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

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

Re: Notice of Exempt Modification Application
Douglas Hill Water Tank
45R Fargo Road
Waterford, CT 06385

September 15, 2017

Dear Ms. Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), is submitting to the Connecticut Siting Council for a Notice of Exempt Modification for Proposed Modifications to an Existing Telecommunications Facility located at the above-referenced site.

This particular modification was initially approved on 9/26/2015 by CT Siting Council however, Sprint received a notice of the expiration of the CSC approval. The documents enclosed are basically what was submitted to the CSC in 2015, but have been modified to reflect the current date, and reality of any subsequent modifiations to the aforementioned Water Tank.

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

Thank you,

By: *Paul F. Sagristano*

Paul F. Sagristano
Cherundolo Consulting
917.841.0247
psagristano@lrivassoc.com

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

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

September 15, 2017

Re: Notice of Exempt Modification –
Existing Sprint Telecommunication Facility
45R Fargo Road, Waterford, CT 06385
Latitude: N41.38639
Longitude: W72.17278

Dear Ms. Bachman:

Sprint currently maintains three (3) existing telecommunications antennas, 3 tower mounted amplifiers, and associated equipment at the 140' level of an existing 138.5' Water Tower at 45 R Fargo Road in Waterford, Connecticut. Sprint intends to add three (3) new panel antennas to existing vacant pipe mounts as well as (3) new tower mounted amplifiers. Sprint is performing a new high-performance air interface upgrade for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

The facility noted above was approved building by Town of Waterford on November 17, 2002. A copy of this approval is attached. There is no original CSC approval on file, nor is the earliest reference of a Sprint exempt modification to the Water Tower printable. It is referenced as EM-SPRINT-152-130114.

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 also being sent to Mr. Daniel Steward, First Selectman of the Town of Waterford the property owner and to Mr. Peter Green, Chairman of the Waterford Utility Commission, owner of the Water Tower.
.
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 Waterford facility is located at 45R Fargo Road, Waterford, CT, the Site coordinates are: N41. 38639, W - 72. 17278. The facility is owned by Waterford Utilities Commission, 1000 Hartford Turnpike, Waterford, CT 06385.

The existing facility consists of a 138.6' Water tower. Sprint currently operates wireless communications equipment on s steel platform at the facility and has three antennas mounted on the tower at a centerline of 140' feet.

Statutory Considerations

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

1. The height of the overall structure will be unaffected.

2. The proposed changes will not require an extension of the property boundaries.

3. The proposed additions will not increase the noise level at the existing facility by

six decibels or more, or to levels that exceed state and/or local criteria

4. The changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

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

Respectfully submitted,

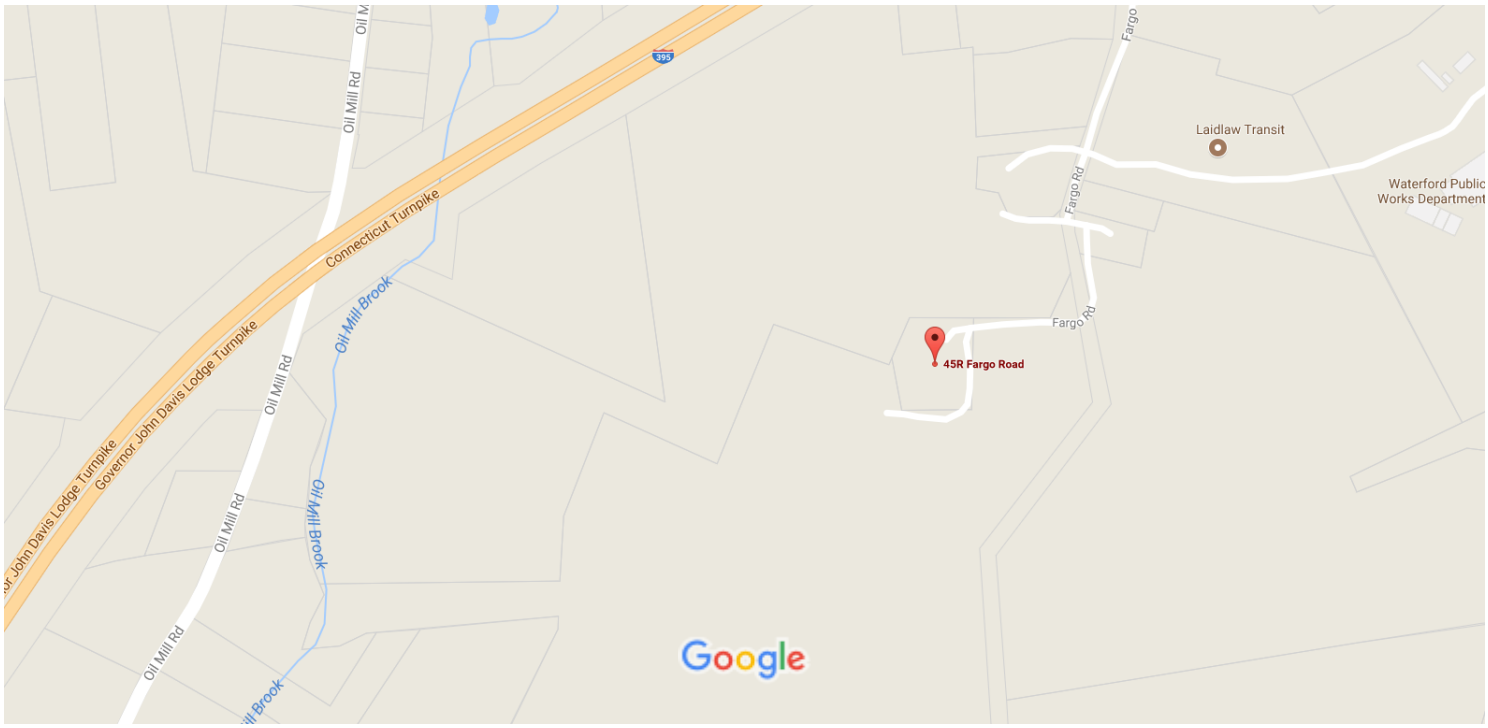
Paul F. Sagristano

Paul F. Sagristano
Charles Cherundolo Consulting
917-841-0247
psagristano@lrivassoc.com

PFS/mtf

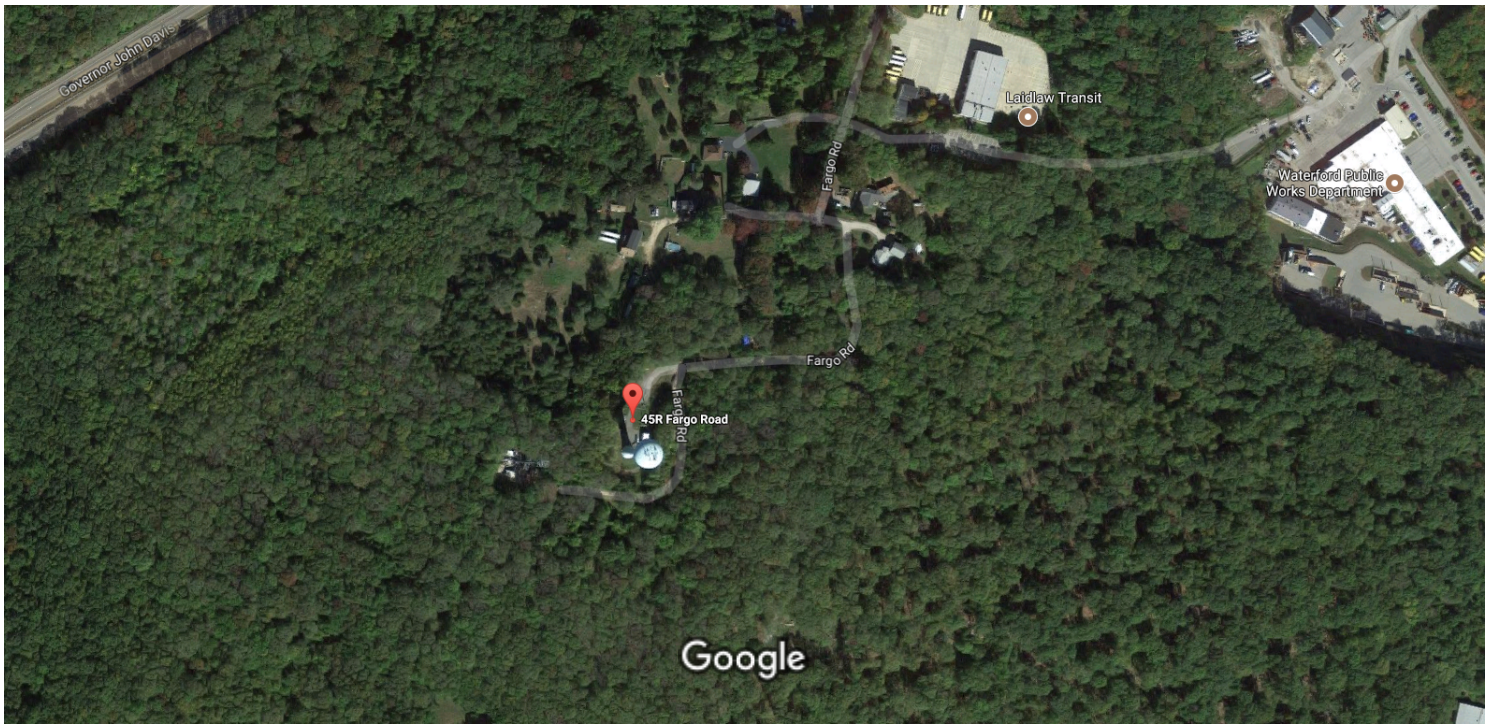
Additional Recipients:
Town of Waterford, First Selectman – Daniel Steward
Waterford Utilities Chairman, Peter Green

Google Maps 45R Fargo Rd



Map data ©2017 Google United States 200 ft

Google Maps 45R Fargo Rd



Imagery ©2017 Google, Map data ©2017 Google United States 200 ft

45R FARGO ROAD

Location	45R FARGO ROAD	**Mblu**	71/ / 2310/ /
Acct#	00202200	**Assessment**	$690,410
Appraisal	$986,270	**PID**	2310
Building Count	1		

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$895,480	$90,790	$986,270
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$626,860	$63,550	$690,410

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade:	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	

Building Photo

(http://images.vgsi.com/photos/WaterfordCTPhotos//\00\00\16/

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Heat Fuel	
Heat Type:	
AC Percent	
Total Bedrooms:	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Num Kitchens	
Fireplace(s)	
Extra Opening(s)	
Gas Fireplace(s)	
% Attic Fin	
LF Dormer	
Foundation	
Bsmt Gar(s)	
Bsmt %	
SF FBM	
Fin Bsmt Qual	
Bsmt Access	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	929
Description	Exempt Comm Vac OB
Zone	RU120
Neighborhood	300
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	1.35
Frontage	0
Depth	0
Assessed Value	$63,550
Appraised Value	$90,790

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**

LSUM	Lump Sum			150000 UNITS	$93,750	1
LSUM	Lump Sum			1250000 UNITS	$781,250	1
SHD1	Shed	FR	Frame	300 S.F.	$2,250	1
SHD1	Shed	FR	Frame	300 S.F.	$2,250	1
FN3	FENCE-6' CHAIN			205 L.F.	$1,230	1
FN4	FENCE-8' CHAIN			500 L.F.	$3,500	1
SHD1	Shed	FR	Frame	300 S.F.	$2,250	1
PAV1	Paving	AS	Asphalt	9000 S.F.	$9,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$895,480	$90,790	$986,270
2010	$0	$0	$1,265,757
2009	$0	$0	$1,265,757

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$626,860	$63,550	$690,410
2010	$0	$0	$886,030
2009	$0	$0	$886,030

September 15,2017

Dear Customer:

The following is the proof-of-delivery for tracking number 770240101037.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	J.JONES	**Delivery location:**	WATERFORD, CT
Service type:	FedEx Express Saver	**Delivery date:**	Sep 15, 2017 13:00
Special Handling:	Deliver Weekday Direct Signature Required		

Signature image is available. In order to view image and detailed information, the shipper or payor account number of the shipment must be provided.

Shipping Information:

Tracking number:	770240101037	**Ship date:**	Sep 12, 2017
		Weight:	0.5 lbs/0.2 kg

Recipient:
WATERFORD, CT US

Shipper:
OLD LYME, CT US

Reference
CT03XC112 CSC to LL

Thank you for choosing FedEx.

September 15,2017

Dear Customer:

The following is the proof-of-delivery for tracking number 770240169478.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	L.GEER	**Delivery location:**	WATERFORD, CT
Service type:	FedEx Express Saver	**Delivery date:**	Sep 15, 2017 13:17
Special Handling:	Deliver Weekday Direct Signature Required		

Signature image is available. In order to view image and detailed information, the shipper or payor account number of the shipment must be provided.

Shipping Information:

Tracking number:	770240169478	**Ship date:**	Sep 12, 2017
		Weight:	0.5 lbs/0.2 kg

Recipient:
WATERFORD, CT US

Shipper:
OLD LYME, CT US

Reference CT03XC112 - CSC to Mayor

Thank you for choosing FedEx.

BUILDING DEPARTMENT
TOWN OF WATERFORD, CONNECTICUT

BUILDING PERMIT

Permit #15302
Date Issued: 11/17/98
Zoning Permit #98-356

Est. Cost $49,000.00
Permit Fee $298.00
C of O Fee $0.00

PERMISION IS HEREBY GRANTED FOR THE FOLLOWING:

Description:
Install telecommunications equipment with associated equipment on/in an existing watertank

Property Address: **45R Fargo Road**

Owner: Town of Waterford
Address: Telephone: 860-444-5886

Leassee:

Contractor: Sprint PCS
Address: 9 Barnes Industrial Road
Wallingford, CT 06492
License #:
Telephone: 203-294-5676

NOTE: The recipient of this permit accepts this permit on the condition that he, as owner, or as representing the owner, agrees to comply with all building and zoning ordinances of the Town of Waterford and the State Statues of the State of Connecticut regarding the use, occupancy, and type of building to be constructed and agrees that this building is to be located the proper distances from all other zones and is located in a zone in which the building and its use is allowed.

Building Official

Post-it® Fax Note 7671	Date 11-18-98	# of pages ▶ 1
To Jeffrey York	From Building Dept	
Co./Dept.	Co. Town of Waterford	
Phone #	Phone # 860-444-5813	
Fax # 203-294-5647	Fax #	

Site # CT 03 XC 112

25 Steps to Building Permit

	Step Name	Date Complete	
☐	1. Receive Ring From RF.	✓	
☐*	2. Send Site Acquisition Agent out for field analysis.	✓	
☐	3. Receive field analysis, forward to zoning attorney.	N/A	
☐*	4. Receive Preliminary Zoning Analysis from Attorney.	✓	
☐*	5. Issue Lease order sheet to Site Acquisition firm 1-3.	✓	
☐*	6. Site Agent submit Candidate Packages for prospects.	✓	yes
☐	7. Forward Candidate Packages to Zoning Attorney.	✓	
☐*	8. Receive Zoning Analysis and Probability Statement.	N/A	
☐	9. If Zoning Analysis is less than 80%, longer than 4 Months, have Senior sign off before proceeding.	N/A	✓ phase I Env. Assessment
	-Consider ordering Zoning Drawings here.-		
☐	10. Receive draft of lease for attorney review, forward to SSLP Attorney.	✓	
☐	11. Receive comments from attorney, return to Agent.	✓	
☐*	12. Receive final lease and summary circulate for signing.	✓	yes
☐*	13. Complete and submit Zoning Drawing order form.	✓	
☐	14. Obtain copies of all zoning Applications fwd Attorney	✓	
☐	15. Attorney Receives zoning drawing. Comments.	✓	
☐	16. Final Zoning Drawings received.	✓	
	-Consider ordering Construction Drawings here.-		
☐	17. File Application for Zoning.	✓	
☐*	18. Request Preliminary Attorney's Release to Build.	✓	
☐	19. Coordinate Zoning Hearings Attendees.	✓	
☐*	20. Order Construction Drawings.	✓	
☐	21. Received Zoning Approval.	✓	
☐	22. Receive Construction Drawings.	✓	
☐*	23. Order Final Attorney's Release to Build.		
☐	24. File for Building permit.		
☐	25. Receive Building Permit.		

*Indicates Standard property form use to complete step.

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: CT03XC112

Douglas Hill Water Tank
450 Fargo Road
Waterford, CT 06385

August 25, 2017

EBI Project Number: 6217003657

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	3.65 %

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

EBI Consulting
environmental | engineering | due diligence

August 25, 2017

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

Emissions Analysis for Site: **CT03XC112 – Douglas Hill Water Tank**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **450 Fargo Road, Waterford, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **450 Fargo Road, Waterford, 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 the 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 **140 feet** above ground level (AGL) for **Sector A**, **140 feet** above ground level (AGL) for **Sector B** and **140 feet** above ground level (AGL) for Sector C.

10) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general population threshold limits.

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**140 feet**	Height (AGL):	**140 feet**	Height (AGL):	**140 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%	**1.71 %**	Antenna B1 MPE%	**1.71 %**	Antenna C1 MPE%	**1.71 %**
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):	**140 feet**	Height (AGL):	**140 feet**	Height (AGL):	**140 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%	**1.25 %**	Antenna B2 MPE%	**1.25 %**	Antenna C2 MPE%	**1.25 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.96 %**
Nextel	0.32 %
Town of Waterford	0.37 %
Site Total MPE %:	**3.65 %**

SPRINT Sector A Total:	2.96 %
SPRINT Sector B Total:	2.96 %
SPRINT Sector C Total:	2.96 %
Site Total:	3.65 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	140	0.88	850 MHz	567	0.15%
Sprint 850 MHz LTE	2	437.55	140	1.75	850 MHz	567	0.31%
Sprint 1900 MHz (PCS) CDMA	5	622.47	140	6.23	1900 MHz (PCS)	1000	0.62%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	140	6.23	1900 MHz (PCS)	1000	0.62%
Sprint 2500 MHz (BRS) LTE	8	778.09	140	12.46	2500 MHz (BRS)	1000	1.25%
						Total:	**2.96%**

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:	2.96 %
Sector B:	2.96 %
Sector C:	2.96 %
SPRINT Maximum Total (per sector):	2.96 %
Site Total:	3.65 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **3.65 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

RAMAKER & ASSOCIATES, INC.

September 5, 2017

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

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

SUBJECT: **STRUCTURAL ASSESSMENT**
55-FOOT WATER TOWER

CARRIER: **SPRINT**

SITE: **EAST LYME/ WATER TANK US1 (CT33XC580-A)**
440 BOSTON POST ROAD
EAST LYME, NEW LONDON COUNTY, CONNECTICUT 06357
RAMAKER & ASSOCIATES PROJECT NUMBER: 28739

RESULTS: **MOUNT:** **PASS**
TOWER: **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 structure(s) with the proposed loading configurations. Engineering recommendations regarding the analysis results are provided in the following pages.

RAMAKER analyzed the structure(s) using accepted engineering practices. 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 structure(s) loading occur.

