Cherundolo Consulting

4 Davis Road West, Old Lyme, CT 06371

Ms. Melanie Bachman
Executive Director
CT Siting Council
10 Franklin Square
New Britain, CT 06043

Re: Notice of Exempt Modification Application
130 Vernon Road, Bolton, CT 06043

May 1. 2019

Dear Ms. Bachman:

The previous CT Siting Council approval for this particular modification EM-Sprint 012-171205 expired on 12/26/2017, and has therefore expired. Please accept this new submission, with revised structural exhibits and construction drawings to reflect the recent code changes.

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

Cherundolo Consulting

4 Davis Road West, Suite 5 – Old Lyme, CT 06371

Ms. Melanie Bachman
Executive Director
CT Siting Council
10 Franklin Square
New Britain, CT 06043

Re: Notice of Exempt Modification Application
130 Vernon Road, Bolton, CT 06043

May 1. 2019
Dear Ms.Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), is submitting to the Connecticut Siting Council for a Notice of Exempt Modification for Proposed Modifications to an Existing Telecommunications Facility located at the above-referenced site. Sprint currently maintains 3 existing panel antenna and 3 RRH's at the 148 level of the Tower. Sprint proposes to add 3 new panel antennas (1 per sector) and add 6 remote radio units (1 per sector) at 148' tower level as well as 1 hybrid cable and a new battery string in existing ground based battery cabinet as well as new 2.5 MHz equipment in existing radio cabinet.

The Sprint installation was initially approved on 3/09/2000 by the Bolton Zoning enforcement officer and a BP was issued by the Land Use Department of Bolton also on 3/09/2000. The construction and structural documents enclosed reflect the current reality of all the existing 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

Cherundolo Consulting

4 Davis Road West, Suite 5 – Old Lyme, CT 06371

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

Re: Notice of Exempt Modification Application
130 Vernon Road, Bolton, CT 06043

Lat: N 41.80205
Long: W 72.4412

December 4, 2017

Dear Ms. Bachman:

Sprint currently maintains 3 existing panel antenna and 3 Remote Radio Units 148' level of the Tower. Sprint proposes to add to the existing equipment with 3 new panel antennas (1 per sector) and add 6 remote radio units (2 per sector) at 148' tower level as well as 1 hybrid cable, new battery string in existing ground based battery cabinet and a new 2.5 MHz radio equipment in existing radio cabinet. 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 original zoning approval was issued by the City of Bolton on March 9, 2000 and original building permit was issued by the City of Bolton on March 9, 2000.

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 and to Sandra Pierog the First Selectman for the City of Bolton, as well as Jim Rupert , Zoning enforcement for the City of Bolton, as well as Milton Hathaway, the tower owner.

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 Bolton facility is located at 130 Vernon Road is owned by Mountaintop Enterprises, Inc., the Site coordinates are: N41.80205, W72.54412. The existing facility consists of a 150' guyed Lattice Tower. Sprint currently operates wireless communications equipment on a platform on a concrete slab at the facility and has 3 antennas and 3 remote radio heads mounted at a centerline of 148' feet on the tower.

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:
Sandra Pierog the First Selectman for the City of Bolton – Via Fed Ex
Jim Rupert , Zoning enforcement for the City of Bolton – Via Fed Ex
Milton Hathaway, President of Mountaintop Enterprises, the tower owner – Via Fed Ex

ORIGIN ID:SKKA (917) 841-0247
PAUL SAGRISTANO
CCC
4 DAVIS ROAD WEST
SUITE 5
OLD LYME, CT 06371
UNITED STATES US

SHIP DATE: 09MAY19
ACTWGT: 0.50 LB
CAD: 111040781/INET4100

BILL SENDER

TO **MS. SANDRA PIEROG - 1ST SELECTMAN**
CITY OF BOLTON
222 BOLTON CENTER ROAD

BOLTON CT 06043
(860) 640-0866 REF: CT33XC550 - CSC TO ZEO
INV:
PO: DEPT:

565J1/D66C/23AD

FedEx Express

E

J191019010701uv

TRK# **7751 8090 4074**
0201

TUE - 14 MAY 4:30P
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Shipment Receipt

Address Information

Ship to:
Ms. Sandra Pierog - 1st Selectman
City of Bolton
222 Bolton Center Road

BOLTON, CT
06043
US
860-640-0866

Ship from:
Paul Sagristano

CCC
4 Davis Road West
Suite 5
OLD LYME, CT
06371
US
9178410247

Shipment Information:

Tracking no.: 775180904074
Ship date: 05/09/2019
Estimated shipping charges: 19.61 USD

Package Information

Pricing option: FedEx Standard Rate
Service type: FedEx Express Saver
Package type: FedEx Envelope
Number of packages: 1
Total weight: 0.50 LBS
Declared Value: 0.00 USD
Special Services: Direct signature required
Pickup/Drop-off: Drop off package at FedEx location

Billing Information:

Bill transportation to: My Account - 429-429
Your reference: CT33XC550 - CSC to ZEO
P.O. no.:
Invoice no.:
Department no.:

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Please Note

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CCC
4 DAVIS ROAD WEST
SUITE 5
OLD LYME, CT 06371
UNITED STATES US

SHIP DATE: 09MAY19
ACTWGT: 0.10 LB
CAD: 111040781/INET4100

BILL SENDER

TO **MILTON HATHAWAY**
MOUNTAINTOP ENTERPRISES INC.
10 QUARRY ROAD

BOLTON CT 06043
(860) 647-7772 REF: CT33XC550 CSC RESUBMISSION
INV:
PO: DEPT:

565J1/D66C/23AD

FedEx Express

J191019010701uv

TRK# 0201 **7751 8035 5491**

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Shipment Receipt

Address Information

Ship to:	Ship from:
Milton Hathaway	Paul Sagristano
Mountaintop Enterprises Inc.	CCC
10 Quarry Road	4 Davis Road West
	Suite 5
BOLTON, CT	OLD LYME, CT
06043	06371
US	US
860-647-7772	9178410247

Shipment Information:

Tracking no.: 775180355491
Ship date: 05/09/2019
Estimated shipping charges: 19.61 USD

Package Information

Pricing option: FedEx Standard Rate
Service type: FedEx Express Saver
Package type: FedEx Envelope
Number of packages: 1
Total weight: 0.10 LBS
Declared Value: 0.00 USD
Special Services: Direct signature required
Pickup/Drop-off: Drop off package at FedEx location

Billing Information:

Bill transportation to: My Account - 429-429
Your reference: CT33XC550 CSC Resubmission
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Invoice no.:
Department no.:

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The estimated shipping charge may be different than the actual charges for your shipment. Differences may occur based on actual weight, dimensions, and other factors. Consult the applicable FedEx Service Guide or the FedEx Rate Sheets for details on how shipping charges are calculated.

ORIGIN ID:SKKA (917) 841-0247
PAUL SAGRISTANO
CCC
4 DAVIS ROAD WEST
SUITE 5
OLD LYME, CT 06371
UNITED STATES US

SHIP DATE: 09MAY19
ACTWGT: 0.50 LB
CAD: 111040781/INET4100

BILL SENDER

TO **JIM RUPERT - ZONINGLAND USE**
CITY OF BOLTON
222 BOLTON CENTER ROAD

BOLTON CT 06043
(860) 640-0866 X 6105 REF: CT33XC550 - CSC RESUB TO ZEO
INV:
PO: DEPT:

565J1/D66C/23AD

FedEx Express

J191019010701uv

TRK# 0201 **7751 8082 2130**

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

FedEx Shipment Receipt

Address Information

Ship to:	**Ship from:**
Jim Rupert - ZoningLand Use	Paul Sagristano
City of Bolton	CCC
222 Bolton Center Road	4 Davis Road West
	Suite 5
BOLTON, CT	OLD LYME, CT
06043	06371
US	US
860-640-0866 6105	9178410247

Shipment Information:

Tracking no.: 775180822130
Ship date: 05/09/2019
Estimated shipping charges: 19.61 USD

Package Information

Pricing option: FedEx Standard Rate
Service type: FedEx Express Saver
Package type: FedEx Envelope
Number of packages: 1
Total weight: 0.50 LBS
Declared Value: 0.00 USD
Special Services: Direct signature required
Pickup/Drop-off: Drop off package at FedEx location

Billing Information:

Bill transportation to: My Account - 429-429
Your reference: CT33XC550 - CSC resub to ZEO
P.O. no.:
Invoice no.:
Department no.:

Thank you for shipping online with FedEx ShipManager at fedex.com.

Please Note

130 Vernon Road, Bo.lton

Property Information

Property ID	09013012-02-3
Location	130 VERNON RD
Owner	MOUNTAINTOP ENTERPRISES INC

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

CRCOG makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

130 VERNON RD

Location	130 VERNON RD	**Assessment**	$391,370
Mblu	02/ / 3/ /	**Appraisal**	$739,300
Owner	MOUNTAINTOP ENTERPRISES INC	**PID**	1982
		Building Count	1

Current Value

Appraisal	
Valuation Year	**Total**
2013	$739,300

Assessment	
Valuation Year	**Total**
2013	$391,370

Owner of Record

Owner	MOUNTAINTOP ENTERPRISES INC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	PO BOX 9219 BOLTON, CT 06043	**Book & Page**	166/656
		Sale Date	10/01/2014
		Instrument	24

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MOUNTAINTOP ENTERPRISES INC			166/656	24	10/01/2014

Building Information

Building 1 : Section 1

Year Built: 1980
Living Area: 2032
Building Percent Good: 76

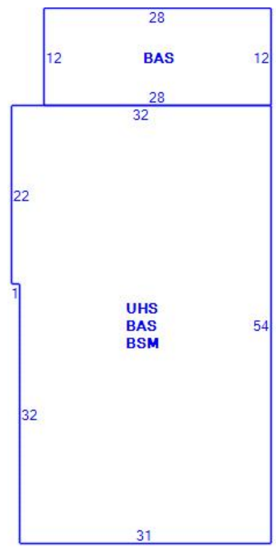
Building Attributes	
Field	**Description**
STYLE	Equipment Garage
Stories:	1.5
Occupancy	1.00

Exterior Wall 1	Board & Batten
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Minimum
Interior Floor 2	
Heating Fuel	None
Heating Type	None
% Central Air	0
Frame Type	WOOD FRAME
Fin. Bsmt. Area	

Building Photo

(PhotoHandler.ashx?pid=1982&bid=1982)

Building Layout



Building Sub-Areas			**Legend**
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	2032	2032
BSM	Basement	1696	0
UHS	Unfinished Half Story	1696	0
		5424	2032

Extra Features

Extra Features	**Legend**
No Data for Extra Features	

Land

Land Use

Land Line Valuation

Zone R-3

Size (Acres) 30.3
Depth
Assessed Value $343,470
Appraised Value $670,800

Outbuildings

Outbuildings					Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Bldg #**
SHD1	Shed	FR	Frame	192.00 S.F.	1
SHD1	Shed	FR	Frame	200.00 S.F.	1
BRN1	1 Story Barn	FR	Frame	4000.00 S.F.	1
CELL	Cell Tower			150.00 FEET	1
CELL	Cell Tower			200.00 FEET	1
SHD1	Shed	FR	Frame	400.00 S.F.	1

Valuation History

Appraisal	
Valuation Year	**Total**
2014	$739,300
2013	$692,200

Assessment	
Valuation Year	**Total**
2014	$391,370
2013	$385,790

TOWN OF BOLTON ZONING PERMIT

222 Bolton Center Road - Telephone: 649-8066 FEE $10.00

TO: ZONING ENFORCEMENT OFFICER

Certification of Zoning Approval is hereby requested for:
application of a Building Permit: X or other: ______
Decision is based on the following information:

1.) Location: (street and no. or lot no.) 130 Vernon Rd, Map 115, Block 21 Lot 4
2.) Owner's Name: Mountaintop Enterprises
3.) Builder: Sprint Spectrum L.P.
Address: 9 Barnes Industrial Rd, Wallingford, CT
4.) Check Type of Construction: ☐ New Building ☒ Addition ☐ Alteration ☐ Repair ☐ Miscellaneous
5.) Job Description* Installation of Telecom antennas on existing Tower and additional equipment on the ground

(*Plot Plan required for all additions to buildings and accessory structures)

6.) Other Buildings Not Shown: ______
7.) Merestones or Stakes Indicating Lot Boundaries? ______
8.) Distance from Street Line: ______
9.) Distance from Side Line: ______
10.) Distance from Building to Rear Lot Line: ______
11.) Proposed Use: ______
(For example: mfg., office, storage, dwelling, garage)
12.) ☐ Sewer ☐ Septic ☐ Water ☐ Well

I hereby certify that the above statements are true to the best of my knowledge and belief.

2/9/00 — Date
[signature] — Signature
860-654-0707 — Telephone

FOR OFFICE USE ONLY

This is to certify that the above-stated information is a permitted and lawful use as controlled by the Zoning Regulations of the Town of Bolton, Connecticut, upon authorized signature of the Zoning Enforcement Officer.

Approval Date 3.9.00 Denial Date ______
Z.E.O. [signature] Z.E.O. ______
Application denied due to violation of section(s) ______

Variance (if granted) Type ______ Date Filed ______
Permit approval with variance Z.E.O. ______

The Completed Work Complies with the Zoning Regulations

______

TOWN OF BOLTON

222 Bolton Center Rd, Bolton, CT 06043

LAND USE DEPARTMENT PERMIT APPLICATION

15-21-9

PLEASE CONTACT THE LAND USE DEPARTMENT AT 649-8066 TO SCHEDULE INSPECTIONS OR FOR FINAL INSPECTION UPON COMPLETION TO ISSUE CERTIFICATE

1. PERMIT TYPE -- BUILDING ✓ ELECTRICAL____ PLUMBING____ HEATING____
2. ADDRESS OF WORK 130 VeRNON Road ZONE R-1
3. PROPERTY OWNER Mountaintop Enterprises Inc
   ADDRESS 10 Quarry Road Suite C TELEPHONE # 860 647-7772
4. APPLICANT Sprint Spectrum L.P.
   ADDRESS 9 Barnes Industrial Road, Wallingford TELEPHONE # 203-294-5600

I hereby agree to conform to all the requirements of the Laws of the State of CT, the Ordinances of the Town of Bolton, all stipulations of this application, and to notify the Building Official of any alteration in the plans or specifications of the building for which this permit is asked. And agree that this building is to be located the proper distance from all street lines, side yard lines and required distances from all other zones and is located in a zone in which this building and its use is allowed. This permit expires one (1) year from date of approval.

[signature] APPLICANT 2/9/00 DATE

Proof of Workers Compensation Coverage
I as owner or sole proprietor claim exemption and intend to not act as a general contractor or principal employer.____________

[signature] 3-9-00
PERMIT APPROVED - DATE
BUILDING OFFICIAL

N/A per JM
PLAN APPROVED - DATE
HEALTH DISTRICT/SANITARIAN

5. OTHER REQUIRED PERMIT APPLICATION(S) - TYPE________

6. FLOODPLAIN: N____ Y____ DESCRIPTION________

7. FEE SCHEDULE

ESTIMATED VALUE OF ALL WORK $ 30,000

Estimated Value	Fee	
$ 1 - 1000	$20	
each additional $1000 or fraction thereof	$12	(standard fees)

-----[redacted]

----- DRIVEWAY PERMIT FEE: $30
----- RETURNABLE DRIVEWAY PERMIT BOND: $500

- 9 2000

TOTAL PERMIT FEE $ 378.

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: CT33XC550

W. Conventry
130 Vernon Road
Bolton, CT 06091

August 18, 2017

EBI Project Number: 6217003656

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**16.00 %**

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

August 18, 2017

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

Emissions Analysis for Site: **CT33XC550 – W. Conventry**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **130 Vernon Road, Bolton, 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.

<u>General population/uncontrolled exposure</u> 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 **130 Vernon Road, Bolton, 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 **148 feet** above ground level (AGL) for **Sector A**, **148 feet** above ground level (AGL) for **Sector B** and **148 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.

EBI Consulting
environmental | engineering | due diligence

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):	**148 feet**	Height (AGL):	**148 feet**	Height (AGL):	**148 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%	**1.52 %**	Antenna B1 MPE%	**1.52 %**	Antenna C1 MPE%	**1.52 %**
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):	**148 feet**	Height (AGL):	**148 feet**	Height (AGL):	**148 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%	**1.11 %**	Antenna B2 MPE%	**1.11 %**	Antenna C2 MPE%	**1.11 %**

Site Composite MPE%

Carrier	MPE%
SPRINT – Max per sector	**2.63 %**
AT&T	1.31 %
T-Mobile	2.57 %
Verizon Wireless	2.71 %
Nextel	0.32 %
Bolton Radio Station	0.00 %
Commsite Internat'l	0.04 %
Metrocall	0.12 %
Pagemart	2.30 %
AirTouch	0.63 %
Conn. Radio	0.23 %
Eversource	3.14 %
Site Total MPE %:	**16.00 %**

SPRINT Sector A Total:	2.63 %
SPRINT Sector B Total:	2.63 %
SPRINT Sector C Total:	2.63 %
Site Total:	16.00 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	148	0.78	850 MHz	567	0.14%
Sprint 850 MHz LTE	2	437.55	148	1.56	850 MHz	567	0.28%
Sprint 1900 MHz (PCS) CDMA	5	622.47	148	5.55	1900 MHz (PCS)	1000	0.55%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	148	5.55	1900 MHz (PCS)	1000	0.55%
Sprint 2500 MHz (BRS) LTE	8	778.09	148	11.10	2500 MHz (BRS)	1000	1.11%
						Total:	**2.63%**

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:	2.63 %
Sector B:	2.63 %
Sector C:	2.63 %
SPRINT Maximum Total (per sector):	2.63 %
Site Total:	16.00 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **16.00 %** 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.

April 11, 2019

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

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

SUBJECT: **MOUNT ASSESSMENT**

CARRIER: **SPRINT**

SITE: **W. COVENTRY (CT33XC550-A)**
130 VERNON ROAD
BOLTON, TOLLAND COUNTY, CONNECTICUT 06091
RAMAKER & ASSOCIATES PROJECT NUMBER: 23012

RESULTS: **MOUNT:** **PASS**

Dear Tom Jupin:

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

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

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

Sincerely,

RAMAKER & ASSOCIATES, INC.

James M. Alvin
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer

STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED
PROFESSIONAL ENGINEER

ANALYSIS CRITERIA

State Building Code	2018 CT State Building Code
Adopted Building Code	2015 IBC
Referenced Standard	TIA-222-G
Risk Category	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	C
Topographic Category	3
Crest Height	140 FT

SUPPORTING DOCUMENTATION

- Construction drawings by RAMAKER, project number 23012
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

MOUNT LOADING

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

Antenna Mount – Alpha & Beta Sectors				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
148	1	---	Sector Frame	---
	2	(1) ALU 800MHz 2x50W RRH		Existing
		(1) ALU 1900MHz 4x45W RRH		
	3	(1) RFS APXVSPP18-C-A20		
	4	**(1) Commscope DT465B-2XR**		**Proposed**
		(1) ALU TD-RRH8x20-25		
		(1) ALU 800MHz 2x50W RRH		

Antenna Mount – Gamma Sector				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
148	1	(1) RFS APXVSPP18-C-A20	Sector Frame	Existing
	2	(1) ALU 800MHz 2x50W RRH		
		(1) ALU 1900MHz 4x45W RRH		
	3	---		---
	4	**(1) Commscope DT465B-2XR**		**Proposed**
		(1) ALU TD-RRH8x20-25		
		(1) ALU 800MHz 2x50W RRH		

MOUNT RESULTS

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

LIMITATIONS

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

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

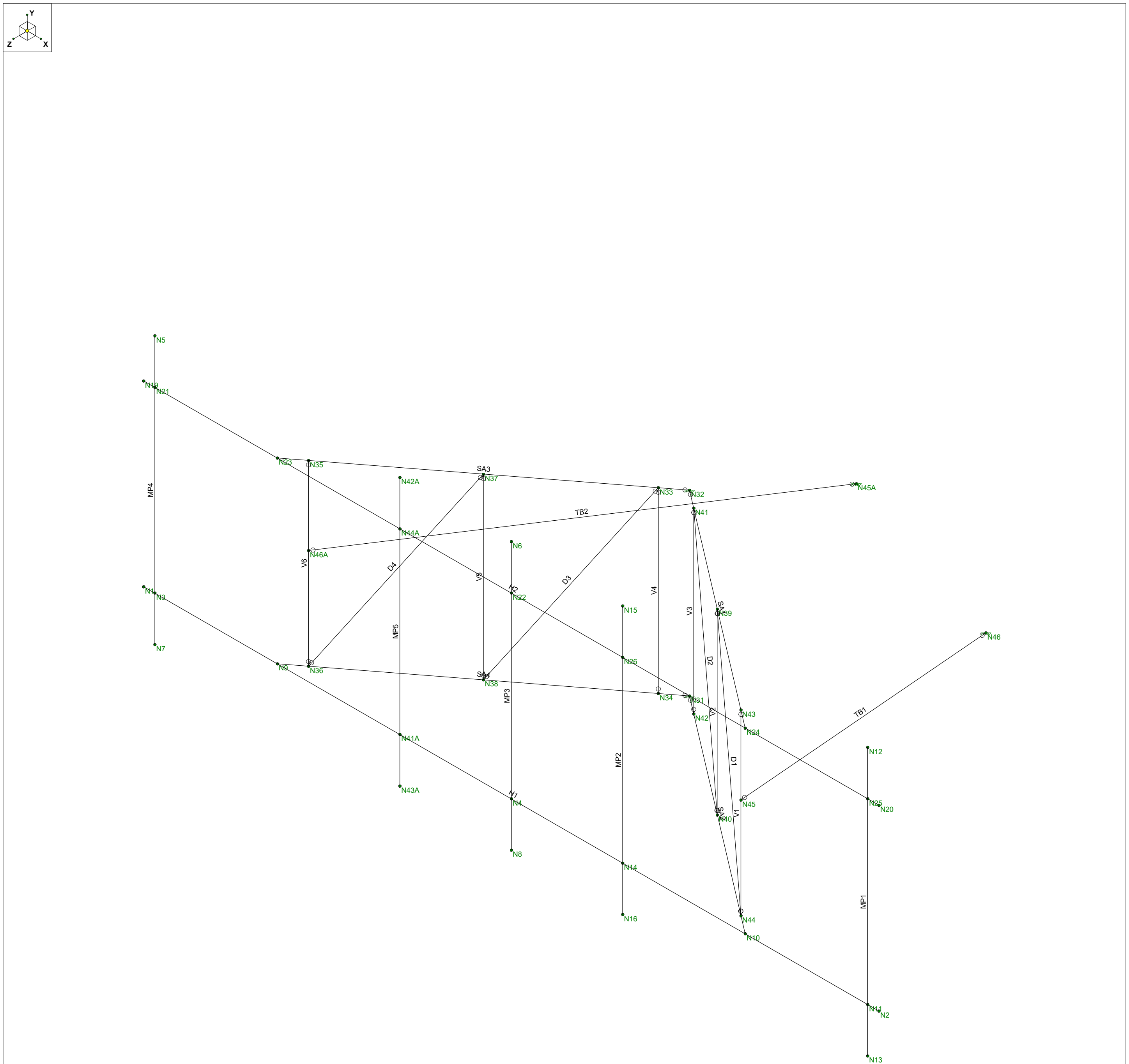
Assumed Steel Member Grades	
Angles/Plates/Channels/Solid Rods	ASTM A36, 36 ksi
Pipes	ASTM A53 Gr. B, 35 ksi
Unistrut	ASTM A653 SS, 33 ksi

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

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

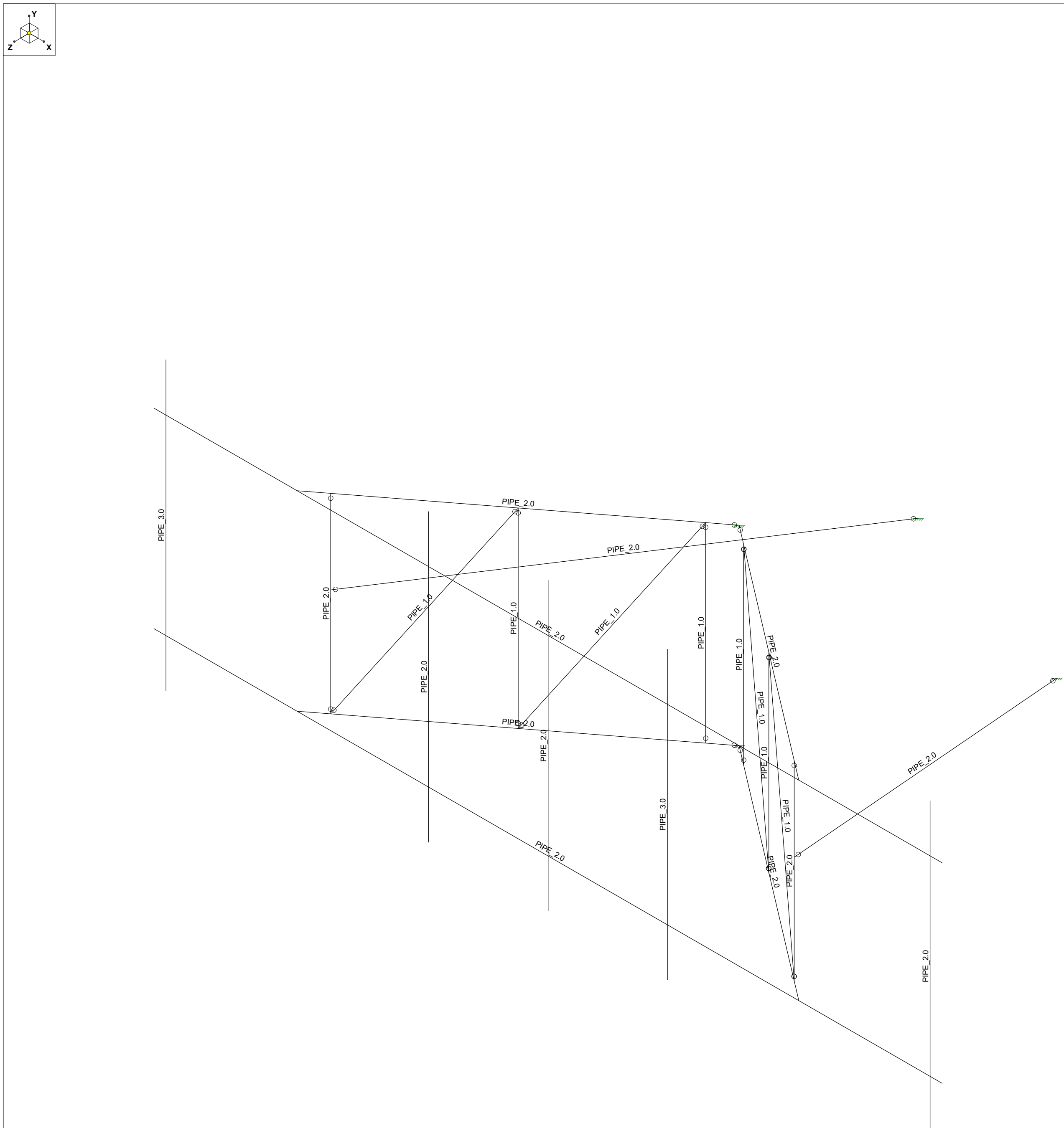
ATTACHMENTS

- Analysis Figures
- Analysis Calculations



Envelope Only Solution

Ramaker & Associates	W. Coventry (CT33XC550)	SK - 1
JMA		Nov 7, 2017 at 3:21 PM
23012		23012 Sector Frame_Rev1.r3d



Envelope Only Solution

Ramaker & Associates	W. Coventry (CT33XC550)	SK - 2
JMA		Nov 7, 2017 at 3:22 PM
23012		23012 Sector Frame_Rev1.r3d

RAMAKER & ASSOCIATES, INC.
855 Community Drive, Sauk City, WI 53583
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Job:	W. Coventry (CT33XC550)
Project:	23012
By:	JMA
Date:	11/7/17

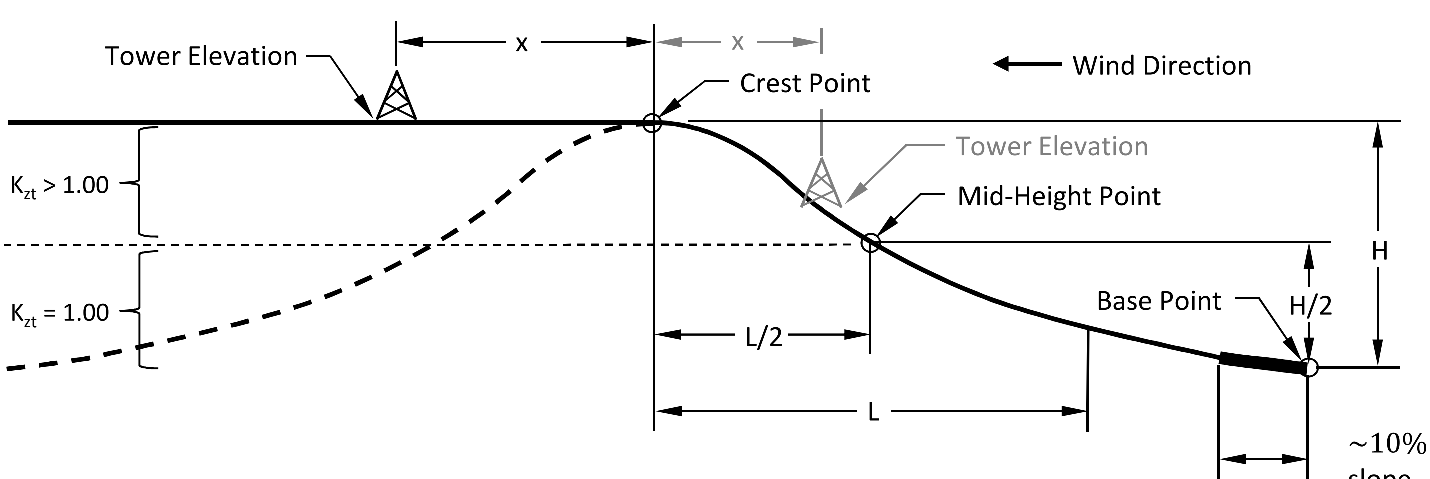
Topographical Multipliers

2.6.2 Topographic Factor KT

Elevations are Above Mean Sea Level

Method =	SEAW RSM-03
Topographic Feature =	Continuous Ridge

Exp =	C		Exposure Category		Override z Value	
Original Input z =	148	ft	Height of antennas above ground level			ft
CP Elev =	806	ft	Crest Point Elevation			
BP Elev =	667	ft	Base Point Elevation			
MHP Elev =	736.5	ft	Mid-Height Point Elevation			
L/2 =	609	ft	Crest to Mid-Height Distance			
TP Elev =	806	ft	Tower Point Elevation		Potential Tower Dist. x	
x =	0	ft	Tower Distance from Crest Line		0.0	ft
H =	139	ft	Crest Height			
L =	1218	ft	Slope Distance			
x =	0	ft	Distance from Crest Line			
KT =	1.35		Topographic Factor at z = 148.0 ft			



