-VTM w/Mount Pipe	163.25	MTI1669	104.83
RRUS 11 B12	163.25	Side Arm Mount [SO 702-1]	104.83
RRUS 11 B12	163.25	10' Dipole	104.83
RRUS 11 B12	163.25	4' Grid Dish	104.83
1710 TMA	163.25	GPS	78.08
1710 TMA	163.25	Side Arm Mount [SO 301-1]	78.08
1710 TMA	163.25	GPS	35.25
T-Arm Mount [TA 602-3] (TMobile)	163.25	Side Arm Mount [SO 301-1]	35.25
(2) KRC 118 057/1 w/Mount Pipe	163.25		
(2) KRC 118 057/1 w/Mount Pipe	163.25		
(2) KRC 118 057/1 w/Mount Pipe	163.25		
TD-RRH8x20-25	153.83		
TD-RRH8x20-25	153.83		
TD-RRH8x20-25	153.83		
APXVSPP18-C-A20 w/Mount Pipe	153.83		
APXVSPP18-C-A20 w/Mount Pipe	153.83		
APXVSPP18-C-A20 w/Mount Pipe	153.83		
1900MHz 4x45W RRH	153.83		

MATERIAL STRENGTH

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

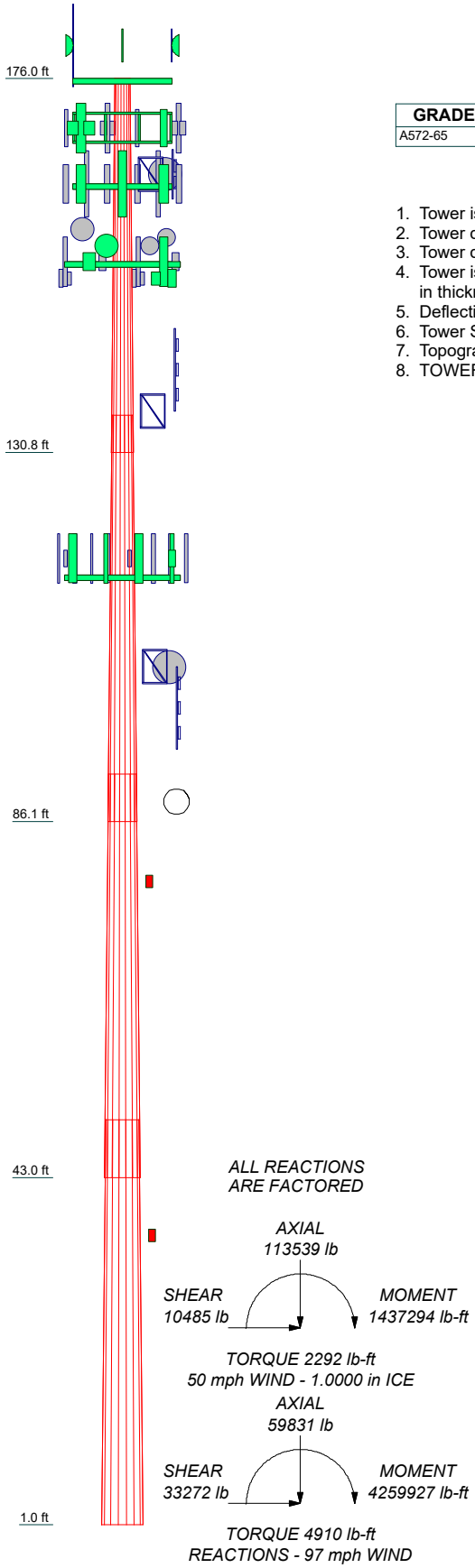
TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 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 1 with Crest Height of 0.00 ft
8. TOWER RATING: 70%

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

Job:	Berlin / RT15 / Fire Dept. (CT43XC846-A)		
Project:	28744		
Client:	Transcend Wireless / Sprint	Drawn by: TEM	App'd:
Code:	TIA-222-G	Date: 09/11/17	Scale: NTS
Path:	I:\28700\28744\Structural\TNX\28744 rev4.eri		Dwg No. E-1

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	45.25	18	0.2500	4.50	21.0000	31.8000	A572-65	3195.0
2	49.13	18	0.3125	5.75	30.2260	41.8200		5921.5
3	48.87	18	0.3750	7.00	39.8381	51.3600		8951.3
4	49.00	18	0.4375		48.9596	60.5000		12570.6
								30638.4



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 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 1 with Crest Height of 0.00 ft
8. TOWER RATING: 70%

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855 Community Drive
Sauk City, WI 53583
Phone: (608) 643-4100
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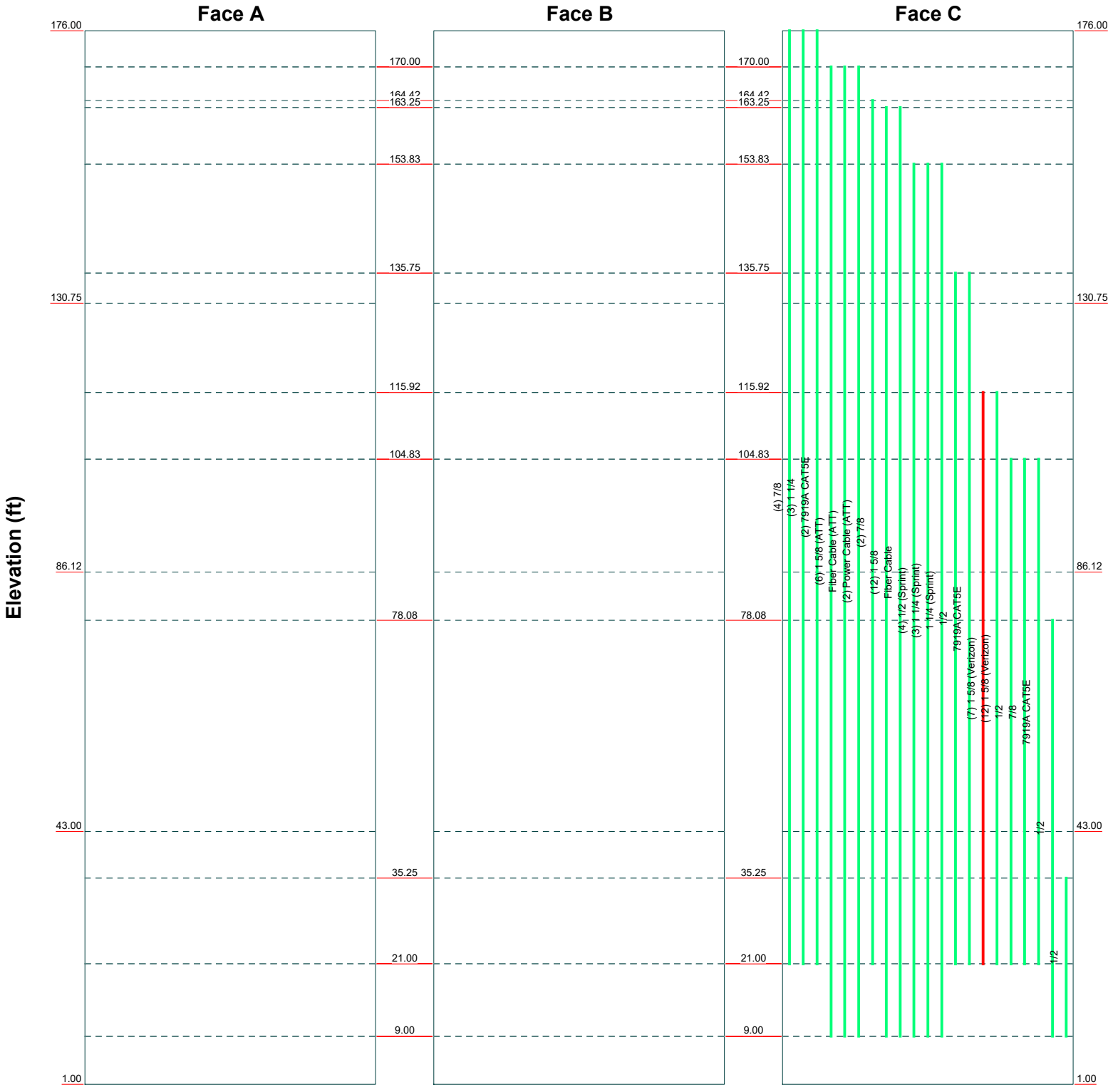
Job:	Berlin / RT15 / Fire Dept. (CT43XC846-A)
Project:	28744
Client: Transcend Wireless / Sprint	Drawn by: TEM / App'd:
Code: TIA-222-G	Date: 09/11/17 / Scale: NTS
Path: I:\28700\28744\Structural\TNX\28744 rev4.eri	Dwg No. E-1

Feed Line Distribution Chart
1' - 176'

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



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

Job:	***Berlin / RT15 / Fire Dept. (CT43XC846-A)***		
Project:	***28744***		
Client: Transcend Wireless / Sprint		Drawn by: TEM	App'd:
Code: TIA-222-G		Date: 09/11/17	Scale: NTS
Path: I:\28700\28744\Structural\TNX\28744 rev4.eri			Dwg No. E-7

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 Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 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	176.00-130.75	45.25	4.50	18	21.0000	31.8000	0.2500	1.0000	A572-65 (65 ksi)
L2	130.75-86.12	49.13	5.75	18	30.2260	41.8200	0.3125	1.2500	A572-65 (65 ksi)
L3	86.12-43.00	48.87	7.00	18	39.8381	51.3600	0.3750	1.5000	A572-65 (65 ksi)
L4	43.00-1.00	49.00		18	48.9596	60.5000	0.4375	1.7500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	21.3240	16.4651	895.6507	7.3663	10.6680	83.9568	1792.4800	8.2341	3.2560	13.024
	32.2906	25.0349	3148.3461	11.2003	16.1544	194.8909	6300.8349	12.5198	5.1568	20.627
L2	31.7706	29.6704	3354.2439	10.6193	15.3548	218.4493	6712.9014	14.8380	4.7698	15.263
	42.4651	41.1703	8961.3641	14.7352	21.2446	421.8192	17934.5198	20.5890	6.8103	21.793
L3	41.8292	46.9709	9241.6269	14.0094	20.2377	456.6531	18495.4142	23.4899	6.3515	16.937
	52.1523	60.6849	19929.7987	18.0997	26.0909	763.8607	39885.8215	30.3482	8.3794	22.345
L4	51.3890	67.3790	20042.0464	17.2254	24.8715	805.8240	40110.4646	33.6959	7.8469	17.936
	61.4333	83.4043	38013.0437	21.3222	30.7340	1236.8401	76076.1060	41.7101	9.8780	22.578

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 176.00-130.75				1	1	1			
L2 130.75-86.12				1	1	1			
L3 86.12-43.00				1	1	1			
L4 43.00-1.00				1	1	1			

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	18
Embedment length	24.0000 in
f'_c	4 ksi
Grout space	2.0000 in
Base plate grade	A572-60
Base plate thickness	2.0000 in
Bolt circle diameter	70.0000 in
Outer diameter	76.0000 in
Inner diameter	60.7500 in
Base plate type	Stiffened Plate
Bolts per stiffener	1
Stiffener thickness	0.5000 in
Stiffener height	12.0000 in

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
*********									
*********									
1 5/8	C	Surface Ar	115.92 - 21.00	7	5	0.000	1.9800		1.04
(Verizon)		(CaAa)				0.000			
*********									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*********								
7/8	C	No	Inside Pole	176.00 - 21.00	4	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
1 1/4	C	No	Inside Pole	176.00 - 21.00	3	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	0.66
7919A CAT5E	C	No	Inside Pole	176.00 - 21.00	2	No Ice	0.00	0.03
						1/2" Ice	0.00	0.03
						1" Ice	0.00	0.03
*********								
1 5/8	C	No	Inside Pole	170.00 - 9.00	6	No Ice	0.00	1.04
(ATT)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
Fiber Cable	C	No	Inside Pole	170.00 - 9.00	1	No Ice	0.00	0.17
(ATT)						1/2" Ice	0.00	0.17
						1" Ice	0.00	0.17
Power Cable	C	No	Inside Pole	170.00 - 9.00	2	No Ice	0.00	0.60
(ATT)						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
*********								
7/8	C	No	Inside Pole	164.42 - 21.00	2	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
*********								
1 5/8	C	No	Inside Pole	163.25 - 9.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
Fiber Cable	C	No	Inside Pole	163.25 - 9.00	1	No Ice	0.00	0.17
						1/2" Ice	0.00	0.17
						1" Ice	0.00	0.17
*********								
1/2	C	No	Inside Pole	153.83 - 9.00	4	No Ice	0.00	0.25
(Sprint)						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1 1/4	C	No	Inside Pole	153.83 - 9.00	3	No Ice	0.00	0.66
(Sprint)						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
1 1/4	C	No	Inside Pole	153.83 - 9.00	1	No Ice	0.00	0.66
(Sprint)						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
*********								
1/2	C	No	Inside Pole	135.75 - 21.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
7919A CAT5E	C	No	Inside Pole	135.75 - 21.00	1	No Ice	0.00	0.03
						1/2" Ice	0.00	0.03
						1" Ice	0.00	0.03
*********								
1 5/8	C	No	Inside Pole	115.92 - 21.00	12	No Ice	0.00	1.04
(Verizon)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
*********								
1/2	C	No	Inside Pole	104.83 - 21.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
7/8	C	No	Inside Pole	104.83 - 21.00	1	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
7919A CAT5E	C	No	Inside Pole	104.83 - 21.00	1	No Ice	0.00	0.03
						1/2" Ice	0.00	0.03
						1" Ice	0.00	0.03
*********								
1/2	C	No	Inside Pole	78.08 - 9.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
*********								

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1/2	C	No	Inside Pole	35.25 - 9.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
*********								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	176.00-130.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1021.64
L2	130.75-86.12	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	29.502	0.000	1918.99
L3	86.12-43.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	42.689	0.000	2166.49
L4	43.00-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	21.780	0.000	1402.74

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	176.00-130.75	A	2.330	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1021.64
L2	130.75-86.12	A	2.251	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	54.237	0.000	3139.07
L3	86.12-43.00	A	2.138	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	77.628	0.000	3874.98
L4	43.00-1.00	A	1.916	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	38.984	0.000	2233.36

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	176.00-130.75	0.0000	0.0000	0.0000	0.0000
L2	130.75-86.12	0.0000	0.9738	0.0000	1.2799
L3	86.12-43.00	0.0000	1.3172	0.0000	1.7026
L4	43.00-1.00	0.0000	0.7345	0.0000	1.0729

