Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

March 18, 2021

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

RE: **Notice of Exempt Modification for T-Mobile: 806367**
65 Maple Avenue West, Haddam, CT 06441
Latitude: 41° 29′ 4.54″ / Longitude: -72° 34′ 20.81″

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 98-foot mount level on the existing 115-foot monopole tower, located at 65 Maple Avenue West, Haddam, CT. The property is owned by D'Amico, Louis W Jr & D'Amico, Enzo. The. The tower is owned by Crown Castle. T-Mobile now intends to replace three (3) antennas and ancillary equipment at the 98-ft level. T-Mobile to also to replace the antenna mount at the same level. This modification/proposal includes hardware that is both 4G (LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times.

Panned Modification:
Tower:

Installed New:
(3) RFS/Celwave – APXVAARR24_43-U-NA20
(3) Ericsson-Radio 4449 B12/B71
(3) Ericsson-TMA KRY112 489/2
(3) Ericsson-TMA KRY112 144/1
(1) HYBRID Cable 1-5/8"

Remove:
(3) ANTENNAs
(1) T-Arm Mounts

Ground:

Install New:
(2) BB 6630
(6) RUS01 B4

Remove:
(1) DUS41
(6) RUS01 B12

The facility was approved by the Connecticut Siting Council in Docket No. 170 on November 15, 1995. T-Mobile's proposed modification will not violate the conditions set forth in the Decision and Order.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mr. Robert McGarry, First Selectman, Town of Haddam, Mr. Bill Warner, Town Planner and he property owner, Mr. Louis W. D'Amico, Jr. Crown Castle is the tower owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

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

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Site Acquisition Specialist
1800 W. Park Drive
Westborough, MA 01581
(781) 970-0053
Jeff.Barbadora@crowncastle.com

Attachments
cc:

First Selectman, Mr. Robert McGarry, 30 Field Park Dr, Haddam, CT 06438 (860)-345-3730
Town Planner, Mr. Bill Warner, 30 Field Park Dr, Haddam, CT 06438 (860)-345-3730
Property Owner, Mr. Louis W D'Amico, Jr., 65 Maple Avenue West, Higganum, CT 06441
Crown Castle, Tower Owner

Filing Guides
Meetings & Minutes
Public Participation
Audio Link to New Britain Hearing Rooms
Programs & Services
Telecommunications Database
Publications
Other Resources
Statutes & Regulations
Electric Transmission Upgrade Projects
Frequently Asked Questions

Melanie Bachman,
Executive Director

DOCKET NO. 170 - An application of Metro Mobile CTS of Hartford, Inc. for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a cellular telecommunications facility located at 109 Maple Avenue West in the Higganum section of the Town of Haddam, Connecticut.

Connecticut Siting Council

November 15, 1995

DECISION AND ORDER

Pursuant to the foregoing Findings of Fact, and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a cellular telecommunications tower and equipment building at the proposed prime site in the Higganum section of Haddam, Connecticut, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Bell Atlantic NYNEX Mobile, Inc. for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed prime site, located within an 88.85 acre parcel at 109 Maple Avenue West, Haddam, Connecticut. We find the effects on scenic resources and the environment from the alternate site to be more significant than the effects from the prime site, and therefore deny certification of the alternate site without prejudice.

The facility shall be constructed, operated, and maintained as a monopole substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed communications service and sufficient to accommodate tower sharing, and not to exceed a total height of 120 feet above ground level.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include plans for the tower and tower foundation; specifications for the placement of all antennas to be attached to this tower; plans for the equipment building, security fence, emergency generator and fuel tank; plans for the access road and utility line installation from 109 Maple Avenue West; plans for site clearing and tree trimming; and plans for water drainage and erosion and sedimentation controls consistent with the Connecticut Guidelines for Soil Erosion and Sedimentation Control, as amended.

3. Upon the establishment of any new State or federal radio frequency power density standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

4. The Certificate Holder shall provide the Council a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. If the facility does not initially provide, or permanently ceases to provide, cellular services following completion of construction, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapplication for any continued or new use shall be made to the Council before any such use is made.

7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

8. The Certificate Holder shall notify the Council upon completion of construction and provide the final cost to construct the facility.

Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in The

Hartford Courant and the Middletown Press.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

APPLICANT	**ITS REPRESENTATIVES**
Bell Atlantic NYNEX Mobile, Inc.	Brian C.S. Freeman, Esq. Kenneth C. Baldwin, Esq. Robinson & Cole One Commercial Plaza Hartford, CT 06103-3597 David S. Malko General Manager - Engineering Sandy M. Ranciato Manager - Regulatory Services Bell Atlantic NYNEX Mobile, Inc. 20 Alexander Drive Wallingford, CT 06492
INTERVENOR	**ITS REPRESENTATIVE**
Town of Haddam	The Honorable Marjorie W. DeBold First Selectman Town of Haddam 30 Field Park Drive Haddam, CT 06438
INTERVENOR	**ITS REPRESENTATIVE**
Springwich Cellular Limited Partnership	Peter J. Tyrrell, Esq. General Counsel - Wireless Springwich Cellular Limited Partnership 500 Enterprise Dr., 4th floor Rocky Hill, CT 06067

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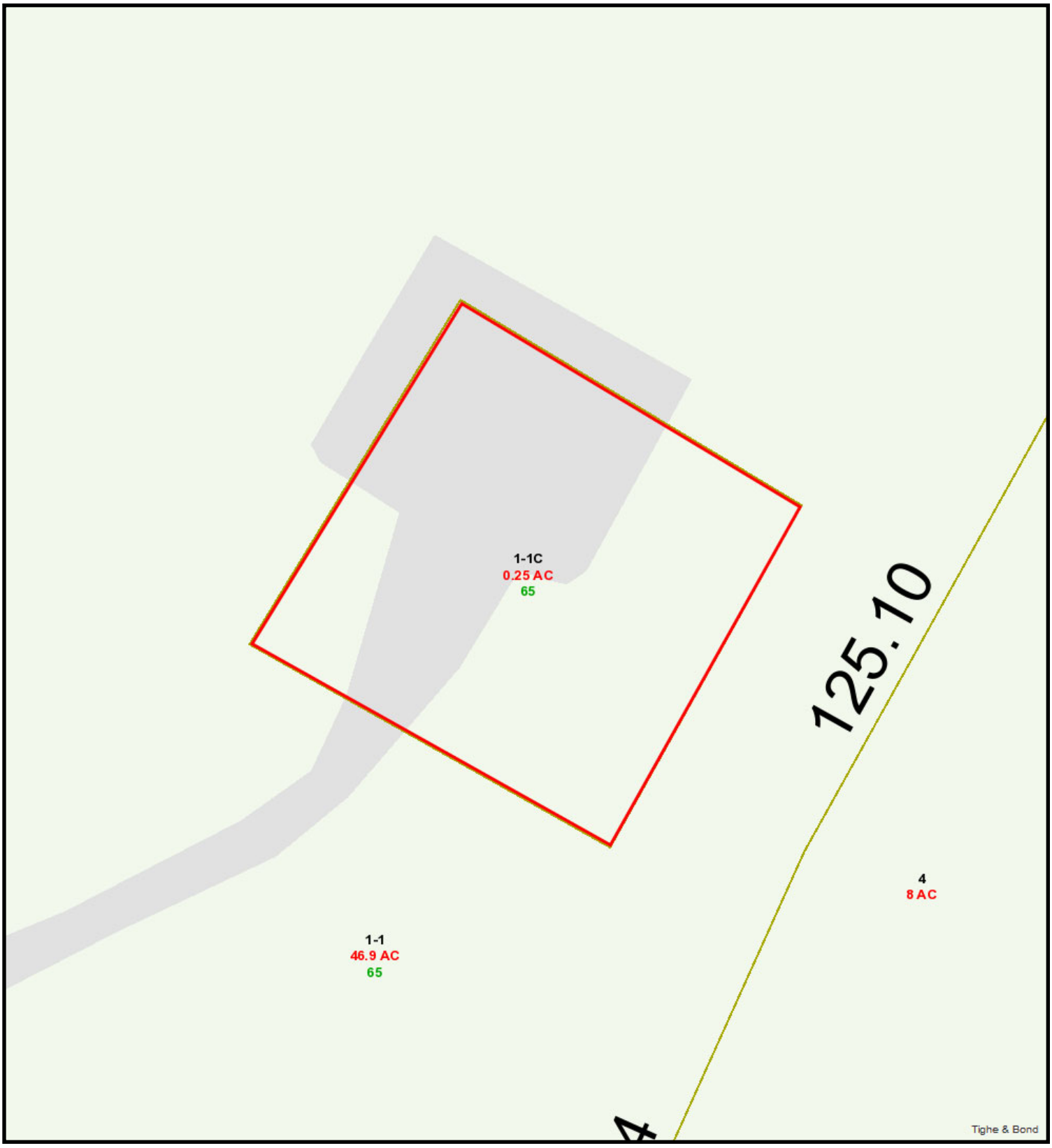

3/16/2021 10:43:10 AM

Scale: 1"=33'

Scale is approximate

The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2020.

Information on the Property Records for the Municipality of Haddam was last updated on 3/15/2021.

Parcel Information

Location:	65 MAPLE AVE WEST UNIT C	Property Use:	Vacant Land	Primary Use:	Cell Tower
Unique ID:	MT380800	Map Block Lot:	23 001 1 C	Acres:	1.25
490 Acres:	0.00	Zone:	R-2	Volume / Page:	0336/0559
Developers Map / Lot:		Census:	5901		

Value Information

	Appraised Value	Assessed Value
Land	100,750	70,530
Buildings	0	0
Detached Outbuildings	349,290	244,500
Total	450,040	315,030

Owner's Information

Owner's Data
DAMICO LOUIS W JR + DAMICO ENZO C/O CROWN ATLANTIC CO LLC PMB 3 4017 WASHINGTON RD MCMURRAY, PA 15317

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
8 Ft Chain Fence	2007	0.00	0.00	2,240
Cell Tower	2007	0.00	0.00	1
Building Utility	2007	0.00	0.00	580

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
DAMICO LOUIS W JR + DAMICO ENZO	0336	0559	04/05/2010		No	$0
DAMICO LOUIS W SR + LOUIS W JR	0305	0805	10/10/2006		No	$0
DAMICO LOUIS W & MARJORY C DAMICO FAMILY	0256	0789	01/27/2003		No	$0
DAMICO LOUIS W	0233	1040	12/21/2000		No	$0

Building Permits

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
8980	Unknown	12/05/2007		Closed	MOUNT 2 ANTENNAS ON EXIST TOWE

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Date: **November 30, 2020**

Denice Nicholson
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11233A
	Carrier Site Name:	Higganum_1
Crown Castle Designation:	**Crown Castle BU Number:**	806367
	Crown Castle Site Name:	HRT 046 943209
	Crown Castle JDE Job Number:	559174
	Crown Castle Work Order Number:	1901246
	Crown Castle Order Number:	479816 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	1901246
Site Data:	**MAPLE AVE WEST, HADDAM, Middlesex County, CT** **Latitude *41° 29' 4.54"*, Longitude *-72° 34' 20.81"*** **115.5 Foot - Monopole Tower**	

Dear Denice Nicholson,

Crown Castle 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-56.1%**

This analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Abigail Ruiz / MAA

Respectfully submitted by:

Maribel Dentinger

Maribel Dentinger, P.E.
Senior Project Engineer

Maribel Dentinger Digitally signed by Maribel Dentinger Date: 2020.11.30 10:23:54 -05'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 115.5 ft Monopole tower designed by FWT INC.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

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)
97.0	98.0	3	ems wireless	RR90-17-02DP	12 1	1-1/4 1-5/8
		3	ericsson	KRY 112 144/1		
		3	ericsson	KRY 112 489/2		
		3	ericsson	RADIO 4449 B12/B71		
		3	rfs celwave	APXVAARR24_43-U-NA20		
	97.0	1	SitePro1	RMQP-SPT		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
117.0	119.0	3	antel	BXA-171063-8BF-2 w/ Mount Pipe	15	1-5/8
		3	antel	BXA-70063/6CF w/ Mount Pipe		
		4	antel	LPA-80063/6CF w/ Mount Pipe		
		2	antel	LPA-80080/6CF w/ Mount Pipe		
		6	rfs celwave	FD9R6004/2C-3L		
	117.0	1	tower mounts	Platform Mount [LP 1001-1]		
104.0	109.0	2	decibel	DB411-A	3	7/8
	107.0	1	maxrad	MFB4505		
	104.0	1	tower mounts	Side Arm Mount [SO 702-3]		
87.0	89.0	4	cci antennas	HPA65R-BU6A w/ Mount Pipe	12 4 2 2 1	7/8 3/4 3/8 7/16 CONDUIT
		2	cci antennas	HPA65R-BU8A w/ Mount Pipe		
		3	ericsson	RRUS 4415 B25		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A		
		2	kathrein	80010965 w/ Mount Pipe		
		1	kathrein	80010966 w/ Mount Pipe		
		3	powerwave technologies	7770.00 w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		6	powerwave technologies	LGP21401		
		2	raycap	DC6-48-60-18-8C-EV		
		1	raycap	DC6-48-60-18-8F		
	87.0	1	tower mounts	Platform Mount [LP 304-1]		
75.0	77.0	3	kathrein	742 213	6	1-5/8
	75.0	1	tower mounts	Pipe Mount [PM 601-3]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH	2225355	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF	2200141	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF	997499	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.5), 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. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	115.5 - 83.92	Pole	TP40.829x32.25x0.25	1	-10.83	1790.03	18.4	Pass
L2	83.92 - 41.25	Pole	TP51.92x38.8811x0.3125	2	-24.66	2808.03	38.1	Pass
L3	41.25 - 0	Pole	TP62.5x49.4614x0.375	3	-41.53	4073.37	45.4	Pass
							Summary	
						Pole (L3)	45.4	Pass
						Rating =	45.4	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	47.0	Pass
1	Base Plate	0	47.0	Pass
1	Base Foundation (Structure)	0	22.5	Pass
1	Base Foundation (Soil Interaction)	0	56.1	Pass

Structure Rating (max from all components) =	56.1%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

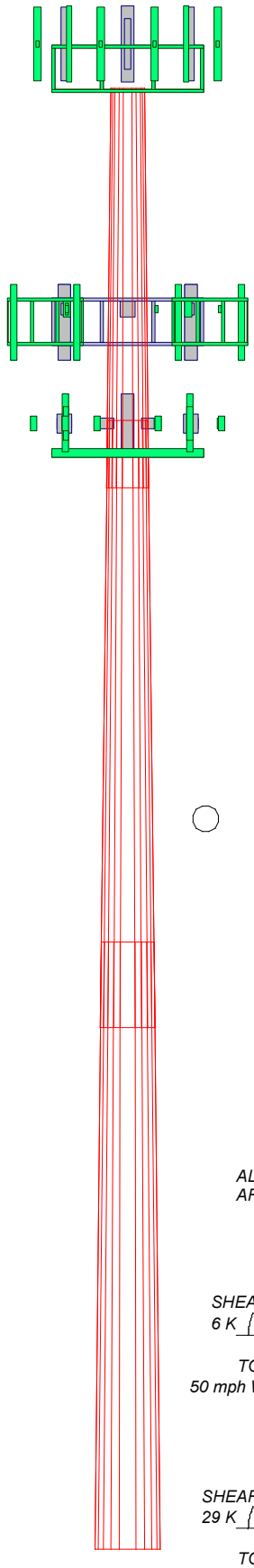
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	31.58	48.00	48.00
Number of Sides	12	12	12
Thickness (in)	0.2500	0.3125	0.3750
Socket Length (ft)	5.33	6.75	
Top Dia (in)	32.2500	38.8811	49.4614
Bot Dia (in)	40.8290	51.9200	62.5000
Grade	A572-65		
Weight (K)	3.1	7.4	11.0



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 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: 45.4%

ALL REACTIONS ARE FACTORED

AXIAL 70 K

SHEAR 6 K

MOMENT 482 kip-ft

TORQUE 0 kip-ft
50 mph WIND - 1.5000 in ICE

AXIAL 42 K

SHEAR 29 K

MOMENT 2289 kip-ft

TORQUE 2 kip-ft
REACTIONS - 130 mph WIND

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: ***BU 806367***			
Project:			
Client: Crown Castle	Drawn by: abruiz		App'd:
Code: TIA-222-H	Date: 11/25/20		Scale: NTS
Path: C:\Users\AbRuiz\Desktop\WIP\806367\WO 1901246 - SA\Prod\806367_RPA.er			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

3) Tower is located in Middlesex County, Connecticut.
4) Tower base elevation above sea level: 515.00 ft.
5) Basic wind speed of 130 mph.
6) Risk Category II.
7) Exposure Category B.
8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
9) Topographic Category: 1.
10) Crest Height: 0.00 ft.
11) Nominal ice thickness of 1.5000 in.
12) Ice thickness is considered to increase with height.
13) Ice density of 56 pcf.
14) A wind speed of 50 mph is used in combination with ice.
15) Temperature drop of 50 °F.
16) Deflections calculated using a wind speed of 60 mph.
17) A non-linear (P-delta) analysis was used.
18) Pressures are calculated at each section.
19) Stress ratio used in pole design is 1.05.
20) Tower analysis based on target reliabilities in accordance with Annex S.
21) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
22) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	115.50-83.92	31.58	5.33	12	32.2500	40.8290	0.2500	1.0000	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	83.92-41.25	48.00	6.75	12	38.8811	51.9200	0.3125	1.2500	A572-65 (65 ksi)
L3	41.25-0.00	48.00		12	49.4614	62.5000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	33.2995	25.7600	3366.9120	11.4560	16.7055	201.5451	6822.2765	12.6783	7.9730	31.892
	42.1811	32.6661	6865.7163	14.5273	21.1494	324.6290	13911.8025	16.0773	10.2722	41.089
L2	41.6413	38.8096	7368.7188	13.8075	20.1404	365.8678	14931.0220	19.1009	9.5826	30.664
	53.6413	51.9300	17653.4791	18.4755	26.8946	656.3959	35770.7347	25.5584	13.0771	41.847
L3	52.9722	59.2718	18228.7377	17.5729	25.6210	711.4763	36936.3647	29.1718	12.2507	32.668
	64.5725	75.0159	36954.9224	22.2407	32.3750	1141.4648	74880.6918	36.9206	15.7450	41.987

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 115.50-83.92				1	1	1			
L2 83.92-41.25				1	1	1			
L3 41.25-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
LCF78-50J(7/8") **	B	No	Surface Ar (CaAa)	104.00 - 0.00	2	2	0.000 0.042	1.1000		0.53
2" (Nominal) Conduit	A	No	Surface Ar (CaAa)	87.00 - 0.00	1	1	-0.125 -0.125	2.3750		0.72
LDF5-50A(7/8)	A	No	Surface Ar (CaAa)	87.00 - 0.00	12	6	0.000 0.108	1.0900		0.33
FB-L98B-034-XXX(3/8)	A	No	Surface Ar (CaAa)	87.00 - 0.00	1	1	-0.108 -0.108	0.3937		0.06
WR-VG86ST-BRD(3/4) **********	A	No	Surface Ar (CaAa)	87.00 - 0.00	4	4	-0.100 0.000	0.7950		0.58

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight plf

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	C	No	No	Inside Pole	115.50 - 0.00	15	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
**									
LCF78-50J(7/8")	C	No	No	Inside Pole	104.00 - 0.00	1	No Ice	0.00	0.53
							1/2" Ice	0.00	0.53
							1" Ice	0.00	0.53
							2" Ice	0.00	0.53
**									
FLC 114-50J(1-1/4")	C	No	No	Inside Pole	97.00 - 0.00	6	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
AVA6-50(1-1/4)	C	No	No	Inside Pole	97.00 - 0.00	6	No Ice	0.00	0.46
							1/2" Ice	0.00	0.46
							1" Ice	0.00	0.46
							2" Ice	0.00	0.46
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	97.00 - 0.00	1	No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
							2" Ice	0.00	2.40
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	87.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG122ST-BRDA(7/16)	C	No	No	Inside Pole	87.00 - 0.00	2	No Ice	0.00	0.14
							1/2" Ice	0.00	0.14
							1" Ice	0.00	0.14
							2" Ice	0.00	0.14
**									
AVA7-50(1-5/8)	C	No	No	Inside Pole	75.00 - 0.00	6	No Ice	0.00	0.70
							1/2" Ice	0.00	0.70
							1" Ice	0.00	0.70
							2" Ice	0.00	0.70
**********									
****									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	115.50-83.92	A	0.000	0.000	3.847	0.000	0.02
		B	0.000	0.000	4.418	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.52
L2	83.92-41.25	A	0.000	0.000	53.289	0.000	0.30
		B	0.000	0.000	9.387	0.000	0.05
		C	0.000	0.000	0.000	0.000	1.10
L3	41.25-0.00	A	0.000	0.000	51.516	0.000	0.29
		B	0.000	0.000	9.075	0.000	0.04
		C	0.000	0.000	0.000	0.000	1.10

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	115.50-83.92	A	1.423	0.000	0.000	8.541	0.000	0.12
		B		0.000	0.000	12.668	0.000	0.14

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.52
L2	83.92-41.25	A	1.358	0.000	0.000	118.323	0.000	1.71
		B		0.000	0.000	26.919	0.000	0.29
		C		0.000	0.000	0.000	0.000	1.10
L3	41.25-0.00	A	1.213	0.000	0.000	111.973	0.000	1.58
		B		0.000	0.000	25.353	0.000	0.26
		C		0.000	0.000	0.000	0.000	1.10

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	115.50-83.92	0.0543	-0.7707	0.3730	-1.2073
L2	83.92-41.25	-4.1245	-3.2033	-4.6191	-3.7209
L3	41.25-0.00	-4.3123	-3.3519	-5.0428	-4.0655

