Town of Tusten
Town Board Meeting

Regular Meeting Agenda

February 8, 2022
6:30 PM

Venue: Community Hall * Zoom ID 890 1678 4280

1 OPENING ITEMS

1.1 Call Meeting to Order

1.2 Pledge of allegiance

1.3 Announcements

- Sullivan County Mobile DMV will be coming on February 22, 2022 10:30 – 3:30 Please call the SC DMV or go online to schedule an appointment

1.4 Presentation

Peter Manning

1.5 Correspondence

1.6 Payment of Bills

2 DIVISION REPORTS

Some reports have been sent to the board in advance of the meeting, therefore they are not read out loud at the meeting; copies of all reports may be obtained at the Town Clerks Office.

2.1 Highway

January Report

2.2 Water & Sewer

January Financial Report

January NWS District Report

2.3 Building Department/ Code Enforcement

January Report

2.4 Assessor

January Report

2.5 Upper Delaware Council

January Report

2.6 Energy Committee

January Report

2.7 Zoning Re-Write Committee

2.8 Grants Report

2.9 Narrowsburg Water & Sewer Committee

3 PUBLIC COMMENT

10 minutes will be given for public comment. Please keep your comments directed to the board.

3.1 NWS Committee recommendation(s)

3.2 Little Lake Erie Culvert Project

4 NEW BUSINESS

4.1 93 Main Street

4.2 Fire Advisory Council

4.3 Lawn Mowing / Property Maintenance

4.4 Gasoline & Diesel Bid

4.5 Castle Crown - Cell Tower

4.6 Spectrum

4.7 Highway Sand & Stone

4.8 Amend 2022 Compensation Schedule

4.9 Town Assessor

4.10 Cell Tower - Castle Crown - Consent

4.11 Ambulance Protection Agreement

4.12 Tusten Youth Agreement

4.13 UDC Litter Sweep

5 PUBLIC COMMENT

10 minutes will be given for public comment. Please keep your comments directed to the board.

6 CLOSING ITEMS

6.1 Board Comment

6.2 Meeting reminder

- **ZBA** Regular Meeting February 14, 2022 at 7:30 PM – Community Hall (Zoom ID 851 9544 5595)
- **Zoning Revision/ Update Committee** Meeting Tuesday February 15, 2022; 2:00PM-4:00PM – Community Hall (Zoom ID 847 5045 2682)

- **Planning Board** Public Hearing & Regular Meeting Tuesday February 22, 2022 at 7:15 PM – Community Hall (Zoom ID 897 1376 8662)
- **Zoning Revision/ Update Committee** Meeting Tuesday March 1, 2022; 2:00PM-4:00PM – Community Hall (Zoom ID 847 5045 2682)
- **Water Sewer Committee** Meeting Monday March 7, 2022 at 8 AM – Community Hall (No Zoom)
- **Town Board** Workshop Tuesday March 1, 2022 at 6:30 PM – Community Hall (No Zoom)
- **Town Board** Regular Meeting Tuesday March 8, 2022 – Community Hall (Zoom ID 890 1678 4280)

6.3 Adjournment

Town of Tusten Highway Report

January 2022

Used 1198.2 gal of diesel fuel 1064.3 gal was for highway and 133.9 was non highway use.

Used 172.8 gal of gas 0 was highway and 172.8 was non highway use.

Patch holes on dirt and paved roads.

Removed trees in road way Swamp Pond, Perry Pond, Gables, Ryer and Trout Pound.

Make sand salt mix for winter.

Work on ice conditions on serval roads.

Repair trucks after storms.

Out for slippery road conductions most of the time.

NARROWSBURG WATER & SEWER

FINANCIAL REPORT FOR JANUARY 2022

Water Metered Rent	$29,526.38	
Service Charge	$349.72	
Water Penalty	$3.56	
TOTAL RECEIVED WATER DEPARTMENT		**$29,879.66**
Sewer Rent	$22,077.15	
Service Charge	$4.50	
Sewer Penalty	$22.84	
TOTAL RECEIVED SEWER DEPARTMENT		**$22,104.49**
GRAND TOTAL		**$51,984.15**

Jocelyn Strumpfler
Water & Sewer Clerk

Narrowsburg Water & Sewer District

Monthly Report for January 2022

- Completed monthly drinking water and waste water sampling and reporting.
- Took daily chlorine samples around the water district.
- Made adjustments to the chlorinator at the sewer plant, as needed, to maintain Federal and State standards on the effluent wastewater.
- Did water meter readings every Wednesday in the month of May.
- Found several leaks inside homes after a cold weekend, turned water off to two locations. One used 82,000 gallons and the other 31,000 in three days. Notified several other homeowners about possible water leaks.
- Repaired curb valve and turned water off to a house on RT-97 due to water leak inside that we found reading water meters on a weekly basis.
- Attended a class provided by NYRWA and several webinars for sewer and water education.
- Koberlein pumped out sludge from dosing tanks.
- Located sewer cleanouts and one water curb valve in wooded easements, used GPS to mark their location.
- Shoveled and plowed sewer plant, wells, and water tower.
- Responded to a grinder station alarm on Main St due to grinder plugged up. Koberlein helped unclog and get pump running.
- Found a leaking galvanized service line on 5th St, had TAM repair leak due to no working valves to turn water off.
- Continued painting inside Well #2.
- Did several final meter reads.
-

Town of Tusten Building Inspector's Report
JANUARY 2022 Monthly Report

Construction Inspections – 12
Fire & Safety Inspections – 0

Complaint/Violation Inspections – 0

Certificate of Occupancy Issued – 0

Certificate of Compliance Issued – 3

Total Permits Issued – 10

New Homes – 0
Renovation/Alteration/Addition – 4
Chimney/Fuel – 0
Acc Bldg Comm – 0
Ren/Alt – Comm Const - 0
Deck – 1
Demolition Permit – 1
Electrical – 2
Mechanical – 0
Plumbing – 0
Roof Replacement -1
Septic Permits – 1
Sign Permit – 0
Well – 0

Accessory Building/Garage – 0
Camping - 0

New Comm Const – 0

Commercial Deck - 0
Driveway Permit – 0
Logging Permits – 0
Permit Renewals – 0
Pool – 0
Roof Structure - 0
Sidewalk - 0
Solar Permit – 0

Flood Plain Permit – 1

Abstracts/Violation Search – 13

Dangerous and Unsafe Building – 0
Complaints Received – 0
Violations Issued – 0
Previous Violations Closed/Corrected – 0

Complaints Closed – 0
Violations Corrected – 0
Stop Work – 1

Jim and Jocelyn attended two on-line continuing education classes on January 13, 2022 on (1) Worker's Compensation & Disability Benefits; and (2) Records and Public Service.

2021 US Census Bureau Report Submitted

Monies collected by this office from January 1, 2022 to January 31, 2022 are $4,993.60.

Respectfully,
Jim P Crowley, Building Inspector
JPC/js

Attached is a copy of the Building Permit Monthly Report

Assessor's monthly report for January 2022

During the month of January the Sullivan County Assessor's Association cancelled their meeting due to the Omicron Covid outbreak.

I have received some calls about tax bills. The usual calls about the market value printed on the bills no longer seems to be a major issue. Before the usual complaint was that the property could no way be worth that much. The sales from 2020 have shown a sharp increase in sale prices that the market value number looks now low. The figures from New York State have recently been received lowering our level of assessment from 51% to 38.5% for 2022. This is a huge jump, but seems to reflect what has happened to sale prices during 2019 and 2020. It appears that this has happened to most towns in Sullivan County and most likely will not cause a large shift in taxation for districts in multiple towns such as school districts and county levies. This shift will also increase the market value figures (the calls will start again!).

As it looks like I will be continuing doing my work at home, I spent some time rearranging my work space to include a new two drawer file that should allow me to keep all the construction and change of value data easily accessible along with giving me a larger area for the chair and computer work spaces. More still has to be done on this a I start work on the 2022 tentative roll and the data collection process.

Respectfully submitted,

Ken Baim, Sole Assessor

UDC

DRBC offered presentation on Micro Plastics in the Delaware River Basin. While more prevalent in the Lower Basin, micro plastics exist in the Upper Basin as well.

The Council elected Officers for 2022. Andy Boyer Town of Highland will be Chair, and Aaron Robinson, Shohola Township, Vice Chair. Al Henry, Secretary

Andy Boyer gave a brief recap of 2021, and forward look into 2022. Highlights are;

2nd Annual Litter sweep.
This is a UDC sponsored River Access clean up, this year starting on Earth Day, Friday, April 4/22 Since we no longer have grant funds, the Council will need to rely on partners, and sponsorships. Looking for Litter Leaders from each participating Town. Last year, Evan Padua's team did a great job. This event coincides with our long-established Litter Pluck, so any trash collected will be accepted free in Sullivan County.

Long Term Fiscal Sustainability Plan aka The Crane Report. Where do we go from here?
Council members will read the report, and attend a roundtable discussion, likely held at the Narrowsburg Union, likely in late January/early Feb., to discuss short- and long-term changes that need to be made. Both PA's Rep Tim Dugan, and NY DEC Rep Bill Rudge have offered their help as well.

DRBC Proposed Rulemaking …. Hydraulic Fracturing. waste water disposal, and water withdrawal. UDC comment letter approved

Milanville/Skinners Falls Bridge. Comment letter on Penn Dot's Purpose and Needs study approved. The comment period has been extended to February 8, and the UDC's letter is filled with information. If you would like to see the Bridge rehabbed, put back into use as a one lane bridge, and provide a cultural/historic resource, look for UDC's letter on our website, and submit your comment.

NY DEC

Announced their annual Tree and Shrub seedling sale, actually FREE if planted in NY State, see their website.

NPS

Lauren Hauptmann, who is working remotely as the NPS Historic/Cultural person, has moved out West, and it is likely they will need a replacement, but no formal job opening has been announced.

Tusten Energy Committee Report January 2022

Soft Plastic Recycling

In January 2022 the TEC collected 546 pounds of soft plastic making us eligible to receive our 6th TREX outdoor bench. This one will go next to the HORSE for operators and those dropping off food scraps.

To date the TEC has logged more than 9 tons from Tusten residents and businesses to be recycled into TREX decking and outdoor furniture.

LED Streetlights

The TEC would like to request the board's support in asking NYPA to schedule our Main St pendant streetlights installation in the spring. On that day they could also go through a punch list of issues with other already installed cobra head streetlights. Originally NYPA wanted to come back only once to Narrowsburg to trench and install the parking lot streetlights on that day as well.

We've waited more than 1 year for the completion of our LED streetlights install and waiting on the parking lot install could take another year. Because the parking lot needs a whole day to trench and install poles with cobra head LED streetlights, we'd like to ask NYPA to break it down that way and come back when the board is ready to proceed.

Bank Building on Main St

The TEC is on our way towards a silver certification as a Climate Smart Community and we've recommended the board consider purchasing and installing air source heat pumps in the bank building lowering Tusten's emissions and energy costs significantly. Councilwoman Jane Luchsinger has confirmed the board's support of mini-splits or air source heat pumps in the building. The TEC thanks you for this decision.

Tusten HORSE update

To date, we have processed 1 ton of organic material from The Heron, The Botanist, Blue Fox and Pete's. We are sorry to hear that The Botanist has closed but thank them for their support while they were in Narrowsburg.

- The TEC is now working on the ongoing HORSE operations plan which is our last deliverable for the DEC grant.
- Northeast Organic Farming Association of New York (NOFA-NY) Certification of the Tusten HORSE plant food product has been initiated with a local farm.
- The local SUNY Green Technology department is interested in scheduling a visit in the spring. There is significant training potential for students with the HORSE.
- As reported previously, an RIT research student/professor team is working on a graduate case study about the Tusten HORSE with the goal of understanding the social, environmental, and financial drivers of a distributed model for food waste processing and energy production.
- Energy Vision is a NYC based advisory team whose sole mission is to help communities lower their carbon footprint across the country. They will be featuring Tusten as a US community committed to responsible energy use. They fully support the Tusten HORSE as a necessary sustainable path for the future and want to highlight our efforts over the past 11 years.

Other TEC Initiatives

The Forsythia in front of the Tusten Solar Array has been fed liquid organic plant food from our HORSE last fall. In spring, Narrowsburg Beautification wants to work with the TEC to mulch and plant around the Forsythia making it look better and become easier for the hi-way department's mowing maintenance. This Tusten garden improvement will be submitted to Sullivan Renaissance this year.

Brandi designed new stickers for town outdoor trash and recycling bins making it easier to understand what each bin is for. The bins surfaces will be cleaned and stickers applied in the spring.

This year the TEC Facebook page will feature inspiring green efforts around our community.

Brandi Merolla, chair
1/29/2022

Star Hesse, Naomi Holoch, Catherine Lewis, Jennifer Porter, Scott Porter, Councilman Greg Triggs, Councilman Kevin McDonough.

200 Spectrum Center Dr,
Irvine, CA 92618

Phone: (480) 735-6948
Email: Angie.Ghobrial-Amer.Contractor@crowncastle.com
www.crowncastle.com

January 26, 2022

VIA email

TOWN OF TUSTEN
210 BRIDGE STREET
P.O. BOX 195
NARROWSBURG, NY 12764

Re: BU 808716 / "Tusten" / 6067 State Route 97, Narrowsburg, NY 12764 ("Site")
The Master Management Agreement, dated February 20, 2008, as it may have been amended and assigned ("Lease")
Consent for modifications

Dear TOWN OF TUSTEN,

In order to better serve the public and minimize the amount of towers in an area where this property is located, Verizon Wireless intends to modify its equipment at the wireless communication facility (the "Modification").

Under the Lease, Landlord's consent cannot be unreasonably withheld, conditioned or delayed. Please provide your consent **on or before February 18th, 2022** by signing below and returning to Angie.Ghobrial-Amer.Contractor@crowncastle.com so that we may install Verizon Wireless's equipment as permitted under the Lease.

Please see the enclosed supplemental materials, as may be required by the Lease. If you have any questions concerning this request, please contact Angie Ghobrial-Amer at (480) 735-6948 or Angie.Ghobrial-Amer.Contractor@crowncastle.com

Sincerely,

Angie Amer

Angie Ghobrial-Amer
Real Estate Specialist

Agreed and accepted _____
(Date)

_____
(Lessor's signature)

_____
(Lessor's name and title)

[Enclosures]

P.S. Please indicate below if you are interested in learning more about removing the obligation for you to sign these consent letters and receive a notice letter instead.

☐ *(check here) Yes, I'm interested in learning more.*

Date: **December 15, 2021**

B&V New York LLP
489 Fifth Avenue 8 & 12 Floor
New York, NY 10017
(913) 458-6909

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Site Number:	404764
	Site Name:	WOODOAK - A
Crown Castle Designation:	**BU Number:**	808716
	Site Name:	Tusten
	JDE Job Number:	694710
	Work Order Number:	2055240
	Order Number:	594303 Rev. 0
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	406642
Site Data:	**6067 State Route 97, Narrowsburg, Sullivan County, NY** **Latitude *41° 35' 34.1"*, Longitude *-75° 1' 17.5"*** **179.098 Foot - Self Support Tower**	

B&V New York LLP is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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

LC5: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 112 mph as required by the 2020 New York Uniform Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Warit Chaisuwan / Jumpon Uea-areevorakul

Respectfully submitted by:

Bryan C. Lindsey, P.E.
Professional Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 179.098 ft Self Support tower designed by GlenMartin.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	112 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	40 mph
Seismic Ss:	0.146
Seismic S1:	0.048
Service Wind Speed:	60 mph
Seismic Loading:	Does not control per engineering judgment

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150.0	150.0	1	cci tower mounts (v2.1)	Sector Mount [SM 801-3]	2	1-5/8
		6	quintel technology	QS8656-5 w/ Mount Pipe		
		1	raycap	RVZDC-6627-PF-48		
		3	samsung telecommunications	MT6407-77A w/ Mount Pipe		
		3	samsung telecommunications	RF4439D-25A		
		3	samsung telecommunications	RF4440D-13A		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
176.0	180.0	3	alcatel lucent	B25 RRH4x30-4R	2 2 1 4 12 1	5/16 3/8 1/2 13/16 1-5/8 Conduit
		3	alcatel lucent	RRH4X25-WCS		
		3	andrew	DBXLH-8585A-R2M		
		3	andrew	SBNHH-1D65C		
		6	commscope	NNHH-65A-R4		
		3	nokia	AIRSCALE RRH 4T4R B5 160W		
		2	raycap	DC6-48-60-18-8F		
		6	andrew	ETD819G-12UB		
	177.0	1	telewave	ANT150F2		
		2	andrew	ETD819G-12UB		
	176.0	3	alcatel lucent	RRH2X40-07-L-AT		
		6	andrew	ETD819G-12UB		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	cci tower mounts (v2.1)	Sector Mount [SM 201-3]		
		1	Jsource technologies	12128FM4SEC		
160.0	160.0	1	andrew	HPX8-59	1	3/8
		1	ceragon	FIBEAIR IP-10		
		1	cci tower mounts (v2.1)	Pipe Mount [PM 602-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	2924679	CCIsites
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	2924681	CCIsites
4-GEOTECHNICAL REPORTS	2924676	CCIsites

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. B&V New York LLP should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Self Support Tower)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	179.098 - 159.41	Leg	P3x.216	2	-81.63	87.22	93.6	Pass
T2	159.41 - 158.827	Leg	P5x.258	33	-84.37	202.96	42.5	Pass
T3	158.827 - 139.139	Leg	P5x.258	36	-100.43	178.59	56.2	Pass
T4	139.139 - 119.452	Leg	P6x.28	57	-131.98	240.98	54.8	Pass
T5	119.452 - 99.7642	Leg	P8x.322	78	-158.71	376.50	42.2	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T6	99.7642 - 80.0767	Leg	P8x.322	99	-183.39	376.50	48.7	Pass
T7	80.0767 - 60.3892	Leg	P8x.406	120	-207.78	469.43	44.3	Pass
T8	60.3892 - 40.7017	Leg	P10x.365	141	-228.91	521.60	43.9	Pass
T9	40.7017 - 21.0142	Leg	P10x.365	156	-251.81	521.60	48.3	Pass
T10	21.0142 - 1.32667	Leg	P10x.365	171	-275.56	521.60	52.8	Pass
T11	1.32667 - 0	Leg	P10x.593	186	-282.19	892.79	38.4	Pass
T1	179.098 - 159.41	Diagonal	L1 3/4x1 3/4x3/16	12	-4.24	15.51	27.4	Pass
T3	158.827 - 139.139	Diagonal	L2x2x3/16	54	-6.70	15.86	42.2	Pass
T4	139.139 - 119.452	Diagonal	L2x2x1/4	63	-4.83	14.27	33.8	Pass
T5	119.452 - 99.7642	Diagonal	L2 1/2x2 1/2x3/16	84	-4.70	17.36	27.0	Pass
T6	99.7642 - 80.0767	Diagonal	L2 1/2x2 1/2x3/16	105	-4.89	13.28	36.8	Pass
T7	80.0767 - 60.3892	Diagonal	L2 1/2x2 1/2x1/4	126	-5.02	13.48	37.2	Pass
T8	60.3892 - 40.7017	Diagonal	L3x3x3/16	147	-6.03	14.09	42.8	Pass
T9	40.7017 - 21.0142	Diagonal	L3x3x1/4	162	-6.59	15.94	41.3	Pass
T10	21.0142 - 1.32667	Diagonal	L3x3x1/4	177	-8.73	13.89	62.8	Pass
T1	179.098 - 159.41	Top Girt	L3x3x1/4	5	-0.55	39.51	1.4	Pass
							Summary	
						Leg (T1)	93.6	Pass
						Diagonal (T10)	62.8	Pass
						Top Girt (T1)	1.4	Pass
						Bolt Checks	86.2	Pass
						Rating =	93.6	Pass

Table 5 - Tower Component Stresses vs. Capacity (Self Support Tower) - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	20.1	Pass
1	Base Foundation (Structure)	0	32.0	Pass
	Base Foundation (Soil Interaction)		52.0	Pass

Structure Rating (max from all components) =	93.6%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5.

