



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

September 22, 2021

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

RE: **Notice of Exempt Modification for T-Mobile: CT11044E/824359**
725 Flanders Road, Groton, CT 06340
Latitude: 41° 22' 11.74" / Longitude: -72° 0' 29.77"

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 130-foot mount on the existing 130-foot monopole tower located at 725 Flanders Road, Groton, CT. The property is owned by the Town of Groton and the tower is owned by Crown Castle. T-Mobile now intends to replace three (3) antennas and ancillary equipment at the 130ft 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 – AIR6449 B41 Antennas
- (3) Ericsson 4460 B25 + B66 Remote Radios
- (1) Hybrid Cable (6x24 4AWG)
- New Site PRO 1 Mount Modification per Kimley-Horn Report

Remove:

- (6) Ericsson – AIR21 KRC118023-1_B2A_B4P
- (3) Generic Twin Style 1B TMAs
- (6) Coax Cables
- (1) Hybrid Cable

Ground:

Install New:

- (1) 6160 SSC Cabinet
- (1) B160 Battery Cabinet
- (1) RBS 6601 IN 6160 SSC Cabinet
- (1) BB648 IN 6160 Cabinet
- (2) PSU 4813 Voltage Booster

Remove:

- (1) RBS 6131 Cabinet

Melanie A. Bachman

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The facility was approved by the Town of Groton Zoning Commission on September 10, 1998 via Grant of Special Permit #225

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 John Burt, Town Manager, as both the municipality and property owner for the Town of Groton, Johnathan Reiner, Director of Planning 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

The Foundation for a Wireless World.

CrownCastle.com

Melanie A. Bachman

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Attachments

cc:

John Burt, Town Manager
Office of the Town Manager
Town Hall
45 Fort Hill Road
Groton, CT 06340
860-441-6630

Johnathan Reiner, AICP, Director of Planning
134 Groton Long Point Road
Groton, CT 06340
860-446-5970

Crown Castle, Tower Owner



Town of Groton

Building Inspection

CT11-044-E

BUILDING/ZONING PERMIT APPLICATION

Please Print

Permit No. <u>98-534</u>	(office use only)	Date Permit Issued <u>11-24-98</u>
Estimated Cost <u>\$53,000</u>	Bldg. Fee <u>436</u>	Zon. C.O. <u>2d</u>

Address of Building Groton Landfill Flanders Road @ I-95

Zone IP-80B zone Map Block Lot

Owner Town of Groton Address 45 Fort Hill Rd. Ph. # 811

Contractor Conti Enterprises, Inc. Address 3001 S. Clinton Ave. South Plainfield NJ 07080

Nature of Proposed Work and Use The construction of a 150' monopole along with related equipment cabinet. Omnipoint Communications will use this site as a wireless telecommunications facility.

Plans: Yes No Type of Construction

No. of Stories 150' monopole No. of Rooms N/A No. of Baths N/A

Garage N/A Breezeway N/A Fireplace N/A Heat N/A

(FAA REGULATION - IF THEY APPLY FOR LIGHT TOWER)

ZONING PERMIT

(To be filled out in conjunction with a building permit involving any new structure, addition to an existing structure, or change of use.)

Flood Hazard District C HDC # 41 ZBA #

Site Plan Approval # X-90-11 Special Zoning Permit # #255

Wetlands..... Coastal Area Management.....

Site Suitability #..... Sewer #..... A2 Survey

Zoning Official Signature R

I hereby certify that the proposed construction will conform to the applicable building and zoning regulations of the Town of Groton. AND ANY FAA REGULATIONS THAT APPLY.

Signed Scott C. Johnston As Agent Date Nov. 20, 1998 Lic. # 00900869

Phone # (203) 855-5428 Building Official Approval [Signature]

NO BUILDING OR STRUCTURE SHALL BE OCCUPIED OR USED, UNTIL A CERTIFICATE OF OCCUPANCY HAS BEEN ISSUED.

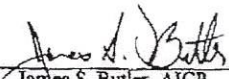
VOL 673 PAGE 538

TOWN OF GROTON
ZONING COMMISSION
NOTICE OF GRANT OF SPECIAL PERMIT #225

This is to certify that on September 2, 1998 the Zoning Commission of the Town of Groton granted a Special Permit under Section 7.1-41 of the Zoning Regulations as follows:

1. Owner of Record: Town of Groton (Omnipoint Communications, Inc., Applicant)
2. Description of the premises: 741 Flanders Road
3. Description of the special permit:
Erection of a 150' telecommunications tower and associated equipment cabinet.

ZONING COMMISSION

by 
James S. Butler, AICP
Director of Planning

Date: September 10, 1998

NOTE: This notice is to be recorded on the Land Records of the Town of Groton, indexed in the grantor's index under the name of the record owner.

RECEIVED FOR RECORD AT GROTON, COMM.
ON 9-22-98 AT 12:44 pm
ATTEST BARBARA TARBOK, TOWN CLERK

Commercial Property Card

Card 1 of 4

<<Back Next>>

Account 260910266458 E	Location 685 FLANDERS RD	Zoning IM	Deed Book/Page 230/536	Acres 166.33
District POQUONNOCK BRIDGE	Use Code MUNICIPALITIES			

Current Owner

GROTON TOWN OF TRANSFER STATION
741 FLANDERS RD
MYSTIC CT 06355

Property Picture



Building Information

Building No: 1
Year Built: 1979
No of Units: 1
Structure Type: OFFICE WAREHOUSE
Building Total Area: 1880 sqft.
Grade: C-
Identical Units: 1

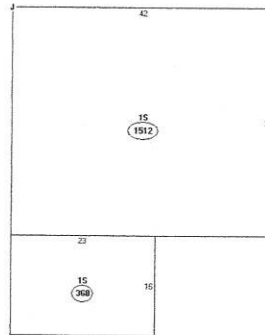
Valuation

Land: \$8,983,200
Building: \$348,900
Total: \$9,332,100
Total Assessed Value: \$6,532,470

Recent Sales

Book/Page	Date	Price
1082/828	11/17/2011	\$0

Building Sketch



Discontinuer
A 002 368 sqft
B 045 1512 sqft
C 001 252 sqft
D FNS 8480 sqft
E 15 1012 sqft
F 15 368 sqft
G EPS 345 sqft
H R51 720 sqft
I R51 600 sqft
J R52 600 sqft

Sketch Legend

—	Main Living Area	ISMA	Masonry	GRHS	Attached Greenhouse
1FR	Frame	OMP	Open Masonry Porch	CAT	Cathedral Ceiling
OFFP	Open Frame Porch	EMP	Enclosed Msry Porch	SOP	Screen Open Frame Prch
EFP	Enclosed Frame Porch	MUB	Masonry Utility	SMP	Screen Open Msry Prch
FUB	Frame Utility Building	MB	Masonry Bay	CPAT	Concrete Patio
FB	Frame Bay	MOH	Masonry Overhang	B	Basement
FG	Frame Garage	.SMA	1/2 Story Masonry		
FCH	Frame Overhang	MP	Masonry Patio		
.SFR	1/2 Story Frame	WD	Wood Deck		
A(U)	Attic (Unfinished)	CPY	Canopy		
A(F)	Attic (Finished)				

Exterior/Interior Information

Levels	Use Type	Ext. Walls	Const. Type	Heating	A/C	Condition
01 - 01	MULTI-USE OFFICE	CONCRETE BLOCK	WOOD JOIST	UNIT HEAT	NONE	FAIR
01 - 01	WAREHOUSE	CONCRETE BLOCK	WOOD JOIST	NONE	NONE	FAIR

Town of Groton



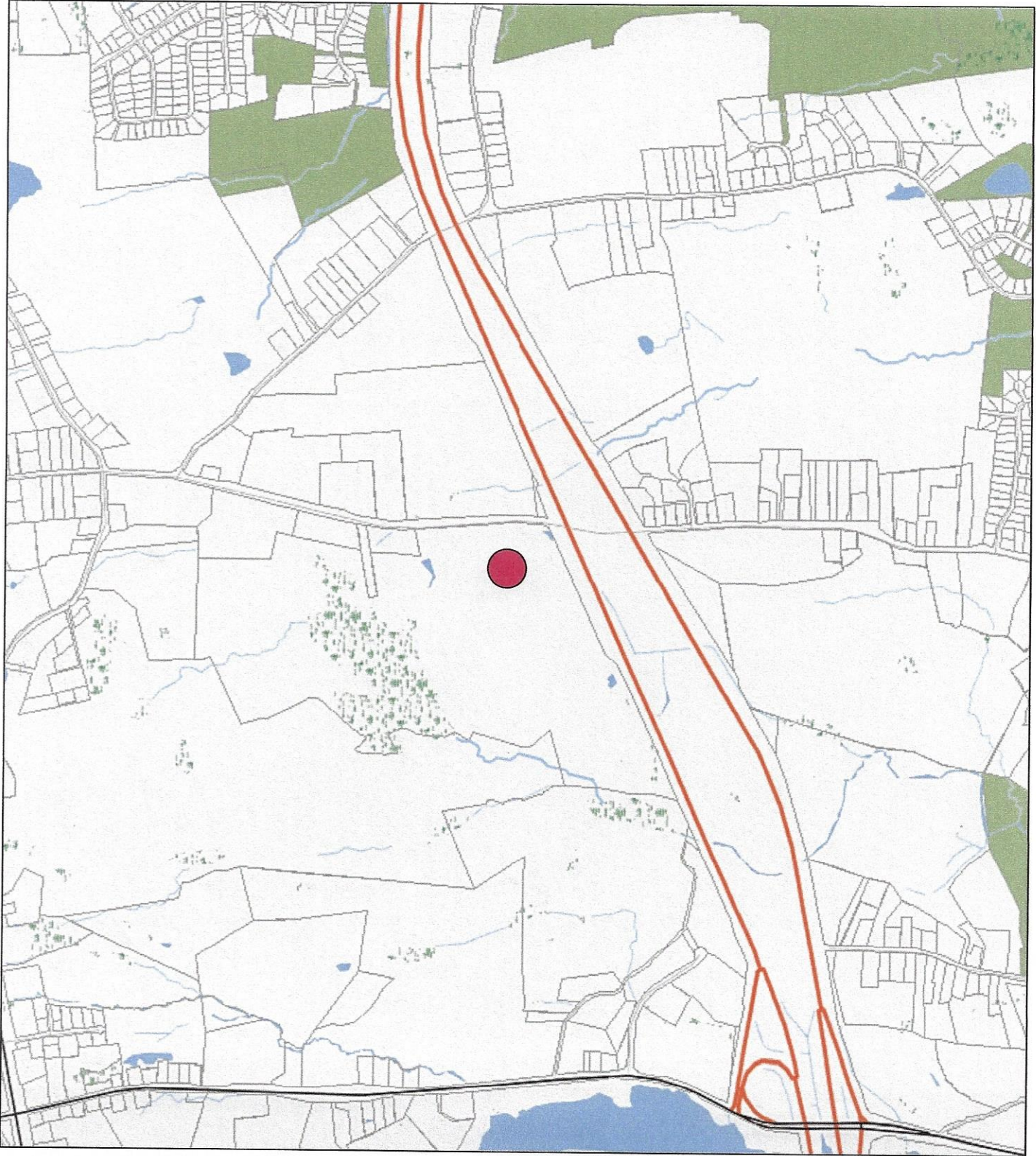
GIS Map

Disclaimer: This map is for informational purposes only. It is not intended to be used as a legal document. The Town of Groton is not responsible for any errors or omissions on this map. The information on this map is based on the most current data available. The information on this map is not intended to be used as a legal document. The information on this map is not intended to be used as a legal document. The information on this map is not intended to be used as a legal document.



1 inch = 1,302 feet

Date: September 21, 2021



Barbadora, Jeff

From: TrackingUpdates@fedex.com
Sent: Wednesday, September 22, 2021 11:02 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 283982464720: Your package has been delivered

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.



Hi. Your package was
delivered Wed, 09/22/2021 at
11:00am.



Delivered to 45 FORT HILL RD, GROTON, CT 06340
Received by M.MARIE

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER [283982464720](#)

FROM Jeff Barbadora
1800 W. Park Drive
WESTBOROUGH, MA, US, 01581

TO Town of Groton Off of Town Manager
John Burt - Mayor
45 Fort Hill Road
GROTON, CT, US, 06340

REFERENCE 799001.7680

SHIPPER REFERENCE 799001.7680

SHIP DATE Tue 9/21/2021 06:15 PM

DELIVERED TO Receptionist/Front Desk

PACKAGING TYPE FedEx Envelope

ORIGIN WESTBOROUGH, MA, US, 01581

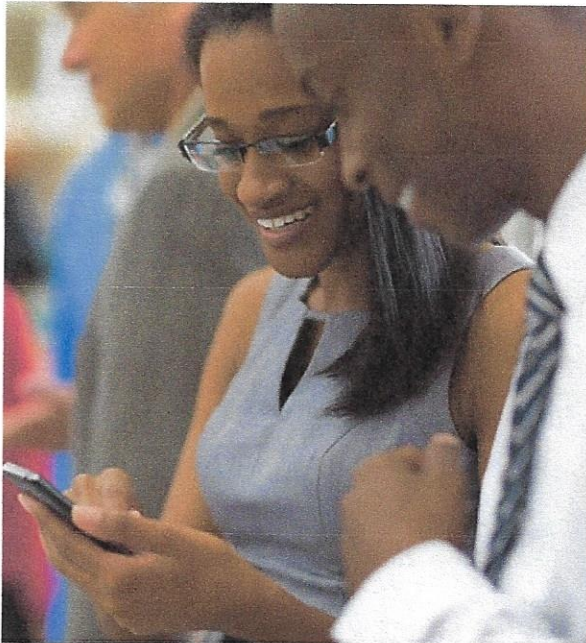
DESTINATION GROTON, CT, US, 06340

SPECIAL HANDLING Deliver Weekday

NUMBER OF PIECES 1

TOTAL SHIPMENT WEIGHT 1.00 LB

SERVICE TYPE FedEx Priority Overnight



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From: TrackingUpdates@fedex.com
Sent: Wednesday, September 22, 2021 11:53 AM
To: Barbadora, Jeff
Subject: FedEx Shipment 283982622394: Your package has been delivered

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Hi. Your package was
delivered Wed, 09/22/2021 at
11:51am.



Delivered to 134 GROTON LONG POINT RD, GROTON, CT 06340
Received by L.LYNDA

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER [283982622394](#)

FROM Jeff Barbadora
1800 W. Park Drive
WESTBOROUGH, MA, US, 01581

TO Town of Groton
Johnathan Reiner - Dir. of Planning
134 Groton long Point Road
GROTON, CT, US, 06340

REFERENCE 799001.7680

SHIPPER REFERENCE 799001.7680

SHIP DATE Tue 9/21/2021 06:15 PM

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ORIGIN WESTBOROUGH, MA, US, 01581

DESTINATION GROTON, CT, US, 06340

SPECIAL HANDLING Deliver Weekday

NUMBER OF PIECES 1

TOTAL SHIPMENT WEIGHT 1.00 LB

SERVICE TYPE FedEx Priority Overnight



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Date: **August 31, 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: CT11044E
Site Name: Groton/ I-95/ X89/ Noa_1

Crown Castle Designation: **BU Number:** 824359
Site Name: Groton/ I-95/ X89/ Noa_1
JDE Job Number: 679106
Work Order Number: 2010511
Order Number: 579836 Rev. 0

Engineering Firm Designation: **B+T Group Project Number:** 137216.006.01

Site Data: **725 Flanders Rd, Groton, New London County, CT**
Latitude 41° 22' 11.74", Longitude -72° 0' 29.77"
130 Foot - Monopole Tower

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:

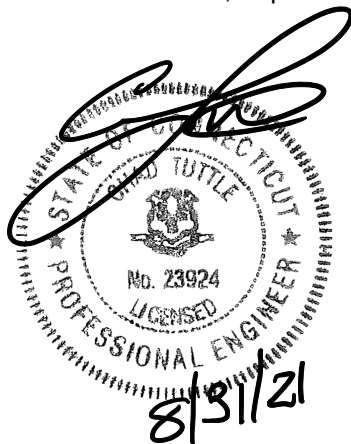
LC5: Proposed Equipment Configuration

Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 135 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Matthew Williams

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires: 02/10/2022



Chad E. Tuttle, P.E.

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1) INTRODUCTION

This is a 130 ft. Monopole tower designed by Pirod Manufactures Inc. The tower has been modified per reinforcement drawings prepared by Structural Components in October of 2009. Reinforcement consists of installation of guy anchors, guy attachment and guy wires. Those are considered as ineffective in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	135 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
130.0	132.0	3	Ericsson	AIR6449 B41_T-MOBILE	4	1-5/8
	131.0	3	Ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	Ericsson	RADIO 4460 B2/B25 B66_TMO		
		3	RFS Celwave	APXVAALL24_43-U-NA20		
	130.0	1	Site Pro 1	AHCP		
		3	--	17'xP2.0STD Pipe Rail		
		1	--	Platform Mount [LP 405-1]		

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)
122.0	124.0	4	CCI Antennas	DMP65R-BU4D	6 3 2 3	1-1/4 7/8 3/4 3/8
		2	CCI Antennas	DMP65R-BU8D		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14		
		3	Ericsson	RRUS 8843 B2/B66A		
		3	Powerwave Tech.	7770.00		
		3	Powerwave Tech.	LGP21401		
		1	Raycap	DC6-48-60-18-8F		
	1	Raycap	DC9-48-60-24-8C-EV			
	122.0	1	--	T-Arm Mount [TA 601-3]		
110.0	110.0	3	Alcatel Lucent	RRH2X60-AWS	20	1-5/8
		3	Alcatel Lucent	RRH2X60-PCS		
		6	Antel	LPA-80063/6CF		
		3	Commscope	LNX-6514DS-A1M		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		2	RFS Celwave	DB-T1-6Z-8AB-0Z		
		1	--	Platform Mount [LP 304-1]		
	109.0	6	Commscope	HBXX-6517DS-A2M		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	3472179	CCI Sites
Mount Analysis Report	9947468	CCI Sites
Tower Modification Drawing	3472487	CCI Sites
Foundation Mapping	3804602	CCI Sites
Geotech Report	3472178	CCI Sites
Crown CAD Package	Date: 08/12/2021	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.
- 3) Base and flange plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

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	130 - 120	Pole	P30x3/8	1	-9.019	1376.613	10.1	Pass
L2	120 - 100	Pole	P36x3/8	2	-16.079	1564.605	33.1	Pass
L3	100 - 80	Pole	P42x3/8	3	-20.969	1752.313	50.6	Pass
L4	80 - 60	Pole	P48x3/8	4	-28.305	1939.864	62.9	Pass
L5	60 - 40	Pole	P54x3/8	5	-35.065	2127.300	72.0	Pass
L6	40 - 20	Pole	P60x3/8	6	-42.453	2314.651	78.4	Pass
L7	20 - 0	Pole	P60x3/4	7	-55.450	5506.441	46.5	Pass
							Summary	

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
						Pole (L6)	78.4	Pass
						Rating =	78.4	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2,3	Flange Connection	120	10.1	Pass
1,2,4	Flange Connection	100	33.4	Pass
1,2,4	Flange Connection	80	52.8	Pass
1,2,4	Flange Connection	60	66.5	Pass
1,2,3	Flange Connection	40	72.0	Pass
1,2,3	Flange Connection	20	78.4	Pass
1,2	Anchor Rods	Base	51.1	Pass
1,2,5	Base Plate	Base	51.1	Pass
1,2	Base Foundation (Structure)	Base	67.3	Pass
1,2	Base Foundation (Soil Interaction)	Base	81.6	Pass

Structure Rating (max from all components) =	81.6%
---	--------------

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.
- 3) Flange plates are assumed to have the same capacity as their respective shaft.
- 4) Flange plates are assumed to have the same capacity as their respective bolts
- 5) Base plate is assumed to have the same capacity as their respective bolts.

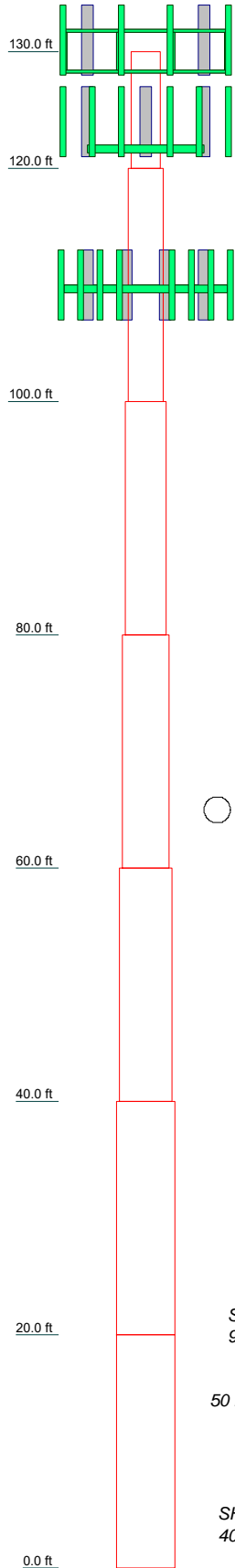
4.1) Recommendations

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	1	P30x3/8	10,000	A53-B-42	1.2
Section	2	P36x3/8	20,000		2.9
Section	3	P42x3/8	20,000		3.3
Section	4	P48x3/8	20,000		3.8
Section	5	P54x3/8	20,000		4.3
Section	6	P60x3/8	20,000		4.8
Section	7	P60x3/4	20,000		9.5
Length (ft)					29.8
Weight (K)					



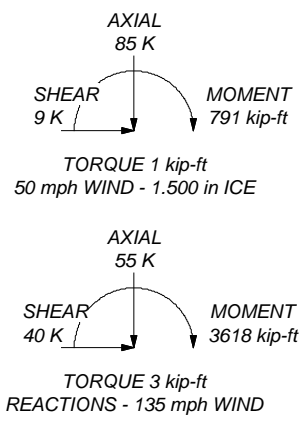
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 135 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 78.4%

ALL REACTIONS ARE FACTORED



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

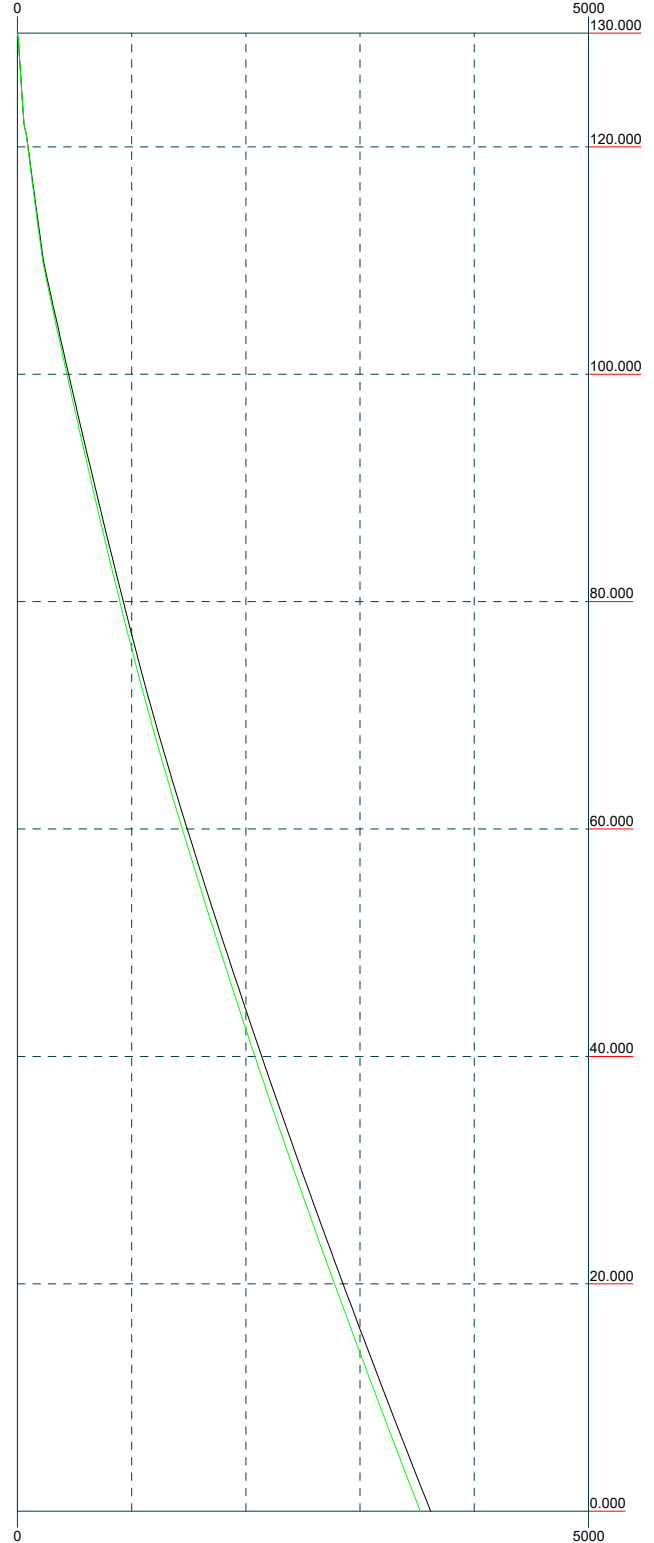
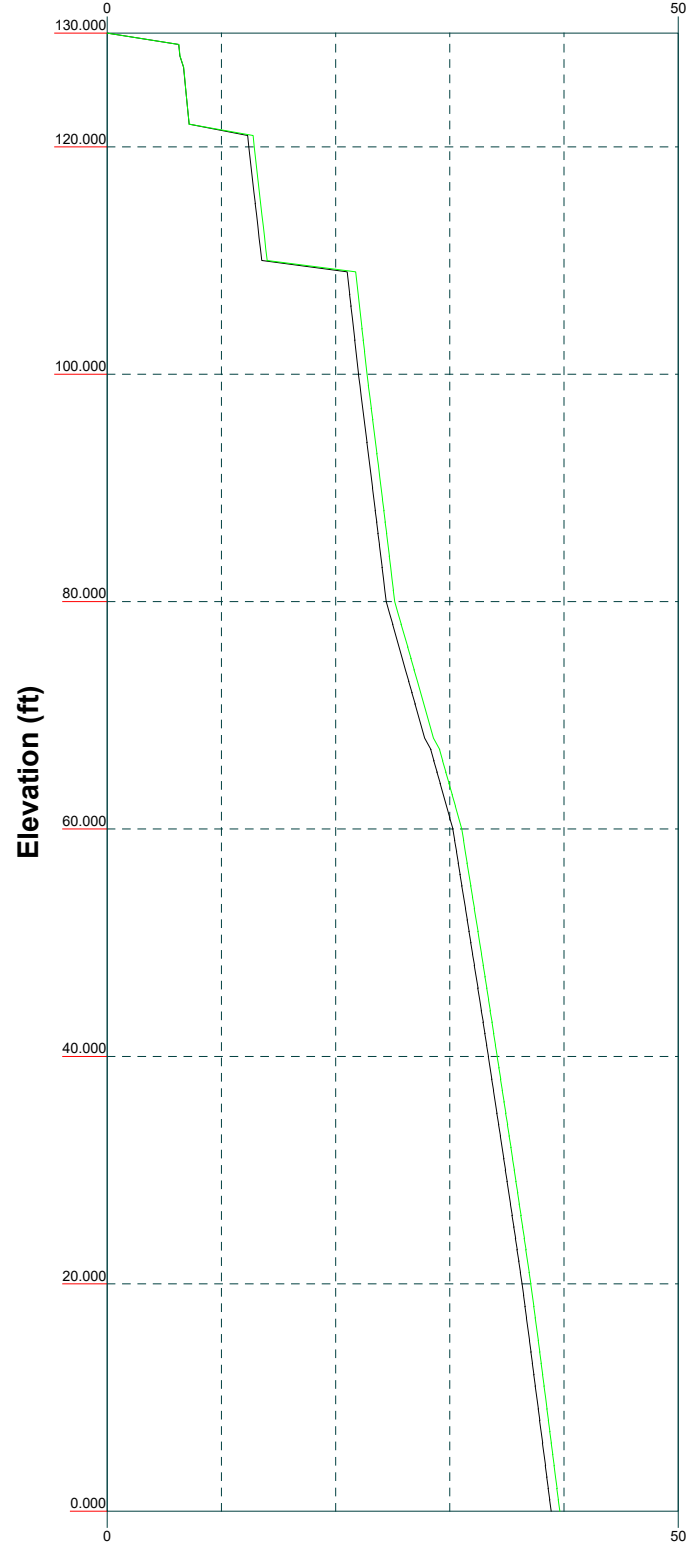
Job:	137216.006.01- Groton-I-95-X89-Noa_1, CT (BU# 82435)		
Project:			
Client:	Crown Castle	Drawn by:	Suhas Poojary
Code:	TIA-222-H	Date:	08/30/21
Path:			Scale: NTS
			Dwg No. E-1

Vx Vz

Mx Mz

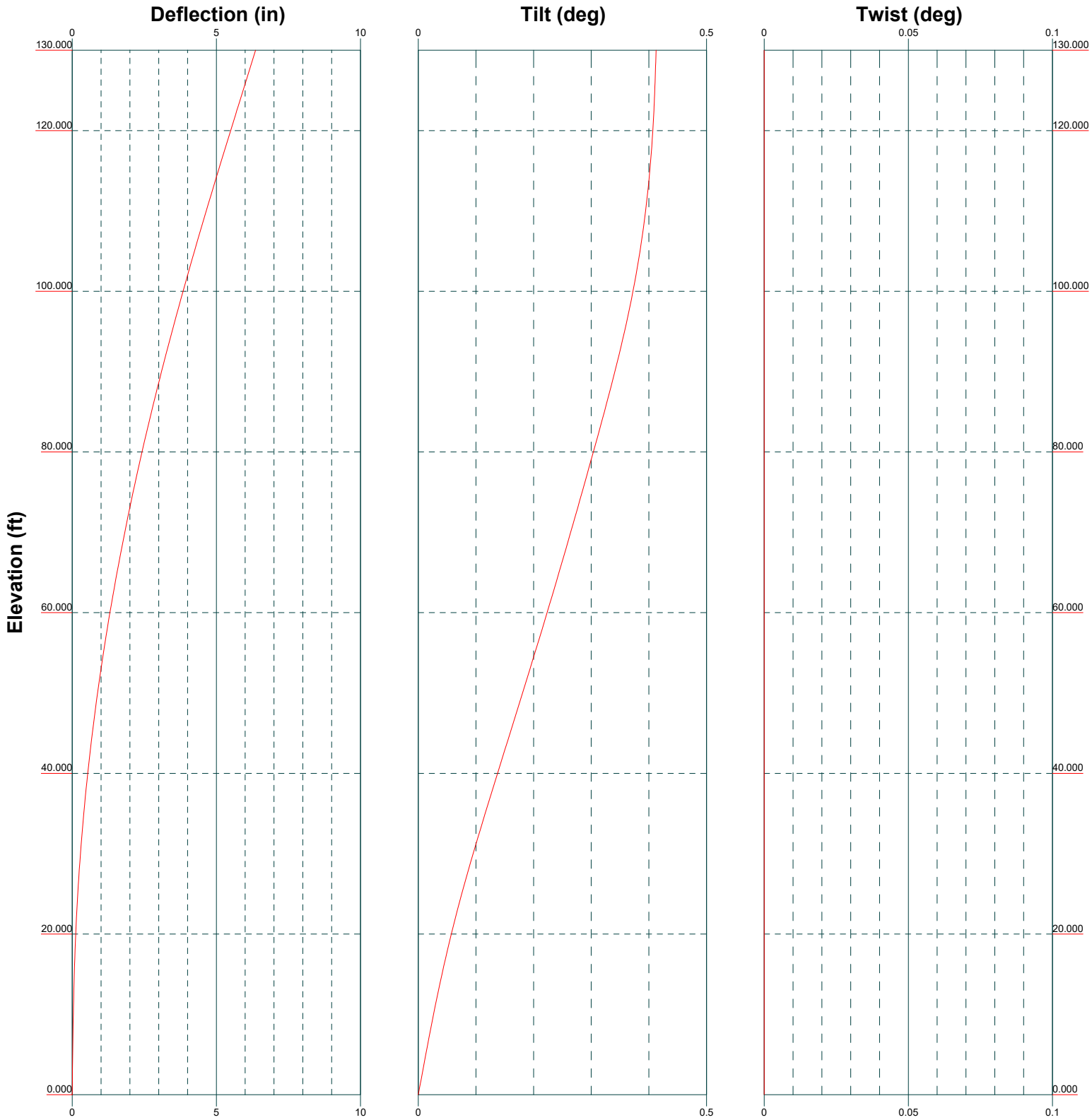
Global Mast Shear (K)


Global Mast Moment (kip-ft)



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

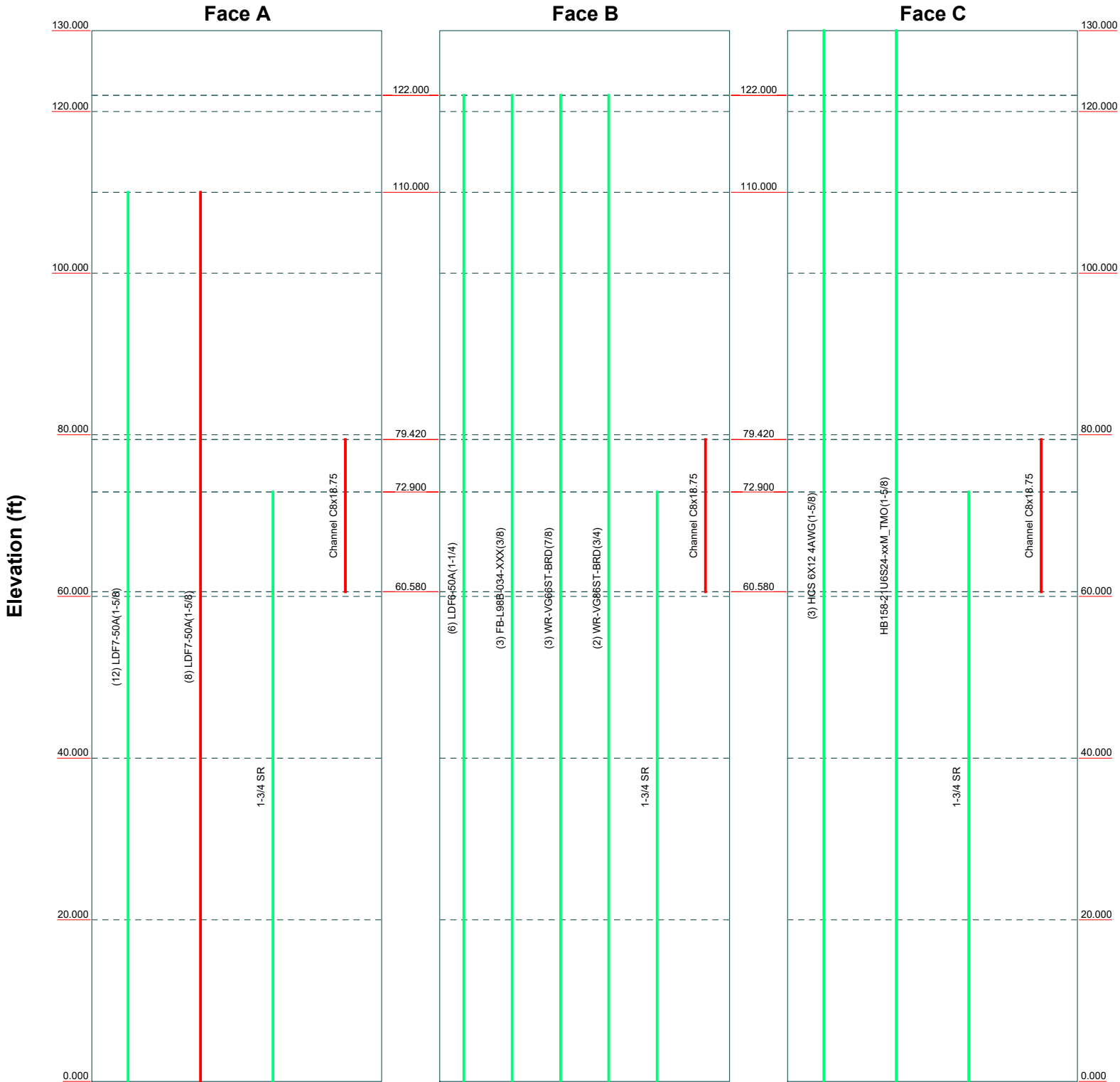
Job: 137216.006.01- Groton-I-95-X89-Noa_1, CT (BU# 82435)		
Project:		
Client: Crown Castle	Drawn by: Suhas Poojary	App'd:
Code: TIA-222-H	Date: 08/30/21	Scale: NTS
Path:		Dwg No. E-4