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	4	LCF78-50J(7/8")	83.92 - 104.00	1.0000	1.0000
L1	10	2" (Nominal) Conduit	83.92 - 87.00	1.0000	1.0000
L1	11	LDF5-50A(7/8)	83.92 - 87.00	1.0000	1.0000
L1	14	FB-L98B-034-XXX(3/8)	83.92 - 87.00	1.0000	1.0000
L1	15	WR-VG86ST-BRD(3/4)	83.92 - 87.00	1.0000	1.0000
L2	4	LCF78-50J(7/8")	41.25 - 83.92	1.0000	1.0000
L2	10	2" (Nominal) Conduit	41.25 - 83.92	1.0000	1.0000
L2	11	LDF5-50A(7/8)	41.25 - 83.92	1.0000	1.0000
L2	14	FB-L98B-034-XXX(3/8)	41.25 - 83.92	1.0000	1.0000
L2	15	WR-VG86ST-BRD(3/4)	41.25 - 83.92	1.0000	1.0000
L3	4	LCF78-50J(7/8")	0.00 - 41.25	1.0000	1.0000
L3	10	2" (Nominal) Conduit	0.00 - 41.25	1.0000	1.0000
L3	11	LDF5-50A(7/8)	0.00 - 41.25	1.0000	1.0000
L3	14	FB-L98B-034-XXX(3/8)	0.00 - 41.25	1.0000	1.0000
L3	15	WR-VG86ST-BRD(3/4)	0.00 - 41.25	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
BXA-171063-8BF-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.18 3.56 3.93 4.69	3.35 3.97 4.60 5.89	0.03 0.06 0.10 0.19
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.18 3.56 3.93 4.69	3.35 3.97 4.60 5.89	0.03 0.06 0.10 0.19
BXA-171063-8BF-2 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.18 3.56 3.93 4.69	3.35 3.97 4.60 5.89	0.03 0.06 0.10 0.19
BXA-70063/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.82 8.37 8.89 9.94	5.70 6.85 7.71 9.50	0.04 0.10 0.17 0.33
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.82 8.37 8.89 9.94	5.70 6.85 7.71 9.50	0.04 0.10 0.17 0.33
BXA-70063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.82 8.37 8.89 9.94	5.70 6.85 7.71 9.50	0.04 0.10 0.17 0.33
(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.56 5.11 5.61 6.65	10.26 11.43 12.31 14.13	0.05 0.11 0.19 0.36
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.83 10.40 10.93 12.03	10.22 11.38 12.27 14.09	0.05 0.14 0.25 0.48
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.83 10.40 10.93 12.03	10.22 11.38 12.27 14.09	0.05 0.14 0.25 0.48
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.39 0.47 0.65	0.08 0.12 0.17 0.29	0.00 0.01 0.01 0.02
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.39 0.47 0.65	0.08 0.12 0.17 0.29	0.00 0.01 0.01 0.02
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 2.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.31 0.39 0.47 0.65	0.08 0.12 0.17 0.29	0.00 0.01 0.01 0.02
(3) 2.375" OD x 4' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice	0.87 1.11 1.36 1.90	0.87 1.11 1.36 1.90	0.02 0.03 0.04 0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
(3) 2.375" OD x 4' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.87 1.11 1.36 1.90	0.87 1.11 1.36 1.90	0.02 0.03 0.04 0.06
(3) 2.375" OD x 4' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.87 1.11 1.36 1.90	0.87 1.11 1.36 1.90	0.02 0.03 0.04 0.06
Platform Mount [LP 1001-1]	C	None		0.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	44.83 50.34 56.62 73.47	44.83 50.34 56.62 73.47	3.02 3.95 5.04 7.68
**									
DB411-A	A	From Leg	4.00 0.00 5.00	0.0000	104.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.50 2.70 3.90 6.30	1.50 2.70 3.90 6.30	0.03 0.03 0.04 0.06
DB411-A	C	From Leg	4.00 0.00 5.00	0.0000	104.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.50 2.70 3.90 6.30	1.50 2.70 3.90 6.30	0.03 0.03 0.04 0.06
MFB4505	B	From Leg	4.00 0.00 3.00	0.0000	104.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.84 1.50 2.13 2.94	0.84 1.50 2.13 2.94	0.00 0.01 0.02 0.06
Side Arm Mount [SO 702-3]	C	None		0.0000	104.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.53 3.37 4.12 5.76	2.53 3.37 4.12 5.76	0.08 0.13 0.19 0.36
****									
APXVAARR24_43-U-NA20	A	From Leg	4.00 0.00 1.00	0.0000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
APXVAARR24_43-U-NA20	B	From Leg	4.00 0.00 1.00	0.0000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
APXVAARR24_43-U-NA20	C	From Leg	4.00 0.00 1.00	0.0000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
RR90-17-02DP	A	From Leg	4.00 0.00 1.00	0.0000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.52 5.16 5.83 7.22	1.54 2.13 2.75 4.03	0.01 0.04 0.06 0.13
RR90-17-02DP	B	From Leg	4.00 0.00 1.00	0.0000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.52 5.16 5.83 7.22	1.54 2.13 2.75 4.03	0.01 0.04 0.06 0.13
RR90-17-02DP	C	From Leg	4.00 0.00	0.0000	97.00	No Ice 1/2"	4.52 5.16	1.54 2.13	0.01 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	5.83	2.75	0.06
						1" Ice	7.22	4.03	0.13
						2" Ice			
RADIO 4449 B12/B71	A	From Leg	4.00	0.0000	97.00	No Ice	1.65	1.16	0.07
			0.00			1/2"	1.81	1.30	0.09
			1.00			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71	B	From Leg	4.00	0.0000	97.00	No Ice	1.65	1.16	0.07
			0.00			1/2"	1.81	1.30	0.09
			1.00			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
RADIO 4449 B12/B71	C	From Leg	4.00	0.0000	97.00	No Ice	1.65	1.16	0.07
			0.00			1/2"	1.81	1.30	0.09
			1.00			Ice	1.98	1.45	0.11
						1" Ice	2.34	1.76	0.16
						2" Ice			
(2) KRY 112 489/2	A	From Leg	4.00	0.0000	97.00	No Ice	0.56	0.37	0.02
			0.00			1/2"	0.66	0.45	0.02
			1.00			Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
						2" Ice			
KRY 112 489/2	C	From Leg	4.00	0.0000	97.00	No Ice	0.56	0.37	0.02
			0.00			1/2"	0.66	0.45	0.02
			1.00			Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
						2" Ice			
(2) KRY 112 144/1	B	From Leg	4.00	0.0000	97.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			1.00			Ice	0.51	0.30	0.02
						1" Ice	0.70	0.46	0.03
						2" Ice			
KRY 112 144/1	C	From Leg	4.00	0.0000	97.00	No Ice	0.35	0.17	0.01
			0.00			1/2"	0.43	0.23	0.01
			1.00			Ice	0.51	0.30	0.02
						1" Ice	0.70	0.46	0.03
						2" Ice			
Platform Mount [LP 301-1]	C	None		0.0000	97.00	No Ice	23.81	23.81	1.59
						1/2"	30.24	30.24	2.10
						Ice	36.33	36.33	2.73
						1" Ice	48.05	48.05	4.34
						2" Ice			
**									
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	87.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			2.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	87.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			2.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	87.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			2.00			Ice	6.61	5.71	0.16
						1" Ice	7.49	7.16	0.29
						2" Ice			
(2) HPA65R-BU6A w/ Mount Pipe	A	From Leg	4.00	0.0000	87.00	No Ice	5.83	5.00	0.08
			0.00			1/2"	6.40	5.56	0.14
			2.00			Ice	6.99	6.13	0.22
						1" Ice	8.19	7.32	0.40
						2" Ice			
(2) HPA65R-BU6A w/	B	From Leg	4.00	0.0000	87.00	No Ice	5.83	5.00	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00			1/2"	6.40	5.56	0.14
			2.00			Ice	6.99	6.13	0.22
						1" Ice	8.19	7.32	0.40
						2" Ice			
(2) HPA65R-BU8A w/ Mount Pipe	C	From Leg	4.00	0.0000	87.00	No Ice	8.10	6.94	0.09
			0.00			1/2"	8.86	7.69	0.17
			2.00			Ice	9.64	8.45	0.27
						1" Ice	11.24	10.03	0.50
						2" Ice			
80010965 w/ Mount Pipe	A	From Leg	4.00	0.0000	87.00	No Ice	12.26	5.79	0.14
			0.00			1/2"	13.03	6.47	0.23
			2.00			Ice	13.80	7.17	0.33
						1" Ice	15.41	8.60	0.57
						2" Ice			
80010965 w/ Mount Pipe	B	From Leg	4.00	0.0000	87.00	No Ice	12.26	5.79	0.14
			0.00			1/2"	13.03	6.47	0.23
			2.00			Ice	13.80	7.17	0.33
						1" Ice	15.41	8.60	0.57
						2" Ice			
80010966 w/ Mount Pipe	C	From Leg	4.00	0.0000	87.00	No Ice	14.61	6.84	0.16
			0.00			1/2"	15.47	7.63	0.27
			2.00			Ice	16.35	8.42	0.39
						1" Ice	18.14	10.06	0.68
						2" Ice			
(4) LGP21401	A	From Leg	4.00	0.0000	87.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			2.00			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) LGP21401	B	From Leg	4.00	0.0000	87.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			2.00			Ice	1.38	0.35	0.03
						1" Ice	1.69	0.52	0.05
						2" Ice			
(2) RRUS 4415 B25	B	From Leg	4.00	0.0000	87.00	No Ice	1.64	0.68	0.04
			0.00			1/2"	1.80	0.79	0.06
			2.00			Ice	1.97	0.91	0.07
						1" Ice	2.33	1.18	0.11
						2" Ice			
RRUS 4415 B25	C	From Leg	4.00	0.0000	87.00	No Ice	1.64	0.68	0.04
			0.00			1/2"	1.80	0.79	0.06
			2.00			Ice	1.97	0.91	0.07
						1" Ice	2.33	1.18	0.11
						2" Ice			
(2) DC6-48-60-18-8C-EV	C	From Leg	4.00	0.0000	87.00	No Ice	1.14	1.14	0.03
			0.00			1/2"	1.79	1.79	0.05
			2.00			Ice	2.00	2.00	0.07
						1" Ice	2.45	2.45	0.13
						2" Ice			
(2) RRUS 4449 B5/B12	A	From Leg	4.00	0.0000	87.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			2.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
RRUS 4449 B5/B12	B	From Leg	4.00	0.0000	87.00	No Ice	1.97	1.41	0.07
			0.00			1/2"	2.14	1.56	0.09
			2.00			Ice	2.33	1.73	0.11
						1" Ice	2.72	2.07	0.16
						2" Ice			
(3) RRUS 8843 B2/B66A	C	From Leg	4.00	0.0000	87.00	No Ice	1.64	1.35	0.07
			0.00			1/2"	1.80	1.50	0.09
			2.00			Ice	1.97	1.65	0.11
						1" Ice	2.32	1.99	0.16
						2" Ice			
DC6-48-60-18-8F	B	From Leg	4.00	0.0000	87.00	No Ice	1.21	1.21	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	1.89	1.89	0.04
			2.00			1" Ice	2.11	2.11	0.07
						2" Ice	2.57	2.57	0.13
Platform Mount [LP 304-1]	C	None		0.0000	87.00	No Ice	17.49	17.49	1.35
						1/2" Ice	21.37	21.37	1.71
						1" Ice	25.28	25.28	2.13
						2" Ice	33.17	33.17	3.16
**									
**									
742 213	A	From Leg	1.00	0.0000	75.00	No Ice	3.57	1.60	0.02
			0.00			1/2" Ice	4.21	2.21	0.05
			2.00			1" Ice	4.86	2.83	0.08
						2" Ice	6.21	4.13	0.16
742 213	B	From Leg	1.00	0.0000	75.00	No Ice	3.57	1.60	0.02
			0.00			1/2" Ice	4.21	2.21	0.05
			2.00			1" Ice	4.86	2.83	0.08
						2" Ice	6.21	4.13	0.16
742 213	C	From Leg	1.00	0.0000	75.00	No Ice	3.57	1.60	0.02
			0.00			1/2" Ice	4.21	2.21	0.05
			2.00			1" Ice	4.86	2.83	0.08
						2" Ice	6.21	4.13	0.16
Pipe Mount [PM 601-3]	C	None		0.0000	75.00	No Ice	3.17	3.17	0.20
						1/2" Ice	3.79	3.79	0.23
						1" Ice	4.42	4.42	0.28
						2" Ice	5.76	5.76	0.40
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Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 115.50-83.92	99.27	0.986	38	99.320	A	0.000	99.320	99.320	100.00	3.847	0.000
					B	0.000	99.320		100.00	4.418	0.000
					C	0.000	99.320		100.00	0.000	0.000
L2 83.92-41.25	62.21	0.863	33	169.405	A	0.000	169.405	169.405	100.00	53.289	0.000
					B	0.000	169.405		100.00	9.387	0.000
					C	0.000	169.405		100.00	0.000	0.000
L3 41.25-0.00	19.99	0.7	27	202.030	A	0.000	202.030	202.030	100.00	51.516	0.000
					B	0.000	202.030		100.00	9.075	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	202.030		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 115.50-83.92	99.27	0.986	6	1.4234	106.812	A	0.000	106.812	106.812	100.00	8.541	0.000
						B	0.000	106.812		100.00	12.668	0.000
						C	0.000	106.812		100.00	0.000	0.000
L2 83.92-41.25	62.21	0.863	5	1.3585	179.528	A	0.000	179.528	179.528	100.00	118.323	0.000
						B	0.000	179.528		100.00	26.919	0.000
						C	0.000	179.528		100.00	0.000	0.000
L3 41.25-0.00	19.99	0.7	4	1.2126	211.369	A	0.000	211.369	211.369	100.00	111.973	0.000
						B	0.000	211.369		100.00	25.353	0.000
						C	0.000	211.369		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 115.50-83.92	99.27	0.986	8	99.320	A	0.000	99.320	99.320	100.00	3.847	0.000
					B	0.000	99.320		100.00	4.418	0.000
					C	0.000	99.320		100.00	0.000	0.000
L2 83.92-41.25	62.21	0.863	7	169.405	A	0.000	169.405	169.405	100.00	53.289	0.000
					B	0.000	169.405		100.00	9.387	0.000
					C	0.000	169.405		100.00	0.000	0.000
L3 41.25-0.00	19.99	0.7	5	202.030	A	0.000	202.030	202.030	100.00	51.516	0.000
					B	0.000	202.030		100.00	9.075	0.000
					C	0.000	202.030		100.00	0.000	0.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice

Comb. No.	Description
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
L1	115.5 - 83.92	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-22.80	0.16	-0.57
			Max. Mx	20	-10.83	253.81	0.19
			Max. My	2	-10.85	0.19	239.85
			Max. Vy	20	-12.50	253.81	0.19
			Max. Vx	14	12.03	0.19	-239.44
			Max. Torque	25			1.02
L2	83.92 - 41.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.99	4.51	-0.34
			Max. Mx	20	-24.66	1059.34	0.24
			Max. My	14	-24.67	1.30	-1025.11
			Max. Vy	20	-22.46	1059.34	0.24
			Max. Vx	2	-22.00	1.86	1025.04
			Max. Torque	25			1.51
L3	41.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.10	7.82	2.34
			Max. Mx	20	-41.53	2288.63	1.13
			Max. My	2	-41.53	2.92	2232.66
			Max. Vy	20	-28.77	2288.63	1.13
			Max. Vx	2	-28.33	2.92	2232.66
			Max. Torque	25			1.51

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	70.10	-0.00	0.00
	Max. H_x	21	31.15	28.76	0.01
	Max. H_z	3	31.15	0.01	28.31
	Max. M_x	2	2232.66	0.01	28.31
	Max. M_z	8	2283.99	-28.76	-0.01
	Max. Torsion	25	1.51	14.38	24.52
	Min. Vert	21	31.15	28.76	0.01
	Min. H_x	9	31.15	-28.76	-0.01
	Min. H_z	15	31.15	-0.01	-28.31
	Min. M_x	14	-2231.60	-0.01	-28.31
	Min. M_z	20	-2288.63	28.76	0.01
	Min. Torsion	13	-1.48	-14.38	-24.52

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	34.61	-0.00	0.00	-0.44	1.90	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	41.54	-0.01	-28.31	-2232.66	2.92	-1.32
0.9 Dead+1.0 Wind 0 deg - No Ice	31.15	-0.01	-28.31	-2224.79	2.33	-1.32
1.2 Dead+1.0 Wind 30 deg - No Ice	41.54	14.49	-24.73	-1946.54	-1147.96	-0.79
0.9 Dead+1.0 Wind 30 deg - No Ice	31.15	14.49	-24.73	-1939.66	-1144.54	-0.79
1.2 Dead+1.0 Wind 60 deg - No Ice	41.54	24.90	-14.15	-1116.09	-1977.44	-0.05
0.9 Dead+1.0 Wind 60 deg - No Ice	31.15	24.90	-14.15	-1112.09	-1971.12	-0.05
1.2 Dead+1.0 Wind 90 deg - No Ice	41.54	28.76	0.01	0.08	-2283.99	0.69
0.9 Dead+1.0 Wind 90 deg - No Ice	31.15	28.76	0.01	0.21	-2276.62	0.69
1.2 Dead+1.0 Wind 120 deg - No Ice	41.54	24.91	14.16	1116.09	-1978.05	1.24
0.9 Dead+1.0 Wind 120 deg - No Ice	31.15	24.91	14.16	1112.34	-1971.72	1.24
1.2 Dead+1.0 Wind 150 deg - No Ice	41.54	14.38	24.52	1932.91	-1141.40	1.47
0.9 Dead+1.0 Wind 150 deg - No Ice	31.15	14.38	24.52	1926.32	-1138.00	1.48
1.2 Dead+1.0 Wind 180 deg - No Ice	41.54	0.01	28.31	2231.60	1.71	1.32
0.9 Dead+1.0 Wind 180 deg - No Ice	31.15	0.01	28.31	2224.00	1.13	1.33
1.2 Dead+1.0 Wind 210 deg - No Ice	41.54	-14.49	24.73	1945.49	1152.60	0.82
0.9 Dead+1.0 Wind 210 deg - No Ice	31.15	-14.49	24.73	1938.87	1148.01	0.82
1.2 Dead+1.0 Wind 240 deg - No Ice	41.54	-24.90	14.15	1115.04	1982.08	0.08
0.9 Dead+1.0 Wind 240 deg - No Ice	31.15	-24.90	14.15	1111.30	1974.58	0.08
1.2 Dead+1.0 Wind 270 deg - No Ice	41.54	-28.76	-0.01	-1.13	2288.63	-0.69
0.9 Dead+1.0 Wind 270 deg - No Ice	31.15	-28.76	-0.01	-1.00	2280.08	-0.69
1.2 Dead+1.0 Wind 300 deg - No Ice	41.54	-24.91	-14.16	-1117.14	1982.68	-1.27
0.9 Dead+1.0 Wind 300 deg	31.15	-24.91	-14.16	-1113.13	1975.19	-1.27

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
- No Ice 1.2 Dead+1.0 Wind 330 deg	41.54	-14.38	-24.52	-1933.96	1146.04	-1.50
- No Ice 0.9 Dead+1.0 Wind 330 deg	31.15	-14.38	-24.52	-1927.11	1141.46	-1.51
- No Ice 1.2 Dead+1.0 Ice+1.0 Temp	70.10	0.00	-0.00	-2.34	7.82	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	70.10	-0.00	-5.77	-468.70	8.20	-0.29
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	70.10	2.91	-4.99	-406.13	-229.05	-0.19
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	70.10	5.05	-2.88	-235.37	-402.77	-0.03
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	70.10	5.83	0.00	-2.17	-466.43	0.13
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	70.10	5.05	2.88	230.98	-402.95	0.26
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	70.10	2.92	4.99	401.60	-229.36	0.32
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	70.10	0.00	5.77	463.99	7.84	0.29
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	70.10	-2.91	4.99	401.42	245.08	0.19
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	70.10	-5.05	2.88	230.66	418.81	0.03
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	70.10	-5.83	-0.00	-2.53	482.46	-0.13
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	70.10	-5.05	-2.88	-235.68	418.99	-0.26
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	70.10	-2.92	-4.99	-406.31	245.40	-0.32
Dead+Wind 0 deg - Service	34.61	-0.00	-5.68	-447.22	2.05	-0.27
Dead+Wind 30 deg - Service	34.61	2.91	-4.96	-389.95	-228.31	-0.16
Dead+Wind 60 deg - Service	34.61	5.00	-2.84	-223.73	-394.33	-0.01
Dead+Wind 90 deg - Service	34.61	5.77	0.00	-0.32	-455.70	0.14
Dead+Wind 120 deg - Service	34.61	5.00	2.84	223.06	-394.45	0.25
Dead+Wind 150 deg - Service	34.61	2.89	4.92	386.55	-226.99	0.30
Dead+Wind 180 deg - Service	34.61	0.00	5.68	446.34	1.81	0.27
Dead+Wind 210 deg - Service	34.61	-2.91	4.96	389.07	232.16	0.16
Dead+Wind 240 deg - Service	34.61	-5.00	2.84	222.85	398.18	0.01
Dead+Wind 270 deg - Service	34.61	-5.77	-0.00	-0.56	459.55	-0.14
Dead+Wind 300 deg - Service	34.61	-5.00	-2.84	-223.94	398.30	-0.25
Dead+Wind 330 deg - Service	34.61	-2.89	-4.92	-387.43	230.85	-0.30

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-34.61	0.00	0.00	34.61	0.00	0.000%
2	-0.01	-41.54	-28.31	0.01	41.54	28.31	0.001%
3	-0.01	-31.15	-28.31	0.01	31.15	28.31	0.001%
4	14.49	-41.54	-24.73	-14.49	41.54	24.73	0.000%
5	14.49	-31.15	-24.73	-14.49	31.15	24.73	0.000%
6	24.90	-41.54	-14.15	-24.90	41.54	14.15	0.000%
7	24.90	-31.15	-14.15	-24.90	31.15	14.15	0.000%
8	28.76	-41.54	0.01	-28.76	41.54	-0.01	0.002%
9	28.76	-31.15	0.01	-28.76	31.15	-0.01	0.001%
10	24.91	-41.54	14.16	-24.91	41.54	-14.16	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
11	24.91	-31.15	14.16	-24.91	31.15	-14.16	0.000%
12	14.38	-41.54	24.52	-14.38	41.54	-24.52	0.000%
13	14.38	-31.15	24.52	-14.38	31.15	-24.52	0.000%
14	0.01	-41.54	28.31	-0.01	41.54	-28.31	0.001%
15	0.01	-31.15	28.31	-0.01	31.15	-28.31	0.001%
16	-14.49	-41.54	24.73	14.49	41.54	-24.73	0.000%
17	-14.49	-31.15	24.73	14.49	31.15	-24.73	0.000%
18	-24.90	-41.54	14.15	24.90	41.54	-14.15	0.000%
19	-24.90	-31.15	14.15	24.90	31.15	-14.15	0.000%
20	-28.76	-41.54	-0.01	28.76	41.54	0.01	0.002%
21	-28.76	-31.15	-0.01	28.76	31.15	0.01	0.001%
22	-24.91	-41.54	-14.16	24.91	41.54	14.16	0.000%
23	-24.91	-31.15	-14.16	24.91	31.15	14.16	0.000%
24	-14.38	-41.54	-24.52	14.38	41.54	24.52	0.000%
25	-14.38	-31.15	-24.52	14.38	31.15	24.52	0.000%
26	0.00	-70.10	0.00	-0.00	70.10	0.00	0.000%
27	-0.00	-70.10	-5.77	0.00	70.10	5.77	0.000%
28	2.91	-70.10	-4.99	-2.91	70.10	4.99	0.000%
29	5.05	-70.10	-2.88	-5.05	70.10	2.88	0.000%
30	5.83	-70.10	0.00	-5.83	70.10	-0.00	0.000%
31	5.05	-70.10	2.89	-5.05	70.10	-2.88	0.000%
32	2.92	-70.10	4.99	-2.92	70.10	-4.99	0.000%
33	0.00	-70.10	5.77	-0.00	70.10	-5.77	0.000%
34	-2.91	-70.10	4.99	2.91	70.10	-4.99	0.000%
35	-5.05	-70.10	2.88	5.05	70.10	-2.88	0.000%
36	-5.83	-70.10	-0.00	5.83	70.10	0.00	0.000%
37	-5.05	-70.10	-2.89	5.05	70.10	2.88	0.000%
38	-2.92	-70.10	-4.99	2.92	70.10	4.99	0.000%
39	-0.00	-34.61	-5.68	0.00	34.61	5.68	0.002%
40	2.91	-34.61	-4.96	-2.91	34.61	4.96	0.002%
41	5.00	-34.61	-2.84	-5.00	34.61	2.84	0.002%
42	5.77	-34.61	0.00	-5.77	34.61	-0.00	0.002%
43	5.00	-34.61	2.84	-5.00	34.61	-2.84	0.002%
44	2.89	-34.61	4.92	-2.89	34.61	-4.92	0.002%
45	0.00	-34.61	5.68	-0.00	34.61	-5.68	0.002%
46	-2.91	-34.61	4.96	2.91	34.61	-4.96	0.002%
47	-5.00	-34.61	2.84	5.00	34.61	-2.84	0.002%
48	-5.77	-34.61	-0.00	5.77	34.61	0.00	0.002%
49	-5.00	-34.61	-2.84	5.00	34.61	2.84	0.002%
50	-2.89	-34.61	-4.92	2.89	34.61	4.92	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	9	0.00000001	0.00008609
3	Yes	9	0.00000001	0.00007618
4	Yes	10	0.00000001	0.00008841
5	Yes	10	0.00000001	0.00007336
6	Yes	10	0.00000001	0.00009406
7	Yes	10	0.00000001	0.00007815
8	Yes	9	0.00000001	0.00007104
9	Yes	9	0.00000001	0.00006375
10	Yes	10	0.00000001	0.00010184
11	Yes	10	0.00000001	0.00008480
12	Yes	10	0.00000001	0.00008493
13	Yes	10	0.00000001	0.00007050
14	Yes	9	0.00000001	0.00008582
15	Yes	9	0.00000001	0.00007595
16	Yes	10	0.00000001	0.00009855
17	Yes	10	0.00000001	0.00008188
18	Yes	10	0.00000001	0.00009319
19	Yes	10	0.00000001	0.00007728
20	Yes	9	0.00000001	0.00007106

21	Yes	9	0.00000001	0.00006375
22	Yes	10	0.00000001	0.00008716
23	Yes	10	0.00000001	0.00007213
24	Yes	10	0.00000001	0.00010213
25	Yes	10	0.00000001	0.00008504
26	Yes	6	0.00000001	0.00000292
27	Yes	10	0.00000001	0.00004495
28	Yes	10	0.00000001	0.00004574
29	Yes	10	0.00000001	0.00004595
30	Yes	10	0.00000001	0.00004502
31	Yes	10	0.00000001	0.00004604
32	Yes	10	0.00000001	0.00004584
33	Yes	10	0.00000001	0.00004501
34	Yes	10	0.00000001	0.00004690
35	Yes	10	0.00000001	0.00004762
36	Yes	10	0.00000001	0.00004683
37	Yes	10	0.00000001	0.00004761
38	Yes	10	0.00000001	0.00004688
39	Yes	8	0.00000001	0.00007106
40	Yes	8	0.00000001	0.00006733
41	Yes	8	0.00000001	0.00006821
42	Yes	8	0.00000001	0.00007238
43	Yes	8	0.00000001	0.00006910
44	Yes	8	0.00000001	0.00006719
45	Yes	8	0.00000001	0.00007103
46	Yes	8	0.00000001	0.00006829
47	Yes	8	0.00000001	0.00006878
48	Yes	8	0.00000001	0.00007321
49	Yes	8	0.00000001	0.00006868
50	Yes	8	0.00000001	0.00006869

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	115.5 - 83.92	4.476	48	0.3168	0.0006
L2	89.25 - 41.25	2.810	48	0.2807	0.0006
L3	48 - 0	0.844	48	0.1573	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.00	BXA-171063-8BF-2 w/ Mount Pipe	48	4.476	0.3168	0.0006	148178
104.00	DB411-A	48	3.729	0.3040	0.0006	64425
97.00	APXVAARR24_43-U-NA20	48	3.285	0.2944	0.0006	40048
87.00	7770.00 w/ Mount Pipe	48	2.677	0.2760	0.0005	26600
75.00	742 213	48	2.007	0.2453	0.0005	20222

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	115.5 - 83.92	22.276	20	1.5761	0.0029
L2	89.25 - 41.25	13.986	20	1.3965	0.0028
L3	48 - 0	4.204	20	0.7831	0.0009

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.00	BXA-171063-8BF-2 w/ Mount Pipe	20	22.276	1.5761	0.0029	29877
104.00	DB411-A	20	18.559	1.5124	0.0029	12990
97.00	APXVAARR24_43-U-NA20	20	16.348	1.4645	0.0029	8074
87.00	7770.00 w/ Mount Pipe	20	13.322	1.3729	0.0027	5361
75.00	742 213	20	9.991	1.2205	0.0023	4071

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	115.5 - 83.92 (1)	TP40.829x32.25x0.25	31.58	0.00	0.0	31.5005	-10.83	1704.79	0.006
L2	83.92 - 41.25 (2)	TP51.92x38.8811x0.3125	48.00	0.00	0.0	50.0850	-24.66	2674.31	0.009
L3	41.25 - 0 (3)	TP62.5x49.4614x0.375	48.00	0.00	0.0	75.0159	-41.53	3879.40	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	115.5 - 83.92 (1)	TP40.829x32.25x0.25	253.81	1361.13	0.186	0.00	1361.13	0.000
L2	83.92 - 41.25 (2)	TP51.92x38.8811x0.3125	1059.34	2716.25	0.390	0.00	2716.25	0.000
L3	41.25 - 0 (3)	TP62.5x49.4614x0.375	2288.63	4919.18	0.465	0.00	4919.18	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	115.5 - 83.92 (1)	TP40.829x32.25x0.25	12.50	552.83	0.023	0.13	1902.90	0.000
L2	83.92 - 41.25 (2)	TP51.92x38.8811x0.3125	22.46	878.99	0.026	0.69	3848.45	0.000
L3	41.25 - 0 (3)	TP62.5x49.4614x0.375	28.77	1316.53	0.022	0.69	7194.44	0.000