L is twice the width at the midheight of the slope

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Wind Load on Antennas TIA-222-G

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	C	Exposure Category
V:	97 mph	Basic Wind Speed (Annex B)
z:	148 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K_z:	1.37	Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.35	Topographic Factor (2.6.6.4)
K_d:	0.95	Wind Direction Probability Factor (Table 2-2)
q_z:	42.4 psf	Velocity Pressure at Height z
G_h:	1.00	Strength Design of Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
DT465B-2XR	71.9	13.8	5.2	Flat	1.320	6.89	385.6	
APXVSPP18-C-A20	72.0	11.9	6.1	Flat	1.358	5.95	342.2	
1900MHz 4x45W RRH	25.1	11.1	2.3	Flat	1.200	1.93	98.4	
800MHz 2x50W RRH	19.0	13.0	1.5	Flat	1.200	1.72	87.2	
TD-RRH8x20-25	26.1	18.6	1.4	Flat	1.200	3.37	171.4	
Pipe3STD x 6 ft	72.0	3.5	20.6	Round	0.934	1.75	69.3	11.5
Pipe2STD x 16.5 ft	198.0	2.4	83.4	Round	1.200	3.27	166.1	10.1
Pipe2STD x 8.9 ft	106.8	2.4	45.0	Round	1.200	1.76	89.6	10.1
Pipe2STD x 6.6 ft	79.2	2.4	33.3	Round	1.200	1.31	66.4	10.1
Pipe2STD x 6 ft	72.0	2.4	30.3	Round	1.200	1.19	60.4	10.1
Pipe2STD x 4 ft	48.0	2.4	20.2	Round	1.094	0.79	36.7	9.2
Pipe1STD x 4.833 ft	58.0	1.3	44.1	Round	1.200	0.53	26.9	5.6
Pipe1STD x 4 ft	48.0	1.3	36.5	Round	1.200	0.44	22.3	5.6

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By:	JMA
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Wind Load on Antennas TIA-222-G

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	C	Exposure Category
V:	97 mph	Basic Wind Speed (Annex B)
z:	148 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K_z:	1.37	Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.35	Topographic Factor (2.6.6.4)
K_d:	0.95	Wind Direction Probability Factor (Table 2-2)
q_z:	42.4 psf	Velocity Pressure at Height z
G_h:	1.00	Strength Design of Appurtenances and their Connections

Mount & Antenna Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
DT465B-2XR	71.9	8.2	8.8	Flat	1.459	4.09	253.1	
APXVSPP18-C-A20	72.0	7.0	10.3	Flat	1.509	3.50	224.1	
1900MHz 4x45W RRH	25.1	10.7	2.3	Flat	1.200	1.86	94.8	
800MHz 2x50W RRH	19.0	12.2	1.6	Flat	1.200	1.61	81.9	
TD-RRH8x20-25	26.1	6.7	3.9	Flat	1.262	1.21	64.9	
Pipe3STD x 6 ft	72.0	3.5	20.6	Round	0.934	1.75	69.3	11.5
Pipe2STD x 16.5 ft	198.0	2.4	83.4	Round	1.200	3.27	166.1	10.1
Pipe2STD x 8.9 ft	106.8	2.4	45.0	Round	1.200	1.76	89.6	10.1
Pipe2STD x 6.6 ft	79.2	2.4	33.3	Round	1.200	1.31	66.4	10.1
Pipe2STD x 6 ft	72.0	2.4	30.3	Round	1.200	1.19	60.4	10.1
Pipe2STD x 4 ft	48.0	2.4	20.2	Round	1.094	0.79	36.7	9.2
Pipe1STD x 4.833 ft	58.0	1.3	44.1	Round	1.200	0.53	26.9	5.6
Pipe1STD x 4 ft	48.0	1.3	36.5	Round	1.200	0.44	22.3	5.6

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By:	JMA
Date:	11/7/17

Ice Wind Load on Antennas TIA-222-G

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	C	Exposure Category
V_i:	50 mph	Basic Wind Speed (Annex B)
z:	148 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K_z:	1.37	Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.35	Topographic Factor (2.6.6.4)
K_d:	0.95	Wind Direction Probability Factor (Table 2-2)
q_z:	11.26 psf	Velocity Pressure at Height z
G_h:	1.00	Strength Design of Appurtenances and their Connections
K_{iz}:	1.16	Height Escalation Factor for Ice Thickness
t_{iz}:	2.58 in	Factored Thickness of Radial Glaze Ice at Height z

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
DT465B-2XR	77.1	19.0	4.1	Flat	1.270	10.15	145.0	
APXVSPP18-C-A20	77.2	17.0	4.5	Flat	1.290	9.14	132.7	
1900MHz 4x45W RRH	30.3	16.3	1.9	Flat	1.200	3.42	46.2	
800MHz 2x50W RRH	24.2	18.2	1.3	Flat	1.200	3.05	41.2	
TD-RRH8x20-25	31.3	23.8	1.3	Flat	1.200	5.16	69.7	
Pipe3STD x 6 ft	77.2	8.7	8.9	Round	0.842	4.64	44.0	6.8
Pipe2STD x 16.5 ft	203.2	7.5	27.0	Round	1.200	10.63	143.6	8.5
Pipe2STD x 8.9 ft	112.0	7.5	14.9	Round	0.975	5.86	64.3	6.9
Pipe2STD x 6.6 ft	84.4	7.5	11.2	Round	0.893	4.41	44.4	6.3
Pipe2STD x 6 ft	77.2	7.5	10.2	Round	0.872	4.04	39.6	6.2
Pipe2STD x 4 ft	53.2	7.5	7.1	Round	0.801	2.78	25.1	5.7
Pipe1STD x 4.833 ft	63.2	6.5	9.8	Round	0.861	2.84	27.5	5.2
Pipe1STD x 4 ft	53.2	6.5	8.2	Round	0.827	2.39	22.3	5.0

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Project:	23012
By:	JMA
Date:	11/7/17

Ice Wind Load on Antennas TIA-222-G

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	II	Classification of Structures (Table 2-1)
Exposure:	C	Exposure Category
V_i:	50 mph	Basic Wind Speed (Annex B)
z:	148 ft	Height above ground level to the center of the antenna
I:	1.00	Importance Factor (Table 2-3)
K_z:	1.37	Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.35	Topographic Factor (2.6.6.4)
K_d:	0.95	Wind Direction Probability Factor (Table 2-2)
q_z:	11.26 psf	Velocity Pressure at Height z
G_h:	1.00	Strength Design of Appurtenances and their Connections
K_{iz}:	1.16	Height Escalation Factor for Ice Thickness
t_{iz}:	2.58 in	Factored Thickness of Radial Glaze Ice at Height z

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Depth	h/D	Shape	C_a	A_f	Force	Force
	in	*in*				*sq ft*	*lb*	*plf*
DT465B-2XR	77.1	13.4	5.8	Flat	1.345	7.15	108.3	
APXVSPP18-C-A20	77.2	12.2	6.3	Flat	1.371	6.52	100.6	
1900MHz 4x45W RRH	30.3	15.8	1.9	Flat	1.200	3.33	45.0	
800MHz 2x50W RRH	24.2	17.4	1.4	Flat	1.200	2.91	39.3	
TD-RRH8x20-25	31.3	11.9	2.6	Flat	1.206	2.57	35.0	
Pipe3STD x 6 ft	77.2	8.7	8.9	Round	0.842	4.64	44.0	6.8
Pipe2STD x 16.5 ft	203.2	7.5	27.0	Round	1.200	10.63	143.6	8.5
Pipe2STD x 8.9 ft	112.0	7.5	14.9	Round	0.975	5.86	64.3	6.9
Pipe2STD x 6.6 ft	84.4	7.5	11.2	Round	0.893	4.41	44.4	6.3
Pipe2STD x 6 ft	77.2	7.5	10.2	Round	0.872	4.04	39.6	6.2
Pipe2STD x 4 ft	53.2	7.5	7.1	Round	0.801	2.78	25.1	5.7
Pipe1STD x 4.833 ft	63.2	6.5	9.8	Round	0.861	2.84	27.5	5.2
Pipe1STD x 4 ft	53.2	6.5	8.2	Round	0.827	2.39	22.3	5.0

RAMAKER
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Job:	W. Coventry (CT33XC550)
Project:	23012
By:	JMA
Date:	11/7/17

Ice Load on Antennas TIA-222-G

Ice Weight:	56	pcf	Ice Density
t_i:	1.00		Design Ice Thickness
Occupancy:	II		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V_i:	50	mph	Basic Wind Speed (Annex B)
z:	148	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_{iz}:	1.16		Height Escalation Factor for Ice Thickness
K_{zt}:	1.35		Topographic Factor (2.6.6.4)
t_{iz}:	2.58	in	Factored Thickness of Radial Glaze Ice at Height z

Platform Grating:	None	
Ice Load:		psf

Mount & Antenna Ice Wind Loads

Appurtenance	Height	Width	Depth	Diam.	Area	Perim.	Ice Weight	
	in	*in*	*in*	*in*	*sq in*	*in*	*lb*	*plf*
DT465B-2XR	77.1	19.0	13.4	16.05	150.98	54.32	351.8	
APXVSPP18-C-A20	77.2	17.0	12.2	13.80	132.74	48.11	309.8	
1900MHz 4x45W RRH	30.3	16.3	15.8	15.41	145.78	53.90	118.6	
800MHz 2x50W RRH	24.2	18.2	17.4	17.83	165.37	60.72	101.8	
TD-RRH8x20-25	31.3	23.8	11.9	19.77	181.11	60.92	153.2	
Pipe3STD x 6 ft	77.2	8.7	8.7	3.50	49.26	19.10	114.9	19.2
Pipe2STD x 16.5 ft	203.2	7.5	7.5	2.38	40.15	15.56	257.6	15.6
Pipe2STD x 8.9 ft	112.0	7.5	7.5	2.38	40.15	15.56	139.0	15.6
Pipe2STD x 6.6 ft	84.4	7.5	7.5	2.38	40.15	15.56	103.0	15.6
Pipe2STD x 6 ft	77.2	7.5	7.5	2.38	40.15	15.56	93.7	15.6
Pipe2STD x 4 ft	53.2	7.5	7.5	2.38	40.15	15.56	62.5	15.6
Pipe1STD x 4.833 ft	63.2	6.5	6.5	1.32	31.56	12.23	59.3	12.3
Pipe1STD x 4 ft	53.2	6.5	6.5	1.32	31.56	12.23	49.1	12.3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	horiz face pipes	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
2	pipe mount	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
3	sector frame pi...	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25
4	proposed pipe ...	PIPE_3.0	Beam	Pipe	A53 Gr. B	Typical	2.07	2.85	2.85	5.69
5	small sector fra...	PIPE_1.0	Beam	Pipe	A53 Gr. B	Typical	.469	.083	.083	.166
6	med. sector fra...	PIPE_2.0	Beam	Pipe	A53 Gr. B	Typical	1.02	.627	.627	1.25

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	H1	N1	N2			horiz face pipes	Beam	Pipe	A53 Gr. B	Typical
2	MP4	N7	N5			proposed pipe ...	Beam	Pipe	A53 Gr. B	Typical
3	MP3	N8	N6			pipe mount	Beam	Pipe	A53 Gr. B	Typical
4	MP1	N12	N13			pipe mount	Beam	Pipe	A53 Gr. B	Typical
5	MP2	N15	N16			proposed pipe ...	Beam	Pipe	A53 Gr. B	Typical
6	H2	N19	N20			horiz face pipes	Beam	Pipe	A53 Gr. B	Typical
7	SA3	N32	N23			sector frame pi...	Beam	Pipe	A53 Gr. B	Typical
8	SA4	N31	N9			sector frame pi...	Beam	Pipe	A53 Gr. B	Typical
9	SA1	N32	N24			sector frame pi...	Beam	Pipe	A53 Gr. B	Typical
10	SA2	N31	N10			sector frame pi...	Beam	Pipe	A53 Gr. B	Typical
11	D4	N36	N37			small sector fr...	Beam	Pipe	A53 Gr. B	Typical
12	V5	N37	N38			small sector fr...	Beam	Pipe	A53 Gr. B	Typical
13	D3	N38	N33			small sector fr...	Beam	Pipe	A53 Gr. B	Typical
14	V4	N33	N34			small sector fr...	Beam	Pipe	A53 Gr. B	Typical
15	V3	N41	N42			small sector fr...	Beam	Pipe	A53 Gr. B	Typical
16	D2	N41	N40			small sector fr...	Beam	Pipe	A53 Gr. B	Typical
17	V2	N40	N39			small sector fr...	Beam	Pipe	A53 Gr. B	Typical
18	D1	N39	N44			small sector fr...	Beam	Pipe	A53 Gr. B	Typical
19	V6	N35	N36			med. sector fra...	Beam	Pipe	A53 Gr. B	Typical
20	V1	N43	N44			med. sector fra...	Beam	Pipe	A53 Gr. B	Typical
21	TB1	N45	N46			sector frame pi...	Beam	Pipe	A53 Gr. B	Typical
22	MP5	N43A	N42A			pipe mount	Beam	Pipe	A53 Gr. B	Typical
23	TB2	N46A	N45A			pipe mount	Beam	Pipe	A53 Gr. B	Typical

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
1	Dead Load	None		-1			8			
2	Antenna Wind 0	None					16			
3	Antenna Wind 30	None					16			
4	Antenna Wind 45	None					16			
5	Antenna Wind 60	None					16			
6	Antenna Wind 90	None					16			
7	Antenna Wind 120	None					16			

Basic Load Cases (Continued)

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

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
65	Member Wind w/Ice 300	None						46		
66	Member Wind w/Ice 315	None						46		
67	Member Wind w/Ice 330	None						46		
68	Live Load - Area	None								
69	Live Load - Point 1	None					2			
70	Live Load - Point 2	None					2			
71	Live Load - Point 3	None					2			
72	Railing Dist. LL z	None								
73	Railing Dist. LL x	None								
74	Railing Point LL z	None								
75	Railing Point LL x	None								

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.4D	Yes	Y		1	1.4																		
2	0.9D + 1.6 (0-Wind)	Yes	Y		1	.9	2	1.6	35	1.6														
3	0.9D + 1.6 (30-Wind)	Yes	Y		1	.9	3	1.6	36	1.6														
4	0.9D + 1.6 (45-Wind)	Yes	Y		1	.9	4	1.6	37	1.6														
5	0.9D + 1.6 (60-Wind)	Yes	Y		1	.9	5	1.6	38	1.6														
6	0.9D + 1.6 (90-Wind)	Yes	Y		1	.9	6	1.6	39	1.6														
7	0.9D + 1.6 (120-Wi...	Yes	Y		1	.9	7	1.6	40	1.6														
8	0.9D + 1.6 (135-Wi...	Yes	Y		1	.9	8	1.6	41	1.6														
9	0.9D + 1.6 (150-Wi...	Yes	Y		1	.9	9	1.6	42	1.6														
10	0.9D + 1.6 (180-Wi...	Yes	Y		1	.9	10	1.6	43	1.6														
11	0.9D + 1.6 (210-Wi...	Yes	Y		1	.9	11	1.6	44	1.6														
12	0.9D + 1.6 (225-Wi...	Yes	Y		1	.9	12	1.6	45	1.6														
13	0.9D + 1.6 (240-Wi...	Yes	Y		1	.9	13	1.6	46	1.6														
14	0.9D + 1.6 (270-Wi...	Yes	Y		1	.9	14	1.6	47	1.6														
15	0.9D + 1.6 (300-Wi...	Yes	Y		1	.9	15	1.6	48	1.6														
16	0.9D + 1.6 (315-Wi...	Yes	Y		1	.9	16	1.6	49	1.6														
17	0.9D + 1.6 (330-Wi...	Yes	Y		1	.9	17	1.6	50	1.6														
18	1.2D + 1.6 (0-Wind)	Yes	Y		1	1.2	2	1.6	35	1.6														
19	1.2D + 1.6 (30-Wind)	Yes	Y		1	1.2	3	1.6	36	1.6														
20	1.2D + 1.6 (45-Wind)	Yes	Y		1	1.2	4	1.6	37	1.6														
21	1.2D + 1.6 (60-Wind)	Yes	Y		1	1.2	5	1.6	38	1.6														
22	1.2D + 1.6 (90-Wind)	Yes	Y		1	1.2	6	1.6	39	1.6														
23	1.2D + 1.6 (120-Wi...	Yes	Y		1	1.2	7	1.6	40	1.6														
24	1.2D + 1.6 (135-Wi...	Yes	Y		1	1.2	8	1.6	41	1.6														
25	1.2D + 1.6 (150-Wi...	Yes	Y		1	1.2	9	1.6	42	1.6														
26	1.2D + 1.6 (180-Wi...	Yes	Y		1	1.2	10	1.6	43	1.6														
27	1.2D + 1.6 (210-Wi...	Yes	Y		1	1.2	11	1.6	44	1.6														
28	1.2D + 1.6 (225-Wi...	Yes	Y		1	1.2	12	1.6	45	1.6														
29	1.2D + 1.6 (240-Wi...	Yes	Y		1	1.2	13	1.6	46	1.6														
30	1.2D + 1.6 (270-Wi...	Yes	Y		1	1.2	14	1.6	47	1.6														
31	1.2D + 1.6 (300-Wi...	Yes	Y		1	1.2	15	1.6	48	1.6														
32	1.2D + 1.6 (315-Wi...	Yes	Y		1	1.2	16	1.6	49	1.6														
33	1.2D + 1.6 (330-Wi...	Yes	Y		1	1.2	17	1.6	50	1.6														
34	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	19	1	52	1										
35	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	20	1	53	1										
36	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	21	1	54	1										
37	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	22	1	55	1										
38	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	23	1	56	1										
39	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	24	1	57	1										
40	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	25	1	58	1										
41	1.2D + 1.0Di + 1.0 (...	Yes	Y		1	1.2	18	1	51	1	26	1	59	1										

Load Combinations (Continued)

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
42	1.2D + 1.0Di + 1.0 (..	Yes	Y		1	1.2	18	1	51	1	27	1	60	1										
43	1.2D + 1.0Di + 1.0 (..	Yes	Y		1	1.2	18	1	51	1	28	1	61	1										
44	1.2D + 1.0Di + 1.0 (..	Yes	Y		1	1.2	18	1	51	1	29	1	62	1										
45	1.2D + 1.0Di + 1.0 (..	Yes	Y		1	1.2	18	1	51	1	30	1	63	1										
46	1.2D + 1.0Di + 1.0 (..	Yes	Y		1	1.2	18	1	51	1	31	1	64	1										
47	1.2D + 1.0Di + 1.0 (..	Yes	Y		1	1.2	18	1	51	1	32	1	65	1										
48	1.2D + 1.0Di + 1.0 (..	Yes	Y		1	1.2	18	1	51	1	33	1	66	1										
49	1.2D + 1.0Di + 1.0 (..	Yes	Y		1	1.2	18	1	51	1	34	1	67	1										
50	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	68	1.5	72	1.5														
51	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	68	1.5	73	1.5														
52	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	68	1.5	74	1.5														
53	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	68	1.5	75	1.5														
54	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	69	1.5	72	1.5														
55	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	69	1.5	73	1.5														
56	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	69	1.5	74	1.5														
57	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	69	1.5	75	1.5														
58	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	70	1.5	72	1.5														
59	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	70	1.5	73	1.5														
60	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	70	1.5	74	1.5														
61	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	70	1.5	75	1.5														
62	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	71	1.5	72	1.5														
63	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	71	1.5	73	1.5														
64	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	71	1.5	74	1.5														
65	1.0D + 1.5LL + 1.5 ..	Yes	Y		1	1	71	1.5	75	1.5														
66	Serviceability (0-Wi..	Yes	Y		1	1	2	.342	35	.342														
67	Serviceability (30-...	Yes	Y		1	1	3	.342	36	.342														
68	Serviceability (45-...	Yes	Y		1	1	4	.342	37	.342														
69	Serviceability (60-...	Yes	Y		1	1	5	.342	38	.342														
70	Serviceability (90-...	Yes	Y		1	1	6	.342	39	.342														
71	Serviceability (120-..	Yes	Y		1	1	7	.342	40	.342														
72	Serviceability (135-..	Yes	Y		1	1	8	.342	41	.342														
73	Serviceability (150-..	Yes	Y		1	1	9	.342	42	.342														
74	Serviceability (180-..	Yes	Y		1	1	10	.342	43	.342														
75	Serviceability (210-..	Yes	Y		1	1	11	.342	44	.342														
76	Serviceability (225-..	Yes	Y		1	1	12	.342	45	.342														
77	Serviceability (240-..	Yes	Y		1	1	13	.342	46	.342														
78	Serviceability (270-..	Yes	Y		1	1	14	.342	47	.342														
79	Serviceability (300-..	Yes	Y		1	1	15	.342	48	.342														
80	Serviceability (315-..	Yes	Y		1	1	16	.342	49	.342														
81	Serviceability (330-..	Yes	Y		1	1	17	.342	50	.342														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N32	max	1719.236	30	2289.164	36	1276.279	17	48.97	54	0	1	12.408	58
2		min	-1436.363	6	393.283	11	-4338.689	41	-24.894	26	0	1	-30.283	62
3	N31	max	1349.896	14	1969.499	43	4305.727	34	44.746	54	0	1	11.447	58
4		min	-1633.993	22	347.379	3	-1242.308	10	-19.859	18	0	1	-31.389	62
5	N46	max	134.301	24	60.265	47	1730.436	23	.597	14	0	1	7.169	14
6		min	-121.124	16	9.141	5	-1727.831	15	-1.46	38	0	1	-17.522	38
7	N45A	max	405.95	8	88.178	40	756.877	32	8.187	39	0	1	6.024	15
8		min	-416.772	32	13.733	16	-751.304	8	-3.925	15	0	1	-12.566	39
9	Totals:	max	2593.218	14	4403.327	39	3564.048	2						
10		min	-2593.218	6	775.698	17	-3564.048	10						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc......	L...	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	H1	PIPE_2.0	.770	2.922	18	.094	2.9...	41	8922....	32130	1871....	1871....	2..	H1-1b
2	MP4	PIPE_3.0	.128	5	45	.025	1	36	53775...	65205	5748.75	5748.75	1..	H1-1b
3	MP3	PIPE_2.0	.088	5	38	.023	5	38	20866...	32130	1871....	1871....	1..	H1-1b
4	MP1	PIPE_2.0	.222	5	54	.034	1	18	20866...	32130	1871....	1871....	1..	H1-1b
5	MP2	PIPE_3.0	.064	5	58	.018	1	31	53775...	65205	5748.75	5748.75	1..	H1-1b
6	H2	PIPE_2.0	.765	2.922	26	.091	2.9...	36	8922....	32130	1871....	1871....	2..	H1-1b
7	SA3	PIPE_2.0	.370	.481	42	.140	0	39	19057...	32130	1871....	1871....	2..	H1-1b
8	SA4	PIPE_2.0	.456	.55	35	.126	0	37	19057...	32130	1871....	1871....	2..	H1-1a
9	SA1	PIPE_2.0	.315	.481	41	.119	0	43	19057...	32130	1871....	1871....	2..	H1-1b
10	SA2	PIPE_2.0	.333	.55	49	.110	0	34	19057...	32130	1871....	1871....	2..	H1-1b
11	D4	PIPE_1.0	.155	2.441	38	.058	4.8...	2	5461....	14773.5	464.625	464.625	1..	H1-1b
12	V5	PIPE_1.0	.328	2.208	39	.010	0	23	7587....	14773.5	464.625	464.625	1..	H1-1a
13	D3	PIPE_1.0	.279	2.492	38	.020	4.8...	2	5461....	14773.5	464.625	464.625	1..	H1-1a
14	V4	PIPE_1.0	.167	4	37	.011	0	21	7587....	14773.5	464.625	464.625	1..	H1-1...
15	V3	PIPE_1.0	.142	4	45	.014	0	39	7587....	14773.5	464.625	464.625	1..	H1-1...
16	D2	PIPE_1.0	.162	2.441	46	.011	4.8...	44	5461....	14773.5	464.625	464.625	1..	H1-1b
17	V2	PIPE_1.0	.274	1.792	48	.012	0	37	7587....	14773.5	464.625	464.625	1..	H1-1a
18	D1	PIPE_1.0	.138	2.441	46	.028	4.8...	27	5461....	14773.5	464.625	464.625	1..	H1-1b
19	V6	PIPE_2.0	.458	1.75	31	.056	0	23	26521...	32130	1871....	1871....	1..	H1-1b
20	V1	PIPE_2.0	.950	1.75	31	.109	0	31	26521...	32130	1871....	1871....	1..	H1-1b
21	TB1	PIPE_2.0	.085	0	23	.017	6.0...	38	20804...	32130	1871....	1871....	1..	H1-1...
22	MP5	PIPE_2.0	.198	5	38	.043	5	39	20866...	32130	1871....	1871....	1..	H1-1b
23	TB2	PIPE_2.0	.123	4.444	47	.019	8.8...	39	12451...	32130	1871....	1871....	1..	H1-1b

April 11, 2019

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** **150-FOOT GUYED TOWER**		
CARRIER:	**SPRINT**		
SITE:	**W. COVENTRY (CT33XC550-A)** **130 VERNON ROAD** **BOLTON, TOLLAND COUNTY, CONNECTICUT 06091** **RAMAKER & ASSOCIATES PROJECT NUMBER: 23012**		
RESULTS:	**TOWER:**	**71.7%**	**PASS**
	FOUNDATION:	**52.3%**	**PASS**

Dear Tom Jupin:

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

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

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

Sincerely,

RAMAKER & ASSOCIATES, INC.

James M. Alvin
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer

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

ANALYSIS CRITERIA

State Building Code	2018 CT State Building Code
Adopted Building Code	2015 IBC
Referenced Standard	TIA-222-G
Risk Category	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	C
Topographic Category	3
Crest Height	140 FT

SUPPORTING DOCUMENTATION

- Geotechnical report by Dr. Clarence Welti, P.E., P.C., dated April 23, 2001
- Previous Structural Analysis by Centek Engineering, Inc., project number 17012.45, dated April 20, 2017
- Tower drawings by Pirod Inc., drawing number 159234-B, dated 10/17/2001
- Construction drawings by RAMAKER, project number 23012
- Site visit(s) conducted by RAMAKER
- Other pertinent data procured or assumed by RAMAKER during site due diligence activities

TOWER LOADING

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

Elevation	Appurtenance	Mount	Coax	Owner	Status
148	(3) RFS APXVSPP18-C-A20	(3) Sector Frame	(3) 1-1/4	Sprint	Existing
	(3) ALU 1900MHz 4x45W RRH				
	(3) ALU 800MHz 2x50W RRH				
	(3) Commscope DT465B-2XR		**(1) Fiber**		**Proposed**
	(3) ALU TD-RRH8x20-25				
	(3) ALU 800MHz 2x50W RRH				
130	**(2) Andrew SBNH-1D65C**	**(2) Sector Frame**	**(4) 1-5/8** **(2) 1-1/4**	**T-Mobile**	**Future**
	(2) Ericsson AIR21 B2P/B4A				
	(2) Ericsson RRUS-11 B12				
	(2) Twin AWS TMA				
122	--	(1) Standoff	--	Abandoned	Existing

TOWER RESULTS

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

Component Type	Percent Capacity	Pass/Fail
Leg	39.6	Pass
Diagonal	46.9	Pass
Horizontal	20.5	Pass
Guy Pull Off	32.1	Pass
Torque Arm	25.8	Pass
Guy Line	71.7	Pass
Bolt	13.0	Pass
RATING	**71.7**	**PASS**

Note: A rating of 105% or less is within engineering tolerances and considered acceptable.

Results of the analysis show that the existing tower will be stressed to a maximum of 71.7 percent of capacity. Therefore, the existing tower will pass the TIA-222-G analysis requirements under proposed loading conditions.

FOUNDATION RESULTS

The maximum foundation stress capacities are as follows:

Component Type	Percent Capacity	Pass/Fail
Tower Base Soil Interaction	28.2	Pass
Tower Base Structural	52.3	Pass
RATING	**52.3**	**PASS**

Note: A rating of 105% or less is within engineering tolerances and considered acceptable.

The foundations were analyzed utilizing the reports referenced above. Results of the analysis show that the existing foundation will be stressed to a maximum of 52.3 percent of capacity. Therefore, the existing foundation will pass the TIA-222-G analysis requirements under proposed loading conditions.