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	23	1 5/8	130.75 - 115.92	1.0000	1.0000
L2	23	1 5/8	86.12 - 115.92	1.0000	1.0000
L3	23	1 5/8	43.00 - 86.12	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
**********									
**********									
10' x 2" Omni	A	From Face	6.00	0.0000	176.00	No Ice	2.00	2.00	30.00
			0.00			1/2" Ice	3.02	3.02	45.50
			4.00			1" Ice	4.07	4.07	67.47
4' x 1.5" Omni w/Mount Pipe	B	From Face	6.00	0.0000	176.00	No Ice	0.94	0.94	22.30
			0.00			1/2" Ice	1.39	1.39	32.81
			4.00			1" Ice	1.78	1.78	46.94
(2) MTI1669/WB2900	C	From Face	6.00	0.0000	176.00	No Ice	1.90	1.90	50.00
			0.00			1/2" Ice	2.17	2.17	70.00
			4.00			1" Ice	2.44	2.44	90.00
4' x 2" Omni	C	From Face	6.00	0.0000	176.00	No Ice	0.79	0.79	5.00
			0.00			1/2" Ice	1.03	1.03	11.34
			4.00			1" Ice	1.28	1.28	20.48
(2) 20' 4-Bay Dipole	C	From Face	6.00	0.0000	176.00	No Ice	4.00	4.00	55.00
			0.00			1/2" Ice	6.00	6.00	100.00
			4.00			1" Ice	8.00	8.00	145.00
Valmont 13'-5" Platform	C	None		0.0000	176.00	No Ice	18.43	18.43	1759.00
						1/2" Ice	22.32	22.32	2143.00
						1" Ice	26.21	26.21	2527.00
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800 10121	A	From Face	4.00	0.0000	170.00	No Ice	5.16	3.29	50.70
			-5.00			1/2" Ice	5.51	3.64	83.61
			0.00			1" Ice	5.87	3.99	121.29
800 10121	B	From Face	4.00	0.0000	170.00	No Ice	5.16	3.29	50.70
			-5.00			1/2" Ice	5.51	3.64	83.61
			0.00			1" Ice	5.87	3.99	121.29
800 10121	C	From Face	4.00	0.0000	170.00	No Ice	5.16	3.29	50.70
			-5.00			1/2" Ice	5.51	3.64	83.61
			0.00			1" Ice	5.87	3.99	121.29
(2) 860-10025	A	From Face	4.00	0.0000	170.00	No Ice	0.12	0.10	1.16
			-5.00			1/2" Ice	0.17	0.15	2.52
			0.00			1" Ice	0.23	0.20	4.75

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) 860-10025	B	From Face	4.00 -5.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	0.12 0.17 0.23	0.10 0.15 0.20	1.16 2.52 4.75
(2) 860-10025	C	From Face	4.00 -5.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	0.12 0.17 0.23	0.10 0.15 0.20	1.16 2.52 4.75
HPA-65R-BUU-H6	A	From Face	4.00 5.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	9.66 10.13 10.61	5.52 5.97 6.43	51.00 109.43 174.17
HPA-65R-BUU-H6	B	From Face	4.00 5.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	9.66 10.13 10.61	5.52 5.97 6.43	51.00 109.43 174.17
HPA-65R-BUU-H6	C	From Face	4.00 5.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	9.66 10.13 10.61	5.52 5.97 6.43	51.00 109.43 174.17
(2) LGP214nn	A	From Face	4.00 0.00 0.00	0.0000	170.00	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	B	From Face	4.00 0.00 0.00	0.0000	170.00	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	C	From Face	4.00 0.00 0.00	0.0000	170.00	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-11 + RRUS-A2	A	From Face	4.00 6.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	3.02 3.24 3.46	125.00 159.53 197.82
RRUS-11 + RRUS-A2	B	From Face	4.00 6.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	3.02 3.24 3.46	125.00 159.53 197.82
RRUS-11 + RRUS-A2	C	From Face	4.00 6.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	3.02 3.24 3.46	125.00 159.53 197.82
RRUS-11	A	From Face	4.00 4.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.71 71.49 95.32
RRUS-11	B	From Face	4.00 4.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.71 71.49 95.32
RRUS-11	C	From Face	4.00 4.00 0.00	0.0000	170.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	50.71 71.49 95.32
DC6-48-60-18-8F	C	None		0.0000	170.00	No Ice 1/2" Ice 1" Ice	0.92 1.46 1.64	0.92 1.46 1.64	32.80 50.52 70.72
Platform Mount [LP 1301-1] (ATT)	C	None		0.0000	170.00	No Ice 1/2" Ice 1" Ice	51.70 62.70 73.70	51.70 62.70 73.70	2262.00 2935.00 3608.00
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3' Dipole	B	From Face	6.00 0.00 0.00	0.0000	164.42	No Ice 1/2" Ice 1" Ice	1.00 1.25 1.50	1.00 1.25 1.50	10.00 20.00 30.00
6' Standoff	B	From Face	3.00 0.00 0.00	0.0000	164.42	No Ice 1/2" Ice 1" Ice	4.97 6.12 7.27	4.97 6.12 7.27	70.00 130.00 190.00
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Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
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(2) KRC 118 057/1 w/Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	7.33 7.78 8.22	5.84 6.58 7.28	130.08 193.22 263.24
(2) KRC 118 057/1 w/Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	7.33 7.78 8.22	5.84 6.58 7.28	130.08 193.22 263.24
(2) KRC 118 057/1 w/Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	7.33 7.78 8.22	5.84 6.58 7.28	130.08 193.22 263.24
LNX-6515DS-VTM w/Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	11.64 12.36 13.08	9.84 11.36 12.90	83.12 172.54 271.91
LNX-6515DS-VTM w/Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	11.64 12.36 13.08	9.84 11.36 12.90	83.12 172.54 271.91
LNX-6515DS-VTM w/Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	11.64 12.36 13.08	9.84 11.36 12.90	83.12 172.54 271.91
RRUS 11 B12	A	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	50.70 71.57 95.49
RRUS 11 B12	B	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	50.70 71.57 95.49
RRUS 11 B12	C	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	50.70 71.57 95.49
1710 TMA	A	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	1.23 1.38 1.54	0.27 0.38 0.50	15.00 21.42 29.65
1710 TMA	B	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	1.23 1.38 1.54	0.27 0.38 0.50	15.00 21.42 29.65
1710 TMA	C	From Face	4.00 0.00 0.00	0.0000	163.25	No Ice 1/2" Ice 1" Ice	1.23 1.38 1.54	0.27 0.38 0.50	15.00 21.42 29.65
T-Arm Mount [TA 602-3] (TMobile)	C	None		0.0000	163.25	No Ice 1/2" Ice 1" Ice	11.59 15.44 19.29	11.59 15.44 19.29	774.30 990.35 1206.41
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APXV9TM14-ALU-I20 w/Mount Pipe	A	From Face	4.00 5.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	7.21 7.77 8.31	5.03 5.89 6.63	77.02 132.43 194.59
APXV9TM14-ALU-I20 w/Mount Pipe	B	From Face	4.00 5.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	7.21 7.77 8.31	5.03 5.89 6.63	77.02 132.43 194.59
APXV9TM14-ALU-I20 w/Mount Pipe	C	From Face	4.00 5.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	7.21 7.77 8.31	5.03 5.89 6.63	77.02 132.43 194.59
TD-RRH8x20-25	A	From Face	4.00 4.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70.00 97.14 127.80
TD-RRH8x20-25	B	From Face	4.00 4.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70.00 97.14 127.80

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
TD-RRH8x20-25	C	From Face	4.00 4.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	70.00 97.14 127.80
APXVSPP18-C-A20 w/Mount Pipe	A	From Face	4.00 -5.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	8.31 8.87 9.40	6.95 8.13 9.03	82.55 150.82 227.06
APXVSPP18-C-A20 w/Mount Pipe	B	From Face	4.00 -5.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	8.31 8.87 9.40	6.95 8.13 9.03	82.55 150.82 227.06
APXVSPP18-C-A20 w/Mount Pipe	C	From Face	4.00 -5.00 0.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	8.31 8.87 9.40	6.95 8.13 9.03	82.55 150.82 227.06
1900MHz 4x45W RRH	A	From Face	4.00 -6.00 -2.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x45W RRH	B	From Face	4.00 -6.00 -2.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.62 108.98
1900MHz 4x45W RRH	C	From Face	4.00 -6.00 -2.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	59.50 82.62 108.98
800MHz 2x50W RRH	A	From Face	4.00 -4.00 -2.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
800MHz 2x50W RRH	B	From Face	4.00 -4.00 -2.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
800MHz 2x50W RRH	C	From Face	4.00 -4.00 -2.00	0.0000	153.83	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	64.00 86.12 111.30
Valmont 13'-5" Platform (Sprint)	C	None		0.0000	153.83	No Ice 1/2" Ice 1" Ice	18.43 22.32 26.21	18.43 22.32 26.21	1759.00 2143.00 2527.00
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10' Dipole	B	From Face	6.00 0.00 5.00	0.0000	135.75	No Ice 1/2" Ice 1" Ice	3.00 4.03 5.03	3.00 4.03 5.03	30.00 51.79 80.14
MTI1669	B	From Face	2.00 0.00 0.00	0.0000	135.75	No Ice 1/2" Ice 1" Ice	1.40 1.56 1.72	0.70 0.82 0.94	5.00 15.34 25.68
6' Standoff	B	From Face	3.00 0.00 0.00	0.0000	135.75	No Ice 1/2" Ice 1" Ice	4.97 6.12 7.27	4.97 6.12 7.27	70.00 130.00 190.00
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BXA-171063-12CF-EDIN-X w/Mount Pipe	A	From Face	4.00 -6.00 2.00	0.0000	115.92	No Ice 1/2" Ice 1" Ice	5.03 5.58 6.10	5.29 6.46 7.34	38.35 84.33 137.75
BXA-171063-12CF-EDIN-X w/Mount Pipe	B	From Face	4.00 -6.00 2.00	0.0000	115.92	No Ice 1/2" Ice 1" Ice	5.03 5.58 6.10	5.29 6.46 7.34	38.35 84.33 137.75
BXA-171063-12CF-EDIN-X w/Mount Pipe	C	From Face	4.00 -6.00 2.00	0.0000	115.92	No Ice 1/2" Ice 1" Ice	5.03 5.58 6.10	5.29 6.46 7.34	38.35 84.33 137.75
BXA-185060-12CF-EDIN-X w/Mount Pipe	A	From Face	4.00 2.00	0.0000	115.92	No Ice 1/2" Ice	5.03 5.58	5.29 6.46	38.35 84.33