 <p>B+T Group 1717 S, Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	Job: 137216.006.01- Groton-I-95-X89-Noa_1, CT (BU# 82435)		
	Project:		
	Client: Crown Castle	Drawn by: Suhas Poojary	App'd:
	Code: TIA-222-H	Date: 08/30/21	Scale: NTS
	Path:	Dwg No. E-5	

Feed Line Distribution Chart 0' - 130'

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



 B+T GRP	B+T Group		Job: 137216.006.01- Groton-I-95-X89-Noa_1, CT (BU# 82435)		
	1717 S, Boulder, Suite 300		Project:		
	Tulsa, OK 74119		Client: Crown Castle	Drawn by: Suhas Poojary	App'd:
	Phone: (918) 587-4630		Code: TIA-222-H	Date: 08/30/21	Scale: NTS
	FAX: (918) 295-0265		Path:	Dwg No. E-7	

tnxTower B+T Group 1717 S, Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 137216.006.01- Groton-I-95-X89-Noa_1, CT (BU# 824359)	Page 1 of 19
	Project	Date 16:34:36 08/30/21
	Client Crown Castle	Designed by Suhas Poojary

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 London County, Connecticut.
- Tower base elevation above sea level: 193.000 ft.
- Basic wind speed of 135 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- Nominal ice thickness of 1.500 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

- | | | |
|--|---|---|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs | <ul style="list-style-type: none"> Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known |
|--|---|---|

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Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	130.000-120.000	10.000	P30x3/8	A53-B-42 (42 ksi)	
L2	120.000-100.000	20.000	P36x3/8	A53-B-42 (42 ksi)	
L3	100.000-80.000	20.000	P42x3/8	A53-B-42 (42 ksi)	
L4	80.000-60.000	20.000	P48x3/8	A53-B-42 (42 ksi)	
L5	60.000-40.000	20.000	P54x3/8	A53-B-42 (42 ksi)	
L6	40.000-20.000	20.000	P60x3/8	A53-B-42 (42 ksi)	
L7	20.000-0.000	20.000	P60x3/4	A53-B-42 (42 ksi)	

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 130.000-120.000				1	1	1			
L2 120.000-100.000				1	1	1			
L3 100.000-80.000				1	1	1			
L4 80.000-60.000				1	1	1			
L5 60.000-40.000				1	1	1			
L6 40.000-20.000				1	1	1			
L7 20.000-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
LDF7-50A(1-5/8)	A	No	Surface Ar (CaAa)	110.000 - 0.000	8	6	-0.350 -0.150	1.980		0.001
Channel C8x18.75	A	No	Surface Af (CaAa)	79.420 - 60.580	1	1	0.000 0.040	8.000	21.060	0.019
Channel C8x18.75	B	No	Surface Af (CaAa)	79.420 - 60.580	1	1	0.000 0.040	8.000	21.060	0.019
Channel C8x18.75	C	No	Surface Af (CaAa)	79.420 - 60.580	1	1	0.000 0.040	8.000	21.060	0.019

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Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight 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 _A A _A ft ² /ft	Weight klf	
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	130.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.002 0.002 0.002 0.002	
HB158-21U6S24-xx M_TMO(1-5/8)	C	No	No	Inside Pole	130.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.003 0.003 0.003 0.003	
*										
LDF6-50A(1-1/4)	B	No	No	Inside Pole	122.000 - 0.000	6	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001	
FB-L98B-034-XXX(3/8)	B	No	No	Inside Pole	122.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.000 0.000 0.000 0.000	
WR-VG66ST-BRD(7/8)	B	No	No	Inside Pole	122.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001	
WR-VG86ST-BRD(3/4)	B	No	No	Inside Pole	122.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001	
*										
LDF7-50A(1-5/8)	A	No	No	Inside Pole	110.000 - 0.000	12	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.001 0.001 0.001 0.001	
*										
1-3/4 SR	A	No	No	CaAa (Out Of Face)	72.900 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.175 0.275 0.375 0.575	0.008 0.010 0.012 0.017	
1-3/4 SR	B	No	No	CaAa (Out Of Face)	72.900 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.175 0.275 0.375 0.575	0.008 0.010 0.012 0.017	
1-3/4 SR	C	No	No	CaAa (Out Of Face)	72.900 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.175 0.275 0.375 0.575	0.008 0.010 0.012 0.017	
*										

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Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R	A_F	C_{AA} In Face	C_{AA} Out Face	Weight K
			ft^2	ft^2	ft^2	ft^2	
L1	130.000-120.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.015
		C	0.000	0.000	0.000	0.000	0.097
L2	120.000-100.000	A	0.000	0.000	11.880	0.000	0.164
		B	0.000	0.000	0.000	0.000	0.154
		C	0.000	0.000	0.000	0.000	0.194
L3	100.000-80.000	A	0.000	0.000	23.760	0.000	0.328
		B	0.000	0.000	0.000	0.000	0.154
		C	0.000	0.000	0.000	0.000	0.194
L4	80.000-60.000	A	0.000	0.000	48.880	2.257	0.787
		B	0.000	0.000	25.120	2.257	0.612
		C	0.000	0.000	25.120	2.257	0.653
L5	60.000-40.000	A	0.000	0.000	23.760	3.500	0.492
		B	0.000	0.000	0.000	3.500	0.317
		C	0.000	0.000	0.000	3.500	0.358
L6	40.000-20.000	A	0.000	0.000	23.760	3.500	0.492
		B	0.000	0.000	0.000	3.500	0.317
		C	0.000	0.000	0.000	3.500	0.358
L7	20.000-0.000	A	0.000	0.000	23.760	3.500	0.492
		B	0.000	0.000	0.000	3.500	0.317
		C	0.000	0.000	0.000	3.500	0.358

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness	A_R	A_F	C_{AA} In Face	C_{AA} Out Face	Weight K
			in	ft^2	ft^2	ft^2	ft^2	
L1	130.000-120.000	A	1.457	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.015
		C		0.000	0.000	0.000	0.000	0.097
L2	120.000-100.000	A	1.438	0.000	0.000	18.445	0.000	0.375
		B		0.000	0.000	0.000	0.000	0.154
		C		0.000	0.000	0.000	0.000	0.194
L3	100.000-80.000	A	1.410	0.000	0.000	36.748	0.000	0.741
		B		0.000	0.000	0.000	0.000	0.154
		C		0.000	0.000	0.000	0.000	0.194
L4	80.000-60.000	A	1.375	0.000	0.000	65.312	5.804	1.526
		B		0.000	0.000	28.739	5.804	0.948
		C		0.000	0.000	28.739	5.804	0.989
L5	60.000-40.000	A	1.329	0.000	0.000	36.345	8.816	0.987
		B		0.000	0.000	0.000	8.816	0.423
		C		0.000	0.000	0.000	8.816	0.463
L6	40.000-20.000	A	1.263	0.000	0.000	36.015	8.552	0.960
		B		0.000	0.000	0.000	8.552	0.415
		C		0.000	0.000	0.000	8.552	0.455
L7	20.000-0.000	A	1.132	0.000	0.000	35.358	8.026	0.908
		B		0.000	0.000	0.000	8.026	0.400
		C		0.000	0.000	0.000	8.026	0.440

Feed Line Center of Pressure

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Section	Elevation	CP _x	CP _z	CP _x	CP _z
	ft	in	in	Ice	Ice
				in	in
L1	130.000-120.000	0.000	0.000	0.000	0.000
L2	120.000-100.000	-4.957	0.000	-3.604	0.000
L3	100.000-80.000	-8.303	0.000	-6.102	0.000
L4	80.000-60.000	-4.011	0.000	-3.748	0.000
L5	60.000-40.000	-7.802	0.000	-5.611	0.000
L6	40.000-20.000	-8.061	0.000	-5.817	0.000
L7	20.000-0.000	-8.061	0.000	-5.811	0.000

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L2	12	LDF7-50A(1-5/8)	100.00 - 110.00	1.0000	1.0000
L3	12	LDF7-50A(1-5/8)	80.00 - 100.00	1.0000	1.0000
L4	12	LDF7-50A(1-5/8)	60.00 - 80.00	1.0000	1.0000
L4	17	Channel C8x18.75	60.58 - 79.42	1.0000	1.0000
L4	18	Channel C8x18.75	60.58 - 79.42	1.0000	1.0000
L4	19	Channel C8x18.75	60.58 - 79.42	1.0000	1.0000
L5	12	LDF7-50A(1-5/8)	40.00 - 60.00	1.0000	1.0000
L6	12	LDF7-50A(1-5/8)	20.00 - 40.00	1.0000	1.0000
L7	12	LDF7-50A(1-5/8)	0.00 - 20.00	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L4	17	Channel C8x18.75	60.58 - 79.42	Auto	1.0000
L4	18	Channel C8x18.75	60.58 - 79.42	Auto	1.0000
L4	19	Channel C8x18.75	60.58 - 79.42	Auto	1.0000

Discrete Tower Loads

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	Client		Crown Castle		Designed by		Suhas Poojary	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
APXVAALL24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	14.690	6.870	0.183
			0.000			1/2" Ice	15.460	7.550	0.311
			1.000			1" Ice	16.230	8.250	0.453
						2" Ice	17.820	9.670	0.782
APXVAALL24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	14.690	6.870	0.183
			0.000			1/2" Ice	15.460	7.550	0.311
			1.000			1" Ice	16.230	8.250	0.453
						2" Ice	17.820	9.670	0.782
APXVAALL24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	14.690	6.870	0.183
			0.000			1/2" Ice	15.460	7.550	0.311
			1.000			1" Ice	16.230	8.250	0.453
						2" Ice	17.820	9.670	0.782
AIR6449 B41_T-MOBILE w/ 8' Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	6.904	4.377	0.144
			0.000			1/2" Ice	7.748	5.432	0.204
			2.000			1" Ice	8.498	6.339	0.270
						2" Ice	9.790	7.823	0.426
AIR6449 B41_T-MOBILE w/ 8' Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	6.904	4.377	0.144
			0.000			1/2" Ice	7.748	5.432	0.204
			2.000			1" Ice	8.498	6.339	0.270
						2" Ice	9.790	7.823	0.426
AIR6449 B41_T-MOBILE w/ 8' Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	6.904	4.377	0.144
			0.000			1/2" Ice	7.748	5.432	0.204
			2.000			1" Ice	8.498	6.339	0.270
						2" Ice	9.790	7.823	0.426
RADIO 4460 B2/B25 B66_TMO	A	From Leg	4.000	0.000	130.000	No Ice	2.139	1.686	0.109
			0.000			1/2" Ice	2.321	1.850	0.131
			1.000			1" Ice	2.511	2.022	0.156
						2" Ice	2.912	2.387	0.217
RADIO 4460 B2/B25 B66_TMO	B	From Leg	4.000	0.000	130.000	No Ice	2.139	1.686	0.109
			0.000			1/2" Ice	2.321	1.850	0.131
			1.000			1" Ice	2.511	2.022	0.156
						2" Ice	2.912	2.387	0.217
RADIO 4460 B2/B25 B66_TMO	C	From Leg	4.000	0.000	130.000	No Ice	2.139	1.686	0.109
			0.000			1/2" Ice	2.321	1.850	0.131
			1.000			1" Ice	2.511	2.022	0.156
						2" Ice	2.912	2.387	0.217
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.000	0.000	130.000	No Ice	1.970	1.587	0.073
			0.000			1/2" Ice	2.147	1.749	0.093
			1.000			1" Ice	2.331	1.918	0.116
						2" Ice	2.721	2.280	0.170
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.000	0.000	130.000	No Ice	1.970	1.587	0.073
			0.000			1/2" Ice	2.147	1.749	0.093
			1.000			1" Ice	2.331	1.918	0.116
						2" Ice	2.721	2.280	0.170
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.000	0.000	130.000	No Ice	1.970	1.587	0.073
			0.000			1/2" Ice	2.147	1.749	0.093
			1.000			1" Ice	2.331	1.918	0.116
						2" Ice	2.721	2.280	0.170
(2) L 2 1/2x2 1/2x1/4x7'	A	From Leg	2.000	0.000	130.000	No Ice	1.750	0.007	0.062
			0.000			1/2" Ice	2.234	0.025	0.072
			-1.000			1" Ice	2.726	0.051	0.088
						2" Ice	3.731	0.126	0.139
(2) L 2 1/2x2 1/2x1/4x7'	B	From Leg	2.000	0.000	130.000	No Ice	1.750	0.007	0.062
			0.000			1/2" Ice	2.234	0.025	0.072
			-1.000			1" Ice	2.726	0.051	0.088
						2" Ice	3.731	0.126	0.139
(2) L 2 1/2x2 1/2x1/4x7'	C	From Leg	2.000	0.000	130.000	No Ice	1.750	0.007	0.062

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
				0.000					0.072
				-1.000		1/2" Ice	2.234	0.025	0.072
						1" Ice	2.726	0.051	0.088
						2" Ice	3.731	0.126	0.139
8' x 2.5" Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	2.300	2.300	0.046
			0.000			1/2" Ice	3.132	3.132	0.063
			0.000			1" Ice	3.620	3.620	0.085
						2" Ice	4.620	4.620	0.146
8' x 2.5" Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	2.300	2.300	0.046
			0.000			1/2" Ice	3.132	3.132	0.063
			0.000			1" Ice	3.620	3.620	0.085
						2" Ice	4.620	4.620	0.146
8' x 2.5" Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	2.300	2.300	0.046
			0.000			1/2" Ice	3.132	3.132	0.063
			0.000			1" Ice	3.620	3.620	0.085
						2" Ice	4.620	4.620	0.146
5' x 2" Pipe Mount	A	From Leg	4.000	0.000	130.000	No Ice	1.188	1.188	0.018
			0.000			1/2" Ice	1.496	1.496	0.027
			0.000			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
Side Arm Mount [SO 102-3]	C	None		0.000	128.000	No Ice	3.600	3.600	0.075
						1/2" Ice	4.180	4.180	0.105
						1" Ice	4.750	4.750	0.135
						2" Ice	5.900	5.900	0.195
Platform Mount [LP 405-1_HR-1]	C	None		0.000	130.000	No Ice	25.330	25.330	2.056
						1/2" Ice	33.790	33.790	2.634
						1" Ice	42.160	42.160	3.360
						2" Ice	58.770	58.770	5.254
*									
7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	122.000	No Ice	5.746	4.254	0.055
			0.000			1/2" Ice	6.179	5.014	0.103
			2.000			1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	122.000	No Ice	5.746	4.254	0.055
			0.000			1/2" Ice	6.179	5.014	0.103
			2.000			1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	122.000	No Ice	5.746	4.254	0.055
			0.000			1/2" Ice	6.179	5.014	0.103
			2.000			1" Ice	6.607	5.711	0.157
						2" Ice	7.488	7.155	0.287
(2) DMP65R-BU8D w/ Mount Pipe	A	From Leg	4.000	0.000	122.000	No Ice	15.890	7.890	0.139
			0.000			1/2" Ice	16.810	8.740	0.252
			2.000			1" Ice	17.760	9.600	0.380
						2" Ice	19.700	11.370	0.679
(2) DMP65R-BU4D w/ Mount Pipe	B	From Leg	4.000	0.000	122.000	No Ice	7.530	3.790	0.095
			0.000			1/2" Ice	8.040	4.230	0.156
			2.000			1" Ice	8.570	4.680	0.225
						2" Ice	9.680	5.630	0.391
(2) DMP65R-BU4D w/ Mount Pipe	C	From Leg	4.000	0.000	122.000	No Ice	7.530	3.790	0.095
			0.000			1/2" Ice	8.040	4.230	0.156
			2.000			1" Ice	8.570	4.680	0.225
						2" Ice	9.680	5.630	0.391
LGP21401	A	From Leg	4.000	0.000	122.000	No Ice	1.104	0.207	0.014
			0.000			1/2" Ice	1.239	0.274	0.021
			2.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
LGP21401	B	From Leg	4.000	0.000	122.000	No Ice	1.104	0.207	0.014

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft					
			0.000			1/2" Ice	1.239	0.274	0.021
			2.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
LGP21401	C	From Leg	4.000	0.000	122.000	No Ice	1.104	0.207	0.014
			0.000			1/2" Ice	1.239	0.274	0.021
			2.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
DC6-48-60-18-8F	A	From Leg	1.000	0.000	122.000	No Ice	1.212	1.212	0.033
			0.000			1/2" Ice	1.892	1.892	0.055
			2.000			1" Ice	2.105	2.105	0.080
						2" Ice	2.570	2.570	0.138
RRUS 4478 B14	A	From Leg	4.000	0.000	122.000	No Ice	1.843	1.059	0.060
			0.000			1/2" Ice	2.012	1.197	0.076
			2.000			1" Ice	2.190	1.342	0.094
						2" Ice	2.566	1.656	0.140
RRUS 4478 B14	B	From Leg	4.000	0.000	122.000	No Ice	1.843	1.059	0.060
			0.000			1/2" Ice	2.012	1.197	0.076
			2.000			1" Ice	2.190	1.342	0.094
						2" Ice	2.566	1.656	0.140
RRUS 4478 B14	C	From Leg	4.000	0.000	122.000	No Ice	1.843	1.059	0.060
			0.000			1/2" Ice	2.012	1.197	0.076
			2.000			1" Ice	2.190	1.342	0.094
						2" Ice	2.566	1.656	0.140
RRUS 4449 B5/B12	A	From Leg	4.000	0.000	122.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			2.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
RRUS 4449 B5/B12	B	From Leg	4.000	0.000	122.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			2.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
RRUS 4449 B5/B12	C	From Leg	4.000	0.000	122.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			2.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
RRUS 8843 B2/B66A	A	From Leg	4.000	0.000	122.000	No Ice	1.639	1.353	0.072
			0.000			1/2" Ice	1.799	1.500	0.090
			2.000			1" Ice	1.966	1.655	0.110
						2" Ice	2.323	1.986	0.159
RRUS 8843 B2/B66A	B	From Leg	4.000	0.000	122.000	No Ice	1.639	1.353	0.072
			0.000			1/2" Ice	1.799	1.500	0.090
			2.000			1" Ice	1.966	1.655	0.110
						2" Ice	2.323	1.986	0.159
RRUS 8843 B2/B66A	C	From Leg	4.000	0.000	122.000	No Ice	1.639	1.353	0.072
			0.000			1/2" Ice	1.799	1.500	0.090
			2.000			1" Ice	1.966	1.655	0.110
						2" Ice	2.323	1.986	0.159
DC9-48-60-24-8C-EV	B	From Leg	1.000	0.000	122.000	No Ice	2.737	4.785	0.026
			0.000			1/2" Ice	2.963	5.065	0.063
			2.000			1" Ice	3.196	5.352	0.104
						2" Ice	3.684	5.948	0.200
8' x 2" Mount Pipe	A	From Leg	4.000	0.000	122.000	No Ice	1.900	1.900	0.029
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
8' x 2" Mount Pipe	B	From Leg	4.000	0.000	122.000	No Ice	1.900	1.900	0.029
			0.000			1/2" Ice	2.728	2.728	0.044

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft					
			0.000			1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
8' x 2" Mount Pipe	C	From Leg	4.000	0.000	122.000	No Ice	1.900	1.900	0.029
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.063
4' x 2" Pipe Mount	A	From Leg	1.000	0.000	122.000	2" Ice	4.396	4.396	0.119
			0.000			No Ice	0.785	0.785	0.029
			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
4' x 2" Pipe Mount	B	From Leg	1.000	0.000	122.000	2" Ice	1.814	1.814	0.072
			0.000			No Ice	0.785	0.785	0.029
			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
4' x 2" Pipe Mount	C	From Leg	1.000	0.000	122.000	2" Ice	1.814	1.814	0.072
			0.000			No Ice	0.785	0.785	0.029
			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
T-Arm Mount [TA 601-3]	C	None		0.000	122.000	2" Ice	1.814	1.814	0.072
						No Ice	12.560	12.560	0.726
						1/2" Ice	15.360	15.360	0.941
						1" Ice	18.040	18.040	1.210
						2" Ice	23.690	23.690	1.924
*									
(2) LPA-80063/6CF w/ Mount Pipe	A	From Leg	4.000	0.000	110.000	No Ice	9.831	10.215	0.052
			0.000			1/2" Ice	10.400	11.384	0.145
			0.000			1" Ice	10.933	12.269	0.246
						2" Ice	12.026	14.086	0.476
(2) LPA-80063/6CF w/ Mount Pipe	B	From Leg	4.000	0.000	110.000	No Ice	9.831	10.215	0.052
			0.000			1/2" Ice	10.400	11.384	0.145
			0.000			1" Ice	10.933	12.269	0.246
						2" Ice	12.026	14.086	0.476
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.000	0.000	110.000	No Ice	9.831	10.215	0.052
			0.000			1/2" Ice	10.400	11.384	0.145
			0.000			1" Ice	10.933	12.269	0.246
						2" Ice	12.026	14.086	0.476
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.000	0.000	110.000	No Ice	7.970	5.990	0.078
			0.000			1/2" Ice	8.730	6.720	0.141
			-1.000			1" Ice	9.500	7.470	0.216
						2" Ice	11.110	9.020	0.399
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.000	0.000	110.000	No Ice	7.970	5.990	0.078
			0.000			1/2" Ice	8.730	6.720	0.141
			-1.000			1" Ice	9.500	7.470	0.216
						2" Ice	11.110	9.020	0.399
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.000	0.000	110.000	No Ice	7.970	5.990	0.078
			0.000			1/2" Ice	8.730	6.720	0.141
			-1.000			1" Ice	9.500	7.470	0.216
						2" Ice	11.110	9.020	0.399
LNx-6514DS-A1M w/ Mount Pipe	A	From Leg	4.000	0.000	110.000	No Ice	4.090	3.300	0.065
			0.000			1/2" Ice	4.490	3.680	0.128
			0.000			1" Ice	4.890	4.060	0.202
						2" Ice	5.710	4.870	0.383
LNx-6514DS-A1M w/ Mount Pipe	B	From Leg	4.000	0.000	110.000	No Ice	4.090	3.300	0.065
			0.000			1/2" Ice	4.490	3.680	0.128
			0.000			1" Ice	4.890	4.060	0.202
						2" Ice	5.710	4.870	0.383
LNx-6514DS-A1M w/ Mount Pipe	C	From Leg	4.000	0.000	110.000	No Ice	4.090	3.300	0.065
			0.000			1/2" Ice	4.490	3.680	0.128

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
			ft	°	ft	ft ²	ft ²	K	
			0.000			1" Ice	0.252	0.252	0.022
						2" Ice	0.400	0.400	0.036
*									

Load Combinations

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

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Comb. No.	Description
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	130 - 120	Pole	Max Tension	26	0.000	-0.000	-0.000
			Max. Compression	26	-19.101	-0.292	2.779
			Max. Mx	8	-9.040	-90.512	0.827
			Max. My	2	-9.019	-0.222	93.046
			Max. Vy	8	12.398	-90.512	0.827
			Max. Vx	14	12.872	0.133	-91.658
			Max. Torque	8			2.341
L2	120 - 100	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-33.607	0.152	4.982
			Max. Mx	8	-16.107	-432.609	2.372
			Max. My	2	-16.079	-0.993	447.914
			Max. Vy	8	22.007	-432.609	2.372
			Max. Vx	14	22.753	1.127	-445.436
			Max. Torque	8			3.406
L3	100 - 80	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.331	1.133	5.622
			Max. Mx	20	-21.010	896.937	-0.434
			Max. My	2	-20.969	-1.618	927.258
			Max. Vy	8	24.433	-896.904	3.455
			Max. Vx	14	25.180	2.274	-924.788
			Max. Torque	8			3.406
L4	80 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.096	2.195	6.253
			Max. Mx	8	-28.339	-1443.311	4.544
			Max. My	14	-28.305	3.458	-1486.591
			Max. Vy	8	30.268	-1443.311	4.544
			Max. Vx	14	31.047	3.458	-1486.591
			Max. Torque	8			3.405
L5	60 - 40	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-60.158	3.340	6.914
			Max. Mx	8	-35.087	-2079.639	5.637
			Max. My	14	-35.065	4.673	-2138.605
			Max. Vy	8	33.380	-2079.639	5.637
			Max. Vx	14	34.155	4.673	-2138.605
			Max. Torque	8			3.404
L6	40 - 20	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-69.849	4.559	7.618
			Max. Mx	8	-42.463	-2776.546	6.730
			Max. My	14	-42.453	5.916	-2851.109
			Max. Vy	8	36.331	-2776.546	6.730
			Max. Vx	14	37.100	5.916	-2851.109
			Max. Torque	8			3.403
L7	20 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-84.921	5.692	8.272
			Max. Mx	8	-55.451	-3528.332	7.807
			Max. My	14	-55.450	7.149	-3618.371

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		Suhas Poojary

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	38.869	-3528.332	7.807
			Max. Vx	14	39.632	7.149	-3618.371
			Max. Torque	8			3.403

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	84.921	0.000	0.000
	Max. H _x	20	55.456	36.231	-0.043
	Max. H _z	2	55.456	-0.043	36.962
	Max. M _x	2	3434.772	-0.043	36.962
	Max. M _z	8	3528.332	-38.861	0.043
	Max. Torsion	8	3.403	-38.861	0.043
	Min. Vert	11	41.592	-31.355	-18.444
	Min. H _x	8	55.456	-38.861	0.043
	Min. H _z	14	55.456	0.043	-39.624
	Min. M _x	14	-3618.371	0.043	-39.624
	Min. M _z	20	-3345.650	36.231	-0.043
	Min. Torsion	20	-3.397	36.231	-0.043

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overtuning Moment, M _x kip-ft	Overtuning Moment, M _z kip-ft	Torque kip-ft
Dead Only	46.214	0.000	0.000	-1.913	1.388	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	55.456	0.043	-36.962	-3434.772	-3.768	0.458
0.9 Dead+1.0 Wind 0 deg - No Ice	41.592	0.043	-36.962	-3419.947	-4.170	0.458
1.2 Dead+1.0 Wind 30 deg - No Ice	55.456	18.155	-32.036	-2977.930	-1675.162	-1.313
0.9 Dead+1.0 Wind 30 deg - No Ice	41.592	18.155	-32.036	-2964.997	-1668.655	-1.308
1.2 Dead+1.0 Wind 60 deg - No Ice	55.456	33.704	-19.849	-1817.455	-3060.062	-2.728
0.9 Dead+1.0 Wind 60 deg - No Ice	41.592	33.704	-19.849	-1809.461	-3048.056	-2.718
1.2 Dead+1.0 Wind 90 deg - No Ice	55.456	38.861	-0.043	-7.807	-3528.332	-3.403
0.9 Dead+1.0 Wind 90 deg - No Ice	41.592	38.861	-0.043	-7.183	-3514.424	-3.391
1.2 Dead+1.0 Wind 120 deg - No Ice	55.456	31.355	18.444	1709.153	-2891.528	-3.163
0.9 Dead+1.0 Wind 120 deg - No Ice	41.592	31.355	18.444	1702.660	-2879.997	-3.153
1.2 Dead+1.0 Wind 150 deg - No Ice	55.456	18.080	31.993	2967.774	-1665.707	-2.083
0.9 Dead+1.0 Wind 150 deg - No Ice	41.592	18.080	31.993	2956.064	-1659.245	-2.077
1.2 Dead+1.0 Wind 180 deg -	55.456	-0.043	39.624	3618.371	7.149	-0.453

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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
No Ice						
0.9 Dead+1.0 Wind 180 deg - No Ice	41.592	-0.043	39.624	3604.225	6.696	-0.453
1.2 Dead+1.0 Wind 210 deg - No Ice	55.456	-19.468	34.309	3134.079	1771.408	1.296
0.9 Dead+1.0 Wind 210 deg - No Ice	41.592	-19.468	34.309	3121.901	1763.791	1.291
1.2 Dead+1.0 Wind 240 deg - No Ice	55.456	-31.399	18.519	1718.603	2900.361	2.705
0.9 Dead+1.0 Wind 240 deg - No Ice	41.592	-31.399	18.519	1712.066	2887.951	2.695
1.2 Dead+1.0 Wind 270 deg - No Ice	55.456	-36.231	0.043	3.110	3345.650	3.397
0.9 Dead+1.0 Wind 270 deg - No Ice	41.592	-36.231	0.043	3.683	3331.400	3.385
1.2 Dead+1.0 Wind 300 deg - No Ice	55.456	-33.661	-19.775	-1808.002	3057.987	3.182
0.9 Dead+1.0 Wind 300 deg - No Ice	41.592	-33.661	-19.775	-1800.053	3045.152	3.171
1.2 Dead+1.0 Wind 330 deg - No Ice	55.456	-19.393	-34.266	-3133.327	1761.960	2.106
0.9 Dead+1.0 Wind 330 deg - No Ice	41.592	-19.393	-34.266	-3119.977	1754.386	2.100
1.2 Dead+1.0 Ice+1.0 Temp	84.921	-0.000	-0.000	-8.272	5.692	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	84.921	0.006	-8.907	-790.971	4.955	0.076
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	84.921	4.407	-7.717	-686.540	-379.830	-0.269
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	84.921	7.636	-4.464	-400.768	-661.918	-0.542
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	84.921	8.809	-0.006	-9.244	-764.408	-0.669
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	84.921	7.621	4.448	382.139	-660.474	-0.617
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	84.921	4.396	7.711	668.870	-378.411	-0.400
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	84.921	-0.006	8.917	774.843	6.594	-0.075
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	84.921	-4.410	7.722	670.030	391.575	0.269
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	84.921	-7.627	4.459	383.558	672.841	0.542
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	84.921	-8.803	0.006	-7.606	775.564	0.670
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	84.921	-7.629	-4.453	-399.349	672.647	0.618
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	84.921	-4.399	-7.715	-686.060	390.156	0.401
Dead+Wind 0 deg - Service	46.214	0.008	-6.878	-639.042	0.392	0.085
Dead+Wind 30 deg - Service	46.214	3.378	-5.961	-554.246	-309.836	-0.244
Dead+Wind 60 deg - Service	46.214	6.271	-3.693	-338.864	-566.910	-0.508
Dead+Wind 90 deg - Service	46.214	7.231	-0.008	-2.966	-653.827	-0.635
Dead+Wind 120 deg - Service	46.214	5.834	3.432	315.714	-535.604	-0.592
Dead+Wind 150 deg - Service	46.214	3.364	5.953	549.327	-308.083	-0.390
Dead+Wind 180 deg - Service	46.214	-0.008	7.373	670.115	2.417	-0.085
Dead+Wind 210 deg - Service	46.214	-3.622	6.384	580.220	329.898	0.244
Dead+Wind 240 deg - Service	46.214	-5.842	3.446	317.468	539.427	0.507
Dead+Wind 270 deg - Service	46.214	-6.742	0.008	-0.941	622.075	0.635
Dead+Wind 300 deg - Service	46.214	-6.263	-3.679	-337.110	568.707	0.593
Dead+Wind 330 deg - Service	46.214	-3.608	-6.376	-583.114	328.144	0.391

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		16:34:36 08/30/21
Client	Crown Castle	Designed by
		Suhas Poojary

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-46.214	0.000	0.000	46.214	0.000	0.000%
2	0.043	-55.456	-36.962	-0.043	55.456	36.962	0.000%
3	0.043	-41.592	-36.962	-0.043	41.592	36.962	0.000%
4	18.155	-55.456	-32.036	-18.155	55.456	32.036	0.000%
5	18.155	-41.592	-32.036	-18.155	41.592	32.036	0.000%
6	33.704	-55.456	-19.849	-33.704	55.456	19.849	0.000%
7	33.704	-41.592	-19.849	-33.704	41.592	19.849	0.000%
8	38.861	-55.456	-0.043	-38.861	55.456	0.043	0.000%
9	38.861	-41.592	-0.043	-38.861	41.592	0.043	0.000%
10	31.355	-55.456	18.444	-31.355	55.456	-18.444	0.000%
11	31.355	-41.592	18.444	-31.355	41.592	-18.444	0.000%
12	18.080	-55.456	31.993	-18.080	55.456	-31.993	0.000%
13	18.080	-41.592	31.993	-18.080	41.592	-31.993	0.000%
14	-0.043	-55.456	39.624	0.043	55.456	-39.624	0.000%
15	-0.043	-41.592	39.624	0.043	41.592	-39.624	0.000%
16	-19.468	-55.456	34.309	19.468	55.456	-34.309	0.000%
17	-19.468	-41.592	34.309	19.468	41.592	-34.309	0.000%
18	-31.399	-55.456	18.519	31.399	55.456	-18.519	0.000%
19	-31.399	-41.592	18.519	31.399	41.592	-18.519	0.000%
20	-36.231	-55.456	0.043	36.231	55.456	-0.043	0.000%
21	-36.231	-41.592	0.043	36.231	41.592	-0.043	0.000%
22	-33.661	-55.456	-19.775	33.661	55.456	19.775	0.000%
23	-33.661	-41.592	-19.775	33.661	41.592	19.775	0.000%
24	-19.393	-55.456	-34.266	19.393	55.456	34.266	0.000%
25	-19.393	-41.592	-34.266	19.393	41.592	34.266	0.000%
26	0.000	-84.921	0.000	0.000	84.921	0.000	0.000%
27	0.006	-84.921	-8.907	-0.006	84.921	8.907	0.000%
28	4.407	-84.921	-7.717	-4.407	84.921	7.717	0.000%
29	7.636	-84.921	-4.464	-7.636	84.921	4.464	0.000%
30	8.809	-84.921	-0.006	-8.809	84.921	0.006	0.000%
31	7.621	-84.921	4.448	-7.621	84.921	-4.448	0.000%
32	4.396	-84.921	7.711	-4.396	84.921	-7.711	0.000%
33	-0.006	-84.921	8.917	0.006	84.921	-8.917	0.000%
34	-4.410	-84.921	7.722	4.410	84.921	-7.722	0.000%
35	-7.627	-84.921	4.459	7.627	84.921	-4.459	0.000%
36	-8.803	-84.921	0.006	8.803	84.921	-0.006	0.000%
37	-7.629	-84.921	-4.453	7.629	84.921	4.453	0.000%
38	-4.399	-84.921	-7.715	4.399	84.921	7.715	0.000%
39	0.008	-46.214	-6.878	-0.008	46.214	6.878	0.000%
40	3.378	-46.214	-5.961	-3.378	46.214	5.961	0.000%
41	6.271	-46.214	-3.693	-6.271	46.214	3.693	0.000%
42	7.231	-46.214	-0.008	-7.231	46.214	0.008	0.000%
43	5.834	-46.214	3.432	-5.834	46.214	-3.432	0.000%
44	3.364	-46.214	5.953	-3.364	46.214	-5.953	0.000%
45	-0.008	-46.214	7.373	0.008	46.214	-7.373	0.000%
46	-3.622	-46.214	6.384	3.622	46.214	-6.384	0.000%
47	-5.842	-46.214	3.446	5.842	46.214	-3.446	0.000%
48	-6.742	-46.214	0.008	6.742	46.214	-0.008	0.000%
49	-6.263	-46.214	-3.679	6.263	46.214	3.679	0.000%
50	-3.608	-46.214	-6.376	3.608	46.214	6.376	0.000%

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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	0.00014256
3	Yes	4	0.00000001	0.00007883
4	Yes	5	0.00000001	0.00005202
5	Yes	5	0.00000001	0.00002401
6	Yes	5	0.00000001	0.00006279
7	Yes	5	0.00000001	0.00002895
8	Yes	4	0.00000001	0.00062016
9	Yes	4	0.00000001	0.00039205
10	Yes	5	0.00000001	0.00004873
11	Yes	5	0.00000001	0.00002255
12	Yes	5	0.00000001	0.00005827
13	Yes	5	0.00000001	0.00002711
14	Yes	4	0.00000001	0.00012951
15	Yes	4	0.00000001	0.00006834
16	Yes	5	0.00000001	0.00006010
17	Yes	5	0.00000001	0.00002761
18	Yes	5	0.00000001	0.00004983
19	Yes	5	0.00000001	0.00002304
20	Yes	4	0.00000001	0.00059707
21	Yes	4	0.00000001	0.00038080
22	Yes	5	0.00000001	0.00006348
23	Yes	5	0.00000001	0.00002930
24	Yes	5	0.00000001	0.00005335
25	Yes	5	0.00000001	0.00002436
26	Yes	4	0.00000001	0.00003599
27	Yes	5	0.00000001	0.00007041
28	Yes	5	0.00000001	0.00007205
29	Yes	5	0.00000001	0.00007105
30	Yes	5	0.00000001	0.00006744
31	Yes	5	0.00000001	0.00006910
32	Yes	5	0.00000001	0.00006953
33	Yes	5	0.00000001	0.00006781
34	Yes	5	0.00000001	0.00007028
35	Yes	5	0.00000001	0.00007013
36	Yes	5	0.00000001	0.00006835
37	Yes	5	0.00000001	0.00007176
38	Yes	5	0.00000001	0.00007248
39	Yes	4	0.00000001	0.00002010
40	Yes	4	0.00000001	0.00003292
41	Yes	4	0.00000001	0.00004503
42	Yes	4	0.00000001	0.00003105
43	Yes	4	0.00000001	0.00003472
44	Yes	4	0.00000001	0.00004004
45	Yes	4	0.00000001	0.00002047
46	Yes	4	0.00000001	0.00003970
47	Yes	4	0.00000001	0.00003403
48	Yes	4	0.00000001	0.00003014
49	Yes	4	0.00000001	0.00004713
50	Yes	4	0.00000001	0.00003509

