

July 25, 2022

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

**RE: Notice of Exempt Modification for ATT
Crown #881533; ATT Site ID CTL02182
75 Roberts Road, Groton, CT 06340
Latitude: 41° 21' 36.6084" / Longitude: -72° 2' 54.132"**

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 145-foot level of the existing 145-foot monopole tower at 75 Roberts Road, Groton, CT. The tower is owned by Crown Castle USA Inc. and the property is owned by Daniel & Stacey Perrotta. AT&T now intends to replace nine (9) antennas, install twelve (12) new antennas and ancillary equipment at the 145-foot level. This modification may include B2, B5, B17, B14, B29, B30, B66 & n77 hardware that is 4G(LTE) and/or 5G NR 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) CCI-TPA65R-BU8DA-K Antennas
 - (3+3) Ericsson-AIR6449 B77D + AIR6419 B77G Stacked Antennas
 - (3) CCI-DMP65R-BU8DA Antennas
 - (3) Ericsson-4426 B66 RRHs
 - (3) Ericsson-4449 B5/B12 RRHs
 - (1) RAYCAP-DC6-48-60-18-8F Squid
 - (1) FB-L98B-034 Fiber Trunk
 - (2) PWRT-606-S DC Trunk
 - (3) Y CABLES
 - (9) SITEPRO1-SCX1-K Crossover Plates
- Mount Modifications per Mount Analysis 2/22/22

Remove:

- (3) POWERWAVE-7770 Antennas
- (3) KATHREIN-840-370799 Antennas
- (2) KMW-AM-X-CD-17-65-00T-RET Antennas
- (1) ANDREW-SBNH-1D6565C Antenna
- (6) POWERWAVE-LGP 21401 TMAs
- (3) ERICSSON-4478 B5 RRHs
- (3) ERICSSON-RRUS-11 B12 RRHs
- (3) ERICSSON-RRUS-11 B4 RRHs

- (6) KAELUS-DBCT108F1V92-1 Diplexers
- (6) 1-5/8" COAX CABLES

Ground:

Install New:

- (3) Rectifiers in existing power plant
- (6) Up-Converters in existing power plant
- (1) DC12-48-60-RM in existing FIF Rack
- 4-Way GPS Splitter
- (1) 6648 w/XCEDE Cable

The facility was approved by the Town of Groton Planning and Zoning on March 1, 2000. Please see the attached approval.

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 Town Manager John Burt, and Jonathan Reiner, Director of Planning, for the municipality, Daniel & Stacey Perrotta as property owners 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, ATT 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: Domenica Tatasciore.

Sincerely,



Domenica Tatasciore
Site Acquisition Specialist
1800 W. Park Drive
Westborough, MA 01581
(508) 621-9161/ Domenica.Tatasciore@crowncastle.com

Melanie A. Bachman

Page 3

Attachments

cc:

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

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

Daniel & Stacey Perrotta, Property Owners
75 Roberts Road
Groton, CT 06340
860-446-2057

Crown Castle, Tower Owner



TOWN OF GROTON

PLANNING AND DEVELOPMENT SERVICES

Planning Department

134 Groton Long Point Road
Groton, Connecticut 06340-4873

March 1, 2000

Gerald Longobardi
Candid Communications of Groton, LLC
110 Washington Avenue
North Haven, Connecticut 06473

Dear Mr. Longobardi:

The Town of Groton Planning Commission, at its meeting on February 22, 2000, approved with modifications your site plan entitled Candid Communications Telecommunications Tower and Facilities, Roberts Road (see attachment).

If your plan was approved with modifications, you should submit two paper check prints of the revised plan for final review to insure compliance with the Commission's approval. Following this review, two mylars and eight paper prints of the entire plan must be submitted for the Chairman's signature.

Please note that this plan, after being signed by the Chairman of the Commission, must be filed by you or your representative in the Land Records Office at Town Hall, and until such filing has been done, no building permit can be issued and no construction shall commence. Please note as per the Zoning Regulations, "any approved site plan for which construction has not commenced or which is not otherwise put into effect within a period of one year shall become null and void, unless an extension of time is applied for by the applicant and granted by the Planning Commission."

If a building permit is involved, "Post Site Plan Approval Requirements and Procedures" and "Contractor's Punch List for Site Work" have been enclosed to assist you in the construction phase of your project.

Please note that any modification to this plan subsequent to Planning Commission approval requires resubmission of an application for site plan modification approval in the same manner as the original application. Failure to submit requisite modification applications could result in delays in issuance of Certificates of Site Plan Compliance and Certificates of Occupancy.

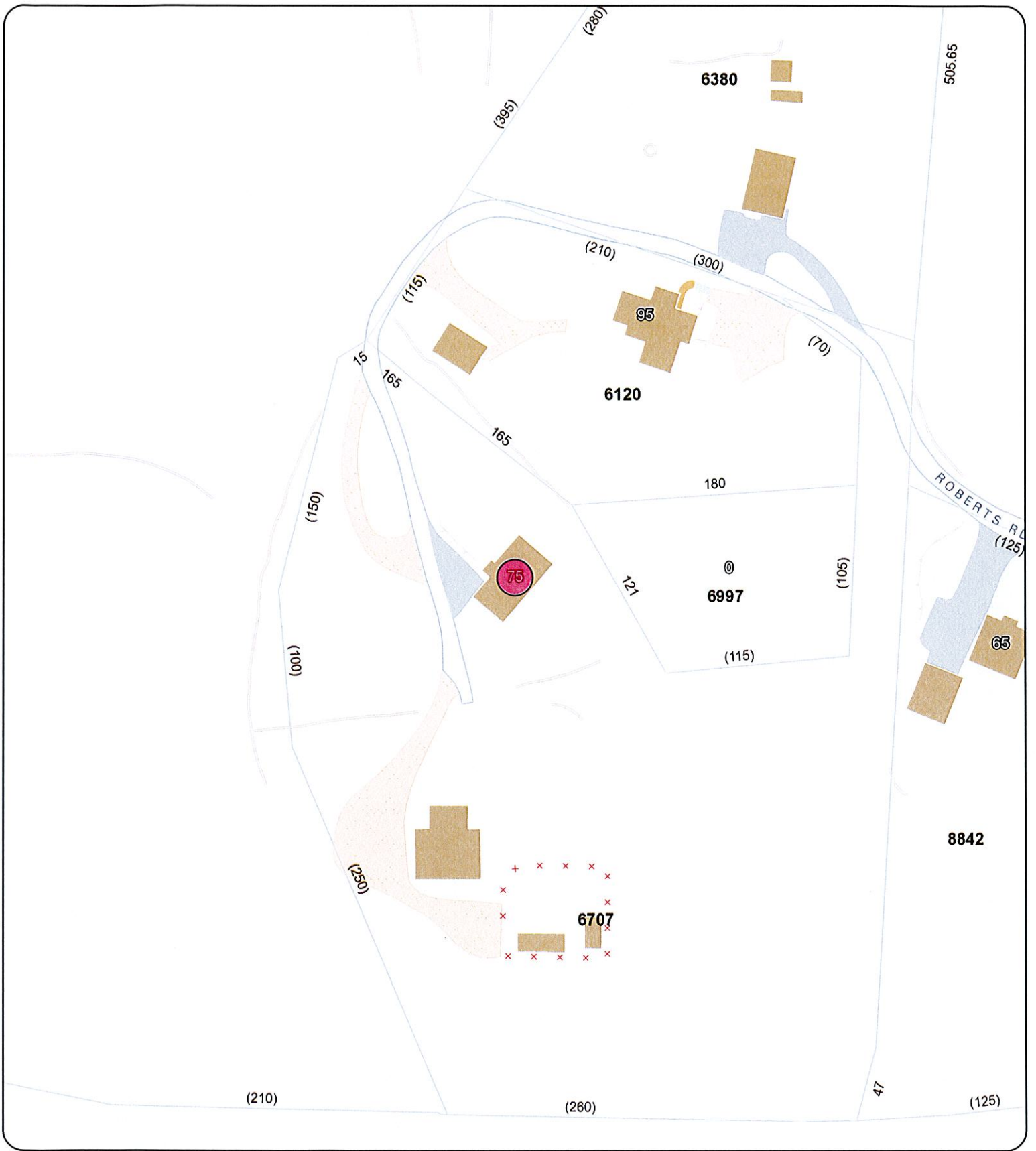
If you have any questions, please do not hesitate to contact me.

Sincerely,

Michael J. Murphy, AICP
Assistant Director of
Planning and Development

MJM:nb

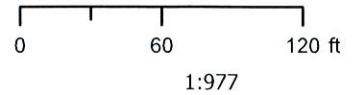
Certified # Z 414 682 282



TOWN OF GROTON



75 Roberts Road



Disclaimer
The planimetric and topographic information depicted on this map was compiled by Fugro based on an aerial flight performed in April 2000. The parcel and property line information depicted on this map has been compiled from recorded deeds, maps, assessor records and other sources of information in the Town of Groton. The intent of this map is to depict a general representation of real property information relative to the planimetric features for the Town of Groton and is subject to change as a more accurate survey may disclose. The Town of Groton and the mapping companies assume no legal responsibility for the information contained in this data.
THIS MAP IS NOT TO BE USED FOR THE TRANSFER OF PROPERTY.
Horizontal Datum
Connecticut State Plane Coordinates, North American Datum of 1983 (NAD83)
Feet
Vertical Datum
North American Vertical Datum of 1988 (NAVD88)

Residential Property Card

Print Date: 7/21/2022

Card 1 Of 1

Account	Location	Grand List Code	Zoning	Acres
169914226707	75 ROBERTS RD	RESIDENTIAL	RU-20	3.18
District	Neighborhood	Deed Book/Page	Use Code	
POQUONNOCK BRIDGE	1031	1206/918	SINGLE FAMILY	

Current Owner

PERROTTA DANIEL J & STACEY A
75 ROBERTS RD
GROTON CT 06340

Property Picture



Building Information

Style:	RAISED RANCH
Exterior:	ALUM/VINYL
Attic:	NONE
Stories:	1
Basement:	FULL
Year Built:	1977
Tot Living Area:	2120 SqFt.
Fuel:	ELECTRIC
Heating:	BASIC
System:	ELECTRIC
Bedrooms:	4
Full Baths:	2
Half Baths:	

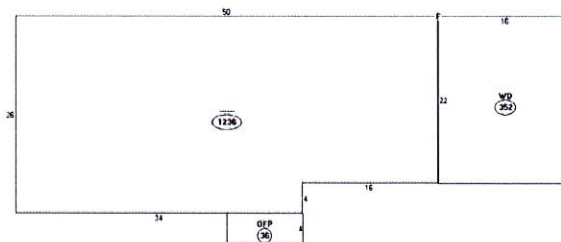
Building Sketch

Valuation

Land:	\$94,000
Building:	\$293,100
Total:	\$387,100
Assessed Value:	\$270,970

Recent Sales

Book/Page	Date	Price
1206/918	10/15/2018	\$0
1091/1053	5/4/2012	\$300,000
1091/1050	5/3/2012	\$0



Descr
 A --- 1236 sqft
 B --- 250 sqft
 C OFP 16 sqft
 D ABZ 1120 sqft
 E 1031 204 sqft
 F 1091 36 sqft

Sketch Legend

---	Main Living Area	LSMA	Masonry	GRHS	Attached Greenhouse
IFR	Frame	DMP	Open Masonry Porch	CAT	Cathedral Ceiling
OFP	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		
FOH	Frame Overhang	MP	Masonry Patio		
.SFR	1/2 Story Frame	WD	Wood Deck		
A(U)	Attic (Unfinished)	CPY	Canopy		
A(F)	Attic (Finished)				

From: TrackingUpdates@fedex.com
To: [Tatasciore, Domenica](#)
Subject: FedEx Shipment 777472602330: Your package has been delivered
Date: Tuesday, July 26, 2022 10:48:39 AM

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fedEx



Hi. Your package was
delivered Tue, 07/26/2022 at
10:46am.



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

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER [777472602330](#)

FROM Domenica Tatasciore
1800 West Park Drive

Suite 200
WESTBOROUGH, MA, US, 01581

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

REFERENCE 799001.7680

SHIPPER REFERENCE 799001.7680

SHIP DATE Mon 7/25/2022 05 32 PM

DELIVERED TO Receptionist/Front Desk

PACKAGING TYPE FedEx Envelope

ORIGIN WESTBOROUGH, MA, US, 01581

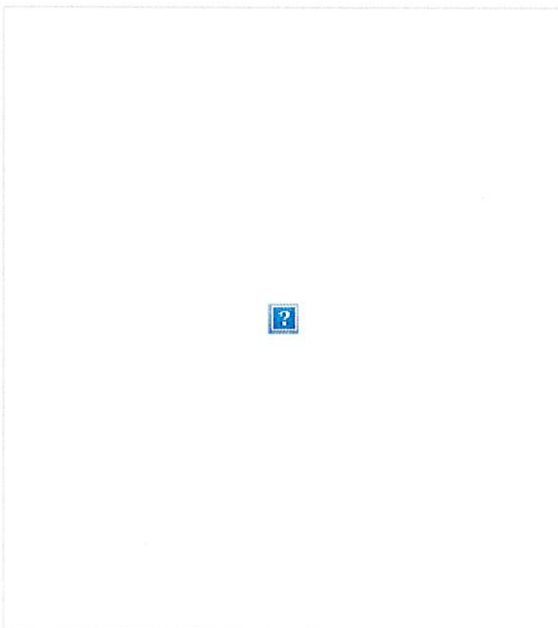
DESTINATION GROTON, CT, US, 06340

SPECIAL HANDLING Deliver Weekday

NUMBER OF PIECES 1

TOTAL SHIPMENT WEIGHT 0.50 LB

SERVICE TYPE FedEx Priority Overnight



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edEx



Hi. Your package was
delivered Tue, 07/26/2022 at
9:59am.



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

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER [777472608453](#)

FROM Domenica Tatasciore
1800 West Park Drive

Suite 200
WESTBOROUGH, MA, US, 01581

TO Town of Groton
Jonathan Reiner, Planning Director
134 Groton Long Point Road
GROTON, CT, US, 06340

REFERENCE 799001.7680

SHIPPER REFERENCE 799001.7680

SHIP DATE Mon 7/25/2022 05:32 PM

DELIVERED TO Receptionist/Front Desk

PACKAGING TYPE FedEx Envelope

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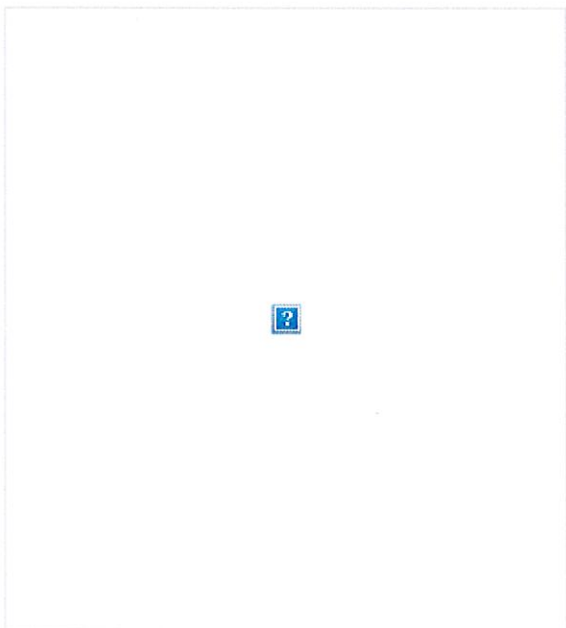
DESTINATION GROTON, CT, US, 06340

SPECIAL HANDLING Deliver Weekday

NUMBER OF PIECES 1

TOTAL SHIPMENT WEIGHT 1.00 LB

SERVICE TYPE FedEx Priority Overnight



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Date: Tuesday, July 26, 2022 11:34:39 AM

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Hi. Your package was
delivered Tue, 07/26/2022 at
11:33am.



Delivered to 75 ROBERTS RD, GROTON, CT 06340

OBTAIN PROOF OF DELIVERY

TRACKING NUMBER [777472615904](#)

FROM Domenica Tatasciore
1800 West Park Drive
Suite 200

WESTBOROUGH, MA, US, 01581

TO Daniel & Stacey Perrotta
75 Roberts Road
GROTON, CT, US, 06340

REFERENCE 799001.7680

SHIPPER REFERENCE 799001.7680

SHIP DATE Mon 7/25/2022 05:32 PM

DELIVERED TO Residence

PACKAGING TYPE FedEx Envelope

ORIGIN WESTBOROUGH, MA, US, 01581

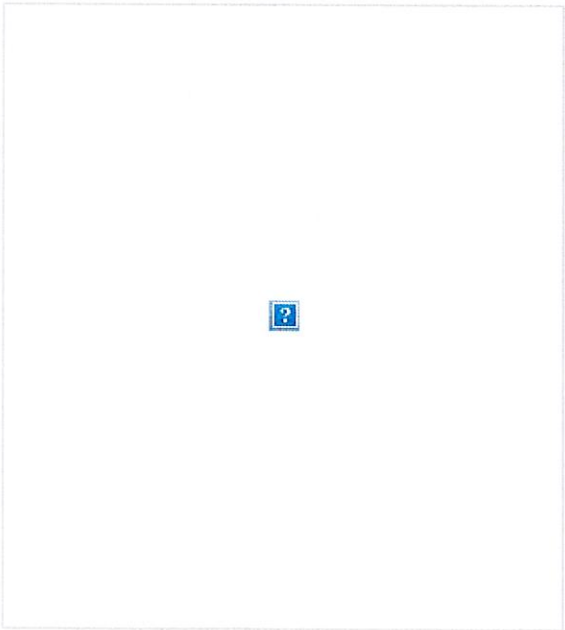
DESTINATION GROTON, CT, US, 06340

SPECIAL HANDLING Deliver Weekday
Residential Delivery

NUMBER OF PIECES 1

TOTAL SHIPMENT WEIGHT 0.50 LB

SERVICE TYPE FedEx Priority Overnight



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Radio Frequency Safety Survey Report Predictive (RFSSRP) Prepared For AT&T



Site Name: GROTON ROBERTS RD
FA# 10035316
USID: 65076
Site ID: CTL02182
Address: 75 ROBERTS ROAD GROTON, CT
06340
County: NEW LONDON
Latitude: 41.3602139
Longitude: -72.0486381
Structure Type: MONOPOLE
Property Owner: PERROTA DANIEL J & STACEY A
Pace Job: MRCTB056368
RFDS Technology: 5G NR 1SR CBAND

Report Information

Report Writer: Karan Vashisht

Report Generated Date: 05-23-2022

Compliance Statement

AT&T Mobility Compliance Statement: Based on the information collected, AT&T Mobility will be Compliant when the remediation recommended in section 5 or appropriate remediation determined by AT&T is implemented



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1. Executive Summary

1.1 Site Summary

Max Predictive Spatial Average MPE% & Location on Site (General Public)	15645.20% on Antennas Centerline Level & at AT&T Sec-A antenna no. #A2-1
Max Predictive Spatial Average MPE% on Ground (General Public)	0.63%
AT&T Mobility Site Compliance	AT&T Mobility will be Compliant by implementing remediation recommended as per section 5 in this report.
TABLE 1: Site Summary	

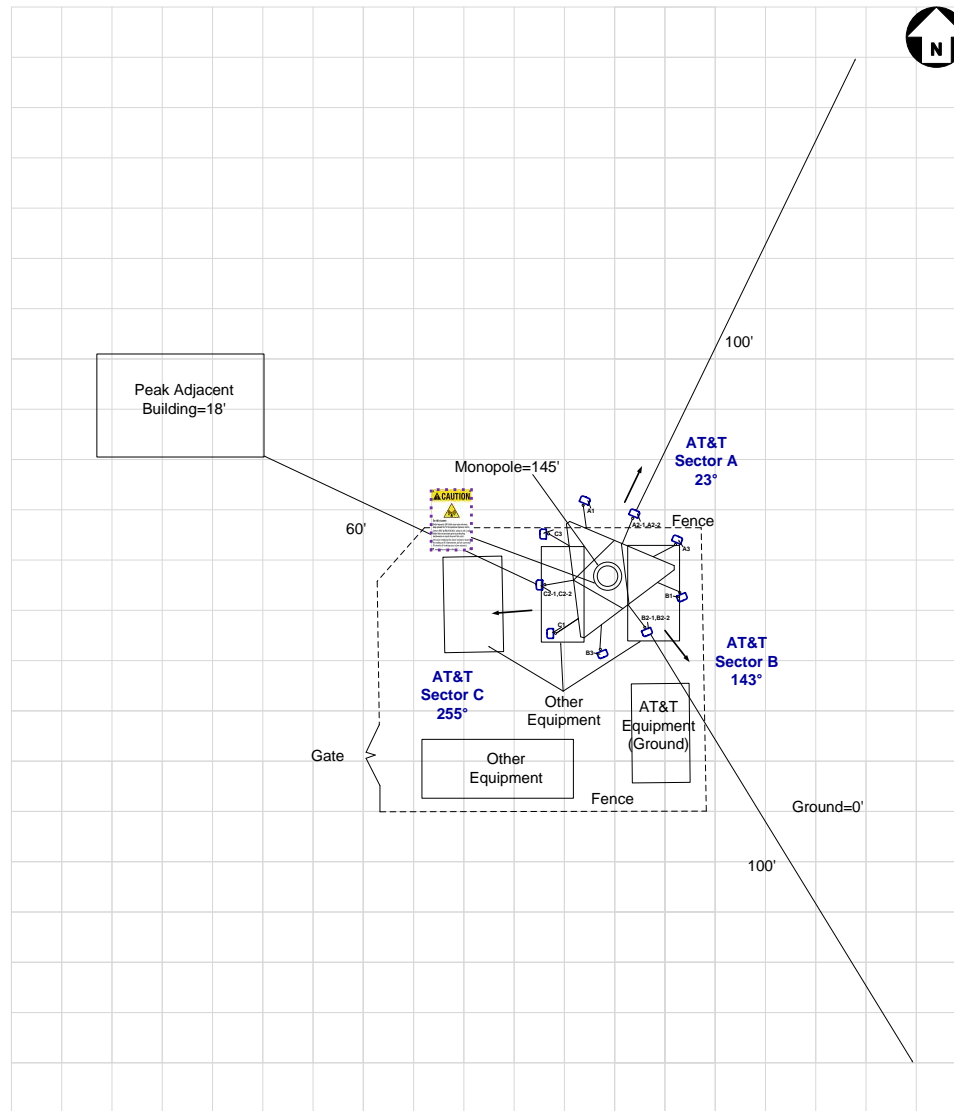
1.2 Signage Summary (Proposed)

AT&T Signage Locations	Sign Type									
	Safety Instructions	Notice Sign 2	Caution Sign 2	Caution Sign 2B	Caution Sign 2C	Caution 7"x7"	Warning Sign 1B	RF Exposure Map	Lock	Barriers
Access Point(s)				1						
Alpha										
Beta										
Gamma										
TABLE 2: Signage Summary (Proposed)										

1.3 List of Documents used to prepare this Report

- CD
- RFDS

2. Site Scale Map



AT&T Antenna		Proposed		Proposed Signage								Lock	Map Scale = 10 ft
	Panel		Barrier										
	OMNI		Posts										