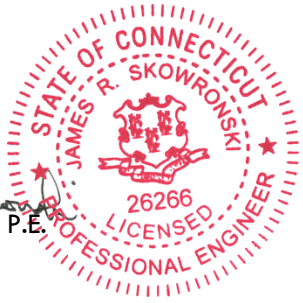
If you have any questions or comments, please do not hesitate to contact our office.

Sincerely,

RAMAKER & ASSOCIATES, INC.

James M. Alvin
Structural Designer

James R. Skowronski, P.E.
Supervising Engineer



ANALYSIS CRITERIA

State Building Code	2016 CT State Building Code
Adopted Building Code	2012 IBC
Referenced Standard	TIA-222-G
Mount Risk Category	II
Ultimate Design Wind Speed, V_{ult}	135 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	105 mph (3 sec. gust)
Tower Risk Category	IV
Ultimate Design Wind Speed, V_{ult}	145 mph (3 sec. gust)
Nominal Design Wind Speed, V_{asd}	112 mph (3 sec. gust)
Design Wind Speed w/ Ice	50 mph (3 sec. gust)
Ice Thickness	3/4 inch
Exposure Category	C
Topographic Category	1
Crest Height	N/A

SUPPORTING DOCUMENTATION

- Previous as-built construction drawings by Tectonic, dated 02/14/2013
- Previous structural analysis by Tectonic, dated 12/03/2012
- 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 Sector				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
59	1	**(1) RFS APXVTM14-ALU-I20**	Pipe Mount	**Proposed**
		(1) ALU TD-RRH8x20-25		
	2	(1) RFS APXVSPP18-C-A20	Pipe Mount	Existing
	Unistrut	(1) ALU 2x50W RRH 800MHz		
		(1) ALU 4x45W RRH 1900MHz		
	3	(1) 2' MW Dish	Pipe Mount	Existing

Antenna Mount – Beta & Gamma Sectors				
Elevation	**Position**	**Appurtenance**	**Mount Type**	**Status**
59	1	--	Pipe Mount	--
	2	(1) RFS APXVSPP18-C-A20	Pipe Mount	Existing
	Unistrut	(1) ALU 2x50W RRH 800MHz		
		(1) ALU 4x45W RRH 1900MHz		
	3	**(1) RFS APXVTM14-ALU-I20**	Pipe Mount	**Proposed**
		(1) ALU TD-RRH8x20-25		

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).

As a result of the proposed antenna configuration, the water tank structure will experience a negligible increase in dead and wind loads from what are currently present. Therefore, it is RAMAKER's assessment that the associated water tank structure will provide adequate support for the proposed loading configurations.

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:

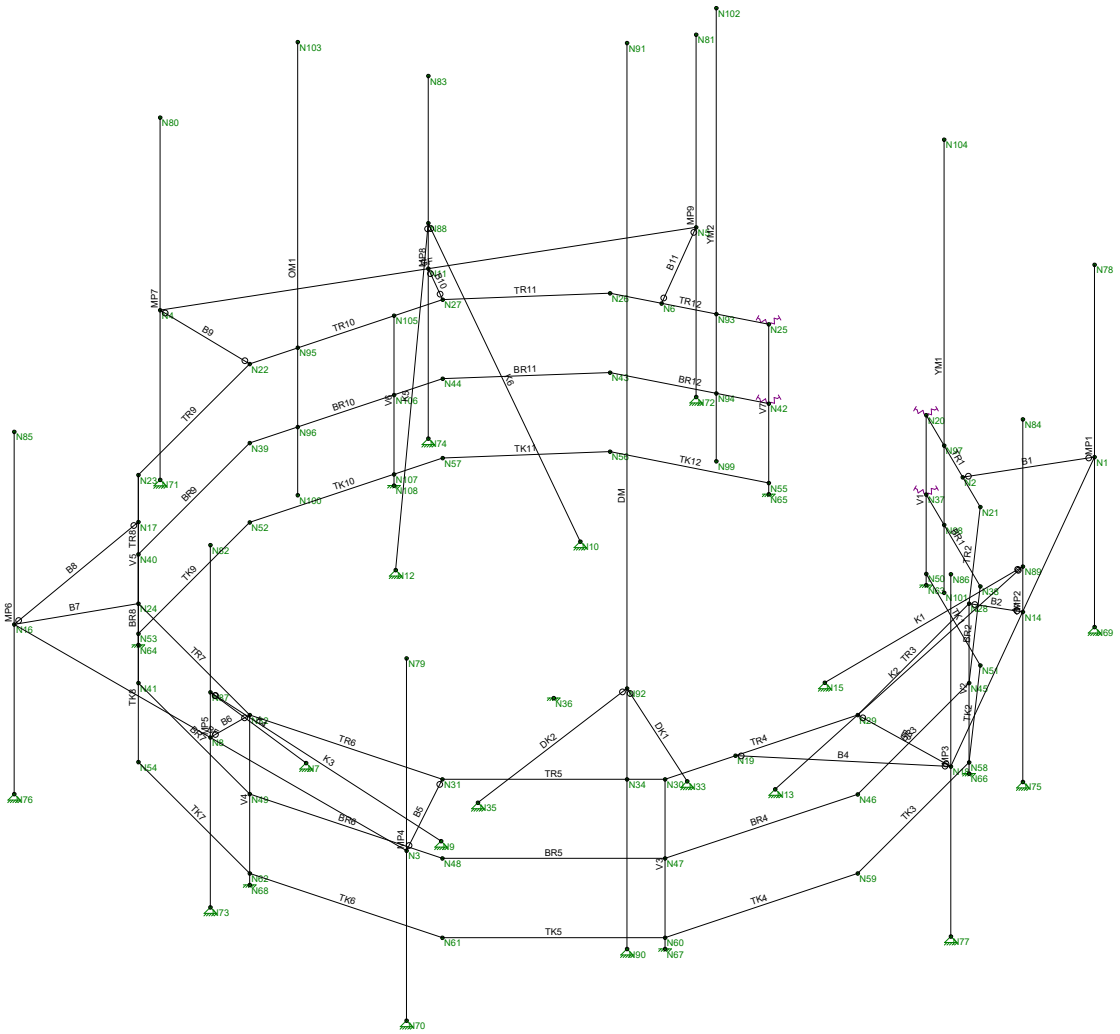
- Missing, corroding, and/or deteriorating members
- Improper manufacturing and/or construction
- Improper maintenance
- Member grades less than assumed grades show below:

Assumed Steel Member Grades	
Angles/Plates	ASTM A36, 36 ksi
Pipes	ASTM A53 Gr. B, 35 ksi

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

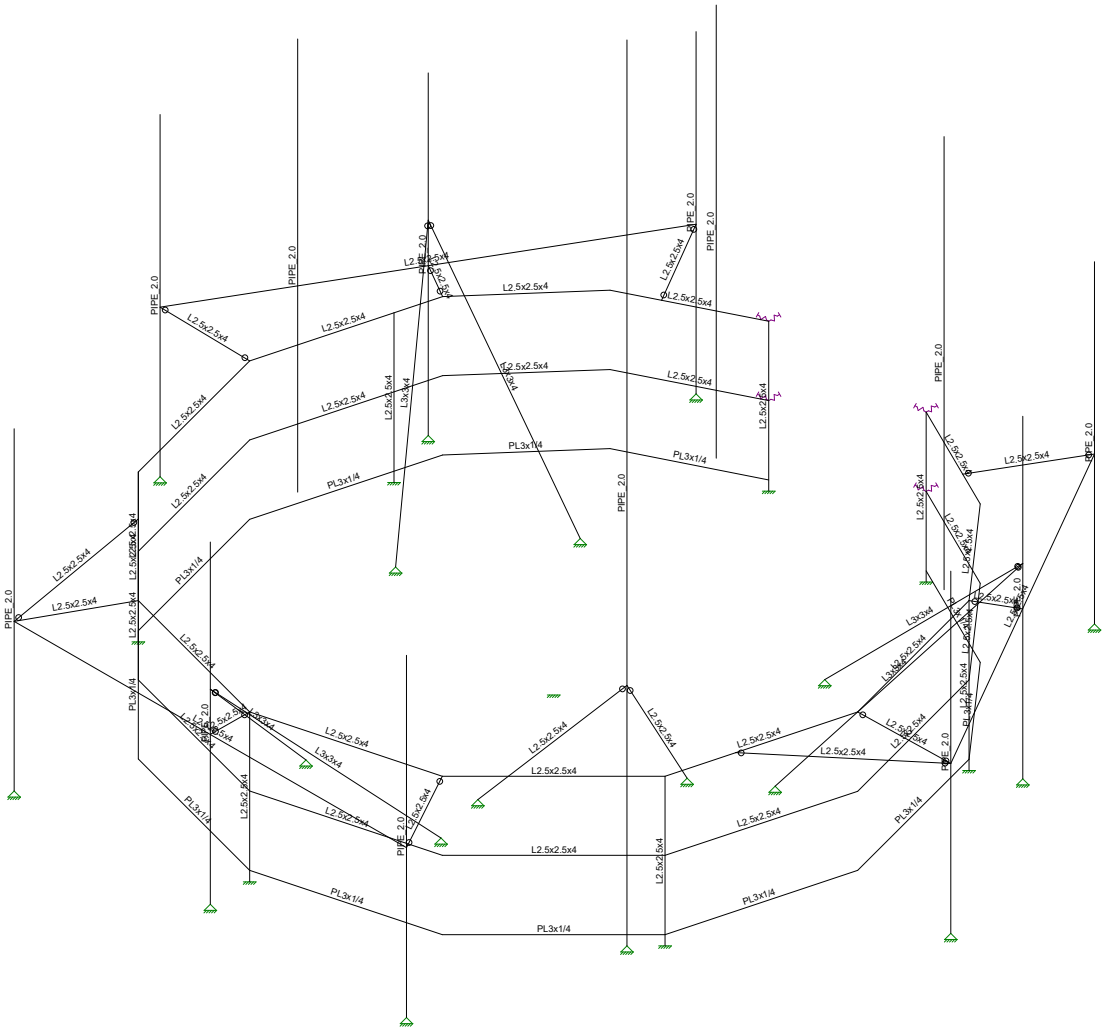
ATTACHMENTS

- Analysis Figures
- Analysis Calculations



Envelope Only Solution

RAMAKER & ASSOCIATES	EAST LYME/WATER TANK US1 (CT33XC580-A)	SK - 1
JMA		Sept 5, 2017 at 11:23 AM
28739		28739 Mount.r3d



Envelope Only Solution

RAMAKER & ASSOCIATES	EAST LYME/WATER TANK US1 (CT33XC580-A)	SK - 2
JMA		Sept 5, 2017 at 11:24 AM
28739		28739 Mount.r3d

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Job: CT33XC580-A
Project: 28739
By: JMA
Date: 9/5/17

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:	105	mph	Basic Wind Speed (Annex B)
z:	59	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.13		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	30.1	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*
APXVTM14-ALU-I20	56.3	12.6	4.5	Flat	1.287	4.93	191.0	
TD-RRH8x20-25	26.1	18.6	1.4	Flat	1.200	3.37	121.8	
APXVSPP18-C-A20	72.0	11.9	6.1	Flat	1.358	5.95	243.2	
1900MHz 4x45W RRH	25.1	11.1	2.3	Flat	1.200	1.93	69.9	
800MHz 2x50W RRH	19.0	13.0	1.5	Flat	1.200	1.72	62.0	
SB2-107CB	28.0	0.0	1.0	Generic	1.262	4.27	162.4	
4' Yagi	600.0	0.5	1200.0	Round	1.200	2.08	75.3	
3' Yagi	480.0	0.5	960.0	Round	1.200	1.67	60.2	
18"x18" Antenna	18.0	18.0	1.0	Flat	1.200	2.25	81.3	
ODU	12.0	6.0	2.0	Flat	1.200	0.50	18.1	
Pipe2STD x 20 ft	240.0	2.4	101.1	Round	1.200	3.96	143.1	7.2
Pipe2STD x 10 ft	120.0	2.4	50.5	Round	1.200	1.98	71.5	7.2
Pipe2STD x 8 ft	96.0	2.4	40.4	Round	1.200	1.58	57.2	7.2
L3X3X1/4 x 6.36 ft	76.3	3.0	25.4	Flat	2.000	1.59	95.8	15.1
L2-1/2X2-1/2X1/4 x 10 ft	120.0	2.5	48.0	Flat	2.000	2.08	125.5	12.5
L2-1/2X2-1/2X1/4 x 7.43 ft	89.2	2.5	35.7	Flat	2.000	1.55	93.2	12.5
L2-1/2X2-1/2X1/4 x 4 ft	48.0	2.5	19.2	Flat	1.807	0.83	45.3	11.3
L2-1/2X2-1/2X1/4 x 3 ft	36.0	2.5	14.4	Flat	1.647	0.63	31.0	10.3
L2-1/2X2-1/2X1/4 x 2.46 ft	29.5	2.5	11.8	Flat	1.560	0.51	24.1	9.8
L2-1/2X2-1/2X1/4 x 1 ft	12.0	2.5	4.8	Flat	1.302	0.21	8.2	8.2
PL 3x1/4 x 4 ft	48.0	3.0	16.0	Flat	1.700	1.00	51.2	12.8

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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:	105	mph	Basic Wind Speed (Annex B)
z:	59	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.13		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	30.1	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*
APXVTM14-ALU-I20	56.3	6.3	8.9	Flat	1.465	2.46	108.7	
TD-RRH8x20-25	26.1	6.7	3.9	Flat	1.262	1.21	46.2	
APXVSPP18-C-A20	72.0	7.0	10.3	Flat	1.509	3.50	159.3	
1900MHz 4x45W RRH	25.1	10.7	2.3	Flat	1.200	1.86	67.3	
800MHz 2x50W RRH	19.0	12.2	1.6	Flat	1.200	1.61	58.2	
SB2-107CB	28.0	0.0	1.0	Generic	0.625	4.27	80.5	
4' Yagi	600.0	0.5	1200.0	Round	1.200	2.08	75.3	
3' Yagi	480.0	0.5	960.0	Round	1.200	1.67	60.2	
18"x18" Antenna	18.0	3.0	6.0	Flat	1.356	0.38	15.3	
ODU	12.0	4.0	3.0	Flat	1.222	0.33	12.3	
Pipe2STD x 20 ft	240.0	2.4	101.1	Round	1.200	3.96	143.1	7.2
Pipe2STD x 10 ft	120.0	2.4	50.5	Round	1.200	1.98	71.5	7.2
Pipe2STD x 8 ft	96.0	2.4	40.4	Round	1.200	1.58	57.2	7.2
L3X3X1/4 x 6.36 ft	76.3	3.0	25.4	Flat	2.000	1.59	95.8	15.1
L2-1/2X2-1/2X1/4 x 10 ft	120.0	2.5	48.0	Flat	2.000	2.08	125.5	12.5
L2-1/2X2-1/2X1/4 x 7.43 ft	89.2	2.5	35.7	Flat	2.000	1.55	93.2	12.5
L2-1/2X2-1/2X1/4 x 4 ft	48.0	2.5	19.2	Flat	1.807	0.83	45.3	11.3
L2-1/2X2-1/2X1/4 x 3 ft	36.0	2.5	14.4	Flat	1.647	0.63	31.0	10.3
L2-1/2X2-1/2X1/4 x 2.46 ft	29.5	2.5	11.8	Flat	1.560	0.51	24.1	9.8
L2-1/2X2-1/2X1/4 x 1 ft	12.0	2.5	4.8	Flat	1.302	0.21	8.2	8.2
PL 3x1/4 x 4 ft	48.0	0.3	192.0	Flat	2.000	0.08	5.0	1.3

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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:	59	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.13		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	6.89	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections
K_{iz}:	1.06		Height Escalation Factor for Ice Thickness
t_{iz}:	1.59	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*
APXVTM14-ALU-I20	59.5	15.8	3.8	Flat	1.256	6.52	56.4	
TD-RRH8x20-25	29.3	21.8	1.3	Flat	1.200	4.43	36.6	
APXVSPP18-C-A20	75.2	15.1	5.0	Flat	1.311	7.87	71.0	
1900MHz 4x45W RRH	28.3	14.3	2.0	Flat	1.200	2.80	23.2	
800MHz 2x50W RRH	22.2	16.2	1.4	Flat	1.200	2.49	20.6	
SB2-107CB	31.2	3.2	1.0	Generic	1.262	5.30	46.1	
4' Yagi	603.2	3.7	163.9	Round	1.200	15.41	127.4	
3' Yagi	483.2	3.7	131.3	Round	1.200	12.35	102.0	
18"x18" Antenna	21.2	21.2	1.0	Flat	1.200	3.12	25.7	
ODU	15.2	9.2	1.7	Flat	1.200	0.97	8.0	
Pipe2STD x 20 ft	243.2	5.6	43.8	Round	1.200	9.38	77.5	3.8
Pipe2STD x 10 ft	123.2	5.6	22.2	Round	1.137	4.75	37.2	3.6
Pipe2STD x 8 ft	99.2	5.6	17.9	Round	1.041	3.83	27.4	3.3
L3X3X1/4 x 6.36 ft	79.5	6.2	12.9	Flat	1.596	3.41	37.5	5.7
L2-1/2X2-1/2X1/4 x 10 ft	123.2	5.7	21.7	Flat	1.890	4.86	63.2	6.2
L2-1/2X2-1/2X1/4 x 7.43 ft	92.3	5.7	16.3	Flat	1.709	3.64	42.8	5.6
L2-1/2X2-1/2X1/4 x 4 ft	51.2	5.7	9.0	Flat	1.467	2.02	20.4	4.8
L2-1/2X2-1/2X1/4 x 3 ft	39.2	5.7	6.9	Flat	1.395	1.55	14.8	4.5
L2-1/2X2-1/2X1/4 x 2.46 ft	32.7	5.7	5.8	Flat	1.345	1.29	11.9	4.4
L2-1/2X2-1/2X1/4 x 1 ft	15.2	5.7	2.7	Flat	1.208	0.60	5.0	3.9
PL 3x1/4 x 4 ft	51.2	6.2	8.3	Flat	1.443	2.20	21.8	5.1