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			2.00			1" Ice	6.10	7.34	137.75
BXA-185060-12CF-EDIN-X w/Mount Pipe	B	From Face	4.00	0.0000	115.92	No Ice	5.03	5.29	38.35
			2.00			1/2" Ice	5.58	6.46	84.33
			2.00			1" Ice	6.10	7.34	137.75
BXA-185060-12CF-EDIN-X w/Mount Pipe	C	From Face	4.00	0.0000	115.92	No Ice	5.03	5.29	38.35
			2.00			1/2" Ice	5.58	6.46	84.33
			2.00			1" Ice	6.10	7.34	137.75
LNX-6514DS-T4M w/Mount Pipe	A	From Face	4.00	0.0000	115.92	No Ice	8.41	7.08	64.16
			-2.00			1/2" Ice	8.97	8.27	133.31
			2.00			1" Ice	9.50	9.18	210.50
LNX-6514DS-T4M w/Mount Pipe	B	From Face	4.00	0.0000	115.92	No Ice	8.41	7.08	64.16
			-2.00			1/2" Ice	8.97	8.27	133.31
			2.00			1" Ice	9.50	9.18	210.50
LNX-6514DS-T4M w/Mount Pipe	C	From Face	4.00	0.0000	115.92	No Ice	8.41	7.08	64.16
			-2.00			1/2" Ice	8.97	8.27	133.31
			2.00			1" Ice	9.50	9.18	210.50
BXA-70063-6BF-EDIN-X w/Mount Pipe	A	From Face	4.00	0.0000	115.92	No Ice	7.88	6.28	44.75
			6.00			1/2" Ice	8.44	7.45	108.14
			2.00			1" Ice	8.96	8.33	179.33
BXA-70063-6BF-EDIN-X w/Mount Pipe	B	From Face	4.00	0.0000	115.92	No Ice	7.88	6.28	44.75
			6.00			1/2" Ice	8.44	7.45	108.14
			2.00			1" Ice	8.96	8.33	179.33
BXA-70063-6BF-EDIN-X w/Mount Pipe	C	From Face	4.00	0.0000	115.92	No Ice	7.88	6.28	44.75
			6.00			1/2" Ice	8.44	7.45	108.14
			2.00			1" Ice	8.96	8.33	179.33
RRH2x40-AWS	A	From Face	3.00	0.0000	115.92	No Ice	2.16	1.42	44.00
			-6.00			1/2" Ice	2.36	1.59	61.40
			2.00			1" Ice	2.57	1.77	81.69
RRH2x40-AWS	B	From Face	3.00	0.0000	115.92	No Ice	2.16	1.42	44.00
			-6.00			1/2" Ice	2.36	1.59	61.40
			2.00			1" Ice	2.57	1.77	81.69
RRH2x40-AWS	C	From Face	3.00	0.0000	115.92	No Ice	2.16	1.42	44.00
			-6.00			1/2" Ice	2.36	1.59	61.40
			2.00			1" Ice	2.57	1.77	81.69
Platform Mount [LP 304-1] (Verizon)	C	None		0.0000	115.92	No Ice	17.46	17.46	1349.00
						1/2" Ice	22.44	22.44	1624.58
						1" Ice	27.42	27.42	1900.16
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10' Dipole	B	From Face	6.00	0.0000	104.83	No Ice	3.00	3.00	30.00
			0.00			1/2" Ice	4.03	4.03	51.79
			-5.00			1" Ice	5.03	5.03	80.14
MTI1669	B	From Face	2.00	0.0000	104.83	No Ice	1.40	0.70	5.00
			0.00			1/2" Ice	1.56	0.82	15.34
			0.00			1" Ice	1.72	0.94	25.68
Side Arm Mount [SO 702-1]	B	From Face	3.00	0.0000	104.83	No Ice	1.00	1.43	27.00
			0.00			1/2" Ice	1.25	2.05	38.00
			0.00			1" Ice	1.50	2.67	49.00
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GPS	B	From Face	2.00	0.0000	78.08	No Ice	1.00	1.00	10.00
			0.00			1/2" Ice	1.50	1.50	15.00
			0.00			1" Ice	2.00	2.00	20.00
Side Arm Mount [SO 301-1]	B	From Face	1.00	0.0000	78.08	No Ice	1.00	0.90	23.00
			0.00			1/2" Ice	1.39	1.42	32.57
			0.00			1" Ice	1.78	1.94	42.14
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Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
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GPS	B	From Face	2.00 0.00 0.00	0.0000	35.25	No Ice 1/2" Ice 1" Ice	1.00 1.50 2.00	1.00 1.50 2.00	10.00 15.00 20.00
Side Arm Mount [SO 301-1]	B	From Face	1.00 0.00 0.00	0.0000	35.25	No Ice 1/2" Ice 1" Ice	1.00 1.39 1.78	0.90 1.42 1.94	23.00 32.57 42.14
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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight lb
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MF-900B	B	Grid	From Leg	6.00 0.00 4.00	0.0000		176.00	2.66	No Ice 1/2" Ice 1" Ice	5.55 5.90 6.25	13.00 44.67 76.34
MF-900B	C	Grid	From Leg	6.00 0.00 4.00	0.0000		176.00	2.66	No Ice 1/2" Ice 1" Ice	5.55 5.90 6.25	13.00 44.67 76.34
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4' Grid Dish	B	Grid	From Face	5.00 0.00 0.00	0.0000		164.42	4.00	No Ice 1/2" Ice 1" Ice	12.57 13.10 13.63	51.00 118.20 185.40
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VHLP2-11	B	Paraboloid w/Shroud (HP)	From Face	4.00 2.00 3.00	0.0000		153.83	2.17	No Ice 1/2" Ice 1" Ice	3.69 3.98 4.27	23.80 44.38 64.96
VHLP2-11	B	Paraboloid w/Shroud (HP)	From Face	4.00 -2.00 2.00	0.0000		153.83	2.17	No Ice 1/2" Ice 1" Ice	3.69 3.98 4.27	23.80 44.38 64.96
VHLP2-11	C	Paraboloid w/Shroud (HP)	From Face	4.00 2.00 2.00	0.0000		153.83	2.17	No Ice 1/2" Ice 1" Ice	3.69 3.98 4.27	23.80 44.38 64.96
VHLP800-11	A	Paraboloid w/Shroud (HP)	From Face	4.00 -1.00 4.00	0.0000		153.83	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46	48.00 76.00 104.00
VHLP800-11	C	Paraboloid w/Shroud (HP)	From Face	4.00 2.00 2.00	0.0000		153.83	2.92	No Ice 1/2" Ice 1" Ice	6.68 7.07 7.46	48.00 76.00 104.00
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4' Grid Dish	B	Grid	From Face	5.00 0.00 0.00	0.0000		104.83	4.00	No Ice 1/2" Ice 1" Ice	12.57 13.10 13.63	51.00 118.20 185.40
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Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	30638.40					
Bracing Weight	0.00					
Total Member Self-Weight	30638.40			1975.23	-1611.06	
Total Weight	49858.84			1975.23	-1611.06	
Wind 0 deg - No Ice		82.51	-20459.30	-2494831.53	-12593.56	2951.44
Wind 30 deg - No Ice		10280.80	-17810.77	-2173150.74	-1255929.52	2617.48
Wind 60 deg - No Ice		17808.80	-10340.59	-1261611.17	-2175674.92	2006.06
Wind 90 deg - No Ice		20789.86	-9.91	1987.74	-2528969.73	1158.43
Wind 120 deg - No Ice		17729.75	10176.69	1243947.36	-2165958.42	-721.43
Wind 150 deg - No Ice		10197.81	17583.62	2145628.84	-1245833.49	-2297.78
Wind 180 deg - No Ice		-67.45	20405.34	2490712.26	7352.70	-3076.27
Wind 210 deg - No Ice		-10310.91	17769.23	2170577.33	1257576.84	-2969.64
Wind 240 deg - No Ice		-17811.88	10319.38	1262931.98	2173653.63	-2166.47
Wind 270 deg - No Ice		-20794.76	93.24	15561.30	2526435.50	-846.03
Wind 300 deg - No Ice		-17682.63	-10189.86	-1241532.91	2155603.75	723.11
Wind 330 deg - No Ice		-10089.72	-17675.83	-2155098.52	1227173.01	2222.88
Member Ice	19769.11					
Total Weight Ice	101395.52			10392.66	-9591.33	
Wind 0 deg - Ice		37.71	-10303.42	-1229018.90	-15033.11	1915.44
Wind 30 deg - Ice		5189.62	-8928.05	-1062126.32	-635661.71	2124.11
Wind 60 deg - Ice		8976.89	-5199.49	-615923.43	-1090546.67	1492.76
Wind 90 deg - Ice		10335.77	-37.95	3397.28	-1253635.54	560.58
Wind 120 deg - Ice		8955.07	5058.89	614531.93	-1088715.17	-462.75
Wind 150 deg - Ice		5095.09	8813.98	1066710.59	-620504.02	-1298.84
Wind 180 deg - Ice		-285.29	10328.13	1250834.45	29466.10	-1462.27
Wind 210 deg - Ice		-5349.78	8913.37	1080509.08	636413.03	-1311.19
Wind 240 deg - Ice		-9109.64	5191.66	633098.26	1090806.77	-1430.37
Wind 270 deg - Ice		-10438.75	148.06	29274.21	1248455.31	-1190.40
Wind 300 deg - Ice		-9117.74	-4951.39	-581705.90	1090212.37	-152.45
Wind 330 deg - Ice		-5121.29	-8839.98	-1049901.73	606666.18	1075.45
Total Weight	49858.84			1975.23	-1611.06	
Wind 0 deg - Service		28.25	-7003.98	-854252.68	-5370.78	1010.39
Wind 30 deg - Service		3519.50	-6097.29	-744129.32	-431011.19	896.06
Wind 60 deg - Service		6096.62	-3539.97	-432075.23	-745874.44	686.75
Wind 90 deg - Service		7117.15	-3.39	501.94	-866820.47	396.57
Wind 120 deg - Service		6069.56	3483.86	425671.18	-742548.12	-246.97
Wind 150 deg - Service		3491.09	6019.53	734350.47	-427554.94	-786.62
Wind 180 deg - Service		-23.09	6985.51	852485.43	1457.57	-1053.12
Wind 210 deg - Service		-3529.81	6083.07	742891.27	429456.06	-1016.62
Wind 240 deg - Service		-6097.67	3532.71	432170.32	743063.41	-741.66
Wind 270 deg - Service		-7118.82	31.92	5148.68	863833.83	-289.63
Wind 300 deg - Service		-6053.43	-3488.37	-425201.69	736884.25	247.55
Wind 330 deg - Service		-3454.09	-6051.10	-737949.37	419047.69	760.97

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

Comb. No.	Description
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
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	176 - 130.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42195.09	-6319.71	-4211.44
			Max. Mx	8	-15330.48	-523478.35	-1829.56
			Max. My	14	-15366.14	404.72	-517603.27
			Max. Vy	20	-18956.01	521508.56	-3800.58
			Max. Vx	2	-18865.72	-2741.98	516827.08

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Torque	8			-4618.08
L2	130.75 - 86.12	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-65760.21	-11092.25	-5041.88
			Max. Mx	8	-26866.34	-1519016.34	-2644.85
			Max. My	2	-26895.60	-7891.74	1505672.65
			Max. Vy	20	-26473.69	1515819.80	-10166.14
			Max. Vx	2	-26239.49	-7891.74	1505672.65
			Max. Torque	16			4605.71
L3	86.12 - 43	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-85881.38	-11941.48	-9490.22
			Max. Mx	8	-40053.32	-2703835.74	-2832.36
			Max. My	2	-40077.08	-13807.08	2675192.93
			Max. Vy	20	-30019.76	2700688.27	-17437.84
			Max. Vx	2	-29522.77	-13807.08	2675192.93
			Max. Torque	14			4743.31
L4	43 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-113538.57	-12348.27	-12674.19
			Max. Mx	8	-59809.99	-4259926.62	-2636.61
			Max. My	2	-59810.59	-20534.91	4204498.39
			Max. Vy	20	-33308.65	4256895.51	-25473.44
			Max. Vx	2	-32771.45	-20534.91	4204498.39
			Max. Torque	14			4912.87

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	30	113538.57	-10335.78	37.95
	Max. H_x	21	44872.96	33271.62	-149.19
	Max. H_z	3	44872.96	-132.02	32734.87
	Max. M_x	2	4204498.39	-132.02	32734.87
	Max. M_z	8	4259926.62	-33263.78	15.86
	Max. Torsion	14	4910.47	107.91	-32648.55
	Min. Vert	13	44872.96	-16316.50	-28133.79
	Min. H_x	9	44872.96	-33263.78	15.86
	Min. H_z	15	44872.96	107.91	-32648.55
	Min. M_x	14	-4196015.53	107.91	-32648.55
	Min. M_z	20	-4256895.51	33271.62	-149.19
	Min. Torsion	2	-4709.77	-132.02	32734.87

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	49858.84	0.00	0.00	2026.13	-1649.72	0.16
1.2 Dead+1.6 Wind 0 deg - No Ice	59830.61	132.02	-32734.87	-4204498.39	-20534.04	4709.77
0.9 Dead+1.6 Wind 0 deg - No Ice	44872.96	132.02	-32734.87	-4147757.81	-19741.52	4701.05
1.2 Dead+1.6 Wind 30 deg - No Ice	59830.61	16449.28	-28497.22	-3662434.58	-2115454.91	4264.78
0.9 Dead+1.6 Wind 30 deg - No Ice	44872.96	16449.28	-28497.22	-3613088.20	-2086080.29	4235.52
1.2 Dead+1.6 Wind 60 deg - No Ice	59830.61	28494.08	-16544.94	-2126533.24	-3665219.16	3335.38
0.9 Dead+1.6 Wind 60 deg - No Ice	44872.96	28494.08	-16544.94	-2098147.42	-3614678.10	3293.89

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
1.2 Dead+1.6 Wind 90 deg - No Ice	59830.61	33263.78	-15.86	2636.24	-4259926.62	1975.52
0.9 Dead+1.6 Wind 90 deg - No Ice	44872.96	33263.78	-15.86	1942.23	-4201413.85	1933.42
1.2 Dead+1.6 Wind 120 deg - No Ice	59830.61	28367.61	16282.70	2095303.10	-3649031.09	-1045.58
0.9 Dead+1.6 Wind 120 deg - No Ice	44872.96	28367.61	16282.70	2066048.80	-3598680.69	-1077.74
1.2 Dead+1.6 Wind 150 deg - No Ice	59830.61	16316.50	28133.79	3614644.23	-2098623.18	-3598.10
0.9 Dead+1.6 Wind 150 deg - No Ice	44872.96	16316.50	28133.79	3564664.60	-2069449.74	-3612.09
1.2 Dead+1.6 Wind 180 deg - No Ice	59830.61	-107.91	32648.55	4196015.53	13032.79	-4910.47
0.9 Dead+1.6 Wind 180 deg - No Ice	44872.96	-107.91	32648.55	4138115.46	13378.97	-4902.01
1.2 Dead+1.6 Wind 210 deg - No Ice	59830.61	-16497.46	28430.76	3656472.42	2119600.29	-4806.64
0.9 Dead+1.6 Wind 210 deg - No Ice	44872.96	-16497.46	28430.76	3605947.68	2091196.68	-4778.09
1.2 Dead+1.6 Wind 240 deg - No Ice	59830.61	-28499.02	16511.01	2127164.06	3663146.12	-3562.73
0.9 Dead+1.6 Wind 240 deg - No Ice	44872.96	-28499.02	16511.01	2097497.66	3613667.52	-3522.03
1.2 Dead+1.6 Wind 270 deg - No Ice	59830.61	-33271.62	149.19	25473.16	4256895.51	-1480.25
0.9 Dead+1.6 Wind 270 deg - No Ice	44872.96	-33271.62	149.19	24476.81	4199483.17	-1437.94
1.2 Dead+1.6 Wind 300 deg - No Ice	59830.61	-28292.21	-16303.78	-2092780.93	3632806.37	1028.66
0.9 Dead+1.6 Wind 300 deg - No Ice	44872.96	-28292.21	-16303.78	-2064849.05	3583748.70	1060.95
1.2 Dead+1.6 Wind 330 deg - No Ice	59830.61	-16143.56	-28281.33	-3632148.59	2068422.74	3465.73
0.9 Dead+1.6 Wind 330 deg - No Ice	44872.96	-16143.56	-28281.33	-3583209.80	2040718.13	3479.47
1.2 Dead+1.0 Ice+1.0 Temp	113538.57	0.00	0.00	12674.19	-12348.27	5.09
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	113538.57	37.71	-10303.43	-1400484.93	-18674.79	1967.17
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	113538.57	5189.62	-8928.05	-1209930.39	-726513.33	2291.57
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	113538.57	8976.89	-5199.50	-701388.90	-1245069.06	1722.05
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	113538.57	10335.78	-37.95	4518.94	-1431039.47	788.85
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	113538.57	8955.07	5058.89	701221.55	-1243189.80	-290.80
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	113538.57	5095.09	8813.98	1216963.46	-708907.56	-1221.36
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	113538.57	-285.29	10328.14	1426879.08	32101.80	-1514.49
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	113538.57	-5349.78	8913.37	1232700.10	724044.18	-1467.25
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	113538.57	-9109.64	5191.66	722415.12	1242549.61	-1641.48
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	113538.57	-10438.76	148.06	34061.86	1422087.68	-1408.80
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	113538.57	-9117.74	-4951.39	-662334.55	1241626.23	-325.49
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	113538.57	-5121.29	-8839.98	-1195969.66	690390.05	999.62
Dead+Wind 0 deg - Service	49858.84	28.25	-7003.98	-891231.19	-5657.19	1017.12
Dead+Wind 30 deg - Service	49858.84	3519.50	-6097.29	-776137.84	-450507.90	917.10
Dead+Wind 60 deg - Service	49858.84	6096.62	-3539.97	-449993.51	-779596.76	716.11
Dead+Wind 90 deg - Service	49858.84	7117.15	-3.39	2130.44	-905899.81	425.85
Dead+Wind 120 deg - Service	49858.84	6069.56	3483.86	446490.12	-776135.88	-225.39
Dead+Wind 150 deg - Service	49858.84	3491.09	6019.53	769093.23	-446911.67	-777.72
Dead+Wind 180 deg - Service	49858.84	-23.09	6985.51	892555.14	1470.91	-1059.70
Dead+Wind 210 deg - Service	49858.84	-3529.81	6083.07	778011.17	448793.61	-1036.73
Dead+Wind 240 deg - Service	49858.84	-6097.67	3532.71	453273.38	776570.39	-769.61
Dead+Wind 270 deg - Service	49858.84	-7118.82	31.92	6979.40	902677.96	-318.65
Dead+Wind 300 deg - Service	49858.84	-6053.43	-3488.37	-442816.76	770107.44	225.39
Dead+Wind 330 deg - Service	49858.84	-3454.09	-6051.10	-769683.78	437915.56	751.86