3. Antenna Inventory

Ant ID	Operator	Antenna Mfg	Antenna Model	Antenna Type	FREQ. (MHz)	TECH.	AZ. (°)	H B W (°)	Antenna Gain (dBd)	Antenna Aperture (ft)	Transmitter Power (Watts)	Total Loss (dB)	Total ERP (Watts)	Total EIRP (Watts)
A1	AT&T	CCI	TPA65R-BU8D	Panel	700	LTE	23	73	13.45	8	120.00	0.5	2366.91	3883.12
A1	AT&T	CCI	TPA65R-BU8D	Panel	1900	LTE/5G	23	66	15.95	8	120.00	0.5	4209.02	6905.28
A1	AT&T	CCI	TPA65R-BU8D	Panel	2100	LTE/5G	23	66	16.15	8	180.00	0.5	6611.08	10846.07
A2-1	AT&T	Ericsson	AIR 6419 B77G^	Panel	3450	5G	23	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
A2-2	AT&T	Ericsson	AIR 6449 B77D^	Panel	3840	5G	23	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
A3	AT&T	CCI	DMP65R-BU8D	Panel	700	LTE	23	75	12.95	8	120.00	0.5	2109.51	3460.84
A3	AT&T	CCI	DMP65R-BU8D	Panel	850	5G	23	64	13.85	8	120.00	0.5	2595.26	4257.76
A3	AT&T	CCI	DMP65R-BU8D	Panel	2300	LTE	23	64	15.95	8	75.00	0.5	2630.64	4315.80
B1	AT&T	CCI	TPA65R-BU8D	Panel	700	LTE	143	73	13.45	8	120.00	0.5	2366.91	3883.12
B1	AT&T	CCI	TPA65R-BU8D	Panel	1900	LTE/5G	143	66	15.95	8	120.00	0.5	4209.02	6905.28
B1	AT&T	CCI	TPA65R-BU8D	Panel	2100	LTE/5G	143	66	16.15	8	180.00	0.5	6611.08	10846.07
B2-1	AT&T	Ericsson	AIR 6419 B77G^	Panel	3450	5G	143	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
B2-2	AT&T	Ericsson	AIR 6449 B77D^	Panel	3840	5G	143	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
B3	AT&T	CCI	DMP65R-BU8D	Panel	700	LTE	143	75	12.95	8	120.00	0.5	2109.51	3460.84
B3	AT&T	CCI	DMP65R-BU8D	Panel	850	5G	143	64	13.85	8	120.00	0.5	2595.26	4257.76
B3	AT&T	CCI	DMP65R-BU8D	Panel	2300	LTE	143	64	15.95	8	75.00	0.5	2630.64	4315.80
C1	AT&T	CCI	TPA65R-BU8D	Panel	700	LTE	255	73	13.45	8	120.00	0.5	2366.91	3883.12
C1	AT&T	CCI	TPA65R-BU8D	Panel	1900	LTE/5G	255	66	15.95	8	120.00	0.5	4209.02	6905.28
C1	AT&T	CCI	TPA65R-BU8D	Panel	2100	LTE/5G	255	66	16.15	8	180.00	0.5	6611.08	10846.07
C2-1	AT&T	Ericsson	AIR 6419 B77G^	Panel	3450	5G	255	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
C2-2	AT&T	Ericsson	AIR 6449 B77D^	Panel	3840	5G	255	11	23.5	2.55	108.44*	0	24277.05*	39828.68*
C3	AT&T	CCI	DMP65R-BU8D	Panel	700	LTE	255	75	12.95	8	120.00	0.5	2109.51	3460.84
C3	AT&T	CCI	DMP65R-BU8D	Panel	850	5G	255	64	13.85	8	120.00	0.5	2595.26	4257.76
C3	AT&T	CCI	DMP65R-BU8D	Panel	2300	LTE	255	64	15.95	8	75.00	0.5	2630.64	4315.80

Table 3.1: Antenna Inventory Table

Note: ^ **Mechanical Tilt value of "0°" MUST be retained for C-BAND and/or DoD AAS antenna(s) at all times to ensure that "EME (Predictive) Study" shall remain valid.**

* 75% TDD duty Cycle, 1.5dB Power Tolerance & 0.32 Power Reduction factor¹ are used to calculate Transmitter Power & ERP/EIRP

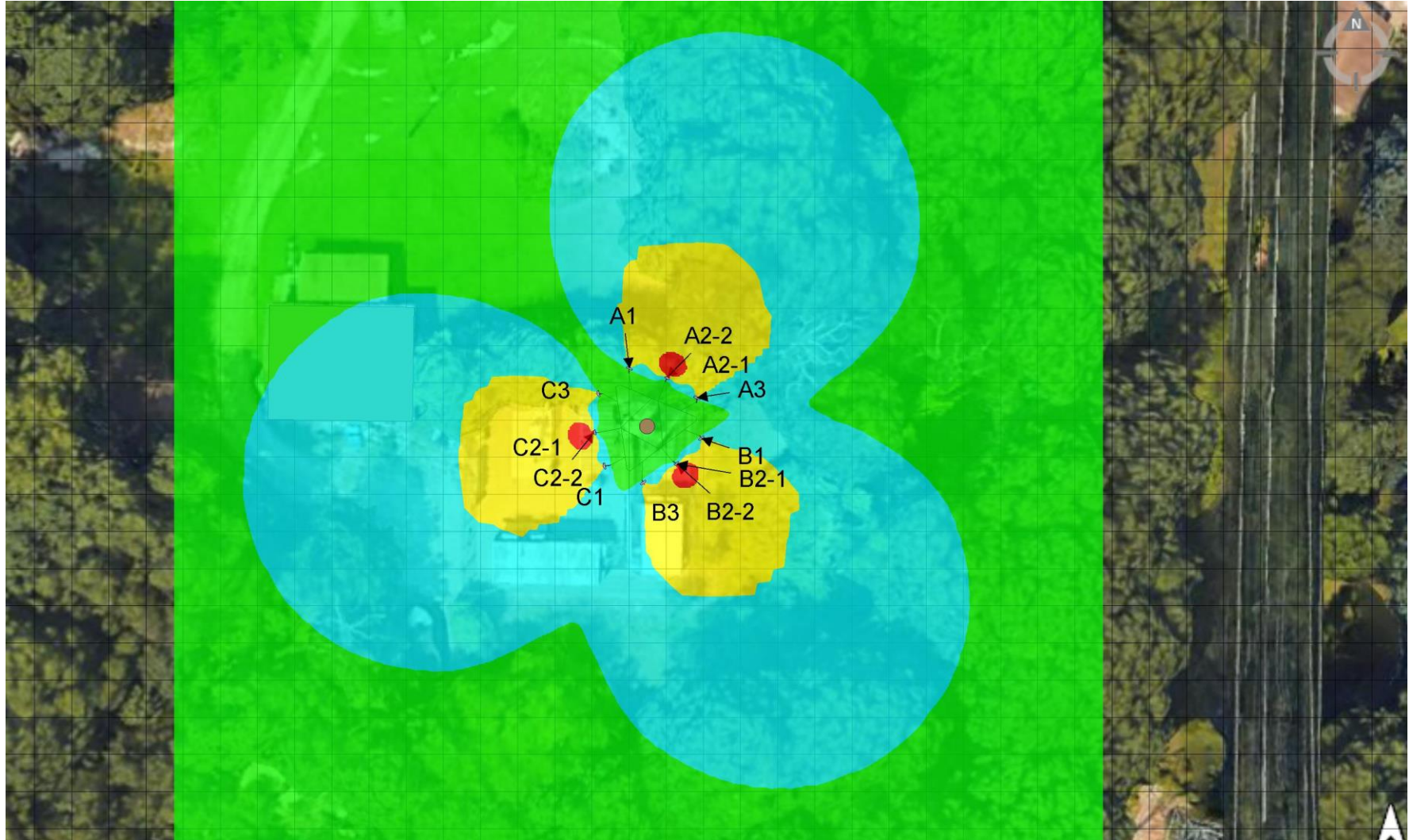
Antenna Heights (Z)

Ant ID	Operator	Antenna Radiation Centerline	Z-Height from Peak Adjacent Building	Z-Height from Ground
A1	AT&T	145.00	123.00	141.00
A2-1	AT&T	146.77	127.50	145.50
A2-2	AT&T	143.22	123.95	141.95
A3	AT&T	145.00	123.00	141.00
B1	AT&T	145.00	123.00	141.00
B2-1	AT&T	146.77	127.50	145.50
B2-2	AT&T	143.22	123.95	141.95
B3	AT&T	145.00	123.00	141.00
C1	AT&T	145.00	123.00	141.00
C2-1	AT&T	146.77	127.50	145.50
C2-2	AT&T	143.22	123.95	141.95
C3	AT&T	145.00	123.00	141.00

Table 3.2: Antenna Height(s) Summary Table

4. Predicted Emission

4.1 Predictive Cumulative MPE Contribution from All Sources at Antennas Centerline Level (145 ft.)



Max. Predictive Spatial Average MPE% = 15645.20%

% of FCC General Public Exposure Limit (Predictive Spatial Average)

Non-Simulated	0-1	1-100	100-500	500-5000	>5000

Proposed Barrier

Proposed Posts

Map Scale = 10 ft

4.2 Predictive Cumulative MPE Contribution from All Sources at Peak Adjacent Building Level (18 ft.)



Max. Predictive Spatial Average MPE% = 1.20%

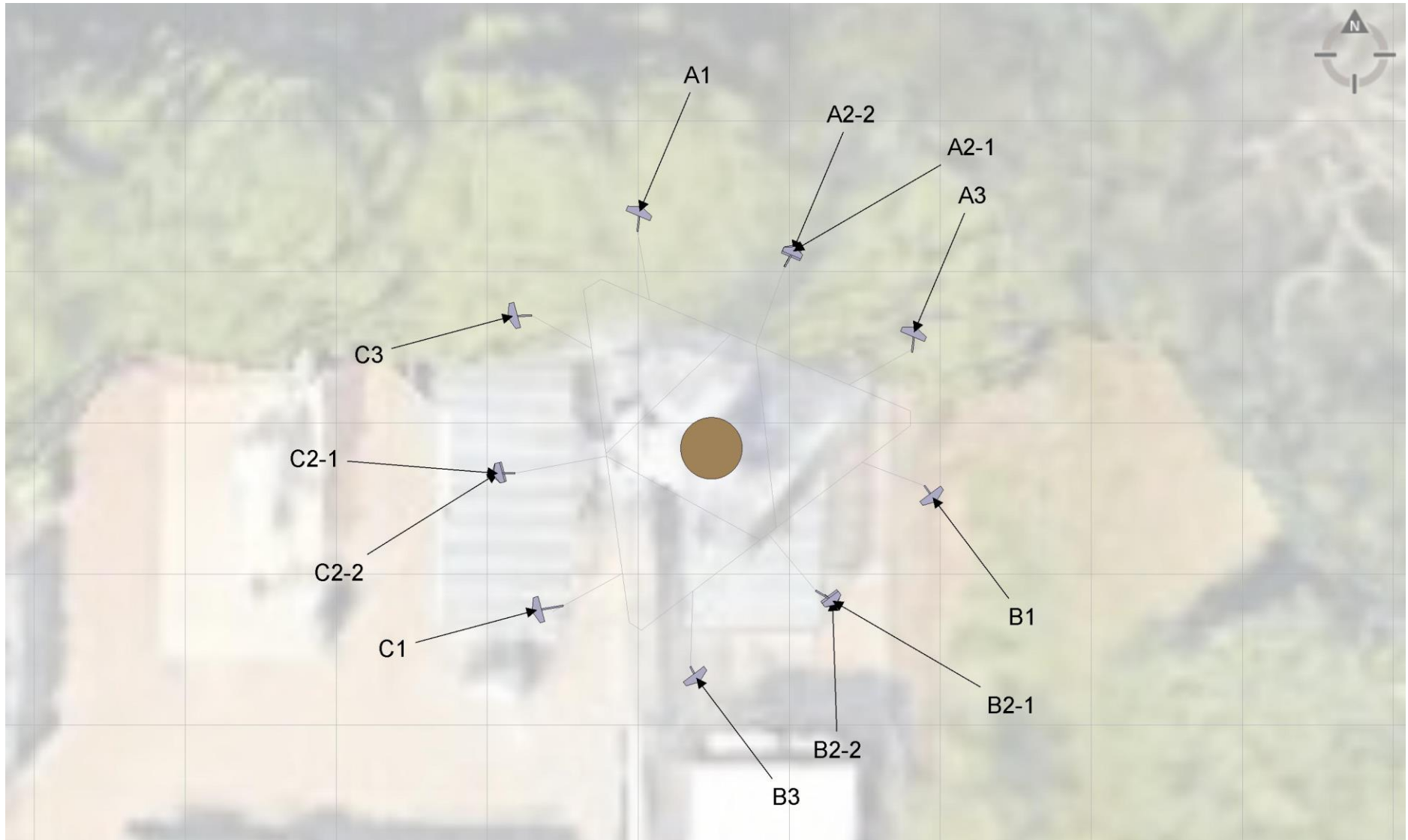
% of FCC General Public Exposure Limit (Predictive Spatial Average)

Proposed Barrier
 Proposed Posts

Non-Simulated	0-1	1-100	100-500	500-5000	>5000

Map Scale = 10 ft

4.3 Predictive Cumulative MPE Contribution from All Sources at Ground Level (0 ft.)



Max. Predictive Spatial Average MPE% = 0.63%

% of FCC General Public Exposure Limit (Predictive Spatial Average)

Proposed Barrier

Proposed Posts

Non-Simulated	0-1	1-100	100-500	500-5000	>5000

Map Scale = 10 ft

5. Statement of Compliance

5.1 *Statement of AT&T Mobility Compliance*

At the time of our Analysis, AT&T Mobility is required to take action to fulfill their Obligations to comply with the FCC's mandate as defined in OET-65

Recommendations

AT&T Alpha Sector:

- No action required.

AT&T Beta Sector:

- No action required.

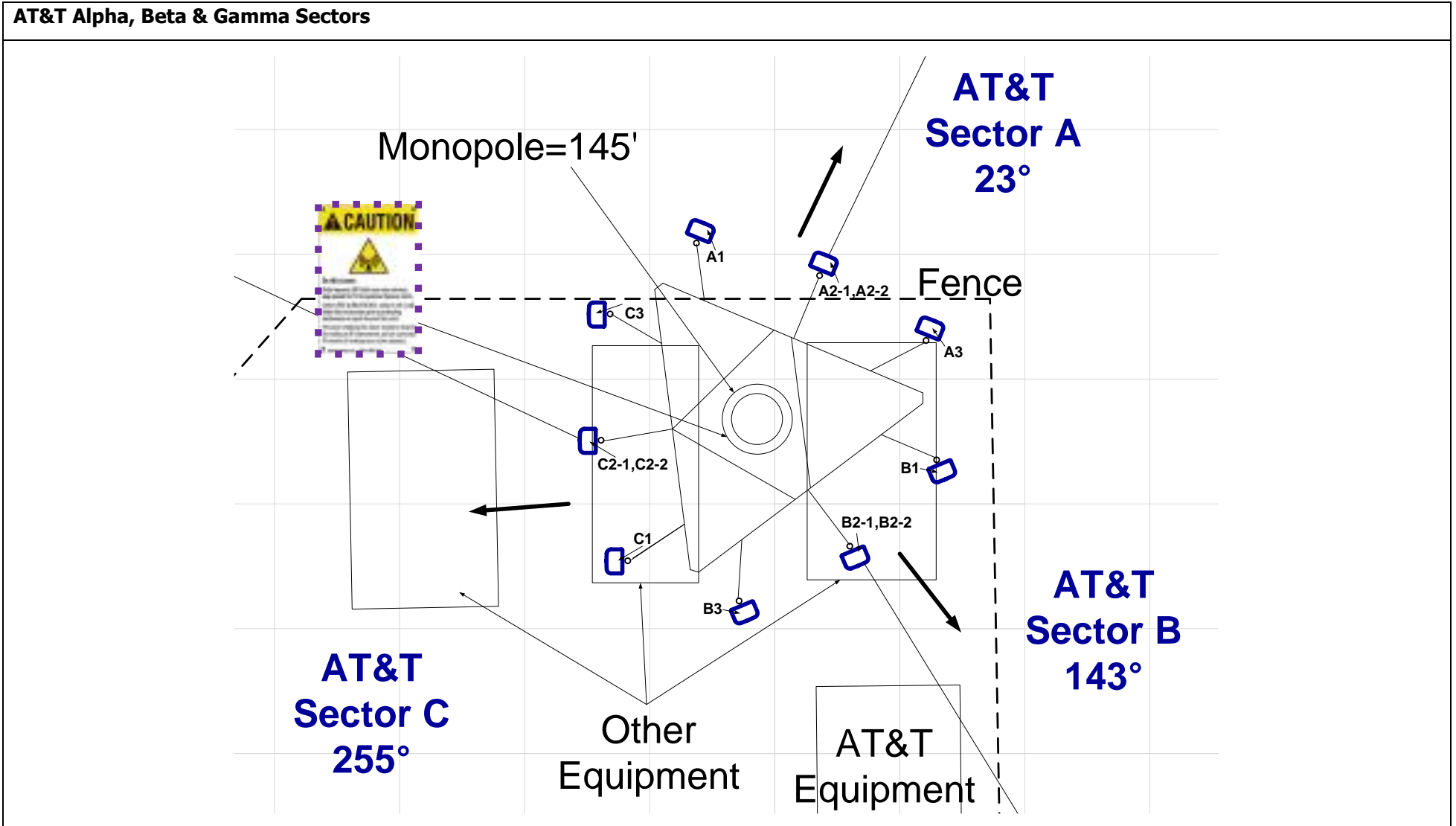
AT&T Gamma Sector:

- No action required.

Monopole:

- One Caution 2B Sign to be posted on the Monopole at climbing Access facing outwards so approaching people can see as shown in "Recommendations Map – Detailed View" on page 11. (1 Total Sign)

Recommendations Map – Detailed View



AT&T Antenna Panel OMNI		Proposed Barrier Posts		Proposed Signage								Map Scale = 10 ft
		Safety Instructions	Notice 2	Caution 2	Caution 2B	Caution 2C	Caution 7"x7"	Warning 1B	RF Exposure Map	Lock		

Appendix A – Statement of Limiting Conditions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at full power at all times. AT&T has further recommended to assume a 75% duty cycle of maximum radiated power for all LTE & 5G carriers (& consider 100% duty cycle for all UMTS carriers).

In this site compliance report, it is assumed that Mechanical Tilt value of “0°” MUST be retained for C-BAND and/or DoD AAS[^] antenna(s) at all times to ensure that “EME (Predictive) Study” shall remain valid.

AT&T recommended to consider - For C-BAND and/or DoD AAS[^] antenna(s) 75% TDD duty Cycle, 1.5dB Power Tolerance & 0.32 Power Reduction factor¹ are used to calculate Transmitter Power & ERP/EIRP.

AT&T recommended to use worst-case tilts for the simulations.

¹ **Power Reduction Factor:** IEC Standard 62232: 2017 allows for a statistically conservative power density model to more realistically define the RF exposure area. AT&T recommends a “0.32” factor to calculate the “Actual Maximum” (time averaged) power value, which accounts for “Beam Scanning,” “Scheduling,” and “RBS Utilization” This recommended value is a conservative figure modelled and supported by other vendors and through measurements published in scientific articles and white papers by IEEE and others. Those publication are listed below:

1. IEEE Access, *Time-Averaged Realistic Maximum Power Levels for the Assessment of RF Exposure for 5G Radio Base Stations Using Massive MIMO* (Published Sept. 18, 2017 / BJÖRN THORS, ANDERS FURUSKÅR, DAVIDE COLOMBI, AND CHRISTER TÖRNEVIK)
2. IEEE Explore, *A Statistical Approach for RF Exposure Compliance Boundary Assessment in Massive MIMO Systems* (Published Jan. 25, 2018 / Paolo Baracca, Andreas Weber, Thorsten Wild, Christophe Grangeat)
3. IEEE Access, *In-situ Measurement Methodology for the Assessment of 5G NR Massive MIMO Base Station Exposure at Sub-6 GHz Frequencies* (Published Dec. 20, 2019 / SAM AERTS, LEEN VERLOOCK, MATTHIAS VAN DEN BOSSCHE, DAVIDE COLOMBI, LUC MARTENS, CHRISTER TÖRNEVIK AND WOUT JOSEPH)
4. Applied Sciences, *Analysis of the Actual Power and EMF Exposure from Base Stations in a Commercial 5G Network* (Published July 30, 2020 / Davide Colombi, Paramananda Joshi, Bo Xu, Fatemeh Ghasemifard, Vignesh Narasaraju and Christer Törnevik)
5. Ofcom Technical Report, *Electromagnetic Field (EMF) measurements near 5G mobile phone base stations* (Published Feb. 21, 2020 / Davide Colombi, Paramananda Joshi, Bo Xu, Fatemeh Ghasemifard, Vignesh Narasaraju and Christer Törnevik)

MobileComm believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor). Thus, at any time, if power density measurements were made, we believe the real time measurements would indicate levels below those depicted in the RF emission diagram(s) in this report. By modelling in this way, MobileComm has conservatively shown exclusion areas – areas that should not be entered without the use of a personal monitor, carriers reducing power, or performing real-time measurements to indicate real-time exposure levels.

Use of Generic Antennas

For the purposes of this report, the use of “Generic” as an antenna model, or “Other Carrier” for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, MobileComm will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer’s published data regarding the antenna’s physical characteristics makes more conservative assumptions.

Where the frequency is unknown, MobileComm uses the closest frequency in the antenna’s range that corresponds to the highest Maximum Exposure Limit (MPE), resulting in a conservative analysis.

Appendix B – FCC Guidelines and Emissions Threshold Limits

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limit for the 700 and 800 MHz Bands is approximately $467 \mu\text{W}/\text{cm}^2$ and $567 \mu\text{W}/\text{cm}^2$ respectively, and the general population exposure limit for the 1900 MHz PCS and 2100 MHz AWS bands is $1000 \mu\text{W}/\text{cm}^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/Controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure, have been properly trained in RF safety and can exercise control over their exposure. Occupational/Controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure, have been trained in RF safety and can exercise control over his or her exposure by leaving the area or by some other appropriate means. The Occupational/Controlled exposure limits all utilized frequency bands is five (5) times the FCC's General Public / Uncontrolled exposure limit.

Additional details can be found in FCC OET 65.

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
300-1,500	--	--	f/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Public/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
300-1,500	--	--	f/1,500	30
1,500-100,000	--	--	1.0	30

Appendix C – Rules & Regulations

Explanation of Applicable Rules and Regulations

FCC has set forth guidelines in OET Bulletin 65 for human exposure to radio frequency electromagnetic fields. Currently, there are two different levels of MPE - General Public MPE and Occupational MPE. An individual classified as Occupational can be defined as an individual who has received appropriate RF training and meets the conditions outlined below. General Public is defined as anyone who does not meet the conditions of being Occupational. FCC Rules and Regulations define compliance in terms of total exposure to total RF energy, regardless of location of or proximity to the sources of energy.

It is the responsibility of all licensees to ensure these guidelines are maintained at all times. It is the ongoing responsibility of all licensees composing the site to maintain ongoing compliance with FCC rules and regulations.

A building owner or site manager can use this report as part of an overall RF Health and Safety Policy. It is important for building owners/site managers to identify areas in excess of the General Population MPE and ensure that only persons qualified as Occupational are granted access to those areas.

Occupational Environment Explained

The FCC definition of Occupational exposure limits apply to persons who:

- *are exposed to RF energy as a consequence of their employment;*
- *have been made aware of the possibility of exposure; and*
- *can exercise control over their exposure.*

FCC guidelines go further to state that persons must complete RF Safety Awareness training and must be trained in the use of appropriate personal protective equipment.

In order to consider this site an Occupational Environment, the site must be controlled to prevent access by any individuals classified as the General Public. Compliance is also maintained when any non-occupational individuals (the General Public) are prevented from accessing areas indicated as Red or Yellow in the attached RF Emissions diagram. In addition, a person must be aware of the RF environment into which they are entering. This can be accomplished by an RF Safety Awareness class, and by appropriate written documentation such as this Site Compliance Report.

Appendix D – General Safety Recommendations

The following are general recommendations appropriate for any site with accessible areas in excess of 100% General Public MPE. These recommendations are not specific to this site. These are safety recommendations appropriate for typical site management, building management, and other tenant operations.

- All individuals needing access to the main site should be instructed to read and obey all posted placards and signs.
- The site should be routinely inspected and this or similar report updated with the addition of any antennas or upon any changes to the RF environment including:
 - adding new antennas that may have been located on the site
 - removing of any existing antennas
 - changes in the radiating power or number of RF emitters
- Post the appropriate SAFETY INSTRUCTIONS, NOTICE, CAUTION & WARNING sign at the main site access point(s) and other locations as required. Note: Please refer to RF Exposure Diagrams in the report section above, to inform everyone who has access to this site that beyond posted signs there may be levels in excess of the limits prescribed by the FCC. The signs below are examples of signs meeting FCC guidelines.