Pole Interaction Design Data

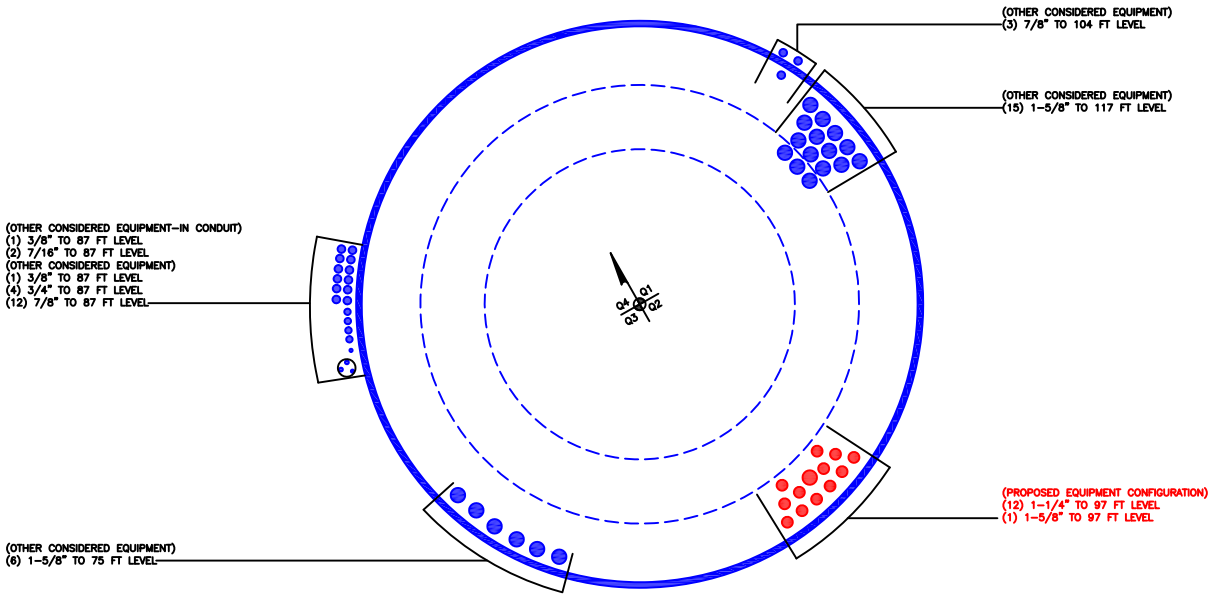
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	115.5 - 83.92 (1)	0.006	0.186	0.000	0.023	0.000	0.193	1.050	4.8.2
L2	83.92 - 41.25 (2)	0.009	0.390	0.000	0.026	0.000	0.400	1.050	4.8.2
L3	41.25 - 0 (3)	0.011	0.465	0.000	0.022	0.000	0.476	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	115.5 - 83.92	Pole	TP40.829x32.25x0.25	1	-10.83	1790.03	18.4	Pass
L2	83.92 - 41.25	Pole	TP51.92x38.8811x0.3125	2	-24.66	2808.03	38.1	Pass
L3	41.25 - 0	Pole	TP62.5x49.4614x0.375	3	-41.53	4073.37	45.4	Pass
							Summary	
						Pole (L3)	45.4	Pass
						RATING =	**45.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(3) 7/8" TO 104 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(15) 1-5/8" TO 117 FT LEVEL
(OTHER CONSIDERED EQUIPMENT-IN CONDUIT)
(1) 3/8" TO 87 FT LEVEL
(2) 7/16" TO 87 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 3/8" TO 87 FT LEVEL
(4) 3/4" TO 87 FT LEVEL
(12) 7/8" TO 87 FT LEVEL
Q1
Q2
Q3
Q4
(PROPOSED EQUIPMENT CONFIGURATION)
(12) 1-1/4" TO 97 FT LEVEL
(1) 1-5/8" TO 97 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 75 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

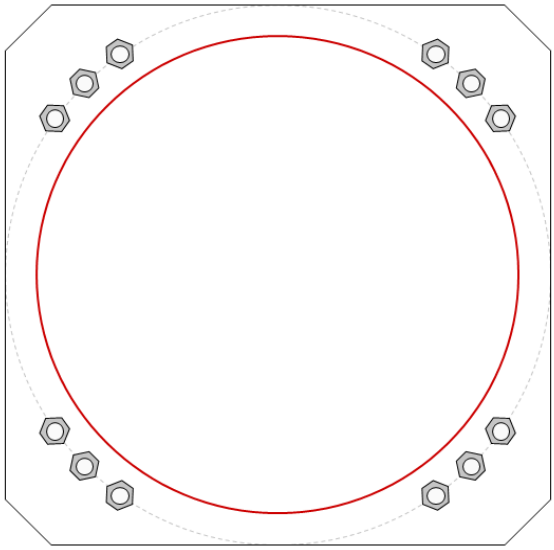
Monopole Base Plate Connection

Site Info	
BU #	806367
Site Name	HRT 046 943209
Order #	479816 REV.1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.75

Applied Loads	
Moment (kip-ft)	2288.63
Axial Force (kips)	41.53
Shear Force (kips)	28.77

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(12) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 71" BC

Anchor Spacing: 6 in

Base Plate Data

71" W x 2.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

62.5" x 0.375" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 132.34	ϕPn_c = 268.39	**Stress Rating**
Vu = 2.4	ϕVn = 120.77	**47.0%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	26.66	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**47.0%**	**Pass**

Pier and Pad Foundation

BU # :	806367
Site Name:	HRT 046 943209
App. Number:	479816, Rev1

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp}:	42	kips
Base Shear, Vu_comp:	29	kips
Moment, M_u:	2289	ft-kips
Tower Height, **H**:	115.5	ft
BP Dist. Above Fdn, bp_{dist}:	6	in
Bolt Circle / Bearing Plate Width, **BC**:	71	in

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	115.73	29.00	**23.9%**	**Pass**
Bearing Pressure (ksf)	9.00	1.51	**16.8%**	**Pass**
*Overturning (kip*ft)*	4310.34	2419.50	**56.1%**	**Pass**
*Pad Flexure (kip*ft)*	3946.25	933.59	**22.5%**	**Pass**
Pad Shear - 1-way (kips)	1072.17	124.40	**11.0%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.002	**1.3%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	3730.81	0.00	**0.0%**	**Pass**

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

Soil Rating*:	**56.1%**
Structural Rating*:	**22.5%**

Pad Properties		
Depth, **D**:	3.5	ft
Pad Width, W_1:	25	ft
Pad Thickness, **T**:	4	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	26	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	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 Gross Bearing, Qult:	12.000	ksf
Cohesion, **Cu**:		ksf
Friction Angle, φ:	36	degrees
SPT Blow Count, N_{blows}:	33	
Base Friction, μ:	0.4	
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	8	ft

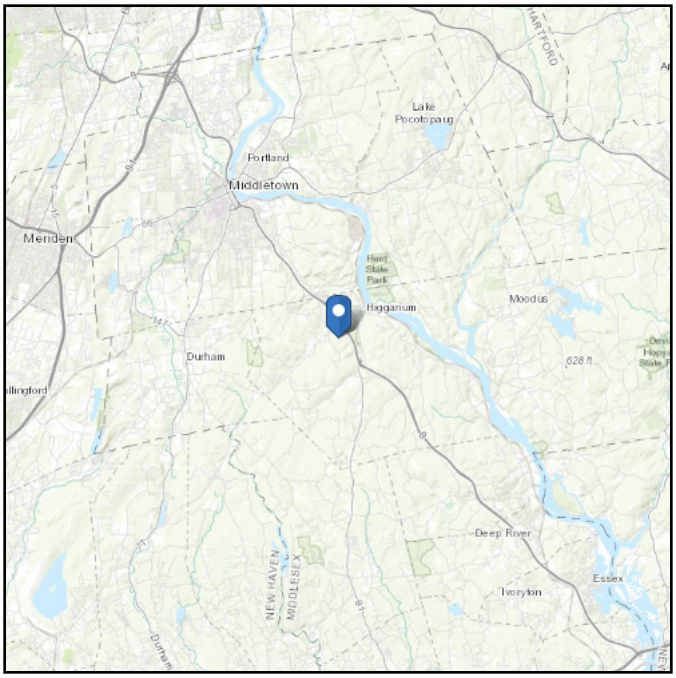
<--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 514.59 ft (NAVD 88)
Latitude: 41.484594
Longitude: -72.572447



Wind

Results:

Wind Speed:	127 Vmph
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	95 Vmph
100-year MRI	104 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Wed Nov 18 2020

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 in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

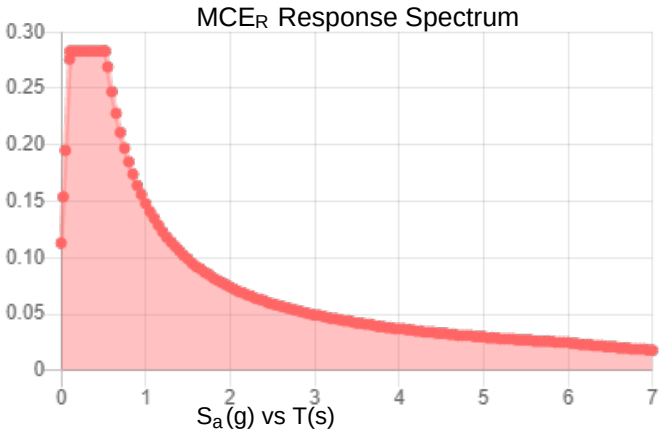
Seismic

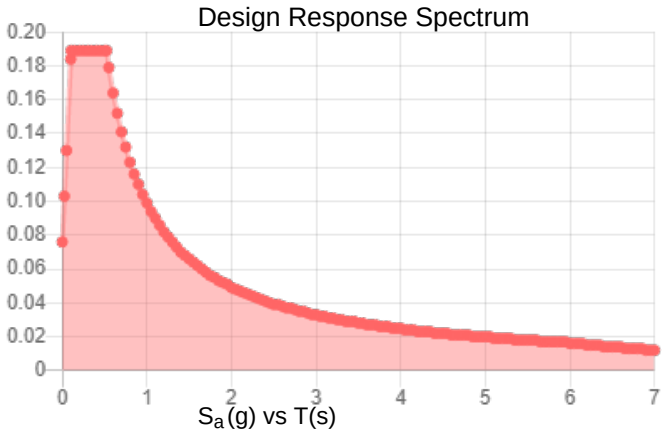
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.062	S_{D1} :	0.099
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.283	PGA_M :	0.144
S_{M1} :	0.148	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Wed Nov 18 2020

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:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Wed Nov 18 2020

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.

PAUL J. FORD & COMPANY

Date: November 17, 2020

Darcy Tarr
Crown Castle
6325 Ardrey Kell Road
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679

Subject:	**Mount Replacement Report**	
Carrier Designation:	***T-Mobile* Equipment Change-out**	
	Carrier Site Number:	CT11233A
	Carrier Site Name:	Higganum_1
Crown Castle Designation:	**Crown Castle BU Number:**	806367
	Crown Castle Site Name:	HRT 046 943209
	Crown Castle JDE Job Number:	559174
	Crown Castle Order Number:	479816 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	A37520-2305.001.7190
Site Data:	**Maple Ave West, Haddam, Middlesex County, CT 06441** **Latitude 41.484594°, Longitude -72.572447°**	
Structure Information:	**Tower Height & Type:**	**115.5 Foot Monopole**
	Mount Elevation:	**97 Foot**
	Mount Type:	**(1) 12.5 Foot Platform**

Dear Darcy Tarr,

Paul J Ford and Company is pleased to submit this "Mount Replacement Report" to determine the structural integrity of the T-Mobile antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

12.5' Platform **SUFFICIENT***

***The mount has sufficient capacity once the modifications, as described in Section 4.1 Recommendations of this report, are completed.**

The analysis utilizes an ultimate 3-second gust wind speed of 130 mph as required by the 2018 Connecticut State Building Code and Appendix N. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

Ibrahim O. Huthman, E.I.
Structural Designer
IHuthman@pauljford.com

STATE OF CONNECTICUT
JAMES R. ANTOSZEWSKI
31499
LICENSED
PROFESSIONAL ENGINEER

D.S.

11/17/2020

TABLE OF CONTENTS

1) INTRODUCTION

The proposed mount under consideration is a (1) 12.5' Platform mount, designed by SitePro1.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	130 mph
Exposure Category:	B
Topographic Factor at Base:	1.00
Topographic Factor at Mount:	1.00
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.177
Seismic S_1:	0.062
Maintenance Loading Wind Speed:	30 mph
Maintenance Load at Mid/End-Points, L_v:	250 lb
Maintenance Load at Mount Pipes, L_m:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
97	98	3	RFS CELWAVE	APXVAARR24_43-U-NA20	(1) PLATFORM (12.5')
		3	EMS WIRELESS	RR90-17-02DP	
		3	ERICSSON	KRY 112 144/1	
		3	ERICSSON	KRY 112 489/2	
		3	ERICSSON	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Mount Manufacturer Drawings	Model #:RMQP-SPT Dated: 06/28/2018	-	SitePro1
Order	ID: 479816 Rev. 1 Dated: 04/17/2019	-	CCISites
Radio Frequency Data Sheet	RFDS ID #: CT11233A Version 2.1, Dated: 03/29/2019	-	Crown Castle

3.1) Analysis Method

RISA-3D (version 17.0.3), 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.

A tool internally developed, using Microsoft Excel, by Paul J. Ford and Company was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C).

3.2) Assumptions

1) *The analysis of the existing tower or the effect of the mount attachment to the tower is not within the current scope of work.*
2) *The antenna mounting system was properly fabricated, installed and maintained in good condition, twist free and plumb in accordance with its original design and manufacturer's specifications and all bolts are tightened as specified by the manufacturer and AISC requirements.*
3) *The configuration of antennas, mounts, and other appurtenances are as specified in Table 1.*
4) *All member connections have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report. All U-Bolt connections have been properly tightened. This analysis will be required to be revised if the existing conditions in the field differ from those shown in the above referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.*
5) *Steel grades are as follows, unless noted otherwise:*
   - *a) Channel, Solid Round, Angle, Unistrut* — *ASTM A53 (GR 35)*
   - *b) Pipe* — *ASTM A53 (GR 35)*
   - *c) HSS (Rectangular), Plate* — *Q235 Gr B (Fy = 34 ksi, Fu = 58 ksi)*
   - *d) HSS (Round)* — *ASTM A53 (GR 35)*
   - *e) Connection Bolts* — *ASTM A325*
   - *f) Threaded Rods* — *SAE J429 (GR2)*
   - *g) U-Bolts* — *SAE J429 (GR2)*
6) *Proposed equipment is to be installed in the locations specified in Appendix A. Any changes to the proposed equipment locations will render this report invalid.*

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the mount.

4) ANALYSIS RESULTS

Table 3- Mount Component Capacity

Notes	Component	Critical Member	Elevation (ft)	% Capacity	Pass / Fail
1,2	Face Horizontals	CBB1	97	19.0	Pass
1,2	Bracing Members	M17		23.8	Pass
1,2	Support Rails	CBB2		57.1	Pass
1,2	Grating Support Members	M5		13.3	Pass
1,2	Standoff Members	M38		55.2	Pass
1,2	Corner Plates	M12		14.3	Pass
1,2	Mount Pipes	C1		56.2	Pass
1,2	Mount to Tower Connection	-		32.4	Pass

Mount Rating (max from all components) =	**57.1%**

Notes:
1) See additional documentation in “Appendix B – Software Analysis Output” and “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H, Section 15.5

4.1) Recommendations

The proposed mount has sufficient capacity to support the proposed loading configuration. In order for the results of this analysis to be considered valid, the mount listed below shall be installed.

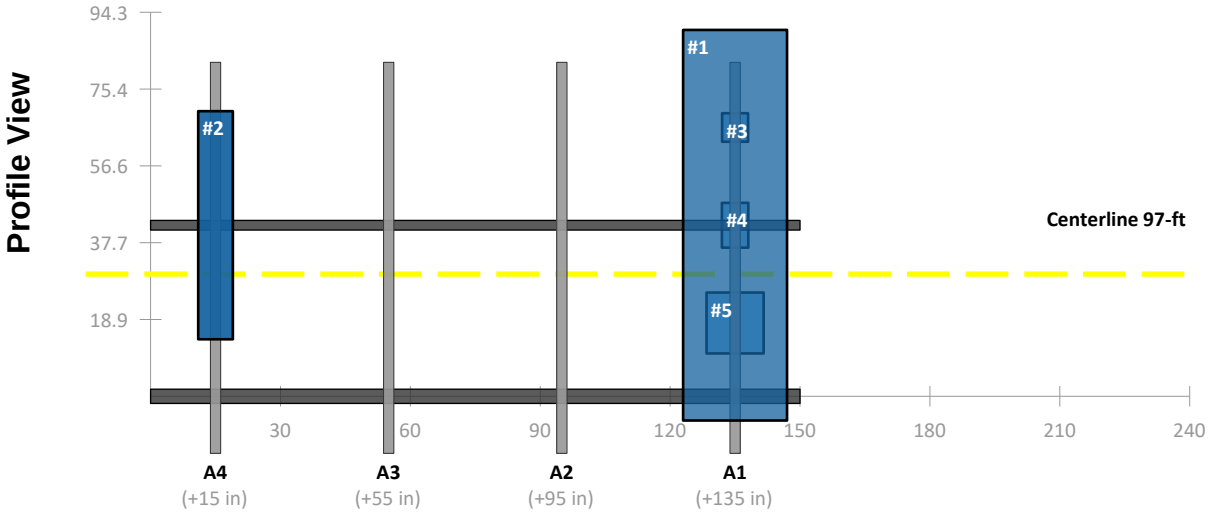
- Mount Replacement, SitePro1 and RMQP-SPT

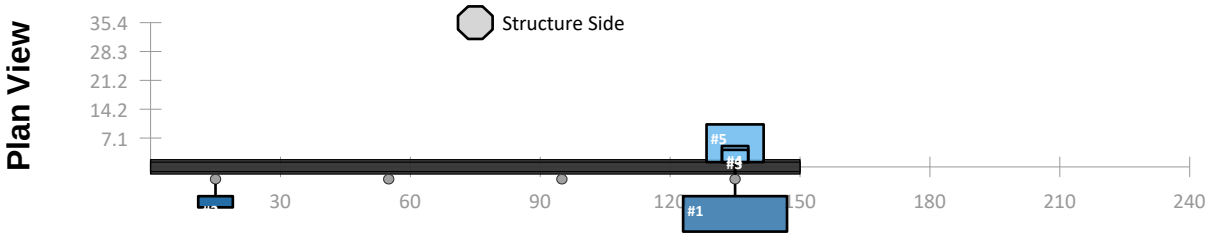
Beyond the mount replacement, no structural modifications are required at this time, provided that the above-listed changes are implemented.

APPENDIX A

SOFTWARE INPUT CALCULATION

Sector A

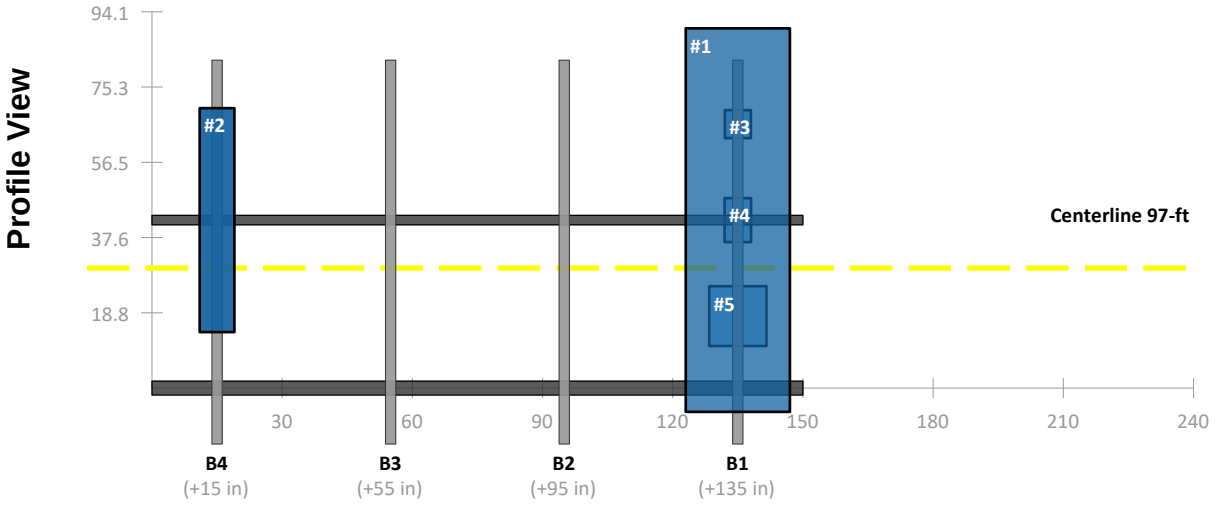


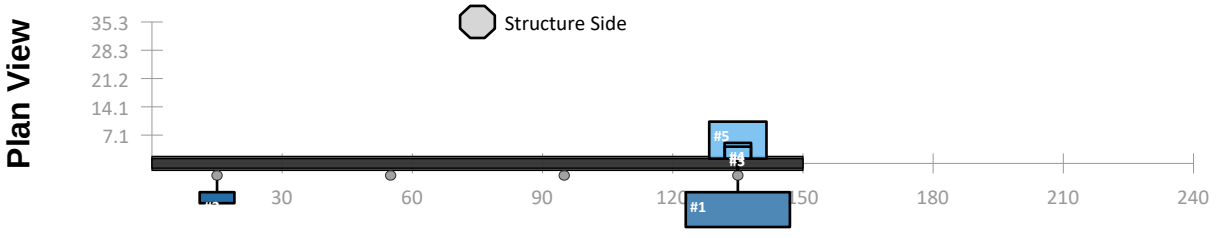


Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Tangential Offset (in)	Normal Offset (in)
#1	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	98.00	A1	0.00	3.00
#2	Antenna	EMS WIRELESS	RR90-17-02DP	56.00	8.00	2.75	98.00	A4	0.00	3.00
#3	TME/RRH	ERICSSON	KRY 112 144/1	7.00	6.00	3.00	100.00	A1	0.00	-3.00
#4	TME/RRH	ERICSSON	KRY 112 489/2	11.00	6.10	3.94	98.00	A1	0.00	-3.00
#5	TME/RRH	ERICSSON	RADIO 4449 B12/B71	14.95	13.19	9.25	96.00	A1	0.00	-3.00

1. A 6" tolerance for proposed equipment is acceptable.
2. Contractor to verify location of existing equipment prior to installation of proposed equipment. Notify for any deviations.
3. Install shall not cause harm to the structure, climbing facility, safety climb, or any system installed on the structure

Sector B





Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Tangential Offset (in)	Normal Offset (in)
#1	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	98.00	B1	0.00	3.00
#2	Antenna	EMS WIRELESS	RR90-17-02DP	56.00	8.00	2.75	98.00	B4	0.00	3.00
#3	TME/RRH	ERICSSON	KRY 112 144/1	7.00	6.00	3.00	100.00	B1	0.00	-3.00
#4	TME/RRH	ERICSSON	KRY 112 489/2	11.00	6.10	3.94	98.00	B1	0.00	-3.00
#5	TME/RRH	ERICSSON	RADIO 4449 B12/B71	14.95	13.19	9.25	96.00	B1	0.00	-3.00

1. A 6" tolerance for proposed equipment is acceptable.
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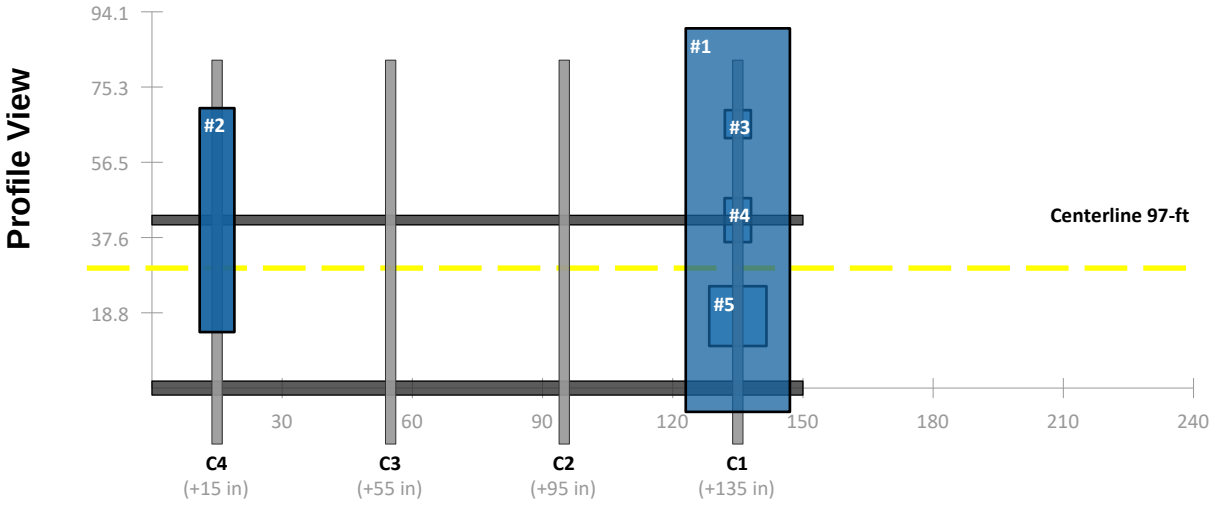
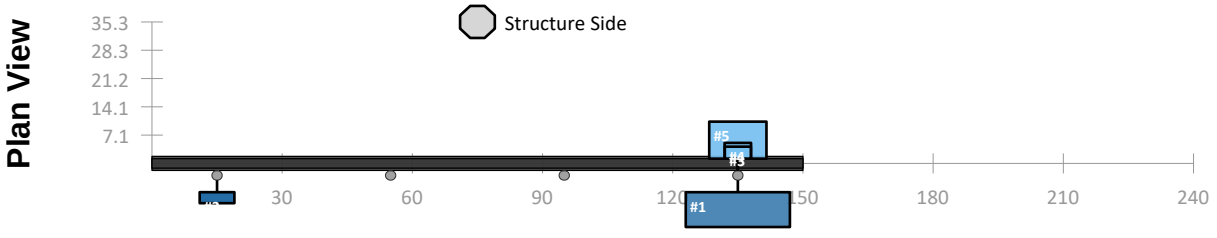
3. Install shall not cause harm to the structure, climbing facility, safety climb, or any system installed on the structure