Maximum Tower Deflections - Service Wind

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	6.361	50	0.415	0.002
L2	120 - 100	5.495	50	0.409	0.002
L3	100 - 80	3.844	50	0.370	0.001
L4	80 - 60	2.421	45	0.302	0.001
L5	60 - 40	1.308	45	0.223	0.000
L6	40 - 20	0.538	45	0.139	0.000
L7	20 - 0	0.121	45	0.056	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	APXVAALL24_43-U-NA20 w/ Mount Pipe	50	6.361	0.415	0.002	123231
128.000	Side Arm Mount [SO 102-3]	50	6.187	0.414	0.002	123231
122.000	7770.00 w/ Mount Pipe	50	5.668	0.411	0.002	76901
110.000	(2) LPA-80063/6CF w/ Mount Pipe	50	4.650	0.394	0.001	29793
68.000	L3x3x1/4 (11.82' horizontal)	45	1.713	0.255	0.001	14291

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 120	34.372	14	2.239	0.010
L2	120 - 100	29.704	14	2.209	0.009
L3	100 - 80	20.787	14	1.999	0.006
L4	80 - 60	13.088	14	1.634	0.004
L5	60 - 40	7.069	14	1.207	0.002
L6	40 - 20	2.906	14	0.754	0.001
L7	20 - 0	0.653	14	0.300	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	APXVAALL24_43-U-NA20 w/ Mount Pipe	14	34.372	2.239	0.010	23450
128.000	Side Arm Mount [SO 102-3]	14	33.435	2.235	0.010	23450
122.000	7770.00 w/ Mount Pipe	14	30.633	2.218	0.010	14627
110.000	(2) LPA-80063/6CF w/ Mount Pipe	14	25.139	2.130	0.008	5617
68.000	L3x3x1/4 (11.82' horizontal)	14	9.260	1.381	0.003	2647

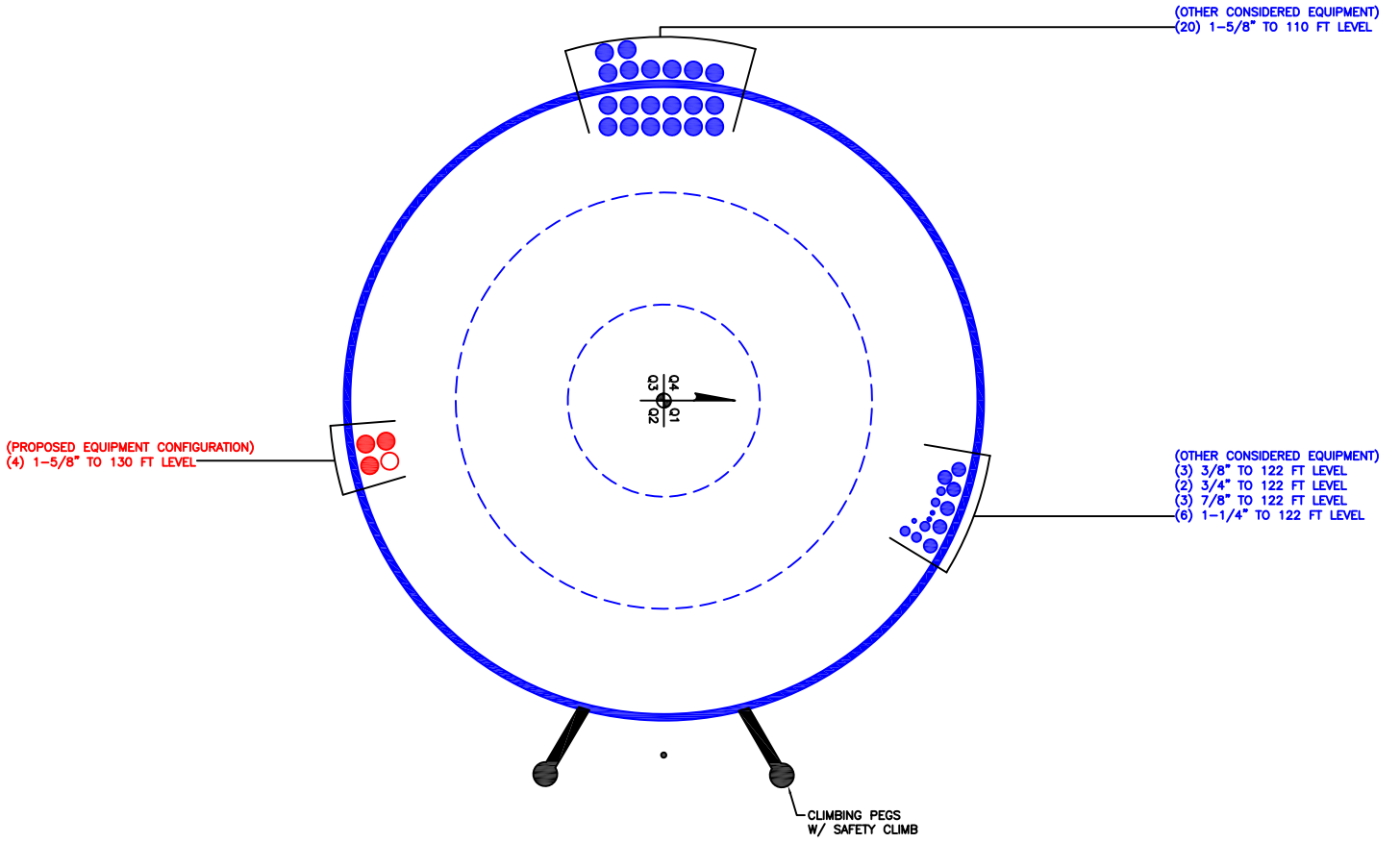
tnxTower B+T Group 1717 S, Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 137216.006.01- Groton-I-95-X89-Noa_1, CT (BU# 824359)	Page 19 of 19
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Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L1	130 - 120 (1)	0.007	0.098	0.000	0.033	0.000	0.106	1.050	4.8.2 ✓
L2	120 - 100 (2)	0.011	0.335	0.000	0.050	0.000	0.348	1.050	4.8.2 ✓
L3	100 - 80 (3)	0.013	0.516	0.000	0.055	0.000	0.532	1.050	4.8.2 ✓
L4	80 - 60 (4)	0.015	0.640	0.000	0.065	0.000	0.660	1.050	4.8.2 ✓
L5	60 - 40 (5)	0.017	0.734	0.000	0.069	0.000	0.756	1.050	4.8.2 ✓
L6	40 - 20 (6)	0.019	0.798	0.000	0.073	0.000	0.823	1.050	4.8.2 ✓
L7	20 - 0 (7)	0.011	0.477	0.000	0.025	0.000	0.488	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	130 - 120	Pole	P30x3/8	1	-9.019	1376.613	10.1	Pass	
L2	120 - 100	Pole	P36x3/8	2	-16.079	1564.605	33.1	Pass	
L3	100 - 80	Pole	P42x3/8	3	-20.969	1752.313	50.6	Pass	
L4	80 - 60	Pole	P48x3/8	4	-28.305	1939.864	62.9	Pass	
L5	60 - 40	Pole	P54x3/8	5	-35.065	2127.300	72.0	Pass	
L6	40 - 20	Pole	P60x3/8	6	-42.453	2314.651	78.4	Pass	
L7	20 - 0	Pole	P60x3/4	7	-55.450	5506.441	46.5	Pass	
							Summary		
							Pole (L6)	78.4	Pass
							RATING =	78.4	Pass

APPENDIX B
BASE LEVEL DRAWING



BUSINESS UNIT: 824359

APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Flange Plate Connection

Elevation = 120 ft.



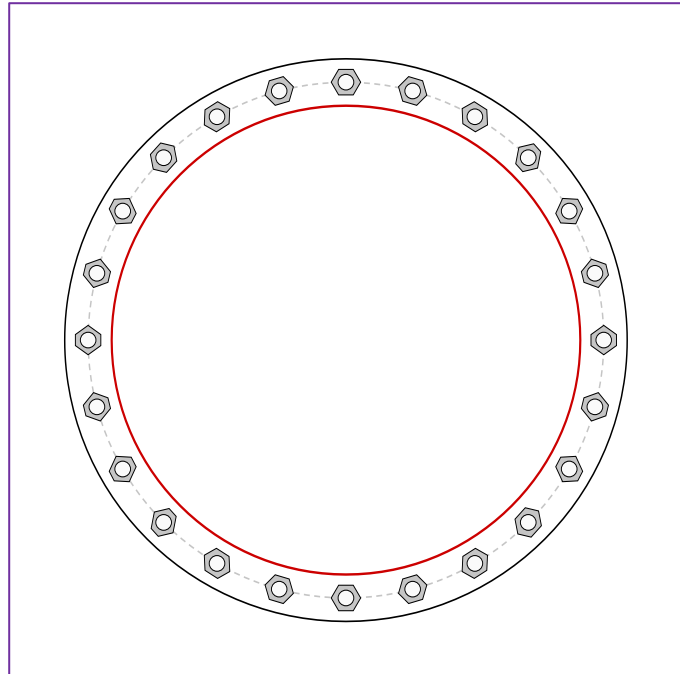
BU #	824359
Site Name	ton/ I-95/ X89/ Noa_1
Order #	579836 Rev# 0

Applied Loads	
Moment (kip-ft)	93.05
Axial Force (kips)	9.02
Shear Force (kips)	12.87

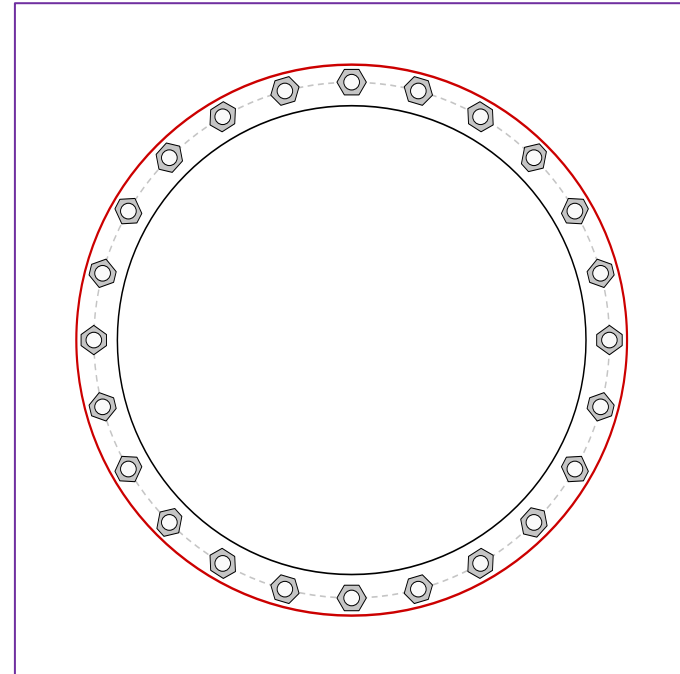
TIA-222 Revision	H
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*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(24) 1" ϕ bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 33" BC

Top Plate Data

36" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Top Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Plate Data

30" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Stiffener Data

N/A

Bottom Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	5.26
Allowable (kips)	54.53
Stress Rating:	9.2% Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Monopole Flange Plate Connection

Elevation = 100 ft.



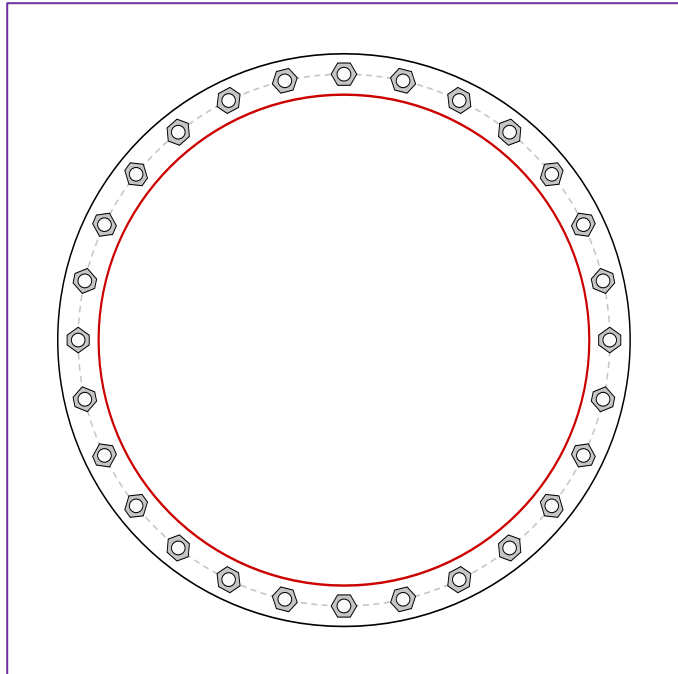
BU #	824359
Site Name	ton/ I-95/ X89/ Noa_1
Order #	579836 Rev# 0

Applied Loads	
Moment (kip-ft)	447.92
Axial Force (kips)	16.08
Shear Force (kips)	22.74

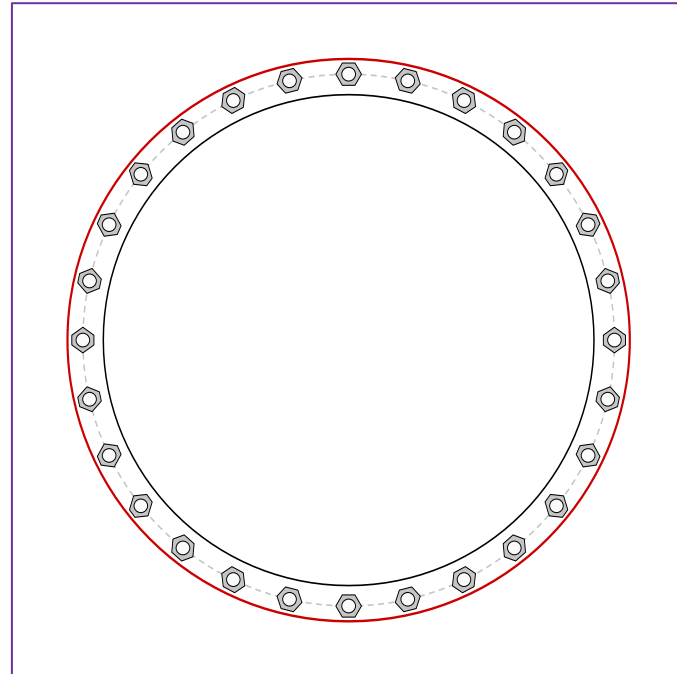
TIA-222 Revision	H
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*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(28) 1" ϕ bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 39" BC

Top Plate Data

42" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Top Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Plate Data

36" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Stiffener Data

N/A

Bottom Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	19.11
Allowable (kips)	54.53
Stress Rating:	33.4% Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Monopole Flange Plate Connection

Elevation = 80 ft.



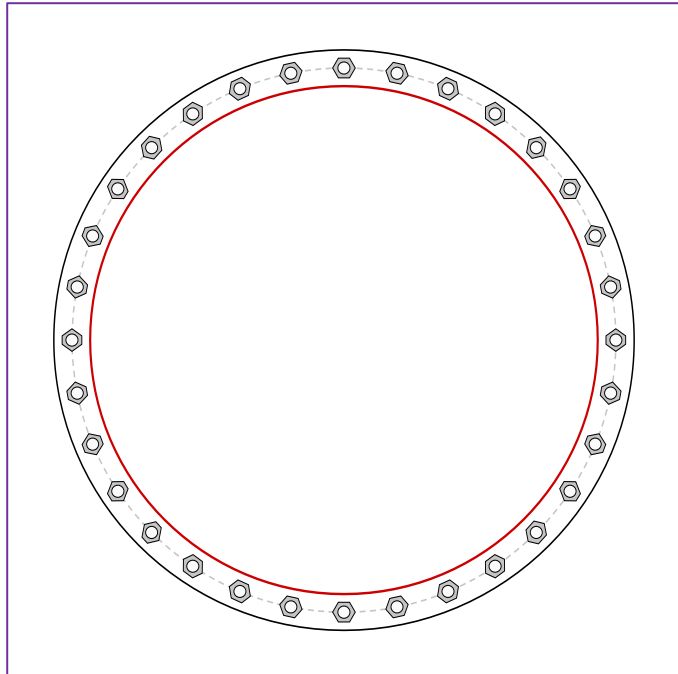
BU #	824359
Site Name	ton/ I-95/ X89/ Noa_1
Order #	579836 Rev# 0

Applied Loads	
Moment (kip-ft)	927.26
Axial Force (kips)	20.97
Shear Force (kips)	25.16

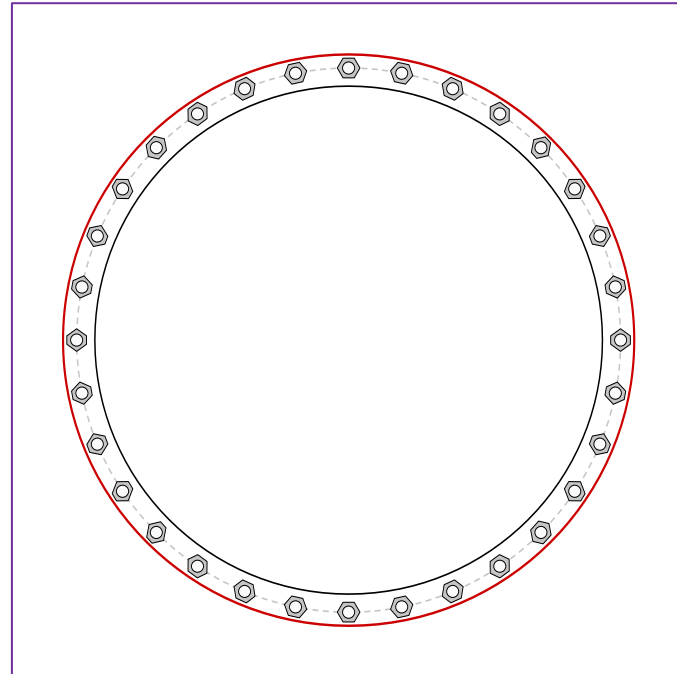
TIA-222 Revision	H
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*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(32) 1" ϕ bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 45" BC

Top Plate Data

48" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Top Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Plate Data

42" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Stiffener Data

N/A

Bottom Pole Data

48" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	30.25
Allowable (kips)	54.53
Stress Rating:	52.8% Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Monopole Flange Plate Connection

Elevation = 60 ft.



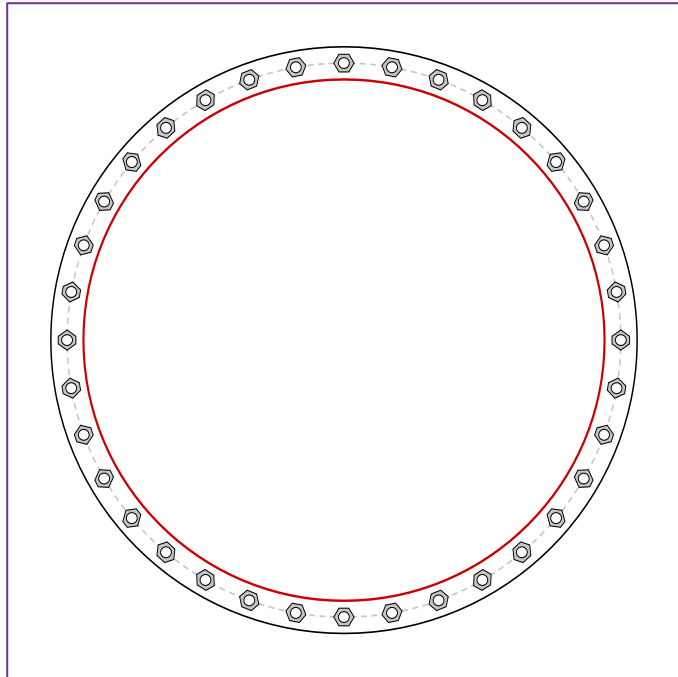
BU #	824359
Site Name	ton/ I-95/ X89/ Noa_1
Order #	579836 Rev# 0

Applied Loads	
Moment (kip-ft)	1486.60
Axial Force (kips)	28.30
Shear Force (kips)	31.05

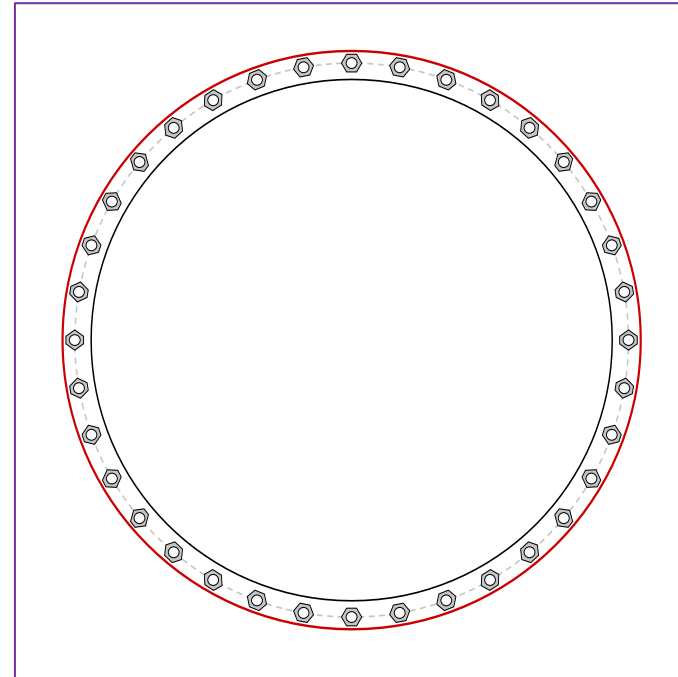
TIA-222 Revision	H
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*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(36) 1" ϕ bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 51" BC

Top Plate Data

54" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Top Pole Data

48" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Plate Data

48" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Stiffener Data

N/A

Bottom Pole Data

54" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	38.07
Allowable (kips)	54.52
Stress Rating:	66.5% Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Monopole Flange Plate Connection

Elevation = 40 ft.



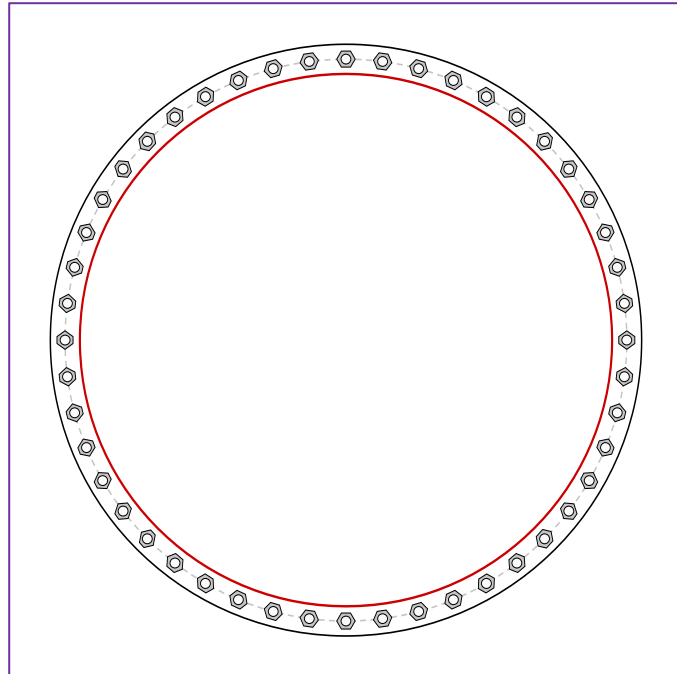
BU #	824359
Site Name	ton/ I-95/ X89/ Noa_1
Order #	579836 Rev# 0

Applied Loads	
Moment (kip-ft)	2138.61
Axial Force (kips)	35.06
Shear Force (kips)	34.16

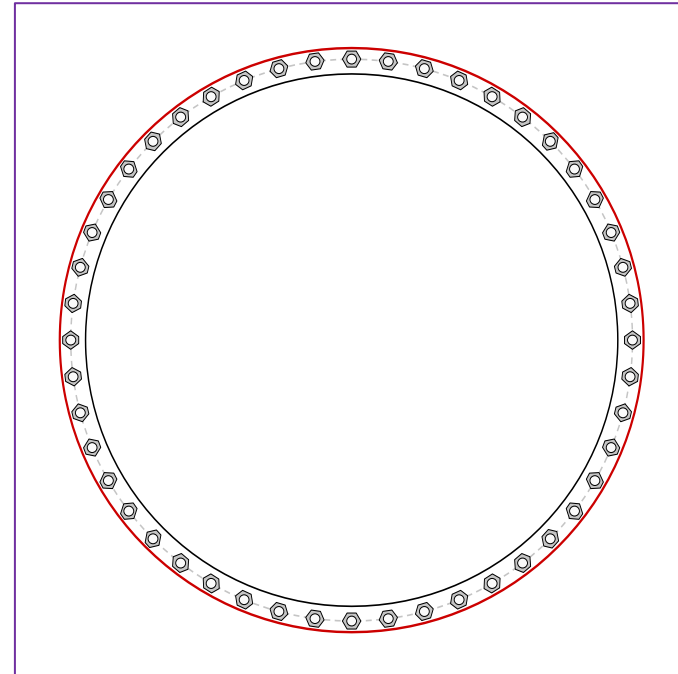
TIA-222 Revision	H
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*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - Internal



Connection Properties

Bolt Data

(48) 1" ϕ bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 57" BC

Top Plate Data

60" OD x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

54" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

54" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	36.78
Allowable (kips)	54.53
Stress Rating:	64.2% Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirod OK
Tension Side Stress Rating:	Pirod OK

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirod OK
Tension Side Stress Rating:	Pirod OK

Monopole Flange Plate Connection

Elevation = 20 ft.



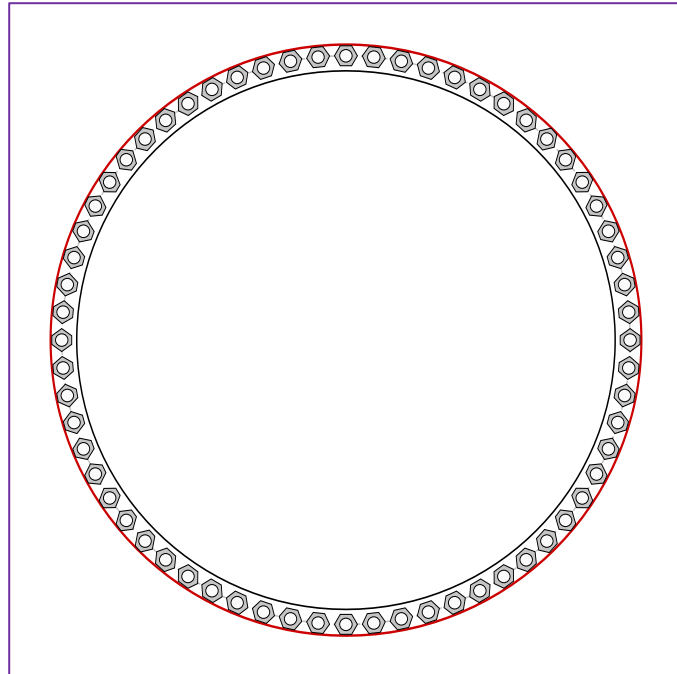
BU #	824359
Site Name	ton/ I-95/ X89/ Noa_1
Order #	579836 Rev# 0

Applied Loads	
Moment (kip-ft)	2851.11
Axial Force (kips)	42.45
Shear Force (kips)	37.10

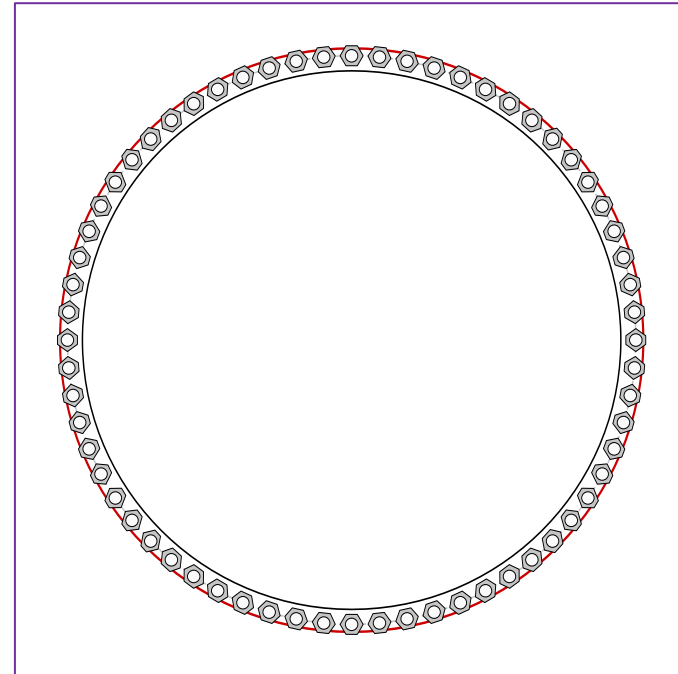
TIA-222 Revision	H
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*TIA-222-H Section 15.5 Applied

Top Plate - Internal



Bottom Plate - Internal



Connection Properties

Bolt Data

(64) 1-1/4" ϕ bolts (A325 N; Fy=81 ksi, Fu=120 ksi) on 57" BC

Top Plate Data

54" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

54" ID x 1.25" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

60" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

60" x 0.75" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	36.84
Allowable (kips)	87.21
Stress Rating:	40.2% Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	Pirol OK
Tension Side Stress Rating:	Pirol OK

Monopole Base Plate Connection

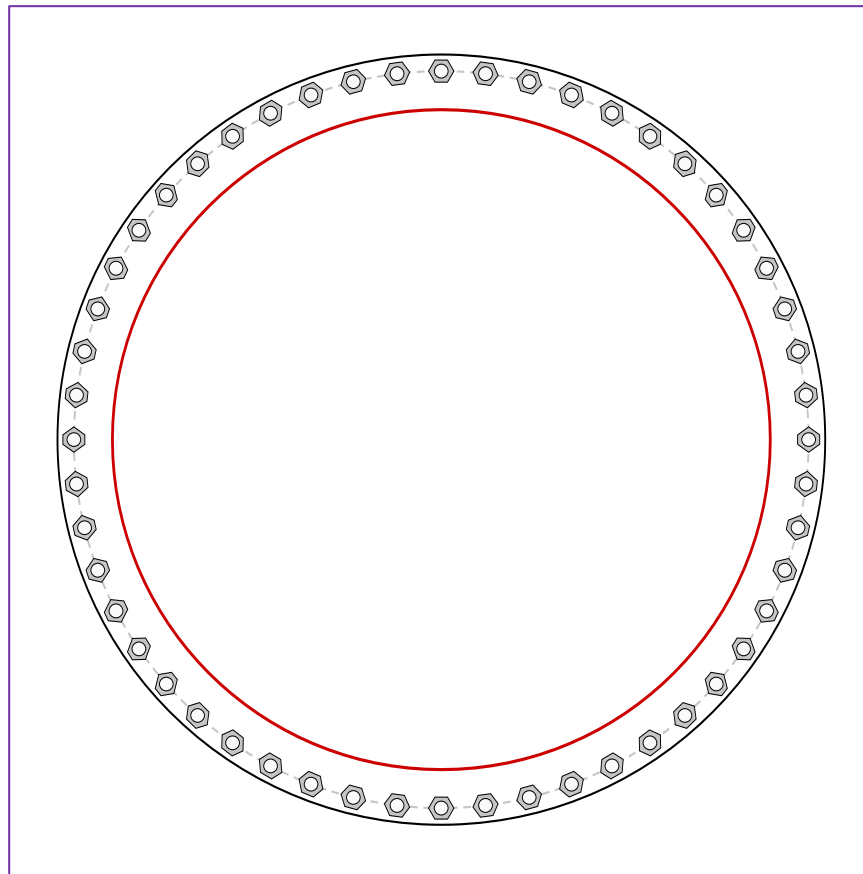


Site Info	
BU #	824359
Site Name	ton/ I-95/ X89/ Noa_1
Order #	579836 Rev# 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.875

Applied Loads	
Moment (kip-ft)	3618.38
Axial Force (kips)	55.45
Shear Force (kips)	39.63

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(52) 1-1/4" ϕ bolts (A687 N; $F_y=105$ ksi, $F_u=125$ ksi) on 67" BC
Base Plate Data
70" OD x 1" Plate (A36; $F_y=36$ ksi, $F_u=58$ ksi)
Stiffener Data
N/A
Pole Data
60" x 0.75" round pole (A53-B-42; $F_y=42$ ksi, $F_u=63$ ksi)

Anchor Rod Summary			<i>(units of kips, kip-in)</i>
$P_{u_t} = 48.78$	$\phi P_{n_t} = 90.84$	Stress Rating	
$V_u = 0.76$	$\phi V_n = 57.52$	51.1%	
$M_u = 0.93$	$\phi M_n = 30.76$	Pass	
Base Plate Summary			
Max Stress (ksi):	-		
Allowable Stress (ksi):	-		
Stress Rating:	Pi rod OK		

Pier and Pad Foundation



BU #: 824359
 Site Name: Groton/ I-95/ X89/ N
 App. Number: 579836 Rev# 0

TIA-222 Revision: H
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	55.45	kips
Base Shear, V_{u_comp} :	39.63	kips
Moment, M_u :	3618.38	ft-kips
Tower Height, H :	130	ft
BP Dist. Above Fdn, bp_{dist} :	3.125	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	302.75	39.63	12.5%	Pass
<i>Bearing Pressure (ksf)</i>	24.64	4.58	18.6%	Pass
<i>Overturning (kip*ft)</i>	4792.36	3910.07	81.6%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	6264.05	3808.60	57.9%	Pass
<i>Pier Compression (kip)</i>	23390.64	97.79	0.4%	Pass
<i>Pad Flexure (kip*ft)</i>	3507.17	2022.93	54.9%	Pass
<i>Pad Shear - 1-way (kips)</i>	458.88	324.45	67.3%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.164	0.000	0.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	4374.68	2285.16	49.7%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, $dpier$:	7	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	9	
Pier Rebar Quantity, mc :	40	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	7	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

*Rating per TIA-222-H Section 15.5

Structural Rating*:	67.3%
Soil Rating*:	81.6%

Pad Properties		
Depth, D :	6.6	ft
Pad Width, W_1 :	20.7	ft
Pad Width, W_2 :	22	ft
Pad Thickness, T :	2.3	ft
Pad Rebar Size (Bottom dir. 1), Sp_1 :	11	
Pad Rebar Quantity (Bottom dir. 1), mp_1 :	24	
Pad Rebar Size (Bottom dir. 2), Sp_2 :	11	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	24	
Pad Clear Cover, cc_{pad} :	3	in

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

Soil Properties		
Total Soil Unit Weight, γ :	130	pcf
Ultimate Net Bearing, Q_{net} :	32.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	34	degrees
SPT Blow Count, N_{blows} :	59	
Base Friction, μ :	0.65	
Neglected Depth, N :	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	10	ft

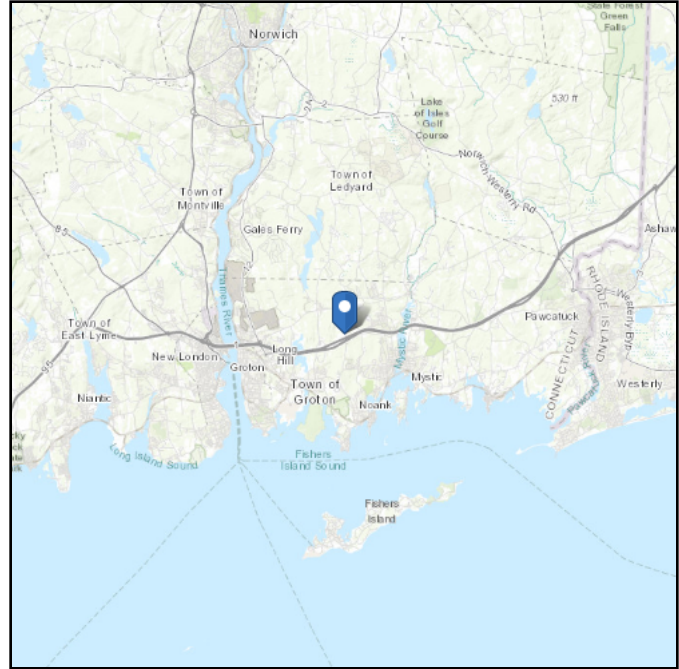
--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 193.35 ft (NAVD 88)
Latitude: 41.369928
Longitude: -72.008269

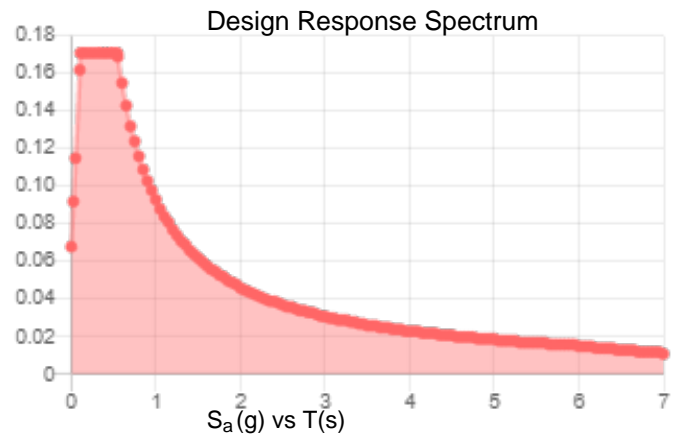
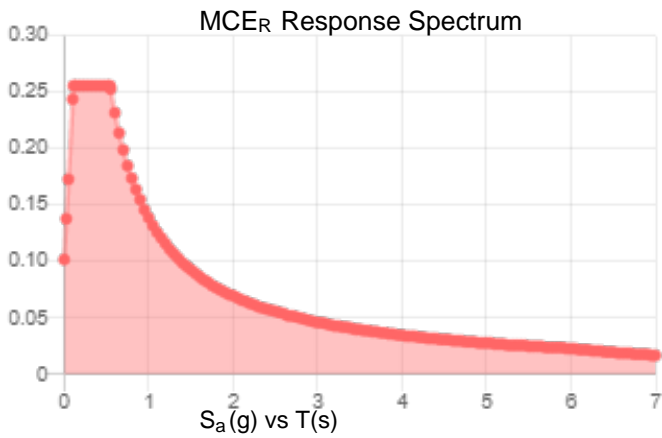


Site Soil Class: D - Stiff Soil

Results:

S_s :	0.16	S_{DS} :	0.171
S_1 :	0.058	S_{D1} :	0.093
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.08
S_{MS} :	0.256	PGA_M :	0.127
S_{M1} :	0.139	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Fri Aug 27 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: Fri Aug 27 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.

