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

October 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: 876319**
280 Elm Street, Naugatuck, CT 06770
Latitude: 41° 28′ 52.54″ / Longitude: -73° 3′ 11.67″

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 120-foot mount level on the existing 150-foot monopole tower, located at 280 Elm Street, Naugatuck, CT. The property is owned by Lanxess Solutions US Inc. Crown Castle is the tower owner. T-Mobile now intends to replace three (3) antennas and ancillary equipment at the 120-ft 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) Ericsson – AIR 6449 B41 Antenna
(3) Ericsson-Radio 460 B25+B66
(1) Ericsson – 6/24 4AWG HYBRID Trunk

Remove:
(3) Ericsson – AIR32 KRD901146-1_B66A_B2A Antenna
(3) Ericsson – AIR21 KRC118023-1_B2A_B4P Antenna
(3) Generric Twin TMAs 1B-AWS
(6) Coaxial Cables
(1) Ericsson-9x18 HCS

Ground:

Install New:
(1) 6160 Cabinet
(1.) B160 Battery Cabinet
(1.) BB 6648 In 6160 Cabinet
(1.) CSR IXRe V2 (Gen) IN 6160 Cabinet
(1.) PSU 4813 Voltage Booster

Remove:
(1) Nortel Cabinet
(6) RU22 from 6131 Cabinet

The facility was approved by the Naugatuck Zoning Commission on September 17, 1997.

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. N. Warren Hess III, Mayor, Borough of Naugatuck, Ms. Lori Rotella, Town Planner, Borough of Naugatuck. Lanxess Solutions US Inc as the land owner and 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:

N. Warren Hess III, Mayor
Borough of Naugatuck
229 Church Street 4th Floor
Naugatuck, CT 06770
203.720.7009

Lori Rotella, Town Planner
Borough of Naugatuck
229 Church Street 2nd Floor
Naugatuck, CT 06770
203.720.7009

Lanxess Solutions US Inc
2 Armstrong Road
Shelton, CT 06484

HARRIS
BEACH &
WILCOX
A LIMITED LIABILITY PARTNERSHIP

ATTORNEYS AT LAW

147 NORTH BROAD STREET
P.O. BOX 112
MILFORD, CONNECTICUT 06460-0112
(203) 877-8000
(203) 878-9800 (Fax)

MEMORANDUM

DATE: September 18, 1997

TO: Christine Rosenthal

FROM: John W. Knuff, Esq.

RE: Naugatuck; Site No. 035

CC: Steve Paisner
Steve Kotfila
Scott Chasse
Steve Crotty

Pete Gardell and I appeared before the Naugatuck Zoning Commission to present Sprint's application for a Special Permit and Site Plan review. The commission closed the public hearing and voted 4-1 to approve the application.

I will record the Special Permit as soon as I receive it and a building application can be submitted.

HARRIS
BEACH &
WILCOX
A LIMITED LIABILITY PARTNERSHIP

ATTORNEYS AT LAW

147 NORTH BROAD STREET
P.O. BOX 112
MILFORD, CONNECTICUT 06460-0112
(203) 877-8000
(203) 878-9800 (Fax)

Memorandum

To: Christine Rosenthal

cc.: Steve Paisner
Steve Kotfila
Scott Chasse
Steve Crotty

From: John W. Knuff, Esq.

Date: September 9, 1997

Re.: Naugatuck 035

Last night I appeared before the Naugatuck Planning Commission in regard to Sprint's application for a Special Permit. The commission unanimously approved the application. The practical effect of the approval is that the application can now be approved by a simple majority of the Zoning Commission; if the Planning Commission had disapproved the application, four out of a possible five votes would be required for approval from the Zoning Commission. The Zoning Commission will conduct its public hearing on September 17, 1997.

HARRIS
BEACH &
WILCOX
A LIMITED LIABILITY PARTNERSHIP

ATTORNEYS AT LAW

147 NORTH BROAD STREET
P.O. BOX 112
MILFORD, CONNECTICUT 06460-0112
(203) 877-8000
(203) 878-0900 (Fax)

MEMORANDUM

DATE: August 15, 1997

TO: Christine Rosenthal
Steve Paisner
Steve Kotfila
Scott Chasse
Steve Crotty
Jennifer Charland

FROM: John W. Knuff, Esq.

RE: Naugatuck; Site No. 035

On Wednesday night I attended the meeting of the Naugatuck Inland Wetland Commission during which the Commission voted unanimously to approve Sprint's application for soil erosion control.

HARRIS
BEACH &
WILCOX
A LIMITED LIABILITY PARTNERSHIP
ATTORNEYS AT LAW
147 NORTH BROAD STREET
P.O. BOX 112
MILFORD, CONNECTICUT 06460-0112
(203) 877-8000
(203) 878-9800 (Fax)

MEMORANDUM

DATE: July 17, 1997

TO: Christine Rosenthal

FROM: John W. Knuff, Esq.

RE: Naugatuck; Site No. 035

Last night, Justin Moses, Tim Crotty and I appeared before the Naugatuck Architectural Review Board to present Sprint's application for architectural review. It was pointed out that the site was in harmony with neighboring uses because the site is within an industrial zone, is across the street from the main Uniroyal plant, substantial screening exists and the site is at a substantially lower ground elevation than the neighboring houses. After further discussion, the Board unanimously approved the application.

I also attended the Zoning Commission hearing after the Architectural Review Board meeting. The Zoning Commission officially accepted Sprint's application for a special permit and scheduled it to be heard at a public hearing on August 20, 1997.

Town of Naugatuck, CT

Property Listing Report | Map Block Lot 5.5-20W20 | Building # 1 | PID 128902 | Account 068-7770

Property Information

Property Location	0 ELM ST
Owner	LANXESS CORPORATION
Co-Owner	
Mailing Address	111 RIDC PARK WEST DR PITTSBURGH PA 15275
Land Use	4400 VACANT IND
Land Class	I
Zoning Code	
Census Tract	

Neighborhood	J
Acreage	86.56
Utilities	
Lot Setting/Desc	
Book / Page	1064/0694
Additional Info	

Photo

Sketch

Primary Construction Details

Year Built	0
Building Desc.	VACANT IND
Building Style	UNKNOWN
Building Grade	
Stories	
Occupancy	
Exterior Walls	
Exterior Walls 2	NA
Roof Style	
Roof Cover	
Interior Walls	
Interior Walls 2	NA
Interior Floors 1	
Interior Floors 2	

Heating Fuel	
Heating Type	
AC Type	
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	0
Extra Fixtures	0
Total Rooms	0
Bath Style	NA
Kitchen Style	NA
Fin Bsmt Area	
Fin Bsmt Quality	
Bsmt Gar	0
Fireplaces	0

(*Industrial / Commercial Details)

Building Use	Vacant
Building Condition	
Sprinkler %	NA
Heat / AC	NA
Frame Type	NA
Baths / Plumbing	NA
Ceiling / Wall	NA
Rooms / Prtns	NA
Wall Height	NA
First Floor Use	NA
Foundation	NA

Report Created On 10/18/2021

Town of Naugatuck, CT

Property Listing Report | Map Block Lot 5.5-20W20 | Building # 1 | PID 128902 | Account 068-7770

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	0	0
Extras	0	0
Improvements		
Outbuildings	142090	99470
Land	1611800	1128270
Total	1753890	1227740

Outbuilding and Extra Features

Type	Description
CELL TOWER	150 HEIGHT
Patio	60 S.F.

Sub Areas

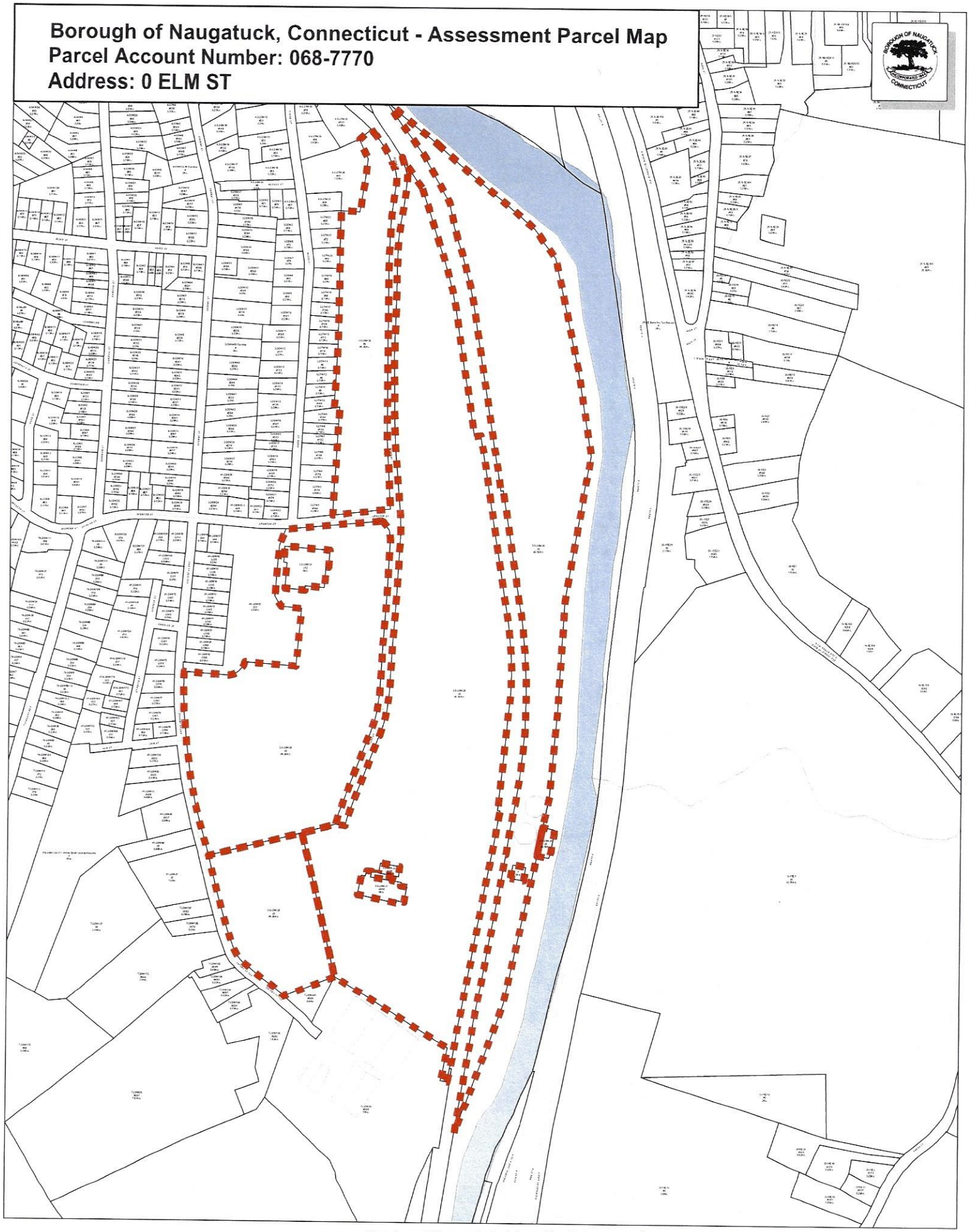
Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area	0	0

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
LANXESS CORPORATION	1064/0694	2021-02-03	0
LANXESS SOLUTIONS US INC	1017/0532	2018-10-02	0
CHEMTURA CORPORATION	0842/0475	2009-02-17	0
UNIROYAL CHEMICAL CO INC	0601/0217	2003-03-31	0
UNIROYAL CHEMICAL CO INC	0601/0216	2003-03-31	0
CROMPTON MANUFACTURING	0584/0275	2002-11-27	0
UNIROYAL CHEMICAL CO INC	0271/0213	1985-10-25	0

Report Created On 10/18/2021

Borough of Naugatuck, Connecticut - Assessment Parcel Map
Parcel Account Number: 068-7770
Address: 0 ELM ST



0 130 260 390 520 Feet

Disclaimer: This map is for informational purposes only.
All information is subject to verification by any user.
The Borough of Naugatuck and its mapping contractors
assume no legal responsibility for the information contained herein.

Map Produced March 2019

Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Tuesday, October 19, 2021 10:42 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 285063243957: Your package has been delivered

Hi. Your package was delivered Tue, 10/19/2021 at 10:40am.

Delivered to 2 ARMSTRONG RD, SHELTON, CT 06484
Received by R.CHARLES

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 285063243957

FROM	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Lanxess Solutions US Inc Lanxess Solutions US Inc 2 Armstrong Road SHELTON, CT, US, 06484
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Mon 10/18/2021 06:53 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	SHELTON, CT, US, 06484
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight

Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Tuesday, October 19, 2021 10:05 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 285062651607: Your package has been delivered

Hi. Your package was delivered Tue, 10/19/2021 at 9:59am.

Delivered to 229 CHURCH ST 2, NAUGATUCK, CT 06770
Received by J.GOGGIN

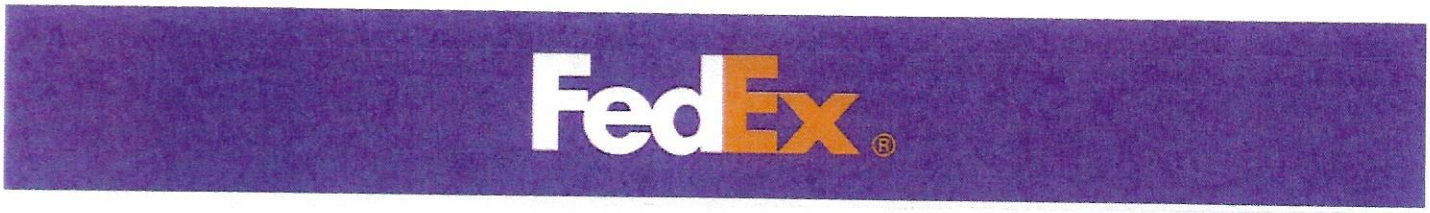
OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 285062651607

FROM	Jeff Barbadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Borough of Naugatuck N. Warren Hess III, Mayor 229 Church Street, 4th Floor NAUGATUCK, CT, US, 06770
REFERENCE	799001.7680
SHIPPER REFERENCE	799001.7680
SHIP DATE	Mon 10/18/2021 06:53 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	NAUGATUCK, CT, US, 06770
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight

Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Tuesday, October 19, 2021 10:03 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 285062734478: Your package has been delivered



Hi. Your package was delivered Tue, 10/19/2021 at 9:59am.

Delivered to 229 CHURCH ST 2, NAUGATUCK, CT 06770
Received by J GOGGIN

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER 285062734478

FROM	Jeff Barcadora 1800 W. Park Drive WESTBOROUGH, MA, US, 01581
TO	Borough of Naugatuck Lori Rotella, Town Planner 229 Church Street, 2nd Floor NAUGATUCK, CT, US, 06770
REFERENCE	799001 7680
SHIPPER REFERENCE	799001 7680
SHIP DATE	Mon 10/18/2021 06:53 PM
DELIVERED TO	Receptionist/Front Desk
PACKAGING TYPE	FedEx Envelope
ORIGIN	WESTBOROUGH, MA, US, 01581
DESTINATION	NAUGATUCK, CT, US, 06770
SPECIAL HANDLING	Deliver Weekday
NUMBER OF PIECES	1
TOTAL SHIPMENT WEIGHT	1.00 LB
SERVICE TYPE	FedEx Priority Overnight

Date: **September 17, 2021**

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Site Number:	CTNH312A
	Site Name:	NH312/Crown-Naugatuck
Crown Castle Designation:	**BU Number:**	876319
	Site Name:	NAUGATUCK 2 UNIROYAL
	JDE Job Number:	680924
	Work Order Number:	2016889
	Order Number:	581568 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	137246.004.01
Site Data:	**280 Elm Street, NAUGATUCK, New Haven County, CT** **Latitude *41° 28' 52.54"*, Longitude *-73° 3' 11.67"*** **150 Foot - Monopole**	

B+T Group 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:

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 118 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria

Structural analysis prepared by: Chris Guidry

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC0001564; Expires: 02/10/2022

Chad E. Tuttle, P.E.

tnxTower Report - version 8.1.1.0

TABLE OF CONTENTS

1) INTRODUCTION

This is a 150 ft Monopole designed by Summit Manufacturing Inc. in August of 1997.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	118 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1 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)
119.0	120.0	3	Ericsson	AIR6449 B41_T-MOBILE	4	1-5/8
		3	Ericsson	RADIO 4449 B71/B85A		
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	Rfs Celwave	APXVAARR24_43-U-NA20		
	119.0	1	SitePro 1	PRK-1245 Reinforcement Kit		
		1	SitePro 1	HRK12-U Support Rail Kit		
		1	--	Platform Mount [LP 304-1]		

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)
150.0	150.0	3	Alcatel Lucent	800 External Notch Filter	1 3	1-7/16 1-1/4
		3	Alcatel Lucent	800MHZ RRH		
		3	Alcatel Lucent	TD-RRH8X20-25		
		3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz		
		3	Rfs Celwave	APXVSPP18-C-A20		
		1	--	Platform Mount [LP 303-1_HR-1]		
142.0	142.0	1	--	Commscope MC-PK8-DSH(1)	1	1-1/2
		3	Fujitsu	TA08025-B604		
		3	Fujitsu	TA08025-B605		
		3	Jma Wireless	MX08FRO665-21		
		1	Raycap	RDIDC-9181-PF-48		
99.0	100.0	1	Lucent	KS24019-L112A	1	1/2
	99.0	1	--	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	1446973	CCI Sites
Mount Analysis Report	9963772	CCI Sites
Foundation Drawing	1447037	CCI Sites
Geotech Report	1529732	CCI Sites
Crown CAD Package	Date: 08/30/2021	CCI Sites

3.1) Analysis Method

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

3.2) Assumptions

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

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group 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	150 - 108	Pole	TP30.401x22x0.25	1	-13.509	1341.963	30.3	Pass
L2	108 - 69.75	Pole	TP37.553x29.151x0.313	2	-19.767	2070.516	44.5	Pass
L3	69.75 - 32.5	Pole	TP44.379x35.978x0.375	3	-28.498	3182.203	44.1	Pass
L4	32.5 - 0	Pole	TP50.13x42.529x0.438	4	-40.766	4300.012	43.2	Pass
							Summary	
						Pole (L2)	44.5	Pass
						Rating =	44.5	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	40.5	Pass
1	Base Plate	Base	41.5	Pass
1	Base Foundation (Structure)	Base	37.5	Pass
1	Base Foundation (Soil Interaction)	Base	24.3	Pass

Structure Rating (max from all components) =	44.5%

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

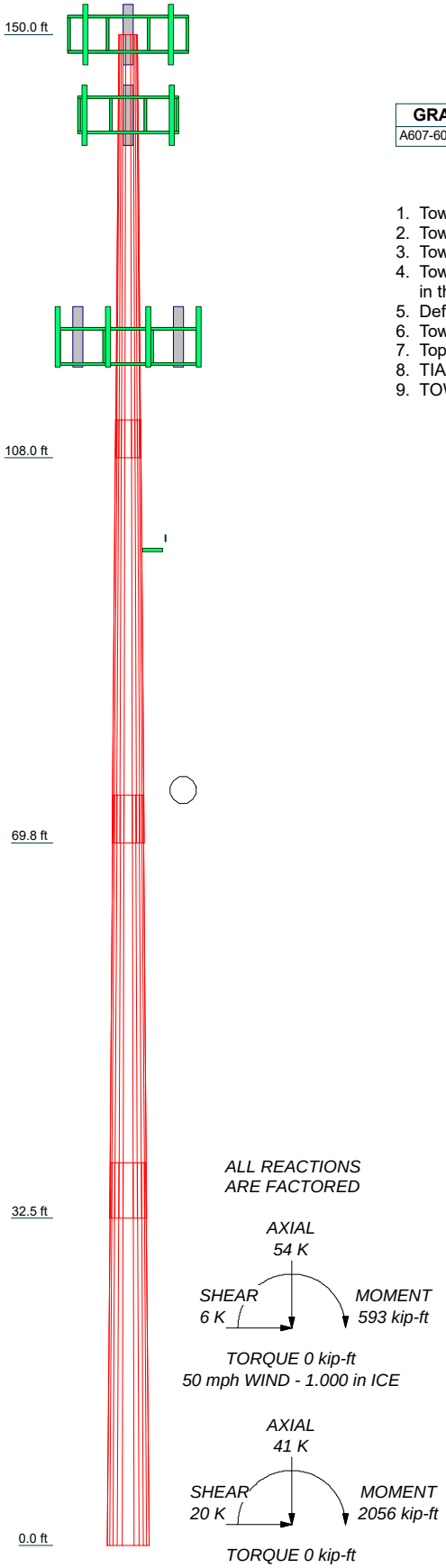
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	42.000	12	0.250	3.750	22.000	30.401		3.0
2	42.000	12	0.313	4.750	29.151	37.553	A607-60	4.8
3	42.000	12	0.375	5.500	35.978	44.379		6.9
4	38.000	12	0.438		42.529	50.130	A607-65	8.4
								23.0



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	A607-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 118 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 44.5%

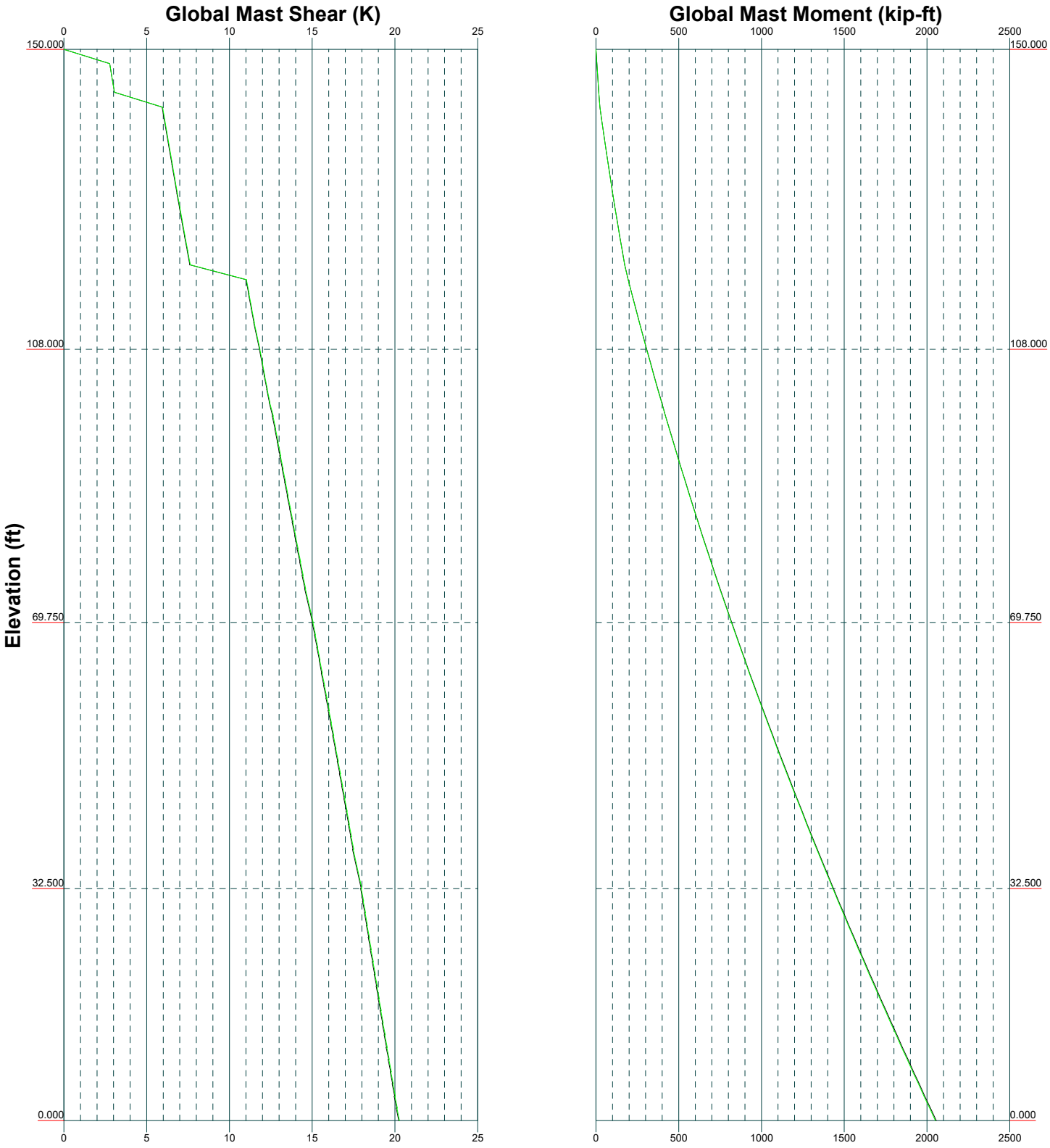
B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 137246.004.01 - Naugatuck 2 Uniroyal, CT (BU# 87631			
Project:			
Client: Crown Castle	Drawn by: Pavan Upadhya	App'd:	
Code: TIA-222-H	Date: 09/17/21	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-H - 118 mph/50 mph 1.000 in Ice Exposure B

