



Plan Commission Meeting
Monday, February 6, 2023
6:00 pm

Location of Meeting: 96 Russell Drive

Meeting Minutes

1. Call to Order, Roll Call: Chairman Mike San Felippo called the meeting to order at 6:00 pm. Commission members present included Mike San Felippo, Elizabeth Manian, Barbara Ruege, John Schluechtermann, Randy Soerens, and Peter Lederer. Village employees present were Clerk/Treasurer Stephanie Waala. For additional attendees see attached sign-in sheet.

2. Discussion and Possible Action to approve the minutes of the January 16, 2023 meeting.

Member Manian made a motion to approve as submitted, motion seconded by Member Schluechtermann. Motion carried 6-0.

3. Discussion and Possible Recommendation to the Village Board to approve a final plat for the Woodland View subdivision submitted by the Scholler Development, LLC.

Engineer Aaron Groh informed the board that changes has been made to the final plat and after review is satisfactory. It was determined not to extend Orth Dr to the west because it could cause potential of lot losage if further development is done to the property to the north.

Member Schluechtermann asks for clarification on the Additional Easement Detail drawing as the lot numbers do not correspond with the larger drawing. It was determined that parcel listed 38 should be listed as 39 and correspond continually to parcel 32.

Member Soerens made a motion to approve as submitted with directive to correct the lot numbering, motion was seconded by member Manian. Motion carried 6-0.

4. Adjourn: meeting was adjourned at 6:13 pm.

Items on the Agenda may be taken out of order as listed. Created by Clerk Waala on 02/16/2023

WI Open Meeting Law (Wis. Stat. 19.83(2) and 19.84(2)) In general, the open meetings law grants citizens the right to attend and observe open session meetings of governmental bodies but does not require a governmental body to allow members of the public to speak or actively participate in the body's meeting. A governmental body is free to determine for itself whether and to what extent it will allow citizen participation at its meetings.



P.O. Box 344 • 96 Russell Drive • Random Lake, WI 53075
 Phone: (920) 994-4852 • Fax: (920) 994-2390

Commercial & Industrial Permit Application

Job Location (identify exact address) W 5009 hwy 144 , Random Lake, WI 53075		Date 02/06/23	Permit#
Owner's Name Global Signal Acquisition	Phone Number 301-283-2828	Contact's Name (When Relevant) Christina Wilburn on behalf of Crown Castle (Tower Owner) 3025 Highland Parkway, 4th Floor Downers Grove, IL 60515 Phone Number 773-628-4388	
Owner's Address (if different from above) PO Box 277455 Atlanta		City Atlanta	State GA
Contractor's Name VOX COMMUNICATIONS, LLC		License Number	Contractor's Contact Name Vasile Dorojan, Sr. Project Manager vd@vox-line.com Phone Number 215-385-2738
Contractor's Address 10871 Bustleton Avenue, Unit 114,		City Philadelphia	State PA Zip Code 19116
It is the responsibility of the permit holder to arrange for appointment times when entry is available for the required inspections. If the inspector cannot access the work site or if the work is not visible, a re-inspection fee will be charged.			
Use of Building	Type of Work	Item	Qty. Fee Amount
<input checked="" type="checkbox"/> Commercial	<input type="checkbox"/> New		
<input type="checkbox"/> Industrial	<input type="checkbox"/> Addition		
	<input checked="" type="checkbox"/> Alteration/Repair	Decks & Porches	20/sq. ft.
		Fences	\$50.00
		Accessory Buildings	20/sq. ft. or \$30 minimum
		Re-Roof	\$ 100.00
		Pools	\$ 100.00
		Erosion Control – Plan Review	\$ 150.00
		Erosion Control – Inspection	\$ 150.00
		Additional Inspection – Call Back - Erosion	\$ 475.00
Required for exterior design, appearance and location		Architectural Review Board	1 \$ 45.00 45.00
Required for fences, accessory buildings, decks & porches, pools, etc.		Plan Commission Review	\$ 45.00
Required for new construction, additions, fences, pools, accessory buildings, etc.		Zoning Permit	\$ 45.00
Refer to current connection rate schedule w/DPW		Sewer Connection Fee	Refer to DPW
		Re-inspection Fee	\$ 75.00
		Construction & HVAC permit fees shall be 75% of the most recent State of WI fee schedule.	
		Plumbing permit fees shall be 75% of the most current State of WI fee schedule.	
Note: If any work is commenced before the permit has been obtained, the fees shall be doubled with no exceptions.			
I attest that the above information accurately describes the property and proposed work to be performed on it. I agree to comply with all Village of Random Lake and State of Wisconsin codes applicable to the occupancy and work stated above. I understand that any false misinformation may result in penalties prescribed in the Village of Random Lake ordinances.			Sub Total:
Base Fee:		(Add to Subtotal)	\$40.00
Total:			
Applicant Signature	Print Name	Date	
Office use only Permit Paid By:		Date	

christina.wilburn@crowncastle.com



3025 Highland Pkwy Suite 510
Downers Grove, IL 60515

Phone: (773) 628-4388
www.crowncastle.com

February 6, 2023

WI - VILLAGE OF RANDOM LAKE
BUILDING DEPT
96 RUSSELL DRIVE
RANDOM LAKE, WI 53075

Via Mail

*******NOTICE OF ELIGIBLE FACILITIES REQUEST*******

RE: Request for Minor Modification to Existing Wireless Facility – Section 6409

Site Address: W 5009 Hwy 144, Random Lake, WI 53075

Crown Site Number: 878349 / Crown Site Name: JUNG BEER

Customer Site Number: ML81125A / Application Number: 620275

Attention BUILDING DEPT:

On behalf of Sprint Spectrum LLC, f/k/a Sprint Spectrum L.P. (“Sprint PCS” or “Applicant”), Crown Castle USA Inc. (“Crown Castle”) is pleased to submit this request to modify the existing wireless facility noted above through the collocation, replacement and/or removal of the Applicant’s equipment as an eligible facilities request for a minor modification under Section 6409¹ and the rules of the Federal Communications Commission (“FCC”).²

Section 6409 mandates that state and local governments must approve any eligible facilities request for the modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station. Under Section 6409, to toll the review period, if the reviewing authority determines that the application is incomplete, it must provide written notice to the applicant within 30 days, which clearly and specifically delineates all missing documents or information reasonably related to whether the request meets the federal requirements.³

Additionally, if a state or local government, fails to issue any approvals required for this request within 60 days, these approvals are deemed granted. The FCC has clarified that the 30-day and 60-day deadlines begins when an applicant: (1) takes the first step required under state or local law; and (2) submits information sufficient to inform the jurisdiction that this modification qualifies under the federal law⁴. Please note that with the submission of this letter and enclosed items, the thirty and sixty-day review periods have started. Based on this filing, the deadline for written notice of incomplete application is March 8, 2023, and the deadline for issuance of approval is April 7, 2023.

¹ Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, § 6409 (2012) (codified at 47 U.S.C. § 1455).

² *Acceleration of Broadband Deployment by Improving Wireless Facility Siting Policies*, 29 FCC Rcd. 12865 (2014) (codified at 47 CFR § 1.6100); and *Implementation of State & Local Governments’ Obligation to Approve Certain Wireless Facility Modification Requests Under Section 6409(a) of the Spectrum Act of 2012*, WT Docket No. 19-250 (June 10, 2020).

³ See 47 CFR § 1.6100 (c)(3). ⁴ See 2020 Upgrade Order at paragraph 16.

The Foundation for a Wireless World

CrownCastle.com



3025 Highland Pkwy Suite 510
Downers Grove, IL 60515

Phone: (773) 628-4388
www.crowncastle.com

The proposed scope of work for this project includes:

Add or replace antennas and ancillary equipment as per plans for an existing carrier on an existing wireless communication facility.

At the end of this letter is a checklist of the applicable substantial change criteria under Section 6409. Additionally, please find enclosed the following information in support of this request:

- (1) Permit Application;
- (2) Construction Drawings;
- (3) Structural Analysis; and
- (4) Section 6409 Substantial Change Checklist.

As these documents indicate, (i) the modification involves the collocation, removal or replacement of transmission equipment; and (ii) such modification will not substantially change the physical dimensions of such tower or base station. As such, it is an "eligible facilities request" as defined in the FCC's rules to which the 60-day deadline for approval applies. Accordingly, Applicant requests all authorization necessary for this proposed minor modification under Section 6409.

Our goal is to work with you to obtain approvals earlier than the deadline. We will respond promptly to any request for related information you may have in connection with this request. Please let us know how we can work with you to expedite the approval process. We look forward to working with you on this important project, which will improve wireless telecommunication services in your community using collocation on existing infrastructure. If you have any questions, please do not hesitate to contact me.

Regards,

Christina Wilburn

Christina Wilburn
Site Acquisition Specialist
Crown Castle, Agent for Applicant
(773) 628-4388
Christina.Wilburn@crowncastle.com



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**Section 6409 Substantial Change Checklist
Towers Outside of the Public Right of Way**

The Federal Communications Commission has determined that a modification substantially changes the physical dimension of a wireless tower or base station under 47 U.S.C. § 1455(a) if it meets one of six enumerated criteria under 47 C.F.R. § 1.6100.

Criteria for Towers Outside the Public Rights of Way

YES/NO NO	Does the modification increase the height of the tower by more than the greater of: (a) 10% (b) or, the height of an additional antenna array plus separation of up to 20 feet from the top of the nearest existing antenna?
YES/NO NO	Does the modification add an appurtenance to the body of the tower that would protrude from the edge of the tower more than 20 feet or more than the width of the tower structure at the level of the appurtenance, whichever is greater?
YES/NO NO	Does the modification involve the installation of more than the standard number of new equipment cabinets for the technology involved or add more than four new equipment cabinets?
YES/NO NO	Does the modification entail any excavation or deployment outside the current site by more than 30 feet in any direction, not including any access or utility easements?
YES/NO NO	Does the modification defeat the concealment elements of the eligible support structure?
YES/NO NO	Does the modification violate conditions associated with the siting approval with the prior approval the tower or base station other than as specified in 47 C.F.R. § 1.6100(c)(7)(i) – (iv)?

If all questions in the above section are answered "NO," then the modification does not constitute a substantial change to the existing tower under 47 C.F.R. § 1.6100.

Date: January 13, 2023



Subject: Structural Analysis Report

Carrier Designation:

Site Number: ML81125A
Site Name: ML33XR049

Crown Castle Designation:

BU Number: 878349
Site Name: JUNG BEER
JDE Job Number: 720045
Work Order Number: 2193158
Order Number: 620275 Rev. 0

Engineering Firm Designation:

Black & Veatch Corp. Project Number: 406642

Site Data:

W 5009 hwy 144, Random Lake, Sheboygan County, WI 53075
Latitude 43° 33' 52", Longitude -87° 56' 34.81"
145 Foot - Self Support Tower

Black & Veatch Corp. 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 115 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Vinaykumar P. / Khushal Patel

Respectfully submitted by:

Ping Jiang, P.E.
Professional Engineer

Digitally signed
by Ping Jiang
Date:
2023.01.13
13:16:02-06'00'



Jan 13, 2023

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 3 - Section Capacity (Summary)

Table 4 - Tower Component Stresses vs. Capacity - LC5

4.1) Recommendations

5) APPENDIX A

tnxTower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 145 ft Self Support tower designed by Sabre Communications Corporation.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	40 mph
Seismic Ss:	0.071
Seismic S1:	0.041
Service Wind Speed:	60 mph
Seismic Loading:	Does not control per engineering judgement

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)
151.0	153.0	2	commscope	HCS 2.0 Part 1	2	1 1/2
		3	nokia	AHFIG_TMO		
		3	nokia	AHLOA_T-MOBILE		
		3	samsung telecommunications	RRH-P4		
	151.0	3	commscope	FFV4-65C-R3-V1_TMO w/ Mount Pipe		
		3	nokia	AEHC w/ Mount Pipe		
		1	cci tower mounts (v2.1)	Platform Mount [14.4' LP 603-1]		

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1557593	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	2054437	CCISITES
4-TOWER MANUFACTURER DRAWINGS	2054439	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. Black & Veatch Corp. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 3 - 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	145 - 140	Leg	P2x.154	3	-9.08	33.20	27.4	Pass	
T2	140 - 120	Leg	P2.5x.203	15	-34.36	60.05	57.2	Pass	
T3	120 - 100	Leg	P3x.3	45	-50.35	116.14	43.4	Pass	
T4	100 - 80	Leg	P3.5x.318	75	-62.80	148.90	42.2	Pass	
T5	80 - 60	Leg	P4x.337	102	-74.28	167.91	44.2	Pass	
T6	60 - 40	Leg	P5x.375	123	-86.68	251.36	34.5	Pass	
T7	40 - 20	Leg	P6x.28	144	-99.27	240.27	41.3	Pass	
T8	20 - 0	Leg	P6x.432	165	-111.06	318.94	34.8	Pass	
T1	145 - 140	Diagonal	L1 3/4x1 3/4x3/16	12	-2.67	13.69	19.5	Pass	
T2	140 - 120	Diagonal	L1 3/4x1 3/4x3/16	21	-2.95	13.82	21.3	Pass	
T3	120 - 100	Diagonal	L1 3/4x1 3/4x3/16	51	-1.53	9.42	16.3	Pass	
T4	100 - 80	Diagonal	L1 3/4x1 3/4x3/16	78	-1.70	6.51	26.1	Pass	
T5	80 - 60	Diagonal	L2x2x3/16	105	-2.13	6.19	34.5	Pass	
T6	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	126	-2.43	9.58	25.3	Pass	
T7	40 - 20	Diagonal	L2 1/2x2 1/2x3/16	147	-2.80	7.60	36.8	Pass	
T8	20 - 0	Diagonal	L3x3x3/16	168	-3.54	9.01	39.3	Pass	
T1	145 - 140	Top Girt	C7x9.8	6	0.54	92.92	0.6	Pass	
T2	140 - 120	Top Girt	L1 3/4x1 3/4x3/16	17	-0.60	7.66	7.8	Pass	
T3	120 - 100	Top Girt	L1 3/4x1 3/4x3/16	47	-0.87	7.84	11.1	Pass	
							Summary		
							Leg (T2)	57.2	Pass
							Diagonal (T8)	39.3	Pass
							Top Girt (T3)	11.1	Pass
							Bolt Checks	29.1	Pass
							Rating =	57.2	Pass

Table 4 - Tower Component Stresses vs. Capacity (Self Support Tower) - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	32.8	Pass
1	Base Foundation (Structure)	0	24.5	Pass
1	Base Foundation (Soil Interaction)		56.4	Pass
Structure Rating (max from all components) =				57.2%

Note:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed. 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



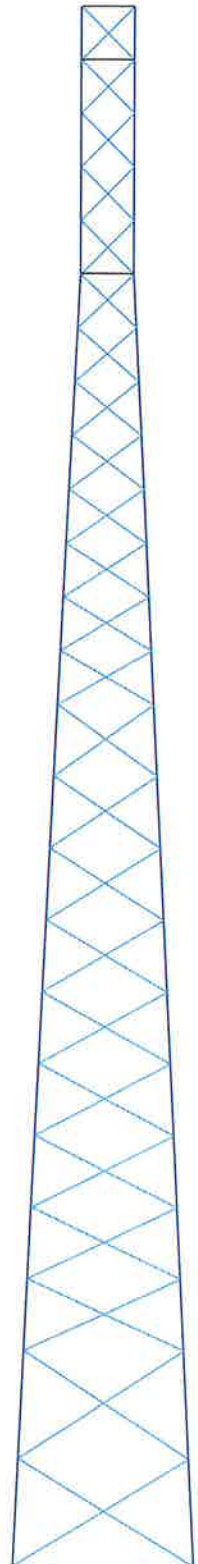
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Sheboygan County, Wisconsin.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 40 mph basic wind with 1.50 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: 57.2%

Section	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22
Legs	P6x.432	P6x.28	P5x.375	P4x.337	P3.5x.318	P3x.3	P2.5x.203	P2x.154									
Leg Grade				A572-50													
Diagonals	L3x3x3/16	L2 1/2x2 1/2x3/16		L2x2x3/16		L1 3/4x1 3/4x3/16											
Diagonal Grade				A36													
Top Girts			N.A.			L1 3/4x1 3/4x3/16											
Face Width (ft)	15	13	11	9	7	5											
# Panels @ (ft)	2 @ 10		9 @ 6.66667			13 @ 5											
Weight (K)	11.9	2.7	2.1	1.5	1.3	1.1	0.8	0.3									

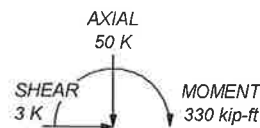


ALL REACTIONS ARE FACTORED

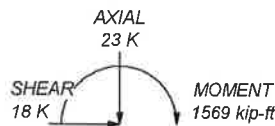
MAX. CORNER REACTIONS AT BASE:

DOWN: 114 K
SHEAR: 11 K

UPLIFT: -95 K
SHEAR: 9 K



TORQUE 2 kip-ft
40 mph WIND - 1.5000 in ICE



TORQUE 9 kip-ft
REACTIONS - 115 mph WIND

BLACK & VEATCH Building a world of difference	Black & Veatch Corp. 11401 Lamar Avenue Overland Park, KS 66211 Phone: (913) 458-6909 FAX: (913) 458-8136			Job: JUNG BEER (BU#878349)
	Project: 406642 (878349.2193158)			Client: Crown Castle
	Code: TIA-222-H		Drawn by: Khushal Patel	App'd:
	Path:			Date: 01/13/23
	Scale: NTS			Dwg No. E-1

Tower Input Data

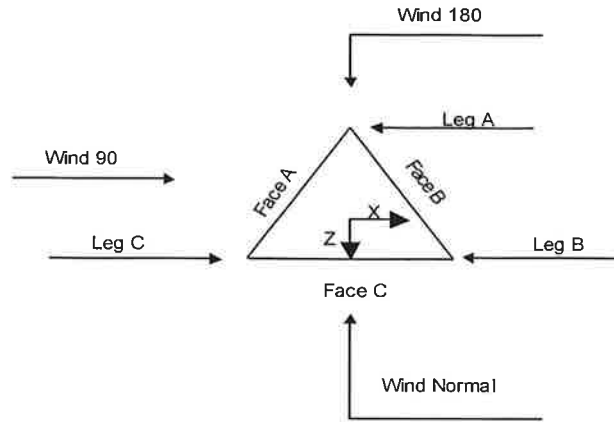
The main tower is a 3x free standing tower with an overall height of 145.00 ft above the ground line.
 The base of the tower is set at an elevation of 0.00 ft above the ground line.
 The face width of the tower is 5.00 ft at the top and 17.00 ft at the base.
 This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- Tower is located in Sheboygan County, Wisconsin.
- Tower base elevation above sea level: 898.00 ft.
- Basic wind speed of 115 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 1.5000 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: $K_{es}(F_w) = 0.95$, $K_{es}(t) = 0.85$.
- 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 Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section ✓ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area ✓ Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules ✓ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA ✓ SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <div style="background-color: #e0e0e0; padding: 2px; text-align: center;">Poles</div> Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	145.00-140.00			5.00	1	5.00
T2	140.00-120.00			5.00	1	20.00
T3	120.00-100.00			5.00	1	20.00
T4	100.00-80.00			7.00	1	20.00
T5	80.00-60.00			9.00	1	20.00
T6	60.00-40.00			11.00	1	20.00
T7	40.00-20.00			13.00	1	20.00
T8	20.00-0.00			15.00	1	20.00