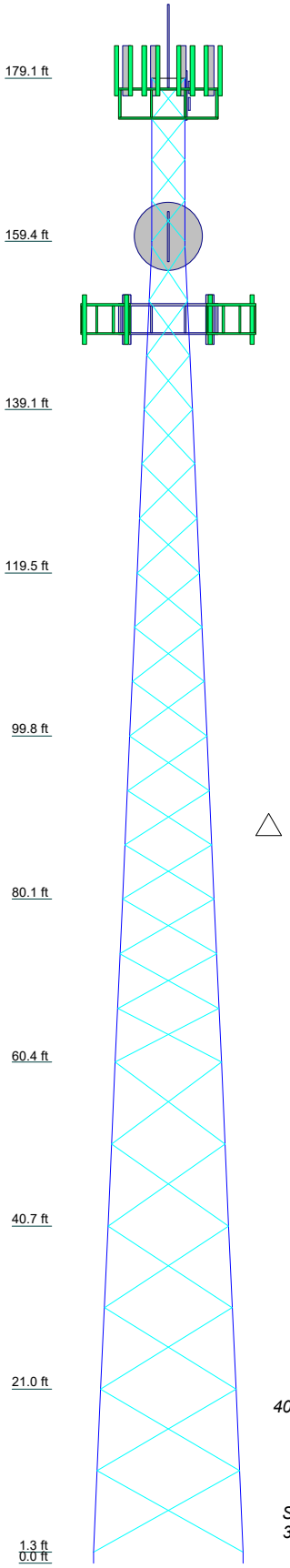
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
T1	P3x.216	A500-50	L1 3/4x1 3/4x3/16	A36	L3x3x1/4	4	4 @ 4.92188	0.9
T2			B	B			C	0.0
T3	P5x.258		L2x2x3/16					1.3
T4	P6x.28		L2x2x1/4			5.75		1.7
T5	P8x.322		L2 1/2x2 1/2x3/16			7.5	15 @ 6.5625	2.4
T6				A36	N.A.	9.25		2.5
T7	P8x.406		L2 1/2x2 1/2x1/4			11		3.3
T8			L3x3x3/16			12.75		3.3
T9	P10x.365		L3x3x1/4			14.5	6 @ 9.84375	3.6
T10						16.25		3.7
T11	A		B	B		18	D	23.0.3



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	P10x.593	C	1 @ 0.58333
B	N.A.	D	1 @ 1.32667

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A36	36 ksi	58 ksi

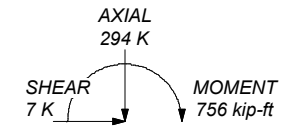
TOWER DESIGN NOTES

1. Tower is located in Sullivan County, New York.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 112 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 93.6%

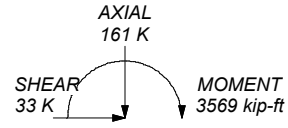
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 282 K
SHEAR: 21 K

UPLIFT: -184 K
SHEAR: 16 K



TORQUE 9 kip-ft
40 mph WIND - 1.0000 in ICE



TORQUE 29 kip-ft
REACTIONS - 112 mph WIND

BLACK & VEATCH
Building a world of difference

B&V New York LLP
480 Fifth Avenue 8 & 12 Floor
York, NY 10017
: (913) 458-6909
FAX:

Job: *Tusten (BU# 808716)*			
Project: *406642 (808716.2055240)*			
Client: Crown Castle	Drawn by: Jumpon Uea-areevoraku	App'd:	
Code: TIA-222-H	Date: 12/15/21	Scale: NTS	
Path:		Dwg No. E-1	

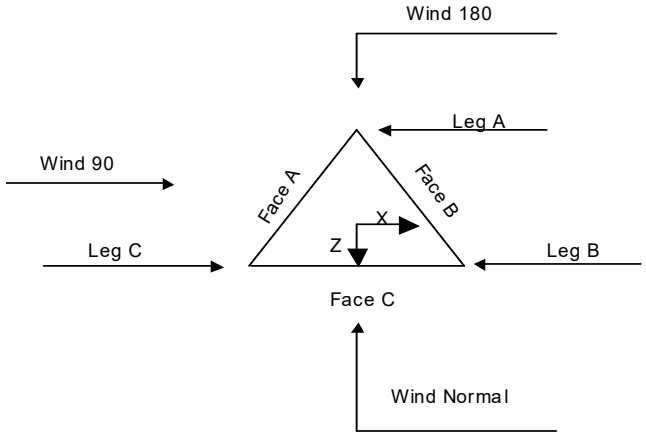
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 179.10 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 4.00 ft at the top and 18.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in Sullivan County, New York.
- Tower base elevation above sea level: 1150.00 ft.
- Basic wind speed of 112 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.0000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 40 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area	√	SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	179.10-159.41			4.00	1	19.69
T2	159.41-158.83			4.00	1	0.58
T3	158.83-139.14			4.00	1	19.69
T4	139.14-119.45			5.75	1	19.69
T5	119.45-99.76			7.50	1	19.69
T6	99.76-80.08			9.25	1	19.69
T7	80.08-60.39			11.00	1	19.69
T8	60.39-40.70			12.75	1	19.69
T9	40.70-21.01			14.50	1	19.69
T10	21.01-1.33			16.25	1	19.69
T11	1.33-0.00			18.00	1	1.33

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	179.10-159.41	4.92	X Brace	No	No	0.0000	0.0000
T2	159.41-158.83	0.58	X Brace	No	Yes	0.0000	0.0000
T3	158.83-139.14	6.56	X Brace	No	No	0.0000	0.0000
T4	139.14-119.45	6.56	X Brace	No	No	0.0000	0.0000
T5	119.45-99.76	6.56	X Brace	No	No	0.0000	0.0000
T6	99.76-80.08	6.56	X Brace	No	No	0.0000	0.0000
T7	80.08-60.39	6.56	X Brace	No	No	0.0000	0.0000
T8	60.39-40.70	9.84	X Brace	No	No	0.0000	0.0000
T9	40.70-21.01	9.84	X Brace	No	No	0.0000	0.0000
T10	21.01-1.33	9.84	X Brace	No	No	0.0000	0.0000
T11	1.33-0.00	1.33	X Brace	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 179.10-159.41	Pipe	P3x.216	A500-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 159.41-158.83	Pipe	P5x.258	A500-50 (50 ksi)	Equal Angle		A36 (36 ksi)
T3 158.83-139.14	Pipe	P5x.258	A500-50 (50 ksi)	Equal Angle	L2x2x3/16	A36 (36 ksi)
T4 139.14-119.45	Pipe	P6x.28	A500-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T5 119.45-99.76	Pipe	P8x.322	A500-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T6 99.76-80.08	Pipe	P8x.322	A500-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 80.08-60.39	Pipe	P8x.406	A500-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T8 60.39-40.70	Pipe	P10x.365	A500-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T9 40.70-21.01	Pipe	P10x.365	A500-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T10 21.01-1.33	Pipe	P10x.365	A500-50 (50 ksi)	Equal Angle	L3x3x1/4	A36 (36 ksi)
T11 1.33-0.00	Pipe	P10x.593	A500-50 (50 ksi)	Equal Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 179.10-159.41	Equal Angle	L3x3x1/4	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 179.10-159.41	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T2 159.41-158.83	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T3 158.83-139.14	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T4 139.14-119.45	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T5 119.45-99.76	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T6 99.76-80.08	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T7 80.08-60.39	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T8 60.39-40.70	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T9 40.70-21.01	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T10 21.01-1.33	0.00	0.3750	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000
T11 1.33-0.00	0.00	0.0000	A36 (36 ksi)	1.05	1	1.05	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 179.10-159.41	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 159.41-158.83	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 158.83-139.14	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 139.14-119.45	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 119.45-99.76	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 99.76-80.08	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 80.08-60.39	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 60.39-40.70	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 40.70-21.01	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T10 21.01-1.33	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T11 1.33-0.00	Yes	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 179.10-159.41	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 159.41-158.83	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 158.83-139.14	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 139.14-119.45	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 119.45-99.76	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T6 99.76-80.08	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 80.08-60.39	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 60.39-40.70	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 40.70-21.01	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 21.01-1.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 1.33-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 179.10-159.41	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 159.41-158.83	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 158.83-139.14	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 139.14-119.45	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 119.45-99.76	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 99.76-80.08	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 80.08-60.39	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 60.39-40.70	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 40.70-21.01	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 21.01-1.33	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 1.33-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 179.10-159.41	Flange	1.0000 A325N	4	0.6250 A325N	1	0.6250 A325N	1	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T2 159.41-158.83	Flange	1.0000 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T3 158.83-139.14	Flange	1.0000 A325N	6	0.6250 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T4 139.14-119.45	Flange	1.0000 A325N	6	0.6250 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T5 119.45-99.76	Flange	1.0000 A325N	6	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T6 99.76-80.08	Flange	1.0000 A325N	6	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T7 80.08-60.39	Flange	1.0000 A325N	10	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T8 60.39-40.70	Flange	1.0000 A325N	10	0.7500 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T9 40.70-21.01	Flange	1.0000 A325N	10	0.7500 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T10 21.01-1.33	Flange	1.0000 A325N	10	0.7500 A325N	2	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0
T11 1.33-0.00	Flange	1.0000 A325N	0	0.7500 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325X	0	0.0000 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8 ***	A	No	No	Ar (CaAa)	179.10 - 0.00	0.0000	-0.5	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af)	C	No	No	Af (CaAa)	179.10 - 10.00	0.0000	0.35	1	1	3.0000	3.0000		8.40
AVA7-50(1-5/8)	C	No	No	Ar (CaAa)	176.00 - 10.00	0.0000	0.35	12	11	2.0100	2.0100		0.70
2" Rigid Conduit	C	No	No	Ar (CaAa)	176.00 - 10.00	0.0000	0.47	1	1	2.0000	2.0000		2.80
ATCB-B01-006(5/16")	C	No	No	Ar (CaAa)	176.00 - 10.00	0.0000	0.47	2	1	0.5000	0.0000		0.07
RFFT-36SM-001-xxM(3/8")	C	No	No	Ar (CaAa)	176.00 - 10.00	0.0000	0.47	2	1	0.5000	0.0000		0.09
PWRT-608-S(13/16")	C	No	No	Ar (CaAa)	176.00 - 10.00	0.0000	0.47	4	2	0.5000	0.0000		0.62
LDF4-50A(1/2") **	C	No	No	Ar (CaAa)	176.00 - 10.00	0.0000	0.23	1	1	0.5000	0.6300		0.15
04-001-54 (3/8" Cable) **	C	No	No	Ar (CaAa)	160.00 - 10.00	2.5000	0.35	1	1	0.5000	0.0001		0.06
Feedline Ladder (Af)	B	No	No	Af (CaAa)	152.00 - 6.00	0.0000	-0.4	1	1	3.0000	3.0000		8.40
CR 50 1873(1-5/8")	B	No	No	Ar (CaAa)	150.00 - 8.00	0.5000	-0.4	2	2	1.9800	1.9800		0.83

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	179.10-159.41	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	54.222	0.000	0.40
T2	159.41-158.83	A	0.000	0.000	0.022	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	1.852	0.000	0.01
T3	158.83-139.14	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	10.731	0.000	0.13

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	62.508	0.000	0.44
T4	139.14-119.45	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	17.640	0.000	0.20
		C	0.000	0.000	62.508	0.000	0.44
T5	119.45-99.76	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	17.640	0.000	0.20
		C	0.000	0.000	62.508	0.000	0.44
T6	99.76-80.08	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	17.640	0.000	0.20
		C	0.000	0.000	62.508	0.000	0.44
T7	80.08-60.39	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	17.640	0.000	0.20
		C	0.000	0.000	62.508	0.000	0.44
T8	60.39-40.70	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	17.640	0.000	0.20
		C	0.000	0.000	62.508	0.000	0.44
T9	40.70-21.01	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	17.640	0.000	0.20
		C	0.000	0.000	62.508	0.000	0.44
T10	21.01-1.33	A	0.000	0.000	0.738	0.000	0.00
		B	0.000	0.000	12.661	0.000	0.15
		C	0.000	0.000	34.970	0.000	0.25
T11	1.33-0.00	A	0.000	0.000	0.050	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	179.10-159.41	A	1.001	0.000	0.000	4.680	0.000	0.04
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	125.406	0.000	1.46
T2	159.41-158.83	A	0.995	0.000	0.000	0.138	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	4.431	0.000	0.05
T3	158.83-139.14	A	0.988	0.000	0.000	4.630	0.000	0.04
		B		0.000	0.000	17.567	0.000	0.28
		C		0.000	0.000	148.985	0.000	1.69
T4	139.14-119.45	A	0.974	0.000	0.000	4.575	0.000	0.04
		B		0.000	0.000	29.150	0.000	0.45
		C		0.000	0.000	147.819	0.000	1.66
T5	119.45-99.76	A	0.958	0.000	0.000	4.512	0.000	0.04
		B		0.000	0.000	28.961	0.000	0.45
		C		0.000	0.000	146.482	0.000	1.63
T6	99.76-80.08	A	0.940	0.000	0.000	4.438	0.000	0.03
		B		0.000	0.000	28.739	0.000	0.44
		C		0.000	0.000	144.907	0.000	1.60
T7	80.08-60.39	A	0.917	0.000	0.000	4.348	0.000	0.03
		B		0.000	0.000	28.468	0.000	0.43
		C		0.000	0.000	142.986	0.000	1.56
T8	60.39-40.70	A	0.887	0.000	0.000	4.231	0.000	0.03
		B		0.000	0.000	28.118	0.000	0.42
		C		0.000	0.000	140.501	0.000	1.51
T9	40.70-21.01	A	0.844	0.000	0.000	4.063	0.000	0.03
		B		0.000	0.000	27.613	0.000	0.41
		C		0.000	0.000	136.923	0.000	1.44
T10	21.01-1.33	A	0.763	0.000	0.000	3.742	0.000	0.03
		B		0.000	0.000	18.922	0.000	0.28
		C		0.000	0.000	72.779	0.000	0.74
T11	1.33-0.00	A	0.575	0.000	0.000	0.202	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	179.10-159.41	-7.8902	4.8892	-10.4211	6.4326
T2	159.41-158.83	-10.3690	6.6308	-12.6883	8.4593
T3	158.83-139.14	-8.7624	2.3992	-11.8620	4.3180
T4	139.14-119.45	-10.4498	0.8532	-14.3510	3.0137
T5	119.45-99.76	-11.3913	0.8129	-16.2694	3.2280
T6	99.76-80.08	-13.0611	0.8593	-18.6992	3.5966
T7	80.08-60.39	-14.5388	0.8990	-20.8489	3.9079
T8	60.39-40.70	-15.7354	0.9152	-22.8127	4.1601
T9	40.70-21.01	-17.0947	0.9567	-24.5777	4.3828
T10	21.01-1.33	-11.5836	-0.6603	-17.4089	1.6670
T11	1.33-0.00	-1.1461	0.6597	-2.9197	1.6806