Maximum Values

Vx Vz Mx Mz



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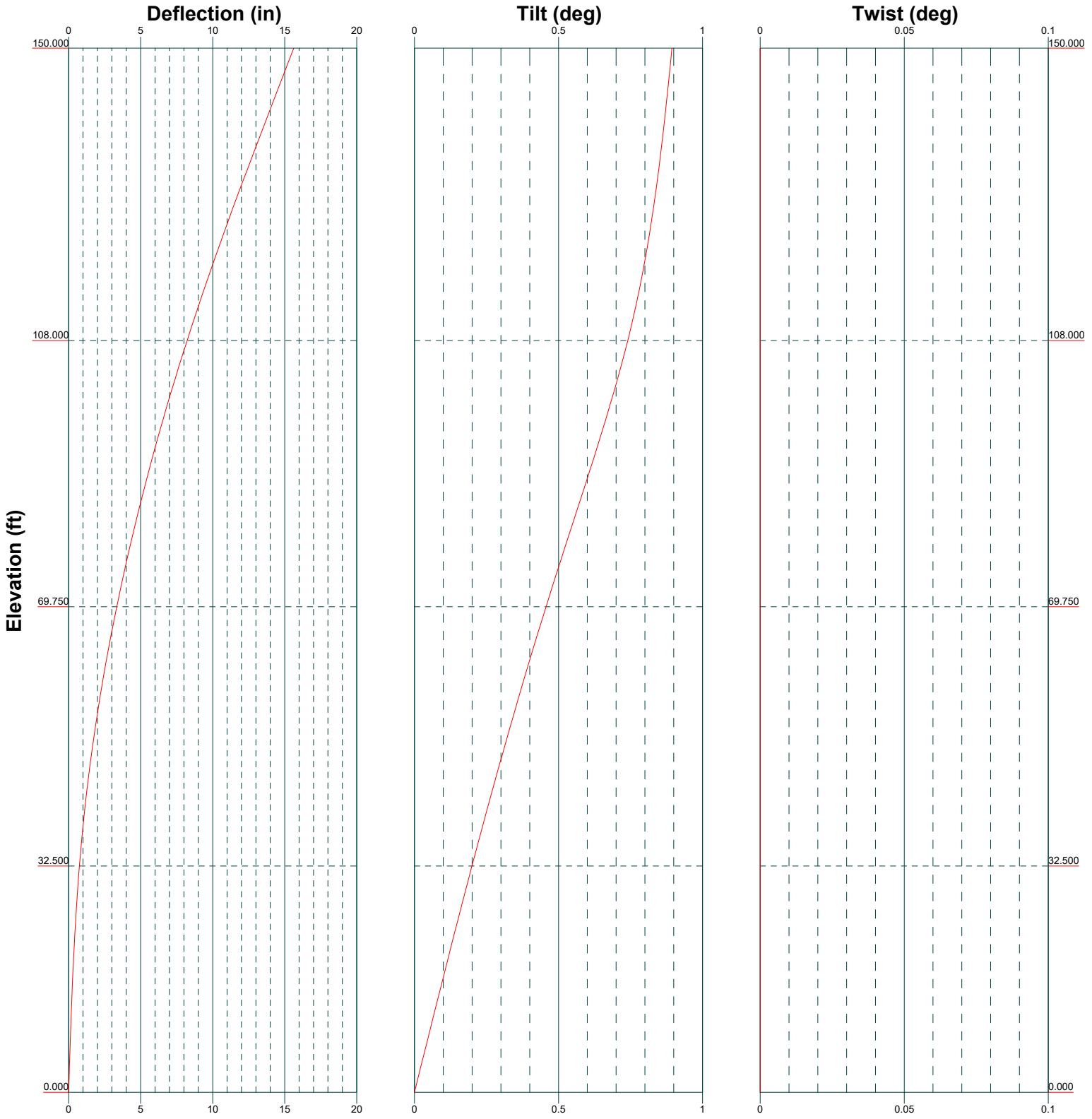
FAX: (918) 295-0265

Job: 137246.004.01 - Naugatuck 2 Uniroyal, CT (BU# 87631			
Project:			
Client: Crown Castle	Drawn by: Pavan Upadhya	App'd:	
Code: TIA-222-H	Date: 09/17/21	Scale: NTS	
Path:		Dwg No. E-4	

TIA-222-H - Service - 60 mph

Maximum Values



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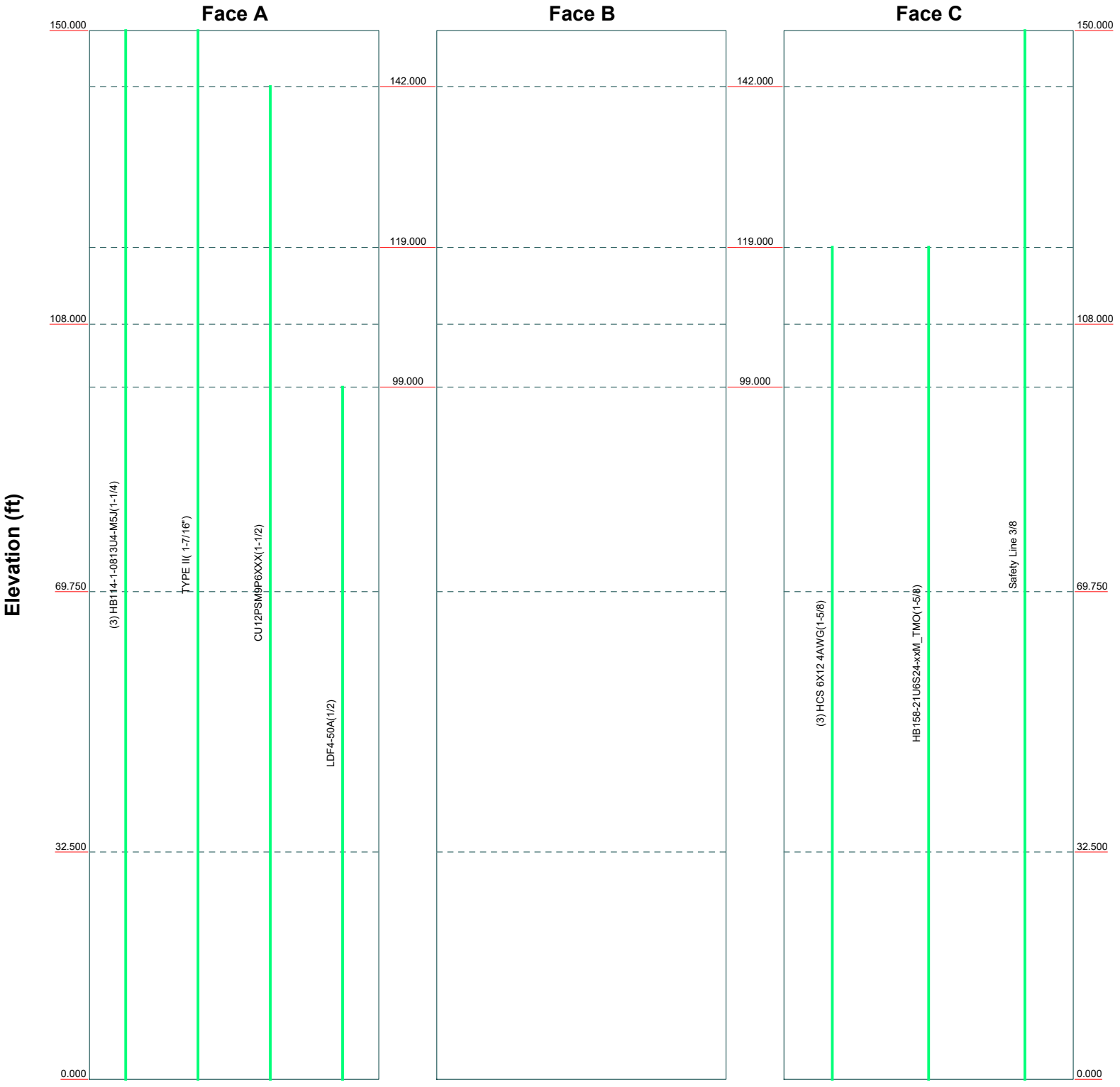
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 137246.004.01 - Naugatuck 2 Uniroyal, CT (BU# 87631			
Project:			
Client: Crown Castle	Drawn by: Pavan Upadhya	App'd:	
Code: TIA-222-H	Date: 09/17/21	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 150'

Round | Flat | App In Face | App Out Face | Truss Leg



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: ***137246.004.01 - Naugatuck 2 Uniroyal, CT (BU# 87631***		
Project:		
Client: Crown Castle	Drawn by: Pavan Upadhya	App'd:
Code: TIA-222-H	Date: 09/17/21	Scale: NTS
Path:		Dwg No. E-7

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Tower base elevation above sea level: 232.000 ft.
Basic wind speed of 118 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.000 ft.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Maximum demand-capacity ratio is: 1.05.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

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
L1	150.000-108.000	42.000	3.750	12	22.000	30.401	0.250	1.000	A607-60 (60 ksi)
L2	108.000-69.750	42.000	4.750	12	29.151	37.553	0.313	1.250	A607-60 (60 ksi)
L3	69.750-32.500	42.000	5.500	12	35.978	44.379	0.375	1.500	A607-65 (65 ksi)
L4	32.500-0.000	38.000		12	42.529	50.130	0.438	1.750	A607-65 (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	22.688	17.509	1057.206	7.786	11.396	92.770	2142.186	8.617	5.226	20.904
	31.385	24.272	2816.352	10.794	15.748	178.842	5706.693	11.946	7.477	29.91
L2	30.846	29.019	3080.391	10.324	15.100	203.997	6241.707	14.282	6.975	22.32
	38.767	37.473	6633.433	13.332	19.452	341.008	13441.134	18.443	9.227	29.525
L3	38.098	42.990	6955.434	12.746	18.636	373.216	14093.595	21.159	8.637	23.032
	45.812	53.135	13132.565	15.753	22.988	571.271	26610.137	26.151	10.889	29.036
L4	45.014	59.296	13409.052	15.069	22.030	608.674	27170.375	29.184	10.225	23.372
	51.744	70.004	22064.415	17.790	25.967	849.699	44708.487	34.454	12.262	28.028

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 150.000-108.000				1	1	1			
L2 108.000-69.750				1	1	1			
L3 69.750-32.500				1	1	1			
L4 32.500-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
*											

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 klf
HB114-1-0813U4-M5J(1-1/4)	A	No	No	Inside Pole	150.000 - 0.000	3	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
TYPE II(1-7/16")	A	No	No	Inside Pole	150.000 - 0.000	1	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
*									
CU12PSM9P6XXX(1-1/2)	A	No	No	Inside Pole	142.000 - 0.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
*									
*									
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	119.000 - 0.000	3	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
HB158-21U6S24-xxM_TMO(1-5/8)	C	No	No	Inside Pole	119.000 - 0.000	1	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
*									
LDF4-50A(1/2)	A	No	No	Inside Pole	99.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
*									
Safety Line 3/8	C	No	No	CaAa (Out Of Face)	150.000 - 0.000	1	No Ice	0.037	0.000
							1/2" Ice	0.137	0.001
							1" Ice	0.238	0.001
*									

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	150.000-108.000	A	0.000	0.000	0.000	0.000	0.262
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.575	0.116
L2	108.000-69.750	A	0.000	0.000	0.000	0.000	0.260
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.434	0.379
L3	69.750-32.500	A	0.000	0.000	0.000	0.000	0.255
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.397	0.370
L4	32.500-0.000	A	0.000	0.000	0.000	0.000	0.222
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	1.219	0.322

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	150.000-108.000	A	0.973	0.000	0.000	0.000	0.000	0.262
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	9.752	0.159
L2	108.000-69.750	A	0.938	0.000	0.000	0.000	0.000	0.260
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.882	0.419
L3	69.750-32.500	A	0.888	0.000	0.000	0.000	0.000	0.255
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	8.385	0.407
L4	32.500-0.000	A	0.790	0.000	0.000	0.000	0.000	0.222
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	6.990	0.353

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.000-108.000	-0.218	0.126	-0.841	0.486
L2	108.000-69.750	-0.219	0.126	-0.869	0.502
L3	69.750-32.500	-0.219	0.127	-0.862	0.498
L4	32.500-0.000	-0.220	0.127	-0.838	0.484

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.600 5.050 5.500	4.010 4.450 4.890	0.095 0.160 0.235
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.600 5.050 5.500	4.010 4.450 4.890	0.095 0.160 0.235
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	4.600 5.050 5.500	4.010 4.450 4.890	0.095 0.160 0.235
800 EXTERNAL NOTCH FILTER	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.660 0.763 0.873	0.321 0.398 0.483	0.011 0.017 0.024
800 EXTERNAL NOTCH FILTER	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	0.660 0.763 0.873	0.321 0.398 0.483	0.011 0.017 0.024
800 EXTERNAL NOTCH FILTER	C	From Leg	4.000 0.000	0.000	150.000	No Ice 1/2" Ice	0.660 0.763	0.321 0.398	0.011 0.017

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			1" Ice	0.873	0.483	0.024
800MHZ RRH	A	From Leg	4.000	0.000	150.000	No Ice	2.134	1.773	0.053
			0.000			1/2" Ice	2.320	1.946	0.074
			0.000			1" Ice	2.512	2.127	0.098
800MHZ RRH	B	From Leg	4.000	0.000	150.000	No Ice	2.134	1.773	0.053
			0.000			1/2" Ice	2.320	1.946	0.074
			0.000			1" Ice	2.512	2.127	0.098
800MHZ RRH	C	From Leg	4.000	0.000	150.000	No Ice	2.134	1.773	0.053
			0.000			1/2" Ice	2.320	1.946	0.074
			0.000			1" Ice	2.512	2.127	0.098
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000	0.000	150.000	No Ice	2.322	2.238	0.060
			0.000			1/2" Ice	2.527	2.441	0.083
			0.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000	0.000	150.000	No Ice	2.322	2.238	0.060
			0.000			1/2" Ice	2.527	2.441	0.083
			0.000			1" Ice	2.739	2.651	0.110
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000	0.000	150.000	No Ice	2.322	2.238	0.060
			0.000			1/2" Ice	2.527	2.441	0.083
			0.000			1" Ice	2.739	2.651	0.110
TD-RRH8x20-25	A	From Leg	4.000	0.000	150.000	No Ice	4.045	1.535	0.070
			0.000			1/2" Ice	4.298	1.714	0.097
			0.000			1" Ice	4.557	1.901	0.128
TD-RRH8x20-25	B	From Leg	4.000	0.000	150.000	No Ice	4.045	1.535	0.070
			0.000			1/2" Ice	4.298	1.714	0.097
			0.000			1" Ice	4.557	1.901	0.128
TD-RRH8x20-25	C	From Leg	4.000	0.000	150.000	No Ice	4.045	1.535	0.070
			0.000			1/2" Ice	4.298	1.714	0.097
			0.000			1" Ice	4.557	1.901	0.128
(3) 7'x2" Antenna Mount Pipe	A	From Leg	4.000	0.000	150.000	No Ice	1.663	1.663	0.026
			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
(3) 7'x2" Antenna Mount Pipe	B	From Leg	4.000	0.000	150.000	No Ice	1.663	1.663	0.026
			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
(3) 7'x2" Antenna Mount Pipe	C	From Leg	4.000	0.000	150.000	No Ice	1.663	1.663	0.026
			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
Platform Mount [LP 303-1_HR-1]	C	None		0.000	150.000	No Ice	17.090	17.090	1.495
						1/2" Ice	21.470	21.470	1.881
						1" Ice	25.720	25.720	2.346
*									
*									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000	0.000	142.000	No Ice	8.010	4.230	0.108
			0.000			1/2" Ice	8.520	4.690	0.194
			0.000			1" Ice	9.040	5.160	0.292
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000	0.000	142.000	No Ice	8.010	4.230	0.108
			0.000			1/2" Ice	8.520	4.690	0.194
			0.000			1" Ice	9.040	5.160	0.292
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000	0.000	142.000	No Ice	8.010	4.230	0.108
			0.000			1/2" Ice	8.520	4.690	0.194
			0.000			1" Ice	9.040	5.160	0.292
TA08025-B604	A	From Leg	4.000	0.000	142.000	No Ice	1.964	0.981	0.064
			0.000			1/2" Ice	2.138	1.112	0.081
			0.000			1" Ice	2.320	1.250	0.100
TA08025-B604	B	From Leg	4.000	0.000	142.000	No Ice	1.964	0.981	0.064
			0.000			1/2" Ice	2.138	1.112	0.081
			0.000			1" Ice	2.320	1.250	0.100

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
TA08025-B604	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	0.981 1.112 1.250	0.064 0.081 0.100
TA08025-B605	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
TA08025-B605	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
TA08025-B605	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
RDIDC-9181-PF-48	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice	2.012 2.189 2.373	1.168 1.311 1.461	0.022 0.040 0.060
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	142.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
Commscope MC-PK8-DSH(1) * *	C	None		0.000	142.000	No Ice 1/2" Ice 1" Ice	34.240 62.950 91.660	34.240 62.950 91.660	1.749 2.099 2.450
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	14.690 15.460 16.230	6.870 7.550 8.250	0.186 0.315 0.458
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	14.690 15.460 16.230	6.870 7.550 8.250	0.186 0.315 0.458
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	14.690 15.460 16.230	6.870 7.550 8.250	0.186 0.315 0.458
RADIO 4449 B71/B85A	A	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	1.644 1.804 1.972	1.310 1.455 1.608	0.075 0.092 0.112
RADIO 4449 B71/B85A	B	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	1.644 1.804 1.972	1.310 1.455 1.608	0.075 0.092 0.112
RADIO 4449 B71/B85A	C	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	1.644 1.804 1.972	1.310 1.455 1.608	0.075 0.092 0.112
AIR6449 B41_T-MOBILE	A	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	5.270 5.700 6.140	2.030 2.360 2.700	0.115 0.154 0.197
AIR6449 B41_T-MOBILE	B	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	5.270 5.700 6.140	2.030 2.360 2.700	0.115 0.154 0.197
AIR6449 B41_T-MOBILE	C	From Leg	4.000 0.000 1.000	0.000	119.000	No Ice 1/2" Ice 1" Ice	5.270 5.700 6.140	2.030 2.360 2.700	0.115 0.154 0.197
RADIO 4460 B2/B25	A	From Leg	4.000	0.000	119.000	No Ice	2.139	1.686	0.109

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
B66_TMO			0.000			1/2" Ice	2.321	1.850	0.131
			1.000			1" Ice	2.511	2.022	0.156
RADIO 4460 B2/B25	B	From Leg	4.000	0.000	119.000	No Ice	2.139	1.686	0.109
B66_TMO			0.000			1/2" Ice	2.321	1.850	0.131
			1.000			1" Ice	2.511	2.022	0.156
RADIO 4460 B2/B25	C	From Leg	4.000	0.000	119.000	No Ice	2.139	1.686	0.109
B66_TMO			0.000			1/2" Ice	2.321	1.850	0.131
			1.000			1" Ice	2.511	2.022	0.156
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	119.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	119.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	119.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
Platform Mount [LP 304-1_KCKR-HR-1]	C	None		0.000	119.000	No Ice	32.630	32.630	1.880
						1/2" Ice	40.840	40.840	2.472
						1" Ice	49.050	49.050	3.195
*									
KS24019-L112A	B	From Leg	3.000	0.000	99.000	No Ice	0.141	0.141	0.005
			0.000			1/2" Ice	0.198	0.198	0.007
			1.000			1" Ice	0.262	0.262	0.009
2' x 2" Pipe Mount	B	From Leg	3.000	0.000	99.000	No Ice	0.023	0.023	0.007
			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
Side Arm Mount [SO 701-1]	B	From Leg	1.500	0.000	99.000	No Ice	0.850	1.670	0.065
			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
*									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft^2	Weight K
*										

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 108	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-21.820	0.047	0.290
			Max. Mx	20	-13.513	262.039	0.113
			Max. My	2	-13.510	-0.005	262.994
			Max. Vy	8	11.483	-262.027	0.128
			Max. Vx	2	-11.511	-0.005	262.994

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	20			-0.180
L2	108 - 69.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-29.688	-0.227	0.066
			Max. Mx	8	-19.770	-747.664	0.301
			Max. My	14	-19.767	0.092	-749.675
			Max. Vy	8	14.565	-747.664	0.301
			Max. Vx	14	14.607	0.092	-749.675
			Max. Torque	6			0.161
L3	69.75 - 32.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.120	-0.160	0.028
			Max. Mx	8	-28.500	-1333.613	0.755
			Max. My	14	-28.498	0.563	-1337.169
			Max. Vy	8	17.472	-1333.613	0.755
			Max. Vx	14	17.514	0.563	-1337.169
			Max. Torque	32			-0.154
L4	32.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-54.176	-0.084	-0.016
			Max. Mx	8	-40.766	-2050.500	1.219
			Max. My	14	-40.766	1.051	-2055.632
			Max. Vy	8	20.231	-2050.500	1.219
			Max. Vx	14	20.271	1.051	-2055.632
			Max. Torque	32			-0.225

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	54.176	-0.004	5.656
	Max. H_x	20	40.774	20.215	-0.012
	Max. H_z	2	40.774	-0.012	20.255
	Max. M_x	2	2055.554	-0.012	20.255
	Max. M_z	8	2050.500	-20.215	0.012
	Max. Torsion	38	0.225	2.820	4.896
	Min. Vert	23	30.580	17.501	10.117
	Min. H_x	8	40.774	-20.215	0.012
	Min. H_z	14	40.774	0.012	-20.255
	Min. M_x	14	-2055.632	0.012	-20.255
	Min. M_z	20	-2050.086	20.215	-0.012
	Min. Torsion	32	-0.225	-2.820	-4.896

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	33.978	0.000	0.000	0.033	-0.161	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	40.774	0.012	-20.255	-2055.554	-1.466	-0.058
0.9 Dead+1.0 Wind 0 deg - No Ice	30.580	0.012	-20.255	-2033.880	-1.400	-0.059
1.2 Dead+1.0 Wind 30 deg - No Ice	40.774	10.118	-17.548	-1780.797	-1026.447	-0.031

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
0.9 Dead+1.0 Wind 30 deg - No Ice	30.580	10.118	-17.548	-1762.015	-1015.566	-0.031
1.2 Dead+1.0 Wind 60 deg - No Ice	40.774	17.513	-10.138	-1028.855	-1776.450	0.004
0.9 Dead+1.0 Wind 60 deg - No Ice	30.580	17.513	-10.138	-1018.009	-1757.656	0.005
1.2 Dead+1.0 Wind 90 deg - No Ice	40.774	20.215	-0.012	-1.219	-2050.500	0.038
0.9 Dead+1.0 Wind 90 deg - No Ice	30.580	20.215	-0.012	-1.218	-2028.821	0.039
1.2 Dead+1.0 Wind 120 deg - No Ice	40.774	17.501	10.117	1026.755	-1775.193	0.062
0.9 Dead+1.0 Wind 120 deg - No Ice	30.580	17.501	10.117	1015.909	-1756.410	0.064
1.2 Dead+1.0 Wind 150 deg - No Ice	40.774	10.097	17.535	1779.618	-1024.268	0.070
0.9 Dead+1.0 Wind 150 deg - No Ice	30.580	10.097	17.535	1760.828	-1013.407	0.071
1.2 Dead+1.0 Wind 180 deg - No Ice	40.774	-0.012	20.255	2055.632	1.051	0.058
0.9 Dead+1.0 Wind 180 deg - No Ice	30.580	-0.012	20.255	2033.938	1.094	0.059
1.2 Dead+1.0 Wind 210 deg - No Ice	40.774	-10.118	17.548	1780.875	1026.031	0.031
0.9 Dead+1.0 Wind 210 deg - No Ice	30.580	-10.118	17.548	1762.074	1015.261	0.031
1.2 Dead+1.0 Wind 240 deg - No Ice	40.774	-17.513	10.138	1028.934	1776.036	-0.004
0.9 Dead+1.0 Wind 240 deg - No Ice	30.580	-17.513	10.138	1018.068	1757.351	-0.005
1.2 Dead+1.0 Wind 270 deg - No Ice	40.774	-20.215	0.012	1.298	2050.086	-0.038
0.9 Dead+1.0 Wind 270 deg - No Ice	30.580	-20.215	0.012	1.277	2028.517	-0.040
1.2 Dead+1.0 Wind 300 deg - No Ice	40.774	-17.501	-10.117	-1026.677	1774.779	-0.062
0.9 Dead+1.0 Wind 300 deg - No Ice	30.580	-17.501	-10.117	-1015.850	1756.105	-0.064
1.2 Dead+1.0 Wind 330 deg - No Ice	40.774	-10.097	-17.535	-1779.541	1023.853	-0.069
0.9 Dead+1.0 Wind 330 deg - No Ice	30.580	-10.097	-17.535	-1760.770	1013.102	-0.070
1.2 Dead+1.0 Ice+1.0 Temp	54.176	0.000	0.000	0.016	-0.084	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	54.176	0.004	-5.656	-593.216	-0.535	-0.188
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	54.176	2.827	-4.900	-513.956	-296.454	-0.100
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	54.176	4.892	-2.832	-296.981	-512.966	0.014
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	54.176	5.646	-0.004	-0.430	-592.057	0.125
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	54.176	4.888	2.824	296.238	-512.534	0.202
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	54.176	2.820	4.896	513.529	-295.706	0.225
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	54.176	-0.004	5.656	593.222	0.329	0.188
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	54.176	-2.827	4.900	513.962	296.249	0.100
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	54.176	-4.892	2.832	296.986	512.761	-0.014

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
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	54.176	-5.646	0.004	0.435	591.852	-0.125
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	54.176	-4.888	-2.824	-296.233	512.328	-0.202
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	54.176	-2.820	-4.896	-513.524	295.500	-0.225
Dead+Wind 0 deg - Service	33.978	0.003	-4.932	-497.260	-0.476	-0.014
Dead+Wind 30 deg - Service	33.978	2.464	-4.273	-430.788	-248.440	-0.008
Dead+Wind 60 deg - Service	33.978	4.265	-2.469	-248.878	-429.880	0.001
Dead+Wind 90 deg - Service	33.978	4.923	-0.003	-0.272	-496.181	0.009
Dead+Wind 120 deg - Service	33.978	4.262	2.464	248.415	-429.575	0.015
Dead+Wind 150 deg - Service	33.978	2.459	4.270	430.548	-247.912	0.017
Dead+Wind 180 deg - Service	33.978	-0.003	4.932	497.325	0.134	0.014
Dead+Wind 210 deg - Service	33.978	-2.464	4.273	430.853	248.098	0.008
Dead+Wind 240 deg - Service	33.978	-4.265	2.469	248.943	429.538	-0.001
Dead+Wind 270 deg - Service	33.978	-4.923	0.003	0.337	495.839	-0.009
Dead+Wind 300 deg - Service	33.978	-4.262	-2.464	-248.350	429.234	-0.015
Dead+Wind 330 deg - Service	33.978	-2.459	-4.270	-430.483	247.570	-0.017