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	145.00-140.00	5.00	X Brace	No	No	0.0000	0.0000
T2	140.00-120.00	5.00	X Brace	No	No	0.0000	0.0000
T3	120.00-100.00	5.00	X Brace	No	No	0.0000	0.0000
T4	100.00-80.00	5.00	X Brace	No	No	0.0000	0.0000
T5	80.00-60.00	6.67	X Brace	No	No	0.0000	0.0000
T6	60.00-40.00	6.67	X Brace	No	No	0.0000	0.0000
T7	40.00-20.00	6.67	X Brace	No	No	0.0000	0.0000
T8	20.00-0.00	10.00	X Brace	No	No	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 145.00-140.00	Pipe	P2x.154	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 140.00-120.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 120.00-100.00	Pipe	P3x.3	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T4 100.00-80.00	Pipe	P3.5x.318	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T5 80.00-60.00	Pipe	P4x.337	A572-50 (50 ksi)	Single Angle	L2x2x3/16	A36 (36 ksi)
T6 60.00-40.00	Pipe	P5x.375	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T7 40.00-20.00	Pipe	P6x.28	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 20.00-0.00	Pipe	P6x.432	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	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 145.00-140.00	Channel	C7x9.8	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T2 140.00-120.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Equal Angle		A36 (36 ksi)
T3 120.00-100.00	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)	Equal 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 _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 145.00-140.00	0.00	0.3750	A36 (36 ksi)	1.05	1.05	0.0000	0.0000	0.0000
T2 140.00-120.00	0.00	0.3750	A36 (36 ksi)	1.05	1.05	0.0000	0.0000	0.0000
T3 120.00-100.00	0.00	0.3750	A36 (36 ksi)	1.05	1.05	0.0000	0.0000	0.0000
T4 100.00-80.00	0.00	0.3750	A36 (36 ksi)	1.05	1.05	0.0000	0.0000	0.0000
T5 80.00-60.00	0.00	0.3750	A36 (36 ksi)	1.05	1.05	0.0000	0.0000	0.0000
T6 60.00-40.00	0.00	0.3750	A36 (36 ksi)	1.05	1.05	0.0000	0.0000	0.0000
T7 40.00-20.00	0.00	0.3750	A36 (36 ksi)	1.05	1.05	0.0000	0.0000	0.0000
T8 20.00-0.00	0.00	0.3750	A36 (36 ksi)	1.05	1.05	0.0000	0.0000	0.0000

Tower Section Geometry (cont'd)

K Factors¹

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 145.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1
T2 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1
T3 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1
T4 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1
T5 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1
T6 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1
T7 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1
T8 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1

¹Note: 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		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
T1 145.00-140.00	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
T2 140.00-120.00	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
T3 120.00-100.00	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
T4 100.00-80.00	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
T5 80.00-60.00	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
T6 60.00-40.00	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
T7 40.00-20.00	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
T8 20.00-0.00	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 145.00-140.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 140.00-120.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 120.00-100.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 100.00-80.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 80.00-60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

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
T6 60.00-40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 40.00-20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 20.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry (cont'd)

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal		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.
T1 145.00-140.00	Flange	0.7500	4	A325X	4	0.6250	1	A325X	3	0.6250	0	A325N	0	0.6250	0
T2 140.00-120.00	Flange	0.7500	4	A325X	4	0.6250	1	A325X	1	0.6250	0	A325N	0	0.6250	0
T3 120.00-100.00	Flange	1.0000	4	A325X	4	0.6250	1	A325X	1	0.7500	0	A325N	0	0.6250	0
T4 100.00-80.00	Flange	1.0000	4	A325X	4	0.6250	1	A325X	0	0.7500	0	A325N	0	0.6250	0
T5 80.00-60.00	Flange	1.2500	4	A325X	4	0.6250	1	A325X	0	0.7500	0	A325N	0	0.6250	1
T6 60.00-40.00	Flange	1.2500	4	A325X	4	0.6250	1	A325X	0	0.7500	0	A325N	0	0.6250	1
T7 40.00-20.00	Flange	1.2500	6	A325X	6	0.7500	1	A325X	0	0.7500	0	A325N	0	0.6250	1
T8 20.00-0.00	Flange	1.5000	0	A325X	0	0.7500	1	A325X	0	0.7500	0	A325N	0	0.6250	1

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Shield Leg	Allow	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
Climbing Ladder (Af)	B	No	No	Af (CaAa)	145.00 - 0.00	0.0000	0	1	1	3.0000	3.0000		8.40
Safety Line 3/8	B	No	No	Ar (CaAa)	145.00 - 0.00	0.0000	0.01	1	1	0.3750	0.3750		0.22
Feedline Ladder (Af)	B	No	No	Af (CaAa)	145.00 - 0.00	0.0000	-0.45	1	1	3.0000	3.0000		8.40
HCS 2.0 Part 3(1-1/2)	B	No	No	Ar (CaAa)	145.00 - 0.00	0.0000	-0.431	2	2	0.5000	1.5500		1.71

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Shield Leg	Allow	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf

Feed Line/Linear Appurtenances Section Areas

Tower Sectio n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	145.00-140.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	6.738	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
T2	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.950	0.000	0.41
		C	0.000	0.000	0.000	0.000	0.00
T3	120.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.950	0.000	0.41
		C	0.000	0.000	0.000	0.000	0.00
T4	100.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.950	0.000	0.41
		C	0.000	0.000	0.000	0.000	0.00
T5	80.00-60.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.950	0.000	0.41
		C	0.000	0.000	0.000	0.000	0.00
T6	60.00-40.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.950	0.000	0.41
		C	0.000	0.000	0.000	0.000	0.00
T7	40.00-20.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.950	0.000	0.41
		C	0.000	0.000	0.000	0.000	0.00
T8	20.00-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	26.950	0.000	0.41
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Sectio n	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight K
T1	145.00-140.00	A	1.476	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	14.583	0.000	0.26
		C		0.000	0.000	0.000	0.000	0.00
T2	140.00-120.00	A	1.462	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	58.078	0.000	1.04
		C		0.000	0.000	0.000	0.000	0.00
T3	120.00-100.00	A	1.438	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	57.618	0.000	1.02
		C		0.000	0.000	0.000	0.000	0.00
T4	100.00-80.00	A	1.410	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	57.077	0.000	1.01
		C		0.000	0.000	0.000	0.000	0.00
T5	80.00-60.00	A	1.375	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	56.414	0.000	0.99
		C		0.000	0.000	0.000	0.000	0.00
T6	60.00-40.00	A	1.329	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	55.553	0.000	0.96
		C		0.000	0.000	0.000	0.000	0.00
T7	40.00-20.00	A	1.263	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	54.299	0.000	0.93
		C		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} A _A In Face ft ²	C _{AA} A _A Out Face ft ²	Weight K
T8	20.00-0.00	A	1.132	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	51.813	0.000	0.86
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP _X in	CP _Z in	CP _X Ice in	CP _Z Ice in
T1	145.00-140.00	1.4183	-4.7832	1.8914	-5.4162
T2	140.00-120.00	1.9810	-6.4433	2.7257	-7.5976
T3	120.00-100.00	2.0855	-6.9153	2.9575	-8.4053
T4	100.00-80.00	2.4025	-8.1921	3.4577	-10.0833
T5	80.00-60.00	2.6965	-9.3571	3.9629	-11.7748
T6	60.00-40.00	2.5688	-9.1120	3.9565	-12.0187
T7	40.00-20.00	2.6754	-9.5819	4.0733	-12.5496
T8	20.00-0.00	2.9861	-10.7412	4.5216	-14.1918

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T1	1	Climbing Ladder (Af)	140.00 - 145.00	0.6000	0.4863
T1	2	Safety Line 3/8	140.00 - 145.00	0.6000	0.4863
T1	3	Feedline Ladder (Af)	140.00 - 145.00	0.6000	0.4863
T1	5	HCS 2.0 Part 3(1-1/2)	140.00 - 145.00	0.6000	0.4863
T2	1	Climbing Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T2	2	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T2	3	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T2	5	HCS 2.0 Part 3(1-1/2)	120.00 - 140.00	0.6000	0.6000
T3	1	Climbing Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T3	2	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T3	3	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T3	5	HCS 2.0 Part 3(1-1/2)	100.00 - 120.00	0.6000	0.6000
T4	1	Climbing Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T4	2	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T4	3	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T4	5	HCS 2.0 Part 3(1-1/2)	80.00 - 100.00	0.6000	0.6000
T5	1	Climbing Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T5	2	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
T5	3	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T5	5	HCS 2.0 Part 3(1-1/2)	60.00 - 80.00	0.6000	0.6000
T6	1	Climbing Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T6	2	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T6	3	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T6	5	HCS 2.0 Part 3(1-1/2)	40.00 - 60.00	0.6000	0.6000
T7	1	Climbing Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T7	2	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T7	3	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T7	5	HCS 2.0 Part 3(1-1/2)	20.00 - 40.00	0.6000	0.6000
T8	1	Climbing Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T8	2	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T8	3	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000
T8	5	HCS 2.0 Part 3(1-1/2)	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Lightning Rod 5/8"x4'	A	From Leg	0.00 0.00 8.00	0.0000	150.00	No Ice	0.25	0.25	0.00
						1/2" Ice	0.66	0.66	0.01
						Ice	0.97	0.97	0.01
						1" Ice	1.49	1.49	0.03
						2" Ice			
6'x3" Mount Pipe	A	From Leg	0.00 0.00 3.00	0.0000	150.00	No Ice	1.93	1.93	0.05
						1/2" Ice	2.29	2.29	0.06
						Ice	2.67	2.67	0.08
						1" Ice	3.44	3.44	0.13
						2" Ice			
Sabre 5' Rotatable Section	C	None		0.0000	145.00	No Ice	5.00	5.00	0.30
						1/2" Ice	7.80	7.80	0.39
						Ice	10.61	10.61	0.48
						1" Ice	16.21	16.21	0.66
						2" Ice			
Platform Mount [14.4' LP 603-1]	C	None		0.0000	151.00	No Ice	41.78	41.78	2.12
						1/2" Ice	48.63	48.63	2.87
						Ice	56.16	56.16	3.76
						1" Ice	73.94	73.94	5.93
						2" Ice			
(2) 6'x2" Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	151.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
(2) 6'x2" Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	151.00	No Ice	1.43	1.43	0.02
						1/2" Ice	1.92	1.92	0.03
						Ice	2.29	2.29	0.05

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral	Vert					
			ft	ft	ft					
(2) 6'x2" Mount Pipe	C	From Face	4.00	0.00	0.00	151.00	1" Ice	3.06	3.06	0.09
							2" Ice			
							No Ice	1.43	1.43	0.02
							1/2"	1.92	1.92	0.03
							Ice	2.29	2.29	0.05
10'x2" Mount Pipe	A	From Face	4.00	0.00	0.00	151.00	1" Ice	3.06	3.06	0.09
							2" Ice			
							No Ice	2.38	2.38	0.04
							1/2"	3.40	3.40	0.05
							Ice	4.45	4.45	0.08
10'x2" Mount Pipe	B	From Face	4.00	0.00	0.00	151.00	1" Ice	5.91	5.91	0.15
							2" Ice			
							No Ice	2.38	2.38	0.04
							1/2"	3.40	3.40	0.05
							Ice	4.45	4.45	0.08
10'x2" Mount Pipe	C	From Face	4.00	0.00	0.00	151.00	1" Ice	5.91	5.91	0.15
							2" Ice			
							No Ice	2.38	2.38	0.04
							1/2"	3.40	3.40	0.05
							Ice	4.45	4.45	0.08
FFV4-65C-R3-V1_TMO w/ Mount Pipe	A	From Face	4.00	0.00	0.00	151.00	2" Ice			
							No Ice	12.97	6.20	0.18
							1/2"	13.62	6.77	0.31
							Ice	14.27	7.36	0.46
							1" Ice	15.62	8.57	0.81
FFV4-65C-R3-V1_TMO w/ Mount Pipe	B	From Face	4.00	0.00	0.00	151.00	2" Ice			
							No Ice	12.97	6.20	0.18
							1/2"	13.62	6.77	0.31
							Ice	14.27	7.36	0.46
							1" Ice	15.62	8.57	0.81
FFV4-65C-R3-V1_TMO w/ Mount Pipe	C	From Face	4.00	0.00	0.00	151.00	2" Ice			
							No Ice	12.97	6.20	0.18
							1/2"	13.62	6.77	0.31
							Ice	14.27	7.36	0.46
							1" Ice	15.62	8.57	0.81
AEHC w/ Mount Pipe	A	From Face	4.00	0.00	0.00	151.00	2" Ice			
							No Ice	6.91	2.77	0.11
							1/2"	7.40	3.15	0.16
							Ice	7.91	3.55	0.22
							1" Ice	8.99	4.39	0.36
AEHC w/ Mount Pipe	B	From Face	4.00	0.00	0.00	151.00	2" Ice			
							No Ice	6.91	2.77	0.11
							1/2"	7.40	3.15	0.16
							Ice	7.91	3.55	0.22
							1" Ice	8.99	4.39	0.36
AEHC w/ Mount Pipe	C	From Face	4.00	0.00	0.00	151.00	2" Ice			
							No Ice	6.91	2.77	0.11
							1/2"	7.40	3.15	0.16
							Ice	7.91	3.55	0.22
							1" Ice	8.99	4.39	0.36
RRH-P4	A	From Face	4.00	0.00	2.00	151.00	2" Ice			
							No Ice	2.74	1.79	0.06
							1/2"	2.95	1.97	0.08
							Ice	3.17	2.16	0.11
							1" Ice	3.63	2.57	0.17
RRH-P4	B	From Face	4.00	0.00	2.00	151.00	2" Ice			
							No Ice	2.74	1.79	0.06
							1/2"	2.95	1.97	0.08
							Ice	3.17	2.16	0.11
							1" Ice	3.63	2.57	0.17
RRH-P4	C	From Face	4.00	0.00	2.00	151.00	2" Ice			
							No Ice	2.74	1.79	0.06
							1/2"	2.95	1.97	0.08
							Ice	3.17	2.16	0.11
							1" Ice	3.63	2.57	0.17

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz Lateral	Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
AHFIG_TMO	A	From Face	4.00	0.00	0.0000	151.00	1" Ice	3.63	2.57	0.17
							2" Ice			
							No Ice	3.08	1.47	0.07
							1/2"	3.32	1.66	0.09
							Ice	3.56	1.85	0.12
AHFIG_TMO	B	From Face	4.00	0.00	0.0000	151.00	1" Ice	4.07	2.27	0.18
							2" Ice			
							No Ice	3.08	1.47	0.07
							1/2"	3.32	1.66	0.09
							Ice	3.56	1.85	0.12
AHFIG_TMO	C	From Face	4.00	0.00	0.0000	151.00	1" Ice	4.07	2.27	0.18
							2" Ice			
							No Ice	3.08	1.47	0.07
							1/2"	3.32	1.66	0.09
							Ice	3.56	1.85	0.12
AHLOA_T-MOBILE	A	From Face	4.00	0.00	0.0000	151.00	1" Ice	3.80	2.65	0.20
							2" Ice			
							No Ice	2.86	1.85	0.08
							1/2"	3.08	2.04	0.11
							Ice	3.31	2.23	0.13
AHLOA_T-MOBILE	B	From Face	4.00	0.00	0.0000	151.00	1" Ice	3.80	2.65	0.20
							2" Ice			
							No Ice	2.86	1.85	0.08
							1/2"	3.08	2.04	0.11
							Ice	3.31	2.23	0.13
AHLOA_T-MOBILE	C	From Face	4.00	0.00	0.0000	151.00	1" Ice	3.80	2.65	0.20
							2" Ice			
							No Ice	2.86	1.85	0.08
							1/2"	3.08	2.04	0.11
							Ice	3.31	2.23	0.13
(2) HCS 2.0 Part 1	A	From Face	4.00	0.00	0.0000	151.00	1" Ice	2.59	1.48	0.11
							2" Ice			
							No Ice	1.87	0.93	0.02
							1/2"	2.04	1.06	0.04
							Ice	2.21	1.19	0.06