- Ensure that the site door remains locked (or appropriately controlled) to deny access to the general public if deemed as policy by the building/site owner.
- For a General Public environment the five color levels identified in measured RF emission diagram can be interpreted in the following manner:
 - White represents areas predicted to be greater than or equal to 0% and less than 1% of the MPE general public limits
 - Green represents areas predicted to be greater than or equal to 1% and less than 100% of the MPE general public limits
 - Blue represents areas predicted to be greater than or equal to 100% and lesser than 500% of the MPE general public limits.
 - Yellow represents areas predicted to be greater than or equal to 500% and lesser than 5000% of the MPE general public limits.
 - Red areas indicates predicted levels greater than or equal to 5000% of the MPE general public limits.

Appendix E – References

1 - FCC Definition

FCC defines an Occupational or Controlled environment as one where persons are exposed to RF fields as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Typical criteria for an Occupational or Controlled environment is restricted access (i.e. locked doors, gates, etc.) to areas where antennas are located coupled with proper RF warning signage.

FCC defines a site as a General Public or Uncontrolled environment when human exposure to RF fields occurs to the general public or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over the exposure. Typical criteria for a General Public or Uncontrolled environment are unrestricted access (i.e. unlocked or no restrictions) to areas where antennas are located without proper RF warning signage being posted.

2 - Physical Testing measurement procedure and Tools

The Narda Broadband Field Meter NBM-550 can make rapid conformance measurements with evaluation in the time domain when used in conjunction EA5091 probe. This probe is a so-called Shaped Probe, i.e. it is frequency weighted so that it automatically takes account of the FCC Occupational limit values. To collect data, the probe is pointed towards the potential source(s) of EME radiation and moved slowly from ground level up to slightly above head height (approx. 6 ft).

Spatial Average Measurement A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy an average sized human body will absorb while present in an electromagnetic field of energy.

3 - Site Safety Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: *Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.*

Training and Qualification Verification: *All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a workers understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet based courses).*

Physical Access Control: *Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:*

- *Locked door or gate*
- *Alarmed door*
- *Locked ladder access*
- *Restrictive Barrier at antenna locations (e.g. Chain link with posted RF Sign)*

RF Signage: *Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.*

Assume all antennas are active: *Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.*

Maintain a 3 foot clearance from all antennas: *There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.*

Rooftop RF Emissions Diagram: *Section 4 of this report contains an RF Emissions Diagram that outlines various theoretical Maximum Permissible Exposure (MPE) areas on the rooftop. This analysis is all theoretical and assumes a duty cycle of 75% for each transmitting antenna at full power. This analysis is a worst case scenario. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.*

4 - Definitions

Compliance- *The determination of whether a site is safe or not with regards to Human Exposure to Radio Frequency Radiation from transmitting antennas.*

Decibel (dB) – *A unit for measuring power or strength of a signal.*

Duty Cycle – *The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 75% corresponds to continuous operation.*

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – *The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna, this product is divided by the cable losses*

Effective Radiated Power (ERP) – *In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half wave dipole multiplied by the net power accepted by the antenna from the connecting transmitter.*

Gain (of an antenna in dbd) – *The ratio of the maximum intensity in a given direction to the maximum radiation in the same direction from a reference dipole. Gain is a measure of the relative efficiency of a directional antennas as compared to a reference dipole.*

General Population/Uncontrolled Environment – *Defined by the FCC, as an area where RFR exposure may occur to persons who are unaware of the potential for exposure and who have no control of their exposure. General Population is also referenced as General Public.*

Generic Antenna – *For the purposes of this report, the use of “Generic” as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, MobileComm will use our industry specific knowledge of antenna models to select a worst case scenario antenna to model the site.*

Isotropic Antenna – *An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.*

Maximum Measurement – *This measurement represents the single largest measurement recorded when performing a spatial average measurement.*



Maximum Exposure Limit (MPE) – *The RMS and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect and with acceptable safety factor.*

Occupational/Controlled Environment – *Defined by the FCC, as an area where Radio Frequency Radiation (RFR) exposure may occur to persons who are aware of the potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.*

Radio Frequency Radiation – *Electromagnetic waves that are propagated from antennas through space.*

Spatial Average Measurement – *A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average energy an average sized human body will absorb while present in an electromagnetic field of energy.*

Transmitter Power Output (TPO) – *The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.*



Appendix F – Proprietary Statement

This report was prepared for the use of AT&T Mobility, LLC to meet requirements specified in AT&T's corporate RF safety guidelines. It was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same locale under like circumstances. The conclusions provided by MobileComm are based solely on the information provided by AT&T Mobility and all observations in this report are valid on the date of the investigation. Any additional information that becomes available concerning the site should be provided to MobileComm so that our conclusions may be revised and modified, if necessary. This report has been prepared in accordance with Standard Conditions for Engagement and authorized proposal, both of which are integral parts of this report. No other warranty, expressed or implied, is made.

March 22, 2022



Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351
CrownMA@tepgroup.net

Subject: Mount Analysis

Carrier Designation: AT&T Mobility Reconfiguration
Client Site Number: CTL02182
Client Site Name: Groton Roberts Rd
FA Location Code: 10035316

Crown Castle Designation: **Crown Castle BU Number:** 881533
Crown Castle Site Name: Groton Tower
Crown Castle JDE Job Number: 686300
Crown Castle Order Number: 586248 Rev. 0

Engineering Firm Designation: **TEP Project Number:** 76625.676368

Site Data: 75 Roberts Road, Groton, New London County, CT 06340
Latitude 41° 21' 36.80", Longitude -72° 02' 55.10"

Structure Information: **Tower Height & Type:** 145.0± ft Monopole
Mount Elevation: 147.0 ft
Mount Width & Type: 10.5 ft Platform w/ Support Rail

Tower Engineering Professionals is pleased to submit this “Mount Analysis” to determine the structural integrity of AT&T Mobility’s antenna mounting system with proposed appurtenance and equipment addition on the above mentioned 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 Rail Mount

Sufficient Capacity*

*Sufficient upon completion of the changes listed in the ‘Recommendations’ section of this report.

The analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 127 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Nicholas P. Danyluk / SDJ

Respectfully submitted by:

Aaron T. Rucker, P.E.
Structural Division Manager
919-661-6351
arucker@tepgroup.net



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1) INTRODUCTION

The mount is an existing 10.5-ft 3-sector Platform w/ Support Rail mount, mapped by Tower Engineering Professionals. The mount is installed at the 147.0 ft elevation on the 145.0± ft Monopole. The mount has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

Building Code:	2018 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	127 mph
Exposure Category:	C
Topographic Category at Base:	1.0
Topographic Category at Mount:	1.0
Ice Thickness:	1.0 in
Wind Speed with Ice:	50 mph
Seismic Design Category:	B
Seismic S_s:	0.189
Seismic S₁:	0.052
Live Loading Wind Speed:	30 mph
Live Loading at Mid/End-Points:	250 lb
Man Live Loading at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
147.0	147.0	3	Ericsson	AIR 6419 B77G_CCIV2	Platform w/ Support Rail Mount
	145.0	3	CCI Antennas	DMP65R-BU8D	
		3	CCI Antennas	TPA65R-BU8D_CCIV2	
		3	Ericsson	RRUS 32 B2	
		3	Ericsson	RRUS 4426 B66	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 B14	
		3	Ericsson	RRUS-32 B30	
		2	Raycap	DC6-48-60-0-8F	
		2	Raycap	DC6-48-60-18-8F	
	143.0	3	Ericsson	AIR 6449 B77D	

3) ANALYSIS PROCEDURE

Table 2 – Documents Provided

Document	Remarks	Reference	Source
Mount Mapping	Tower Engineering Professionals	9400082	CCIsites
Previous Mount Analysis	Tower Engineering Professionals	TEP No. 76625.640974	TEP
RFDS	AT&T Mobility	10035316	TEP
Loading Application	AT&T Mobility	Order 586248 Rev. 0	CCIsites

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A and Appendix C.

TEP Mount Analysis Tool, a tool internally developed by TEP using Microsoft Excel, was used to calculate member loading for various load cases. Selected output from the analysis is included in Appendix B.

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

In addition, this analysis is in accordance with AT&T's *Mount Technical Guidance – Revision 16*.

3.2) Assumptions

- 1) The mount was built in accordance with the manufacturer's specifications.
- 2) The mount has been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, mounts and other appurtenances are as specified in Table 1. All mount components have been assumed to be in sufficient condition to carry their full design capacity for this analysis. Refer to the issued mapping for any structural and/or maintenance issues found during our site visit if applicable.
- 4) All mount components are in sufficient condition to carry their full design capacity.
- 5) TEP did not analyze the collar mount connection to the pole and assumes it to have sufficient structural capacity to transfer the applied forces from the mount to the tower.
- 6) All material grades used for this analysis, unless verified by mount manufacturer design, were assumed per AISC Table 2-4, 15th Edition. See RISA-3D output for confirmation on grades used in this analysis.

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform w/ Support Rail Mount)

Notes	Component	Critical Member	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontals	FF-H2	147.0	57.0	Pass
1	Support Horizontals	SA2	147.0	14.2	Pass
1	Internals	GSI2	147.0	41.7	Pass
1	Support Rail	HR-2	147.0	30.6	Pass
1	Bracing	MOD-3	147.0	45.7	Pass
1	Mount Pipes	MP-1	147.0	63.0	Pass
1	Kickers	K5	147.0	37.1	Pass
2	Connection Bolts	-	147.0	20.2	Pass

Structure Rating (max from all components) =	63.0%
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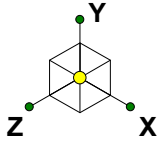
Notes:

- 1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity listed.
- 2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity listed.

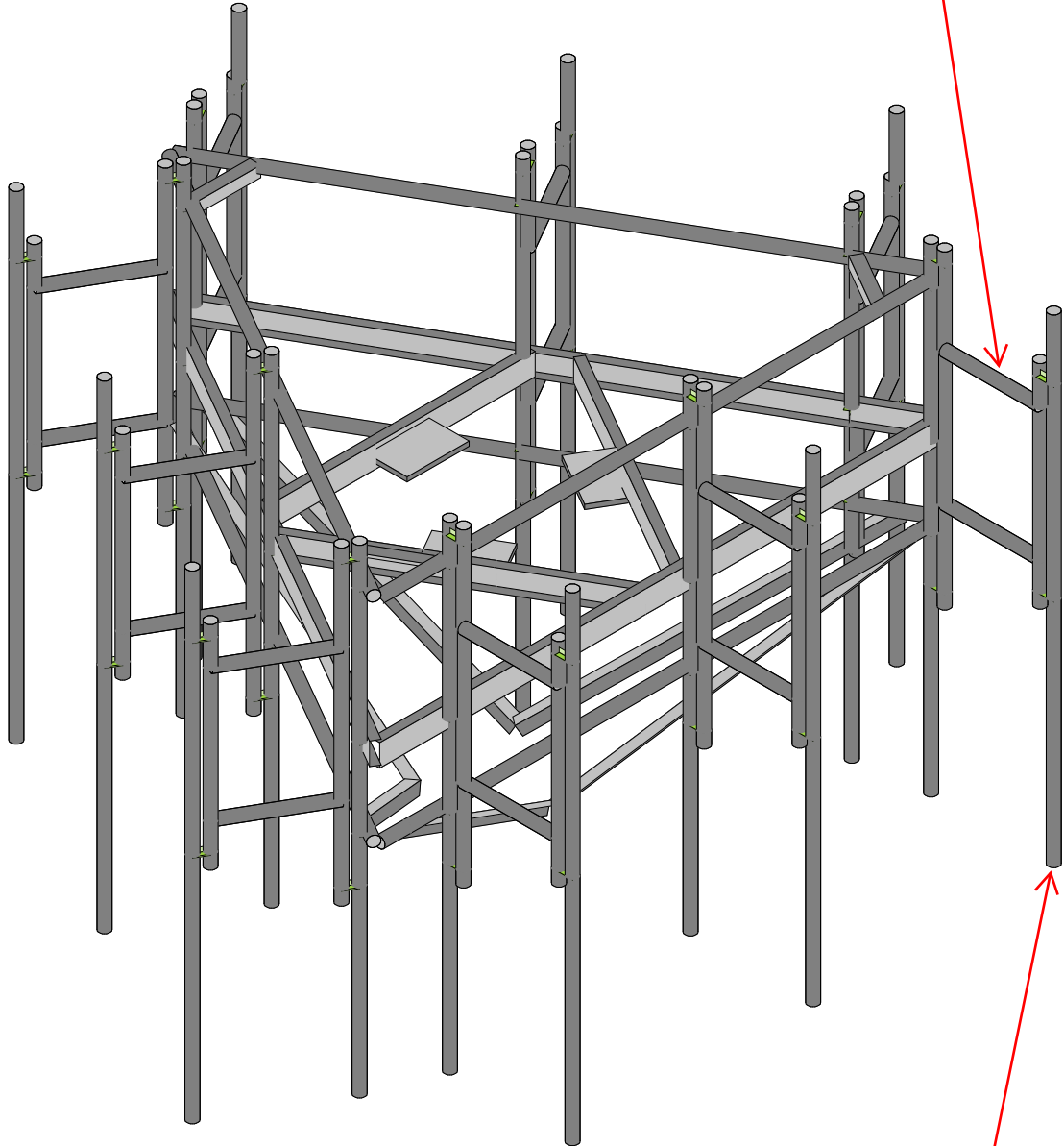
4.1) Recommendations

- 1) If the load differs from that described in Table 1 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
- 2) The mount and its connection have sufficient capacity to carry the proposed loading configuration. In order for the results of this analysis to be valid, the mount modifications listed below must be completed:
 - a) Due to the carrier's antenna spacing requirements, all antennas are to be installed on proposed 2.0SCH40 x 9'-0" mount pipes, mounted on SitePro PM2 2-ft standoff mounts, or approved equivalent. See "Appendix A - Wire Frame and Rendered Models."

APPENDIX A
WIRE FRAME AND RENDERED MODELS



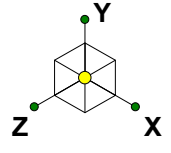
Proposed SitePro
PM2 Standoff



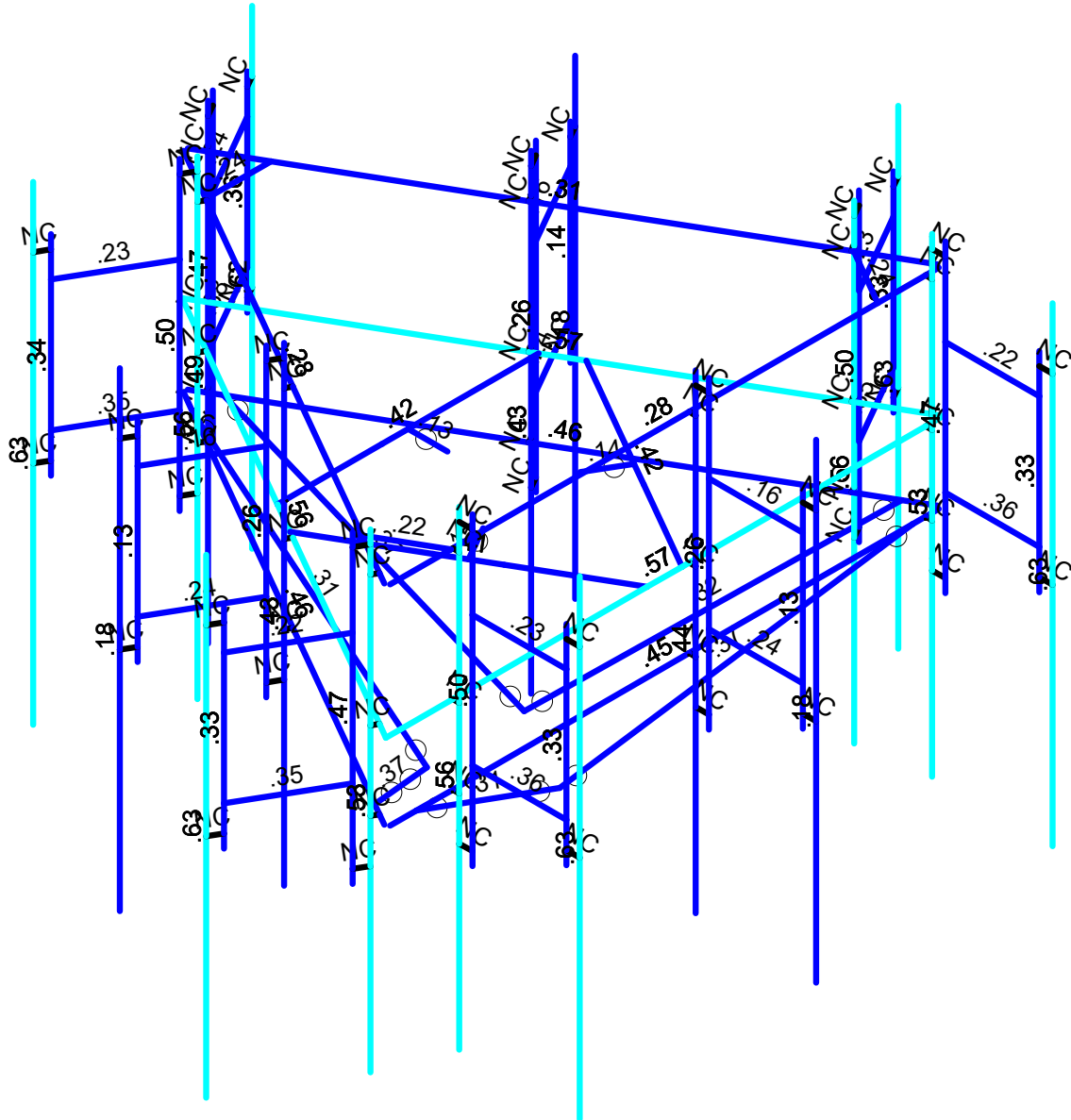
Proposed 2.0SCH40
x 9'-0" Mount Pipe

Envelope Only Solution

Tower Engineering Profes...	Groton Tower (881533)	SK - 1
NPD		Mar 21, 2022 at 9:05 AM
TEP No. 76625.676368		PL-2 Platform.r3d

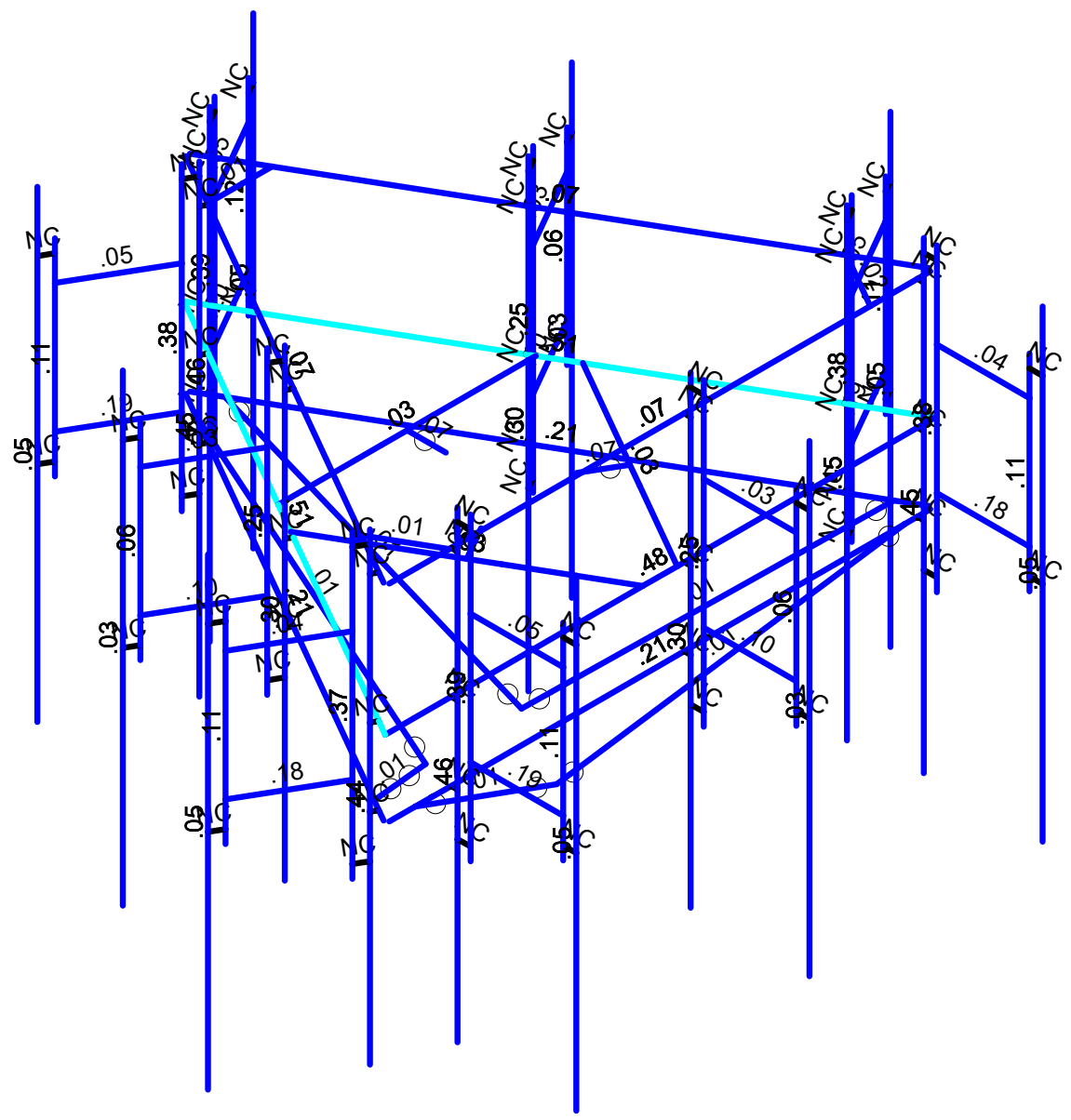
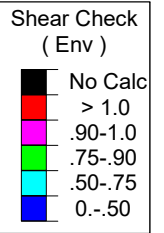
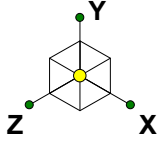


Code Check (Env)	
Black	No Calc
Red	> 1.0
Magenta	.90-1.0
Green	.75-.90
Cyan	.50-.75
Blue	0-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Tower Engineering Profes...	Groton Tower (881533)	SK - 3
NPD		Mar 21, 2022 at 9:05 AM
TEP No. 76625.676368		PL-2 Platform.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Tower Engineering Profes...	Groton Tower (881533)	SK - 4
NPD		Mar 21, 2022 at 9:08 AM
TEP No. 76625.676368		PL-2 Platform.r3d

APPENDIX B
SOFTWARE INPUT CALCULATIONS



Groton Tower (881533)

TEP No. 76625.676368

Analysis By: NPD 3/21/2022

Checked By: SDJ 3/21/2022

Code Revisions:	TIA-222-H	IBC 2018
Tower Type:	Monopole	

Wind Inputs:

Ult. Wind Velocity:	127.0	mph
Live Load Velocity:	30.0	mph
Ice Wind Velocity:	50.0	mph
Base Ice Thickness:	1.00	inches
Mount Centerline:	147.0	ft
Antenna Centerline:	145.0	ft
Exposure Category:	C	
Topo Category:	1	
Risk Category:	II	
Ground Elevation:	128	ft

Wind Calculations:

K_{zt} :	1.000	Section 2.6.6
K_d :	0.950	
$K_{z-Mount}$:	1.373	Section 2.6.5.2
$K_{z-Antenna}$:	1.369	Section 2.6.5.2
K_{iz} :	1.160	Section 2.6.10
Ice Thickness:	1.160	inches - Section 2.6.10

Without Ice - (psf)	With Ice - (psf)
$(q_z G_h)_{Mount}$: 53.59	$(q_z G_h)_{Mount}$: 8.31
$(q_z G_h)_{Antenna}$: 53.44	$(q_z G_h)_{Antenna}$: 8.28



Antenna Loads are Calculated in Accordance with TIA-222-H

Azimuth is the absolute angle measured clockwise from RISA-3D global X-axis.