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-33.978	0.000	0.000	33.978	0.000	0.000%
2	0.012	-40.774	-20.255	-0.012	40.774	20.255	0.000%
3	0.012	-30.580	-20.255	-0.012	30.580	20.255	0.000%
4	10.118	-40.774	-17.548	-10.118	40.774	17.548	0.000%
5	10.118	-30.580	-17.548	-10.118	30.580	17.548	0.000%
6	17.513	-40.774	-10.138	-17.513	40.774	10.138	0.000%
7	17.513	-30.580	-10.138	-17.513	30.580	10.138	0.000%
8	20.215	-40.774	-0.012	-20.215	40.774	0.012	0.000%
9	20.215	-30.580	-0.012	-20.215	30.580	0.012	0.000%
10	17.501	-40.774	10.117	-17.501	40.774	-10.117	0.000%
11	17.501	-30.580	10.117	-17.501	30.580	-10.117	0.000%
12	10.097	-40.774	17.535	-10.097	40.774	-17.535	0.000%
13	10.097	-30.580	17.535	-10.097	30.580	-17.535	0.000%
14	-0.012	-40.774	20.255	0.012	40.774	-20.255	0.000%
15	-0.012	-30.580	20.255	0.012	30.580	-20.255	0.000%
16	-10.118	-40.774	17.548	10.118	40.774	-17.548	0.000%
17	-10.118	-30.580	17.548	10.118	30.580	-17.548	0.000%
18	-17.513	-40.774	10.138	17.513	40.774	-10.138	0.000%
19	-17.513	-30.580	10.138	17.513	30.580	-10.138	0.000%
20	-20.215	-40.774	0.012	20.215	40.774	-0.012	0.000%
21	-20.215	-30.580	0.012	20.215	30.580	-0.012	0.000%
22	-17.501	-40.774	-10.117	17.501	40.774	10.117	0.000%
23	-17.501	-30.580	-10.117	17.501	30.580	10.117	0.000%
24	-10.097	-40.774	-17.535	10.097	40.774	17.535	0.000%
25	-10.097	-30.580	-17.535	10.097	30.580	17.535	0.000%
26	0.000	-54.176	0.000	0.000	54.176	0.000	0.000%
27	0.004	-54.176	-5.656	-0.004	54.176	5.656	0.000%
28	2.827	-54.176	-4.900	-2.827	54.176	4.900	0.000%
29	4.892	-54.176	-2.832	-4.892	54.176	2.832	0.000%
30	5.646	-54.176	-0.004	-5.646	54.176	0.004	0.000%
31	4.888	-54.176	2.824	-4.888	54.176	-2.824	0.000%
32	2.819	-54.176	4.896	-2.820	54.176	-4.896	0.000%
33	-0.004	-54.176	5.656	0.004	54.176	-5.656	0.000%
34	-2.827	-54.176	4.900	2.827	54.176	-4.900	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
35	-4.892	-54.176	2.832	4.892	54.176	-2.832	0.000%
36	-5.646	-54.176	0.004	5.646	54.176	-0.004	0.000%
37	-4.888	-54.176	-2.824	4.888	54.176	2.824	0.000%
38	-2.819	-54.176	-4.896	2.820	54.176	4.896	0.000%
39	0.003	-33.978	-4.932	-0.003	33.978	4.932	0.000%
40	2.464	-33.978	-4.273	-2.464	33.978	4.273	0.000%
41	4.265	-33.978	-2.469	-4.265	33.978	2.469	0.000%
42	4.923	-33.978	-0.003	-4.923	33.978	0.003	0.000%
43	4.262	-33.978	2.464	-4.262	33.978	-2.464	0.000%
44	2.459	-33.978	4.270	-2.459	33.978	-4.270	0.000%
45	-0.003	-33.978	4.932	0.003	33.978	-4.932	0.000%
46	-2.464	-33.978	4.273	2.464	33.978	-4.273	0.000%
47	-4.265	-33.978	2.469	4.265	33.978	-2.469	0.000%
48	-4.923	-33.978	0.003	4.923	33.978	-0.003	0.000%
49	-4.262	-33.978	-2.464	4.262	33.978	2.464	0.000%
50	-2.459	-33.978	-4.270	2.459	33.978	4.270	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00027403
3	Yes	4	0.00000001	0.00011020
4	Yes	5	0.00000001	0.00046186
5	Yes	5	0.00000001	0.00022446
6	Yes	5	0.00000001	0.00046225
7	Yes	5	0.00000001	0.00022471
8	Yes	4	0.00000001	0.00027725
9	Yes	4	0.00000001	0.00011459
10	Yes	5	0.00000001	0.00045948
11	Yes	5	0.00000001	0.00022339
12	Yes	5	0.00000001	0.00046149
13	Yes	5	0.00000001	0.00022434
14	Yes	4	0.00000001	0.00027301
15	Yes	4	0.00000001	0.00010918
16	Yes	5	0.00000001	0.00046188
17	Yes	5	0.00000001	0.00022454
18	Yes	5	0.00000001	0.00046055
19	Yes	5	0.00000001	0.00022391
20	Yes	4	0.00000001	0.00027468
21	Yes	4	0.00000001	0.00011195
22	Yes	5	0.00000001	0.00046092
23	Yes	5	0.00000001	0.00022416
24	Yes	5	0.00000001	0.00045984
25	Yes	5	0.00000001	0.00022357
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00018257
28	Yes	5	0.00000001	0.00020687
29	Yes	5	0.00000001	0.00020679
30	Yes	5	0.00000001	0.00018217
31	Yes	5	0.00000001	0.00020654
32	Yes	5	0.00000001	0.00020628
33	Yes	5	0.00000001	0.00018237
34	Yes	5	0.00000001	0.00020667
35	Yes	5	0.00000001	0.00020639

36	Yes	5	0.00000001	0.00018196
37	Yes	5	0.00000001	0.00020611
38	Yes	5	0.00000001	0.00020673
39	Yes	4	0.00000001	0.00003373
40	Yes	4	0.00000001	0.00014367
41	Yes	4	0.00000001	0.00014428
42	Yes	4	0.00000001	0.00003375
43	Yes	4	0.00000001	0.00014248
44	Yes	4	0.00000001	0.00014402
45	Yes	4	0.00000001	0.00003371
46	Yes	4	0.00000001	0.00014363
47	Yes	4	0.00000001	0.00014273
48	Yes	4	0.00000001	0.00003369
49	Yes	4	0.00000001	0.00014372
50	Yes	4	0.00000001	0.00014248

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 108	15.629	39	0.896	0.000
L2	111.75 - 69.75	8.817	45	0.761	0.000
L3	74.5 - 32.5	3.828	45	0.494	0.000
L4	38 - 0	0.985	45	0.235	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	APXVSPP18-C-A20 w/ Mount Pipe	39	15.629	0.896	0.000	66226
142.000	MX08FRO665-21 w/ Mount Pipe	40	14.137	0.875	0.000	41391
119.000	APXVAARR24_43-U-NA20 w/ Mount Pipe	40	10.014	0.796	0.000	10681
99.000	KS24019-L112A	45	6.885	0.680	0.000	8417

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 108	64.726	2	3.712	0.001
L2	111.75 - 69.75	36.506	14	3.152	0.000
L3	74.5 - 32.5	15.843	14	2.045	0.000
L4	38 - 0	4.072	14	0.972	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	APXVSPP18-C-A20 w/ Mount Pipe	2	64.726	3.712	0.001	16092
142.000	MX08FRO665-21 w/ Mount Pipe	2	58.544	3.626	0.001	10057
119.000	APXVAARR24_43-U-NA20 w/ Mount Pipe	14	41.465	3.301	0.000	2593
99.000	KS24019-L112A	14	28.503	2.818	0.000	2039

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	150 - 108 (1)	TP30.401x22x0.25	42.000	0.000	0.0	23.668	-13.509	1278.060	0.011
L2	108 - 69.75 (2)	TP37.553x29.151x0.313	42.000	0.000	0.0	36.517	-19.767	1971.920	0.010
L3	69.75 - 32.5 (3)	TP44.379x35.978x0.375	42.000	0.000	0.0	51.806	-28.498	3030.670	0.009
L4	32.5 - 0 (4)	TP50.13x42.529x0.438	38.000	0.000	0.0	70.004	-40.766	4095.250	0.010

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	150 - 108 (1)	TP30.401x22x0.25	262.994	857.033	0.307	0.000	857.033	0.000
L2	108 - 69.75 (2)	TP37.553x29.151x0.313	749.675	1641.275	0.457	0.000	1641.275	0.000
L3	69.75 - 32.5 (3)	TP44.379x35.978x0.375	1337.167	2949.925	0.453	0.000	2949.925	0.000
L4	32.5 - 0 (4)	TP50.13x42.529x0.438	2055.633	4631.983	0.444	0.000	4631.983	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	150 - 108 (1)	TP30.401x22x0.25	11.511	383.417	0.030	0.050	991.592	0.000
L2	108 - 69.75 (2)	TP37.553x29.151x0.313	14.607	591.577	0.025	0.061	1888.433	0.000
L3	69.75 - 32.5 (3)	TP44.379x35.978x0.375	17.514	909.202	0.019	0.004	3431.283	0.000
L4	32.5 - 0 (4)	TP50.13x42.529x0.438	20.271	1228.580	0.016	0.058	5370.225	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	150 - 108 (1)	0.011	0.307	0.000	0.030	0.000	0.318 ✔	1.050	4.8.2 ✔
L2	108 - 69.75 (2)	0.010	0.457	0.000	0.025	0.000	0.467 ✔	1.050	4.8.2 ✔
L3	69.75 - 32.5 (3)	0.009	0.453	0.000	0.019	0.000	0.463 ✔	1.050	4.8.2 ✔
L4	32.5 - 0 (4)	0.010	0.444	0.000	0.016	0.000	0.454 ✔	1.050	4.8.2 ✔

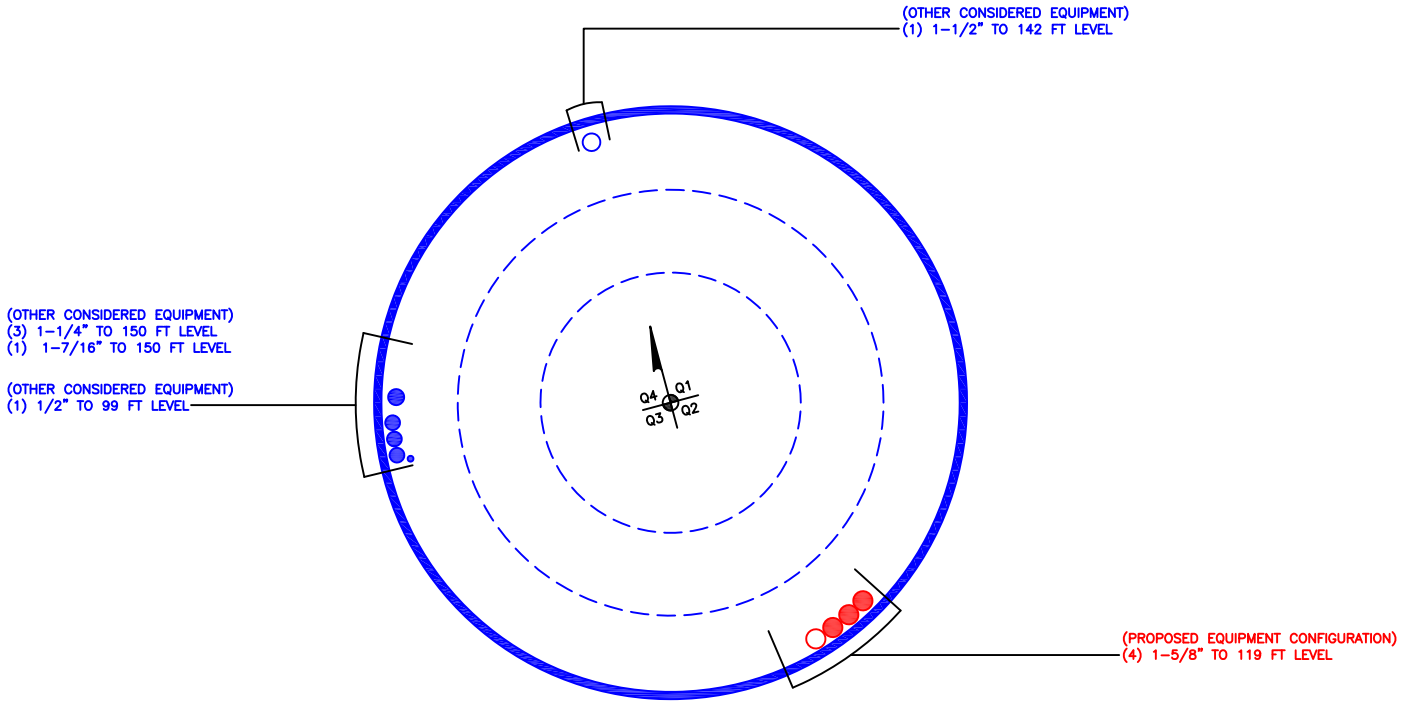
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 108	Pole	TP30.401x22x0.25	1	-13.509	1341.963	30.3	Pass
L2	108 - 69.75	Pole	TP37.553x29.151x0.313	2	-19.767	2070.516	44.5	Pass
L3	69.75 - 32.5	Pole	TP44.379x35.978x0.375	3	-28.498	3182.203	44.1	Pass
L4	32.5 - 0	Pole	TP50.13x42.529x0.438	4	-40.766	4300.012	43.2	Pass
							Summary	
						Pole (L2)	44.5	Pass
						RATING =	**44.5**	**Pass**

Program Version 8.1.1.0

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876319

APPENDIX C

ADDITIONAL CALCULATIONS

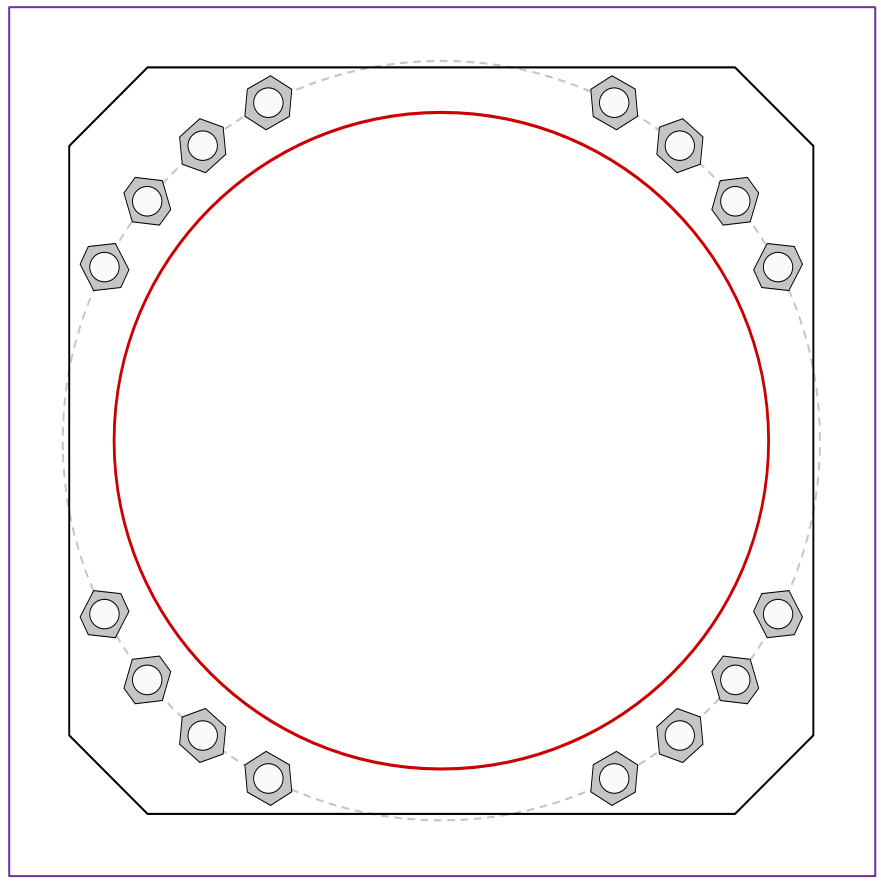
Monopole Base Plate Connection

Site Info	
BU #	876319
Site Name	augatuck 2 Uniroyal, C
Order #	581568, Rev# 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.5

Applied Loads	
Moment (kip-ft)	2055.63
Axial Force (kips)	40.77
Shear Force (kips)	20.27

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 58" BC

Anchor Spacing: 6 in

Base Plate Data

57" W x 3" Plate (A572-50; Fy=50 ksi, Fu=65 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

50.13" x 0.4375" 12-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_t = 103.71	ϕPn_t = 243.75	**Stress Rating**
Vu = 1.27	ϕVn = 149.1	**40.5%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	19.63	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**41.5%**	**Pass**

Drilled Pier Foundation

BU # :	876319
Site Name:	Naugatuck 2 Uniroyal, CT
Order Number:	581568, Rev# 0
TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	2056	
Axial Force (kips)	41	
Shear Force (kips)	20	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	26	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 26' below grade		
Pier Diameter	7	ft
Rebar Quantity	32	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing	18	in

Rebar & Pier Options
Embedded Pole Inputs
Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.73	-
Soil Safety Factor	6.09	-
Max Moment (kip-ft)	2167.76	-
Rating*	*20.8%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	643.53	-
End Bearing (kips)	203.80	-
Weight of Concrete (kips)	174.90	-
Total Capacity (kips)	847.33	-
Axial (kips)	215.90	-
Rating*	*24.3%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.63	-
Critical Moment (kip-ft)	2167.70	-
Critical Moment Capacity	7495.90	-
Rating*	*27.5%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	19.35	-
Critical Shear (kip)	237.06	-
Critical Shear Capacity	601.60	-
Rating*	*37.5%*	-

Structural Foundation Rating*	**37.5%**
Soil Interaction Rating*	**24.3%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

Groundwater Depth	23
# of Layers	5

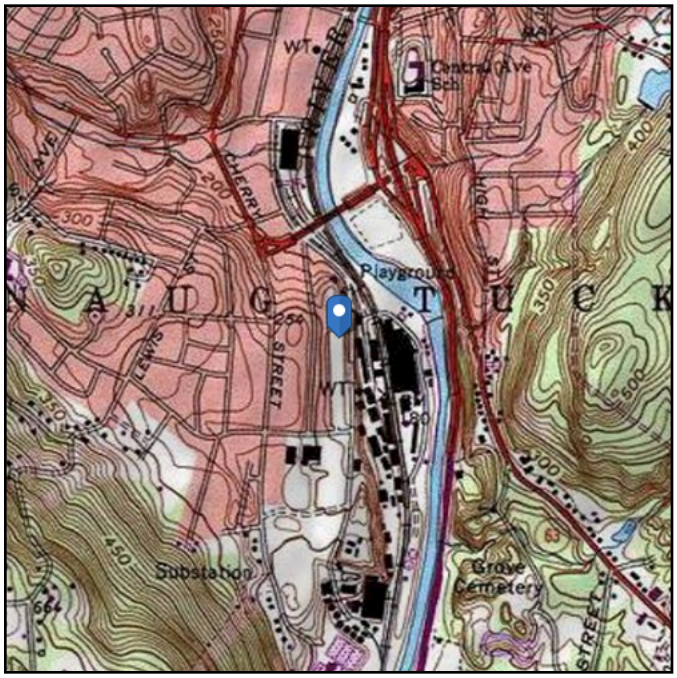
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Net Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	125	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	8	4.5	125	150	0	34	0.845	0.845				48	Cohesionless
3	8	15	7	125	150	0	34	1.498	1.498				22	Cohesionless
4	15	23	8	125	150	0	34	2.165	2.165				16	Cohesionless
5	23	26	3	62	87.6	0	34	2.469	2.469			4	57	Cohesionless

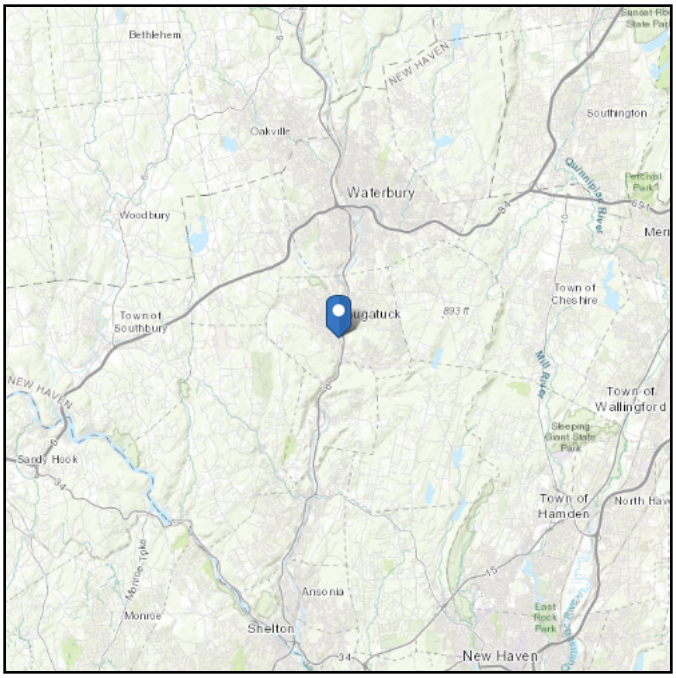
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Elevation: 232.9 ft (NAVD 88)
Latitude: 41.481261
Longitude: -73.053242





Wind

Results:

Wind Speed:	118 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Wed Sep 08 2021

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

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

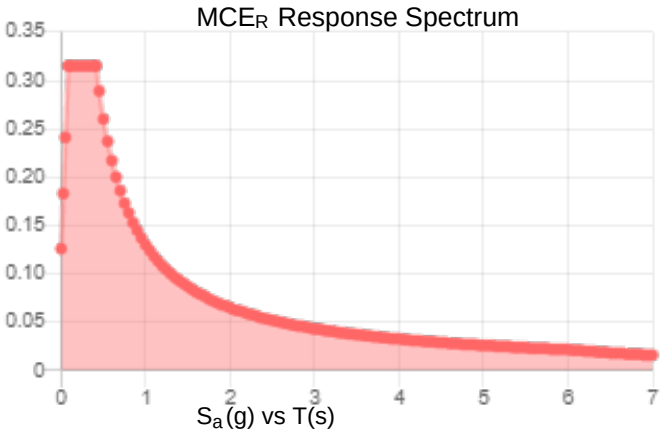
Seismic

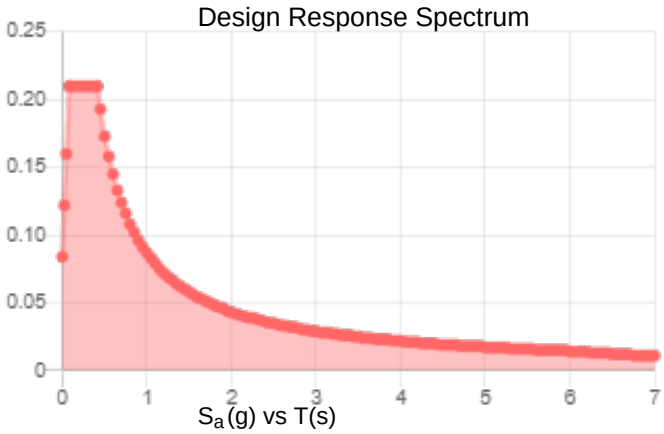
Site Soil Class: D - Default (see Section 11.4.3)

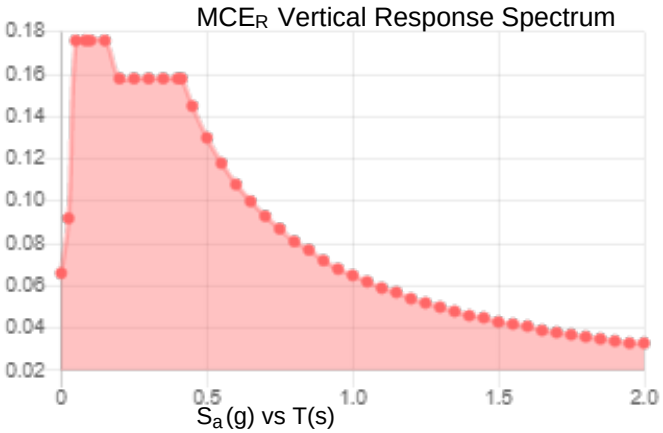
Results:

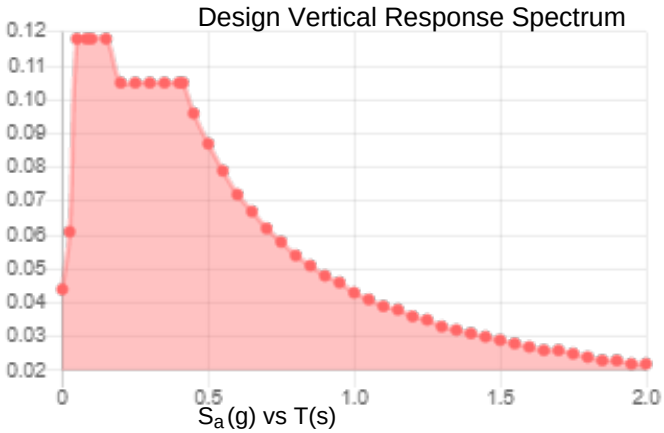
S_S :	0.197	S_{D1} :	0.087
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.109
F_v :	2.4	PGA_M :	0.173
S_{MS} :	0.315	F_{PGA} :	1.581
S_{M1} :	0.13	I_e :	1
S_{DS} :	0.21	C_v :	0.7

Seismic Design Category B









Data Accessed: Wed Sep 08 2021

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

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Wed Sep 08 2021

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

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

Date: **September 2, 2021**

Darcy Tarr
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6589

Trylon
1825 W. Walnut Hill Lane,
Suite 302
Irving, TX 75038
214-930-1730

Subject:	**Mount Analysis Report**	
Carrier Designation:	**T-Mobile Equipment Anchor**	
	Carrier Site Number:	CTNH312A
	Carrier Site Name:	NH312/Crown-Naugatuck
Crown Castle Designation:	**Crown Castle BU Number:**	876319
	Crown Castle Site Name:	NAUGATUCK 2 UNIROYAL
	Crown Castle JDE Job Number:	680924
	Crown Castle Order Number:	581568 Rev. 0
Engineering Firm Designation:	**Trylon Report Designation:**	191124
Site Data:	**280 Elm Street, Naugatuck, New Haven County, CT, 06770**	
	Latitude 41°28'52.54" Longitude -73°3'11.67"	
Structure Information:	**Tower Height & Type:**	**150.0 ft Monopole**
	Mount Elevation:	**119.0 ft**
	Mount Type:	**13.3 ft Platform**

Dear Darcy Tarr,

Trylon is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of T-Mobile's 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 for fall protection or rigging 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:

Platform **Sufficient**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Mostafa Faghihnia, P.E.