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

Comb. No.	Description
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	145 - 140	Leg	Max Tension	23	6.71	0.03	0.03
			Max. Compression	2	-9.08	0.00	0.05
			Max. Mx	18	-8.93	0.04	-0.03
			Max. My	2	-9.08	0.00	0.05
			Max. Vy	8	-1.43	0.00	0.00
			Max. Vx	2	1.40	0.00	0.00
		Diagonal	Max Tension	7	2.07	0.00	0.00
			Max. Compression	18	-2.67	0.00	0.00
			Max. Mx	38	-0.34	0.01	-0.00
			Max. My	6	-1.66	-0.00	0.00
			Max. Vy	38	-0.02	0.01	-0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	31	0.54	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	26	0.49	0.09	0.00
T2	140 - 120	Leg	Max. Vy	26	-0.07	0.00	0.00
			Max Tension	23	29.91	0.02	0.02
			Max. Compression	2	-34.36	0.00	0.21
			Max. Mx	8	-2.32	-0.22	-0.02
			Max. My	2	-34.36	0.00	0.21
			Max. Vy	8	0.08	-0.22	-0.02
		Diagonal	Max. Vx	2	-0.07	0.00	0.21
			Max Tension	5	2.83	0.00	0.00
			Max. Compression	10	-2.95	0.00	0.00
			Max. Mx	2	2.13	0.03	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft	
T3	120 - 100	Top Girt	Max. My	8	2.54	0.02	0.01	
			Max. Vy	27	-0.02	0.02	-0.00	
			Max. Vx	8	0.00	0.02	0.01	
			Max Tension	22	0.80	0.00	0.00	
			Max. Compression	3	-0.39	0.00	0.00	
		Leg	Max. Mx	26	0.50	-0.03	0.00	
			Max. Vy	26	0.02	0.00	0.00	
			Max Tension	23	43.94	-0.11	-0.01	
			Max. Compression	2	-50.35	0.15	-0.00	
			Max. Mx	2	-39.67	0.21	-0.00	
		Diagonal	Max. My	8	-2.72	-0.02	0.29	
			Max. Vy	18	0.06	0.21	-0.01	
			Max. Vx	8	-0.10	-0.02	0.29	
			Max Tension	10	1.59	0.00	0.00	
			Max. Compression	10	-1.74	0.00	0.00	
			Max. Mx	27	0.25	0.02	-0.00	
			Max. My	24	-1.50	-0.01	-0.00	
			Max. Vy	29	0.02	0.02	-0.00	
			Max. Vx	24	0.00	0.00	0.00	
			Max Tension	23	0.18	0.00	0.00	
T4	100 - 80	Top Girt	Max. Compression	2	-0.20	0.00	0.00	
			Max. Mx	26	-0.02	-0.03	0.00	
			Max. My	26	-0.03	0.00	0.00	
			Max. Vy	26	-0.02	0.00	0.00	
			Max. Vx	26	-0.00	0.00	0.00	
		Leg	Max Tension	7	54.34	-0.16	0.00	
			Max. Compression	2	-62.80	0.19	-0.00	
			Max. Mx	22	53.42	-0.19	-0.01	
			Max. My	8	-3.89	-0.01	0.23	
			Max. Vy	14	0.04	-0.19	0.00	
			Max. Vx	8	-0.06	-0.01	0.23	
			Diagonal	Max Tension	12	1.71	0.00	0.00
				Max. Compression	12	-1.70	0.00	0.00
				Max. Mx	29	0.19	0.03	0.00
				Max. My	37	-0.25	0.02	-0.00
Max. Vy	29	0.03		0.03	0.00			
T5	80 - 60	Leg	Max. Vx	37	0.00	0.00	0.00	
			Max Tension	7	63.77	-0.19	0.01	
			Max. Compression	2	-74.28	0.26	-0.01	
			Max. Mx	19	-72.54	0.27	-0.01	
			Max. My	8	-4.70	-0.00	0.28	
		Diagonal	Max. Vy	19	-0.06	0.27	-0.01	
			Max. Vx	20	0.06	-0.00	-0.28	
			Max Tension	12	2.06	0.00	0.00	
			Max. Compression	10	-2.13	0.00	0.00	
			Max. Mx	29	0.28	0.05	-0.01	
T6	60 - 40	Leg	Max. My	30	0.23	0.05	0.01	
			Max. Vy	29	0.03	0.05	-0.01	
			Max. Vx	30	-0.00	0.00	0.00	
			Max Tension	7	73.51	-0.27	0.01	
			Max. Compression	2	-86.68	0.36	-0.00	
		Diagonal	Max. Mx	11	-84.93	0.36	0.01	
			Max. My	8	-5.80	-0.01	0.33	
			Max. Vy	14	0.06	-0.34	0.00	
			Max. Vx	8	-0.06	-0.01	0.31	
			Max Tension	12	2.41	0.00	0.00	
T7	40 - 20	Leg	Max. Compression	12	-2.43	0.00	0.00	
			Max. Mx	29	0.16	0.07	0.01	
			Max. My	30	-0.41	0.07	0.01	
			Max. Vy	29	0.05	0.07	0.01	
			Max. Vx	37	0.00	0.00	0.00	
		Diagonal	Max Tension	7	83.33	-0.36	0.00	
			Max. Compression	2	-99.27	0.61	-0.01	
			Max. Mx	29	4.38	-1.28	0.01	
			Max. My	8	-6.29	-0.00	0.44	
			Max. Vy	33	0.32	-1.28	0.00	
Diagonal	Max. Vx	8	0.08	-0.01	0.43			
	Max Tension	12	2.74	0.00	0.00			
	Max. Compression	10	-2.80	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
T8	20 - 0	Leg	Max. Mx	29	-0.01	0.08	-0.01
			Max. My	30	0.23	0.08	0.01
			Max. Vy	29	0.05	0.08	0.01
			Max. Vx	30	-0.00	0.00	0.00
			Max Tension	7	92.20	-0.44	0.02
			Max. Compression	2	-111.06	0.00	0.00
			Max. Mx	29	6.23	-1.28	0.01
			Max. My	8	-7.54	-0.07	0.92
		Diagonal	Max. Vy	33	-0.27	-1.28	0.00
			Max. Vx	8	0.17	-0.07	0.92
			Max Tension	12	3.29	0.00	0.00
			Max. Compression	10	-3.54	0.00	0.00
			Max. Mx	29	-0.69	0.13	0.01
			Max. My	30	1.51	0.10	0.02
			Max. Vy	29	0.06	0.13	0.01
			Max. Vx	30	-0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	113.18	9.61	-5.83
	Max. H _x	18	113.18	9.61	-5.83
	Max. H _z	7	-94.58	-8.05	4.91
	Min. Vert	7	-94.58	-8.05	4.91
	Min. H _x	7	-94.58	-8.05	4.91
	Min. H _z	18	113.18	9.61	-5.83
Leg B	Max. Vert	10	113.53	-9.55	-5.88
	Max. H _x	23	-94.02	7.98	4.94
	Max. H _z	23	-94.02	7.98	4.94
	Min. Vert	23	-94.02	7.98	4.94
	Min. H _x	10	113.53	-9.55	-5.88
	Min. H _z	10	113.53	-9.55	-5.88
Leg A	Max. Vert	2	114.20	0.09	11.20
	Max. H _x	20	8.82	1.38	0.61
	Max. H _z	2	114.20	0.09	11.20
	Min. Vert	15	-92.73	-0.08	-9.34
	Min. H _x	9	6.15	-1.37	0.43
	Min. H _z	15	-92.73	-0.08	-9.34

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	19.09	0.00	0.00	-11.27	-3.69	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	22.91	-0.03	-17.61	-1568.86	-0.58	2.51
0.9 Dead+1.0 Wind 0 deg - No Ice	17.18	-0.03	-17.61	-1565.48	0.53	2.51
1.2 Dead+1.0 Wind 30 deg - No Ice	22.91	8.33	-14.42	-1304.37	-749.70	-2.46
0.9 Dead+1.0 Wind 30 deg - No Ice	17.18	8.33	-14.42	-1300.98	-748.59	-2.46
1.2 Dead+1.0 Wind 60 deg - No Ice	22.91	14.14	-8.13	-744.61	-1278.41	-6.82
0.9 Dead+1.0 Wind 60 deg - No Ice	17.18	14.14	-8.13	-741.23	-1277.31	-6.82
1.2 Dead+1.0 Wind 90 deg - No Ice	22.91	16.69	0.03	-9.67	-1501.64	-9.35

Load Combination	Vertical	Shear _x	Shear _z	Overturing Moment, M _x	Overturing Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 90 deg - No Ice	17.18	16.69	0.03	-6.29	-1500.53	-9.35
1.2 Dead+1.0 Wind 120 deg - No Ice	22.91	15.29	8.83	767.48	-1357.17	-8.86
0.9 Dead+1.0 Wind 120 deg - No Ice	17.18	15.29	8.83	770.86	-1356.06	-8.86
1.2 Dead+1.0 Wind 150 deg - No Ice	22.91	8.24	14.22	1263.49	-746.16	-6.16
0.9 Dead+1.0 Wind 150 deg - No Ice	17.18	8.24	14.22	1266.87	-745.05	-6.16
1.2 Dead+1.0 Wind 180 deg - No Ice	22.91	0.03	16.19	1446.16	-8.28	-2.51
0.9 Dead+1.0 Wind 180 deg - No Ice	17.18	0.03	16.19	1449.54	-7.17	-2.51
1.2 Dead+1.0 Wind 210 deg - No Ice	22.91	-8.33	14.42	1277.32	740.84	2.46
0.9 Dead+1.0 Wind 210 deg - No Ice	17.18	-8.33	14.42	1280.70	741.94	2.46
1.2 Dead+1.0 Wind 240 deg - No Ice	22.91	-15.36	8.84	765.39	1352.39	6.82
0.9 Dead+1.0 Wind 240 deg - No Ice	17.18	-15.36	8.84	768.77	1353.50	6.82
1.2 Dead+1.0 Wind 270 deg - No Ice	22.91	-16.69	-0.03	-17.37	1492.77	9.35
0.9 Dead+1.0 Wind 270 deg - No Ice	17.18	-16.69	-0.03	-13.99	1493.88	9.35
1.2 Dead+1.0 Wind 300 deg - No Ice	22.91	-14.06	-8.12	-746.70	1265.46	8.86
0.9 Dead+1.0 Wind 300 deg - No Ice	17.18	-14.06	-8.12	-743.32	1266.57	8.86
1.2 Dead+1.0 Wind 330 deg - No Ice	22.91	-8.24	-14.22	-1290.53	737.30	6.16
0.9 Dead+1.0 Wind 330 deg - No Ice	17.18	-8.24	-14.22	-1287.15	738.40	6.16
1.2 Dead+1.0 Ice+1.0 Temp	49.54	0.00	0.00	-28.64	-8.99	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	49.54	-0.00	-3.38	-330.15	-8.46	0.75
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	49.54	1.65	-2.86	-285.60	-157.34	-0.53
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	49.54	2.85	-1.64	-176.16	-265.57	-1.75
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	49.54	3.31	0.00	-28.11	-306.62	-2.37
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	49.54	2.93	1.69	122.57	-270.90	-2.28
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	49.54	1.63	2.82	225.36	-156.25	-1.70
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	49.54	0.00	3.23	263.30	-9.52	-0.75
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	49.54	-1.65	2.86	228.31	139.36	0.53
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	49.54	-2.97	1.71	123.67	255.87	1.75
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	49.54	-3.31	-0.00	-29.17	288.64	2.37
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	49.54	-2.80	-1.62	-175.07	244.63	2.28
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	49.54	-1.63	-2.82	-282.64	138.27	1.70
Dead+Wind 0 deg - Service	19.09	-0.01	-5.14	-460.31	-2.59	0.72
Dead+Wind 30 deg - Service	19.09	2.43	-4.22	-384.07	-218.93	-0.71
Dead+Wind 60 deg - Service	19.09	4.13	-2.38	-222.44	-371.66	-1.96
Dead+Wind 90 deg - Service	19.09	4.88	0.01	-10.17	-436.07	-2.68
Dead+Wind 120 deg - Service	19.09	4.46	2.58	214.20	-394.23	-2.54
Dead+Wind 150 deg - Service	19.09	2.41	4.16	357.56	-217.91	-1.77
Dead+Wind 180 deg - Service	19.09	0.01	4.74	410.36	-4.80	-0.72

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead+Wind 210 deg - Service	19.09	-2.43	4.22	361.53	211.54	0.71
Dead+Wind 240 deg - Service	19.09	-4.49	2.58	213.61	388.01	1.96
Dead+Wind 270 deg - Service	19.09	-4.88	-0.01	-12.37	428.69	2.68
Dead+Wind 300 deg - Service	19.09	-4.11	-2.37	-223.04	363.10	2.54
Dead+Wind 330 deg - Service	19.09	-2.41	-4.16	-380.10	210.53	1.77

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-19.09	0.00	0.00	19.09	-0.00	0.000%
2	-0.03	-22.91	-17.61	0.03	22.91	17.61	0.000%
3	-0.03	-17.18	-17.61	0.03	17.18	17.61	0.000%
4	8.33	-22.91	-14.42	-8.33	22.91	14.42	0.000%
5	8.33	-17.18	-14.42	-8.33	17.18	14.42	0.000%
6	14.14	-22.91	-8.13	-14.14	22.91	8.13	0.000%
7	14.14	-17.18	-8.13	-14.14	17.18	8.13	0.000%
8	16.69	-22.91	0.03	-16.69	22.91	-0.03	0.000%
9	16.69	-17.18	0.03	-16.69	17.18	-0.03	0.000%
10	15.29	-22.91	8.83	-15.29	22.91	-8.83	0.000%
11	15.29	-17.18	8.83	-15.29	17.18	-8.83	0.000%
12	8.24	-22.91	14.22	-8.24	22.91	-14.22	0.000%
13	8.24	-17.18	14.22	-8.24	17.18	-14.22	0.000%
14	0.03	-22.91	16.19	-0.03	22.91	-16.19	0.000%
15	0.03	-17.18	16.19	-0.03	17.18	-16.19	0.000%
16	-8.33	-22.91	14.42	8.33	22.91	-14.42	0.000%
17	-8.33	-17.18	14.42	8.33	17.18	-14.42	0.000%
18	-15.36	-22.91	8.84	15.36	22.91	-8.84	0.000%
19	-15.36	-17.18	8.84	15.36	17.18	-8.84	0.000%
20	-16.69	-22.91	-0.03	16.69	22.91	0.03	0.000%
21	-16.69	-17.18	-0.03	16.69	17.18	0.03	0.000%
22	-14.06	-22.91	-8.12	14.06	22.91	8.12	0.000%
23	-14.06	-17.18	-8.12	14.06	17.18	8.12	0.000%
24	-8.24	-22.91	-14.22	8.24	22.91	14.22	0.000%
25	-8.24	-17.18	-14.22	8.24	17.18	14.22	0.000%
26	0.00	-49.54	0.00	0.00	49.54	-0.00	0.000%
27	-0.00	-49.54	-3.38	0.00	49.54	3.38	0.000%
28	1.65	-49.54	-2.86	-1.65	49.54	2.86	0.000%
29	2.85	-49.54	-1.64	-2.85	49.54	1.64	0.000%
30	3.31	-49.54	0.00	-3.31	49.54	-0.00	0.000%
31	2.93	-49.54	1.69	-2.93	49.54	-1.69	0.000%
32	1.63	-49.54	2.82	-1.63	49.54	-2.82	0.000%
33	0.00	-49.54	3.23	-0.00	49.54	-3.23	0.000%
34	-1.65	-49.54	2.86	1.65	49.54	-2.86	0.000%
35	-2.97	-49.54	1.71	2.97	49.54	-1.71	0.000%
36	-3.31	-49.54	-0.00	3.31	49.54	0.00	0.000%
37	-2.80	-49.54	-1.62	2.80	49.54	1.62	0.000%
38	-1.63	-49.54	-2.82	1.63	49.54	2.82	0.000%
39	-0.01	-19.09	-5.14	0.01	19.09	5.14	0.000%
40	2.43	-19.09	-4.22	-2.43	19.09	4.22	0.000%
41	4.13	-19.09	-2.38	-4.13	19.09	2.38	0.000%
42	4.88	-19.09	0.01	-4.88	19.09	-0.01	0.000%
43	4.46	-19.09	2.58	-4.46	19.09	-2.58	0.000%
44	2.41	-19.09	4.16	-2.41	19.09	-4.16	0.000%
45	0.01	-19.09	4.74	-0.01	19.09	-4.74	0.000%
46	-2.43	-19.09	4.22	2.43	19.09	-4.22	0.000%
47	-4.49	-19.09	2.58	4.49	19.09	-2.58	0.000%
48	-4.88	-19.09	-0.01	4.88	19.09	0.01	0.000%
49	-4.11	-19.09	-2.37	4.11	19.09	2.37	0.000%
50	-2.41	-19.09	-4.16	2.41	19.09	4.16	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	145 - 140	2.877	39	0.2305	0.0235
T2	140 - 120	2.635	39	0.2233	0.0230
T3	120 - 100	1.774	39	0.1698	0.0192
T4	100 - 80	1.149	39	0.1235	0.0144
T5	80 - 60	0.696	39	0.0870	0.0103
T6	60 - 40	0.381	39	0.0575	0.0069
T7	40 - 20	0.170	39	0.0369	0.0044
T8	20 - 0	0.045	39	0.0146	0.0018

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
151.00	Platform Mount [14.4' LP 603-1]	39	2.877	0.2305	0.0235	39020
150.00	Lightning Rod 5/8"x4'	39	2.877	0.2305	0.0235	39020
145.00	Sabre 5' Rotatable Section	39	2.877	0.2305	0.0235	39020

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	145 - 140	9.860	2	0.7893	0.0819
T2	140 - 120	9.032	2	0.7648	0.0804
T3	120 - 100	6.079	2	0.5819	0.0669
T4	100 - 80	3.937	2	0.4229	0.0503
T5	80 - 60	2.384	2	0.2976	0.0358
T6	60 - 40	1.303	2	0.1967	0.0242
T7	40 - 20	0.581	2	0.1260	0.0153
T8	20 - 0	0.154	19	0.0498	0.0064

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
151.00	Platform Mount [14.4' LP 603-1]	2	9.860	0.7893	0.0819	11425
150.00	Lightning Rod 5/8"x4'	2	9.860	0.7893	0.0819	11425
145.00	Sabre 5' Rotatable Section	2	9.860	0.7893	0.0819	11425

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	145	Leg	A325X	0.7500	4	1.68	30.10	0.056	1.05	Bolt Tension Member Bearing Member Bearing
		Diagonal	A325X	0.6250	1	2.67	13.05	0.205	1.05	
		Top Girt	A325X	0.6250	3	0.18	13.89	0.013	1.05	
T2	140	Leg	A325X	0.7500	4	7.48	30.10	0.248	1.05	Bolt Tension Member Bearing Member Bearing
		Diagonal	A325X	0.6250	1	2.83	11.09	0.255	1.05	
		Top Girt	A325X	0.6250	1	0.80	11.09	0.072	1.05	
T3	120	Leg	A325X	1.0000	4	10.99	54.52	0.202	1.05	Bolt Tension Member Bearing Member Bearing
		Diagonal	A325X	0.6250	1	1.59	11.09	0.144	1.05	
		Top Girt	A325X	0.6250	1	0.87	11.09	0.079	1.05	
T4	100	Leg	A325X	1.0000	4	13.58	54.52	0.249	1.05	Bolt Tension Member Bearing
		Diagonal	A325X	0.6250	1	1.71	11.09	0.154	1.05	
T5	80	Leg	A325X	1.2500	4	15.94	87.22	0.183	1.05	Bolt Tension Member Bearing
		Diagonal	A325X	0.6250	1	2.06	11.09	0.186	1.05	
T6	60	Leg	A325X	1.2500	4	18.38	87.22	0.211	1.05	Bolt Tension Member Bearing
		Diagonal	A325X	0.6250	1	2.41	11.09	0.218	1.05	
T7	40	Leg	A325X	1.2500	6	13.89	87.22	0.159	1.05	Bolt Tension Member Bearing
		Diagonal	A325X	0.7500	1	2.74	10.77	0.255	1.05	
T8	20	Diagonal	A325X	0.7500	1	3.29	10.77	0.306	1.05	Member Bearing

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	145 - 140	P2x.154	5.00	5.00	76.2 K=1.00	1.0745	-9.08	31.62	0.287 ¹
T2	140 - 120	P2.5x.203	20.00	5.00	63.3 K=1.00	1.7040	-34.36	57.19	0.601 ¹
T3	120 - 100	P3x.3	20.03	5.01	52.9 K=1.00	3.0159	-50.35	110.61	0.455 ¹
T4	100 - 80	P3.5x.318	20.03	5.01	46.0 K=1.00	3.6784	-62.80	141.81	0.443 ¹
T5	80 - 60	P4x.337	20.03	6.68	54.3 K=1.00	4.4074	-74.28	159.91	0.465 ¹
T6	60 - 40	P5x.375	20.03	6.68	43.6 K=1.00	6.1120	-86.68	239.39	0.362 ¹
T7	40 - 20	P6x.28	20.03	6.68	35.7 K=1.00	5.5813	-99.27	228.83	0.434 ¹
T8	20 - 0	P6x.432	20.03	10.02	54.8 K=1.00	8.4049	-111.06	303.75	0.366 ¹

¹ $P_u / \phi P_n$ 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	145 - 140	L1 3/4x1 3/4x3/16	7.07	3.25	115.2 K=1.01	0.6211	-2.67	13.04	0.205 ¹
T2	140 - 120	L1 3/4x1 3/4x3/16	7.07	3.22	114.4 K=1.02	0.6211	-2.95	13.16	0.224 ¹
T3	120 - 100	L1 3/4x1 3/4x3/16	8.40	4.03	140.8 K=1.00	0.6211	-1.53	8.97	0.171 ¹
T4	100 - 80	L1 3/4x1 3/4x3/16	10.08	4.85	169.3 K=1.00	0.6211	-1.70	6.20	0.274 ¹
T5	80 - 60	L2x2x3/16	12.58	6.12	186.4 K=1.00	0.7150	-2.13	5.89	0.362 ¹
T6	60 - 40	L2 1/2x2 1/2x3/16	14.32	6.94	168.2 K=1.00	0.9020	-2.43	9.13	0.266 ¹
T7	40 - 20	L2 1/2x2 1/2x3/16	16.11	7.79	188.8 K=1.00	0.9020	-2.80	7.24	0.386 ¹
T8	20 - 0	L3x3x3/16	19.30	9.47	190.7 K=1.00	1.0900	-3.54	8.58	0.413 ¹