Sector C





Ref ID	Type	Manufacturer	Model	Height (in)	Width (in)	Depth (in)	Center Line (ft)	Mount Pipe	Tangential Offset (in)	Normal Offset (in)
#1	Antenna	RFS CELWAVE	APXVAARR24_43-U-NA20	95.90	24.00	8.70	98.00	C1	0.00	3.00
#2	Antenna	EMS WIRELESS	RR90-17-02DP	56.00	8.00	2.75	98.00	C4	0.00	3.00
#3	TME/RRH	ERICSSON	KRY 112 144/1	7.00	6.00	3.00	100.00	C1	0.00	-3.00
#4	TME/RRH	ERICSSON	KRY 112 489/2	11.00	6.10	3.94	98.00	C1	0.00	-3.00
#5	TME/RRH	ERICSSON	RADIO 4449 B12/B71	14.95	13.19	9.25	96.00	C1	0.00	-3.00

1. A 6" tolerance for proposed equipment is acceptable.
2. Contractor to verify location of existing equipment prior to installation of proposed equipment. Notify for any deviations.
3. Install shall not cause harm to the structure, climbing facility, safety climb, or any system installed on the structure

Project Number: 37520-2305.001.7190
Date: 11/17/2020
Engineer: IOH

Mount Loading per TIA-222-H (Version v3.3 - Effective 10/22/2020)

Structure & Wind Speed

Structure Type = Mount
Mount Type = 3 Sectors
Mount Centerline (z) = 97.00 ft
Risa C/L Y-Coordinate = 30.00 in

Ultimate Wind Speed = 130 mph
Ice Wind Speed = 50 mph
Maintenance Wind Speed = 30 mph
Non-Op Wind Speed = - mph
Op Wind Speed = - mph

Ice Thickness = 1.5 in

Topography

Risk Category = II
Exposure Category = B
Topographic Category = 1
Structure Base Height (Z_{sj}) = 514.59 ft
Crest Height (H) = ft

Velocity Pressure Coefficients

z_g = 1200 ft (Table 2-4)
α' = 7.00 (Table 2-4)
K_z = 0.98 (Section 2.6.5.2)
K_{zmin} = 0.70
K_{zcalc} = 0.98
K_{zmax} = 2.01

			Override
K_{zt} =	1.00	(Section 2.6.6.2.1)	
K_d =	0.95	(Section 16.6)	
K_e =	0.98	(Section 2.6.8)	
G_h =	1.00	(Section 16.6)	
K_{es} =	1.0	(Annex S - Wind Force)	
q_z =	39.52 psf	(Section 2.6.11.6)	

Ice Loading

h = 1.00 in (Bar Grating Height)

I_i = 1.00 (Table 2-3)
K_{es} = 1.0 (Annex S - Ice)
q_{iz} = 5.96 psf (Section 2.6.11.6)
K_{iz} = 1.11 (Section 2.6.10)
t_z = 1.67 in (Section 2.6.10)

W_i = 12.46 psf (Grating Ice Weight)

Wind Pressure

			Override
K_a =	0.9	(on all Appurt. / Member Forces)	
$(q_z)(G_h)(K_{es})$ =	39.52 psf		
$(q_{iz})(G_h)(K_{es})$ =	5.96 psf	(Ice)	

Analysis Settings

Analysis Scope = Client
Analysis Wind Direction Increment = 30°
EPA Calculation Method = TIA
Construction Duration =

File Suffix = _Client.r3d

Maintenance Point Loads

	Load	Label	Node #		Load	Label	Node #
L_{m1} =	500 lbs	N110	110	L_{v1} =	250 lbs	N14	14
L_{m2} =	500 lbs	N104	104	L_{v2} =	250 lbs	N173	167
L_{m3} =	500 lbs	N98	98	L_{v3} =	250 lbs	N13	13
L_{m4} =	500 lbs	N152	152	L_{v4} =	250 lbs	N2	2

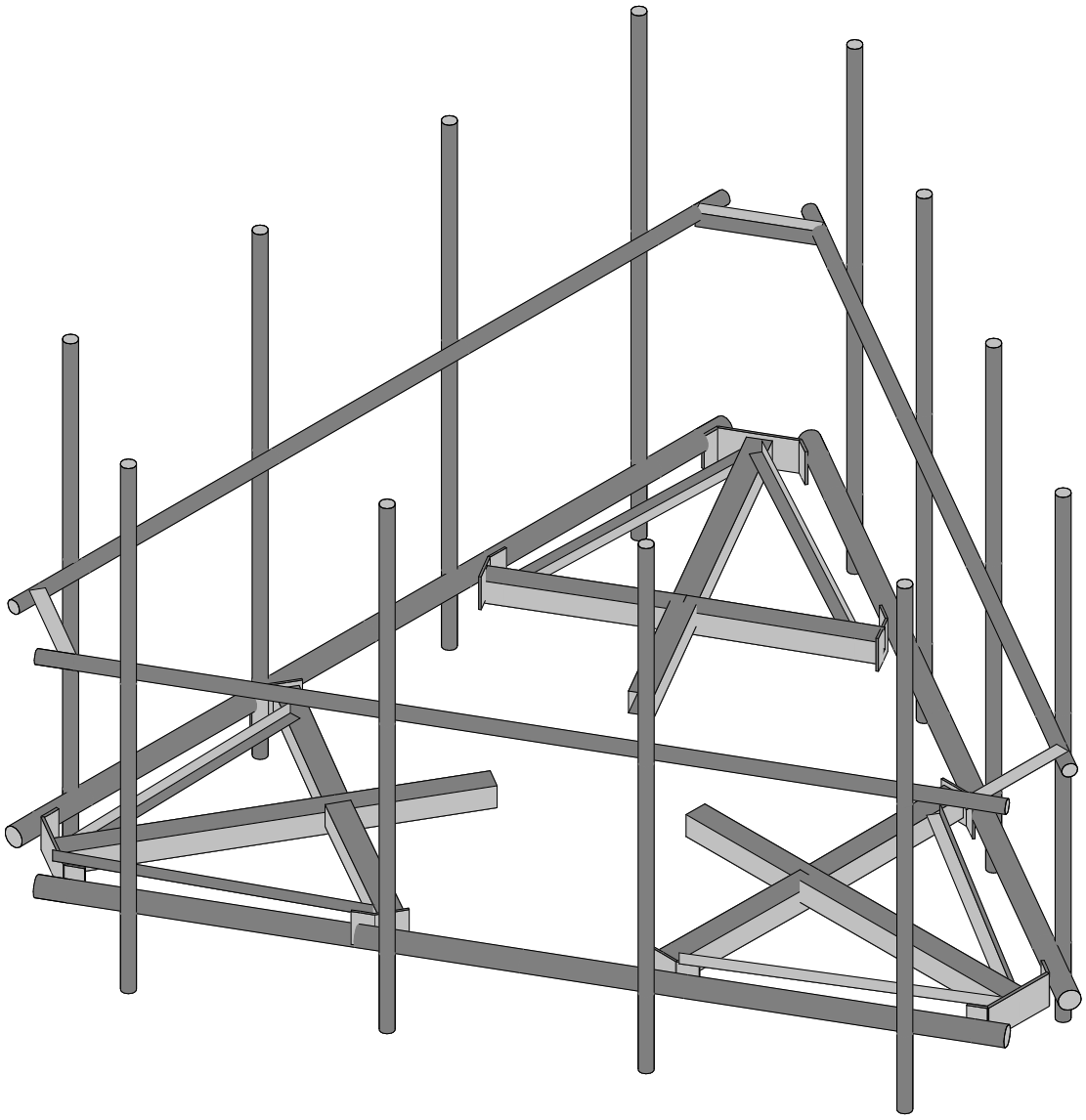
Risa3D Source: G:\TOWER\375_Crown_Castle\2020\37520-2305_806367_HRT 046 943209\37520-2305.001.7190_MA\RISA\37520-2305.001.7190.r3d (57 Total Populated Members)

Antennas

Item	Include Loading	Status	Mounting Location	Manufacturer	Antenna	Height (in)	Width (in)	Depth (in)	Flat or Round	Weight (lbs)	Sector / Face	Position	Quantity	Orientation	Use tnxTower C_AA_A (CFD)	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Antenna C/L (ft)	Min Antenna C/L (ft)	Antenna C/L (ft)	Antenna Top Mount Location from Mount Pipe Bottom (in)	Antenna Bottom Mount Location from Mount Pipe Bottom (in)	Override Top Antenna Mounting Location (in)	Override Bottom Antenna Mounting Location (in)	Normal Wind Force per Antenna (lbs)	Transverse Wind Force per Antenna (lbs)
1	Yes	Proposed	Mount	RFS CELWAVE	APXVAARR24_43-U-NA20	95.9	24	8.7	Flat	128	A	1	1	Normal	Yes	89.90	78	98.083	96.583	98	95.00	17.00			521.809	189.231
2	Yes	Existing	Mount	EMS WIRELESS	RR90-17-02DP	56	8	2.75	Flat	13.5	A	4	1	Normal	Yes	50.00		99.250	95.417	98	81.00	31.00			160.776	54.778
3	Yes	Existing	Mount	ERICSSON	KRY 112 144/1	7	6	3	Flat	11	A	1	1	Normal	No	1.00		101.292	93.375	100	80.50	79.50			12.449	6.225
4	Yes	Proposed	Mount	ERICSSON	KRY 112 489/2	11	6.1	3.94	Flat	15.4	A	1	1	Normal	No	5.00		101.125	93.542	98	58.50	53.50			19.889	12.986
5	Yes	Proposed	Mount	ERICSSON	RADIO 4449 B12/B71	14.95	13.19	9.25	Flat	75	A	1	1	Normal	No	8.95		100.960	93.706	96	36.48	27.53			58.450	40.991
6	Yes	Proposed	Mount	RFS CELWAVE	APXVAARR24_43-U-NA20	95.9	24	8.7	Flat	128	B	1	1	Normal	Yes	89.90	78	98.083	96.583	98	95.00	17.00			521.809	189.231
7	Yes	Existing	Mount	EMS WIRELESS	RR90-17-02DP	56	8	2.75	Flat	13.5	B	4	1	Normal	Yes	50.00		99.250	95.417	98	81.00	31.00			160.776	54.778
8	Yes	Existing	Mount	ERICSSON	KRY 112 144/1	7	6	3	Flat	11	B	1	1	Normal	No	1.00		101.292	93.375	100	80.50	79.50			12.449	6.225
9	Yes	Proposed	Mount	ERICSSON	KRY 112 489/2	11	6.1	3.94	Flat	15.4	B	1	1	Normal	No	5.00		101.125	93.542	98	58.50	53.50			19.889	12.986
10	Yes	Proposed	Mount	ERICSSON	RADIO 4449 B12/B71	14.95	13.19	9.25	Flat	75	B	1	1	Normal	No	8.95		100.960	93.706	96	36.48	27.53			58.450	40.991
11	Yes	Proposed	Mount	RFS CELWAVE	APXVAARR24_43-U-NA20	95.9	24	8.7	Flat	128	C	1	1	Normal	Yes	89.90	78	98.083	96.583	98	95.00	17.00			521.809	189.231
12	Yes	Existing	Mount	EMS WIRELESS	RR90-17-02DP	56	8	2.75	Flat	13.5	C	4	1	Normal	Yes	50.00		99.250	95.417	98	81.00	31.00			160.776	54.778
13	Yes	Existing	Mount	ERICSSON	KRY 112 144/1	7	6	3	Flat	11	C	1	1	Normal	No	1.00		101.292	93.375	100	80.50	79.50			12.449	6.225
14	Yes	Proposed	Mount	ERICSSON	KRY 112 489/2	11	6.1	3.94	Flat	15.4	C	1	1	Normal	No	5.00		101.125	93.542	98	58.50	53.50			19.889	12.986
15	Yes	Proposed	Mount	ERICSSON	RADIO 4449 B12/B71	14.95	13.19	9.25	Flat	75	C	1	1	Normal	No	8.95		100.960	93.706	96	36.48	27.53			58.450	40.991

Dishes

Item	Include Loading	Status	Mounting Location	Manufacturer	Microwave Dish	Dia (in)	Dish Type	Weight (lbs)	Sector / Face	Position	Top/Bottom Mounting Point Spacing	Override Spacing (in)	Max Dish C/L (ft)	Min Dish C/L (ft)	Dish C/L (ft)	Dish Top Mount Location from Mount Pipe Bottom	Dish Bottom Mount Location from Mount Pipe Bottom	Override Top Dish Mounting Location (in)	Override Bottom Dish Mounting Location (in)



Envelope Only Solution

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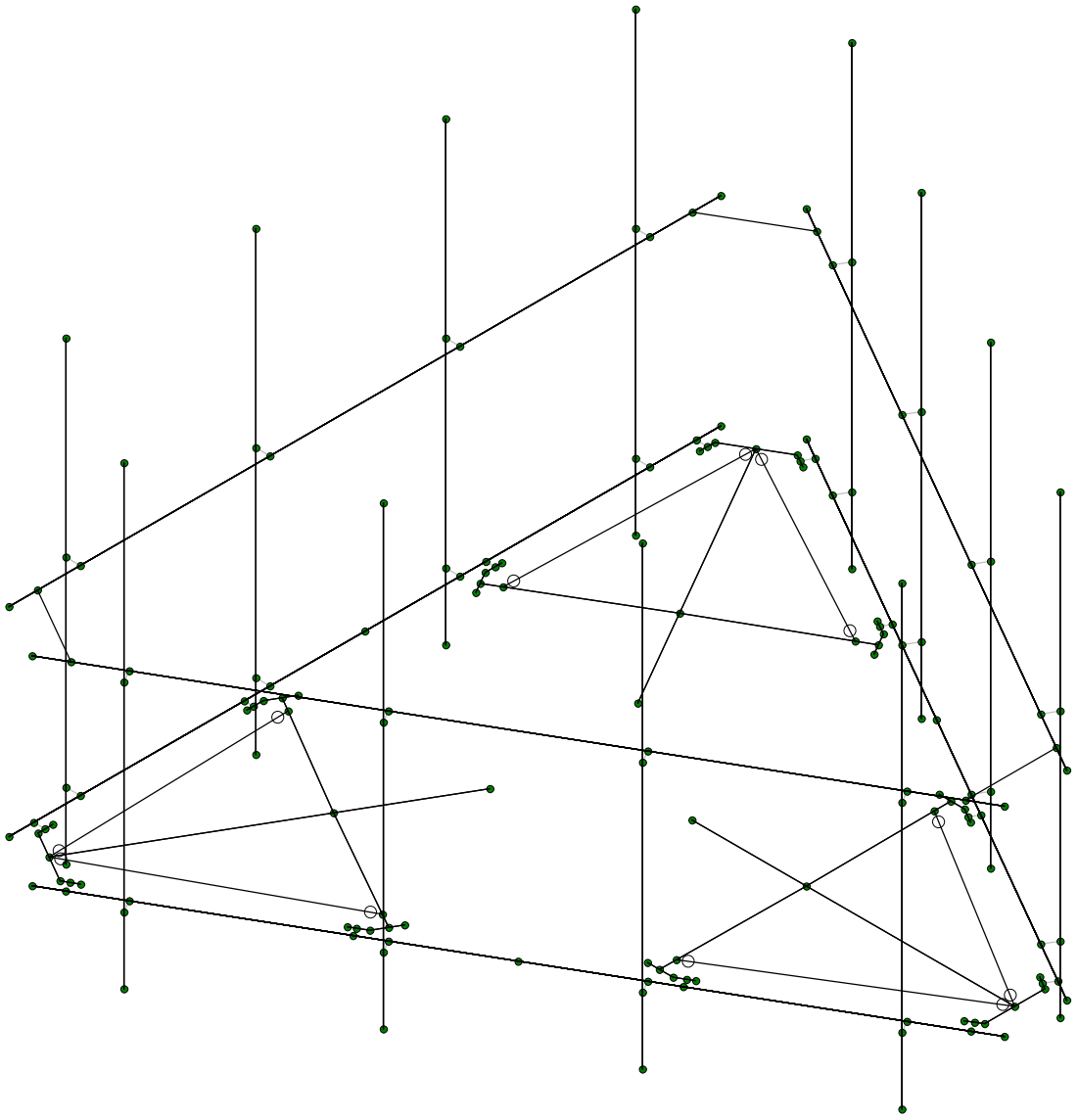
37520-2305.001.7190		37520-2305.001.7190_Client.r3d



Envelope Only Solution

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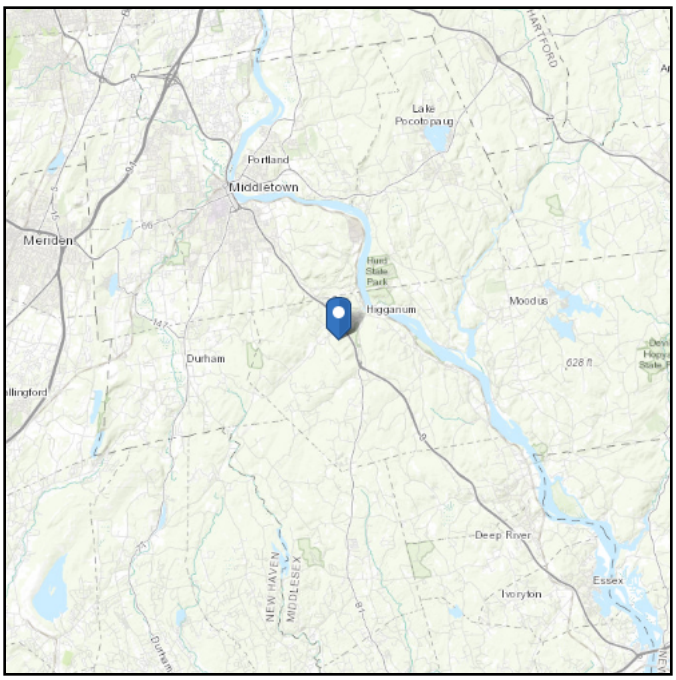
37520-2305.001.7190		37520-2305.001.7190_Client.r3d

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 514.59 ft (NAVD 88)
Latitude: 41.484594
Longitude: -72.572447



Wind

Results:

Wind Speed:	127 Vmph
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	95 Vmph
100-year MRI	104 Vmph

130 Vmph REQUIRED BY JURISDICTION

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Fri May 03 2019

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 in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

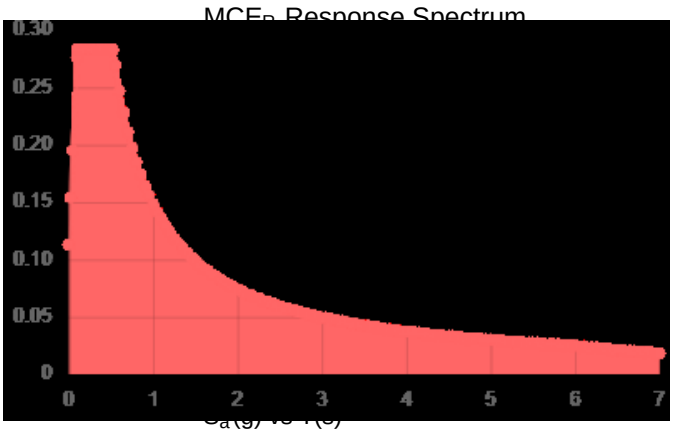
Seismic

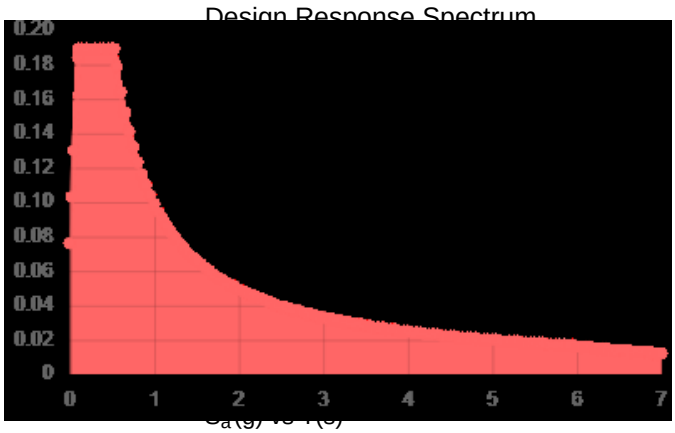
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.062	S_{D1} :	0.099
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.283	PGA_M :	0.144
S_{M1} :	0.148	F_{PGA} :	1.6
		I_e :	1

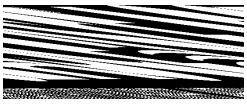
Seismic Design Category B





Data Accessed: Fri May 03 2019

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:

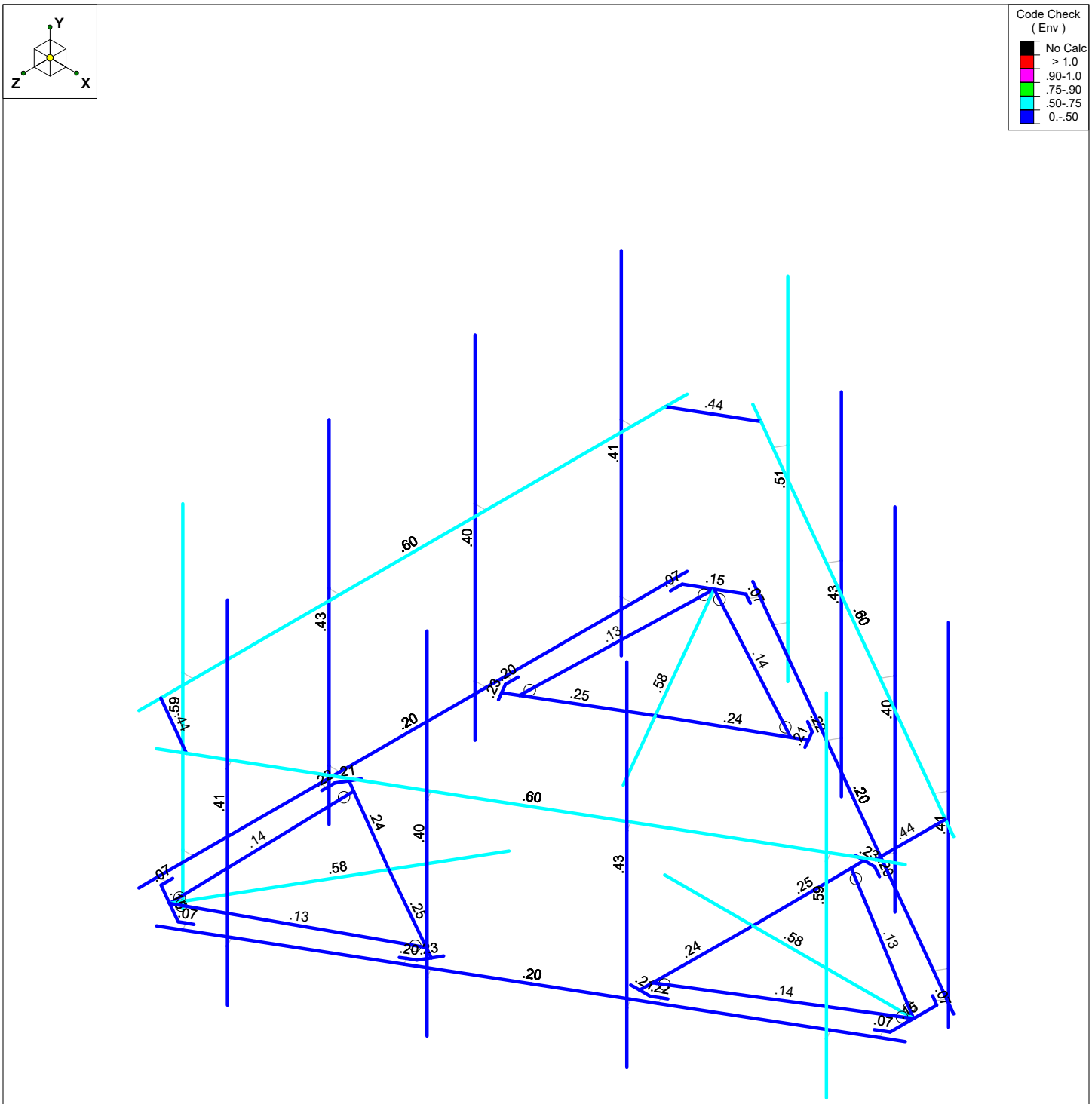
Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri May 03 2019

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.