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Safety Line 3/8	159.41 - 179.10	0.6000	0.6000
T1	3	Feedline Ladder (Af)	159.41 - 179.10	0.6000	0.6000
T1	4	AVA7-50(1-5/8)	159.41 - 176.00	0.6000	0.6000
T1	5	2" Rigid Conduit	159.41 - 176.00	0.6000	0.6000
T1	6	ATCB-B01-006(5/16")	159.41 - 176.00	0.6000	0.6000
T1	7	RFFT-36SM-001-xxM(3/8")	159.41 - 176.00	0.6000	0.6000
T1	8	PWRT-608-S(13/16")	159.41 - 176.00	0.6000	0.6000
T1	9	LDF4-50A(1/2")	159.41 - 176.00	0.6000	0.6000
T1	11	04-001-54 (3/8" Cable)	159.41 - 160.00	0.6000	0.6000
T2	1	Safety Line 3/8	158.83 - 159.41	0.6000	0.6000
T2	3	Feedline Ladder (Af)	158.83 - 159.41	0.6000	0.6000
T2	4	AVA7-50(1-5/8)	158.83 - 159.41	0.6000	0.6000
T2	5	2" Rigid Conduit	158.83 - 159.41	0.6000	0.6000
T2	6	ATCB-B01-006(5/16")	158.83 - 159.41	0.6000	0.6000
T2	7	RFFT-36SM-001-xxM(3/8")	158.83 - 159.41	0.6000	0.6000
T2	8	PWRT-608-S(13/16")	158.83 - 159.41	0.6000	0.6000
T2	9	LDF4-50A(1/2")	158.83 - 159.41	0.6000	0.6000
T2	11	04-001-54 (3/8" Cable)	158.83 - 159.41	0.6000	0.6000
T3	1	Safety Line 3/8	139.14 - 158.83	0.6000	0.6000
T3	3	Feedline Ladder (Af)	139.14 - 158.83	0.6000	0.6000
T3	4	AVA7-50(1-5/8)	139.14 - 158.83	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	5	2" Rigid Conduit	139.14 - 158.83	0.6000	0.6000
T3	6	ATCB-B01-006(5/16")	139.14 - 158.83	0.6000	0.6000
T3	7	RFFT-36SM-001-xxM(3/8")	139.14 - 158.83	0.6000	0.6000
T3	8	PWRT-608-S(13/16")	139.14 - 158.83	0.6000	0.6000
T3	9	LDF4-50A(1/2")	139.14 - 158.83	0.6000	0.6000
T3	11	04-001-54 (3/8" Cable)	139.14 - 158.83	0.6000	0.6000
T3	13	Feedline Ladder (Af)	139.14 - 152.00	0.6000	0.6000
T3	14	CR 50 1873(1-5/8")	139.14 - 150.00	0.6000	0.6000
T4	1	Safety Line 3/8	119.45 - 139.14	0.6000	0.6000
T4	3	Feedline Ladder (Af)	119.45 - 139.14	0.6000	0.6000
T4	4	AVA7-50(1-5/8)	119.45 - 139.14	0.6000	0.6000
T4	5	2" Rigid Conduit	119.45 - 139.14	0.6000	0.6000
T4	6	ATCB-B01-006(5/16")	119.45 - 139.14	0.6000	0.6000
T4	7	RFFT-36SM-001-xxM(3/8")	119.45 - 139.14	0.6000	0.6000
T4	8	PWRT-608-S(13/16")	119.45 - 139.14	0.6000	0.6000
T4	9	LDF4-50A(1/2")	119.45 - 139.14	0.6000	0.6000
T4	11	04-001-54 (3/8" Cable)	119.45 - 139.14	0.6000	0.6000
T4	13	Feedline Ladder (Af)	119.45 - 139.14	0.6000	0.6000
T4	14	CR 50 1873(1-5/8")	119.45 - 139.14	0.6000	0.6000
T5	1	Safety Line 3/8	99.76 - 119.45	0.6000	0.6000
T5	3	Feedline Ladder (Af)	99.76 - 119.45	0.6000	0.6000
T5	4	AVA7-50(1-5/8)	99.76 - 119.45	0.6000	0.6000
T5	5	2" Rigid Conduit	99.76 - 119.45	0.6000	0.6000
T5	6	ATCB-B01-006(5/16")	99.76 - 119.45	0.6000	0.6000
T5	7	RFFT-36SM-001-xxM(3/8")	99.76 - 119.45	0.6000	0.6000
T5	8	PWRT-608-S(13/16")	99.76 - 119.45	0.6000	0.6000
T5	9	LDF4-50A(1/2")	99.76 - 119.45	0.6000	0.6000
T5	11	04-001-54 (3/8" Cable)	99.76 - 119.45	0.6000	0.6000
T5	13	Feedline Ladder (Af)	99.76 - 119.45	0.6000	0.6000
T5	14	CR 50 1873(1-5/8")	99.76 - 119.45	0.6000	0.6000
T6	1	Safety Line 3/8	80.08 - 99.76	0.6000	0.6000
T6	3	Feedline Ladder (Af)	80.08 - 99.76	0.6000	0.6000
T6	4	AVA7-50(1-5/8)	80.08 - 99.76	0.6000	0.6000
T6	5	2" Rigid Conduit	80.08 - 99.76	0.6000	0.6000
T6	6	ATCB-B01-006(5/16")	80.08 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	7	RFFT-36SM-001-xxM(3/8")	99.76 80.08 - 99.76	0.6000	0.6000
T6	8	PWRT-608-S(13/16")	80.08 - 99.76	0.6000	0.6000
T6	9	LDF4-50A(1/2")	80.08 - 99.76	0.6000	0.6000
T6	11	04-001-54 (3/8" Cable)	80.08 - 99.76	0.6000	0.6000
T6	13	Feedline Ladder (Af)	80.08 - 99.76	0.6000	0.6000
T6	14	CR 50 1873(1-5/8")	80.08 - 99.76	0.6000	0.6000
T7	1	Safety Line 3/8	60.39 - 80.08	0.6000	0.6000
T7	3	Feedline Ladder (Af)	60.39 - 80.08	0.6000	0.6000
T7	4	AVA7-50(1-5/8)	60.39 - 80.08	0.6000	0.6000
T7	5	2" Rigid Conduit	60.39 - 80.08	0.6000	0.6000
T7	6	ATCB-B01-006(5/16")	60.39 - 80.08	0.6000	0.6000
T7	7	RFFT-36SM-001-xxM(3/8")	60.39 - 80.08	0.6000	0.6000
T7	8	PWRT-608-S(13/16")	60.39 - 80.08	0.6000	0.6000
T7	9	LDF4-50A(1/2")	60.39 - 80.08	0.6000	0.6000
T7	11	04-001-54 (3/8" Cable)	60.39 - 80.08	0.6000	0.6000
T7	13	Feedline Ladder (Af)	60.39 - 80.08	0.6000	0.6000
T7	14	CR 50 1873(1-5/8")	60.39 - 80.08	0.6000	0.6000
T8	1	Safety Line 3/8	40.70 - 60.39	0.6000	0.6000
T8	3	Feedline Ladder (Af)	40.70 - 60.39	0.6000	0.6000
T8	4	AVA7-50(1-5/8)	40.70 - 60.39	0.6000	0.6000
T8	5	2" Rigid Conduit	40.70 - 60.39	0.6000	0.6000
T8	6	ATCB-B01-006(5/16")	40.70 - 60.39	0.6000	0.6000
T8	7	RFFT-36SM-001-xxM(3/8")	40.70 - 60.39	0.6000	0.6000
T8	8	PWRT-608-S(13/16")	40.70 - 60.39	0.6000	0.6000
T8	9	LDF4-50A(1/2")	40.70 - 60.39	0.6000	0.6000
T8	11	04-001-54 (3/8" Cable)	40.70 - 60.39	0.6000	0.6000
T8	13	Feedline Ladder (Af)	40.70 - 60.39	0.6000	0.6000
T8	14	CR 50 1873(1-5/8")	40.70 - 60.39	0.6000	0.6000
T9	1	Safety Line 3/8	21.01 - 40.70	0.6000	0.6000
T9	3	Feedline Ladder (Af)	21.01 - 40.70	0.6000	0.6000
T9	4	AVA7-50(1-5/8)	21.01 - 40.70	0.6000	0.6000
T9	5	2" Rigid Conduit	21.01 - 40.70	0.6000	0.6000
T9	6	ATCB-B01-006(5/16")	21.01 - 40.70	0.6000	0.6000
T9	7	RFFT-36SM-001-xxM(3/8")	21.01 - 40.70	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	8	PWRT-608-S(13/16")	21.01 - 40.70	0.6000	0.6000
T9	9	LDF4-50A(1/2")	21.01 - 40.70	0.6000	0.6000
T9	11	04-001-54 (3/8" Cable)	21.01 - 40.70	0.6000	0.6000
T9	13	Feedline Ladder (Af)	21.01 - 40.70	0.6000	0.6000
T9	14	CR 50 1873(1-5/8")	21.01 - 40.70	0.6000	0.6000
T10	1	Safety Line 3/8	1.33 - 21.01	0.6000	0.6000
T10	3	Feedline Ladder (Af)	10.00 - 21.01	0.6000	0.6000
T10	4	AVA7-50(1-5/8)	10.00 - 21.01	0.6000	0.6000
T10	5	2" Rigid Conduit	10.00 - 21.01	0.6000	0.6000
T10	6	ATCB-B01-006(5/16")	10.00 - 21.01	0.6000	0.6000
T10	7	RFFT-36SM-001-xxM(3/8")	10.00 - 21.01	0.6000	0.6000
T10	8	PWRT-608-S(13/16")	10.00 - 21.01	0.6000	0.6000
T10	9	LDF4-50A(1/2")	10.00 - 21.01	0.6000	0.6000
T10	11	04-001-54 (3/8" Cable)	10.00 - 21.01	0.6000	0.6000
T10	13	Feedline Ladder (Af)	6.00 - 21.01	0.6000	0.6000
T10	14	CR 50 1873(1-5/8")	8.00 - 21.01	0.6000	0.6000
T11	1	Safety Line 3/8	0.00 - 1.33	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment ° ft	Placement		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8"x8'	A	From Leg	0.00 0.00 4.00	0.00	179.00	No Ice 1/2" Ice 1" Ice	0.50 1.31 2.14	0.50 1.31 2.14	0.01 0.01 0.02
***									
6'x2" Mount Pipe	B	From Face	0.50 1.50 0.00	0.00	176.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
ANT150F2	B	From Face	0.50 1.50 1.00	0.00	176.00	No Ice 1/2" Ice 1" Ice	1.23 1.53 1.84	1.23 1.53 1.84	0.01 0.02 0.04
(2) ETD819G-12UB	B	From Face	0.50 1.50 1.00	0.00	176.00	No Ice 1/2" Ice 1" Ice	1.84 2.01 2.19	0.45 0.55 0.66	0.03 0.04 0.06
***									
Sector Mount [SM 201-3]	C	None		0.00	176.00	No Ice 1/2" Ice 1" Ice	24.76 33.89 43.00	24.76 33.89 43.00	1.08 1.52 2.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Modifications (3)	C	None		0.00	176.00	No Ice	5.00	5.00	50.00
						1/2" Ice	6.00	6.00	75.00
						1" Ice	7.00	7.00	100.00
(12) 4' Vertical Unistrut	C	None		0.00	176.00	No Ice	12.80	12.80	50.00
						1/2" Ice	19.20	19.20	75.00
						1" Ice	25.60	25.60	100.00
6'x4'' Mount Pipe	A	From Leg	0.50 0.00 0.00	0.00	176.00	No Ice	1.89	1.89	0.06
						1/2" Ice	2.62	2.62	0.08
						1" Ice	3.00	3.00	0.11
6'x4'' Mount Pipe	B	From Leg	0.50 0.00 0.00	0.00	176.00	No Ice	1.89	1.89	0.06
						1/2" Ice	2.62	2.62	0.08
						1" Ice	3.00	3.00	0.11
6'x4'' Mount Pipe	C	From Leg	0.50 0.00 0.00	0.00	176.00	No Ice	1.89	1.89	0.06
						1/2" Ice	2.62	2.62	0.08
						1" Ice	3.00	3.00	0.11
DBXLH-8585A-R2M	A	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	4.95	2.70	0.04
						1/2" Ice	5.47	3.18	0.07
						1" Ice	6.02	3.67	0.11
DBXLH-8585A-R2M	B	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	4.95	2.70	0.04
						1/2" Ice	5.47	3.18	0.07
						1" Ice	6.02	3.67	0.11
DBXLH-8585A-R2M	C	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	4.95	2.70	0.04
						1/2" Ice	5.47	3.18	0.07
						1" Ice	6.02	3.67	0.11
(4) ETD819G-12UB	A	From Leg	2.00 0.00 0.00	0.00	176.00	No Ice	1.84	0.45	0.03
						1/2" Ice	2.01	0.55	0.04
						1" Ice	2.19	0.66	0.06
(4) ETD819G-12UB	A	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	1.84	0.45	0.03
						1/2" Ice	2.01	0.55	0.04
						1" Ice	2.19	0.66	0.06
(2) ETD819G-12UB	B	From Leg	2.00 0.00 0.00	0.00	176.00	No Ice	1.84	0.45	0.03
						1/2" Ice	2.01	0.55	0.04
						1" Ice	2.19	0.66	0.06
(2) ETD819G-12UB	B	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	1.84	0.45	0.03
						1/2" Ice	2.01	0.55	0.04
						1" Ice	2.19	0.66	0.06
(2) NNHH-65A-R4	A	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	5.71	2.32	0.07
						1/2" Ice	6.11	2.66	0.12
						1" Ice	6.52	3.01	0.19
(2) NNHH-65A-R4	B	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	5.71	2.32	0.07
						1/2" Ice	6.11	2.66	0.12
						1" Ice	6.52	3.01	0.19
(2) NNHH-65A-R4	C	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	5.71	2.32	0.07
						1/2" Ice	6.11	2.66	0.12
						1" Ice	6.52	3.01	0.19
SBNHH-1D65C	A	From Leg	2.00 0.00 4.00	0.00	176.00	No Ice	5.67	3.40	0.05
						1/2" Ice	6.20	3.91	0.12
						1" Ice	6.74	4.43	0.19
SBNHH-1D65C	B	From Leg	2.00	0.00	176.00	No Ice	5.67	3.40	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	6.20	3.91	0.12
			4.00			Ice	6.74	4.43	0.19
						1" Ice			
SBNHH-1D65C	C	From Leg	2.00	0.00	176.00	No Ice	5.67	3.40	0.05
			0.00			1/2"	6.20	3.91	0.12
			4.00			Ice	6.74	4.43	0.19
						1" Ice			
(3) B25 RRH4x30-4R	A	From Leg	2.00	0.00	176.00	No Ice	2.14	1.31	0.05
			0.00			1/2"	2.33	1.46	0.07
			4.00			Ice	2.53	1.63	0.09
						1" Ice			
DC6-48-60-18-8F	A	From Leg	2.00	0.00	176.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			4.00			Ice	1.64	1.64	0.06
						1" Ice			
DC6-48-60-18-8F	B	From Leg	2.00	0.00	176.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			4.00			Ice	1.64	1.64	0.06
						1" Ice			
(2) RRH4X25-WCS	B	From Leg	2.00	0.00	176.00	No Ice	3.16	2.38	0.07
			0.00			1/2"	3.40	2.60	0.10
			4.00			Ice	3.65	2.82	0.13
						1" Ice			
RRH4X25-WCS	C	From Leg	2.00	0.00	176.00	No Ice	3.16	2.38	0.07
			0.00			1/2"	3.40	2.60	0.10
			4.00			Ice	3.65	2.82	0.13
						1" Ice			
RRH2X40-07-L-AT	B	From Leg	2.00	0.00	176.00	No Ice	2.38	1.26	0.05
			0.00			1/2"	2.58	1.43	0.07
			0.00			Ice	2.79	1.60	0.09
						1" Ice			
(2) RRH2X40-07-L-AT	C	From Leg	2.00	0.00	176.00	No Ice	2.38	1.26	0.05
			0.00			1/2"	2.58	1.43	0.07
			0.00			Ice	2.79	1.60	0.09
						1" Ice			
AIRSCALE RRH 4T4R B5 160W	A	From Leg	2.00	0.00	176.00	No Ice	1.29	0.72	0.04
			0.00			1/2"	1.43	0.83	0.05
			4.00			Ice	1.58	0.96	0.06
						1" Ice			
(2) AIRSCALE RRH 4T4R B5 160W	B	From Leg	2.00	0.00	176.00	No Ice	1.29	0.72	0.04
			0.00			1/2"	1.43	0.83	0.05
			4.00			Ice	1.58	0.96	0.06
						1" Ice			
jsource technologies 12128FM4SEC	B	From Leg	2.00	0.00	176.00	No Ice	1.20	0.80	0.01
			0.00			1/2"	1.34	0.91	0.02
			0.00			Ice	1.48	1.04	0.03
						1" Ice			
***									
Pipe Mount [PM 602-1]	A	From Leg	1.00	0.00	160.00	No Ice	2.78	2.78	0.09
			0.00			1/2"	3.21	3.21	0.11
			0.00			Ice	3.64	3.64	0.14
						1" Ice			
(2) 10' Tieback	A	From Face	2.00	0.00	160.00	No Ice	2.38	0.25	0.04
			0.00			1/2"	3.38	0.50	0.05
			0.00			Ice	4.38	0.75	0.07
						1" Ice			
10' Tieback	B	From Face	2.00	0.00	160.00	No Ice	2.38	0.25	0.04
			0.00			1/2"	3.38	0.50	0.05
			0.00			Ice	4.38	0.75	0.07
						1" Ice			
FIBEAIR IP-10	A	From Leg	2.00	0.00	160.00	No Ice	1.01	0.56	0.02
			0.00			1/2"	1.14	0.66	0.02
			0.00			Ice	1.28	0.77	0.03
						1" Ice			
***									

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Sector Mount [SM 801-3]	C	None		0.00	150.00	No Ice 1/2" Ice 1" Ice	20.61 29.42 38.23	20.61 29.42 38.23	0.88 1.28 1.82
Mount Reinforcement Specifications	C	None		0.00	150.00	No Ice 1/2" Ice 1" Ice	28.63 34.69 40.75	28.63 34.69 40.75	0.00 0.00 0.00
(2) QS8656-5 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	5.42 5.92 6.43	5.62 6.12 6.63	0.12 0.21 0.31
(2) QS8656-5 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	5.42 5.92 6.43	5.62 6.12 6.63	0.12 0.21 0.31
(2) QS8656-5 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	5.42 5.92 6.43	5.62 6.12 6.63	0.12 0.21 0.31
RF4439D-25A	A	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.25 1.39 1.54	0.07 0.09 0.11
RF4439D-25A	B	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.25 1.39 1.54	0.07 0.09 0.11
RF4439D-25A	C	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.25 1.39 1.54	0.07 0.09 0.11
RF4440D-13A	A	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.13 1.27 1.41	0.07 0.09 0.11
RF4440D-13A	B	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.13 1.27 1.41	0.07 0.09 0.11
RF4440D-13A	C	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	1.87 2.03 2.21	1.13 1.27 1.41	0.07 0.09 0.11
MT6407-77A w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
MT6407-77A w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	4.91 5.26 5.61	2.68 3.14 3.62	0.10 0.14 0.18
RVZDC-6627-PF-48	B	From Leg	4.00 0.00 0.00	0.00	150.00	No Ice 1/2" Ice 1" Ice	3.79 4.04 4.30	2.51 2.73 2.95	0.03 0.06 0.10

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HPX8-59	A	Paraboloid w/Shroud (HP)	From Leg	2.00 0.00 0.00	41.00		160.00	8.38	No Ice 1/2" Ice 1" Ice	55.09 56.19 57.29	0.30 0.59 0.88