FOUNDATION REACTIONS

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

Load Type	ASD Design	Modified ASD	Proposed Model
Axial (k)	213.2	287.8	142.8
Shear (k)	4.5	6.1	3.0
Anchor Uplift (k)	88.2	119.1	21.8
Anchor Lateral (k)	100.5	135.7	36.8

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 is anticipated 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

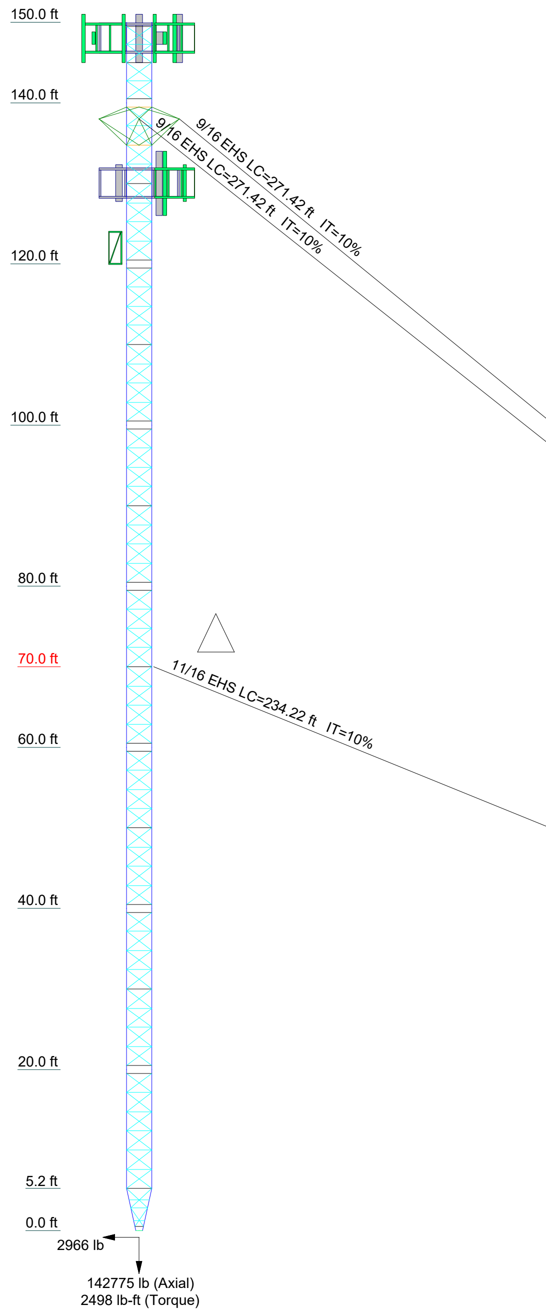
The tower owner is responsible for verifying that the existing loading on the structure is consistent with the loading applied to the structure within this report. If there is any information contrary to that contained herein, or if there are any defects arising from the original design, material, fabrication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

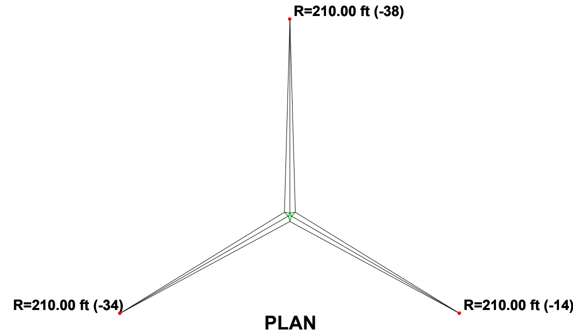
This analysis pertains only to the tower structure, and no analyses or conclusions were made regarding the antenna and equipment mounting structure(s). Analysis and certification of the antenna and equipment mounting structure(s) is performed and submitted separately.

ATTACHMENTS

- Analysis Figures
- Analysis Calculations

Section	T1	T2	T3	T4	T5	T6	T7	T8	T9
Legs	SR 2			SR 2 1/4				SR 2 1/2	
Leg Grade	A572-50								
Diagonals	SR 3/4								A
Diagonal Grade	A572-50								
Top Girts	SR 1	N.A.	SR 1						N.A.
Mid Girts	SR 1							N.A.	
Bottom Girts	SR 1							SR 1 1/4	SR 1
Horizontals	SR 3/4								6x1/2
Sec. Horizontals	N.A.								A
Top Guy Pull-Offs	N.A.	SR 1	N.A.						
Bot Guy Pull-Offs	N.A.	SR 1	N.A.						
Face Width (ft)	3.75								1
# Panels @ (ft)	4 @ 2.26	56 @ 2.38							
Weight (lb) 10345.3	591.8	1928.2	1107.6	1281.4	1281.4	1281.4	1281.4	1106.9	485.1





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/Mount Pipe (Sprint)	148	TD-RRH 8x20 (Sprint)	148
APXVSPP18-C-A20 w/Mount Pipe (Sprint)	148	TD-RRH 8x20 (Sprint)	148
APXVSPP18-C-A20 w/Mount Pipe (Sprint)	148	800MHz 2x50W RRH (Sprint)	148
1900MHz 4x40W RRH (Sprint)	148	800MHz 2x50W RRH (Sprint)	148
1900MHz 4x40W RRH (Sprint)	148	800MHz 2x50W RRH (Sprint)	148
1900MHz 4x40W RRH (Sprint)	148	Pirod 12' T-Frame Sector Mount (1) (T-Mobile)	130
800MHz 2x50W RRH (Sprint)	148	Pirod 12' T-Frame Sector Mount (1) (T-Mobile)	130
800MHz 2x50W RRH (Sprint)	148	SBNHH-1D65C w/Mount Pipe (T-Mobile)	130
800MHz 2x50W RRH (Sprint)	148	SBNHH-1D65C w/Mount Pipe (T-Mobile)	130
Sector Mount [SM 502-1] (Sprint)	148	AIR21 B2A/B4P (T-Mobile)	130
Sector Mount [SM 502-1] (Sprint)	148	AIR21 B2A/B4P (T-Mobile)	130
Sector Mount [SM 502-1] (Sprint)	148	RRUS-11 (T-Mobile)	130
DT465B-2XR w/3.5" Mount Pipe (Sprint)	148	RRUS-11 (T-Mobile)	130
DT465B-2XR w/3.5" Mount Pipe (Sprint)	148	TMA 12"x6"x4" (T-Mobile)	130
DT465B-2XR w/3.5" Mount Pipe (Sprint)	148	TMA 12"x6"x4" (T-Mobile)	130
TD-RRH 8x20 (Sprint)	148	4' Standoff (Abandoned)	122

SYMBOL LIST

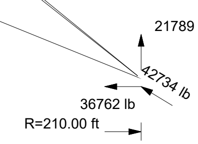
MARK	SIZE	MARK	SIZE
A	SR 7/8		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C 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 3 with Crest Height of 140.00 ft
8. TOWER RATING: 71.7%

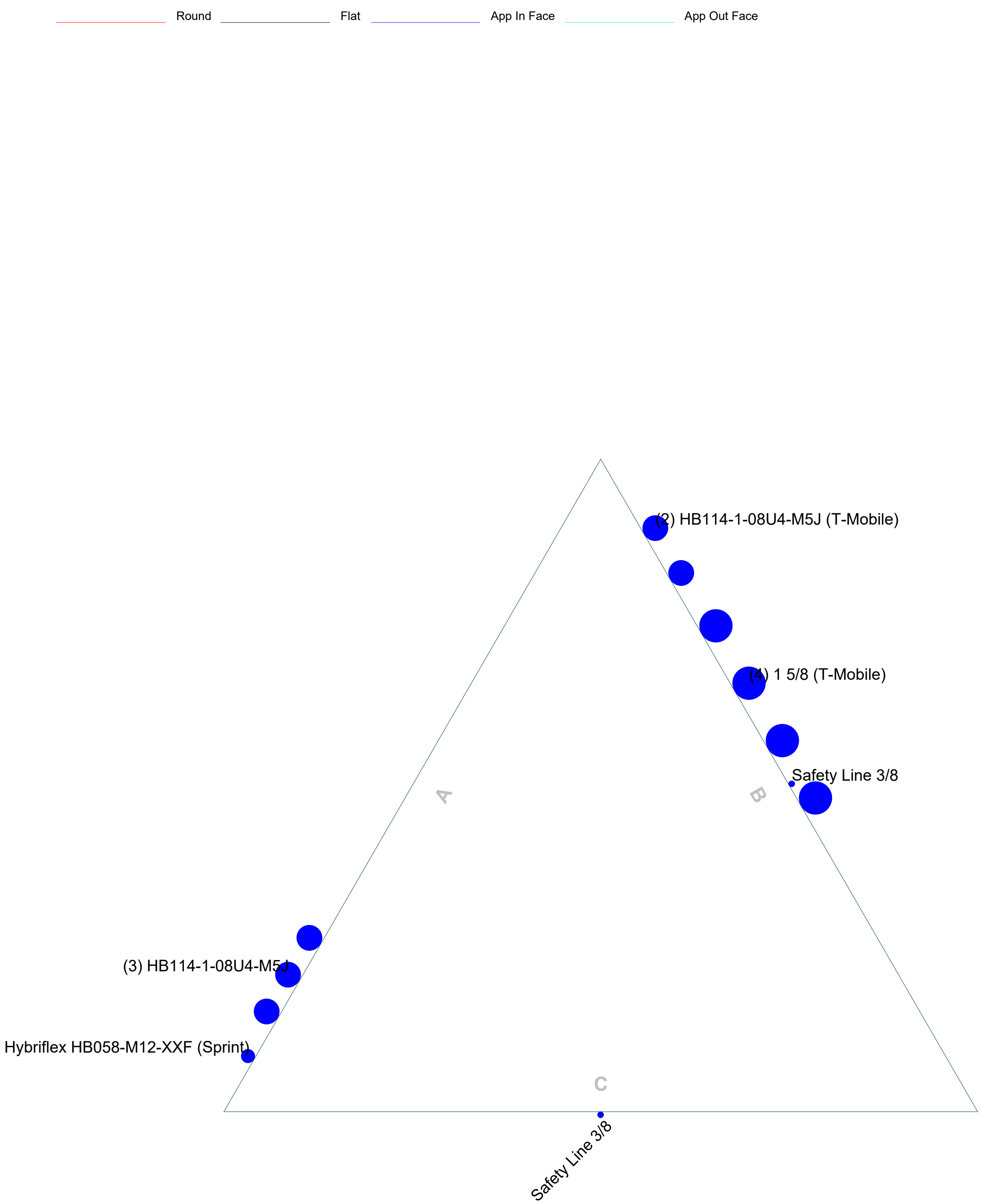


ALL REACTIONS ARE FACTORED

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

Job: ***W. Coventry (CT33XC550)***		
Project: ***23012***		
Client: Sprint	Drawn by: JMA	App'd:
Code: TIA-222-G	Date: 11/07/17	Scale: NTS
Path: I:\23000\23012\Structural\DO Macro Upgrade\tnx\23012 Tower_Rev2.eri		Dwg No. E-1

Feed Line Plan



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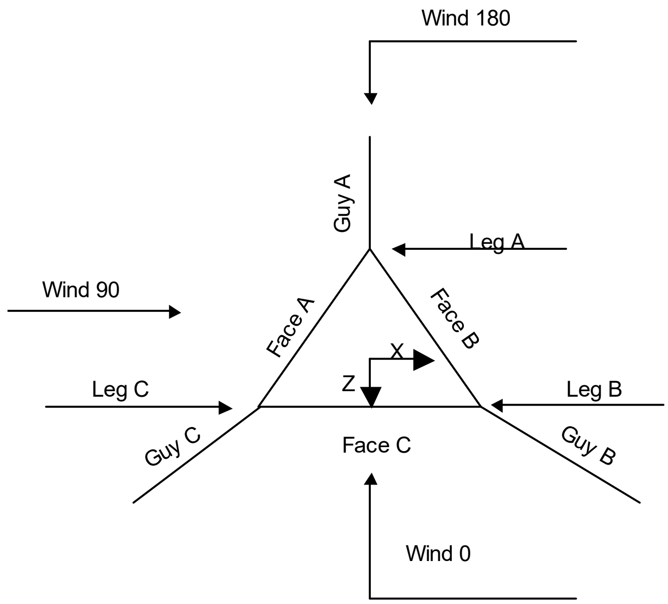
855 Community Drive	Project: ***23012***		
Sauk City, WI 53583	Client: Sprint	Drawn by: JMA	App'd:
Phone: (608) 643-4100	Code: TIA-222-G	Date: 11/07/17	Scale: NTS
FAX: (608) 643 7999	Path: I:\23000\23012\Structural\DO Macro Upgrade\tnx\23012 Tower_Rev2.eri		Dwg No. E-7

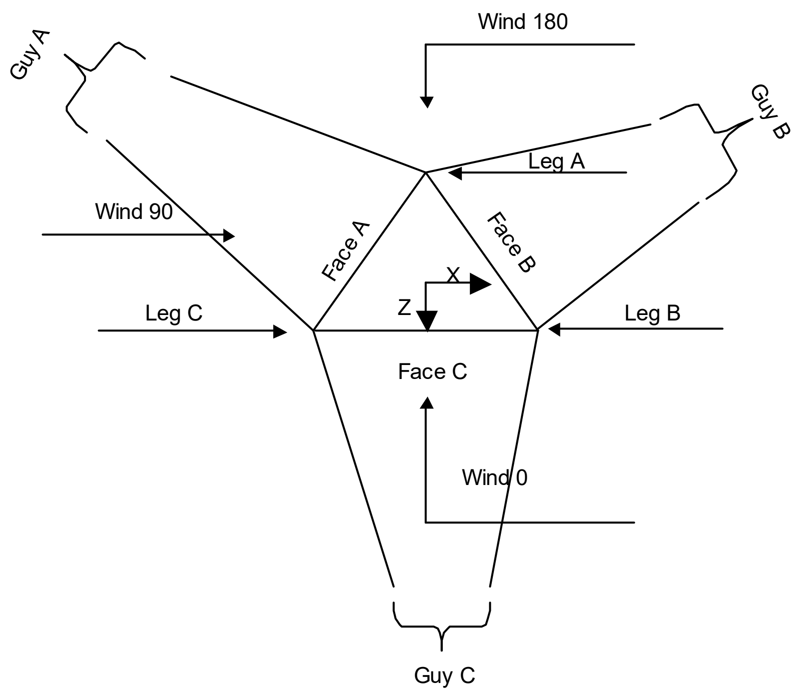
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 150.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.75 ft at the top and 1.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

- Tower is located in Tolland 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 C.
- Topographic Category 3.
- Crest Height 140.00 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.
- Pressures are calculated at each section.
- Safety factor used in guy design is 1.
- Stress ratio used in tower member design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation (ft)	Assembly Database	Description	Section Width (ft)	Number of Sections	Section Length (ft)
T1	150.00-140.00		48M 103923	3.75	1	10.00
T2	140.00-120.00		48M 103923	3.75	1	20.00
T3	120.00-100.00		48M 103923	3.75	1	20.00
T4	100.00-80.00		48M 103926	3.75	1	20.00
T5	80.00-60.00		48M 103926	3.75	1	20.00
T6	60.00-40.00		48M 103926	3.75	1	20.00
T7	40.00-20.00		48M 103926	3.75	1	20.00
T8	20.00-5.24			3.75	1	14.76
T9	5.24-0.00			3.75	1	5.24

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	150.00-140.00	2.26	X Brace	No	Steps	5.7600	5.7600
T2	140.00-120.00	2.38	X Brace	No	Steps	5.7600	5.7600
T3	120.00-100.00	2.38	X Brace	No	Steps	5.7600	5.7600
T4	100.00-80.00	2.38	X Brace	No	Steps	5.7600	5.7600
T5	80.00-60.00	2.38	X Brace	No	Steps	5.7600	5.7600
T6	60.00-40.00	2.38	X Brace	No	Steps	5.7600	5.7600
T7	40.00-20.00	2.38	X Brace	No	Steps	5.7600	5.7600
T8	20.00-5.24	2.38	X Brace	No	Steps	5.7600	0.0000
T9	5.24-0.00	2.38	X Brace	No	Yes	0.0000	5.7600

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T8 20.00-5.24	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T9 5.24-0.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 150.00-140.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T2 140.00-120.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 120.00-100.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T4 100.00-80.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T5 80.00-60.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T6 60.00-40.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T7 40.00-20.00	Solid Round	1	A572-50	Solid Round	1	A572-50

Tower Elevation ft	*Top Girt Type*	*Top Girt Size*	*Top Girt Grade*	*Bottom Girt Type*	*Bottom Girt Size*	*Bottom Girt Grade*
			(50 ksi)			(50 ksi)
T8 20.00-5.24	Solid Round	1	A572-50 (50 ksi)	Solid Round	1 1/4	A572-50 (50 ksi)
T9 5.24-0.00	Solid Round		A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*No. of Mid Girts*	*Mid Girt Type*	*Mid Girt Size*	*Mid Girt Grade*	*Horizontal Type*	*Horizontal Size*	*Horizontal Grade*
T1 150.00-140.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	1	Solid Round	1	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T8 20.00-5.24	None	Solid Round		A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T9 5.24-0.00	None	Solid Round		A572-50 (50 ksi)	Flat Bar	6x1/2	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Secondary Horizontal Type*	*Secondary Horizontal Size*	*Secondary Horizontal Grade*	*Inner Bracing Type*	*Inner Bracing Size*	*Inner Bracing Grade*
T9 5.24-0.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	*Gusset Area (per face) ft^2*	*Gusset Thickness in*	*Gusset Grade*	*Adjust. Factor A_f*	*Adjust. Factor A_r*	*Weight Mult.*	*Double Angle Stitch Bolt Spacing Diagonals in*	*Double Angle Stitch Bolt Spacing Horizontals in*	*Double Angle Stitch Bolt Spacing Redundants in*

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
T1 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000
T2 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000
T3 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000
T4 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000
T5 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000
T6 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000
T7 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000
T8 20.00-5.24	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000
T9 5.24-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.02	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

			K Factors[1]							
Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 150.00-140.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 140.00-120.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 120.00-100.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 100.00-80.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 80.00-60.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 60.00-40.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 40.00-20.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 20.00-5.24	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 5.24-0.00	No	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 150.00-140.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 140.00-120.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 120.00-100.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 100.00-80.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 80.00-60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 60.00-40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 40.00-20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 20.00-5.24	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 5.24-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 150.00-140.00	Flange	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 140.00-120.00	Flange	0.6250 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 120.00-100.00	Flange	0.6250 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 100.00-80.00	Flange	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 80.00-60.00	Flange	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 60.00-40.00	Flange	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 40.00-20.00	Flange	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 20.00-5.24	Flange	0.7500 A325N	5	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 5.24-0.00	Flange	0.7500 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
138	EHS	A	9/16	3500.00	10%	21000	0.671	271.20	210.00	0.0000	-38.00	100%
		B	9/16	3500.00	10%	21000	0.671	256.30	210.00	0.0000	-14.00	100%
		C	9/16	3500.00	10%	21000	0.671	268.63	210.00	0.0000	-34.00	100%

70	EHS	A	11/16	5000.00	10%	19000	1.000	234.02	210.00	0.0000	-38.00	100%
		B	11/16	5000.00	10%	19000	1.000	223.97	210.00	0.0000	-14.00	100%
		C	11/16	5000.00	10%	19000	1.000	232.20	210.00	0.0000	-34.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	*Mount Type*	*Torque-Arm Spread ft*	*Torque-Arm Leg Angle °*	*Torque-Arm Style*	*Torque-Arm Grade*	*Torque-Arm Type*	*Torque-Arm Size*
138	Torque Arm	12.00	15.0000	Wing	A36 (36 ksi)	Double Equal Angle	2L3x3x1/4x3/8
70	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	*Diagonal Grade*	*Diagonal Type*	*Upper Diagonal Size*	*Lower Diagonal Size*	*Is Strap.*	*Pull-Off Grade*	*Pull-Off Type*	*Pull-Off Size*
138.00	A572-50 (50 ksi)	Solid Round			No	A572-50 (50 ksi)	Solid Round	1
70.00	A572-50 (50 ksi)	Solid Round				A572-50 (50 ksi)	Solid Round	

Guy Data *(cont'd)*

Guy Elevation ft	*Cable Weight A lb*	*Cable Weight B lb*	*Cable Weight C lb*	*Cable Weight D lb*	*Tower Intercept A ft*	*Tower Intercept B ft*	*Tower Intercept C ft*	*Tower Intercept D ft*
138	181.98	171.98	180.25		6.94 4.5 sec/pulse	6.21 4.3 sec/pulse	6.81 4.5 sec/pulse	
70	234.02	223.97	232.20		5.42 4.0 sec/pulse	4.98 3.9 sec/pulse	5.34 4.0 sec/pulse	

Guy Data *(cont'd)*

			Torque Arm		*Pull Off*		*Diagonal*	
Guy Elevation ft	*Calc K Single Angles*	*Calc K Solid Rounds*	K_x	K_y	K_x	K_y	K_x	K_y
138	Yes	Yes	1	1	1	1	1	1
70	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
138	0.0000 A325N	0	0.0000	1	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
70	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
138	A	50.00	36	9	2.4502
	B	62.00	35	9	2.4463
	C	52.00	35	9	2.4498
70	A	16.00	36	9	2.3799
	B	28.00	36	10	2.4340
	C	18.00	36	10	2.3940

Guy-Tensioning Information

Temperature At Time Of Tensioning

Guy Elevation ft		H ft	V ft	0 F Initial Tension lb	0 F Intercept ft	20 F Initial Tension lb	20 F Intercept ft	40 F Initial Tension lb	40 F Intercept ft	60 F Initial Tension lb	60 F Intercept ft	80 F Initial Tension lb	80 F Intercept ft	100 F Initial Tension lb	100 F Intercept ft	120 F Initial Tension lb	120 F Intercept ft
138	A	206.62	176.00	4335	5.62	4051	6.01	3772	6.45	3500	6.94	3235	7.50	2981	8.13	2737	8.84
	B	206.62	152.00	4437	4.91	4118	5.29	3805	5.72	3500	6.21	3205	6.78	2922	7.42	2654	8.16
	C	206.62	172.00	4351	5.49	4062	5.88	3778	6.32	3500	6.81	3231	7.37	2971	8.00	2724	8.72
70	A	207.83	108.00	6485	4.19	5979	4.54	5483	4.95	5000	5.42	4535	5.97	4092	6.61	3678	7.35
	B	207.83	84.00	6625	3.76	6070	4.11	5527	4.51	5000	4.98	4494	5.54	4015	6.19	3572	6.95
	C	207.83	104.00	6509	4.11	5995	4.46	5490	4.87	5000	5.34	4528	5.89	4079	6.54	3659	7.28

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	B	No	Ar (CaAa)	150.00 - 0.00	0.0000	0	1	1	0.3750	0.3750		0.22
Safety Line 3/8	C	No	Ar (CaAa)	150.00 - 0.00	0.0000	0	1	1	0.3750	0.3750		0.22
*************												
HB114-1-08U4-M5J	A	No	Ar (CaAa)	148.00 - 0.00	0.0000	-0.3	3	3	1.0000	1.5400		1.08
*************												
Hybriflex HB058-M12-XXF (Sprint)	A	No	Ar (CaAa)	148.00 - 0.00	0.0000	-0.42	1	1	0.8400	0.8400		0.24
*************												
1 5/8 (T-Mobile)	B	No	Ar (CaAa)	130.00 - 0.00	0.0000	-0.1	4	4	1.9800	1.9800		1.04

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
HB114-1-08U4-M5J (T-Mobile)	B	No	Ar (CaAa)	130.00 - 0.00	0.0000	-0.35	2	2	1.5400	1.5400		1.08

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
T1	150.00-140.00	A	0.000	0.000	4.368	0.000	27.86
		B	0.000	0.000	0.375	0.000	2.20
		C	0.000	0.000	0.375	0.000	2.20
T2	140.00-120.00	A	0.000	0.000	10.920	0.000	69.64
		B	0.000	0.000	11.750	0.000	67.60
		C	0.000	0.000	0.750	0.000	4.40
T3	120.00-100.00	A	0.000	0.000	10.920	0.000	69.64
		B	0.000	0.000	22.750	0.000	130.80
		C	0.000	0.000	0.750	0.000	4.40
T4	100.00-80.00	A	0.000	0.000	10.920	0.000	69.64
		B	0.000	0.000	22.750	0.000	130.80
		C	0.000	0.000	0.750	0.000	4.40
T5	80.00-60.00	A	0.000	0.000	10.920	0.000	69.64
		B	0.000	0.000	22.750	0.000	130.80
		C	0.000	0.000	0.750	0.000	4.40
T6	60.00-40.00	A	0.000	0.000	10.920	0.000	69.64
		B	0.000	0.000	22.750	0.000	130.80
		C	0.000	0.000	0.750	0.000	4.40
T7	40.00-20.00	A	0.000	0.000	10.920	0.000	69.64
		B	0.000	0.000	22.750	0.000	130.80
		C	0.000	0.000	0.750	0.000	4.40
T8	20.00-5.24	A	0.000	0.000	8.059	0.000	51.39
		B	0.000	0.000	16.790	0.000	96.53
		C	0.000	0.000	0.553	0.000	3.25
T9	5.24-0.00	A	0.000	0.000	2.861	0.000	18.25
		B	0.000	0.000	5.960	0.000	34.27
		C	0.000	0.000	0.197	0.000	1.15

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
T1	150.00-140.00	A	2.426	0.000	0.000	17.688	0.000	288.83
		B		0.000	0.000	5.228	0.000	85.25
		C		0.000	0.000	5.228	0.000	85.25
T2	140.00-120.00	A	2.425	0.000	0.000	44.206	0.000	721.61
		B		0.000	0.000	49.629	0.000	830.47
		C		0.000	0.000	10.451	0.000	170.33
T3	120.00-100.00	A	2.427	0.000	0.000	44.226	0.000	722.30
		B		0.000	0.000	88.840	0.000	1491.88
		C		0.000	0.000	10.458	0.000	170.57
T4	100.00-80.00	A	2.433	0.000	0.000	44.293	0.000	724.60
		B		0.000	0.000	88.946	0.000	1496.08
		C		0.000	0.000	10.483	0.000	171.35
T5	80.00-60.00	A	2.443	0.000	0.000	44.394	0.000	728.12

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*
		B		0.000	0.000	89.109	0.000	1502.50
		C		0.000	0.000	10.520	0.000	172.56
T6	60.00-40.00	A	2.450	0.000	0.000	44.477	0.000	731.01
		B		0.000	0.000	89.242	0.000	1507.78
		C		0.000	0.000	10.551	0.000	173.55
T7	40.00-20.00	A	2.438	0.000	0.000	44.346	0.000	726.47
		B		0.000	0.000	89.032	0.000	1499.48
		C		0.000	0.000	10.502	0.000	171.99
T8	20.00-5.24	A	2.348	0.000	0.000	32.009	0.000	511.42
		B		0.000	0.000	64.551	0.000	1061.43
		C		0.000	0.000	7.485	0.000	118.53
T9	5.24-0.00	A	2.072	0.000	0.000	10.585	0.000	156.04
		B		0.000	0.000	21.666	0.000	329.71
		C		0.000	0.000	2.368	0.000	33.61

Feed Line Center of Pressure

Section	*Elevation ft*	CP_X *in*	CP_Z *in*	CP_X *Ice in*	CP_Z *Ice in*
T1	150.00-140.00	-3.5179	1.1930	-0.5026	0.3945
T2	140.00-120.00	-1.8963	-1.4607	-0.3988	-0.0015
T3	120.00-100.00	-0.2679	-3.4192	-0.0674	-0.4826
T4	100.00-80.00	-0.2614	-3.3364	-0.0663	-0.4705
T5	80.00-60.00	-0.2614	-3.3364	-0.0664	-0.4648
T6	60.00-40.00	-0.2614	-3.3364	-0.0664	-0.4602
T7	40.00-20.00	-0.2614	-3.3364	-0.0663	-0.4675
T8	20.00-5.24	-0.2534	-3.2353	-0.0620	-0.4988
T9	5.24-0.00	-0.0929	-1.8878	0.0000	0.0000

Shielding Factor Ka

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	K_a *No Ice*	K_a *Ice*
T1	1	Safety Line 3/8	140.00 - 150.00	0.6000	0.2527
T1	2	Safety Line 3/8	140.00 - 150.00	0.6000	0.2527
T1	5	HB114-1-08U4-M5J	140.00 - 148.00	0.6000	0.2527
T1	7	Hybriflex HB058-M12-XXF	140.00 - 148.00	0.6000	0.2527
T2	1	Safety Line 3/8	120.00 - 140.00	0.6000	0.2882
T2	2	Safety Line 3/8	120.00 - 140.00	0.6000	0.2882
T2	5	HB114-1-08U4-M5J	120.00 - 140.00	0.6000	0.2882
T2	7	Hybriflex HB058-M12-XXF	120.00 - 140.00	0.6000	0.2882
T2	9	1 5/8	120.00 - 130.00	0.6000	0.2882
T2	10	HB114-1-08U4-M5J	120.00 - 130.00	0.6000	0.2882
T3	1	Safety Line 3/8	100.00 - 120.00	0.6000	0.3080
T3	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.3080
T3	5	HB114-1-08U4-M5J	100.00 - 120.00	0.6000	0.3080
T3	7	Hybriflex HB058-M12-XXF	100.00 - 120.00	0.6000	0.3080
T3	9	1 5/8	100.00 - 120.00	0.6000	0.3080
T3	10	HB114-1-08U4-M5J	100.00 - 120.00	0.6000	0.3080
T4	1	Safety Line 3/8	80.00 - 100.00	0.6000	0.3030

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	K_a *No Ice*	K_a *Ice*
T4	2	Safety Line 3/8	80.00 - 100.00	0.6000	0.3030
T4	5	HB114-1-08U4-M5J	80.00 - 100.00	0.6000	0.3030
T4	7	Hybriflex HB058-M12-XXF	80.00 - 100.00	0.6000	0.3030
T4	9	1 5/8	80.00 - 100.00	0.6000	0.3030
T4	10	HB114-1-08U4-M5J	80.00 - 100.00	0.6000	0.3030
T5	1	Safety Line 3/8	60.00 - 80.00	0.6000	0.3011
T5	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.3011
T5	5	HB114-1-08U4-M5J	60.00 - 80.00	0.6000	0.3011
T5	7	Hybriflex HB058-M12-XXF	60.00 - 80.00	0.6000	0.3011
T5	9	1 5/8	60.00 - 80.00	0.6000	0.3011
T5	10	HB114-1-08U4-M5J	60.00 - 80.00	0.6000	0.3011
T6	1	Safety Line 3/8	40.00 - 60.00	0.6000	0.2996
T6	2	Safety Line 3/8	40.00 - 60.00	0.6000	0.2996
T6	5	HB114-1-08U4-M5J	40.00 - 60.00	0.6000	0.2996
T6	7	Hybriflex HB058-M12-XXF	40.00 - 60.00	0.6000	0.2996
T6	9	1 5/8	40.00 - 60.00	0.6000	0.2996
T6	10	HB114-1-08U4-M5J	40.00 - 60.00	0.6000	0.2996
T7	1	Safety Line 3/8	20.00 - 40.00	0.6000	0.3020
T7	2	Safety Line 3/8	20.00 - 40.00	0.6000	0.3020
T7	5	HB114-1-08U4-M5J	20.00 - 40.00	0.6000	0.3020
T7	7	Hybriflex HB058-M12-XXF	20.00 - 40.00	0.6000	0.3020
T7	9	1 5/8	20.00 - 40.00	0.6000	0.3020
T7	10	HB114-1-08U4-M5J	20.00 - 40.00	0.6000	0.3020
T8	1	Safety Line 3/8	5.24 - 20.00	0.6000	0.3149
T8	2	Safety Line 3/8	5.24 - 20.00	0.6000	0.3149
T8	5	HB114-1-08U4-M5J	5.24 - 20.00	0.6000	0.3149
T8	7	Hybriflex HB058-M12-XXF	5.24 - 20.00	0.6000	0.3149
T8	9	1 5/8	5.24 - 20.00	0.6000	0.3149
T8	10	HB114-1-08U4-M5J	5.24 - 20.00	0.6000	0.3149
T9	1	Safety Line 3/8	0.00 - 5.24	0.6000	0.0000
T9	2	Safety Line 3/8	0.00 - 5.24	0.6000	0.0000
T9	5	HB114-1-08U4-M5J	0.00 - 5.24	0.6000	0.0000
T9	7	Hybriflex HB058-M12-XXF	0.00 - 5.24	0.6000	0.0000
T9	9	1 5/8	0.00 - 5.24	0.6000	0.0000
T9	10	HB114-1-08U4-M5J	0.00 - 5.24	0.6000	0.0000