¹ $P_u / \phi P_n$ 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 $\frac{P_u}{\phi P_n}$
T2	140 - 120	L1 3/4x1 3/4x3/16	5.00	4.47	156.1 K=1.00	0.6211	-0.60	7.29	0.082 ¹
T3	120 - 100	L1 3/4x1 3/4x3/16	5.00	4.42	154.3 K=1.00	0.6211	-0.87	7.46	0.117 ¹

¹ $P_u / \phi P_n$ 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 $\frac{P_u}{\phi P_n}$
T1	145 - 140	P2x.154	5.00	5.00	76.2	1.0745	6.71	48.35	0.139 ¹
T2	140 - 120	P2.5x.203	20.00	5.00	63.3	1.7040	29.91	76.68	0.390 ¹
T3	120 - 100	P3x.3	20.03	5.01	52.9	3.0159	43.94	135.72	0.324 ¹
T4	100 - 80	P3.5x.318	20.03	5.01	46.0	3.6784	54.34	165.53	0.328 ¹
T5	80 - 60	P4x.337	20.03	6.68	54.3	4.4074	63.77	198.34	0.322 ¹
T6	60 - 40	P5x.375	20.03	6.68	43.6	6.1120	73.51	275.04	0.267 ¹
T7	40 - 20	P6x.28	20.03	6.68	35.7	5.5813	83.33	251.16	0.332 ¹
T8	20 - 0	P6x.432	20.03	10.02	54.8	8.4049	92.20	378.22	0.244 ¹

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	145 - 140	L1 3/4x1 3/4x3/16	7.07	3.25	75.9	0.3604	2.07	15.68	0.132 ¹
T2	140 - 120	L1 3/4x1 3/4x3/16	7.07	3.22	75.2	0.3604	2.83	15.68	0.180 ¹
T3	120 - 100	L1 3/4x1 3/4x3/16	7.62	3.65	84.8	0.3604	1.59	15.68	0.102 ¹
T4	100 - 80	L1 3/4x1 3/4x3/16	10.08	4.85	111.6	0.3604	1.71	15.68	0.109 ¹
T5	80 - 60	L2x2x3/16	12.58	6.12	121.9	0.4308	2.06	18.74	0.110 ¹
T6	60 - 40	L2 1/2x2 1/2x3/16	14.32	6.94	109.3	0.5710	2.41	24.84	0.097 ¹
T7	40 - 20	L2 1/2x2 1/2x3/16	16.11	7.79	122.4	0.5535	2.74	24.08	0.114 ¹
T8	20 - 0	L3x3x3/16	19.30	9.47	122.9	0.6945	3.29	30.21	0.109 ¹

¹ P_u / φP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
T1	145 - 140	C7x9.8	5.00	4.80	99.2	2.0344	0.54	88.50	0.006 ¹
T2	140 - 120	L1 3/4x1 3/4x3/16	5.00	4.47	106.4	0.3604	0.80	15.68	0.051 ¹
T3	120 - 100	L1 3/4x1 3/4x3/16	5.00	4.42	105.2	0.3604	0.87	15.68	0.056 ¹

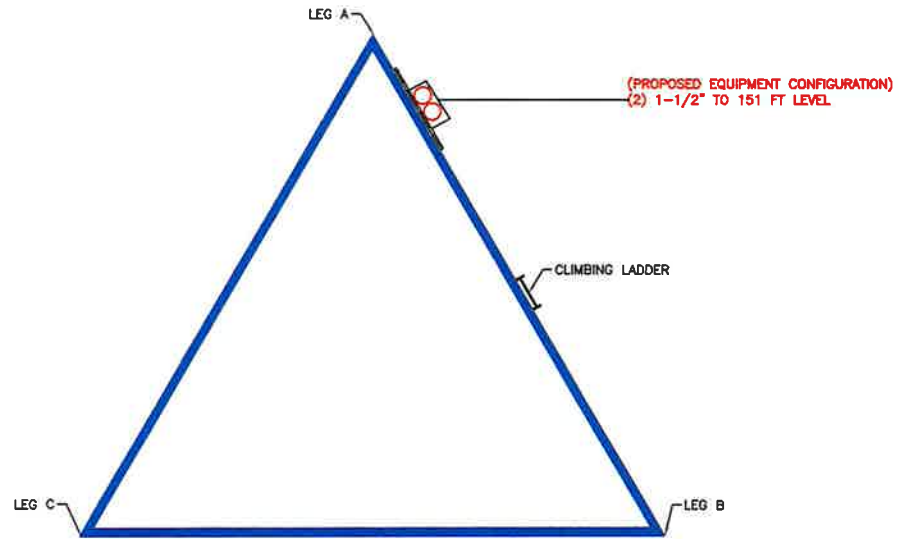
¹ P_u / φP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	φP _{allow} K	% Capacity	Pass Fail	
T1	145 - 140	Leg	P2x.154	3	-9.08	33.20	27.4	Pass	
T2	140 - 120	Leg	P2.5x.203	15	-34.36	60.05	57.2	Pass	
T3	120 - 100	Leg	P3x.3	45	-50.35	116.14	43.4	Pass	
T4	100 - 80	Leg	P3.5x.318	75	-62.80	148.90	42.2	Pass	
T5	80 - 60	Leg	P4x.337	102	-74.28	167.91	44.2	Pass	
T6	60 - 40	Leg	P5x.375	123	-86.68	251.36	34.5	Pass	
T7	40 - 20	Leg	P6x.28	144	-99.27	240.27	41.3	Pass	
T8	20 - 0	Leg	P6x.432	165	-111.06	318.94	34.8	Pass	
T1	145 - 140	Diagonal	L1 3/4x1 3/4x3/16	12	-2.67	13.69	19.5	Pass	
T2	140 - 120	Diagonal	L1 3/4x1 3/4x3/16	21	-2.95	13.82	21.3	Pass	
T3	120 - 100	Diagonal	L1 3/4x1 3/4x3/16	51	-1.53	9.42	16.3	Pass	
T4	100 - 80	Diagonal	L1 3/4x1 3/4x3/16	78	-1.70	6.51	26.1	Pass	
T5	80 - 60	Diagonal	L2x2x3/16	105	-2.13	6.19	34.5	Pass	
T6	60 - 40	Diagonal	L2 1/2x2 1/2x3/16	126	-2.43	9.58	25.3	Pass	
T7	40 - 20	Diagonal	L2 1/2x2 1/2x3/16	147	-2.80	7.60	36.8	Pass	
T8	20 - 0	Diagonal	L3x3x3/16	168	-3.54	9.01	39.3	Pass	
T1	145 - 140	Top Girt	C7x9.8	6	0.54	92.92	0.6	Pass	
T2	140 - 120	Top Girt	L1 3/4x1 3/4x3/16	17	-0.60	7.66	7.8	Pass	
T3	120 - 100	Top Girt	L1 3/4x1 3/4x3/16	47	-0.87	7.84	11.1	Pass	
							Summary		
							Leg (T2)	57.2	Pass
							Diagonal (T8)	39.3	Pass
							Top Girt (T3)	11.1	Pass
							Bolt	29.1	Pass
							Checks		
							RATING =	57.2	Pass

APPENDIX B
BASE LEVEL DRAWING

APPENDIX C
ADDITIONAL CALCULATIONS



BUSINESS UNIT: 878349 TOWER ID: C_BASELEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Self Support Anchor Rod Capacity



Site Info	
BU #	878349
Site Name	JUNG BEER
Order #	620275 Rev. 0

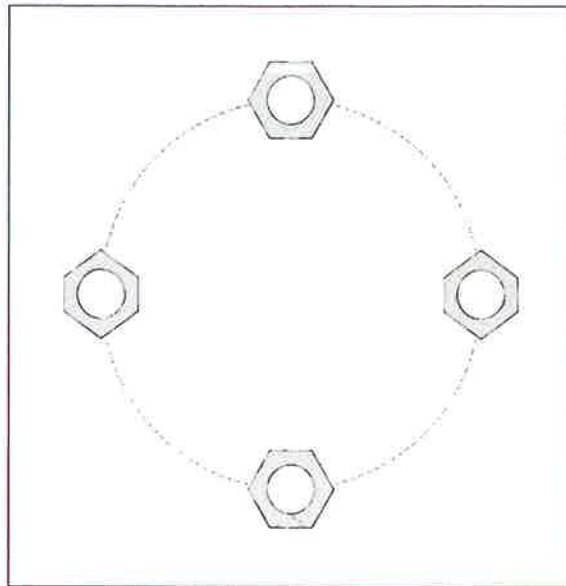
Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	Yes
l_{ar} (in)	2

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	114.20	94.58
Shear Force (kips)	11.20	9.43

*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	Analysis Results
-----------------------	------------------

Anchor Rod Data
(4) 1-1/2" ϕ bolts (A572-50 N; Fy=50 ksi, Fu=65 ksi)
l_{ar} (in): 2

Anchor Rod Summary		(units of kips, kip-in)
$Pu_t = 23.65$	$\phi Pn_t = 68.74$	Stress Rating
$Vu = 2.36$	$\phi Vn = 43.07$	32.8%
$Mu = n/a$	$\phi Mn = n/a$	Pass

Pier and Pad Foundation



BU #: 878349
 Site Name: JUNG BEER
 App. Number: 620275 Rev. 0

TIA-222 Revision: H
 Tower Type: Self Support

Top & Bot. Pad Rein. Different?:
 Block Foundation?:
 Rectangular Pad?:

Superstructure Analysis Reactions		
Compression, P_{comp} :	114.2	kips
Compression Shear, V_{u_comp} :	11.2	kips
Uplift, P_{uplift} :	94.58	kips
Uplift Shear, V_{u_uplift} :	9.43	kips
Tower Height, H:	145	ft
Base Face Width, BW:	17	ft
BP Dist. Above Fdn, b_{p_dist} :	3.5	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
Uplift (kips)	173.90	94.58	51.8%	Pass
Lateral (Sliding) (kips)	49.22	9.43	18.2%	Pass
Bearing Pressure (ksf)	4.58	2.71	56.4%	Pass
Pier Flexure (Comp.) (kip*ft)	670.13	100.80	14.3%	Pass
Pier Flexure (Tension) (kip*ft)	440.08	84.87	18.4%	Pass
Pier Compression (kip)	5847.66	134.05	2.2%	Pass
Pad Flexure (kip*ft)	352.84	57.09	15.4%	Pass
Pad Shear - 1-way (kips)	128.20	23.59	17.5%	Pass
Pad Shear - 2-way (Comp) (ksi)	0.164	0.040	23.2%	Pass
Flexural 2-way (Comp) (kip*ft)	570.30	60.48	10.1%	Pass
Pad Shear - 2-way (Uplift) (ksi)	0.164	0.042	24.5%	Pass
Flexural 2-way (Tension) (kip*ft)	570.30	50.92	8.5%	Pass

*Rating per TIA-222-H Section 15.5

Structural Rating*:	24.5%
Soil Rating*:	56.4%

Pier Properties		
Pier Shape:	Square	
Pier Diameter, d_{pier} :	3.5	ft
Ext. Above Grade, E:	1.33	ft
Pier Rebar Size, S_c :	7	
Pier Rebar Quantity, m_c :	12	
Pier Tie/Spiral Size, S_t :	3	
Pier Tie/Spiral Quantity, m_t :	9	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $c_{c_{pier}}$:	3	in

Pad Properties		
Depth, D:	9.17	ft
Pad Width, W_1 :	9.5	ft
Pad Thickness, T:	1.5	ft
Pad Rebar Size (Bottom dir. 2), S_{p2} :	7	
Pad Rebar Quantity (Bottom dir. 2), m_{p2} :	10	
Pad Clear Cover, $c_{c_{pad}}$:	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	3	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	120	pcf
Ultimate Net Bearing, Q_{net} :	5.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	30	degrees
SPT Blow Count, N_{blows} :		
Base Friction, μ :	0.35	
Neglected Depth, N:	5.00	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw:	11	ft

<--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Latitude: 43.564444
Longitude: -87.943003
Elevation: 897.74 ft (NAVD 88)



Wind

Results:

Wind Speed	115 Vmph
10-year MRI	76 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating data of March 12, 2014
Date Accessed: Thu Jan 12 2023

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 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

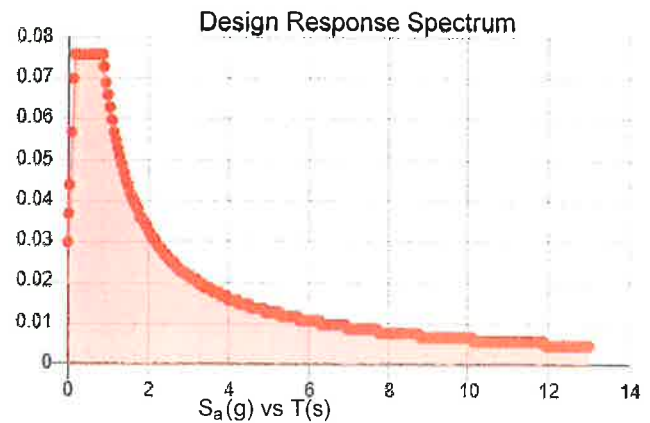
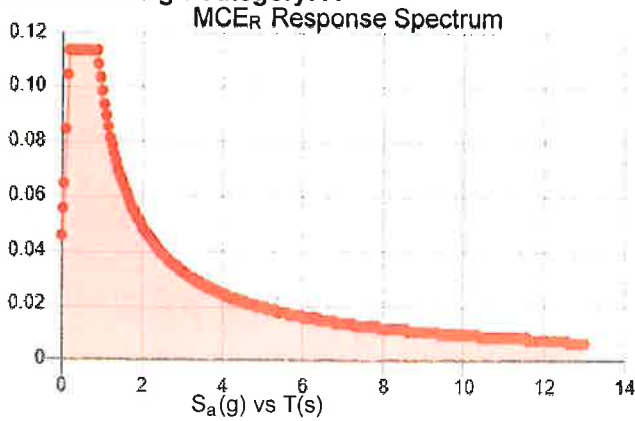
Site is not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

Site Soil Class:

Results:

S_s :	0.071	S_{D1} :	0.066
S_1 :	0.041	T_L :	12
F_a :	1.6	PGA :	0.034
F_v :	2.4	PGA _M :	0.054
S_{MS} :	0.114	F_{PGA} :	1.6
S_{M1} :	0.099	I_e :	1
S_{DS} :	0.076		

Seismic Design Category: A



Data Accessed: Thu Jan 12 2023

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness: 0.75 in.
Concurrent Temperature: -5 F
Gust Speed 40 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Thu Jan 12 2023

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 50-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.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.



T-MOBILE SITE NUMBER: ML81125A
T-MOBILE SITE NAME: CROWN BU - 878349
T-MOBILE PROJECT: ANCHOR

BUSINESS UNIT #: 878349
SITE ADDRESS: W 5009 HWY 144
 RANDOM LAKE, WI 53075
COUNTY: SHEBOYGAN
SITE TYPE: SELF SUPPORT
TOWER HEIGHT: 150'-0"



1 RAVINIA DRIVE, SUITE 1000
 ATLANTA, GA 30346



1505 WESTLAKE AVENUE NORTH, SUITE 800
 SEATTLE, WA 98109



11490 BLUEGRASS PKWY
 LOUISVILLE, KY 40299
 502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

BU #: 878349
JUNG BEER

W 5009 HWY 144
 RANDOM LAKE, WI 53075

EXISTING 150'-0" SELF
 SUPPORT

SITE INFORMATION

CROWN CASTLE USA INC.
 SITE NAME: JUNG BEER
 BU NUMBER: 878349

TOWER OWNER: CROWN CASTLE
 2000 CORPORATE DRIVE
 CANONSBURG, PA 15317

CARRIER/APPLICANT: T-MOBILE
 312 ELM STREET, 10TH FLOOR
 CINCINNATI, OH 45202

SITE ADDRESS: W 5009 HWY 144
 RANDOM LAKE, WI 53075

COUNTY: SHEBOYGAN
 LATITUDE: 43° 33' 52.00"
 LONGITUDE: -87° 56' 34.81"
 LAT/LONG TYPE: NAD83
 GROUND ELEVATION: 897 FT.

AREA OF CONSTRUCTION: EXISTING
 CURRENT ZONING: NOT AVAILABLE
 MAP/PARCEL #: 59176-744620

OCCUPANCY CLASSIFICATION: U
 TYPE OF CONSTRUCTION: IIB
 A.D.A. COMPLIANCE: FACILITY IS UNMANNED AND
 NOT FOR HUMAN HABITATION

PROPERTY OWNER: GLOBAL SIGNAL ACQUISITION
 P.O. BOX 277455
 ATLANTA, GA 30389-7455

JURISDICTION: VILLAGE OF RANDOM LAKE

ELECTRIC PROVIDER: WE ENERGIES
 (800) 242-9137

TELCO PROVIDER: NOT AVAILABLE

PROJECT TEAM

A&E FIRM: POWER OF DESIGN
 11490 BLUEGRASS PARKWAY
 LOUISVILLE, KY 40299
 (502) 437-5252

CROWN CASTLE USA INC. DISTRICT CONTACTS:
 3025 HIGHLAND PKWY, SUITE 510,
 DOWNERS GROVE, IL, 60515

PAUL SLIFER - PROJECT MANAGER
 PAUL.SLIFER@CROWNCastle.COM

COREY BESL - CONSTRUCTION MANAGER
 COREY.BESL@CROWNCastle.COM

DALE GRAY - A&E SPECIALIST
 DALE.GRAY@CROWNCastle.COM
 (312) 585-9560

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	SITE PLAN
C-1.2	EXISTING & FINAL EQUIPMENT PLANS
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	EQUIPMENT DETAILS & COAX COLOR CODING
C-4	EQUIPMENT SPECIFICATIONS
C-5	ICE BRIDGE DETAIL
E-1	PANEL SCHEDULES & ONE-LINE DIAGRAM
E-2	ELECTRICAL DETAILS
G-1	TYPICAL FINAL GROUNDING SCHEMATIC
G-2	GROUNDING DETAILS

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.

CALL WISCONSIN ONE CALL
 (800) 242-8511
 CALL 3 WORKING DAYS
 BEFORE YOU DIG!