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	179.098 - 159.41	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	31	-81.63	0.28	0.15
			Max. Mx	20	-44.17	-1.21	-0.00
			Max. My	14	-43.88	0.04	1.36
			Max. Vy	9	1.38	-0.25	0.19
			Max. Vx	16	1.20	-0.05	-0.20
		Diagonal	Max Tension	24	3.35	0.00	0.00
			Max. Compression	16	-4.24	0.00	0.00
			Max. Mx	27	-1.01	0.08	0.00
			Max. My	12	2.39	-0.02	0.01
			Max. Vy	27	-0.03	0.08	0.00
			Max. Vx	12	0.00	-0.02	0.01
		Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	35	-0.55	0.00	0.00
			Max. Mx	26	-0.52	-0.03	0.00
			Max. Vy	26	0.03	0.00	0.00
T2	159.41 - 158.827	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	27	-84.37	-0.02	0.32
			Max. Mx	18	-69.14	2.22	-2.06
			Max. My	2	-71.74	-0.38	2.85
			Max. Vy	18	-3.89	2.22	-2.06
			Max. Vx	2	-4.91	-0.38	2.85
T3	158.827 - 139.139	Leg	Max Tension	15	24.58	-0.74	-0.03
			Max. Compression	2	-100.43	0.35	0.09
			Max. Mx	18	-72.64	2.95	-0.67
			Max. My	8	-41.35	0.97	1.51
			Max. Vy	22	-0.73	-0.94	0.11
			Max. Vx	24	0.67	-0.49	0.79
		Diagonal	Max Tension	16	5.90	0.00	0.00
			Max. Compression	16	-6.70	0.00	0.00
			Max. Mx	27	1.34	0.06	0.00
			Max. My	8	-4.25	0.00	0.01
			Max. Vy	27	-0.03	0.06	0.00
			Max. Vx	8	-0.00	0.00	0.00
T4	139.139 - 119.452	Leg	Max Tension	15	54.25	-0.82	-0.08
			Max. Compression	2	-131.98	1.02	0.05
			Max. Mx	2	-122.34	1.09	0.04
			Max. My	24	-41.31	-0.24	0.94
			Max. Vy	2	-0.16	1.09	0.04
			Max. Vx	13	0.14	-0.13	-0.94
		Diagonal	Max Tension	16	5.23	0.00	0.00
			Max. Compression	17	-5.01	0.00	0.00
			Max. Mx	27	0.75	0.05	0.00
			Max. My	14	2.60	0.03	-0.01
			Max. Vy	27	-0.02	0.05	0.00
			Max. Vx	14	0.00	0.00	0.00
T5	119.452 - 99.7642	Leg	Max Tension	15	78.55	-1.31	-0.08
			Max. Compression	2	-158.71	1.34	0.05
			Max. Mx	18	-149.58	1.58	-0.03
			Max. My	16	-44.25	-0.10	1.43
			Max. Vy	14	0.15	-1.35	-0.07
			Max. Vx	13	0.15	0.15	-1.12
		Diagonal	Max Tension	16	4.72	0.00	0.00
			Max. Compression	16	-4.76	0.00	0.00
			Max. Mx	27	0.65	0.05	0.00
			Max. My	14	2.35	0.02	-0.01
			Max. Vy	35	-0.03	0.05	-0.00
			Max. Vx	14	0.00	0.00	0.00
T6	99.7642 - 80.0767	Leg	Max Tension	15	100.70	-1.26	-0.06

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	2	-183.39	1.71	0.15
			Max. Mx	2	-183.39	1.71	0.15
			Max. My	13	-41.51	0.11	-1.56
			Max. Vy	2	-0.15	1.71	0.15
			Max. Vx	12	0.13	0.12	-1.56
		Diagonal	Max Tension	16	4.83	0.00	0.00
			Max. Compression	16	-4.89	0.00	0.00
			Max. Mx	35	0.49	0.05	-0.00
			Max. My	14	-4.36	0.00	-0.01
			Max. Vy	35	-0.03	0.05	-0.00
			Max. Vx	33	0.00	0.00	0.00
T7	80.0767 - 60.3892	Leg	Max Tension	15	121.44	-1.21	-0.05
			Max. Compression	2	-207.78	1.64	0.05
			Max. Mx	2	-191.37	1.71	0.15
			Max. My	16	-47.08	-0.03	1.64
			Max. Vy	2	0.15	1.71	0.15
			Max. Vx	24	-0.19	-0.06	1.57
		Diagonal	Max Tension	16	5.24	0.00	0.00
			Max. Compression	16	-5.22	0.00	0.00
			Max. Mx	35	0.91	0.06	-0.01
			Max. My	33	-0.88	0.04	-0.01
			Max. Vy	35	-0.04	0.06	-0.01
			Max. Vx	33	0.00	0.00	0.00
T8	60.3892 - 40.7017	Leg	Max Tension	15	139.34	-2.15	-0.12
			Max. Compression	2	-228.91	2.88	0.22
			Max. Mx	2	-228.91	2.88	0.22
			Max. My	16	-47.97	-0.30	2.59
			Max. Vy	2	-0.22	2.88	0.22
			Max. Vx	24	-0.25	-0.34	2.49
		Diagonal	Max Tension	16	6.10	0.00	0.00
			Max. Compression	16	-6.03	0.00	0.00
			Max. Mx	35	0.93	0.09	-0.01
			Max. My	32	0.87	0.08	-0.01
			Max. Vy	35	-0.05	0.09	-0.01
			Max. Vx	32	0.00	0.00	0.00
T9	40.7017 - 21.0142	Leg	Max Tension	15	158.57	-2.39	-0.11
			Max. Compression	2	-251.81	0.93	0.03
			Max. Mx	2	-239.87	2.88	0.22
			Max. My	16	-49.07	-0.28	2.38
			Max. Vy	34	0.32	-1.90	-0.16
			Max. Vx	24	0.20	-0.32	2.30
		Diagonal	Max Tension	17	6.41	0.00	0.00
			Max. Compression	16	-6.59	0.00	0.00
			Max. Mx	35	1.27	0.12	-0.01
			Max. My	32	1.35	0.12	-0.01
			Max. Vy	33	0.06	0.10	-0.01
			Max. Vx	32	0.00	0.00	0.00
T10	21.0142 - 1.32667	Leg	Max Tension	15	177.86	-7.79	-0.32
			Max. Compression	2	-275.56	-27.81	-1.17
			Max. Mx	2	-275.56	-27.81	-1.17
			Max. My	12	-61.74	-3.59	5.31
			Max. Vy	2	3.80	8.83	0.26
			Max. Vx	12	-0.95	0.67	-3.08
		Diagonal	Max Tension	16	9.03	0.00	0.00
			Max. Compression	17	-8.73	0.00	0.00
			Max. Mx	35	-0.20	0.13	-0.01
			Max. My	32	0.39	0.09	-0.02
			Max. Vy	33	0.06	0.12	-0.01
			Max. Vx	32	0.00	0.00	0.00
T11	1.32667 - 0	Leg	Max Tension	15	183.80	-1.26	21.68
			Max. Compression	2	-282.24	0.00	0.00
			Max. Mx	18	-279.37	-23.42	13.91
			Max. My	2	-282.13	1.17	-27.81
			Max. Vy	18	-17.66	0.00	0.00
			Max. Vx	2	-20.97	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	279.48	17.66	-10.49
	Max. H_x	18	279.48	17.66	-10.49
	Max. H_z	5	-153.35	-11.11	8.86
	Min. Vert	7	-171.53	-13.26	7.92
	Min. H_x	7	-171.53	-13.26	7.92
	Min. H_z	16	252.98	14.73	-11.04
Leg B	Max. Vert	10	269.59	-17.54	-9.63
	Max. H_x	23	-168.44	13.37	7.21
	Max. H_z	25	-147.19	11.39	7.39
	Min. Vert	23	-168.44	13.37	7.21
	Min. H_x	10	269.59	-17.54	-9.63
	Min. H_z	10	269.59	-17.54	-9.63
Leg A	Max. Vert	2	282.24	-0.88	20.97
	Max. H_x	19	-75.88	2.94	-7.65
	Max. H_z	2	282.24	-0.88	20.97
	Min. Vert	15	-183.72	0.95	-16.35
	Min. H_x	8	60.17	-2.84	2.65
	Min. H_z	15	-183.72	0.95	-16.35

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	134.20	-0.00	-0.00	1.00	12.18	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	161.04	0.60	-32.95	-3562.92	-80.65	-26.14
0.9 Dead+1.0 Wind 0 deg - No Ice	120.78	0.60	-32.95	-3563.23	-84.31	-26.14
1.2 Dead+1.0 Wind 30 deg - No Ice	161.04	16.02	-27.64	-3019.90	-1737.63	-17.57
0.9 Dead+1.0 Wind 30 deg - No Ice	120.78	16.02	-27.64	-3020.20	-1741.28	-17.57
1.2 Dead+1.0 Wind 60 deg - No Ice	161.04	25.95	-15.31	-1695.66	-2829.45	-6.92
0.9 Dead+1.0 Wind 60 deg - No Ice	120.78	25.95	-15.31	-1695.96	-2833.11	-6.92
1.2 Dead+1.0 Wind 90 deg - No Ice	161.04	27.42	-0.65	-101.11	-3007.08	-5.25
0.9 Dead+1.0 Wind 90 deg - No Ice	120.78	27.42	-0.65	-101.41	-3010.73	-5.25
1.2 Dead+1.0 Wind 120 deg - No Ice	161.04	27.25	15.37	1649.23	-2934.13	12.56
0.9 Dead+1.0 Wind 120 deg - No Ice	120.78	27.25	15.37	1648.93	-2937.79	12.56
1.2 Dead+1.0 Wind 150 deg - No Ice	161.04	15.02	27.43	3010.02	-1590.37	28.96
0.9 Dead+1.0 Wind 150 deg - No Ice	120.78	15.02	27.43	3009.72	-1594.02	28.96
1.2 Dead+1.0 Wind 180 deg - No Ice	161.04	-0.78	31.71	3491.79	139.17	28.65
0.9 Dead+1.0 Wind 180 deg - No Ice	120.78	-0.78	31.71	3491.49	135.51	28.65
1.2 Dead+1.0 Wind 210 deg - No Ice	161.04	-16.31	27.97	3075.21	1811.91	19.54

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 210 deg - No Ice	120.78	-16.31	27.97	3074.91	1808.25	19.54
1.2 Dead+1.0 Wind 240 deg - No Ice	161.04	-27.62	16.41	1810.66	3019.00	7.16
0.9 Dead+1.0 Wind 240 deg - No Ice	120.78	-27.62	16.41	1810.36	3015.34	7.16
1.2 Dead+1.0 Wind 270 deg - No Ice	161.04	-27.65	0.93	148.30	3074.57	4.57
0.9 Dead+1.0 Wind 270 deg - No Ice	120.78	-27.65	0.93	148.00	3070.92	4.57
1.2 Dead+1.0 Wind 300 deg - No Ice	161.04	-25.81	-14.63	-1590.19	2842.01	-13.56
0.9 Dead+1.0 Wind 300 deg - No Ice	120.78	-25.81	-14.63	-1590.50	2838.35	-13.56
1.2 Dead+1.0 Wind 330 deg - No Ice	161.04	-15.20	-27.35	-2994.25	1648.89	-26.99
0.9 Dead+1.0 Wind 330 deg - No Ice	120.78	-15.20	-27.35	-2994.55	1645.23	-26.99
1.2 Dead+1.0 Ice+1.0 Temp	294.30	-0.00	0.00	17.87	46.85	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	294.30	0.08	-6.72	-704.21	34.65	-7.74
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	294.30	3.29	-5.67	-594.35	-307.96	-4.59
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	294.30	5.00	-2.92	-302.74	-497.24	-1.29
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	294.30	5.45	-0.08	4.74	-548.75	0.28
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	294.30	5.12	2.91	330.00	-506.78	3.78
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	294.30	3.14	5.62	626.21	-287.64	8.70
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	294.30	-0.10	6.58	732.51	62.93	8.07
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	294.30	-3.32	5.72	637.10	407.63	4.85
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	294.30	-5.20	3.06	352.25	610.19	1.32
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	294.30	-5.48	0.12	36.94	647.52	-0.37
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	294.30	-4.95	-2.82	-287.91	586.39	-3.92
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	294.30	-3.16	-5.61	-588.70	385.22	-8.44
Dead+Wind 0 deg - Service	134.20	0.18	-10.38	-1107.43	-16.60	-7.89
Dead+Wind 30 deg - Service	134.20	5.05	-8.72	-939.14	-533.02	-5.31
Dead+Wind 60 deg - Service	134.20	8.21	-4.84	-527.48	-874.47	-2.09
Dead+Wind 90 deg - Service	134.20	8.71	-0.19	-29.91	-932.38	-1.59
Dead+Wind 120 deg - Service	134.20	8.60	4.86	514.73	-906.10	3.79
Dead+Wind 150 deg - Service	134.20	4.75	8.66	937.43	-488.54	8.74
Dead+Wind 180 deg - Service	134.20	-0.24	10.01	1087.22	49.81	8.65
Dead+Wind 210 deg - Service	134.20	-5.14	8.82	957.12	571.00	5.90
Dead+Wind 240 deg - Service	134.20	-8.71	5.17	563.49	947.27	2.16
Dead+Wind 270 deg - Service	134.20	-8.78	0.28	45.44	968.31	1.38
Dead+Wind 300 deg - Service	134.20	-8.17	-4.63	-495.61	893.80	-4.09
Dead+Wind 330 deg - Service	134.20	-4.81	-8.63	-931.39	521.75	-8.15

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-134.20	0.00	0.00	134.20	0.00	0.000%
2	0.60	-161.04	-32.95	-0.60	161.04	32.95	0.000%
3	0.60	-120.78	-32.95	-0.60	120.78	32.95	0.000%
4	16.02	-161.04	-27.64	-16.02	161.04	27.64	0.000%
5	16.02	-120.78	-27.64	-16.02	120.78	27.64	0.000%
6	25.95	-161.04	-15.31	-25.95	161.04	15.31	0.000%
7	25.95	-120.78	-15.31	-25.95	120.78	15.31	0.000%
8	27.42	-161.04	-0.65	-27.42	161.04	0.65	0.000%
9	27.42	-120.78	-0.65	-27.42	120.78	0.65	0.000%
10	27.25	-161.04	15.37	-27.25	161.04	-15.37	0.000%
11	27.25	-120.78	15.37	-27.25	120.78	-15.37	0.000%
12	15.02	-161.04	27.43	-15.02	161.04	-27.43	0.000%
13	15.02	-120.78	27.43	-15.02	120.78	-27.43	0.000%
14	-0.78	-161.04	31.71	0.78	161.04	-31.71	0.000%
15	-0.78	-120.78	31.71	0.78	120.78	-31.71	0.000%
16	-16.31	-161.04	27.97	16.31	161.04	-27.97	0.000%
17	-16.31	-120.78	27.97	16.31	120.78	-27.97	0.000%
18	-27.62	-161.04	16.41	27.62	161.04	-16.41	0.000%
19	-27.62	-120.78	16.41	27.62	120.78	-16.41	0.000%
20	-27.65	-161.04	0.93	27.65	161.04	-0.93	0.000%
21	-27.65	-120.78	0.93	27.65	120.78	-0.93	0.000%
22	-25.81	-161.04	-14.63	25.81	161.04	14.63	0.000%
23	-25.81	-120.78	-14.63	25.81	120.78	14.63	0.000%
24	-15.20	-161.04	-27.35	15.20	161.04	27.35	0.000%
25	-15.20	-120.78	-27.35	15.20	120.78	27.35	0.000%
26	0.00	-294.30	0.00	0.00	294.30	-0.00	0.000%
27	0.08	-294.30	-6.72	-0.08	294.30	6.72	0.000%
28	3.29	-294.30	-5.67	-3.29	294.30	5.67	0.000%
29	5.00	-294.30	-2.92	-5.00	294.30	2.92	0.000%
30	5.45	-294.30	-0.08	-5.45	294.30	0.08	0.000%
31	5.12	-294.30	2.91	-5.12	294.30	-2.91	0.000%
32	3.14	-294.30	5.62	-3.14	294.30	-5.62	0.000%
33	-0.10	-294.30	6.58	0.10	294.30	-6.58	0.000%
34	-3.32	-294.30	5.72	3.32	294.30	-5.72	0.000%
35	-5.20	-294.30	3.06	5.20	294.30	-3.06	0.000%
36	-5.48	-294.30	0.12	5.48	294.30	-0.12	0.000%
37	-4.95	-294.30	-2.82	4.95	294.30	2.82	0.000%
38	-3.16	-294.30	-5.61	3.16	294.30	5.61	0.000%
39	0.18	-134.20	-10.38	-0.18	134.20	10.38	0.000%
40	5.05	-134.20	-8.72	-5.05	134.20	8.72	0.000%
41	8.21	-134.20	-4.84	-8.21	134.20	4.84	0.000%
42	8.71	-134.20	-0.19	-8.71	134.20	0.19	0.000%
43	8.60	-134.20	4.86	-8.60	134.20	-4.86	0.000%
44	4.75	-134.20	8.66	-4.75	134.20	-8.66	0.000%
45	-0.24	-134.20	10.01	0.24	134.20	-10.01	0.000%
46	-5.14	-134.20	8.82	5.14	134.20	-8.82	0.000%
47	-8.71	-134.20	5.17	8.71	134.20	-5.17	0.000%
48	-8.78	-134.20	0.28	8.78	134.20	-0.28	0.000%
49	-8.17	-134.20	-4.63	8.17	134.20	4.63	0.000%
50	-4.81	-134.20	-8.63	4.81	134.20	8.63	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	179.098 - 159.41	4.6699	46	0.27	0.08
T2	159.41 - 158.827	3.5990	46	0.24	0.08
T3	158.827 - 139.139	3.5670	46	0.24	0.08
T4	139.139 - 119.452	2.6418	46	0.19	0.05
T5	119.452 - 99.7642	1.9036	46	0.15	0.04
T6	99.7642 -	1.3149	46		0.03

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
	80.0767				
T7	80.0767 - 60.3892	0.8494	46	0.09	0.02
T8	60.3892 - 40.7017	0.5017	46	0.07	0.02
T9	40.7017 - 21.0142	0.2472	39	0.04	0.01
T10	21.0142 - 1.32667	0.0877	39	0.02	0.00
T11	1.32667 - 0	0.0108	39	0.00	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
179.00	Lightning Rod 5/8"x8'	46	4.6646	0.27	0.08	474775
176.00	6'x2" Mount Pipe	46	4.5021	0.26	0.09	474775
160.00	HPX8-59	46	3.6313	0.24	0.09	33561
150.00	Sector Mount [SM 801-3]	46	3.1193	0.22	0.06	17000

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	179.098 - 159.41	15.1664	16	0.86	0.28
T2	159.41 - 158.827	11.6537	16	0.77	0.28
T3	158.827 - 139.139	11.5491	16	0.77	0.27
T4	139.139 - 119.452	8.5303	16	0.63	0.17
T5	119.452 - 99.7642	6.1331	16	0.49	0.13
T6	99.7642 - 80.0767	4.2281	16	0.40	0.10
T7	80.0767 - 60.3892	2.7261	16	0.29	0.07
T8	60.3892 - 40.7017	1.6073	3	0.21	0.05
T9	40.7017 - 21.0142	0.7926	3	0.14	0.03
T10	21.0142 - 1.32667	0.2796	3	0.07	0.02
T11	1.32667 - 0	0.0342	2	0.00	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
179.00	Lightning Rod 5/8"x8'	16	15.1491	0.86	0.28	154904
176.00	6'x2" Mount Pipe	16	14.6156	0.85	0.29	154904
160.00	HPX8-59	16	11.7596	0.78	0.28	10407
150.00	Sector Mount [SM 801-3]	16	10.0861	0.71	0.20	5092