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Date: 9/5/17

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:	59	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.13		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	6.89	psf	Velocity Pressure at Height z
G_h:	1.00		Strength Design of Appurtenances and their Connections
K_{iz}:	1.06		Height Escalation Factor for Ice Thickness
t_{iz}:	1.59	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*
APXVTM14-ALU-I20	59.5	9.5	6.3	Flat	1.368	3.92	36.9	
TD-RRH8x20-25	29.3	9.9	3.0	Flat	1.221	2.01	16.9	
APXVSPP18-C-A20	75.2	10.2	7.4	Flat	1.413	5.32	51.7	
1900MHz 4x45W RRH	28.3	13.9	2.0	Flat	1.200	2.72	22.5	
800MHz 2x50W RRH	22.2	15.4	1.4	Flat	1.200	2.37	19.6	
SB2-107CB	31.2	3.2	1.0	Generic	0.625	5.30	22.8	
4' Yagi	603.2	3.7	163.9	Round	1.200	15.41	127.4	
3' Yagi	483.2	3.7	131.3	Round	1.200	12.35	102.0	
18"x18" Antenna	21.2	6.2	3.4	Flat	1.241	0.91	7.8	
ODU	15.2	7.2	2.1	Flat	1.200	0.76	6.3	
Pipe2STD x 20 ft	243.2	5.6	43.8	Round	1.200	9.38	77.5	3.8
Pipe2STD x 10 ft	123.2	5.6	22.2	Round	1.137	4.75	37.2	3.6
Pipe2STD x 8 ft	99.2	5.6	17.9	Round	1.041	3.83	27.4	3.3
L3X3X1/4 x 6.36 ft	79.5	6.2	12.9	Flat	1.596	3.41	37.5	5.7
L2-1/2X2-1/2X1/4 x 10 ft	123.2	5.7	21.7	Flat	1.890	4.86	63.2	6.2
L2-1/2X2-1/2X1/4 x 7.43 ft	92.3	5.7	16.3	Flat	1.709	3.64	42.8	5.6
L2-1/2X2-1/2X1/4 x 4 ft	51.2	5.7	9.0	Flat	1.467	2.02	20.4	4.8
L2-1/2X2-1/2X1/4 x 3 ft	39.2	5.7	6.9	Flat	1.395	1.55	14.8	4.5
L2-1/2X2-1/2X1/4 x 2.46 ft	32.7	5.7	5.8	Flat	1.345	1.29	11.9	4.4
L2-1/2X2-1/2X1/4 x 1 ft	15.2	5.7	2.7	Flat	1.208	0.60	5.0	3.9
PL 3x1/4 x 4 ft	51.2	3.4	14.9	Flat	1.664	1.22	14.0	3.3

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Ice Load on Antennas TIA-222-G

Ice Weight:	56	pcf	Ice Density
t_i:	0.75		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:	59	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_{iz}:	1.06		Height Escalation Factor for Ice Thickness
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
t_{iz}:	1.59	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*
APXVTM14-ALU-I20	59.5	15.8	9.5	14.09	78.30	44.16	142.9	
TD-RRH8x20-25	29.3	21.8	9.9	19.77	106.68	56.96	90.2	
APXVSPP18-C-A20	75.2	15.1	10.2	13.80	76.87	44.15	179.4	
1900MHz 4x45W RRH	28.3	14.3	13.9	15.41	84.90	49.94	69.1	
800MHz 2x50W RRH	22.2	16.2	15.4	17.83	96.98	56.76	59.7	
SB2-107CB	-	-	-	-	-	-	101.4	
4' Yagi	603.2	3.7	3.7	0.50	10.44	6.57	202.9	
3' Yagi	483.2	3.7	3.7	0.50	10.44	6.57	162.3	
18"x18" Antenna	21.2	21.2	6.2	18.25	99.08	48.36	57.8	
ODU	15.2	9.2	7.2	7.21	43.95	26.36	17.1	
Pipe2STD x 20 ft	243.2	5.6	5.6	2.38	19.80	12.46	154.0	7.7
Pipe2STD x 10 ft	123.2	5.6	5.6	2.38	19.80	12.46	77.0	7.7
Pipe2STD x 8 ft	99.2	5.6	5.6	2.38	19.80	12.46	61.6	7.7
L3X3X1/4 x 6.36 ft	79.5	6.2	6.2	4.24	29.13	18.36	72.0	11.3
L2-1/2X2-1/2X1/4 x 10 ft	123.2	5.7	5.7	3.54	25.60	16.36	99.5	10.0
L2-1/2X2-1/2X1/4 x 7.43 ft	92.3	5.7	5.7	3.54	25.60	16.36	74.0	10.0
L2-1/2X2-1/2X1/4 x 4 ft	51.2	5.7	5.7	3.54	25.60	16.36	39.8	10.0
L2-1/2X2-1/2X1/4 x 3 ft	39.2	5.7	5.7	3.54	25.60	16.36	29.9	10.0
L2-1/2X2-1/2X1/4 x 2.46 ft	32.7	5.7	5.7	3.54	25.60	16.36	24.5	10.0
L2-1/2X2-1/2X1/4 x 1 ft	15.2	5.7	5.7	3.54	25.60	16.36	10.0	10.0
PL 3x1/4 x 4 ft	51.2	6.2	3.4	3.01	22.97	12.86	35.7	8.9

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	Gr. 33	29000	11154	.3	.65	.49	33	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
5	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
6	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3
7	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	L2.5x2.5x1/4	L2.5x2.5x4	Beam	Single Angle	A36 Gr.36	Typical	1.19	.692	.692	.026
2	L3x3x1/4	L3x3x4	Beam	Single Angle	A36 Gr.36	Typical	1.44	1.23	1.23	.031
3	toekick	PL3x1/4	Beam	RECT	A36 Gr.36	Typical	.75	.004	.563	.015
4	Pipe 2.0	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	BF	N16	N3		270	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
2	GF	N5	N4		270	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
3	B2	N14	N28			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
4	B6	N8	N32			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
5	B10	N11	N27			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
6	B3	N18	N29			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
7	B1	N1	N2			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
8	B5	N3	N31			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
9	B7	N16	N24			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
10	B9	N4	N22			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
11	B11	N5	N6			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
12	K4	N7	N87		180	L3x3x1/4	Beam	Single Angle	A36 Gr.36	Typical
13	K3	N9	N87		90	L3x3x1/4	Beam	Single Angle	A36 Gr.36	Typical
14	K6	N10	N88		180	L3x3x1/4	Beam	Single Angle	A36 Gr.36	Typical
15	K5	N12	N88		90	L3x3x1/4	Beam	Single Angle	A36 Gr.36	Typical
16	K2	N13	N89		180	L3x3x1/4	Beam	Single Angle	A36 Gr.36	Typical
17	K1	N15	N89		90	L3x3x1/4	Beam	Single Angle	A36 Gr.36	Typical
18	B8	N16	N17			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
19	B4	N18	N19			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
20	TR1	N20	N21		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
21	TR2	N21	N28		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
22	TR9	N23	N22		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
23	TR10	N22	N27		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
24	TR8	N23	N24		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
25	TR7	N24	N32		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
26	TR12	N25	N26		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
27	TR11	N26	N27		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
28	TR3	N28	N29		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
29	TR4	N29	N30		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
30	TR5	N30	N31		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
31	TR6	N31	N32		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
32	DK1	N33	N92		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
33	DK2	N35	N92		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
34	AF	N1	N18			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
35	BR1	N37	N38		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
36	BR2	N38	N45		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
37	BR9	N40	N39		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
38	BR10	N39	N44		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
39	BR8	N40	N41		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
40	BR7	N41	N49		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
41	BR12	N42	N43		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
42	BR11	N43	N44		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
43	BR3	N45	N46		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
44	BR4	N46	N47		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
45	BR5	N47	N48		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
46	BR6	N48	N49		180	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
47	TK1	N50	N51			toekick	Beam	RECT	A36 Gr.36	Typical
48	TK2	N51	N58			toekick	Beam	RECT	A36 Gr.36	Typical
49	TK9	N53	N52			toekick	Beam	RECT	A36 Gr.36	Typical
50	TK10	N52	N57			toekick	Beam	RECT	A36 Gr.36	Typical
51	TK8	N53	N54			toekick	Beam	RECT	A36 Gr.36	Typical
52	TK7	N54	N62			toekick	Beam	RECT	A36 Gr.36	Typical
53	TK12	N55	N56			toekick	Beam	RECT	A36 Gr.36	Typical
54	TK11	N56	N57			toekick	Beam	RECT	A36 Gr.36	Typical
55	TK3	N58	N59			toekick	Beam	RECT	A36 Gr.36	Typical
56	TK4	N59	N60			toekick	Beam	RECT	A36 Gr.36	Typical
57	TK5	N60	N61			toekick	Beam	RECT	A36 Gr.36	Typical
58	TK6	N61	N62			toekick	Beam	RECT	A36 Gr.36	Typical
59	V6	N108	N105			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
60	V7	N65	N25			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
61	V5	N64	N23			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
62	V4	N68	N32			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
63	V3	N67	N30			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
64	V2	N66	N28			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
65	V1	N63	N20			L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
66	MP7	N71	N80			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
67	MP8	N74	N83			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
68	MP6	N76	N85			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
69	MP9	N72	N81			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
70	MP5	N73	N82			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
71	MP4	N70	N79			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
72	MP1	N69	N78			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
73	MP2	N75	N84			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
74	MP3	N77	N86			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
75	DM	N90	N91			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
76	YM1	N101	N104			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
77	YM2	N99	N102			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical
78	OM1	N100	N103			Pipe 2.0	Beam	Pipe	A53 Gr. B	Typical

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
1	Dead Load	None		-1			26			
2	Antenna Wind 0	None					52			
3	Antenna Wind 30	None					52			
4	Antenna Wind 45	None					52			
5	Antenna Wind 60	None					52			
6	Antenna Wind 90	None					52			
7	Antenna Wind 120	None					52			
8	Antenna Wind 135	None					52			
9	Antenna Wind 150	None					52			
10	Antenna Wind 180	None					52			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
11	Antenna Wind 210	None					52			
12	Antenna Wind 225	None					52			
13	Antenna Wind 240	None					52			
14	Antenna Wind 270	None					52			
15	Antenna Wind 300	None					52			
16	Antenna Wind 315	None					52			
17	Antenna Wind 330	None					52			
18	Antenna Ice Dead Load	None					26			
19	Antenna Wind w/Ice 0	None					52			
20	Antenna Wind w/Ice 30	None					52			
21	Antenna Wind w/Ice 45	None					52			
22	Antenna Wind w/Ice 60	None					52			
23	Antenna Wind w/Ice 90	None					52			
24	Antenna Wind w/Ice 120	None					52			
25	Antenna Wind w/Ice 135	None					52			
26	Antenna Wind w/Ice 150	None					52			
27	Antenna Wind w/Ice 180	None					52			
28	Antenna Wind w/Ice 210	None					52			
29	Antenna Wind w/Ice 225	None					52			
30	Antenna Wind w/Ice 240	None					52			
31	Antenna Wind w/Ice 270	None					52			
32	Antenna Wind w/Ice 300	None					52			
33	Antenna Wind w/Ice 315	None					52			
34	Antenna Wind w/Ice 330	None					52			
35	Member Wind 0	None						156		
36	Member Wind 30	None						156		
37	Member Wind 45	None						156		
38	Member Wind 60	None						156		
39	Member Wind 90	None						156		
40	Member Wind 120	None						156		
41	Member Wind 135	None						156		
42	Member Wind 150	None						156		
43	Member Wind 180	None						156		
44	Member Wind 210	None						156		
45	Member Wind 225	None						156		
46	Member Wind 240	None						156		
47	Member Wind 270	None						156		
48	Member Wind 300	None						156		
49	Member Wind 315	None						156		
50	Member Wind 330	None						156		
51	Member Ice Dead Load	None						78		
52	Member Wind w/Ice 0	None						156		
53	Member Wind w/Ice 30	None						156		
54	Member Wind w/Ice 45	None						156		
55	Member Wind w/Ice 60	None						156		
56	Member Wind w/Ice 90	None						156		
57	Member Wind w/Ice 120	None						156		
58	Member Wind w/Ice 135	None						156		
59	Member Wind w/Ice 150	None						156		
60	Member Wind w/Ice 180	None						156		
61	Member Wind w/Ice 210	None						156		
62	Member Wind w/Ice 225	None						156		
63	Member Wind w/Ice 240	None						156		
64	Member Wind w/Ice 270	None						156		
65	Member Wind w/Ice 300	None						156		
66	Member Wind w/Ice 315	None						156		
67	Member Wind w/Ice 330	None						156		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
68	Live Load - Area	None								
69	Live Load - Point 1	None								
70	Live Load - Point 2	None								
71	Live Load - Point 3	None								
72	Railing Dist. LL z	None						12		
73	Railing Dist. LL x	None						12		
74	Railing Point LL z	None					3			
75	Railing Point LL x	None					3			

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										
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										

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...	BLC	Fac...
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	.303	35	.303																
67	Serviceability (30-...	Yes	Y		1	1	3	.303	36	.303																
68	Serviceability (45-...	Yes	Y		1	1	4	.303	37	.303																
69	Serviceability (60-...	Yes	Y		1	1	5	.303	38	.303																
70	Serviceability (90-...	Yes	Y		1	1	6	.303	39	.303																
71	Serviceability (120-...	Yes	Y		1	1	7	.303	40	.303																
72	Serviceability (135-...	Yes	Y		1	1	8	.303	41	.303																
73	Serviceability (150-...	Yes	Y		1	1	9	.303	42	.303																
74	Serviceability (180-...	Yes	Y		1	1	10	.303	43	.303																
75	Serviceability (210-...	Yes	Y		1	1	11	.303	44	.303																
76	Serviceability (225-...	Yes	Y		1	1	12	.303	45	.303																
77	Serviceability (240-...	Yes	Y		1	1	13	.303	46	.303																
78	Serviceability (270-...	Yes	Y		1	1	14	.303	47	.303																
79	Serviceability (300-...	Yes	Y		1	1	15	.303	48	.303																
80	Serviceability (315-...	Yes	Y		1	1	16	.303	49	.303																
81	Serviceability (330-...	Yes	Y		1	1	17	.303	50	.303																

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	N7	max	622.559	15	1474.91	31	1364.68	15	0	1	0	1	0	1
2		min	-625.776	23	-1399.522	7	-1370.794	23	0	1	0	1	0	1
3	N9	max	666.336	12	1622.71	20	1517.174	20	0	1	0	1	0	1
4		min	-663.286	20	-1549.155	12	-1522.595	12	0	1	0	1	0	1
5	N10	max	1910.179	30	1902.223	22	241.326	30	0	1	0	1	0	1
6		min	-1913.876	22	-1814.079	14	-242.659	22	0	1	0	1	0	1
7	N12	max	946.862	2	1605.528	26	1327.705	2	0	1	0	1	0	1
8		min	-949.842	26	-1521.763	2	-1330.486	26	0	1	0	1	0	1
9	N13	max	1044.713	26	1762.78	26	1455.286	2	0	1	0	1	0	1
10		min	-1048.967	2	-1687.793	2	-1448.101	26	0	1	0	1	0	1
11	N15	max	2139.179	15	2119.033	31	245.678	22	0	1	0	1	0	1
12		min	-2158.419	23	-2055.749	7	-249.682	14	0	1	0	1	0	1
13	N33	max	781.937	19	1683.671	19	1331.883	19	0	1	0	1	0	1
14		min	-807.501	27	-1701.572	27	-1374.463	27	0	1	0	1	0	1
15	N35	max	1595.561	29	1772.213	29	323.19	29	0	1	0	1	0	1

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
16		min	-1534.86	21	-1670.802	5	-308.509	21	0	1	0	1	0	1
17	N63	max	301.419	37	596.318	47	165.414	28	170.742	29	13.15	11	112.753	44
18		min	-196.023	14	15.022	8	-152.688	4	-172.487	21	-13.003	3	-151.819	36
19	N64	max	374.728	18	469.567	42	600.146	2	617.64	2	19.944	22	358.724	25
20		min	-358.988	10	-6.941	16	-599.823	26	-621.267	26	-19.476	14	-476.095	51
21	N65	max	79.601	6	566.571	37	189.059	24	123.738	31	19.788	17	127.082	7
22		min	-271.207	47	-.571	13	-163.503	16	-116.651	7	-20.454	25	-130.745	15
23	N66	max	221.096	30	478.839	38	181.253	50	225.936	50	17.945	30	146.564	6
24		min	-217.284	6	.285	16	-178.902	11	-129.759	11	-17.802	6	-157.302	30
25	N67	max	186.051	14	613.879	43	290.445	5	272.989	21	18.906	6	75.099	2
26		min	-183.687	22	-233.021	4	-292.573	29	-257.753	13	-19.138	30	-302.475	51
27	N68	max	365.144	51	414.194	38	138.141	51	323.171	51	16.883	3	260.934	20
28		min	-341.284	20	18.488	13	-147.973	26	-137.025	9	-17.188	27	-500.554	51
29	N69	max	221.222	21	551.747	35	147.582	27	0	1	0	1	0	1
30		min	-218.455	29	77.939	11	-145.631	19	0	1	0	1	0	1
31	N70	max	1.842	2	153.313	43	5.737	26	0	1	0	1	0	1
32		min	-6.065	42	2.675	3	-5.771	18	0	1	0	1	0	1
33	N71	max	3.747	25	159.155	49	5.918	7	0	1	0	1	0	1
34		min	-2.211	17	4.591	9	-8.24	31	0	1	0	1	0	1
35	N72	max	219.041	23	553.347	49	147.246	25	0	1	0	1	0	1
36		min	-222.005	31	67.369	9	-145.457	33	0	1	0	1	0	1
37	N73	max	94.726	13	1405.237	26	85.576	18	0	1	0	1	0	1
38		min	-95.627	21	-935.319	2	-88.746	10	0	1	0	1	0	1
39	N74	max	160.93	15	1620.745	31	120.999	2	0	1	0	1	0	1
40		min	-164.034	23	-1181.763	7	-122.165	26	0	1	0	1	0	1
41	N75	max	170.436	14	1520.224	21	123.252	2	0	1	0	1	0	1
42		min	-164.798	22	-1076.015	13	-122.364	26	0	1	0	1	0	1
43	N76	max	101.782	25	632.955	43	112.719	10	0	1	0	1	0	1
44		min	-96.948	17	-76.21	3	-115.144	18	0	1	0	1	0	1
45	N77	max	139.212	5	359.943	36	115.089	11	0	1	0	1	0	1
46		min	-175.907	30	48.445	13	-94.255	19	0	1	0	1	0	1
47	N90	max	97.013	51	1014.459	22	86.912	21	0	1	0	1	0	1
48		min	-23.699	7	-782.66	14	-91.258	13	0	1	0	1	0	1
49	N36	max	0	1	0	1	0	1	0	1	0	1	0	1
50		min	0	1	0	1	0	1	0	1	0	1	0	1
51	N20	max	1004.575	13	0	1	576.902	20	0	1	0	1	0	1
52		min	-1038.942	21	0	1	-570.74	28	0	1	0	1	0	1
53	N25	max	715.24	30	0	1	681.704	17	0	1	0	1	0	1
54		min	-645.744	6	0	1	-726.992	25	0	1	0	1	0	1
55	N37	max	123.925	13	0	1	45.269	45	0	1	0	1	0	1
56		min	-123.922	21	0	1	-59.548	37	0	1	0	1	0	1
57	N42	max	169.263	30	0	1	173.59	33	0	1	0	1	0	1
58		min	-162.342	6	0	1	-174.784	25	0	1	0	1	0	1
59	N108	max	151.055	14	650.59	48	601.656	33	580.282	33	14.04	17	174.006	26
60		min	-173.62	22	-139.875	8	-563.317	9	-571.919	9	-15.98	25	-162.456	2
61	Totals:	max	7755.496	30	8767.549	37	7578.293	18						
62		min	-7704.221	6	2248.979	13	-7589.882	26						

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	BF	L2.5x2.5x4	.304	5	2	.039	5	y	18	17053...	38556	1113....	1821....	1	H2-1
2	GF	L2.5x2.5x4	.383	5	7	.070	5	y	23	17053...	38556	1113....	1821....	1	H2-1
3	B2	L2.5x2.5x4	.012	.5	21	.045	1	z	25	37318...	38556	1113....	2537....	1...	H2-1
4	B6	L2.5x2.5x4	.009	.5	50	.045	1	y	51	37318...	38556	1113....	2537....	1...	H2-1
5	B10	L2.5x2.5x4	.016	.5	32	.067	1	y	33	37318...	38556	1113....	2537....	1...	H2-1