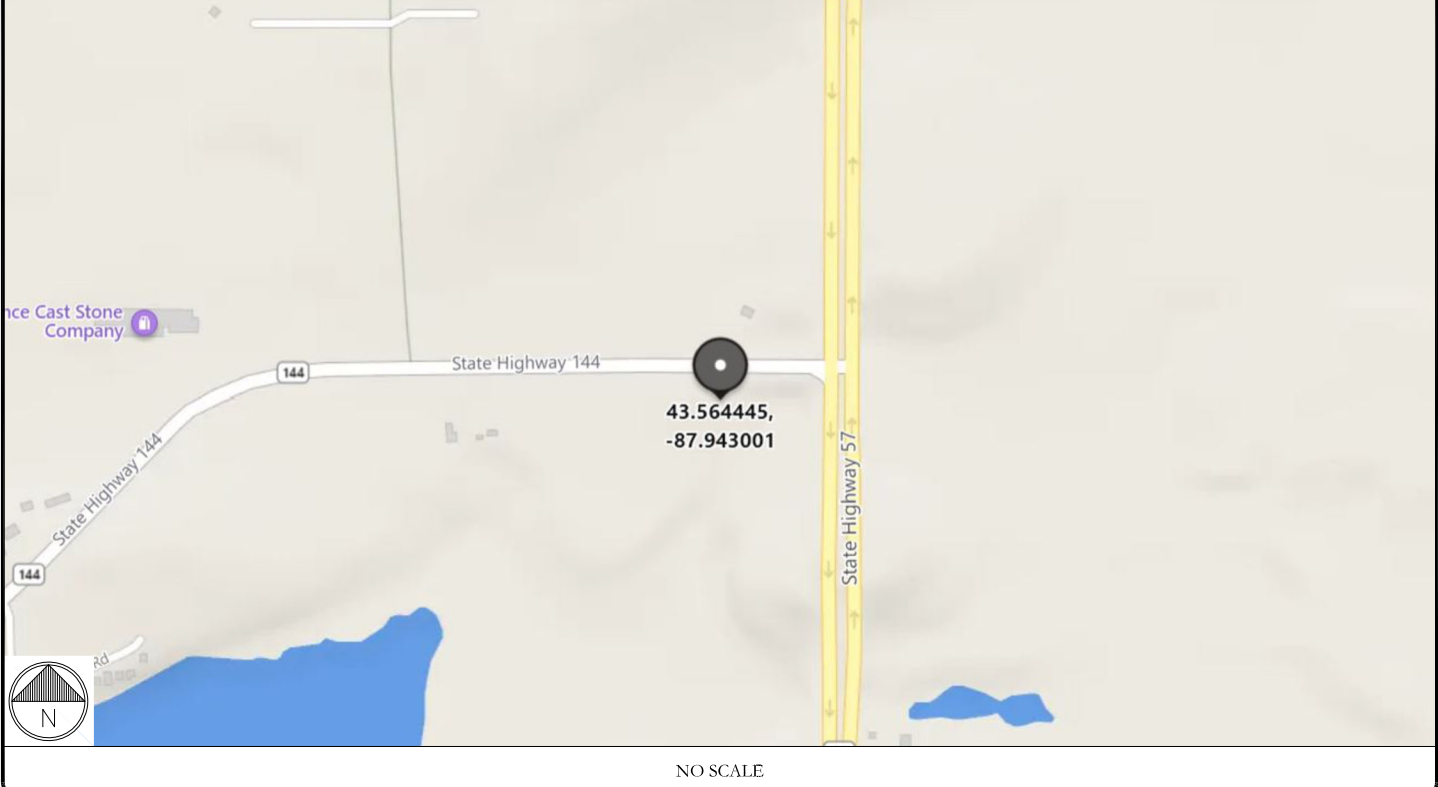
PROJECT DESCRIPTION

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

TOWER SCOPE OF WORK:
 • REMOVE (3) HYBRID CABLES (1")
 • RELOCATE (6) RRHs
 • RELOCATE (3) ANTENNAS
 • INSTALL (3) ANTENNAS
 • INSTALL (1) HCS 2.0 BREAKOUT PENDANT
 • INSTALL (1) HCS 2.0 HYBRID CABLE (1-1/2")

GROUND SCOPE OF WORK:
 • REMOVE (1) ASIB, (1) ASIK, (1) FSMF, (1) ABIA, (1) ABIL, (1) AMIA
 • INSTALL (2) ASUL, (4) ABIO
 • INSTALL (1) HCS 2.0 JUNCTION BOX
 • INSTALL ICE BRIDGE 15'-0"±

LOCATION MAP



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	WISCONSIN CBC/2015 IBC W/ WI AMENDMENTS
MECHANICAL	WISCONSIN CBC/2015 IMC W/ WI AMENDMENTS
ELECTRICAL	WISCONSIN ELECTRICAL CODE/2017 NEC W/ WI AMENDMENTS

REFERENCE DOCUMENTS:
 STRUCTURAL ANALYSIS: BLACK & VEATCH CORP.
 DATED: JANUARY 13, 2023
 MOUNT ANALYSIS: INFINIGY
 DATED: JANUARY 05, 2023
 RFDS REVISION: 2
 DATED: 04/04/2022
 ORDER ID: 620275
 REVISION: 0

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

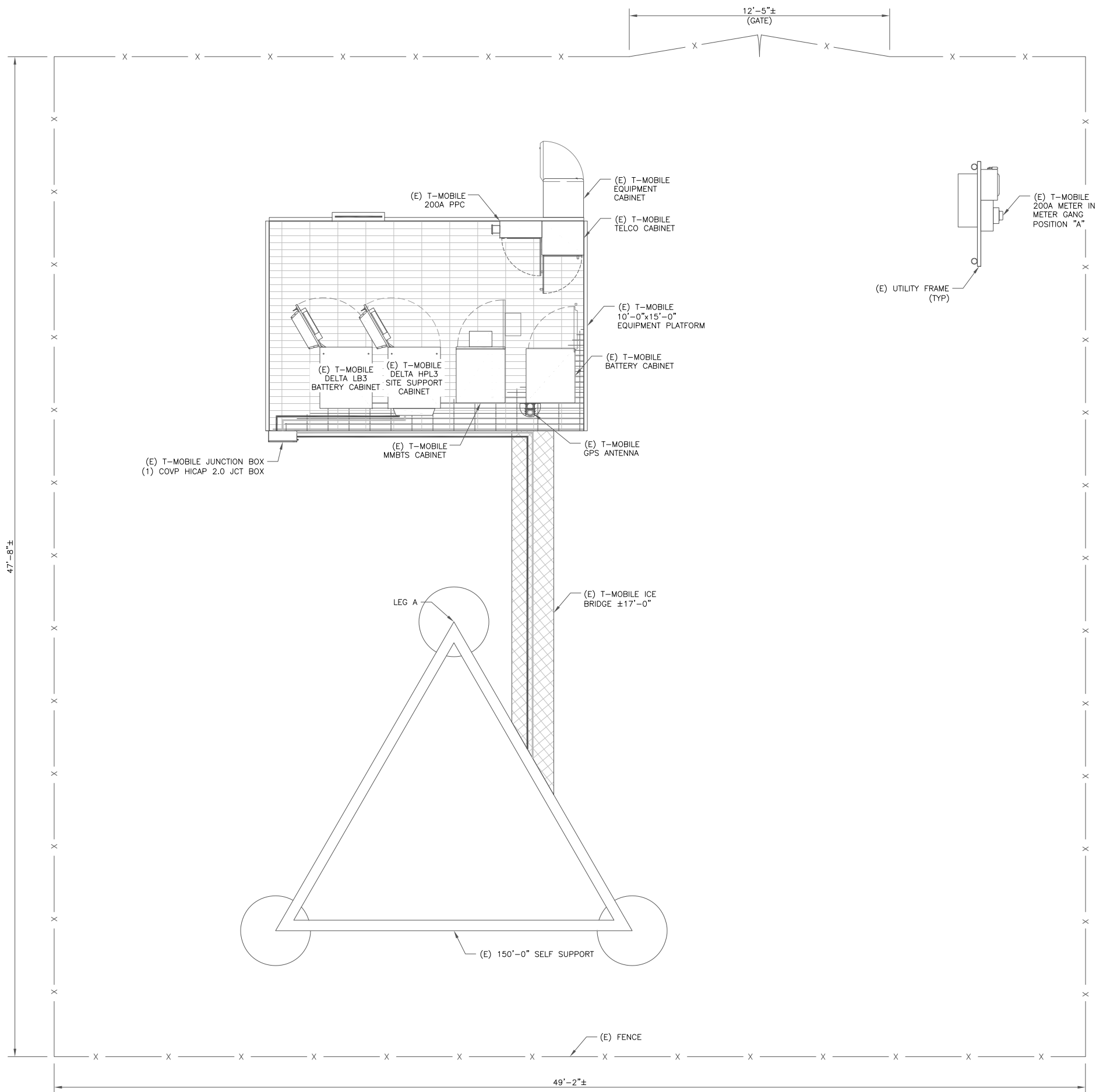
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	01/27/2023	NM/NH	CONSTRUCTION	AH
1	02/01/2023	NM	CONSTRUCTION	AH

02/01/2023

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SHEET NUMBER: **T-1** REVISION: **1**



T-Mobile
 1 RAVINIA DRIVE, SUITE 1000
 ATLANTA, GA 30346

CROWN CASTLE
 1505 WESTLAKE AVENUE NORTH, SUITE 800
 SEATTLE, WA 98109

POD
 POWER OF DESIGN
 11490 BLUEGRASS PKWY
 LOUISVILLE, KY 40299
 502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

BU #: 878349
JUNG BEER

W 5009 HWY 144
 RANDOM LAKE, WI 53075

EXISTING 150'-0" SELF SUPPORT

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	01/27/2023	NM/NH	CONSTRUCTION	AH
1	02/01/2023	NM	CONSTRUCTION	AH

PROFESSIONAL ENGINEER
 WISCONSIN
 AARON HERKENHOFF
 E-49355
 LOUISVILLE KY

02/01/2023

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SHEET NUMBER: C-1.1
REVISION: 1

1 SITE PLAN
 SCALE: 3/8"=1'-0" (FULL SIZE)
 3/16"=1'-0" (11x17)

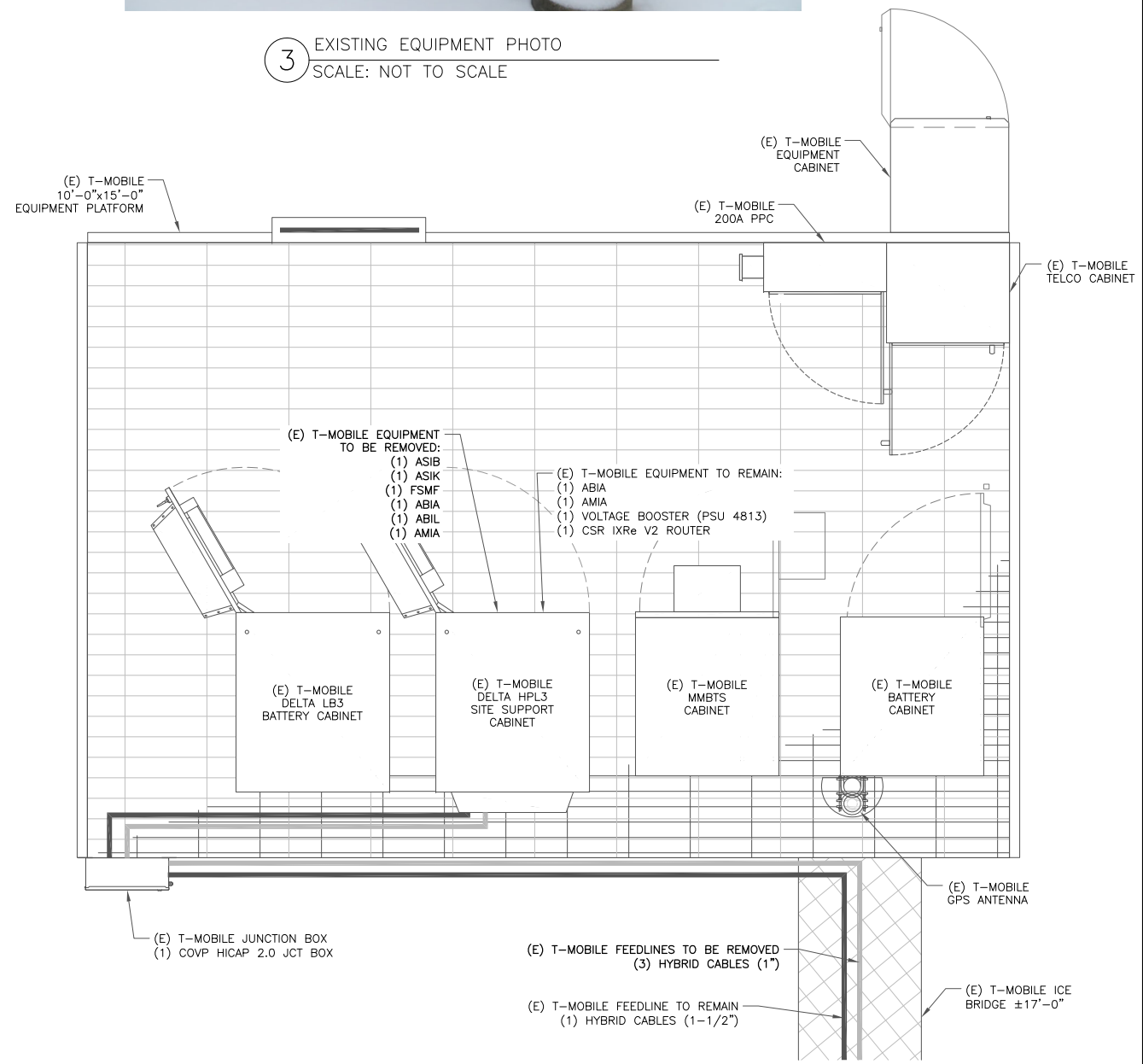
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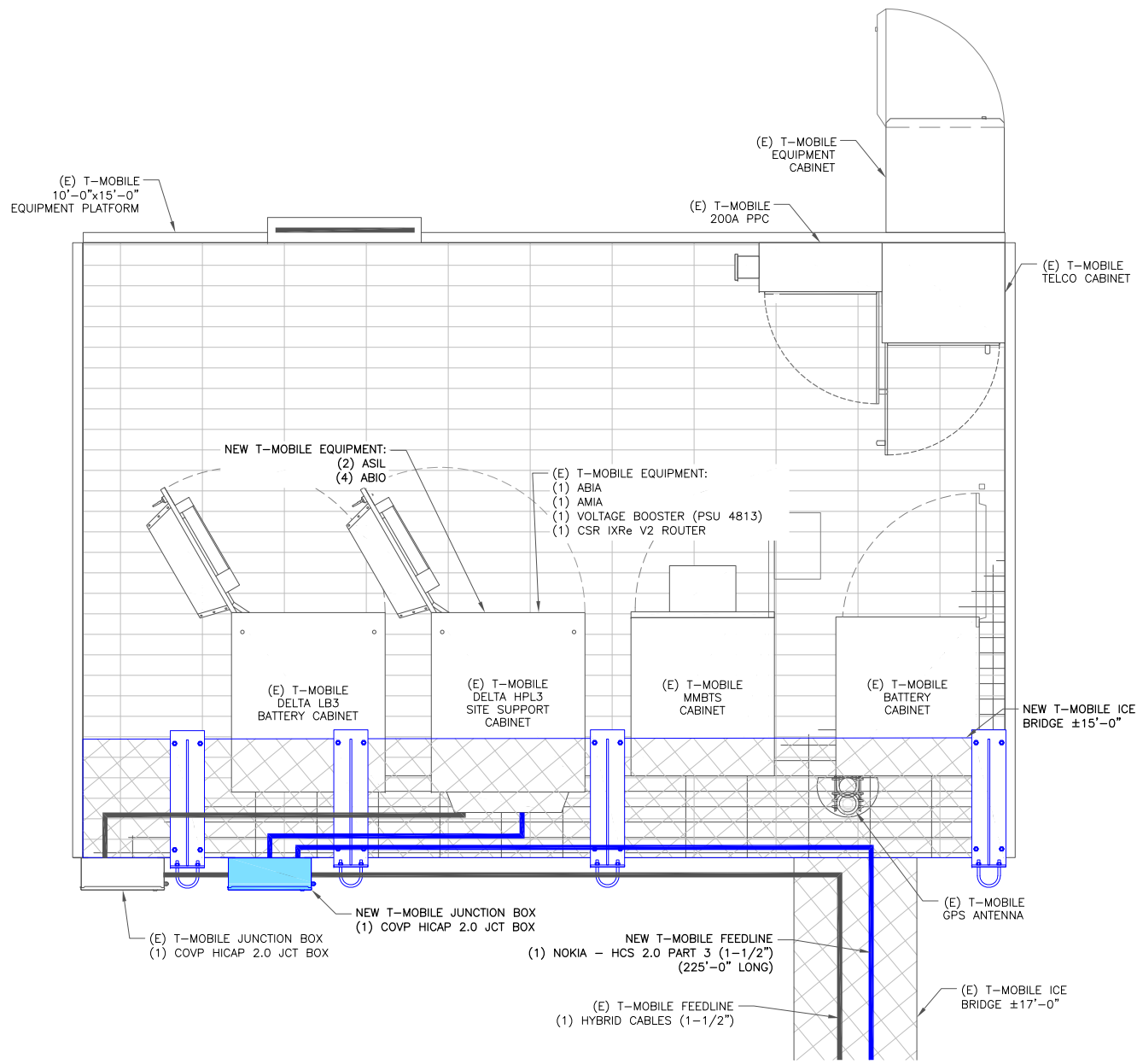
EQUIPMENT LEGEND:

- EXISTING
- TO BE RELOCATED/REMOVED
- NEW

3 EXISTING EQUIPMENT PHOTO
SCALE: NOT TO SCALE



1 EXISTING EQUIPMENT PLAN
SCALE: 3/4"=1'-0" (FULL SIZE)
3/8"=1'-0" (11x17)



2 FINAL EQUIPMENT PLAN
SCALE: 3/4"=1'-0" (FULL SIZE)
3/8"=1'-0" (11x17)

T-Mobile

1 RAVINIA DRIVE, SUITE 1000
ATLANTA, GA 30346

CROWN CASTLE

1505 WESTLAKE AVENUE NORTH, SUITE 800
SEATTLE, WA 98109

POD
POWER OF DESIGN

11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

BU #: 878349
JUNG BEER

W 5009 HWY 144
RANDOM LAKE, WI 53075

EXISTING 150'-0" SELF SUPPORT

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	01/27/2023	NM/NH	CONSTRUCTION	AH
1	02/01/2023	NM	CONSTRUCTION	AH

PROFESSIONAL ENGINEER

AARON HERKENHOFF
E-49355
LOUISVILLE
KY

02/01/2023

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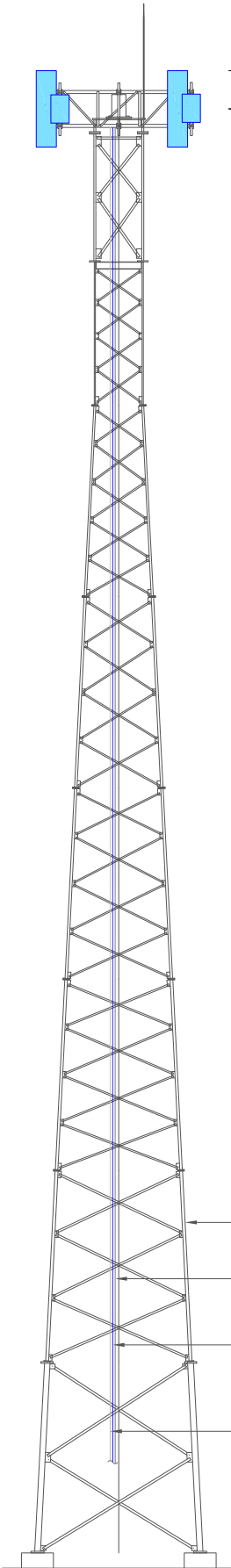
SHEET NUMBER:
C-1.2