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
APXVSPP18-C-A20 w/Mount	A	From Leg	4.00	0.0000	148.00	No Ice	8.56	6.95	82.55
Pipe			0.00			1/2" Ice	9.21	8.13	147.99
(Sprint)			0.00			1" Ice	9.83	9.03	225.42
APXVSPP18-C-A20 w/Mount	B	From Leg	4.00	0.0000	148.00	No Ice	8.56	6.95	82.55
Pipe			0.00			1/2" Ice	9.21	8.13	147.99
(Sprint)			0.00			1" Ice	9.83	9.03	225.42
APXVSPP18-C-A20 w/Mount	C	From Leg	4.00	0.0000	148.00	No Ice	8.56	6.95	82.55
Pipe			-6.00			1/2" Ice	9.21	8.13	147.99
(Sprint)			0.00			1" Ice	9.83	9.03	225.42
1900MHz 4x40W RRH	A	From Leg	4.00	0.0000	148.00	No Ice	2.32	2.24	60.00

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		C_AA_A *Front* *ft²*	C_AA_A *Side* *ft²*	*Weight* *lb*
(Sprint)			-1.50			1/2" Ice	2.53	2.44	83.12
			0.00			1" Ice	2.74	2.65	109.48
1900MHz 4x40W RRH	B	From Leg	4.00	0.0000	148.00	No Ice	2.32	2.24	60.00
(Sprint)			-1.50			1/2" Ice	2.53	2.44	83.12
			0.00			1" Ice	2.74	2.65	109.48
1900MHz 4x40W RRH	C	From Leg	4.00	0.0000	148.00	No Ice	2.32	2.24	60.00
(Sprint)			-1.50			1/2" Ice	2.53	2.44	83.12
			0.00			1" Ice	2.74	2.65	109.48
800MHz 2x50W RRH	A	From Leg	4.00	0.0000	148.00	No Ice	2.06	1.93	64.00
(Sprint)			-1.50			1/2" Ice	2.24	2.11	86.12
			1.50			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	B	From Leg	4.00	0.0000	148.00	No Ice	2.06	1.93	64.00
(Sprint)			-1.50			1/2" Ice	2.24	2.11	86.12
			1.50			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	C	From Leg	4.00	0.0000	148.00	No Ice	2.06	1.93	64.00
(Sprint)			-1.50			1/2" Ice	2.24	2.11	86.12
			1.50			1" Ice	2.43	2.29	111.30
Sector Mount [SM 502-1]	A	From Leg	4.00	0.0000	148.00	No Ice	15.35	14.00	557.70
(Sprint)			0.00			1/2" Ice	21.29	20.81	741.30
			0.00			1" Ice	27.23	27.62	924.90
Sector Mount [SM 502-1]	B	From Leg	4.00	0.0000	148.00	No Ice	15.35	14.00	557.70
(Sprint)			0.00			1/2" Ice	21.29	20.81	741.30
			0.00			1" Ice	27.23	27.62	924.90
Sector Mount [SM 502-1]	C	From Leg	4.00	0.0000	148.00	No Ice	15.35	14.00	557.70
(Sprint)			0.00			1/2" Ice	21.29	20.81	741.30
			0.00			1" Ice	27.23	27.62	924.90
***********									
DT465B-2XR w/3.5" Mount Pipe	A	From Leg	4.00	0.0000	148.00	No Ice	9.41	8.16	111.06
(Sprint)			6.00			1/2" Ice	9.97	9.26	195.52
			0.00			1" Ice	10.51	10.16	289.89
DT465B-2XR w/3.5" Mount Pipe	B	From Leg	4.00	0.0000	148.00	No Ice	9.41	8.16	111.06
(Sprint)			6.00			1/2" Ice	9.97	9.26	195.52
			0.00			1" Ice	10.51	10.16	289.89
DT465B-2XR w/3.5" Mount Pipe	C	From Leg	4.00	0.0000	148.00	No Ice	9.41	8.16	111.06
(Sprint)			6.00			1/2" Ice	9.97	9.26	195.52
			0.00			1" Ice	10.51	10.16	289.89
TD-RRH 8x20	A	From Leg	4.00	0.0000	148.00	No Ice	4.32	1.41	66.13
(Sprint)			6.00			1/2" Ice	4.60	1.61	90.06
			2.00			1" Ice	4.89	1.83	117.33
TD-RRH 8x20	B	From Leg	4.00	0.0000	148.00	No Ice	4.32	1.41	66.13
(Sprint)			6.00			1/2" Ice	4.60	1.61	90.06
			2.00			1" Ice	4.89	1.83	117.33
TD-RRH 8x20	C	From Leg	4.00	0.0000	148.00	No Ice	4.32	1.41	66.13
(Sprint)			6.00			1/2" Ice	4.60	1.61	90.06
			2.00			1" Ice	4.89	1.83	117.33
800MHz 2x50W RRH	A	From Leg	4.00	0.0000	148.00	No Ice	2.06	1.93	64.00
(Sprint)			3.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	B	From Leg	4.00	0.0000	148.00	No Ice	2.06	1.93	64.00
(Sprint)			3.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
800MHz 2x50W RRH	C	From Leg	4.00	0.0000	148.00	No Ice	2.06	1.93	64.00
(Sprint)			3.00			1/2" Ice	2.24	2.11	86.12
			0.00			1" Ice	2.43	2.29	111.30
***********									
Pirod 12' T-Frame Sector Mount	A	From Leg	4.00	0.0000	130.00	No Ice	13.60	13.60	465.00
(1)			0.00			1/2" Ice	18.40	18.40	600.00

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
(T-Mobile)			0.00			1" Ice	23.20	23.20	735.00
Pirod 12' T-Frame Sector Mount	B	From Leg	4.00	0.0000	130.00	No Ice	13.60	13.60	465.00
(1)			0.00			1/2" Ice	18.40	18.40	600.00
(T-Mobile)			0.00			1" Ice	23.20	23.20	735.00
SBNHH-1D65C w/Mount Pipe	A	From Leg	4.00	0.0000	130.00	No Ice	11.41	9.60	95.34
(T-Mobile)			3.00			1/2" Ice	12.03	11.02	182.15
			0.00			1" Ice	12.65	12.29	278.71
SBNHH-1D65C w/Mount Pipe	B	From Leg	4.00	0.0000	130.00	No Ice	11.41	9.60	95.34
(T-Mobile)			3.00			1/2" Ice	12.03	11.02	182.15
			0.00			1" Ice	12.65	12.29	278.71
AIR21 B2A/B4P	A	From Leg	4.00	0.0000	130.00	No Ice	5.92	4.22	83.00
(T-Mobile)			-3.00			1/2" Ice	6.29	4.56	124.00
			0.00			1" Ice	6.66	4.91	170.05
AIR21 B2A/B4P	B	From Leg	4.00	0.0000	130.00	No Ice	5.92	4.22	83.00
(T-Mobile)			-3.00			1/2" Ice	6.29	4.56	124.00
			0.00			1" Ice	6.66	4.91	170.05
RRUS-11	A	From Leg	1.50	0.0000	130.00	No Ice	2.52	1.07	55.00
(T-Mobile)			-1.00			1/2" Ice	2.72	1.21	74.32
			0.00			1" Ice	2.92	1.36	96.56
RRUS-11	B	From Leg	1.50	0.0000	130.00	No Ice	2.52	1.07	55.00
(T-Mobile)			-1.00			1/2" Ice	2.72	1.21	74.32
			0.00			1" Ice	2.92	1.36	96.56
TMA 12"x6"x4"	A	From Leg	4.00	0.0000	130.00	No Ice	0.60	0.41	20.00
(T-Mobile)			3.00			1/2" Ice	0.70	0.50	25.41
			0.00			1" Ice	0.81	0.59	32.44
TMA 12"x6"x4"	B	From Leg	4.00	0.0000	130.00	No Ice	0.60	0.41	20.00
(T-Mobile)			3.00			1/2" Ice	0.70	0.50	25.41
			0.00			1" Ice	0.81	0.59	32.44
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4' Standoff	C	From Leg	2.00	0.0000	122.00	No Ice	2.72	2.72	50.00
(Abandoned)			0.00			1/2" Ice	4.91	4.91	89.00
			0.00			1" Ice	7.10	7.10	128.00

Force Totals (Does not include forces on guys)

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques lb-ft
Leg Weight	5981.96			
Bracing Weight	4363.35			
Total Member Self-Weight	10345.31			
Guy Weight	1758.59			
Total Weight	18009.84			
Wind 0 deg - No Ice		-60.99	-13721.04	4263.82
Wind 30 deg - No Ice		6609.96	-11570.77	2328.74
Wind 60 deg - No Ice		12159.88	-7020.51	-429.62
Wind 90 deg - No Ice		14367.50	60.99	-3017.95
Wind 120 deg - No Ice		11803.51	6885.19	-4575.74
Wind 150 deg - No Ice		6306.46	10923.11	-4992.07
Wind 180 deg - No Ice		60.99	13360.87	-4280.88

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Torques lb-ft
Wind 210 deg - No Ice		-6609.96	11570.77	-2328.74
Wind 240 deg - No Ice		-11877.04	6857.21	351.12
Wind 270 deg - No Ice		-14367.50	-60.99	3017.95
Wind 300 deg - No Ice		-11788.97	-6876.79	4573.51
Wind 330 deg - No Ice		-6306.46	-10923.11	4992.07
Member Ice	27581.05			
Guy Ice	20604.11			
Total Weight Ice	91908.95			
Wind 0 deg - Ice		-8.55	-11246.74	2174.03
Wind 30 deg - Ice		4953.85	-8597.42	1459.16
Wind 60 deg - Ice		10083.05	-5821.45	282.39
Wind 90 deg - Ice		11616.03	8.55	-925.55
Wind 120 deg - Ice		8541.01	4941.03	-1846.61
Wind 150 deg - Ice		4840.83	8384.57	-2327.63
Wind 180 deg - Ice		8.55	9708.53	-2190.04
Wind 210 deg - Ice		-4953.85	8597.42	-1459.16
Wind 240 deg - Ice		-8753.87	5054.05	-332.22
Wind 270 deg - Ice		-11616.03	-8.55	925.55
Wind 300 deg - Ice		-8539.54	-4940.18	1846.61
Wind 330 deg - Ice		-4840.83	-8384.57	2327.63
Total Weight	18009.84			
Wind 0 deg - Service		-23.34	-5249.84	1631.39
Wind 30 deg - Service		2529.05	-4427.12	891.01
Wind 60 deg - Service		4652.52	-2686.13	-164.38
Wind 90 deg - Service		5497.18	23.34	-1154.70
Wind 120 deg - Service		4516.17	2634.36	-1750.73
Wind 150 deg - Service		2412.93	4179.32	-1910.03
Wind 180 deg - Service		23.34	5112.03	-1637.92
Wind 210 deg - Service		-2529.05	4427.12	-891.01
Wind 240 deg - Service		-4544.30	2623.66	134.34
Wind 270 deg - Service		-5497.18	-23.34	1154.70
Wind 300 deg - Service		-4510.60	-2631.15	1749.88
Wind 330 deg - Service		-2412.93	-4179.32	1910.03

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy
5	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy

Comb. No.	Description
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

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
T1	150 - 140	Leg	Max Tension	8	12037.54	51.63	781.99
			Max. Compression	6	-14907.51	-37.51	-18.50
			Max. Mx	11	7891.17	-864.58	115.55
			Max. My	2	3929.86	40.87	-887.70
			Max. Vy	5	1933.19	-65.20	-43.99
			Max. Vx	2	-2052.83	-26.17	97.05
		Diagonal	Max Tension	11	2999.59	0.00	0.00
			Max. Compression	11	-3038.39	0.00	0.00
			Max. Mx	22	656.87	-6.17	-0.12
			Max. My	11	-3036.29	-0.63	-1.25
			Max. Vy	22	13.38	-6.17	-0.12
			Max. Vx	5	0.57	0.00	0.00
		Horizontal	Max Tension	2	546.40	0.00	0.00
			Max. Compression	8	-486.01	0.00	0.00
			Max. Mx	19	7.15	19.79	0.00
			Max. My	22	-62.04	0.00	-0.00
			Max. Vy	19	21.11	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
		Top Girt	Max Tension	12	159.93	0.00	0.00
			Max. Compression	10	-182.33	0.00	0.00
			Max. Mx	25	-77.66	23.61	0.00
			Max. My	2	78.45	0.00	-0.00
			Max. Vy	25	25.18	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	4	1698.41	0.00	0.00
			Max. Compression	6	-1607.09	0.00	0.00
			Max. Mx	25	-214.64	23.61	0.00
			Max. My	2	892.58	0.00	-0.00
			Max. Vy	25	25.18	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Mid Girt	Max Tension	4	739.95	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Compression	6	-684.82	0.00	0.00
			Max. Mx	25	-58.95	23.61	0.00
			Max. My	2	389.33	0.00	-0.00
			Max. Vy	25	25.18	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
T2	140 - 120	Leg	Max Tension	8	12031.32	-5.13	-38.80
			Max. Compression	21	-38336.64	4.94	51.30
			Max. Mx	5	10113.35	-994.89	-206.16
			Max. My	2	5022.48	-93.16	1083.83
			Max. Vy	5	1938.50	-994.89	-206.16
			Max. Vx	2	-2057.26	-93.16	1083.83
		Diagonal	Max Tension	13	3050.16	0.00	0.00
			Max. Compression	13	-3132.09	0.00	0.00
			Max. Mx	18	947.66	-7.62	0.19
			Max. My	7	-3060.54	-0.12	3.10
			Max. Vy	18	13.97	-7.62	0.19
			Max. Vx	7	1.40	0.00	0.00
		Horizontal	Max Tension	15	1242.73	0.00	0.00
			Max. Compression	8	-291.07	0.00	0.00
			Max. Mx	19	601.53	19.77	0.00
			Max. My	6	286.31	0.00	-0.00
			Max. Vy	19	21.09	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	822.30	0.00	0.00
			Max. Compression	12	-184.40	0.00	0.00
			Max. Mx	21	289.87	23.59	0.00
			Max. My	7	85.13	0.00	0.00
			Max. Vy	21	25.16	0.00	0.00
			Max. Vx	7	-0.00	0.00	0.00
		Mid Girt	Max Tension	15	991.68	0.00	0.00
			Max. Compression	12	-316.79	0.00	0.00
			Max. Mx	25	175.43	23.59	0.00
			Max. My	2	-136.77	0.00	-0.00
			Max. Vy	25	25.16	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Guy A	Bottom Tension	21	13355.35		
			Top Tension	21	15053.75		
			Top Cable Vert	21	10683.65		
			Top Cable Norm	21	10605.42		
			Top Cable Tan	21	13.94		
			Bot Cable Vert	21	-7675.31		
			Bot Cable Norm	21	10929.54		
			Bot Cable Tan	21	8.46		
		Guy B	Bottom Tension	25	12735.32		
			Top Tension	25	14198.52		
			Top Cable Vert	25	9348.37		
			Top Cable Norm	25	10686.71		
			Top Cable Tan	25	9.35		
			Bot Cable Vert	25	-6560.65		
			Bot Cable Norm	25	10915.41		
			Bot Cable Tan	25	9.57		
		Guy C	Bottom Tension	17	13319.18		
			Top Tension	17	14978.66		
			Top Cable Vert	17	10507.55		
			Top Cable Norm	17	10674.79		
			Top Cable Tan	17	13.32		
			Bot Cable Vert	17	-7536.22		
			Bot Cable Norm	17	10982.07		
			Bot Cable Tan	17	8.49		
		Top Guy Pull-Off	Max Tension	4	6602.20	0.00	0.00
			Max. Compression	6	-3548.52	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Mx	23	380.21	23.59	0.00
			Max. My	2	3833.49	0.00	-0.00
			Max. Vy	23	25.16	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Guy Pull-Off	Max Tension	12	2694.12	0.00	0.00
			Max. Compression	6	-3924.43	0.00	0.00
			Max. Mx	23	-3367.38	23.59	0.00
			Max. My	2	805.70	0.00	-0.00
			Max. Vy	23	25.16	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Torque Arm Top	Max Tension	18	16438.67	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	23	11092.58	184.81	0.00
			Max. My	22	13350.25	0.00	-0.10
			Max. Vy	23	-116.89	0.00	0.00
			Max. Vx	22	0.06	0.00	0.00
		Torque Arm Bottom	Max Tension	7	3630.52	0.00	0.00
			Max. Compression	20	-15941.79	0.00	0.00
			Max. Mx	23	-12347.53	203.05	0.00
			Max. My	22	-6316.42	0.00	0.28
			Max. Vy	23	-117.01	0.00	0.00
			Max. Vx	22	-0.16	0.00	0.00
T3	120 - 100	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-42425.96	-2.33	50.22
			Max. Mx	4	-6416.06	216.56	-67.67
			Max. My	2	-13900.98	15.41	-242.67
			Max. Vy	10	-484.08	40.99	-24.31
			Max. Vx	2	-577.19	-8.96	33.53
		Diagonal	Max Tension	2	685.23	0.00	0.00
			Max. Compression	18	-1136.76	0.00	0.00
			Max. Mx	22	-263.44	-7.88	-0.22
			Max. My	9	-659.18	-0.69	-0.46
			Max. Vy	22	14.10	-7.88	-0.22
			Max. Vx	9	0.21	-0.69	-0.46
		Horizontal	Max Tension	15	1203.02	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	23	815.30	19.79	0.00
			Max. My	6	286.92	0.00	-0.00
			Max. Vy	23	-21.11	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	21	494.07	0.00	0.00
			Max. Compression	19	-80.93	0.00	0.00
			Max. Mx	21	1.04	23.61	0.00
			Max. My	6	168.74	0.00	-0.00
			Max. Vy	25	-25.19	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	672.07	0.00	0.00
			Max. Compression	10	-165.91	0.00	0.00
			Max. Mx	26	179.03	23.61	0.00
			Max. My	6	142.62	0.00	0.00
			Max. Vy	26	25.19	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Mid Girt	Max Tension	15	1143.10	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	850.90	23.61	0.00
			Max. My	6	264.65	0.00	-0.00
			Max. Vy	24	-25.19	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T4	100 - 80	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-42448.66	-16.12	-22.68
			Max. Mx	11	-10758.28	-512.31	-44.10

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. My	8	-12407.35	87.52	553.75
			Max. Vy	11	-1072.60	7.01	-15.80
			Max. Vx	2	-1157.49	0.00	30.12
		Diagonal	Max Tension	7	1672.12	0.00	0.00
			Max. Compression	7	-1812.19	0.00	0.00
			Max. Mx	22	-565.32	-7.45	-0.27
			Max. My	7	-1802.66	-1.47	-0.61
			Max. Vy	22	13.94	-7.45	-0.27
			Max. Vx	7	0.28	-1.47	-0.61
		Horizontal	Max Tension	15	1038.26	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	22	541.61	19.87	0.00
			Max. My	5	291.84	0.00	-0.00
			Max. Vy	22	-21.19	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	15	541.45	0.00	0.00
			Max. Compression	12	-175.42	0.00	0.00
			Max. Mx	26	30.82	23.69	0.00
			Max. My	6	-50.90	0.00	0.00
			Max. Vy	26	-25.27	0.00	0.00
			Max. Vx	6	-0.00	0.00	0.00
		Bottom Girt	Max Tension	21	681.93	0.00	0.00
			Max. Compression	10	-522.32	0.00	0.00
			Max. Mx	14	215.42	23.69	0.00
			Max. My	5	240.04	0.00	-0.00
			Max. Vy	14	-25.27	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Mid Girt	Max Tension	15	956.18	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	330.52	23.69	0.00
			Max. My	5	337.42	0.00	-0.00
			Max. Vy	14	-25.27	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T5	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-50242.36	-0.10	73.23
			Max. Mx	5	-17842.11	-589.07	-34.87
			Max. My	2	-23011.46	-68.42	618.70
			Max. Vy	5	-1220.67	-579.83	-27.32
			Max. Vx	2	1225.18	-68.42	618.70
		Diagonal	Max Tension	7	1934.99	0.00	0.00
			Max. Compression	5	-2119.04	0.00	0.00
			Max. Mx	15	270.48	-7.88	0.07
			Max. My	7	-1844.87	-1.30	-0.61
			Max. Vy	15	14.20	-7.88	0.07
			Max. Vx	7	0.28	-1.30	-0.61
		Horizontal	Max Tension	15	1126.00	0.00	0.00
			Max. Compression	2	-308.29	0.00	0.00
			Max. Mx	22	797.27	19.98	0.00
			Max. My	5	366.79	0.00	-0.00
			Max. Vy	22	-21.31	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	15	749.25	0.00	0.00
			Max. Compression	12	-443.64	0.00	0.00
			Max. Mx	14	184.60	23.81	0.00
			Max. My	5	170.70	0.00	-0.00
			Max. Vy	14	25.40	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	982.44	0.00	0.00
			Max. Compression	12	-471.50	0.00	0.00
			Max. Mx	25	-86.29	23.81	0.00
			Max. My	5	258.10	0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vy	25	25.40	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Mid Girt	Max Tension	15	7258.93	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	5810.84	23.81	0.00
			Max. My	5	3252.38	0.00	-0.00
			Max. Vy	14	25.40	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Guy A	Bottom Tension	21	16343.85		
			Top Tension	21	17411.44		
			Top Cable Vert	21	9020.25		
			Top Cable Norm	21	14892.73		
			Top Cable Tan	21	2.01		
			Bot Cable Vert	21	-6505.70		
			Bot Cable Norm	21	14993.24		
			Bot Cable Tan	21	2.01		
		Guy B	Bottom Tension	25	15756.56		
			Top Tension	25	16617.39		
			Top Cable Vert	25	7268.79		
			Top Cable Norm	25	14943.31		
			Top Cable Tan	25	0.91		
			Bot Cable Vert	25	-4832.71		
			Bot Cable Norm	25	14997.13		
			Bot Cable Tan	25	0.91		
		Guy C	Bottom Tension	17	16096.64		
			Top Tension	17	17134.50		
			Top Cable Vert	17	8671.96		
			Top Cable Norm	17	14777.96		
			Top Cable Tan	17	2.89		
			Bot Cable Vert	17	-6162.42		
			Bot Cable Norm	17	14870.33		
			Bot Cable Tan	17	2.89		
T6	60 - 40	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-57983.06	-0.06	96.67
			Max. Mx	5	-18692.43	588.74	-9.17
			Max. My	8	-18525.53	-81.45	576.97
			Max. Vy	5	-1217.20	5.30	-18.82
			Max. Vx	2	1222.18	0.03	31.64
		Diagonal	Max Tension	3	1610.36	0.00	0.00
			Max. Compression	5	-2023.94	0.00	0.00
			Max. Mx	20	-164.79	-8.03	0.30
			Max. My	9	-1771.22	-1.00	-0.56
			Max. Vy	20	14.31	-8.03	0.30
			Max. Vx	5	0.25	-1.18	-0.55
		Horizontal	Max Tension	15	1368.86	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	15	1355.30	20.07	0.00
			Max. My	18	900.38	0.00	-0.00
			Max. Vy	15	-21.41	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00
		Top Girt	Max Tension	21	741.68	0.00	0.00
			Max. Compression	10	-510.81	0.00	0.00
			Max. Mx	25	509.67	23.91	0.00
			Max. My	5	273.47	0.00	-0.00
			Max. Vy	25	-25.50	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	819.76	0.00	0.00
			Max. Compression	12	-151.97	0.00	0.00
			Max. Mx	25	132.54	23.91	0.00
			Max. My	5	255.44	0.00	-0.00
			Max. Vy	25	-25.50	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
			Max. Vx	5	0.00	0.00	0.00
		Mid Girt	Max Tension	15	1297.28	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	25	372.62	23.91	0.00
			Max. My	5	462.91	0.00	-0.00
			Max. Vy	25	-25.50	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T7	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-58703.46	0.79	-102.93
			Max. Mx	11	-28649.72	-259.48	55.78
			Max. My	21	-56800.05	23.30	320.29
			Max. Vy	5	631.71	-49.20	31.36
			Max. Vx	21	558.97	-4.33	52.63
		Diagonal	Max Tension	12	701.77	0.00	0.00
			Max. Compression	17	-1384.71	0.00	0.00
			Max. Mx	20	-495.23	-8.08	0.41
			Max. My	6	-766.19	-1.08	-0.52
			Max. Vy	20	14.25	-8.08	0.41
			Max. Vx	6	-0.24	-1.08	-0.52
		Horizontal	Max Tension	15	1471.04	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	21	963.86	19.93	0.00
			Max. My	18	929.36	0.00	-0.00
			Max. Vy	21	-21.26	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00
		Top Girt	Max Tension	15	719.08	0.00	0.00
			Max. Compression	10	-109.79	0.00	0.00
			Max. Mx	25	215.81	23.75	0.00
			Max. My	5	273.96	0.00	-0.00
			Max. Vy	25	25.34	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	21	785.66	0.00	0.00
			Max. Compression	9	-0.31	0.00	0.00
			Max. Mx	14	257.47	23.75	0.00
			Max. My	5	243.38	0.00	-0.00
			Max. Vy	14	25.34	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Mid Girt	Max Tension	15	1376.27	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	488.97	23.75	0.00
			Max. My	5	467.09	0.00	-0.00
			Max. Vy	14	25.34	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T8	20 - 5.24	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-56847.07	-31.85	-219.35
			Max. Mx	5	-16546.35	-353.79	52.67
			Max. My	21	-38113.91	-38.39	-326.79
			Max. Vy	5	638.14	-353.79	52.67
			Max. Vx	21	567.99	-31.85	-219.35
		Diagonal	Max Tension	12	1374.62	0.00	0.00
			Max. Compression	18	-1385.59	0.00	0.00
			Max. Mx	20	-443.57	-6.90	-0.08
			Max. My	5	-962.35	-1.19	-0.58
			Max. Vy	20	13.13	-6.90	-0.08
			Max. Vx	5	0.26	0.00	0.00
		Horizontal	Max Tension	15	1075.24	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	21	945.70	18.85	0.00
			Max. My	18	1017.83	0.00	-0.00
			Max. Vy	21	-20.11	0.00	0.00
			Max. Vx	18	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
		Top Girt	Max Tension	15	839.22	0.00	0.00
			Max. Compression	4	-175.27	0.00	0.00
			Max. Mx	14	248.58	22.63	0.00
			Max. My	5	243.64	0.00	-0.00
			Max. Vy	14	-24.14	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	19	8737.06	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	8115.28	27.13	0.00
			Max. My	5	3226.26	0.00	-0.00
			Max. Vy	14	-28.93	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T9	5.24 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-51288.26	43.83	7.75
			Max. Mx	19	-47822.81	-974.72	-97.71
			Max. My	5	-18566.64	-220.34	-916.10
			Max. Vy	19	2702.20	-974.72	-97.71
			Max. Vx	5	1888.59	-220.34	-916.10
		Diagonal	Max Tension	6	1010.88	1.98	-1.68
			Max. Compression	21	-4389.01	0.00	0.00
			Max. Mx	16	-1205.26	-7.95	-2.55
			Max. My	5	-3496.72	-0.47	-3.85
			Max. Vy	16	12.76	-7.89	2.81
			Max. Vx	5	-3.79	0.00	0.00
		Horizontal	Max Tension	19	2191.00	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	19	2190.98	25.50	0.00
			Max. My	25	1987.79	0.00	3.86
			Max. Vy	19	40.78	0.00	0.00
			Max. Vx	25	6.18	0.00	0.00
		Secondary Horizontal	Max Tension	21	917.75	0.00	0.00
			Max. Compression	21	-917.75	-0.86	2.47
			Max. Mx	16	904.61	-3.49	4.58
			Max. My	21	814.52	-3.24	4.85
			Max. Vy	16	-9.80	-3.49	4.58
			Max. Vx	21	-3.25	0.00	0.00
		Bottom Girt	Max Tension	21	1551.74	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	1314.80	2.16	0.00
			Max. My	5	451.48	0.00	-0.00
			Max. Vy	14	6.92	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Base Beam	Max Tension	1	0.00	0.00	0.00
			Max. Compression	21	-13458.27	-282.81	21.25
			Max. Mx	19	-48139.82	-28230.29	447.19
			Max. My	5	-17961.89	-10590.69	1357.62
			Max. Vy	20	-48188.16	-28145.55	211.17
			Max. Vx	5	1867.18	-10590.69	1357.62

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Guy C @ 210 ft Elev -34 ft Azimuth 240 deg	Max. Vert	10	-1199.45	-1169.69	675.02