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc...		L...	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
6	B3	L2.5x2.5x4	.024	1.188	27	.034	0	z	11	32305...	38556	1113....	2537....	1...	H2-1
7	B1	L2.5x2.5x4	.033	1.255	29	.051	2.4...	z	22	31656...	38556	1113....	2537....	1...	H2-1
8	B5	L2.5x2.5x4	.012	1.164	29	.010	2.3...	z	30	32305...	38556	1113....	2537....	1...	H2-1
9	B7	L2.5x2.5x4	.490	0	26	.056	0	y	25	32305...	38556	1113....	2537....	1...	H2-1
10	B9	L2.5x2.5x4	.012	1.164	18	.014	0	y	51	32305...	38556	1113....	2537....	1...	H2-1
11	B11	L2.5x2.5x4	.034	1.255	23	.034	0	y	23	31656...	38556	1113....	2537....	1...	H2-1
12	K4	L3x3x4	.240	3.977	14	.009	6.3...	z	5	19023...	46656	1688....	3289....	1...	H2-1
13	K3	L3x3x4	.248	3.977	6	.010	6.3...	y	7	19023...	46656	1688....	3292....	1...	H2-1
14	K6	L3x3x4	.237	3.977	3	.009	6.3...	z	10	19023...	46656	1688....	3289....	1...	H2-1
15	K5	L3x3x4	.264	3.977	12	.010	6.3...	y	21	19023...	46656	1688....	3287....	1...	H2-1
16	K2	L3x3x4	.268	3.977	9	.009	6.3...	z	15	19023...	46656	1688....	3289....	1...	H2-1
17	K1	L3x3x4	.288	3.977	17	.010	6.3...	y	2	19023...	46656	1688....	3292....	1...	H2-1
18	B8	L2.5x2.5x4	.052	1.95	18	.017	3.9	y	33	23473...	38556	1113....	2412....	1...	H2-1
19	B4	L2.5x2.5x4	.039	1.95	25	.021	0	z	31	23473...	38556	1113....	2412....	1...	H2-1
20	TR1	L2.5x2.5x4	1.013	2.047	29	.198	0	z	20	6777....	38556	1113....	2160....	1...	H2-1
21	TR2	L2.5x2.5x4	.621	3.024	29	.061	3.0...	z	28	6777....	38556	1113....	2463....	1	H2-1
22	TR9	L2.5x2.5x4	.370	0	25	.045	0	y	25	6777....	38556	1113....	2344....	1	H2-1
23	TR10	L2.5x2.5x4	.604	4.012	7	.208	0	y	25	6777....	38556	1113....	2344....	1	H2-1
24	TR8	L2.5x2.5x4	.557	1.463	18	.050	0	z	18	6777....	38556	1113....	2344....	1	H2-1
25	TR7	L2.5x2.5x4	.332	0	51	.017	4.0...	z	50	6777....	38556	1113....	2344....	1	H2-1
26	TR12	L2.5x2.5x4	1.006	.976	23	.214	0	z	24	6777....	38556	1113....	2463....	1	H2-1
27	TR11	L2.5x2.5x4	.597	0	24	.180	3.0...	z	31	6777....	38556	1113....	2463....	1	H2-1
28	TR3	L2.5x2.5x4	.639	0	13	.040	0	z	20	6777....	38556	1113....	2344....	1	H2-1
29	TR4	L2.5x2.5x4	.324	0	29	.042	4.0...	z	22	6777....	38556	1113....	2327....	1...	H2-1
30	TR5	L2.5x2.5x4	.397	.669	30	.078	.669	y	21	6777....	38556	1113....	2344....	1	H2-1
31	TR6	L2.5x2.5x4	.202	4.012	50	.031	4.0...	z	50	6777....	38556	1113....	2344....	1	H2-1
32	DK1	L2.5x2.5x4	.391	3.639	20	.006	0	z	5	7850....	38556	1113....	2094....	1...	H2-1
33	DK2	L2.5x2.5x4	.389	3.639	11	.006	7.4...	z	18	7850....	38556	1113....	2094....	1...	H2-1
34	AF	L2.5x2.5x4	.409	5	22	.066	5	z	21	17053...	38556	1113....	1821....	1	H2-1
35	BR1	L2.5x2.5x4	.387	0	21	.147	0	y	21	6777....	38556	1113....	2463....	1	H2-1
36	BR2	L2.5x2.5x4	.265	3.024	21	.051	3.0...	y	36	6777....	38556	1113....	2463....	1	H2-1
37	BR9	L2.5x2.5x4	.435	0	25	.041	0	y	26	6777....	38556	1113....	2344....	1	H2-1
38	BR10	L2.5x2.5x4	.290	2.967	33	.170	0	y	26	6777....	38556	1113....	2116....	1...	H2-1
39	BR8	L2.5x2.5x4	.247	0	51	.021	0	y	42	6777....	38556	1113....	2344....	1	H2-1
40	BR7	L2.5x2.5x4	.152	4.012	51	.033	4.0...	z	26	6777....	38556	1113....	2296....	1...	H2-1
41	BR12	L2.5x2.5x4	.346	.976	48	.111	.976	z	23	6777....	38556	1113....	2463....	1	H2-1
42	BR11	L2.5x2.5x4	.261	0	17	.075	3.0...	y	44	6777....	38556	1113....	2119....	1...	H2-1
43	BR3	L2.5x2.5x4	.135	0	50	.018	0	y	45	6777....	38556	1113....	2344....	1	H2-1
44	BR4	L2.5x2.5x4	.120	4.012	44	.020	4.0...	y	42	6777....	38556	1113....	2344....	1	H2-1
45	BR5	L2.5x2.5x4	.146	0	51	.022	0	y	38	6777....	38556	1113....	2207....	1...	H2-1
46	BR6	L2.5x2.5x4	.166	4.012	51	.019	4.0...	y	38	6777....	38556	1113....	2344....	1	H2-1
47	V6	L2.5x2.5x4	.498	0	33	.125	0	z	9	24367...	38556	1113....	2537....	2...	H2-1
48	V7	L2.5x2.5x4	.396	1.992	46	.126	2.0...	y	23	24367...	38556	1113....	2523.83	1...	H2-1
49	V5	L2.5x2.5x4	.480	3.75	25	.142	0	z	27	24367...	38556	1113....	2537....	2...	H2-1
50	V4	L2.5x2.5x4	.366	.273	51	.111	0	y	27	24367...	38556	1113....	2537....	2...	H2-1
51	V3	L2.5x2.5x4	.258	.273	51	.116	0	z	30	24367...	38556	1113....	2537....	2...	H2-1
52	V2	L2.5x2.5x4	.177	.273	50	.107	0	y	30	24367...	38556	1113....	2537....	2...	H2-1
53	V1	L2.5x2.5x4	.553	1.992	21	.101	2.0...	y	20	24367...	38556	1113....	2537....	1...	H2-1
54	MP7	PIPE_2.0	.063	3.75	31	.005	3.75		32	14916...	32130	1871....	1871....	1...	H1-1b
55	MP8	PIPE_2.0	.390	4.75	31	.104	4.75		30	14916...	32130	1871....	1871....	1...	H1-1b
56	MP6	PIPE_2.0	.635	3.75	26	.041	3.75		18	14916...	32130	1871....	1871....	3...	H1-1b
57	MP9	PIPE_2.0	.615	3.75	31	.046	3.75		31	14916...	32130	1871....	1871....	1...	H1-1b
58	MP5	PIPE_2.0	.381	4.75	26	.077	4.75		11	14916...	32130	1871....	1871....	2...	H1-1b
59	MP4	PIPE_2.0	.058	3.75	26	.005	3.75		26	14916...	32130	1871....	1871....	3...	H1-1b
60	MP1	PIPE_2.0	.615	3.75	21	.046	3.75		21	14916...	32130	1871....	1871....	1...	H1-1b
61	MP2	PIPE_2.0	.387	4.75	21	.109	4.75		23	14916...	32130	1871....	1871....	2...	H1-1b
62	MP3	PIPE_2.0	.456	3.75	28	.035	3.75		29	14916...	32130	1871....	1871....	1...	H1-1b

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc.....	L..	phi*Pn..	phi*Pn..	phi*M...	phi*M...	...	Eqn
63	DM	PIPE_2.0	.960	5.625	24	.091	5.6...	28	2459....	32130	1871....	1871....	1..	H1-1a
64	YM1	PIPE_2.0	.654	3.229	20	.317	3.2...	21	9836....	32130	1871....	1871....	1..	H3-6
65	YM2	PIPE_2.0	.580	3.229	25	.343	3.2...	24	9836....	32130	1871....	1871....	1..	H3-6
66	OM1	PIPE_2.0	.195	1.563	33	.072	1.5...	32	9836....	32130	1871....	1871....	2..	H1-1b

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

Job:	CT33XC580-A
Project:	28739
By:	JMA
Date:	9/5/17

Wind Load on Antennas TIA-222-G

RISK CATEGORY IV WIND SPEED USED TO DETERMINE ADEQUACY OF CONNECTIONS OF THE MOUNT TO THE TANK

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

$F = q_z\ G_h\ C_a\ A_a$

Occupancy:	IV		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V:	112	mph	Basic Wind Speed (Annex B)
z:	59	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.13		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	34.7	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*
APXVTM14-ALU-I20	56.3	12.6	4.5	Flat	1.287	4.93	220.4	
TD-RRH8x20-25	26.1	18.6	1.4	Flat	1.200	3.37	140.6	
APXVSPP18-C-A20	72.0	11.9	6.1	Flat	1.358	5.95	280.6	
1900MHz 4x45W RRH	25.1	11.1	2.3	Flat	1.200	1.93	80.7	
800MHz 2x50W RRH	19.0	13.0	1.5	Flat	1.200	1.72	71.5	
SB2-107CB	28.0	0.0	1.0	Generic	1.262	4.27	187.4	
4' Yagi	600.0	0.5	1200.0	Round	1.200	2.08	86.9	
3' Yagi	480.0	0.5	960.0	Round	1.200	1.67	69.5	
18"x18" Antenna	18.0	18.0	1.0	Flat	1.200	2.25	93.8	
ODU	12.0	6.0	2.0	Flat	1.200	0.50	20.8	
Pipe2STD x 20 ft	240.0	2.4	101.1	Round	1.200	3.96	165.0	8.3
Pipe2STD x 10 ft	120.0	2.4	50.5	Round	1.200	1.98	82.5	8.3
Pipe2STD x 8 ft	96.0	2.4	40.4	Round	1.200	1.58	66.0	8.3
L3X3X1/4 x 6.36 ft	76.3	3.0	25.4	Flat	2.000	1.59	110.5	17.4
L2-1/2X2-1/2X1/4 x 10 ft	120.0	2.5	48.0	Flat	2.000	2.08	144.8	14.5
L2-1/2X2-1/2X1/4 x 7.43 ft	89.2	2.5	35.7	Flat	2.000	1.55	107.6	14.5
L2-1/2X2-1/2X1/4 x 4 ft	48.0	2.5	19.2	Flat	1.807	0.83	52.3	13.1
L2-1/2X2-1/2X1/4 x 3 ft	36.0	2.5	14.4	Flat	1.647	0.63	35.8	11.9
L2-1/2X2-1/2X1/4 x 2.46 ft	29.5	2.5	11.8	Flat	1.560	0.51	27.8	11.3
L2-1/2X2-1/2X1/4 x 1 ft	12.0	2.5	4.8	Flat	1.302	0.21	9.4	9.4
PL 3x1/4 x 4 ft	48.0	3.0	16.0	Flat	1.700	1.00	59.1	14.8

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Job: CT33XC580-A
Project: 28739
By: JMA
Date: 9/5/17

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:	IV		Classification of Structures (Table 2-1)
Exposure:	C		Exposure Category
V:	112	mph	Basic Wind Speed (Annex B)
z:	59	ft	Height above ground level to the center of the antenna
I:	1.00		Importance Factor (Table 2-3)
K_z:	1.13		Velocity Pressure Coefficient (2.6.5.2)
K_{zt}:	1.00		Topographic Factor (2.6.6.4)
K_d:	0.95		Wind Direction Probability Factor (Table 2-2)
q_z:	34.7	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*
APXVTM14-ALU-I20	56.3	6.3	8.9	Flat	1.465	2.46	125.3	
TD-RRH8x20-25	26.1	6.7	3.9	Flat	1.262	1.21	53.3	
APXVSPP18-C-A20	72.0	7.0	10.3	Flat	1.509	3.50	183.8	
1900MHz 4x45W RRH	25.1	10.7	2.3	Flat	1.200	1.86	77.7	
800MHz 2x50W RRH	19.0	12.2	1.6	Flat	1.200	1.61	67.1	
SB2-107CB	28.0	0.0	1.0	Generic	0.625	4.27	92.8	
4' Yagi	600.0	0.5	1200.0	Round	1.200	2.08	86.9	
3' Yagi	480.0	0.5	960.0	Round	1.200	1.67	69.5	
18"x18" Antenna	18.0	3.0	6.0	Flat	1.356	0.38	17.7	
ODU	12.0	4.0	3.0	Flat	1.222	0.33	14.2	
Pipe2STD x 20 ft	240.0	2.4	101.1	Round	1.200	3.96	165.0	8.3
Pipe2STD x 10 ft	120.0	2.4	50.5	Round	1.200	1.98	82.5	8.3
Pipe2STD x 8 ft	96.0	2.4	40.4	Round	1.200	1.58	66.0	8.3
L3X3X1/4 x 6.36 ft	76.3	3.0	25.4	Flat	2.000	1.59	110.5	17.4
L2-1/2X2-1/2X1/4 x 10 ft	120.0	2.5	48.0	Flat	2.000	2.08	144.8	14.5
L2-1/2X2-1/2X1/4 x 7.43 ft	89.2	2.5	35.7	Flat	2.000	1.55	107.6	14.5
L2-1/2X2-1/2X1/4 x 4 ft	48.0	2.5	19.2	Flat	1.807	0.83	52.3	13.1
L2-1/2X2-1/2X1/4 x 3 ft	36.0	2.5	14.4	Flat	1.647	0.63	35.8	11.9
L2-1/2X2-1/2X1/4 x 2.46 ft	29.5	2.5	11.8	Flat	1.560	0.51	27.8	11.3
L2-1/2X2-1/2X1/4 x 1 ft	12.0	2.5	4.8	Flat	1.302	0.21	9.4	9.4
PL 3x1/4 x 4 ft	48.0	0.3	192.0	Flat	2.000	0.08	5.8	1.4

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
1	Dead Load	None		-1			26			
2	Antenna Wind 0	None					52			
3	Antenna Wind 30	None					52			
4	Antenna Wind 45	None					52			
5	Antenna Wind 60	None					52			
6	Antenna Wind 90	None					52			
7	Antenna Wind 120	None					52			
8	Antenna Wind 135	None					52			
9	Antenna Wind 150	None					52			
10	Antenna Wind 180	None					52			
11	Antenna Wind 210	None					52			
12	Antenna Wind 225	None					52			
13	Antenna Wind 240	None					52			
14	Antenna Wind 270	None					52			
15	Antenna Wind 300	None					52			
16	Antenna Wind 315	None					52			
17	Antenna Wind 330	None					52			
18	Antenna Ice Dead Load	None					26			
19	Antenna Wind w/Ice 0	None					52			
20	Antenna Wind w/Ice 30	None					52			
21	Antenna Wind w/Ice 45	None					52			
22	Antenna Wind w/Ice 60	None					52			
23	Antenna Wind w/Ice 90	None					52			
24	Antenna Wind w/Ice 120	None					52			
25	Antenna Wind w/Ice 135	None					52			
26	Antenna Wind w/Ice 150	None					52			
27	Antenna Wind w/Ice 180	None					52			
28	Antenna Wind w/Ice 210	None					52			
29	Antenna Wind w/Ice 225	None					52			
30	Antenna Wind w/Ice 240	None					52			
31	Antenna Wind w/Ice 270	None					52			
32	Antenna Wind w/Ice 300	None					52			
33	Antenna Wind w/Ice 315	None					52			
34	Antenna Wind w/Ice 330	None					52			
35	Member Wind 0	None						156		
36	Member Wind 30	None						156		
37	Member Wind 45	None						156		
38	Member Wind 60	None						156		
39	Member Wind 90	None						156		
40	Member Wind 120	None						156		
41	Member Wind 135	None						156		
42	Member Wind 150	None						156		
43	Member Wind 180	None						156		
44	Member Wind 210	None						156		
45	Member Wind 225	None						156		
46	Member Wind 240	None						156		
47	Member Wind 270	None						156		
48	Member Wind 300	None						156		
49	Member Wind 315	None						156		
50	Member Wind 330	None						156		
51	Member Ice Dead Load	None						78		
52	Member Wind w/Ice 0	None						156		
53	Member Wind w/Ice 30	None						156		
54	Member Wind w/Ice 45	None						156		
55	Member Wind w/Ice 60	None						156		
56	Member Wind w/Ice 90	None						156		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Mem...	Surface(Pl...
57	Member Wind w/Ice 120	None						156		
58	Member Wind w/Ice 135	None						156		
59	Member Wind w/Ice 150	None						156		
60	Member Wind w/Ice 180	None						156		
61	Member Wind w/Ice 210	None						156		
62	Member Wind w/Ice 225	None						156		
63	Member Wind w/Ice 240	None						156		
64	Member Wind w/Ice 270	None						156		
65	Member Wind w/Ice 300	None						156		
66	Member Wind w/Ice 315	None						156		
67	Member Wind w/Ice 330	None						156		
68	Live Load - Area	None								
69	Live Load - Point 1	None								
70	Live Load - Point 2	None								
71	Live Load - Point 3	None								
72	Railing Dist. LL z	None						12		
73	Railing Dist. LL x	None						12		
74	Railing Point LL z	None					3			
75	Railing Point LL x	None					3			