MFR	Model	Height (in)	Width (in)	Depth (in)	Wt. (lbs)	Azimuth°	Qty	Shape	Member Label	Distance from start node of the member		
										Location #1 (ft,%)	Location #2 (ft,%)	Location #3 (ft,%)
CCI ANTENNAS	TPA65R-BU8D_C CIV2	96.00	20.70	7.70	87.10	0.00	1	Flat	MP-1	1.00	7.50	
ERICSSON	AIR 6419 B77G_C CIV2	28.30	16.10	7.90	66.10	0.00	1	Flat	MP-2	1.00	3.00	
ERICSSON	AIR 6449 B77D	30.39	15.87	8.07	81.60	0.00	1	Flat	MP-2	5.00	7.00	
CCI ANTENNAS	DMP65R-BU8D	96.00	20.70	7.70	105.60	0.00	1	Flat	MP-3	1.00	7.50	
ERICSSON	RRUS 4478 B14	16.50	13.40	7.70	59.90	90.00	1	Flat	MP-1D	1.00		
ERICSSON	RRUS 32 B2	27.20	12.05	7.00	52.90	90.00	1	Flat	MP-1D	1.00		
ERICSSON	RRUS 4426 B66	14.96	13.19	5.80	48.40	0.00	1	Flat	MP-1D	3.00		
ERICSSON	RRUS 4449 B5/B12	17.90	13.19	9.44	71.00	90.00	1	Flat	MP-3D	2.00		
ERICSSON	RRUS-32 B30	29.90	13.30	9.50	77.00	90.00	1	Flat	MP-3D	2.00		
CCI ANTENNAS	TPA65R-BU8D_C CIV2	96.00	20.70	7.70	87.10	120.00	1	Flat	MP-4	1.00	7.50	
ERICSSON	AIR 6419 B77G_C CIV2	28.30	16.10	7.90	66.10	120.00	1	Flat	MP-5	1.00	3.00	
ERICSSON	AIR 6449 B77D	30.39	15.87	8.07	81.60	120.00	1	Flat	MP-5	5.00	7.00	
CCI ANTENNAS	DMP65R-BU8D	96.00	20.70	7.70	105.60	120.00	1	Flat	MP-6	1.00	7.50	
ERICSSON	RRUS 4478 B14	16.50	13.40	7.70	59.90	210.00	1	Flat	MP-4D	1.00		
ERICSSON	RRUS 32 B2	27.20	12.05	7.00	52.90	210.00	1	Flat	MP-4D	1.00		
ERICSSON	RRUS 4426 B66	14.96	13.19	5.80	48.40	120.00	1	Flat	MP-4D	3.00		
ERICSSON	RRUS 4449 B5/B12	17.90	13.19	9.44	71.00	210.00	1	Flat	MP-6D	2.00		
ERICSSON	RRUS-32 B30	29.90	13.30	9.50	77.00	210.00	1	Flat	MP-6D	2.00		
CCI ANTENNAS	TPA65R-BU8D_C CIV2	96.00	20.70	7.70	87.10	232.00	1	Flat	MP-7	1.00	7.50	
ERICSSON	AIR 6419 B77G_C CIV2	28.30	16.10	7.90	66.10	240.00	1	Flat	MP-8	1.00	3.00	
ERICSSON	AIR 6449 B77D	30.39	15.87	8.07	81.60	240.00	1	Flat	MP-8	5.00	7.00	
CCI ANTENNAS	DMP65R-BU8D	96.00	20.70	7.70	105.60	240.00	1	Flat	MP-9	1.00	7.50	
ERICSSON	RRUS 4478 B14	16.50	13.40	7.70	59.90	330.00	1	Flat	MP-7D	1.00		
ERICSSON	RRUS 32 B2	27.20	12.05	7.00	52.90	330.00	1	Flat	MP-7D	1.00		
ERICSSON	RRUS 4426 B66	14.96	13.19	5.80	48.40	240.00	1	Flat	MP-7D	3.00		
ERICSSON	RRUS 4449 B5/B12	17.90	13.19	9.44	71.00	330.00	1	Flat	MP-9D	2.00		
ERICSSON	RRUS-32 B30	29.90	13.30	9.50	77.00	330.00	1	Flat	MP-9D	2.00		
RAYCAP	DC6-48-60-0-8F	24.00	11.00	11.00	32.80	0.00	2	Round	MP-2D	1.00		
RAYCAP	DC6-48-60-18-8F	24.00	11.00	11.00	18.90	0.00	1	Round	MP-5D	1.00		
RAYCAP	DC6-48-60-18-8F	24.00	11.00	11.00	18.90	0.00	1	Round	MP-8D	1.00		



Groton Tower (881533)

TEP No. 76625.676368
 Analysis By: NPD 3/21/2022
 Checked By: SDJ 3/21/2022

Member Forces are Calculated in Accordance with TIA-222-H

Member Name	Wind Proj. (in)	Length (in)	Shape	θ (°)	Perimeter (in)
SA1	1.000	9.07	Flat	-60.00	30.00
SA2	1.000	9.07	Flat	60.00	30.00
SA3	1.000	9.07	Flat	0.00	30.00
FF-H2	5.000	128.00	Flat	90.00	18.00
GSI1	5.000	60.00	Flat	30.00	18.00
GSI2	5.000	60.00	Flat	-30.00	18.00
GSI3	5.000	60.00	Flat	90.00	18.00
SF1-H2	5.000	128.00	Flat	30.00	18.00
SF2-H2	5.000	128.00	Flat	-30.00	18.00
HRC-1	2.500	15.00	Flat	30.00	10.00
HRC-2	2.500	15.00	Flat	-30.00	10.00
HRC-3	2.500	15.00	Flat	90.00	10.00
K1	2.500	71.59	Flat		10.00
K2	2.500	71.59	Flat		10.00
K3	2.500	71.59	Flat		10.00
K4	2.500	71.59	Flat		10.00
K5	2.500	71.59	Flat		10.00
K6	2.500	71.59	Flat		10.00
MOD-1	2.375	126.00	Round	90.00	7.46
MOD-2	2.375	126.00	Round	30.00	7.46
MOD-3	2.375	126.00	Round	-30.00	7.46
MP-1D	2.375	108.00	Round		7.46
HR-1	2.375	126.00	Round	90.00	7.46
HR-2	2.375	126.00	Round	30.00	7.46
HR-3	2.375	126.00	Round	-30.00	7.46
MP-1C	2.375	70.00	Round		7.46
MP-1B	2.375	48.00	Round		7.46
MP-1	2.375	108.00	Round		7.46
PM2-1A	2.375	21.62	Round	0.00	7.46
PM2-1B	2.375	21.62	Round	0.00	7.46
MP-2D	2.375	108.00	Round		7.46
MP-2C	2.375	70.00	Round		7.46
MP-2B	2.375	48.00	Round		7.46
MP-2	2.375	108.00	Round		7.46
PM2-2A	2.375	21.62	Round	0.00	7.46
PM2-2B	2.375	21.62	Round	0.00	7.46
MP-3D	2.375	108.00	Round		7.46
MP-3C	2.375	70.00	Round		7.46
MP-3B	2.375	48.00	Round		7.46
MP-3	2.375	108.00	Round		7.46
PM2-3A	2.375	21.62	Round	0.00	7.46
PM2-3B	2.375	21.62	Round	0.00	7.46
MP-7D	2.375	108.00	Round		7.46
MP-7C	2.375	70.00	Round		7.46
MP-7B	2.375	48.00	Round		7.46
MP-7	2.375	108.00	Round		7.46
PM2-7A	2.375	21.62	Round	-60.00	7.46
PM2-7B	2.375	21.62	Round	-60.00	7.46
MP-8D	2.375	108.00	Round		7.46
MP-8C	2.375	70.00	Round		7.46

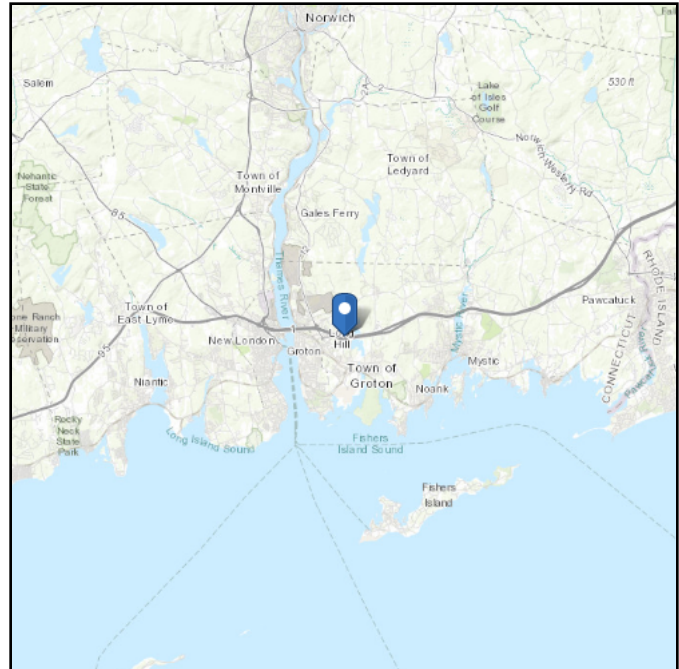
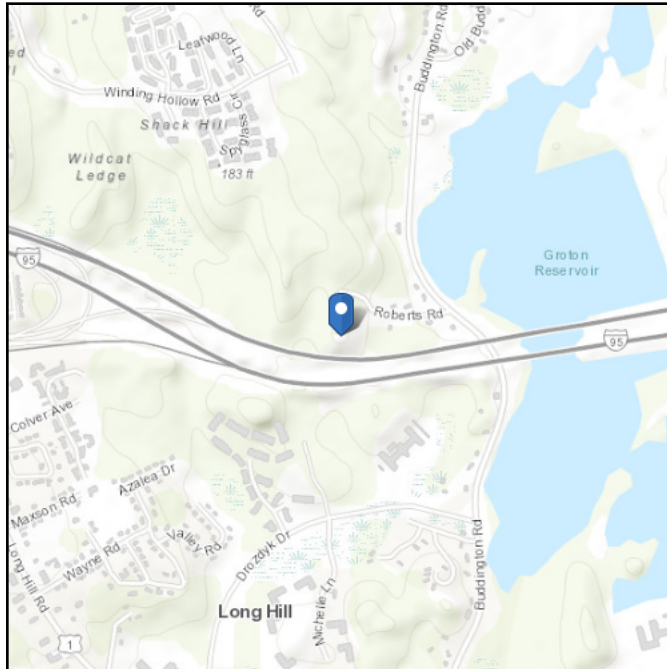
MP-8B	2.375	48.00	Round		7.46
MP-8	2.375	108.00	Round		7.46
PM2-8A	2.375	21.62	Round	-60.00	7.46
PM2-8B	2.375	21.62	Round	-60.00	7.46
MP-9D	2.375	108.00	Round		7.46
MP-9C	2.375	70.00	Round		7.46
MP-9B	2.375	48.00	Round		7.46
MP-9	2.375	108.00	Round		7.46
PM2-9A	2.375	21.62	Round	-60.00	7.46
PM2-9B	2.375	21.62	Round	-60.00	7.46
MP-4D	2.375	108.00	Round		7.46
MP-4C	2.375	70.00	Round		7.46
MP-4B	2.375	48.00	Round		7.46
MP-4	2.375	108.00	Round		7.46
PM2-4A	2.375	21.62	Round	60.00	7.46
PM2-4B	2.375	21.62	Round	60.00	7.46
MP-5D	2.375	108.00	Round		7.46
MP-5C	2.375	70.00	Round		7.46
MP-5B	2.375	48.00	Round		7.46
MP-5	2.375	108.00	Round		7.46
PM2-5A	2.375	21.62	Round	60.00	7.46
PM2-5B	2.375	21.62	Round	60.00	7.46
MP-6D	2.375	108.00	Round		7.46
MP-6C	2.375	70.00	Round		7.46
MP-6B	2.375	48.00	Round		7.46
MP-6	2.375	108.00	Round		7.46
PM2-6A	2.375	21.62	Round	60.00	7.46
PM2-6B	2.375	21.62	Round	60.00	7.46

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 128.26 ft (NAVD 88)
Latitude: 41.360222
Longitude: -72.048639



Wind

Results:

Wind Speed	127 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	99 Vmph
100-year MRI	105 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Fri Jan 07 2022

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

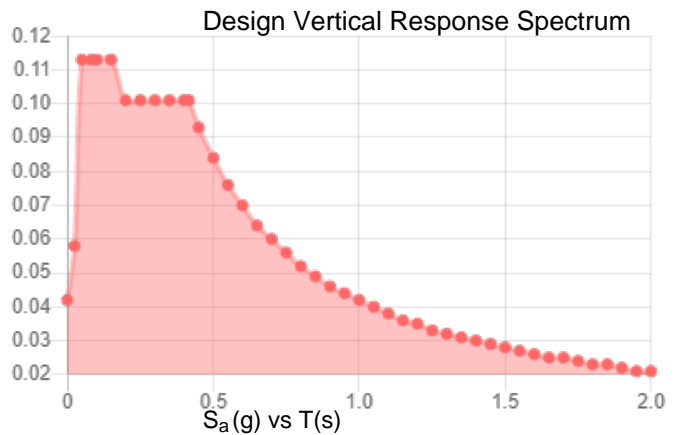
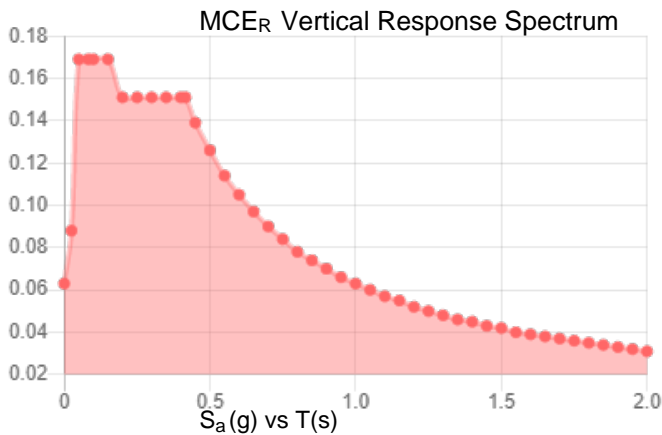
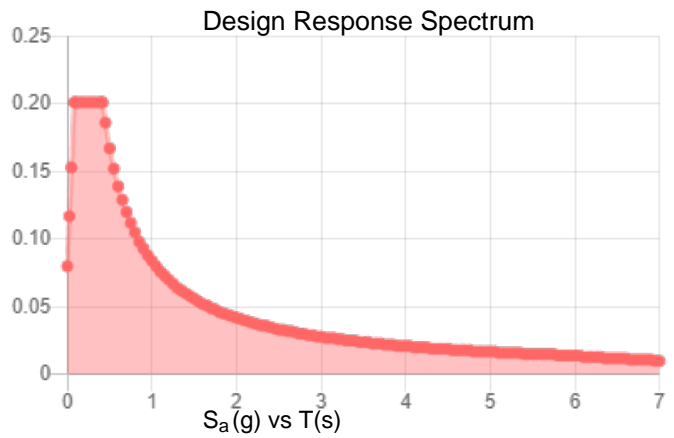
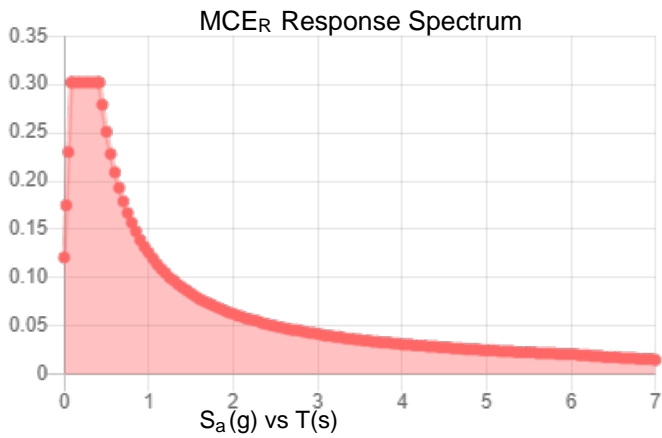
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

Results:

S_S :	0.189	S_{D1} :	0.084
S_1 :	0.052	T_L :	6
F_a :	1.6	PGA :	0.104
F_v :	2.4	PGA _M :	0.165
S_{MS} :	0.302	F_{PGA} :	1.593
S_{M1} :	0.126	I_e :	1
S_{DS} :	0.201	C_v :	0.7

Seismic Design Category B



Data Accessed: Fri Jan 07 2022

Date Source:

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

Ice

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 15 F
Gust Speed 50 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Fri Jan 07 2022

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

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

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APPENDIX C
SOFTWARE ANALYSIS OUTPUT



Company : Tower Engineering Professionals
 Designer : NPD
 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

Mar 21, 2022
 9:17 AM
 Checked By: SDJ

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	No
RISACONNECTION CODE	None
Cold Formed Steel Code	None
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	None

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



Company : Tower Engineering Professionals
 Designer : NPD
 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

Mar 21, 2022
 9:17 AM
 Checked By: SDJ

(Global) Model Settings, Continued

Seismic Code	ASCE 7-05
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Occupancy Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	F [ksi]	G [ksi]	Nu	Therm /1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.4	58	1.3
6	A53-B-35	29000	11154	.3	.65	.49	35	1.5	63	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design ...	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Support Rail	PIPE 2.0	None	None	A53-B-35	Typical	1.02	.627	.627	1.25
2	Frame	C5X9	None	None	A36 Gr.36	Typical	2.64	.624	8.89	.109
3	Bracing	L1.75X1.75X4	None	None	A36 Gr.36	Typical	.813	.227	.227	.018
4	Connection Plate	PL1x14	None	None	A36 Gr.36	Typical	14	1.167	228.667	4.457
5	Mount Pipe	PIPE 2.0	None	None	A53-B-35	Typical	1.02	.627	.627	1.25
6	Handrail Plate	L2.5x2.5x4	None	None	A36 Gr.36	Typical	1.19	.692	.692	.026
7	Mod Pipe	PIPE 2.0	None	None	A53-B-35	Typical	1.02	.627	.627	1.25
8	Kicker	L2.5x2.5x3	None	None	A36 Gr.36	Typical	.901	.535	.535	.011
9	TR	TR 1/2	None	None	A36 Gr.36	Typical	.142	.002	.002	.003
10	TR Plate	PL 2-3/8x1/2	None	None	A36 Gr.36	Typical	1.188	.025	.558	.086
11	PM2	PIPE 2.0	None	None	A53-B-35	Typical	1.02	.627	.627	1.25

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF1A	1.5CU1.25X035	Beam	None	A570 Gr...	Typical	.131	.022	.052	5.4e-5



Company : Tower Engineering Professionals
 Designer : NPD
 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

Mar 21, 2022
 9:17 AM
 Checked By: SDJ

Material Takeoff

	Material	Size	Pieces	Length[ft]	Weight[K]
1	General				
2	RIGID		63	12.4	0
3	Total General		63	12.4	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	C5X9	6	47	.422
7	A36 Gr.36	L2.5x2.5x3	6	35.8	.11
8	A36 Gr.36	L2.5x2.5x4	3	3.8	.015
9	A36 Gr.36	PL1x14	3	2.3	.108
10	A53-B-35	PIPE 2.0	60	345.9	1.201
11	Total HR Steel		78	434.8	1.856

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	SA1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	SA2	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	SA3	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N136	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N137	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N138	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...)	Section/Shape	Type	Design List	Material	Design R...
1	SA1	SA1	N40		90	Connection Plate	None	None	A36 Gr.36	Typical
2	SA2	SA2	N41		90	Connection Plate	None	None	A36 Gr.36	Typical
3	SA3	SA3	N42		90	Connection Plate	None	None	A36 Gr.36	Typical
4	FF-H2	FF2	FF4			Frame	None	None	A36 Gr.36	Typical
5	GS11	GS11	GS14		180	Frame	None	None	A36 Gr.36	Typical
6	GS12	GS12	GS15			Frame	None	None	A36 Gr.36	Typical
7	GS13	GS13	GS16		180	Frame	None	None	A36 Gr.36	Typical
8	SF1-H2	SF1-2	FF2			Frame	None	None	A36 Gr.36	Typical
9	SF2-H2	FF4	SF1-2			Frame	None	None	A36 Gr.36	Typical
10	HRC-1	N91	N90		180	Handrail Plate	None	None	A36 Gr.36	Typical
11	HRC-2	N93	N92		180	Handrail Plate	None	None	A36 Gr.36	Typical
12	HRC-3	N100	N99		180	Handrail Plate	None	None	A36 Gr.36	Typical
13	K1	N139	N138		90	Kicker	None	None	A36 Gr.36	Typical
14	K2	N138	N140		90	Kicker	None	None	A36 Gr.36	Typical
15	K3	N169	N137		90	Kicker	None	None	A36 Gr.36	Typical
16	K4	N137	N170		90	Kicker	None	None	A36 Gr.36	Typical
17	K5	N136	N155		90	Kicker	None	None	A36 Gr.36	Typical
18	K6	N154	N136		90	Kicker	None	None	A36 Gr.36	Typical
19	MOD-1	N125	N124			Mod Pipe	None	None	A53-B-35	Typical
20	MOD-2	N142	N141			Mod Pipe	None	None	A53-B-35	Typical
21	MOD-3	N157	N156			Mod Pipe	None	None	A53-B-35	Typical
22	MP-1D	N94	N96			Mount Pipe	None	None	A53-B-35	Typical
23	M11	N43	N33			RIGID	None	None	RIGID	Typical
24	M12	N38	N29			RIGID	None	None	RIGID	Typical
25	M61	N135	N130			RIGID	None	None	RIGID	Typical
26	HR-1	N28	N27A			Support Rail	None	None	A53-B-35	Typical
27	HR-2	N50A	N49A			Support Rail	None	None	A53-B-35	Typical
28	HR-3	N72	N71			Support Rail	None	None	A53-B-35	Typical
29	MP-1C	N57	N58			Mount Pipe	None	None	A53-B-35	Typical
30	MP-1B	N59	N60			Mount Pipe	None	None	A53-B-35	Typical



Company : Tower Engineering Professionals
 Designer : NPD
 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

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Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(...)	Section/Shape	Type	Design List	Material	Design R...
31	MP-1	N61	N62			Mount Pipe	None	None	A53-B-35	Typical
32	PM2-1A	N65	N63			PM2	None	None	A53-B-35	Typical
33	PM2-1B	N66	N64			PM2	None	None	A53-B-35	Typical
34	M34	N67	N68			RIGID	None	None	RIGID	Typical
35	M35	N69	N70			RIGID	None	None	RIGID	Typical
36	M36	N71A	N72A			RIGID	None	None	RIGID	Typical
37	M37	N73	N74			RIGID	None	None	RIGID	Typical
38	MP-2D	N79	N80			Mount Pipe	None	None	A53-B-35	Typical
39	M39	N78	N76			RIGID	None	None	RIGID	Typical
40	M40	N77	N75			RIGID	None	None	RIGID	Typical
41	M41	N82	N81			RIGID	None	None	RIGID	Typical
42	MP-2C	N83	N84			Mount Pipe	None	None	A53-B-35	Typical
43	MP-2B	N85	N86			Mount Pipe	None	None	A53-B-35	Typical
44	MP-2	N87	N88			Mount Pipe	None	None	A53-B-35	Typical
45	PM2-2A	N91A	N89			PM2	None	None	A53-B-35	Typical
46	PM2-2B	N92A	N90A			PM2	None	None	A53-B-35	Typical
47	M47	N93A	N94A			RIGID	None	None	RIGID	Typical
48	M48	N95	N96A			RIGID	None	None	RIGID	Typical
49	M49	N97	N98			RIGID	None	None	RIGID	Typical
50	M50	N99A	N100A			RIGID	None	None	RIGID	Typical
51	MP-3D	N105	N106			Mount Pipe	None	None	A53-B-35	Typical
52	M52	N104	N102			RIGID	None	None	RIGID	Typical
53	M53	N103	N101			RIGID	None	None	RIGID	Typical
54	M54	N108	N107			RIGID	None	None	RIGID	Typical
55	MP-3C	N109	N110			Mount Pipe	None	None	A53-B-35	Typical
56	MP-3B	N111	N112			Mount Pipe	None	None	A53-B-35	Typical
57	MP-3	N113	N114			Mount Pipe	None	None	A53-B-35	Typical
58	PM2-3A	N117	N115			PM2	None	None	A53-B-35	Typical
59	PM2-3B	N118	N116			PM2	None	None	A53-B-35	Typical
60	M60	N119	N120			RIGID	None	None	RIGID	Typical
61	M61A	N121	N122			RIGID	None	None	RIGID	Typical
62	M62	N123	N124A			RIGID	None	None	RIGID	Typical
63	M63	N125A	N126			RIGID	None	None	RIGID	Typical
64	MP-7D	N131	N132			Mount Pipe	None	None	A53-B-35	Typical
65	M65	N130A	N128			RIGID	None	None	RIGID	Typical
66	M66	N129	N127			RIGID	None	None	RIGID	Typical
67	M67	N134	N133			RIGID	None	None	RIGID	Typical
68	MP-7C	N135A	N136A			Mount Pipe	None	None	A53-B-35	Typical
69	MP-7B	N137A	N138A			Mount Pipe	None	None	A53-B-35	Typical
70	MP-7	N139A	N140A			Mount Pipe	None	None	A53-B-35	Typical
71	PM2-7A	N143	N141A			PM2	None	None	A53-B-35	Typical
72	PM2-7B	N144	N142A			PM2	None	None	A53-B-35	Typical
73	M73	N145	N146			RIGID	None	None	RIGID	Typical
74	M74	N147	N148			RIGID	None	None	RIGID	Typical
75	M75	N149	N150			RIGID	None	None	RIGID	Typical
76	M76	N151	N152			RIGID	None	None	RIGID	Typical
77	MP-8D	N157A	N158			Mount Pipe	None	None	A53-B-35	Typical
78	M78	N156A	N154A			RIGID	None	None	RIGID	Typical
79	M79	N155A	N153			RIGID	None	None	RIGID	Typical
80	M80	N160	N159			RIGID	None	None	RIGID	Typical
81	MP-8C	N161	N162			Mount Pipe	None	None	A53-B-35	Typical
82	MP-8B	N163	N164			Mount Pipe	None	None	A53-B-35	Typical
83	MP-8	N165	N166			Mount Pipe	None	None	A53-B-35	Typical
84	PM2-8A	N169A	N167			PM2	None	None	A53-B-35	Typical
85	PM2-8B	N170A	N168			PM2	None	None	A53-B-35	Typical
86	M86	N171	N172			RIGID	None	None	RIGID	Typical
87	M87	N173	N174			RIGID	None	None	RIGID	Typical