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Max. H_x	10	-1199.45	-1169.69	675.02
	Max. H_z	16	-20472.89	-30677.33	18400.34
	Min. Vert	17	-21219.54	-31880.54	18395.46
	Min. H_x	17	-21219.54	-31880.54	18395.46
	Min. H_z	10	-1199.45	-1169.69	675.02
Guy B @ 210 ft Elev -14 ft Azimuth 120 deg	Max. Vert	6	-758.66	1033.08	595.72
	Max. H_x	25	-17903.50	31824.63	18375.99
	Max. H_z	25	-17903.50	31824.63	18375.99
	Min. Vert	12	-18304.55	27146.10	15692.95
	Min. H_x	6	-758.66	1033.08	595.72
	Min. H_z	6	-758.66	1033.08	595.72
Guy A @ 210 ft Elev -38 ft Azimuth 0 deg	Max. Vert	2	-1271.77	0.66	-1355.01
	Max. H_x	24	-16328.47	1705.57	-27989.32
	Max. H_z	2	-1271.77	0.66	-1355.01
	Min. Vert	21	-21788.59	-10.90	-36762.17
	Min. H_x	18	-16409.40	-1719.36	-28093.92
	Min. H_z	21	-21788.59	-10.90	-36762.17
Mast	Max. Vert	19	142775.21	-1506.57	-938.87
	Max. H_x	11	52640.79	2963.13	124.43
	Max. H_z	13	52829.40	1614.14	2428.84
	Max. M_x	1	0.00	-7.35	-14.29
	Max. M_z	1	0.00	-7.35	-14.29
	Max. Torsion	5	2497.87	-2939.70	135.25
	Min. Vert	1	36534.96	-7.35	-14.29
	Min. H_x	5	54097.92	-2939.70	135.25
	Min. H_z	8	53926.62	8.61	-2952.32
	Min. M_x	1	0.00	-7.35	-14.29
	Min. M_z	1	0.00	-7.35	-14.29
	Min. Torsion	11	-2469.31	2963.13	124.43

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	36534.96	7.35	14.29	0.00	0.00	0.43
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	51788.45	-1.15	-2372.50	0.00	0.00	786.88
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	53633.63	1619.32	-2413.03	0.00	0.00	-20.68
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	53648.53	2574.38	-1439.75	0.00	0.00	-1432.58
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	54097.92	2939.70	-135.25	0.00	0.00	-2497.87
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	53415.94	2173.78	1259.75	0.00	0.00	-2222.05
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	54418.93	1316.03	2609.00	0.00	0.00	-1456.41
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	53926.62	-8.61	2952.32	0.00	0.00	-956.35
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	53739.73	-1323.32	2622.99	0.00	0.00	9.32
1.2 Dead+1.6 Wind 240 deg - No	51776.31	-2118.39	1227.96	0.00	0.00	1400.48

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*
Ice+1.0 Guy						
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	52640.79	-2963.13	-124.43	0.00	0.00	2469.31
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	52611.89	-2585.31	-1432.73	0.00	0.00	2180.23
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	52829.40	-1614.14	-2428.84	0.00	0.00	1330.55
1.2 Dead+1.0 Ice+1.0 Temp+Guy	138511.20	-28.77	53.75	0.00	0.00	-3.27
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	140762.01	-3.89	-1765.91	0.00	0.00	262.35
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	140458.60	825.00	-1580.25	0.00	0.00	412.01
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	140468.20	1479.95	-837.22	0.00	0.00	-111.11
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	141697.28	1783.39	156.53	0.00	0.00	-616.92
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	142775.21	1506.57	938.87	0.00	0.00	-374.30
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	141809.07	959.83	1564.51	0.00	0.00	-61.89
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	140689.68	-50.08	1797.54	0.00	0.00	-299.44
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	140763.44	-1008.36	1599.38	0.00	0.00	-421.01
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	141071.39	-1583.91	981.03	0.00	0.00	97.85
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	139999.08	-1847.29	183.71	0.00	0.00	614.97
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	139203.92	-1531.15	-822.89	0.00	0.00	354.83
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	139803.82	-837.69	-1572.00	0.00	0.00	49.76
Dead+Wind 0 deg - Service+Guy	37057.05	9.22	-711.11	0.00	0.00	148.53
Dead+Wind 30 deg - Service+Guy	37144.21	397.21	-671.20	0.00	0.00	-37.93
Dead+Wind 60 deg - Service+Guy	37310.08	655.16	-357.33	0.00	0.00	-350.31
Dead+Wind 90 deg - Service+Guy	37359.92	796.97	23.98	0.00	0.00	-562.38
Dead+Wind 120 deg - Service+Guy	37405.17	636.85	376.80	0.00	0.00	-478.29
Dead+Wind 150 deg - Service+Guy	37372.67	408.82	690.99	0.00	0.00	-284.49
Dead+Wind 180 deg - Service+Guy	37339.74	4.66	757.43	0.00	0.00	-161.04
Dead+Wind 210 deg - Service+Guy	37191.20	-394.70	692.97	0.00	0.00	36.03
Dead+Wind 240 deg - Service+Guy	37111.42	-622.90	379.52	0.00	0.00	334.16
Dead+Wind 270 deg - Service+Guy	37090.33	-781.31	25.75	0.00	0.00	559.47
Dead+Wind 300 deg - Service+Guy	37125.37	-638.82	-355.26	0.00	0.00	478.15
Dead+Wind 330 deg - Service+Guy	37055.19	-379.17	-669.99	0.00	0.00	280.85

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	-18009.84	0.00	2.06	18009.84	1.95	0.016%
2	-80.28	-21525.68	-25711.18	79.02	21525.30	25696.08	0.045%
3	13288.99	-21242.92	-23213.15	-13293.50	21242.66	23200.78	0.039%
4	22695.60	-20963.48	-13128.92	-22683.78	20963.34	13140.78	0.050%
5	26706.63	-21352.51	102.22	-26695.40	21352.16	-90.76	0.047%
6	22211.33	-21723.08	12942.03	-22194.58	21722.56	-12932.96	0.057%
7	13446.42	-21369.68	23281.39	-13429.50	21369.32	-23277.78	0.050%
8	80.28	-20994.50	26392.17	-67.22	20994.45	-26390.44	0.039%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
9	-13288.99	-21277.26	23213.15	13273.30	21276.95	-23210.60	0.046%
10	-22105.85	-21556.70	12788.42	22089.95	21556.26	-12781.46	0.052%
11	-26706.63	-21167.67	-102.22	26696.31	21167.37	111.45	0.041%
12	-22801.08	-20797.10	-13282.52	22797.79	20796.90	13275.68	0.023%
13	-13446.42	-21150.51	-23281.39	13449.29	21150.24	23269.29	0.036%
14	-0.00	-95159.20	-0.00	6.32	95159.19	0.78	0.007%
15	20.58	-95558.18	-16975.98	-24.53	95557.71	16949.09	0.028%
16	8667.27	-95134.30	-15032.25	-8684.63	95134.15	15007.88	0.031%
17	15018.91	-94715.13	-8714.54	-15006.28	94715.11	8741.63	0.031%
18	17279.71	-95296.53	12.86	-17260.82	95296.08	4.19	0.026%
19	14678.65	-95850.70	8494.33	-14647.55	95849.90	-8478.73	0.036%
20	8658.46	-95321.43	14991.29	-8632.99	95321.03	-14985.86	0.027%
21	-20.58	-94760.22	17386.95	47.45	94760.35	-17393.62	0.029%
22	-8667.27	-95184.10	15032.25	8626.49	95183.85	-15035.28	0.042%
23	-14663.00	-95603.28	8509.06	14629.92	95602.61	-8498.03	0.036%
24	-17279.71	-95021.88	-12.86	17261.78	95021.52	28.49	0.025%
25	-15034.56	-94467.70	-8699.82	15037.83	94467.92	8719.31	0.021%
26	-8658.46	-94996.97	-14991.29	8669.76	94996.59	14958.28	0.036%
27	-19.20	-18073.35	-6148.38	19.09	18073.34	6146.17	0.012%
28	3177.83	-18005.74	-5551.02	-3177.74	18005.73	5548.86	0.011%
29	5427.26	-17938.91	-3139.55	-5425.81	17938.91	3140.36	0.009%
30	6386.43	-18031.94	24.44	-6384.73	18031.93	-23.51	0.010%
31	5311.46	-18120.56	3094.86	-5309.83	18120.55	-3094.04	0.010%
32	3215.48	-18036.05	5567.34	-3213.75	18036.04	-5566.46	0.010%
33	19.20	-17946.33	6311.23	-16.19	17946.32	-6309.68	0.018%
34	-3177.83	-18013.95	5551.02	3175.64	18013.93	-5549.77	0.013%
35	-5286.23	-18080.77	3058.13	5283.75	18080.75	-3057.02	0.014%
36	-6386.43	-17987.74	-24.44	6383.75	17987.73	25.85	0.016%
37	-5452.49	-17899.12	-3176.29	5451.06	17899.12	3175.93	0.008%
38	-3215.48	-17983.64	-5567.34	3215.48	17983.62	5564.77	0.013%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00009506
2	Yes	22	0.00000001	0.00006279
3	Yes	22	0.00000001	0.00006011
4	Yes	17	0.00000001	0.00007970
5	Yes	23	0.00000001	0.00006680
6	Yes	23	0.00000001	0.00006729
7	Yes	23	0.00000001	0.00007118
8	Yes	18	0.00000001	0.00006141
9	Yes	22	0.00000001	0.00006994
10	Yes	22	0.00000001	0.00006985
11	Yes	22	0.00000001	0.00006401
12	Yes	16	0.00000001	0.00005116
13	Yes	22	0.00000001	0.00005885
14	Yes	13	0.00000001	0.00006448
15	Yes	17	0.00000001	0.00006201
16	Yes	16	0.00000001	0.00007248
17	Yes	16	0.00000001	0.00007403
18	Yes	18	0.00000001	0.00005861
19	Yes	18	0.00000001	0.00006672
20	Yes	18	0.00000001	0.00006006
21	Yes	16	0.00000001	0.00006659

22	Yes	16	0.00000001	0.00009381
23	Yes	17	0.00000001	0.00007380
24	Yes	17	0.00000001	0.00005874
25	Yes	14	0.00000001	0.00005266
26	Yes	16	0.00000001	0.00008821
27	Yes	12	0.00000001	0.00006469
28	Yes	12	0.00000001	0.00006064
29	Yes	12	0.00000001	0.00005654
30	Yes	13	0.00000001	0.00005079
31	Yes	13	0.00000001	0.00004816
32	Yes	13	0.00000001	0.00004891
33	Yes	11	0.00000001	0.00007907
34	Yes	12	0.00000001	0.00006518
35	Yes	12	0.00000001	0.00007447
36	Yes	12	0.00000001	0.00008330
37	Yes	11	0.00000001	0.00006281
38	Yes	12	0.00000001	0.00007285

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	1.697	33	0.0394	0.0516
T2	140 - 120	1.629	33	0.0357	0.0486
T3	120 - 100	1.541	33	0.0366	0.0545
T4	100 - 80	1.377	33	0.0488	0.0561
T5	80 - 60	1.141	33	0.0564	0.0563
T6	60 - 40	0.913	33	0.0533	0.0532
T7	40 - 20	0.681	33	0.0649	0.0435
T8	20 - 5.24	0.372	33	0.0822	0.0283
T9	5.24 - 0	0.099	33	0.0889	0.0146

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	APXVSPP18-C-A20 w/Mount Pipe	33	1.682	0.0386	0.0508	68541
138.00	Guy	33	1.619	0.0352	0.0485	43672
130.00	Pirod 12' T-Frame Sector Mount (1)	33	1.585	0.0344	0.0500	193499
122.00	4' Standoff	33	1.551	0.0358	0.0534	47524
70.00	Guy	33	1.025	0.0545	0.0556	174516

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	10.674	3	0.3351	0.3109
T2	140 - 120	10.038	7	0.3197	0.2980

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T3	120 - 100	9.055	9	0.3220	0.2990
T4	100 - 80	7.807	9	0.3585	0.2880
T5	80 - 60	6.306	9	0.3535	0.2654
T6	60 - 40	4.903	9	0.3226	0.2439
T7	40 - 20	3.546	9	0.3598	0.1967
T8	20 - 5.24	1.899	9	0.4271	0.1269
T9	5.24 - 0	0.505	9	0.4542	0.0648

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.00	APXVSPP18-C-A20 w/Mount Pipe	3	10.541	0.3316	0.3075	16896
138.00	Guy	7	9.929	0.3177	0.2974	10652
130.00	Pirod 12' T-Frame Sector Mount (1)	9	9.539	0.3145	0.3002	48325
122.00	4' Standoff	9	9.157	0.3194	0.3008	12974
70.00	Guy	9	5.585	0.3358	0.2577	16746

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T2	140	Leg	A325N	0.6250	5	2406.26	20708.70	0.116 ✔	1	Bolt Tension
T3	120	Leg	A325N	0.6250	5	2557.16	20708.70	0.123 ✔	1	Bolt Tension
T4	100	Leg	A325N	0.7500	5	2829.91	29820.60	0.095 ✔	1	Bolt Tension
T5	80	Leg	A325N	0.7500	5	2590.53	29820.60	0.087 ✔	1	Bolt Tension
T6	60	Leg	A325N	0.7500	5	3351.02	29820.60	0.112 ✔	1	Bolt Tension
T7	40	Leg	A325N	0.7500	5	3867.05	29820.60	0.130 ✔	1	Bolt Tension
T8	20	Leg	A325N	0.7500	5	3789.80	29820.60	0.127 ✔	1	Bolt Tension

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
T2	138.00 (A) (526)	9/16 EHS	3500.00	35000.04	15053.80	21000.00	1.000	1.395 ✔
	138.00 (A) (527)	9/16 EHS	3500.00	35000.04	14948.20	21000.00	1.000	1.405 ✔
	138.00 (B) (520)	9/16 EHS	3500.00	35000.04	14112.30	21000.00	1.000	1.488 ✔
	138.00 (B) (521)	9/16 EHS	3500.00	35000.04	14198.50	21000.00	1.000	1.479 ✔

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
	138.00 (C) (512)	9/16 EHS	3500.00	35000.04	14954.50	21000.00	1.000	1.404 ✔
	138.00 (C) (513)	9/16 EHS	3500.00	35000.04	14978.70	21000.00	1.000	1.402 ✔
T5	70.00 (A) (534)	11/16 EHS	5000.00	49999.96	17411.40	30000.00	1.000	1.723 ✔
	70.00 (B) (533)	11/16 EHS	5000.00	49999.96	16617.40	30000.00	1.000	1.805 ✔
	70.00 (C) (532)	11/16 EHS	5000.00	49999.96	17134.50	30000.00	1.000	1.751 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u lb	ϕP_n lb	Ratio $P_u / \phi P_n$
T1	150 - 140	2	10.00	2.26	54.2 K=1.00	3.1416	1.00	-14907.50	114010.00	0.131 [1] ✔
T2	140 - 120	2	20.00	2.38	57.1 K=1.00	3.1416	1.00	-38336.60	111367.00	0.344 [1] ✔
T3	120 - 100	2	20.00	2.38	57.1 K=1.00	3.1416	1.00	-42426.00	111367.00	0.381 [1] ✔
T4	100 - 80	2 1/4	20.00	2.38	50.8 K=1.00	3.9761	1.00	-42448.70	148186.00	0.286 [1] ✔
T5	80 - 60	2 1/4	20.00	2.38	50.8 K=1.00	3.9761	1.00	-50242.40	148186.00	0.339 [1] ✔
T6	60 - 40	2 1/4	20.00	2.38	50.8 K=1.00	3.9761	1.00	-57983.10	148186.00	0.391 [1] ✔
T7	40 - 20	2 1/4	20.00	2.38	50.8 K=1.00	3.9761	1.00	-58703.50	148186.00	0.396 [1] ✔
T8	20 - 5.24	2 1/2	14.76	2.38	45.7 K=1.00	4.9087	0.99	-56847.10	188430.00	0.302 [1] ✔
T9	5.24 - 0	2 1/2	5.48	1.66	31.8 K=1.00	4.9087	0.92	-51288.30	189461.00	0.271 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u / \phi P_n$
T1	150 - 140	3/4	4.38	2.09	120.5 K=0.90	0.4418	-3038.39	6874.34	0.442 [1] ✔
T2	140 - 120	3/4	4.44	2.12	122.2 K=0.90	0.4418	-3132.09	6680.31	0.469 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T3	120 - 100	3/4	4.44	2.12	122.2 K=0.90	0.4418	-1136.76	6680.31	0.170 [1] ✔
T4	100 - 80	3/4	4.44	2.11	121.5 K=0.90	0.4418	-1812.19	6758.67	0.268 [1] ✔
T5	80 - 60	3/4	4.44	2.11	121.5 K=0.90	0.4418	-2119.04	6758.67	0.314 [1] ✔
T6	60 - 40	3/4	4.44	2.11	121.5 K=0.90	0.4418	-2023.94	6758.67	0.299 [1] ✔
T7	40 - 20	3/4	4.44	2.11	121.5 K=0.90	0.4418	-1384.71	6758.67	0.205 [1] ✔
T8	20 - 5.24	3/4	4.44	2.10	120.8 K=0.90	0.4418	-1385.59	6838.42	0.203 [1] ✔
T9	5.24 - 0	7/8	3.05	1.87	101.2 K=0.99	0.6013	-4389.01	12797.90	0.343 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	3.75	3.58	160.5 K=0.70	0.4418	-486.01	3872.77	0.125 [1] ✔
T2	140 - 120	3/4	3.75	3.58	160.5 K=0.70	0.4418	-291.07	3872.77	0.075 [1] ✔
T5	80 - 60	3/4	3.75	3.56	159.6 K=0.70	0.4418	-308.29	3918.20	0.079 [1] ✔

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T9	5.24 - 0	7/8	3.00	2.79	107.2 K=0.70	0.6013	-917.75	11674.10	0.079 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1	3.75	3.58	120.4 K=0.70	0.7854	-182.33	12239.90	0.015 [1]
T3	120 - 100	1	3.75	3.58	120.4 K=0.70	0.7854	-80.93	12239.90	0.007 [1]
T4	100 - 80	1	3.75	3.56	119.7 K=0.70	0.7854	-175.42	12383.40	0.014 [1]
T5	80 - 60	1	3.75	3.56	119.7 K=0.70	0.7854	-443.64	12383.40	0.036 [1]
T6	60 - 40	1	3.75	3.56	119.7 K=0.70	0.7854	-510.81	12383.40	0.041 [1]
T7	40 - 20	1	3.75	3.56	119.7 K=0.70	0.7854	-109.79	12383.40	0.009 [1]
T8	20 - 5.24	1	3.75	3.54	119.0 K=0.70	0.7854	-175.27	12529.60	0.014 [1]

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1	3.75	3.58	120.4 K=0.70	0.7854	-1607.09	12239.90	0.131 [1]
T2	140 - 120	1	3.75	3.58	120.4 K=0.70	0.7854	-184.40	12239.90	0.015 [1]
T3	120 - 100	1	3.75	3.58	120.4 K=0.70	0.7854	-165.91	12239.90	0.014 [1]
T4	100 - 80	1	3.75	3.56	119.7 K=0.70	0.7854	-522.32	12383.40	0.042 [1]
T5	80 - 60	1	3.75	3.56	119.7 K=0.70	0.7854	-471.50	12383.40	0.038 [1]
T6	60 - 40	1	3.75	3.56	119.7 K=0.70	0.7854	-151.97	12383.40	0.012 [1]
T7	40 - 20	1	3.75	3.56	119.7 K=0.70	0.7854	-0.31	12383.40	0.000 [1]

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1	3.75	3.58	120.4 K=0.70	0.7854	-684.82	12239.90	0.056 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	1	3.75	3.58	120.4 K=0.70	0.7854	-316.79	12239.90	0.026 [1] ✔

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	1	3.75	3.58	120.4 K=0.70	0.7854	-3548.52	12239.90	0.290 [1] ✔

[1] P_u / ϕP_n controls

Bottom Guy Pull-Off Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	1	3.75	3.58	120.4 K=0.70	0.7854	-3924.43	12239.90	0.321 [1] ✔

[1] P_u / ϕP_n controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (516)	2L3x3x1/4x3/8	6.94	6.85	88.4 K=1.00	2.8800	-15899.60	61867.60	0.257 [1] ✔
T2	140 - 120 (517)	2L3x3x1/4x3/8	6.94	6.85	88.4 K=1.00	2.8800	-15704.90	61867.60	0.254 [1] ✔
T2	140 - 120 (524)	2L3x3x1/4x3/8	6.94	6.85	88.4 K=1.00	2.8800	-14190.70	61867.60	0.229 [1] ✔
T2	140 - 120 (525)	2L3x3x1/4x3/8	6.94	6.85	88.4 K=1.00	2.8800	-15659.00	61867.60	0.253 [1] ✔
T2	140 - 120 (530)	2L3x3x1/4x3/8	6.94	6.85	88.4 K=1.00	2.8800	-14583.80	61867.60	0.236 [1] ✔
T2	140 - 120 (531)	2L3x3x1/4x3/8	6.94	6.85	88.4 K=1.00	2.8800	-15941.80	61867.60	0.258 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	2	10.00	2.26	54.2	3.1416	12037.50	141372.00	0.085 [1] ✔
T2	140 - 120	2	20.00	2.38	57.1	3.1416	12031.30	141372.00	0.085 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	4.38	2.09	133.9	0.4418	2999.59	19880.40	0.151 [1] ✔
T2	140 - 120	3/4	4.44	2.12	135.8	0.4418	3050.16	19880.40	0.153 [1] ✔
T3	120 - 100	3/4	4.44	2.12	135.8	0.4418	685.23	19880.40	0.034 [1] ✔
T4	100 - 80	3/4	4.44	2.11	135.0	0.4418	1672.12	19880.40	0.084 [1] ✔
T5	80 - 60	3/4	4.44	2.11	135.0	0.4418	1934.99	19880.40	0.097 [1] ✔
T6	60 - 40	3/4	4.44	2.11	135.0	0.4418	1610.36	19880.40	0.081 [1] ✔
T7	40 - 20	3/4	4.44	2.11	135.0	0.4418	701.77	19880.40	0.035 [1] ✔
T8	20 - 5.24	3/4	4.44	2.10	134.2	0.4418	1374.62	19880.40	0.069 [1] ✔
T9	5.24 - 0	7/8	3.05	1.87	102.4	0.6013	1010.88	27059.40	0.037 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	3.75	3.58	229.3	0.4418	546.40	19880.40	0.027 [1] ✔
T2	140 - 120	3/4	3.75	3.58	229.3	0.4418	1242.73	19880.40	0.063 [1] ✔
T3	120 - 100	3/4	3.75	3.58	229.3	0.4418	1203.02	19880.40	0.061 [1] ✔
T4	100 - 80	3/4	3.75	3.56	228.0	0.4418	1038.26	19880.40	0.052 [1] ✔
T5	80 - 60	3/4	3.75	3.56	228.0	0.4418	1126.00	19880.40	0.057 [1] ✔
T6	60 - 40	3/4	3.75	3.56	228.0	0.4418	1368.86	19880.40	0.069 [1] ✔
T7	40 - 20	3/4	3.75	3.56	228.0	0.4418	1471.04	19880.40	0.074 [1] ✔
T8	20 - 5.24	3/4	3.75	3.54	226.7	0.4418	1075.24	19880.40	0.054 [1] ✔
T9	5.24 - 0	6x1/2	2.50	2.29	190.6	3.0000	2191.00	97200.00	0.023 [1] ✔

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T9	5.24 - 0	7/8	3.00	2.79	153.2	0.6013	917.75	27059.40	0.034 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1	3.75	3.58	172.0	0.7854	159.93	35342.90	0.005 [1] ✔
T3	120 - 100	1	3.75	3.58	172.0	0.7854	494.07	35342.90	0.014 [1] ✔
T4	100 - 80	1	3.75	3.56	171.0	0.7854	541.45	35342.90	0.015 [1] ✔
T5	80 - 60	1	3.75	3.56	171.0	0.7854	749.24	35342.90	0.021 [1] ✔
T6	60 - 40	1	3.75	3.56	171.0	0.7854	741.68	35342.90	0.021 [1] ✔
T7	40 - 20	1	3.75	3.56	171.0	0.7854	719.08	35342.90	0.020 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T8	20 - 5.24	1	3.75	3.54	170.0	0.7854	839.22	35342.90	0.024 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1	3.75	3.58	172.0	0.7854	1698.41	35342.90	0.048 [1] ✔
T2	140 - 120	1	3.75	3.58	172.0	0.7854	822.30	35342.90	0.023 [1] ✔
T3	120 - 100	1	3.75	3.58	172.0	0.7854	672.07	35342.90	0.019 [1] ✔
T4	100 - 80	1	3.75	3.56	171.0	0.7854	681.93	35342.90	0.019 [1] ✔
T5	80 - 60	1	3.75	3.56	171.0	0.7854	982.44	35342.90	0.028 [1] ✔
T6	60 - 40	1	3.75	3.56	171.0	0.7854	819.76	35342.90	0.023 [1] ✔
T7	40 - 20	1	3.75	3.56	171.0	0.7854	785.66	35342.90	0.022 [1] ✔
T8	20 - 5.24	1 1/4	3.75	3.54	136.0	1.2272	8737.06	55223.30	0.158 [1] ✔
T9	5.24 - 0	1	1.25	1.04	50.1	0.7854	1551.74	35342.90	0.044 [1] ✔

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1	3.75	3.58	172.0	0.7854	739.95	35342.90	0.021 [1] ✔
T2	140 - 120	1	3.75	3.58	172.0	0.7854	991.68	35342.90	0.028 [1] ✔
T3	120 - 100	1	3.75	3.58	172.0	0.7854	1143.10	35342.90	0.032 [1] ✔
T4	100 - 80	1	3.75	3.56	171.0	0.7854	956.18	35342.90	0.027 [1] ✔
T5	80 - 60	1	3.75	3.56	171.0	0.7854	7258.93	35342.90	0.205 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u/\phi P_n$
T6	60 - 40	1	3.75	3.56	171.0	0.7854	1297.28	35342.90	0.037 [1] ✔
T7	40 - 20	1	3.75	3.56	171.0	0.7854	1376.27	35342.90	0.039 [1] ✔

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u/\phi P_n$
T2	140 - 120	1	3.75	3.58	172.0	0.7854	6602.20	35342.90	0.187 [1] ✔

[1] P_u / ϕP_n controls

Bottom Guy Pull-Off Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u/\phi P_n$
T2	140 - 120	1	3.75	3.58	172.0	0.7854	2694.12	35342.90	0.076 [1] ✔

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u/\phi P_n$
T2	140 - 120 (514)	2L3x3x1/4x3/8	6.32	6.24	80.5	2.8800	16377.50	93312.00	0.176 [1] ✔
T2	140 - 120 (515)	2L 'a' > 35.7408 in - 514 2L3x3x1/4x3/8	6.32	6.24	80.5	2.8800	16438.70	93312.00	0.176 [1] ✔
T2	140 - 120 (522)	2L 'a' > 35.7408 in - 515 2L3x3x1/4x3/8	6.32	6.24	80.5	2.8800	16088.30	93312.00	0.172 [1] ✔
T2	140 - 120 (523)	2L 'a' > 35.7408 in - 522 2L3x3x1/4x3/8	6.32	6.24	80.5	2.8800	15421.60	93312.00	0.165 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u / \phi P_n$
		2L 'a' > 35.7408 in - 523							
T2	140 - 120 (528)	2L3x3x1/4x3/8	6.32	6.24	80.5	2.8800	15412.00	93312.00	0.165 [1] ✔
		2L 'a' > 35.7408 in - 528							
T2	140 - 120 (529)	2L3x3x1/4x3/8	6.32	6.24	80.5	2.8800	16145.60	93312.00	0.173 [1] ✔
		2L 'a' > 35.7408 in - 529							