REVISION:
1

T-MOBILE-CENTRAL REGION-ANCHOR_06/16/2022_V2

STRUCTURE W/ APPURTENANCE
ELEV. = 162'-0"

HEIGHT OF STRUCTURE
ELEV. = 150'-0"



TIP OF PANEL ANTENNA
ELEV. = 155'-0"

EXISTING T-MOBILE ANTENNA CENTERLINE
ELEV. = 151'-0"

EXISTING T-MOBILE MOUNT CENTERLINE
ELEV. = 151'-0"

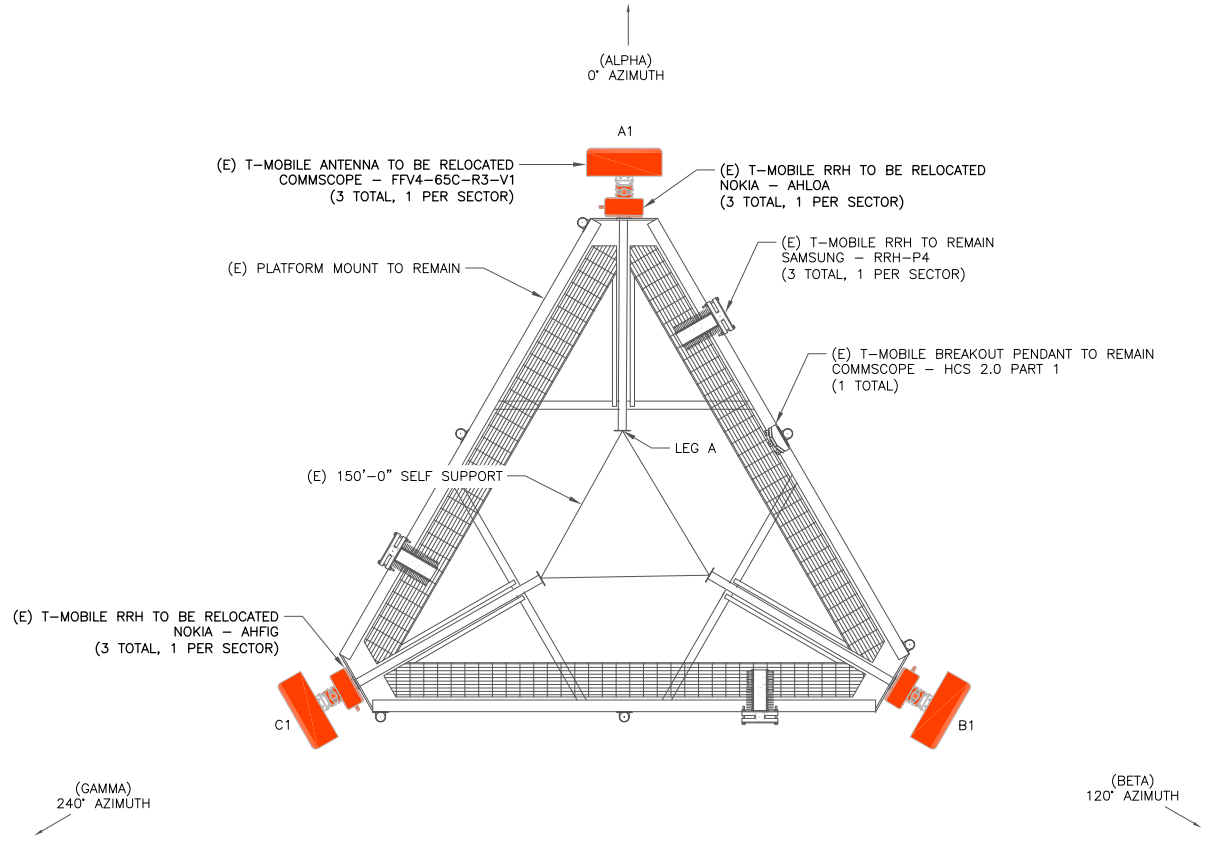
(E) 150'-0" SELF SUPPORT

(E) T-MOBILE FEEDLINE
(1) HYBRID CABLES (1-1/2")

NEW T-MOBILE FEEDLINE
(1) NOKIA - HCS 2.0 PART 3 (1-1/2")
(225'-0" LONG)
(ROUTED PER STRUCTURAL ANALYSIS)

(E) T-MOBILE FEEDLINES TO BE REMOVED
(3) HYBRID CABLES (1")

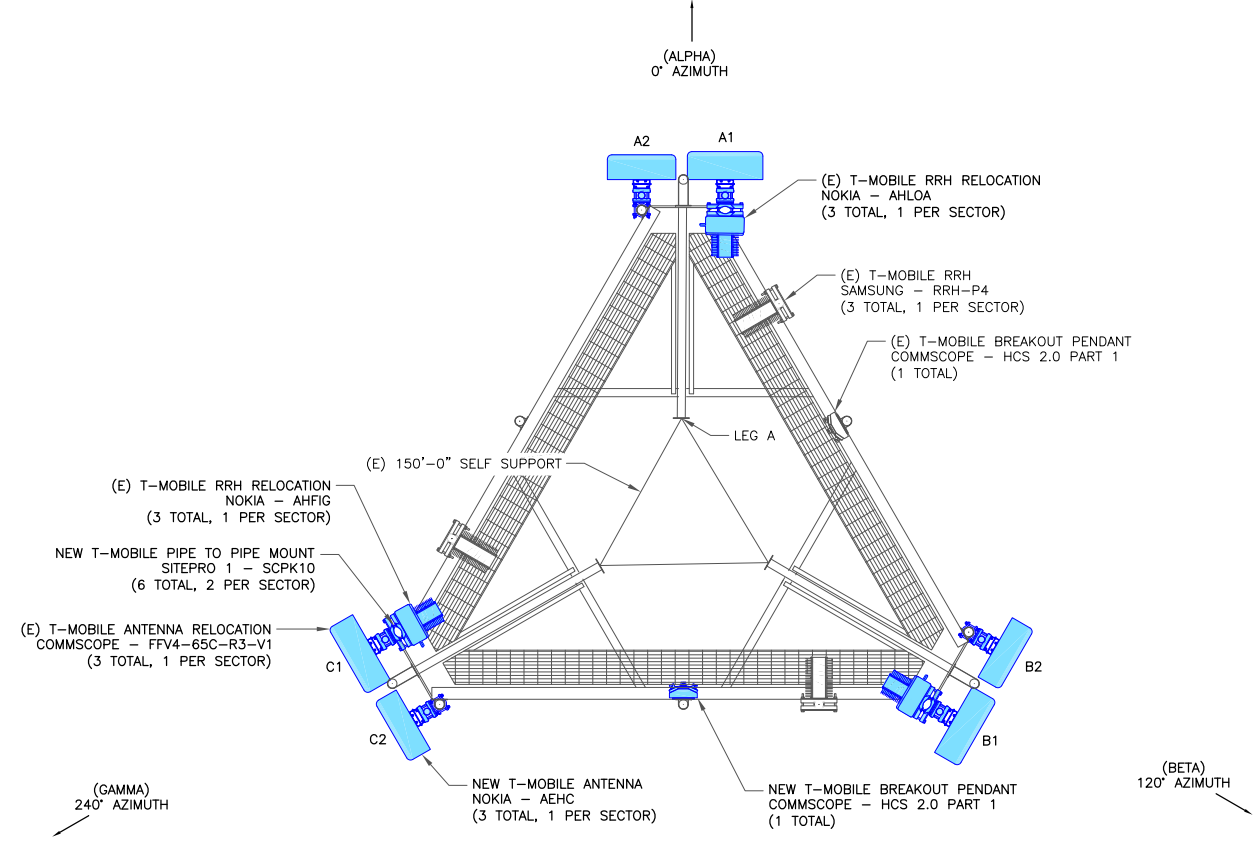
1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA PLAN
SCALE: NOT TO SCALE

EQUIPMENT LEGEND:

- EXISTING
- TO BE RELOCATED/REMOVED
- NEW/RELOCATED



3 FINAL ANTENNA PLAN
SCALE: NOT TO SCALE

T-Mobile

1 RAVINIA DRIVE, SUITE 1000
ATLANTA, GA 30346

CROWN CASTLE

1505 WESTLAKE AVENUE NORTH, SUITE 800
SEATTLE, WA 98109

POD
POWER OF DESIGN

11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

BU #: **878349**
JUNG BEER

W 5009 HWY 144
RANDOM LAKE, WI 53075

EXISTING 150'-0" SELF SUPPORT

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	01/27/2023	NM/NH	CONSTRUCTION	AH
1	02/01/2023	NM	CONSTRUCTION	AH

WISCONSIN

AARON HERKENHOFF
E-49355
LOUISVILLE
KY

PROFESSIONAL ENGINEER

02/01/2023

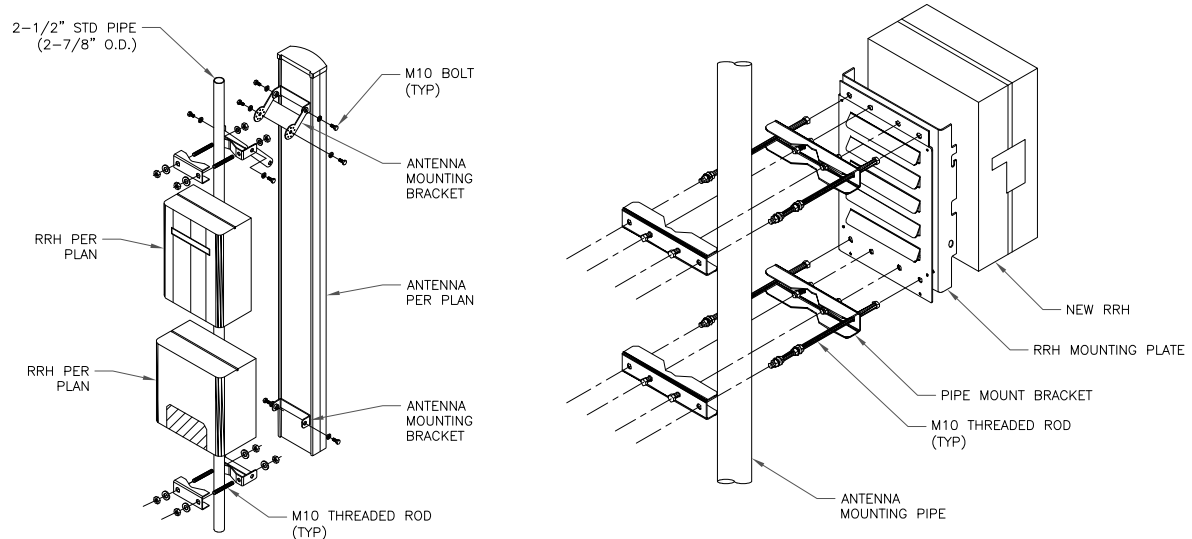
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SHEET NUMBER: **C-2** REVISION: **1**

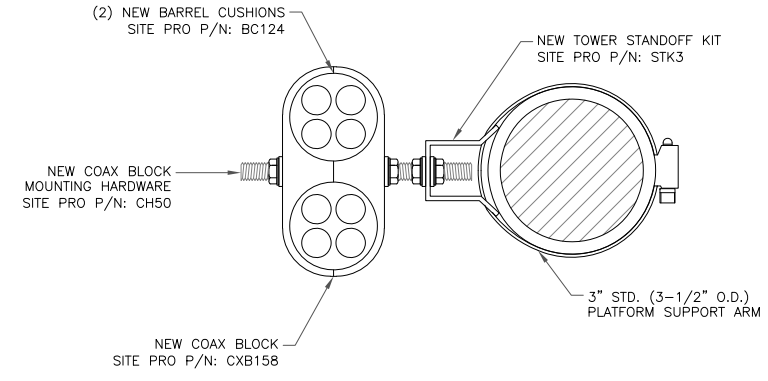
T-MOBILE-CENTRAL REGION-ANCHOR_06/16/2022_V2

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



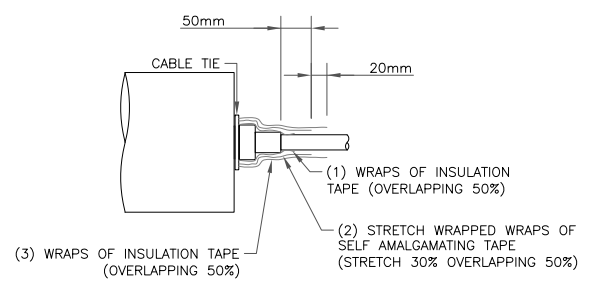
1 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE



2 RF JUMPER DETAIL
SCALE: NOT TO SCALE

INSTALLER NOTE:

JUMPERS TO BE TORQUED TO 221.27 IN/LBS



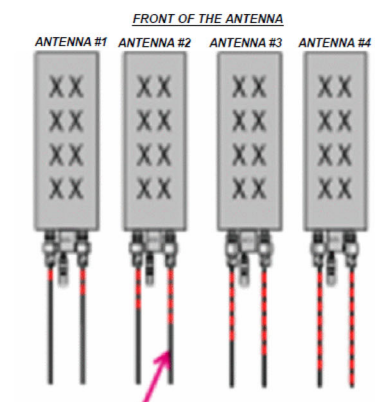
3 RF JUMPER CONNECTION
SCALE: NOT TO SCALE

4 NOT USED
SCALE: NOT TO SCALE

Coax Color Coding

- Antennas will be labeled (back of antenna view) right to left 1 - X ports
- Coax/jumper lines will be identified by sector color and by number of bands around the coax/jumper

SECTOR A	RED
SECTOR B	GREEN
SECTOR C	BLUE
SECTOR D	YELLOW
SECTOR E	WHITE
SECTOR F	PURPLE
LMU	BROWN + SECTOR COLOR BANDS (1 & 2)
FIBER ID	GRAY
UNUSED COAX	PINK
MICROWAVE	ORANGE
DWE T-1'S + GPS DOWNLINK CABLE	ID W LABEL MAKER



COLOR CODING NOTES:

color	GSM
color	UMTS 1900
color	UMTS AWS
color	LTE
color	FIBER CABLE

METALLIC TAG NOTES:

- TWO METALLIC TAGS SHALL BE ATTACHED AT EACH END OF EVERY CABLE LONGER THAN (3) THREE FEET
- CABLE LESS THAN (3) THREE FEET WILL HAVE TWO METALLIC TAGS ATTACHED AT THE CENTER OF THE CABLE
- TAGS WILL BE FASTENED WITH STAINLESS STEEL ZIP TIES APPROPRIATE FOR CABLE DIAMETER
- STANDARDIZED METALLIC TAG KIT WILL BE ASSEMBLED WITH TAGS ALREADY ENGRAVED TO ACCOMMODATE ALL CONFIGURATIONS.

ANTENNA AND COAXIAL CABLE SCHEDULE

- ALL ANTENNAS SHALL BE FURNISHED WITH DOWNTILT BRACKETS. CONTRACTOR SHALL COORDINATE REQUIRED MECHANICAL DOWNTILT FOR EACH ANTENNA WITH RF ENGINEER. ANTENNA DOWNTILT SHALL BE SET AND VERIFIED BY A SMART LEVEL.
- CONTRACTOR SHALL INSTALL COLOR CODE RINGS ON EACH OF THE HYBRID CABLES AND JUMPER CABLES WITH UV RESISTANT TAPE. ALL CABLE SHALL BE MARKED AT TOP AND BOTTOM WITH 2" COLOR TAPE OR STENCIL TAG. COLOR TAPE MAY BE OBTAINED FROM GRAYBAR ELECTRONICS.



5 COAX COLOR CODING
SCALE: NOT TO SCALE

T-Mobile

1 RAVINIA DRIVE, SUITE 1000
ATLANTA, GA 30346

CROWN CASTLE

1505 WESTLAKE AVENUE NORTH, SUITE 800
SEATTLE, WA 98109

POD
POWER OF DESIGN

11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

BU #: 878349
JUNG BEER

W 5009 HWY 144
RANDOM LAKE, WI 53075

EXISTING 150'-0" SELF SUPPORT

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	01/27/2023	NM/NH	CONSTRUCTION	AH
1	02/01/2023	NM	CONSTRUCTION	AH

PROFESSIONAL ENGINEER

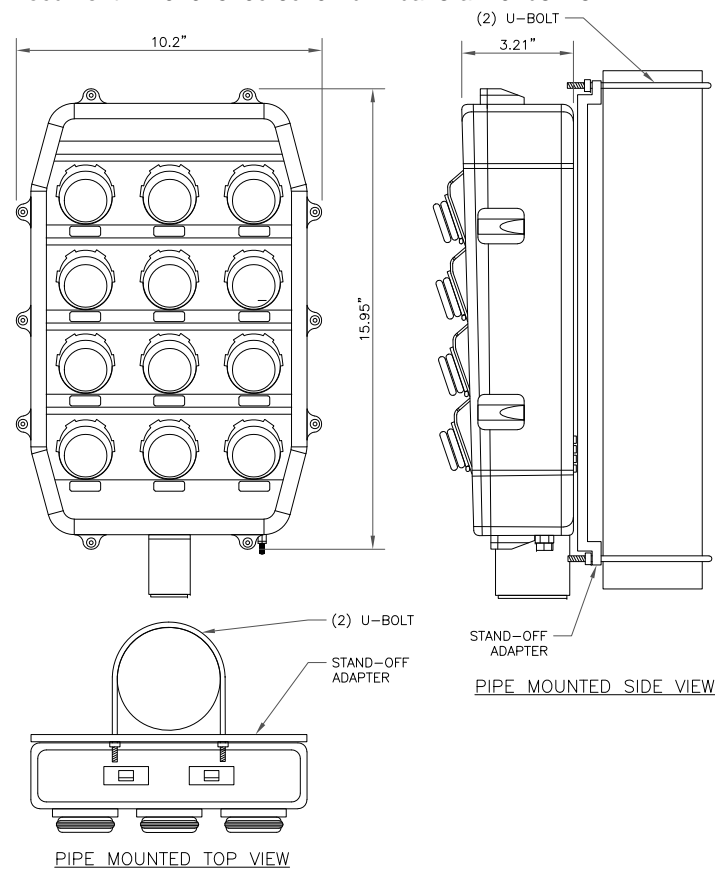
AARON HERKENHOFF
E-49355
LOUISVILLE
KY

02/01/2023

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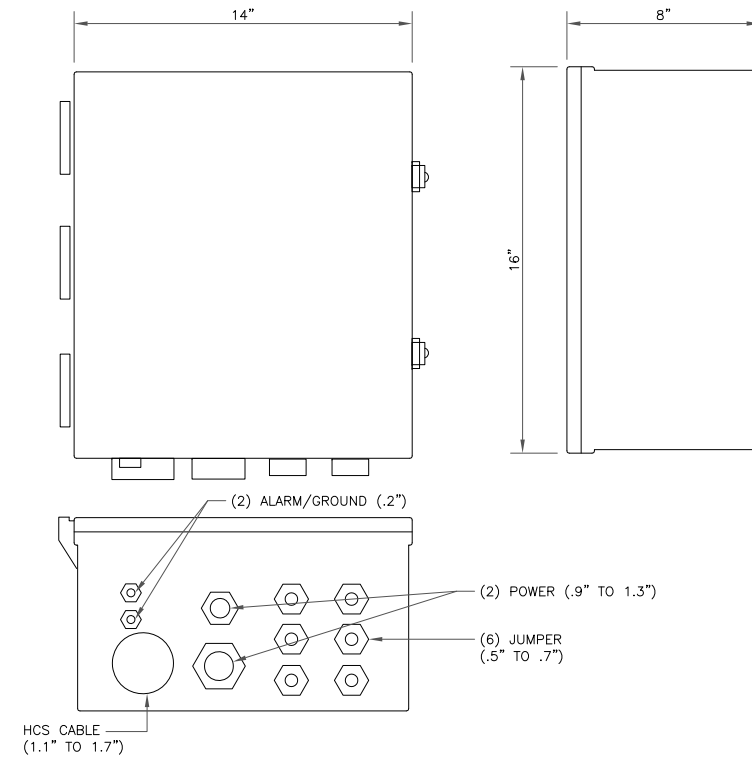
SHEET NUMBER:
C-3