Company : Tower Engineering Professionals
 Designer : NPD
 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

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Member Primary Data (Continued)

Label	I Joint	J Joint	K Joint	Rotat[e]...	Section/Shape	Type	Design List	Material	Design B...
88	M88	N175	N176		RIGID	None	None	RIGID	Typical
89	M89	N177	N178		RIGID	None	None	RIGID	Typical
90	MP-9D	N183	N184		Mount Pipe	None	None	A53-B-35	Typical
91	M91	N182	N180		RIGID	None	None	RIGID	Typical
92	M92	N181	N179		RIGID	None	None	RIGID	Typical
93	M93	N186	N185		RIGID	None	None	RIGID	Typical
94	MP-9C	N187	N188		Mount Pipe	None	None	A53-B-35	Typical
95	MP-9B	N189	N190		Mount Pipe	None	None	A53-B-35	Typical
96	MP-9	N191	N192		Mount Pipe	None	None	A53-B-35	Typical
97	PM2-9A	N195	N193		PM2	None	None	A53-B-35	Typical
98	PM2-9B	N196	N194		PM2	None	None	A53-B-35	Typical
99	M99	N197	N198		RIGID	None	None	RIGID	Typical
100	M100	N199	N200		RIGID	None	None	RIGID	Typical
101	M101	N201	N202		RIGID	None	None	RIGID	Typical
102	M102	N203	N204		RIGID	None	None	RIGID	Typical
103	MP-4D	N209	N210		Mount Pipe	None	None	A53-B-35	Typical
104	M104	N208	N206		RIGID	None	None	RIGID	Typical
105	M105	N207	N205		RIGID	None	None	RIGID	Typical
106	M106	N212	N211		RIGID	None	None	RIGID	Typical
107	MP-4C	N213	N214		Mount Pipe	None	None	A53-B-35	Typical
108	MP-4B	N215	N216		Mount Pipe	None	None	A53-B-35	Typical
109	MP-4	N217	N218		Mount Pipe	None	None	A53-B-35	Typical
110	PM2-4A	N221	N219		PM2	None	None	A53-B-35	Typical
111	PM2-4B	N222	N220		PM2	None	None	A53-B-35	Typical
112	M112	N223	N224		RIGID	None	None	RIGID	Typical
113	M113	N225	N226		RIGID	None	None	RIGID	Typical
114	M114	N227	N228		RIGID	None	None	RIGID	Typical
115	M115	N229	N230		RIGID	None	None	RIGID	Typical
116	MP-5D	N235	N236		Mount Pipe	None	None	A53-B-35	Typical
117	M117	N234	N232		RIGID	None	None	RIGID	Typical
118	M118	N233	N231		RIGID	None	None	RIGID	Typical
119	M119	N238	N237		RIGID	None	None	RIGID	Typical
120	MP-5C	N239	N240		Mount Pipe	None	None	A53-B-35	Typical
121	MP-5B	N241	N242		Mount Pipe	None	None	A53-B-35	Typical
122	MP-5	N243	N244		Mount Pipe	None	None	A53-B-35	Typical
123	PM2-5A	N247	N245		PM2	None	None	A53-B-35	Typical
124	PM2-5B	N248	N246		PM2	None	None	A53-B-35	Typical
125	M125	N249	N250		RIGID	None	None	RIGID	Typical
126	M126	N251	N252		RIGID	None	None	RIGID	Typical
127	M127	N253	N254		RIGID	None	None	RIGID	Typical
128	M128	N255	N256		RIGID	None	None	RIGID	Typical
129	MP-6D	N261	N262		Mount Pipe	None	None	A53-B-35	Typical
130	M130	N260	N258		RIGID	None	None	RIGID	Typical
131	M131	N259	N257		RIGID	None	None	RIGID	Typical
132	M132	N264	N263		RIGID	None	None	RIGID	Typical
133	MP-6C	N265	N266		Mount Pipe	None	None	A53-B-35	Typical
134	MP-6B	N267	N268		Mount Pipe	None	None	A53-B-35	Typical
135	MP-6	N269	N270		Mount Pipe	None	None	A53-B-35	Typical
136	PM2-6A	N273	N271		PM2	None	None	A53-B-35	Typical
137	PM2-6B	N274	N272		PM2	None	None	A53-B-35	Typical
138	M138	N275	N276		RIGID	None	None	RIGID	Typical
139	M139	N277	N278		RIGID	None	None	RIGID	Typical
140	M140	N279	N280		RIGID	None	None	RIGID	Typical
141	M141	N281	N282		RIGID	None	None	RIGID	Typical



Company : Tower Engineering Professionals
 Designer : NPD
 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

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Member Advanced Data

	Label	I Release	J Release	I Offset(jn)	J Offset(jn)	T/C Only	Physical	Defl Ra...	Analysis...	Inactive	Seismi...
1	SA1		000000				Yes	** NA **			None
2	SA2		000000				Yes	** NA **			None
3	SA3		000000				Yes	** NA **			None
4	FF-H2						Yes	** NA **			None
5	GS1						Yes	** NA **			None
6	GS2						Yes	** NA **			None
7	GS3						Yes	** NA **			None
8	SF1-H2						Yes	** NA **			None
9	SF2-H2						Yes	** NA **			None
10	HRC-1						Yes	** NA **			None
11	HRC-2						Yes	** NA **			None
12	HRC-3						Yes	** NA **			None
13	K1	BenPIN	BenPIN				Yes	** NA **			None
14	K2	BenPIN	BenPIN				Yes	** NA **			None
15	K3	BenPIN	BenPIN				Yes	** NA **			None
16	K4	BenPIN	BenPIN				Yes	** NA **			None
17	K5	BenPIN	BenPIN				Yes	** NA **			None
18	K6	BenPIN	BenPIN				Yes	** NA **			None
19	MOD-1						Yes	** NA **			None
20	MOD-2						Yes	** NA **			None
21	MOD-3						Yes	** NA **			None
22	MP-1D						Yes	** NA **			None
23	M11						Yes	** NA **			None
24	M12						Yes	** NA **			None
25	M61						Yes	** NA **			None
26	HR-1						Yes	** NA **			None
27	HR-2						Yes	** NA **			None
28	HR-3						Yes	** NA **			None
29	MP-1C						Yes	** NA **			None
30	MP-1B						Yes	** NA **			None
31	MP-1						Yes	** NA **			None
32	PM2-1A						Yes	** NA **			None
33	PM2-1B						Yes	** NA **			None
34	M34						Yes	** NA **			None
35	M35						Yes	** NA **			None
36	M36						Yes	** NA **			None
37	M37						Yes	** NA **			None
38	MP-2D						Yes	** NA **			None
39	M39						Yes	** NA **			None
40	M40						Yes	** NA **			None
41	M41						Yes	** NA **			None
42	MP-2C						Yes	** NA **			None
43	MP-2B						Yes	** NA **			None
44	MP-2						Yes	** NA **			None
45	PM2-2A						Yes	** NA **			None
46	PM2-2B						Yes	** NA **			None
47	M47						Yes	** NA **			None
48	M48						Yes	** NA **			None
49	M49						Yes	** NA **			None
50	M50						Yes	** NA **			None
51	MP-3D						Yes	** NA **			None
52	M52						Yes	** NA **			None
53	M53						Yes	** NA **			None
54	M54						Yes	** NA **			None
55	MP-3C						Yes	** NA **			None
56	MP-3B						Yes	** NA **			None



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Member Advanced Data (Continued)

Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Ra.	Analysis...	Inactive	Seismi...
57	MP-3					Yes	** NA **			None
58	PM2-3A					Yes	** NA **			None
59	PM2-3B					Yes	** NA **			None
60	M60					Yes	** NA **			None
61	M61A					Yes	** NA **			None
62	M62					Yes	** NA **			None
63	M63					Yes	** NA **			None
64	MP-7D					Yes	** NA **			None
65	M65					Yes	** NA **			None
66	M66					Yes	** NA **			None
67	M67					Yes	** NA **			None
68	MP-7C					Yes	** NA **			None
69	MP-7B					Yes	** NA **			None
70	MP-7					Yes	** NA **			None
71	PM2-7A					Yes	** NA **			None
72	PM2-7B					Yes	** NA **			None
73	M73					Yes	** NA **			None
74	M74					Yes	** NA **			None
75	M75					Yes	** NA **			None
76	M76					Yes	** NA **			None
77	MP-8D					Yes	** NA **			None
78	M78					Yes	** NA **			None
79	M79					Yes	** NA **			None
80	M80					Yes	** NA **			None
81	MP-8C					Yes	** NA **			None
82	MP-8B					Yes	** NA **			None
83	MP-8					Yes	** NA **			None
84	PM2-8A					Yes	** NA **			None
85	PM2-8B					Yes	** NA **			None
86	M86					Yes	** NA **			None
87	M87					Yes	** NA **			None
88	M88					Yes	** NA **			None
89	M89					Yes	** NA **			None
90	MP-9D					Yes	** NA **			None
91	M91					Yes	** NA **			None
92	M92					Yes	** NA **			None
93	M93					Yes	** NA **			None
94	MP-9C					Yes	** NA **			None
95	MP-9B					Yes	** NA **			None
96	MP-9					Yes	** NA **			None
97	PM2-9A					Yes	** NA **			None
98	PM2-9B					Yes	** NA **			None
99	M99					Yes	** NA **			None
100	M100					Yes	** NA **			None
101	M101					Yes	** NA **			None
102	M102					Yes	** NA **			None
103	MP-4D					Yes	** NA **			None
104	M104					Yes	** NA **			None
105	M105					Yes	** NA **			None
106	M106					Yes	** NA **			None
107	MP-4C					Yes	** NA **			None
108	MP-4B					Yes	** NA **			None
109	MP-4					Yes	** NA **			None
110	PM2-4A					Yes	** NA **			None
111	PM2-4B					Yes	** NA **			None
112	M112					Yes	** NA **			None
113	M113					Yes	** NA **			None



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 Designer : NPD
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Member Advanced Data (Continued)

Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Ra.	Analysis...	Inactive	Seismi...
114	M114					Yes	** NA **			None
115	M115					Yes	** NA **			None
116	MP-5D					Yes	** NA **			None
117	M117					Yes	** NA **			None
118	M118					Yes	** NA **			None
119	M119					Yes	** NA **			None
120	MP-5C					Yes	** NA **			None
121	MP-5B					Yes	** NA **			None
122	MP-5					Yes	** NA **			None
123	PM2-5A					Yes	** NA **			None
124	PM2-5B					Yes	** NA **			None
125	M125					Yes	** NA **			None
126	M126					Yes	** NA **			None
127	M127					Yes	** NA **			None
128	M128					Yes	** NA **			None
129	MP-6D					Yes	** NA **			None
130	M130					Yes	** NA **			None
131	M131					Yes	** NA **			None
132	M132					Yes	** NA **			None
133	MP-6C					Yes	** NA **			None
134	MP-6B					Yes	** NA **			None
135	MP-6					Yes	** NA **			None
136	PM2-6A					Yes	** NA **			None
137	PM2-6B					Yes	** NA **			None
138	M138					Yes	** NA **			None
139	M139					Yes	** NA **			None
140	M140					Yes	** NA **			None
141	M141					Yes	** NA **			None

Hot Rolled Steel Design Parameters

Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp...	L-torq...	Kyy	Kzz	Cb	Funct...
1	SA1	Connection Plate	.755					.8	.65		Lateral
2	SA2	Connection Plate	.755					.8	.65		Lateral
3	SA3	Connection Plate	.755					.8	.65		Lateral
4	FF-H2	Frame	10.667	5	3.25			.65	.65		Lateral
5	GS1	Frame	5	2.5	2.5			.65	.65		Lateral
6	GS2	Frame	5	2.5	2.5			.65	.65		Lateral
7	GS3	Frame	5	2.5	2.5			.65	.65		Lateral
8	SF1-H2	Frame	10.667	5	3.25			.65	.65		Lateral
9	SF2-H2	Frame	10.667	5	3.25			.65	.65		Lateral
10	HRC-1	Handrail Plate	1.25					.65	.65		Lateral
11	HRC-2	Handrail Plate	1.25					.65	.65		Lateral
12	HRC-3	Handrail Plate	1.25					.65	.65		Lateral
13	K1	Kicker	5.966					1	1		Lateral
14	K2	Kicker	5.966					1	1		Lateral
15	K3	Kicker	5.966					1	1		Lateral
16	K4	Kicker	5.966					1	1		Lateral
17	K5	Kicker	5.966					1	1		Lateral
18	K6	Kicker	5.966					1	1		Lateral
19	MOD-1	Mod Pipe	10.5					2.1	2.1		Lateral
20	MOD-2	Mod Pipe	10.5					2.1	2.1		Lateral
21	MOD-3	Mod Pipe	10.5					2.1	2.1		Lateral
22	MP-1D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
23	HR-1	Support Rail	10.5					2.1	2.1		Lateral
24	HR-2	Support Rail	10.5					2.1	2.1		Lateral



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Hot Rolled Steel Design Parameters (Continued)

Label	Shape	Length(ft)	Lbyy(ft)	Lbzz(ft)	Lcomp to...	Lcomp b...	L-torq...	Kyy	Kzz	Cb	Func...
25	HR-3	Support Rail	10.5					2.1	2.1		Lateral
26	MP-1C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
27	MP-1B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
28	MP-1	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
29	PM2-1A	PM2	1.802					.65	.65		Lateral
30	PM2-1B	PM2	1.802					.65	.65		Lateral
31	MP-2D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
32	MP-2C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
33	MP-2B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
34	MP-2	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
35	PM2-2A	PM2	1.802					.65	.65		Lateral
36	PM2-2B	PM2	1.802					.65	.65		Lateral
37	MP-3D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
38	MP-3C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
39	MP-3B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
40	MP-3	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
41	PM2-3A	PM2	1.802					.65	.65		Lateral
42	PM2-3B	PM2	1.802					.65	.65		Lateral
43	MP-7D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
44	MP-7C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
45	MP-7B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
46	MP-7	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
47	PM2-7A	PM2	1.802					.65	.65		Lateral
48	PM2-7B	PM2	1.802					.65	.65		Lateral
49	MP-8D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
50	MP-8C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
51	MP-8B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
52	MP-8	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
53	PM2-8A	PM2	1.802					.65	.65		Lateral
54	PM2-8B	PM2	1.802					.65	.65		Lateral
55	MP-9D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
56	MP-9C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
57	MP-9B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
58	MP-9	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
59	PM2-9A	PM2	1.802					.65	.65		Lateral
60	PM2-9B	PM2	1.802					.65	.65		Lateral
61	MP-4D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
62	MP-4C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
63	MP-4B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
64	MP-4	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
65	PM2-4A	PM2	1.802					.65	.65		Lateral
66	PM2-4B	PM2	1.802					.65	.65		Lateral
67	MP-5D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
68	MP-5C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
69	MP-5B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
70	MP-5	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
71	PM2-5A	PM2	1.802					.65	.65		Lateral
72	PM2-5B	PM2	1.802					.65	.65		Lateral
73	MP-6D	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
74	MP-6C	Mount Pipe	5.833	Segment	Segment			2.1	2.1		Lateral
75	MP-6B	Mount Pipe	4	Segment	Segment			2.1	2.1		Lateral
76	MP-6	Mount Pipe	9	Segment	Segment			2.1	2.1		Lateral
77	PM2-6A	PM2	1.802					.65	.65		Lateral
78	PM2-6B	PM2	1.802					.65	.65		Lateral



Company : Tower Engineering Professionals
 Designer : NPD
 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

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Cold Formed Steel Design Parameters

Label	Shape	Length...	Lbyy(ft)	Lbzz(ft)	Lcomp to...	Lcomp b...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	R	y	swayz	sway
No Data to Print ...															

Basic Load Cases

BLC	Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface...
1	Dead	None		-1			42		6	
2	0 Wind - No Ice	None					42	78		
3	30 Wind - No Ice	None					84	156		
4	45 Wind - No Ice	None					84	156		
5	60 Wind - No Ice	None					84	156		
6	90 Wind - No Ice	None					42	78		
7	120 Wind - No Ice	None					84	156		
8	135 Wind - No Ice	None					84	156		
9	150 Wind - No Ice	None					84	156		
10	180 Wind - No Ice	None					42	78		
11	210 Wind - No Ice	None					84	156		
12	225 Wind - No Ice	None					84	156		
13	240 Wind - No Ice	None					84	156		
14	270 Wind - No Ice	None					42	78		
15	300 Wind - No Ice	None					84	156		
16	315 Wind - No Ice	None					84	156		
17	330 Wind - No Ice	None					84	156		
18	Ice Weight	None					42	78	6	
19	0 Wind - Ice	None					42	78		
20	30 Wind - Ice	None					84	156		
21	45 Wind - Ice	None					84	156		
22	60 Wind - Ice	None					84	156		
23	90 Wind - Ice	None					42	78		
24	120 Wind - Ice	None					84	156		
25	135 Wind - Ice	None					84	156		
26	150 Wind - Ice	None					84	156		
27	180 Wind - Ice	None					42	78		
28	210 Wind - Ice	None					84	156		
29	225 Wind - Ice	None					84	156		
30	240 Wind - Ice	None					84	156		
31	270 Wind - Ice	None					42	78		
32	300 Wind - Ice	None					84	156		
33	315 Wind - Ice	None					84	156		
34	330 Wind - Ice	None					84	156		
35	Lm	None				1				
36	Lv	None				1				
37	Seismic Load X	ELX	-1				42			
38	Seismic Load Z	ELZ			-1		42			
39	BLC 1 Transient Area Loads	None						84		
40	BLC 18 Transient Area Loads	None						84		

Load Combinations

Description	S...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	
1	1.4D	Yes	Y		1	1.4													
2	0.9D+1.0 0-Wind	Yes	Y		1	.9	2	1											
3	0.9D+1.0 30-Wind	Yes	Y		1	.9	3	1											
4	0.9D+1.0 45-Wind	Yes	Y		1	.9	4	1											
5	0.9D+1.0 60-Wind	Yes	Y		1	.9	5	1											
6	0.9D+1.0 90-Wind	Yes	Y		1	.9	6	1											



Company : Tower Engineering Professionals
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 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