APPENDIX B

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Paul J. Ford and Company	879532 / HRT 046 943209	SK - 3
IOH		Nov 17, 2020 at 2:06 PM
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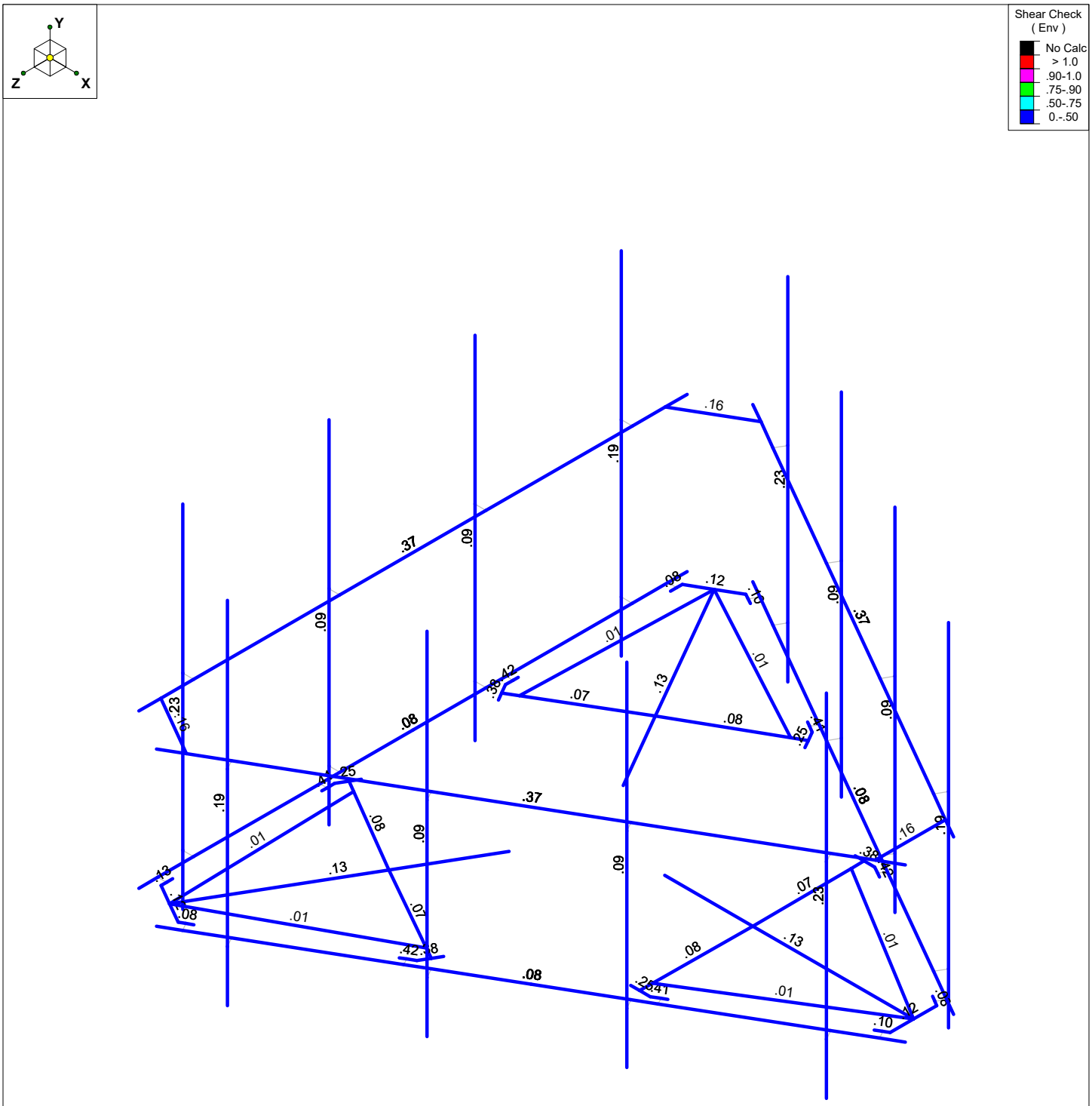

Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

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IOH		Nov 17, 2020 at 2:06 PM
37520-2305.001.7190		37520-2305.001.7190_Client.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm ...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
3	Q235 Gr B	29000	11154	.3	.65	.527	34	1.4	58	1.3

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
1	M10	N11	N12			RIGID	None	None	RIGID	Typical
2	M14	N18	N19			RIGID	None	None	RIGID	Typical
3	M21	N29	N30			RIGID	None	None	RIGID	Typical
4	M22	N32	N31			RIGID	None	None	RIGID	Typical
5	M25	N35	N36			RIGID	None	None	RIGID	Typical
6	M29	N42	N43			RIGID	None	None	RIGID	Typical
7	M36	N54	N53			RIGID	None	None	RIGID	Typical
8	M37	N56	N55			RIGID	None	None	RIGID	Typical
9	M40	N60	N61			RIGID	None	None	RIGID	Typical
10	M43	N65	N66			RIGID	None	None	RIGID	Typical
11	M50	N77	N76			RIGID	None	None	RIGID	Typical
12	M51	N78	N79			RIGID	None	None	RIGID	Typical
13	M52	N81	N80			RIGID	None	None	RIGID	Typical
14	M76	N95	N94			RIGID	None	None	RIGID	Typical
15	M64	N99	N98			RIGID	None	None	RIGID	Typical
16	M65	N101	N100			RIGID	None	None	RIGID	Typical
17	M67	N105	N104			RIGID	None	None	RIGID	Typical
18	M68	N107	N106			RIGID	None	None	RIGID	Typical
19	M70A	N111	N110			RIGID	None	None	RIGID	Typical
20	M71A	N113	N112			RIGID	None	None	RIGID	Typical
21	M73A	N117	N116			RIGID	None	None	RIGID	Typical
22	M74A	N119	N118			RIGID	None	None	RIGID	Typical
23	M76A	N123	N122			RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
24	M77	N125	N124			RIGID	None	None	RIGID	Typical
25	M79	N129	N128			RIGID	None	None	RIGID	Typical
26	M80	N131	N130			RIGID	None	None	RIGID	Typical
27	M82	N135	N134			RIGID	None	None	RIGID	Typical
28	M83	N137	N136			RIGID	None	None	RIGID	Typical
29	M85A	N141	N140			RIGID	None	None	RIGID	Typical
30	M86A	N143	N142			RIGID	None	None	RIGID	Typical
31	M88	N147	N146			RIGID	None	None	RIGID	Typical
32	M89	N149	N148			RIGID	None	None	RIGID	Typical
33	M91	N153	N152			RIGID	None	None	RIGID	Typical
34	M92	N155	N154			RIGID	None	None	RIGID	Typical
35	M94	N159	N158			RIGID	None	None	RIGID	Typical
36	M95	N161	N160			RIGID	None	None	RIGID	Typical
37	M15	N22	N20			PL6x0.375	None	None	Q235 Gr B	Typical
38	M16	N21	N22			PL6x0.375	None	None	Q235 Gr B	Typical
39	M18	N26	N24			PL6x0.375	None	None	Q235 Gr B	Typical
40	M19	N25	N26			PL6x0.375	None	None	Q235 Gr B	Typical
41	M30	N46	N44			PL6x0.375	None	None	Q235 Gr B	Typical
42	M31	N45	N46			PL6x0.375	None	None	Q235 Gr B	Typical
43	M33	N50	N48			PL6x0.375	None	None	Q235 Gr B	Typical
44	M34	N49	N50			PL6x0.375	None	None	Q235 Gr B	Typical
45	M44	N69	N67			PL6x0.375	None	None	Q235 Gr B	Typical
46	M45	N68	N69			PL6x0.375	None	None	Q235 Gr B	Typical
47	M47	N73	N71			PL6x0.375	None	None	Q235 Gr B	Typical
48	M48	N72	N73			PL6x0.375	None	None	Q235 Gr B	Typical
49	M9	N10	N15			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
50	M12	N17	N15			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
51	M13	N16	N17			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
52	M24	N34	N39			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
53	M27	N41	N39			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
54	M28	N40	N41			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
55	M39	N59	N62			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
56	M41	N64	N62			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
57	M42	N63	N64			PL 6" x 1/2"	None	None	Q235 Gr B	Typical
58	CBA1	N1	N2			PIPE_3.0	None	None	A53 Gr.B	Typical
59	CBC1	N13	N14			PIPE_3.0	None	None	A53 Gr.B	Typical
60	CBB1	N37	N38			PIPE_3.0	None	None	A53 Gr.B	Typical
61	CBA2	N82	N83			PIPE_2.0	None	None	A53 Gr.B	Typical
62	CBC2	N84	N85			PIPE_2.0	None	None	A53 Gr.B	Typical
63	CBB2	N86	N87			PIPE_2.0	None	None	A53 Gr.B	Typical
64	C4	N96	N97			PIPE_2.0	None	None	A53 Gr.B	Typical
65	C3	N102	N103			PIPE_2.0	None	None	A53 Gr.B	Typical
66	C2	N108	N109			PIPE_2.0	None	None	A53 Gr.B	Typical
67	C1	N114	N115			PIPE_2.0	None	None	A53 Gr.B	Typical
68	B4	N120	N121			PIPE_2.0	None	None	A53 Gr.B	Typical
69	B3	N126	N127			PIPE_2.0	None	None	A53 Gr.B	Typical
70	B2	N132	N133			PIPE_2.0	None	None	A53 Gr.B	Typical
71	B1	N138	N139			PIPE_2.0	None	None	A53 Gr.B	Typical
72	A4	N144	N145			PIPE_2.0	None	None	A53 Gr.B	Typical
73	A3	N150	N151			PIPE_2.0	None	None	A53 Gr.B	Typical
74	A2	N156	N157			PIPE_2.0	None	None	A53 Gr.B	Typical
75	A1	N162	N163			PIPE_2.0	None	None	A53 Gr.B	Typical
76	M2	N9	N3		270	L2x2x3	None	None	A53 Gr.B	Typical
77	M3	N9	N4			L2x2x3	None	None	A53 Gr.B	Typical
78	M4	N33	N5		270	L2x2x3	None	None	A53 Gr.B	Typical
79	M5	N33	N6			L2x2x3	None	None	A53 Gr.B	Typical
80	M6	N58	N7		270	L2x2x3	None	None	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design ...
81	M7	N58	N8			L2x2x3	None	None	A53 Gr.B	Typical
82	M73	N89	N88		90	L2.5x2.5x4	None	None	A53 Gr.B	Typical
83	M74	N91	N90		90	L2.5x2.5x4	None	None	A53 Gr.B	Typical
84	M75	N93	N92		90	L2.5x2.5x4	None	None	A53 Gr.B	Typical
85	M17	N23	N28			HSS4X4X4	None	None	Q235 Gr B	Typical
86	M20	N27	N28			HSS4X4X4	None	None	Q235 Gr B	Typical
87	M32	N47	N52			HSS4X4X4	None	None	Q235 Gr B	Typical
88	M35	N51	N52			HSS4X4X4	None	None	Q235 Gr B	Typical
89	M38	N57	N58			HSS4X4X4	None	None	Q235 Gr B	Typical
90	M46	N70	N75			HSS4X4X4	None	None	Q235 Gr B	Typical
91	M49	N74	N75			HSS4X4X4	None	None	Q235 Gr B	Typical
92	M93	N164	N9			HSS4X4X4	None	None	Q235 Gr B	Typical
93	M95A	N165	N33			HSS4X4X4	None	None	Q235 Gr B	Typical

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
1	M10	BenPIN					Yes	** NA **			None
2	M14	BenPIN					Yes	** NA **			None
3	M21		BenPIN				Yes	** NA **			None
4	M22	BenPIN					Yes	** NA **			None
5	M25	BenPIN					Yes	** NA **			None
6	M29	BenPIN					Yes	** NA **			None
7	M36	BenPIN					Yes	** NA **			None
8	M37	BenPIN					Yes	** NA **			None
9	M40	BenPIN					Yes	** NA **			None
10	M43	BenPIN					Yes	** NA **			None
11	M50	BenPIN					Yes	** NA **			None
12	M51		BenPIN				Yes	** NA **			None
13	M52						Yes	** NA **			None
14	M76						Yes	** NA **			None
15	M64						Yes	** NA **			None
16	M65						Yes	** NA **			None
17	M67						Yes	** NA **			None
18	M68						Yes	** NA **			None
19	M70A						Yes	** NA **			None
20	M71A						Yes	** NA **			None
21	M73A						Yes	** NA **			None
22	M74A						Yes	** NA **			None
23	M76A						Yes	** NA **			None
24	M77						Yes	** NA **			None
25	M79						Yes	** NA **			None
26	M80						Yes	** NA **			None
27	M82						Yes	** NA **			None
28	M83						Yes	** NA **			None
29	M85A						Yes	** NA **			None
30	M86A						Yes	** NA **			None
31	M88						Yes	** NA **			None
32	M89						Yes	** NA **			None
33	M91						Yes	** NA **			None
34	M92						Yes	** NA **			None
35	M94						Yes	** NA **			None
36	M95						Yes	** NA **			None
37	M15						Yes	** NA **			None
38	M16						Yes	** NA **			None
39	M18						Yes	** NA **			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Rat...	Analysis ...	Inactive	Seismic...
40	M19						Yes	** NA **			None
41	M30						Yes	** NA **			None
42	M31						Yes	** NA **			None
43	M33						Yes	** NA **			None
44	M34						Yes	** NA **			None
45	M44						Yes	** NA **			None
46	M45						Yes	** NA **			None
47	M47						Yes	** NA **			None
48	M48						Yes	** NA **			None
49	M9						Yes	** NA **			None
50	M12						Yes	** NA **			None
51	M13						Yes	** NA **			None
52	M24						Yes	** NA **			None
53	M27						Yes	** NA **			None
54	M28						Yes	** NA **			None
55	M39						Yes	** NA **			None
56	M41						Yes	** NA **			None
57	M42						Yes	** NA **			None
58	CBA1						Yes	** NA **			None
59	CBC1						Yes	** NA **			None
60	CBB1						Yes	** NA **			None
61	CBA2						Yes	** NA **			None
62	CBC2						Yes	** NA **			None
63	CBB2						Yes	** NA **			None
64	C4						Yes	** NA **			None
65	C3						Yes	** NA **			None
66	C2						Yes	** NA **			None
67	C1						Yes	** NA **			None
68	B4						Yes	** NA **			None
69	B3						Yes	** NA **			None
70	B2						Yes	** NA **			None
71	B1						Yes	** NA **			None
72	A4						Yes	** NA **			None
73	A3						Yes	** NA **			None
74	A2						Yes	** NA **			None
75	A1						Yes	** NA **			None
76	M2	BenPIN	BenPIN				Yes	** NA **			None
77	M3	BenPIN	BenPIN				Yes	** NA **			None
78	M4	BenPIN	BenPIN				Yes	** NA **			None
79	M5	BenPIN	BenPIN				Yes	** NA **			None
80	M6	BenPIN	BenPIN				Yes	** NA **			None
81	M7	BenPIN	BenPIN				Yes	** NA **			None
82	M73						Yes	** NA **			None
83	M74						Yes	** NA **			None
84	M75						Yes	** NA **			None
85	M17						Yes	** NA **			None
86	M20						Yes	** NA **			None
87	M32						Yes	** NA **			None
88	M35						Yes	** NA **			None
89	M38						Yes	** NA **			None
90	M46						Yes	** NA **			None
91	M49						Yes	** NA **			None
92	M93						Yes	** NA **			None
93	M95A						Yes	** NA **			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[i..	Lcomp bot[i..	L-torq...	Kyy	Kzz	Cb	Functi...
1	M15	PL6x0.375	5.363			Lbyy						Lateral
2	M16	PL6x0.375	3.499			Lbyy						Lateral
3	M18	PL6x0.375	5.363			Lbyy						Lateral
4	M19	PL6x0.375	3.499			Lbyy						Lateral
5	M30	PL6x0.375	5.363			Lbyy						Lateral
6	M31	PL6x0.375	3.499			Lbyy						Lateral
7	M33	PL6x0.375	5.363			Lbyy						Lateral
8	M34	PL6x0.375	3.499			Lbyy						Lateral
9	M44	PL6x0.375	5.363			Lbyy						Lateral
10	M45	PL6x0.375	3.499			Lbyy						Lateral
11	M47	PL6x0.375	5.363			Lbyy						Lateral
12	M48	PL6x0.375	3.499			Lbyy						Lateral
13	M9	PL 6" x 1/2"	3.184			Lbyy						Lateral
14	M12	PL 6" x 1/2"	12.707			Lbyy						Lateral
15	M13	PL 6" x 1/2"	3.184			Lbyy						Lateral
16	M24	PL 6" x 1/2"	3.184			Lbyy						Lateral
17	M27	PL 6" x 1/2"	12.707			Lbyy						Lateral
18	M28	PL 6" x 1/2"	3.184			Lbyy						Lateral
19	M39	PL 6" x 1/2"	3.184			Lbyy						Lateral
20	M41	PL 6" x 1/2"	12.707			Lbyy						Lateral
21	M42	PL 6" x 1/2"	3.184			Lbyy						Lateral
22	CBA1	PIPE_3.0	150			Lbyy						Lateral
23	CBC1	PIPE_3.0	150			Lbyy						Lateral
24	CBB1	PIPE_3.0	150			Lbyy						Lateral
25	CBA2	PIPE_2.0	150			Lbyy						Lateral
26	CBC2	PIPE_2.0	150			Lbyy						Lateral
27	CBB2	PIPE_2.0	150			Lbyy						Lateral
28	C4	PIPE_2.0	96									Lateral
29	C3	PIPE_2.0	96									Lateral
30	C2	PIPE_2.0	96									Lateral
31	C1	PIPE_2.0	96									Lateral
32	B4	PIPE_2.0	96									Lateral
33	B3	PIPE_2.0	96									Lateral
34	B2	PIPE_2.0	96									Lateral
35	B1	PIPE_2.0	96									Lateral
36	A4	PIPE_2.0	96									Lateral
37	A3	PIPE_2.0	96									Lateral
38	A2	PIPE_2.0	96									Lateral
39	A1	PIPE_2.0	96									Lateral
40	M2	L2x2x3	51.837			Lbyy						Lateral
41	M3	L2x2x3	51.837			Lbyy						Lateral
42	M4	L2x2x3	51.837			Lbyy						Lateral
43	M5	L2x2x3	51.837			Lbyy						Lateral
44	M6	L2x2x3	51.837			Lbyy						Lateral
45	M7	L2x2x3	51.837			Lbyy						Lateral
46	M73	L2.5x2.5x4	19.173									Lateral
47	M74	L2.5x2.5x4	19.173									Lateral
48	M75	L2.5x2.5x4	19.173									Lateral
49	M17	HSS4X4X4	30.71			Lbyy						Lateral
50	M20	HSS4X4X4	30.71			Lbyy						Lateral
51	M32	HSS4X4X4	30.71			Lbyy						Lateral
52	M35	HSS4X4X4	30.71			Lbyy						Lateral
53	M38	HSS4X4X4	68.014			Lbyy						Lateral
54	M46	HSS4X4X4	30.71			Lbyy						Lateral
55	M49	HSS4X4X4	30.71			Lbyy						Lateral
56	M93	HSS4X4X4	68.014			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[i..	Lcomp bot[i..	L-torq...	Kyy	Kzz	Cb	Functi...
57	M95A	HSS4X4X4	68.014			Lbyy						Lateral

Basic Load Cases

	BLC Description	Category	X Gravi...	Y Gravi...	Z Gravity	Joint	Point	Distrib...	Area(M...	Surfac...
1	Dead	None		-1.1			30		3	
2	Wind 0	None					60	114		
3	Wind 30	None					60	114		
4	Wind 60	None					60	114		
5	Wind 90	None					60	114		
6	Wind 120	None					60	114		
7	Wind 150	None					60	114		
8	Ice Load	None					30	57	3	
9	Ice 0	None					60	114		
10	Ice 30	None					60	114		
11	Ice 60	None					60	114		
12	Ice 90	None					60	114		
13	Ice 120	None					60	114		
14	Ice 150	None					60	114		
15	Lm1	None				1				
16	Lm2	None				1				
17	Lm3	None				1				
18	Lm4	None				1				
19	Lv1	None				1				
20	Lv2	None				1				
21	Lv3	None				1				
22	Lv4	None				1				
23	BLC 1 Transient Area Loads	None						75		
24	BLC 8 Transient Area Loads	None						75		

Load Combinations

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 D	Y...	Y		1	1.4																				
2	1.2 D + 1.0 Wo @ 0	Y...	Y		1	1.2	2	1																		
3	1.2 D + 1.0 Wo @ 30	Y...	Y		1	1.2	3	1																		
4	1.2 D + 1.0 Wo @ 60	Y...	Y		1	1.2	4	1																		
5	1.2 D + 1.0 Wo @ 90	Y...	Y		1	1.2	5	1																		
6	1.2 D + 1.0 Wo @ 120	Y...	Y		1	1.2	6	1																		
7	1.2 D + 1.0 Wo @ 150	Y...	Y		1	1.2	7	1																		
8	1.2 D + 1.0 Wo @ 180	Y...	Y		1	1.2	2	-1																		
9	1.2 D + 1.0 Wo @ 210	Y...	Y		1	1.2	3	-1																		
10	1.2 D + 1.0 Wo @ 240	Y...	Y		1	1.2	4	-1																		
11	1.2 D + 1.0 Wo @ 270	Y...	Y		1	1.2	5	-1																		
12	1.2 D + 1.0 Wo @ 300	Y...	Y		1	1.2	6	-1																		
13	1.2 D + 1.0 Wo @ 330	Y...	Y		1	1.2	7	-1																		
14	1.2 D + 1.0 Di + 1.0 Wi @ 0	Y...	Y		1	1.2	8	1	9	1																
15	1.2 D + 1.0 Di + 1.0 Wi @ 30	Y...	Y		1	1.2	8	1	10	1																
16	1.2 D + 1.0 Di + 1.0 Wi @ 60	Y...	Y		1	1.2	8	1	11	1																
17	1.2 D + 1.0 Di + 1.0 Wi @ 90	Y...	Y		1	1.2	8	1	12	1																
18	1.2 D + 1.0 Di + 1.0 Wi @ 120	Y...	Y		1	1.2	8	1	13	1																
19	1.2 D + 1.0 Di + 1.0 Wi @ 150	Y...	Y		1	1.2	8	1	14	1																
20	1.2 D + 1.0 Di + 1.0 Wi @ 180	Y...	Y		1	1.2	8	1	9	-1																
21	1.2 D + 1.0 Di + 1.0 Wi @ 210	Y...	Y		1	1.2	8	1	10	-1																
22	1.2 D + 1.0 Di + 1.0 Wi @ 240	Y...	Y		1	1.2	8	1	11	-1																
23	1.2 D + 1.0 Di + 1.0 Wi @ 270	Y...	Y		1	1.2	8	1	12	-1																

Load Combinations (Continued)

	Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
24	1.2 D + 1.0 Di + 1.0 Wi @ 300	Y...	Y		1	1.2	8	1	13	-1																
25	1.2 D + 1.0 Di + 1.0 Wi @ 330	Y...	Y		1	1.2	8	1	14	-1																
26	1.2 D + 1.5 Lm1 + 1.0 Wm @ 0	Y...	Y		1	1.2	15	1.5	2	.053																
27	1.2 D + 1.5 Lm1 + 1.0 Wm @ 30	Y...	Y		1	1.2	15	1.5	3	.053																
28	1.2 D + 1.5 Lm1 + 1.0 Wm @ 60	Y...	Y		1	1.2	15	1.5	4	.053																
29	1.2 D + 1.5 Lm1 + 1.0 Wm @ 90	Y...	Y		1	1.2	15	1.5	5	.053																
30	1.2 D + 1.5 Lm1 + 1.0 Wm @ 120	Y...	Y		1	1.2	15	1.5	6	.053																
31	1.2 D + 1.5 Lm1 + 1.0 Wm @ 150	Y...	Y		1	1.2	15	1.5	7	.053																
32	1.2 D + 1.5 Lm1 + 1.0 Wm @ 180	Y...	Y		1	1.2	15	1.5	2	.053																
33	1.2 D + 1.5 Lm1 + 1.0 Wm @ 210	Y...	Y		1	1.2	15	1.5	3	.053																
34	1.2 D + 1.5 Lm1 + 1.0 Wm @ 240	Y...	Y		1	1.2	15	1.5	4	.053																
35	1.2 D + 1.5 Lm1 + 1.0 Wm @ 270	Y...	Y		1	1.2	15	1.5	5	.053																
36	1.2 D + 1.5 Lm1 + 1.0 Wm @ 300	Y...	Y		1	1.2	15	1.5	6	.053																
37	1.2 D + 1.5 Lm1 + 1.0 Wm @ 330	Y...	Y		1	1.2	15	1.5	7	.053																
38	1.2 D + 1.5 Lm2 + 1.0 Wm @ 0	Y...	Y		1	1.2	16	1.5	2	.053																
39	1.2 D + 1.5 Lm2 + 1.0 Wm @ 30	Y...	Y		1	1.2	16	1.5	3	.053																
40	1.2 D + 1.5 Lm2 + 1.0 Wm @ 60	Y...	Y		1	1.2	16	1.5	4	.053																
41	1.2 D + 1.5 Lm2 + 1.0 Wm @ 90	Y...	Y		1	1.2	16	1.5	5	.053																
42	1.2 D + 1.5 Lm2 + 1.0 Wm @ 120	Y...	Y		1	1.2	16	1.5	6	.053																
43	1.2 D + 1.5 Lm2 + 1.0 Wm @ 150	Y...	Y		1	1.2	16	1.5	7	.053																
44	1.2 D + 1.5 Lm2 + 1.0 Wm @ 180	Y...	Y		1	1.2	16	1.5	2	.053																
45	1.2 D + 1.5 Lm2 + 1.0 Wm @ 210	Y...	Y		1	1.2	16	1.5	3	.053																
46	1.2 D + 1.5 Lm2 + 1.0 Wm @ 240	Y...	Y		1	1.2	16	1.5	4	.053																
47	1.2 D + 1.5 Lm2 + 1.0 Wm @ 270	Y...	Y		1	1.2	16	1.5	5	.053																
48	1.2 D + 1.5 Lm2 + 1.0 Wm @ 300	Y...	Y		1	1.2	16	1.5	6	.053																
49	1.2 D + 1.5 Lm2 + 1.0 Wm @ 330	Y...	Y		1	1.2	16	1.5	7	.053																
50	1.2 D + 1.5 Lm3 + 1.0 Wm @ 0	Y...	Y		1	1.2	17	1.5	2	.053																
51	1.2 D + 1.5 Lm3 + 1.0 Wm @ 30	Y...	Y		1	1.2	17	1.5	3	.053																
52	1.2 D + 1.5 Lm3 + 1.0 Wm @ 60	Y...	Y		1	1.2	17	1.5	4	.053																
53	1.2 D + 1.5 Lm3 + 1.0 Wm @ 90	Y...	Y		1	1.2	17	1.5	5	.053																
54	1.2 D + 1.5 Lm3 + 1.0 Wm @ 120	Y...	Y		1	1.2	17	1.5	6	.053																
55	1.2 D + 1.5 Lm3 + 1.0 Wm @ 150	Y...	Y		1	1.2	17	1.5	7	.053																
56	1.2 D + 1.5 Lm3 + 1.0 Wm @ 180	Y...	Y		1	1.2	17	1.5	2	.053																
57	1.2 D + 1.5 Lm3 + 1.0 Wm @ 210	Y...	Y		1	1.2	17	1.5	3	.053																
58	1.2 D + 1.5 Lm3 + 1.0 Wm @ 240	Y...	Y		1	1.2	17	1.5	4	.053																
59	1.2 D + 1.5 Lm3 + 1.0 Wm @ 270	Y...	Y		1	1.2	17	1.5	5	.053																
60	1.2 D + 1.5 Lm3 + 1.0 Wm @ 300	Y...	Y		1	1.2	17	1.5	6	.053																
61	1.2 D + 1.5 Lm3 + 1.0 Wm @ 330	Y...	Y		1	1.2	17	1.5	7	.053																
62	1.2 D + 1.5 Lm4 + 1.0 Wm @ 0	Y...	Y		1	1.2	18	1.5	2	.053																
63	1.2 D + 1.5 Lm4 + 1.0 Wm @ 30	Y...	Y		1	1.2	18	1.5	3	.053																
64	1.2 D + 1.5 Lm4 + 1.0 Wm @ 60	Y...	Y		1	1.2	18	1.5	4	.053																
65	1.2 D + 1.5 Lm4 + 1.0 Wm @ 90	Y...	Y		1	1.2	18	1.5	5	.053																
66	1.2 D + 1.5 Lm4 + 1.0 Wm @ 120	Y...	Y		1	1.2	18	1.5	6	.053																
67	1.2 D + 1.5 Lm4 + 1.0 Wm @ 150	Y...	Y		1	1.2	18	1.5	7	.053																
68	1.2 D + 1.5 Lm4 + 1.0 Wm @ 180	Y...	Y		1	1.2	18	1.5	2	-.0...																
69	1.2 D + 1.5 Lm4 + 1.0 Wm @ 210	Y...	Y		1	1.2	18	1.5	3	-.0...																
70	1.2 D + 1.5 Lm4 + 1.0 Wm @ 240	Y...	Y		1	1.2	18	1.5	4	-.0...																
71	1.2 D + 1.5 Lm4 + 1.0 Wm @ 270	Y...	Y		1	1.2	18	1.5	5	-.0...																
72	1.2 D + 1.5 Lm4 + 1.0 Wm @ 300	Y...	Y		1	1.2	18	1.5	6	-.0...																
73	1.2 D + 1.5 Lm4 + 1.0 Wm @ 330	Y...	Y		1	1.2	18	1.5	7	-.0...																
74	1.2 D + 1.5 Lv1	Y...	Y		1	1.2	19	1.5																		
75	1.2 D + 1.5 Lv2	Y...	Y		1	1.2	20	1.5																		
76	1.2 D + 1.5 Lv3	Y...	Y		1	1.2	21	1.5																		
77	1.2 D + 1.5 Lv4	Y...	Y		1	1.2	22	1.5																		
78	1.0 D	Y...	Y		1	1																				

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N57	max	1738.504	11	2689.512	17	638.527	2	.607	2	1.296	8	6.928	17
2		min	-1679.141	5	-75.157	11	-632.839	8	-.763	8	-1.278	2	-1.24	11
3	N164	max	858.068	13	2689.513	25	1443.415	13	6.104	25	1.297	4	.709	6
4		min	-882.027	7	-75.101	7	-1498.129	7	-1.04	7	-1.278	10	-3.291	24
5	N165	max	917.997	11	2689.54	21	1512.937	3	1.108	3	1.296	12	.634	4
6		min	-952.838	5	-75.085	3	-1464.834	9	-5.896	21	-1.278	6	-3.658	22
7	Totals:	max	3355.995	11	7301.745	22	3355.77	2						
8		min	-3355.993	5	2281.999	78	-3355.774	8						

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc...	LC	Shear Check	Loc...	...	LC	phi*P...	phi*P...	phi*M...	phi*M...	...	Eqn
1	CBC2	PIPE_2.0	.598	135...	6	.373	143...		6	6295....	32130	1.872	1.872	...	H3-6
2	CBA2	PIPE_2.0	.598	135...	10	.373	143...		10	6295....	32130	1.872	1.872	...	H3-6
3	CBB2	PIPE_2.0	.598	135...	2	.373	143...		2	6295....	32130	1.872	1.872	...	H3-6
4	C1	PIPE_2.0	.592	56	11	.232	56		11	14916...	32130	1.872	1.872	...	H1-1b
5	B1	PIPE_2.0	.590	56	7	.232	56		7	14916...	32130	1.872	1.872	...	H1-1b
6	M95A	HSS4X4X4	.582	0	21	.126	0	y	44	93367...	103122	11.96	11.96	...	H1-1b
7	M93	HSS4X4X4	.582	0	25	.130	0	y	63	93367...	103122	11.96	11.96	...	H1-1b
8	M38	HSS4X4X4	.582	0	17	.126	0	y	19	93367...	103122	11.96	11.96	...	H1-1b
9	A1	PIPE_2.0	.515	56	3	.232	56		3	14916...	32130	1.872	1.872	...	H1-1b
10	M73	L2.5x2.5x4	.443	19....	10	.157	19....	z	5	34569...	37485	1.083	2.467	...	H2-1
11	M74	L2.5x2.5x4	.443	19....	6	.157	19....	z	13	34569...	37485	1.083	2.467	...	H2-1
12	M75	L2.5x2.5x4	.443	19....	2	.157	19....	z	9	34569...	37485	1.083	2.467	...	H2-1
13	A2	PIPE_2.0	.429	14	6	.089	14		7	14916...	32130	1.872	1.872	...	H1-1b
14	B2	PIPE_2.0	.429	14	10	.089	14		11	14916...	32130	1.872	1.872	...	H1-1b
15	C2	PIPE_2.0	.429	14	2	.089	14		3	14916...	32130	1.872	1.872	...	H1-1b
16	B4	PIPE_2.0	.413	14	5	.190	56		7	14916...	32130	1.872	1.872	...	H1-1b
17	A4	PIPE_2.0	.413	14	13	.190	56		3	14916...	32130	1.872	1.872	...	H1-1b
18	C4	PIPE_2.0	.413	14	9	.190	56		11	14916...	32130	1.872	1.872	...	H1-1b
19	B3	PIPE_2.0	.404	14	5	.088	14		8	14916...	32130	1.872	1.872	...	H1-1b
20	A3	PIPE_2.0	.404	14	13	.088	14		4	14916...	32130	1.872	1.872	...	H1-1b
21	C3	PIPE_2.0	.404	14	9	.088	14		12	14916...	32130	1.872	1.872	...	H1-1b
22	M17	HSS4X4X4	.247	30....	24	.070	30....	y	24	10105...	103122	11.96	11.96	...	H1-1b
23	M32	HSS4X4X4	.247	30....	20	.070	30....	y	20	10105...	103122	11.96	11.96	...	H1-1b
24	M46	HSS4X4X4	.247	30....	16	.070	30....	y	16	10105...	103122	11.96	11.96	...	H1-1b
25	M35	HSS4X4X4	.237	30....	22	.078	30....	y	22	10105...	103122	11.96	11.96	...	H1-1b
26	M49	HSS4X4X4	.237	30....	18	.078	30....	y	18	10105...	103122	11.96	11.96	...	H1-1b
27	M20	HSS4X4X4	.237	30....	14	.078	30....	y	14	10105...	103122	11.96	11.96	...	H1-1b
28	M44	PL6x0.375	.232	2.8...	4	.379	2.8...	y	18	60835...	68850	.538	8.606	...	H1-1b
29	M30	PL6x0.375	.232	2.8...	8	.379	2.8...	y	22	60835...	68850	.538	8.606	...	H1-1b
30	M15	PL6x0.375	.232	2.8...	12	.379	2.8...	y	14	60835...	68850	.538	8.606	...	H1-1b
31	M48	PL6x0.375	.218	1.4...	12	.408	3.4...	y	17	65316...	68850	.538	8.606	...	H1-1b
32	M34	PL6x0.375	.218	1.4...	4	.408	3.4...	y	21	65316...	68850	.538	8.606	...	H1-1b
33	M19	PL6x0.375	.218	1.4...	8	.408	3.4...	y	25	65316...	68850	.538	8.606	...	H1-1b
34	M18	PL6x0.375	.207	2.8...	13	.246	2.8...	y	24	60835...	68850	.538	8.606	...	H1-1b
35	M33	PL6x0.375	.207	2.8...	9	.246	2.8...	y	20	60835...	68850	.538	8.606	...	H1-1b
36	M47	PL6x0.375	.207	2.8...	5	.246	2.8...	y	16	60835...	68850	.538	8.606	...	H1-1b
37	M45	PL6x0.375	.202	1.4...	10	.415	3.4...	y	17	65316...	68850	.538	8.606	...	H1-1b
38	M16	PL6x0.375	.202	1.4...	6	.415	3.4...	y	25	65316...	68850	.538	8.606	...	H1-1b
39	M31	PL6x0.375	.202	1.4...	2	.415	3.4...	y	21	65316...	68850	.538	8.606	...	H1-1b
40	CBB1	PIPE_3.0	.196	50	19	.079	50		8	28250...	65205	5.749	5.749	...	H1-1b
41	CBC1	PIPE_3.0	.196	50	23	.079	50		12	28250...	65205	5.749	5.749	...	H1-1b
42	CBA1	PIPE_3.0	.196	50	15	.079	50		4	28250...	65205	5.749	5.749	...	H1-1b
43	M41	PL 6" x 1/2"	.148	6.3...	10	.124	6.3...	y	16	62633...	91800	.956	11.475	...	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc...	LC	Shear Check	Loc...	...	LC	phi*P...	phi*P...	phi*M...	phi*M...	...	Eqn
44	M12	PL 6" x 1/2"	.148	6.3...	6	.124	6.3...	y	24	62633...	91800	.956	11.475	...	H1-1b
45	M27	PL 6" x 1/2"	.148	6.3...	2	.124	6.3...	y	20	62633...	91800	.956	11.475	...	H1-1b
46	M7	L2x2x3	.139	25....	6	.009	51....	y	25	9165....	22743	.542	1.039	...	H2-1
47	M5	L2x2x3	.139	25....	10	.009	51....	y	17	9165....	22743	.542	1.039	...	H2-1
48	M3	L2x2x3	.139	25....	2	.009	51....	y	21	9165....	22743	.542	1.039	...	H2-1
49	M6	L2x2x3	.134	25....	4	.012	51....	z	19	9165....	22743	.542	1.038	...	H2-1
50	M2	L2x2x3	.134	25....	12	.012	51....	z	15	9165....	22743	.542	1.038	...	H2-1
51	M4	L2x2x3	.134	25....	8	.012	51....	z	23	9165....	22743	.542	1.038	...	H2-1
52	M42	PL 6" x 1/2"	.068	1.6...	5	.103	3.1...	y	6	89622...	91800	.956	11.475	...	H1-1b
53	M28	PL 6" x 1/2"	.068	1.6...	9	.127	3.1...	y	37	89622...	91800	.956	11.475	...	H1-1b
54	M13	PL 6" x 1/2"	.068	1.6...	13	.103	3.1...	y	2	89622...	91800	.956	11.475	...	H1-1b
55	M39	PL 6" x 1/2"	.067	1.6...	5	.079	1.6...	y	9	89622...	91800	.956	11.475	...	H1-1b
56	M24	PL 6" x 1/2"	.067	1.6...	9	.079	1.6...	y	13	89622...	91800	.956	11.475	...	H1-1b
57	M9	PL 6" x 1/2"	.067	1.6...	13	.079	1.6...	y	5	89622...	91800	.956	11.475	...	H1-1b

APPENDIX C

ADDITIONAL CALCULATIONS

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number:	37520-2305.001.7190
Engineer:	IOH
Date:	11/17/2020
Site Name:	HRT 046 943209
Site Number:	806367
Order Number:	479816 Rev 1

Mount to Tower Connection Checks (Version v4.6 - Effective Date 11/11/2020)

Total Populated Members: 93
Total Populated Nodes: 168

Risa File Path: G:\TOWER\375_Crown_Castle\2020\37520-2305_806367_HRT 046 943209\37520-2305.001.7190_MA\RISA\37520-2305.001.7190_Client.r3d

Settings

☑ Apply Capcity Normalization Per Section 15.5

Code:	TIA-222-H
Check(s) Performed:	Bolts & Welds

Risa-3D Member Reactions

☐ Input Forces Manually

Consider Tie-Backs:	No	
Consider Kickers:	No	
Consider Horizontal Members Only:	Yes	
Controlling Load Case:	17	
Controlling Member:	M38	
Member Orientation:	Horizontal	*(in global Risa coordinate system)*
Member Local Rotation:	0	*(about its longitudinal axis)*

	Shear (kip)	Moment (kip-ft)
Local Z Axis (Global Horizontal):	0.012	6.928
Local Y Axis (Global Vertical):	2.688	0.013
	Axial (kip)	**Torque (kip-ft)**
Local X Axis (Global Horizontal):	0.404	0.304

Note: Forces are relative to member local axis

Bolt Information

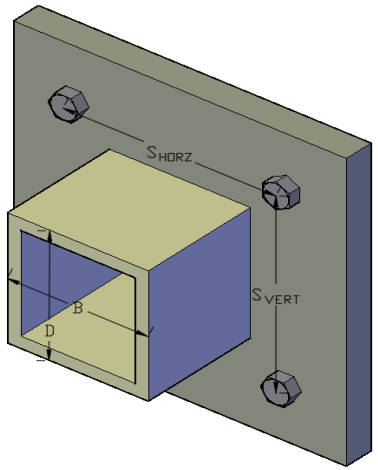
Type:	A325N	
Diameter:	0.625	in
Quantity:	4	
Vertical Spacing (S_{VERT}):	6.00	in
Horizontal Spacing (S_{HORZ}):	6.00	in

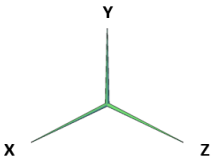
Standoff Member Information

Type:	Rectangular	
Width (B):	4	in
Depth (D):	4	in
Thickness:	0.25	in
Weld Size:	0.375	in
Weld Size Assummed:	Yes	

Stiffener Information

Present:	No





Member Local Axis

Connection Type: Collar

Analysis Results

32.4% Pass

Bolt Capacity — 32.4%

Tension:	Applied Load: 7.04 kip Capacity: 20.71 kip	32.4%
Shear:	Applied Load: 0.89 kip Capacity: 12.43 kip	6.8%
Tension-Shear Interaction:	Applied Load: - Capacity: -	OK

Weld Capacity — 30.4%

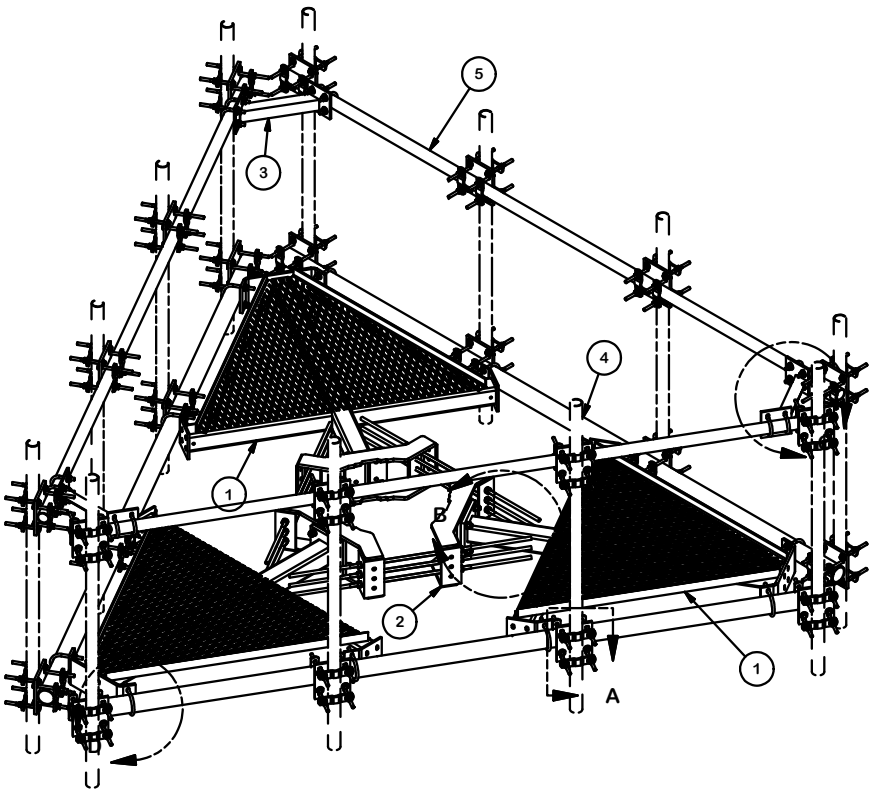
	Applied Resultant Load: 2.67 kip/in	30.4%
	Capacity: 8.35 kip/in	

(Bolts Controls)

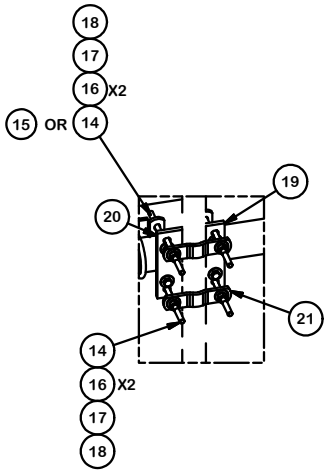
Notes:
1. Connection is considered fixed.
2. Allowable capacity limit is 100%. Values have been normalized by dividing by 1.05 per TIA-222-H Section 15.5
3. Calculations are in accordance with TIA-222-H and AISC 15th Ed.
4. Bolt tension reduction not required as tension and/or shear capacity is below 30%.

APPENDIX D

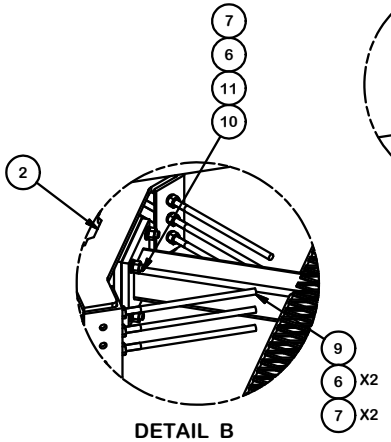
MANUFACTURER DRAWINGS (FOR REFERENCE ONLY)



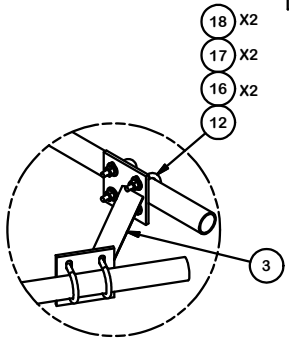
PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-SV196	LOW PROFILE PLATFORM CORNER		212.10	636.31
2	3	X-LWRM	RING MOUNT WELDMENT		68.81	206.42
3	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
4	3	P3150	3-1/2" X 150" (3" SCH 40) GALVANIZED PIPE	150 in	94.80	284.40
5	3	P2150	2-3/8" O.D. X 150" SCH 40 GALVANIZED PIPE	150 in	45.77	137.31
6	30	G58LW	5/8" HDG LOCKWASHER		0.03	0.78
7	30	A58NUT	5/8" HDG A325 HEX NUT		0.13	3.90
8	9	G58R-24	5/8" x 24" THREADED ROD (HDG.)	24 in	0.40	3.59
9	9	G58R-48	5/8" x 48" THREADED ROD (HDG.)	48 in	0.40	3.59
10	12	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	4.27
11	12	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.41
12	12	X-UB1212	1/2" X 2" X 3" X 1-1/4" U-BOLT (HDG.)		0.60	7.17
13	12	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	9.94
14	192	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	78.62
15	96	G12045	1/2" x 4.5" HDG HEX BOLT GR5 FULL THREAD	4 1/2 in	0.30	28.61
16	432	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	14.72
17	240	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.34
18	240	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	17.19
19	24	SCX7	CROSSOVER PLATE	8 in	7.55	181.17
20	48	X-100064	CLAMP (4" V-CLAMP) GALVANIZED		0.92	44.24
21	48	X-115765	5" V-CLAMP	7 1/16 in	1.03	49.23
					TOTAL WT. #	1803.22



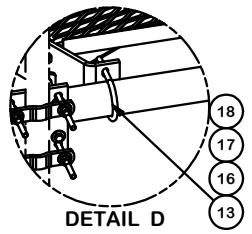
DETAIL A



DETAIL B



DETAIL C



DETAIL D

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

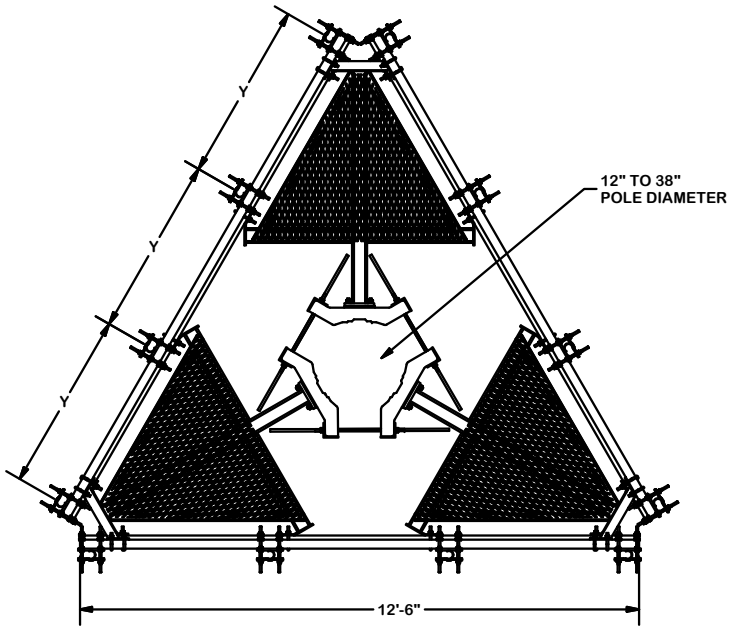
SITE PRO 1 — A valmont COMPANY

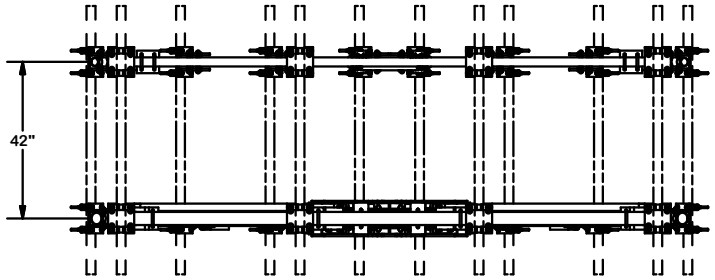
Engineering Support Team: 1-888-753-7446

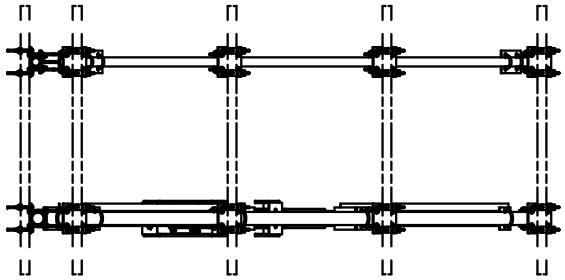
Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-SPT

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 6/28/2018	RMQP-SPT







TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-SPT

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 6/28/2018	RMQP-SPT

Transcom Engineering, Inc.
Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CT11233A

Higganum_1
65 Maple Avenue West
Haddam, CT 06441

May 23, 2019

Transcom Engineering Project Number: 737001-0050

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**13.70 %**

May 23, 2019

T-MOBILE
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 6009

Emissions Analysis for Site: **CT11233A – Higganum_1**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **65 Maple Avenue West, Haddam, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

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

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 & 700 MHz bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **65 Maple Avenue West, Haddam, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20
LTE	1900 MHz (PCS)	4	40
GSM	1900 MHz (PCS)	1	15
LTE	2100 MHz (AWS)	2	60

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APXVAARR24_43-U-NA20	120
A	2	EMS RR90-17-XXDP (Dormant)	120
B	1	RFS APXVAARR24_43-U-NA20	120
B	2	EMS RR90-17-XXDP (Dormant)	120
C	1	RFS APXVAARR24_43-U-NA20	120
C	2	EMS RR90-17-XXDP (Dormant)	120

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. Since all **1900 MHz (PCS) and 2100 MHz (AWS)** radios are ground mounted the following cable loss values were used. For each ground mounted **1900 MHz (PCS)** radio there was **1.95 dB** of cable loss calculated into the system gains / losses for this site. For each ground mounted **2100 MHz (AWS)** radio there was **2.06 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **160** feet of **1-1/4”** coax.

RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	12.95 / 13.35 / 15.65 / 16.35	11	415	9,767.84	3.63
Antenna A2	EMS RR90-17-XXDP	Dormant	N/A	0	0	0.00	0.00
						Sector A Composite MPE%	**3.63**
Antenna B1	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	12.95 / 13.35 / 15.65 / 16.35	11	415	9,767.84	3.63
Antenna B2	EMS RR90-17-XXDP	Dormant	N/A	0	0	0.00	0.00
						Sector B Composite MPE%	**3.63**
Antenna C1	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz / 1900 MHz (PCS) / 2100 MHz (AWS)	12.95 / 13.35 / 15.65 / 16.35	11	415	9,767.84	3.63
Antenna C2	EMS RR90-17-XXDP	Dormant	N/A	0	0	0.00	0.00
						Sector C Composite MPE%	**3.63**

Table 3: T-MOBILE Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**3.63 %**
Town	0.89 %
AT&T	4.99 %
MetroPCS	1.09 %
Verizon Wireless	3.04 %
Haddam VFD	0.06 %
Site Total MPE %:	**13.70 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	3.63 %
T-MOBILE Sector B Total:	3.63 %
T-MOBILE Sector C Total:	3.63 %
Site Total:	13.70 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 600 MHz LTE / 5G NR	2	788.97	120	4.37	600 MHz	400	1.09%
T-Mobile 700 MHz LTE	2	432.54	120	2.39	700 MHz	467	0.51%
T-Mobile 1900 MHz (PCS) LTE	4	937.69	120	10.38	1900 MHz (PCS)	1000	1.04%
T-Mobile 1900 MHz (PCS) GSM	1	351.63	120	0.97	1900 MHz (PCS)	1000	0.10%
T-Mobile 2100 MHz (AWS) LTE	2	1,611.21	120	8.91	2100 MHz (AWS)	1000	0.89%
						Total:	**3.63%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-MOBILE facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-MOBILE Sector	Power Density Value (%)
Sector A:	3.63 %
Sector B:	3.63 %
Sector C:	3.63 %
T-MOBILE Maximum Total (per sector):	3.63 %
Site Total:	13.70 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **13.70 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director
Transcom Engineering, Inc
PO Box 1048
Sterling, MA 01564

T-Mobile

T-MOBILE SITE NUMBER: CT11233A
T-MOBILE SITE NAME: HIGGANUM_1
SITE TYPE: MONOPOLE
TOWER HEIGHT: 115'-6"

BUSINESS UNIT #: 806367
SITE ADDRESS: MAPLE AVE WEST, HADDAM, CT 06441
COUNTY: MIDDLESEX
JURISDICTION: TOWN OF HADDAM

T-MOBILE L600 SITE CONFIGURATION: 67D94AR V2 Outdoor

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	HRT 046 943209
SITE ADDRESS:	MAPLE AVE WEST HADDAM, CT 06441
COUNTY:	MIDDLESEX
MAP/PARCEL #:	HADD-000023-000001-000001
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 29' 04.54"
LONGITUDE:	-72° 34' 20.81"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	509 FT.
CURRENT ZONING:	NOT REQUIRED
JURISDICTION:	TOWN OF HADDAM
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	GLOBAL SIGNAL ACQUISITIONS IV LLC PO BOX 277455 ATLANTA, GA 30384-7455
TOWER OWNER:	CROWN ATLANTIC COMPANY LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
CROWN CASTLE USA INC. APPLICATION ID:	479816
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER CO (800) 286-2000
TELCO PROVIDER:	AT&T (866) 620-6900

PROJECT TEAM

A&E FIRM:	KIMLEY-HORN & ASSOCIATES, INC. COA: PEC.0000738 3875 EMBASSY PKWY, SUITE 280 AKRON, OH 44333 KEVIN.CLEMENTS@KIMLEY-HORN.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3 CORPORATE PARK DRIVE, SUITE 101 CLIFTON PARK, NY 12065 TRICIA PELON - PROJECT MANAGER (518) 373-3507 JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104 ALLISON SQUIRES - A&E SPECIALIST (518) 373-3523

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN AND ENLARGED SITE PLAN
C-2	FINAL ELEVATION AND ANTENNA PLANS
C-3	ANTENNA AND CABLE SCHEDULE
C-4	EQUIPMENT SPECIFICATIONS
E-1	AC PANEL SCHEDULES AND ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

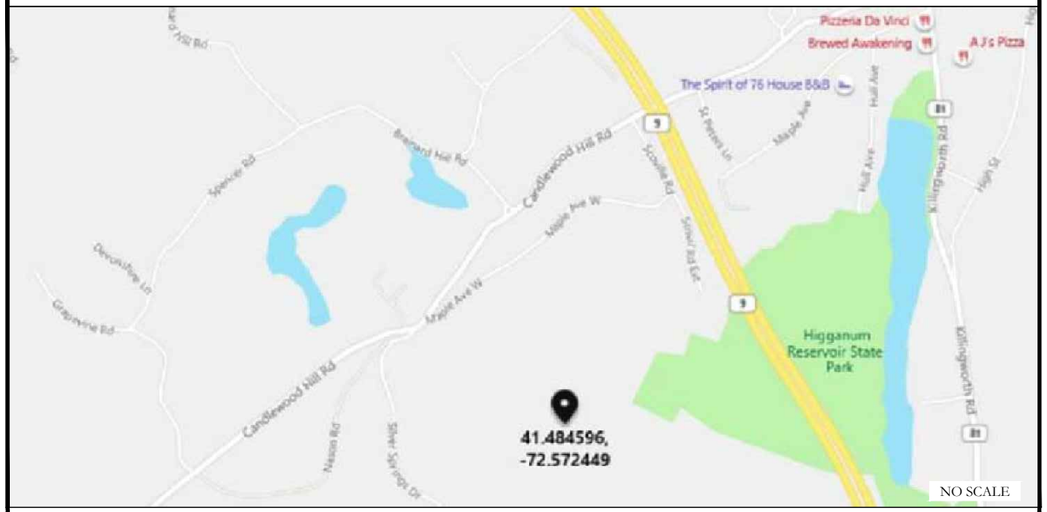
ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11x17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

APPROVALS

APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.		
LAND USE PLANNER		
T-MOBILE		
OPERATIONS		
RF		
NETWORK		
BACKHAUL		
CONSTRUCTION MANAGER		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

LOCATION MAP



NO SCALE

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	2018 CT STATE BUILDING CODE/2015 IBC W/ CT AMENDMENTS
MECHANICAL	2018 CT STATE BUILDING CODE/2015 IMC W/ CT AMENDMENTS
ELECTRICAL	2018 CT STATE BUILDING CODE/2017 NEC W/ CT AMENDMENTS

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS: CROWN CASTLE DATED NOVEMBER 30, 2020

MOUNT ANALYSIS: PAUL J FORD AND COMPANY DATED NOVEMBER 17, 2020

INSTALLER NOTE:

NO PROPOSED LOADING TO BE ADDED UNTIL MOUNT MODIFICATIONS ARE INSTALLED PER MOUNT ANALYSIS DESIGNED BY PAUL J FORD AND COMPANY DATED NOVEMBER 17, 2020.

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) ANTENNAS
- REMOVE EXISTING T-ARM MOUNTS
- INSTALL (3) ANTENNAS
- INSTALL (3) RRHs
- INSTALL (6) TMAs
- INSTALL (1) 1-5/8" HYBRID CABLE
- INSTALL NEW PLATFORM MOUNT PER MOUNT ANALYSIS

GROUND SCOPE OF WORK:
- REMOVE (1) DUS41
- REMOVE (6) RUS01 B12
- INSTALL (2) BB 6630
- INSTALL (6) RUS01 B4

DESIGN PACKAGE BASED ON THE APPLICATION ID: 479816 REVISION: 1

DESIGN PACKAGE BASED ON THE RFDS REVISION: 2.1 DATE: 3/29/2019

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

CALL CONNECTICUT ONE CALL (800) 922-4455 CBYD.COM CALL 2 WORKING DAYS BEFORE YOU DIG!

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
CT11233A

BU #: **806367**
HRT 046 943209

MAPLE AVE WEST
HADDAM, CT 06441

EXISTING 115'-6" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	08/13/19	JAS	CONSTRUCTION	JL
1	12/14/20	DMW	REVISED PER CLIENT	MCK
2	01/26/21	DMW	REVISED PER CLIENT	MCK
3	02/26/21	DMW	REVISED PER CLIENT	MCK
4	03/18/21	DMW	REVISED PER CLIENT	MCK

STATE OF CONNECTICUT
BRIAN J. BRAMLEY
29510
LICENSED PROFESSIONAL ENGINEER

03/18/21
Exp. 01/31/22

SHEET NUMBER: T-1
REVISION: 4

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED- NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE NOTED.
2. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4"ø) CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
3. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8"ø ASTM A307 BOLTS UNLESS NOTED OTHERWISE.
4. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. SLAB FOUNDATION DESIGN ASSUMING ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER.....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALLS.....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.

5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE. IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

MASONRY NOTES:

1. HOLLOW CONCRETE MASONRY UNITS SHALL MEET A.S.T.M. SPECIFICATION C90, GRADE N. TYPE 1. THE SPECIFIED DESIGN COMPRESSIVE STRENGTH OF CONCRETE MASONRY (F'm) SHALL BE 1500 PSI.
2. MORTAR SHALL MEET THE PROPERTY SPECIFICATION OF A.S.T.M. C270 TYP. "S" MORTAR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
3. GROUT SHALL MEET A.S.T.M. SPECIFICATION C475 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI.
4. CONCRETE MASONRY SHALL BE LAID IN RUNNING (COMMON) BOND.
5. WALL SHALL RECEIVE TEMPORARY BRACING. TEMPORARY BRACING SHALL NOT BE REMOVED UNTIL GROUT IS FULLY CURED.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR-	
SUBCONTRACTOR-	GENERAL CONTRACTOR (CONSTRUCTION)
CARRIER-	T-MOBILE
TOWER OWNER-	CROWN CASTLE USA INC.
OEM-	ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR AND CROWN CASTLE USA INC.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO SCALE AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR AND CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

ABBREVIATIONS AND SYMBOLS:

ABBREVIATIONS:

AGL	ABOVE GRADE LEVEL
BTS	BASE TRANSCEIVER STATION
(E)	EXISTING
MIN.	MINIMUM
REF	REFERENCE
RF	RADIO FREQUENCY
T.B.D.	TO BE DETERMINED
T.B.R.	TO BE RESOLVED
TYP	TYPICAL
REQ	REQUIRED
EGR	EQUIPMENT GROUND RING
AWG	AMERICAN WIRE GAUGE
MGB	MASTER GROUND BAR
EG	EQUIPMENT GROUND
BCW	BARE COPPER WIRE
SMD	SMART INTEGRATED ACCESS DEVICE
GEN	GENERATOR
IGR	INTERIOR GROUND RING (HALO)
RBS	RADIO BASE STATION

SYMBOLS:

- SOLID GROUND BUS BAR
- SOLID NEUTRAL BUS BAR
- SUPPLEMENTAL GROUND CONDUCTOR
- 2-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- SINGLE-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- CHEMICAL GROUND ROD
- TEST WELL
- DISCONNECT SWITCH
- METER
- EXOTHERMIC WELD (CADWELD) (UNLESS OTHERWISE NOTED)
- MECHANICAL CONNECTION
- GROUNDING WIRE

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC. HILTI EPOXY ANCHORS ARE REQUIRED BY CROWN CASTLE USA INC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
5. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
6. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PLASTIC TAPE PER COLOR SCHEDULE. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (I.E. PANEL BOARD AND CIRCUIT ID'S).
8. PANEL BOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
10. POWER, CONTROL AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET & DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2 GREEN INSULATION CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION WITH OUTER JACKET LISTED OR LABELED FOR THE LOCATION USED UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E. RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT) OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
21. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER).
22. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHIN ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
23. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL; SHALL MEET OR EXCEED UL 50 AND RATED NEMA 1 (OR BETTER) INDOORS OR NEMA 3R (OR BETTER) OUTDOORS.
24. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
25. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
28. INSTALL PLASTIC LABEL ON THE METER CENTER TO SHOW "T-MOBILE".
29. ALL CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

GREENFIELD GROUNDING NOTES:

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

NEC INSULATOR COLOR CODE

DESCRIPTION	PHASE/CODE LETTER	WIRE COLOR
240/120 1Ø	LEG 1	BLACK
	LEG 2	RED
AC NEUTRAL	N	WHITE
GROUND (EGC)	G	GREEN
VDC POS	+	*RED-POLARITY MARK AT TERMINATION
VDC NEG	-	*BLACK-POLARITY MARK AT TERMINATION
240V OR 208V, 3Ø	PHASE A	BLACK
	PHASE B	RED(ORG. IF HI LEG)
	PHASE C	BLUE
480V, 3Ø	PHASE A	BROWN
	PHASE B	ORANGE OR PURPLE
	PHASE C	YELLOW

* SEE NEC 210.5(C)(1) AND (2)

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
CT11233A

BU #: **806367**
HRT 046 943209

MAPLE AVE WEST
HADDAM, CT 06441

EXISTING 115'-6" MONOPOLE

ISSUED FOR:

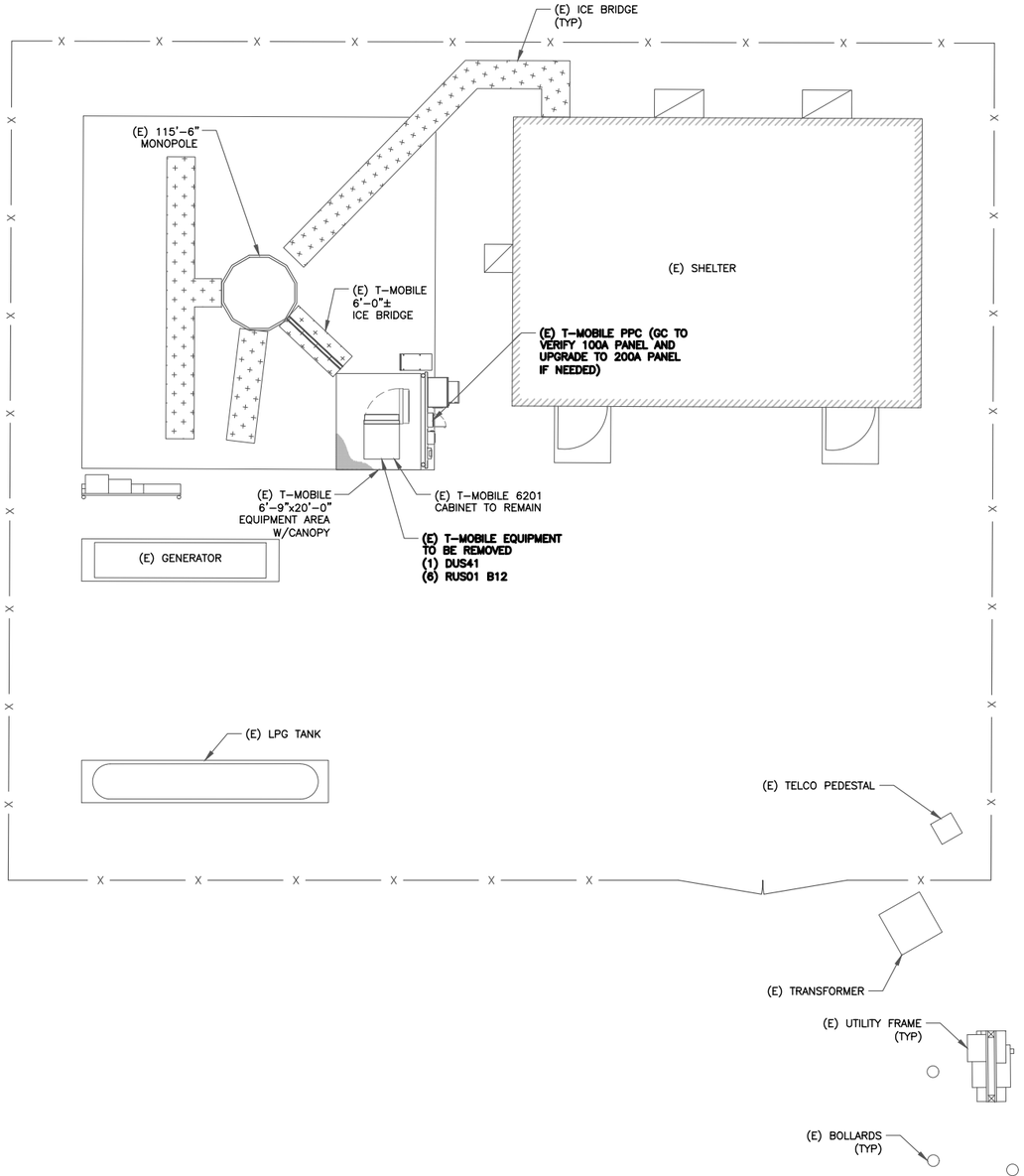
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	08/13/19	JAS	CONSTRUCTION	JL
1	12/14/20	DMW	REVISED PER CLIENT	MCK
2	01/26/21	DMW	REVISED PER CLIENT	MCK
3	02/26/21	DMW	REVISED PER CLIENT	MCK
4	03/18/21	DMW	REVISED PER CLIENT	MCK

STATE OF CONNECTICUT
BRUCE M. BREWER
29510
LICENSED
PROFESSIONAL ENGINEER

03/18/21
Exp. 01/31/22

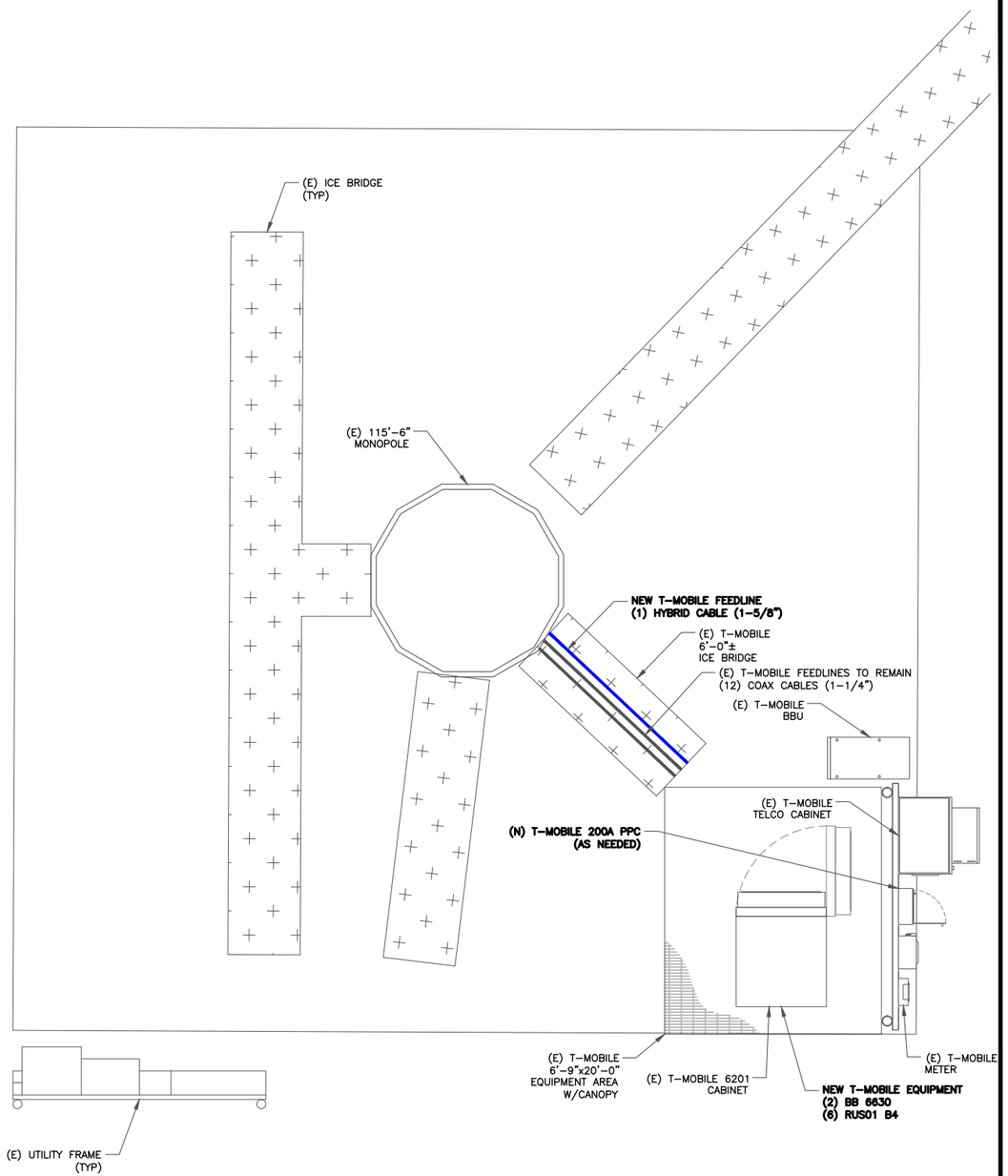
SHEET NUMBER: T-2

REVISION: 4



1 SITE PLAN
SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N



2 ENLARGED SITE PLAN
SCALE: 1' 6" 0 1' 1"=1'-0" (FULL SIZE) 1/2"=1'-0" (11x17)

N

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
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BU #: **806367**
HRT 046 943209

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EXISTING 115'-6" MONOPOLE

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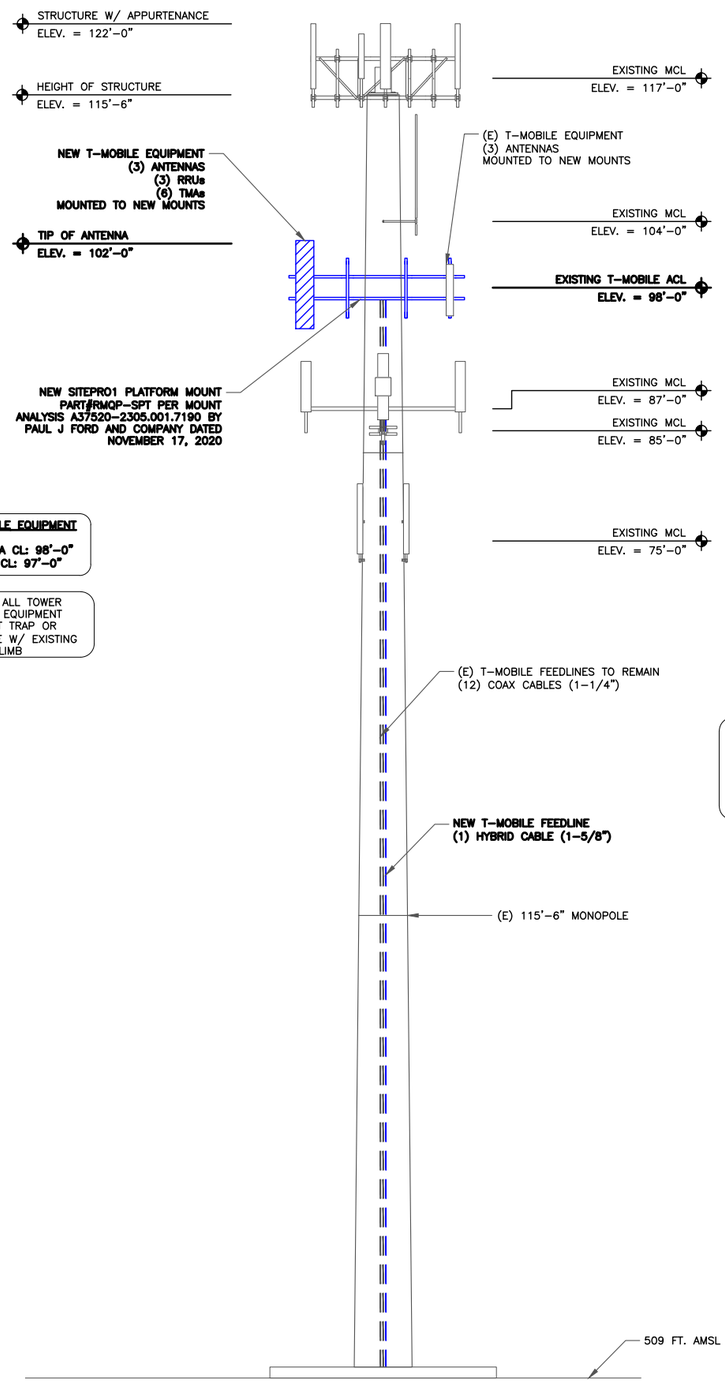
4	03/18/21	DMW	REVISED PER CLIENT	MCK

STATE OF CONNECTICUT
BRIAN J. BREWER
29510
LICENSED
PROFESSIONAL ENGINEER

03/18/21
Exp. 01/31/22

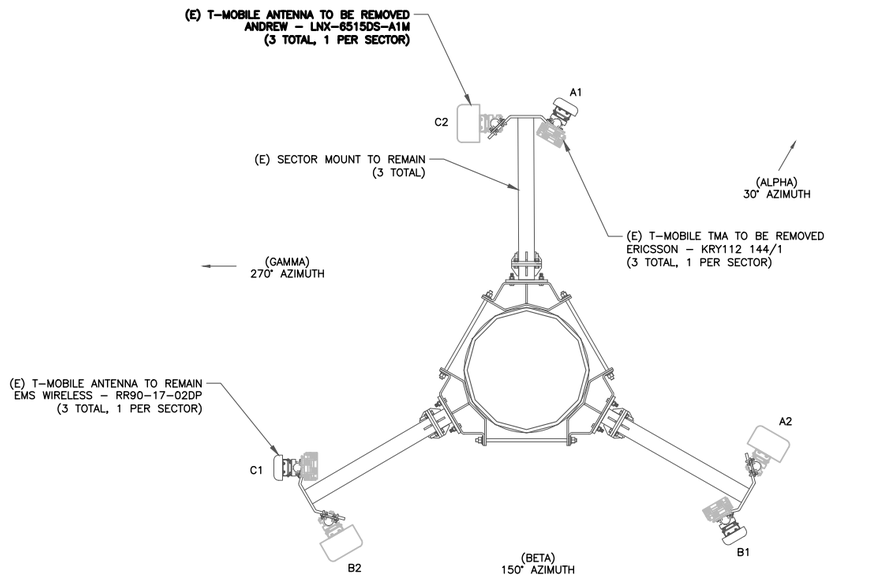
SHEET NUMBER: C-1
REVISION: 4



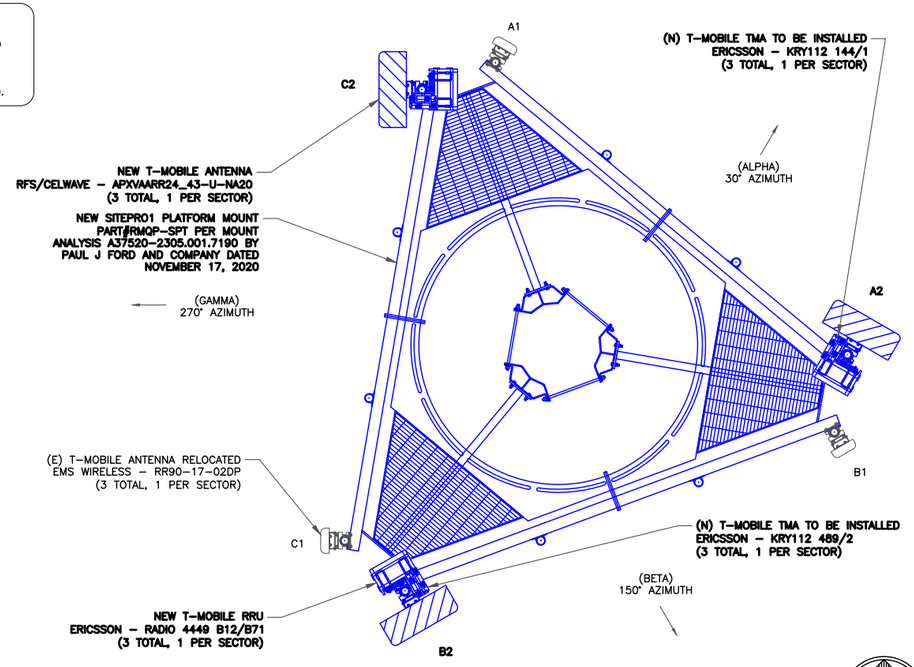
1 FINAL ELEVATION
SCALE: NOT TO SCALE

INSTALLER NOTE:

NO PROPOSED LOADING TO BE ADDED UNTIL MOUNT MODIFICATIONS ARE INSTALLED PER MOUNT ANALYSIS DESIGNED BY PAUL J FORD AND COMPANY DATED NOVEMBER 17, 2020.