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	179.098	Leg	A325N	1.0000	4	6.75	54.52	0.124	1.05	Bolt Tension
		Diagonal	A325N	0.6250	1	3.35	5.51	0.609	1.05	Member Block Shear
		Top Girt	A325N	0.6250	1	0.55	13.81	0.040	1.05	Bolt Shear
T2	159.41	Leg	A325N	1.0000	4	7.03	54.52	0.129	1.05	Bolt Tension
T3	158.827	Leg	A325N	1.0000	6	5.58	54.52	0.102	1.05	Bolt Tension
		Diagonal	A325N	0.6250	1	5.90	6.53	0.905	1.05	Member Block Shear
T4	139.139	Leg	A325N	1.0000	6	9.04	54.52	0.166	1.05	Bolt Tension
		Diagonal	A325N	0.6250	1	5.23	8.70	0.601	1.05	Member Block Shear
T5	119.452	Leg	A325N	1.0000	6	13.09	54.52	0.240	1.05	Bolt Tension
		Diagonal	A325N	0.7500	1	4.72	8.16	0.579	1.05	Member Bearing
T6	99.7642	Leg	A325N	1.0000	6	16.78	54.52	0.308	1.05	Bolt Tension
		Diagonal	A325N	0.7500	1	4.83	8.16	0.592	1.05	Member Bearing
T7	80.0767	Leg	A325N	1.0000	10	12.14	54.52	0.223	1.05	Bolt Tension
		Diagonal	A325N	0.7500	1	5.24	10.88	0.482	1.05	Member Bearing
T8	60.3892	Leg	A325N	1.0000	10	13.93	54.52	0.256	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	3.05	8.05	0.379	1.05	Member Block Shear
T9	40.7017	Leg	A325N	1.0000	10	15.86	54.52	0.291	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	3.21	10.74	0.299	1.05	Member Block Shear
T10	21.0142	Leg	A325N	1.0000	10	17.79	54.52	0.326	1.05	Bolt Tension
		Diagonal	A325N	0.7500	2	4.51	10.74	0.420	1.05	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	179.098 - 159.41	P3x.216	19.69	4.92	50.8 K=1.00	2.2285	-81.63	83.06	0.983 [1]
T2	159.41 - 158.827	P5x.258	0.58	0.58	3.7 K=1.00	4.2999	-84.37	193.30	0.436
T3	158.827 - 139.139	P5x.258	19.71	6.57	42.0 K=1.00	4.2999	-100.43	170.09	0.590 [1]
T4	139.139 - 119.452	P6x.28	19.71	6.57	35.1 K=1.00	5.5813	-131.98	229.51	0.575 [1]
T5	119.452 - 99.7642	P8x.322	19.71	6.57	26.8 K=1.00	8.3993	-158.71	358.57	0.443 [1]
T6	99.7642 - 80.0767	P8x.322	19.71	6.57	26.8 K=1.00	8.3993	-183.39	358.57	0.511 [1]
T7	80.0767 - 60.3892	P8x.406	19.71	6.57	27.1 K=1.00	10.483 2	-207.78	447.08	0.465 [1]
T8	60.3892 - 40.7017	P10x.365	19.71	9.86	32.2 K=1.00	11.908 3	-228.91	496.76	0.461 [1]
T9	40.7017 -	P10x.365	19.71	9.86	32.2	11.908	-251.81	496.76	0.507 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	21.0142				K=1.00	3			
T10	21.0142 - 1.32667	P10x.365	19.71	9.86	32.2	11.908	-275.56	496.76	0.555 [1]
					K=1.00	3			
T11	1.32667 - 0	P10x.593	1.33	1.33	4.4	18.922	-282.19	850.28	0.332
					K=1.00	1			

[1] P_u / ϕP_n controls

Leg Bending Design Data (Compression)

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	179.098 - 159.41	P3x.216	0.00	8.75	0.000	0.00	8.75	0.000
T2	159.41 - 158.827	P5x.258	1.80	27.25	0.066	0.00	27.25	0.000
T3	158.827 - 139.139	P5x.258	0.00	27.25	0.000	0.00	27.25	0.000
T4	139.139 - 119.452	P6x.28	0.00	42.30	0.000	0.00	42.30	0.000
T5	119.452 - 99.7642	P8x.322	0.00	83.29	0.000	0.00	83.29	0.000
T6	99.7642 - 80.0767	P8x.322	0.00	83.29	0.000	0.00	83.29	0.000
T7	80.0767 - 60.3892	P8x.406	0.00	102.93	0.000	0.00	102.93	0.000
T8	60.3892 - 40.7017	P10x.365	0.00	147.68	0.000	0.00	147.68	0.000
T9	40.7017 - 21.0142	P10x.365	0.00	147.68	0.000	0.00	147.68	0.000
T10	21.0142 - 1.32667	P10x.365	0.00	147.68	0.000	0.00	147.68	0.000
T11	1.32667 - 0	P10x.593	27.83	229.67	0.121	0.00	229.67	0.000

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	179.098 - 159.41	P3x.216	0.983	0.000	0.000	0.983 [1]	1.050	4.8.1
T2	159.41 - 158.827	P5x.258	0.436	0.066	0.000	0.447	1.050	4.8.1
T3	158.827 - 139.139	P5x.258	0.590	0.000	0.000	0.590 [1]	1.050	4.8.1
T4	139.139 - 119.452	P6x.28	0.575	0.000	0.000	0.575 [1]	1.050	4.8.1
T5	119.452 - 99.7642	P8x.322	0.443	0.000	0.000	0.443 [1]	1.050	4.8.1
T6	99.7642 - 80.0767	P8x.322	0.511	0.000	0.000	0.511 [1]	1.050	4.8.1
T7	80.0767 - 60.3892	P8x.406	0.465	0.000	0.000	0.465 [1]	1.050	4.8.1
T8	60.3892 - 40.7017	P10x.365	0.461	0.000	0.000	0.461 [1]	1.050	4.8.1
T9	40.7017 - 21.0142	P10x.365	0.507	0.000	0.000	0.507 [1]	1.050	4.8.1
T10	21.0142 - 1.32667	P10x.365	0.555	0.000	0.000	0.555 [1]	1.050	4.8.1

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T11	1.32667 - 0	P10x.593	0.332	0.121	0.000	0.403	1.050	4.8.1

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	179.098 - 159.41	L1 3/4x1 3/4x3/16	6.34	2.82	103.9 K=1.05	0.6211	-4.24	14.77	0.287 [1]
T3	158.827 - 139.139	L2x2x3/16	7.84	3.71	114.7 K=1.02	0.7150	-6.70	15.10	0.443 [1]
T4	139.139 - 119.452	L2x2x1/4	9.75	4.58	140.5 K=1.00	0.9380	-4.83	13.59	0.355 [1]
T5	119.452 - 99.7642	L2 1/2x2 1/2x3/16	11.11	5.15	124.9 K=1.00	0.9020	-4.70	16.54	0.284 [1]
T6	99.7642 - 80.0767	L2 1/2x2 1/2x3/16	12.56	5.89	142.9 K=1.00	0.9020	-4.89	12.64	0.387 [1]
T7	80.0767 - 60.3892	L2 1/2x2 1/2x1/4	14.08	6.66	162.9 K=1.00	1.1900	-5.02	12.84	0.391 [1]
T8	60.3892 - 40.7017	L3x3x3/16	17.17	8.07	152.5 K=0.94	1.0900	-6.03	13.42	0.450 [1]
T9	40.7017 - 21.0142	L3x3x1/4	18.63	8.81	164.8 K=0.92	1.4400	-6.59	15.18	0.434 [1]
T10	21.0142 - 1.32667	L3x3x1/4	20.13	9.58	176.5 K=0.91	1.4400	-8.73	13.23	0.660 [1]

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	179.098 - 159.41	L3x3x1/4	4.00	3.29	93.4 K=1.40	1.4400	-0.55	37.63	0.015 [1]

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	158.827 - 139.139	P5x.258	19.71	6.57	42.0	4.2999	24.58	193.49	0.127 [1]
T4	139.139 - 119.452	P6x.28	19.71	6.57	35.1	5.5813	54.25	251.16	0.216 [1]
T5	119.452 - 99.7642	P8x.322	19.71	6.57	26.8	8.3993	78.55	377.97	0.208 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T6	99.7642 - 80.0767	P8x.322	19.71	6.57	26.8	8.3993	100.70	377.97	0.266 [1]
T7	80.0767 - 60.3892	P8x.406	19.71	6.57	27.1	10.4832	121.44	471.75	0.257 [1]
T8	60.3892 - 40.7017	P10x.365	19.71	9.86	32.2	11.9083	139.34	535.87	0.260 [1]
T9	40.7017 - 21.0142	P10x.365	19.71	9.86	32.2	11.9083	158.57	535.87	0.296 [1]
T10	21.0142 - 1.32667	P10x.365	19.71	9.86	32.2	11.9083	177.86	535.87	0.332 [1]
T11	1.32667 - 0	P10x.593	1.33	1.33	4.4	18.9221	183.80	851.50	0.216

[1] $P_u / \phi P_n$ controls

Leg Bending Design Data (Tension)

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T3	158.827 - 139.139	P5x.258	0.00	27.25	0.000	0.00	27.25	0.000
T4	139.139 - 119.452	P6x.28	0.00	42.30	0.000	0.00	42.30	0.000
T5	119.452 - 99.7642	P8x.322	0.00	83.29	0.000	0.00	83.29	0.000
T6	99.7642 - 80.0767	P8x.322	0.00	83.29	0.000	0.00	83.29	0.000
T7	80.0767 - 60.3892	P8x.406	0.00	102.93	0.000	0.00	102.93	0.000
T8	60.3892 - 40.7017	P10x.365	0.00	147.68	0.000	0.00	147.68	0.000
T9	40.7017 - 21.0142	P10x.365	0.00	147.68	0.000	0.00	147.68	0.000
T10	21.0142 - 1.32667	P10x.365	0.00	147.68	0.000	0.00	147.68	0.000
T11	1.32667 - 0	P10x.593	21.72	229.67	0.095	0.00	229.67	0.000

Leg Interaction Design Data (Tension)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T3	158.827 - 139.139	P5x.258	0.127	0.000	0.000	0.127 [1]	1.050	4.8.1
T4	139.139 - 119.452	P6x.28	0.216	0.000	0.000	0.216 [1]	1.050	4.8.1
T5	119.452 - 99.7642	P8x.322	0.208	0.000	0.000	0.208 [1]	1.050	4.8.1
T6	99.7642 - 80.0767	P8x.322	0.266	0.000	0.000	0.266 [1]	1.050	4.8.1
T7	80.0767 - 60.3892	P8x.406	0.257	0.000	0.000	0.257 [1]	1.050	4.8.1
T8	60.3892 - 40.7017	P10x.365	0.260	0.000	0.000	0.260 [1]	1.050	4.8.1
T9	40.7017 - 21.0142	P10x.365	0.296	0.000	0.000	0.296 [1]	1.050	4.8.1
T10	21.0142 - 1.32667	P10x.365	0.332	0.000	0.000	0.332 [1]	1.050	4.8.1
T11	1.32667 - 0	P10x.593	0.216	0.095	0.000	0.276	1.050	4.8.1

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	179.098 - 159.41	L1 3/4x1 3/4x3/16	6.34	2.82	65.7	0.3604	3.35	15.68	0.214 [1]
T3	158.827 - 139.139	L2x2x3/16	8.18	3.85	77.2	0.4308	5.90	18.74	0.315 [1]
T4	139.139 - 119.452	L2x2x1/4	8.92	4.18	84.8	0.5629	5.23	24.49	0.214 [1]
T5	119.452 - 99.7642	L2 1/2x2 1/2x3/16	11.11	5.15	81.6	0.5535	4.72	24.08	0.196 [1]
T6	99.7642 - 80.0767	L2 1/2x2 1/2x3/16	12.07	5.65	89.2	0.5535	4.83	24.08	0.201 [1]
T7	80.0767 - 60.3892	L2 1/2x2 1/2x1/4	14.08	6.66	106.1	0.7284	5.24	31.69	0.165 [1]
T8	60.3892 - 40.7017	L3x3x3/16	17.17	8.07	106.1	0.6945	6.10	30.21	0.202 [1]
T9	40.7017 - 21.0142	L3x3x1/4	18.63	8.81	116.7	0.9159	6.41	39.84	0.161 [1]
T10	21.0142 - 1.32667	L3x3x1/4	20.13	9.58	126.5	0.9159	9.03	39.84	0.227 [1]

[1] $P_u / \phi P_n$ controls

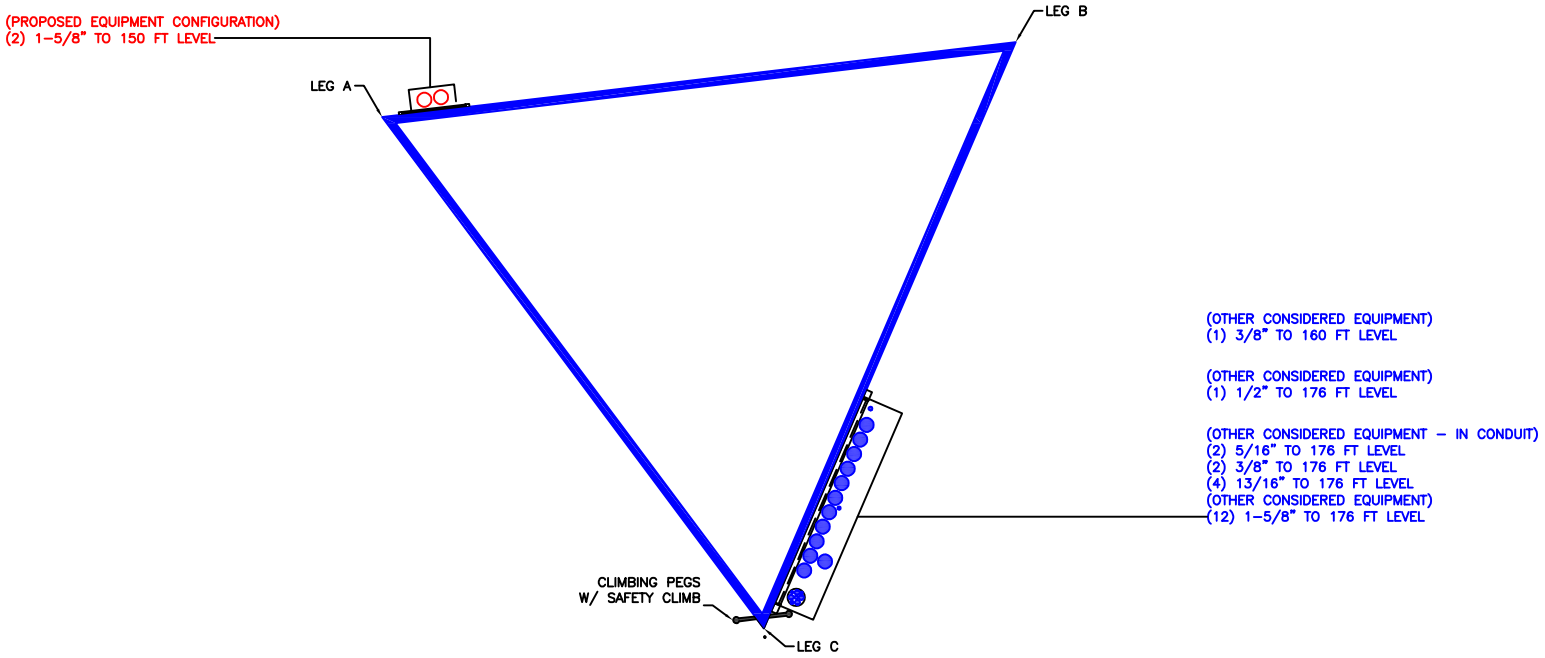
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	179.098 - 159.41	Leg	P3x.216	2	-81.63	87.22	93.6	Pass
T2	159.41 - 158.827	Leg	P5x.258	33	-84.37	202.96	42.5	Pass
T3	158.827 - 139.139	Leg	P5x.258	36	-100.43	178.59	56.2	Pass
T4	139.139 - 119.452	Leg	P6x.28	57	-131.98	240.98	54.8	Pass
T5	119.452 - 99.7642	Leg	P8x.322	78	-158.71	376.50	42.2	Pass
T6	99.7642 - 80.0767	Leg	P8x.322	99	-183.39	376.50	48.7	Pass
T7	80.0767 - 60.3892	Leg	P8x.406	120	-207.78	469.43	44.3	Pass
T8	60.3892 - 40.7017	Leg	P10x.365	141	-228.91	521.60	43.9	Pass
T9	40.7017 - 21.0142	Leg	P10x.365	156	-251.81	521.60	48.3	Pass
T10	21.0142 - 1.32667	Leg	P10x.365	171	-275.56	521.60	52.8	Pass
T11	1.32667 - 0	Leg	P10x.593	186	-282.19	892.79	38.4	Pass
T1	179.098 - 159.41	Diagonal	L1 3/4x1 3/4x3/16	12	-4.24	15.51	27.4	Pass
T3	158.827 - 139.139	Diagonal	L2x2x3/16	54	-6.70	15.86	42.2	Pass
T4	139.139 - 119.452	Diagonal	L2x2x1/4	63	-4.83	14.27	33.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T5	119.452 - 99.7642	Diagonal	L2 1/2x2 1/2x3/16	84	-4.70	17.36	27.0	Pass
T6	99.7642 - 80.0767	Diagonal	L2 1/2x2 1/2x3/16	105	-4.89	13.28	36.8	Pass
T7	80.0767 - 60.3892	Diagonal	L2 1/2x2 1/2x1/4	126	-5.02	13.48	37.2	Pass
T8	60.3892 - 40.7017	Diagonal	L3x3x3/16	147	-6.03	14.09	42.8	Pass
T9	40.7017 - 21.0142	Diagonal	L3x3x1/4	162	-6.59	15.94	41.3	Pass
T10	21.0142 - 1.32667	Diagonal	L3x3x1/4	177	-8.73	13.89	62.8	Pass
T1	179.098 - 159.41	Top Girt	L3x3x1/4	5	-0.55	39.51	1.4	Pass
							Summary	
						Leg (T1)	93.6	Pass
						Diagonal (T10)	62.8	Pass
						Top Girt (T1)	1.4	Pass
						Bolt Checks	86.2	Pass
						RATING =	**93.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED EQUIPMENT CONFIGURATION)
(2) 1-5/8" TO 150 FT LEVEL
LEG A
LEG B
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 160 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 176 FT LEVEL
(OTHER CONSIDERED EQUIPMENT - IN CONDUIT)
(2) 5/16" TO 176 FT LEVEL
(2) 3/8" TO 176 FT LEVEL
(4) 13/16" TO 176 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(12) 1-5/8" TO 176 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
LEG C