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

Member	Shape	Code Check	Loc(f)	LC	Shear Loc	LC	phi*Pn	phi*Pn	phi*M	phi*M	Eqn			
1	MP-1	PIPE 2.0	.630	4.688	2	.052	4.594	32	11.879	32.13	1.872	1.872	2.H1-1b	
2	MP-4	PIPE 2.0	.630	4.688	7	.050	4.594	22	11.879	32.13	1.872	1.872	2.H1-1b	
3	MP-3	PIPE 2.0	.630	4.688	10	.054	4.594	20	11.879	32.13	1.872	1.872	2.H1-1b	
4	MP-9	PIPE 2.0	.630	4.688	5	.052	4.594	30	11.879	32.13	1.872	1.872	2.H1-1b	
5	MP-6	PIPE 2.0	.630	4.688	15	.052	4.594	25	11.879	32.13	1.872	1.872	2.H1-1b	
6	MP-7	PIPE 2.0	.625	4.688	12	.054	4.594	26	11.879	32.13	1.872	1.872	2.H1-1b	
7	FF-H2	C5X9	.570	5.667	24	.477	4.889	z	18	60.957	85.536	1.909	11.853	1.H1-1b
8	SF1-H2	C5X9	.567	5.667	18	.506	4.889	z	28	60.957	85.536	1.909	11.853	2.H1-1b
9	SF2-H2	C5X9	.559	5.667	29	.506	4.889	z	23	60.957	85.536	1.909	11.853	2.H1-1b
10	MP-9D	PIPE 2.0	.558	5.531	27	.449	4.781	26	30.972	32.13	1.872	1.872	2.H3-6	
11	MP-6D	PIPE 2.0	.557	5.531	22	.449	4.781	21	30.972	32.13	1.872	1.872	2.H3-6	
12	MP-3D	PIPE 2.0	.555	5.531	33	.463	4.781	32	30.972	32.13	1.872	1.872	3.H3-6	
13	MP-4D	PIPE 2.0	.530	5.531	9	.442	4.781	26	30.972	32.13	1.872	1.872	3.H3-6	
14	MP-1D	PIPE 2.0	.527	5.531	3	.452	4.781	20	30.972	32.13	1.872	1.872	3.H3-6	
15	MP-9C	PIPE 2.0	.498	5.53	27	.375	5.53	26	28.895	32.13	1.872	1.872	3.H3-6	
16	MP-6C	PIPE 2.0	.497	5.53	22	.376	5.53	21	28.895	32.13	1.872	1.872	1.H3-6	
17	MP-3C	PIPE 2.0	.496	5.53	33	.391	5.53	32	28.895	32.13	1.872	1.872	2.H3-6	
18	MP-7D	PIPE 2.0	.494	5.531	19	.464	4.781	10	30.972	32.13	1.872	1.872	3.H3-6	
19	MP-4C	PIPE 2.0	.471	5.53	25	.371	5.53	26	28.895	32.13	1.872	1.872	2.H3-6	
20	MP-1C	PIPE 2.0	.469	5.53	19	.382	5.53	20	28.895	32.13	1.872	1.872	2.H3-6	
21	MP-7C	PIPE 2.0	.466	5.53	27	.386	5.53	10	28.895	32.13	1.872	1.872	2.H3-6	
22	MOD-3	PIPE 2.0	.457	5.687	15	.211	10....	39	2.023	32.13	1.872	1.872	3.H1-1a	
23	MOD-2	PIPE 2.0	.456	1.203	3	.213	10....	44	2.023	32.13	1.872	1.872	2.H1-1a	
24	MOD-1	PIPE 2.0	.450	5.688	10	.214	10....	34	2.023	32.13	1.872	1.872	3.H1-1a	
25	MP-2D	PIPE 2.0	.435	3.281	18	.303	4.781	21	28.526	32.13	1.872	1.872	3.H1-1b	
26	MP-5D	PIPE 2.0	.432	3.281	23	.304	4.781	26	28.526	32.13	1.872	1.872	3.H1-1b	
27	MP-8D	PIPE 2.0	.431	3.281	28	.303	4.781	31	28.526	32.13	1.872	1.872	2.H1-1b	
28	GS12	C5X9	.417	2.5	23	.028	2.5	v	37	75.694	85.536	1.909	11.853	1.H1-1b
29	GS13	C5X9	.415	2.5	18	.027	2.5	v	34	75.694	85.536	1.909	11.853	1.H1-1b
30	GS11	C5X9	.409	2.5	29	.028	2.5	v	42	75.694	85.536	1.909	11.853	1.H1-1b
31	PM2-7B	PIPE 2.0	.376	0	26	.202	0	26	31.606	32.13	1.872	1.872	1.H1-1b	
32	K5	L2.5x2.5x3	.371	2.921	29	.013	0	v	22	9.227	29.192	.873	1.534	1.H2-1
33	K2	L2.5x2.5x3	.370	2.921	18	.013	0	v	27	9.227	29.192	.873	1.534	1.H2-1
34	K4	L2.5x2.5x3	.369	2.921	23	.013	0	v	33	9.227	29.192	.873	1.534	1.H2-1
35	PM2-3B	PIPE 2.0	.361	0	32	.193	0	20	31.606	32.13	1.872	1.872	1.H1-1b	
36	MP-7B	PIPE 2.0	.357	3.25	27	.118	3.25	27	23.088	32.13	1.872	1.872	2.H1-1b	
37	PM2-1B	PIPE 2.0	.356	0	20	.182	0	32	31.606	32.13	1.872	1.872	1.H1-1b	
38	PM2-6B	PIPE 2.0	.350	0	21	.189	0	26	31.606	32.13	1.872	1.872	1.H1-1b	
39	PM2-9B	PIPE 2.0	.350	0	26	.189	0	31	31.606	32.13	1.872	1.872	1.H1-1b	
40	PM2-4B	PIPE 2.0	.347	0	26	.181	0	21	31.606	32.13	1.872	1.872	1.H1-1b	
41	MP-6B	PIPE 2.0	.339	3.25	25	.114	3.25	25	23.088	32.13	1.872	1.872	2.H1-1b	
42	MP-4B	PIPE 2.0	.333	3.25	25	.110	3.25	22	23.088	32.13	1.872	1.872	2.H1-1b	
43	MP-9B	PIPE 2.0	.332	3.25	14	.114	3.25	30	23.088	32.13	1.872	1.872	1.H1-1b	
44	MP-3B	PIPE 2.0	.332	3.25	3	.113	3.25	19	23.088	32.13	1.872	1.872	2.H1-1b	
45	MP-1B	PIPE 2.0	.330	3.25	2	.110	3.25	33	23.088	32.13	1.872	1.872	2.H1-1b	
46	K6	L2.5x2.5x3	.316	2.983	28	.014	5.966	v	19	9.227	29.192	.873	1.534	1.H2-1
47	K3	L2.5x2.5x3	.312	3.045	23	.014	5.966	v	30	9.227	29.192	.873	1.534	1.H2-1
48	K1	L2.5x2.5x3	.312	3.045	18	.014	0	v	25	9.227	29.192	.873	1.534	1.H2-1
49	HR-2	PIPE 2.0	.306	10.172	26	.069	10....	32	2.023	32.13	1.872	1.872	2.H1-1b	
50	HR-3	PIPE 2.0	.283	10.172	21	.072	10....	26	2.023	32.13	1.872	1.872	2.H1-1b	
51	HR-1	PIPE 2.0	.281	10.172	32	.070	10....	21	2.023	32.13	1.872	1.872	1.H1-1b	
52	MP-2C	PIPE 2.0	.261	5.53	18	.254	5.53	21	28.895	32.13	1.872	1.872	2.H1-1b	
53	MP-5C	PIPE 2.0	.259	5.53	23	.254	5.53	26	28.895	32.13	1.872	1.872	2.H1-1b	
54	MP-8C	PIPE 2.0	.258	5.53	29	.253	5.53	31	28.895	32.13	1.872	1.872	2.H1-1b	
55	PM2-7A	PIPE 2.0	.238	0	26	.046	0	26	31.606	32.13	1.872	1.872	2.H1-1b	
56	HRC-3	L2.5x2.5x4	.237	0	18	.015	0	z	26	37.734	38.556	1.114	2.537	1.H2-1



Company : Tower Engineering Professionals
 Designer : NPD
 Job Number : TEP No. 76625.676368
 Model Name : Groton Tower (881533)

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

Member	Shape	Code Check	Loc(f)	LC	Shear Loc	LC	phi*Pn	phi*Pn	phi*M	phi*M	Eqn			
57	HRC-2	L2.5x2.5x4	.237	0	24	.016	0	z	32	37.734	38.556	1.114	2.537	1.H2-1
58	PM2-5B	PIPE 2.0	.236	0	26	.100	0	20	31.606	32.13	1.872	1.872	2.H1-1b	
59	PM2-2B	PIPE 2.0	.236	0	21	.100	0	31	31.606	32.13	1.872	1.872	2.H1-1b	
60	PM2-8B	PIPE 2.0	.236	0	31	.100	0	26	31.606	32.13	1.872	1.872	2.H1-1b	
61	PM2-6A	PIPE 2.0	.229	0	26	.048	0	26	31.606	32.13	1.872	1.872	2.H1-1b	
62	PM2-9A	PIPE 2.0	.229	0	31	.048	0	31	31.606	32.13	1.872	1.872	2.H1-1b	
63	PM2-3A	PIPE 2.0	.229	0	21	.048	0	21	31.606	32.13	1.872	1.872	2.H1-1b	
64	HRC-1	L2.5x2.5x4	.225	0	29	.015	0	z	21	37.734	38.556	1.114	2.537	1.H2-1
65	PM2-4A	PIPE 2.0	.215	0	21	.043	0	21	31.606	32.13	1.872	1.872	2.H1-1b	
66	PM2-1A	PIPE 2.0	.215	0	31	.043	0	31	31.606	32.13	1.872	1.872	2.H1-1b	
67	MP-2	PIPE 2.0	.181	4.688	26	.031	4.594	32	11.879	32.13	1.872	1.872	2.H1-1b	
68	MP-5	PIPE 2.0	.181	4.688	31	.031	4.594	21	11.879	32.13	1.872	1.872	2.H1-1b	
69	MP-8	PIPE 2.0	.181	4.688	21	.031	4.594	26	11.879	32.13	1.872	1.872	2.H1-1b	
70	PM2-8A	PIPE 2.0	.165	0	24	.034	0	26	31.606	32.13	1.872	1.872	2.H1-1b	
71	PM2-2A	PIPE 2.0	.164	0	30	.034	0	31	31.606	32.13	1.872	1.872	2.H1-1b	
72	PM2-5A	PIPE 2.0	.164	0	19	.035	0	21	31.606	32.13	1.872	1.872	2.H1-1b	
73	SA2	PL1x14	.142	0	37	.073	0	v	27	438.779	453.6	9.45	132.3	1.H1-1b
74	SA1	PL1x14	.142	0	42	.074	0	v	25	438.779	453.6	9.45	132.3	1.H1-1b
75	MP-8B	PIPE 2.0	.135	3.25	27	.061	3.25	27	23.088	32.13	1.872	1.872	2.H1-1b	
76	SA3	PL1x14	.135	0	34	.071	0	v	30	438.779	453.6	9.45	132.3	1.H1-1b
77	MP-2B	PIPE 2.0	.134	3.25	32	.063	3.25	32	23.088	32.13	1.872	1.872	1.H1-1b	
78	MP-5B	PIPE 2.0	.133	3.25	25	.061	3.25	22	23.088	32.13	1.872	1.872	2.H1-1b	

Envelope None Cold Formed Steel Code Checks

Member	Shape	Code	Loc(f)	LC	Shear Loc	Dir	LC	Pn[k]	Tn[k]	Mny[k...Mnzz[k...]	Cb	Cmy	Cmzz	Eqn
No Data to Print ...														

APPENDIX D
ADDITIONAL CALCULATIONS

Moment Bolt Group - Connection Angle**RISA 3D Results**

$F_x =$	4.035	kip
$F_y =$	0.852	kip
$F_z =$	0.504	kip
$M_x =$	0.001	kip*ft
$M_y =$	0.494	kip*ft
$M_z =$	1.987	kip*ft

Code Checks Per ANSI/TIA-222-HTension Capacity= 4.8% **PASS**Shear Capacity= 20.2% **PASS****Tension**

$$T_{Total} = \frac{F_z}{3 \text{ bolts}} + \frac{M_y / 0.375 \text{ ft}}{1 \text{ bolt}}$$

$$T_{Total} = 1.49 \text{ kip}$$

$$\phi T = \phi F_{ub} A_{nt}$$

$$\phi T = (0.75)(120 \text{ ksi})(0.344 \text{ in}^2)$$

$$\phi T = 30.96 \text{ kip}$$

Shear

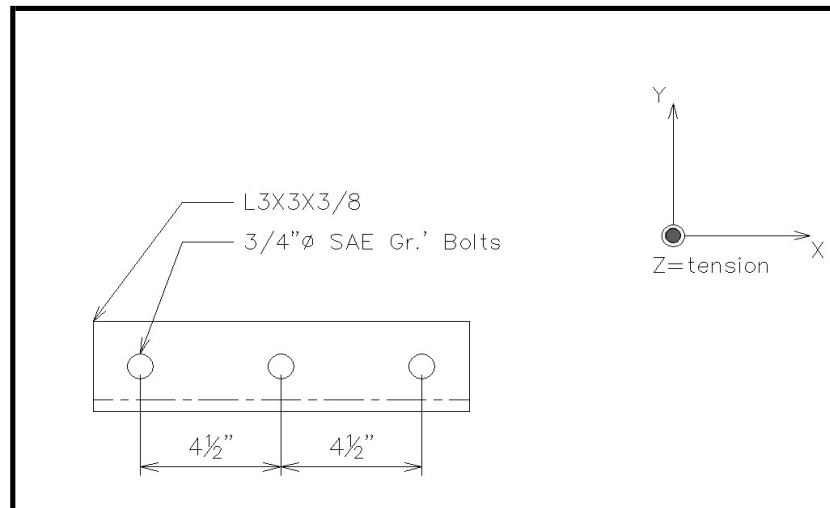
$$V_{Total} = \frac{\sqrt{F_x^2 + F_y^2}}{3 \text{ bolts}} + \frac{M_z / 0.375 \text{ ft}}{2 \text{ bolts}}$$

$$V_{Total} = 4.02 \text{ kip}$$

$$\phi V = \phi(0.625)R_b F_{ub}(0.8)A_b$$

$$\phi V = (0.75)(0.625)(1.0)(120 \text{ ksi})(0.8) \left(\frac{\pi}{4} \cdot 0.75 \text{ in}^2 \right)$$

$$\phi V = 19.88 \text{ kip}$$





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

Date: **January 19, 2022**

Subject: **Structural Analysis Report**

Carrier Designation: **AT&T Mobility Co-Locate**
Site Number: CTL02182
Site Name: Groton Roberts RD
FA Number: 10035316

Crown Castle Designation: **BU Number:** 881533
Site Name: Groton Tower
JDE Job Number: 686300
Work Order Number: 2061306
Order Number: 586248 Rev. 0

Engineering Firm Designation: **B+T Group Project Number:** 92739.021.01

Site Data: **75 Roberts Road, Groton, New London County, CT**
Latitude 41° 21' 36.8", Longitude -72° 2' 55.1"
144.5 Foot - Monopole

B+T Group is pleased to submit this “**Structural Analysis Report**” to determine the structural integrity of the above-mentioned tower.

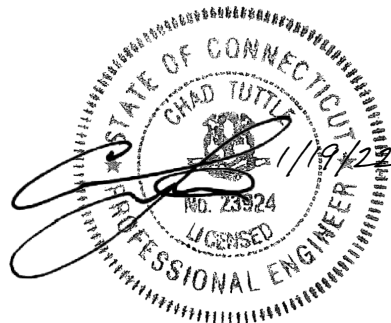
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Proposed Equipment Configuration **Sufficient Capacity - 85.5%**

This analysis utilizes an ultimate 3-second gust wind speed of 127 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: Massood Sattari

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



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Disclaimer provided by AT&T. This statement does not constitute engineering analysis or design

Chad E. Tuttle, P.E.

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Additional Calculations

1) INTRODUCTION

This tower is a 144.5 ft Monopole designed by Engineered Endeavors, Inc.

This monopole has been modified multiple times to accommodate additional loading.

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Wind Speed: 127 mph
Exposure Category: C
Topographic Factor: 1
Ice Thickness: 1 in
Wind Speed with Ice: 50 mph
Service Wind Speed: 60 mph

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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)
147.0	147.0	1	--	Platform Mount [LP 602-1_KCKR]	6 2 6 3	1-5/8 7/8 13/16 3/8
	145.0	3	CCI Antennas	DMP65R-BU8D		
		3	CCI Antennas	TPA65R-BU8D_CCIV2		
		3	Ericsson	AIR 6419 B77G_CCIV2		
		3	Ericsson	RRUS 32 B2		
		3	Ericsson	RRUS 4426 B66		
		3	Ericsson	RRUS 4449 B5/B12		
		3	Ericsson	RRUS 4478 B14		
		3	Ericsson	RRUS-32 B30		
		2	Raycap	DC6-48-60-0-8F		
	2	Raycap	DC6-48-60-18-8F			
	143.0	3	Ericsson	AIR 6449 B77D		

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)
135.0	135.0	3	Andrew	LNx-6512DS-VTM	8	1-5/8
		6	JMA Wireless	MX06FRO660-02		
		2	Raycap	RVZDC-6627-PF-48		
		3	Samsung Telecom	RFV01U-D1A		
		3	Samsung Telecom	RFV01U-D2A		
		1	--	Platform Mount [LP 601-1]		
		3	VZW	Sub6 Antenna - VZS01		
128.0	128.0	3	Ericsson	ERICSSON AIR 21 B2A B4P	4	1-5/8
		3	Ericsson	ERICSSON AIR 21 B4A B2P		
		3	Ericsson	KRY 112 144/1		
		3	Ericsson	RADIO 4449 B12/B71		
		3	RFS Celwave	APXVAARR24_43-U-NA20		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	--	Platform Mount [LP 602-1]		
118.0	118.0	3	Alcatel Lucent	TD-RRH8X20-25	3	1-1/4 5/8
		3	RFS Celwave	APXVSPP18-C-A20		
		3	RFS Celwave	APXVTM14-C-120		
		1	--	Platform Mount [LP 601-1]		
108.0	108.0	3	Alcatel Lucent	TME-PCS 1900MHz 4x45W-65MHz	--	--
		1	--	Side Arm Mount [SO 102-3]		
	106.0	3	Alcatel Lucent	TME-800MHz 2X50W RRH W/FILTER		
103.0	103.0	1	--	Platform Mount [LP 601-1]	--	--
98.0	98.0	3	Fujitsu	TA08025-B604	1	1-1/2
		3	Fujitsu	TA08025-B605		
		3	JMA Wireless	MX08FRO665-21		
		1	Raycap	RDIDC-9181-PF-48		
		1	--	Commscope MC-PK8-DSH		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Tower Manufacturer Drawing	1405782	CCI Sites
Mount Analysis Report	10138108	CCI Sites
Tower Modification Drawing	2048224	CCI Sites
Post Modification Inspection	2304223	CCI Sites
Tower Modification Drawing	2353860	CCI Sites
Post Modification Inspection	2435103	CCI Sites
Tower Modification Drawing	4491288	CCI Sites
Post Modification Inspection	5246681	CCI Sites
Tower Modification Drawing	5795331	CCI Sites
Post Modification Inspection	6017666	CCI Sites
Tower Modification Drawing	5944786	CCI Sites
Post Modification Inspection	6089847	CCI Sites
Tower Modification Drawing	6708152	CCI Sites
Post Modification Inspection	7137178	CCI Sites
Tower Modification Drawing	7042669	CCI Sites
Post Modification Inspection	7262385	CCI Sites
Foundation Drawing	1405796	CCI Sites
Geotech Report	1406209	CCI Sites
Crown CAD Package	Date: 12/30/2021	CCI Sites

3.1) Analysis Method

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

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

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

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	144.5 - 139.5	Pole	TP22.092x21x0.1875	1	-4.496	--	16.8	Pass
L2	139.5 - 134.5	Pole	TP23.184x22.092x0.1875	2	-7.551	--	29.2	Pass
L3	134.5 - 129.5	Pole	TP24.276x23.184x0.1875	3	-8.045	--	44.4	Pass
L4	129.5 - 124.5	Pole	TP25.368x24.276x0.1875	4	-11.684	--	61.5	Pass
L5	124.5 - 121.41	Pole	TP26.882x25.368x0.1875	5	-12.090	--	71.5	Pass
L6	121.41 - 116.41	Pole	TP26.737x25.668x0.25	6	-15.110	--	61.5	Pass
L7	116.41 - 112.58	Pole	TP27.555x26.737x0.25	7	-15.748	--	69.9	Pass
L8	112.58 - 112.33	Pole	TP27.608x27.555x0.25	8	-15.812	--	70.4	Pass
L9	112.33 - 107.33	Pole	TP28.677x27.608x0.25	9	-17.143	--	80.2	Pass
L10	107.33 - 106.92	Pole	TP28.765x28.677x0.25	10	-17.232	--	80.9	Pass
L11	106.92 - 106.67	Pole + Reinf.	TP28.818x28.765x0.5375	11	-17.301	--	67.4	Pass
L12	106.67 - 103.5	Pole + Reinf.	TP29.496x28.818x0.525	12	-18.083	--	72.6	Pass
L13	103.5 - 103.25	Pole + Reinf.	TP29.549x29.496x0.525	13	-18.157	--	73.0	Pass
L14	103.25 - 98.5	Pole + Reinf.	TP30.564x29.549x0.5125	14	-20.891	--	81.2	Pass
L15	98.5 - 98.25	Pole + Reinf.	TP30.618x30.564x0.675	15	-20.983	--	62.6	Pass
L16	98.25 - 97.58	Pole + Reinf.	TP30.761x30.618x0.675	16	-24.125	--	63.7	Pass
L17	97.58 - 97.33	Pole + Reinf.	TP30.815x30.761x0.5625	17	-24.201	--	72.5	Pass
L18	97.33 - 92.33	Pole + Reinf.	TP31.883x30.815x0.55	18	-25.619	--	80.4	Pass
L19	92.33 - 91.74	Pole + Reinf.	TP32.997x31.883x0.55	19	-25.797	--	81.3	Pass
L20	91.74 - 86.12	Pole	TP32.72x31.509x0.375	20	-28.051	--	75.8	Pass
L21	86.12 - 83	Pole	TP33.392x32.72x0.375	21	-28.856	--	78.3	Pass
L22	83 - 82.75	Pole	TP33.446x33.392x0.375	22	-28.942	--	78.5	Pass
L23	82.75 - 77.75	Pole	TP34.523x33.446x0.375	23	-30.246	--	82.1	Pass
L24	77.75 - 77.25	Pole	TP34.631x34.523x0.375	24	-30.395	--	82.4	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L25	77.25 - 77	Pole + Reinf.	TP34.685x34.631x0.825	25	-30.508	--	61.0	Pass
L26	77 - 76.75	Pole + Reinf.	TP34.738x34.685x0.6375	26	-30.594	--	77.8	Pass
L27	76.75 - 71.75	Pole + Reinf.	TP35.816x34.738x0.625	27	-32.328	--	81.6	Pass
L28	71.75 - 69	Pole + Reinf.	TP36.408x35.816x0.625	28	-33.297	--	83.6	Pass
L29	69 - 68.75	Pole + Reinf.	TP36.462x36.408x0.8	29	-33.424	--	66.4	Pass
L30	68.75 - 63.75	Pole + Reinf.	TP37.539x36.462x0.7875	30	-35.536	--	69.3	Pass
L31	63.75 - 60	Pole + Reinf.	TP38.347x37.539x0.775	31	-37.149	--	71.4	Pass
L32	60 - 59.75	Pole + Reinf.	TP38.401x38.347x0.775	32	-37.272	--	71.5	Pass
L33	59.75 - 58.5	Pole + Reinf.	TP38.67x38.401x0.775	33	-37.801	--	72.1	Pass
L34	58.5 - 58.25	Pole + Reinf.	TP38.724x38.67x0.775	34	-37.925	--	72.3	Pass
L35	58.25 - 58	Pole + Reinf.	TP38.778x38.724x0.775	35	-38.034	--	72.4	Pass
L36	58 - 57.75	Pole + Reinf.	TP38.832x38.778x0.6125	36	-38.137	--	82.5	Pass
L37	57.75 - 56.75	Pole + Reinf.	TP39.047x38.832x0.6125	37	-38.538	--	83.0	Pass
L38	56.75 - 56.5	Pole + Reinf.	TP39.101x39.047x0.7375	38	-38.663	--	75.4	Pass
L39	56.5 - 51.5	Pole + Reinf.	TP40.178x39.101x0.725	39	-40.874	--	77.8	Pass
L40	51.5 - 47.82	Pole + Reinf.	TP42.216x40.178x0.7125	40	-42.530	--	79.4	Pass
L41	47.82 - 41.04	Pole + Reinf.	TP41.678x40.221x0.7875	41	-47.908	--	77.3	Pass
L42	41.04 - 36.04	Pole + Reinf.	TP42.753x41.678x0.7875	42	-50.365	--	79.0	Pass
L43	36.04 - 31.25	Pole + Reinf.	TP43.783x42.753x0.7625	43	-52.750	--	80.4	Pass
L44	31.25 - 31	Pole + Reinf.	TP43.836x43.783x0.65	44	-52.889	--	79.1	Pass
L45	31 - 27.75	Pole + Reinf.	TP44.535x43.836x0.65	45	-54.489	--	77.0	Pass
L46	27.75 - 27.5	Pole + Reinf.	TP44.589x44.535x0.65	46	-54.630	--	77.0	Pass
L47	27.5 - 27.25	Pole + Reinf.	TP44.642x44.589x0.65	47	-54.755	--	77.1	Pass
L48	27.25 - 27	Pole + Reinf.	TP44.696x44.642x0.725	48	-54.880	--	78.6	Pass
L49	27 - 22	Pole + Reinf.	TP45.771x44.696x0.7125	49	-57.365	--	79.8	Pass
L50	22 - 17	Pole + Reinf.	TP46.846x45.771x0.7125	50	-59.895	--	80.9	Pass
L51	17 - 12	Pole + Reinf.	TP47.921x46.846x0.7125	51	-62.455	--	81.8	Pass
L52	12 - 7	Pole + Reinf.	TP48.995x47.921x0.7125	52	-65.047	--	82.7	Pass
L53	7 - 2	Pole + Reinf.	TP50.07x48.995x0.7	53	-67.671	--	83.5	Pass
L54	2 - 0	Pole + Reinf.	TP50.5x50.07x0.7	54	-68.731	--	83.8	Pass
							Summary	
						Pole (L24)	82.4	Pass
						Reinforcement	83.8	Pass
						Rating =	83.8	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rod Brackets	Base	47.9	Pass
1,2	Anchor Rods	Base	77.5	Pass
1,2	Base Plate	Base	76.4	Pass
1,2	Base Foundation (Structure)	Base	25.8	Pass
1,2	Base Foundation (Soil Interaction)	Base	55.6	Pass
1,2	Concrete Breakout	Base	85.5	Pass

Structure Rating (max from all components) =	85.5%
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Notes:

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

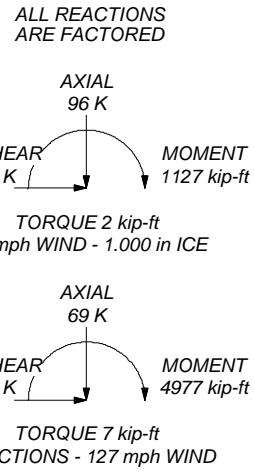
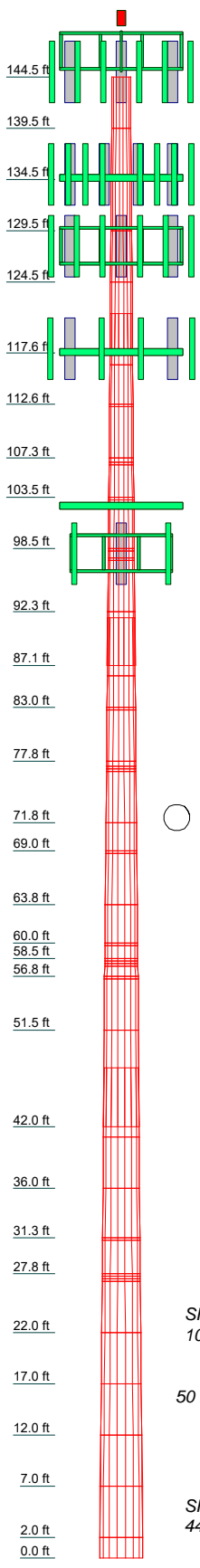
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1		18	0.188					0.2
2		18	0.188					0.2
3		18	0.188					0.2
4		18	0.188					0.2
5		18	0.188					0.2
6		18	0.188					0.2
7		18	0.188					0.2
8		18	0.188					0.2
9		18	0.188					0.2
10		18	0.188					0.2
11		18	0.188					0.2
12		18	0.188					0.2
13		18	0.188					0.2
14		18	0.188					0.2
15		18	0.188					0.2
16		18	0.188					0.2
17		18	0.188					0.2
18		18	0.188					0.2
19		18	0.188					0.2
20		18	0.188					0.2
21		18	0.188					0.2
22		18	0.188					0.2
23		18	0.188					0.2
24		18	0.188					0.2
25		18	0.188					0.2
26		18	0.188					0.2
27		18	0.188					0.2
28		18	0.188					0.2
29		18	0.188					0.2
30		18	0.188					0.2
31		18	0.188					0.2
32		18	0.188					0.2
33		18	0.188					0.2
34		18	0.188					0.2
35		18	0.188					0.2
36		18	0.188					0.2
37		18	0.188					0.2
38		18	0.188					0.2
39		18	0.188					0.2
40		18	0.188					0.2
41		18	0.188					0.2
42		18	0.188					0.2
43		18	0.188					0.2
44		18	0.188					0.2
45		18	0.188					0.2
46		18	0.188					0.2
47		18	0.188					0.2
48		18	0.188					0.2
49		18	0.188					0.2
50		18	0.188					0.2
51		18	0.188					0.2
52		18	0.188					0.2
53		18	0.188					0.2
54		18	0.188					0.2



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 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 127 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 83.8%

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

Job: **92739.021.01 - GROTON TOWER, CT (BU# 881533)**

Project:	Client: Crown Castle	Drawn by: JD Prabhu	App'd:
Code: TIA-222-H	Date: 01/18/22	Scale: NTS	Dwg No. E-1

Vx

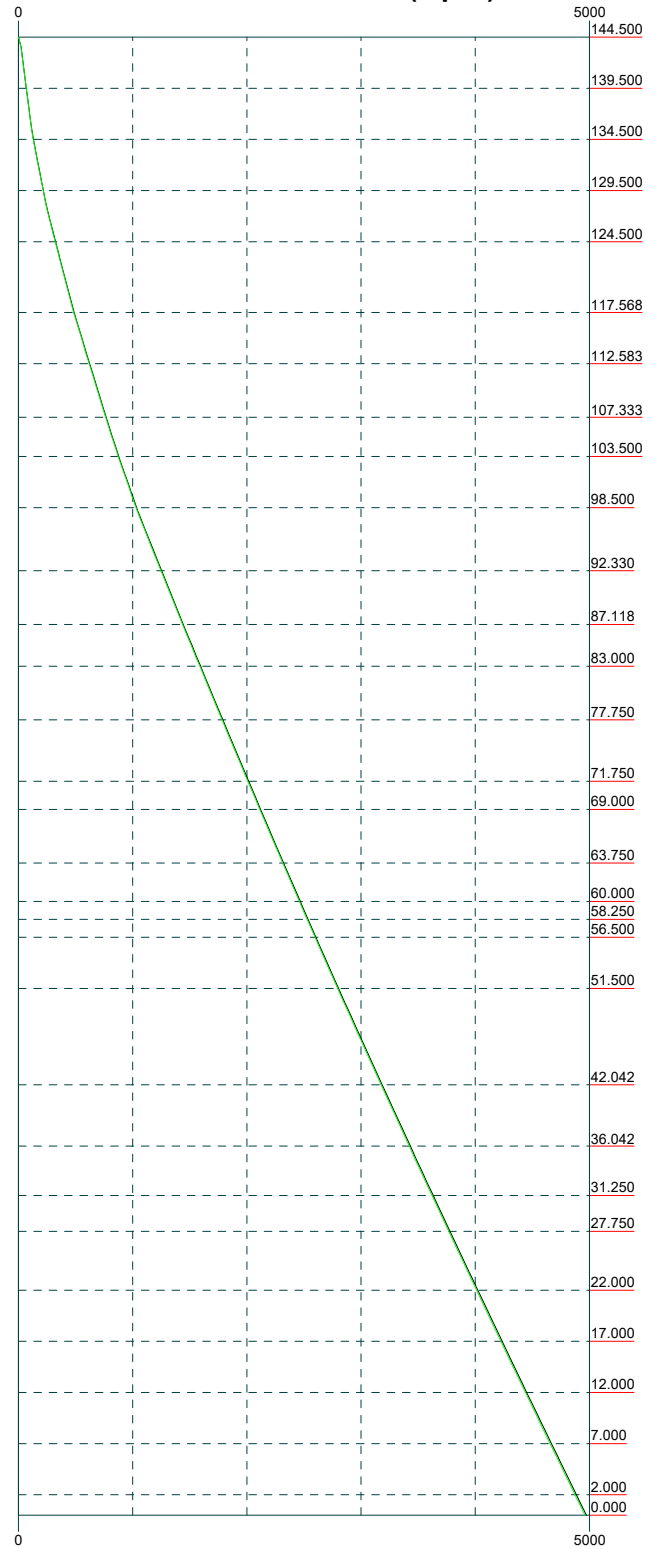
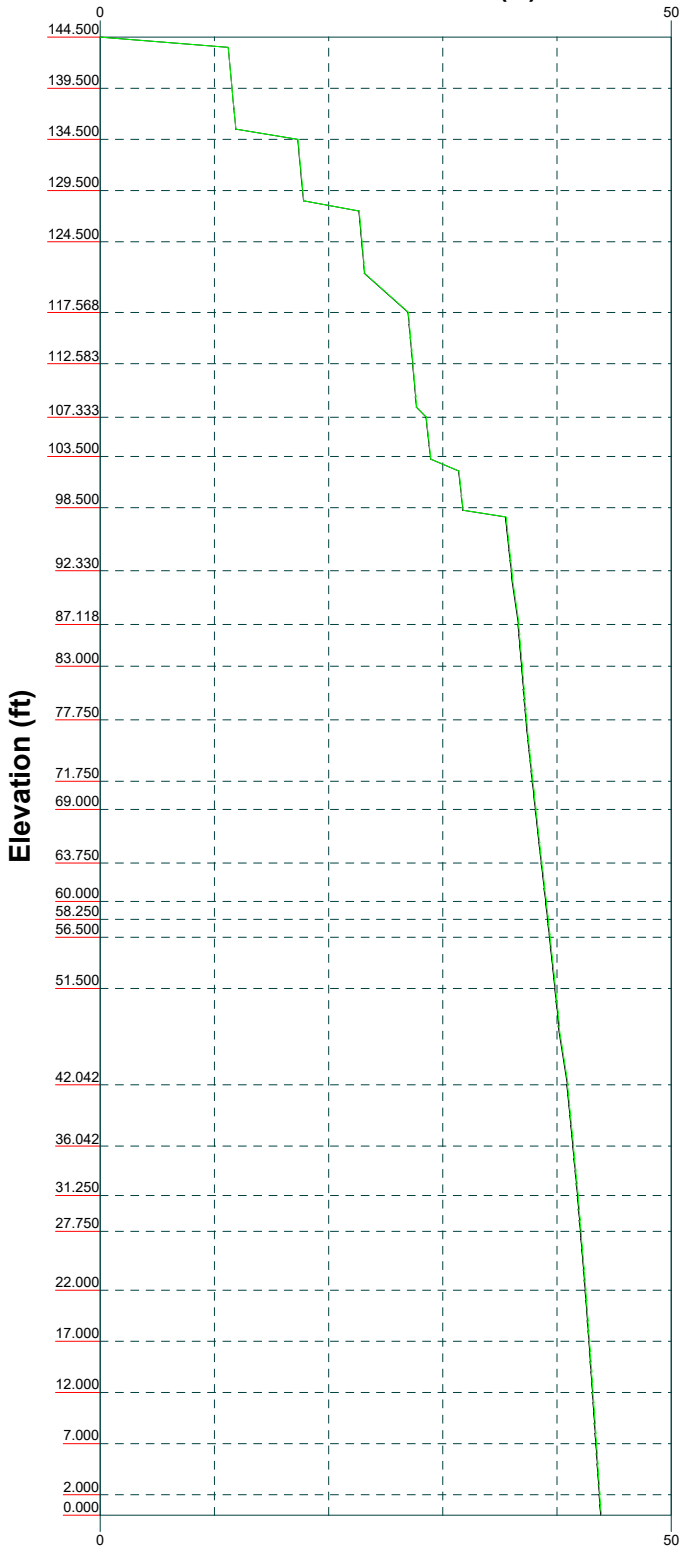
Vz

Mx

Mz

Global Mast Shear (K)

Global Mast Moment (kip-ft)



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Job: 92739.021.01 - GROTON TOWER, CT (BU# 881533)		
Project:		
Client: Crown Castle	Drawn by: JD Prabhu	App'd:
Code: TIA-222-H	Date: 01/18/22	Scale: NTS
Path:	Dwg No. E-4	

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<p>tnxTower</p> <p>B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	<p>Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)</p>	<p>Page 1 of 59</p>
	<p>Project</p>	<p>Date 18:52:00 01/18/22</p>
	<p>Client Crown Castle</p>	<p>Designed by JD Prabhu</p>

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: 128.000 ft.

Basic wind speed of 127 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 1.000 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 60 mph.

TIA-222-H Annex S.

TOWER RATING: 83.8%.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

Tower analysis based on target reliabilities in accordance with Annex S.

Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.

Maximum demand-capacity ratio is: 1.05.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)	Page 2 of 59
	Project	Date 18:52:00 01/18/22
	Client Crown Castle	Designed by JD Prabhu

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	144.500-139.500	5.000	0.000	18	21.000	22.092	0.188	0.750	A572-65 (65 ksi)
L2	139.500-134.500	5.000	0.000	18	22.092	23.184	0.188	0.750	A572-65 (65 ksi)
L3	134.500-129.500	5.000	0.000	18	23.184	24.276	0.188	0.750	A572-65 (65 ksi)
L4	129.500-124.500	5.000	0.000	18	24.276	25.368	0.188	0.750	A572-65 (65 ksi)
L5	124.500-117.568	6.932	3.841	18	25.368	26.882	0.188	0.750	A572-65 (65 ksi)
L6	117.568-116.409	5.000	0.000	18	25.668	26.737	0.250	1.000	A572-65 (65 ksi)
L7	116.409-112.583	3.826	0.000	18	26.737	27.555	0.250	1.000	A572-65 (65 ksi)
L8	112.583-112.333	0.250	0.000	18	27.555	27.608	0.250	1.000	A572-65 (65 ksi)
L9	112.333-107.333	5.000	0.000	18	27.608	28.677	0.250	1.000	A572-65 (65 ksi)
L10	107.333-106.920	0.413	0.000	18	28.677	28.765	0.250	1.000	A572-65 (65 ksi)
L11	106.920-106.670	0.250	0.000	18	28.765	28.818	0.537	2.150	A572-65 (65 ksi)
L12	106.670-103.500	3.170	0.000	18	28.818	29.496	0.525	2.100	A572-65 (65 ksi)
L13	103.500-103.250	0.250	0.000	18	29.496	29.549	0.525	2.100	A572-65 (65 ksi)
L14	103.250-98.500	4.750	0.000	18	29.549	30.564	0.512	2.050	A572-65 (65 ksi)
L15	98.500-98.250	0.250	0.000	18	30.564	30.618	0.675	2.700	A572-65 (65 ksi)
L16	98.250-97.580	0.670	0.000	18	30.618	30.761	0.675	2.700	A572-65 (65 ksi)
L17	97.580-97.330	0.250	0.000	18	30.761	30.815	0.563	2.250	A572-65 (65 ksi)
L18	97.330-92.330	5.000	0.000	18	30.815	31.883	0.550	2.200	A572-65 (65 ksi)
L19	92.330-87.118	5.212	4.625	18	31.883	32.997	0.550	2.200	A572-65 (65 ksi)
L20	87.118-86.118	5.625	0.000	18	31.509	32.720	0.375	1.500	A572-65 (65 ksi)
L21	86.118-83.000	3.118	0.000	18	32.720	33.392	0.375	1.500	A572-65 (65 ksi)
L22	83.000-82.750	0.250	0.000	18	33.392	33.446	0.375	1.500	A572-65 (65 ksi)
L23	82.750-77.750	5.000	0.000	18	33.446	34.523	0.375	1.500	A572-65 (65 ksi)
L24	77.750-77.250	0.500	0.000	18	34.523	34.631	0.375	1.500	A572-65 (65 ksi)
L25	77.250-77.000	0.250	0.000	18	34.631	34.685	0.825	3.300	A572-65 (65 ksi)
L26	77.000-76.750	0.250	0.000	18	34.685	34.738	0.637	2.550	A572-65 (65 ksi)
L27	76.750-71.750	5.000	0.000	18	34.738	35.816	0.625	2.500	A572-65 (65 ksi)
L28	71.750-69.000	2.750	0.000	18	35.816	36.408	0.625	2.500	A572-65 (65 ksi)

tnxTower

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

Job
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Project
Date
 18:52:00 01/18/22

Client
 Crown Castle
Designed by
 JD Prabhu

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L29	69.000-68.750	0.250	0.000	18	36.408	36.462	0.800	3.200	A572-65 (65 ksi)
L30	68.750-63.750	5.000	0.000	18	36.462	37.539	0.787	3.150	A572-65 (65 ksi)
L31	63.750-60.000	3.750	0.000	18	37.539	38.347	0.775	3.100	A572-65 (65 ksi)
L32	60.000-59.750	0.250	0.000	18	38.347	38.401	0.775	3.100	A572-65 (65 ksi)
L33	59.750-58.500	1.250	0.000	18	38.401	38.670	0.775	3.100	A572-65 (65 ksi)
L34	58.500-58.250	0.250	0.000	18	38.670	38.724	0.775	3.100	A572-65 (65 ksi)
L35	58.250-58.000	0.250	0.000	18	38.724	38.778	0.775	3.100	A572-65 (65 ksi)
L36	58.000-57.750	0.250	0.000	18	38.778	38.832	0.613	2.450	A572-65 (65 ksi)
L37	57.750-56.750	1.000	0.000	18	38.832	39.047	0.613	2.450	A572-65 (65 ksi)
L38	56.750-56.500	0.250	0.000	18	39.047	39.101	0.738	2.950	A572-65 (65 ksi)
L39	56.500-51.500	5.000	0.000	18	39.101	40.178	0.725	2.900	A572-65 (65 ksi)
L40	51.500-42.042	9.458	5.776	18	40.178	42.215	0.713	2.850	A572-65 (65 ksi)
L41	42.042-41.042	6.776	0.000	18	40.221	41.678	0.787	3.150	A572-65 (65 ksi)
L42	41.042-36.042	5.000	0.000	18	41.678	42.753	0.787	3.150	A572-65 (65 ksi)
L43	36.042-31.250	4.792	0.000	18	42.753	43.783	0.762	3.050	A572-65 (65 ksi)
L44	31.250-31.000	0.250	0.000	18	43.783	43.836	0.650	2.600	A572-65 (65 ksi)
L45	31.000-27.750	3.250	0.000	18	43.836	44.535	0.650	2.600	A572-65 (65 ksi)
L46	27.750-27.500	0.250	0.000	18	44.535	44.589	0.650	2.600	A572-65 (65 ksi)
L47	27.500-27.250	0.250	0.000	18	44.589	44.642	0.650	2.600	A572-65 (65 ksi)
L48	27.250-27.000	0.250	0.000	18	44.642	44.696	0.725	2.900	A572-65 (65 ksi)
L49	27.000-22.000	5.000	0.000	18	44.696	45.771	0.713	2.850	A572-65 (65 ksi)
L50	22.000-17.000	5.000	0.000	18	45.771	46.846	0.713	2.850	A572-65 (65 ksi)
L51	17.000-12.000	5.000	0.000	18	46.846	47.921	0.713	2.850	A572-65 (65 ksi)
L52	12.000-7.000	5.000	0.000	18	47.921	48.995	0.713	2.850	A572-65 (65 ksi)
L53	7.000-2.000	5.000	0.000	18	48.995	50.070	0.700	2.800	A572-65 (65 ksi)
L54	2.000-0.000	2.000		18	50.070	50.500	0.700	2.800	A572-65 (65 ksi)

Tapered Pole Properties

<p>tnxTower</p> <p>B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	Job	Page	
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	Project	Date	18:52:00 01/18/22
Client	Crown Castle	Designed by JD Prabhu	

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	21.295	12.386	677.826	7.388	10.668	63.538	1356.544	6.194	3.366	17.952
	22.404	13.036	790.221	7.776	11.223	70.412	1581.483	6.519	3.558	18.977
L2	22.404	13.036	790.221	7.776	11.223	70.412	1581.483	6.519	3.558	18.977
	23.513	13.686	914.401	8.164	11.778	77.640	1830.006	6.844	3.750	20.002
L3	23.513	13.686	914.401	8.164	11.778	77.640	1830.006	6.844	3.750	20.002
	24.622	14.336	1050.954	8.551	12.332	85.220	2103.290	7.169	3.943	21.027
L4	24.622	14.336	1050.954	8.551	12.332	85.220	2103.290	7.169	3.943	21.027
	25.731	14.986	1200.465	8.939	12.887	93.153	2402.511	7.494	4.135	22.052
L5	25.731	14.986	1200.465	8.939	12.887	93.153	2402.511	7.494	4.135	22.052
	27.268	15.887	1430.295	9.477	13.656	104.736	2862.472	7.945	4.401	23.474
L6	26.859	20.169	1646.369	9.024	13.040	126.260	3294.904	10.087	4.078	16.311
	27.111	21.017	1862.865	9.403	13.582	137.153	3728.181	10.511	4.266	17.063
L7	27.111	21.017	1862.865	9.403	13.582	137.153	3728.181	10.511	4.266	17.063
	27.941	21.666	2040.766	9.693	13.998	145.792	4084.218	10.835	4.410	17.638
L8	27.941	21.666	2040.766	9.693	13.998	145.792	4084.218	10.835	4.410	17.638
	27.995	21.709	2052.770	9.712	14.025	146.366	4108.241	10.856	4.419	17.676
L9	27.995	21.709	2052.770	9.712	14.025	146.366	4108.241	10.856	4.419	17.676
	29.080	22.557	2302.832	10.091	14.568	158.077	4608.695	11.280	4.607	18.428
L10	29.080	22.557	2302.832	10.091	14.568	158.077	4608.695	11.280	4.607	18.428
	29.170	22.627	2324.350	10.123	14.613	159.065	4651.759	11.315	4.623	18.491
L11	29.126	48.157	4847.716	10.021	14.613	331.749	9701.811	24.083	4.117	7.659
	29.180	48.248	4875.296	10.040	14.640	333.018	9757.007	24.129	4.126	7.676
L12	29.182	47.147	4768.234	10.044	14.640	325.705	9542.743	23.578	4.148	7.901
	29.870	48.276	5119.035	10.285	14.984	341.636	10244.805	24.142	4.267	8.128
L13	29.870	48.276	5119.035	10.285	14.984	341.636	10244.805	24.142	4.267	8.128
	29.924	48.365	5147.410	10.304	15.011	342.908	10301.593	24.187	4.277	8.146
L14	29.926	47.233	5031.348	10.308	15.011	335.176	10069.315	23.621	4.299	8.388
	30.957	48.885	5577.727	10.668	15.527	359.233	11162.794	24.447	4.477	8.736
L15	30.932	64.037	7227.748	10.611	15.527	465.503	14465.006	32.024	4.191	6.209
	30.986	64.151	7266.578	10.630	15.554	467.187	14542.718	32.082	4.201	6.223
L16	30.986	64.151	7266.578	10.630	15.554	467.187	14542.718	32.082	4.201	6.223
	31.132	64.458	7371.329	10.681	15.627	471.716	14752.357	32.235	4.226	6.261
L17	31.149	53.916	6211.940	10.721	15.627	397.523	12432.055	26.963	4.424	7.865
	31.203	54.011	6244.971	10.739	15.654	398.943	12498.160	27.011	4.433	7.882
L18	31.205	52.833	6113.766	10.744	15.654	390.562	12235.577	26.421	4.455	8.101
	32.290	54.698	6784.514	11.123	16.197	418.884	13577.956	27.354	4.643	8.443
L19	32.290	54.698	6784.514	11.123	16.197	418.884	13577.956	27.354	4.643	8.443
	33.421	56.643	7534.158	11.519	16.763	449.464	15078.230	28.327	4.839	8.799
L20	32.949	37.057	4538.007	11.052	16.006	283.512	9081.986	18.532	4.886	13.028
	33.167	38.499	5088.777	11.483	16.622	306.148	10184.250	19.253	5.099	13.597
L21	33.167	38.499	5088.777	11.483	16.622	306.148	10184.250	19.253	5.099	13.597
	33.849	39.299	5412.411	11.721	16.963	319.068	10831.944	19.653	5.217	13.912
L22	33.849	39.299	5412.411	11.721	16.963	319.068	10831.944	19.653	5.217	13.912
	33.904	39.363	5438.940	11.740	16.991	320.116	10885.037	19.685	5.226	13.937
L23	33.904	39.363	5438.940	11.740	16.991	320.116	10885.037	19.685	5.226	13.937
	34.998	40.645	5987.880	12.123	17.538	341.429	11983.639	20.326	5.416	14.443
L24	34.998	40.645	5987.880	12.123	17.538	341.429	11983.639	20.326	5.416	14.443
	35.107	40.773	6044.721	12.161	17.592	343.598	12097.396	20.390	5.435	14.493
L25	35.038	88.522	12781.159	12.001	17.592	726.515	25579.137	44.269	4.643	5.628
	35.092	88.663	12842.342	12.020	17.620	728.859	25701.583	44.340	4.652	5.639
L26	35.121	68.892	10089.401	12.087	17.620	572.618	20192.078	34.452	4.982	7.816
	35.176	69.001	10137.356	12.106	17.647	574.447	20288.050	34.507	4.992	7.831
L27	35.178	67.673	9949.517	12.110	17.647	563.803	19912.126	33.843	5.014	8.022
	36.272	69.809	10922.052	12.493	18.194	600.300	21858.476	34.911	5.204	8.326
L28	36.272	69.809	10922.052	12.493	18.194	600.300	21858.476	34.911	5.204	8.326
	36.873	70.985	11482.996	12.703	18.495	620.861	22981.101	35.499	5.308	8.492
L29	36.846	90.416	14483.639	12.641	18.495	783.100	28986.335	45.217	5.000	6.25
	36.901	90.553	14549.457	12.660	18.523	785.496	29118.058	45.285	5.009	6.262
L30	36.903	89.169	14337.187	12.664	18.523	774.036	28693.239	44.593	5.031	6.389
	37.997	91.861	15675.454	13.047	19.070	822.004	31371.535	45.939	5.221	6.63
L31	37.999	90.434	15442.384	13.051	19.070	809.782	30905.087	45.226	5.243	6.765
	38.819	92.421	16482.901	13.338	19.480	846.136	32987.491	46.219	5.385	6.948

<p>tnxTower</p> <p>B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	<p>Job</p> <p>92739.021.01 - GROTON TOWER, CT (BU# 881533)</p>	<p>Page</p> <p>5 of 59</p>
	<p>Project</p>	<p>Date</p> <p>18:52:00 01/18/22</p>
	<p>Client</p> <p>Crown Castle</p>	<p>Designed by</p> <p>JD Prabhu</p>