Respectfully Submitted by:
Cliff Abernathy, P.E.

09/02/2021

TABLE OF CONTENTS

1) INTRODUCTION

This is an proposed 3 sector 13.3 ft Platform, mapped by P-SEC. The mount has been modified per reinforecement drawings prepared by CLS Engineering PLLC, in May of 2019. Reinforcement consists of installation of Site Pro 1 PRK-1245 reinforcement kit and Site Pro 1 HRK12-U support rail kit.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC / 2018 CSBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 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:	0.190
Seismic S_1:	0.064
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
119.0	120.0	3	ERICSSON	AIR6449 B41_T-MOBILE	13.3 ft Platform
		3	RFS/CELWAVE	APXVAARR24_43-U-NA20	
		3	ERICSSON	RADIO 4449 B71/B85A	
		3	ERICSSON	RADIO 4460 B2/B25 B66_TMO	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	Dsih Network Application	581568 Rev.0	CCI Sites
Mount Mapping	P-Sec	8341800	CCI Sites
Mount Analysis Report	CLS Engineering PLLC	8436842	CCI Sites

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed, using Microsoft Excel, by Trylon 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 B).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The 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) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Trylon should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform, All Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe(s)	MP5	119.0	57.5	Pass
	Horizontal(s)	H1		15.2	Pass
	Standoff(s)	M5		14.7	Pass
	Bracing(s)	M84		22.4	Pass
	Handrail(s)	M81		28.3	Pass
	Kicker(s)	M89B		14.3	Pass
	Mount Connection(s)	---		9.7	Pass

Structure Rating (max from all components) =	57.5%

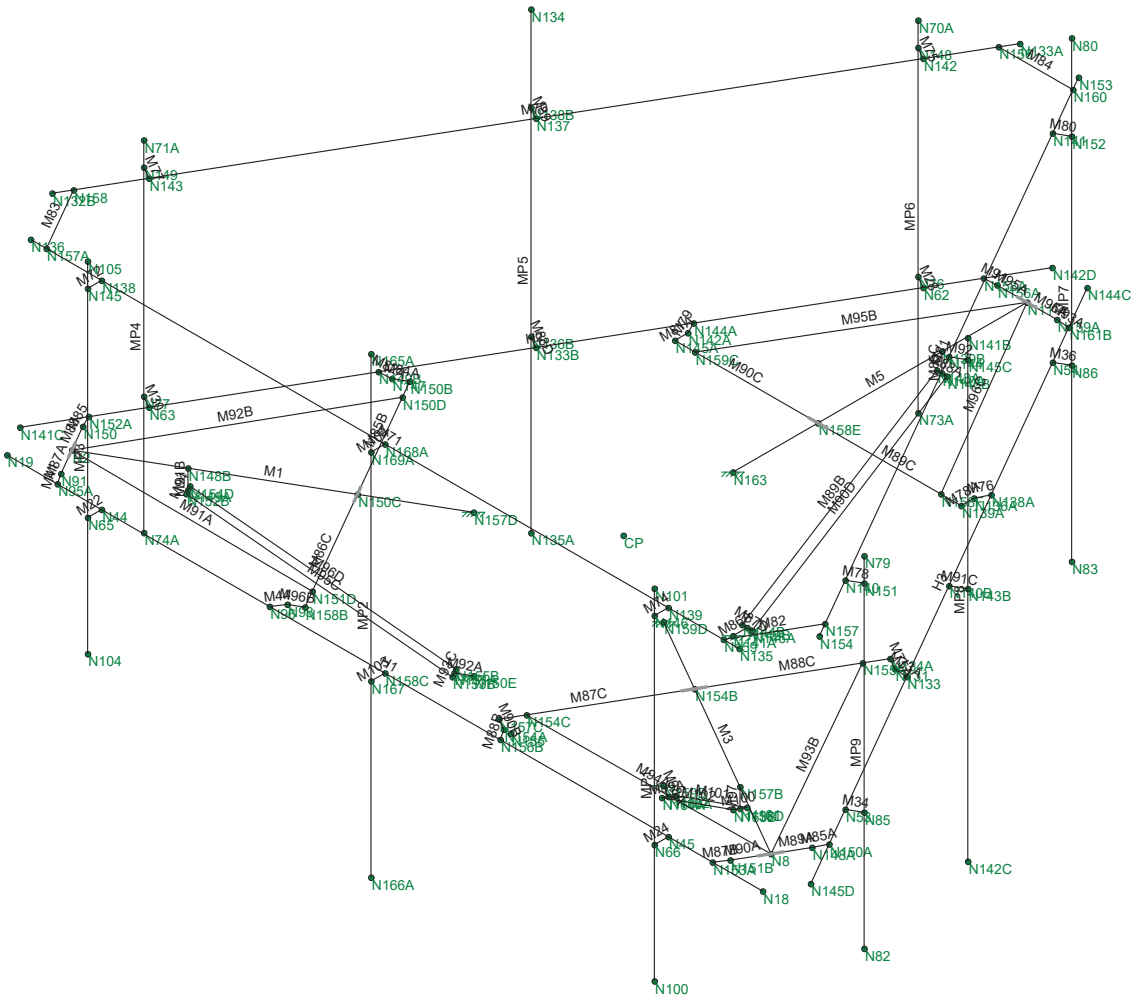
Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H, Section 15.5

4.1) Recommendations

The mount has sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Trylon	876319	Wireframe
MFT		Aug 31, 2021 at 3:16 PM
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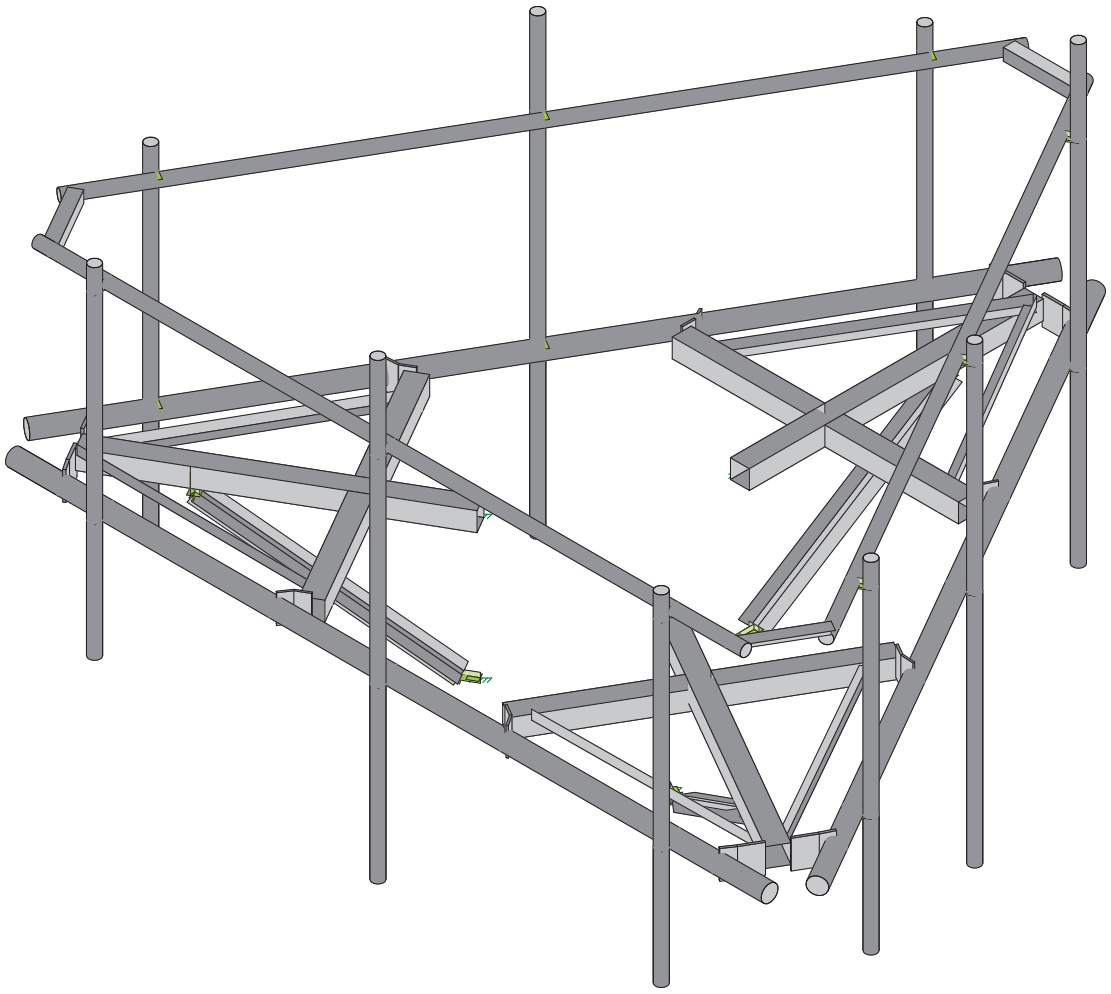


Trylon	876319	Render
MFT		Aug 31, 2021 at 3:16 PM
191124		876319_loaded.r3d

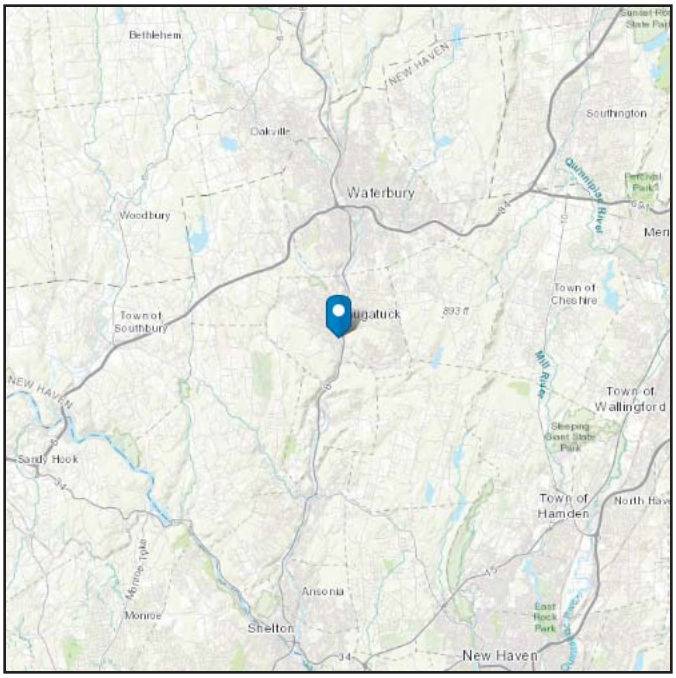
APPENDIX B

SOFTWARE INPUT CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	232.9 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.481261
Soil Class:	D - Stiff Soil	**Longitude:**	-73.053242



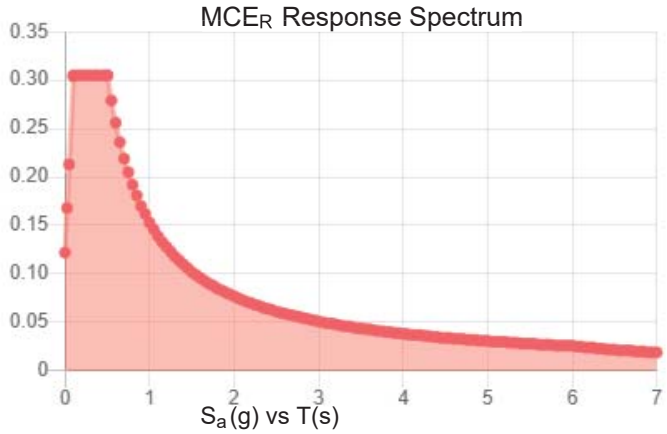
Seismic

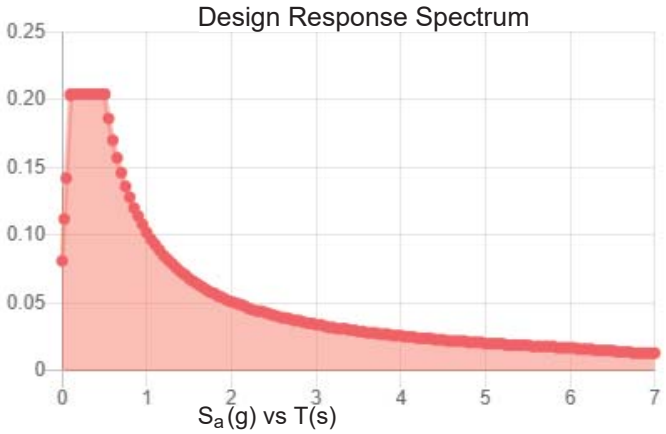
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.191	S_{DS} :	0.204
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.1
S_{MS} :	0.305	PGA_M :	0.159
S_{M1} :	0.153	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Mon Aug 30 2021

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:	Mon Aug 30 2021

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 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.

Trylon
1825 W. Walnut Hill Lane Suite 120
Irving, TX 75038

TIA LOAD CALCULATOR 2.1

PROJECT DATA	
Job Code:	191124
Carrier Site ID:	876319
Carrier Site Name:	NAUGATUCK 2 UNIROYAL

CODES AND STANDARDS	
Building Code:	2015 IBC
Local Building Code:	2018 CSBC
Design Standard:	TIA-222-H

STRUCTURE DETAILS		
Mount Type:	Platform	--
Mount Elevation:	119.0	ft.
Number of Sectors:	3	--
Structure Type:	Monopole	--
Structure Height:	150.0	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	B	--
Site Class:	D - Stiff Soil	--
Ground Elevation:	232.9	ft.

TOPOGRAPHIC DATA		
Topographic Category:	1.00	--
Topographic Feature:	N/A	--
Crest Point Elevation:	0.00	ft.
Base Point Elevation:	0.00	ft.
Crest to Mid-Height (L/2):	0.00	ft.
Distance from Crest (x):	0.00	ft.
Base Topo Factor (K_{zt}):	1.00	--
Mount Topo Factor (K_{zt}):	1.00	--

WIND PARAMETERS		
Design Wind Speed:	125	mph
Wind Escalation Factor (K_s):	1.00	--
Velocity Coefficient (K_z):	1.04	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (Gh):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	39.14	psf
Ground Elevation Factor (K_e):	0.99	--

ICE PARAMETERS		
Design Ice Wind Speed:	50	mph
Design Ice Thickness (t_i):	1.50	in
Importance Factor (I_i):	1.00	--
Ice Velocity Pressure (q_{zi}):	39.14	psf
Mount Ice Thickness (t_{iz}):	1.71	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	70.44	psf
Round Member Pressure:	42.27	psf
Ice Wind Pressure:	7.40	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel .(S_s):	0.19	g
1 Second Accel (S_1):	0.06	g
Short Period Des. (S_{DS}):	0.20	g
1 Second Des. (S_{D1}):	0.10	g
Short Period Coeff. (F_a):	1.60	--
1 Second Coeff. (F_v):	2.40	--
Response Coefficient (Cs):	0.10	--
Amplification Factor (A_S):	1.20	--

LOAD COMBINATIONS [LRFD]

#	Description
1	1.4DL
2	1.2DL + 1WL 0 AZI
3	1.2DL + 1WL 30 AZI
4	1.2DL + 1WL 45 AZI
5	1.2DL + 1WL 60 AZI
6	1.2DL + 1WL 90 AZI
7	1.2DL + 1WL 120 AZI
8	1.2DL + 1WL 135 AZI
9	1.2DL + 1WL 150 AZI
10	1.2DL + 1WL 180 AZI
11	1.2DL + 1WL 210 AZI
12	1.2DL + 1WL 225 AZI
13	1.2DL + 1WL 240 AZI
14	1.2DL + 1WL 270 AZI
15	1.2DL + 1WL 300 AZI
16	1.2DL + 1WL 315 AZI
17	1.2DL + 1WL 330 AZI
18	0.9DL + 1WL 0 AZI
19	0.9DL + 1WL 30 AZI
20	0.9DL + 1WL 45 AZI
21	0.9DL + 1WL 60 AZI
22	0.9DL + 1WL 90 AZI
23	0.9DL + 1WL 120 AZI
24	0.9DL + 1WL 135 AZI
25	0.9DL + 1WL 150 AZI
26	0.9DL + 1WL 180 AZI
27	0.9DL + 1WL 210 AZI
28	0.9DL + 1WL 225 AZI
29	0.9DL + 1WL 240 AZI
30	0.9DL + 1WL 270 AZI
31	0.9DL + 1WL 300 AZI
32	0.9DL + 1WL 315 AZI
33	0.9DL + 1WL 330 AZI
34	1.2DL + 1DLi + 1WLi 0 AZI
35	1.2DL + 1DLi + 1WLi 30 AZI
36	1.2DL + 1DLi + 1WLi 45 AZI
37	1.2DL + 1DLi + 1WLi 60 AZI
38	1.2DL + 1DLi + 1WLi 90 AZI
39	1.2DL + 1DLi + 1WLi 120 AZI
40	1.2DL + 1DLi + 1WLi 135 AZI
41	1.2DL + 1DLi + 1WLi 150 AZI

#	Description
42	1.2DL + 1DLi + 1WLi 180 AZI
43	1.2DL + 1DLi + 1WLi 210 AZI
44	1.2DL + 1DLi + 1WLi 225 AZI
45	1.2DL + 1DLi + 1WLi 240 AZI
46	1.2DL + 1DLi + 1WLi 270 AZI
47	1.2DL + 1DLi + 1WLi 300 AZI
48	1.2DL + 1DLi + 1WLi 315 AZI
49	1.2DL + 1DLi + 1WLi 330 AZI
50	(1.2+0.2Sds) + 1.0E 0 AZI
51	(1.2+0.2Sds) + 1.0E 30 AZI
52	(1.2+0.2Sds) + 1.0E 45 AZI
53	(1.2+0.2Sds) + 1.0E 60 AZI
54	(1.2+0.2Sds) + 1.0E 90 AZI
55	(1.2+0.2Sds) + 1.0E 120 AZI
56	(1.2+0.2Sds) + 1.0E 135 AZI
57	(1.2+0.2Sds) + 1.0E 150 AZI
58	(1.2+0.2Sds) + 1.0E 180 AZI
59	(1.2+0.2Sds) + 1.0E 210 AZI
60	(1.2+0.2Sds) + 1.0E 225 AZI
61	(1.2+0.2Sds) + 1.0E 240 AZI
62	(1.2+0.2Sds) + 1.0E 270 AZI
63	(1.2+0.2Sds) + 1.0E 300 AZI
64	(1.2+0.2Sds) + 1.0E 315 AZI
65	(1.2+0.2Sds) + 1.0E 330 AZI
66	(0.9-0.2Sds) + 1.0E 0 AZI
67	(0.9-0.2Sds) + 1.0E 30 AZI
68	(0.9-0.2Sds) + 1.0E 45 AZI
69	(0.9-0.2Sds) + 1.0E 60 AZI
70	(0.9-0.2Sds) + 1.0E 90 AZI
71	(0.9-0.2Sds) + 1.0E 120 AZI
72	(0.9-0.2Sds) + 1.0E 135 AZI
73	(0.9-0.2Sds) + 1.0E 150 AZI
74	(0.9-0.2Sds) + 1.0E 180 AZI
75	(0.9-0.2Sds) + 1.0E 210 AZI
76	(0.9-0.2Sds) + 1.0E 225 AZI
77	(0.9-0.2Sds) + 1.0E 240 AZI
78	(0.9-0.2Sds) + 1.0E 270 AZI
79	(0.9-0.2Sds) + 1.0E 300 AZI
80	(0.9-0.2Sds) + 1.0E 315 AZI
81	(0.9-0.2Sds) + 1.0E 330 AZI
82-88	1.2D + 1.5 Lv1

#	Description
89	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP1
90	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP1
91	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP1
92	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP1
93	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP1
94	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP1
95	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP1
96	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP1
97	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP1
98	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP1
99	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP1
100	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP1
101	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP1
102	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP1
103	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP1
104	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP1
105	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP2
106	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP2
107	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP2
108	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP2
109	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP2
110	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP2
111	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP2
112	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP2
113	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP2
114	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP2
115	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP2
116	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP2
117	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP2
118	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP2
119	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP2
120	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP2

#	Description
121	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP3
122	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP3
123	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP3
124	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP3
125	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP3
126	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP3
127	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP3
128	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP3
129	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP3
130	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP3
131	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP3
132	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP3
133	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP3
134	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP3
135	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP3
136	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP3
137	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP4
138	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP4
139	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP4
140	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP4
141	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP4
142	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP4
143	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP4
144	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP4
145	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP4
146	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP4
147	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP4
148	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP4
149	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP4
150	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP4
151	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP4
152	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP4

*This page shows an example of maintenance loads for (4) pipes, the number of mount pipe LCs may vary per site

EQUIPMENT LOADING

Appurtenance Name	***Qty.***	***Elevation [ft]***	***--***	***EPA $_N$ (ft2)***	***EPA $_T$ (ft2)***	***Weight (lbs)***
AIR6449 B41_T-MOBILE	3	120	No Ice	5.66	2.48	114.63
--	--	--	w/ Ice	6.63	3.10	150.53
APXVAARR24_43-U-NA20	3	120	No Ice	20.24	8.89	128.00
--	--	--	w/ Ice	17.04	7.41	419.84
RADIO 4449 B71/B85A	3	120	No Ice	1.64	1.31	74.95
--	--	--	w/ Ice	2.03	1.67	70.44
RADIO 4460 B2/B25 B66_TMO	3	120	No Ice	2.14	1.69	109.00
--	--	--	w/ Ice	2.57	2.08	88.55
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
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			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

EQUIPMENT WIND CALCULATIONS

Appurtenance Name	Qty.	Elevation [ft]	K_{zt}	K_z	K_d	t_d	q_z [psf]	q_{zi} [psf]
AIR6449 B41_T-MOBILE	3	120	1.00	1.04	0.95	1.71	39.23	6.28
APXVAARR24_43-U-NA20	3	120	1.00	1.04	0.95	1.71	39.23	6.28
RADIO 4449 B71/B85A	3	120	1.00	1.04	0.95	1.71	39.23	6.28
ADIO 4460 B2/B25 B66_TM	3	120	1.00	1.04	0.95	1.71	39.23	6.28

EQUIPMENT LATERAL WIND FORCE CALCULATIONS

Appurtenance Name	Qty.	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
AIR6449 B41_T-MOBILE	3	No Ice	199.80	115.53	171.71	87.44	171.71	115.53
--	--	w/ Ice	37.48	22.50	32.48	17.51	32.48	22.50
APXVAARR24_43-U-NA20	3	No Ice	714.68	414.03	614.47	313.82	614.47	414.03
--	--	w/ Ice	96.24	55.44	82.64	41.83	82.64	55.44
RADIO 4449 B71/B85A	3	No Ice	58.06	49.21	55.11	46.26	55.11	49.21
--	--	w/ Ice	11.48	9.93	10.96	9.41	10.96	9.93
RADIO 4460 B2/B25 B66_TMC	3	No Ice	75.53	63.52	71.52	59.52	71.52	63.52
--	--	w/ Ice	14.54	12.46	13.85	11.77	13.85	12.46
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
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		No Ice						
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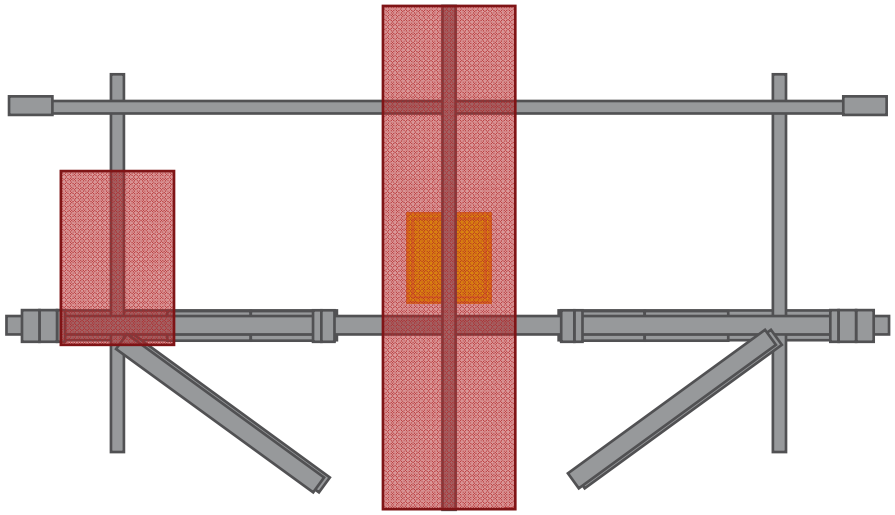
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						