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

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Date: August 23, 2021



Kimley-Horn and Associates, Inc.
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000
CrownMounts@kimley-horn.com

Subject: Mount Analysis - Conditional Passing Report

Carrier Designation: T-Mobile Equipment Change-Out
Carrier Site Number: CT11044E
Carrier Site Name: Groton/ I-95/ X89/ Noa_1

Crown Castle Designation: **BU Number:** 824359
Site Name: Groton/ I-95/ X89/ Noa_1
JDE Job Number: 679106
Order Number: 579836, Rev. 0

Engineering Firm Designation: Kimley-Horn Project Number: 019558056

Site Data: 725 Flanders Rd, Groton, New London County, CT 06340
Latitude 41° 22' 11.74" Longitude -72° 0' 29.77"

Structure Information: **Tower Height & Type:** 130 ft Monopole
Mount Elevation: 130 ft
Mount Type: 16 ft Platform w/ Support Rails

Kimley-Horn is pleased to submit this “**Mount Analysis - Conditional Passing 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 w/ Support Rails

Sufficient

* See Section 4.1 for loading and structural modifications required for the mount to support the loading listed in Table 1.

This analysis utilizes an ultimate 3-second gust wind speed of 135 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 Sam Brohaugh, E.I. under the supervision of Steven C. Ball, P.E., S.E.



8.25.21

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7) APPENDIX C

Software Analysis Output

8) APPENDIX D

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9) APPENDIX E

Supplemental Drawings

1) INTRODUCTION

The mounting configuration consists of an existing 16 ft Platform w/ Support Rails designed by Pirod.

2) ANALYSIS CRITERIA

Building Code:	2018 Connecticut State Building Code
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	135 mph
Exposure Category:	C
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
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

Elevation (ft)		Antennas			Mount / Modification Details
Mount	Centerline	#	Manufacturer	Model	
130	132	3	Ericsson	AIR6449 B41_T-MOBILE	Existing 16 ft Platform w/ Support Rails designed by Pirod
	131	3	Ericsson	RADIO 4460 B2/B25 B66_TMO	
		3	Ericsson	RADIO 4449 B71 B85A_T-MOBILE	
		3	RFS	APXVAALL24_43-U-NA20	

3) ANALYSIS PROCEDURE

Table 2 – Documents Provided

Document	Remarks	Reference	Source
Supplemental Loading	T-Mobile RFDS	07/16/2021	TSA
Tower Analysis	Crown Castle	9379657	CCIsites

3.1) Analysis Method

RISA-3D (version 17.02.00), 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 proprietary tool internally developed by Kimley-Horn 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 *Mount Analysis* (Revision D).

3.2) Assumptions

- 1) The antenna mounting system (including any considered modifications) was properly fabricated, installed and maintained in good condition in accordance with its original design, TIA standards, and/or manufacturer specifications.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the provided reference information.
- 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 that could not be verified at this time.
- 5) Any referenced prior structural modifications to the tower mounting system are assumed to be installed as shown per available data unless noted otherwise.
- 6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (Gr. 36)
HSS (Rectangular)	ASTM A36 (Gr. 36)
Pipe	ASTM A53 (Gr. B-35)
Connection Bolts	ASTM A325
Threaded Rods	ASTM A36 (Gr. 36)

This analysis may be affected if any assumptions are not valid or have been made in error. Kimley-Horn 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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Flange Plates	N61	130	75%	Pass
1, 2	Mount Pipes	M145A		49%	Pass
1, 2	Stand Off Horizontals	M34		34%	Pass
1, 2	Face Horizontals	M35		33%	Pass
1, 2	Support Rails	M175B		17%	Pass

Structure Rating (max from all components) =	75%
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Notes:

- 1) See additional documentation in Appendix C and Appendix D for calculations supporting the % capacity consumed.
- 2) Rating per TIA-222-H, Section 15.5.

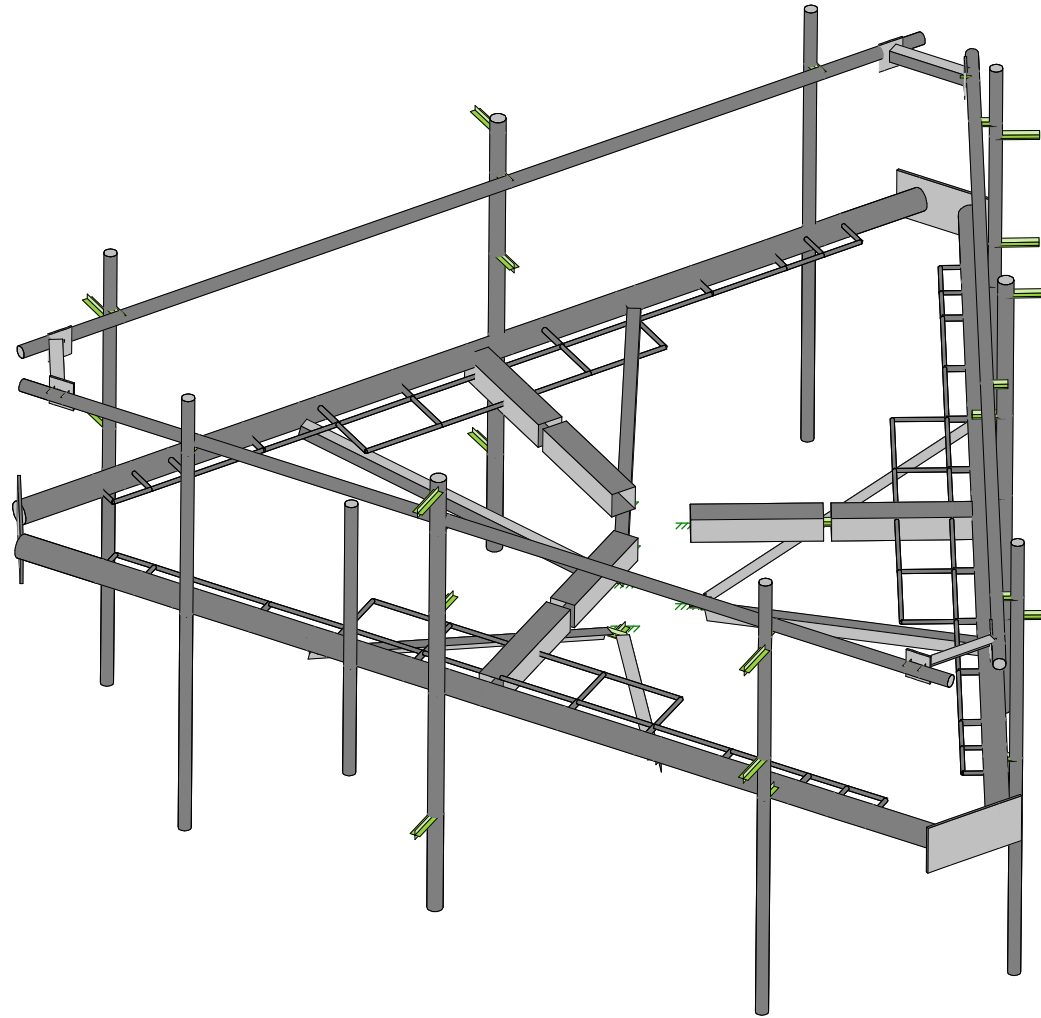
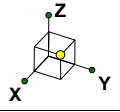
4.1) Recommendations

The mounting configuration will have sufficient design capacity to carry the referenced loading once the following modifications are completed:

- Install proposed support rail composed of the below components. Install support rail 36" above the platform face horizontal and connect to existing mount pipes.
 - **(1) Site Pro 1 AHCP**
 - **(3) P2.0STD Pipes (17'-0" Long, field cut as necessary)**
 - **(9) Site Pro 1 SCX7-U**

No additional modifications are required at this time provided that the above-listed changes are completed.

APPENDIX A
WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Kimley-Horn and Associates, Inc.

STB

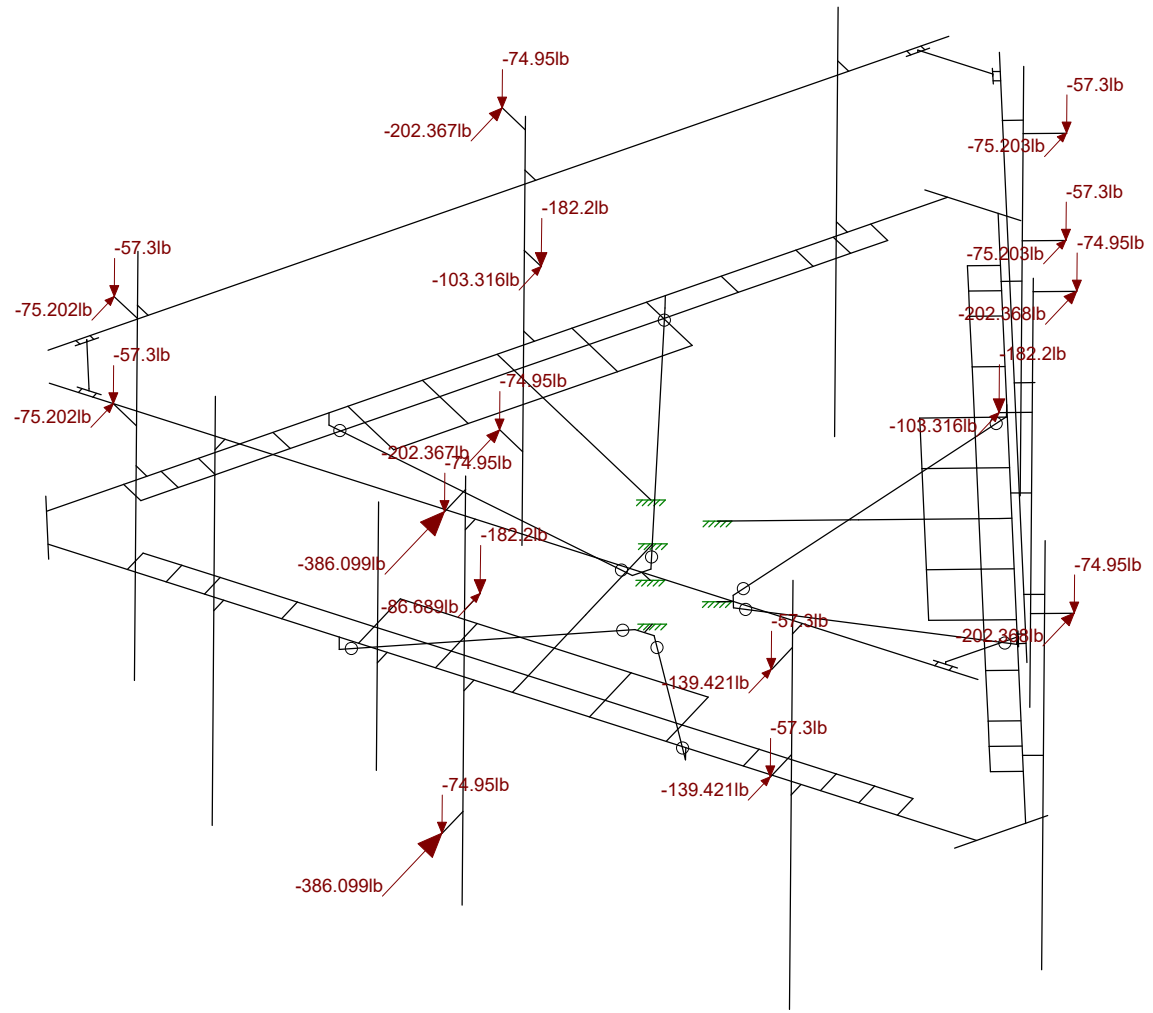
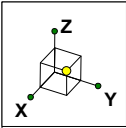
019558056

824358

SK - 1

Aug 23, 2021 at 7:22 PM

824359.r3d



Loads: LC 1, Summary: 1.0D + 1.0W
Envelope Only Solution

Kimley-Horn and Associates, Inc.
STB
019558056

824358

SK - 2
Aug 23, 2021 at 7:22 PM
824359.r3d

APPENDIX B
SOFTWARE INPUT CALCULATIONS

Date	August 23, 2021
Client	Crown Castle
Site #	824359
Site Name	Groton/ I-95/ X89/ Noa_1
Project #	19558056

General Criteria	
TIA Standard	H
IBC Edition	2015
Structure Class	-
Risk Category	II

Wind Summary	
Basic Wind Speed w/o Ice, V (mph)	135.00
Velocity Pressure Coeff., K _z	1.34
Velocity Pressure, q _z (w/o Ice) (psf)	58.87

Site-Specific Criteria	
Exposure Category	C
Topographic Factor, K _{zt}	1.00
Structure Base Elev. (AMSL), z _s (ft)	193.00
Ground Effect Factor, K _e	0.99

Ice Load Summary	
Basic Wind Speed w/ Ice, V _i (mph)	50.00
Design Ice Thick. (ASCE 7-10), t _i (in)	0.75
Velocity Pressure, q _z (w/ Ice) (psf)	8.08
Escalated Ice Thick. @ Mount, t _{iz} (in)	1.72

Mount & Structure Criteria	
Mount Elevation (AGL) (ft)	130.00
Structure Height (ft)	130.00
Structure Type	Monopole

Seismic Load Summary	
Spectral Response (Short Periods), S _s	-
Spectral Response (1-Sec. Period), S ₁	-
Site Class	-
Seismic Design Category	-
Seismic Risk Category	-

Constants	
Wind Direction Probability Factor, K _d	0.95
Gust Effect Factor, G _f	1
Shielding Factor, K _s (antenna)	0.9
Shielding Factor, K _s (mount)	0.9

Snow Load Summary	
Ground Snow Load, p _g (psf)	-
Snow Load on Flat Roofs, p _f (psf)	-

447

21

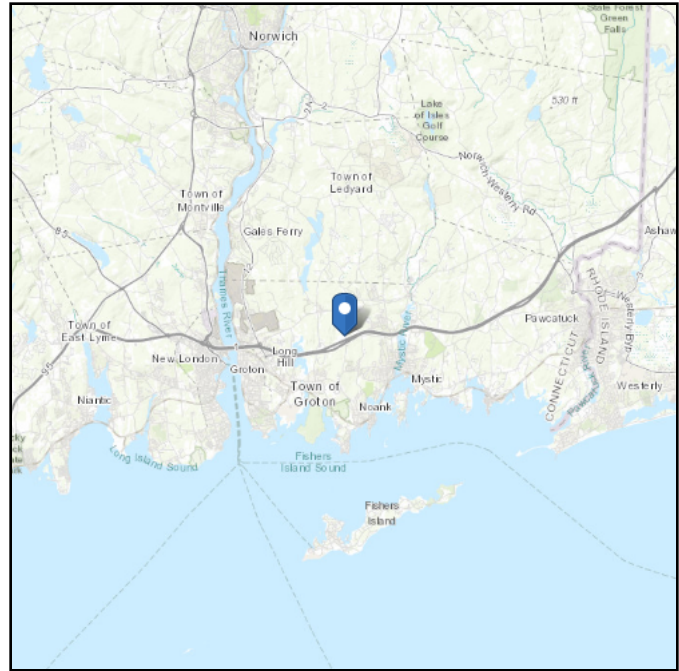
Antenna Name	Qty	Shape	Dimensions (in)			Weight (lb)	Joint Labels								EPA (ft ²)		Wind Force, F _A (lb)			
			H	W	D		Alpha		Beta		Gamma		Delta		Front	Side	No Ice		With Ice	
							A1B	A1T	B1B	B1T	G1B	G1T					Front	Side	Front	Side
AIR6449 B41_T-MOBILE	3	Flat	33.1	20.5	8.5	114.6	A1B	A1T	B1B	B1T	G1B	G1T			5.26	2.03	278.84	107.59	49.31	22.19
APXVAALL24_43-U-NA20	3	Flat	95.9	24	8.5	149.9	A2B	A2T	B2B	B2T	G2B	G2T			14.57	5.33	772.2	282.25	123.8	52.73
RADIO 4449 B71 B85A_T-MOBILE	3	Flat	17.9	13.2	10.6	73.2	A2R		B2R		G2R				0.79	0.99	42.03	52.19	9.1	10.76
RADIO 4460 B2/B25 B66_TMO	3	Flat	17	15.1	11.9	109	A2R		B2R		G2R				0.84	1.07	44.66	56.67	9.5	11.48

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 193.35 ft (NAVD 88)
Latitude: 41.369928
Longitude: -72.008269



Wind

Results:

Wind Speed:	135 Vmph
10-year MRI	80 Vmph
25-year MRI	90 Vmph
50-year MRI	99 Vmph
100-year MRI	110 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

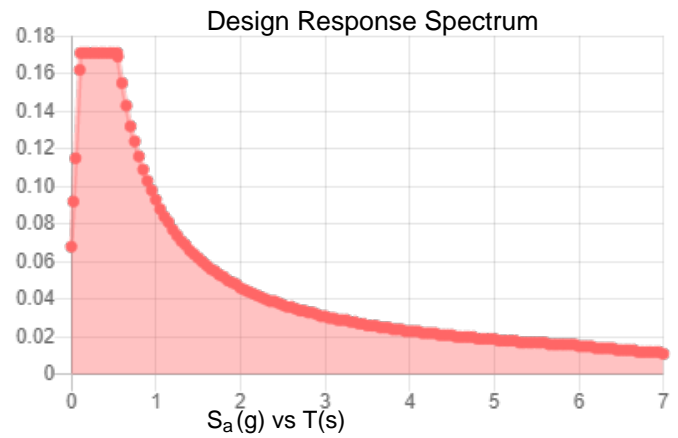
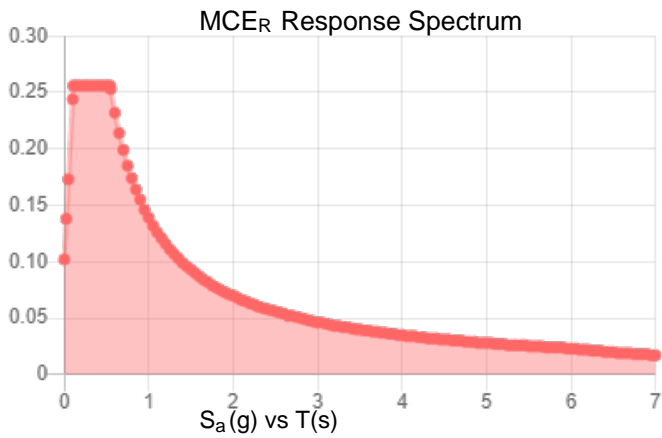
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: D - Stiff Soil

Results:

S_s :	0.16	S_{DS} :	0.171
S_1 :	0.058	S_{D1} :	0.093
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.08
S_{MS} :	0.256	PGA_M :	0.127
S_{M1} :	0.139	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Tue Aug 17 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: Tue Aug 17 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.

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APPENDIX C
SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
30	M125	Grating SR 2	10			Lbyy			.65	.65		Lateral
31	M126	Grating SR 2	10			Lbyy			.65	.65		Lateral
32	M127	Grating SR 2	10			Lbyy			.65	.65		Lateral
33	M128	Grating SR 2	6			Lbyy			.65	.65		Lateral
34	M129	Grating SR 1	6			Lbyy			.65	.65		Lateral
35	M130	Grating SR 1	6			Lbyy			.65	.65		Lateral
36	M131	Grating SR 1	6			Lbyy			.65	.65		Lateral
37	M132	Grating SR 1	6			Lbyy			.65	.65		Lateral
38	M133	Grating SR 1	6			Lbyy			.65	.65		Lateral
39	M134	Grating SR 1	6			Lbyy			.65	.65		Lateral
40	M135	Grating SR 1	6			Lbyy			.65	.65		Lateral
41	M136	Grating SR 1	6			Lbyy			.65	.65		Lateral
42	M137	Grating SR 2	6			Lbyy			.65	.65		Lateral
43	M138	Grating SR 2	6			Lbyy			.65	.65		Lateral
44	M139	Grating SR 2	8			Lbyy			.65	.65		Lateral
45	M140	Grating SR 2	10			Lbyy			.65	.65		Lateral
46	M141	Grating SR 2	16			Lbyy			.65	.65		Lateral
47	M142	Grating SR 2	16			Lbyy			.65	.65		Lateral
48	M143	Grating SR 2	16			Lbyy			.65	.65		Lateral
49	M144	Grating SR 2	16			Lbyy			.65	.65		Lateral
50	M145	Grating SR 2	10			Lbyy			.65	.65		Lateral
51	M146	Grating SR 2	10			Lbyy			.65	.65		Lateral
52	M147	Grating SR 2	10			Lbyy			.65	.65		Lateral
53	M148	Grating SR 2	6			Lbyy			.65	.65		Lateral
54	M149	Grating SR 1	6			Lbyy			.65	.65		Lateral
55	M150	Grating SR 1	6			Lbyy			.65	.65		Lateral
56	M151	Grating SR 1	6			Lbyy			.65	.65		Lateral
57	M152	Grating SR 1	6			Lbyy			.65	.65		Lateral
58	M153	Grating SR 1	6			Lbyy			.65	.65		Lateral
59	M154	Grating SR 1	6			Lbyy			.65	.65		Lateral
60	M155	Grating SR 1	6			Lbyy			.65	.65		Lateral
61	M156	Grating SR 1	6			Lbyy			.65	.65		Lateral
62	M157	Grating SR 2	6			Lbyy			.65	.65		Lateral
63	M158	Grating SR 2	6			Lbyy			.65	.65		Lateral
64	M159	Grating SR 2	8			Lbyy			.65	.65		Lateral
65	M160	Grating SR 2	10			Lbyy			.65	.65		Lateral
66	M161	Grating SR 2	16			Lbyy			.65	.65		Lateral
67	M162	Grating SR 2	16			Lbyy			.65	.65		Lateral
68	M163	Grating SR 2	16			Lbyy			.65	.65		Lateral
69	M164	Grating SR 2	16			Lbyy			.65	.65		Lateral
70	M165	Grating SR 2	10			Lbyy			.65	.65		Lateral
71	M166	Grating SR 2	10			Lbyy			.65	.65		Lateral
72	M167	Grating SR 2	10			Lbyy			.65	.65		Lateral
73	M168	Grating SR 2	6			Lbyy			.65	.65		Lateral
74	M169	Grating SR 2	16			Lbyy			.65	.65		Lateral
75	M170	Grating SR 2	16			Lbyy			.65	.65		Lateral
76	M171	Grating SR 2	16			Lbyy			.65	.65		Lateral
77	M172	Grating SR 2	16			Lbyy			.65	.65		Lateral
78	M173	Grating SR 2	16			Lbyy			.65	.65		Lateral
79	M174	Grating SR 2	16			Lbyy			.65	.65		Lateral
80	M175	Grating SR 2	16			Lbyy			.65	.65		Lateral
81	M176	Grating SR 2	16			Lbyy			.65	.65		Lateral
82	M177	Grating SR 2	16			Lbyy			.65	.65		Lateral
83	M178	Grating SR 2	16			Lbyy			.65	.65		Lateral
84	M179	Grating SR 2	16			Lbyy			.65	.65		Lateral
85	M180	Grating SR 2	16			Lbyy			.65	.65		Lateral
86	M181	Grating SR 2	16			Lbyy			.65	.65		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
87	M182	Grating SR 2	16			Lbyy			.65	.65		Lateral
88	M183	Grating SR 2	16			Lbyy			.65	.65		Lateral
89	M184	Grating SR 2	16			Lbyy			.65	.65		Lateral
90	M185	Grating SR 2	16			Lbyy			.65	.65		Lateral
91	M186	Grating SR 2	16			Lbyy			.65	.65		Lateral
92	M187	Grating SR 2	8			Lbyy			.65	.65		Lateral
93	M188	Grating SR 2	16			Lbyy			.65	.65		Lateral
94	M189	Grating SR 2	16			Lbyy			.65	.65		Lateral
95	M190	Grating SR 2	16			Lbyy			.65	.65		Lateral
96	M191	Grating SR 2	8			Lbyy			.65	.65		Lateral
97	M192	Grating SR 2	16			Lbyy			.65	.65		Lateral
98	M193	Grating SR 2	16			Lbyy			.65	.65		Lateral
99	M194	Grating SR 2	16			Lbyy			.65	.65		Lateral
100	M195	Grating SR 2	8			Lbyy			.65	.65		Lateral
101	M196	Grating SR 2	6			Lbyy			.65	.65		Lateral
102	M197	Grating SR 2	6			Lbyy			.65	.65		Lateral
103	M198	Grating SR 2	6			Lbyy			.65	.65		Lateral
104	M199	Grating SR 2	8			Lbyy			.65	.65		Lateral
105	M200	Grating SR 2	8			Lbyy			.65	.65		Lateral
106	M201	Grating SR 2	8			Lbyy			.65	.65		Lateral
107	M202	Grating SR 2	8			Lbyy			.65	.65		Lateral
108	M203	Grating SR 2	8			Lbyy			.65	.65		Lateral
109	M204	Grating SR 2	8			Lbyy			.65	.65		Lateral
110	M126A	Mount Pipe 2	96			Lbyy						Lateral
111	M131A	Mount Pipe	96			Lbyy						Lateral
112	M136A	Mount Pipe	96			Lbyy						Lateral
113	M151A	Mount Pipe	96			Lbyy						Lateral
114	M156A	Mount Pipe	96			Lbyy						Lateral
115	M171A	Mount Pipe	96			Lbyy						Lateral
116	M175A	Support Rail	193			Lbyy						Lateral
117	M140A	Mount Pipe 2	96			Lbyy						Lateral
118	M145A	Mount Pipe 2	96			Lbyy						Lateral
119	M150B	Mount Pipe	60			Lbyy						Lateral
120	M151B	Support Rail	193			Lbyy						Lateral
121	M152A	Support Rail	193			Lbyy						Lateral
122	M155B	SR Plate	5			Lbyy						Lateral
123	M159A	SR Plate	5			Lbyy						Lateral
124	M163A	SR Plate	5			Lbyy						Lateral
125	M167A	SR Plate	5			Lbyy						Lateral
126	M171B	SR Plate	5			Lbyy						Lateral
127	M175B	SR Plate	5			Lbyy						Lateral
128	M177A	SR Brace	15.573			Lbyy						Lateral
129	M178A	SR Brace	15.573			Lbyy						Lateral
130	M179A	SR Brace	15.573			Lbyy						Lateral
131	M192A	Stabilizer A...	62.961			Lbyy						Lateral
132	M193A	Stabilizer A...	62.961			Lbyy						Lateral
133	M194A	Stabilizer A...	62.961			Lbyy						Lateral
134	M195A	Stabilizer A...	62.961			Lbyy						Lateral
135	M196A	Stabilizer A...	62.961			Lbyy						Lateral
136	M197A	Stabilizer A...	62.961			Lbyy						Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(P...
1	Dead	DL			-1	18			
2	Dead of Ice	RL				18		136	



Basic Load Cases (Continued)

BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(P...
4 Structure Wind (0)	None						272	
5 Structure Wind (30)	None						272	
6 Structure Wind (45)	None						272	
7 Structure Wind (60)	None						272	
8 Structure Wind (90)	None						272	
9 Structure Wind (120)	None						272	
10 Structure Wind (135)	None						272	
11 Structure Wind (150)	None						272	
12 Structure Wind w/ Ice ...	None						272	
13 Structure Wind w/ Ice ...	None						272	
14 Structure Wind w/ Ice ...	None						272	
15 Structure Wind w/ Ice ...	None						272	
16 Structure Wind w/ Ice ...	None						272	
17 Structure Wind w/ Ice ...	None						272	
18 Structure Wind w/ Ice ...	None						272	
19 Structure Wind w/ Ice ...	None						272	
20 Antenna Wind (0)	None				36			
21 Antenna Wind (30)	None				36			
22 Antenna Wind (45)	None				36			
23 Antenna Wind (60)	None				36			
24 Antenna Wind (90)	None				36			
25 Antenna Wind (120)	None				36			
26 Antenna Wind (135)	None				36			
27 Antenna Wind (150)	None				36			
28 Antenna Wind w/ Ice (...)	None				36			
29 Antenna Wind w/ Ice (...)	None				36			
30 Antenna Wind w/ Ice (...)	None				36			
31 Antenna Wind w/ Ice (...)	None				36			
32 Antenna Wind w/ Ice (...)	None				36			
33 Antenna Wind w/ Ice (...)	None				36			
34 Antenna Wind w/ Ice (...)	None				36			
35 Antenna Wind w/ Ice (...)	None				36			
36 Maintenance Live Lm ...	OL1				1			
37 Maintenance Live Lm ...	OL2				1			
38 Maintenance Live Lm ...	OL3				1			
41 Maintenance Live Lv (...)	OL6					1		
42 Maintenance Live Lv (...)	OL7					1		

Load Combinations

Description	So...P...	S...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...
1 Summary: 1.0D + 1.0W(0)	Yes	Y	DL	1	20	1							
2 1.4D	Yes	Y	DL	1.4									
3 1.2D + 1.0W(0)	Yes	Y	DL	1.2	4	1	20	1					
4 1.2D + 1.0W(30)	Yes	Y	DL	1.2	5	1	21	1					
5 1.2D + 1.0W(45)	Yes	Y	DL	1.2	6	1	22	1					
6 1.2D + 1.0W(60)	Yes	Y	DL	1.2	7	1	23	1					
7 1.2D + 1.0W(90)	Yes	Y	DL	1.2	8	1	24	1					
8 1.2D + 1.0W(120)	Yes	Y	DL	1.2	9	1	25	1					
9 1.2D + 1.0W(135)	Yes	Y	DL	1.2	10	1	26	1					
10 1.2D + 1.0W(150)	Yes	Y	DL	1.2	11	1	27	1					
11 1.2D + 1.0W(180)	Yes	Y	DL	1.2	4	-1	20	-1					
12 1.2D + 1.0W(210)	Yes	Y	DL	1.2	5	-1	21	-1					
13 1.2D + 1.0W(225)	Yes	Y	DL	1.2	6	-1	22	-1					
14 1.2D + 1.0W(240)	Yes	Y	DL	1.2	7	-1	23	-1					
15 1.2D + 1.0W(270)	Yes	Y	DL	1.2	8	-1	24	-1					



Company : Kimley-Horn and Associates, Inc.
 Designer : STB
 Job Number : 019558056
 Model Name : 824358

Aug 23, 2021
 7:23 PM
 Checked By: ZAM

Load Combinations (Continued)

Description	So...	P...	S...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...
16	1.2D + 1.0W(300)	Yes	Y	DL 1.2	9	-1	25	-1					
17	1.2D + 1.0W(315)	Yes	Y	DL 1.2	10	-1	26	-1					
18	1.2D + 1.0W(330)	Yes	Y	DL 1.2	11	-1	27	-1					
19	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	12	1	28	1				
20	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	13	1	29	1				
21	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	14	1	30	1				
22	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	15	1	31	1				
23	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	16	1	32	1				
24	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	17	1	33	1				
25	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	18	1	34	1				
26	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	19	1	35	1				
27	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	12	-1	28	-1				
28	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	13	-1	39	-1				
29	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	14	-1	30	-1				
30	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	15	-1	31	-1				
31	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	16	-1	32	-1				
32	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	17	-1	33	-1				
33	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	18	-1	34	-1				
34	1.2D + 1.0Di + 1.0...	Yes	Y	DL 1.2	RL 1	19	-1	35	-1				
35	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	4	.049	20	.049	OL1	1.5			
36	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	5	.049	21	.049	OL1	1.5			
37	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	6	.049	22	.049	OL1	1.5			
38	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	7	.049	23	.049	OL1	1.5			
39	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	8	.049	24	.049	OL1	1.5			
40	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	9	.049	25	.049	OL1	1.5			
41	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	10	.049	26	.049	OL1	1.5			
42	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	11	.049	27	.049	OL1	1.5			
43	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	4	-.049	20	-.049	OL1	1.5			
44	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	5	-.049	21	-.049	OL1	1.5			
45	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	6	-.049	22	-.049	OL1	1.5			
46	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	7	-.049	23	-.049	OL1	1.5			
47	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	8	-.049	24	-.049	OL1	1.5			
48	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	9	-.049	25	-.049	OL1	1.5			
49	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	10	-.049	26	-.049	OL1	1.5			
50	1.2D + 1.5Lm(1) + 1...	Yes	Y	DL 1.2	11	-.049	27	-.049	OL1	1.5			
51	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	4	.049	20	.049	OL2	1.5			
52	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	5	.049	21	.049	OL2	1.5			
53	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	6	.049	22	.049	OL2	1.5			
54	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	7	.049	23	.049	OL2	1.5			
55	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	8	.049	24	.049	OL2	1.5			
56	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	9	.049	25	.049	OL2	1.5			
57	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	10	.049	26	.049	OL2	1.5			
58	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	11	.049	27	.049	OL2	1.5			
59	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	4	-.049	20	-.049	OL2	1.5			
60	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	5	-.049	21	-.049	OL2	1.5			
61	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	6	-.049	22	-.049	OL2	1.5			
62	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	7	-.049	23	-.049	OL2	1.5			
63	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	8	-.049	24	-.049	OL2	1.5			
64	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	9	-.049	25	-.049	OL2	1.5			
65	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	10	-.049	26	-.049	OL2	1.5			
66	1.2D + 1.5Lm(2) + 1...	Yes	Y	DL 1.2	11	-.049	27	-.049	OL2	1.5			
67	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	4	.049	20	.049	OL3	1.5			
68	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	5	.049	21	.049	OL3	1.5			
69	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	6	.049	22	.049	OL3	1.5			
70	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	7	.049	23	.049	OL3	1.5			
71	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	8	.049	24	.049	OL3	1.5			
72	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	9	.049	25	.049	OL3	1.5			



Load Combinations (Continued)