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

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...	BLC	Fac...
34	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	19	1	52	1												
35	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	20	1	53	1												
36	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	21	1	54	1												
37	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	22	1	55	1												
38	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	23	1	56	1												
39	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	24	1	57	1												
40	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	25	1	58	1												
41	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	26	1	59	1												
42	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	27	1	60	1												
43	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	28	1	61	1												
44	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	29	1	62	1												
45	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	30	1	63	1												
46	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	31	1	64	1												
47	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	32	1	65	1												
48	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	33	1	66	1												
49	1.2D + 1.0Di + 1.0 (...		Y		1	1.2	18	1	51	1	34	1	67	1												
50	1.0D + 1.5LL + 1.5 ...		Y		1	1	68	1.5	72	1.5																
51	1.0D + 1.5LL + 1.5 ...		Y		1	1	68	1.5	73	1.5																
52	1.0D + 1.5LL + 1.5 ...		Y		1	1	68	1.5	74	1.5																
53	1.0D + 1.5LL + 1.5 ...		Y		1	1	68	1.5	75	1.5																
54	1.0D + 1.5LL + 1.5 ...		Y		1	1	69	1.5	72	1.5																
55	1.0D + 1.5LL + 1.5 ...		Y		1	1	69	1.5	73	1.5																
56	1.0D + 1.5LL + 1.5 ...		Y		1	1	69	1.5	74	1.5																
57	1.0D + 1.5LL + 1.5 ...		Y		1	1	69	1.5	75	1.5																
58	1.0D + 1.5LL + 1.5 ...		Y		1	1	70	1.5	72	1.5																
59	1.0D + 1.5LL + 1.5 ...		Y		1	1	70	1.5	73	1.5																
60	1.0D + 1.5LL + 1.5 ...		Y		1	1	70	1.5	74	1.5																
61	1.0D + 1.5LL + 1.5 ...		Y		1	1	70	1.5	75	1.5																
62	1.0D + 1.5LL + 1.5 ...		Y		1	1	71	1.5	72	1.5																
63	1.0D + 1.5LL + 1.5 ...		Y		1	1	71	1.5	73	1.5																
64	1.0D + 1.5LL + 1.5 ...		Y		1	1	71	1.5	74	1.5																
65	1.0D + 1.5LL + 1.5 ...		Y		1	1	71	1.5	75	1.5																
66	Serviceability (0-Wi...		Y		1	1	2	.303	35	.303																
67	Serviceability (30-...		Y		1	1	3	.303	36	.303																
68	Serviceability (45-...		Y		1	1	4	.303	37	.303																
69	Serviceability (60-...		Y		1	1	5	.303	38	.303																
70	Serviceability (90-...		Y		1	1	6	.303	39	.303																
71	Serviceability (120-...		Y		1	1	7	.303	40	.303																
72	Serviceability (135-...		Y		1	1	8	.303	41	.303																
73	Serviceability (150-...		Y		1	1	9	.303	42	.303																
74	Serviceability (180-...		Y		1	1	10	.303	43	.303																
75	Serviceability (210-...		Y		1	1	11	.303	44	.303																
76	Serviceability (225-...		Y		1	1	12	.303	45	.303																
77	Serviceability (240-...		Y		1	1	13	.303	46	.303																
78	Serviceability (270-...		Y		1	1	14	.303	47	.303																
79	Serviceability (300-...		Y		1	1	15	.303	48	.303																
80	Serviceability (315-...		Y		1	1	16	.303	49	.303																
81	Serviceability (330-...		Y		1	1	17	.303	50	.303																
82	*** ASD ***																									
83	1.0D + 1.0 (0-Wind)	Yes	Y		1	1	2	1	35	1																
84	1.0D + 1.0 (30-Wind)	Yes	Y		1	1	3	1	36	1																
85	1.0D + 1.0 (45-Wind)	Yes	Y		1	1	4	1	37	1																
86	1.0D + 1.0 (60-Wind)	Yes	Y		1	1	5	1	38	1																
87	1.0D + 1.0 (90-Wind)	Yes	Y		1	1	6	1	39	1																
88	1.0D + 1.0 (120-Wi...	Yes	Y		1	1	7	1	40	1																
89	1.0D + 1.0 (135-Wi...	Yes	Y		1	1	8	1	41	1																
90	1.0D + 1.0 (150-Wi...	Yes	Y		1	1	9	1	42	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...
91	1.0D + 1.0 (180-Wi...	Yes	Y		1	1	10	1	43	1														
92	1.0D + 1.0 (210-Wi...	Yes	Y		1	1	11	1	44	1														
93	1.0D + 1.0 (225-Wi...	Yes	Y		1	1	12	1	45	1														
94	1.0D + 1.0 (240-Wi...	Yes	Y		1	1	13	1	46	1														
95	1.0D + 1.0 (270-Wi...	Yes	Y		1	1	14	1	47	1														
96	1.0D + 1.0 (300-Wi...	Yes	Y		1	1	15	1	48	1														
97	1.0D + 1.0 (315-Wi...	Yes	Y		1	1	16	1	49	1														
98	1.0D + 1.0 (330-Wi...	Yes	Y		1	1	17	1	50	1														

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	N7	max	448.093	96	1067.946	96	981.898	96	0	83	0	83	0	83
2		min	-451.597	88	-997.325	88	-989.498	88	0	83	0	83	0	83
3	N9	max	479.203	93	1176.526	85	1095.264	85	0	83	0	83	0	83
4		min	-478.883	85	-1100.744	93	-1095.031	93	0	83	0	83	0	83
5	N10	max	1376.71	95	1376.266	87	174.011	95	0	83	0	83	0	83
6		min	-1379.468	87	-1294.208	95	-174.813	87	0	83	0	83	0	83
7	N12	max	682.664	83	1162.588	91	957.135	83	0	83	0	83	0	83
8		min	-684.769	91	-1083.887	83	-959.306	91	0	83	0	83	0	83
9	N13	max	754.358	91	1278.183	91	1045.053	83	0	83	0	83	0	83
10		min	-753.205	83	-1197.912	83	-1045.706	91	0	83	0	83	0	83
11	N15	max	1537.843	96	1530.52	96	177.491	87	0	83	0	83	0	83
12		min	-1557.395	88	-1474.248	88	-179.229	95	0	83	0	83	0	83
13	N33	max	562.528	84	1213.568	84	958.57	84	0	83	0	83	0	83
14		min	-581.831	92	-1223.863	92	-990.144	92	0	83	0	83	0	83
15	N35	max	1150.397	94	1279.676	94	232.891	94	0	83	0	83	0	83
16		min	-1103.545	86	-1196.212	86	-221.868	86	0	83	0	83	0	83
17	N63	max	171.206	87	163.919	97	120.407	93	122.906	94	9.455	92	71.244	91
18		min	-135.189	95	48.041	89	-107.198	85	-124.218	86	-9.398	84	-77.677	83
19	N64	max	270.486	83	184.99	89	431.216	83	442.763	83	14.407	87	259.372	90
20		min	-257.526	91	33.136	97	-433.18	91	-448.964	91	-13.969	95	-240.395	83
21	N65	max	48.789	87	178.529	86	137.612	89	89.598	96	14.281	98	92.09	88
22		min	-93.712	95	38.183	94	-113.958	97	-83	88	-14.699	90	-93.758	96
23	N66	max	160.135	95	166.389	88	131.385	84	82.255	84	12.948	95	103.637	87
24		min	-155.349	87	35.585	97	-125.531	92	-93.052	92	-12.819	87	-114.453	95
25	N67	max	132.529	95	334.868	92	209.038	86	197.51	86	13.624	87	51.195	83
26		min	-133.314	87	-124.563	85	-211.278	94	-183.378	94	-13.804	95	-78.88	91
27	N68	max	250.67	93	154.738	86	90.14	83	99.512	98	12.109	84	188.466	85
28		min	-246.603	85	48.859	94	-107.762	91	-98.529	90	-12.417	92	-191.383	93
29	N69	max	158.931	86	221.811	84	106.343	92	0	83	0	83	0	83
30		min	-156.989	94	114.853	92	-104.457	84	0	83	0	83	0	83
31	N70	max	.846	83	67.596	92	4.125	91	0	83	0	83	0	83
32		min	-3.606	91	16.542	84	-4.157	83	0	83	0	83	0	83
33	N71	max	2.796	90	65.635	98	3.855	88	0	83	0	83	0	83
34		min	-1.347	98	18.272	90	-6.104	96	0	83	0	83	0	83
35	N72	max	157.377	88	228.711	98	106.105	90	0	83	0	83	0	83
36		min	-159.46	96	107.221	90	-104.287	98	0	83	0	83	0	83
37	N73	max	67.977	94	1042.01	91	61.875	83	0	83	0	83	0	83
38		min	-69.094	86	-599.004	83	-63.714	91	0	83	0	83	0	83
39	N74	max	116.108	96	1198.311	96	87.158	83	0	83	0	83	0	83
40		min	-118.055	88	-775.858	88	-88.089	91	0	83	0	83	0	83
41	N75	max	122.471	95	1125.129	86	88.306	83	0	83	0	83	0	83
42		min	-119.056	87	-700.104	94	-88.454	91	0	83	0	83	0	83
43	N76	max	73.564	90	353.105	92	80.344	91	0	83	0	83	0	83
44		min	-69.237	98	8.633	84	-83.343	83	0	83	0	83	0	83

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
45	N77	max	100.169	86	118.419	86	82.616	92	0	83	0	83	0	83
46		min	-126.813	95	66.321	94	-68.051	84	0	83	0	83	0	83
47	N90	max	20.847	96	740.685	87	63.342	86	0	83	0	83	0	83
48		min	-16.876	88	-534.612	95	-64.449	94	0	83	0	83	0	83
49	N36	max	0	83	0	83	0	83	0	83	0	83	0	83
50		min	0	83	0	83	0	83	0	83	0	83	0	83
51	N20	max	719.682	94	0	83	414.736	85	0	83	0	83	0	83
52		min	-750.307	86	0	83	-411.921	93	0	83	0	83	0	83
53	N25	max	520.054	95	0	83	484.636	98	0	83	0	83	0	83
54		min	-453.885	87	0	83	-526.309	90	0	83	0	83	0	83
55	N37	max	89.026	94	0	83	21.597	95	0	83	0	83	0	83
56		min	-89.607	86	0	83	-23.743	87	0	83	0	83	0	83
57	N42	max	122.265	95	0	83	125.135	98	0	83	0	83	0	83
58		min	-116.228	87	0	83	-125.805	90	0	83	0	83	0	83
59	N108	max	104.799	95	355.306	97	436.382	98	418.147	98	10.268	98	126.242	91
60		min	-126.839	87	-48.637	89	-399.353	90	-411.862	90	-11.317	90	-114.953	83
61	Totals:	max	5591.883	95	2498.865	86	5464.119	83						
62		min	-5554.913	87	2498.865	94	-5472.475	91						

Stud check

- At antenna base: 8"x8" stl plate w/ (4) 3/8" ϕ studs

$T_{allow} = 3788 \times 0.6 = 2273$ lb/bolt

From RISA: $V_{max} = \sqrt{159^2 + 106^2} = 191$ lbs ✓ NEGLIGIBLE

$T_{max} = 776$ lbs < (2273)(4) = 9092 lb

- At kickbacks: (4) 3/8" ϕ Nelson studs attached to a WT 5x7.5

3/8" ϕ studs $T_{allow} = 3788 \times 0.6 = 2273$ lb/bolt

$V_{allow} = 3536 \times 0.6 = 2122$ lb/bolt

From RISA:

$V_{max} = \sqrt{1557^2 + 179^2} = 1567$ lb/4 bolt $= 391$ lb/bolt

$T_{max} = 1474$ lb/4 bolt $= 369$ lb/bolt

$\frac{391}{2122} + \frac{369}{2273} = 0.346 < 1.0$ ∴ ok ✓

Name: JMA

Date: 9/5/17

Project: 28739

SP1Engineering@Valmont.com

Sprint®

PROJECT: 2.5 EQUIPMENT DEPLOYMENT

SITE NAME: DOUGLAS HILL WATER TANK

SITE CASCADE: CT03XC112-P

SITE ADDRESS: 450 FARGO ROAD
WATERFORD, CT 06385

SITE TYPE: 138'-6" WATER TANK

SITE INFORMATION

PROPERTY OWNER:
TOWN OF WATERFORD
WATERFORD UTILITY COMMISSION
PH.:800-922-4455

SITE ADDRESS:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

GEOGRAPHIC COORDINATES:
LATITUDE: 41° 23' 11.0034" (41.38639)
LONGITUDE: 72° 10' 22.0044" (-72.172779)

ZONING JURISDICTION:
TOWN OF WATERFORD

ZONING DISTRICT:
I-G GENERAL INDUSTRIAL

POWER COMPANY:
CONNECTICUT LIGHT AND POWER
PH.: (888) 783-6617

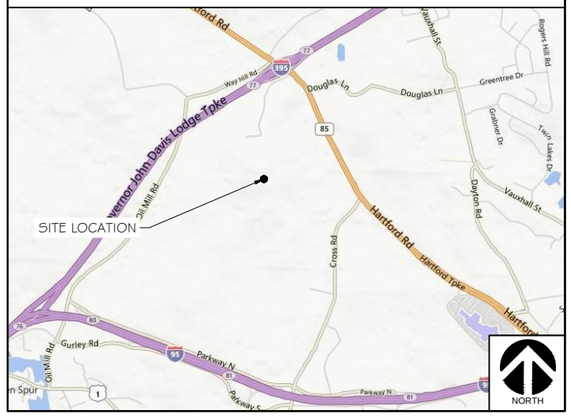
AAV PROVIDER:
AT&T
PH.: (888) 944-0447

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

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

AREA MAP



LOCATION MAP

PROJECT DESCRIPTION

- INSTALL NEW 2.5 EQUIPMENT IN EXISTING BTS CABINET
  - *(1) RECTIFIER SHELF AND (3) RECTIFIERS
  - *(1) BASE BAND UNIT
- INSTALL NEW BATTERY STRING IN EXISTING BATTERY CABINET
- INSTALL (3) PANEL ANTENNAS
- INSTALL (3) RRH'S ON WATER TOWER
- INSTALL (1) FIBER CABLE AND (2) FIBER JUMPERS
- INSTALL (27) ANTENNA / RRH JUMPERS

APPLICABLE CODES

* ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.

1. 2016 CT STATE BUILDING CODE
2. 2016 CT FIRE SAFETY CODE
3. 2014 NATIONAL ELECTRIC CODE W/ CT AMENDMENTS
4. 2012 IECC W/ CT AMENDMENTS

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SHEET INDEX

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

Sprint®
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

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www.Ramaker.com

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

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

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

Signature: Date: 8/7/2017

MARK	DATE	DESCRIPTION
A	7/25/17	PRELIMINARY CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL CDs DATE ISSUED: 08/07/2017

PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
TITLE SHEET

SCALE: NONE

PROJECT NUMBER: 28722
SHEET NUMBER: T-1

I:\28700\28722\CAD\28722 Sprint 2.5 CD for Charles.dwg Printed by: sbents on Aug 07, 2017 - 4:37pm

DRAWN BY: TJN CHECKED BY: KAB

SECTION 01 100 - SCOPE OF WORK

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

RELATED DOCUMENTS:
A. THE REQUIREMENTS OF EACH SECTION OF THIS SPECIFICATION APPLY TO ALL SECTIONS, INDIVIDUALLY AND COLLECTIVELY.
B. RELATED DOCUMENTS: THE CONTRACTOR SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE FOLLOWING SUPPLEMENTAL REQUIREMENTS FOR INSTALLATION AND TESTING.
   1. EN-2012-001: (FIBER OPTIC, DC CABLE, AND DC CIRCUIT BREAKER TAGGING STANDARDS)
   2. TS-0200 - (TRANSMISSION ANTENNA LINE ACCEPTANCE STANDARDS)
   3. EL-0568: (FIBER TESTING POLICY)
   4. NP-312-201: (EXTERIOR GROUNDING SYSTEM TESTING)
   5. NP-760-500: ETHERNET, MICROWAVE, TESTING AND ACCEPTANCE

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

NATIONALLY RECOGNIZED CODES AND STANDARDS:
THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
C. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY -GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
D. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE - "NEC") AND NFPA 101 (LIFE SAFETY CODE).
E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
G. AMERICAN CONCRETE INSTITUTE (ACI)
H. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
I. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
J. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
K. PORTLAND CEMENT ASSOCIATION (PCA)
L. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
M. BRICK INDUSTRY ASSOCIATION (BIA)
N. AMERICAN WELDING SOCIETY (AWS)
O. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
P. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
Q. DOOR AND HARDWARE INSTITUTE (DHI)
R. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
S. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

DEFINITIONS:
A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B. COMPANY: "SPRINT"; SPRINT NEXTEL CORPORATION AND IT'S OPERATING ENTITIES.
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D. CONTRACTOR: CONSTRUCTION CONTRACTOR, SUPPLIER, CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
F. CONSTRUCTION MANAGER - ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT.

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

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

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

DRAWINGS REQUIRED AT JOBSITE:
THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.
B. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

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

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

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

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

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

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

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

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

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

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

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

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

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

SECTION 01 300 - CELL SITE CONSTRUCTION

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

GENERAL REQUIREMENTS FOR CONSTRUCTION:
A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
   1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
   2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.
D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

FUNCTIONAL REQUIREMENTS:
A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. CONTRACTOR SHALL TAKE ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.
B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.
C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES
D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
   1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
   2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
   3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND BACKHAUL (FIBER, COPPER, OR MICROWAVE).
   4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
   5. INSTALL ABOVE GROUND GROUNDING SYSTEMS, CONDUIT AND BOXES.
   6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
   7. INSTALL "H-FRAMES", CABINETS AND PADS AND PLATFORMS AS INDICATED.
   8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
   9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
   10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
   11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
   12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
   13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
   14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
   15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
   16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
   17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
   18. CONDUCT ALL REQUIRED TESTS AND INSPECTIONS
   19. PERFORM, DOCUMENT, AND CLOSE OUT ALL JURISDICTIONAL PERMITTING REQUIREMENTS AND ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
   20. PERFORM ALL ADDITIONAL WORK AS IDENTIFIED IN SCOPE OF SERVICES ATTACHED TO THE SUPPLIER AGREEMENT FOR THIS PROJECT. THIS WORK MAY INCLUDE COMMISSIONING, INTEGRATION, SPECIAL WAREHOUSING, REVERSE LOGISTICS ACTIVITIES, ETC. PERFORM COMMISSIONING AND INTEGRATION ACTIVITIES PER APPLICABLE MOPS.

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

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

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

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

TESTING BY THIRD PARTY AGENCY:
A. EMPLOY AN AGENCY OF ENGINEERS AND SCIENTISTS WHO IS REGULARLY ENGAGED IN FIELD AND LABORATORY TESTING AND ANALYSIS. AGENCY SHALL HAVE BEEN IN BUSINESS A MINIMUM OF FIVE YEARS, AND BE LICENSED AS PROFESSIONAL ENGINEERS IN THE STATE WHERE THE PROJECT IS LOCATED. AGENCY IS SUBJECT TO APPROVAL BY COMPANY.
   1. AGENCY MUST HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
   2. AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
   3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
B. REQUIRED THIRD PARTY TESTS:
   1. SITE RESISTANCE TO EARTH TEST PER NP-312-201
   2. CONCRETE CYLINDER BREAK TESTS FOR TOWER PIER AND ANCHORS PER NATIONALLY RECOGNIZED STANDARDS
   3. STRUCTURAL SOILS COMPACTION TESTS PER NATIONALLY RECOGNIZED STANDARDS
   4. REBAR PLACEMENT VERIFICATION WITH REPORT
   5. TESTING TENSION STUDY FOR ROCK ANCHORS
   6. ALL THIRD PARTY TESTS AS REQUIRED BY LOCAL JURISDICTION
C. REQUIRED TESTS BY CONTRACTOR
   1. COAX SWEEP TESTS PER SPRINT STANDARD TS-0200
   2. FIBER TESTS PER SPRINT STANDARD EL-0568
   3. MICROWAVE LINK TESTS PER NP-760-500
   4. ANTENNA AZIMUTHS AND DOWN TILT USING ELECTRONIC ALIGNMENT TOOL PER ANTENNA INSTALLATION SPECIFICATION HEREIN.