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
CT11233A

BU #: **806367**
HRT 046 943209

MAPLE AVE WEST
HADDAM, CT 06441

EXISTING 115'-6" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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1	12/14/20	DMW	REVISED PER CLIENT	MCK
2	01/26/21	DMW	REVISED PER CLIENT	MCK
3	02/26/21	DMW	REVISED PER CLIENT	MCK
4	03/18/21	DMW	REVISED PER CLIENT	MCK

STATE OF CONNECTICUT
BRIAN J. BRAWLEY
29510
LICENSED
PROFESSIONAL ENGINEER

03/18/21
Exp. 01/31/22

SHEET NUMBER: C-2
REVISION: 4

ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	L2100	98'-0"	30°	EMS WIRELESS	RR90-17-02DP	0°	-	-	-
ALPHA	**A2**	**N600, L600, L700, L1900, G1900, L2100**	**98'-0"**	**30°**	**RFS/CELWAVE**	**APXVAARR24_43-U-NA20**	**0°**	**2°/2°/2°/2°**	(1) ERICSSON - KRY112 144/1 **(1) ERICSSON - KRY112 489/2** **(1) ERICSSON - RADIO 4449 B12/B71**	**HYBRID**/COAX
BETA	B1	L2100	98'-0"	150°	EMS WIRELESS	RR90-17-02DP	0°	-	-	-
BETA	**B2**	**N600, L600, L700, L1900, G1900, L2100**	**98'-0"**	**150°**	**RFS/CELWAVE**	**APXVAARR24_43-U-NA20**	**0°**	**2°/2°/2°/2°**	(1) ERICSSON - KRY112 144/1 **(1) ERICSSON - KRY112 489/2** **(1) ERICSSON - RADIO 4449 B12/B71**	**HYBRID**/COAX
GAMMA	C1	L2100	98'-0"	270°	EMS WIRELESS	RR90-17-02DP	0°	-	-	-
GAMMA	**C2**	**N600, L600, L700, L1900, G1900, L2100**	**98'-0"**	**270°**	**RFS/CELWAVE**	**APXVAARR24_43-U-NA20**	**0°**	**2°/2°/2°/2°**	(1) ERICSSON - KRY112 144/1 **(1) ERICSSON - KRY112 489/2** **(1) ERICSSON - RADIO 4449 B12/B71**	**HYBRID**/COAX

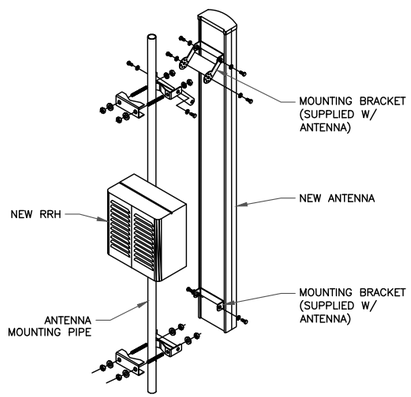
CABLE SCHEDULE

STATUS	CABLE TYPE	SIZE	QUANTITY
EXISTING	COAX	1-1/4"	12
NEW	**HYBRID**	**1-5/8"**	**1**
CABLE QUANTITY			**13**

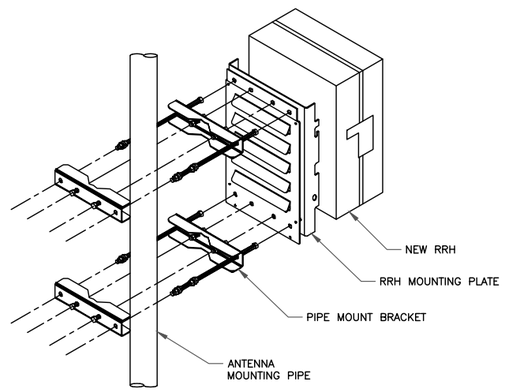
1 ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

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.



NOTE:
ANTENNA NOT SHOWN FOR CLARITY



2 ANTENNA WITH RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
CT11233A

BU #: **806367**
HRT 046 943209

MAPLE AVE WEST
HADDAM, CT 06441

EXISTING 115'-6" MONOPOLE

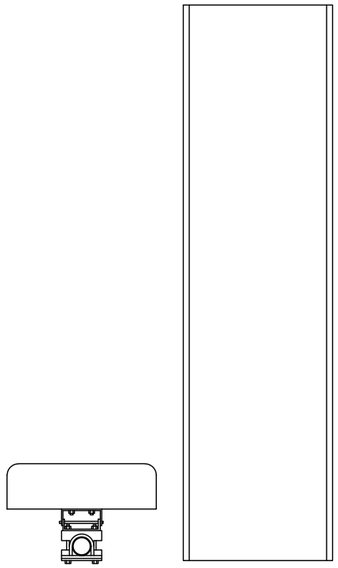
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	08/13/19	JAS	CONSTRUCTION	JL
1	12/14/20	DMW	REVISED PER CLIENT	MCK
2	01/26/21	DMW	REVISED PER CLIENT	MCK
3	02/26/21	DMW	REVISED PER CLIENT	MCK
4	03/18/21	DMW	REVISED PER CLIENT	MCK

STATE OF CONNECTICUT
BRIAN J. BRAWLEY
29510
LICENSED
PROFESSIONAL ENGINEER

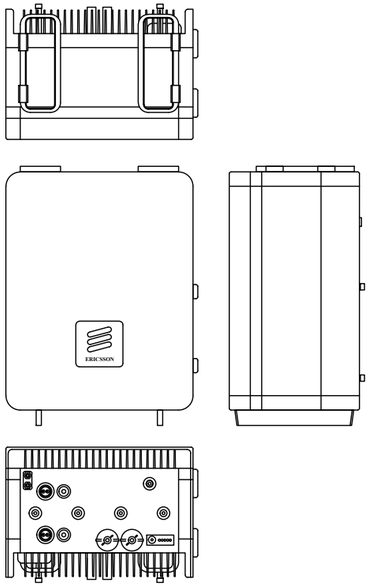
03/18/21
Exp. 01/31/22

SHEET NUMBER: C-3
REVISION: 4



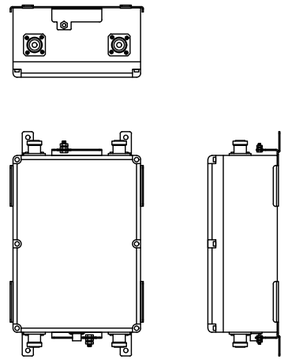
RFS/CELWAVE – APXVAA24_43-U-NA20
WEIGHT (WITHOUT MOUNTING HARDWARE): 101.4 LBS
SIZE (HxWxD): 96.0x24.0x8.5 IN.

1 RFS/CELWAVE – APXVAA24_43-U-NA20
SCALE: NOT TO SCALE



ERICSSON – RADIO 4449 B12/B71
WEIGHT: 70.0 LBS
SIZE (HxWxD): 18.0x13.2x9.4 IN.

2 ERICSSON – RADIO 4449 B12/B71
SCALE: NOT TO SCALE



ERICSSON – KRY 112 489/2
WEIGHT: 15.4 LBS
SIZE (HxWxD): 11.0x6.1x3.9 IN.

3 ERICSSON – KRY 112 489/2
SCALE: NOT TO SCALE

4 NOT USED
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
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SHEET NUMBER: C-4
REVISION: 4

VOLTAGE	120/240V	**AIC RATING**	10,000 AMPS	
MAIN BREAKER	200 AMP	**BUSS RATING**	200 AMPS	
MOUNT	INSIDE PPC ENCLOSURE	**NEUTRAL BAR**	YES	
ENCLOSURE TYPE	NEMA 3R	**GROUND BAR**	YES	
PANEL STATUS	NEW	**N TO GROUND BOND**	YES	
PHASE, WIRES	SINGLE, 3	**INTERNAL TVSS**	TBD	

CKT	LOAD DESCRIPTION	BREAKER AMPS	BREAKER POLES	BREAKER STATUS	SERVICE LOAD VA	USAGE FACTOR	PHASE A VA	PHASE B VA	USAGE FACTOR	SERVICE LOAD VA	BREAKER STATUS	BREAKER POLES	BREAKER AMPS	LOAD DESCRIPTION	CKT
1	PANEL MAIN BREAKER	100	2	OFF	0	1.25	0		1.25	0	N/A	1	---	EMPTY	2
3		100	2	OFF	0	1.25		0	1.25	0	N/A	1	---	EMPTY	4
5	UNKNOWN	20	1	ON	960	1.25	8700		1.25	6000	ON	2	125**	6201 CABINET	6
7	FIBER 7	20	1	ON	960	1.25		8700	1.25	6000	ON	2	125**		8
9	SPARE	100	2	ON	0	1.25	0		1.00	0	OFF	1	20	SPARE	10
11		100	2	ON	0	1.25		0	1.25	0	N/A	1	---	EMPTY	12
13	EMPTY	---	1	N/A	0	1.25	0		1.25	0	N/A	1	---	EMPTY	14
15	EMPTY	---	1	N/A	0	1.25		0	1.25	0	N/A	1	---	EMPTY	16
							8700	8700							

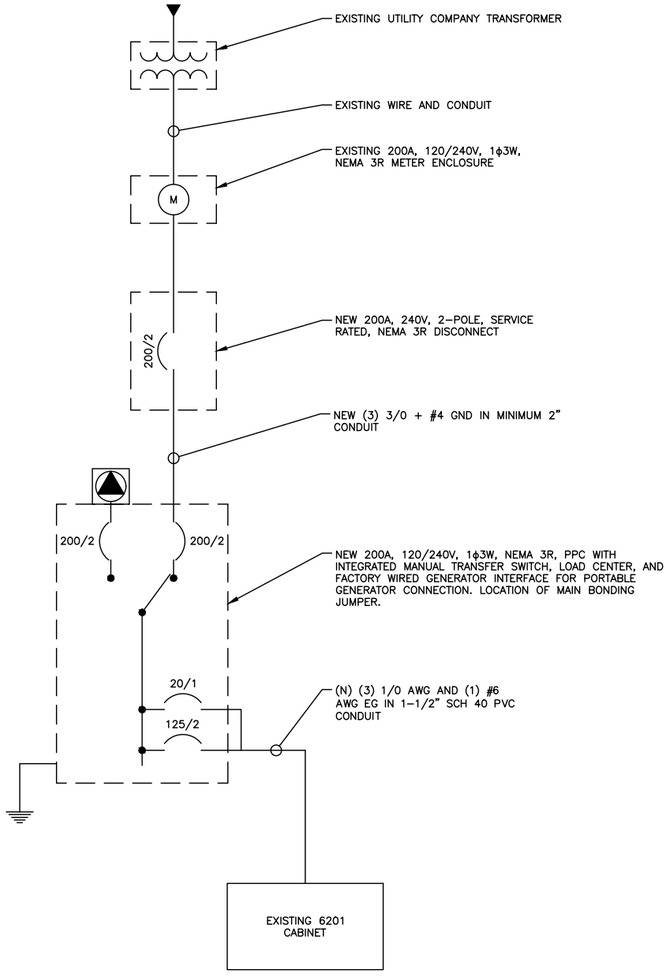
OVERALL LOAD SUMMARY	
TOTAL SERVICE LOAD kVA	17.40
AMPS	72.50

= Loading provided by CCI/TMO

** = New 125A Breaker

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE

NOTE:
GROUND CREW TO VERIFY EXISTING 100AMP SERVICE DISCONNECT



2 ONE-LINE DIAGRAM
SCALE: NOT TO SCALE

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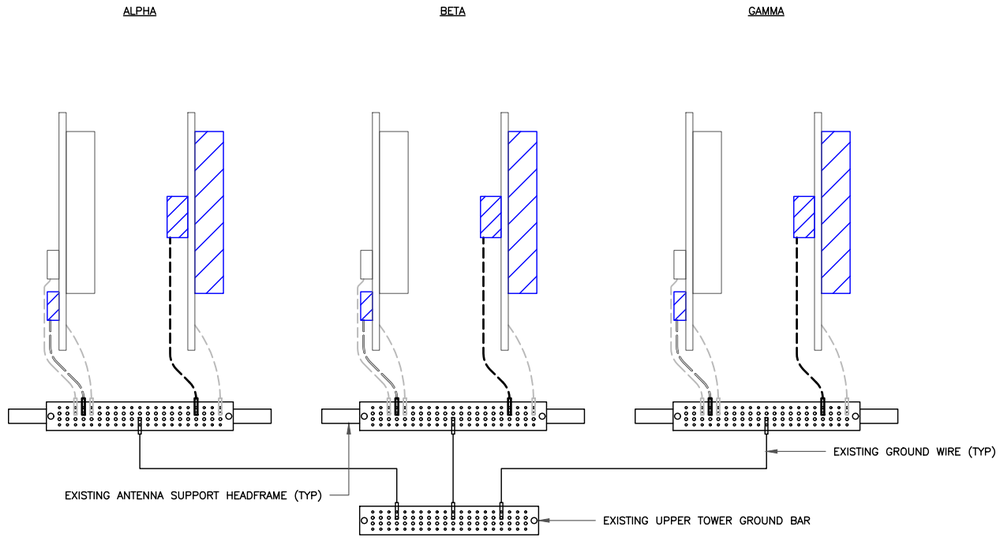
03/18/21
Exp. 01/31/22

SHEET NUMBER: E-1
REVISION: 4



1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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

T-MOBILE SITE NUMBER:
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HRT 046 943209

MAPLE AVE WEST
HADDAM, CT 06441

EXISTING 115'-6" MONOPOLE

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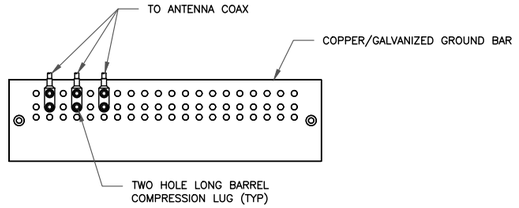
STATE OF CONNECTICUT
BRIAN J. BREWER
29510
LICENSED
PROFESSIONAL ENGINEER

03/18/21
Exp. 01/31/22

SHEET NUMBER: G-1

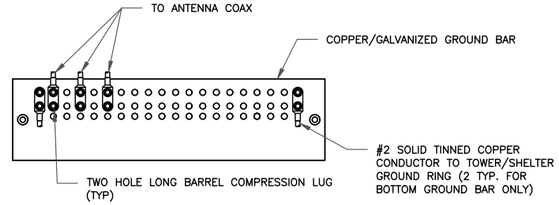
REVISION: 4



NOTES:

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

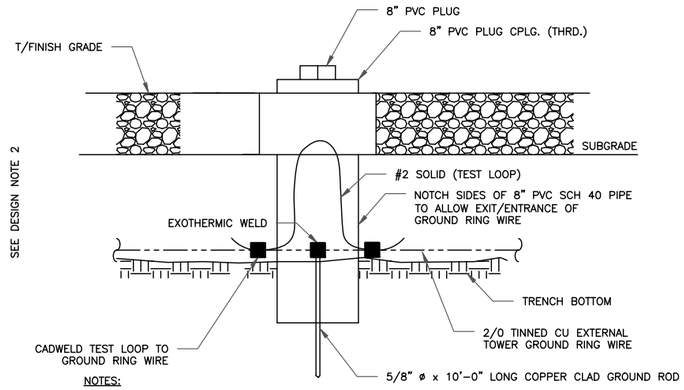
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

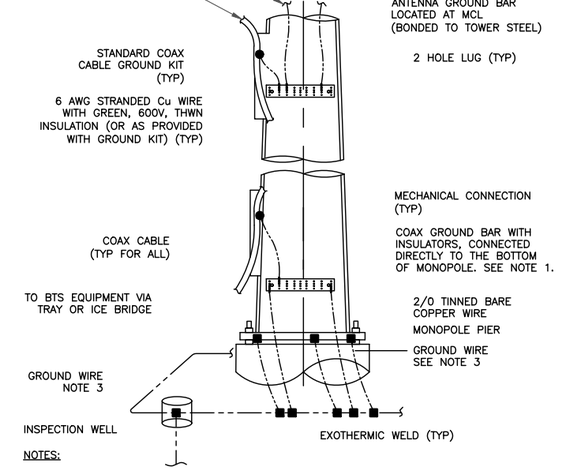
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

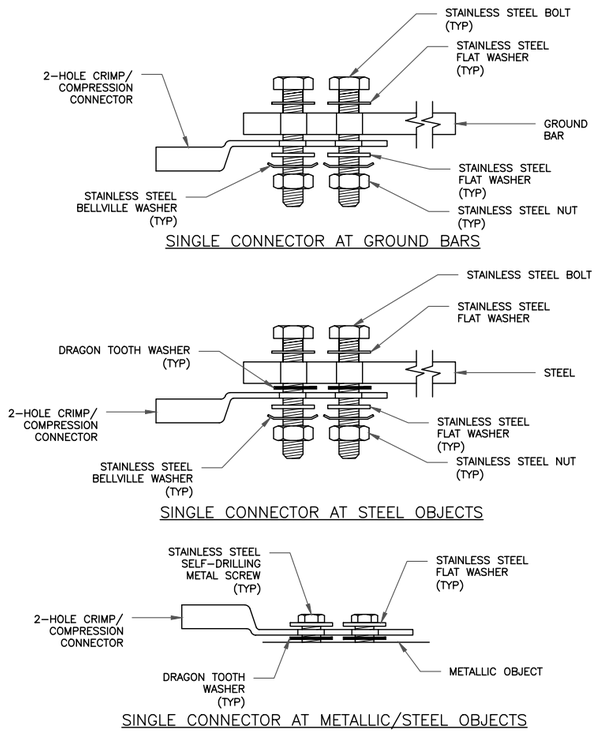
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



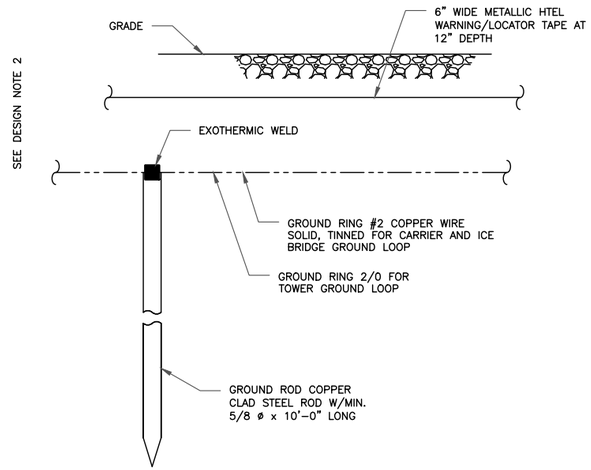
NOTES:

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

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

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STATE OF CONNECTICUT
BRUCE A. BREWER
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LICENSED
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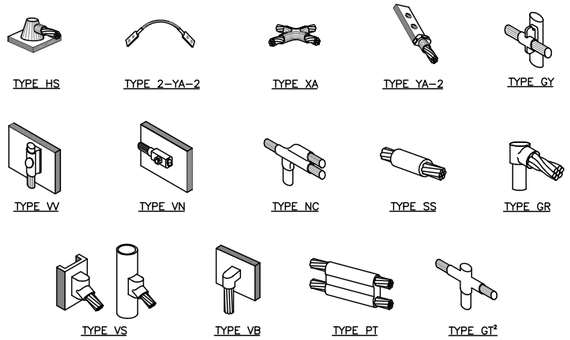
SHEET NUMBER: G-2
REVISION: 4

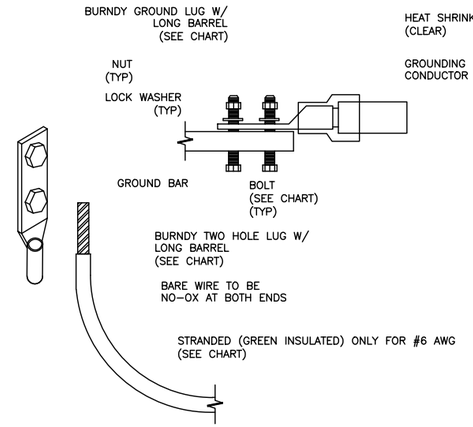


NOTE:

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

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

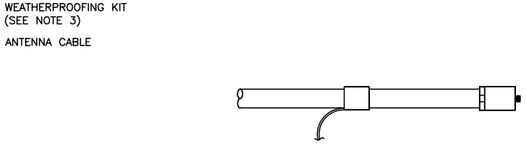
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

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

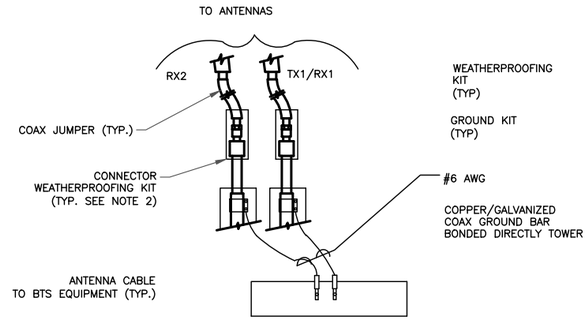
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

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

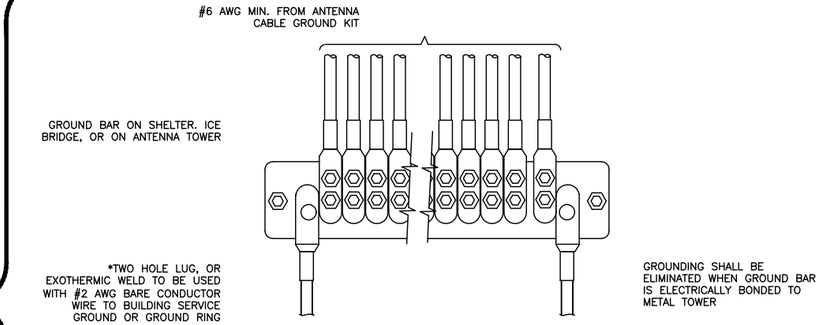
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



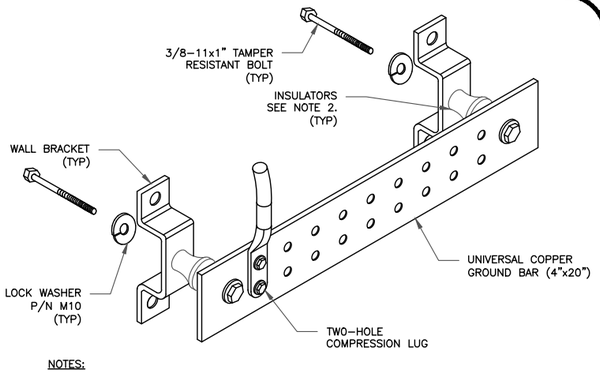
NOTES:

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

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



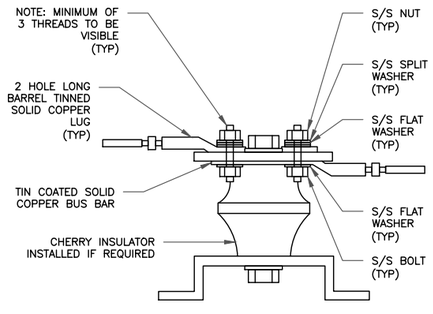
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



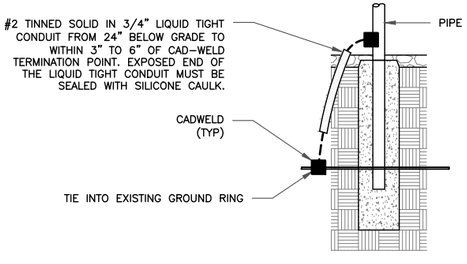
NOTES:

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

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

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