APPENDIX C

ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity

Site Info	
BU #	808716
Site Name	Tusten
Order #	594303 Rev.0

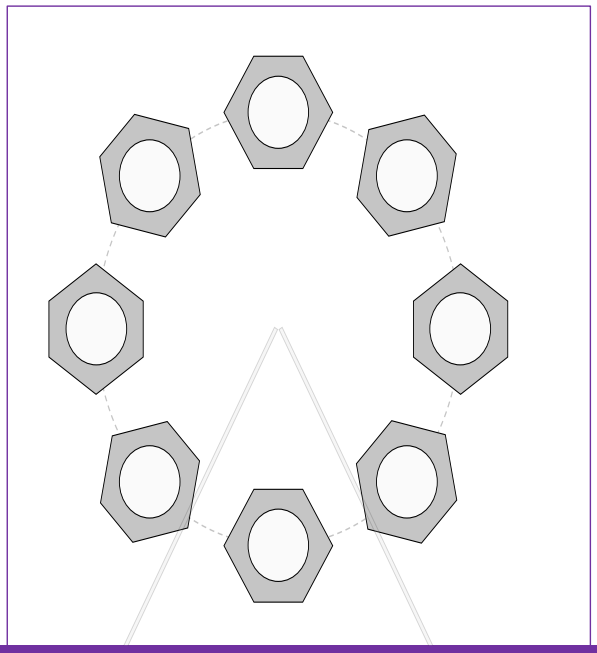
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	2.5

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	282.24	183.72
Shear Force (kips)	20.99	16.38

**TIA-222-H Section 15.5 Applied*

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

**Anchor Rod Eccentricity Applied*



Connection Properties

Anchor Rod Data

(8) 2" ø bolts (A36 N; Fy=36 ksi, Fu=58 ksi)

l_{ar} (in): 2.5

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

Pu_t = 22.97	ϕPn_t = 108.75	**Stress Rating**
Vu = 2.05	ϕVn = 68.33	**20.1%**
Mu = n/a	ϕMn = n/a	**Pass**

SST Unit Base Foundation

BU # :	808716
Site Name:	Tusten
App. Number:	594303 Rev.0
TIA-222 Revision:	H

Top & Bot. Pad Rein. Different?:	☐
Tower Centroid Offset?:	☑
Block Foundation?:	☐
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Global Moment, **M**:	3569.3	ft-kips
Global Axial, **P**:	161.04	kips
Global Shear, **V**:	32.38	kips
Leg Compression, P_{comp}:	282.24	kips
Leg Comp. Shear, V_{u_comp}:	20.99	kips
Leg Uplift, P_{uplift}:	183.72	kips
Leg Uplift. Shear, V_{u_uplift}:	16.38	kips
Tower Height, **H**:	179.1	ft
Base Face Width, **BW**:	18	ft
BP Dist. Above Fdn, bp_{dist}:	4.5	in

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, **dpier**:	5.0	ft
Ext. Above Grade, **E**:	1.00	ft
Pier Rebar Size, **Sc**:	9	
Pier Rebar Quantity, **mc**:	26	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	6	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	5	in

Pad Properties		
Depth, **D**:	6.50	ft
Pad Width, W_1:	27.00	ft
Pad Thickness, **T**:	2.00	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	9	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	27	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δc:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	115	pcf
Ultimate Gross Bearing, Qult:	16.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:		degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.6	
Neglected Depth, **N**:	4.2	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, **gw**:	15	ft

<-- Toggle between Gross and Net

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	330.53	32.38	**9.3%**	**Pass**
Bearing Pressure (ksf)	12.00	3.11	**24.7%**	**Pass**
*Overturning (kip*ft)*	8183.41	4251.72	**52.0%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	3112.24	115.45	**3.5%**	**Pass**
*Pier Flexure (Tension) (kip*ft)*	2436.18	90.09	**3.5%**	**Pass**
Pier Compression (kip)	11247.53	301.68	**2.6%**	**Pass**
*Pad Flexure (kip*ft)*	2256.58	215.83	**9.1%**	**Pass**
Pad Shear - 1-way (kips)	593.48	68.72	**11.0%**	**Pass**
Pad Shear - Comp 2-way (ksi)	0.190	0.064	**32.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	1482.16	69.27	**4.5%**	**Pass**
Pad Shear - Tension 2-way (ksi)	0.190	0.045	**22.8%**	**Pass**
*Flexural 2-way (Tension) (kip*ft)*	1482.16	54.05	**3.5%**	**Pass**

**Rating per TIA-222-H Section 15.5*

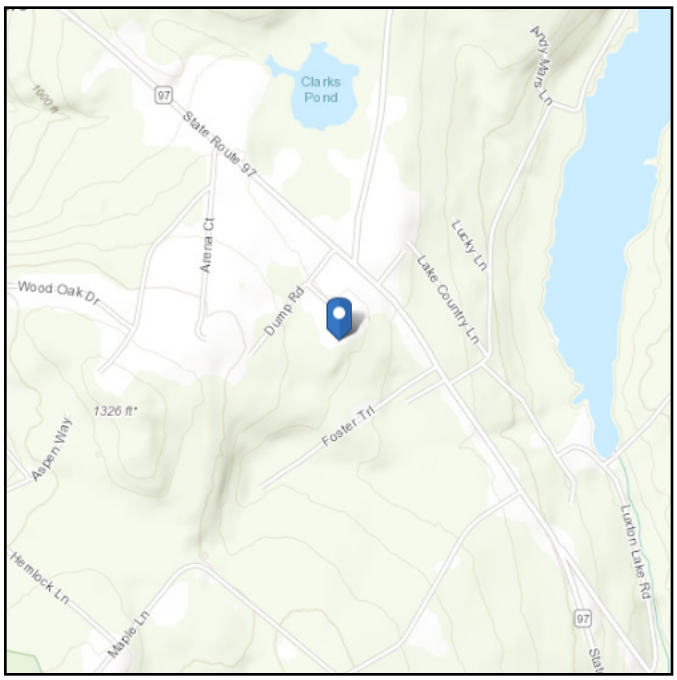
Structural Rating*:	**32.0%**
Soil Rating*:	**52.0%**

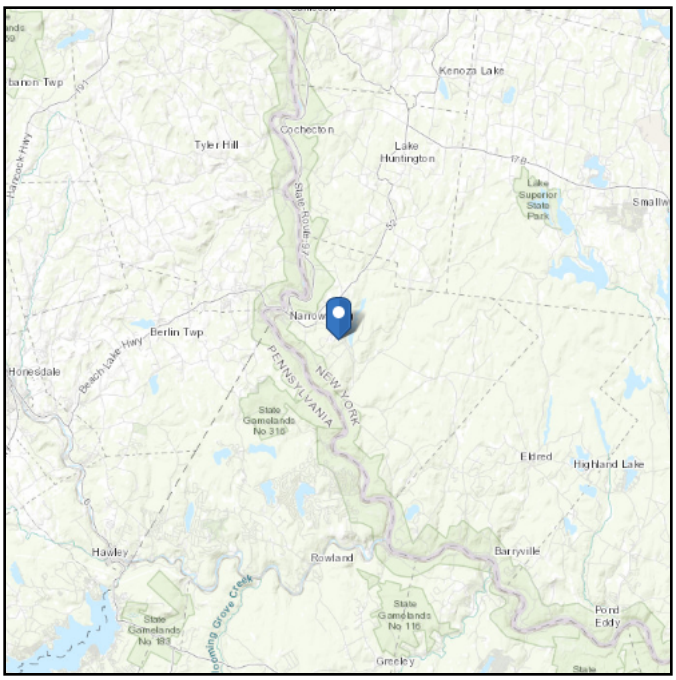
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 1150.28 ft (NAVD 88)
Latitude: 41.592806
Longitude: -75.021528





Wind

Results:

Wind Speed	112 Vmph
10-year MRI	75 Vmph
25-year MRI	83 Vmph
50-year MRI	88 Vmph
100-year MRI	94 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon Dec 13 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

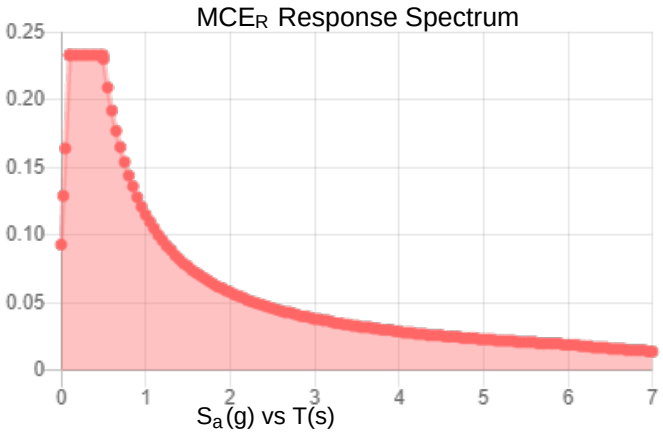
Seismic

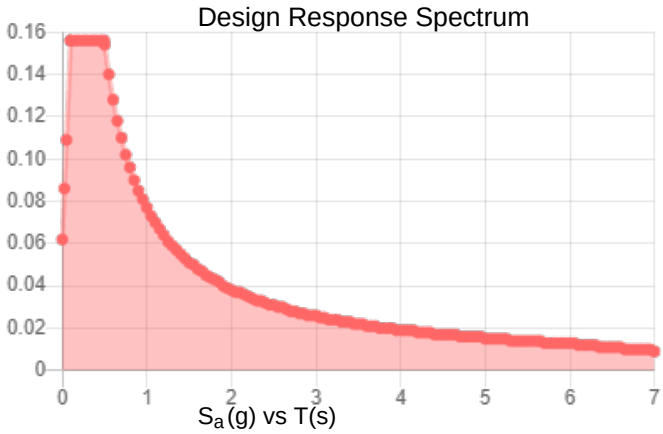
Site Soil Class: D - Stiff Soil

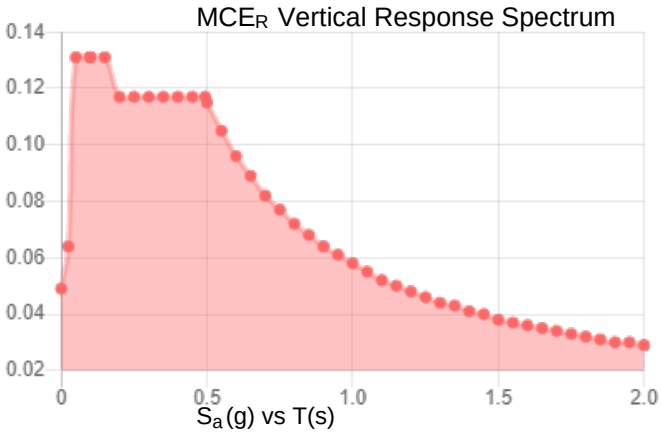
Results:

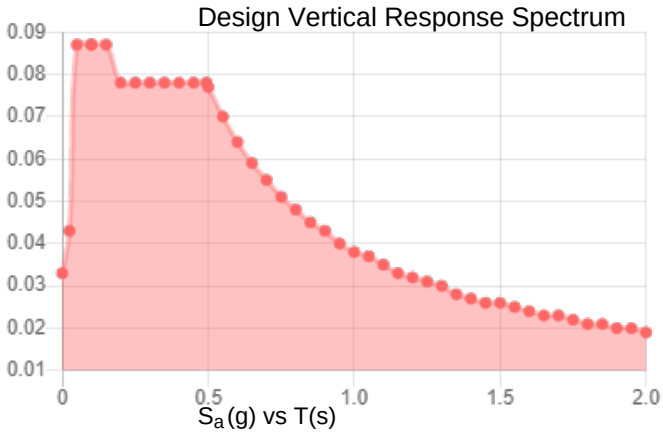
S_S :	0.146	S_{D1} :	0.077
S_1 :	0.048	T_L :	6
F_a :	1.6	PGA :	0.075
F_v :	2.4	PGA_M :	0.12
S_{MS} :	0.233	F_{PGA} :	1.6
S_{M1} :	0.115	I_e :	1
S_{DS} :	0.156	C_v :	0.7

Seismic Design Category B









Data Accessed: **Mon Dec 13 2021**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	40 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Mon Dec 13 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

verizon

VERIZON SITE NUMBER: 404764
VERIZON SITE NAME: WOODOAK - A
SITE TYPE: SELF SUPPORT TOWER
TOWER HEIGHT: 180'-0"

BUSINESS UNIT #: 808716
SITE ADDRESS: 6067 STATE ROUTE 97 NARROWSBURG, NY 12764
COUNTY: SULLIVAN
JURISDICTION: TOWN OF TUSTEN

VERIZON FUZE PROJECT #: 16272851

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	TUSTEN
SITE ADDRESS:	6067 STATE ROUTE 97 NARROWSBURG, NY 12764
COUNTY:	SULLIVAN
MAP/PARCEL #:	TBD
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 35' 34.10" N (41.59280555°)
LONGITUDE:	75° 1' 17.50" W (-75.02152777°)
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	1148'
CURRENT ZONING:	N/A
JURISDICTION:	TOWN OF TUSTEN
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	TOWN OF TUSTEN 210 BRIDGE STREET NARROWSBURG, NY 12764
TOWER OWNER:	CCATT LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	VERIZON WIRELESS 180 WASHINGTON VALLEY ROAD BEDMINSTER, NJ 07921
ELECTRIC PROVIDER:	TBD ----
TELCO PROVIDER:	TBD ----

PROJECT TEAM

A&E FIRM:	CROWN CASTLE USA INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065 WILLIAM GATES - PROJECT MANAGER WILLIAM.GATES @CROWNCASTLE.COM TAMMY NOSEK - CONSTRUCTION MANAGER TAMMY.NOSEK@CROWNCASTLE.COM

DRAWING INDEX

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

APPROVALS

SIGNATURE	DATE

CONTRACTOR PMI REQUIREMENTS

PMI ACCESSED AT	https://pmi.vxwsmart.com
SMART TOOL VENDOR PROJECT NUMBER	6039-Z0001-C
VzW LOCATION CODE (PSLC)	404764

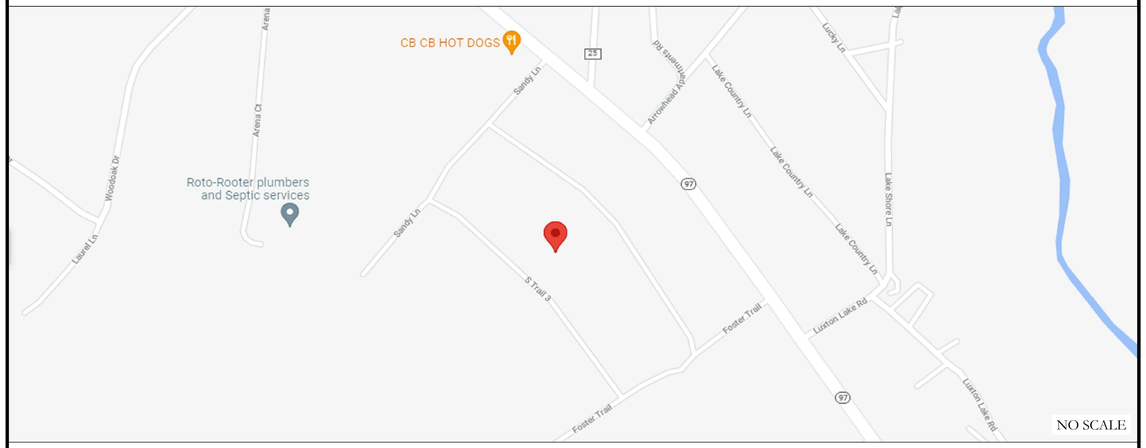
*** PMI AND REQUIREMENTS ALSO EMBEDDED IN MOUNT ANALYSIS REPORT

MOUNT MODIFICATION REQUIRED	**N**

VzW APPROVED SMART KIT VENDORS

REFER TO MOUNT MODIFICATION DRAWINGS PAGE FOR VzW SMART KIT APPROVED VENDORS

LOCATION MAP



DRIVING DIRECTIONS FROM VERIZON LOCAL OFFICE (180 WASHINGTON VALLEY RD, BEDMINSTER, NJ 07921) DEPART AND HEAD TOWARD WASHINGTON VALLEY RD / COUNTY HWY-620, TURN LEFT ONTO WASHINGTON VALLEY RD / COUNTY HWY-620, TURN RIGHT ONTO SCHLEY MOUNTAIN RD, AT EXIT 41B, HEAD RIGHT ON THE RAMP FOR I-80 WEST TOWARD DEL WATER GAP, AT EXIT 34B, HEAD RIGHT ON THE RAMP FOR NJ-15 NORTH TOWARD JEFFERSON / SPARTA, TURN RIGHT ONTO PA-434 / ROUTE 434, ENTERING NEW YORK, TURN LEFT ONTO NY-97 / STATE ROUTE 97, ARRIVE AT 6067 STATE ROUTE 97, NARROWSBURG, NY 12764

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF 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:

CODE TYPE	CODE
BUILDING	2020 IBC
MECHANICAL	2020 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	VERTICAL STRUCTURES INC.
DATED:	12/27/2018
MOUNT ANALYSIS:	TOWER ENGINEERING SOLUTIONS, LLC
DATED:	11/22/2021
RFDS REVISION:	2
DATED:	11/22/2021
ORDER ID:	594303
REVISION:	0

CALL NEW YORK ONE CALL
(800) 962-7962
CALL 3 WORKING DAYS BEFORE YOU DIG!