EQUIPMENT SEISMIC FORCE CALCULATIONS

Appurtenance Name	Qty.	Elevation [ft]	Weight [lbs]	F_p [lbs]
AIR6449 B41_T-MOBILE	3	120	114.63	13.94
APXVAARR24_43-U-NA20	3	120	128	15.56
RADIO 4449 B71/B85A	3	120	74.95	9.11
RADIO 4460 B2/B25 B66_TMO	3	120	109	13.25

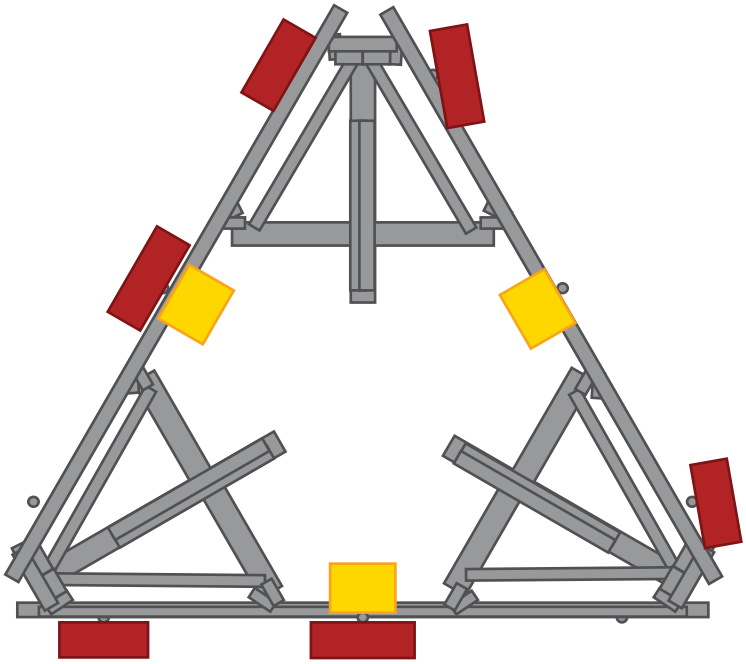
ELEVATION VIEW



MP3 MP2 MP1

*Elevation View Shows Alpha Sector Only

PLAN VIEW



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Equipment Name	Total Quantity	Antenna Centerline	Mount Pipe Positions	Equipment Azimuths
AIR6449 B41_T-MOBILE	3	120	MP3/MP6/MP9	0/120/260
APXVAARR24_43-U-NA20	3	120	MP2/MP5/MP7	0/120/260
RADIO 4449 B71/B85A	3	120	MP2/MP5/MP8	0/120/240
RADIO 4460 B2/B25 B66_TMO	3	120	MP2/MP5/MP8	0/120/240

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APPENDIX C

SOFTWARE ANALYSIS OUTPUT

(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	AISC 15th(360-16): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	AWC NDS-18: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: Strength
Aluminum Code	AA ADM1-10: LRFD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

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?	No
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	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E..	Density[k/ft...	Yield[psi]	Ry	Fu[psi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36000	1.5	58000	1.2
2	A500 Gr.B RND	29000	11154	.3	.65	.527	42000	1.4	58000	1.3
3	A500 Gr.B Rect	29000	11154	.3	.65	.527	46000	1.4	58000	1.3
4	A53 Gr.B	29000	11154	.3	.65	.49	35000	1.6	60000	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Standoffs	HSS4X4X4	Beam	None	A500 Gr.B ...	Typical	3.37	7.8	7.8	12.8
2	Horizontals	PIPE_3.0	Beam	None	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
3	Platform An...	L2x2x3	Beam	None	A36 Gr.36	Typical	.722	.271	.271	.009
4	Mount Pipe	PIPE_2.0	Column	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
5	Corner Plate	6"x1/2" Plate	Beam	None	A36 Gr.36	Typical	3	.063	9	.237
6	Handrail Hor...	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
7	Angle Handr...	L2.5x2.5x4	Beam	None	A36 Gr.36	Typical	1.19	.692	.692	.026
8	Platform Bra...	HSS4X4X4	Beam	None	A500 Gr.B ...	Typical	3.37	7.8	7.8	12.8
9	Connection ...	PL6x.375	Beam	None	A36 Gr.36	Typical	2.25	.026	6.75	.101
10	Kickers	L2.5x2.5x3	Beam	None	A36 Gr.36	Typical	.901	.535	.535	.011

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N163	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N157D	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Joint Boundary Conditions (Continued)

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
3	N159D	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N141A	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N142B						
6	N144B						
7	N146A						
8	N150E	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
9	N151A						
10	N153B						
11	N155B						
12	N159B	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
13	N160A						
14	N162						
15	N164A						

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Self Weight	DL		-1			18		3	
2	Structure Wind Z	WLZ						93		
3	Structure Wind X	WLX						93		
4	Wind Load 0 AZI	WLZ					36			
5	Wind Load 30 AZI	None					36			
6	Wind Load 45 AZI	None					36			
7	Wind Load 60 AZI	None					36			
8	Wind Load 90 AZI	WLX					36			
9	Wind Load 120 AZI	None					36			
10	Wind Load 135 AZI	None					36			
11	Wind Load 150 AZI	None					36			
12	Ice Weight	OL1					18	93	3	
13	Ice Structure Wind Z	OL2						93		
14	Ice Structure Wind X	OL3						93		
15	Ice Wind Load 0 AZI	OL2					36			
16	Ice Wind Load 30 AZI	None					36			
17	Ice Wind Load 45 AZI	None					36			
18	Ice Wind Load 60 AZI	None					36			
19	Ice Wind Load 90 AZI	OL3					36			
20	Ice Wind Load 120 AZI	None					36			
21	Ice Wind Load 135 AZI	None					36			
22	Ice Wind Load 150 AZI	None					36			
23	Seismic Load Z	ELZ			-.122		18			
24	Seismic Load X	ELX	-.122				18			
25	Live Load 1 (Lv)	None					1			
26	Live Load 2 (Lv)	None					1			
27	Live Load 3 (Lv)	None					1			
28	Live Load 4 (Lv)	None					1			
29	Live Load 5 (Lv)	None					1			
30	Live Load 6 (Lv)	None					1			
31	Live Load 7 (Lv)	None					1			
32	Live Load 8 (Lv)	None					1			
33	Live Load 9 (Lv)	None					1			
34	Maintenance Load 1 (...	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
35	Maintenance Load 2 (...	None					1			
36	Maintenance Load 3 (...	None					1			
37	Maintenance Load 4 (...	None					1			
38	Maintenance Load 5 (...	None					1			
39	Maintenance Load 6 (...	None					1			
40	Maintenance Load 7 (...	None					1			
41	Maintenance Load 8 (...	None					1			
42	Maintenance Load 9 (...	None					1			
43	BLC 1 Transient Area...	None						21		
44	BLC 12 Transient Are...	None						21		

Load Combinations

	Description	Sol...	PD...	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.4DL	Yes	Y		DL	1.4																		
2	1.2DL + 1...	Yes	Y		DL	1.2	2	1	3		4	1												
3	1.2DL + 1...	Yes	Y		DL	1.2	2	.866	3	.5	5	1												
4	1.2DL + 1...	Yes	Y		DL	1.2	2	.707	3	.707	6	1												
5	1.2DL + 1...	Yes	Y		DL	1.2	2	.5	3	.866	7	1												
6	1.2DL + 1...	Yes	Y		DL	1.2	2		3	1	8	1												
7	1.2DL + 1...	Yes	Y		DL	1.2	2	-.5	3	.866	9	1												
8	1.2DL + 1...	Yes	Y		DL	1.2	2	-.707	3	.707	10	1												
9	1.2DL + 1...	Yes	Y		DL	1.2	2	-.866	3	.5	11	1												
10	1.2DL + 1...	Yes	Y		DL	1.2	2	-1	3		4	-1												
11	1.2DL + 1...	Yes	Y		DL	1.2	2	-.866	3	-.5	5	-1												
12	1.2DL + 1...	Yes	Y		DL	1.2	2	-.707	3	-.707	6	-1												
13	1.2DL + 1...	Yes	Y		DL	1.2	2	-.5	3	-.866	7	-1												
14	1.2DL + 1...	Yes	Y		DL	1.2	2		3	-1	8	-1												
15	1.2DL + 1...	Yes	Y		DL	1.2	2	.5	3	-.866	9	-1												
16	1.2DL + 1...	Yes	Y		DL	1.2	2	.707	3	-.707	10	-1												
17	1.2DL + 1...	Yes	Y		DL	1.2	2	.866	3	-.5	11	-1												
18	0.9DL + 1...	Yes	Y		DL	.9	2	1	3		4	1												
19	0.9DL + 1...	Yes	Y		DL	.9	2	.866	3	.5	5	1												
20	0.9DL + 1...	Yes	Y		DL	.9	2	.707	3	.707	6	1												
21	0.9DL + 1...	Yes	Y		DL	.9	2	.5	3	.866	7	1												
22	0.9DL + 1...	Yes	Y		DL	.9	2		3	1	8	1												
23	0.9DL + 1...	Yes	Y		DL	.9	2	-.5	3	.866	9	1												
24	0.9DL + 1...	Yes	Y		DL	.9	2	-.707	3	.707	10	1												
25	0.9DL + 1...	Yes	Y		DL	.9	2	-.866	3	.5	11	1												
26	0.9DL + 1...	Yes	Y		DL	.9	2	-1	3		4	-1												
27	0.9DL + 1...	Yes	Y		DL	.9	2	-.866	3	-.5	5	-1												
28	0.9DL + 1...	Yes	Y		DL	.9	2	-.707	3	-.707	6	-1												
29	0.9DL + 1...	Yes	Y		DL	.9	2	-.5	3	-.866	7	-1												
30	0.9DL + 1...	Yes	Y		DL	.9	2		3	-1	8	-1												
31	0.9DL + 1...	Yes	Y		DL	.9	2	.5	3	-.866	9	-1												
32	0.9DL + 1...	Yes	Y		DL	.9	2	.707	3	-.707	10	-1												
33	0.9DL + 1...	Yes	Y		DL	.9	2	.866	3	-.5	11	-1												
34	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	1	14		15	1										
35	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.866	14	.5	16	1										
36	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.707	14	.707	17	1										
37	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.5	14	.866	18	1										

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
38	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13		14	1	19	1												
39	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	.866	20	1												
40	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.707	14	.707	21	1												
41	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.866	14	.5	22	1												
42	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-1	14		15	-1												
43	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.866	14	-.5	16	-1												
44	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.707	14	-.707	17	-1												
45	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	-.5	14	-.866	18	-1												
46	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13		14	-1	19	-1												
47	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.5	14	-.866	20	-1												
48	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.707	14	-.707	21	-1												
49	1.2DL + 1...	Yes	Y		DL	1.2	OL1	1	13	.866	14	-.5	22	-1												
50	(1.2+0.2S...	Yes	Y		DL	1.241	23	1	24																	
51	(1.2+0.2S...	Yes	Y		DL	1.241	23	.866	24	.5																
52	(1.2+0.2S...	Yes	Y		DL	1.241	23	.707	24	.707																
53	(1.2+0.2S...	Yes	Y		DL	1.241	23	.5	24	.866																
54	(1.2+0.2S...	Yes	Y		DL	1.241	23		24	1																
55	(1.2+0.2S...	Yes	Y		DL	1.241	23	-.5	24	.866																
56	(1.2+0.2S...	Yes	Y		DL	1.241	23	-.707	24	.707																
57	(1.2+0.2S...	Yes	Y		DL	1.241	23	-.866	24	.5																
58	(1.2+0.2S...	Yes	Y		DL	1.241	23	-1	24																	
59	(1.2+0.2S...	Yes	Y		DL	1.241	23	-.866	24	-.5																
60	(1.2+0.2S...	Yes	Y		DL	1.241	23	-.707	24	-.707																
61	(1.2+0.2S...	Yes	Y		DL	1.241	23	-.5	24	-.866																
62	(1.2+0.2S...	Yes	Y		DL	1.241	23		24	-1																
63	(1.2+0.2S...	Yes	Y		DL	1.241	23	.5	24	-.866																
64	(1.2+0.2S...	Yes	Y		DL	1.241	23	.707	24	-.707																
65	(1.2+0.2S...	Yes	Y		DL	1.241	23	.866	24	-.5																
66	(0.9-0.2Sd...	Yes	Y		DL	.859	23	1	24																	
67	(0.9-0.2Sd...	Yes	Y		DL	.859	23	.866	24	.5																
68	(0.9-0.2Sd...	Yes	Y		DL	.859	23	.707	24	.707																
69	(0.9-0.2Sd...	Yes	Y		DL	.859	23	.5	24	.866																
70	(0.9-0.2Sd...	Yes	Y		DL	.859	23		24	1																
71	(0.9-0.2Sd...	Yes	Y		DL	.859	23	-.5	24	.866																
72	(0.9-0.2Sd...	Yes	Y		DL	.859	23	-.707	24	.707																
73	(0.9-0.2Sd...	Yes	Y		DL	.859	23	-.866	24	.5																
74	(0.9-0.2Sd...	Yes	Y		DL	.859	23	-1	24																	
75	(0.9-0.2Sd...	Yes	Y		DL	.859	23	-.866	24	-.5																
76	(0.9-0.2Sd...	Yes	Y		DL	.859	23	-.707	24	-.707																
77	(0.9-0.2Sd...	Yes	Y		DL	.859	23	-.5	24	-.866																
78	(0.9-0.2Sd...	Yes	Y		DL	.859	23		24	-1																
79	(0.9-0.2Sd...	Yes	Y		DL	.859	23	.5	24	-.866																
80	(0.9-0.2Sd...	Yes	Y		DL	.859	23	.707	24	-.707																
81	(0.9-0.2Sd...	Yes	Y		DL	.859	23	.866	24	-.5																
82	1.2DL + 1...	Yes	Y		DL	1.2	25	1.5																		
83	1.2DL + 1...	Yes	Y		DL	1.2	26	1.5																		
84	1.2DL + 1...	Yes	Y		DL	1.2	27	1.5																		
85	1.2DL + 1...	Yes	Y		DL	1.2	28	1.5																		
86	1.2DL + 1...	Yes	Y		DL	1.2	29	1.5																		
87	1.2DL + 1...	Yes	Y		DL	1.2	30	1.5																		
88	1.2DL + 1...	Yes	Y		DL	1.2	31	1.5																		
89	1.2DL + 1...	Yes	Y		DL	1.2	32	1.5																		

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
90	1.2DL + 1...	Yes	Y		DL	1.2	33	1.5																		
91	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	.058	3		4	.058												
92	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	.05	3	.029	5	.058												
93	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	.041	3	.041	6	.058												
94	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	.029	3	.05	7	.058												
95	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2		3	.058	8	.058												
96	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	-.029	3	.05	9	.058												
97	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	-.041	3	.041	10	.058												
98	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	-.05	3	.029	11	.058												
99	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	-.058	3		4	-.058												
100	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	-.05	3	-.029	5	-.058												
101	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	-.041	3	-.041	6	-.058												
102	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	-.029	3	-.05	7	-.058												
103	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2		3	-.058	8	-.058												
104	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	.029	3	-.05	9	-.058												
105	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	.041	3	-.041	10	-.058												
106	1.2DL + 1...	Yes	Y		DL	1.2	34	1.5	2	.05	3	-.029	11	-.058												
107	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	.058	3		4	.058												
108	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	.05	3	.029	5	.058												
109	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	.041	3	.041	6	.058												
110	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	.029	3	.05	7	.058												
111	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2		3	.058	8	.058												
112	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	-.029	3	.05	9	.058												
113	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	-.041	3	.041	10	.058												
114	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	-.05	3	.029	11	.058												
115	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	-.058	3		4	-.058												
116	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	-.05	3	-.029	5	-.058												
117	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	-.041	3	-.041	6	-.058												
118	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	-.029	3	-.05	7	-.058												
119	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2		3	-.058	8	-.058												
120	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	.029	3	-.05	9	-.058												
121	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	.041	3	-.041	10	-.058												
122	1.2DL + 1...	Yes	Y		DL	1.2	35	1.5	2	.05	3	-.029	11	-.058												
123	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	.058	3		4	.058												
124	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	.05	3	.029	5	.058												
125	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	.041	3	.041	6	.058												
126	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	.029	3	.05	7	.058												
127	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2		3	.058	8	.058												
128	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	-.029	3	.05	9	.058												
129	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	-.041	3	.041	10	.058												
130	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	-.05	3	.029	11	.058												
131	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	-.058	3		4	-.058												
132	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	-.05	3	-.029	5	-.058												
133	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	-.041	3	-.041	6	-.058												
134	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	-.029	3	-.05	7	-.058												
135	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2		3	-.058	8	-.058												
136	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	.029	3	-.05	9	-.058												
137	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	.041	3	-.041	10	-.058												
138	1.2DL + 1...	Yes	Y		DL	1.2	36	1.5	2	.05	3	-.029	11	-.058												
139	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	.058	3		4	.058												
140	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	.05	3	.029	5	.058												
141	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	.041	3	.041	6	.058												

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
142	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	.029	3	.05	7	.058										
143	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2		3	.058	8	.058										
144	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	-.029	3	.05	9	.058										
145	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	-.041	3	.041	10	.058										
146	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	-.05	3	.029	11	.058										
147	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	-.058	3		4	-.058										
148	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	-.05	3	-.029	5	-.058										
149	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	-.041	3	-.041	6	-.058										
150	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	-.029	3	-.05	7	-.058										
151	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2		3	-.058	8	-.058										
152	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	.029	3	-.05	9	-.058										
153	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	.041	3	-.041	10	-.058										
154	1.2DL + 1...	Yes	Y		DL	1.2	37	1.5	2	.05	3	-.029	11	-.058										
155	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	.058	3		4	.058										
156	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	.05	3	.029	5	.058										
157	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	.041	3	.041	6	.058										
158	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	.029	3	.05	7	.058										
159	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2		3	.058	8	.058										
160	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	-.029	3	.05	9	.058										
161	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	-.041	3	.041	10	.058										
162	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	-.05	3	.029	11	.058										
163	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	-.058	3		4	-.058										
164	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	-.05	3	-.029	5	-.058										
165	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	-.041	3	-.041	6	-.058										
166	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	-.029	3	-.05	7	-.058										
167	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2		3	-.058	8	-.058										
168	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	.029	3	-.05	9	-.058										
169	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	.041	3	-.041	10	-.058										
170	1.2DL + 1...	Yes	Y		DL	1.2	38	1.5	2	.05	3	-.029	11	-.058										
171	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	.058	3		4	.058										
172	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	.05	3	.029	5	.058										
173	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	.041	3	.041	6	.058										
174	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	.029	3	.05	7	.058										
175	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2		3	.058	8	.058										
176	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	-.029	3	.05	9	.058										
177	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	-.041	3	.041	10	.058										
178	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	-.05	3	.029	11	.058										
179	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	-.058	3		4	-.058										
180	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	-.05	3	-.029	5	-.058										
181	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	-.041	3	-.041	6	-.058										
182	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	-.029	3	-.05	7	-.058										
183	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2		3	-.058	8	-.058										
184	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	.029	3	-.05	9	-.058										
185	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	.041	3	-.041	10	-.058										
186	1.2DL + 1...	Yes	Y		DL	1.2	39	1.5	2	.05	3	-.029	11	-.058										
187	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	.058	3		4	.058										
188	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	.05	3	.029	5	.058										
189	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	.041	3	.041	6	.058										
190	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	.029	3	.05	7	.058										
191	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2		3	.058	8	.058										
192	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	-.029	3	.05	9	.058										
193	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	-.041	3	.041	10	.058										

Load Combinations (Continued)

	Description	Sol..	PD..	SR..	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
194	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	-.05	3	.029	11	.058										
195	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	-.058	3		4	-.058										
196	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	-.05	3	-.029	5	-.058										
197	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	-.041	3	-.041	6	-.058										
198	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	-.029	3	-.05	7	-.058										
199	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2		3	-.058	8	-.058										
200	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	.029	3	-.05	9	-.058										
201	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	.041	3	-.041	10	-.058										
202	1.2DL + 1...	Yes	Y		DL	1.2	40	1.5	2	.05	3	-.029	11	-.058										
203	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	.058	3		4	.058										
204	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	.05	3	.029	5	.058										
205	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	.041	3	.041	6	.058										
206	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	.029	3	.05	7	.058										
207	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2		3	.058	8	.058										
208	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	-.029	3	.05	9	.058										
209	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	-.041	3	.041	10	.058										
210	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	-.05	3	.029	11	.058										
211	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	-.058	3		4	-.058										
212	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	-.05	3	-.029	5	-.058										
213	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	-.041	3	-.041	6	-.058										
214	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	-.029	3	-.05	7	-.058										
215	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2		3	-.058	8	-.058										
216	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	.029	3	-.05	9	-.058										
217	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	.041	3	-.041	10	-.058										
218	1.2DL + 1...	Yes	Y		DL	1.2	41	1.5	2	.05	3	-.029	11	-.058										
219	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	.058	3		4	.058										
220	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	.05	3	.029	5	.058										
221	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	.041	3	.041	6	.058										
222	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	.029	3	.05	7	.058										
223	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2		3	.058	8	.058										
224	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	-.029	3	.05	9	.058										
225	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	-.041	3	.041	10	.058										
226	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	-.05	3	.029	11	.058										
227	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	-.058	3		4	-.058										
228	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	-.05	3	-.029	5	-.058										
229	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	-.041	3	-.041	6	-.058										
230	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	-.029	3	-.05	7	-.058										
231	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2		3	-.058	8	-.058										
232	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	.029	3	-.05	9	-.058										
233	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	.041	3	-.041	10	-.058										
234	1.2DL + 1...	Yes	Y		DL	1.2	42	1.5	2	.05	3	-.029	11	-.058										

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N163	max	1526.266	6	935.555	37	3325.367	34	976.6	37	1955.488	30	485.364	232
2		min	-1520.112	30	153.062	29	-1239.249	26	138.766	29	-1962.681	6	-638.117	208
3	N157D	max	2713.724	7	1248.521	47	1390.558	33	273.002	19	1179.666	19	-9.393	27
4		min	-1564.223	31	221.371	23	-2062.808	9	-925.16	196	-1186.449	11	-1053.415	35
5	N159D	max	1433.48	21	974.749	39	1165.314	20	210.058	33	722.731	25	859.426	234
6		min	-2538.515	13	193.696	32	-1802.958	12	-892.112	194	-726.214	17	95.926	25

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
7	N141A	max	58.356	22	2069.177	34	-470.891	26	571.421	34	201.955	14	117.022	14
8		min	-64.665	14	289.014	26	-3178.904	34	68.122	26	-197.32	22	-115.616	22
9	N150E	max	-112.56	31	1557.768	39	1174.582	39	35.419	30	111.164	14	-40.67	32
10		min	-2012.991	39	79.788	31	93.646	31	-238.393	39	-102.639	22	-401.499	40
11	N159B	max	1913.747	45	1476.747	45	1112.137	45	36.684	22	96.856	30	375.608	44
12		min	67.119	21	40.694	21	62.572	21	-223.954	45	-98.086	6	21.53	20
13	Totals:	max	4555.532	22	7989.167	38	4424.312	18						
14		min	-4555.532	30	2170.948	78	-4424.313	10						