[1] P_u / ϕP_n controls

Torque-Arm Bottom Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $P_u / \phi P_n$
T2	140 - 120 (516)	2L3x3x1/4x3/8	6.94	6.85	88.4	2.8800	2717.45	93312.00	0.029 [1] ✔
T2	140 - 120 (517)	2L3x3x1/4x3/8	6.94	6.85	88.4	2.8800	2750.85	93312.00	0.029 [1] ✔
T2	140 - 120 (524)	2L3x3x1/4x3/8	6.94	6.85	88.4	2.8800	2897.36	93312.00	0.031 [1] ✔
T2	140 - 120 (525)	2L3x3x1/4x3/8	6.94	6.85	88.4	2.8800	2774.38	93312.00	0.030 [1] ✔
T2	140 - 120 (530)	2L3x3x1/4x3/8	6.94	6.85	88.4	2.8800	3630.52	93312.00	0.039 [1] ✔
T2	140 - 120 (531)	2L3x3x1/4x3/8	6.94	6.85	88.4	2.8800	3594.10	93312.00	0.039 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$øP_{allow}$ lb	% Capacity	Pass Fail
T1	150 - 140	Leg	2	2	-14907.50	114010.00	13.1	Pass
		Diagonal	3/4	13	-3038.39	6874.34	44.2	Pass
		Horizontal	3/4	32	-486.01	3872.77	12.5	Pass
		Top Girt	1	5	-182.33	12239.90	1.5	Pass
		Bottom Girt	1	9	-1607.09	12239.90	13.1	Pass
		Mid Girt	1	12	-684.82	12239.90	5.6	Pass
T2	140 - 120	Leg	2	41	-38336.60	111367.00	34.4	Pass
		Diagonal	3/4	87	-3132.09	6680.31	46.9	Pass
		Horizontal	3/4	98	-291.07	3872.77	7.5	Pass
		Bottom Girt	1	45	822.30	35342.90	2.3	Pass
		Mid Girt	1	48	991.68	35342.90	2.8	Pass
		Guy A@138	9/16	526	15053.80	21000.00	71.7	Pass
		Guy B@138	9/16	521	14198.50	21000.00	67.6	Pass
		Guy C@138	9/16	513	14978.70	21000.00	71.3	Pass
		Top Guy Pull-Off@138	1	44	-3548.52	12239.90	29.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$øP_{allow}$ lb	% Capacity	Pass Fail
		Bottom Guy Pull-Off@138	1	519	-3924.43	12239.90	32.1	Pass
		Torque Arm Top@138	2L3x3x1/4x3/8	515	16438.70	93312.00	17.6	Pass
		Torque Arm Bottom@138	2L3x3x1/4x3/8	531	-15941.80	61867.60	25.8	Pass
T3	120 - 100	Leg	2	107	-42426.00	111367.00	38.1	Pass
		Diagonal	3/4	165	-1136.76	6680.31	17.0	Pass
		Horizontal	3/4	123	1203.02	19880.40	6.1	Pass
		Top Girt	1	108	494.07	35342.90	1.4	Pass
		Bottom Girt	1	111	672.07	35342.90	1.9	Pass
		Mid Girt	1	114	1143.10	35342.90	3.2	Pass
T4	100 - 80	Leg	2 1/4	173	-42448.70	148186.00	28.6	Pass
		Diagonal	3/4	185	-1812.19	6758.67	26.8	Pass
		Horizontal	3/4	189	1038.26	19880.40	5.2	Pass
		Top Girt	1	174	541.45	35342.90	1.5	Pass
		Bottom Girt	1	178	-522.32	12383.40	4.2	Pass
		Mid Girt	1	180	956.18	35342.90	2.7	Pass
T5	80 - 60	Leg	2 1/4	239	-50242.40	148186.00	33.9	Pass
		Diagonal	3/4	249	-2119.04	6758.67	31.4	Pass
		Horizontal	3/4	282	-308.29	3918.20	7.9	Pass
		Top Girt	1	242	-443.64	12383.40	3.6	Pass
		Bottom Girt	1	245	-471.50	12383.40	3.8	Pass
		Mid Girt	1	246	7258.93	35342.90	20.5	Pass
		Guy A@70	11/16	534	17411.40	30000.00	58.0	Pass
		Guy B@70	11/16	533	16617.40	30000.00	55.4	Pass
		Guy C@70	11/16	532	17134.50	30000.00	57.1	Pass
T6	60 - 40	Leg	2 1/4	305	-57983.10	148186.00	39.1	Pass
		Diagonal	3/4	363	-2023.94	6758.67	29.9	Pass
		Horizontal	3/4	321	1368.86	19880.40	6.9	Pass
		Top Girt	1	307	-510.81	12383.40	4.1	Pass
		Bottom Girt	1	309	819.76	35342.90	2.3	Pass
		Mid Girt	1	312	1297.28	35342.90	3.7	Pass
T7	40 - 20	Leg	2 1/4	371	-58703.50	148186.00	39.6	Pass
		Diagonal	3/4	382	-1384.71	6758.67	20.5	Pass
		Horizontal	3/4	387	1471.04	19880.40	7.4	Pass
		Top Girt	1	372	719.08	35342.90	2.0	Pass
		Bottom Girt	1	375	785.66	35342.90	2.2	Pass
		Mid Girt	1	378	1376.27	35342.90	3.9	Pass
T8	20 - 5.24	Leg	2 1/2	437	-56847.10	188430.00	30.2	Pass
		Diagonal	3/4	452	-1385.59	6838.42	20.3	Pass
		Horizontal	3/4	478	1075.24	19880.40	5.4	Pass
		Top Girt	1	438	839.22	35342.90	2.4	Pass
		Bottom Girt	1 1/4	443	8737.06	55223.30	15.8	Pass
T9	5.24 - 0	Leg	2 1/2	487	-51288.30	189461.00	27.1	Pass
		Diagonal	7/8	493	-4389.01	12797.90	34.3	Pass
		Horizontal	6x1/2	499	2191.00	97200.00	2.3	Pass
		Secondary Horizontal	7/8	510	-917.75	11674.10	7.9	Pass
		Bottom Girt	1	488	1551.74	35342.90	4.4	Pass
							Summary	
						Leg (T7)	39.6	Pass
						Diagonal (T2)	46.9	Pass
						Horizontal (T1)	12.5	Pass
						Secondary Horizontal (T9)	7.9	Pass
						Top Girt (T6)	4.1	Pass
						Bottom Girt (T8)	15.8	Pass
						Mid Girt (T5)	20.5	Pass
						Guy A (T2)	71.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
						Guy B (T2)	67.6	Pass
						Guy C (T2)	71.3	Pass
						Top Guy Pull-Off (T2)	29.0	Pass
						Bottom Guy Pull-Off (T2)	32.1	Pass
						Torque Arm Top (T2)	17.6	Pass
						Torque Arm Bottom (T2)	25.8	Pass
						Bolt Checks	13.0	Pass
						RATING =	**71.7**	**Pass**

Pier and Pad Foundation

Project #: 23012
Site Name: W. Coventry (CT33

TIA-222 Revision: G
Tower Type: Guyed

Block Foundation?: ☐

Superstructure Analysis Reactions		
Compression, P_{comp}:	142.775	kips
Base Shear, Vu_comp:	2.966	kips
Tower Height, **H**:	150	ft
BP Dist. Above Fdn, bp_{dist}:	3	in

Foundation Analysis Checks	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	28.01	2.97	**10.6%**	**Pass**
Bearing Pressure (ksf)	12.00	3.39	**28.2%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	322.94	6.67	**2.1%**	**Pass**
Pier Compression (kip)	3124.31	144.76	**4.6%**	**Pass**
*Pad Flexure (kip*ft)*	118.78	51.63	**43.5%**	**Pass**
Pad Shear - 1-way (kips)	89.65	26.77	**29.9%**	**Pass**
Pad Shear - 2-way (kips)	276.62	144.76	**52.3%**	**Pass**

Soil Rating:	**28.2%**
Structural Rating:	**52.3%**

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	2.5	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	6	
Pier Rebar Quantity, **mc**:	9	
Pier Tie/Spiral Size, **St**:	3	
Pier Tie/Spiral Quantity, **mt**:	3	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	3.0	ft
Pad Width, **W**:	7.0	ft
Pad Thickness, **T**:	1.3	ft
Pad Rebar Size, **Sp**:	4	
Pad Rebar Quantity, **mp**:	12	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	110	pcf
Ultimate Gross Bearing, Qult:	20.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:		degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.3	
Neglected Depth, **N**:	3.3	ft
Groundwater Depth, **gw**:	None	ft

<--Toggle between Gross and Net

Sprint™

PROJECT:	DO MACRO UPGRADE
SITE NAME:	W. CONVENTRY
SITE CASCADE:	CT33XC550-A
SITE ADDRESS:	130 VERNON ROAD BOLTON, CT 06091
SITE TYPE:	150'-0" GUYED TOWER

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

RAMAKER & ASSOCIATES, INC.
100% EMPLOYEE-OWNED
855 Community Dr, Sauk City, WI 53583
608-643-4100 www.Ramaker.com
Sauk City, WI • Willmar, MN
Woodcliff Lake, NJ • Bayamon, PR

Charles Cherundolo Consulting, Inc.
713 Clover Lane, Moscow, PA 18444
Phone: 570-840-5084 Fax: 570-842-5592

SITE INFORMATION

PROPERTY OWNER:
MOUNTAINTOP ENTERPRISES, INC.
C/O MILTON HATHAWAY
PO BOX 9219
BOLTON, T 06043

SITE ADDRESS:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

GEOGRAPHIC COORDINATES:
LATITUDE: 41.80205°
LONGITUDE: -72.4412°

ZONING JURISDICTION:
CONNECTICUT SITING COUNCIL

ZONING DISTRICT:
R-1

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

AAV PROVIDER:
AT&T
PH.: (800) 288-2020

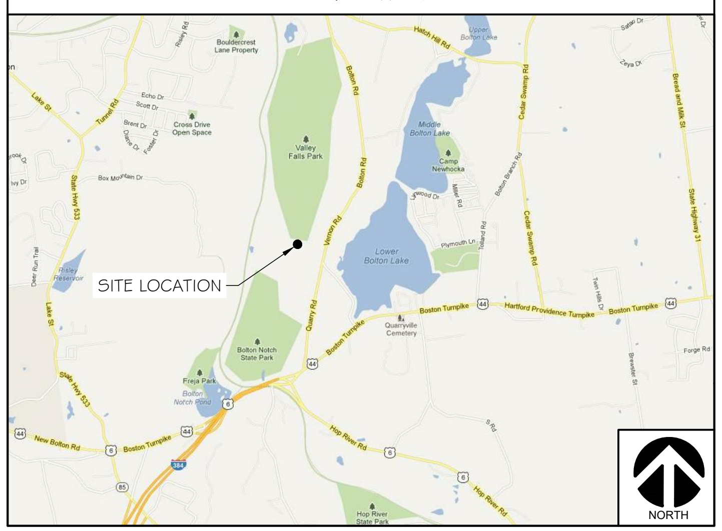
SPRINT CONSTRUCTION MANAGER:
NAME: MIKE DELIA
PHONE: (781) 316-6348
E-MAIL: michael.delia@sprint.com

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

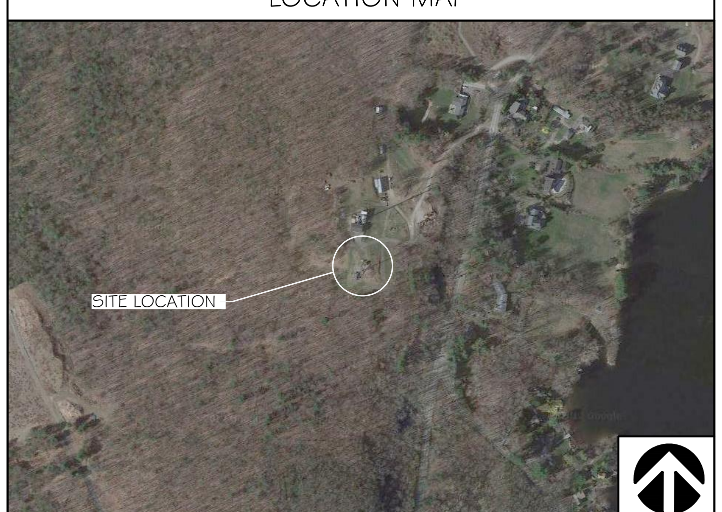
SITE ACQUISITION:
CHARLES CHERUNDOLO CONSULTING, INC.
1280 RT. 46 WEST
PARSIPPANY, NJ 07054
CONTACT: TOM JUPIN, PMP, PROJECT MANAGER
CELL: (973) 819-9033
EMAIL: tom.jupin@cherundoloconsulting.com

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 EQUIPMENT IN EXISTING BTS CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (6) RRH'S ON TOWER
- INSTALL (1) HYBRIFLEX CABLE

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. 2015 INTERNATIONAL BUILDING CODE
2. 2018 CT STATE BUILDING CODE
3. ANSI/TIA-222 STRUCTURAL STANDARD FOR ANTENNA STRUCTURES
4. NFPA 780 - LIGHTNING PROTECTION CODE
5. NATIONAL ELECTRIC CODE

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SHEET INDEX

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: [signature] Date: 4/10/2019

MARK	DATE	DESCRIPTION
3	04/10/19	REVISED CODE COMPLIANCE
2	11/01/17	RFDS REVISIONS
1	08/31/17	ADD FUTURE T-MOBILE

ISSUE PHASE: FINAL — DATE ISSUED: 07/19/2017

PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
TITLE SHEET

SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: T-1

SECTION 01 100 - SCOPE OF WORK

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

RELATED DOCUMENTS:
A. THE REQUIREMENTS OF EACH SECTION OF THIS SPECIFICATION APPLY TO ALL SECTIONS, INDIVIDUALLY AND COLLECTIVELY.
B. RELATED DOCUMENTS: THE CONTRACTOR SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE FOLLOWING SUPPLEMENTAL REQUIREMENTS FOR INSTALLATION AND TESTING.
1. EN-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 COMPANYS DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANYS 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

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

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

Signature: [signature] Date: 4/10/2019

MARK	DATE	DESCRIPTION
3	04/10/19	REVISED CODE COMPLIANCE
2	11/01/17	RFDS REVISIONS
1	08/31/17	ADD FUTURE T-MOBILE

ISSUE PHASE: FINAL — DATE ISSUED: 07/19/2017

PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: SP-1

5. POST CONSTRUCTION HEIGHT VERIFICATION AS REQUIRED HEREWITH IN THE TOWER INSTALLATION SPECIFICATIONS.
6. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED HEREWITH IN THE ASPHALT PAVING SPECIFICATIONS.
7. FIELD QUALITY CONTROL TESTING AS SPECIFIED HEREWITH IN THE CONCRETE PAVING SPECIFICATIONS.
8. TESTING REQUIRED HEREWITH UNDER SPECIFICATIONS FOR AGGREGATE BASE FOR ROADWAYS
9. ALL OTHER TESTS REQUIRED BY LOCAL JURISDICTION

D. INSPECTIONS BY COMPANY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN INSPECTION ACTIVITIES, FINAL ACCEPTANCE / PUNCH WALK REVIEW, AND/OR AS A RESULT OF TESTING

E. SPRINT RESERVES THE RIGHT TO INSPECT THE CONSTRUCTION SITE AT ANY TIME VIA SITE WALKS AND/OR PHOTO REVIEWS. CONTRACTOR SHALL GIVE SPRINT 24 HOURS NOTICE PRIOR TO THE COMMENCEMENT OF THE FOLLOWING CONSTRUCTION ACTIVITIES AND PHOTOGRAPHS OF THE IN-PROGRESS WORK.
1. GROUNDING SYSTEM AND BURIED UTILITIES INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS, AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS, ASPHALT PAVING, AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE AND POST CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES. PRIOR TO CONSTRUCTION ACTIVITIES AND AFTER CONSTRUCTION IS COMPLETE, PROVIDE PHOTOGRAPHIC DOCUMENTATION OF ROOF, FLASHINGS, AND PARAPETS, BOTH BEFORE AND AFTER CONSTRUCTION IS COMPLETE.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. TOWER TOP AND INACCESSIBLE EQUIPMENT (RRUS, ANTENNAS, AND CABLING): PROVIDE PHOTOS OF THE BACKS OF ALL ANTENNAS, RRUS, COMBINERS, FILTERS, FIBER AND DC CABLING, CABLE COLOR CODING, EQUIPMENT GROUNDING AND CONNECTOR WATER PROOFING INCLUDING NAME PLATE AND SERIAL NUMBER FOR ALL SERIALIZED EQUIPMENT.

PROJECT CLOSEOUT:

A. FINAL ACCEPTANCE PUNCH WALK AND INSPECTION: AS IDENTIFIED IN THE SCOPE OF SERVICES, SPRINT WILL CONDUCT A FINAL PUNCH WALK OR FINAL DESK TOP PHOTO REVIEW (SITE MODIFICATIONS). PUNCH WALKS MUST BE SCHEDULED IN ADVANCE AS REQUIRED. AT THE PUNCH WALK / REVIEW, SPRINT MAY IDENTIFY CRITICAL DEFICIENCIES WHICH MUST BE CORRECTED PRIOR TO PUTTING SITE ON AIR. MINOR DEFICIENCIES MUST BE CORRECTED WITHIN 30 DAYS EXCEPT AS OTHERWISE REQUIRED. VERIFICATIONS OF CORRECTIONS MAY BE MADE BY COMPANY DURING A REPEAT SITE WALK OR DESK TOP PHOTO REVIEW AT COMPANY'S SOLE DISCRETION.

B. CLOSEOUT DOCUMENTATION: ALL CLOSEOUT DOCUMENTATION AND PHOTOGRAPHS SHALL BE UPLOADED PRIOR TO FINAL ACCEPTANCE. SPRINT WILL REVIEW CLOSEOUT DOCUMENTATION FOR PRESENCE AND CONTENT. CLOSEOUT DOCUMENTATION SHALL INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING AS APPLICABLE:
1. COAX SWEEP TESTS:
2. FIBER TESTS:
3. JURISDICTION FINAL INSPECTION DOCUMENTATION
4. REINFORCEMENT CERTIFICATION (MILL CERTIFICATION)
5. CONCRETE MIX DESIGN AND PRODUCT DATA (TOWER FOUNDATION)
6. LIEN WAIVERS AND RELEASES.
7. POST -CONSTRUCTION HEIGHT VERIFICATION
8. JURISDICTION CERTIFICATE OF OCCUPANCY
9. ELECTRONIC ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
10. STRUCTURAL BACKFILL TEST RESULTS (IF APPLICABLE)
11. CELL SITE UTILITY SETUP
12. AS-BUILT REDLINE CONSTRUCTION DRAWINGS (PDF SCAN OF FIELD MARKS)
13. AS-BUILT CONSTRUCTION DRAWINGS IN DWG AND PDF FORMATS
14. LIST OF SUB CONTRACTORS
15. APPROVED PERMITTING DOCUMENTS
16. FINAL SITE PHOTOS UP-LOADED TO SITERRA. INCLUDE THE FOLLOWING AS APPLICABLE:
   a. TOWER, ANTENNAS, RRUS, AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX/CABLE LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS 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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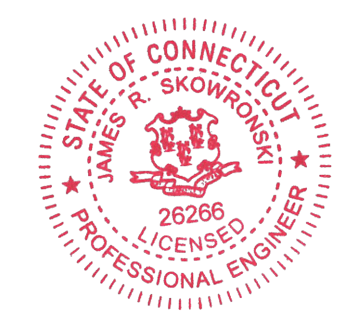
Certification & Seal:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Connecticut.



Signature: Date: 4/10/2019

MARK	DATE	DESCRIPTION
3	04/10/19	REVISED CODE COMPLIANCE
2	11/01/17	RFDS REVISIONS
1	08/31/17	ADD FUTURE T-MOBILE

ISSUE PHASE: FINAL DATE ISSUED: 07/19/2017

PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: SP-2

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.

B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.

C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:

1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.

2. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.

B. CABLE TERMINATION FITTINGS FOR CONDUIT

1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.

2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO-OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

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

CONDUIT AND CONDUCTOR INSTALLATION:

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

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

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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: 4/10/2019

MARK	DATE	DESCRIPTION
3	04/10/19	REVISED CODE COMPLIANCE
2	11/01/17	RFDS REVISIONS
1	08/31/17	ADD FUTURE T-MOBILE

ISSUE PHASE: FINAL DATE ISSUED: 07/19/2017

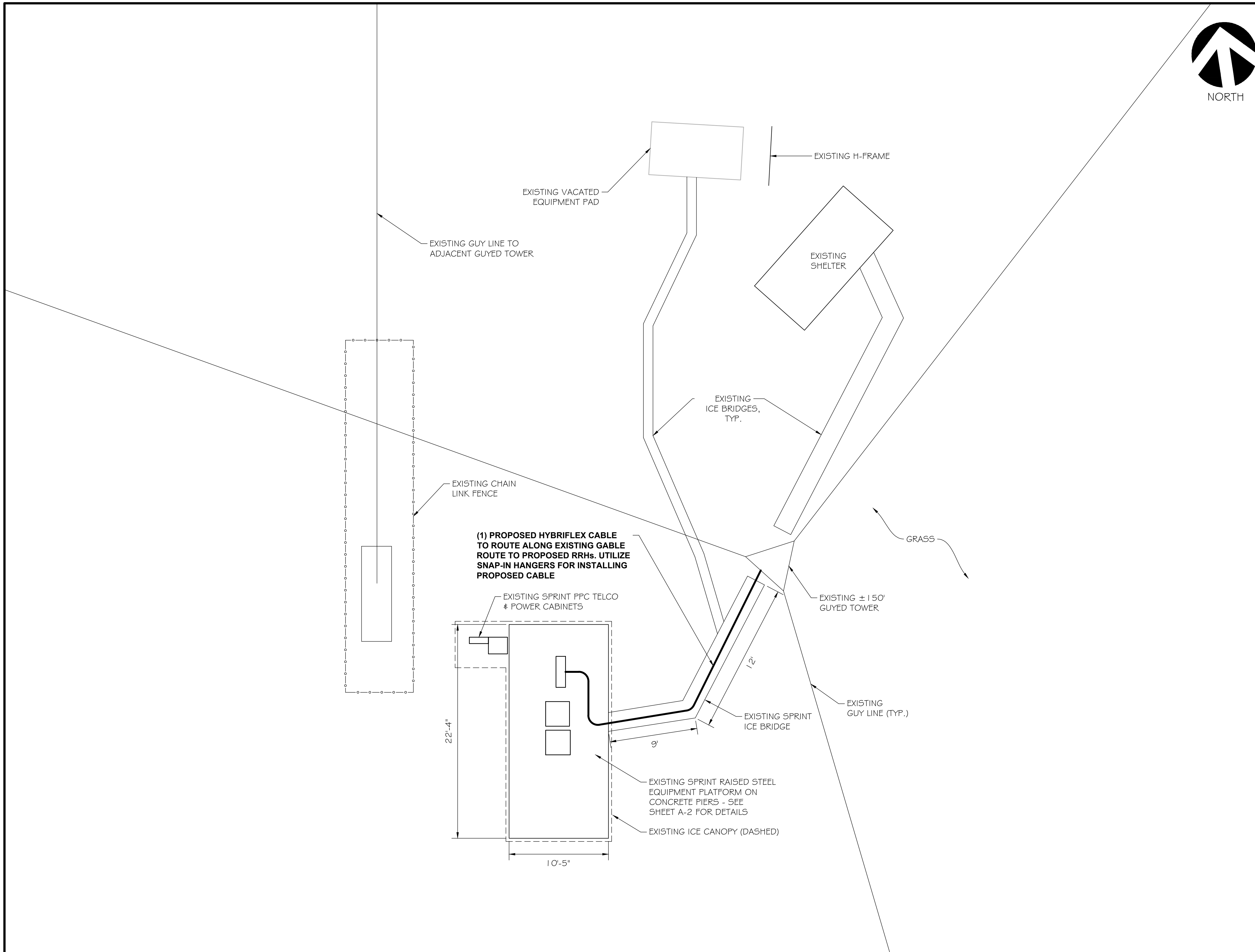
PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: SP-3



SITE PLAN
SCALE: 1" = 10'
1

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STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED
PROFESSIONAL ENGINEER

Signature: Date: 4/10/2019

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ISSUE PHASE: FINAL — DATE ISSUED: 07/19/2017

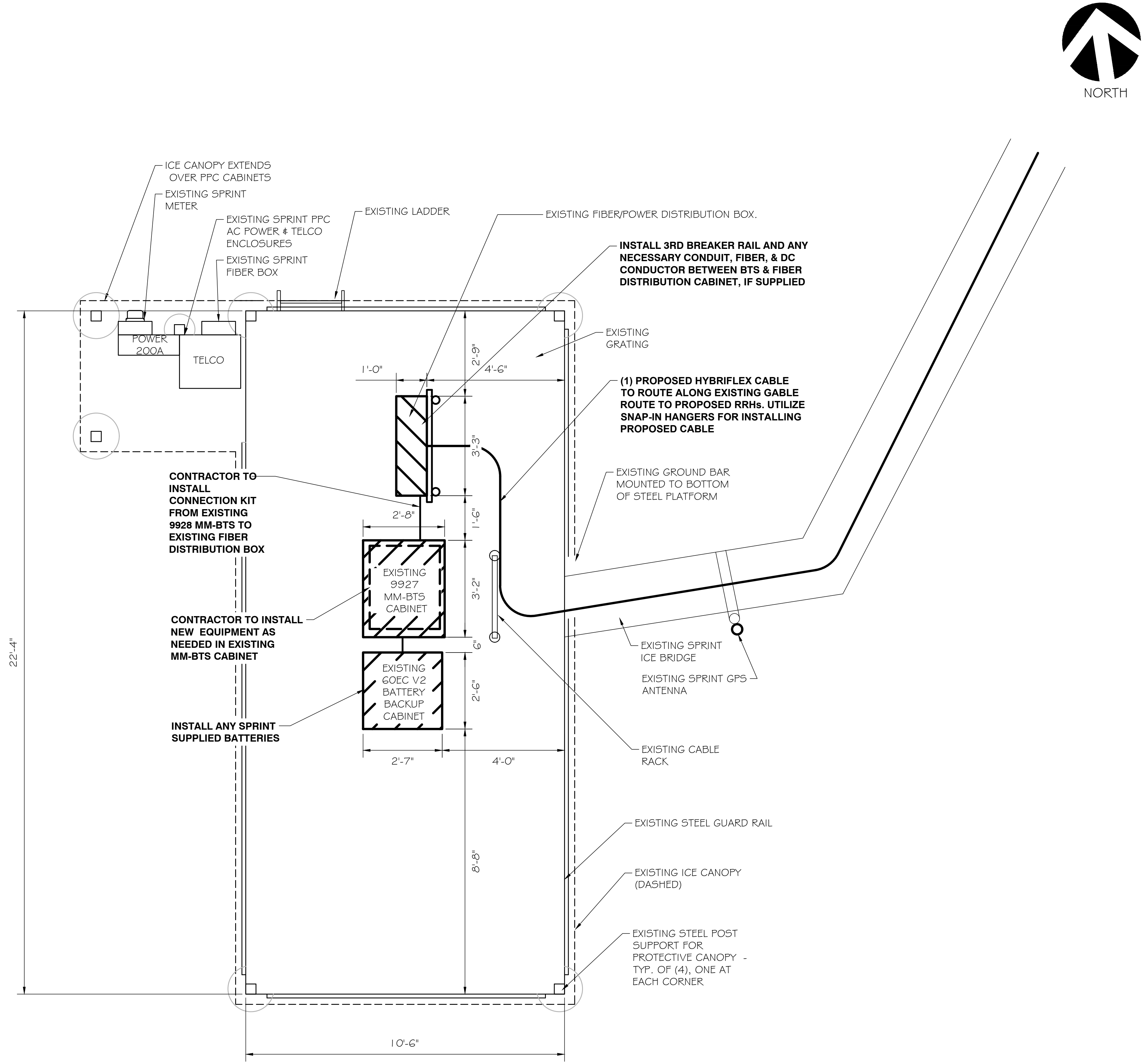
PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
SITE PLAN

0 5' 10' 20'
11" x 17" - 1" = 10'
22" x 34" - 1" = 5'

PROJECT NUMBER: 23012
SHEET NUMBER: A-1



EQUIPMENT PLAN 1
SCALE: 1" = 3.75'

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PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
EQUIPMENT PLAN

0 1.875' 3.75' 7.5'
11" x 17" - 1" = 3.75'
22" x 34" - 1" = 1.875'

PROJECT NUMBER: 23012
SHEET NUMBER: A-2

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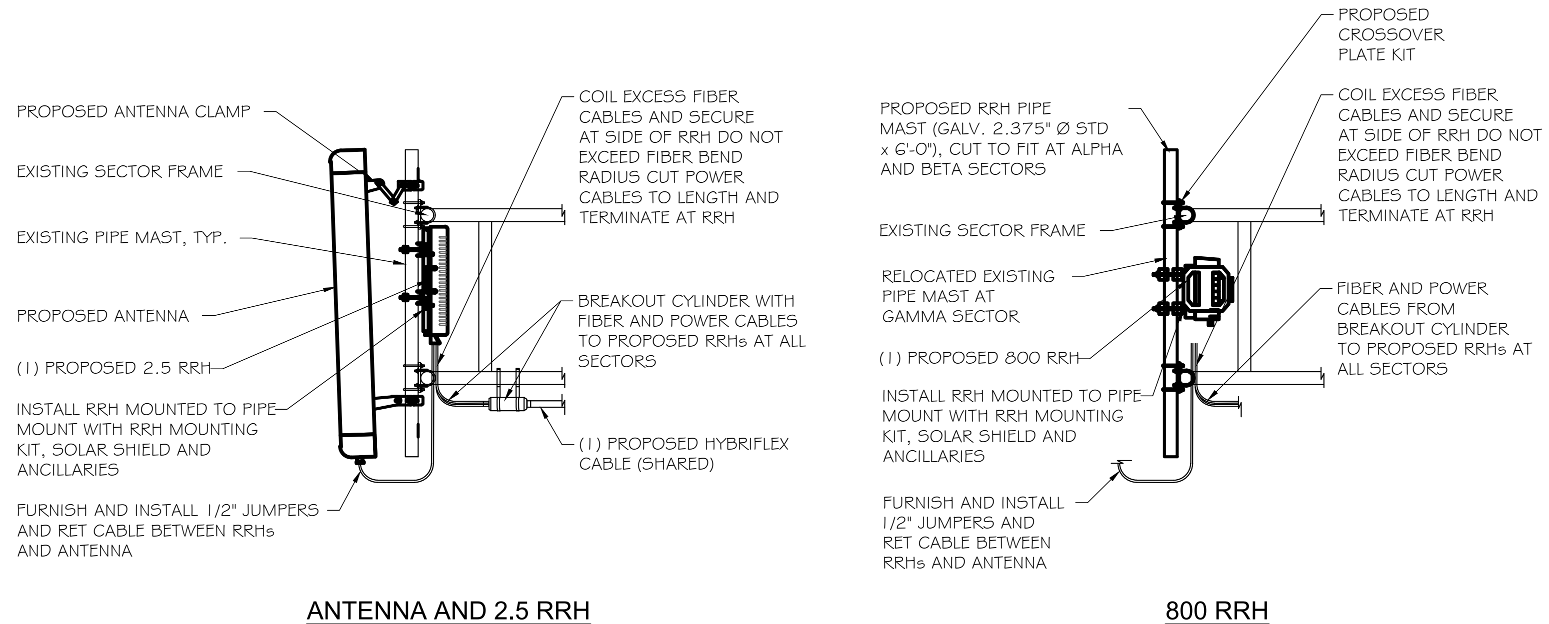
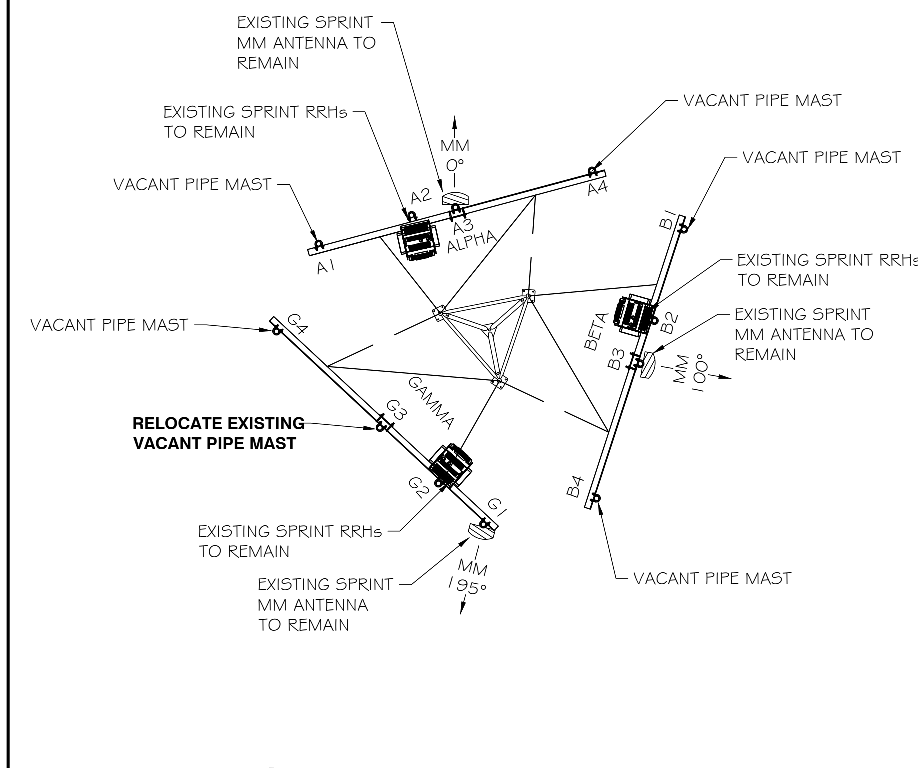