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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: 8/7/2017

MARK	DATE	DESCRIPTION
A	7/25/17	PRELIMINARY CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL CDs DATE ISSUED: 08/07/2017

PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 28722
SHEET NUMBER: SP-1

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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.

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

Signature: James R. Skowronski Date: 8/7/2017

MARK	DATE	DESCRIPTION
A	7/25/17	PRELIMINARY CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL CDs DATE ISSUED: 08/07/2017

PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 28722
SHEET NUMBER: SP-2

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

Signature: Date: 8/7/2017

MARK	DATE	DESCRIPTION
A	7/25/17	PRELIMINARY CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL CDs DATE ISSUED: 08/07/2017

PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

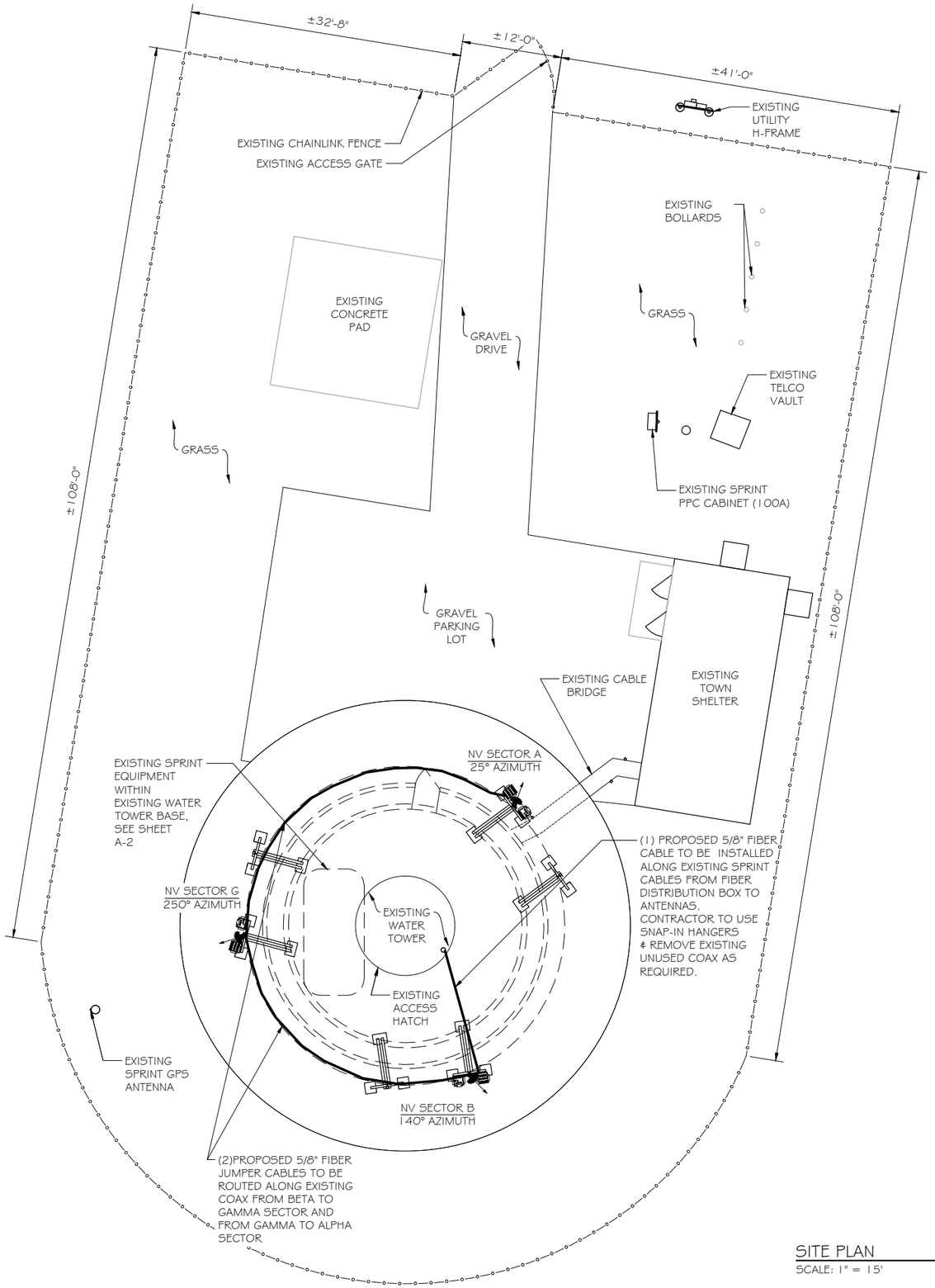
PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
SPRINT SPECIFICATIONS

SCALE: NONE

PROJECT NUMBER: 28722

SHEET NUMBER: SP-3



NORTH

SITE PLAN
SCALE: 1" = 15'
1

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DATE ISSUED: 08/07/2017

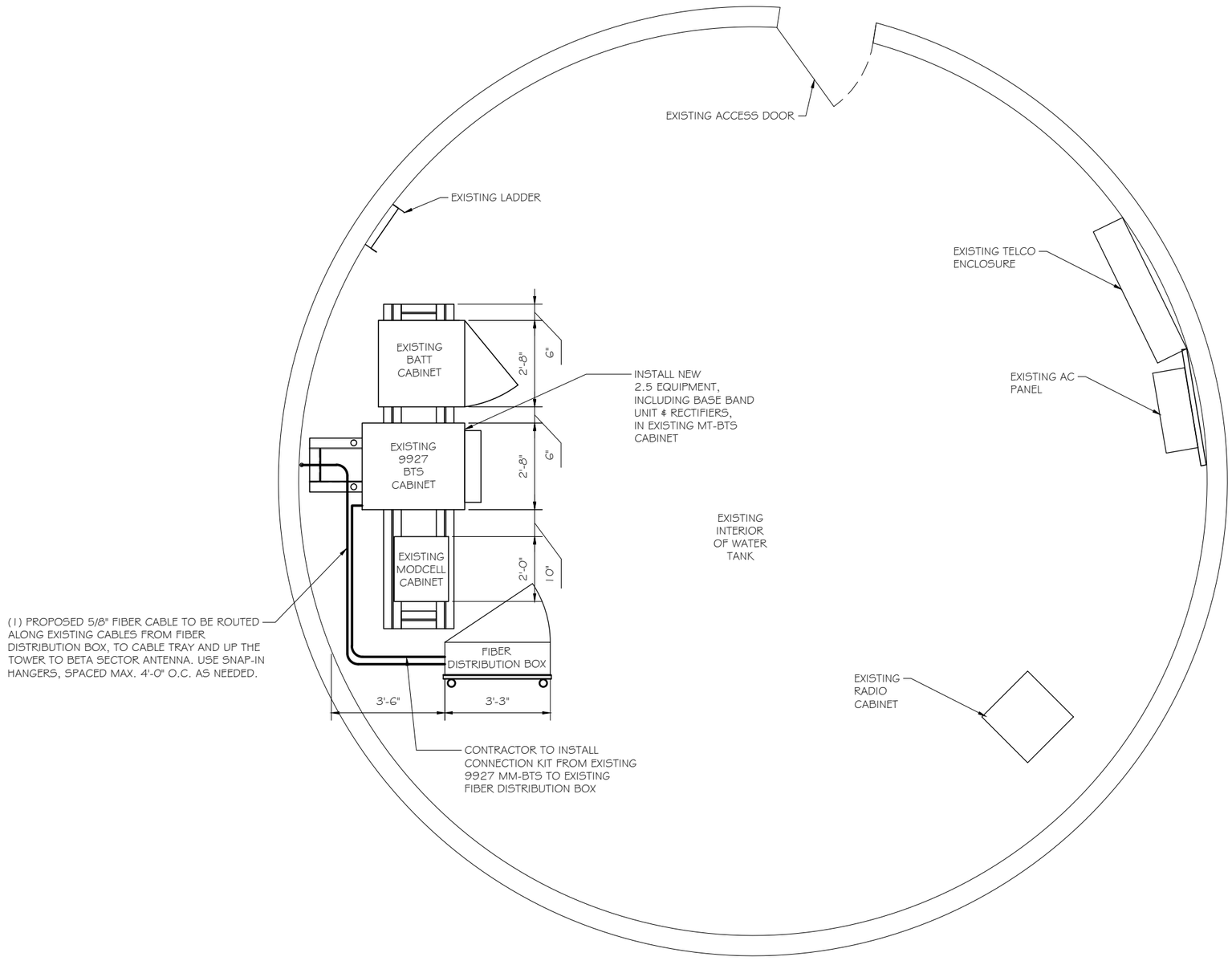
PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
SITE PLAN

0 7.5' 15' 30'
11" x 17" - 1" = 15'
22" x 34" - 1" = 7.5'

PROJECT NUMBER: 28722
SHEET NUMBER: A-1



EQUIPMENT PLAN (1)
SCALE: 1" = 3.75'

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ISSUE PHASE: FINAL CDs
DATE ISSUED: 08/07/2017

PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

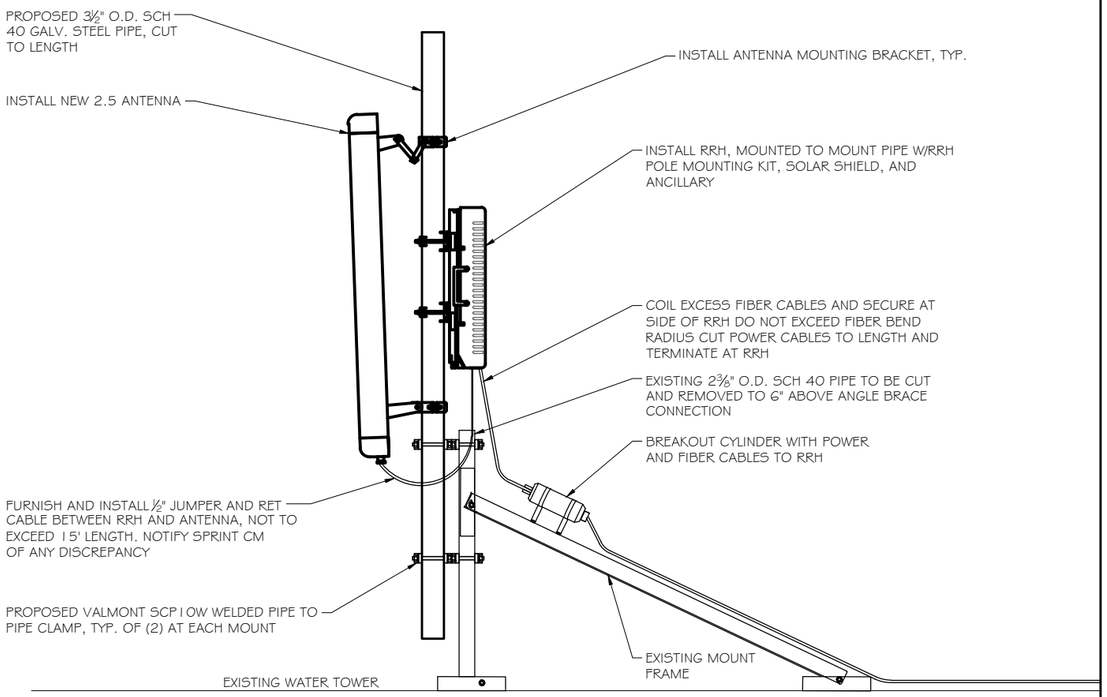
PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
EQUIPMENT PLAN

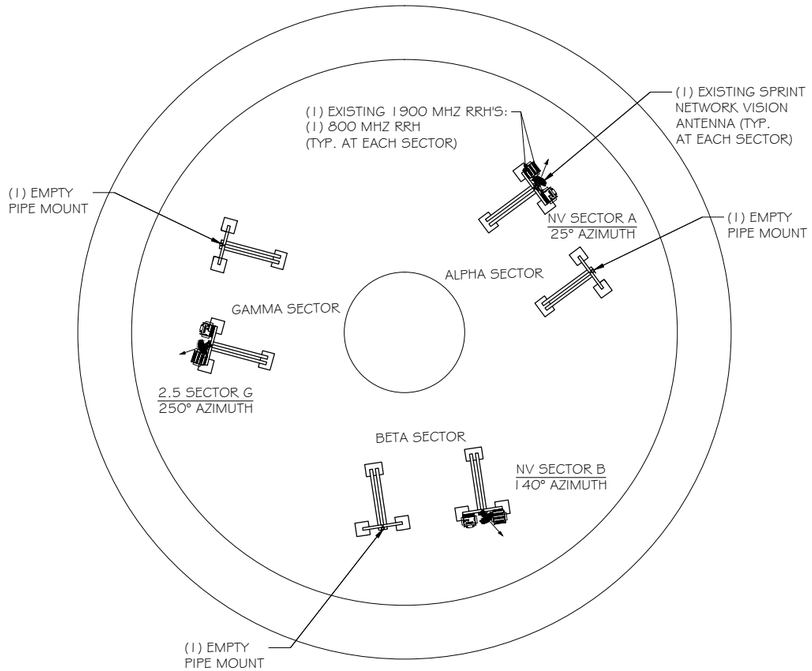
0 1.875' 3.75' 7.5'
11" x 17" - 1" = 3.75'
22" x 34" - 1" = 1.875'

PROJECT NUMBER: 28722
SHEET NUMBER: A-2

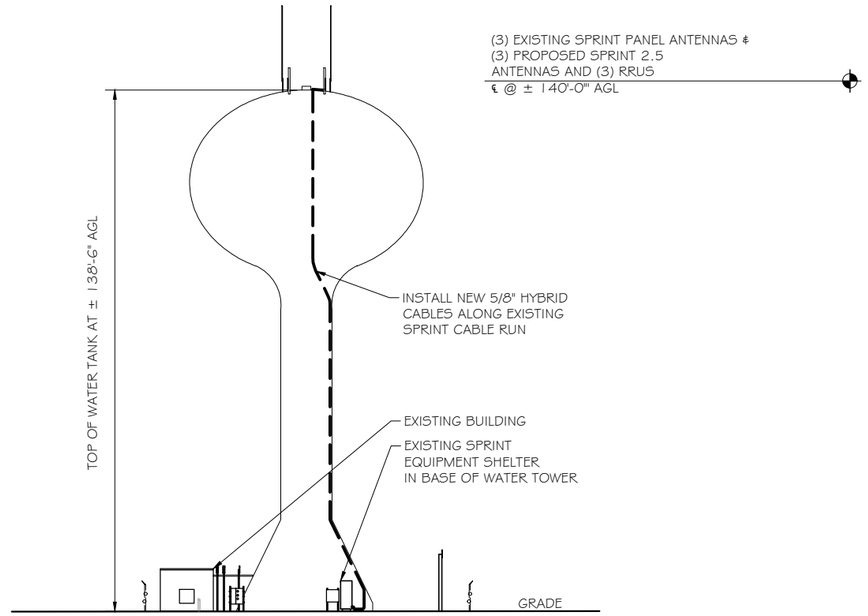
DRAWN BY: TJN CHECKED BY: KAB



ANTENNA & RRH MOUNTING DETAILS (1)
SCALE: NTS



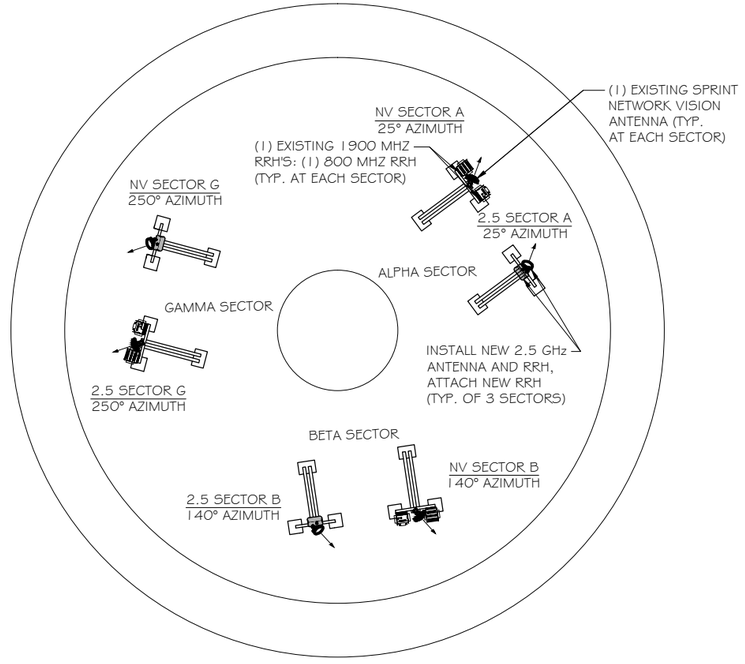
EXISTING ANTENNA ARRAY (3)
SCALE: NTS



BUILDING ELEVATION (2)
SCALE: 1" = 40'

0 20' 40' 80'

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



PROPOSED ANTENNA ARRAY (4)
SCALE: NTS

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STATE OF CONNECTICUT JAMES R. SKOWRONSKI 26266 LICENSED PROFESSIONAL ENGINEER

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ISSUE PHASE: FINAL CDs DATE ISSUED: 08/07/2017

PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
BUILDING ELEVATIONS & ANTENNA DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 28722
SHEET NUMBER: A-3

Sprint

RFDS Sheet

General Site Information

Site ID	CT03XC112	Equipment Vendor	Alcatel-Lucent
Market	Northern Connecticut	Lattitude	41.38639
Region	Northeast	Longitude	-72.172779
MLA	N/A	LL SITE ID	N/A
Structure Type	Water tank		
BTS Type			

Solution ID		Siterra SR Equipment type	
		Equipment Vendor	Alcatel-Lucent

Incremental Power Draw needed by added Equipment: N/A

Base Equipment

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

RF Path Information

RRH	TD-RRH8x20-25	
RRH Qty	3	
RRH Dimensions	26.1"x18.6"x6.7"	
RRH Weight. lbs.	70	
RRH Mount Weight. Lbs.	10	
Power and Fiber Cable	ALU FIBER ONLY	
Cable Qty	1	
Weight per foot. Lbs.	0.242	
Diameter. Inches.	0.73	
Length Ft.	170	(calculated as antenna height plus 20%)
Coax Jumper	TBD	
Coax Jumper Qty	27	
Coax Jumper Length. Feet.	15	
Coax Jumper Weight	1.7	
Coax Jumper Diameter. Inches	0.5	
AISG Cable	COMMSCOPE ATCB-0B01-006	
AISG Cable Qty	3	
AISG Diameter. Inches.	0.315	
AISG Cable length.	8'	
Weight of entire AISG cable. Lbs.	1.3	

Antenna Sector Information

	Sector 1	Sector 2	Sector 3
Antenna make/model	RFS APXV9TM14-ALU-I20	RFS APXV9TM14-ALU-I20	RFS APXV9TM14-ALU-I20
Antenna qty	1	1	1
Antenna Dimensions. Inches	56.3"x12.6"x6.3"	56.3"x12.6"x6.3"	56.3"x12.6"x6.3"
Antenna Weight. Lbs	55.12	55.12	55.12
Antenna Mounting Kit Weight. Lbs.	11.5	11.5	11.5
CL Height	140	140	140
Antenna Azimuth	25	140	250
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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ISSUE PHASE: FINAL CDs DATE ISSUED: 08/07/2017

PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

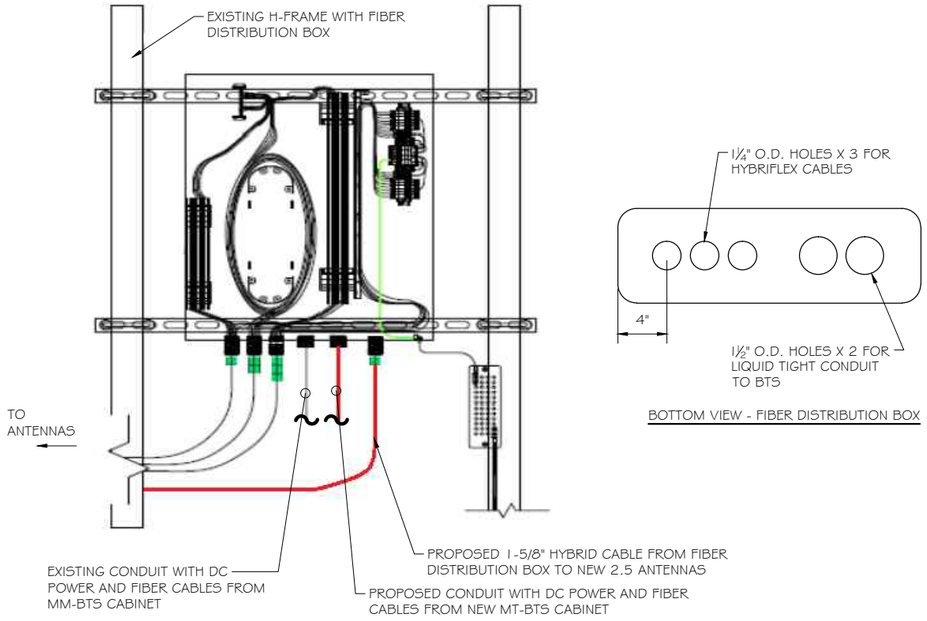
PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
RF DATA SHEET

SCALE:
AS NOTED

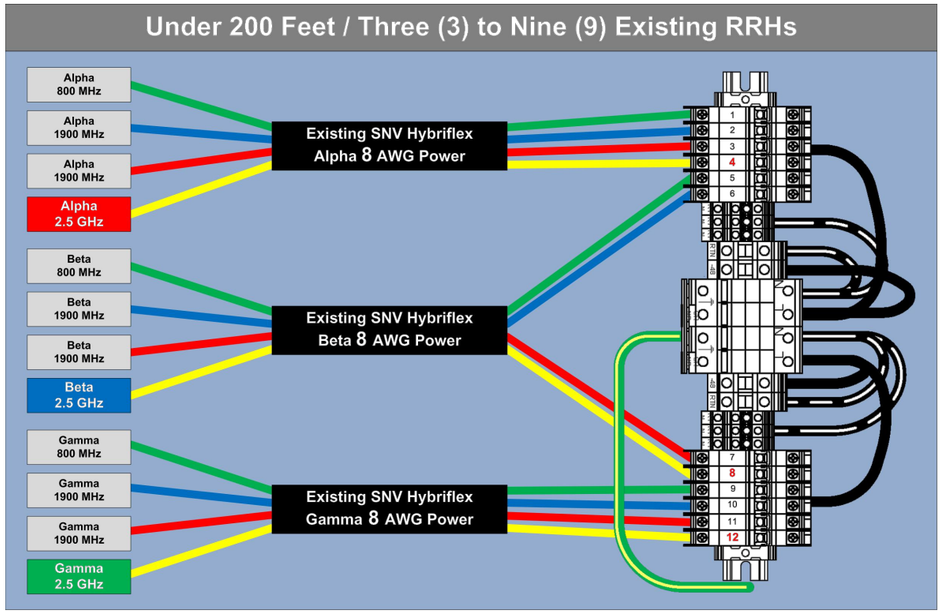
PROJECT NUMBER: 28722
SHEET NUMBER: A-4

DRAWN BY: TJN CHECKED BY: KAB

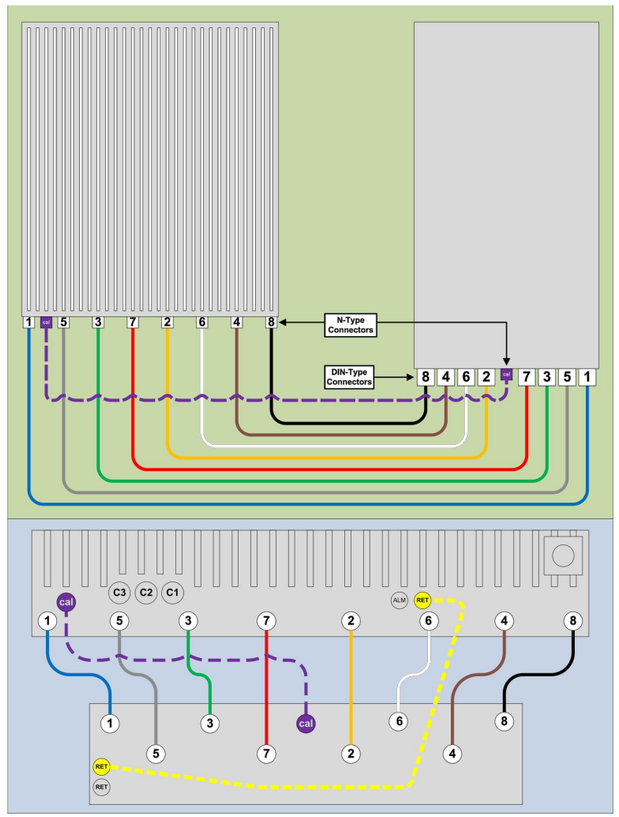


TYPICAL FIBER DISTRIBUTION BOX DETAIL (1)
SCALE: NTS

BOTTOM VIEW - FIBER DISTRIBUTION BOX

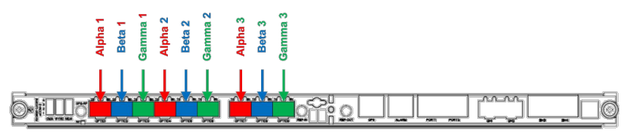


RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL (2)
SCALE: NTS

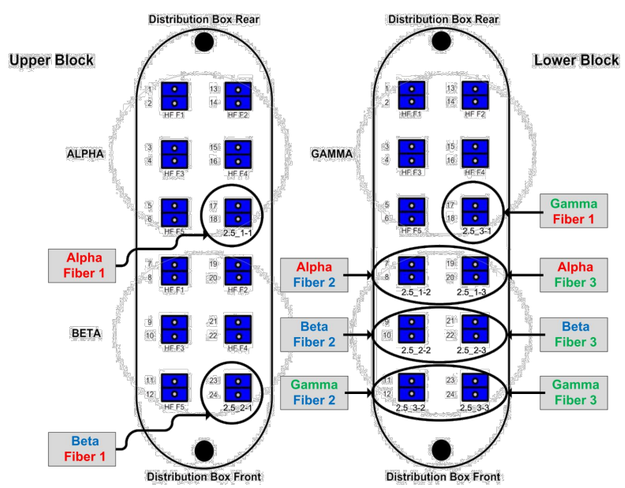


8T8R DETAIL (3)
SCALE: NTS

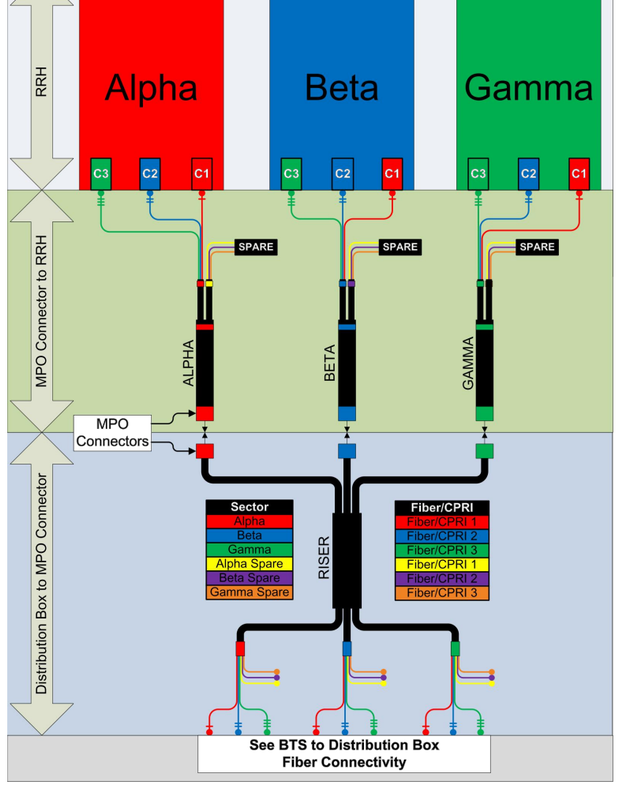
eCCM2-HR



Distribution Box Fiber Panel



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



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

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DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
FIBER PLUMBING DIAGRAM

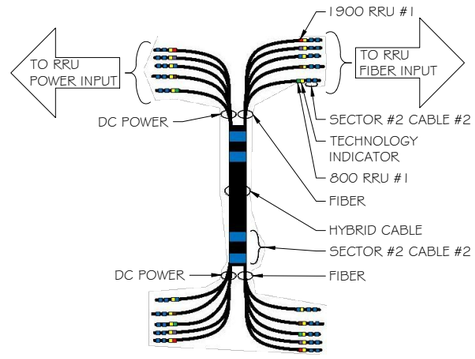
SCALE:
AS NOTED

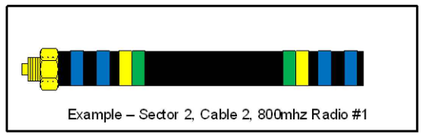
PROJECT NUMBER: 28722
SHEET NUMBER: A-5

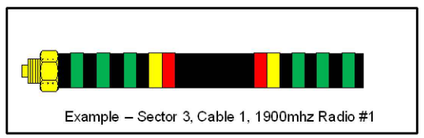
Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue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

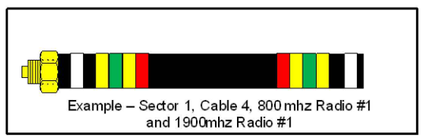
2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

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

Signature: 8/7/2017 Date:

MARK	DATE	DESCRIPTION
A	7/25/17	PRELIMINARY CONSTRUCTION DRAWINGS

ISSUE PHASE: FINAL CDs DATE ISSUED: 08/07/2017

PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
CABLE COLOR CODING

SCALE:
AS NOTED

PROJECT NUMBER: 28722
SHEET NUMBER: A-6

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE
MANUF:RFS

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

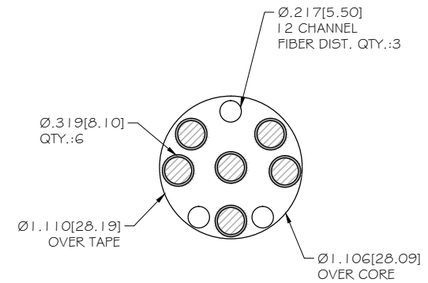
RFS HYBRIFLEX RISER CABLE SCHEDULE

FIBER ONLY (EXISTING DC POWER)	Hybrid cable MN:HB058-M12-050F 12x multi-mode fiber pairs, Top:Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50 ft	50 ft
	MN:HB058-M12-075F	75 ft
	MN:HB058-M12-100F	100 ft
	*MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	MN:HB058-M12-200F	200 ft
8 AWG Power	Hybrid cable MN:HB114-08U3M12-050F 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 50 ft	50 ft
	MN:HB114-08U3M12-075F	75 ft
	MN:HB114-08U3M12-100F	100 ft
	MN:HB114-08U3M12-125F	125 ft
	MN:HB114-08U3M12-150F	150 ft
	MN:HB114-08U3M12-175F	175 ft
	MN:HB114-08U3M12-200F	200 ft
6 AWG Power	Hybrid cable MN:HB114-13U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 225 ft	225 ft
	MN:HB114-13U3M12-250F	250 ft
	MN:HB114-13U3M12-275F	275 ft
	MN:HB114-13U3M12-300F	300 ft
4 AWG Power	Hybrid cable MN:HB114-21U3M12-325F 3x 4 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC connectors. 1 1/4 cable, 325 ft	325 ft
	MN:HB114-21U3M12-350F	350 ft
	MN:HB114-21U3M12-375F	375 ft

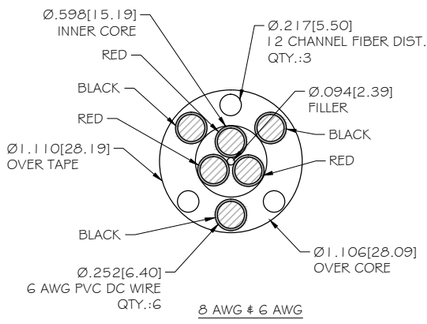
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

FIBER ONLY	Hybrid Jumper cable MN:HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN:HBF012-M3-10F1	10 ft
	*MN:HBF012-M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
8 AWG POWER	Hybrid Jumper cable MN:HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable	5 ft
	MN:HBF058-08U1M3-10F1	10 ft
	MN:HBF058-08U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
6 AWG POWER	Hybrid Jumper cable MN:HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 5/8 cable	5 ft
	MN:HBF058-13U1M3-10F1	10 ft
	MN:HBF058-13U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
4 AWG POWER	Hybrid Jumper cable MN:HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC connectors, 7/8 cable	5 ft
	MN:HBF078-21U1M3-10F1	10 ft
	MN:HBF078-21U1M3-15F1	15 ft
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	

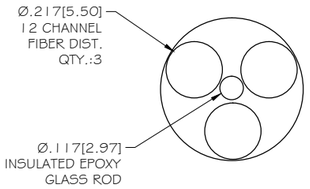
*NOTE: SPRINT CM TO CONFIRM HYBRID/FIBER RISER CABLE & HYBRID/FIBER JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.



4 AWG



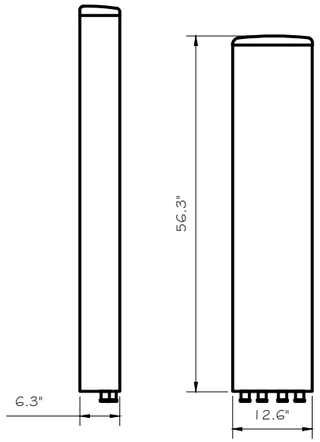
8 AWG & 6 AWG



FIBER ONLY

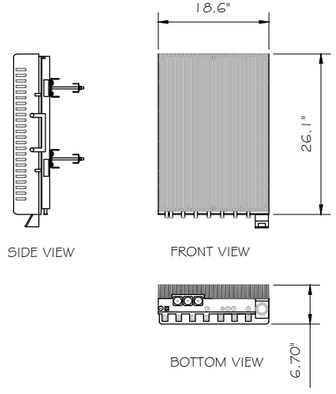
FIBER CABLE CROSS SECTION & DATA (1)
SCALE: NTS

RFS: APXV9TM14-ALU-120



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

2.5 ANTENNA DETAIL (2)
SCALE: NTS



ALCATEL-LUCENT: TD-RRH8x20

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

WEIGHT = 70 lbs.

2.5 RRH DETAIL (3)
SCALE: NTS

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DATE ISSUED: 08/07/2017

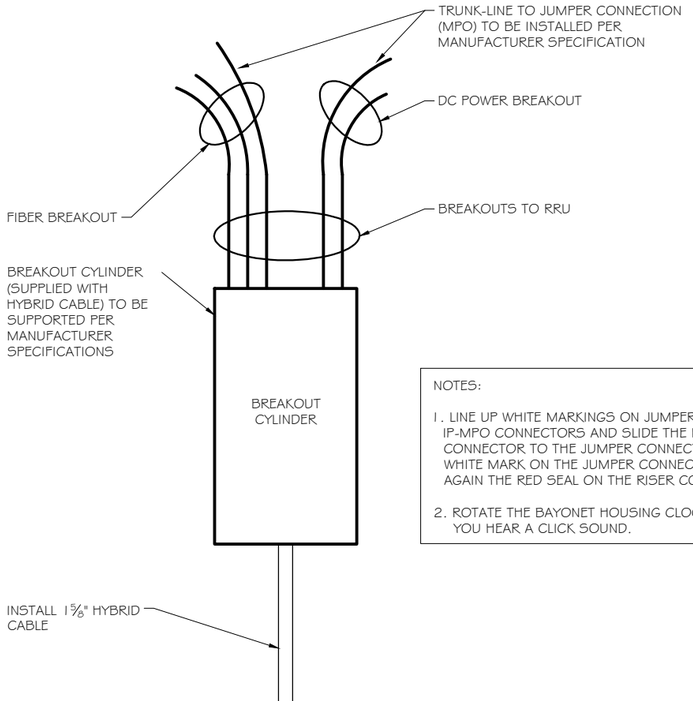
PROJECT TITLE:
DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
ANTENNA & HYBRID CABLE DETAILS

SCALE:
AS NOTED

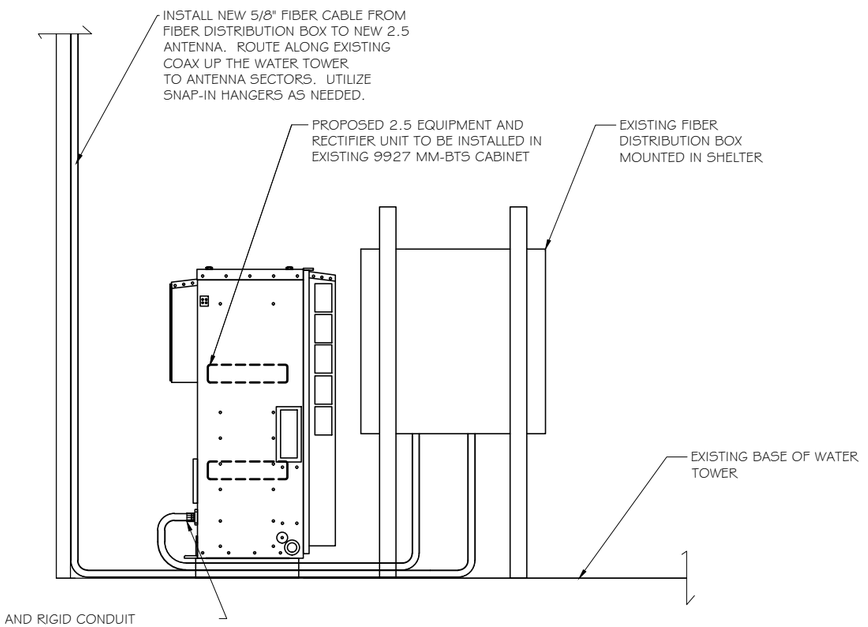
PROJECT NUMBER: 28722
SHEET NUMBER: A-7



NOTES:

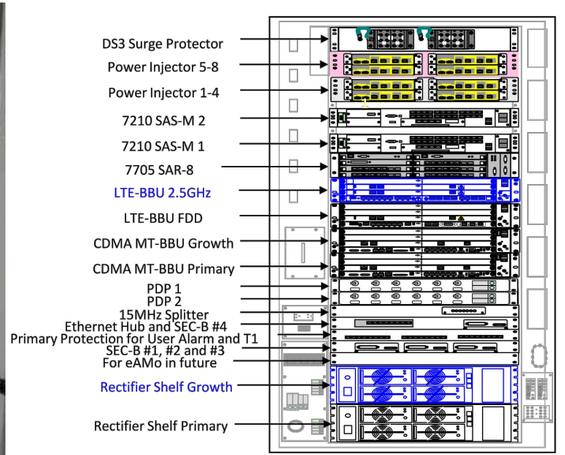
1. LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTORS AND SLIDE THE RISER CONNECTOR TO THE JUMPER CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAIN THE RED SEAL ON THE RISER CONNECTOR.
2. ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL YOU HEAR A CLICK SOUND.