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

	Member	Shape	Code ...	Loc[...	LC	Shear...	Loc[in]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	MP5	PIPE_2.0	.604	60	13	.064	60		6	14916....	32130	1871.625	1871.625	1...	H1-1b
2	MP2	PIPE_2.0	.602	60	2	.053	60		3	14916....	32130	1871.625	1871.625	1...	H1-1b
3	MP7	PIPE_2.0	.597	60	14	.100	60		15	14916....	32130	1871.625	1871.625	2...	H1-1b
4	MP6	PIPE_2.0	.307	46.5	14	.121	46.5		5	20866....	32130	1871.625	1871.625	2...	H1-1b
5	MP8	PIPE_2.0	.304	46	6	.066	46		6	14916....	32130	1871.625	1871.625	3...	H1-1b
6	M81	PIPE_2.0	.297	135....	14	.211	145.313		6	25978....	32130	1871.625	1871.625	1	H1-1b
7	M84	L2.5x2.5x4	.235	0	14	.127	0	z	14	36453....	38556	1113.554	2537.388	2...	H2-1
8	MP3	PIPE_2.0	.233	46.5	3	.118	46.5		10	20866....	32130	1871.625	1871.625	2...	H1-1b
9	MP4	PIPE_2.0	.214	46.5	10	.110	46.5		5	20866....	32130	1871.625	1871.625	1...	H1-1b
10	M70	PIPE_2.0	.207	14.0...	6	.150	134.375		5	25978....	32130	1871.625	1871.625	1	H1-1b
11	M71	PIPE_2.0	.207	75	10	.155	134.375		10	25978....	32130	1871.625	1871.625	1	H1-1b
12	MP9	PIPE_2.0	.198	46.5	12	.049	46.5		14	20866....	32130	1871.625	1871.625	2...	H1-1b
13	M73A	PL6x.375	.190	2.704	6	.090	0	y	9	70544.2	72900	569.533	9112.5	1...	H1-1b
14	M81A	PL6x.375	.175	2.75	6	.123	2.75	y	13	70465.57	72900	569.533	9112.5	1...	H1-1b
15	MP1	PIPE_2.0	.172	46.5	16	.110	46.5		10	20866....	32130	1871.625	1871.625	2...	H1-1b
16	M82	L2.5x2.5x4	.163	15.7...	10	.069	15.731	y	10	36453....	38556	1113.554	2537.388	1...	H2-1
17	H1	PIPE_3.0	.160	80	188	.084	11.667		42	59302....	65205	5748.75	5748.75	1	H1-1b
18	H2	PIPE_3.0	.159	80	215	.109	11.667		6	59302....	65205	5748.75	5748.75	1	H1-1b
19	M5	HSS4X4X4	.154	0	6	.076	0	z	6	131968...	139518	16180.5	16180.5	1	H1-1b
20	M83	L2.5x2.5x4	.150	0	2	.098	15.731	y	3	36453....	38556	1113.554	2537.388	2...	H2-1
21	M89B	L2.5x2.5x3	.150	0	37	.006	48.765	z	5	17031.41	29192.4	872.574	1953.705	2...	H2-1
22	M95C	L2.5x2.5x3	.147	48.7...	11	.009	48.765	z	12	17031.41	29192.4	872.574	1962.891	2...	H2-1
23	M82A	PL6x.375	.147	2.704	14	.144	0	y	43	70544.2	72900	569.533	9112.5	1...	H1-1b
24	M90D	L2.5x2.5x3	.145	0	14	.006	48.765	y	5	17031.41	29192.4	872.574	1875.998	1...	H2-1
25	M91A	L2x2x3	.145	51.3...	9	.009	0	z	35	9346.076	23392.8	557.717	1239.29	2...	H2-1
26	M95B	L2x2x3	.143	51.3...	5	.010	0	z	45	9346.157	23392.8	557.717	1239.29	2...	H2-1
27	M96C	L2x2x3	.141	51.3...	15	.008	0	y	37	9346.27	23392.8	557.717	1239.29	2...	H2-1
28	H3	PIPE_3.0	.137	80	229	.095	148.333		6	59302....	65205	5748.75	5748.75	1	H1-1b
29	M96B	PL6x.375	.137	2.75	11	.120	2.75	y	11	70464....	72900	569.533	9112.5	1...	H1-1b
30	M92B	L2x2x3	.136	51.3...	6	.011	0	y	43	9346.21	23392.8	557.717	1227.502	2...	H2-1
31	M89A	6"x1/2" Plate	.133	4.338	14	.073	4.338	y	1...	92686....	97200	1012.5	12150	1...	H1-1b
32	M79	PL6x.375	.132	2.704	14	.097	0	y	14	70544.2	72900	569.533	9112.5	1...	H1-1b
33	M88	6"x1/2" Plate	.132	0	7	.071	0	y	1...	92686....	97200	1012.5	12150	1...	H1-1b
34	M102	L2.5x2.5x3	.131	48.7...	99	.008	48.765	y	9	17031.41	29192.4	872.574	1925.247	2...	H2-1
35	M94A	L2x2x3	.130	51.3...	11	.010	0	y	49	9346.209	23392.8	557.717	1239.29	2...	H2-1
36	M101	L2.5x2.5x3	.130	48.7...	186	.008	48.765	z	17	17031.41	29192.4	872.574	1927.266	2...	H2-1
37	M93B	L2x2x3	.127	51.3...	14	.008	0	z	42	9346.076	23392.8	557.717	1235.721	2...	H2-1
38	M84A	PL6x.375	.125	2.75	3	.124	2.75	y	12	70464....	72900	569.533	9112.5	1...	H1-1b
39	M96D	L2.5x2.5x3	.125	48.7...	3	.009	48.765	y	12	17031.41	29192.4	872.574	1971.83	2...	H2-1

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

	Member	Shape	Code ...	Loc[...	LC	Shear...	Loc[in]	Dir	LC	phi*Pnc..	phi*Pnt...	phi*Mn ..	phi*Mn ..	Cb	Eqn
40	M86C	HSS4X4X4	.120	0	42	.033	0	y	43	136307...	139518	16180.5	16180.5	1...	H1-1b
41	M87A	6"x1/2" Plate	.119	4.338	7	.074	4.338	y	1...	92686....	97200	1012.5	12150	1...	H1-1b
42	M85B	HSS4X4X4	.116	28.3...	37	.028	4.127	z	5	136307...	139518	16180.5	16180.5	1...	H1-1b
43	M78A	PL6x.375	.113	2.75	14	.120	2.75	y	5	70464....	72900	569.533	9112.5	1...	H1-1b
44	M95A	6"x1/2" Plate	.113	4.338	3	.091	4.338	y	44	92685....	97200	1012.5	12150	1...	H1-1b
45	M85	6"x1/2" Plate	.112	2.704	7	.051	2.704	y	13	95420....	97200	1012.5	12150	1...	H1-1b
46	M90C	HSS4X4X4	.111	0	36	.034	24.174	z	5	136307...	139518	16180.5	16180.5	1...	H1-1b
47	M96A	6"x1/2" Plate	.108	0	8	.093	0	y	36	92687....	97200	1012.5	12150	1...	H1-1b
48	M85A	6"x1/2" Plate	.107	2.704	14	.048	0	y	8	95420....	97200	1012.5	12150	1...	H1-1b
49	M1	HSS4X4X4	.105	0	11	.077	0	z	11	131968...	139518	16180.5	16180.5	1	H1-1b
50	M90B	PL6x.375	.105	2.75	9	.112	2.75	y	3	70464....	72900	569.533	9112.5	1...	H1-1b
51	M87C	HSS4X4X4	.105	28.3...	42	.027	28.301	y	41	136307...	139518	16180.5	16180.5	1...	H1-1b
52	M90A	6"x1/2" Plate	.104	0	12	.071	0	y	91	92686....	97200	1012.5	12150	1...	H1-1b
53	M75A	PL6x.375	.102	2.75	6	.152	2.75	y	15	70464....	72900	569.533	9112.5	1...	H1-1b
54	M41	6"x1/2" Plate	.098	2.704	7	.054	0	y	2	95420....	97200	1012.5	12150	1...	H1-1b
55	M89C	HSS4X4X4	.093	28.3	49	.031	4.127	z	15	136307...	139518	16180.5	16180.5	1...	H1-1b
56	M76	PL6x.375	.093	2.704	9	.089	0	y	6	70544.2	72900	569.533	9112.5	1...	H1-1b
57	M93A	6"x1/2" Plate	.092	2.704	8	.067	0	y	15	95420....	97200	1012.5	12150	1...	H1-1b
58	M44	PL6x.375	.089	2.704	3	.110	0	y	3	70544.2	72900	569.533	9112.5	1...	H1-1b
59	M87B	6"x1/2" Plate	.087	2.704	12	.050	2.704	y	3	95420....	97200	1012.5	12150	1...	H1-1b
60	M91	6"x1/2" Plate	.085	2.704	3	.071	2.704	y	13	95420....	97200	1012.5	12150	1...	H1-1b
61	M88C	HSS4X4X4	.083	0	46	.028	24.174	z	15	136307...	139518	16180.5	16180.5	1...	H1-1b
62	M3	HSS4X4X4	.077	0	41	.064	0	y	1...	131968...	139518	16180.5	16180.5	1	H1-1b
63	M88B	PL6x.375	.064	2.704	17	.108	0	y	49	70544.2	72900	569.533	9112.5	1...	H1-1b

APPENDIX D

ADDITIONAL CALCUATIONS

Trylon

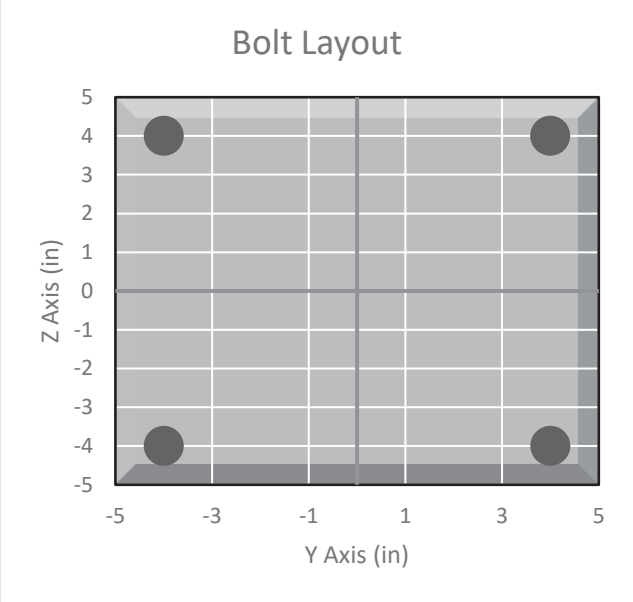
Analysis date: 8/31/2021

BOLT TOOL 1.5.2

Project Data	
Job Code:	191124
Carrier Site ID:	876319
Carrier Site Name:	NAUGATUCK 2 UNIROYAL

Code	
Design Standard:	TIA-222-H
Slip Check:	No
Pretension Standard:	TIA-222-H

Bolt Properties		
Connection Type:	Bolt	
Diameter:	0.625	in
Grade:	A325	--
Yield Strength (Fy):	92	ksi
Ultimate Strength (Fu):	120	ksi
Number of Bolts:	4	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	-	in



Connection Description
Kickers to Collar Connection

Bolt Check*		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	0.0	lbs
Shear Force (V_u):	518.8	lbs
Tension Usage:	0.0%	--
Shear Usage:	3.6%	--
Interaction:	3.6%	Pass
Controlling Member:	M86A	--
Controlling LC:	34	--

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

1825 W. Walnut Hill Lane, Suite 120
Irving, Texas 75038

Trylon

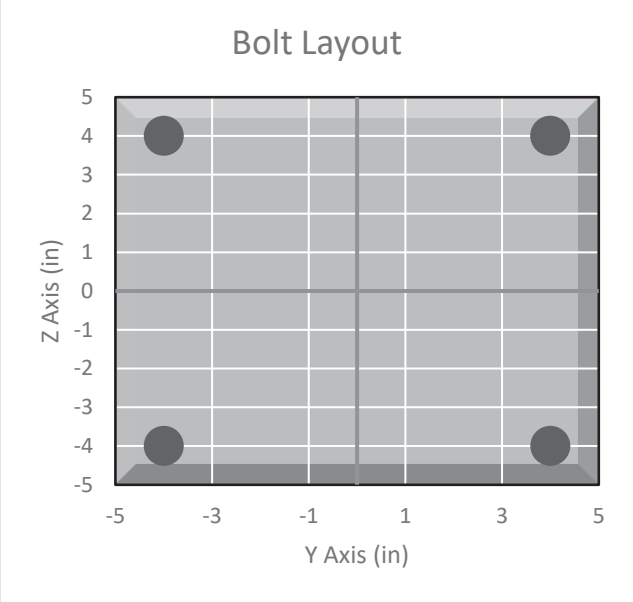
Analysis date: 8/31/2021

BOLT TOOL 1.5.2

Project Data	
Job Code:	191124
Carrier Site ID:	876319
Carrier Site Name:	NAUGATUCK 2 UNIROYAL

Code	
Design Standard:	TIA-222-H
Slip Check:	No
Pretension Standard:	TIA-222-H

Bolt Properties		
Connection Type:	Bolt	
Diameter:	0.625	in
Grade:	A325	--
Yield Strength (Fy):	92	ksi
Ultimate Strength (Fu):	120	ksi
Number of Bolts:	4	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	-	in



Connection Description
Mount to Collar Connection

Bolt Check*		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	2064.5	lbs
Shear Force (V_u):	208.0	lbs
Tension Usage:	9.7%	--
Shear Usage:	1.4%	--
Interaction:	9.7%	Pass
Controlling Member:	M5	--
Controlling LC:	6	--

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

1825 W. Walnut Hill Lane, Suite 120
Irving, Texas 75038

EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTNH312A

876319
280 Elm Street
Naugatuck, Connecticut 06770

October 5, 2021

EBI Project Number: 6221005726

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**22.03%**

October 5, 2021

T-Mobile
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CTNH312A - 876319

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **280 Elm Street** in **Naugatuck, Connecticut** 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 ($\mu W/cm^2$). 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.

Public 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 MHz and 700 MHz frequency 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), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 280 Elm Street in Naugatuck, Connecticut 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower. For power density calculations, the broadcast footprint of the AIR6449 antenna has been considered. Due to the beamforming nature of this antenna, the actual beam locations vary depending on demand and are narrow in nature. Using the broadcast footprint accounts for the potential location of beams at any given time.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

5) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

8) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

9) 1 LTE Traffic channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 60 Watts.

10) 1 LTE Broadcast channel (LTE 1C and 2C BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 20 Watts.

11) 1 NR Traffic channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 120 Watts.

12) 1 NR Broadcast channel (BRS Band - 2500 MHz) was considered for each sector of the proposed installation. This Channel has a transmit power of 40 Watts.

13) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

14) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

15) The antennas used in this modeling are the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector A, the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector B, the Ericsson

AIR 6449 for the 2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

16) The antenna mounting height centerline of the proposed antennas is 120 feet above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz / 2500 MHz / 2500 MHz
Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd	Gain:	22.65 dBd / 17.3 dBd / 22.65 dBd / 17.3 dBd
Height (AGL):	120 feet	Height (AGL):	120 feet	Height (AGL):	120 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	36,356.09	ERP (W):	36,356.09	ERP (W):	36,356.09
Antenna A1 MPE %:	**10.06%**	Antenna B1 MPE %:	**10.06%**	Antenna C1 MPE %:	**10.06%**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 1900 MHz / 1900 MHz / 2100 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 15.65 dBd / 15.65 dBd / 16.35 dBd / 16.35 dBd
Height (AGL):	120 feet	Height (AGL):	120 feet	Height (AGL):	120 feet
Channel Count:	17	Channel Count:	17	Channel Count:	17
Total TX Power (W):	680 Watts	Total TX Power (W):	680 Watts	Total TX Power (W):	680 Watts
ERP (W):	22,844.84	ERP (W):	22,844.84	ERP (W):	22,844.84
Antenna A2 MPE %:	**7.88%**	Antenna B2 MPE %:	**7.88%**	Antenna C2 MPE %:	**7.88%**

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	17.93%
Nextel	0.37%
Verizon	1.08%
Clearwire	0.09%
Sprint	2.56%
Site Total MPE % :	22.03%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	17.93%
T-Mobile Sector B Total:	17.93%
T-Mobile Sector C Total:	17.93%
Site Total MPE % :	22.03%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 2500 MHz LTE 1C & 2C Traffic	1	11044.63	120.0	30.55	2500 MHz LTE 1C & 2C Traffic	1000	3.06%
T-Mobile 2500 MHz LTE 1C & 2C Broadcast	1	1074.06	120.0	2.97	2500 MHz LTE 1C & 2C Broadcast	1000	0.30%
T-Mobile 2500 MHz NR Traffic	1	22089.26	120.0	61.11	2500 MHz NR Traffic	1000	6.11%
T-Mobile 2500 MHz NR Broadcast	1	2148.13	120.0	5.94	2500 MHz NR Broadcast	1000	0.59%
T-Mobile 600 MHz LTE	2	591.73	120.0	3.27	600 MHz LTE	400	0.82%
T-Mobile 600 MHz NR	1	1577.94	120.0	4.37	600 MHz NR	400	1.09%
T-Mobile 700 MHz LTE	2	648.82	120.0	3.59	700 MHz LTE	467	0.77%
T-Mobile 1900 MHz GSM	4	1101.85	120.0	12.19	1900 MHz GSM	1000	1.22%
T-Mobile 1900 MHz UMTS	2	1101.85	120.0	6.10	1900 MHz UMTS	1000	0.61%
T-Mobile 1900 MHz LTE	2	2203.69	120.0	12.19	1900 MHz LTE	1000	1.22%
T-Mobile 2100 MHz UMTS	2	1294.56	120.0	7.16	2100 MHz UMTS	1000	0.72%
T-Mobile 2100 MHz LTE	2	2589.11	120.0	14.32	2100 MHz LTE	1000	1.43%
						Total:	**17.93%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

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:	17.93%
Sector B:	17.93%
Sector C:	17.93%
T-Mobile Maximum MPE % (Sector A):	17.93%
Site Total:	22.03%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **22.03%** 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.

T-MOBILE SITE NUMBER: CTNH312A
T-MOBILE SITE NAME: NH312/CROWN-NAUGATUCK
SITE TYPE: MONOPOLE
TOWER HEIGHT: 150'-0"
BUSINESS UNIT #: 876319
SITE ADDRESS: 280 ELM STREET NAUGATUCK, CT 06770
COUNTY: NEW HAVEN
JURISDICTION: CONNECTICUT SITING COUNCIL

T-MOBILE ANCHOR SITE CONFIGURATION: 67D5A998E OUTDOOR

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	NAUGATUCK 2 UNIROYAL
SITE ADDRESS:	280 ELM STREET NAUGATUCK, CT 06770
COUNTY:	NEW HAVEN
MAP/PARCEL #:	5.5-20W20
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.481271
LONGITUDE:	-73.053294
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	233 FT
CURRENT ZONING:	I-1
JURISDICTION:	CONNECTICUT SITING COUNCIL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	LANXESS CORPORATION 111 RIDC PARK WEST DR PITTSBURGH, PA 15275
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 12920 SE 38TH STREET BELLEVUE, WA 98006
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER
TELCO PROVIDER:	AT&T

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S. BOULDER AVE. TULSA, OK 74119 MARVIN PHILLIPS marvin.phillips@btgrp.com
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3530 TORINGDON WAY, SUITE 300 CHARLOTTE, NC 28277

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

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	CODE SUMMARY
T-3	CODE SUMMARY
T-4	GENERAL NOTES
C-1.1	OVERALL SITE PLAN
C-1.2	SITE PLAN & ENLARGED SITE PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	PLUMBING DIAGRAM
C-5	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR ----. 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.

PROJECT DESCRIPTION

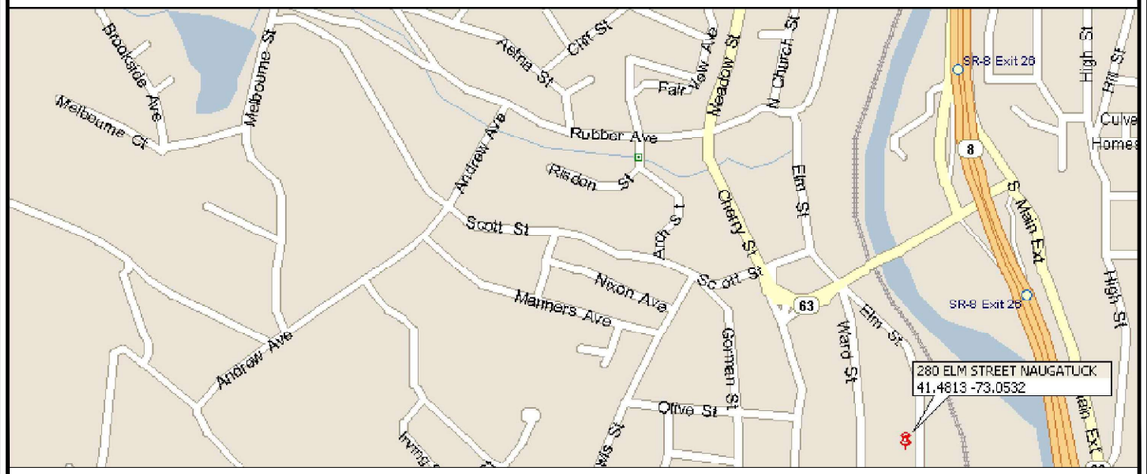
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (6) ANTENNAS
- REMOVE (3) TMAs
- REMOVE (1) ERICSSON - 9x18 HCS
- REMOVE (6) COAX CABLES
- INSTALL (3) ANTENNAS
- INSTALL (3) RADIOs
- INSTALL (1) ERICSSON - 6/24 4AWG HYBRID TRUNK

GROUND SCOPE OF WORK:
- REMOVE (1) NORTEL CABINET
- REMOVE (6) RU22 FROM 6131 CABINET
- INSTALL (1) 6160 CABINET
- INSTALL (1) B160 BATTERY CABINET
- INSTALL (1) BB 6648 IN 6160 CABINET
- INSTALL (1) CSR IXRe V2 (Gen2) IN 6160 CABINET
- INSTALL (1) PSU 4813 VOLTAGE BOOSTER

NOTE:
THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. T-MOBILE IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.

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	2015 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	B+T GROUP
DATED:	9/17/21
MOUNT ANALYSIS:	TRYLON
DATED:	9/2/21
AC ELECTRICAL POWER DESIGN:	BY OTHERS
DATED:	
RFDS REVISION:	4
DATED:	8/16/21
ORDER ID:	581568
REVISION:	0

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(800) 922-4455 CBYD.COM
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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.

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE
SITE NUMBER: **CTNH312A**

BU #: **876319**
NAUGATUCK 2 UNIROYAL

280 ELM STREET
NAUGATUCK, CT 06770

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/21/21	CLG	CONSTRUCTION	MTJ
1	9/29/21	JTS	CONSTRUCTION	JTS

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/29/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: T-1

REVISION: 1

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
(EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)
(Reproduce the following data on the building plans sheet 1 or 2)

Name of Project: T-Mobile Antenna Removal and Addition
Address: 280 ELM STREET, NAUGATUCK, CT Zip Code 06770
Owner/Authorized Agent: _____ Phone # (____) ____ - ____ E-Mail _____
Owned By: ☐ City/County ☒ Private ☐ State
Code Enforcement Jurisdiction: ☐ City_____ ☒ County NEW HAVEN ☐ State

CONTACT: _____

DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE #	E-MAIL
Architectural				(___)	
Civil	Crown Castle	Andrew Fandozzi, P.E., C.P.E.	042222	(724)416-2864	andrew.fandozzi@crowncastle.com
Electrical	Crown Castle	Andrew Fandozzi, P.E., C.P.E.	042222	(724)416-2864	andrew.fandozzi@crowncastle.com
Fire Alarm				(___)	
Plumbing				(___)	
Mechanical				(___)	
Sprinkler-Standpipe				(___)	
Structural	John W. Kelly P.E. Engineering, P.C.	John W/Kelly, III	042719	(918)587-4630	
Retaining Walls >5' High				(___)	
Other				(___)	

("Other" should include firms and individuals such as truss, precast, pre-engineered, interior designers, etc.)

2018 NC BUILDING CODE: ☐ New Building ☐ Addition ☐ Renovation
☐ 1st Time Interior Completion
☐ Shell/Core - Contact the local inspection jurisdiction for possible additional procedures and requirements
☐ Phased Construction - Shell/Core- Contact the local inspection jurisdiction for possible additional procedures and requirements

2018 NC EXISTING BUILDING CODE: EXISTING: ☐ Prescriptive ☐ Repair ☐ Chapter 14
Alteration: ☐ Level I ☐ Level II ☐ Level III
☐ Historic Property ☐ Change of Use

CONSTRUCTED: (date) _____ **CURRENT OCCUPANCY(S)** (Ch. 3): U
RENOVATED: (date) _____ **PROPOSED OCCUPANCY(S)** (Ch. 3): U
RISK CATEGORY (Table 1604.5): **Current:** ☐ I ☒ II ☐ III ☐ IV
Proposed: ☐ I ☒ II ☐ III ☐ IV

BASIC BUILDING DATA
Construction Type: (check all that apply) ☐ I-A ☐ I-B ☐ II-A ☒ II-B ☐ III-A ☐ III-B ☐ IV ☐ V-A ☐ V-B
Sprinklers: ☒ No ☐ Partial ☐ Yes ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ☒ No ☐ Yes Class ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Fire District: ☒ No ☐ Yes **Flood Hazard Area:** ☐ No ☐ Yes
Special Inspections Required: ☒ No ☐ Yes (Contact the local inspection jurisdiction for additional procedures and requirements.)

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING REQ'D	RATING PROVIDED (W/ * REDUCTION)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR RATED PENETRATION	SHEET # FOR RATED JOINTS
Structural Frame, including columns, girders, trusses							
Bearing Walls							
Exterior							
North							
East							
West							
South							
interior							
Nonbearing Walls and Partitions Exterior walls							
North							
East							
West							
South							
Interior walls and partitions							
Floor Construction Including supporting beams and joists							
Floor Ceiling Assembly							
Columns Supporting Floors							
Roof Construction, including supporting beams and joists							
Roof Ceiling Assembly							
Columns Supporting Roof							
Shaft Enclosures - Exit							
Shaft Enclosures - Other							
Corridor Separation							
Occupancy/Fire Barrier Separation							
Party/Fire Wall Separation							
Smoke Barrier Separation							
Smoke Partition							
Tenant/Dwelling Unit/ Sleeping Unit Separation							
Incidental Use Separation							

* Indicate section number permitting reduction

Gross Building Area Table

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
3rd Floor			
2nd Floor			
Mezzanine			
1st Floor			
Basement			
TOTAL			

ALLOWABLE AREA

Primary Occupancy Classification(s):
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
Business ☐
Educational ☐
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 Condition ☐ 1 ☐ 2
☐ I-2 Condition ☐ 1 ☐ 2
☐ I-3 Condition ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
☐ I-4
Mercantile ☐
Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☒

Accessory Occupancy Classification(s): _____
Incidental Uses (Table 509): _____
Special Uses (Chapter 4 – List Code Sections): _____
Special Provisions: (Chapter 5 – List Code Sections): _____
Mixed Occupancy: ☒ No ☐ Yes Separation: ____ Hr. Exception: _____

☐ Non-Separated Use (508.3) - The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.