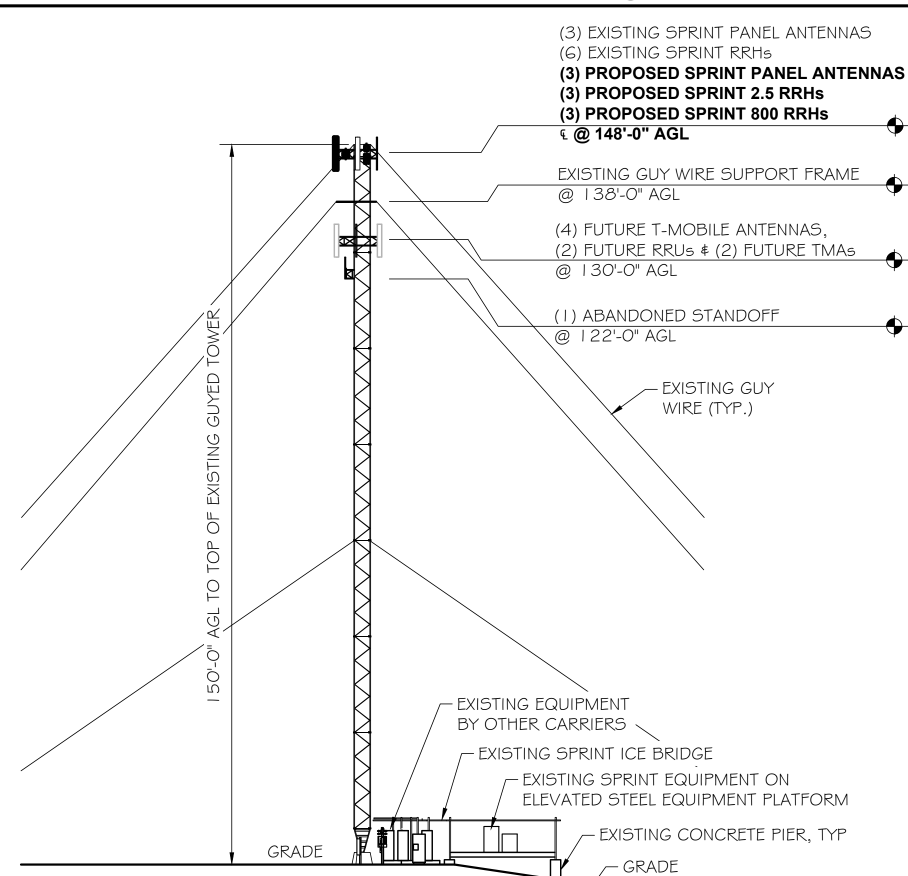
ANTENNA & RRH MOUNTING DETAILS (1)

SCALE: NTS



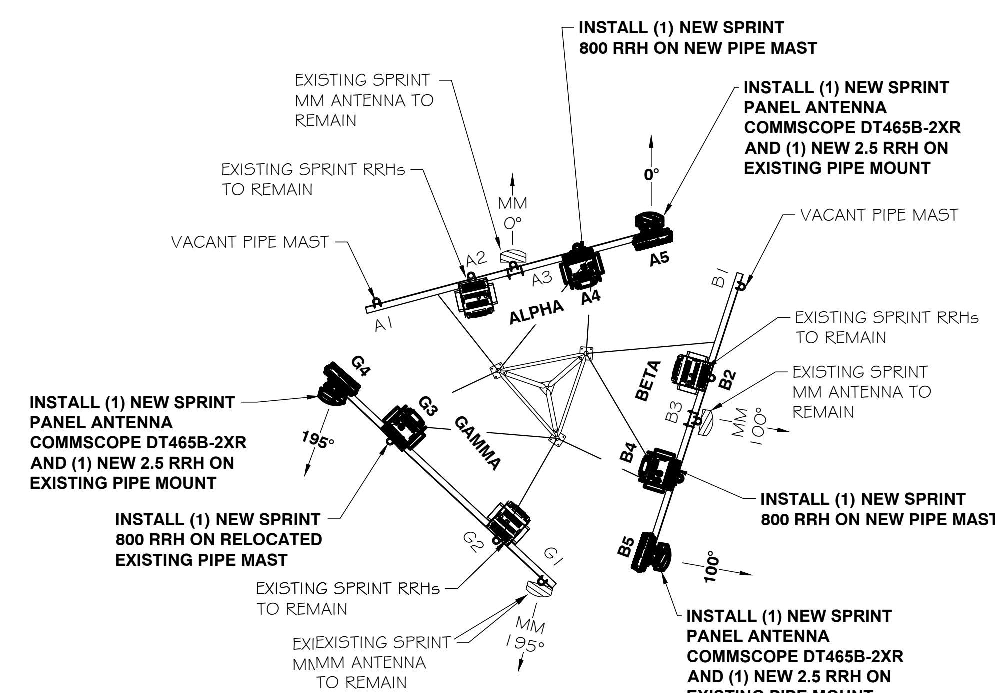
EXISTING ANTENNA ARRAY (3)

SCALE: NTS



BUILDING ELEVATION (2)

SCALE: 1" = 40'



PROPOSED ANTENNA ARRAY (4)

SCALE: NTS

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STATE OF CONNECTICUT
JAMES R. SKOWRONSKI
26266
LICENSED
PROFESSIONAL ENGINEER

Signature: [signature] Date: 4/10/2019

MARK	DATE	DESCRIPTION
3	04/10/19	REVISED CODE COMPLIANCE
2	11/01/17	RFDS REVISIONS
1	08/31/17	ADD FUTURE T-MOBILE

ISSUE PHASE: FINAL — DATE ISSUED: 07/19/2017

PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
BUILDING ELEVATIONS & ANTENNA DETAILS

0 20' 40' 80'
11" x 17" - 1" = 40'
22" x 34" - 1" = 20'

PROJECT NUMBER: 23012

SHEET NUMBER: A-3

DRAWN BY: TWS CHECKED BY: KAB

I:\23000\23012\CAD\Sprint Macro Upgrade\23012 Sprint Macro Upgrade CD.dwg Printed by: bwitmer on Apr 10, 2019 - 11:51am

RFDS Sheet

General Site Information

Site ID	**CT33XC550**	Equipment Vendor	Alcatel-Lucent
Market	Northern Connecticut	Lattitude	41.80205
Region	Northeast	Longitude	-72.44118
MLA	N/A	LL SITE ID	N/A
Structure Type	GUY TOWER		
BTS Type			

Solution ID		Siterra SR Equipment type		Incremental Power Draw needed by added Equipment
		Equipment Vendor	Alcatel-Lucent	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 & ALU #800 MHz 2X50W	
RRH Qty	(3) 8X20-25 & (3) 2X50W	
RRH Dimensions	SEE PAGE A-7	
RRH Weight. lbs.	SEE PAGE A-7	
RRH Mount Weight. Lbs.	SEE PAGE A-7	
Power and Fiber Cable	ALU HYBRIFLEX	
Cable Qty	1	
Weight per foot. Lbs.	1	
Diameter. Inches.	1.54	
Length Ft.	240	(calculated as antenna height plus 20%)
Coax Jumper	2.5 JUMPER	
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	COMMSCOPE DT465B-2XR	COMMSCOPE DT465B-2XR	COMMSCOPE DT465B-2XR
Antenna qty	1	1	1
Antenna Dimensions. Inches	72"x14"x8"	72"x14"x8"	72"x14"x8"
Antenna Weight. Lbs	58	58	58
Antenna Mounting Kit Weight. Lbs.	11.5	11.5	11.5
CL Height	148	148	148
Antenna Azimuth	0	100	195
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 3Z RF ALIGNMENT TOOL OR EQUIVALENT TOOL.

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

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ISSUE PHASE: FINAL — DATE ISSUED: 07/19/2017

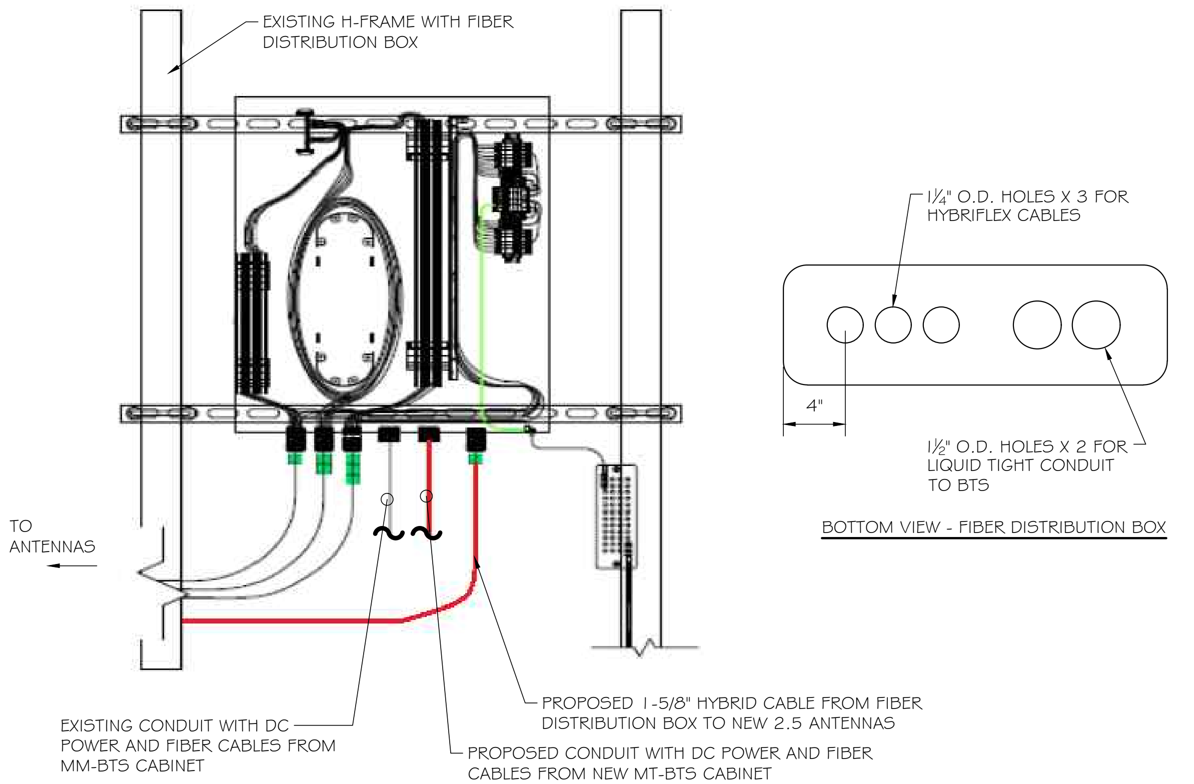
PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
RF DATA SHEET

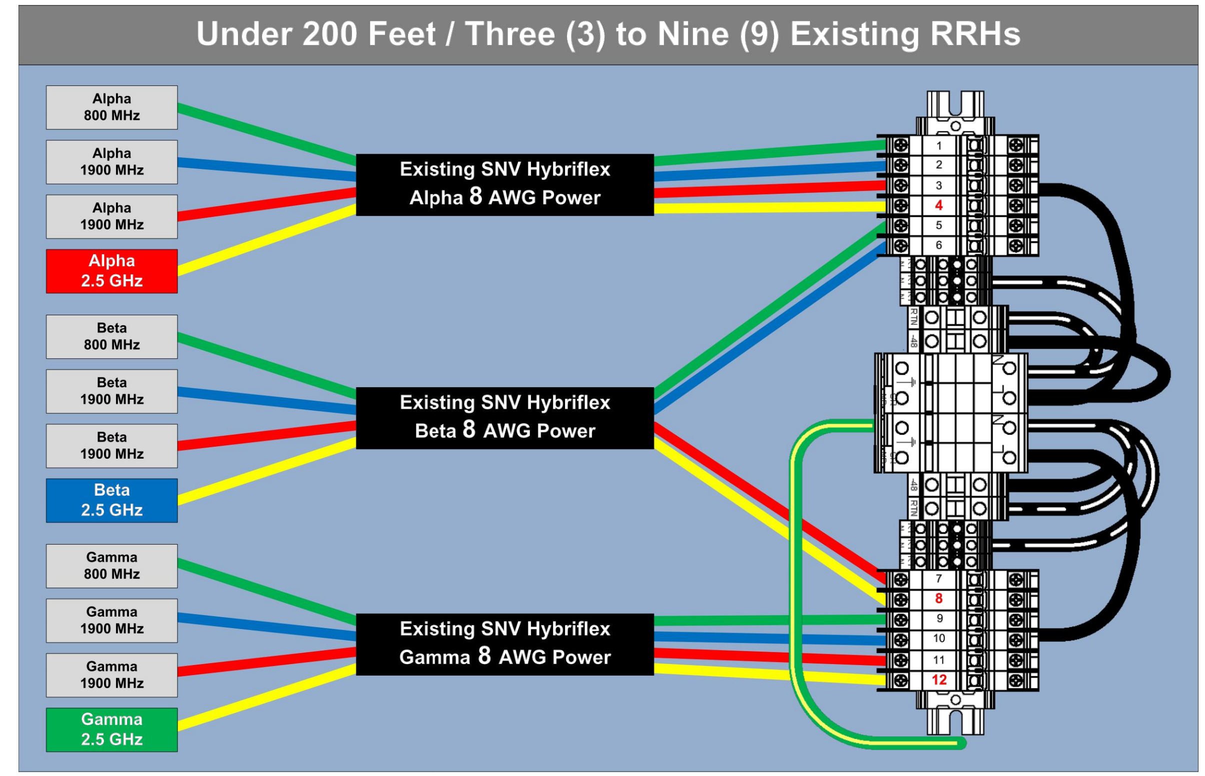
SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: A-4



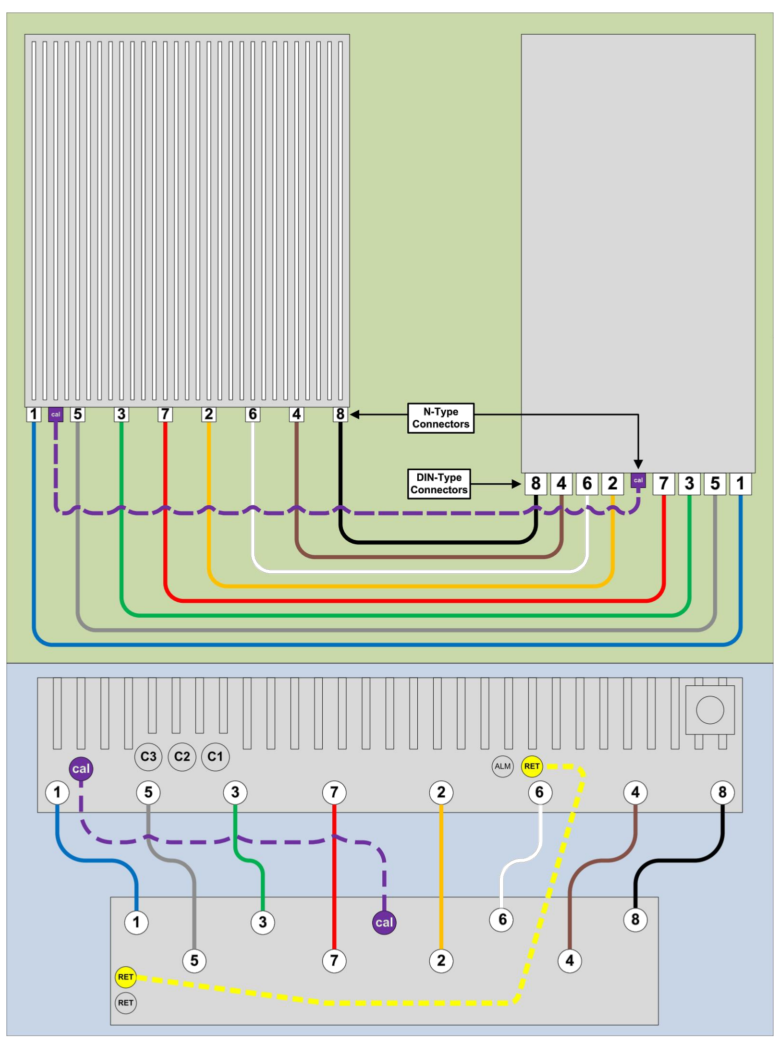
TYPICAL FIBER DISTRIBUTION BOX DETAIL (1)

SCALE: NTS



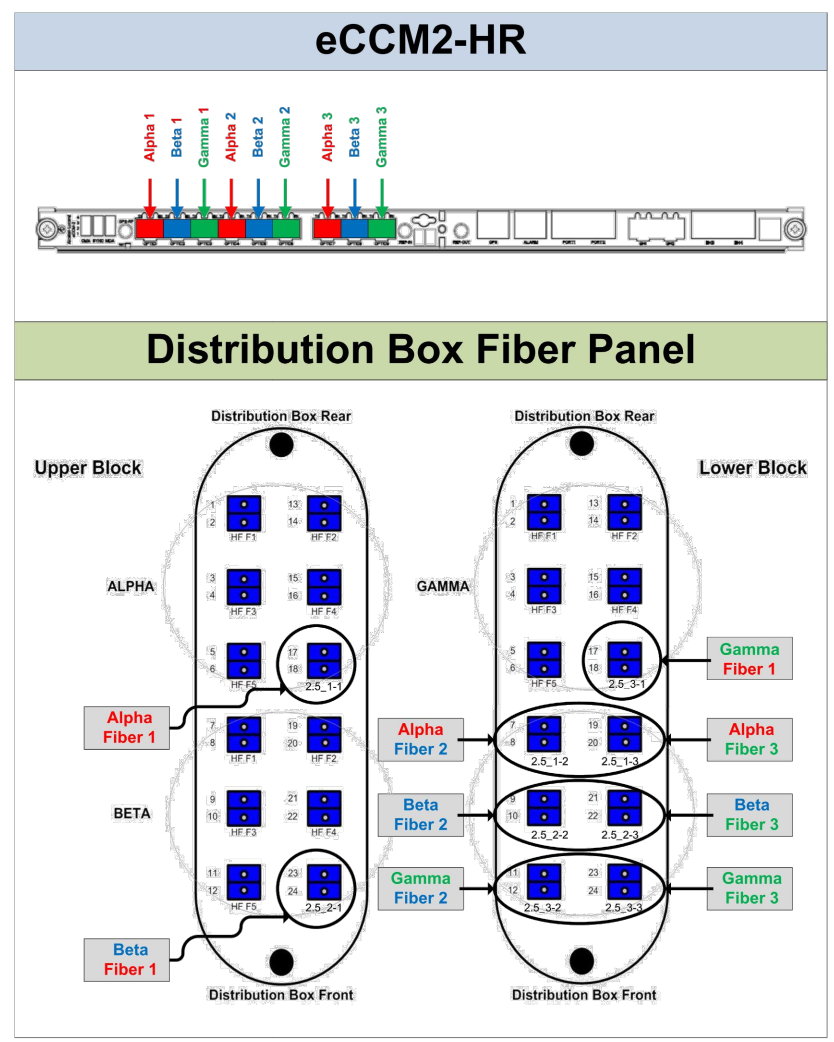
RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL (2)

SCALE: NTS



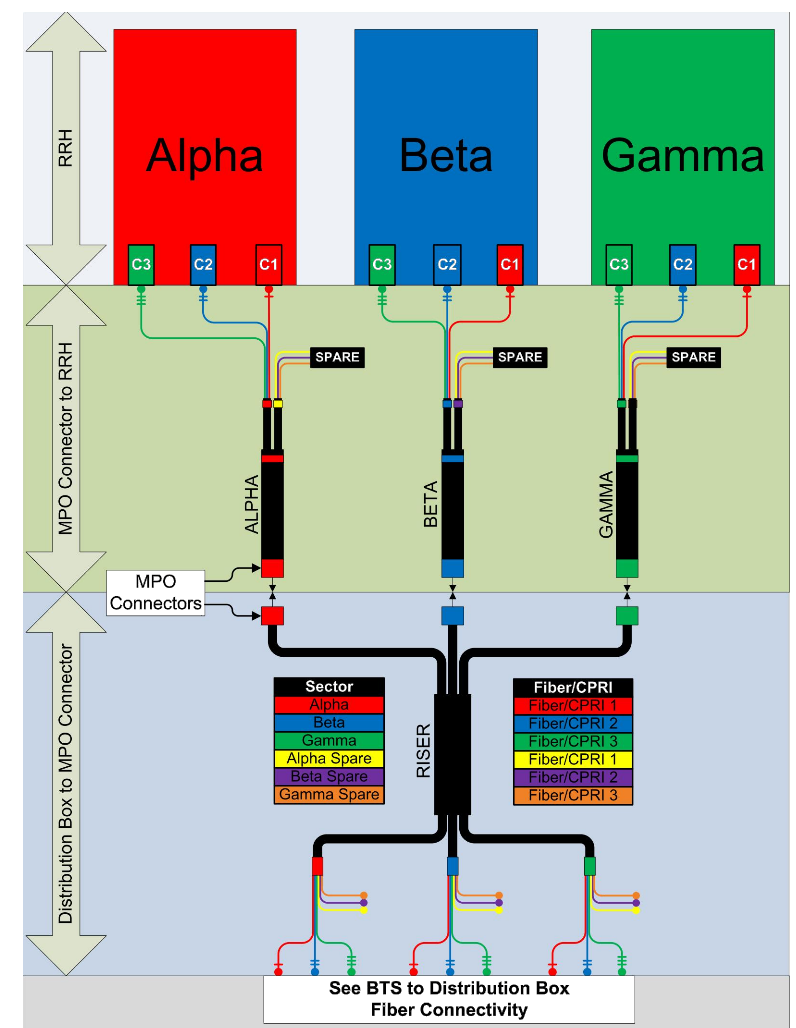
8T8R DETAIL (3)

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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ISSUE PHASE: FINAL DATE ISSUED: 07/19/2017

PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

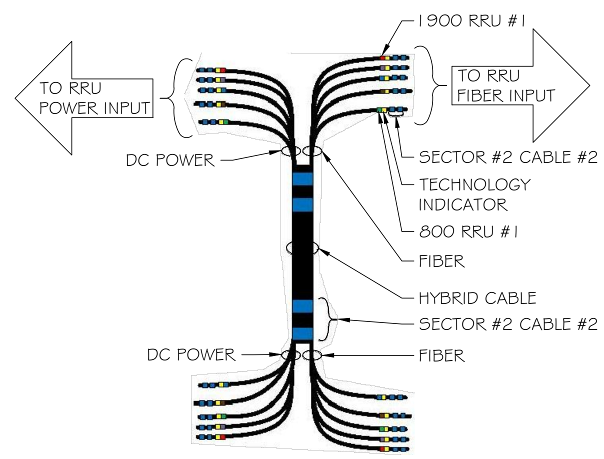
SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: A-5

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

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



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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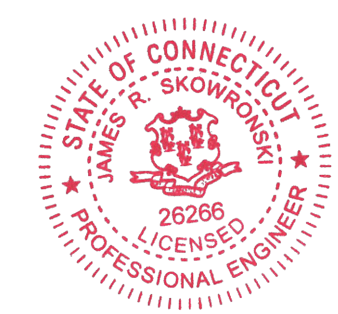

Signature: | Date: 4/10/2019

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PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
CABLE COLOR CODING

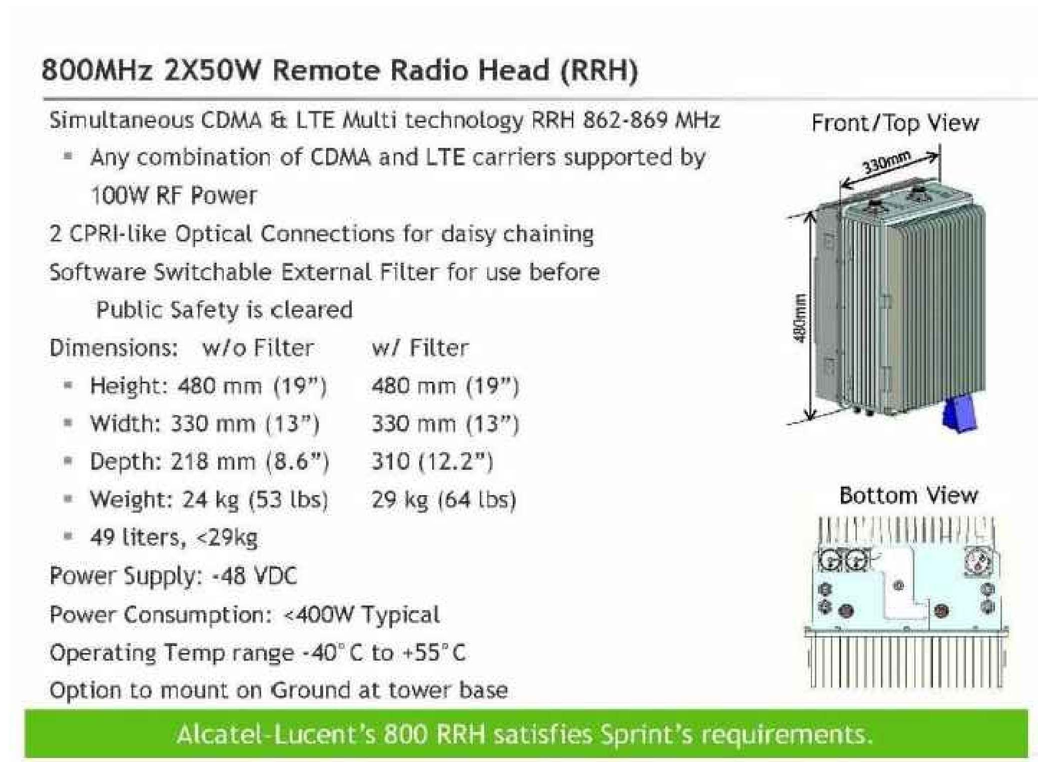
SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: A-6

MECHANICAL	
DIMENSION (HxWxD)	71.9" x 13.8" x 8.2"
WEIGHT	58 lbs

ANTENNA MODEL: COMMSCOPE #DT465B-2XR - ANTENNA SPECS

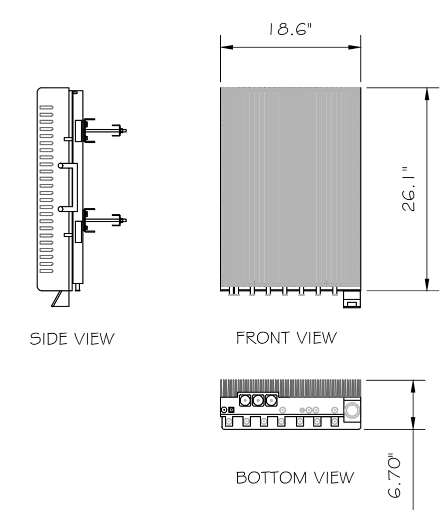
DUAL BAND ANTENNA DETAIL (1)
SCALE: NTS



MECHANICAL	
DIMENSION (HxWxD)	19" x 13" x 12.2"
WEIGHT	64 lbs

RRH MODEL: ALU #800 MHz 2x50W - RADIO SPECS

800 RRH DETAIL (2)
SCALE: NTS



ALCATEL-LUCENT: TD-RRH8x20

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

WEIGHT = 66.13 lbs.