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	0.00	-49858.84	0.00	-0.00	49858.84	-0.00	0.000%
2	132.02	-59830.61	-32734.87	-132.02	59830.61	32734.87	0.000%
3	132.02	-44872.96	-32734.87	-132.02	44872.96	32734.87	0.000%
4	16449.28	-59830.61	-28497.22	-16449.28	59830.61	28497.22	0.000%
5	16449.28	-44872.96	-28497.22	-16449.28	44872.96	28497.22	0.000%
6	28494.08	-59830.61	-16544.94	-28494.08	59830.61	16544.94	0.000%
7	28494.08	-44872.96	-16544.94	-28494.08	44872.96	16544.94	0.000%
8	33263.78	-59830.61	-15.86	-33263.78	59830.61	15.86	0.000%
9	33263.78	-44872.96	-15.86	-33263.78	44872.96	15.86	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
10	28367.61	-59830.61	16282.70	-28367.61	59830.61	-16282.70	0.000%
11	28367.61	-44872.96	16282.70	-28367.61	44872.96	-16282.70	0.000%
12	16316.50	-59830.61	28133.79	-16316.50	59830.61	-28133.79	0.000%
13	16316.50	-44872.96	28133.79	-16316.50	44872.96	-28133.79	0.000%
14	-107.91	-59830.61	32648.55	107.91	59830.61	-32648.55	0.000%
15	-107.91	-44872.96	32648.55	107.91	44872.96	-32648.55	0.000%
16	-16497.46	-59830.61	28430.76	16497.46	59830.61	-28430.76	0.000%
17	-16497.46	-44872.96	28430.76	16497.46	44872.96	-28430.76	0.000%
18	-28499.02	-59830.61	16511.01	28499.02	59830.61	-16511.01	0.000%
19	-28499.02	-44872.96	16511.01	28499.02	44872.96	-16511.01	0.000%
20	-33271.62	-59830.61	149.19	33271.62	59830.61	-149.19	0.000%
21	-33271.62	-44872.96	149.19	33271.62	44872.96	-149.19	0.000%
22	-28292.21	-59830.61	-16303.78	28292.21	59830.61	16303.78	0.000%
23	-28292.21	-44872.96	-16303.78	28292.21	44872.96	16303.78	0.000%
24	-16143.56	-59830.61	-28281.33	16143.56	59830.61	28281.33	0.000%
25	-16143.56	-44872.96	-28281.33	16143.56	44872.96	28281.33	0.000%
26	0.00	-113538.57	0.00	-0.00	113538.57	-0.00	0.000%
27	37.71	-113538.57	-10303.42	-37.71	113538.57	10303.43	0.000%
28	5189.62	-113538.57	-8928.05	-5189.62	113538.57	8928.05	0.000%
29	8976.89	-113538.57	-5199.49	-8976.89	113538.57	5199.50	0.000%
30	10335.77	-113538.57	-37.95	-10335.78	113538.57	37.95	0.000%
31	8955.07	-113538.57	5058.89	-8955.07	113538.57	-5058.89	0.000%
32	5095.09	-113538.57	8813.98	-5095.09	113538.57	-8813.98	0.000%
33	-285.29	-113538.57	10328.13	285.29	113538.57	-10328.14	0.000%
34	-5349.78	-113538.57	8913.37	5349.78	113538.57	-8913.37	0.000%
35	-9109.64	-113538.57	5191.66	9109.64	113538.57	-5191.66	0.000%
36	-10438.75	-113538.57	148.06	10438.76	113538.57	-148.06	0.000%
37	-9117.74	-113538.57	-4951.39	9117.74	113538.57	4951.39	0.000%
38	-5121.29	-113538.57	-8839.98	5121.29	113538.57	8839.98	0.000%
39	28.25	-49858.84	-7003.98	-28.25	49858.84	7003.98	0.000%
40	3519.50	-49858.84	-6097.29	-3519.50	49858.84	6097.29	0.000%
41	6096.62	-49858.84	-3539.97	-6096.62	49858.84	3539.97	0.000%
42	7117.15	-49858.84	-3.39	-7117.15	49858.84	3.39	0.000%
43	6069.56	-49858.84	3483.86	-6069.56	49858.84	-3483.86	0.000%
44	3491.09	-49858.84	6019.53	-3491.09	49858.84	-6019.53	0.000%
45	-23.09	-49858.84	6985.51	23.09	49858.84	-6985.51	0.000%
46	-3529.81	-49858.84	6083.07	3529.81	49858.84	-6083.07	0.000%
47	-6097.67	-49858.84	3532.71	6097.67	49858.84	-3532.71	0.000%
48	-7118.82	-49858.84	31.92	7118.82	49858.84	-31.92	0.000%
49	-6053.43	-49858.84	-3488.37	6053.43	49858.84	3488.37	0.000%
50	-3454.09	-49858.84	-6051.10	3454.09	49858.84	6051.10	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176 - 130.75	26.365	42	1.3943	0.0113
L2	135.25 - 86.12	15.119	42	1.1576	0.0033
L3	91.87 - 43	6.482	42	0.7127	0.0017
L4	50 - 1	1.799	42	0.3387	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	MF-900B	42	26.365	1.3943	0.0113	43997
176.00	10' x 2" Omni	42	26.365	1.3943	0.0113	43997
170.00	800 10121	42	24.620	1.3666	0.0098	36664
164.42	4' Grid Dish	42	23.008	1.3400	0.0085	18997
163.25	(2) KRC 118 057/1 w/Mount Pipe	42	22.673	1.3343	0.0082	17253
157.83	VHLP800-11	42	21.131	1.3065	0.0071	12106
156.83	VHLP2-11	42	20.849	1.3011	0.0069	11475
155.83	VHLP2-11	42	20.569	1.2957	0.0067	10906
153.83	APXV9TM14-ALU-I20 w/Mount Pipe	42	20.011	1.2846	0.0063	9922
135.75	10' Dipole	42	15.242	1.1617	0.0039	5556
115.92	BXA-171063-12CF-EDIN-X w/Mount Pipe	42	10.778	0.9719	0.0027	5642
104.83	4' Grid Dish	42	8.648	0.8519	0.0022	5790
78.08	GPS	42	4.550	0.5767	0.0013	5964
35.25	GPS	42	0.969	0.2299	0.0004	8508

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	176 - 130.75	123.978	8	6.5637	0.0528
L2	135.25 - 86.12	71.131	8	5.4508	0.0156
L3	91.87 - 43	30.503	8	3.3555	0.0077
L4	50 - 1	8.463	8	1.5942	0.0028

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	MF-900B	8	123.978	6.5637	0.0528	9576
176.00	10' x 2" Omni	8	123.978	6.5637	0.0528	9576
170.00	800 10121	8	115.782	6.4335	0.0458	7980
164.42	4' Grid Dish	8	108.207	6.3086	0.0394	4133
163.25	(2) KRC 118 057/1 w/Mount Pipe	8	106.630	6.2816	0.0381	3753
157.83	VHLP800-11	8	99.384	6.1511	0.0329	2632
156.83	VHLP2-11	8	98.061	6.1259	0.0320	2495
155.83	VHLP2-11	8	96.743	6.1003	0.0312	2371
153.83	APXV9TM14-ALU-I20 w/Mount Pipe	8	94.123	6.0479	0.0294	2156
135.75	10' Dipole	8	71.710	5.4701	0.0179	1203
115.92	BXA-171063-12CF-EDIN-X w/Mount Pipe	8	50.714	4.5766	0.0126	1213
104.83	4' Grid Dish	8	40.695	4.0113	0.0104	1241
78.08	GPS	8	21.410	2.7151	0.0060	1272
35.25	GPS	8	4.557	1.0818	0.0018	1808

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual / Allowable Ratio Bolt Tension lb	Actual / Allowable Ratio Bolt Compression lb	Actual / Allowable Ratio Plate Stress ksi	Actual / Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
2.0000	18	2.2500	156494.73 223654.40 0.70	163140.28 371266.30 0.44	27.636 54.000 0.51	28.812 54.000 0.53	Bolt T	0.70 ✔

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	176 - 130.75 (1)	TP31.8x21x0.25	45.25	0.00	0.0	24.1827	-15330.50	1698250.00	0.009
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	49.13	0.00	0.0	39.8244	-26866.30	2747890.00	0.010
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	48.87	0.00	0.0	58.7205	-40053.30	4018070.00	0.010
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	49.00	0.00	0.0	83.4043	-59810.00	5618130.00	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	176 - 130.75 (1)	TP31.8x21x0.25	523481.67	1063908.33	0.492	0.00	1063908.33	0.000
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	1519016.67	2268908.33	0.669	0.00	2268908.33	0.000
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	2703833.33	4077308.33	0.663	0.00	4077308.33	0.000
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	4259925.00	6942808.00	0.614	0.00	6942808.00	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	176 - 130.75 (1)	TP31.8x21x0.25	18950.80	849124.00	0.022	4611.64	2130416.67	0.002
L2	130.75 - 86.12 (2)	TP41.82x30.226x0.3125	26467.90	1373950.00	0.019	2206.19	4543366.67	0.000
L3	86.12 - 43 (3)	TP51.36x39.8381x0.375	30013.00	2009040.00	0.015	2080.84	8164591.33	0.000
L4	43 - 1 (4)	TP60.5x48.9596x0.4375	33300.80	2809060.00	0.012	1975.52	13902582.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $P_u / \phi P_n$	Ratio $M_{ux} / \phi M_{nx}$	Ratio $M_{uy} / \phi M_{ny}$	Ratio $V_u / \phi V_n$	Ratio $T_u / \phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	176 - 130.75 (1)	0.009	0.492	0.000	0.022	0.002	0.502 ✔	1.000	4.8.2 ✔
L2	130.75 - 86.12 (2)	0.010	0.669	0.000	0.019	0.000	0.680 ✔	1.000	4.8.2 ✔
L3	86.12 - 43 (3)	0.010	0.663	0.000	0.015	0.000	0.673 ✔	1.000	4.8.2 ✔
L4	43 - 1 (4)	0.011	0.614	0.000	0.012	0.000	0.624 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	176 - 130.75	Pole	TP31.8x21x0.25	1	-15330.50	1698250.00	50.2	Pass
L2	130.75 - 86.12	Pole	TP41.82x30.226x0.3125	2	-26866.30	2747890.00	68.0	Pass
L3	86.12 - 43	Pole	TP51.36x39.8381x0.375	3	-40053.30	4018070.00	67.3	Pass
L4	43 - 1	Pole	TP60.5x48.9596x0.4375	4	-59810.00	5618130.00	62.4	Pass
							Summary	
						Pole (L2)	68.0	Pass
						Base Plate	70.0	Pass
						RATING =	**70.0**	**Pass**

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PROJECT: DO MACRO UPGRADE

SITE NAME: BERLIN/RT 15/FIRE DEPT

SITE CASCADE: CT43XC846-A

SITE ADDRESS: 1657 WILBUR CROSS
BERLIN, CT 06037

SITE TYPE: 175'-0" MONOPOLE

SITE INFORMATION

PROPERTY OWNER:
BERLIN VOLUNTEER FIRE DEPT
1657 BERLIN TURNPIKE
BERLIN, CT 08037
PH.:(860)828-7000

SITE ADDRESS:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

GEOGRAPHIC COORDINATES:
LATITUDE: 41.606217°, 41° 36' 22.3812" N
LONGITUDE: -72.749686°, 72° 44' 58.869" W

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL

ZONING DISTRICT:
BT-1 BERLIN TURNPIKE

POWER COMPANY:
CONN. LIGHT AND POWER
PH.: (800) 286-2000

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

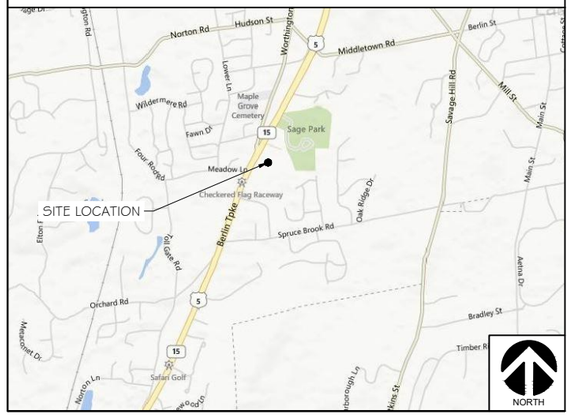
SPRINT CONSTRUCTION MANAGER:
NAME: MIKE DELIA
PHONE: (781)316-6348
E-MAIL: michael.delia@sprint.com

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

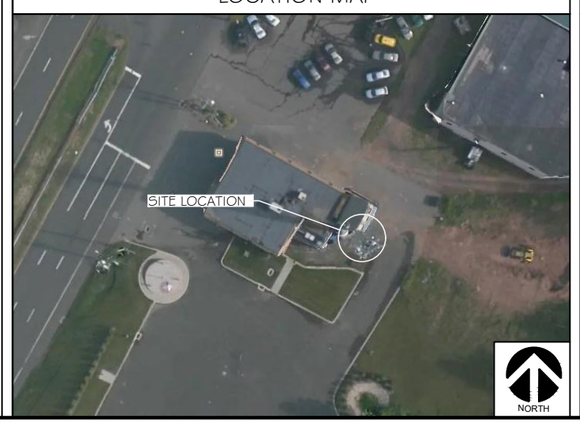
SITE ACQUISITION:
CHARLES CHERUNDOLO CONSULTING, INC.
1280 RT. 46 WEST
PARSIPPANY, NJ 07054
CONTACT: TOM JUPIN, PMP, PROJECT MANAGER
CELL: (973) 819-9033
EMAIL: tom.jupin@cherundoloconsulting.com

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 2.5 EQUIPMENT IN EXISTING BTS CABINET
  *(1) RECTIFIER SHELF AND (3) RECTIFIERS
  *(1) BASE BAND UNIT
- INSTALL NEW BATTERY STRING IN EXISTING BATTERY CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRH'S ON TOWER
- INSTALL (1) FIBER CABLE AND (2) 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

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SHEET INDEX

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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	1	JRS
A-4	RF DATA SHEET	1	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
E-1	EQUIPMENT UTILITY & GROUNDING PLAN	-	JRS
E-2	GROUNDING DETAILS	-	JRS
E-3	DC POWER DETAILS & PANEL SCHEDULES	-	JRS

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RAMAKER & ASSOCIATES, INC.
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.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 9/12/2017 Date:

MARK	DATE	DESCRIPTION
1	9/12/17	REVISED TOWER LOADING

ISSUE PHASE: FINAL DATE ISSUED: 7/21/2017

PROJECT TITLE:
BERLIN/RT 15/FIRE DEPT
SITE#:CT43XC846-A

PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
TITLE SHEET

SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: T-1

DRAWN BY: TJN CHECKED BY: KAB

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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-2012-001: (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)
S. 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 IT'S 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/FEES:
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 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 (OFIC) 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, AASJTO, AND OTHER METHODS IS NEEDED.
B. REQUIRED THIRD PARTY TESTS:
   1. SITE RESISTANCE TO EARTH TEST PER NP-312-201
   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.