☐ Separated Use (508.4) - See below for area calculations for each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.

$$\frac{\text{Actual Area of Occupancy A}}{\text{Allowable Area of Occupancy A}} + \frac{\text{Actual Area of Occupancy B}}{\text{Allowable Area of Occupancy B}} \leq 1$$

_____ + _____ + ... = _____ ≤ 1.00

PERCENTAGE OF WALL OPENING CALCULATIONS

FIRE SEPARATION DISTANCE (FEET) FROM PROPERTY LINES	DEGREE OF OPENINGS PROTECTION (TABLE 705.8)	ALLOWABLE AREA (%)	ACTUAL SHOWN ON PLANS (%)

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting: ☐ No ☐ Yes
Exit Signs: ☐ No ☐ Yes
Fire Alarm: ☐ No ☐ Yes
Smoke Detection Systems: ☐ No ☐ Yes ☐ Partial _____
Carbon Monoxide Detection: ☐ No ☐ Yes

LIFE SAFETY PLAN REQUIREMENTS

Life Safety Plan Sheet #: _____

☐ Fire and/or smoke rated wall locations (Chapter 7)
☐ Assumed and real property line locations (if not on the site plan)
☐ Exterior wall opening area with respect to distance to assumed property lines (705.8)
☐ Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)
☐ Occupant loads for each area
☐ Exit access travel distances (1017)
☐ Common path of travel distances (Tables 1006.2.1 & 1006.3.2(1))
☐ Dead end lengths (1020.4)
☐ Clear exit widths for each exit door
☐ Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
☐ Actual occupant load for each exit door
☐ A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
☐ Location of doors with panic hardware (1010.1.10)
☐ Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
☐ Location of doors with electromagnetic egress locks (1010.1.9.9)
☐ Location of doors equipped with hold-open devices
☐ Location of emergency escape windows (1030)
☐ The square footage of each fire area (202)
☐ The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
☐ Note any code exceptions or table notes that may have been utilized regarding the items above

STORY NO.	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 506.2[4] AREA	(C) AREA FOR FRONTAGE INCREASE[1,2]	(D) ALLOWABLE AREA PER STORY OR UNLIMITED[2,3]

[1] Frontage area increases from Section 506.3 are computed thus:
a. Perimeter which fronts a public way or open space having 20 feet minimum width = _____ (F)
b. Total Building Perimeter = _____ (P)
c. Ratio (F/P) = _____ (F/P)
d. W = Minimum width of public way = _____ (W)
e. Percent of frontage increase $I_f = 100[F/P - 0.25] \times W/30$ = _____ (%)
[2] Unlimited area applicable under conditions of Section 507.
[3] Maximum Building Area = total number of stories in the building x D (maximum3 stories) (506.2).
[4] The maximum area of open parking garages must comply with Table 406.5.4.
[5] Frontage increase is based on the unsprinklered area value in Table 506.2.

ALLOWABLE HEIGHT

	ALLOWABLE	SHOWN ON PLANS	CODE REFERENCE [1]
Building Height in Feet (Table 504.3) [2]			
Building Height in Stories (Table 504.4) [3]			

[1] Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4.
[2] The maximum height of air traffic control towers must comply with Table 412.3.1.
[3] The maximum height of open parking garages must comply with Table 406.5.4.

ACCESSIBLE DWELLING UNITS
(SECTION 1107)

TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED	TOTAL ACCESSIBLE UNITS PROVIDED

ACCESSIBLE PARKING
(SECTION 1106)

LOT OR PARKING AREA	TOTAL # OF PARKING SPACES REQUIRED	TOTAL # OF PARKING SPACES PROVIDED	# OF ACCESSIBLE SPACES PROVIDED REGULAR WITH 5' ACCESS AISLE	VAN SPACES WITH 132" ACCESS AISLE	VAN SPACES WITH 8' ACCESS AISLE	TOTAL # ACCESSIBLE PROVIDED
TOTAL						

PLUMBING FIXTURE REQUIREMENTS
(TABLE 2902.1)

USE		WATERCLOSETS MALE	WATERCLOSETS FEMALE	WATERCLOSETS UNISEX	URINALS	LAVATORIES MALE	LAVATORIES FEMALE	LAVATORIES UNISEX	SHOWERS /TUBS	DRINKING FOUNTAINS REGULAR	DRINKING FOUNTAINS ACCESSIBLE
SPACE	EXIST'G										
	NEW										
	REQ'D										

SPECIAL APPROVALS

Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, etc., describe below)

_____

_____

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE
SITE NUMBER: **CTNH312A**

BU #: **876319**
NAUGATUCK 2 UNIROYAL

280 ELM STREET
NAUGATUCK, CT 06770

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/21/21	CLG	CONSTRUCTION	MTJ
1	9/29/21	JTS	CONSTRUCTION	JTS

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: T-2
REVISION: 1

ENERGY SUMMARY

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code: ☐ No ☐ Yes (The remainder of this section is not applicable)

Exempt Building: ☐ No ☐ Yes (Provide code or statutory reference): _____

Climate Zone: ☐ 3A ☐ 4A ☐ 5A

Method of Compliance: Energy Code ☐ Performance ☐ Prescriptive
ASHRAE 90.1 ☐ Performance ☐ Prescriptive
(If "Other" specify source here)_____

THERMAL ENVELOPE (Prescriptive method only)

Roof/ceiling Assembly (each assembly)
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Skylights in each assembly: _____
U-Value of skylight: _____
total square footage of skylights in each assembly: _____

Exterior Walls (each assembly)
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Openings (windows or doors with glazing)
U-Value of assembly: _____
Solar heat gain coefficient: _____
projection factor: _____
Door R-Values: _____

Walls below grade (each assembly)
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____

Floors over unconditioned space (each assembly)
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____

Floors slab on grade
Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Horizontal/vertical requirement: _____
slab heated: _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
STRUCTURAL DESIGN
(PROVIDE ON THE STRUCTURAL SHEETS IF APPLICABLE)

DESIGN LOADS:

Importance Factors: Snow (I_s) _____
Seismic (I_E) _____

Live Loads: Roof _____ psf
Mezzanine _____ psf
Floor _____ psf

Ground Snow Load: _____ psf

Wind Load: Ultimate Wind Speed _____ mph (ASCE-7)
Exposure Category _____

SEISMIC DESIGN CATEGORY: ☐ A ☐ B ☐ C ☐ D
Provide the following Seismic Design Parameters:
Risk Category (Table 1604.5) ☐ I ☐ II ☐ III ☐ IV
Spectral Response Acceleration S_S_____ %g S_1_____ %g
Site Classification (ASCE 7) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F
Data Source: ☐ Field Test ☐ Presumptive ☐ Historical Data
Basic structural system ☐ Bearing Wall ☐ Dual w/Special Moment Frame
☐ Building Frame ☐ Dual w/Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Analysis Procedure: ☐ Simplified ☐ Equivalent Lateral Force ☐ Dynamic
Architectural, Mechanical, Components anchored? ☐ Yes ☐ No

LATERAL DESIGN CONTROL: Earthquake ☐ Wind ☐

SOIL BEARING CAPACITIES:
Field Test (provide copy of test report) _____ psf
Presumptive Bearing capacity _____ psf
Pile size, type, and capacity _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
MECHANICAL DESIGN
(PROVIDE ON THE MECHANICAL SHEETS IF APPLICABLE)

MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone
winter dry bulb: _____
summer dry bulb: _____

Interior design conditions
winter dry bulb: _____
summer dry bulb: _____
relative humidity: _____

Building heating load: _____

Building cooling load: _____

Mechanical Spacing Conditioning System
Unitary
description of unit: _____
heating efficiency: _____
cooling efficiency: _____
size category of unit: _____
Boiler
Size category. If oversized, state reason.: _____
Chiller
Size category. If oversized, state reason.: _____

List equipment efficiencies: _____

2018 APPENDIX B
BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS
ELECTRICAL DESIGN
(PROVIDE ON THE ELECTRICAL SHEETS IF APPLICABLE)

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance: Energy Code ☐ Performance ☐ Prescriptive
ASHRAE 90.1 ☐ Performance ☐ Prescriptive

Lighting schedule (each fixture type)
lamp type required in fixture
number of lamps in fixture
ballast type used in the fixture
number of ballasts in fixture
total wattage per fixture
total interior wattage specified vs. allowed (whole building or space by space)
total exterior wattage specified vs. allowed

Additional Efficiency Package Options
(When using the 2018 NCECC; not required for ASHRAE 90.1)
☐ C406.2 More Efficient HVAC Equipment Performance
☐ C406.3 Reduced Lighting Power Density
☐ C406.4 Enhanced Digital Lighting Controls
☐ C406.5 On-Site Renewable Energy
☐ C406.6 Dedicated Outdoor Air System
☐ C406.7 Reduced Energy Use in Service Water Heating

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B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: T-3

REVISION: 1

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

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

GENERAL NOTES:

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

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

ELECTRICAL INSTALLATION NOTES:

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

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

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

APWA UNIFORM COLOR CODE:

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

ABBREVIATIONS:

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

GREENFIELD GROUNDING NOTES:

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

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SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE
SITE NUMBER: **CTNH312A**

BU #: **876319**
NAUGATUCK 2 UNIROYAL

280 ELM STREET
NAUGATUCK, CT 06770

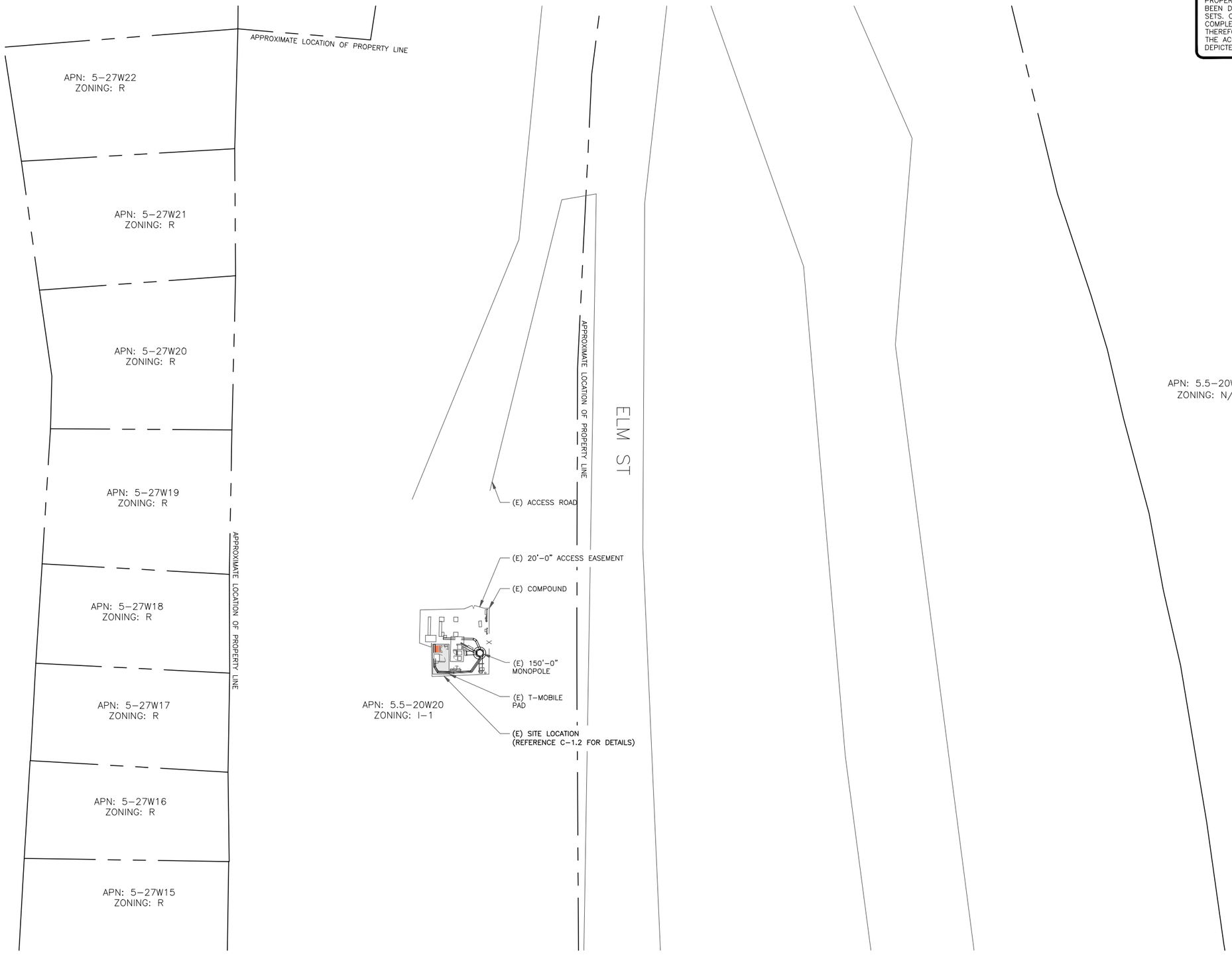
EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/21/21	CLG	CONSTRUCTION	MTJ
1	9/29/21	JTS	CONSTRUCTION	JTS

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: T-4
REVISION: 1



1 OVERALL SITE PLAN

SCALE: 30' 15' 0 30' 1"=30'-0" (FULL SIZE) 1"=60'-0" (11x17)

N

SITE PLAN DISCLAIMER:

PROPERTY LINES AND STRUCTURES HAVE BEEN DIGITIZED FROM PREVIOUS PLAN SETS. CROWN CASTLE USA INC. HAS NOT COMPLETED A SITE SURVEY AND THEREFORE MAKES NO CLAIMS AS TO THE ACCURACY OF INFORMATION DEPICTED ON THIS SHEET.

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STATE OF CONNECTICUT
TIMOTHY J. STIKES
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/29/21

B&T ENGINEERING, INC.
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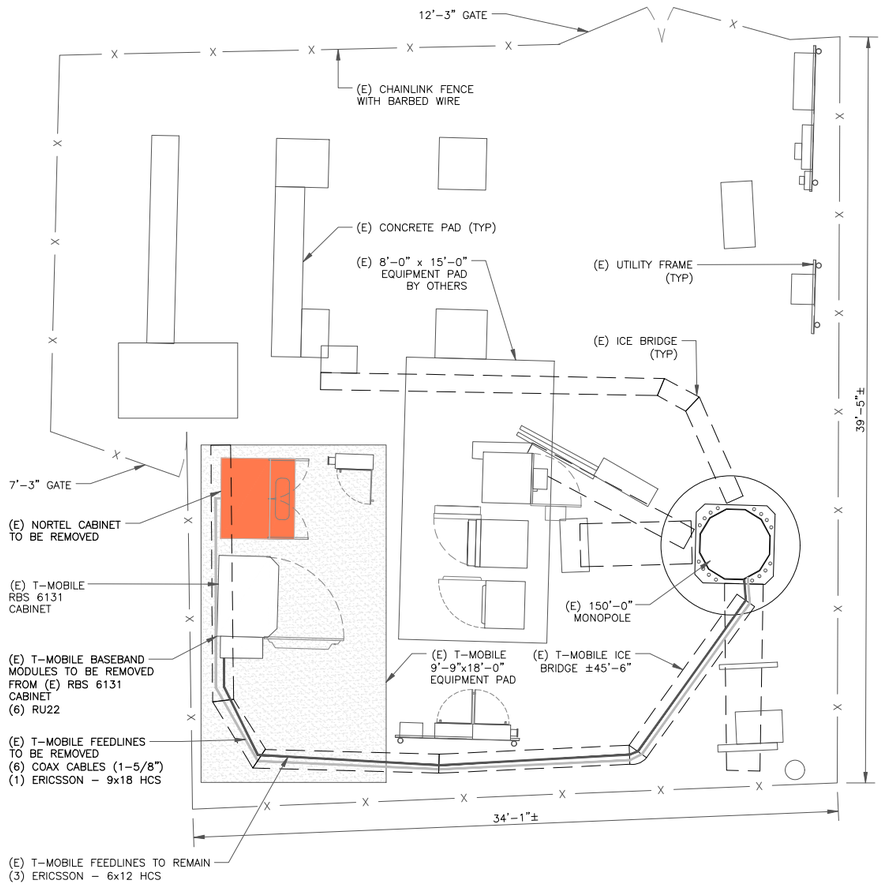
SHEET NUMBER: C-1.1

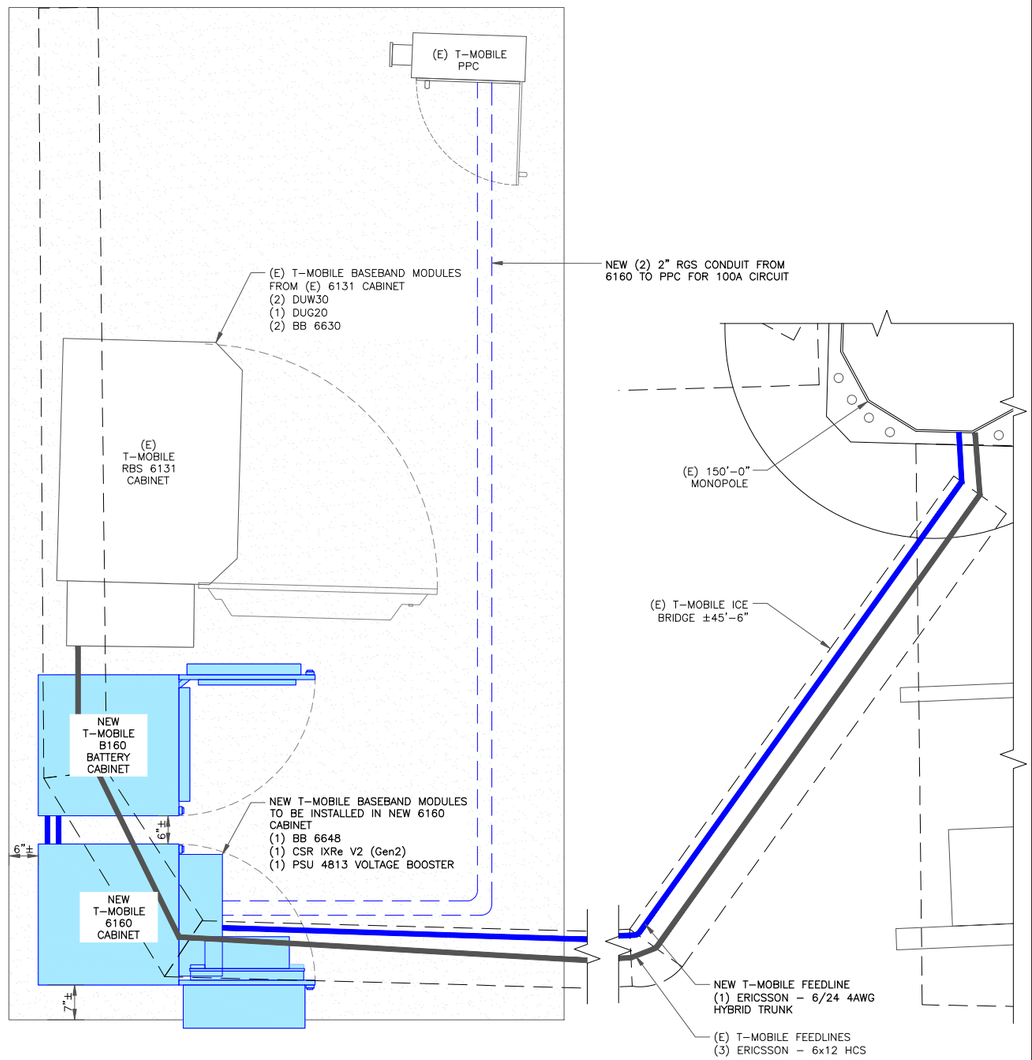
REVISION: 1

137246.003.01_NAUGATUCK 2 UNIROYAL.dwg - Sheet:C-1.1 - User: jstikes - Sep 29, 2021 - 10:14am



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

N



2 ENLARGED SITE PLAN
SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

N

NOTES:

THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. T-MOBILE IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.

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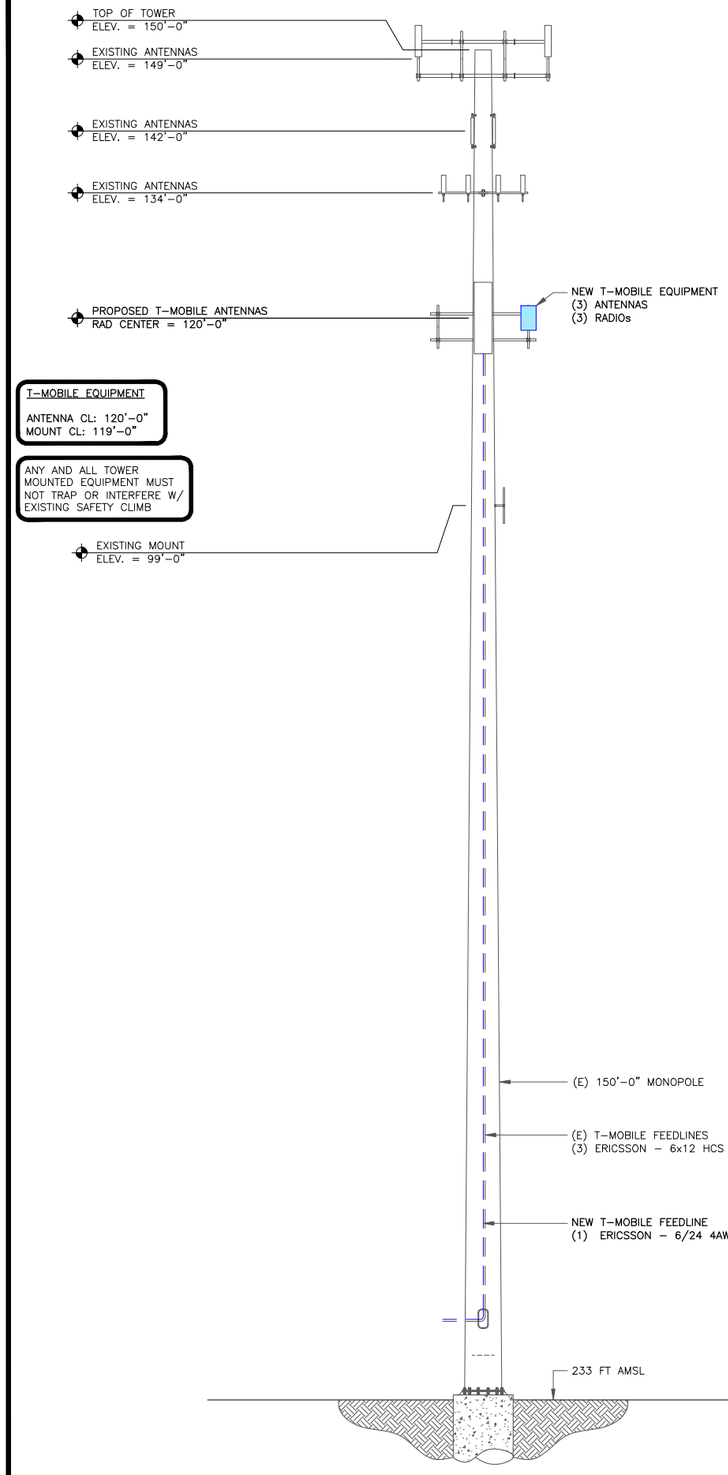
SHEET NUMBER: C-1.2

REVISION: 1



1 FINAL ELEVATION
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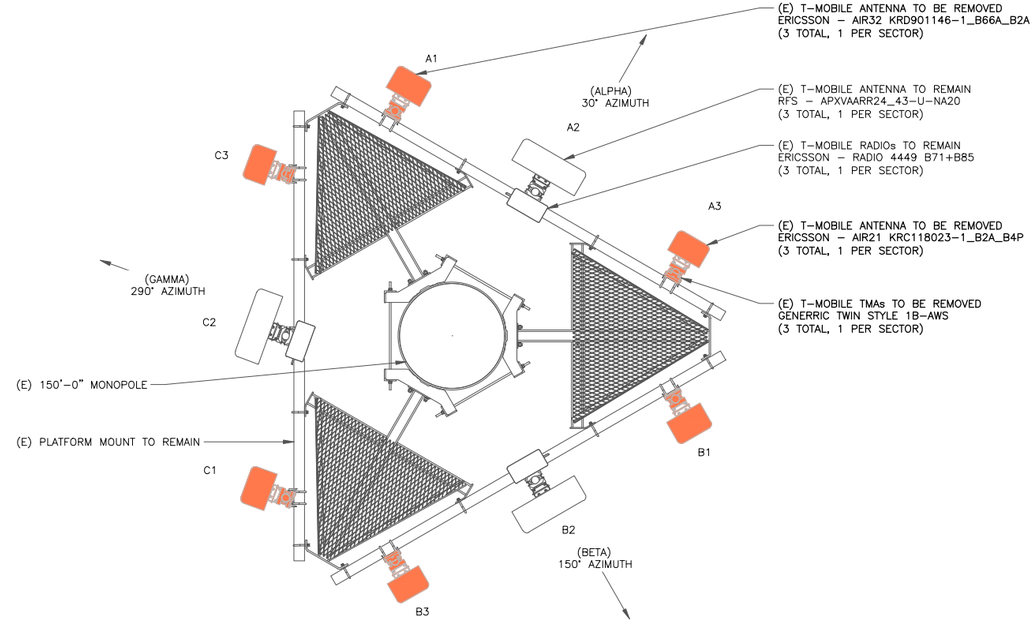
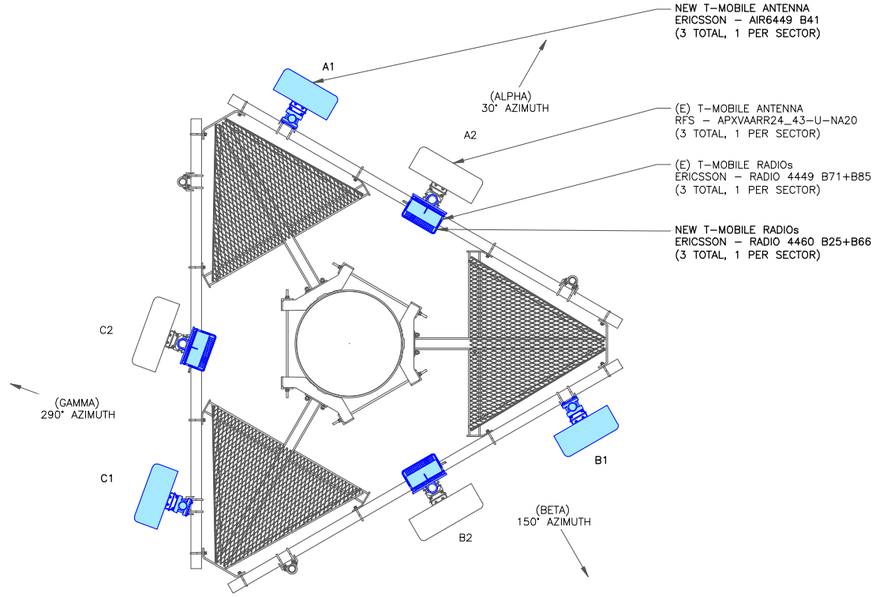