HYBRID BREAKOUT DETAIL ①
SCALE: NTS



CABLE ROUTE FROM CABINET ②
SCALE: NTS

EXISTING BBU CABINET ③
SCALE: NTS



EXISTING MMBS CABINET ④
SCALE: NTS

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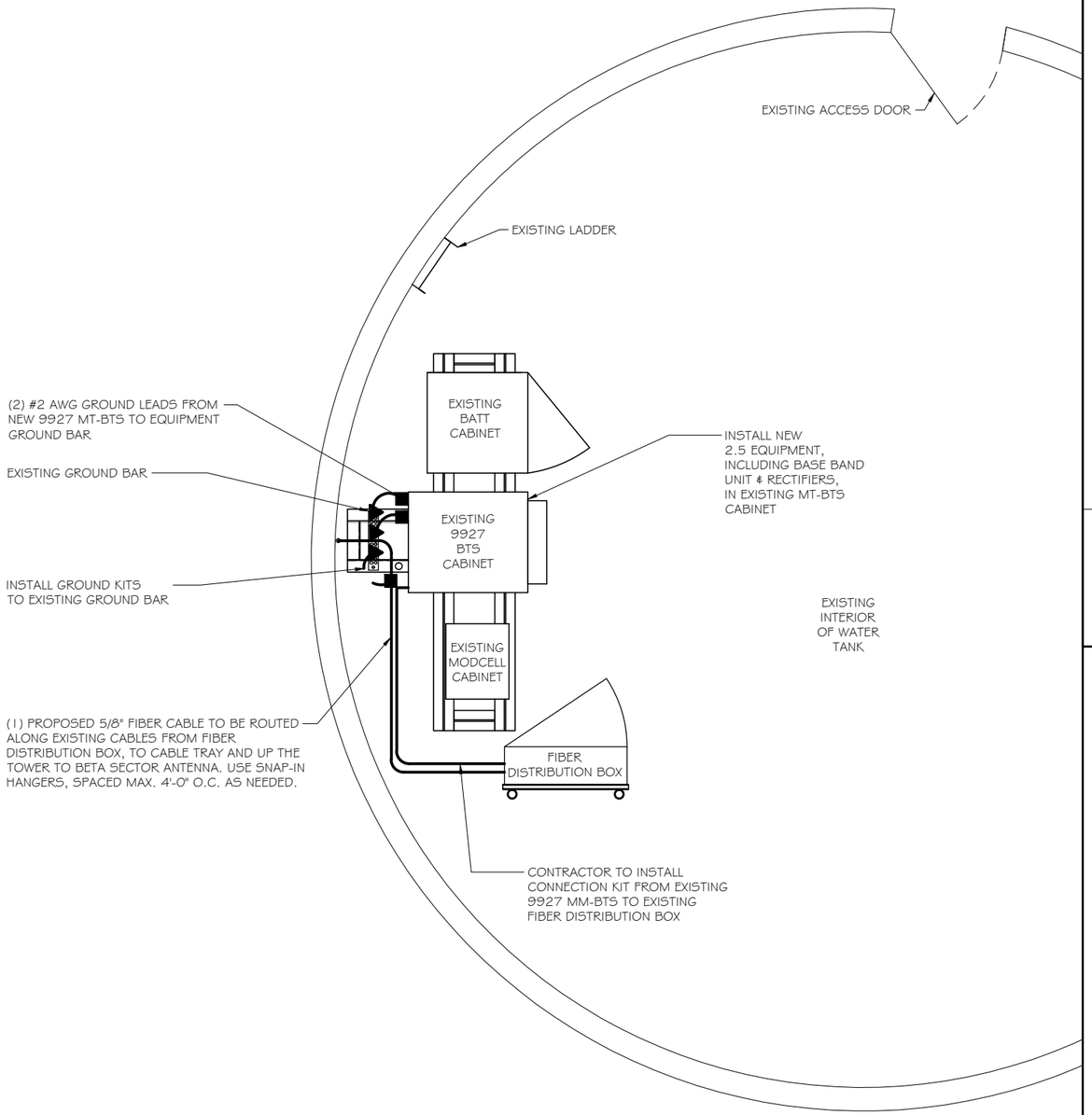
DOUGLAS HILL WATER TANK
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

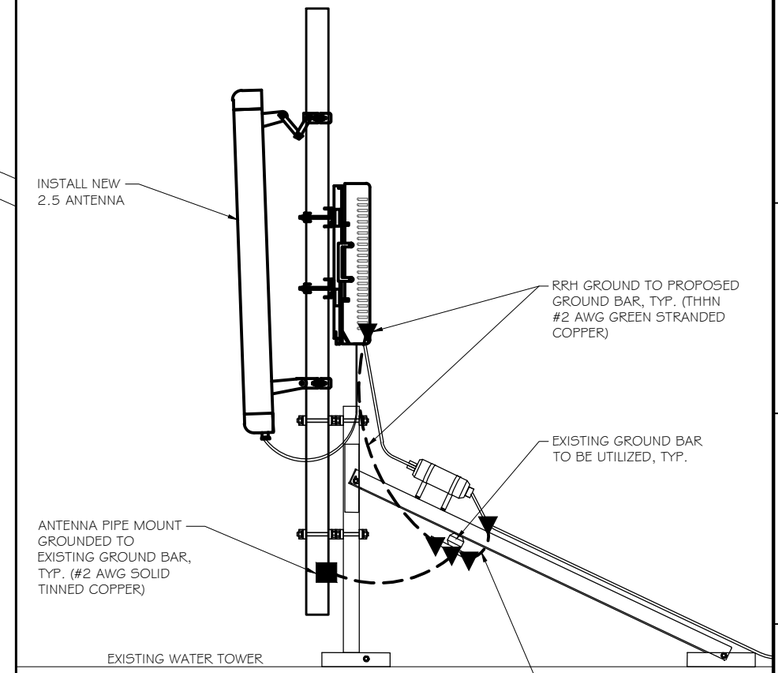
SHEET TITLE:
EQUIPMENT DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 28722
SHEET NUMBER: A-8



EQUIPMENT UTILITY & GROUNDING PLAN (1)
SCALE: NTS



ANTENNA GROUNDING DETAIL (2)
SCALE: NTS

GROUNDING NOTES:

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

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

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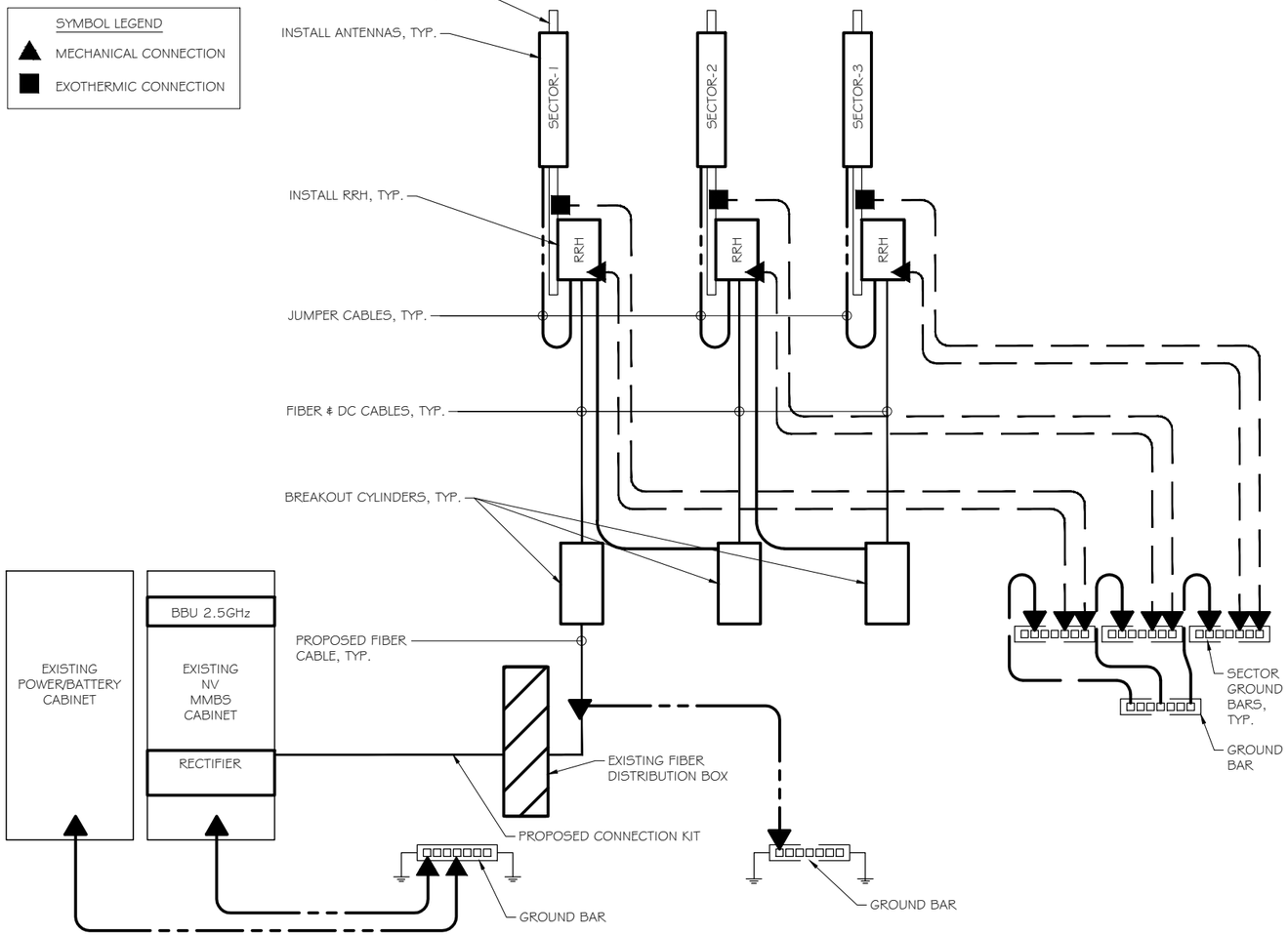
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

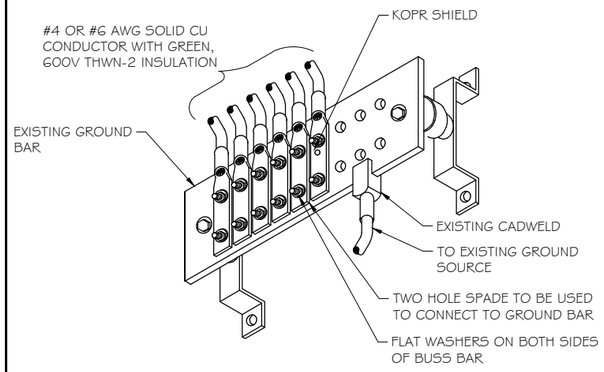
SHEET TITLE:
EQUIPMENT UTILITY & GROUNDING PLAN

SCALE:
AS NOTED

PROJECT NUMBER: 28722
SHEET NUMBER: E-1



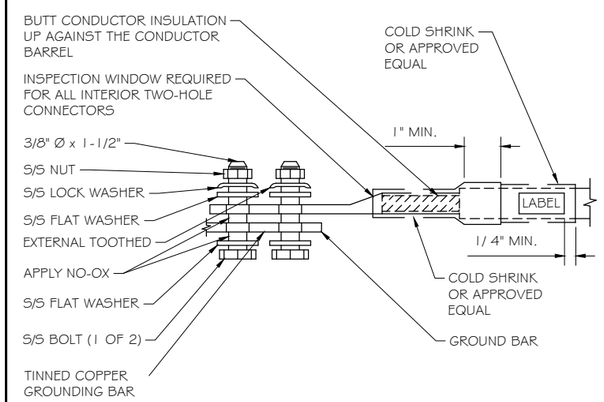
GROUNDING RISER DIAGRAM (1)
SCALE: NTS



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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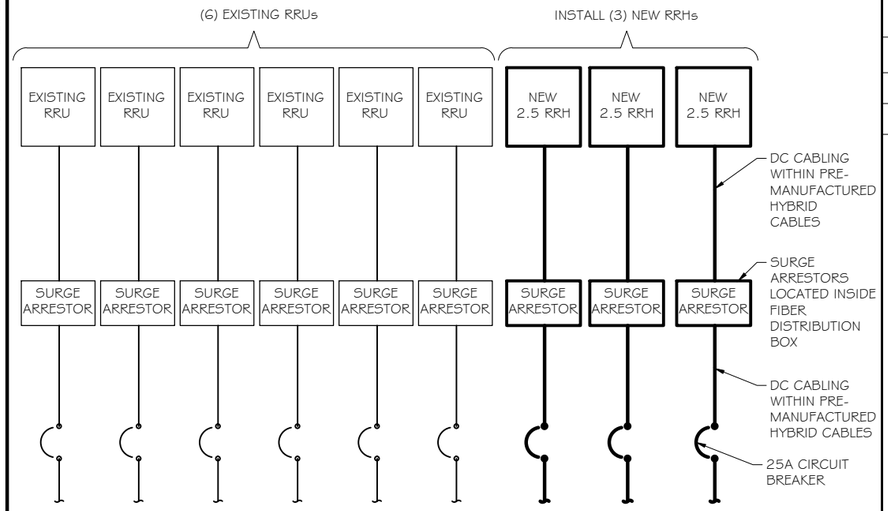
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
GROUNDING DETAILS

SCALE:
AS NOTED

PROJECT NUMBER: 28722
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:	GROUND		PHASE:	1		WIRE:	3
ENCLOSURE TYPE:	NEMA 3R		BUSS RATING:	200 AMP		GROUND BAR:	YES
			NEUTRAL BAR:	YES			

CKT	DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	PHASE A VA	PHASE B VA	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	DESCRIPTION	CKT
1	BLANK (UNUSED)	-	-	-							7
2	BLANK (UNUSED)	-	-	-			ON	2	60	SURGE PROTECTION	8
3	MBTS 1	100	2	ON			OFF	2	60	BOOSTER CABINET	9
4											10
5	NOT LABELED	30	2	OFF			ON	1	20	G.F.C.I. RECEPTACLE	11
6							-	-	-	BLANK (UNUSED)	12

AC PANEL SCHEDULE (2)
SCALE: NTS

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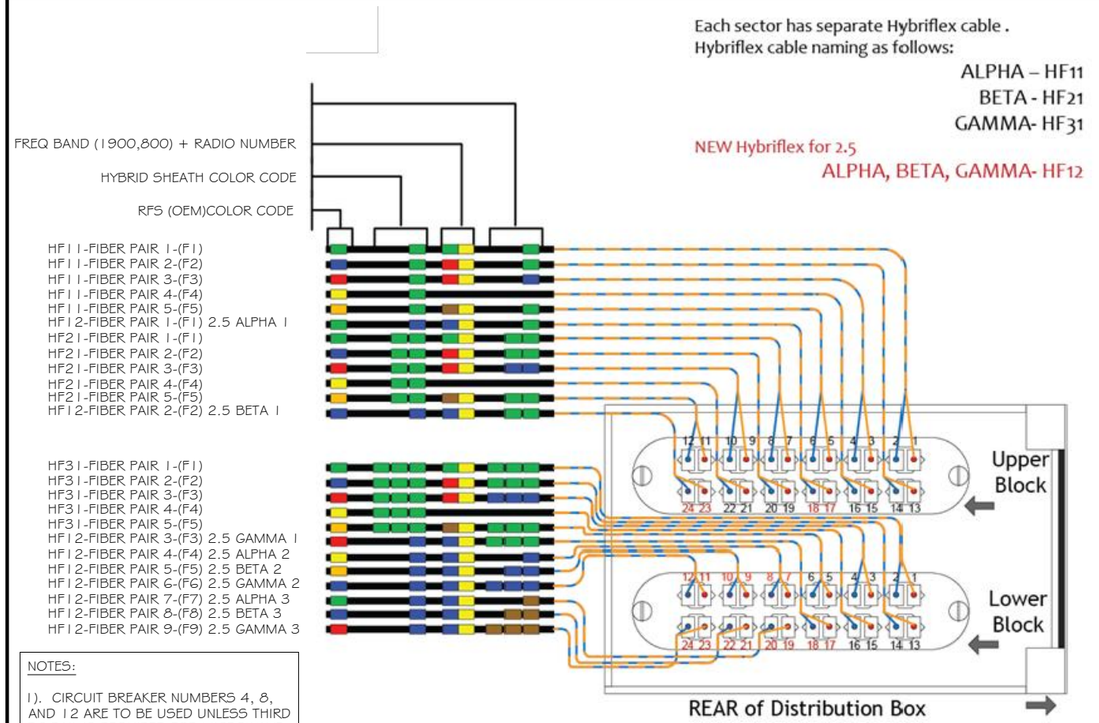
CT03XC112-P

PROJECT INFORMATION:
450 FARGO ROAD
WATERFORD, CT 06385
NEW LONDON COUNTY

SHEET TITLE:
DC POWER DETAILS & PANEL SCHEDULES

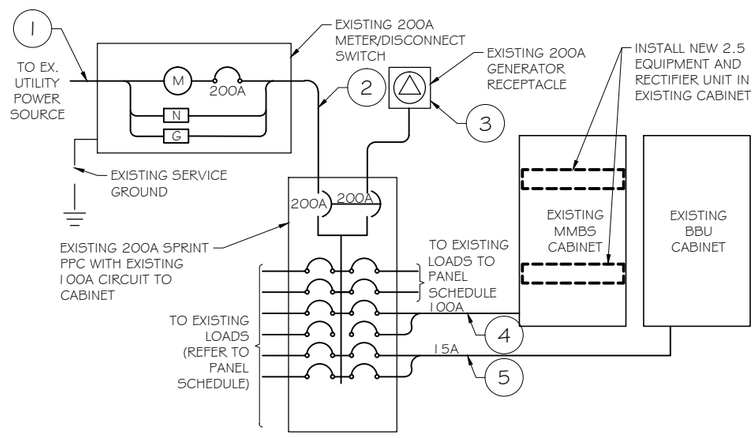
SCALE:
AS NOTED

PROJECT NUMBER: 28722
SHEET NUMBER: E-3



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

I:\28700\28722\CAD\28722 Sprnt 2.5 CD for Charles.dwg Printed by: sbents on Aug 07, 2017 - 4:38pm