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
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.

STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: Date: 9/12/2017

MARK	DATE	DESCRIPTION
1	9/12/17	REVISED TOWER LOADING

ISSUE PHASE: FINAL DATE ISSUED: 7/21/2017

PROJECT TITLE:
BERLIN/RT 15/FIRE DEPT
SITE#:CT43XC846-A

PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: SP-1

DRAWN BY: TJN CHECKED BY: KAB

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 ANTENNA(S); 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, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRU'S 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 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRU'S 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 RADII.

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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www.Ramaker.com

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Certification & Seal:
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STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED PROFESSIONAL ENGINEER

Signature: Date: 9/12/2017

MARK	DATE	DESCRIPTION
1	9/12/17	REVISED TOWER LOADING

ISSUE PHASE: FINAL DATE ISSUED: 7/21/2017

PROJECT TITLE:

BERLIN/RT15/FIRE DEPT
SITE#:CT43XC846-A

PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:

SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: SP-2

I:\28700\28744\CAD\Sprint Macro Upgrade\28744 Sprint Macro Upgrade CD.dwg Printed by: cfoley on Sep 12, 2017 - 3:26pm

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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STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: 9/12/2017 Date:

MARK	DATE	DESCRIPTION
1	9/12/17	REVISED TOWER LOADING

ISSUE PHASE: FINAL
DATE ISSUED: 7/21/2017

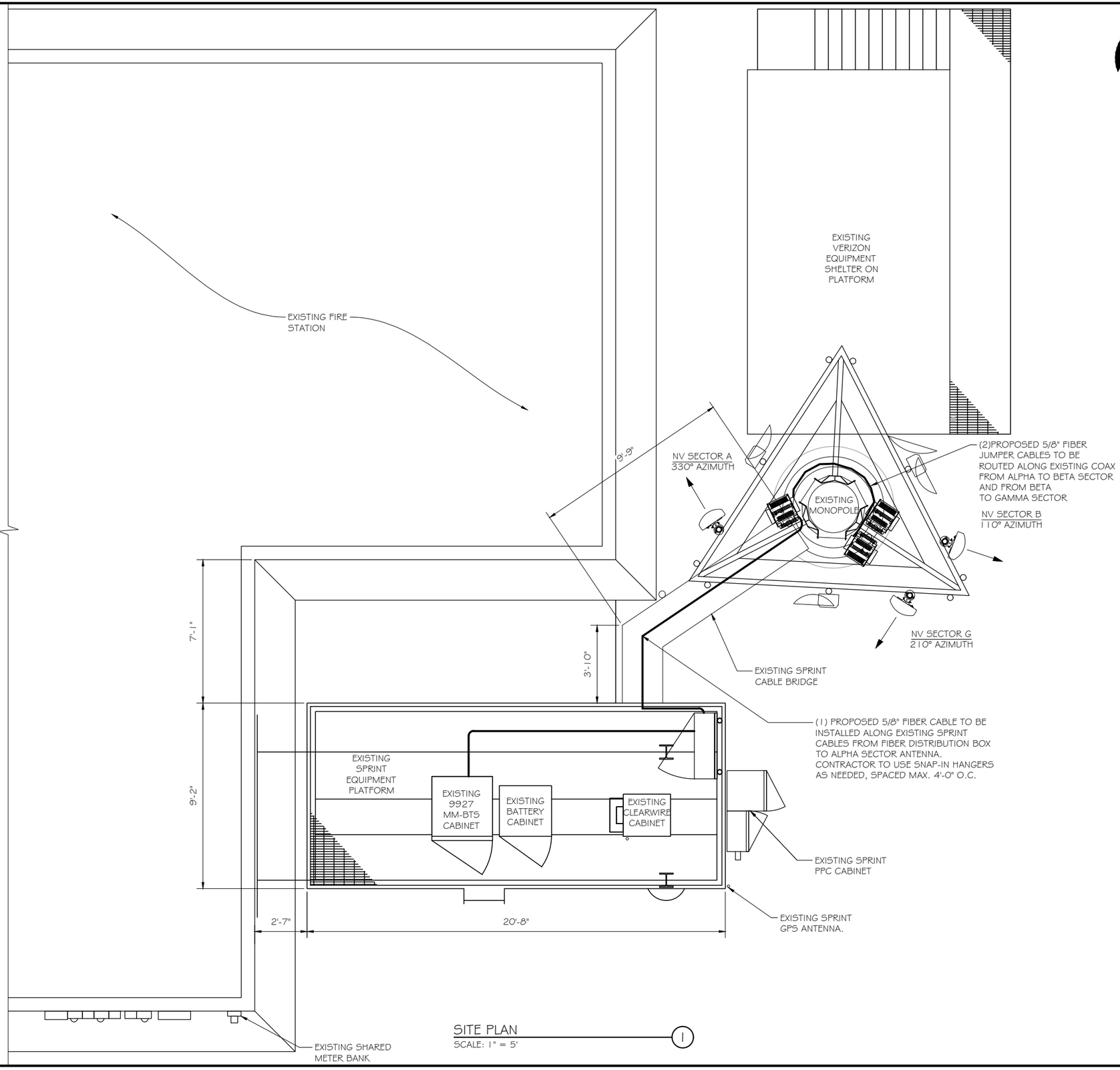
PROJECT TITLE:
BERLIN/RT 15/FIRE DEPT
SITE#:CT43XC846-A

PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: SP-3



SITE PLAN
SCALE: 1" = 5'

1

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BERLIN/RT 15/FIRE DEPT
SITE#:CT43XC846-A

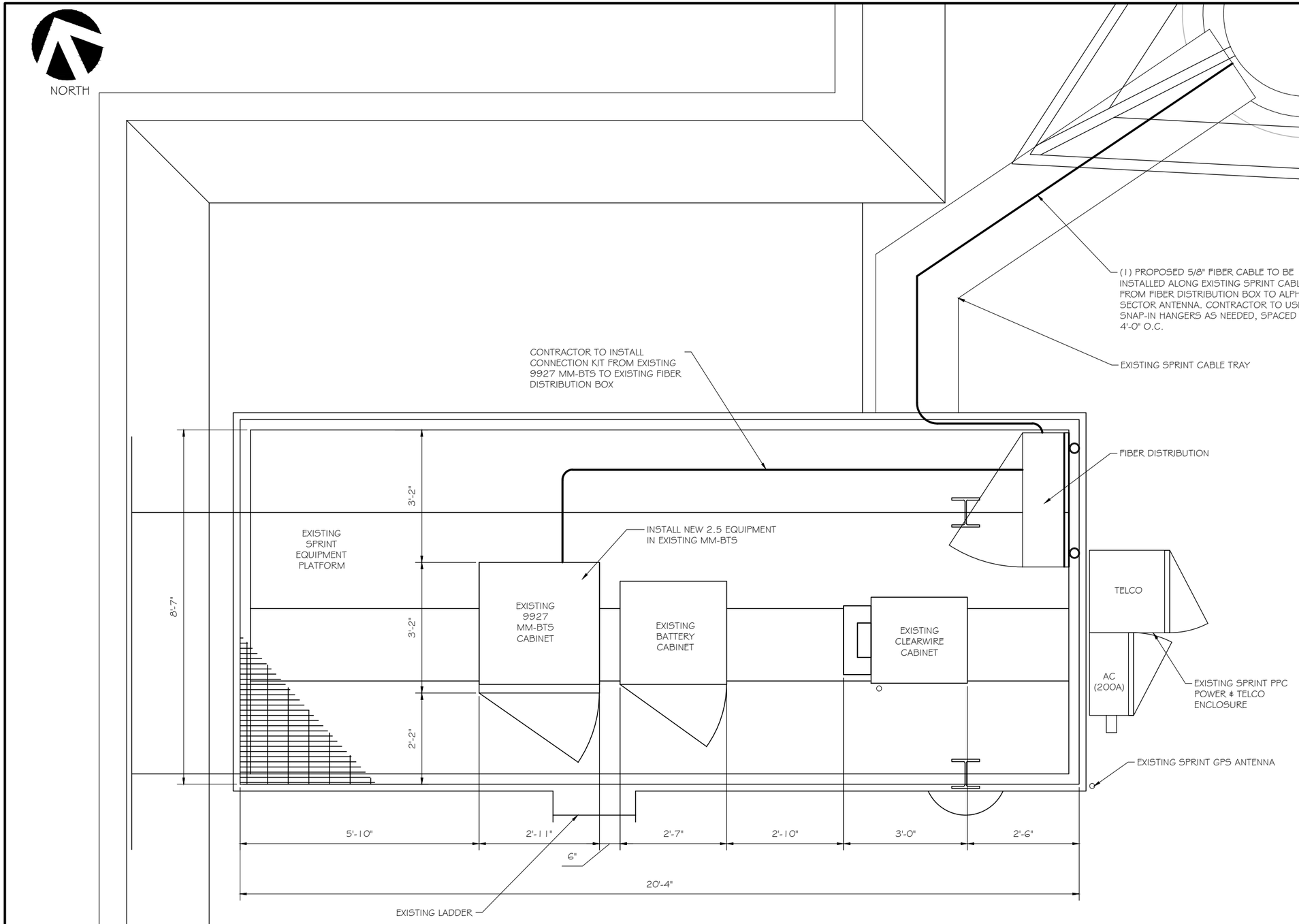
PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
SITE PLAN

0 2.5' 5' 10'
11" x 17" - 1" = 5'
22" x 34" - 1" = 2.5'

PROJECT NUMBER: 28744
SHEET NUMBER: A-1

NORTH



EQUIPMENT PLAN
SCALE: 1" = 2.5'

(1)

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SITE#:CT43XC846-A

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1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

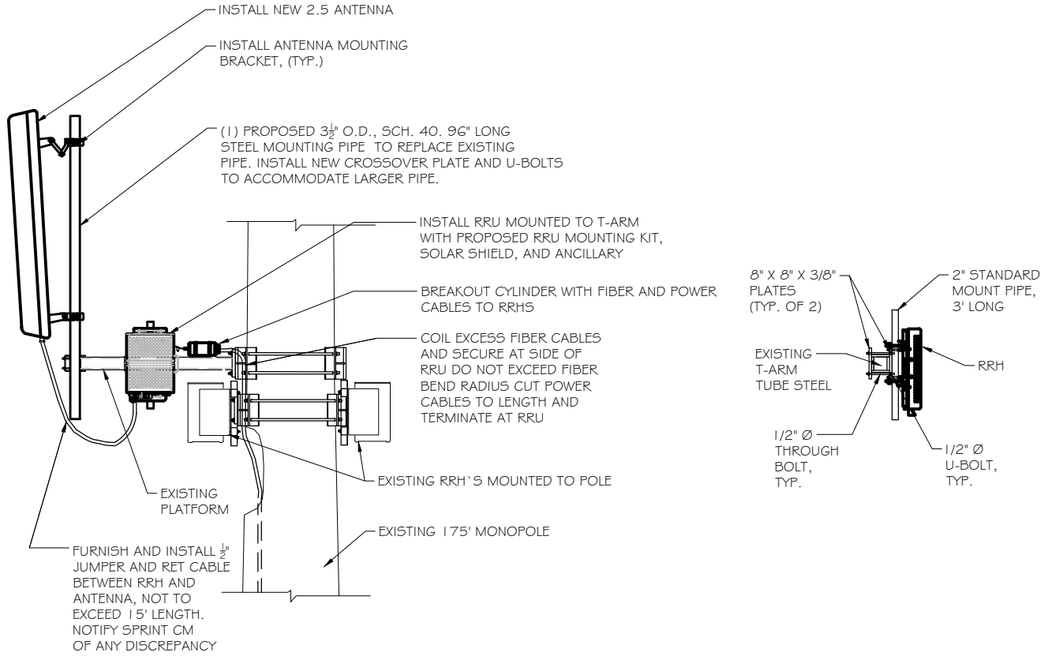
SHEET TITLE:

EQUIPMENT PLAN

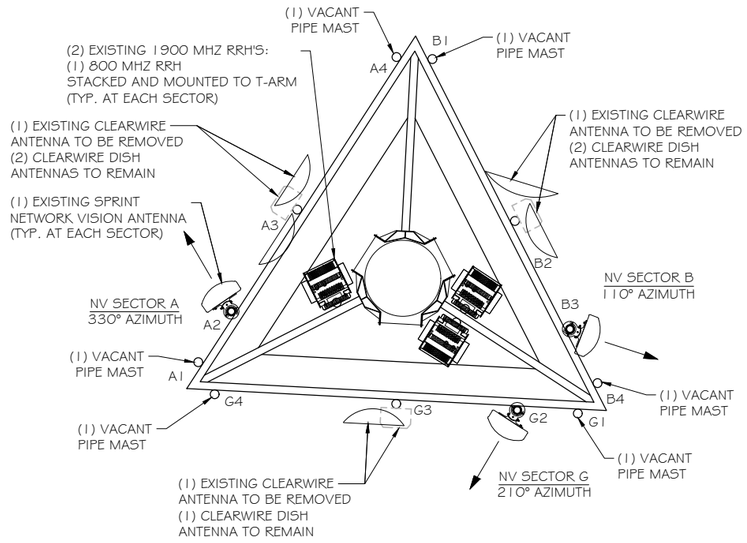
0 1.25' 2.5' 5'