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (3) RRHs
- REMOVE (1) OVP
- INSTALL (3) MT6407-77A INTEGRATED RADIO/ANTENNAS
- INSTALL (6) RRHs
- INSTALL (1) HYBRID CABLE

GROUND SCOPE OF WORK:
- REMOVE (1) OVP
- INSTALL (1) OVP

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER

verizon
180 WASHINGTON VALLEY ROAD
BEDMINSTER, NJ 07921

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
BELLEVUE, WA 98004

VERIZON SITE NUMBER:
404764

BU #: **808716**
TUSTEN

6067 STATE ROUTE 97
NARROWSBURG, NY 12764

EXISTING 180'-0" SELF SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/2021	RCD	FINAL CDs	----

STATE OF NEW YORK
JOHN S. STEVENS
071096
LICENSED PROFESSIONAL ENGINEER
EXCELSIOR

12-21-2021

SHEET NUMBER: T-1
REVISION: 0

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: VERIZON
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
   #4 BARS AND SMALLER..40 ksi
   #5 BARS AND LARGER...60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH.......................3"
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 BARS AND LARGER..2"
   #5 BARS AND SMALLER...1–1/2"
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
   SLAB AND WALLS..3/4"
   BEAMS AND COLUMNS...1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PER THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) 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 FLUSH TO FINISH GRADE 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.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "VERIZON".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

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BU #: **808716**
TUSTEN

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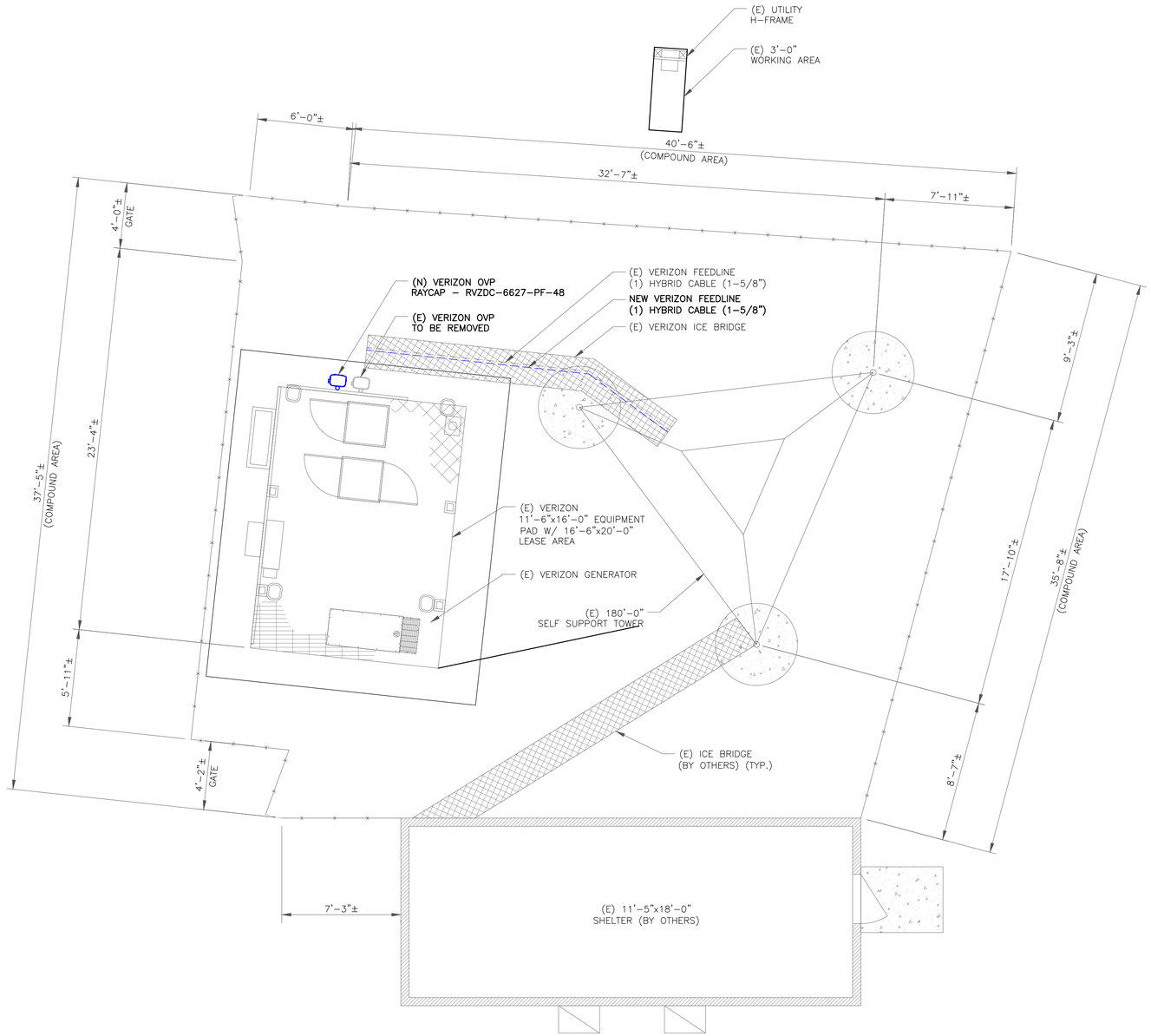
EXISTING 180'-0" SELF SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/2021	RCD	FINAL CDs	----

12-21-2021

SHEET NUMBER: **T-2**
REVISION: **0**



1 SITE PLAN

SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

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EXCELSIOR
071096
LICENSED PROFESSIONAL ENGINEER

12-21-2021

SHEET NUMBER: C-1

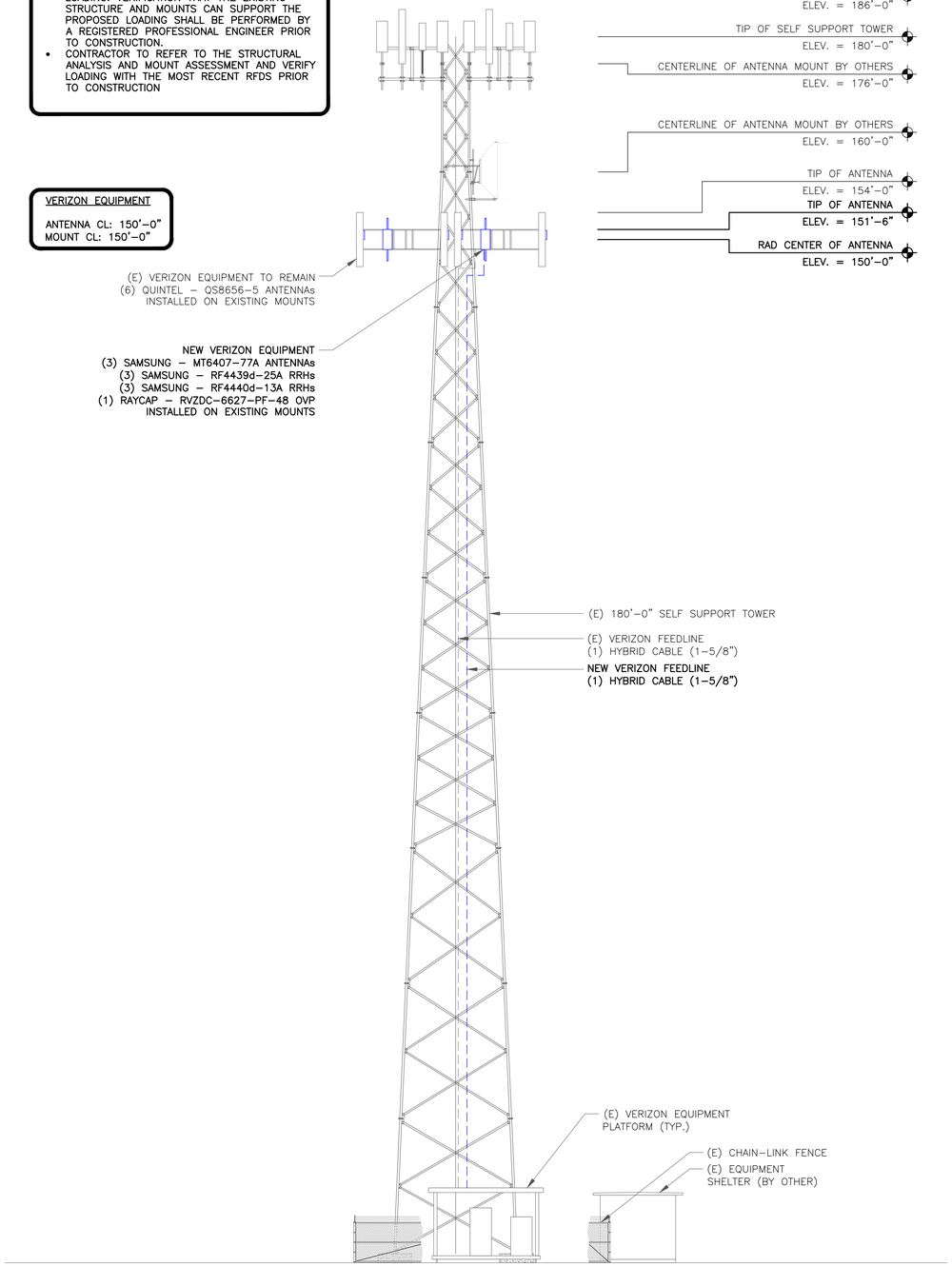
REVISION: 0

NOTES:

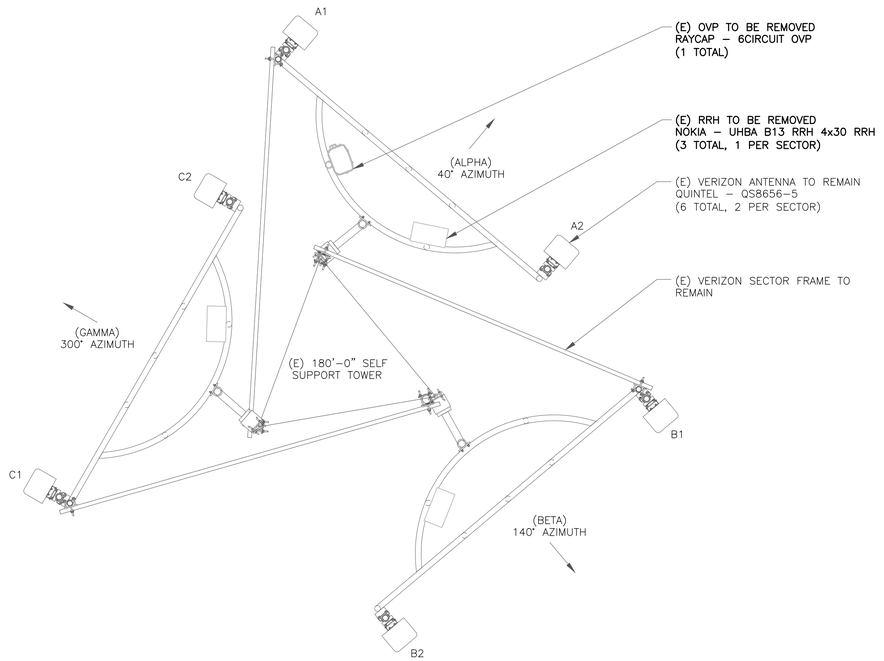
- THESE DRAWINGS ARE NOT INTENDED TO BE A VERIFICATION THAT THE STRUCTURE OR MOUNTS ARE ADEQUATE TO SUPPORT THE PROPOSED LOADING. VERIFICATION THAT THE EXISTING STRUCTURE AND MOUNTS CAN SUPPORT THE PROPOSED LOADING SHALL BE PERFORMED BY A REGISTERED PROFESSIONAL ENGINEER PRIOR TO CONSTRUCTION.
- CONTRACTOR TO REFER TO THE STRUCTURAL ANALYSIS AND MOUNT ASSESSMENT AND VERIFY LOADING WITH THE MOST RECENT RFDS PRIOR TO CONSTRUCTION

VERIZON EQUIPMENT

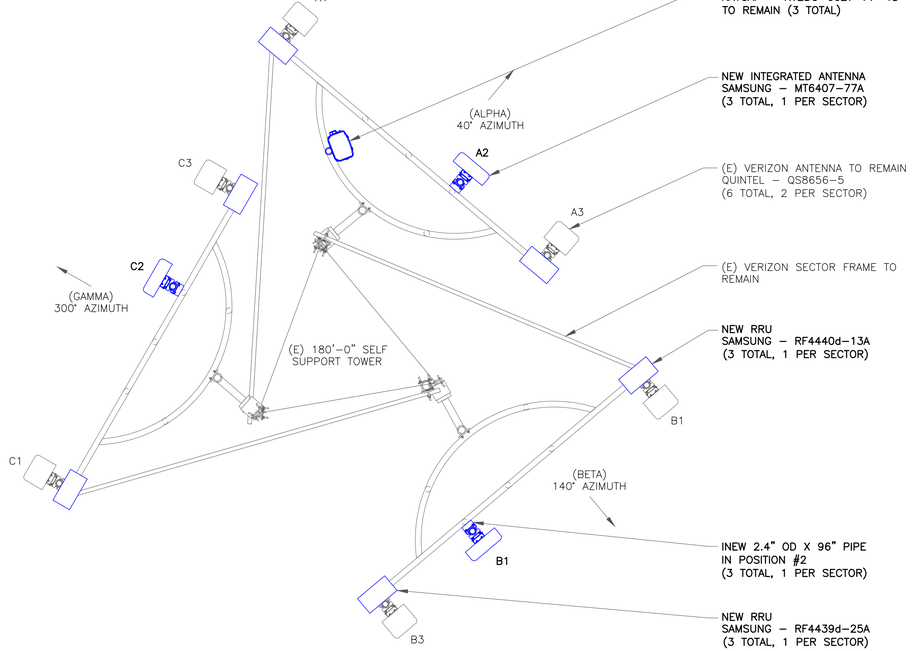
ANTENNA CL: 150'-0"
MOUNT CL: 150'-0"



1 TOWER ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA PLAN
SCALE: NOT TO SCALE



3 NEW ANTENNA PLAN
SCALE: NOT TO SCALE

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REVISION: 0

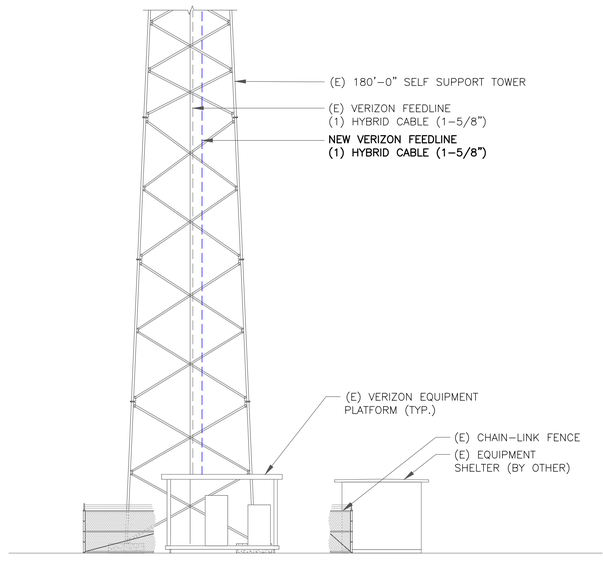
ANTENNA/RRH SCHEDULE

SECTOR	STATUS	ANTENNA MANUFACTURER	ANTENNA MODEL	ANTENNA CENTERLINE	AZIMUTH	MECHANICAL DOWNTILTS	ELECTRICAL DOWNTILTS	TOWER EQUIPMENT MANUFACTURER	TOWER EQUIPMENT QTY/MODEL
A1	EXISTING	QUINTEL	QS8656-5	150'-0"	40°	0°	2°/2°/2°/2°	SAMSUNG	(1) RF4439d-25A
A2	**NEW**	**SAMSUNG**	**MT6407-77A**	**150'-0"**	**40°**	**0°**	**6°**	–	(1) RVZDC-6627-PF-48
A3	EXISTING	QUINTEL	QS8656-5	150'-0"	40°	0°	2°/2°/2°/2°	SAMSUNG	(1) RF4440d-13A
B1	EXISTING	QUINTEL	QS8656-5	150'-0"	140°	0°	2°/2°/2°/2°	RAYCAP	(1) RF4439d-25A
B2	**NEW**	**SAMSUNG**	**MT6407-77A**	**150'-0"**	**140°**	**0°**	**6°**	–	–
B3	EXISTING	QUINTEL	QS8656-5	150'-0"	140°	0°	2°/2°/2°/2°	SAMSUNG	(1) RF4440d-13A
C1	EXISTING	QUINTEL	QS8656-5	150'-0"	300°	0°	5°/2°/2°/2°	RAYCAP	(1) RF4439d-25A
C2	**NEW**	**SAMSUNG**	**MT6407-77A**	**150'-0"**	**300°**	**0°**	**6°**	–	–
C3	EXISTING	QUINTEL	QS8656-5	150'-0"	300°	0°	5°/2°/2°/2°	SAMSUNG	(1) RF4440d-13A

1 VERIZON TOWER EQUIPMENT SCHEDULE
SCALE: NOT TO SCALE

CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	LENGTH	QTY
EXISTING	HYBRID	1-5/8"	200'-0"±	1
NEW	**HYBRID**	**1-5/8"**	**200'-0"±**	**1**
TOTAL CABLE QTY:				2



2 BASE LEVEL DETAIL
SCALE: NOT TO SCALE

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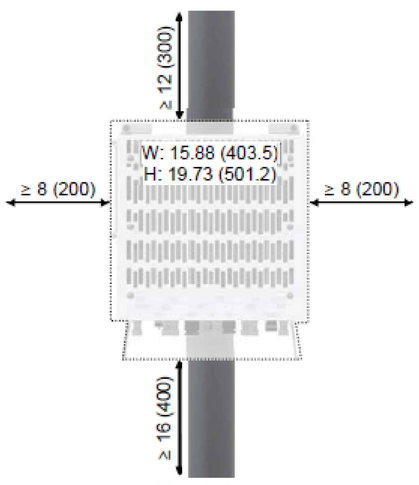
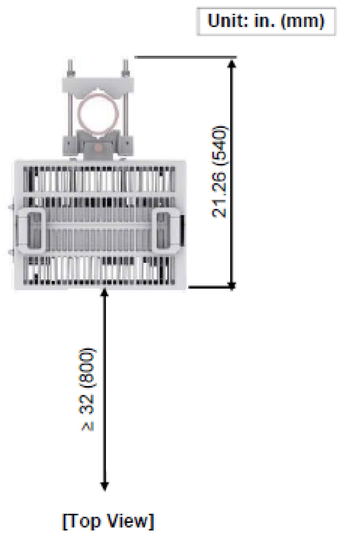
SHEET NUMBER: C-3

REVISION: 0

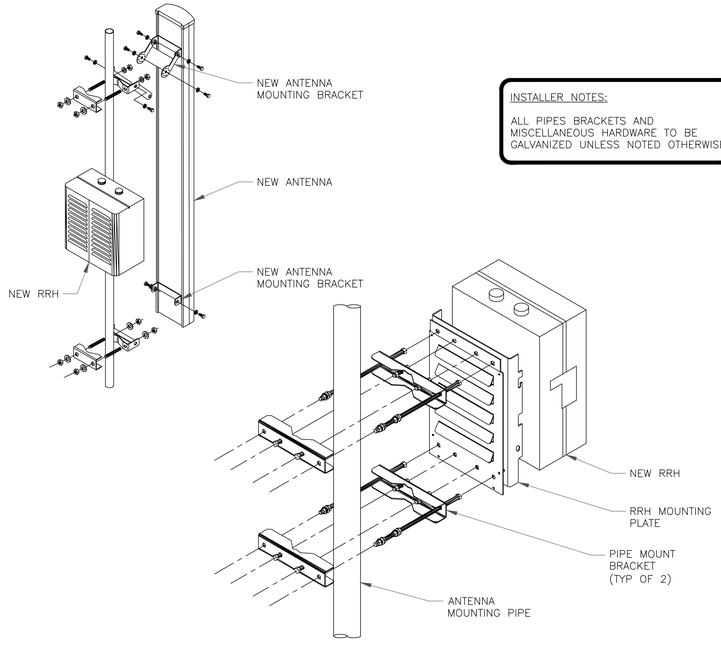
1 NOT USED
SCALE: NOT TO SCALE

2 NOT USED
SCALE: NOT TO SCALE





3 SAMSUNG – FPKA BRACKET MOUNTING DETAIL
SCALE: NOT TO SCALE



INSTALLER NOTES:

ALL PIPES BRACKETS AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.