Description	So...	P...	S...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...	BLC Fac...
73	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	10	.049	26	.049	OL3	1.5			
74	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	11	.049	27	.049	OL3	1.5			
75	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	4	-.049	20	-.049	OL3	1.5			
76	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	5	-.049	21	-.049	OL3	1.5			
77	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	6	-.049	22	-.049	OL3	1.5			
78	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	7	-.049	23	-.049	OL3	1.5			
79	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	8	-.049	24	-.049	OL3	1.5			
80	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	9	-.049	25	-.049	OL3	1.5			
81	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	10	-.049	26	-.049	OL3	1.5			
82	1.2D + 1.5Lm(3) + 1...	Yes	Y	DL 1.2	11	-.049	27	-.049	OL3	1.5			
83	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	4	.049	20	.049	OL6	1.5			
84	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	5	.049	21	.049	OL6	1.5			
85	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	6	.049	22	.049	OL6	1.5			
86	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	7	.049	23	.049	OL6	1.5			
87	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	8	.049	24	.049	OL6	1.5			
88	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	9	.049	25	.049	OL6	1.5			
89	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	10	.049	26	.049	OL6	1.5			
90	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	11	.049	27	.049	OL6	1.5			
91	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	4	-.049	20	-.049	OL6	1.5			
92	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	5	-.049	21	-.049	OL6	1.5			
93	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	6	-.049	22	-.049	OL6	1.5			
94	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	7	-.049	23	-.049	OL6	1.5			
95	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	8	-.049	24	-.049	OL6	1.5			
96	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	9	-.049	25	-.049	OL6	1.5			
97	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	10	-.049	26	-.049	OL6	1.5			
98	1.2D + 1.5Lv(1) + 1...	Yes	Y	DL 1.2	11	-.049	27	-.049	OL6	1.5			
99	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	4	.049	20	.049	OL7	1.5			
100	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	5	.049	21	.049	OL7	1.5			
101	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	6	.049	22	.049	OL7	1.5			
102	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	7	.049	23	.049	OL7	1.5			
103	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	8	.049	24	.049	OL7	1.5			
104	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	9	.049	25	.049	OL7	1.5			
105	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	10	.049	26	.049	OL7	1.5			
106	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	11	.049	27	.049	OL7	1.5			
107	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	4	-.049	20	-.049	OL7	1.5			
108	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	5	-.049	21	-.049	OL7	1.5			
109	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	6	-.049	22	-.049	OL7	1.5			
110	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	7	-.049	23	-.049	OL7	1.5			
111	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	8	-.049	24	-.049	OL7	1.5			
112	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	9	-.049	25	-.049	OL7	1.5			
113	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	10	-.049	26	-.049	OL7	1.5			
114	1.2D + 1.5Lv(2) + 1...	Yes	Y	DL 1.2	11	-.049	27	-.049	OL7	1.5			

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	N61	max	683.339	3	1559.456	16	1744.219	27	746.915	39	-346.466	3	4727.481	17
2		min	-3382.07	27	-1514.922	8	469.35	3	-879.47	15	-6905.443	27	-4573.52	9
3	N125	max	2305.052	4	747.847	15	1572.933	22	5148.651	22	3644.885	21	3802.789	8
4		min	-928.308	12	-2780.269	23	416.142	14	96.279	14	158.784	13	-4259.701	16
5	N189	max	2352.669	18	2979.205	31	1731.032	32	-286.402	8	3687.181	33	4884.414	6
6		min	-1032.44	10	-755.959	7	466.609	8	-5723.505	32	281.438	9	-4652.231	14
7	N239A	max	3851.996	34	503.666	47	1214.089	19	36.923	47	-85.864	1	20.02	15
8		min	1092.635	1	-482.021	71	343.985	1	-35.31	71	-303.412	19	-20.096	7
9	N240	max	-639.832	18	3155.799	28	1205.28	28	249.354	28	170.338	28	20.273	10
10		min	-2186.352	28	1005.459	9	408.197	71	82.82	74	55.502	18	-19.898	18



Company : Kimley-Horn and Associates, Inc.
 Designer : STB
 Job Number : 019558056
 Model Name : 824358

Aug 23, 2021
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Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

Member	Shape	Code Check	Loc[...]	LC	Shear Check	Loc[...]	Dir	Lc	phi*Pnc	phi*Pnt	phi*Mn	phi*Mn	Cb	Eqn	
49	M130	SR1	.260	0	7	.029	6	15	25122	25446	424.112	424.112	1	H1-1b	
50	M193A	L2.5x2.5x3	.260	31.1	23	.009	0	z	16	11889	29192.4	872.574	1595.281	1	H2-1
51	M196A	L2.5x2.5x3	.257	31.1	19	.009	0	y	11	11889	29192.4	872.574	1595.281	1	H2-1
52	M132	SR1	.250	0	23	.040	0		23	25122	25446	424.112	424.112	1	H1-1b
53	M7	PIPE 2.0	.247	48	10	.084	48		11	14916	32130	1871.625	1871.625	1	H1-1b
54	M195	SR3/4	.246	0	6	.017	0		7	13745.88	14313	178.929	178.929	1	H1-1b
55	M187	SR3/4	.242	0	16	.016	0		16	13745.88	14313	178.929	178.929	1	H1-1b
56	M200	SR3/4	.240	8	16	.017	8		15	13745.88	14313	178.929	178.929	1	H1-1b
57	M195A	L2.5x2.5x3	.236	31.1	19	.009	0	z	11	11889	29192.4	872.574	1595.281	1	H2-1
58	M135	SR1	.234	0	4	.028	6		4	25122	25446	424.112	424.112	1	H1-1b
59	M110	SR1	.230	0	13	.025	6		13	25122	25446	424.112	424.112	1	H1-1b
60	M191	SR3/4	.225	0	11	.015	0		11	13745.88	14313	178.929	178.929	1	H1-1b
61	M199	SR3/4	.225	8	6	.015	8		6	13745.88	14313	178.929	178.929	1	H1-1b
62	M150	SR1	.224	0	3	.024	6		3	25122	25446	424.112	424.112	1	H1-1b
63	M201	SR3/4	.223	8	11	.016	8		11	13745.88	14313	178.929	178.929	1	H1-1b
64	M202	SR3/4	.209	8	16	.016	0		16	13745.88	14313	178.929	178.929	2	H1-1b
65	M192	SR3/4	.208	0	15	.016	16		26	12173	14313	178.929	178.929	1	H1-1b
66	M184	SR3/4	.206	0	10	.016	16		20	12173	14313	178.929	178.929	1	H1-1b
67	M204	SR3/4	.202	8	6	.016	0		6	13745.88	14313	178.929	178.929	1	H1-1b
68	M139	SR3/4	.201	0	16	.016	8		16	13745.88	14313	178.929	178.929	1	H1-1b
69	M188	SR3/4	.196	0	4	.016	16		31	12173	14313	178.929	178.929	1	H1-1b
70	M178	SR3/4	.196	16	7	.017	0		27	12173	14313	178.929	178.929	1	H1-1b
71	M119	SR3/4	.196	0	6	.014	8		6	13745.88	14313	178.929	178.929	2	H1-1b
72	M193	SR3/4	.190	0	15	.010	0		15	12173	14313	178.929	178.929	1	H1-1b
73	M159	SR3/4	.190	0	11	.015	8		11	13745.88	14313	178.929	178.929	1	H1-1b
74	M182	SR3/4	.188	16	18	.020	0		23	12173	14313	178.929	178.929	1	H1-1b
75	M185	SR3/4	.187	0	9	.011	0		11	12173	14313	178.929	178.929	1	H1-1b
76	M203	SR3/4	.185	8	11	.014	0		11	13745.88	14313	178.929	178.929	1	H1-1b
77	M177	SR3/4	.184	16	7	.008	16		15	12173	14313	178.929	178.929	1	H1-1b
78	M174	SR3/4	.182	16	12	.020	0		34	12173	14313	178.929	178.929	1	H1-1b
79	M186	SR3/4	.177	0	17	.008	0		18	12173	14313	178.929	178.929	1	H1-1b
80	M194	SR3/4	.176	0	6	.009	0		7	12173	14313	178.929	178.929	1	H1-1b
81	M175B	PL6x3/8	.175	2.5	6	.144	2.5	y	8	65052	72900	569.7	9112.5	1	H1-1b
82	M159A	PL6x3/8	.172	2.5	32	.095	2.5	y	3	65052	72900	569.7	9112.5	1	H1-1b
83	M176	SR3/4	.172	16	15	.009	16		15	12173	14313	178.929	178.929	2	H1-1b
84	M152A	PIPE 2.0	.171	88.3	30	.104	6.095		6	3802.706	32130	1871.625	1871.625	1	H1-1b
85	M189	SR3/4	.171	0	4	.011	0		5	12173	14313	178.929	178.929	1	H1-1b
86	M33	HSS5X5X5	.167	25.75	10	.070	25.75	z	15	168785	170424	24732	24732	1	H1-1b
87	M173	SR3/4	.166	16	13	.008	16		4	12173	14313	178.929	178.929	1	H1-1b
88	M101	HSS5X5X5	.165	25.75	15	.074	25.75	z	5	168785	170424	24732	24732	1	H1-1b
89	M181	SR3/4	.164	16	18	.008	0		6	12173	14313	178.929	178.929	1	H1-1b
90	M67	HSS5X5X5	.163	25.75	7	.077	25.75	z	18	168785	170424	24732	24732	1	H1-1b
91	M190	SR3/4	.160	0	11	.009	0		4	12173	14313	178.929	178.929	1	H1-1b
92	M175A	PIPE 2.0	.158	157	12	.096	88.3		11	3802.706	32130	1871.625	1871.625	1	H1-1b
93	M172	SR3/4	.157	16	6	.007	16		5	12173	14313	178.929	178.929	3	H1-1b
94	M180	SR3/4	.154	16	11	.007	16		10	12173	14313	178.929	178.929	2	H1-1b
95	M179A	L2.5x2.5x4	.152	15.5	32	.068	15.5	z	10	36494	38556	1113.554	2537.388	1	H2-1
96	M171B	PL6x3/8	.146	2.5	27	.118	2.526	y	8	65052	72900	569.7	9112.5	1	H1-1b
97	M178A	L2.5x2.5x4	.144	15.5	5	.055	15.5	z	15	36494	38556	1113.554	2537.388	1	H2-1
98	M167A	PL6x3/8	.140	2.5	27	.120	2.5	y	13	65052	72900	569.7	9112.5	1	H1-1b
99	M177A	L2.5x2.5x4	.133	15.5	22	.075	0	z	12	36494	38556	1113.554	2537.388	1	H2-1
100	M171	SR3/4	.132	0	15	.019	16		25	12173	14313	178.929	178.929	1	H1-1b
101	M155B	PL6x3/8	.131	2.5	22	.090	2.526	y	3	65052	72900	569.7	9112.5	1	H1-1b
102	M169	SR3/4	.131	0	10	.019	16		19	12173	14313	178.929	178.929	1	H1-1b
103	M105	PL10x1/2	.131	4.842	14	.058	15.1	y	6	58831	162000	1687.5	32139	1	H1-1b
104	M170	SR3/4	.129	0	20	.015	16		30	12173	14313	178.929	178.929	1	H1-1b
105	M127	SR3/4	.128	10	9	.024	0		20	13436.35	14313	178.929	178.929	1	H1-1b



Company : Kimley-Horn and Associates, Inc.
 Designer : STB
 Job Number : 019558056
 Model Name : 824358

Aug 23, 2021
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Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

Member	Shape	Code Check	Loc...	LC	Shear Check	Loc...	Dir	LC	phi*	Pnc...	phi*	Pnt...	phi*	Mn...	phi*	Mn...	Cb	Eqn
106	M163A	PL6x3/8	.126	2.5	22	.110	2.5	y	14	65052....	72900	569.7	9112.5	1...	H1-1b			
107	M183	SR3/4	.126	16	34	.018	0		24	12173....	14313....	178.929	178.929	1...	H1-1b			
108	M167	SR3/4	.126	10	15	.024	10		27	13436.35	14313....	178.929	178.929	1...	H1-1b			
109	M147	SR3/4	.125	10	4	.023	0		31	13436.35	14313....	178.929	178.929	1...	H1-1b			
110	M104	PL10x1/2	.125	4.842	9	.054	4.842	y	17	58831....	162000	1687.5	33750	1...	H1-1b			
111	M179	SR3/4	.125	16	7	.020	0		29	12173....	14313....	178.929	178.929	1...	H1-1b			
112	M151B	PIPE_2.0	.120	171....	7	.078	8.126		27	3802.706	32130	1871.625	1871.625	3...	H1-1b			
113	M175	SR3/4	.119	16	12	.018	0		19	12173....	14313....	178.929	178.929	1...	H1-1b			
114	M166	SR3/4	.119	10	18	.026	0		23	13436.35	14313....	178.929	178.929	1...	H1-1b			
115	M126	SR3/4	.118	10	13	.026	0		34	13436.35	14313....	178.929	178.929	1...	H1-1b			
116	M104A	PL10x1/2	.117	15.1....	13	.055	4.842	y	12	58831....	162000	1687.5	32984....	1...	H1-1b			
117	M146	SR3/4	.116	10	7	.025	10		27	13436.35	14313....	178.929	178.929	1...	H1-1b			
118	M124	SR3/4	.112	16	9	.013	16		20	12173....	14313....	178.929	178.929	1...	H1-1b			
119	M125	SR3/4	.112	0	9	.012	0		10	13436.35	14313....	178.929	178.929	1...	H1-1b			
120	M164	SR3/4	.111	16	15	.013	16		26	12173....	14313....	178.929	178.929	1...	H1-1b			
121	M165	SR3/4	.110	0	15	.012	0		15	13436.35	14313....	178.929	178.929	1...	H1-1b			
122	M144	SR3/4	.105	16	4	.013	16		31	12173....	14313....	178.929	178.929	1...	H1-1b			
123	M145	SR3/4	.105	0	4	.013	10		5	13436.35	14313....	178.929	178.929	1...	H1-1b			
124	M141	SR3/4	.104	0	7	.014	0		29	12173....	14313....	178.929	178.929	1...	H1-1b			
125	M140	SR3/4	.103	10	7	.010	10		7	13436.35	14313....	178.929	178.929	2...	H1-1b			
126	M121	SR3/4	.102	0	13	.016	0		34	12173....	14313....	178.929	178.929	1...	H1-1b			
127	M143	SR3/4	.102	0	20	.016	0		30	12173....	14313....	178.929	178.929	1...	H1-1b			
128	M120	SR3/4	.101	10	13	.011	10		4	13436.35	14313....	178.929	178.929	2...	H1-1b			
129	M161	SR3/4	.101	0	3	.015	0		23	12173....	14313....	178.929	178.929	2...	H1-1b			
130	M160	SR3/4	.100	10	3	.010	10		10	13436.35	14313....	178.929	178.929	2...	H1-1b			
131	M162	SR3/4	.099	16	19	.018	16		24	12173....	14313....	178.929	178.929	2...	H1-1b			
132	M122	SR3/4	.091	16	29	.019	16		19	12173....	14313....	178.929	178.929	2...	H1-1b			
133	M123	SR3/4	.089	0	25	.019	0		19	12173....	14313....	178.929	178.929	2...	H1-1b			
134	M163	SR3/4	.089	0	30	.020	0		24	12173....	14313....	178.929	178.929	1...	H1-1b			
135	M142	SR3/4	.082	16	24	.021	16		30	12173....	14313....	178.929	178.929	2...	H1-1b			
136	M150B	PIPE_2.0	.031	36	11	.004	36		11	23808.54	32130	1871.625	1871.625	1...	H1-1b			

APPENDIX D
ADDITIONAL CALCULATIONS

Square/Rectangular Flange Connection

TIA-222-H



Site Number	824359
Job number	019558056
Code	TIA-222-H

Reaction Node Under Consideration	N62
Controlling Load Combination	27

Normalize usages per TIA-222-H, Sec. 15.5

REACTIONS	
Moment, Mu (kip-ft)	6.905
Axial, Pu (kips) - <i>Negative for tension</i>	-3.382
Shear, Vu (kips)	-1.738

About X

BOLT CONFIGURATION	
Bolt Quantity, n _b	4
Bolt Diameter, d _b (in)	0.750
Bolt Grade	A325
Width between bolts, s (in)	6.50

BOLT USAGE	
Maximum Tension in Bolt, T _{ub} (kip)	9.859
Nominal Tensile Strength, φR _{nt} (kip)	30.101
Tensile Usage (Section 4.9.6.1)	32.8%

PLATE CONFIGURATION	
Plate Grade	A36
Thickness of plate, t (in)	0.750
Width of plate, w (in)	9.50

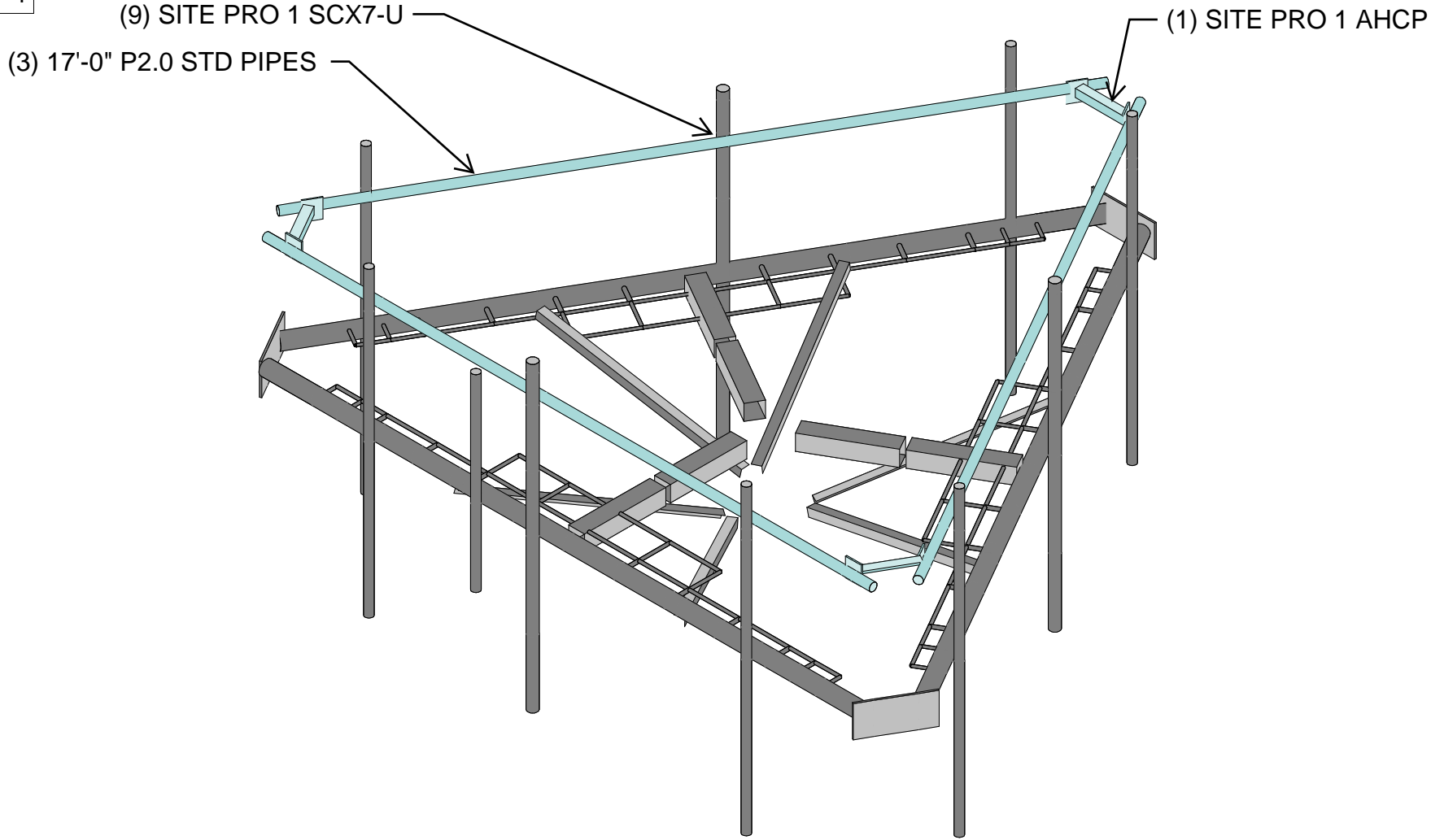
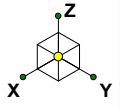
PLATE USAGE	
Ultimate flexural load in plate, Mu (kip-in)	8.560
Factored flexural capacity, φM _n (kip-in)	10.804
Flexural Usage	79.2%

SUPPORT ARM CONFIGURATION	
Member Shape	Square
Member Grade	A36
Thickness of Member, t (in)	0.375
Width of member, w (in)	5.000

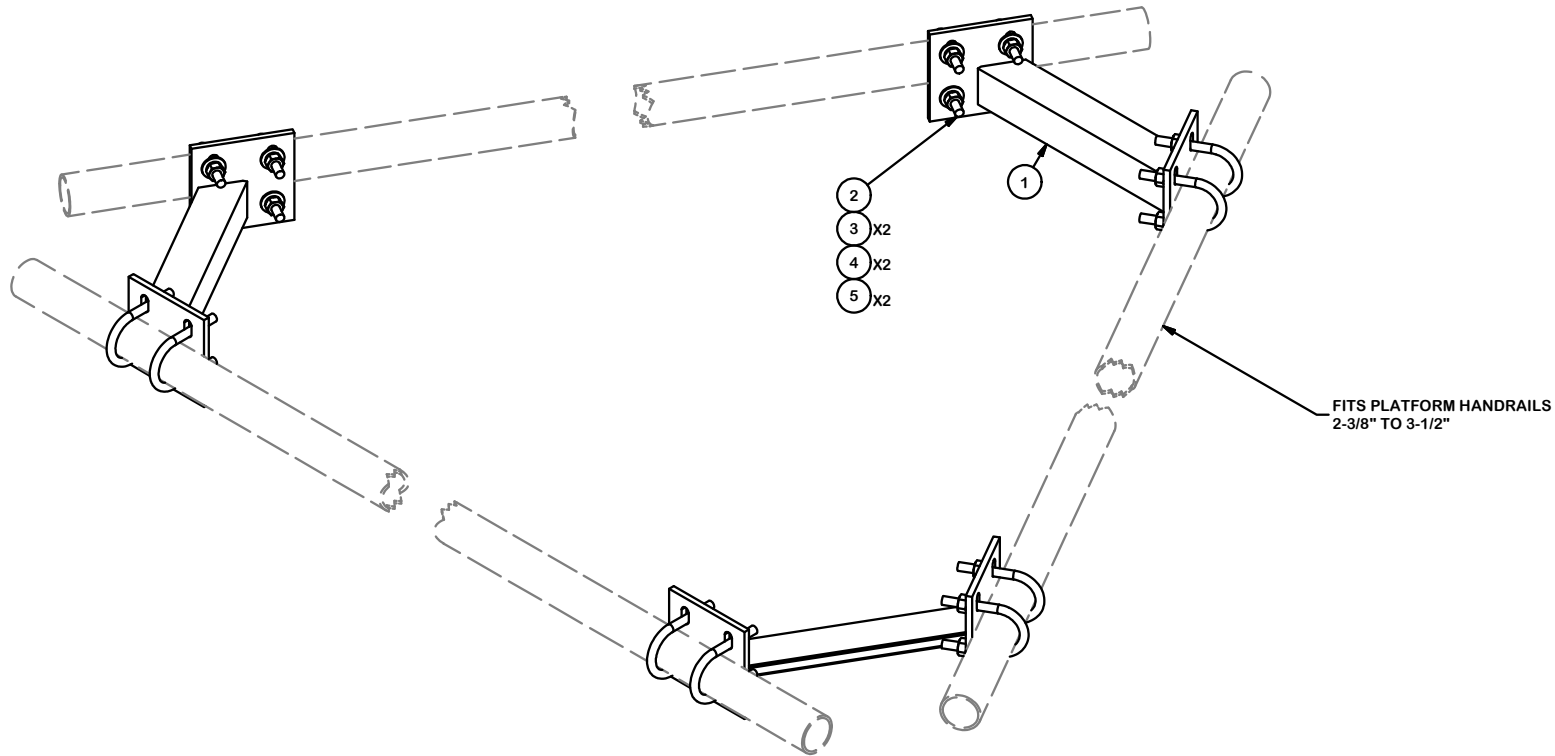
Stiffeners present?

APPENDIX E
SUPPLEMENTAL DRAWINGS

PROPOSED SUPPORT RAIL



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
2	12	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	8.78
2	12	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.73	8.78
2	12	X-UB1358	1/2" X 3-5/8" X 5-1/2" X 3" U-BOLT (HDG.)		0.73	8.78
3	24	G12FW	1/2" HDG USS FLATWASHER		0.03	0.82
4	24	G12LW	1/2" HDG LOCKWASHER		0.01	0.33
5	24	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	1.72
					TOTAL WT. #	66.76



TOLERANCE NOTES

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

PROPRIETARY NOTE:
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION
**ANGLE HANDRAIL
 CORNER PLATE KIT**



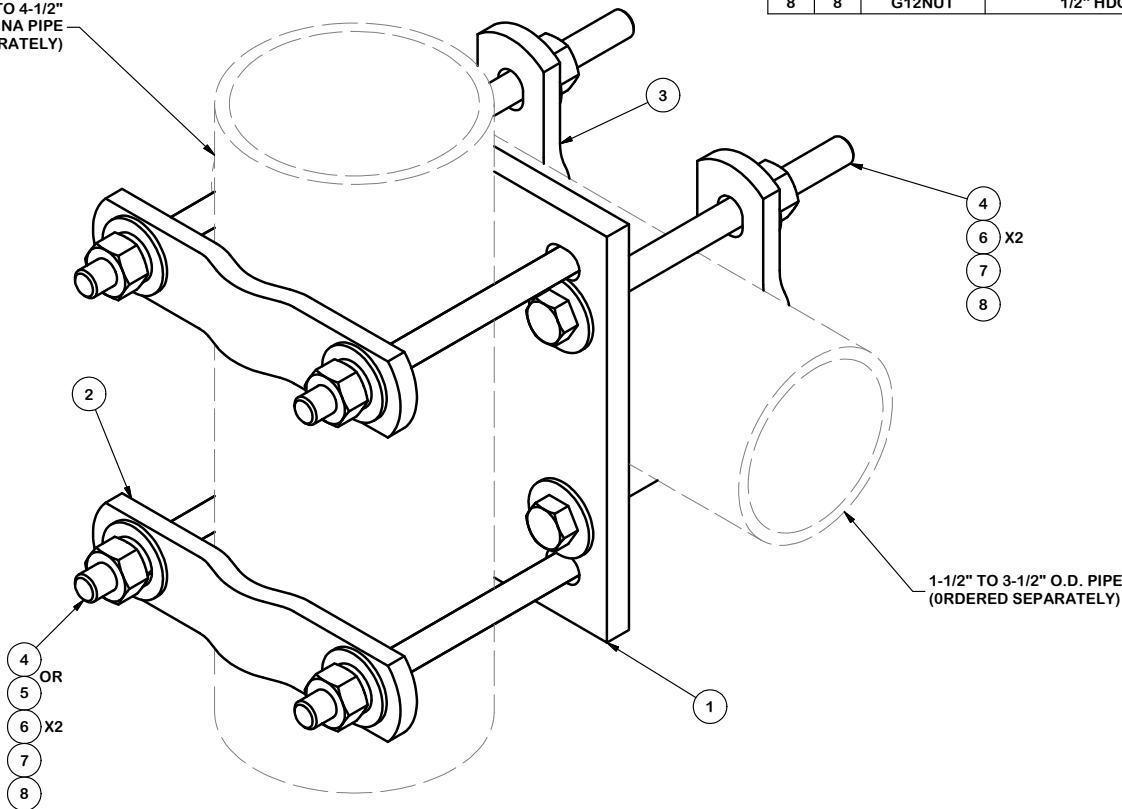
Engineering Support Team:
 1-888-753-7446

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

CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER
		BMC 5/23/2014

PART NO.	AHCP
DWG. NO.	AHCP

1-1/2" TO 4-1/2"
ANTENNA PIPE
(ORDERED SEPARATELY)



1-1/2" TO 3-1/2" O.D. PIPE
(ORDERED SEPARATELY)

PARTS LIST

ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	SCX7	CROSSOVER PLATE	8 in	7.55	7.55
2	2	X-115765	5" V-CLAMP		1.02	2.04
3	2	X-100064	CLAMP (S) (4" V-CLAMP) GALVANIZED		0.91	1.83
4	8	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	6 1/2 in	0.41	3.28
5	4	G12045	1/2" x 4.5" HDG HEX BOLT GR5 FULL THREAD	4 1/2 in	0.30	1.19
6	16	G12FW	1/2" HDG USS FLATWASHER		0.03	0.54
7	8	G12LW	1/2" HDG LOCKWASHER		0.01	0.11
8	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57
					TOTAL WT. #	16.98

TOLERANCE NOTES

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

PROPRIETARY NOTE:
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION
 CROSSOVER PLATE
 (V-CLAMP STYLE)

CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	01	CUSTOMER
		BMC 10/8/2010

SITE PRO 1
 A valmont COMPANY

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

Engineering Support Team:
 1-888-753-7446

PART NO.	SCX7-U	PAGE
DWG. NO.	SCX7-U	1 OF 1



Non-Ionizing Radiation Report

Compiled For: Northeast Site Solutions on behalf of T-Mobile

Site Name: CT11280A

Site ID: CT11044E

725 Flanders Road, Groton, CT 06095

Latitude: 41-22-11.74 N; Longitude: 72-00-29.77 W

Structure Type: Monopole

Report Date: September 15, 2021

Report Written By: Tim Harris

Status: T-Mobile will be compliant with FCC rules on RF Exposure.

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1. Executive Summary:

Northeast Site Solutions on behalf of T-Mobile has contracted Infinigy Solutions, LLC to determine whether the site CT11044E located at 725 Flanders Road in Groton, CT Will Be Compliant with all Federal Communications Commission (FCC) rules and regulations for radio frequency (RF) exposure as indicated in **47CFR§1.1310**.

The report incorporates a theoretical RF field analysis in accordance with the FCC Rules and Regulations for all individuals classified as “Occupational or Controlled” and “General Public or Uncontrolled” (see Appendix A and B).

This document and the conclusions herein are based on information provided by Northeast Site Solutions on behalf of T-Mobile.

As a result of the analysis, **T-Mobile Will Be Compliant with FCC rules.**

T-Mobile, All Bands Cumulative Exposure %		
Uncontrolled / General Population	Exposure values at the site (mW/cm ²)	0.0154
	% Exposure	2.06 %
Controlled / Occupational	Exposure values at the site (mW/cm ²)	0.0154
	% Exposure	0.42 %

2. Site Summary:

Site Information	
Site Name: CT11044E	
Site Address: 725 Flanders Road, Groton, CT 06095	
Site Type: Monopole	
Compliance Status	Will Be Compliant
Mitigation Required	No
Signage Required	Yes
Barriers Required	No
Access Locked	No
Area Controlled or Uncontrolled	Uncontrolled

3. Site Compliance

This report also incorporates overview of the site information:

- Antenna Inventory Table
- Calculation Tables showing exposure for each carrier transmit frequency
- Total exposure for all carriers existing and proposed at ground level considering the centerline of all antennas and horizontal distance from the tower.
- Maximum Effective Radiated Power Assumed as Worst Case for Calculations used in this study
- Calculations based on flat ground around base of the structure

4. Site Compliance Recommendations

Infinigy recommends the following upon the installation of antennas at the site:

Base of tower

Install an RF caution sign. Note: The recommendation for alerting signage is moot if there is an RF caution, or greater already installed.

5. Antenna Inventory Table

Ant ID	Sector	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	Total ERP Power (Watts)
1a	Alpha	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	132	80	3590
1b	Alpha	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	132	80	3591
2a	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	132	80	2256
2b	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	132	80	1128
2c	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	132	80	1128
2d	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz UMTS	132	80	1056
2e	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz GSM	132	80	1055
2f	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	2100 MHz UMTS	132	80	4308
2g	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	132	80	1055
3a	Beta	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	132	180	3590
3b	Beta	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	132	180	3591
4a	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	132	180	2256
4b	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	132	180	1128
4c	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	132	180	1128
4d	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz UMTS	132	180	1056
4e	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz GSM	132	180	1055
4f	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	2100 MHz UMTS	132	180	4308
4g	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	132	180	1055
5a	Gamma	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	132	300	3590
5b	Gamma	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	132	300	3591
6a	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	132	300	2256
6b	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	132	300	1128
6c	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	132	300	1128
6d	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz UMTS	132	300	1056

INFINIGY

Ant ID	Sector	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	Total ERP Power (Watts)
6e	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz GSM	132	300	1055
6f	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	2100 MHz UMTS	132	300	4308
6g	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	132	300	1055

6. RF Guidelines

To ensure safety of company workers, the following points need to be taken into consideration and implemented at wireless sites in accordance with the Carriers policies:

- a) **Worksite:** Any employee at the site should avoid working directly in front of the antenna or in areas predicted to exceed general population exposure limits by 100%. Workers should insist that the transmitters be switched off during the work period.
- b) **RF Safety Training and Awareness:** All employees working in areas exceeding the general population limits should have a basic awareness of RF safety measures. Videos, classroom lectures and online courses are all appropriate training methods on these topics.
- c) **Site Access:** Restricting access to transmitting antenna locations is one of the most important elements of RF safety. This can be done with:
 - Locked doors/gates/ladder access
 - Alarmed doors
 - Restrictive barriers
- d) **Three-foot Buffer:** There is an inverse relationship between the strength of the field and the distance from the antenna. The RF field diminishes with distance from the antenna. Workers should maintain a three-foot distance from the antennas.
- e) **Antennas:** Workers should always assume that the antenna is transmitting and should never stop right in front of the antenna. If someone must pass by an antenna, he/she should move quickly, thus reducing RF exposure.

7. T-Mobile Exposure Analysis By Band and Technology

T-Mobile 600 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	0.4
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.26%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	2.0
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.05%

T-Mobile 600 MHz 5G		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	0.4
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.26%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	2.0
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.05%

T-Mobile 700 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	0.5
	Exposure values at the site (mW/cm ²)	0.0021
	% Exposure	0.41%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	2.3
	Exposure values at the site (mW/cm ²)	0.0021
	% Exposure	0.09%

T-Mobile 1900 MHz GSM		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	1.0
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.10%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	5.0
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.02%

T-Mobile 1900 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	1.0
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.10%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	5.0
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.02%

T-Mobile 1900 MHz UMTS		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	1.0
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.10%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	5.0
	Exposure values at the site (mW/cm ²)	0.0010
	% Exposure	0.02%

T-Mobile 2100 MHz UMTS		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	1.0
	Exposure values at the site (mW/cm ²)	0.0040
	% Exposure	0.40%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	5.0
	Exposure values at the site (mW/cm ²)	0.0040
	% Exposure	0.08%

T-Mobile 2500 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	1.0
	Exposure values at the site (mW/cm ²)	0.0022
	% Exposure	0.22%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	5.0
	Exposure values at the site (mW/cm ²)	0.0022
	% Exposure	0.04%

T-Mobile 2500 MHz 5G		
Uncontrolled / General Population	FCC's exposure limits (mW/cm ²)	1.0
	Exposure values at the site (mW/cm ²)	0.0022
	% Exposure	0.22%
Controlled / Occupational	FCC's Exposure limits(mW/cm ²)	5.0
	Exposure values at the site (mW/cm ²)	0.0022
	% Exposure	0.04%

8. Appendix A: FCC Guidelines

FCC Policies

The Federal Communications Commission (FCC) in 1996 implemented regulations and policies for analysis of RF propagation to evaluate RF emissions. All the analysis and results of this report are compared with FCC's (Federal Communications Commission) rules to determine whether a site is compliant for Occupational/Controlled or General Public/Uncontrolled exposure. All the analysis of RF propagation is done in terms of a percentage. The limits primarily indicate the power density and are generally expressed in terms of milliwatts per centimeter square, mW/cm².

FCC guidelines incorporate two separate tiers of exposure limits that are dependent on the scenario/ situation in which that exposure takes place or the status of the individuals who are subjected to that exposure. The decision as to which tier is applied to a scenario is based on the following definitions:

Occupational / Controlled

These limits apply in situations when someone is exposed to RF energy through his/her occupation, is fully aware of the harmful effects of the RF exposure and has an ability to exercise control over this exposure. Occupational / controlled exposure limits also apply when 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. limits for Occupational/Controlled exposure can be found on Table 1(A).

General Population / Uncontrolled

These limits apply to situations in which the general public may be exposed or in which persons who are exposed because of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure to RF. Therefore, members of the general public would always be considered under this category, for example, in the case of a telecommunications tower that exposes people in a nearby residential area. Exposure limits for General Population/Uncontrolled can be found on Table 1(B).

Table 1. LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

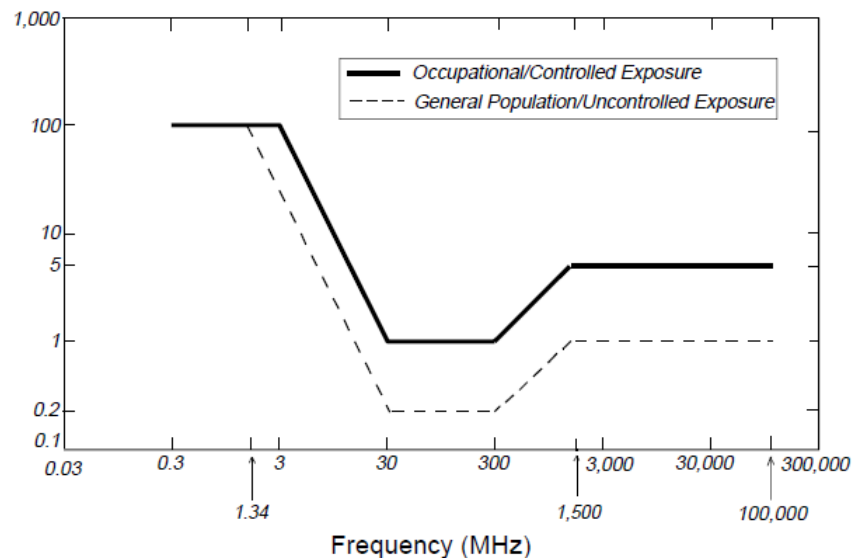
(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz

*Plane-wave equivalent power density

Figure 1. FCC Limits for Maximum Permissible Exposure (MPE)
Plane-wave Equivalent Power Density



OSHA Statement:

The objective of the OSHA Act is to ensure the safety and health of the working men and women by enforcing certain standards. The act also assists and encourages the states in their efforts to ensure safe and healthy working conditions through means of research, information, education and training in the field of occupational safety and health and for other purposes.