11" x 17" - 1" = 2.5'
22" x 34" - 1" = 1.25'

PROJECT NUMBER: 28744
SHEET NUMBER: A-2

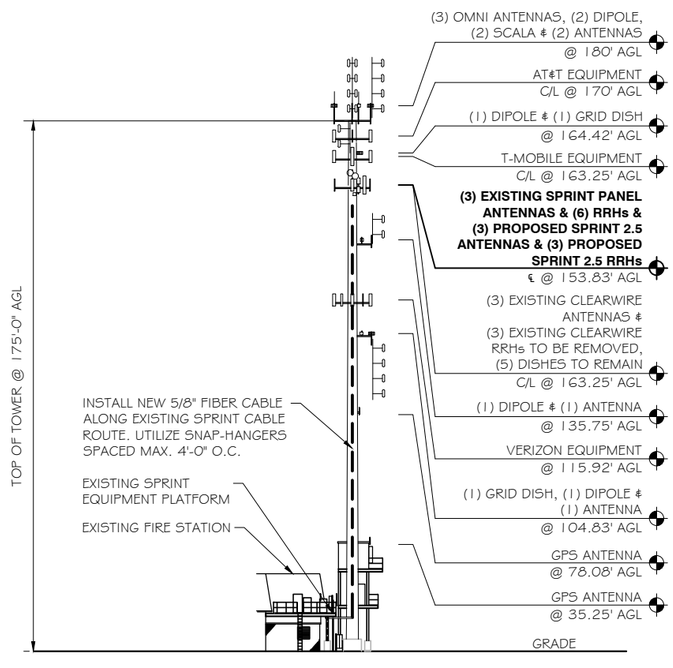


ANTENNA & RRH MOUNTING DETAILS — 1
SCALE: NTS

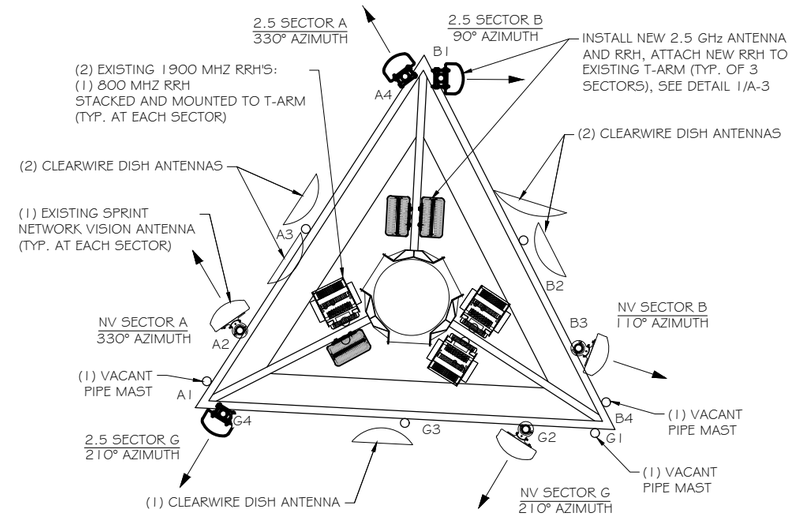


EXISTING ANTENNA ARRAY — 3
SCALE: NTS

NOTE:
A STRUCTURAL ANALYSIS OF THE TOWER HAS BEEN COMPLETED BY RAMAKER & ASSOCIATES, INC., DATED 9/11/2017. A TOWER MAPPING/INVENTORY OF THE EXISTING EQUIPMENT WAS OUTSIDE THE SCOPE OF RAMAKER & ASSOCIATES, INC. AND THE EXISTING EQUIPMENT LOADING WAS OBTAINED FROM THE LATEST AT&T STRUCTURAL REPORT COMPLETED BY DESTEK ENGINEERING (DATED 11/18/2016) AND CONFIRMED BY THE LANDLORD. CONTRACTOR SHALL VERIFY THAT ALL EXISTING AND PROPOSED EQUIPMENT IS INSTALLED IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS.



BUILDING ELEVATION — 2
SCALE: 1" = 50'



PROPOSED ANTENNA ARRAY — 4
SCALE: NTS

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SITE#:CT43XC846-A

PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
BUILDING ELEVATIONS & ANTENNA DETAILS

0 25' 50' 100'
11" x 17" - 1" = 50'
22" x 34" - 1" = 25'

PROJECT NUMBER: 28744
SHEET NUMBER: A-3

Sprint

RFDS Sheet

General Site Information

Site ID	CT43XC846	Equipment Vendor	Alcatel-Lucent
Market	Northern Connecticut	Lattitude	41.606217
Region	Northeast	Longitude	-72.749686
MLA	N/A	LL SITE ID	N/A
Structure Type	MONOPOLE		
BTS Type			

Solution ID		Siterra SR Equipment type	
		Equipment Vendor	Alcatel-Lucent

Incremental Power Draw needed by added Equipment: N/A

Base Equipment

BBU Kit	ALU BBU Kit	Top Hat	None
BBU Kit Qty	1	Top Hat Qty	N/A
		Top Hat Dimenstions	N/A
Growth Cabinet	None	Top Hat Weight (lbs)	N/A
Growth Cabinet Qty	N/A		
Growth Cabinet Dimensions	N/A		
Growth Cabinet Weight	N/A		

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.	0.625	
Length Ft.	180	(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

	Sector 1	Sector 2	Sector 3
Antenna make/model	RFS APXV9TM14-ALU-I20	RFS APXV9TM14-ALU-I20	RFS APXV9TM14-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.	11.5	11.5	11.5
CL Height	153.83'	153.83'	153.83'
Antenna Azimuth	330	90	210
Antenna Mechanical Downtilt	0	0	0
Antenna etilt	-2	-2	-2

*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:

1. 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-BUILD DRAWING WITH CORRECT C/L HEIGHT. ALSO EMAIL CORRECT 1.9GHZ AND 800MHZ ANTENNA C/L HEIGHT, AZIMUTH AND MECHANICAL DOWNTILT TO RF ENGINEER.
2. 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.
3. 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.
4. 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.
5. GENERAL CONTRACT 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 32 RF ALIGNMENT TOOL OR EQUIVALENT TOOL.

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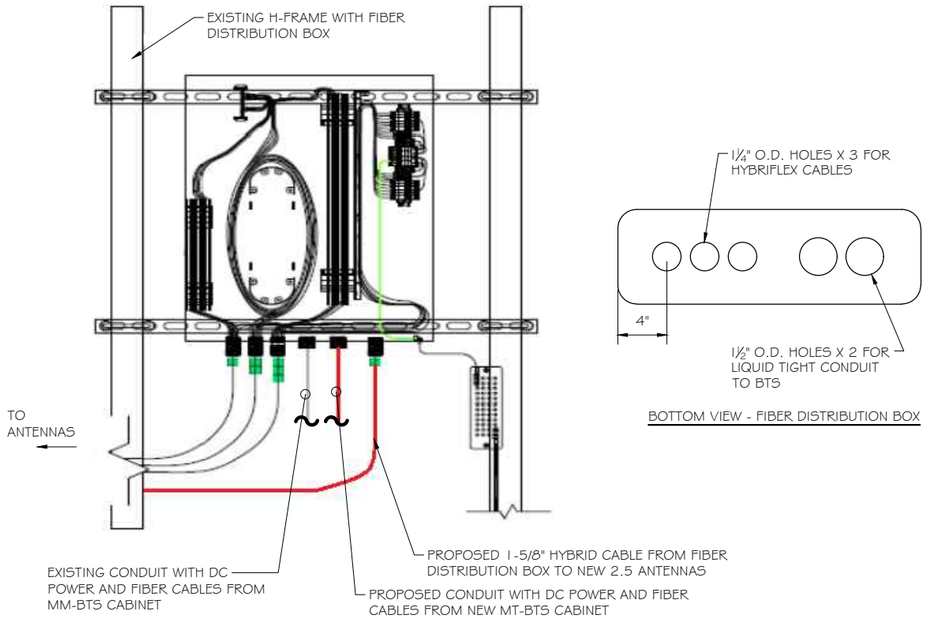
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
RF DATA SHEET

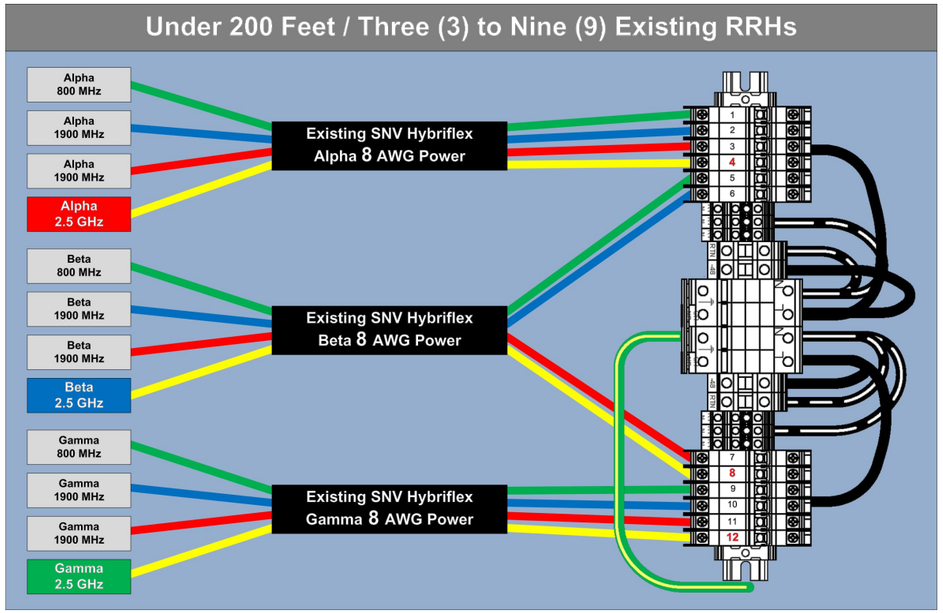
SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: A-4

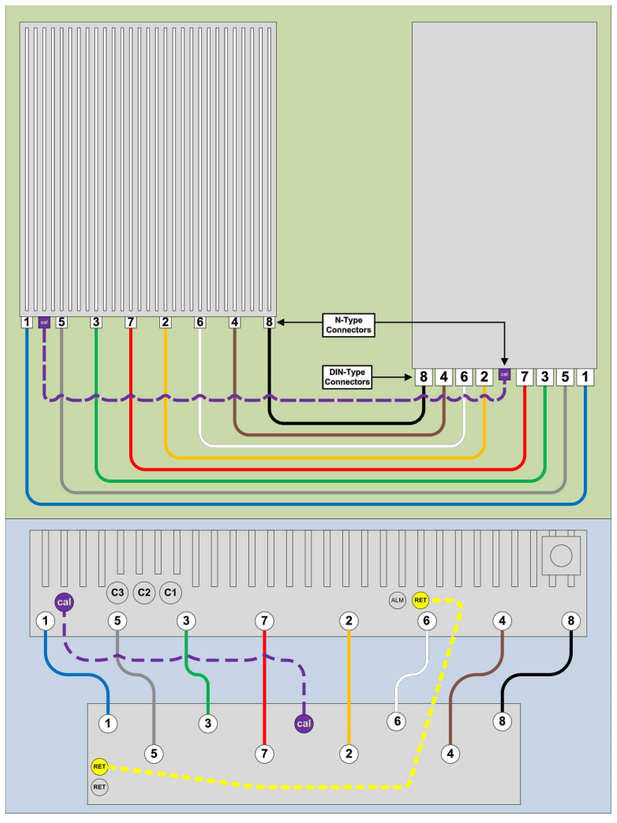


BOTTOM VIEW - FIBER DISTRIBUTION BOX

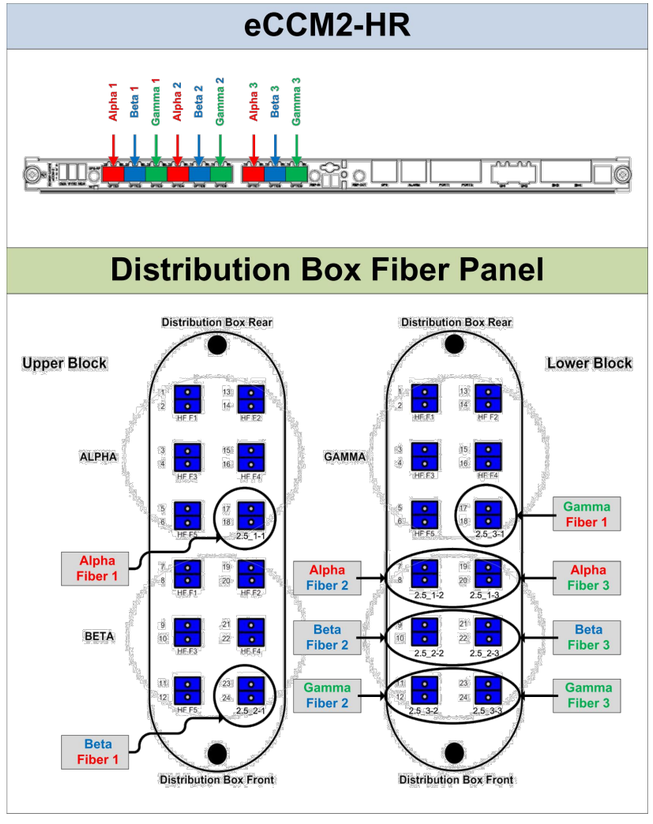
TYPICAL FIBER DISTRIBUTION BOX DETAIL (1)
SCALE: NTS



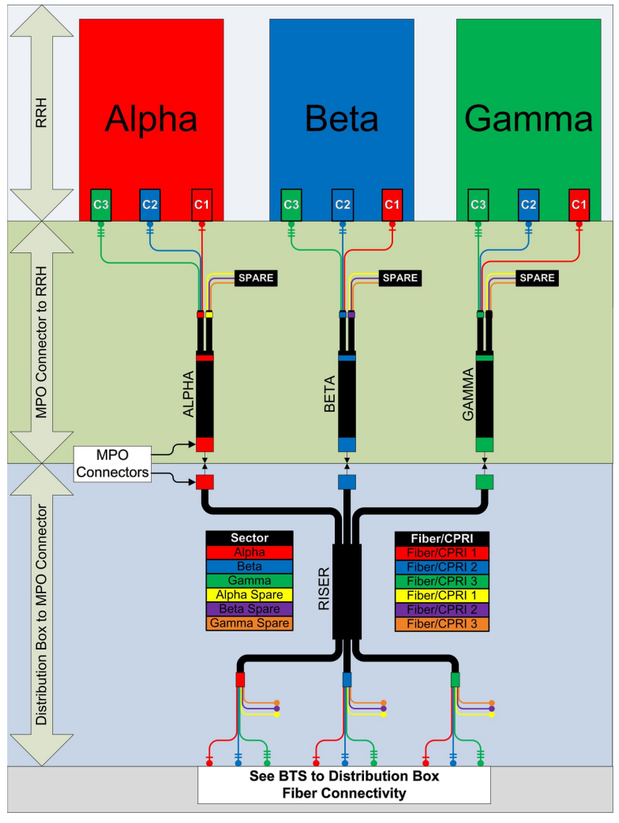
RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL (2)
SCALE: NTS