2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

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SHEET NUMBER: C-2

REVISION: 1

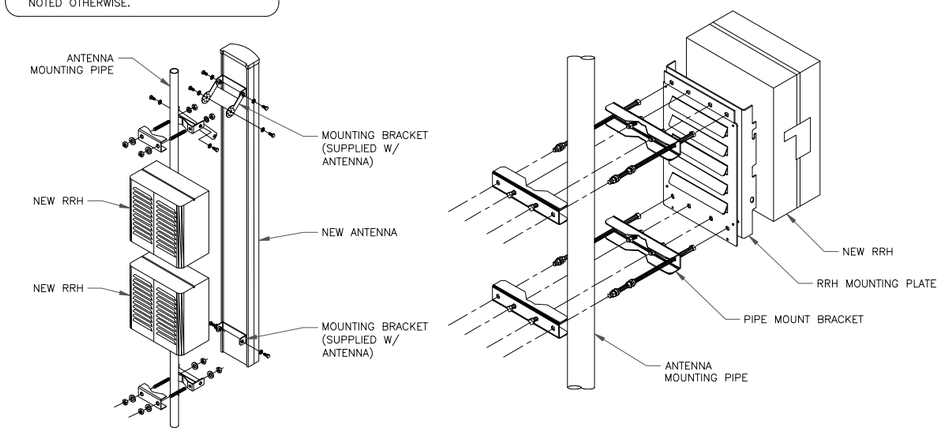
RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	FEEDLINE TYPE
ALPHA	A1	L2500 / N2500	ERICSSON	AIR6449 B41	30°	0°	2°/2°	120'-0"	–	(1) ERICSSON – 6x12 HCS (1) ERICSSON – 6/24 4AWG HYBRID TRUNK
	A2	L700/L600/N600/ L2100/L1900/ G1900/U1900/U2100	RFS	APXVAARR24_43-U-NA20	30°	0°	2°/2°/2°/2°	120'-0"	(1) ERICSSON – RADIO 4449 B71+B85 (1) ERICSSON – RADIO 4460 B25+B66	
	–	–	–	–	–	–	–	–	–	
BETA	B1	L2500 / N2500	ERICSSON	AIR6449 B41	150°	0°	2°/2°	120'-0"	–	(1) ERICSSON – 6x12 HCS
	B2	L700/L600/N600/ L2100/L1900/ G1900/U1900/U2100	RFS	APXVAARR24_43-U-NA20	150°	0°	2°/2°/2°/2°	120'-0"	(1) ERICSSON – RADIO 4449 B71+B85 (1) ERICSSON – RADIO 4460 B25+B66	
	*	–	–	–	–	–	–	–	–	
GAMMA	C1	L2500 / N2500	ERICSSON	AIR6449 B41	290°	0°	2°/2°	120'-0"	–	(1) ERICSSON – 6x12 HCS
	C2	L700/L600/N600/ L2100/L1900/ G1900/U1900/U2100	RFS	APXVAARR24_43-U-NA20	290°	0°	2°/2°/2°/2°	120'-0"	(1) ERICSSON – RADIO 4449 B71+B85 (1) ERICSSON – RADIO 4460 B25+B66	
	–	–	–	–	–	–	–	–	–	

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.



2 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE

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STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/29/21

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SHEET NUMBER: C-3

REVISION: 1

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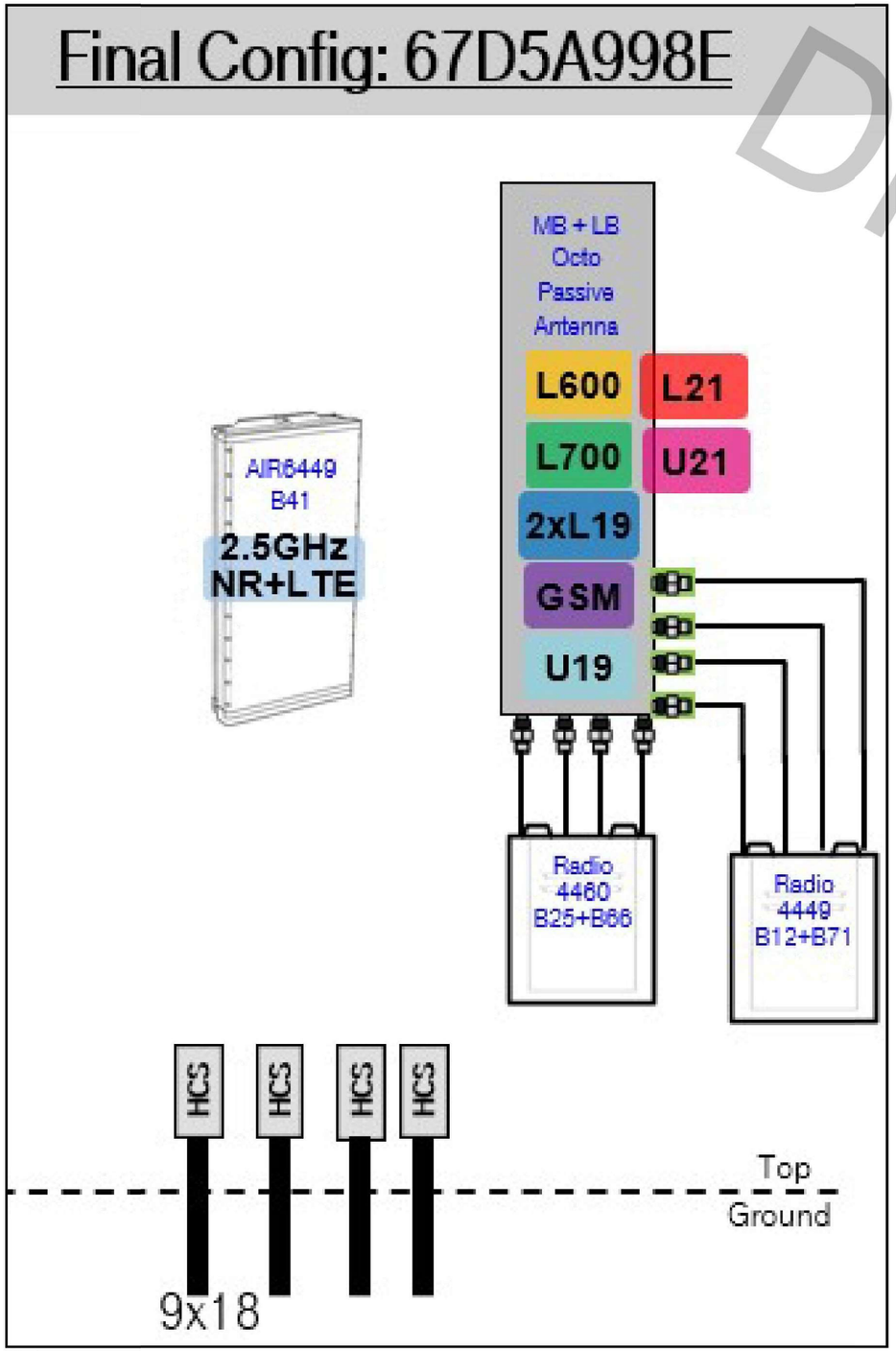

Notes:

1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

137246.003.01_NAUGATUCK 2 UNIROYAL.dwg – Sheet:C–4 – User: jslikes – Sep 29, 2021 – 10:14am

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T-MOBILE
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NAUGATUCK 2 UNIROYAL

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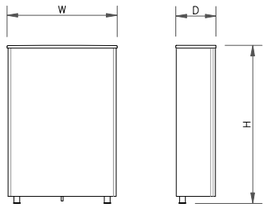
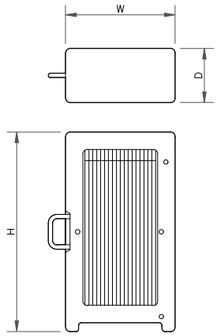
SHEET NUMBER: C-4
REVISION: 1



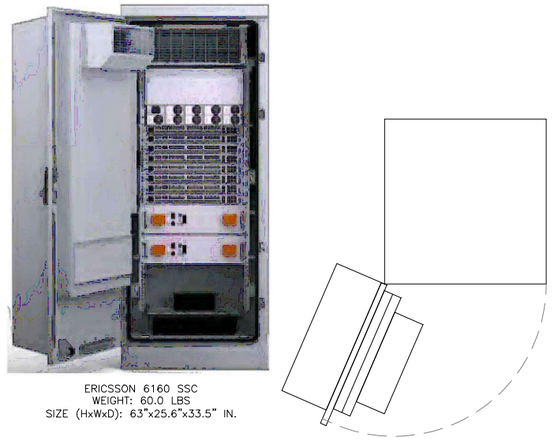
ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR6449 B41
WIDTH	20.51"
DEPTH	8.54"
HEIGHT	33.11"
WEIGHT	114.63 LBS

1 ANTENNA SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	4460 B2/B25
WIDTH	15.10"
DEPTH	11.90"
HEIGHT	17.00"
WEIGHT	109.00 LBS

2 RRU SPECS
SCALE: NOT TO SCALE



ERICSSON 6160 SSC
WEIGHT: 60.0 LBS
SIZE (HxWxD): 63"x25.6"x33.5" IN.

3 ERICSSON 6160 SSC
SCALE: NOT TO SCALE

BATTERY CABINET SPECIFICATIONS	
MODEL #	B160
MANUF.	ERICSSON
HEIGHT	63"
WIDTH	26"
DEPTH	26"
WEIGHT	

4 ERICSSON B160 BATTERY CABINET
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

7 NOT USED
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE
SITE NUMBER: **CTNH312A**

BU #: **876319**
NAUGATUCK 2 UNIROYAL

280 ELM STREET
NAUGATUCK, CT 06770

EXISTING
150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/21/21	CLG	CONSTRUCTION	MTJ
1	9/29/21	JTS	CONSTRUCTION	JTS

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/29/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: C-5
REVISION: 1

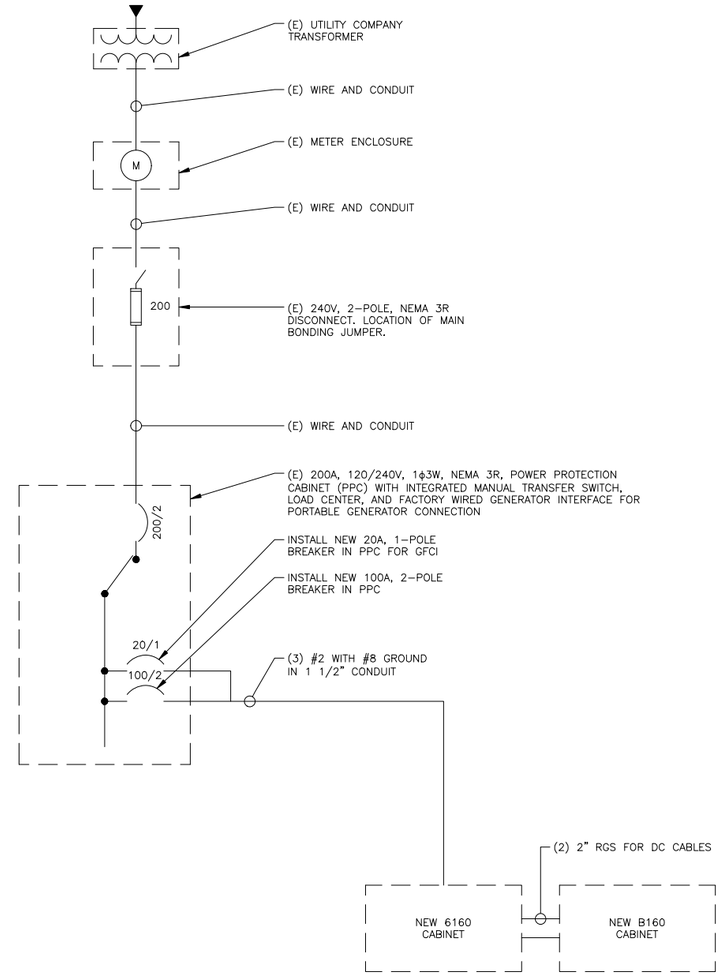
FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
TVSS	2	60A	1	2	20A	1	GFCI BELOW
			3	4	50A	2	BTS-1
UMTS	2	125A	5	6			
			7	8	20A	1	SPOTLIGHT
			9	10	100A	2	6160
			11	12			
			13	14	20A	1	B160 BATTERY CABINET
			15	16			
			17	18			
			19	20			
			21	22			
			23	24			

RATED VOLTAGE: ■120/240 □_____, 1 PHASE, 3 WIRE	BRANCH POLES: □12 ■24 □30 □42	APPROVED MF'RS
RATED AMPS: □100 ■200 □400 □_____,	CABINET: ■SURFACE □FLUSH	NEMA □1 ■3R □4X
□MAIN LUGS ONLY ■MAIN 200 AMPS ■BREAKER □FUSED SWITCH	■HINGED DOOR	■KEYED DOOR LATCH
□FUSED ■CIRCUIT BREAKER BRANCH DEVICES	□_____ TO BE GFCI BREAKERS	FULL NEUTRAL BUS / GROUND BAR
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL		

REPLACE EXISTING BREAKER IN POSITION 10 AND 12 WITH A NEW 2P 100A BREAKER
REPLACE EXISTING BREAKER IN POSITION 14 WITH A NEW 1P 20A BREAKER
REPLACE EXISTING WIRES FOR EXISTING EQUIPMENT CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #2G AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 200A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING PHOTOS

1 FINAL T-MOBILE PANEL DETAIL
SCALE: NOT TO SCALE

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE



NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.

2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
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T-MOBILE
SITE NUMBER: **CTNH312A**

BU #: **876319**
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9/29/21

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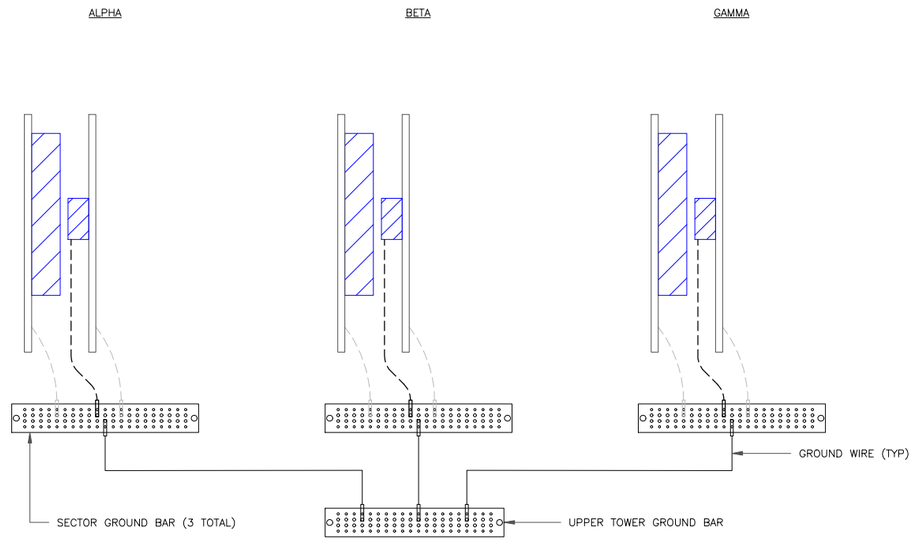
SHEET NUMBER: E-1
REVISION: 1



NOTE:

ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
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T-MOBILE
SITE NUMBER: **CTNH312A**

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NAUGATUCK 2 UNIROYAL

280 ELM STREET
NAUGATUCK, CT 06770

EXISTING
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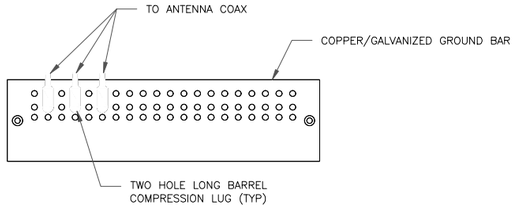
SHEET NUMBER: G-1

REVISION: 1

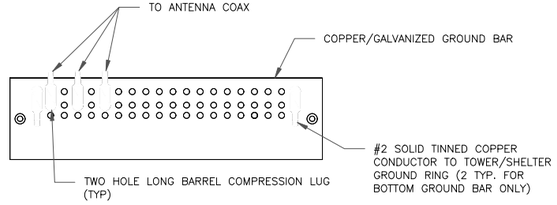
137246.003.01_NAUGATUCK 2 UNIROYAL.dwg – Sheet:G-1 – User: jsikes – Sep 29, 2021 – 10:14am



NOTES:

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

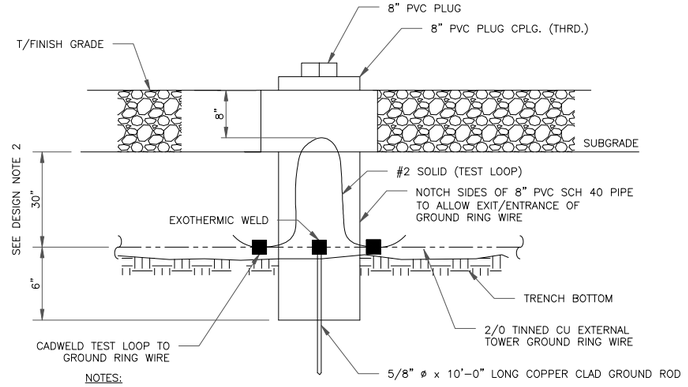
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



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.

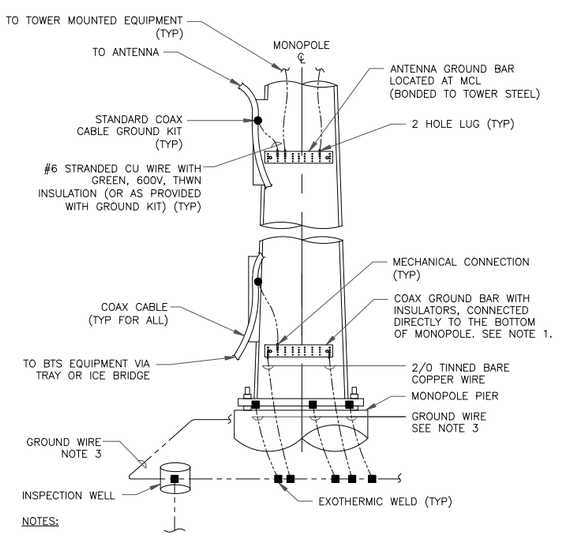
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



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)

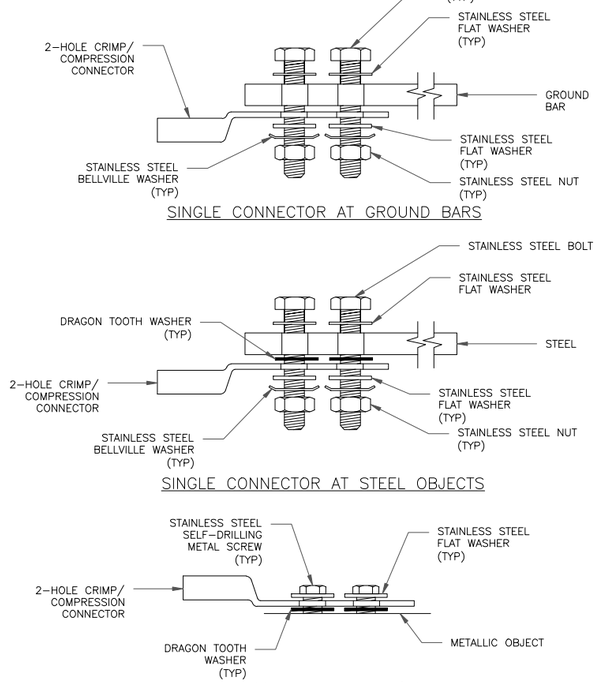
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



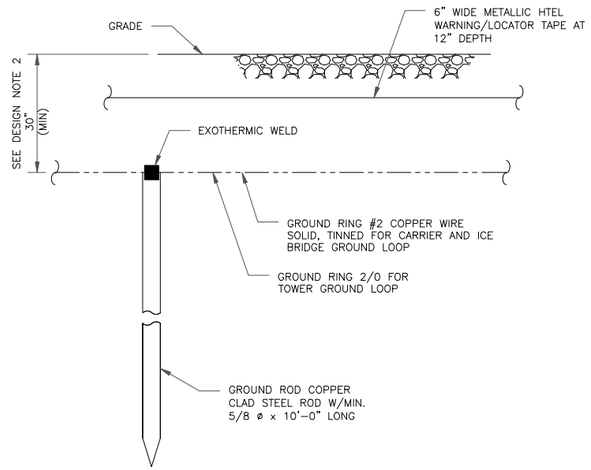
NOTES:

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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NAUGATUCK 2 UNIROYAL

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9/29/21

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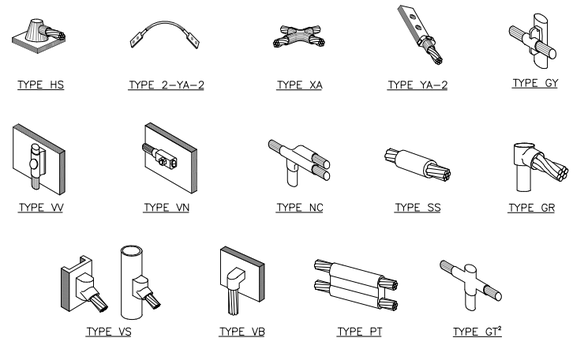
SHEET NUMBER: G-2
REVISION: 1

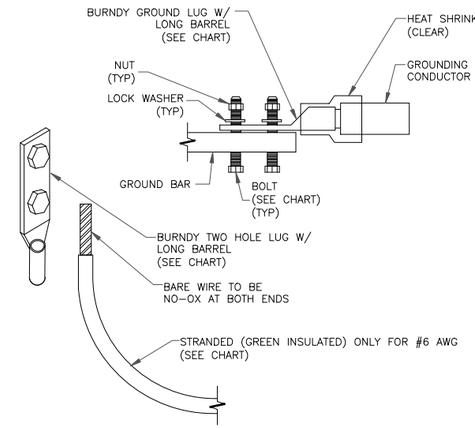


NOTE:

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

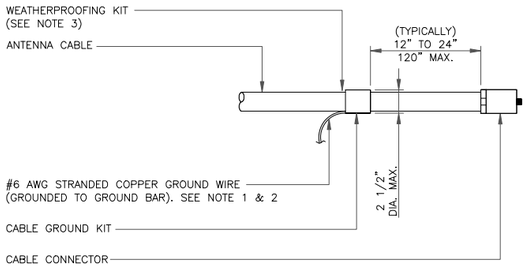
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



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.

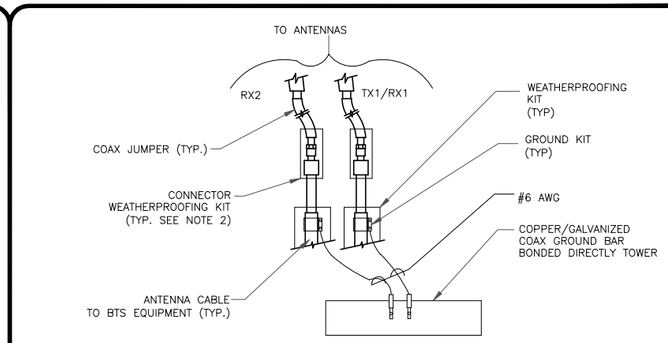
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



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

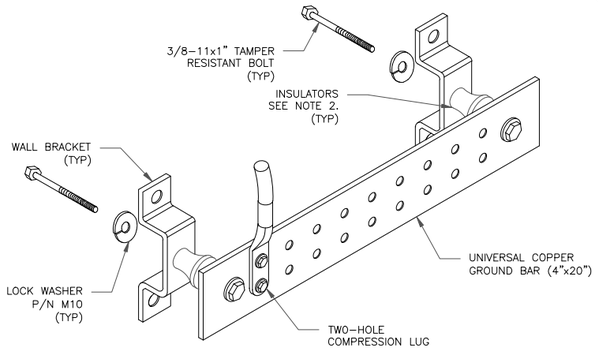


NOTES:

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

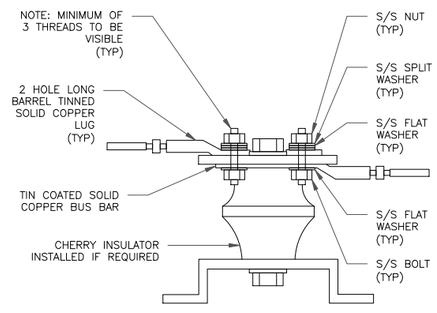
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



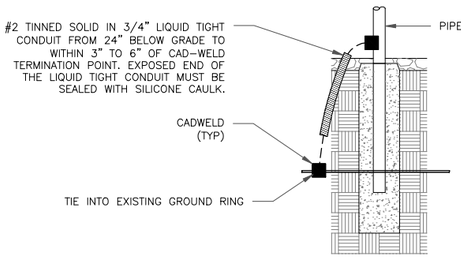
NOTES:

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

T-Mobile
4 SYLVAN WAY
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