REVISION:
1



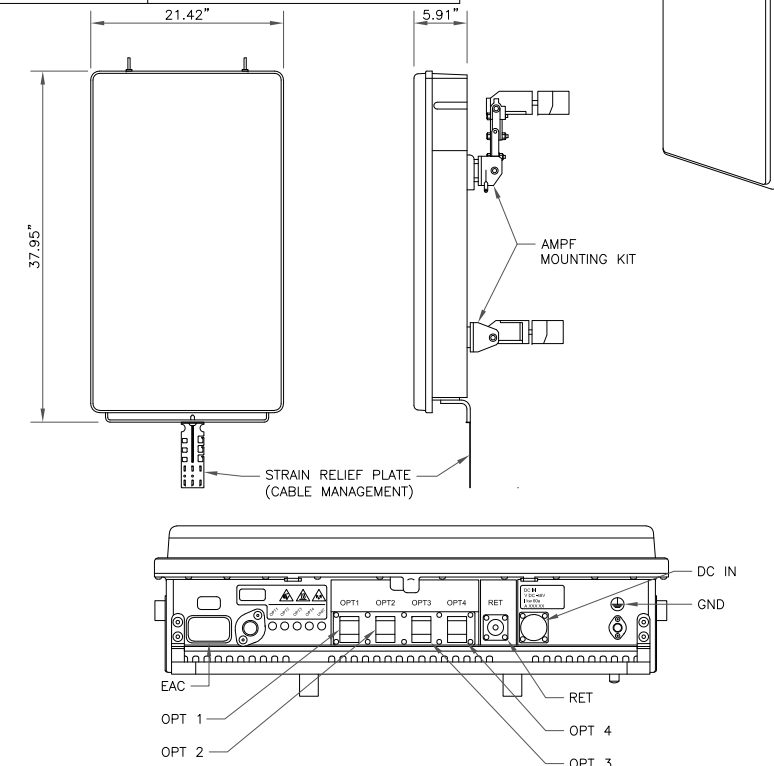
1 HCS 2.0 PENDANT DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	COMMSCOPE
MODEL:	FE-16148-OVP-B12
DIMENSIONS (HxWxD):	14"x16"x8"
WEIGHT:	15.2 LBS



2 HI-CAP JUNCTION BOX DETAIL
SCALE: NOT TO SCALE

MANUFACTURER:	NOKIA
MODEL:	AEHC
DIMENSIONS (HxWxD):	37.95"x21.42"x5.91"
WEIGHT:	108 LBS
BAND:	B41/n41
MOUNTING KIT:	AMPF (475188A) (NOT INCLUDED)



3 NOKIA AEHC ANTENNA SPEC
SCALE: NOT TO SCALE

T-Mobile

1 RAVINIA DRIVE, SUITE 1000
ATLANTA, GA 30346

CROWN CASTLE

1505 WESTLAKE AVENUE NORTH, SUITE 800
SEATTLE, WA 98109

POD

POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

BU #: **878349**
JUNG BEER

W 5009 HWY 144
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EXISTING 150'-0" SELF
SUPPORT

ISSUED FOR:

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02/01/2023

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OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

SHEET NUMBER:

C-4

REVISION:

1

4 NOT USED
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
 1 RAVINIA DRIVE, SUITE 1000
 ATLANTA, GA 30346

CROWN CASTLE
 1505 WESTLAKE AVENUE NORTH, SUITE 800
 SEATTLE, WA 98109

POD
 POWER OF DESIGN
 11490 BLUEGRASS PKWY
 LOUISVILLE, KY 40299
 502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

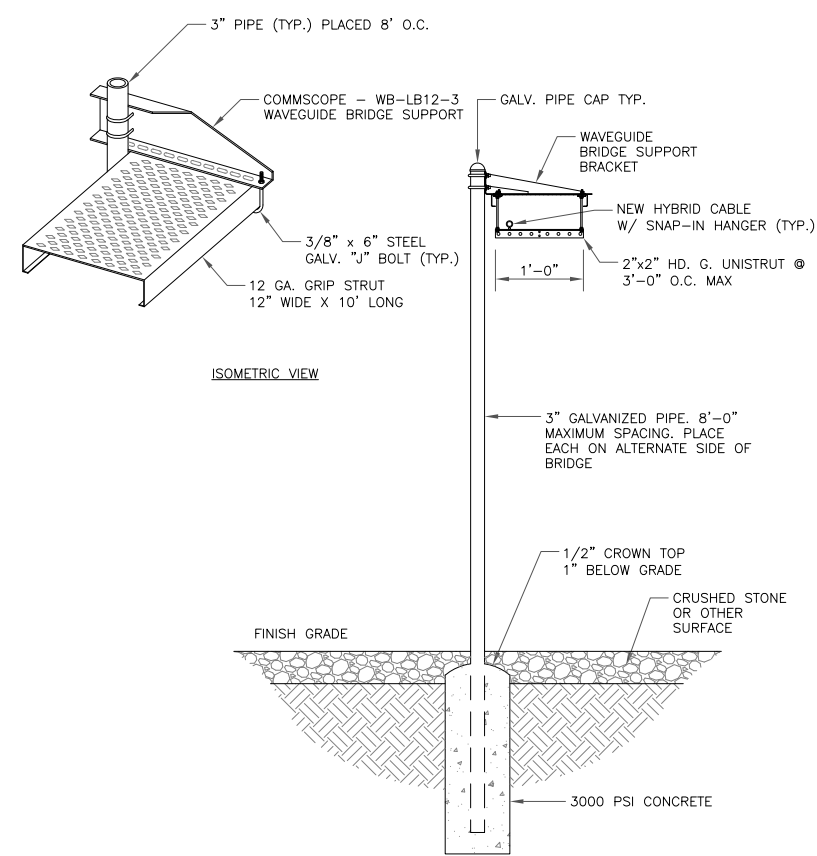
BU #: **878349**
JUNG BEER

W 5009 HWY 144
 RANDOM LAKE, WI 53075

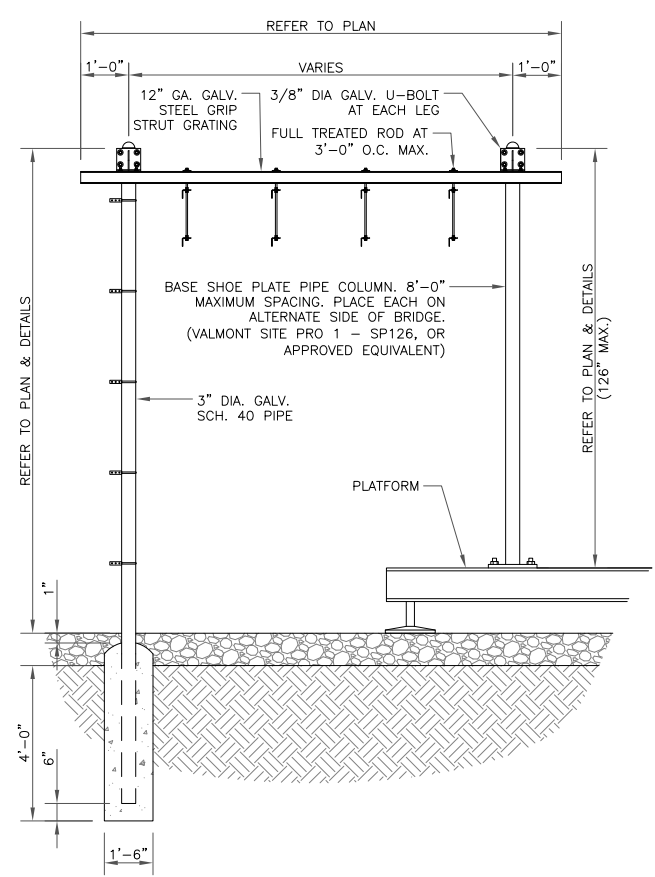
EXISTING 150'-0" SELF
 SUPPORT

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	01/27/2023	NM/NH	CONSTRUCTION	AH
1	02/01/2023	NM	CONSTRUCTION	AH



1 ICE BRIDGE DETAIL
 SCALE: NOT TO SCALE



2 NOT USED
 SCALE: NOT TO SCALE

PROFESSIONAL ENGINEER

AARON HERKENHOFF
 E-49355
 LOUISVILLE
 KY

02/01/2023

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SHEET NUMBER: C-5	REVISION: 1
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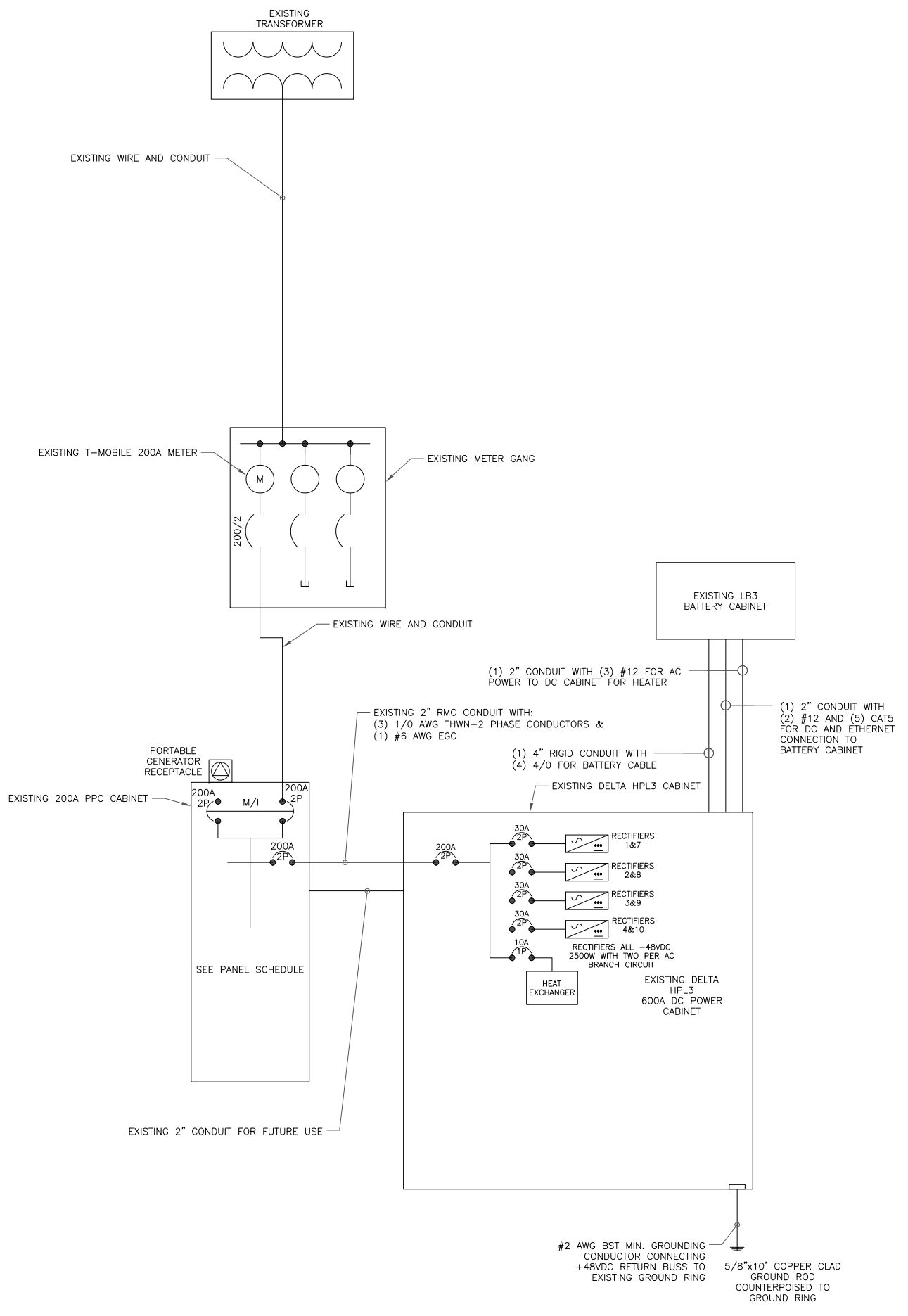
T-MOBILE-CENTRAL REGION-ANCHOR_06/16/2022_V2

T-MOBILE PANEL SCHEDULE											
MAIN: 200 AMP MAIN BREAKER			VOLTAGE/PHASE: 120/240V, 1-PHASE, 3-WIRE				SHORT CIRCUIT CURRENT RATING: N/A				
MOUNTING: INSIDE PPC ENCLOSURE			ENCLOSURE: NEMA 3R				SURGE PROTECTION DEVICE: YES				
DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	LOAD (VA)		CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
					A-PHASE	B-PHASE					
SURGE PROTECTION DEVICE	0	NC	20	1	4800		2	100	C	4800	MMBS
	0	NC		3		4800	4		C	4800	
BBU	1200	C	25	5	12200		6	200	C	11000	DELTA SSC MAIN FEEDER OCPD
	1200	C		7		12380	8		C	11180	
				9	0		10		C		
				11	0		12		C		
				13	0		14		C		
				15	0		16		C		
				17	0		18		C		
				19	0		20		C		
				21	0		22		C		
				23	0		24		C		
BASE LOAD (VA) =					17000	17180					
25% OF CONTINUOUS LOAD (VA) =					4250	4295	C = CONTINUOUS LOAD; NC = NON-CONTINUOUS LOAD				
TOTAL LOAD (VA) =					21250	21475	** INDICATES NEW LOAD. ALL OTHER LOADS ARE EXISTING. NEW BREAKER TO BE SAME TYPE AND HAVE SAME AIC RATING AS EXISTING. CUSTOMER HAS NOT PROVIDED LOADS SHOWN ARE ESTIMATED VALUES				
TOTAL LOAD (A) =					178	179					

1 EXISTING PANEL SCHEDULE
SCALE: NOT TO SCALE

T-MOBILE PANEL SCHEDULE											
MAIN: 200 AMP MAIN BREAKER			VOLTAGE/PHASE: 120/240V, 1-PHASE, 3-WIRE				SHORT CIRCUIT CURRENT RATING: N/A				
MOUNTING: INSIDE PPC ENCLOSURE			ENCLOSURE: NEMA 3R				SURGE PROTECTION DEVICE: YES				
DESCRIPTION	LOAD (VA)	C or NC	C/B	CIR No.	LOAD (VA)		CIR No.	C/B	C or NC	LOAD (VA)	DESCRIPTION
					A-PHASE	B-PHASE					
SURGE PROTECTION DEVICE	0	NC	20	1	4800		2	100	C	4800	MMBS
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	1200	C		7		12380	8		C	11180	
				9	0		10		C		
				11	0		12		C		
				13	0		14		C		
				15	0		16		C		
				17	0		18		C		
				19	0		20		C		
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				23	0		24		C		
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TOTAL LOAD (A) =					178	179					

2 FINAL PANEL SCHEDULE
SCALE: NOT TO SCALE



3 ONE-LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
1 RAVINIA DRIVE, SUITE 1000
ATLANTA, GA 30346

CROWN CASTLE
1505 WESTLAKE AVENUE NORTH, SUITE 800
SEATTLE, WA 98109

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

BU #: **878349**
JUNG BEER

W 5009 HWY 144
RANDOM LAKE, WI 53075

EXISTING 150'-0" SELF SUPPORT

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	01/27/2023	NM/NH	CONSTRUCTION	AH
1	02/01/2023	NM	CONSTRUCTION	AH

WISCONSIN PROFESSIONAL ENGINEER

AARON HERKENHOFF
E-49355
LOUISVILLE KY

02/01/2023

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: **E-1** REVISION: **1**

T-MOBILE-CENTRAL REGION-ANCHOR_06/16/2022_V2



1 RAVINIA DRIVE, SUITE 1000
ATLANTA, GA 30346



1505 WESTLAKE AVENUE NORTH, SUITE 800
SEATTLE, WA 98109



11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
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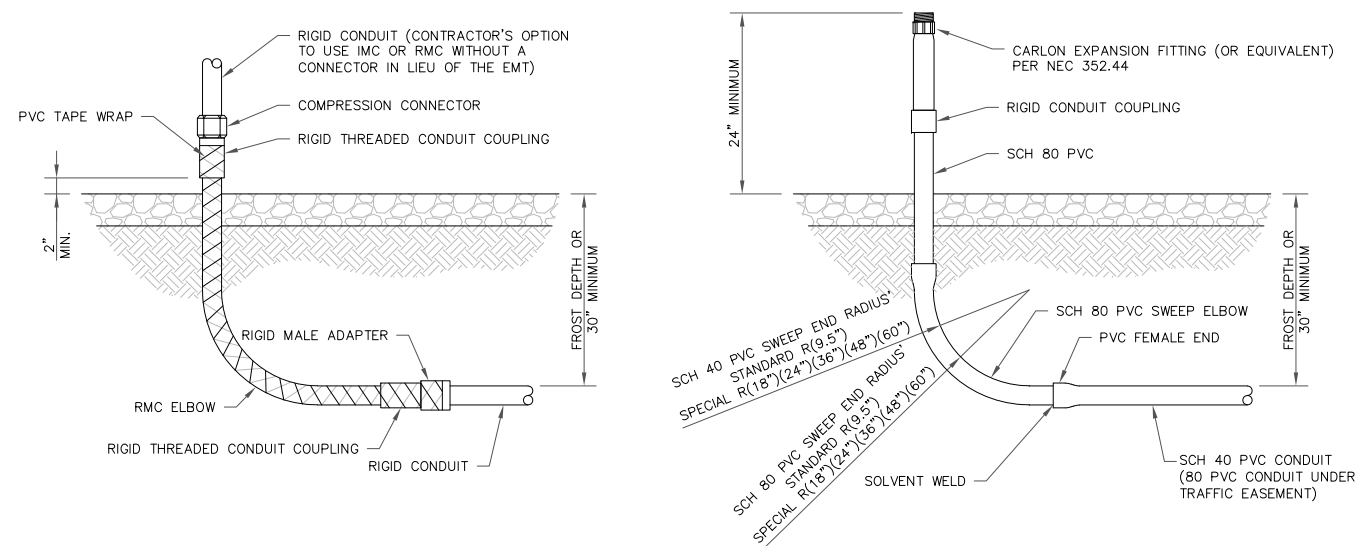
EXISTING 150'-0" SELF
SUPPORT

INSTALLER NOTES:

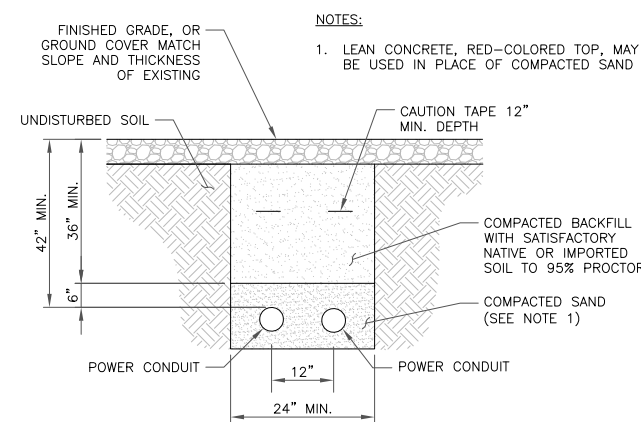
ALL METAL CONDUIT INSTALLED IN DIRECT CONTACT WITH THE EARTH SHALL BE CONSIDERED TO BE INSTALLED IN A SEVERELY CORROSIVE ENVIRONMENT AND IS REQUIRED TO HAVE SUPPLEMENTAL PROTECTION AGAINST CORROSION (NEC ARTICLE 342.10(B) & 344.10(B)(1)). THIS PROTECTION SHALL EITHER BE AN APPROVED MANUFACTURER INSTALLED PROTECTIVE COATING ON THE CONDUIT OR SHALL BE (2) LAYERS OF 10 MIL PVC PIPE WRAP TAPE INSTALLED USING OPPOSING SPIRAL WRAPS. ON VERTICAL PIPE THE OUTSIDE LAYER OF TAPE SHALL BE WRAPPED SO AS TO PROVIDE SHEDDING OF WATER (i.e. TAPE SHOULD WRAP IN AN UPWARD DIRECTION WITH LOWER WRAP BEING BENEATH THE WRAP ABOVE). SPIRAL WRAPS SHALL HAVE A MINIMUM OF 1/4" OVERLAP WITH THE PRECEDING TAPE WRAP. ANY OTHER METHODS OF CORROSION PROTECTION SHALL REQUIRE APPROVAL BY THE ENGINEER OF RECORD PRIOR TO BEING USED.