8T8R DETAIL (3)
SCALE: NTS



BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (4)
SCALE: NTS



RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL (5)
SCALE: NTS

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STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED PROFESSIONAL ENGINEER

Signature: 9/12/2017 Date:

MARK	DATE	DESCRIPTION
1	9/12/17	REVISED TOWER LOADING

ISSUE PHASE: FINAL
DATE ISSUED: 7/21/2017

PROJECT TITLE:
BERLIN/RT 15/FIRE DEPT
SITE#:CT43XC846-A

PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

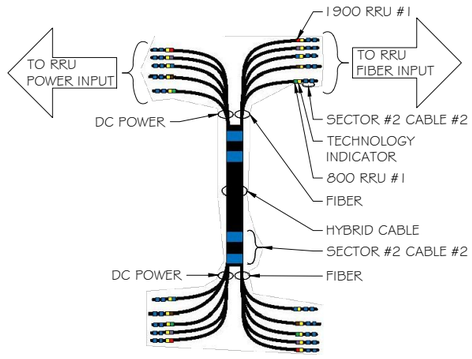
SCALE: NONE

PROJECT NUMBER: 28744
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

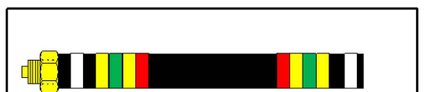
NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

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




Example – Sector 2, Cable 2, 800mhz Radio #1


Example – Sector 3, Cable 1, 1900mhz Radio #1


Example – Sector 1, Cable 4, 800 mhz Radio #1 and 1900mhz Radio #1

COLOR CODING CHARTS (1)
SCALE: NTS

CABLE MARKING NOTES

1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
2. 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.
3. 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.
4. 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.
5. 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
6. 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.
7. HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
8. INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABELED WITH BOTH THE CABLE AND FREQUENCY.

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SITE#:CT43XC846-A

PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE: NONE

PROJECT NUMBER: 28744
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

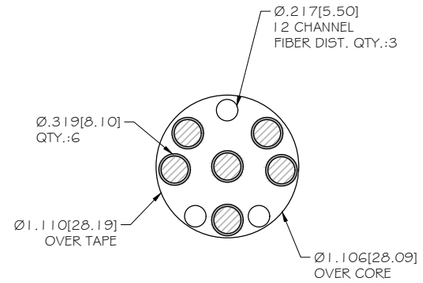
FIBER ONLY (EXISTING DC POWER)	Hybrid cable MN:HB058-M12-050F 12x multi-mode fiber pairs, Top:Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50 ft	50 ft
	MN:HB058-M12-075F	75 ft
	MN:HB058-M12-100F	100 ft
	*MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	MN:HB058-M12-200F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

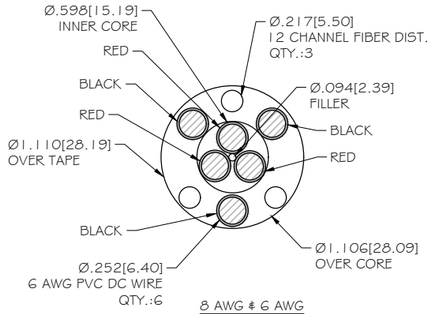
FIBER ONLY	Hybrid Jumper cable MN:HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN:HBF012-M3-10F1	10 ft
	*MN:HBF012-M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
8 AWG POWER	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	

*NOTE: SPRINT CM TO CONFIRM HYBRID/FIBER RISER CABLE & HYBRID/FIBER JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.

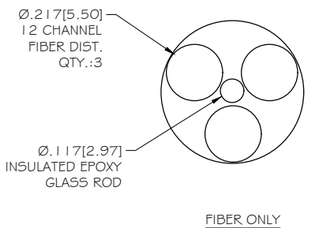
FIBER CABLE CROSS SECTION & DATA (1)
SCALE: NTS



4 AWG

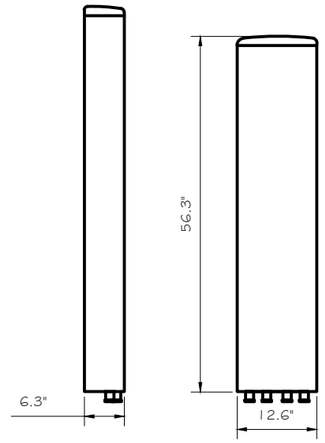


8 AWG & 6 AWG



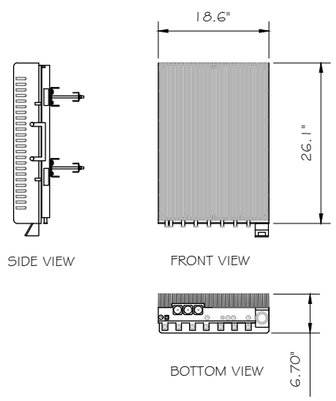
FIBER ONLY

RFS: APXV9TM14-ALU-120



DIMENSIONS, HxWxD:	56.3" x 12.6" x 6.3"
WEIGHT, WITHOUT PRE-MOUNTED BRACKETS:	55.12 lbs.
CONNECTOR:	(9) XX" MINI-DIN FEMALE/BOTTOM

2.5 ANTENNA DETAIL (2)
SCALE: NTS



ALCATEL-LUCENT: TD-RRH8x20-25

HxWxD = (26.1" x 18.6" x 6.7")

WEIGHT = 70 lbs.

2.5 RRH DETAIL (3)
SCALE: NTS

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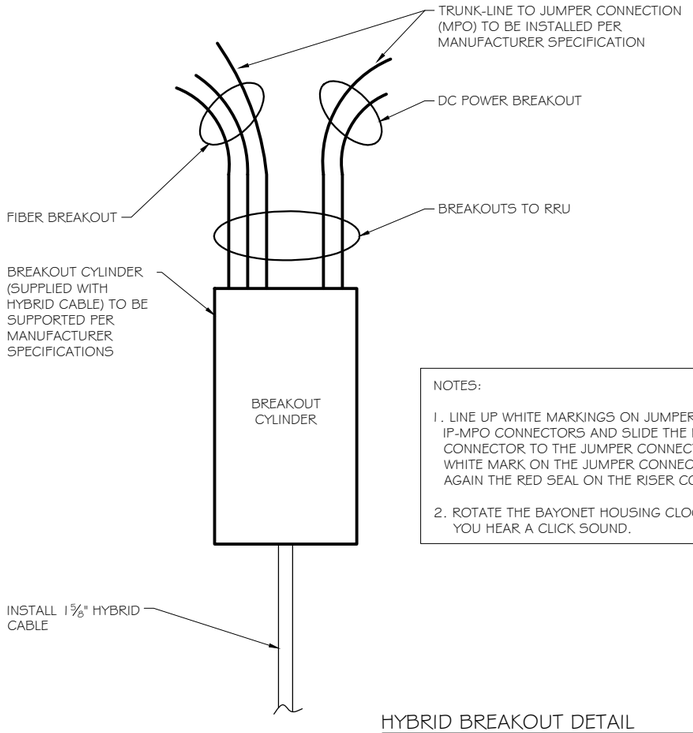
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
ANTENNA & HYBRID CABLE DETAILS

SCALE: NONE

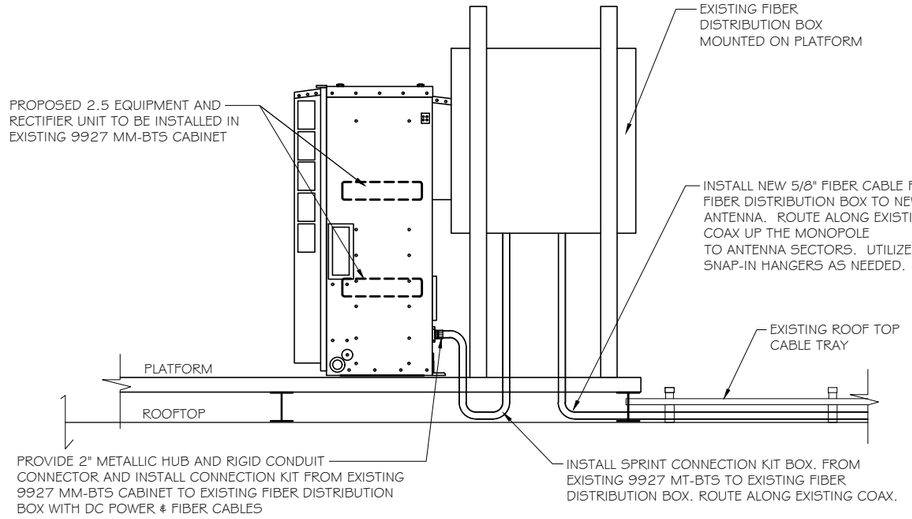
PROJECT NUMBER: 28744
SHEET NUMBER: A-7



NOTES:

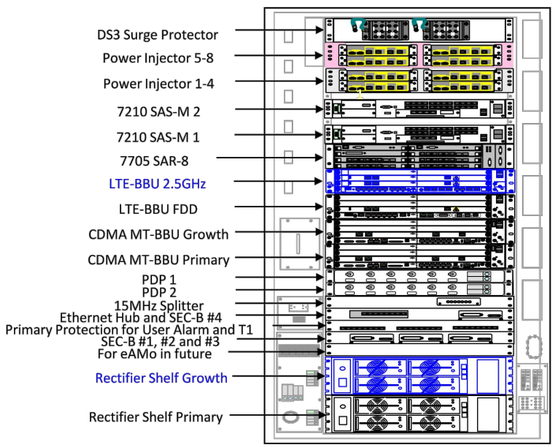
1. LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTORS AND SLIDE THE RISER CONNECTOR TO THE JUMPER CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAIN THE RED SEAL ON THE RISER CONNECTOR.
2. ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL YOU HEAR A CLICK SOUND.

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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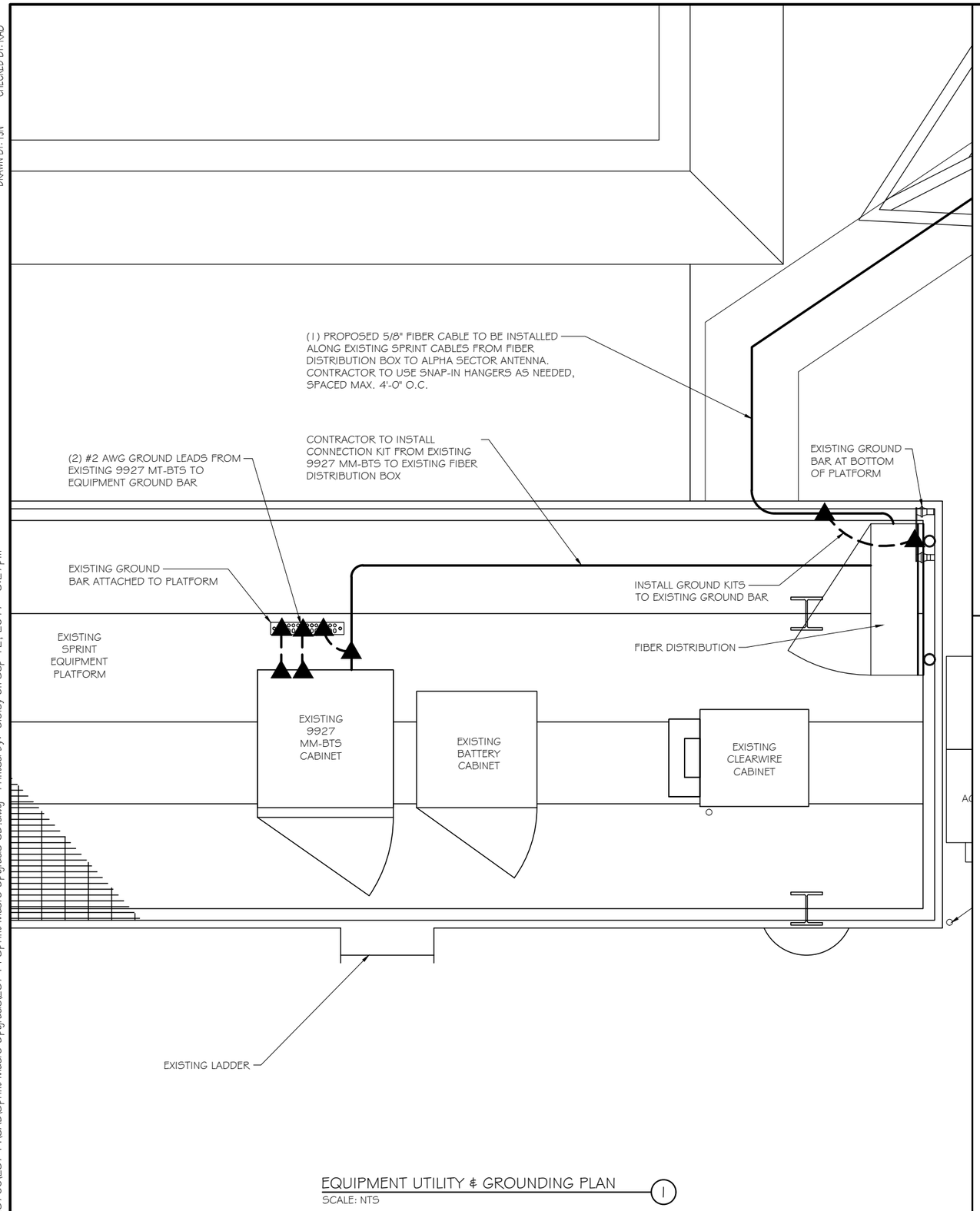
HARTFORD COUNTY