4 ANTENNA & RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

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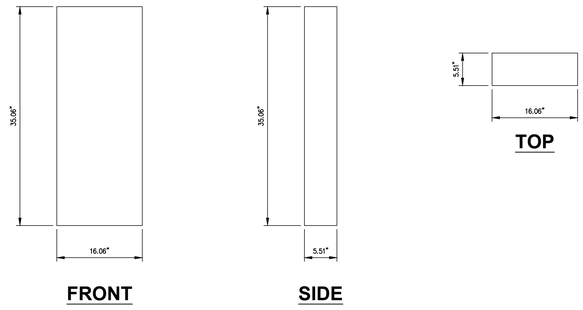
SHEET NUMBER: C-4

REVISION: 0

SAMSUNG PANEL ANTENNA (MT6407-77A)

DIMENSIONS, HxWxD: 35.06"x16.06"x5.51"

WEIGHT, W/O BRACKETS: 81.57 lbs



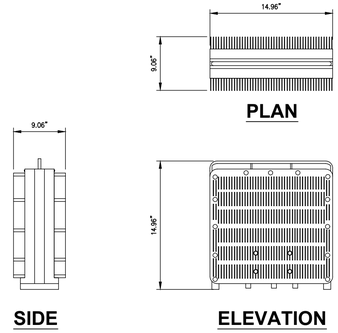
1 SAMSUNG MT6407-77A ANTENNA DETAIL
SCALE: NOT TO SCALE

SAMSUNG B5/B13 RRH-BR04C

DIMENSIONS, WxDxH: 14.96" X 14.96" X 9.06"

TOTAL WEIGHT: 72.50 lbs

TEMPERATURE: -40° TO 55° C

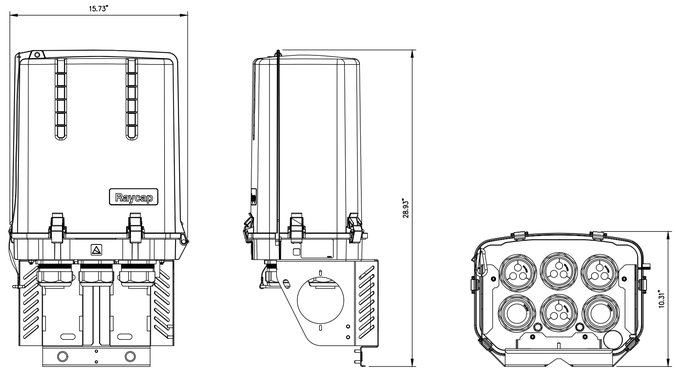


2 SAMSUNG RF4440d-13A DETAIL
SCALE: NOT TO SCALE

RAYCAP RVZDC-6627-PF-48

DIMENSIONS, LxWxH: 28.93"x15.73"x10.31"

WEIGHT, W/O BRACKETS: 32.0 lbs



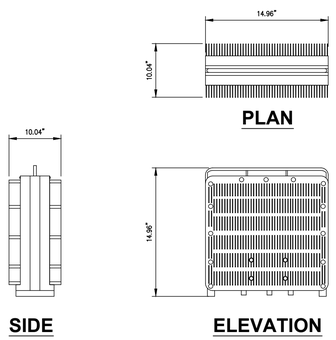
3 RVZDC-6627-PF-48 DETAIL
SCALE: NOT TO SCALE

SAMSUNG B2/B66A RRH-BR049

DIMENSIONS, WxDxH: 14.96" X 14.96" X 10.04"

TOTAL WEIGHT: 74.70 lbs

TEMPERATURE: -40° TO 55° C



4 SAMSUNG RF4439D-25A DETAIL
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

FIBER NAMING CONVENTION	
Technology	**(Equipment-Sector-OPTI #)**
DUPLEX FIBER RUN	
5GmmW L0	5GmmW-A-0
SIMPLEX FIBER RUN	
CBRS L0	CBRS-A-0
CBRS L1	CBRS-A-1
LAA L0	LAA-A-0
High Band Dual Band L0	HB-A-0
High Band Dual Band L1	HB-A-1
Low Band Dual Band L0	LB-A-0
FDMIMO AWS L0	FDM-AWS-A-0
FDMIMO AWS L1	FDM-AWS-A-1
FDMIMO PCS L0	FDM-PCS-A-0
FDMIMO PCS L1	FDM-PCS-A-1
Rev. 2/23/2021	

6 FIBER NAMING CONVENTION
SCALE: NOT TO SCALE

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12-21-2021

SHEET NUMBER:	REVISION:
C-5	0

Alpha AWS							*Beta AWS*							*GammaAWS*						
Port 1	WHITE						Port 1							Port 1						
Port 2	WHITE						Port 2							Port 2						
Port 3	WHITE						Port 3							Port 3						
Port 4	WHITE						Port 4							Port 4						
Alpha PCS							*Beta PCS*							*Gamma PCS*						
Port 1	WHITE						Port 1							Port 1						
Port 2	WHITE						Port 2							Port 2						
Port 3	WHITE						Port 3							Port 3						
Port 4	WHITE						Port 4							Port 4						
Alpha LTE 700							*Beta LTE 700*							*Gamma LTE 700*						
Port 1	WHITE						Port 1							Port 1						
Port 2	WHITE						Port 2							Port 2						
Port 3	WHITE						Port 3							Port 3						
Port 4	WHITE						Port 4							Port 4						
Alpha 850 LTE							*Beta 850 LTE*							*Gamma 850 LTE*						
Port 1	WHITE						Port 1							Port 1						
Port 2	WHITE						Port 2							Port 2						
Port 3	WHITE						Port 3							Port 3						
Port 4	WHITE						Port 4							Port 4						
Alpha 850 CDMA							*Beta 850 CDMA*							*Gamma 850 CDMA*						
Port 1	WHITE						Port 1							Port 1						
Port 2	WHITE						Port 2							Port 2						
Alpha EVDO							*Beta EVDO*							*Gamma EVDO*						
Port 1	WHITE						Port 1							Port 1						
Port 2	WHITE						Port 2							Port 2						

GPS 1				
GPS 2				
GPS 3				
GPS 4				

Alpha 850 LTE + 700 LTE									
Port 1	WHITE								
Port 2	WHITE								
Port 3	WHITE								
Port 4	WHITE								
Beta 850 LTE + 700 LTE									
Port 1									
Port 2									
Port 3									
Port 4									
Gamma 850 LTE + 700 LTE									
Port 1									
Port 2									
Port 3									
Port 4									

Alpha 850 NR Fiber	White			Ptouch - Alpha 850 NR
Beta 850 NR Fiber				Ptouch - Beta 850 NR
Gamma 850 NR Fiber				Ptouch - Gamma 850 NR

1 COLOR CODE
SCALE: NOT TO SCALE

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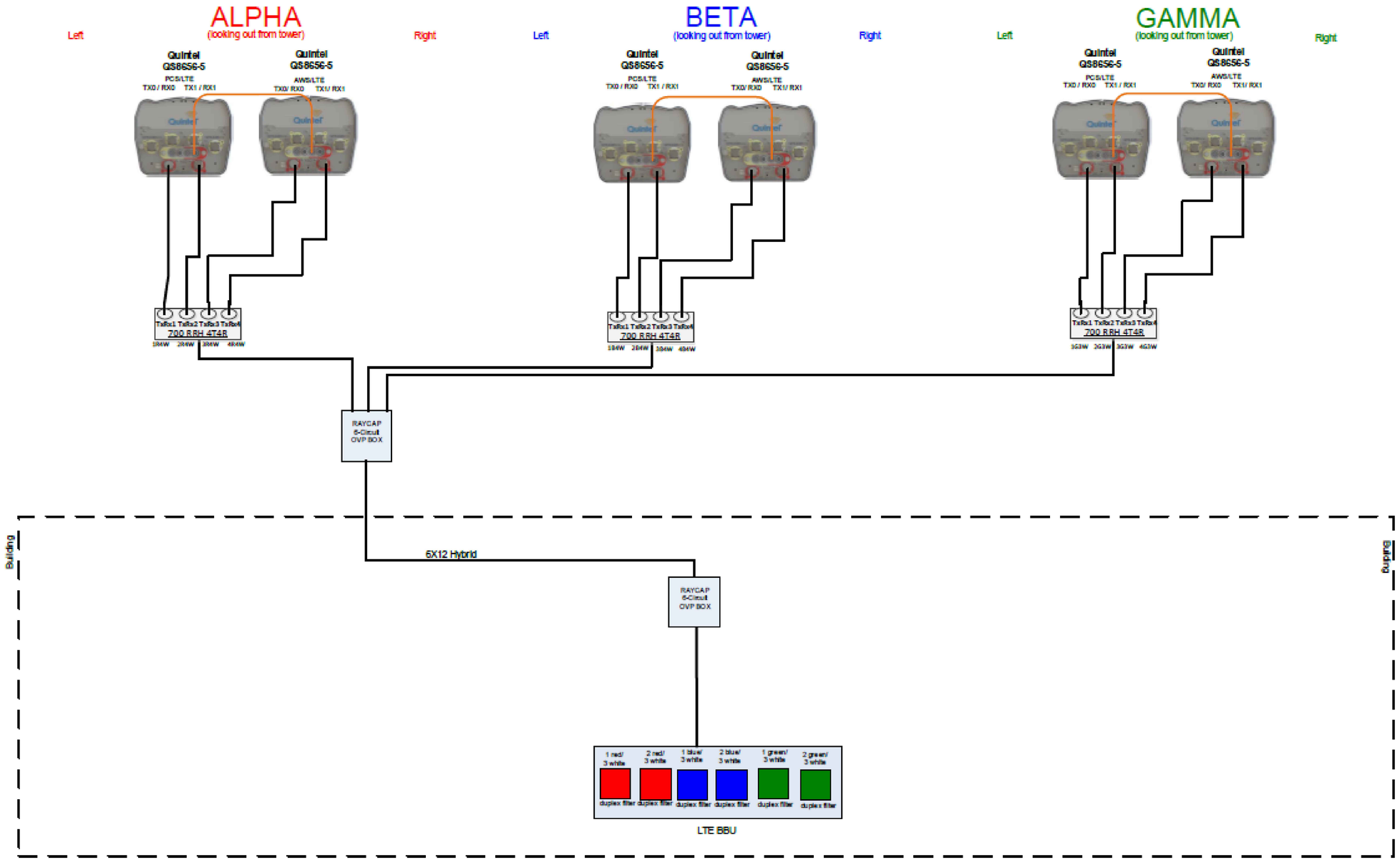
SHEET NUMBER: C-6

REVISION: 0



WOODOAK ANTENNA LINE LAYOUT - EXISTING

1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

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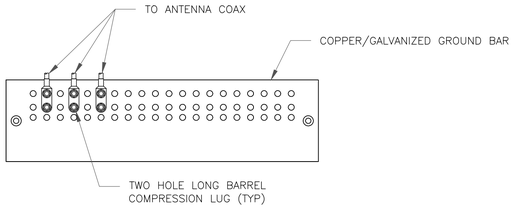
REVISION: 0



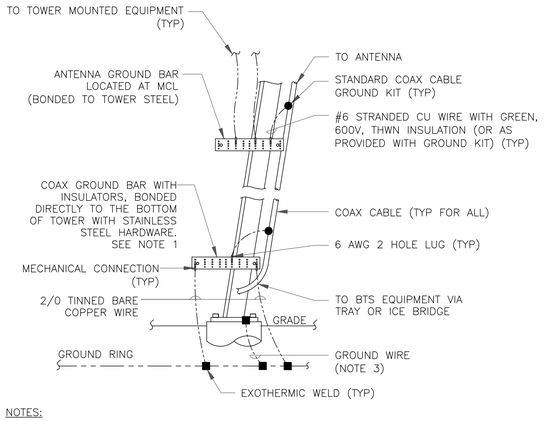
NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE

2 NOT USED
SCALE: NOT TO SCALE

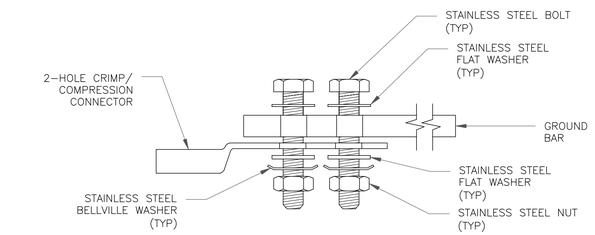
3 NOT USED
SCALE: NOT TO SCALE



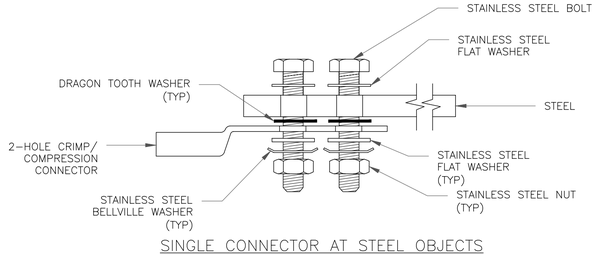
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

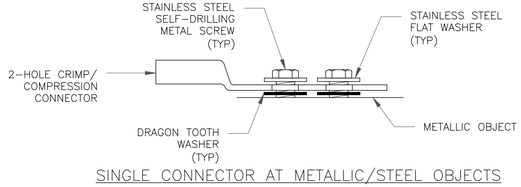
4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS



SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

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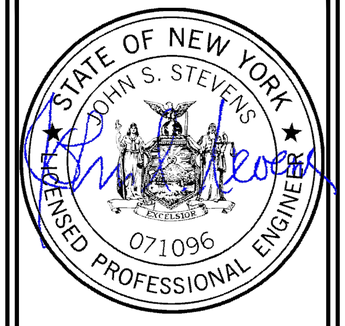
6067 STATE ROUTE 97
NARROWSBURG, NY 12764

EXISTING 180'-0" SELF SUPPORT TOWER

ISSUED FOR:

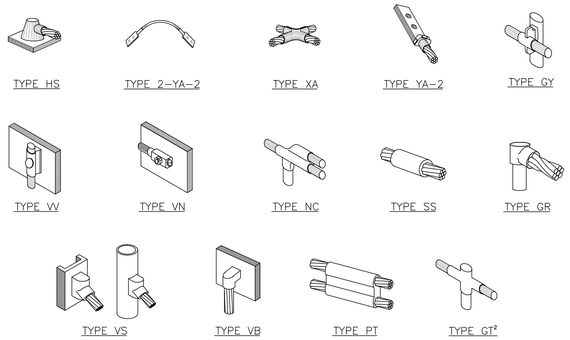
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	12/13/2021	RCD	FINAL CDs	----



12-21-2021

SHEET NUMBER: G-1

REVISION: 0

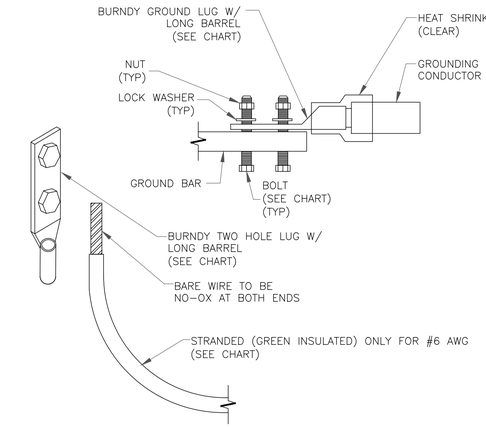


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

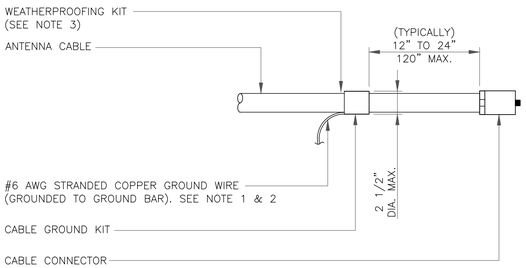
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

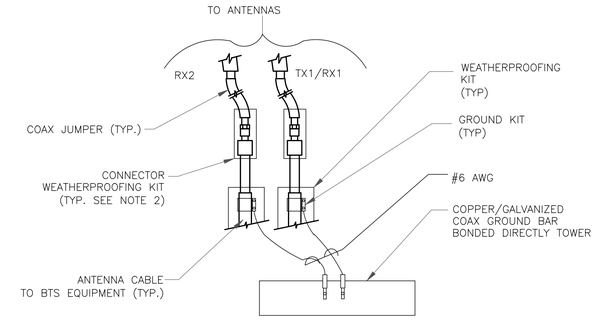
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

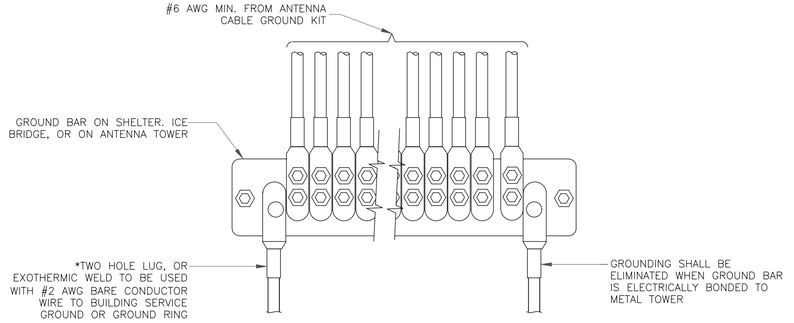
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



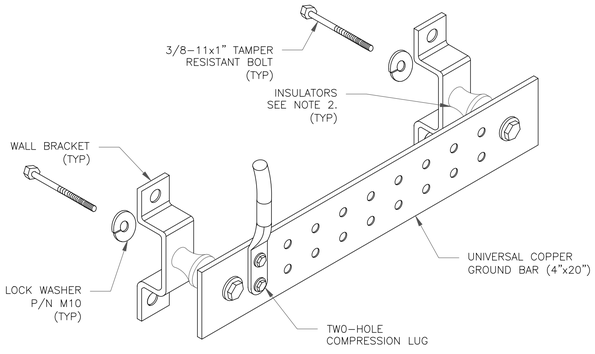
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



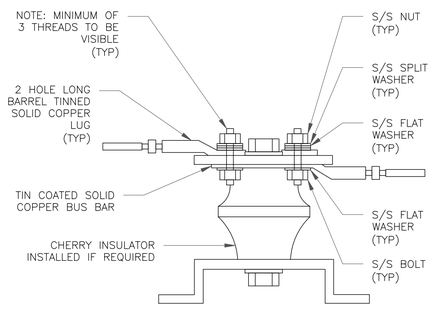
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

8 NOT USED
SCALE: NOT TO SCALE

verizon
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6067 STATE ROUTE 97
NARROWSBURG, NY 12764

EXISTING 180'-0" SELF SUPPORT TOWER

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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12-21-2021

SHEET NUMBER: G-2

REVISION: 0