ISSUED FOR:

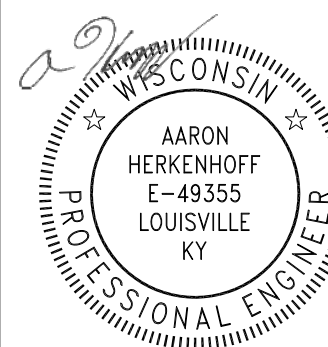
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	01/27/2023	NM/NH	CONSTRUCTION	AH
1	02/01/2023	NM	CONSTRUCTION	AH



1 CONDUIT STUB UP DETAILS
SCALE: NOT TO SCALE



2 TRENCH DETAIL
SCALE: NOT TO SCALE



02/01/2023

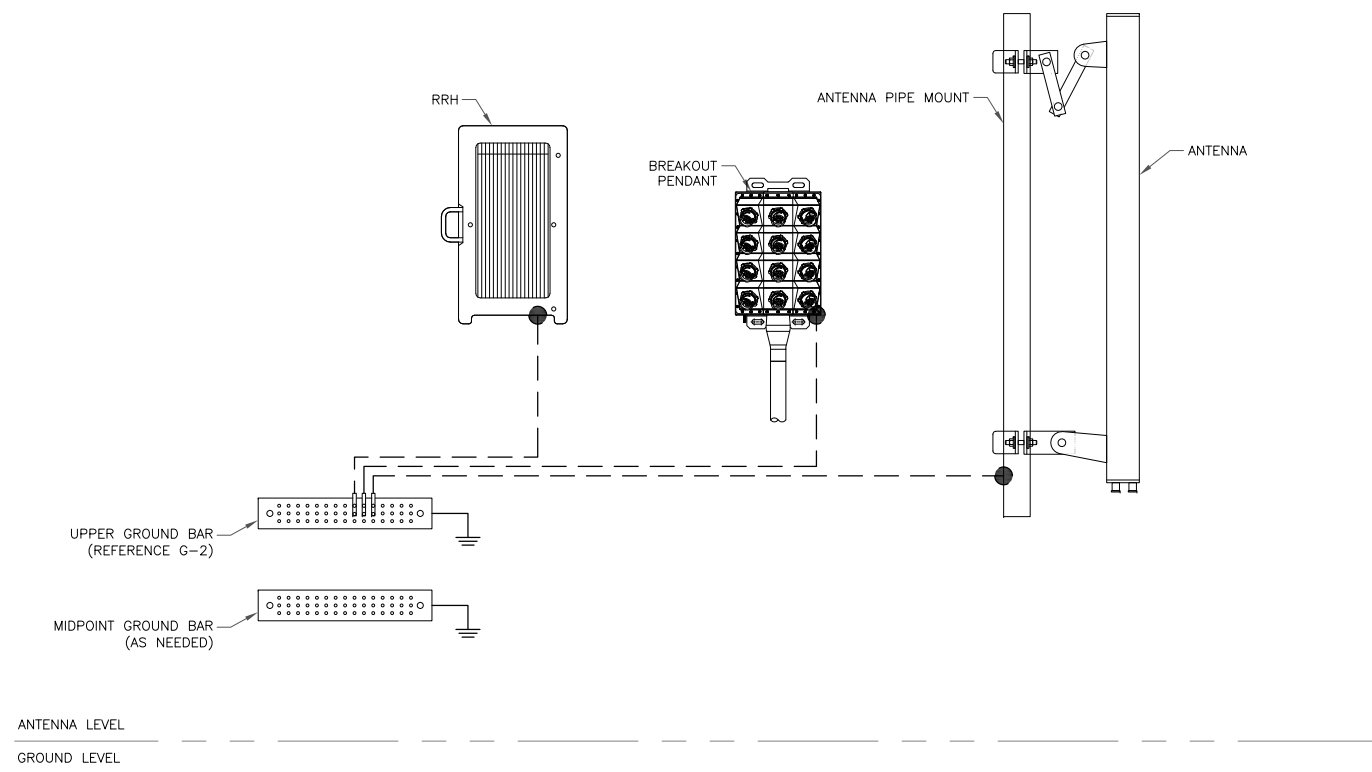
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SHEET NUMBER:

E-2

REVISION:

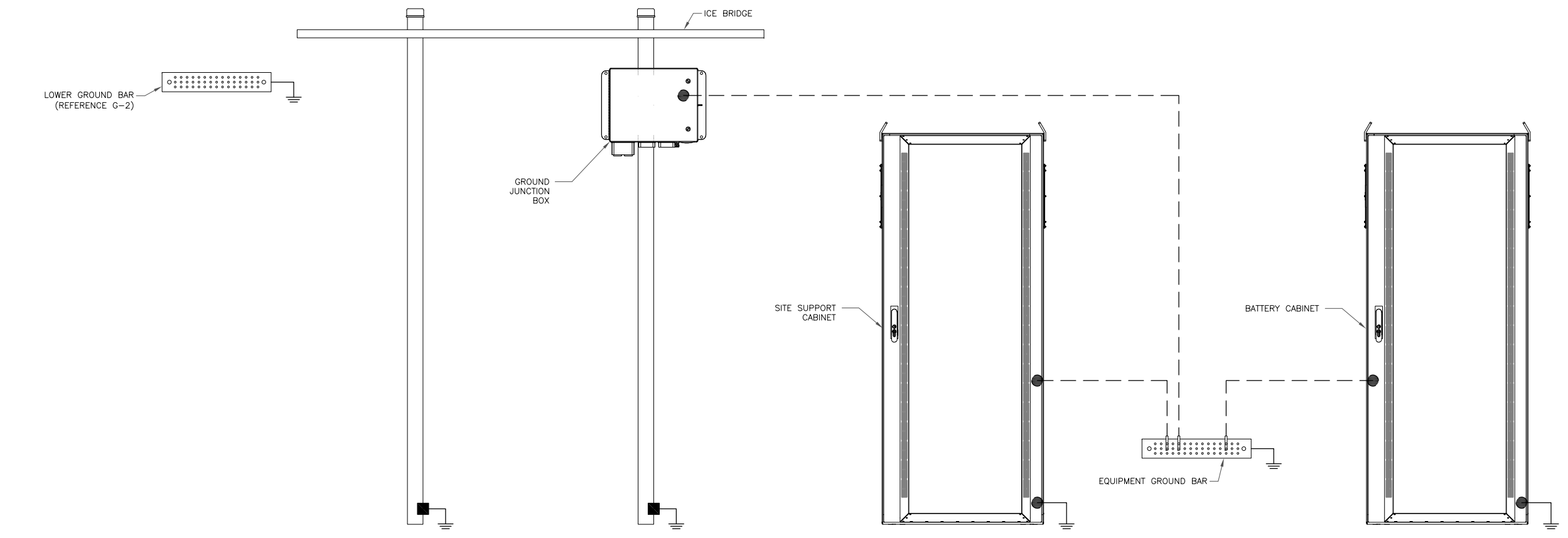
1



GROUNDING PLAN LEGEND:

- #6 STRANDED COPPER WITH GREEN INSULATION GROUND WIRE
- #2 STRANDED COPPER WITH GREEN INSULATION GROUND WIRE
- #2 BARE, SOLID, TINNED COPPER GROUND WIRE
- EXOTHERMIC WELD
- MECHANICAL CONNECTION
- COPPER GROUND ROD
- ⊗ GROUND ROD W/ TEST WELL

NOTE:
SEE FINAL EQUIPMENT PLAN FOR NEW EQUIPMENT REQUIRING GROUNDING. CONTRACTOR TO VERIFY EXISTING EQUIPMENT GROUNDING IN FIELD. CONTRACTOR TO VERIFY IN FIELD AND INSTALL ANY MISSING T-MOBILE GROUND BARS ON SITE.



T-Mobile

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POWER OF DESIGN

11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

T-MOBILE SITE NUMBER:
ML81125A

BU #: 878349
JUNG BEER

W 5009 HWY 144
RANDOM LAKE, WI 53075

EXISTING 150'-0" SELF SUPPORT

ISSUED FOR:

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1	02/01/2023	NM	CONSTRUCTION	AH

WISCONSIN

AARON HERKENHOFF
E-49355
LOUISVILLE
KY

PROFESSIONAL ENGINEER

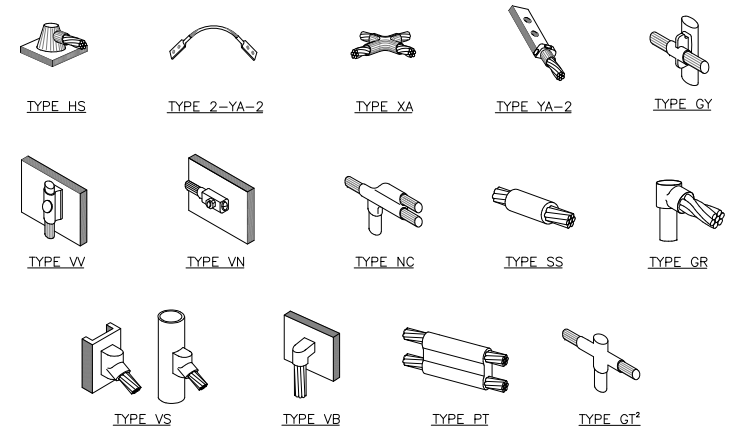
02/01/2023

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SHEET NUMBER: **G-1** **REVISION:** **1**

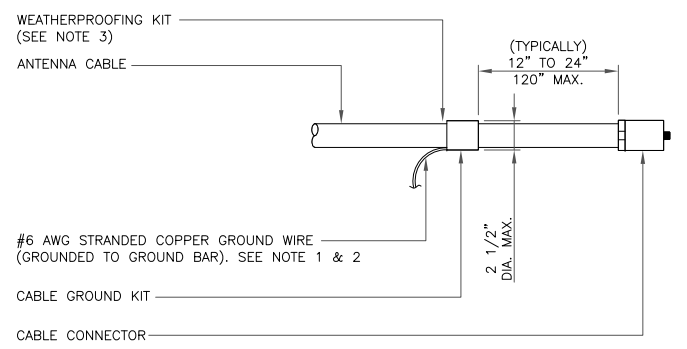
1 TYPICAL FINAL GROUNDING SCHEMATIC
SCALE: NOT TO SCALE

T-MOBILE_CENTRAL_REGION_ANCHOR_06162022_V2



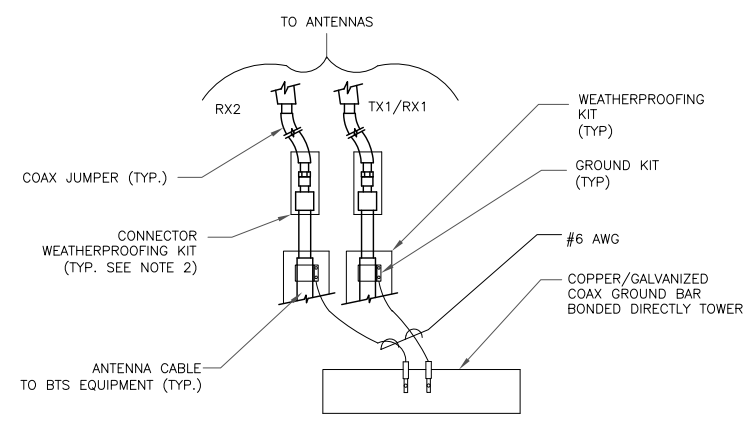
NOTE:
 1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
 2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
 SCALE: NOT TO SCALE



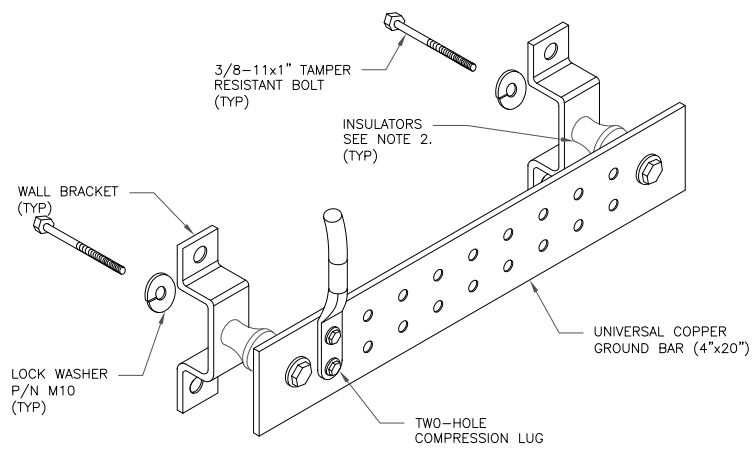
NOTES:
 1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
 2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
 3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

3 CABLE GROUND KIT CONNECTION
 SCALE: NOT TO SCALE



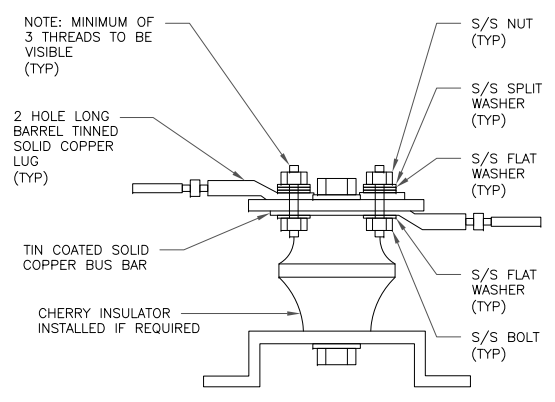
NOTES:
 1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
 2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
 SCALE: NOT TO SCALE



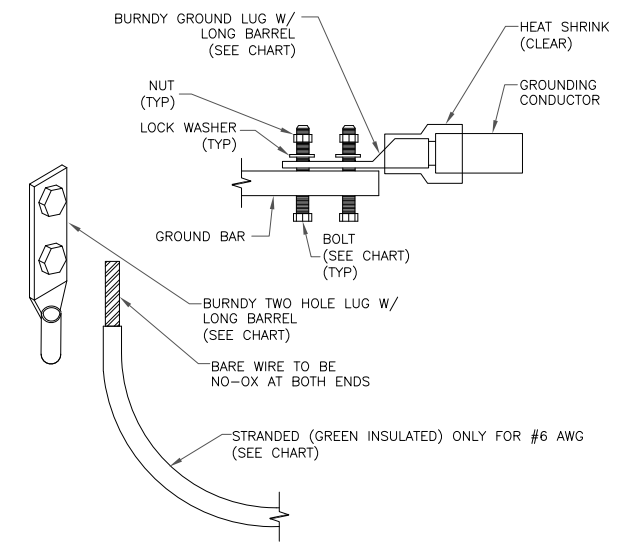
NOTES:
 1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
 2. OMIT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



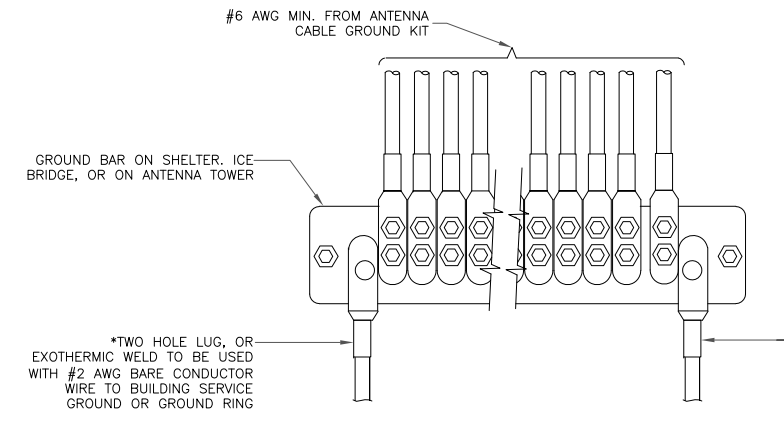
7 LUG DETAIL
 SCALE: NOT TO SCALE

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

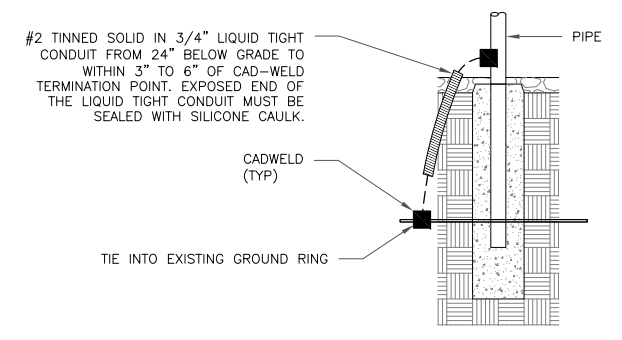


NOTES:
 1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.
 STRANDED (GREEN INSULATED) ONLY FOR #6 AWG (SEE CHART)

2 MECHANICAL LUG CONNECTION
 SCALE: NOT TO SCALE



5 GROUNDWIRE INSTALLATION
 SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
 SCALE: NOT TO SCALE

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WISCONSIN PROFESSIONAL ENGINEER
 AARON HERKENHOFF
 E-49355
 LOUISVILLE KY
 02/01/2023
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SHEET NUMBER: G-2 **REVISION: 1**