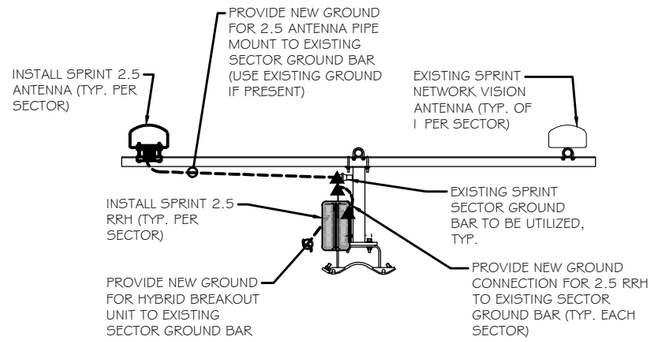
SHEET TITLE:
EQUIPMENT DETAILS

SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: A-8



EQUIPMENT UTILITY & GROUNDING PLAN (1)
SCALE: NTS



ANTENNA GROUNDING DETAIL (2)
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 BEAR 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—	PROPOSED ELECTRIC

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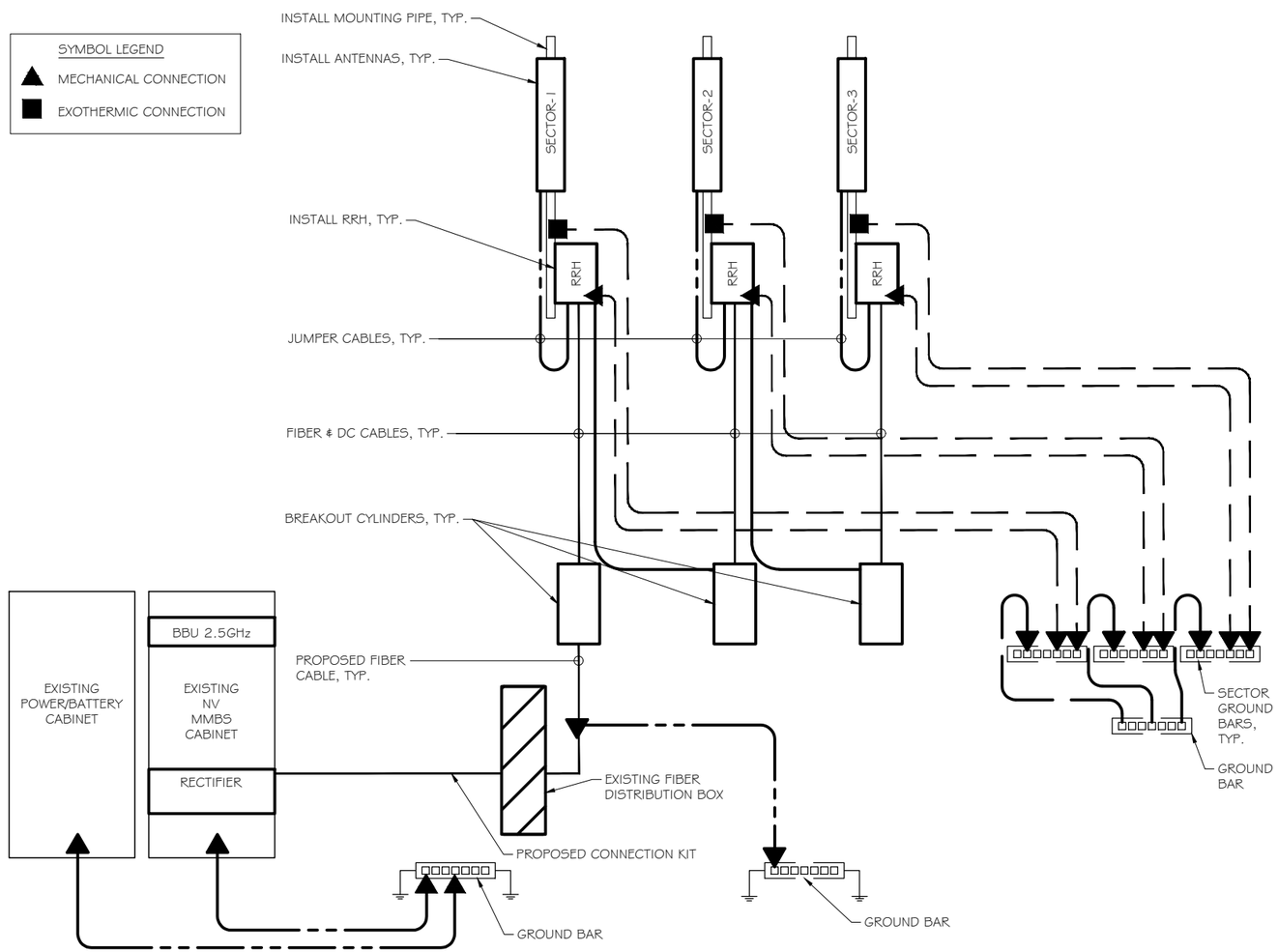
HARTFORD COUNTY

SHEET TITLE:
EQUIPMENT UTILITY & GROUNDING PLAN

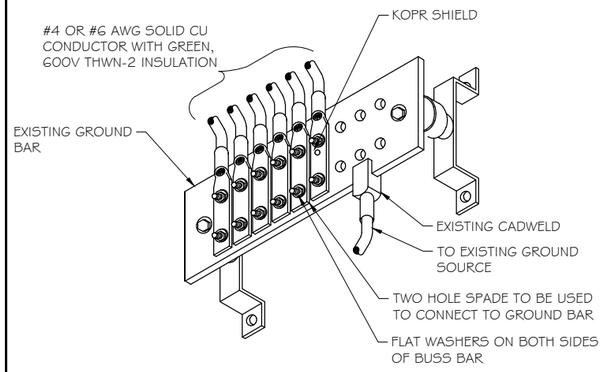
SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: E-1

SYMBOL LEGEND
- MECHANICAL CONNECTION
- EXOTHERMIC CONNECTION



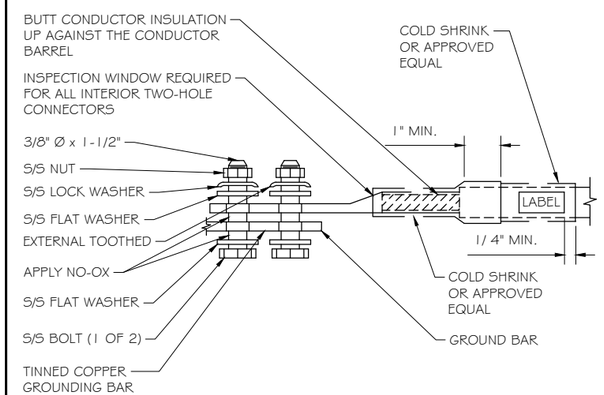
GROUNDING RISER DIAGRAM (1)
SCALE: NTS



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 (2)
SCALE: NTS



TWO-HOLE LUG (3)
SCALE: NTS

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1	9/12/17	REVISED TOWER LOADING

ISSUE PHASE: FINAL DATE ISSUED: 7/21/2017

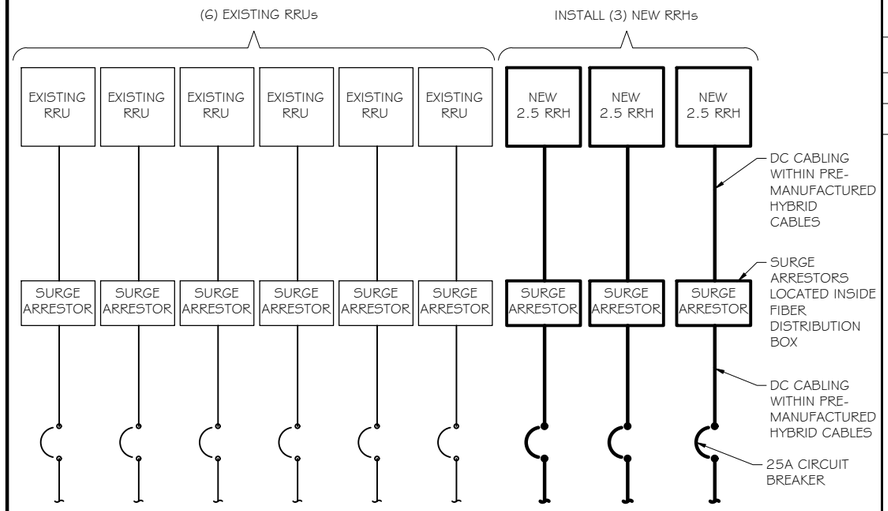
PROJECT TITLE:
BERLIN/RT 15/FIRE DEPT
SITE#:CT43XC846-A

PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
GROUNDING DETAILS

SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: E-2



DC ONE-LINE DIAGRAM (1)
SCALE: NTS

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:	ROOFTOP		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	RADIO EQUIPMENT	100	2	ON			ON	2	60	SUPPRESSOR	7
2											8
3	BLANK (UNUSED)	-	-	-			ON	2	30	CLEARWIRE	9
4	BLANK (UNUSED)	-	-	-							10
5	BLANK (UNUSED)	-	-	-			ON	1	15	TELCO GFI	11
6	FAN	10	1	ON			-	-	-	BLANK (UNUSED)	12

AC PANEL SCHEDULE (2)
SCALE: NTS

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

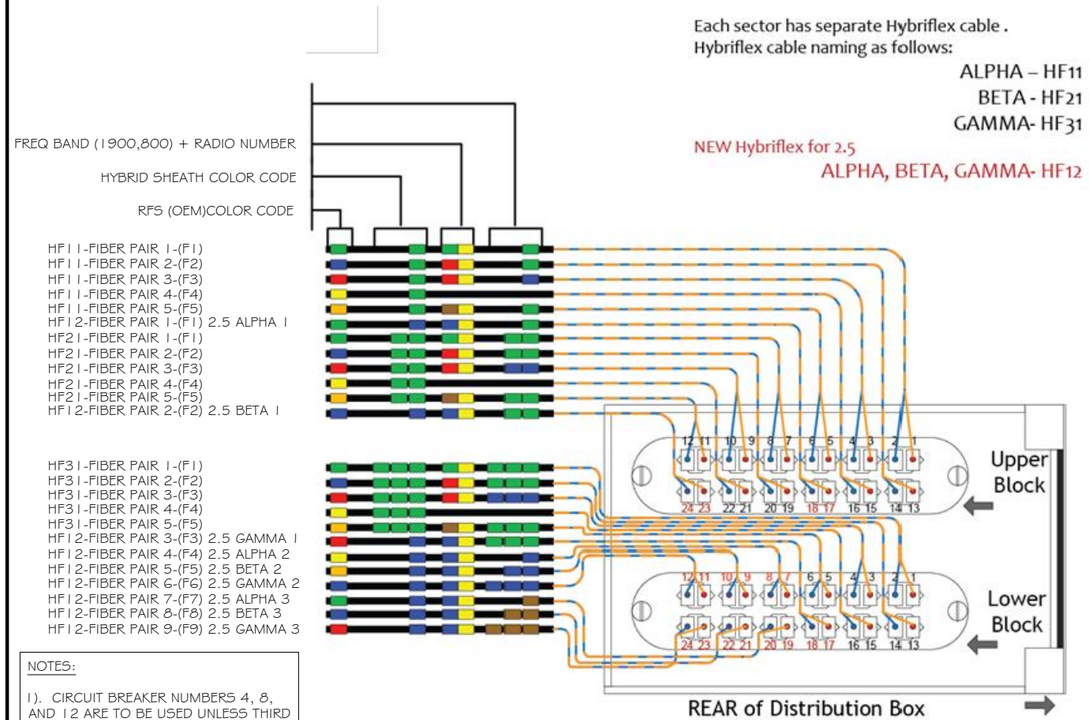
RAMAKER & ASSOCIATES, INC.
855 Community Drive, Sauk City, WI 53583
Phone: 608-643-4100 Fax: 608-643-7999
www.Ramaker.com

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.

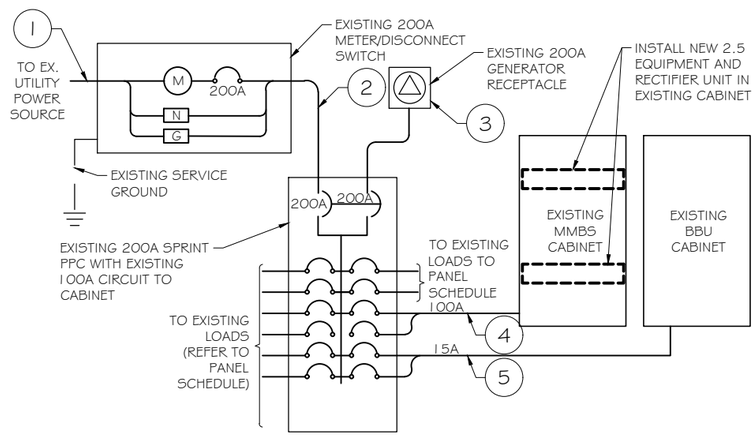
STATE OF CONNECTICUT · JAMES R. SKOWRONSKI · 26266 · LICENSED PROFESSIONAL ENGINEER

Signature: James R Skowronski Date: 9/12/2017



NOTES:
1). CIRCUIT BREAKER NUMBERS 4, 8, AND 12 ARE TO BE USED UNLESS THIRD DC RAIL IS REQUIRED FOR MICROWAVE.
2). USE DC POWER LOOP.
3). ALL UNUSED DC FEEDERS TO BE TERMINATED WITH WIRE NUTS AND TAPED.
4). REMOVE ALL DEBRIS FROM INTERIOR OF FIBER DISTRIBUTION BOX WHEN COMPLETE.

TYPICAL FIBER DISTRIBUTION (3)
SCALE: NTS



CIRCUIT SCHEDULE			
NO.	FROM	TO	CONFIGURATION
1	UTILITY SOURCE	METER/ DISCONNECT	EXISTING
2	METER/ DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
3	TRANSFER & LOAD CENTER	GENERATOR RECEPTACLE	EXISTING
4	TRANSFER & LOAD CENTER	EX. MMBS CABINET	(3) #2 AWG, (1) #8 GND IN 1½" CONDUIT
5	TRANSFER & LOAD CENTER	EX. BBU CABINET	(2) #12 AWG, (1) #12 GND IN ¾" CONDUIT

ELECTRICAL ONE-LINE DIAGRAM (4)
SCALE: NTS

MARK	DATE	DESCRIPTION
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PROJECT INFORMATION:
1657 WILBUR CROSS
BERLIN, CT 06037
HARTFORD COUNTY

SHEET TITLE:
DC POWER DETAILS & PANEL SCHEDULES

SCALE: NONE

PROJECT NUMBER: 28744
SHEET NUMBER: E-3