According to OSHA Act section 5, important duties to be considered are:

(a) Each employer

- 1) Shall furnish to each of his employees' employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious harm to his employees
- 2) Shall comply with occupational safety and health standards promulgated under this act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

9. Preparer Certification

I, Tim Harris, preparer of this report, certify that I am fully trained and aware of the rules and regulations of both the Federal Communications Commission and the Occupational Safety and Health Administration regarding Human Exposure to Radio Frequency Radiation. In addition, I have been trained in RF safety practices, rules, and regulations.

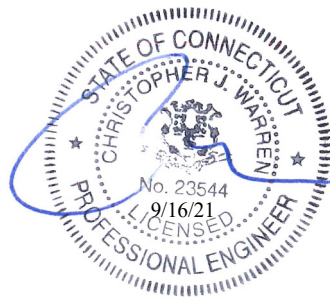
I certify that the information contained in this report is true and correct to the best of my knowledge.

Timothy A. Harris

9/15/2021

Signature

Date



T-Mobile

T-MOBILE SITE NUMBER: CT11044E

T-MOBILE SITE NAME: GROTON/ I-95/ X89/ NOA_1

SITE TYPE: MONOPOLE

TOWER HEIGHT: 130'-0"

BUSINESS UNIT #: 824359

**SITE ADDRESS: 725 FLANDERS RD
GROTON, CT 06340**

COUNTY: NEW LONDON

**JURISDICTION: CONNECTICUT SITING
COUNCIL**

T-MOBILE ANCHOR SITE CONFIGURATION: 67D5A998E OUTDOOR

T-Mobile

35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN
CASTLE

1500 CORPORATE DRIVE
CANONSBURG, PA 15317

B+T GRP

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

T-MOBILE
SITE NUMBER: **CT11044E**

BU #: **824359**
GROTON/I-95/X89/NOA_1

725 FLANDERS RD
GROTON, CT 06340

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/16/21	JJR	CONSTRUCTION	JJR

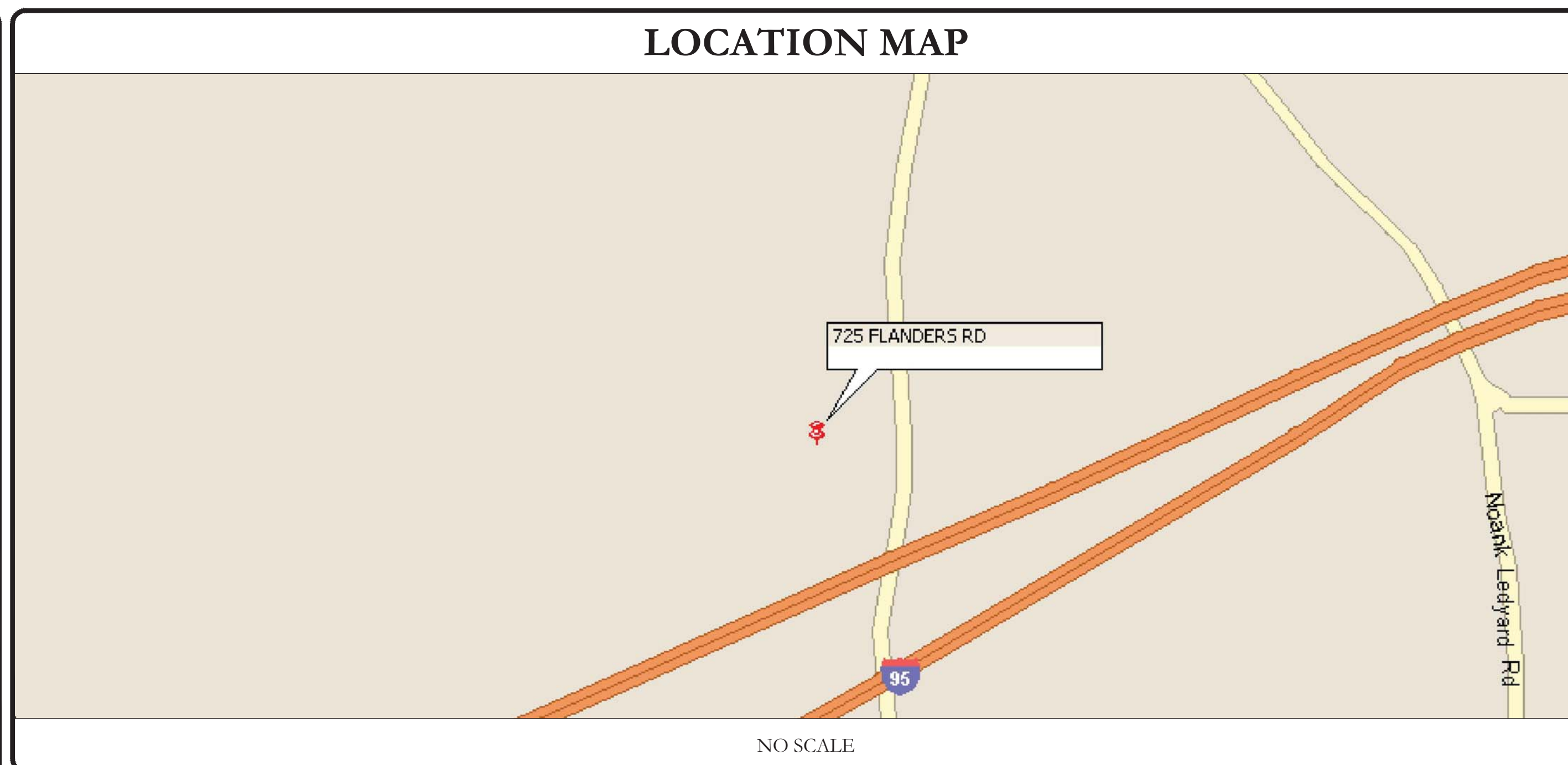
SITE INFORMATION	
CROWN CASTLE USA INC. SITE NAME:	GROTON/I-95/X89/NOA_1
SITE ADDRESS:	725 FLANDERS RD GROTON, CT 06340
COUNTY:	NEW LONDON
MAP/PARCEL #:	260910266458 E
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.369955°
LONGITUDE:	-72.008269°
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	196'
CURRENT ZONING:	IM
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:	GROTON TOWN OF TRANSFER STATION 741 FLANDERS RD MYSTIC, CT 06355
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER
TELCO PROVIDER:	PIONEER TELEPHONE

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:	1500 CORPORATE DRIVE CANONSBURG, PA 15317
	N/A - PROJECT MANAGER
	N/A - 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 24X36. 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:	<ul style="list-style-type: none"> REMOVE (6) ANTENNAS REMOVE (3) TMAs REMOVE (6) COAX CABLES REMOVE (1) HYBRID CABLE INSTALL NEW MOUNT MODIFICATION AS PER KIMLEY-HORN AND ASSOCIATES, INC. INSTALL (3) ANTENNAS INSTALL (3) RADIOS INSTALL (1) HYBRID CABLE
GROUND SCOPE OF WORK:	<ul style="list-style-type: none"> REMOVE (1) RBS 6131 CABINET RELOCATE (1) DUW30 RELOCATE (1) DUG20 RELOCATE (1) BB 6630 RELOCATE (1) BB 6648 RELOCATE (1) CSR IXRE V2 INSTALL (1) 6160 CABINET INSTALL (1) B160 BATTERY CABINET INSTALL (1) BB 6648 IN 6160 CABINET INSTALL (1) RBS 6601 IN 6160 CABINET INSTALL (2) PSU 4813 VOLTAGE BOOSTER
NOTE:	PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER.



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:	8/31/21
MOUNT ANALYSIS:	KIMLEY-HORN AND ASSOCIATES, INC.
DATED:	8/23/21
RFDS REVISION:	6
DATED:	7/12/21
ORDER ID:	579836
REVISION:	0

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.

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

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SHEET NUMBER:	REVISION:
T-1	0

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**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: _____ Zip Code 06340
 Owner/Authorized Agent: _____ Phone # (____) _____ B-Mail _____
 Owned By: City/County Private State
 Code Enforcement Jurisdiction: City _____ County NEW LONDON State

CONTACT:

DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE #	E-MAIL
Architectural				()	
Civil				()	
Electrical				()	
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 Level IV
 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: I-A II-A III-A IV V-A
 (check all that apply) I-B II-B III-B 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.)

2018 NC Administrative Code and Policies

FIRE PROTECTION REQUIREMENTS

BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	RATING		DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR RATED PENETRATION	SHEET # FOR RATED JOINTS
		REQ'D	PROVIDED * (w/ REDUCTION)				
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

2018 NC Administrative Code and Policies

Ground Building Area Table

FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
3 rd Floor			
2 nd Floor			
Mezzanine			
1 st 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 I-2 I-3 Condition I-4
 I-1 I-2 I-3 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.

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

$$\text{_____} + \text{_____} + \dots = \text{_____} \leq 1.00$$

2018 NC Administrative Code and Policies

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

2018 NC Administrative Code and Policies

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 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 $I_f = 100[F/P - 0.25] \times W/30 = \text{_____} (\%)$
² Unlimited area applicable under conditions of Section 507.
³ Maximum Building Area = total number of stories in the building x D (maximum 3 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.

2018 NC Administrative Code and Policies

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			TOTAL # ACCESSIBLE PROVIDED
			REGULAR WITH 5' ACCESS AISLE	132" ACCESS AISLE	8' ACCESS AISLE	
TOTAL						

PLUMBING FIXTURE REQUIREMENTS (TABLE 2902.1)

USE	SPACE	WATER/CLOSETS			URINALS	LAVATORIES			SHOWERS /TUBS	DRINKING FOUNTAINS	
		MALE	FEMALE	UNSEX		MALE	FEMALE	UNSEX		REGULAR	ACCESSIBLE
EXIST'G											
NEW											
REQ'D											

SPECIAL APPROVALS

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

2018 NC Administrative Code and Policies

T-Mobile
 35 GRIFFIN ROAD
 BLOOMFIELD, CT 06002

CROWN CASTLE
 1500 CORPORATE DRIVE
 CANONSBURG, PA 15317

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

T-MOBILE
 SITE NUMBER: CT11044E
 BU #: 824359
 GROTON/I-95/X89/NOA_1
 725 FLANDERS RD
 GROTON, CT 06340
 EXISTING
 130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/16/21	JJR	CONSTRUCTION	JJR



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

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 NC Administrative Code and Policies

**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 NC Administrative Code and Policies

**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 NC Administrative Code and Policies

**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

2018 NC Administrative Code and Policies

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EXISTING
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ISSUED FOR:

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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.

GREENFIELD GROUNDING NOTES:

- 1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDING 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 ANTI-OXIDANT 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).

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. 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. 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. VERIFY 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 THE 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/IEEC 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 SIZES AND FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEC 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 LOCKOUT 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.

Table with 3 columns: SYSTEM, CONDUCTOR, COLOR. Rows include 120/240V, 10; 120/208V, 30; 277/480V, 30; DC VOLTAGE.

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

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

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

T-Mobile logo and address: 35 GRIFFIN ROAD, BLOOMFIELD, CT 06002

CROWN CASTLE logo and address: 1500 CORPORATE DRIVE, CANONSBURG, PA 15317

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

T-MOBILE SITE NUMBER: CT11044E, BU #: 824359, GROTON/I-95/X89/NOA_1, 725 FLANDERS RD, GROTON, CT 06340, EXISTING 130'-0" MONOPOLE

Table with 5 columns: REV, DATE, DRWN, DESCRIPTION, DES./QA. Row 1: 0, 9/16/21, JJR, CONSTRUCTION, JJR

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T-MOBILE
SITE NUMBER: CT11044E


BU #: 824359
GROTON/I-95/X89/NOA_1

 725 FLANDERS RD
 GROTON, CT 06340

 EXISTING
 130'-0" MONOPOLE

ISSUED FOR:

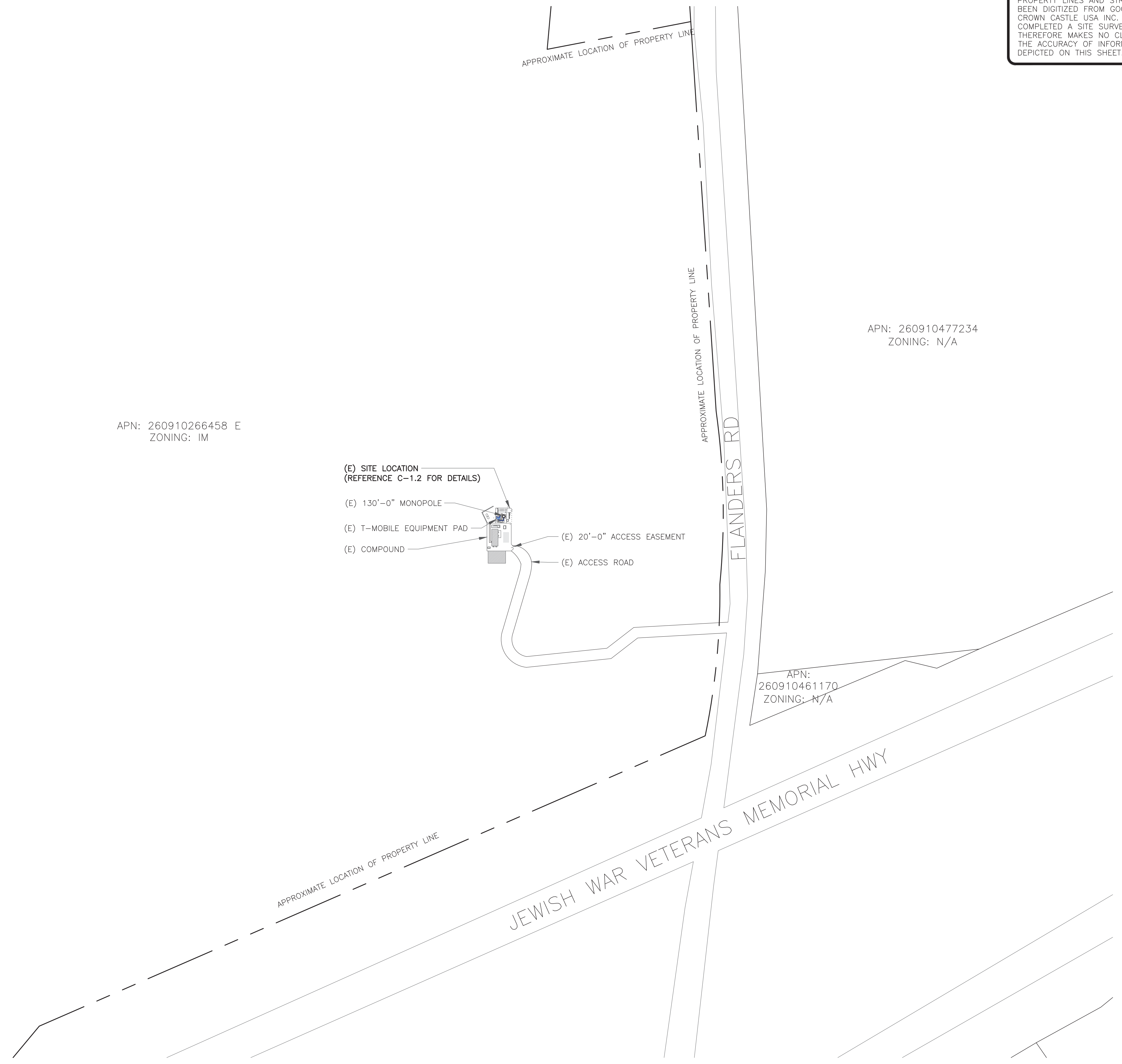
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/16/21	JJR	CONSTRUCTION	JJR



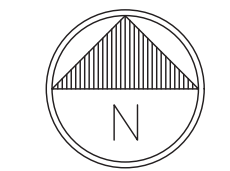
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SHEET NUMBER: C-1.1 **REVISION: 0**



1 OVERALL SITE PLAN
 SCALE: 1" = 100'-0" (FULL SIZE)
 1" = 200'-0" (11x17)



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T-MOBILE
SITE NUMBER: **CT11044E**

BU #: **824359**
GROTON/I-95/X89/NOA_1

725 FLANDERS RD
GROTON, CT 06340

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/16/21	JJR	CONSTRUCTION	JJR

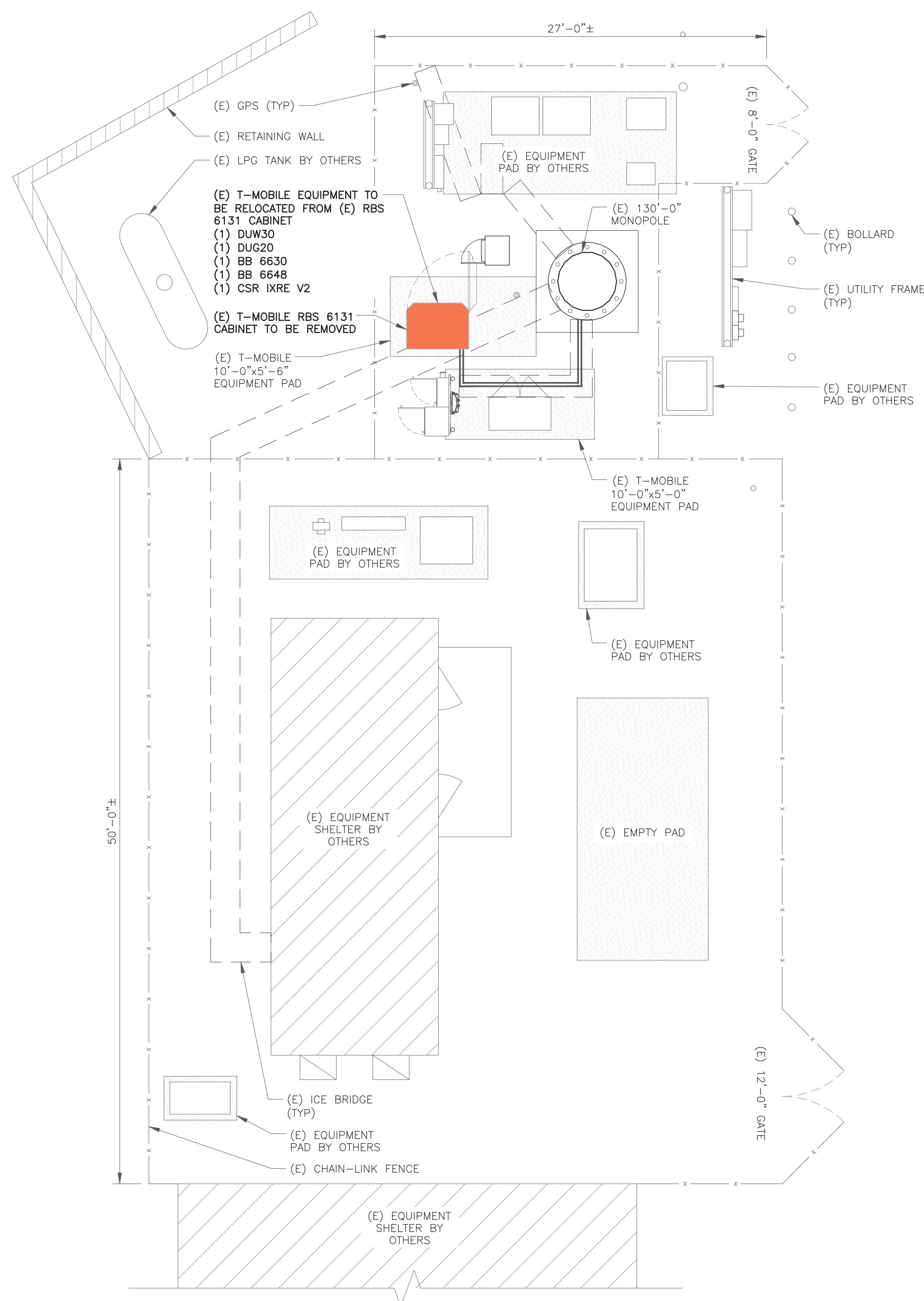


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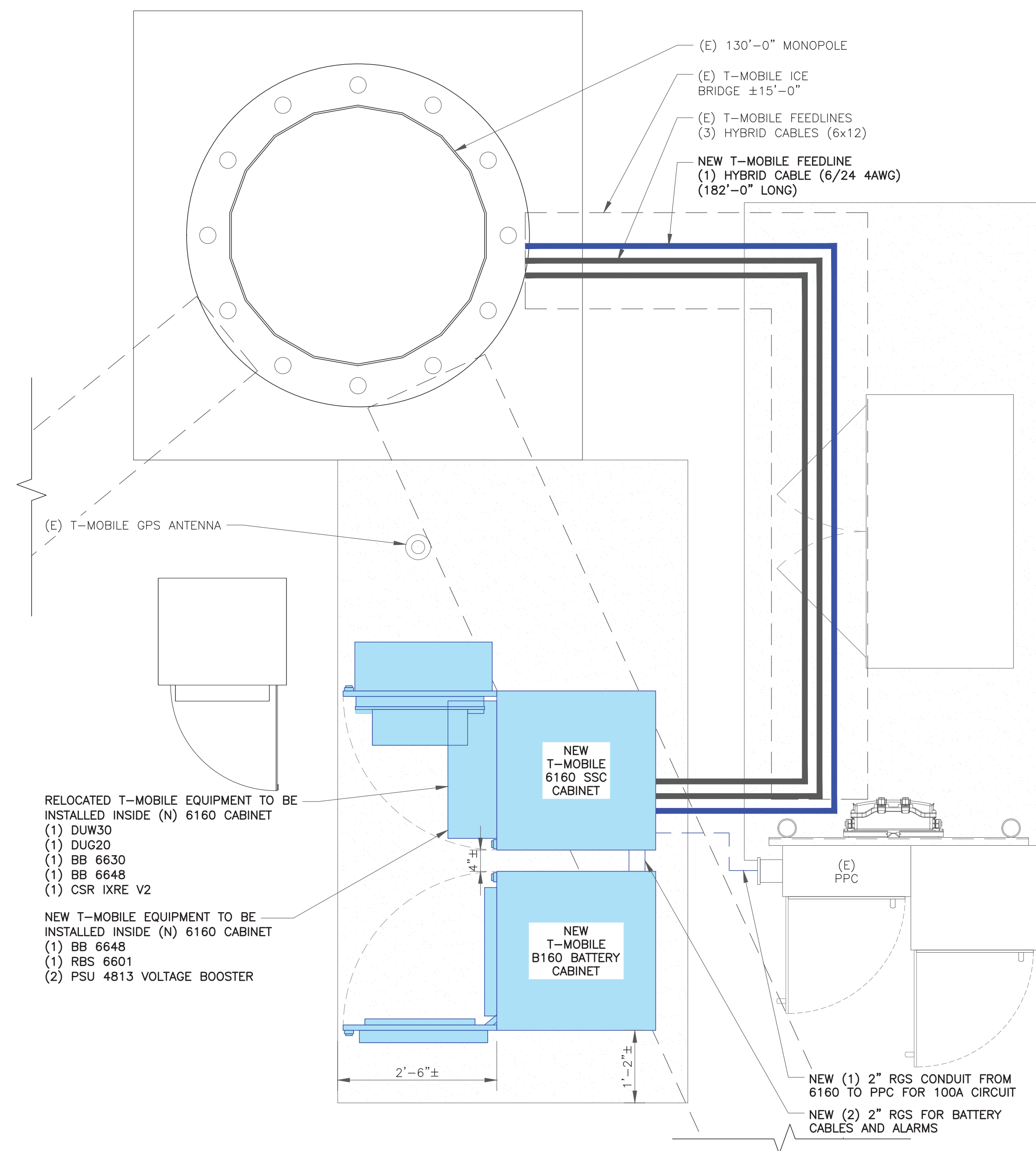
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C-1.2 **0**

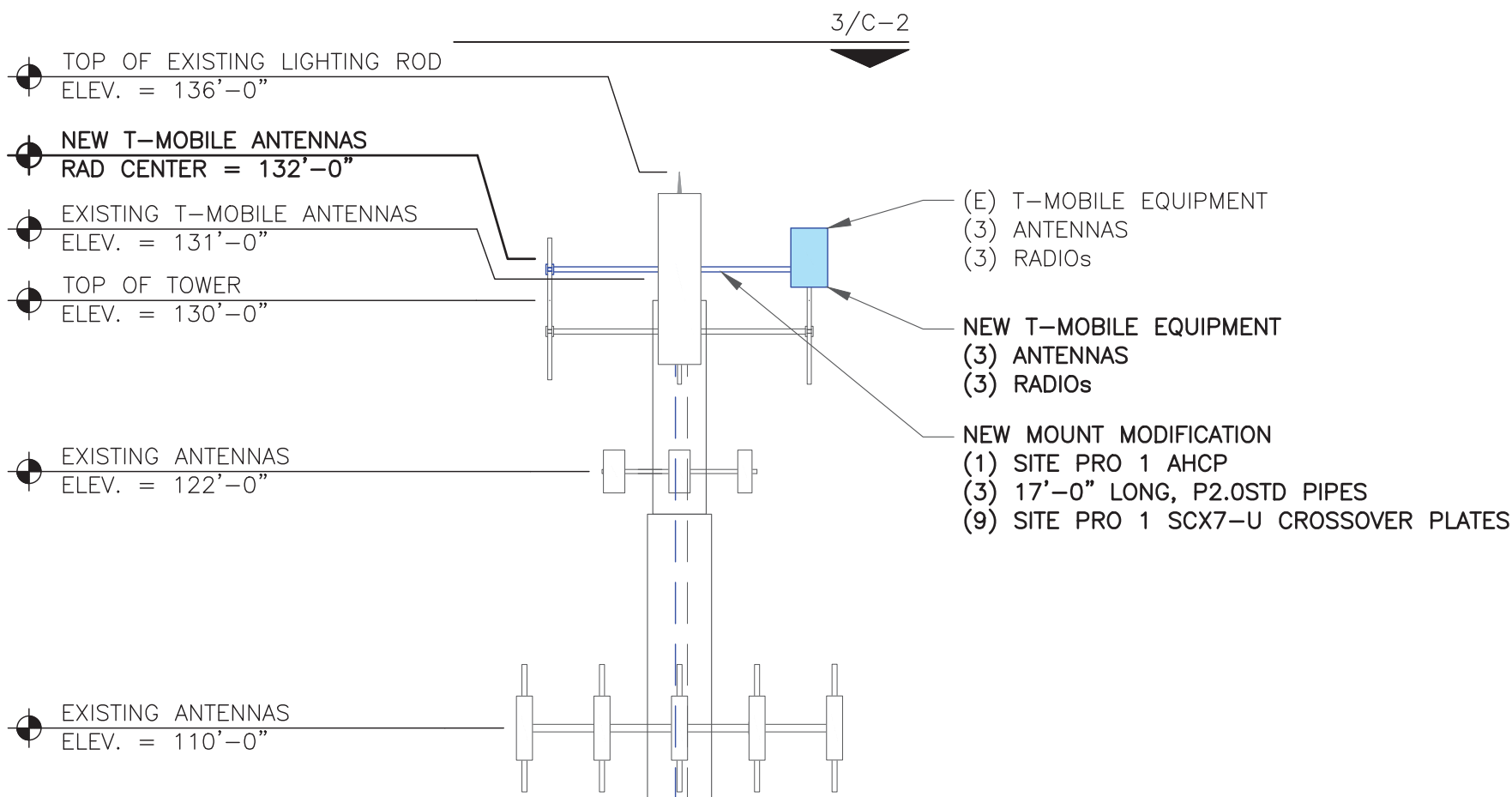


1 SITE PLAN
SCALE: 3/16"=1'-0" (FULL SIZE)
3/32"=1'-0" (11x17)



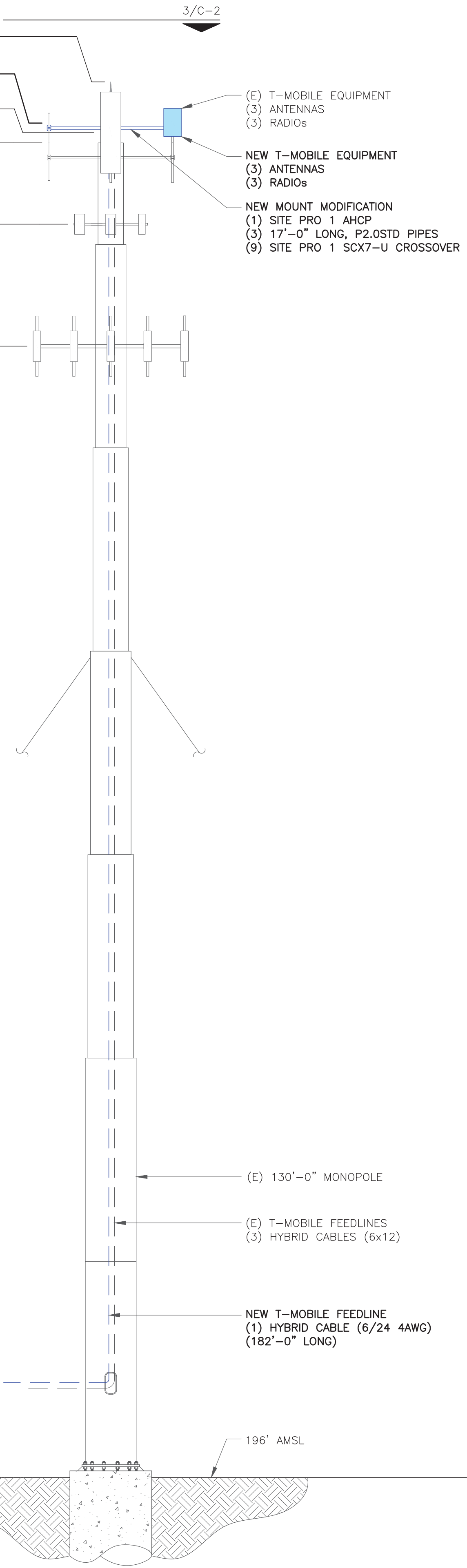
2 ENLARGED SITE PLAN
SCALE: 3/4"=1'-0" (FULL SIZE)
3/8"=1'-0" (11x17)



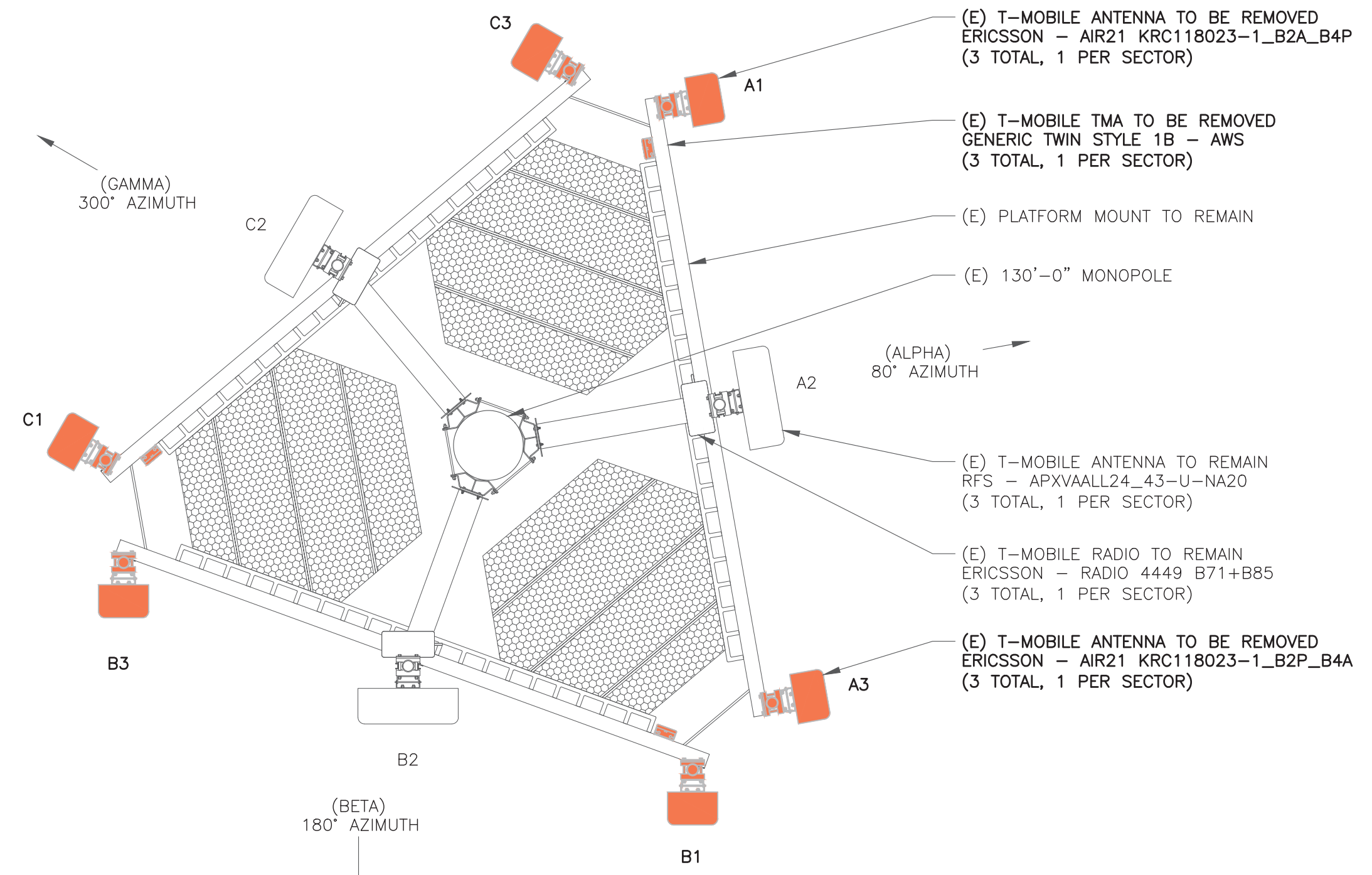


T-MOBILE EQUIPMENT
ANTENNA CL: 132'-0"
MOUNT CL: 130'-0"

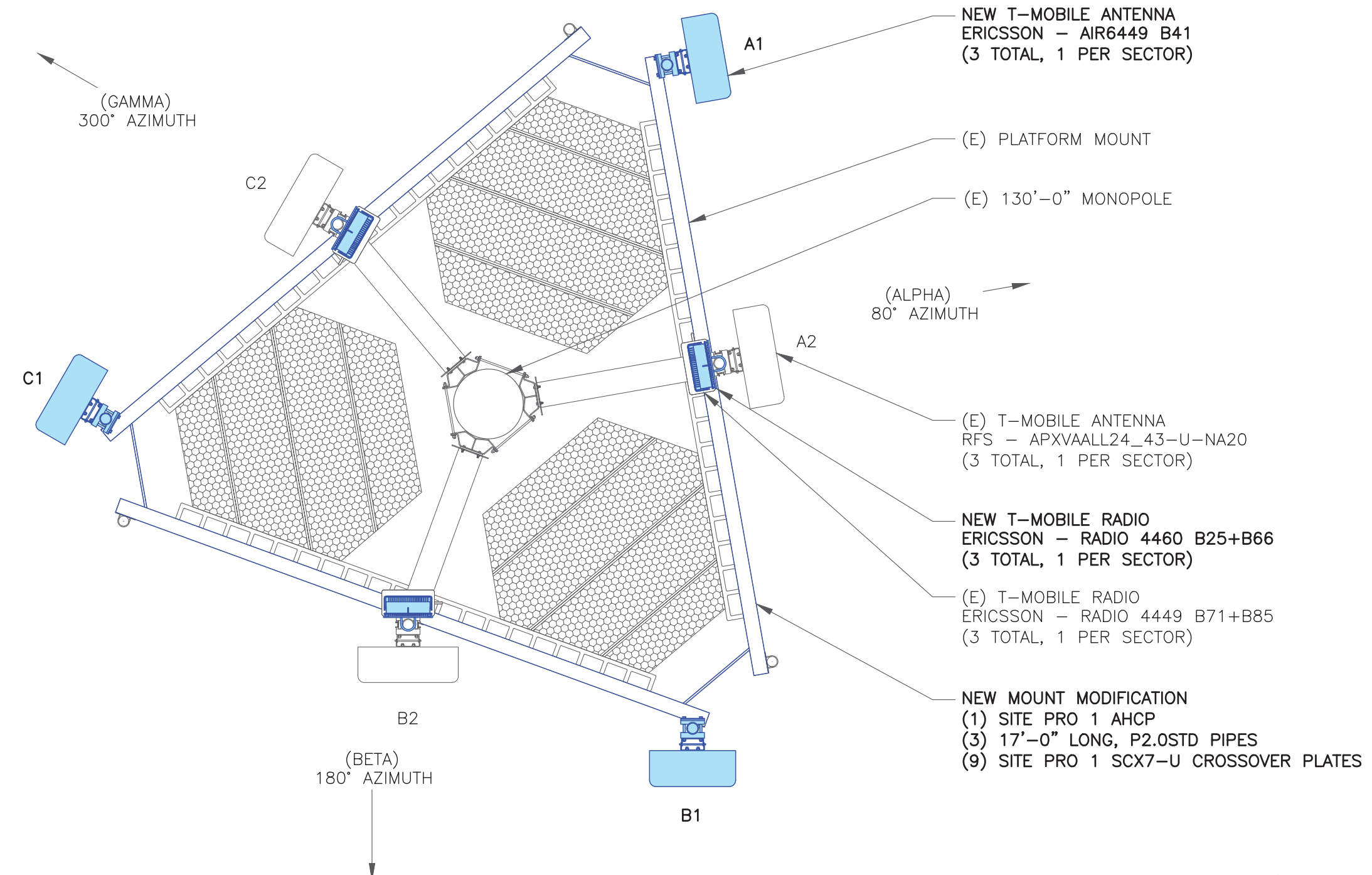
ANY AND ALL TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ EXISTING SAFETY CLIMB