2.5 RRH DETAIL (3)
SCALE: NTS

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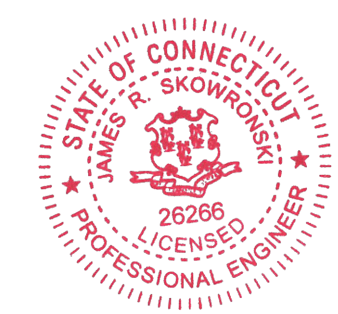

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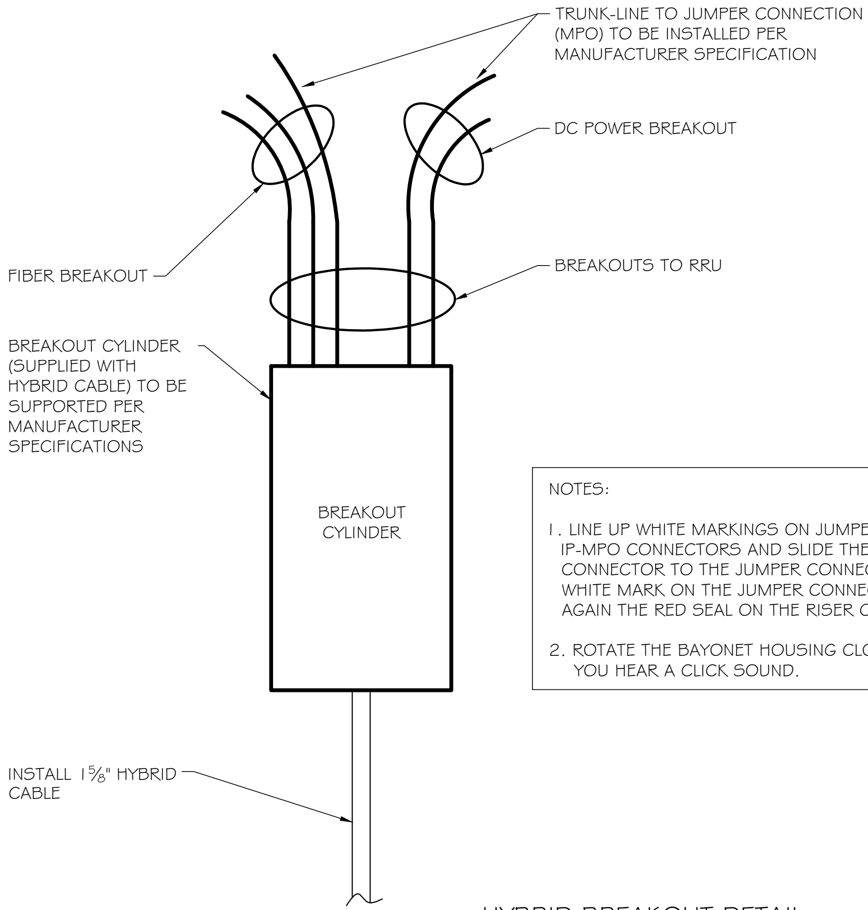
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
ANTENNA & RRH DETAILS

SCALE: NONE

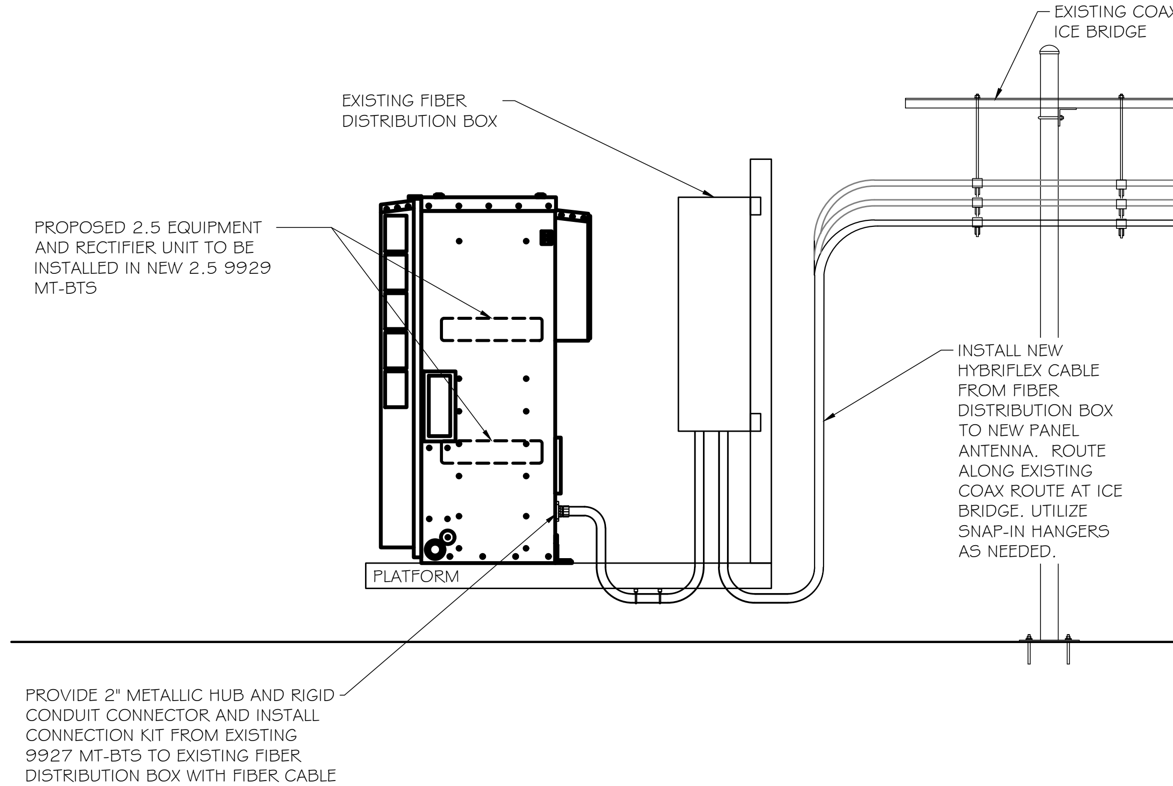
PROJECT NUMBER: 23012
SHEET NUMBER: A-7



NOTES:

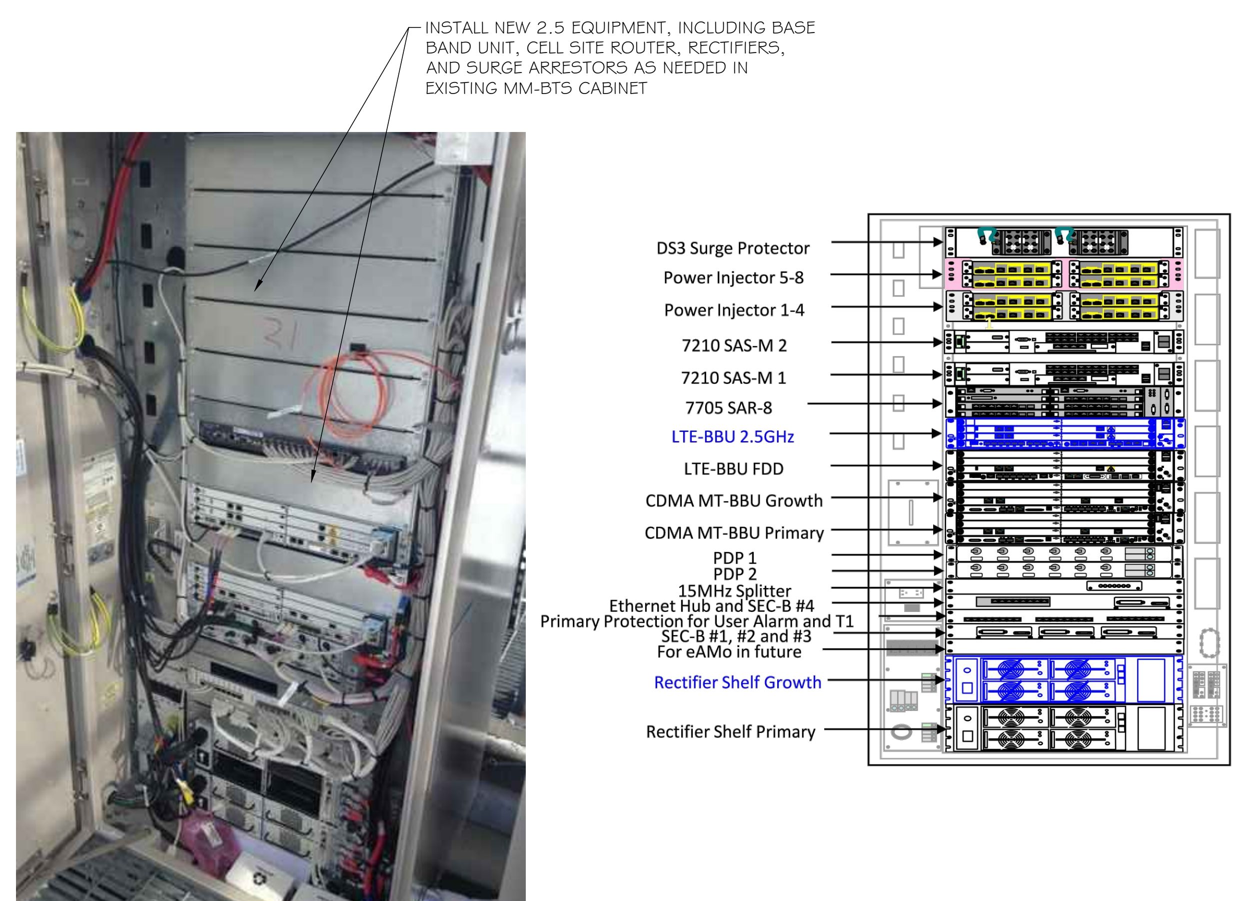
1. LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTORS AND SLIDE THE RISER CONNECTOR TO THE JUMPER CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAIN THE RED SEAL ON THE RISER CONNECTOR.
2. ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL YOU HEAR A CLICK SOUND.

HYBRID BREAKOUT DETAIL (1)
SCALE: NTS



CABLE ROUTE FROM FIBER BOX (2)
SCALE: NTS

EXISTING BBU CABINET (3)
SCALE: NTS



EXISTING MMBS CABINET (4)
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STATE OF CONNECTICUT JAMES R. SKOWRONSKI 26266 LICENSED PROFESSIONAL ENGINEER

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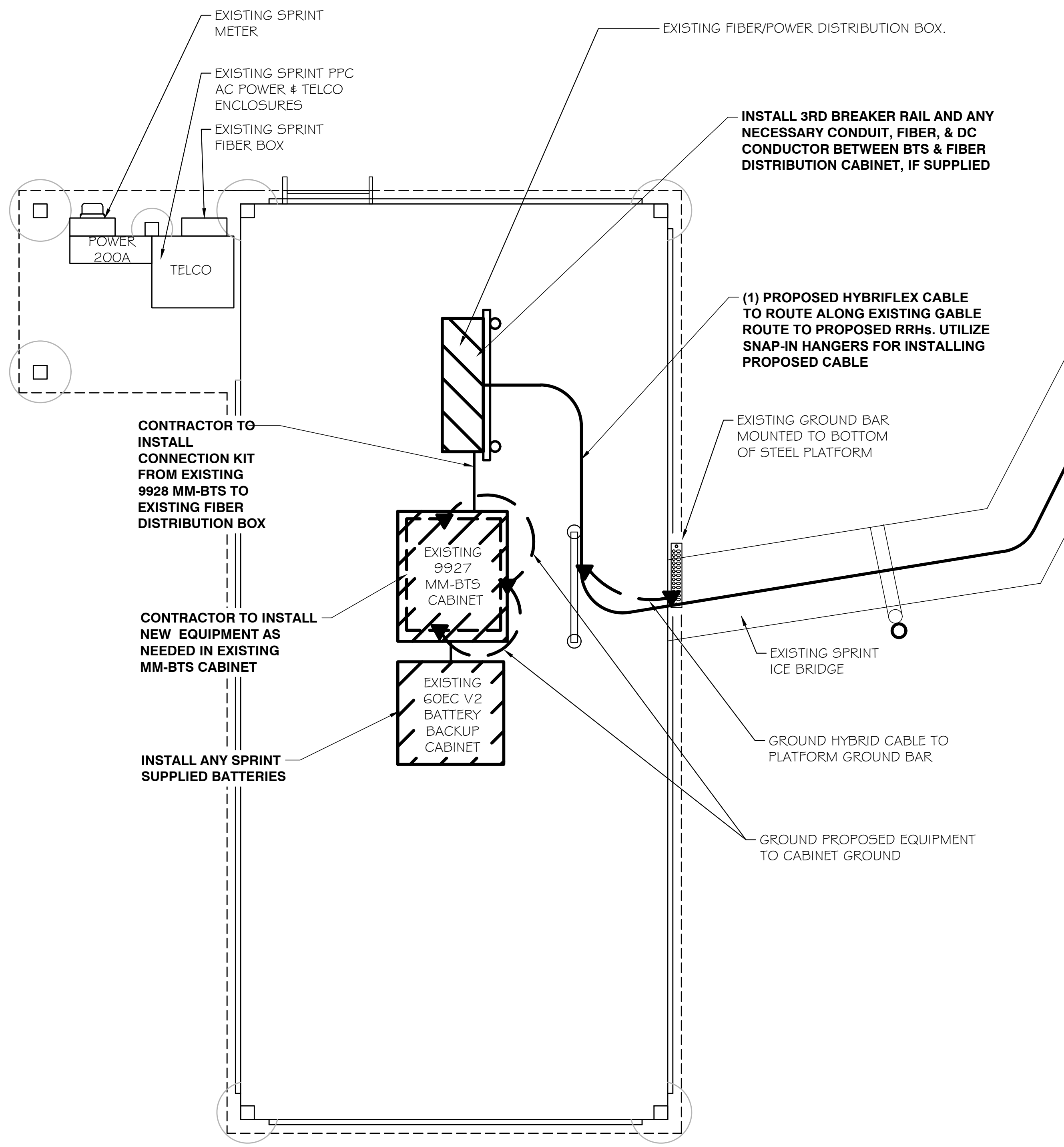
PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

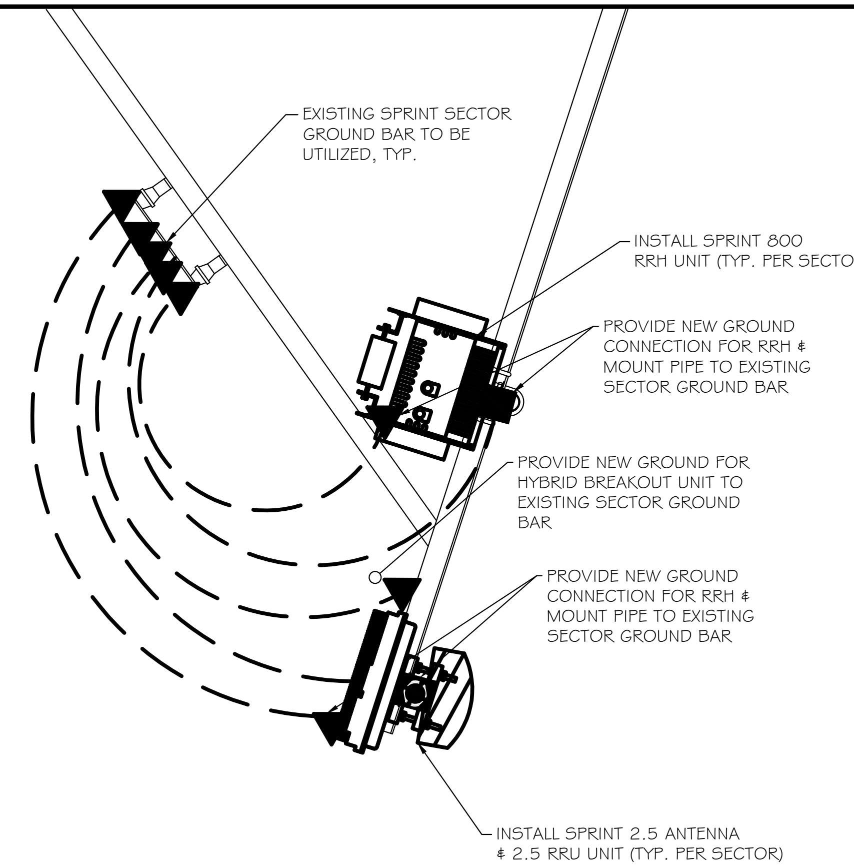
SHEET TITLE:
EQUIPMENT DETAILS

SCALE: NONE

PROJECT NUMBER: 23012
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:	
(thin dashed line)	EXISTING GROUND CABLE
(heavy dashed line)	PROPOSED GROUND CABLE
▲	MECHANICAL CONNECTION
■	EXOTHERMIC CONNECTION
—E—E—E—E—	PROPOSED ELECTRIC

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

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

Signature: [signature] Date: 4/10/2019

MARK	DATE	DESCRIPTION
3	04/10/19	REVISED CODE COMPLIANCE
2	11/01/17	RFDS REVISIONS
1	08/31/17	ADD FUTURE T-MOBILE

ISSUE PHASE: FINAL DATE ISSUED: 07/19/2017

PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
EQUIPMENT UTILITY & GROUNDING PLAN

SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: E-1

DRAWN BY: TWS CHECKED BY: KAB

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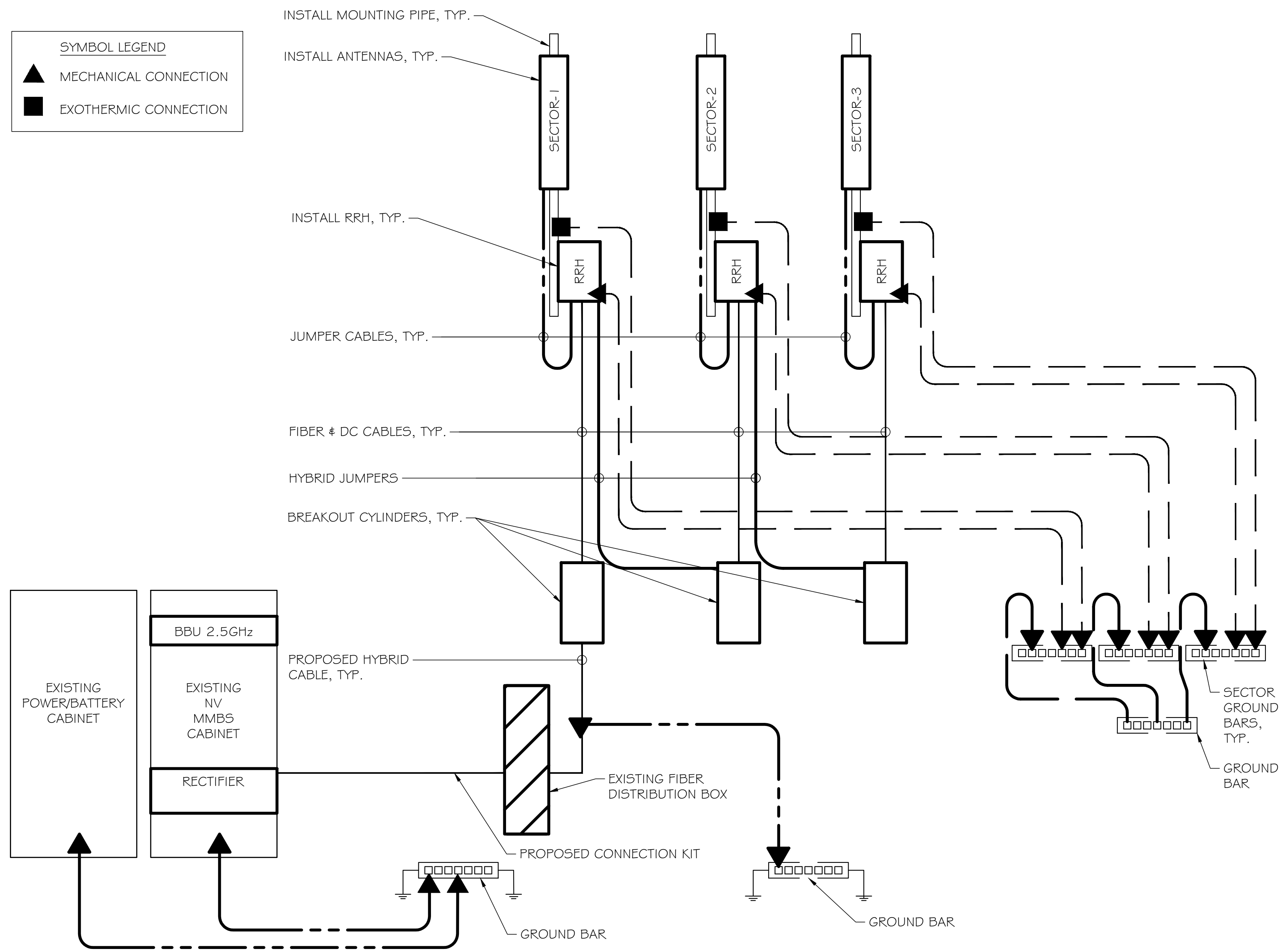
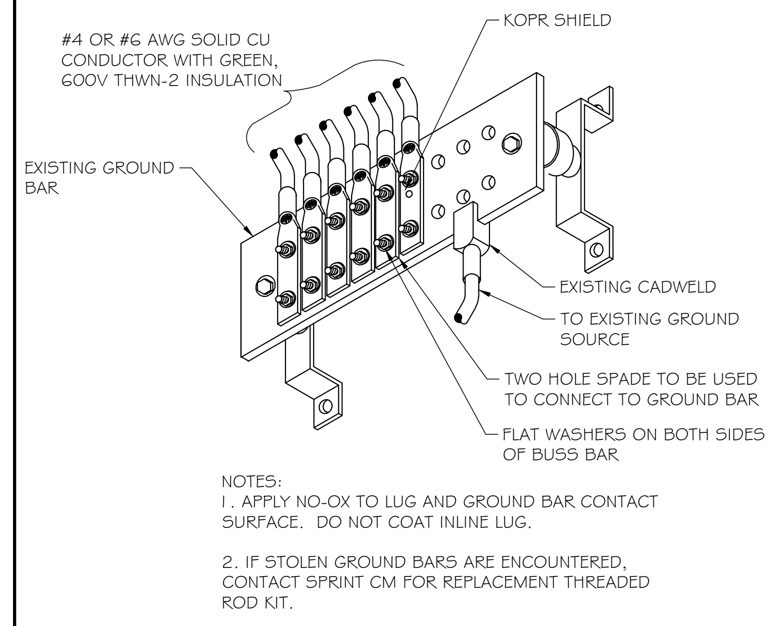


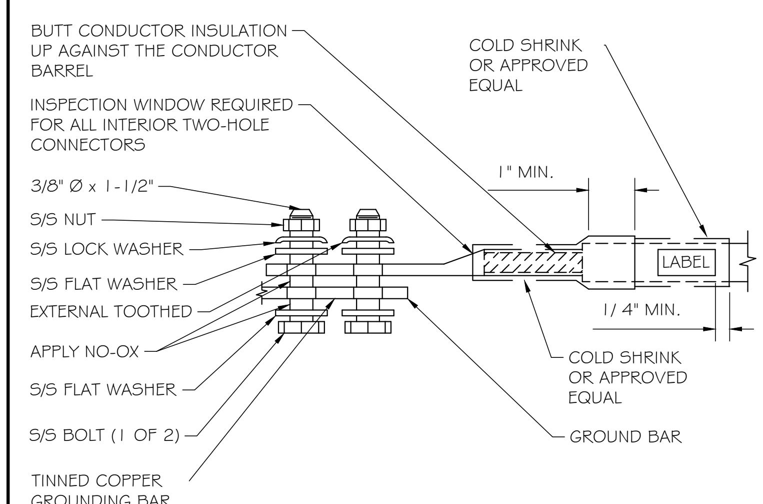
GROUNDING RISER DIAGRAM (1)
SCALE: NTS



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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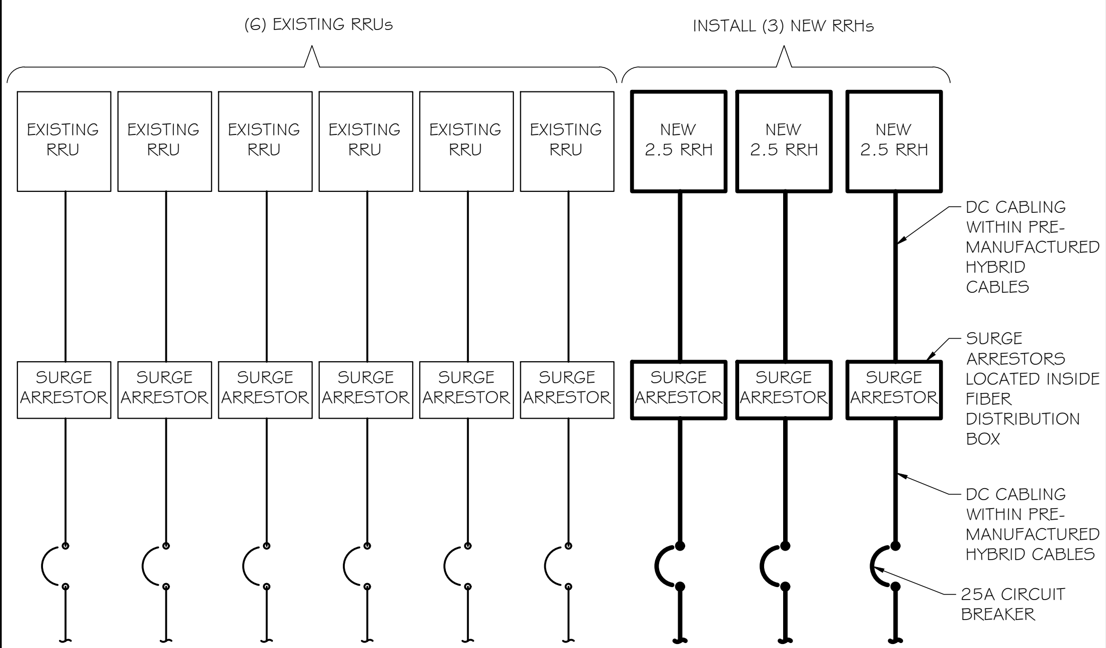
PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
GROUNDING DETAILS

SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: E-2



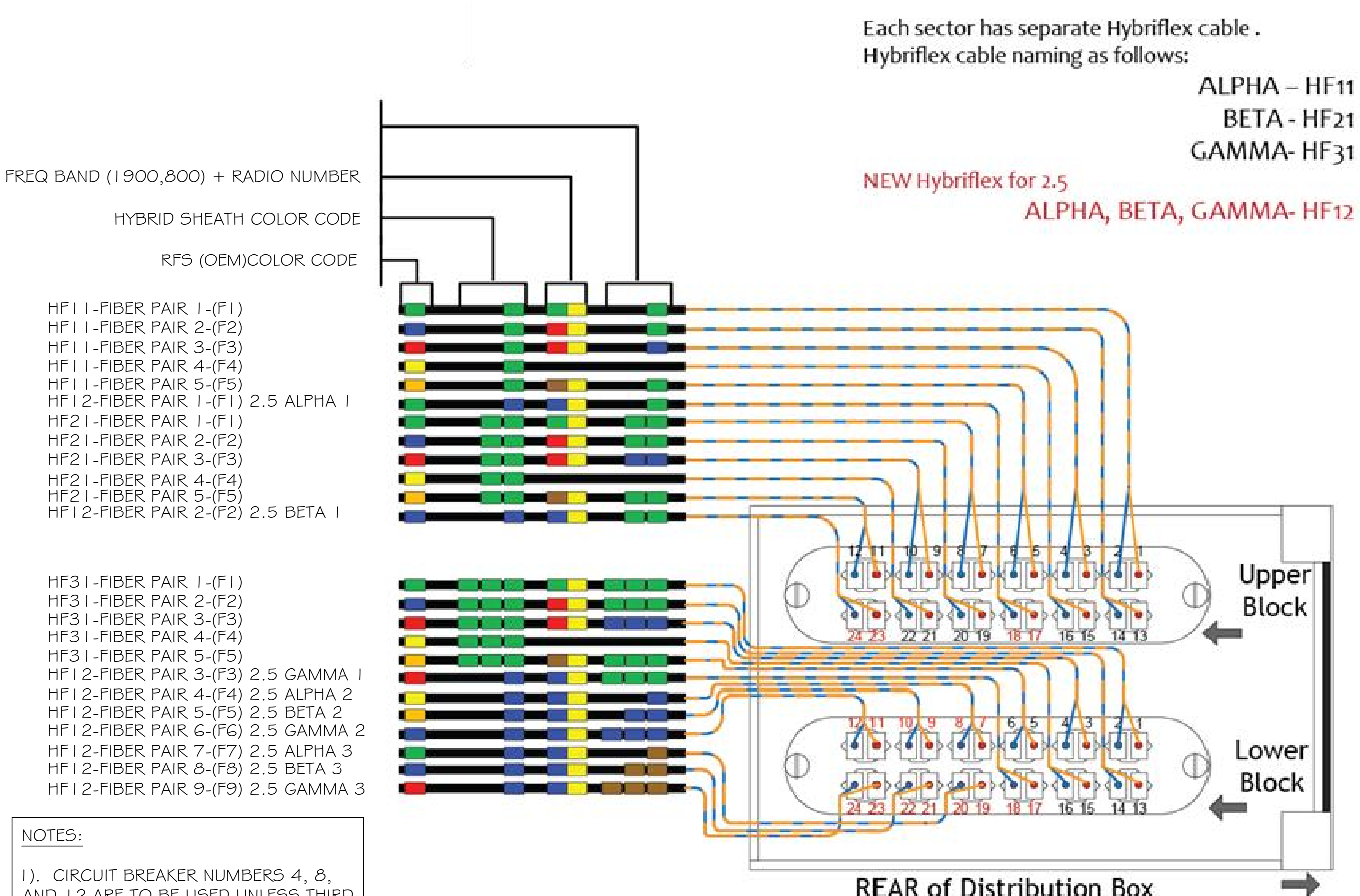
DC ONE-LINE DIAGRAM (1)
SCALE: NTS

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		

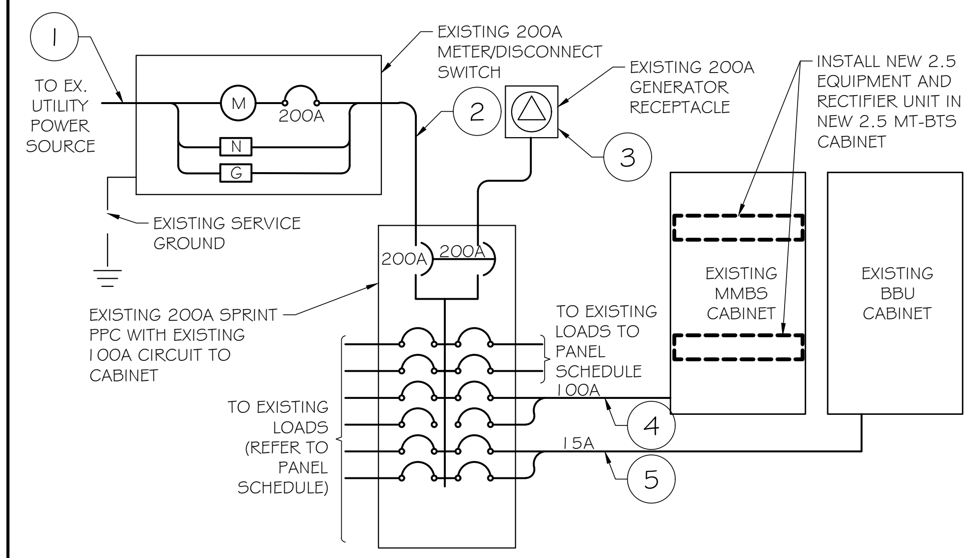
CKT	DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	PHASE A VA	PHASE B VA	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	DESCRIPTION	CKT
1	MBTS	100	2	ON			ON	2	60	SURGE PROTECTION	7
2											8
3	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	9
4	BLANK (UNUSED)	-	-	-			-	-	-	BLANK (UNUSED)	10
5	BLANK (UNUSED)	-	-	-			ON	1	15	GFI	11
6	FAN	10	1	ON			-	-	-	BLANK (UNUSED)	12

AC PANEL SCHEDULE (2)
SCALE: NTS



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

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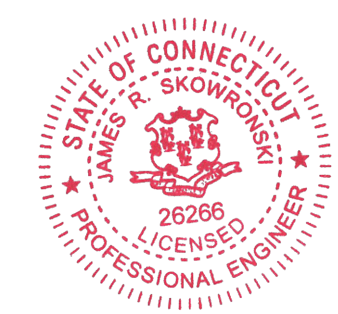

Signature: Date: 4/10/2019

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PROJECT TITLE:
W. COVENTRY
CT33XC550-A

PROJECT INFORMATION:
130 VERNON ROAD
BOLTON, CT 06091
TOLLAND COUNTY

SHEET TITLE:
DC POWER DETAILS & PANEL SCHEDULES

SCALE: NONE

PROJECT NUMBER: 23012
SHEET NUMBER: E-3