1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

T-Mobile

35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE

1500 CORPORATE DRIVE
CANONSBURG, PA 15317

B+T GRP

1717 S. BOULDER
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T-MOBILE
SITE NUMBER: **CT11044E**

BU #: **824359**
GROTON/I-95/X89/NOA_1

725 FLANDERS RD
GROTON, CT 06340

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	9/16/21	JJR	CONSTRUCTION	JJR

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PEC.0001564
Expires 2/10/22

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

1:37216.005.01_GROTON-I-95-X89-NOA_1.dwg - User: jrjrichardson - Sep 16, 2021 - 9:39am

T-MOBILE
SITE NUMBER: **CT11044E**

BU #: **824359**
GROTON/I-95/X89/NOA_1

725 FLANDERS RD
GROTON, CT 06340

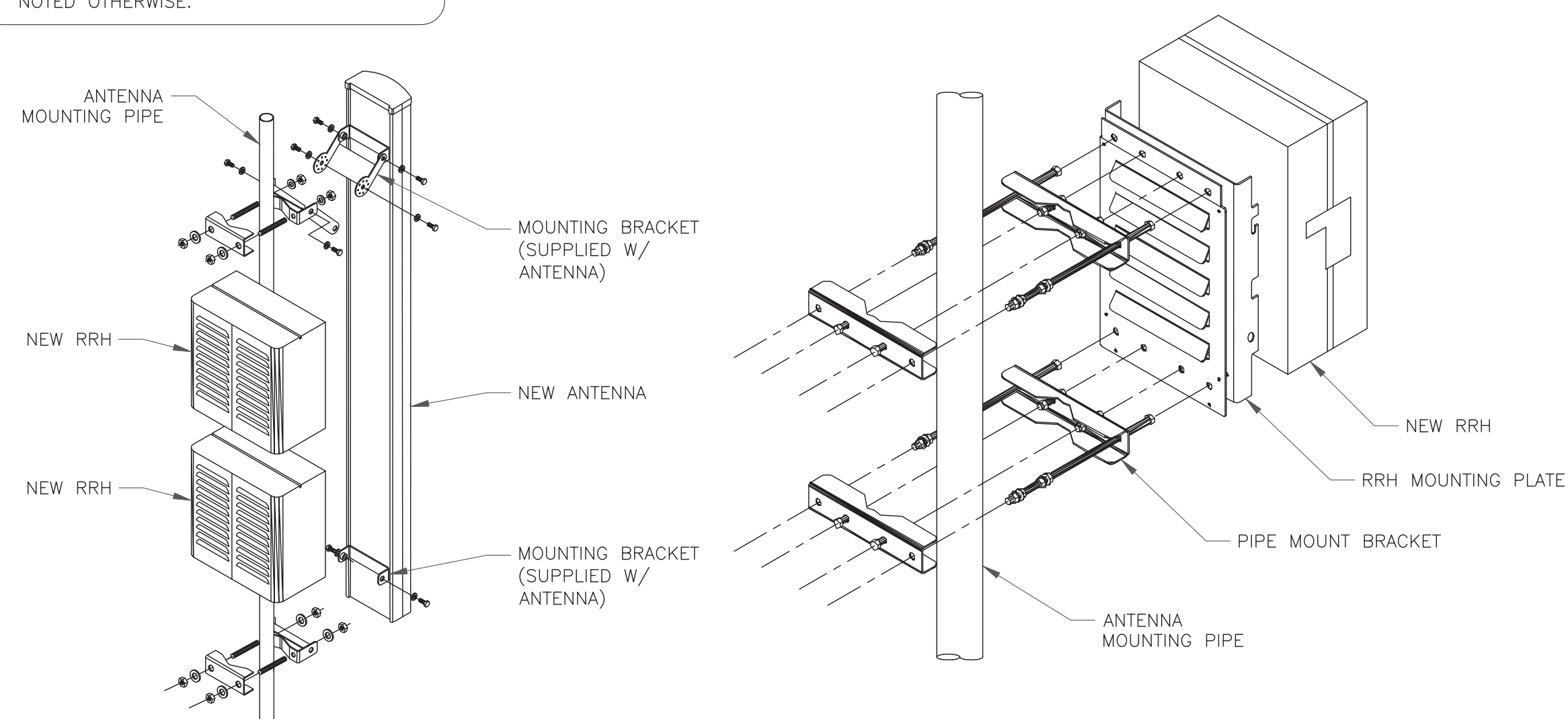
EXISTING
130'-0" MONOPOLE

RF SYSTEM SCHEDULE										
SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	FEEDLINE TYPE
ALPHA	A-1	L2500 / N2500	ERICSSON	AIR6449 B41	80°	0°	2°/2°	132'-0"	-	(1) 6x12 HYBRID
	A-2	L700 / L600 / N600 / U1900 / G1900 / L2100 / L1900	RFS	APXVAALL24_43-U-NA20	80°	0°	2° / 2° / 2° / 2°	131'-0"	(1) ERICSSON - RADIO 4449 B71+B85 (1) ERICSSON - RADIO 4460 B25+B66	(1) 6/24 4AWG HYBRID
	A-3	-	-	-	-	-	-	-	-	-
BETA	B-1	L2500 / N2500	ERICSSON	AIR6449 B41	180°	0°	2°/2°	132'-0"	-	(1) 6X12 HYBRID
	B-2	L700 / L600 / N600 / U1900 / G1900 / L2100 / L1900	RFS	APXVAALL24_43-U-NA20	180°	0°	2° / 2° / 2° / 2°	131'-0"	(1) ERICSSON - RADIO 4449 B71+B85 (1) ERICSSON - RADIO 4460 B25+B66	-
	B-3	-	-	-	-	-	-	-	-	-
GAMMA	C-1	L2500 / N2500	ERICSSON	AIR6449 B41	300°	0°	2° / 2°	132'-0"	-	(1) 6X12 HYBRID
	C-2	L700 / L600 / N600 / U1900 / G1900 / L2100 / L1900	RFS	APXVAALL24_43-U-NA20	300°	0°	2° / 2° / 2° / 2°	131'-0"	(1) ERICSSON - RADIO 4449 B71+B85 (1) ERICSSON - RADIO 4460 B25+B66	-
	C-3	-	-	-	-	-	-	-	-	-

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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C-3

REVISION:

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T-Mobile

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CROWN CASTLE

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CANONSBURG, PA 15317

B+T GRP

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SUITE 300
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T-MOBILE
SITE NUMBER: CT11044E

BU #: 824359
GROTON/I-95/X89/NOA_1

725 FLANDERS RD
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EXISTING
130'-0" MONOPOLE

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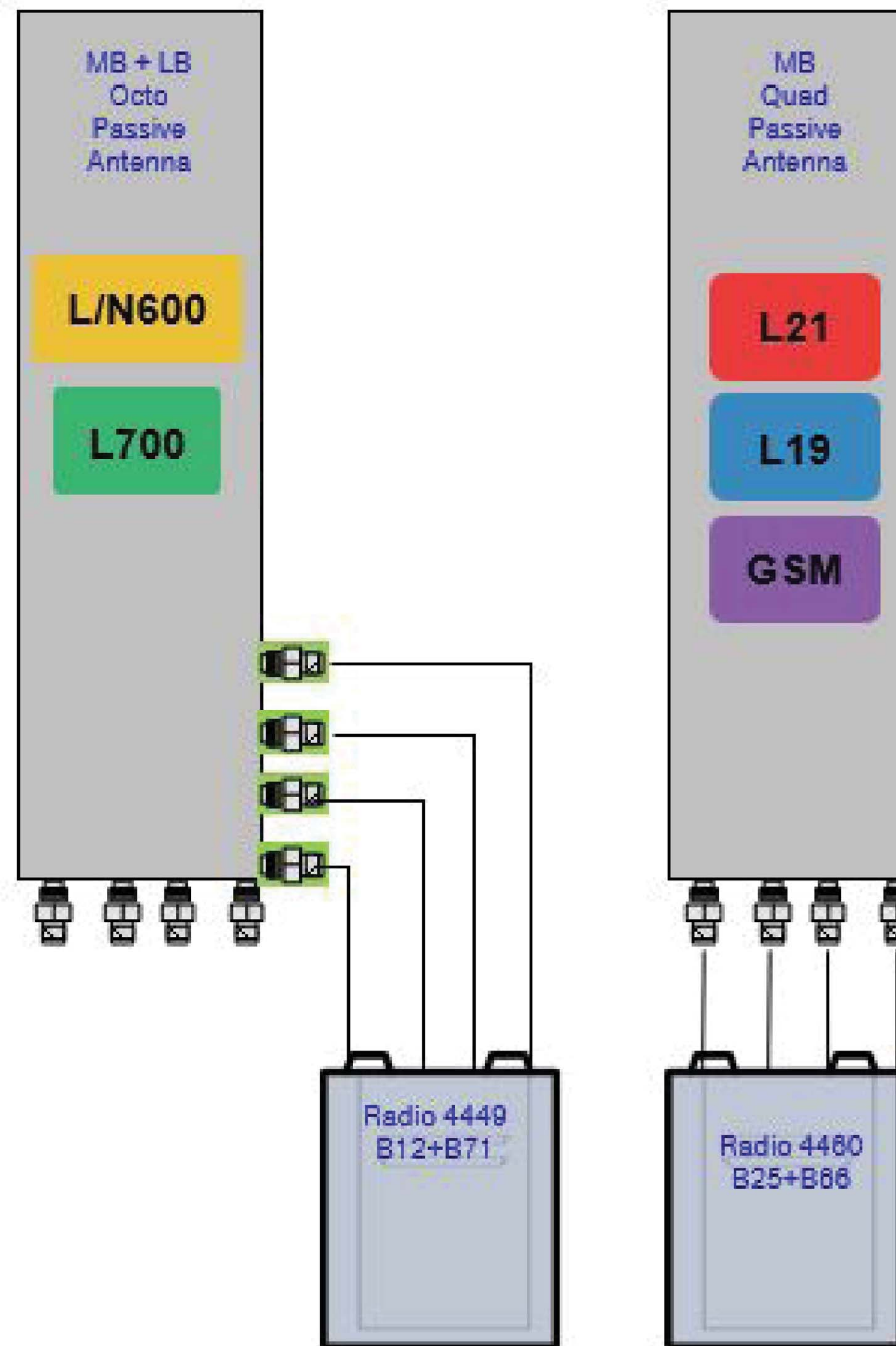
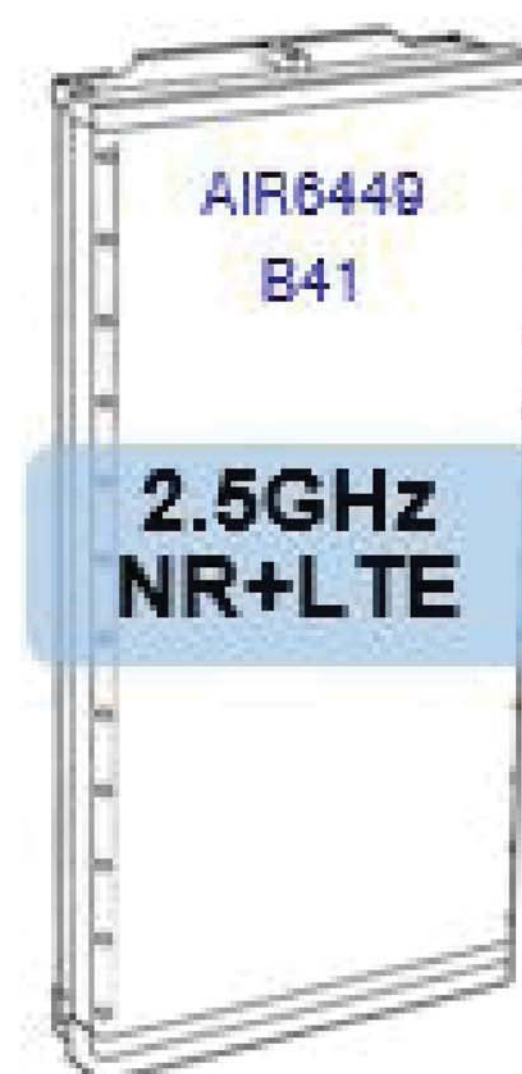
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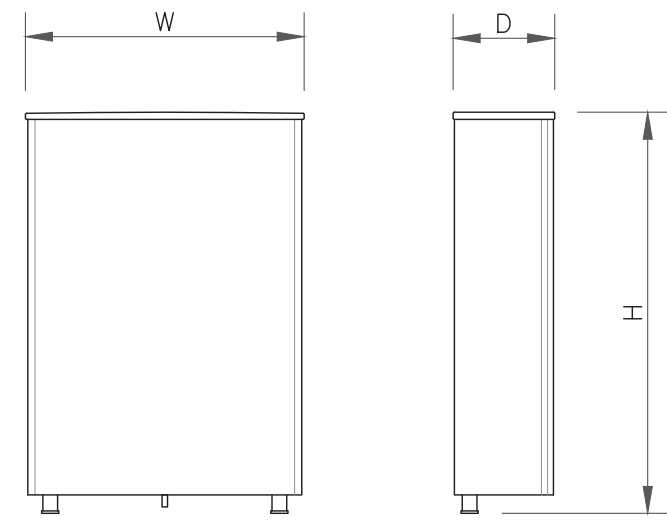
C-4

REVISION:

0

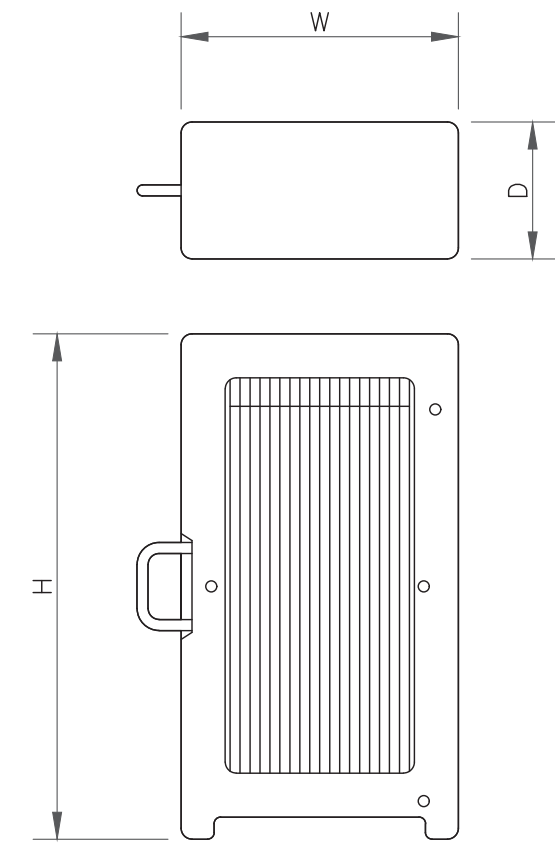


1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE



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



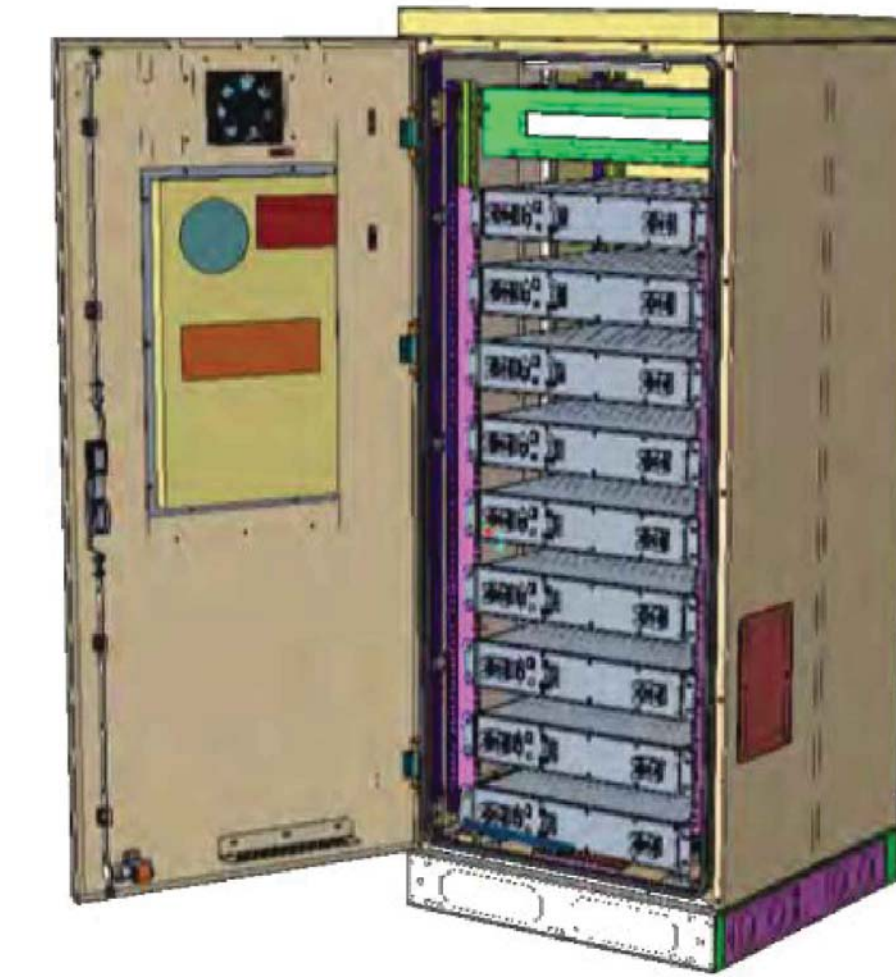
RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RADIO 4460 B25+B66
WIDTH	15.10"
DEPTH	11.90"
HEIGHT	17.0"
WEIGHT	109.0 LBS

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

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BU #: **824359**
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SHEET NUMBER: **C-5** REVISION: **0**

5 NOT USED
SCALE: NOT TO SCALE

6 NOT USED
SCALE: NOT TO SCALE

7 NOT USED
SCALE: NOT TO SCALE

8 NOT USED
SCALE: NOT TO SCALE

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SHEET NUMBER:

E-1

REVISION:

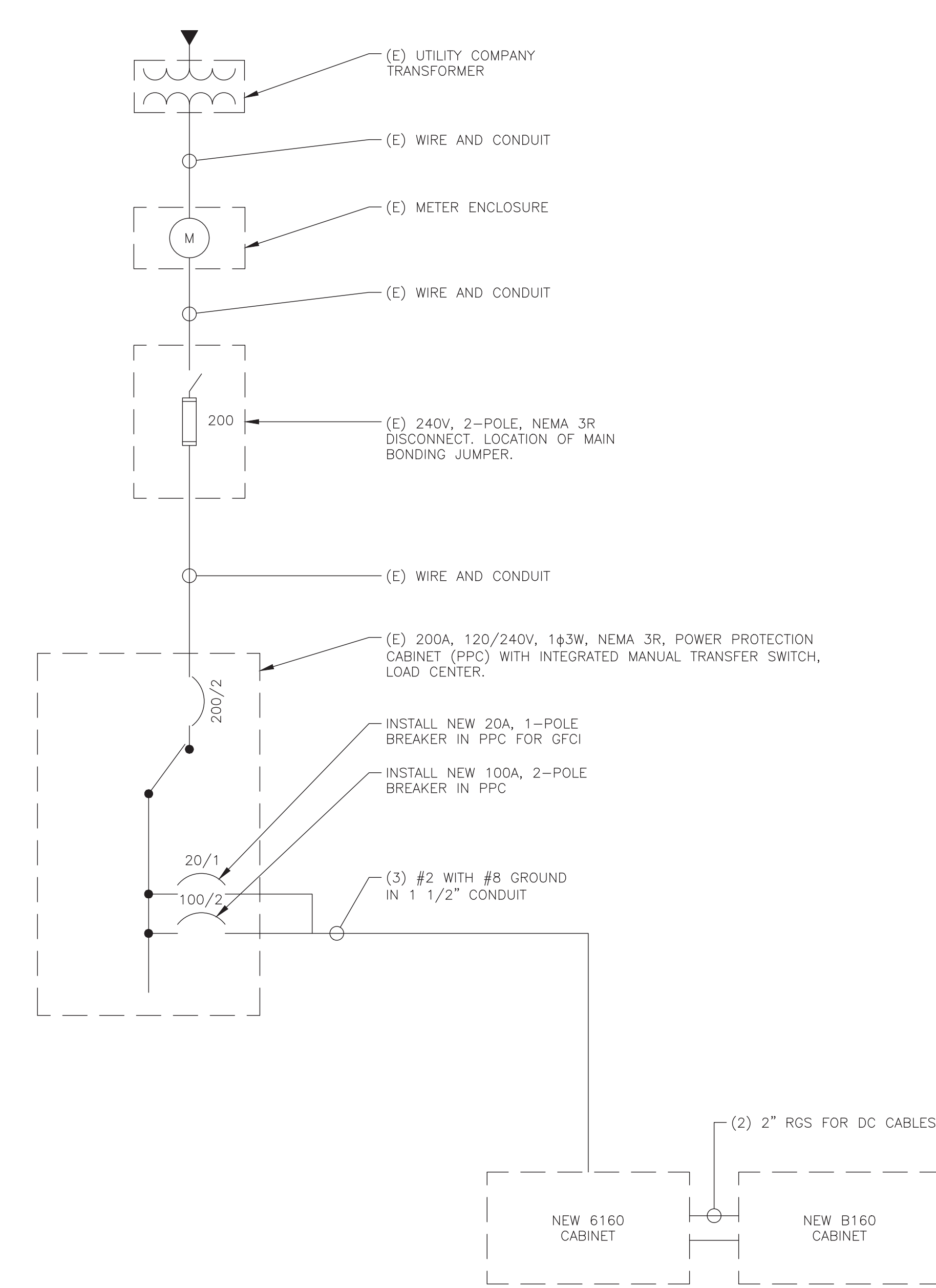
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FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS		AMPS	POLES	LOAD
			L1	L2			
S12000	1	20A	1	2	50A	2	BTS
6160 CABINET	2	100A	3	4	20A	1	GFCI
			5	6			

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 3 AND 5 WITH A NEW 2P 100A BREAKER
 INSTALL NEW BREAKER IN POSITION 6 WITH A NEW 1P 20A BREAKER
 REPLACE EXISTING WIRES FOR EXISTING 6160 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #2G AWG. MINIMUM CONDUIT SIZE TO BE 2".
 IF XXXA BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL Q012040M200RB (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 DOCUMENTS AND PHOTOS

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



- NOTES:**
- 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.
 - CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
 - ALL GROUNDING AND BONDING PER THE NEC.

2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

1:37216.005.01_GROTON-I-95-X89-NOA_1.dwg - User: jrichardson - Sep 16, 2021 - 9:39am

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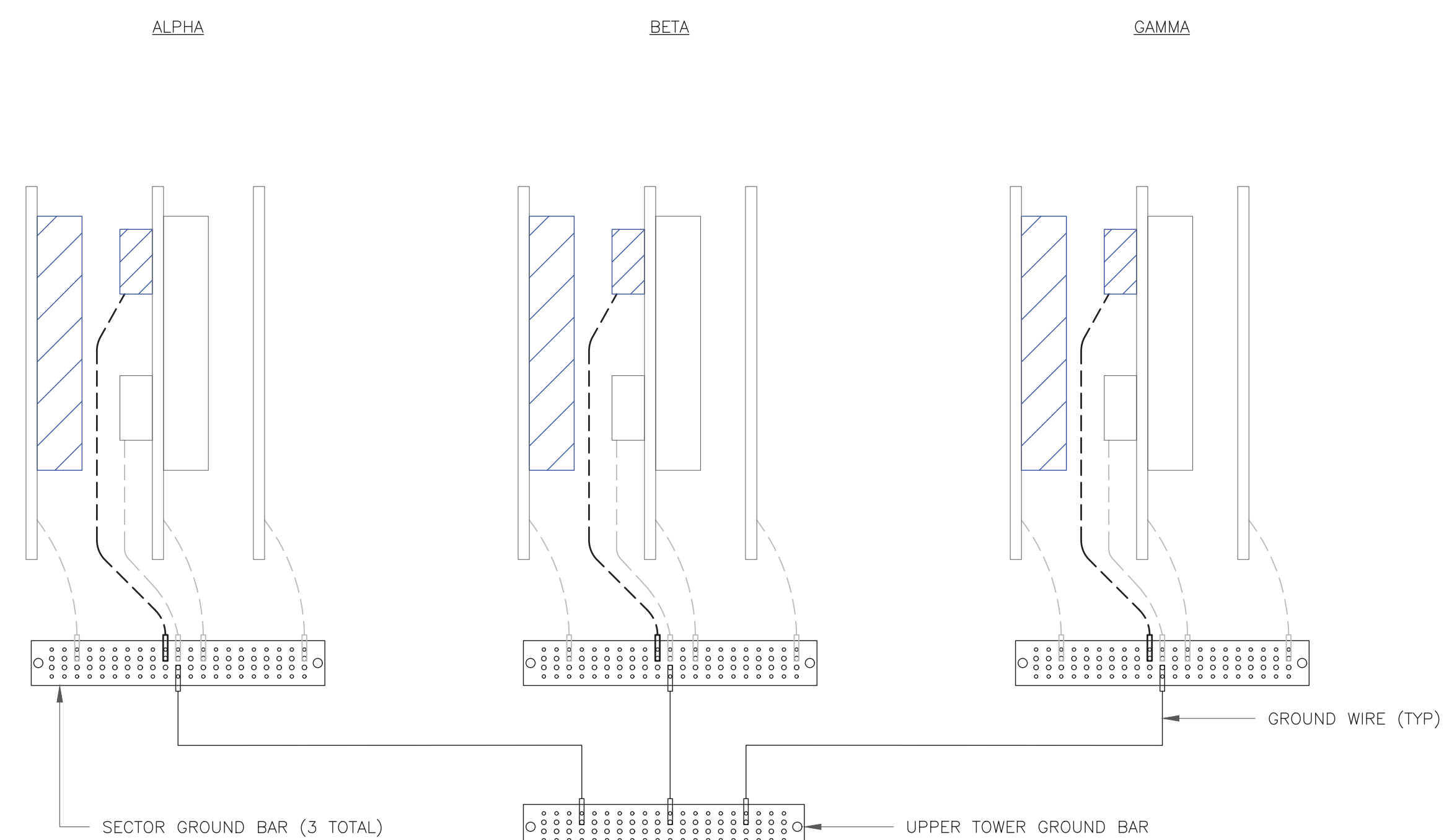
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G-1

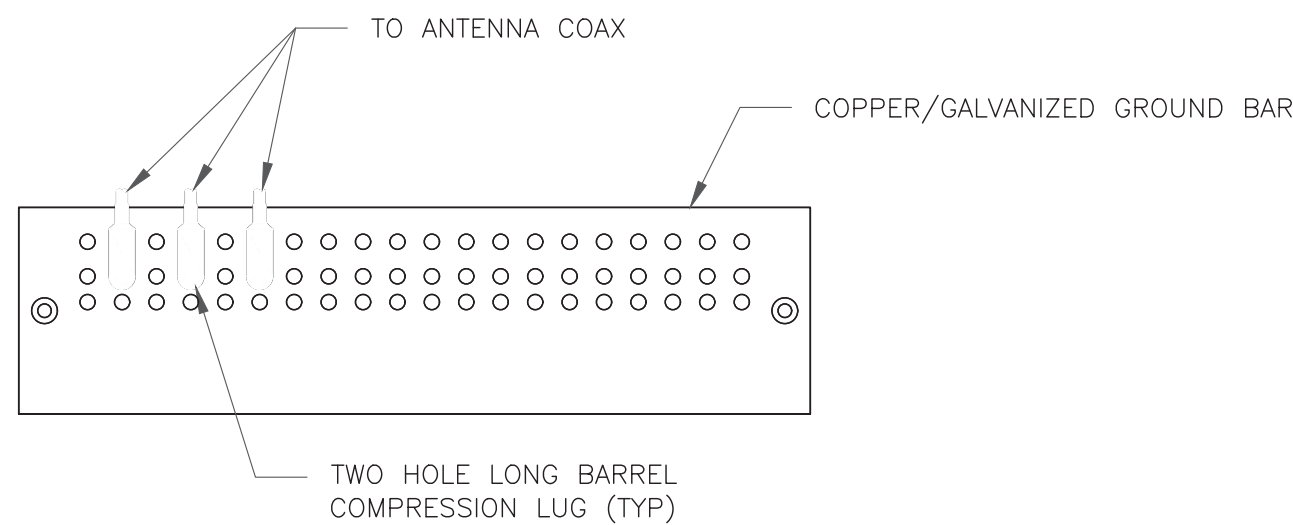
REVISION:

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

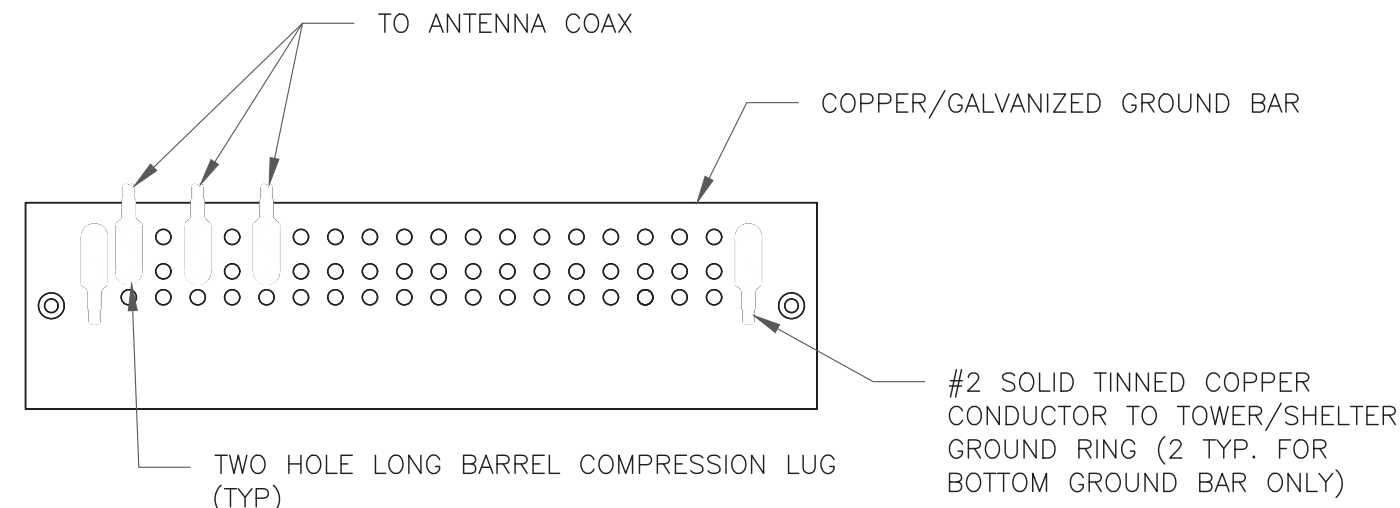
1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE



NOTES:

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

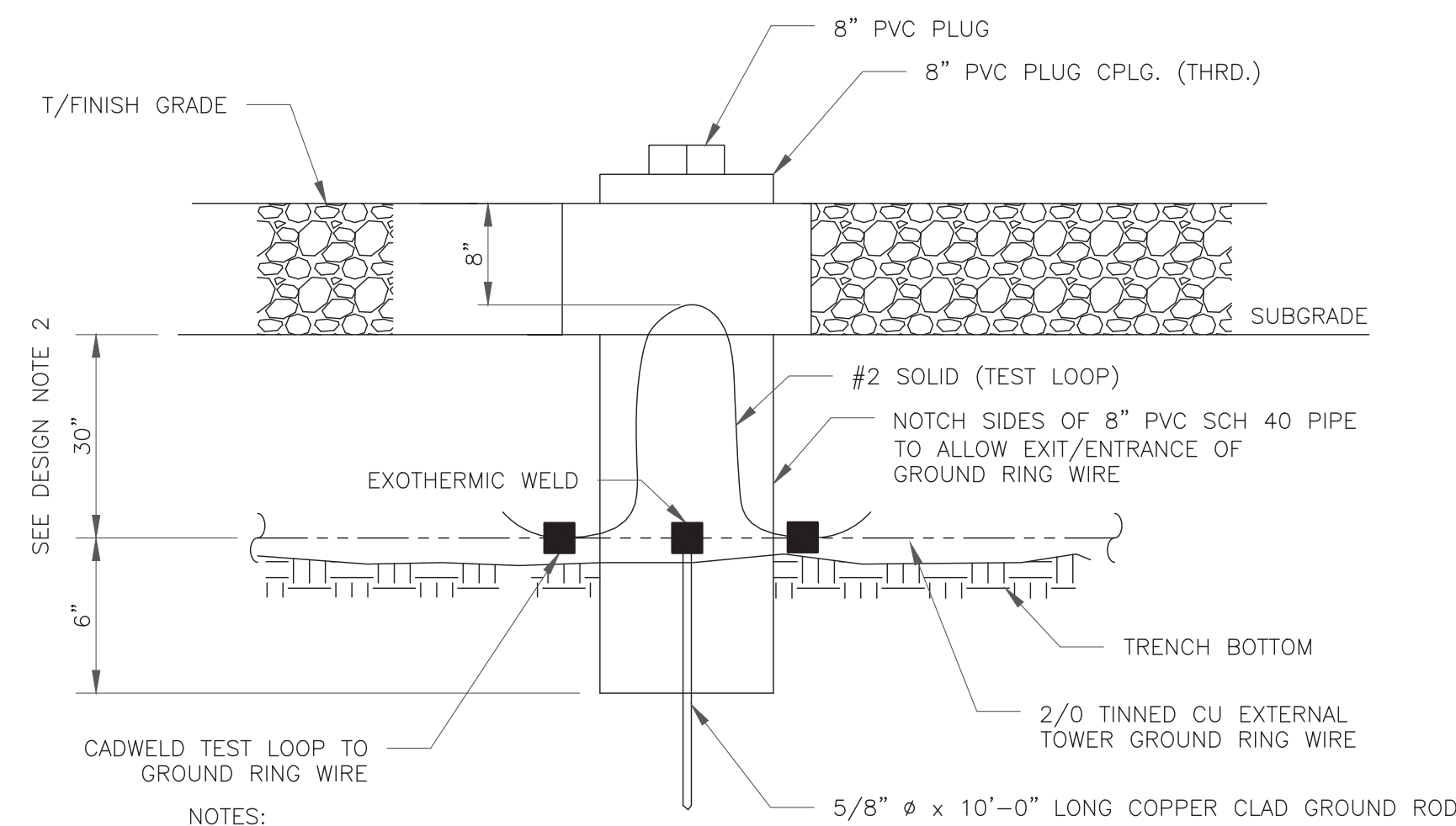
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

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

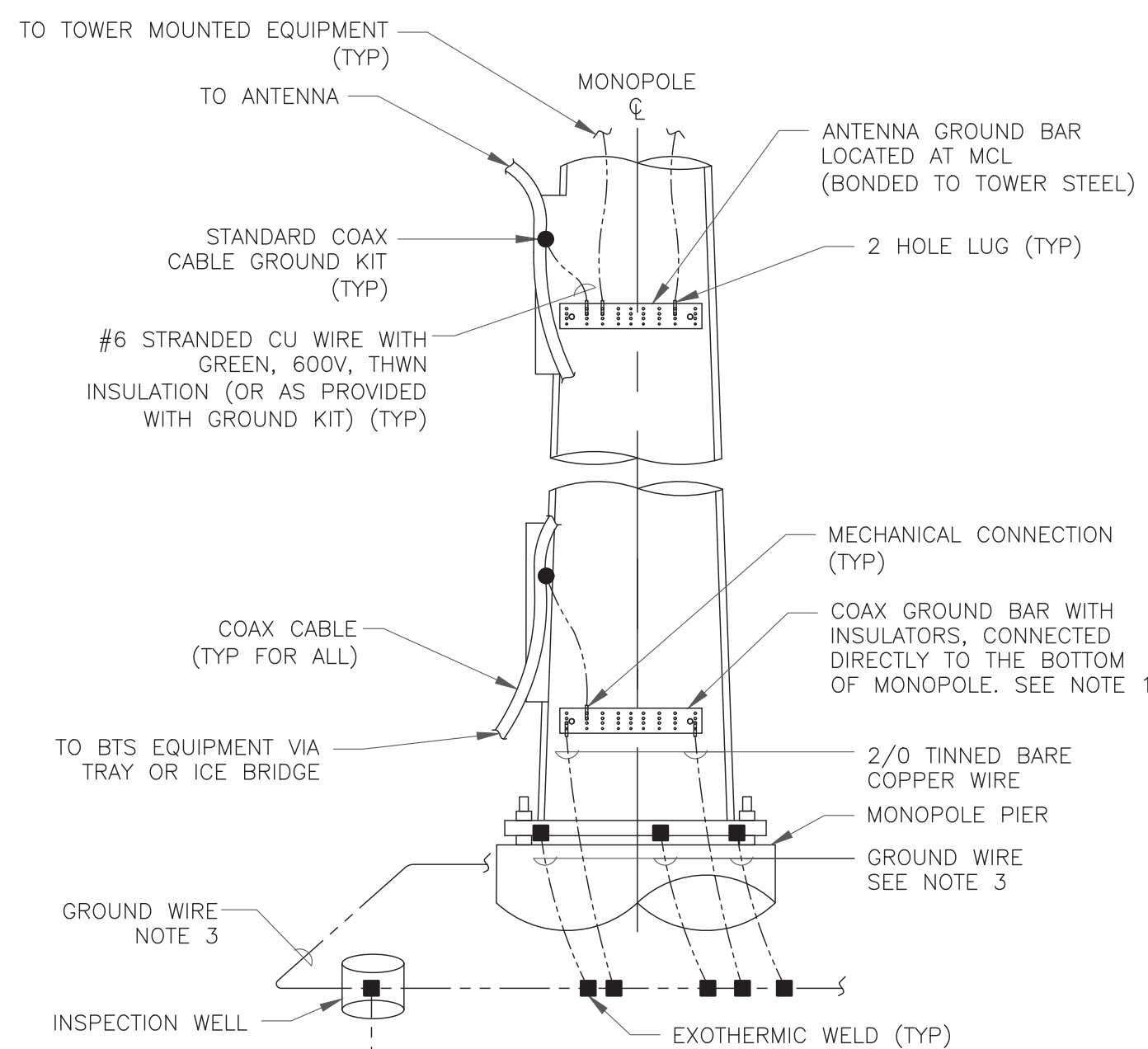
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

- GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
- 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)

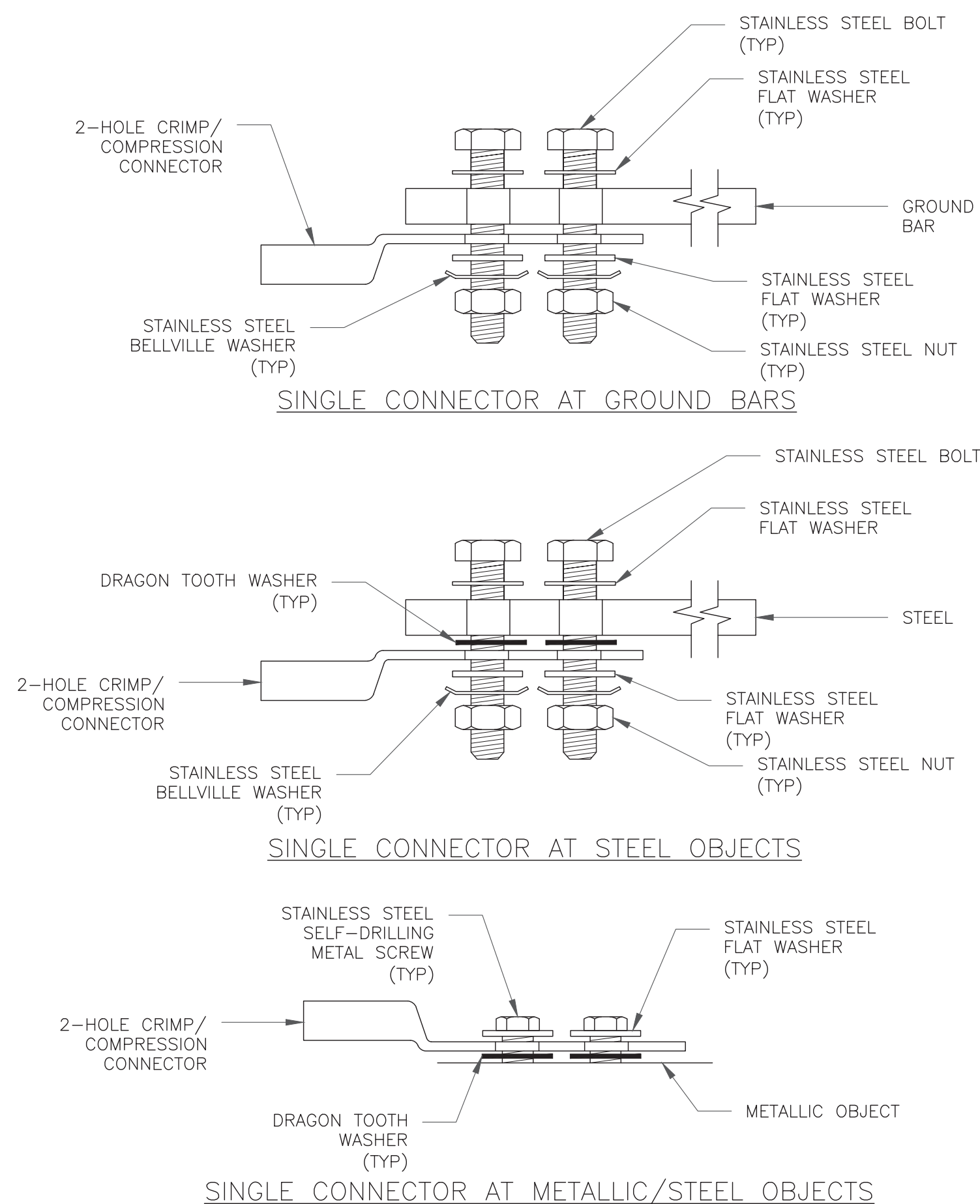
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



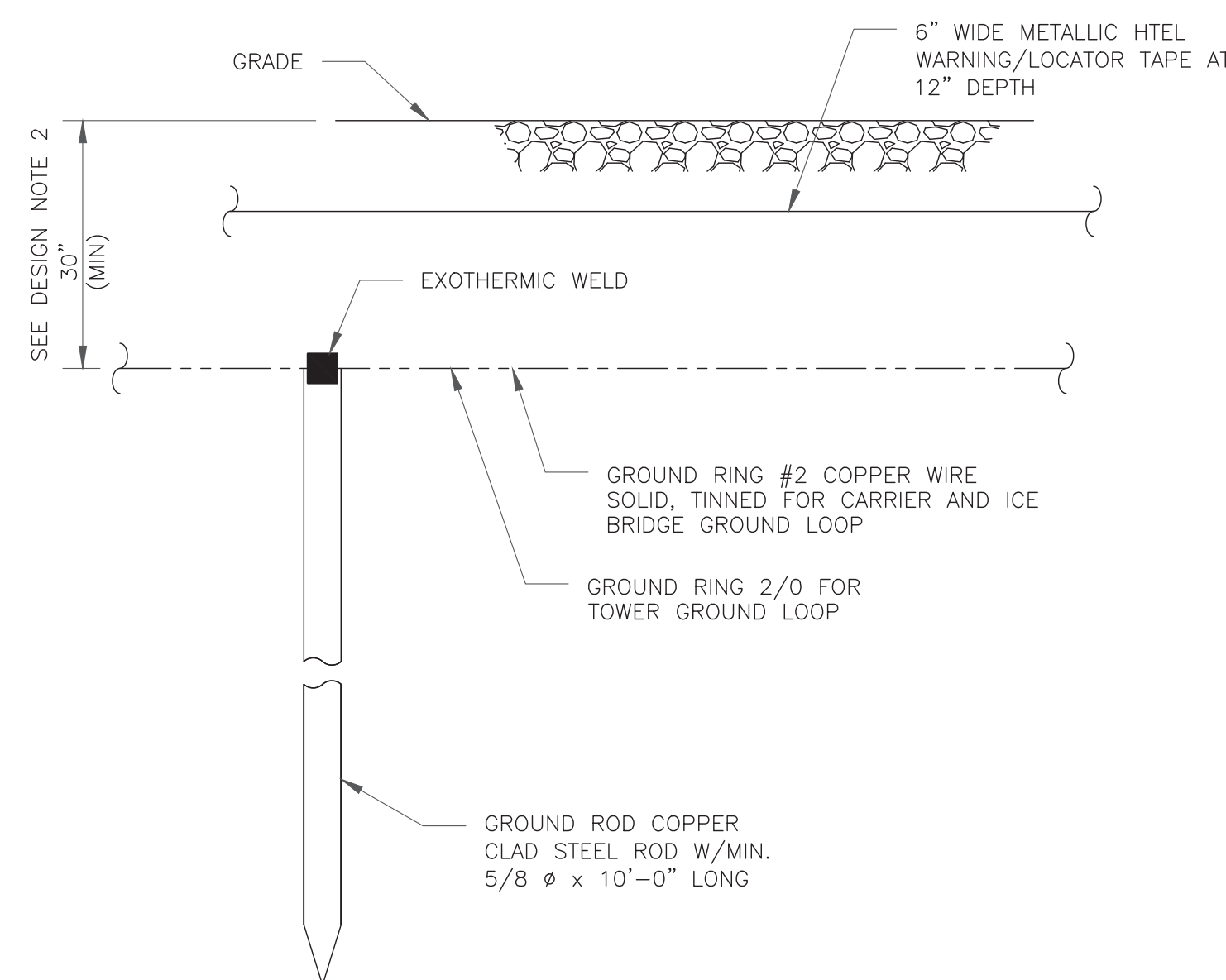
NOTES:

- 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.
- 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.
- 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:

- GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
- 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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SITE NUMBER: **CT11044E**

BU #: **824359**
GROTON/I-95/X89/NOA_1

725 FLANDERS RD
GROTON, CT 06340

EXISTING
130'-0" MONOPOLE

ISSUED FOR:

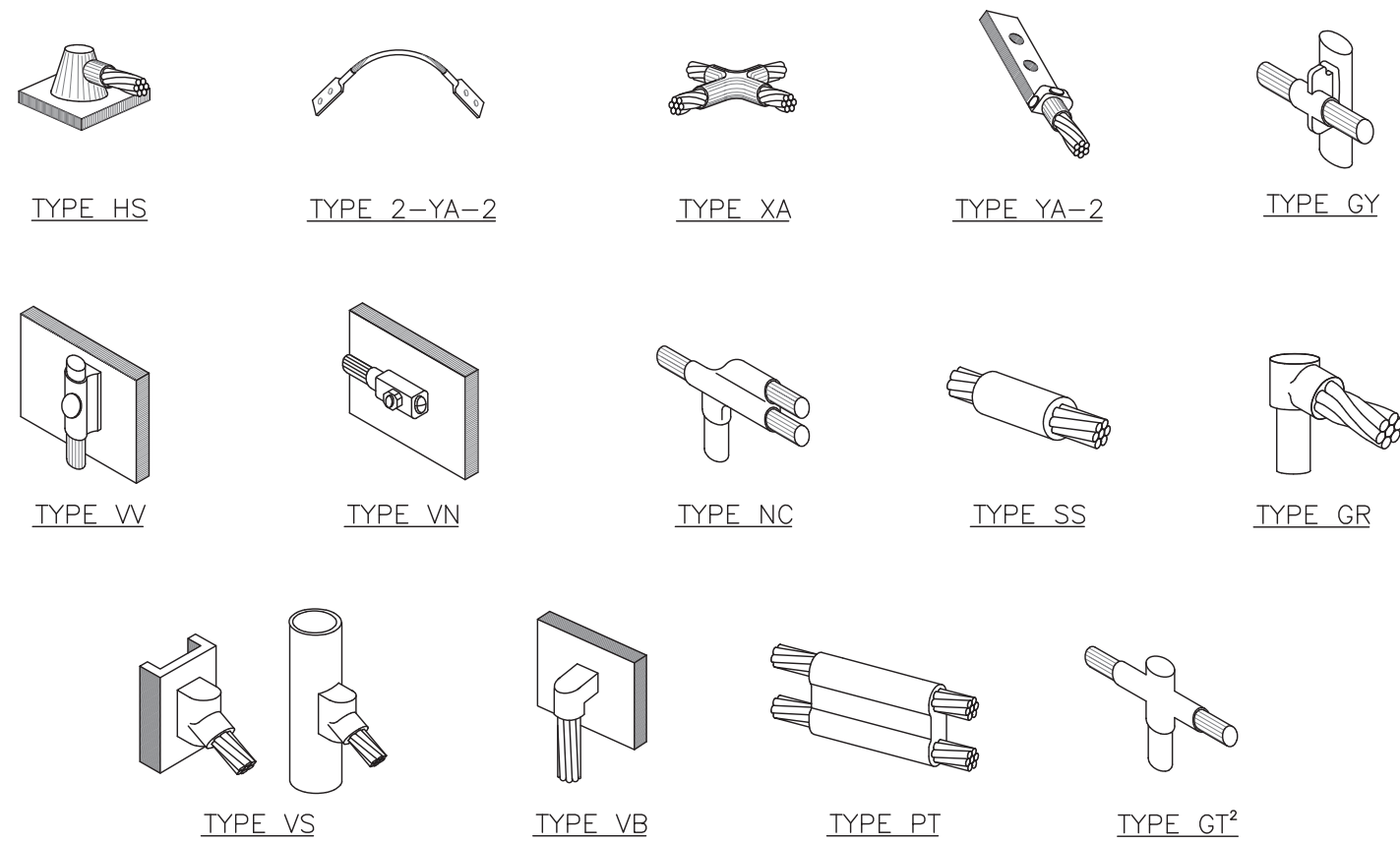
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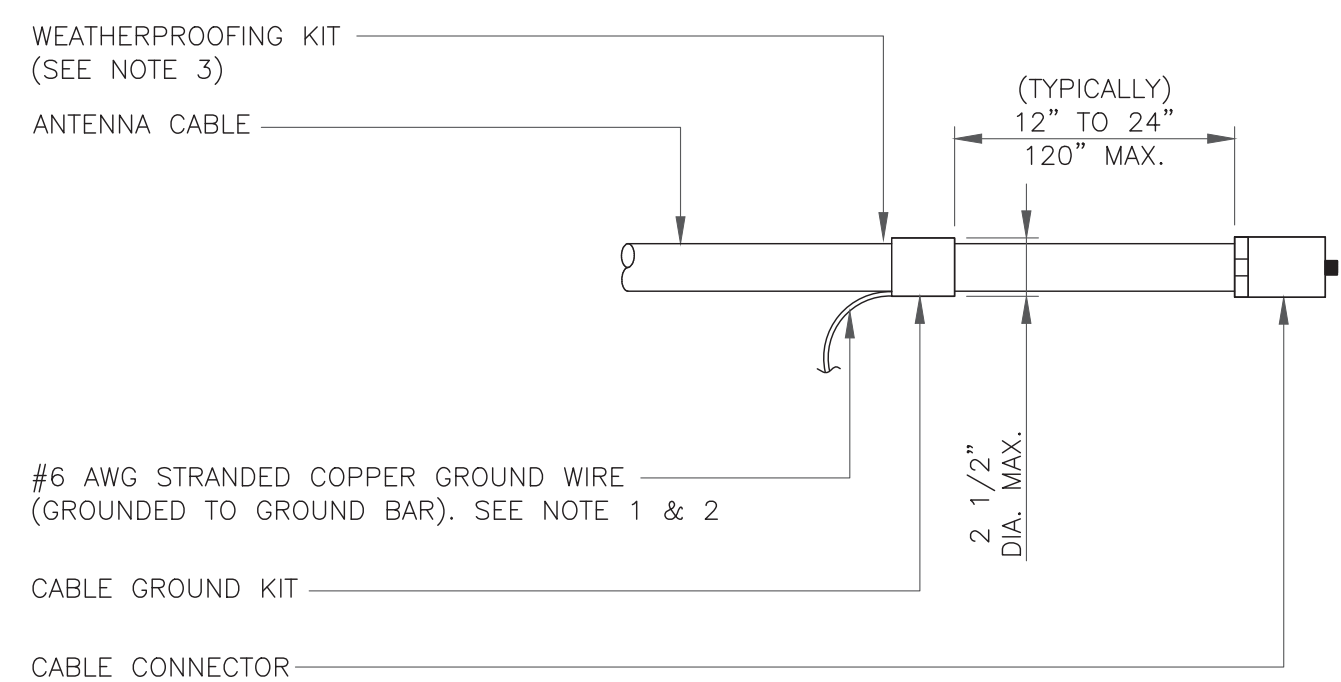
SHEET NUMBER: **G-2** REVISION: **0**



NOTE:

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

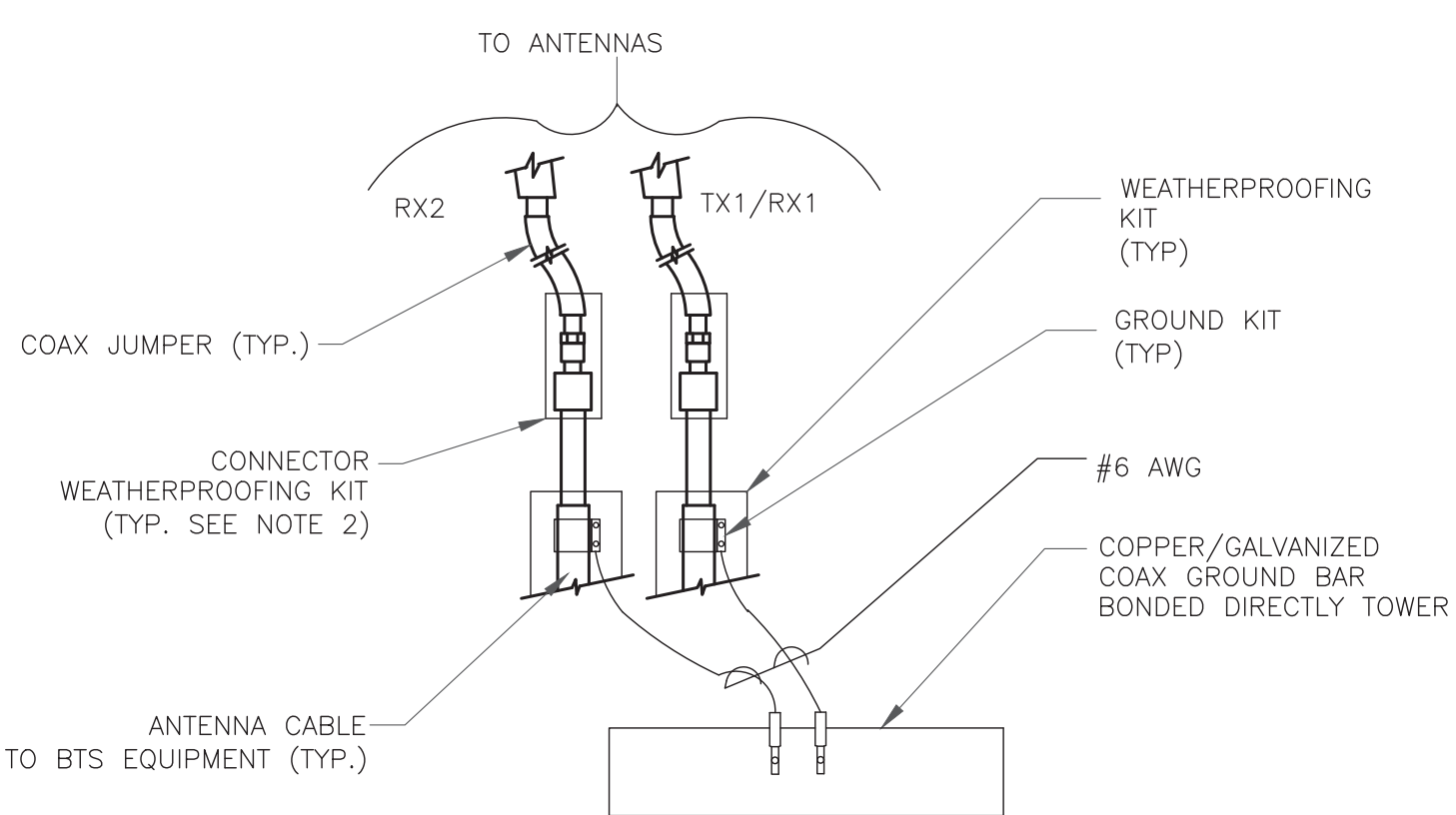
1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

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

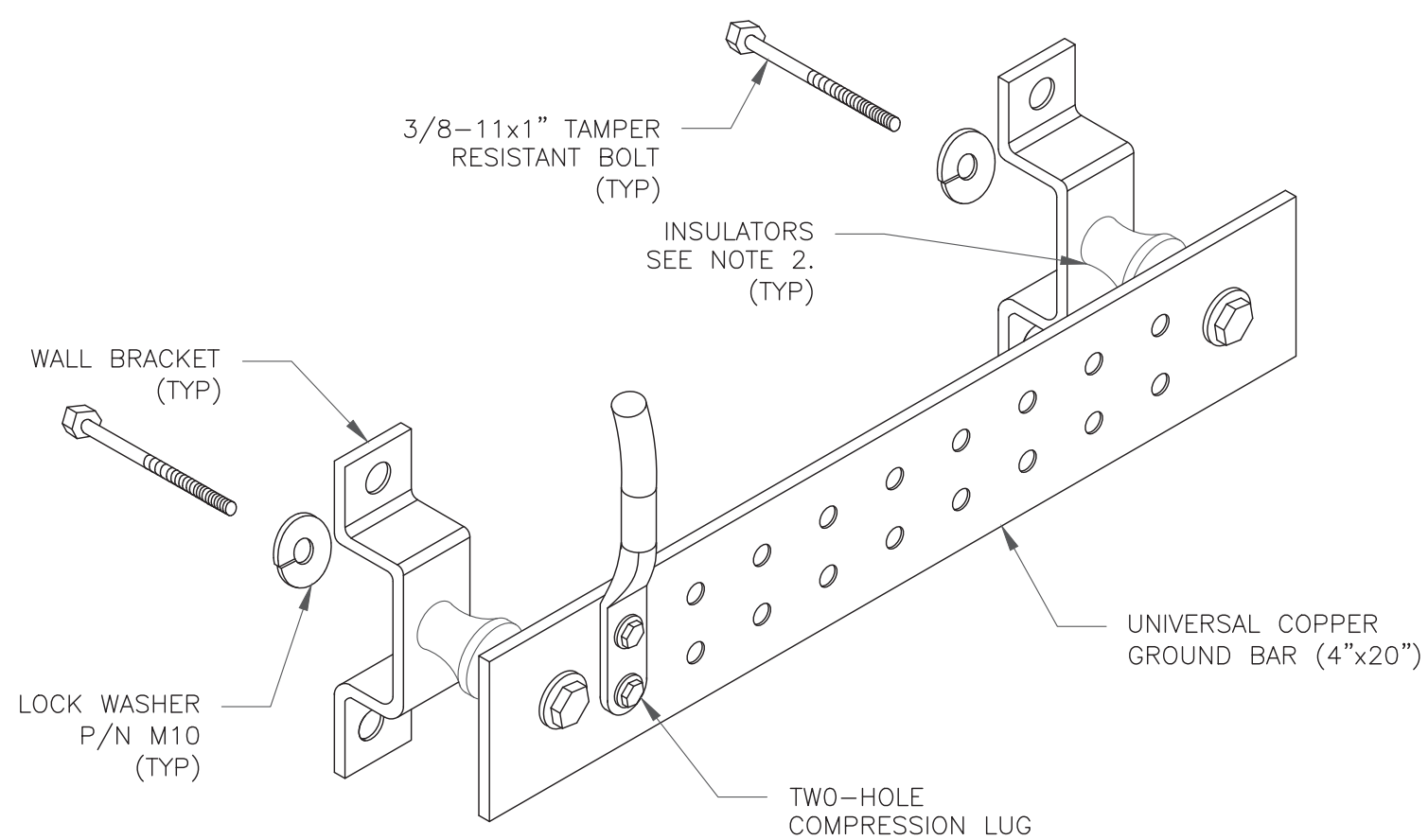
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



NOTES:

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

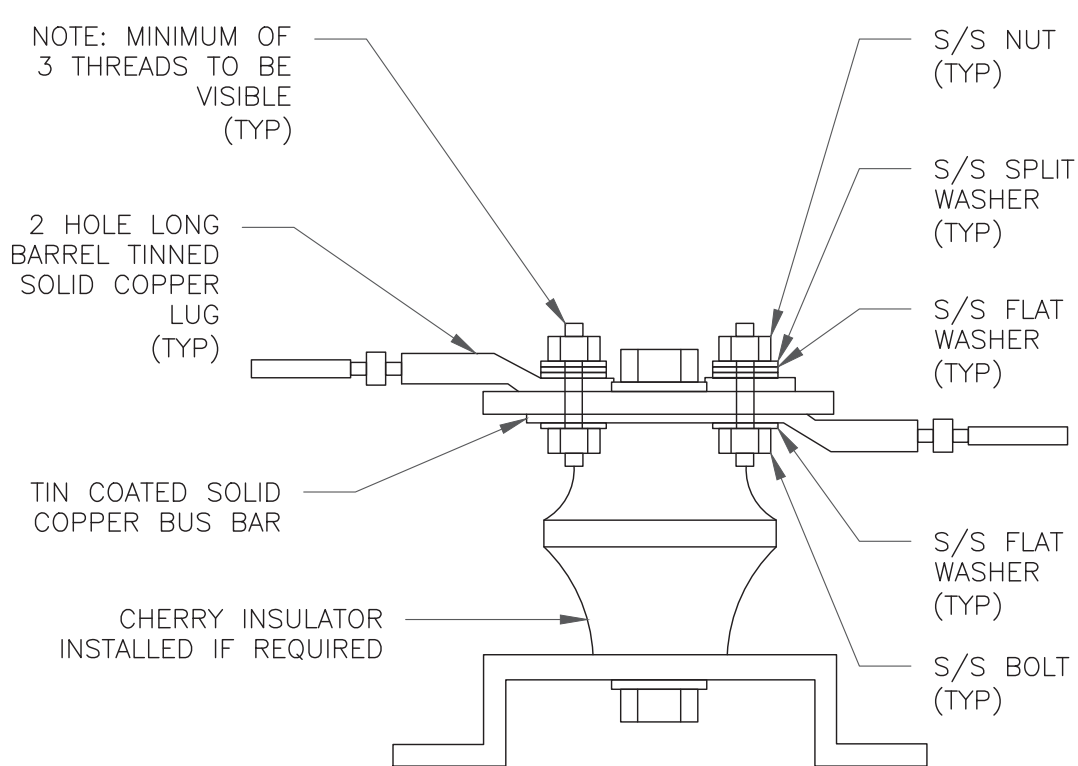
4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



NOTES:

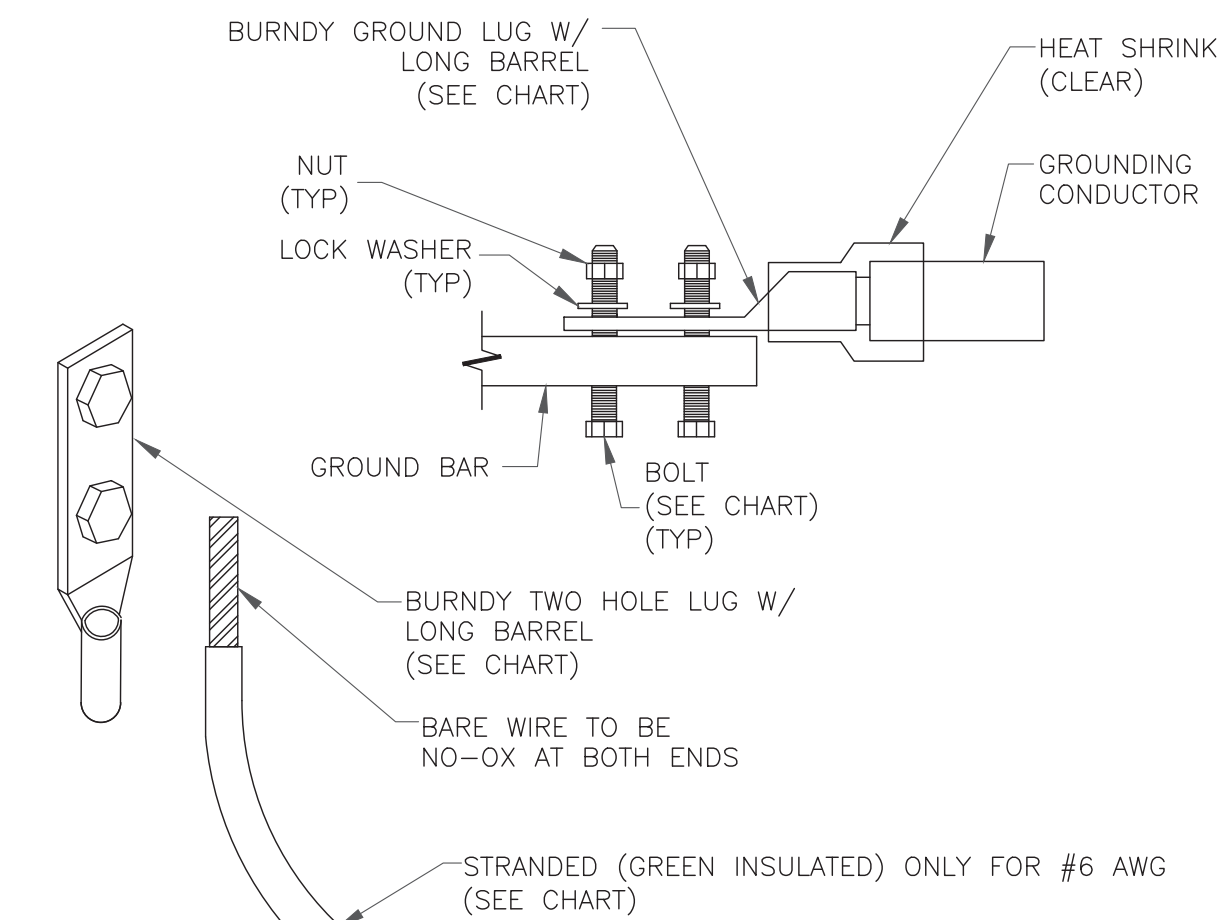
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR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

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

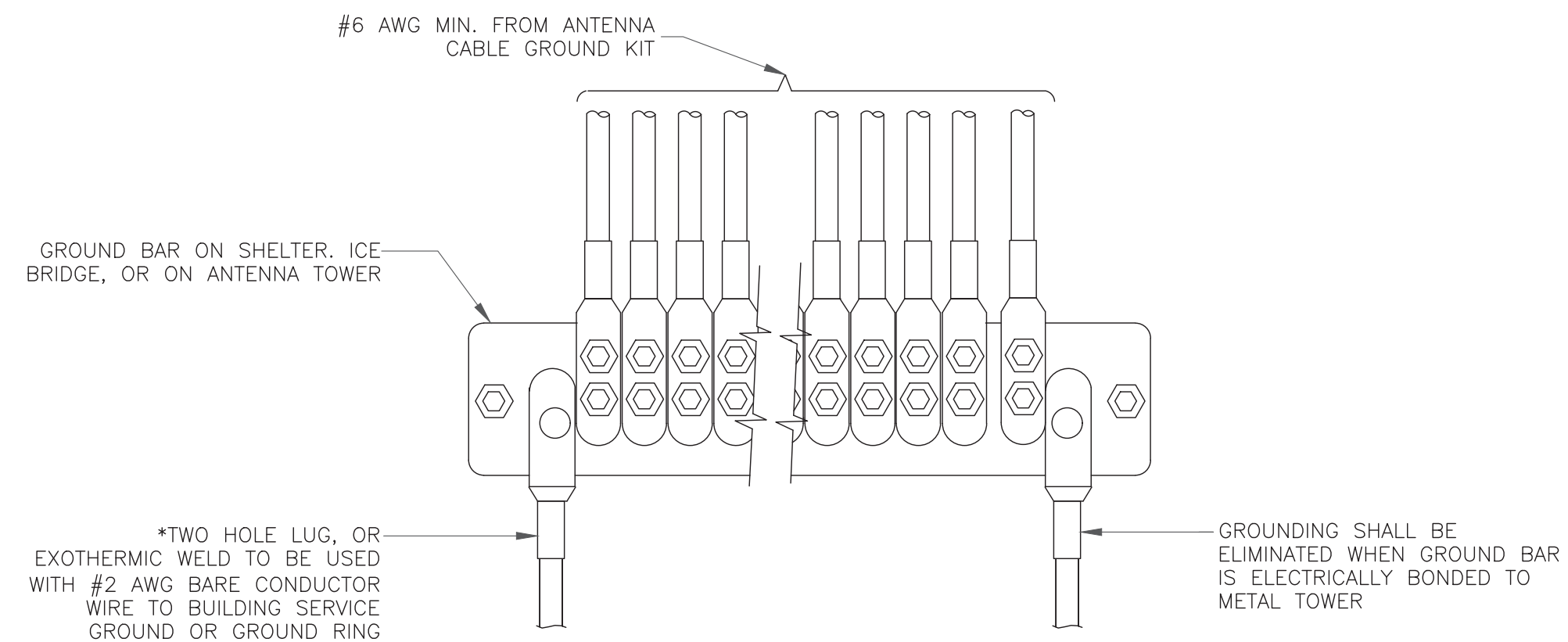
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



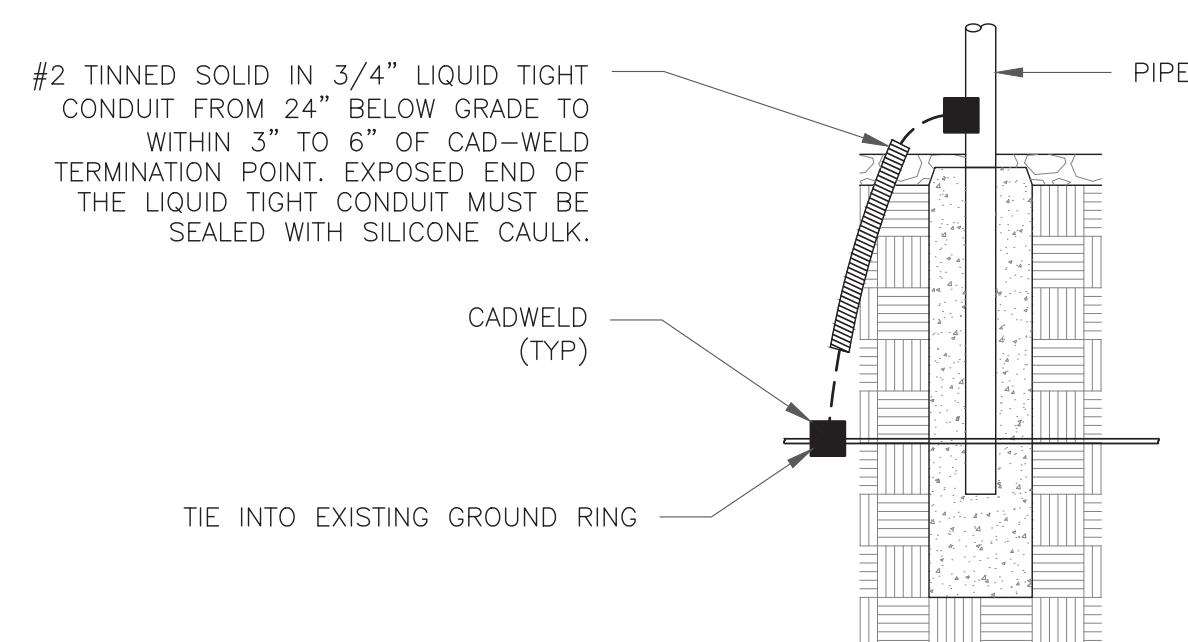
NOTES:

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

2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile

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SHEET NUMBER:

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