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	It/Q in ²	w in	w/t
L32	38.819	92.421	16482.901	13.338	19.480	846.136	32987.491	46.219	5.385	6.948
	38.874	92.554	16553.884	13.357	19.508	848.588	33129.550	46.286	5.395	6.961
L33	38.874	92.554	16553.884	13.357	19.508	848.588	33129.550	46.286	5.395	6.961
	39.147	93.216	16911.855	13.453	19.644	860.902	33845.963	46.617	5.442	7.022
L34	39.147	93.216	16911.855	13.453	19.644	860.902	33845.963	46.617	5.442	7.022
	39.202	93.348	16984.063	13.472	19.672	863.375	33990.474	46.683	5.451	7.034
L35	39.202	93.348	16984.063	13.472	19.672	863.375	33990.474	46.683	5.451	7.034
	39.256	93.481	17056.476	13.491	19.699	865.852	34135.396	46.749	5.461	7.046
L36	39.281	74.196	13653.782	13.549	19.699	693.118	27325.531	37.105	5.747	9.383
	39.336	74.301	13711.666	13.568	19.726	695.091	27441.374	37.157	5.756	9.398
L37	39.336	74.301	13711.666	13.568	19.726	695.091	27441.374	37.157	5.756	9.398
	39.555	74.720	13944.837	13.644	19.836	703.011	27908.023	37.367	5.794	9.46
L38	39.536	89.676	16627.429	13.600	19.836	838.251	33276.738	44.846	5.574	7.558
	39.590	89.802	16697.654	13.619	19.863	840.632	33417.279	44.909	5.584	7.571
L39	39.592	88.309	16430.693	13.623	19.863	827.192	32883.006	44.163	5.606	7.732
	40.686	90.787	17853.412	14.006	20.410	874.721	35730.317	45.402	5.795	7.994
L40	40.688	89.250	17562.277	14.010	20.410	860.457	35147.663	44.634	5.817	8.165
	42.757	93.858	20425.266	14.734	21.445	952.428	40877.407	46.938	6.176	8.668
L41	41.981	98.566	19364.112	13.999	20.432	947.717	38753.704	49.292	5.693	7.229
	42.199	102.206	21590.086	14.516	21.172	1019.733	43208.582	51.113	5.949	7.555
L42	42.199	102.206	21590.086	14.516	21.172	1019.733	43208.582	51.113	5.949	7.555
	43.291	104.893	23337.694	14.898	21.718	1074.564	46706.096	52.456	6.138	7.795
L43	43.294	101.623	22637.224	14.906	21.718	1042.311	45304.234	50.821	6.182	8.108
	44.340	104.116	24344.325	15.272	22.242	1094.543	48720.684	52.068	6.364	8.346
L44	44.358	88.987	20915.773	15.312	22.242	940.392	41859.068	44.502	6.562	10.095
	44.412	89.098	20994.048	15.331	22.269	942.754	42015.721	44.557	6.571	10.11
L45	44.412	89.098	20994.048	15.331	22.269	942.754	42015.721	44.557	6.571	10.11
	45.122	90.539	22029.462	15.579	22.624	973.732	44087.911	45.278	6.694	10.299
L46	45.122	90.539	22029.462	15.579	22.624	973.732	44087.911	45.278	6.694	10.299
	45.176	90.650	22110.490	15.598	22.651	976.136	44250.073	45.334	6.704	10.313
L47	45.176	90.650	22110.490	15.598	22.651	976.136	44250.073	45.334	6.704	10.313
	45.231	90.761	22191.716	15.617	22.678	978.542	44412.632	45.389	6.713	10.328
L48	45.219	101.061	24625.918	15.591	22.678	1085.878	49284.240	50.540	6.581	9.077
	45.274	101.184	24716.429	15.610	22.706	1088.559	49465.381	50.602	6.591	9.09
L49	45.276	99.468	24311.005	15.614	22.706	1070.703	48653.999	49.743	6.613	9.281
	46.367	101.899	26137.107	15.996	23.252	1124.098	52308.605	50.959	6.802	9.546
L50	46.367	101.899	26137.107	15.996	23.252	1124.098	52308.605	50.959	6.802	9.546
	47.458	104.329	28052.436	16.377	23.798	1178.791	56141.785	52.174	6.991	9.812
L51	47.458	104.329	28052.436	16.377	23.798	1178.791	56141.785	52.174	6.991	9.812
	48.550	106.760	30059.123	16.759	24.344	1234.784	60157.798	53.390	7.180	10.077
L52	48.550	106.760	30059.123	16.759	24.344	1234.784	60157.798	53.390	7.180	10.077
	49.641	109.190	32159.294	17.140	24.890	1292.077	64360.904	54.606	7.369	10.343
L53	49.643	107.302	31619.641	17.145	24.890	1270.395	63280.888	53.661	7.391	10.559
	50.735	109.690	33778.008	17.526	25.436	1327.981	67600.462	54.856	7.580	10.829
L54	50.735	109.690	33778.008	17.526	25.436	1327.981	67600.462	54.856	7.580	10.829
	51.171	110.646	34668.132	17.679	25.654	1351.373	69381.881	55.333	7.656	10.937

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 144.500-139.5 00				1	1	1			
L2 139.500-134.5 00				1	1	1			
L3 134.500-129.5 00				1	1	1			

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)	Page 9 of 59
	Project	Date 18:52:00 01/18/22
	Client Crown Castle	Designed by JD Prabhu

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
CCI 8.5" x 1.25" Plate	C	No	Surface Af (CaAa)	62.250 - 27.250	1	1	0.250 0.250	8.500	19.500	0.000
*										
CCI 4" x 0.75" Plate	A	No	Surface Af (CaAa)	107.000 - 97.000	1	1	-0.250 -0.250	4.000	9.500	0.000
CCI 4" x 0.75" Plate	B	No	Surface Af (CaAa)	107.000 - 97.000	1	1	-0.250 -0.250	4.000	9.500	0.000
CCI 4" x 0.75" Plate	C	No	Surface Af (CaAa)	107.000 - 97.000	1	1	-0.250 -0.250	4.000	9.500	0.000
*										
CCI 6.5" x 1.25" Plate	C	No	Surface Af (CaAa)	59.500 - 24.500	1	1	0.000 0.000	6.500	15.500	0.000
*										
CCI 6" x 1" Plate	A	No	Surface Af (CaAa)	71.000 - 56.000	1	1	0.000 0.000	6.000	14.000	0.000
CCI 6" x 1" Plate	B	No	Surface Af (CaAa)	71.000 - 56.000	1	1	0.000 0.000	6.000	14.000	0.000
CCI 6" x 1" Plate	C	No	Surface Af (CaAa)	71.000 - 56.000	1	1	0.000 0.000	6.000	14.000	0.000
*										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight klf
LDF7-50A(1-5/8)	C	No	No	Inside Pole	144.500 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	144.500 - 0.000	2	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	144.500 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
PWRT-606-S(7/8)	C	No	No	Inside Pole	144.500 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
PWRT-608-S(13/16)	C	No	No	Inside Pole	144.500 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
2" Rigid Conduit	C	No	No	Inside Pole	144.500 - 0.000	4	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
*									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	135.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
HB158-21U6S12-XXM-01(1-5/8)	C	No	No	Inside Pole	135.000 - 0.000	2	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002

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019 SA

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)	Page 10 of 59
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Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C _{AA} ft ² /ft	Weight klf
LDF7-50A(1-5/8)	B	No	No	Inside Pole	128.000 - 0.000	5	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	128.000 - 0.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
*									
LDF4.5-50(5/8)	A	No	No	Inside Pole	118.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
HB114-1-08U4-M5J (1-1/4)	A	No	No	Inside Pole	118.000 - 0.000	3	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
*									
CU12PSM9P6XXX(1-1/2)	B	No	No	Inside Pole	98.000 - 0.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
*									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	144.500-139.500	A	0.000	0.000	0.188	0.000	0.001
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.109
L2	139.500-134.500	A	0.000	0.000	0.188	0.000	0.001
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.113
L3	134.500-129.500	A	0.000	0.000	0.188	0.000	0.001
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.153
L4	129.500-124.500	A	0.000	0.000	0.188	0.000	0.001
		B	0.000	0.000	1.386	0.000	0.020
		C	0.000	0.000	0.000	0.000	0.161
L5	124.500-117.568	A	0.000	0.000	0.260	0.000	0.003
		B	0.000	0.000	2.745	0.000	0.040
		C	0.000	0.000	0.000	0.000	0.228
L6	117.568-116.409	A	0.000	0.000	0.043	0.000	0.004
		B	0.000	0.000	0.459	0.000	0.007
		C	0.000	0.000	0.000	0.000	0.038
L7	116.409-112.583	A	0.000	0.000	1.266	0.000	0.014
		B	0.000	0.000	2.638	0.000	0.022
		C	0.000	0.000	1.123	0.000	0.126
L8	112.583-112.333	A	0.000	0.000	0.197	0.000	0.001
		B	0.000	0.000	0.286	0.000	0.001
		C	0.000	0.000	0.188	0.000	0.008
L9	112.333-107.333	A	0.000	0.000	3.938	0.000	0.018
		B	0.000	0.000	5.730	0.000	0.029
		C	0.000	0.000	3.750	0.000	0.165
L10	107.333-106.920	A	0.000	0.000	0.379	0.000	0.001
		B	0.000	0.000	0.527	0.000	0.002
		C	0.000	0.000	0.363	0.000	0.014

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L11	106.920-106.670	A	0.000	0.000	0.364	0.000	0.001
		B	0.000	0.000	0.453	0.000	0.001
		C	0.000	0.000	0.354	0.000	0.008
L12	106.670-103.500	A	0.000	0.000	5.735	0.000	0.011
		B	0.000	0.000	6.871	0.000	0.018
		C	0.000	0.000	5.616	0.000	0.104
L13	103.500-103.250	A	0.000	0.000	0.551	0.000	0.001
		B	0.000	0.000	0.641	0.000	0.001
		C	0.000	0.000	0.542	0.000	0.008
L14	103.250-98.500	A	0.000	0.000	10.845	0.000	0.017
		B	0.000	0.000	12.548	0.000	0.027
		C	0.000	0.000	10.667	0.000	0.156
L15	98.500-98.250	A	0.000	0.000	0.551	0.000	0.001
		B	0.000	0.000	0.641	0.000	0.001
		C	0.000	0.000	0.542	0.000	0.008
L16	98.250-97.580	A	0.000	0.000	1.477	0.000	0.002
		B	0.000	0.000	1.717	0.000	0.005
		C	0.000	0.000	1.452	0.000	0.022
L17	97.580-97.330	A	0.000	0.000	0.551	0.000	0.001
		B	0.000	0.000	0.641	0.000	0.002
		C	0.000	0.000	0.542	0.000	0.008
L18	97.330-92.330	A	0.000	0.000	7.907	0.000	0.018
		B	0.000	0.000	9.700	0.000	0.040
		C	0.000	0.000	7.720	0.000	0.165
L19	92.330-87.118	A	0.000	0.000	3.690	0.000	0.019
		B	0.000	0.000	5.559	0.000	0.042
		C	0.000	0.000	3.495	0.000	0.172
L20	87.118-86.118	A	0.000	0.000	0.037	0.000	0.004
		B	0.000	0.000	0.396	0.000	0.008
		C	0.000	0.000	0.000	0.000	0.033
L21	86.118-83.000	A	0.000	0.000	1.941	0.000	0.011
		B	0.000	0.000	3.059	0.000	0.025
		C	0.000	0.000	1.824	0.000	0.103
L22	83.000-82.750	A	0.000	0.000	0.237	0.000	0.001
		B	0.000	0.000	0.327	0.000	0.002
		C	0.000	0.000	0.228	0.000	0.008
L23	82.750-77.750	A	0.000	0.000	7.186	0.000	0.018
		B	0.000	0.000	8.978	0.000	0.040
		C	0.000	0.000	6.998	0.000	0.165
L24	77.750-77.250	A	0.000	0.000	1.016	0.000	0.002
		B	0.000	0.000	1.196	0.000	0.004
		C	0.000	0.000	0.998	0.000	0.016
L25	77.250-77.000	A	0.000	0.000	0.508	0.000	0.001
		B	0.000	0.000	0.598	0.000	0.002
		C	0.000	0.000	0.499	0.000	0.008
L26	77.000-76.750	A	0.000	0.000	0.508	0.000	0.001
		B	0.000	0.000	0.598	0.000	0.002
		C	0.000	0.000	0.499	0.000	0.008
L27	76.750-71.750	A	0.000	0.000	7.200	0.000	0.018
		B	0.000	0.000	8.993	0.000	0.040
		C	0.000	0.000	7.013	0.000	0.165
L28	71.750-69.000	A	0.000	0.000	5.082	0.000	0.010
		B	0.000	0.000	6.068	0.000	0.022
		C	0.000	0.000	4.979	0.000	0.091
L29	69.000-68.750	A	0.000	0.000	0.530	0.000	0.001
		B	0.000	0.000	0.620	0.000	0.002
		C	0.000	0.000	0.521	0.000	0.008
L30	68.750-63.750	A	0.000	0.000	10.604	0.000	0.018
		B	0.000	0.000	12.397	0.000	0.040
		C	0.000	0.000	10.417	0.000	0.165
L31	63.750-60.000	A	0.000	0.000	7.953	0.000	0.014

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	Client Crown Castle	Designed by JD Prabhu

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
		B	0.000	0.000	9.297	0.000	0.030
		C	0.000	0.000	11.000	0.000	0.123
L32	60.000-59.750	A	0.000	0.000	0.530	0.000	0.001
		B	0.000	0.000	0.620	0.000	0.002
		C	0.000	0.000	0.875	0.000	0.008
L33	59.750-58.500	A	0.000	0.000	2.651	0.000	0.005
		B	0.000	0.000	3.099	0.000	0.010
		C	0.000	0.000	5.458	0.000	0.041
L34	58.500-58.250	A	0.000	0.000	0.530	0.000	0.001
		B	0.000	0.000	0.620	0.000	0.002
		C	0.000	0.000	1.146	0.000	0.008
L35	58.250-58.000	A	0.000	0.000	0.530	0.000	0.001
		B	0.000	0.000	0.620	0.000	0.002
		C	0.000	0.000	1.146	0.000	0.008
L36	58.000-57.750	A	0.000	0.000	0.530	0.000	0.001
		B	0.000	0.000	0.620	0.000	0.002
		C	0.000	0.000	1.146	0.000	0.008
L37	57.750-56.750	A	0.000	0.000	2.121	0.000	0.004
		B	0.000	0.000	2.479	0.000	0.008
		C	0.000	0.000	4.583	0.000	0.033
L38	56.750-56.500	A	0.000	0.000	0.530	0.000	0.001
		B	0.000	0.000	0.620	0.000	0.002
		C	0.000	0.000	1.146	0.000	0.008
L39	56.500-51.500	A	0.000	0.000	6.104	0.000	0.018
		B	0.000	0.000	7.897	0.000	0.040
		C	0.000	0.000	18.417	0.000	0.165
L40	51.500-42.042	A	0.000	0.000	10.601	0.000	0.034
		B	0.000	0.000	13.992	0.000	0.077
		C	0.000	0.000	33.892	0.000	0.311
L41	42.042-41.042	A	0.000	0.000	1.121	0.000	0.004
		B	0.000	0.000	1.479	0.000	0.008
		C	0.000	0.000	3.583	0.000	0.033
L42	41.042-36.042	A	0.000	0.000	5.604	0.000	0.018
		B	0.000	0.000	7.397	0.000	0.040
		C	0.000	0.000	17.917	0.000	0.165
L43	36.042-31.250	A	0.000	0.000	10.683	0.000	0.017
		B	0.000	0.000	8.339	0.000	0.039
		C	0.000	0.000	18.421	0.000	0.158
L44	31.250-31.000	A	0.000	0.000	0.634	0.000	0.001
		B	0.000	0.000	0.453	0.000	0.002
		C	0.000	0.000	0.979	0.000	0.008
L45	31.000-27.750	A	0.000	0.000	10.309	0.000	0.012
		B	0.000	0.000	10.391	0.000	0.026
		C	0.000	0.000	12.729	0.000	0.107
L46	27.750-27.500	A	0.000	0.000	0.864	0.000	0.001
		B	0.000	0.000	0.953	0.000	0.002
		C	0.000	0.000	0.979	0.000	0.008
L47	27.500-27.250	A	0.000	0.000	0.864	0.000	0.001
		B	0.000	0.000	0.953	0.000	0.002
		C	0.000	0.000	0.979	0.000	0.008
L48	27.250-27.000	A	0.000	0.000	0.864	0.000	0.001
		B	0.000	0.000	0.953	0.000	0.002
		C	0.000	0.000	0.625	0.000	0.008
L49	27.000-22.000	A	0.000	0.000	14.021	0.000	0.018
		B	0.000	0.000	19.063	0.000	0.040
		C	0.000	0.000	9.792	0.000	0.165
L50	22.000-17.000	A	0.000	0.000	11.854	0.000	0.018
		B	0.000	0.000	19.063	0.000	0.040
		C	0.000	0.000	7.083	0.000	0.165
L51	17.000-12.000	A	0.000	0.000	11.854	0.000	0.018
		B	0.000	0.000	19.063	0.000	0.040

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	Client Crown Castle	Designed by JD Prabhu

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L52	12.000-7.000	C	0.000	0.000	7.083	0.000	0.165
		A	0.000	0.000	11.854	0.000	0.018
		B	0.000	0.000	19.063	0.000	0.040
L53	7.000-2.000	C	0.000	0.000	7.083	0.000	0.165
		A	0.000	0.000	11.854	0.000	0.018
		B	0.000	0.000	19.063	0.000	0.040
L54	2.000-0.000	C	0.000	0.000	7.083	0.000	0.165
		A	0.000	0.000	4.742	0.000	0.007
		B	0.000	0.000	7.625	0.000	0.016
		C	0.000	0.000	2.833	0.000	0.066

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	144.500-139.500	A	0.984	0.000	0.000	1.171	0.000	0.009
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.109
L2	139.500-134.500	A	0.980	0.000	0.000	1.168	0.000	0.009
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.113
L3	134.500-129.500	A	0.976	0.000	0.000	1.164	0.000	0.009
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.153
L4	129.500-124.500	A	0.973	0.000	0.000	1.160	0.000	0.009
		B		0.000	0.000	2.584	0.000	0.039
		C		0.000	0.000	0.000	0.000	0.161
L5	124.500-117.568	A	0.968	0.000	0.000	1.602	0.000	0.014
		B		0.000	0.000	5.109	0.000	0.077
		C		0.000	0.000	0.000	0.000	0.228
L6	117.568-116.409	A	0.965	0.000	0.000	0.268	0.000	0.006
		B		0.000	0.000	0.854	0.000	0.013
		C		0.000	0.000	0.000	0.000	0.038
L7	116.409-112.583	A	0.963	0.000	0.000	2.291	0.000	0.028
		B		0.000	0.000	4.225	0.000	0.050
		C		0.000	0.000	1.411	0.000	0.134
L8	112.583-112.333	A	0.961	0.000	0.000	0.293	0.000	0.003
		B		0.000	0.000	0.419	0.000	0.004
		C		0.000	0.000	0.236	0.000	0.010
L9	112.333-107.333	A	0.959	0.000	0.000	5.855	0.000	0.053
		B		0.000	0.000	8.382	0.000	0.082
		C		0.000	0.000	4.709	0.000	0.192
L10	107.333-106.920	A	0.956	0.000	0.000	0.548	0.000	0.005
		B		0.000	0.000	0.757	0.000	0.007
		C		0.000	0.000	0.454	0.000	0.016
L11	106.920-106.670	A	0.956	0.000	0.000	0.496	0.000	0.004
		B		0.000	0.000	0.623	0.000	0.005
		C		0.000	0.000	0.439	0.000	0.011
L12	106.670-103.500	A	0.954	0.000	0.000	7.704	0.000	0.057
		B		0.000	0.000	9.305	0.000	0.075
		C		0.000	0.000	6.980	0.000	0.145
L13	103.500-103.250	A	0.953	0.000	0.000	0.731	0.000	0.005
		B		0.000	0.000	0.857	0.000	0.007
		C		0.000	0.000	0.674	0.000	0.012
L14	103.250-98.500	A	0.950	0.000	0.000	14.240	0.000	0.101
		B		0.000	0.000	16.639	0.000	0.129
		C		0.000	0.000	13.159	0.000	0.233

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Client	Crown Castle	Designed by	JD Prabhu

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L15	98.500-98.250	A	0.948	0.000	0.000	0.711	0.000	0.005
		B		0.000	0.000	0.837	0.000	0.007
		C		0.000	0.000	0.654	0.000	0.012
L16	98.250-97.580	A	0.948	0.000	0.000	1.906	0.000	0.014
		B		0.000	0.000	2.244	0.000	0.019
		C		0.000	0.000	1.754	0.000	0.032
L17	97.580-97.330	A	0.947	0.000	0.000	0.711	0.000	0.005
		B		0.000	0.000	0.837	0.000	0.007
		C		0.000	0.000	0.654	0.000	0.012
L18	97.330-92.330	A	0.945	0.000	0.000	10.410	0.000	0.081
		B		0.000	0.000	12.933	0.000	0.121
		C		0.000	0.000	9.278	0.000	0.220
L19	92.330-87.118	A	0.939	0.000	0.000	5.369	0.000	0.051
		B		0.000	0.000	7.999	0.000	0.094
		C		0.000	0.000	4.194	0.000	0.196
L20	87.118-86.118	A	0.936	0.000	0.000	0.225	0.000	0.005
		B		0.000	0.000	0.730	0.000	0.013
		C		0.000	0.000	0.000	0.000	0.033
L21	86.118-83.000	A	0.934	0.000	0.000	2.724	0.000	0.029
		B		0.000	0.000	4.296	0.000	0.054
		C		0.000	0.000	2.025	0.000	0.115
L22	83.000-82.750	A	0.932	0.000	0.000	0.309	0.000	0.003
		B		0.000	0.000	0.435	0.000	0.005
		C		0.000	0.000	0.253	0.000	0.010
L23	82.750-77.750	A	0.929	0.000	0.000	9.032	0.000	0.073
		B		0.000	0.000	11.551	0.000	0.113
		C		0.000	0.000	7.915	0.000	0.212
L24	77.750-77.250	A	0.926	0.000	0.000	1.251	0.000	0.009
		B		0.000	0.000	1.503	0.000	0.013
		C		0.000	0.000	1.140	0.000	0.023
L25	77.250-77.000	A	0.925	0.000	0.000	0.626	0.000	0.005
		B		0.000	0.000	0.752	0.000	0.007
		C		0.000	0.000	0.570	0.000	0.012
L26	77.000-76.750	A	0.925	0.000	0.000	0.626	0.000	0.005
		B		0.000	0.000	0.752	0.000	0.007
		C		0.000	0.000	0.570	0.000	0.012
L27	76.750-71.750	A	0.922	0.000	0.000	9.217	0.000	0.070
		B		0.000	0.000	11.735	0.000	0.111
		C		0.000	0.000	8.108	0.000	0.210
L28	71.750-69.000	A	0.917	0.000	0.000	6.437	0.000	0.045
		B		0.000	0.000	7.822	0.000	0.067
		C		0.000	0.000	5.830	0.000	0.122
L29	69.000-68.750	A	0.915	0.000	0.000	0.665	0.000	0.005
		B		0.000	0.000	0.791	0.000	0.007
		C		0.000	0.000	0.610	0.000	0.011
L30	68.750-63.750	A	0.911	0.000	0.000	13.290	0.000	0.090
		B		0.000	0.000	15.806	0.000	0.130
		C		0.000	0.000	12.192	0.000	0.229
L31	63.750-60.000	A	0.905	0.000	0.000	9.956	0.000	0.067
		B		0.000	0.000	11.841	0.000	0.097
		C		0.000	0.000	12.731	0.000	0.190
L32	60.000-59.750	A	0.902	0.000	0.000	0.663	0.000	0.004
		B		0.000	0.000	0.789	0.000	0.006
		C		0.000	0.000	1.008	0.000	0.013
L33	59.750-58.500	A	0.901	0.000	0.000	3.316	0.000	0.022
		B		0.000	0.000	3.944	0.000	0.032
		C		0.000	0.000	6.304	0.000	0.074
L34	58.500-58.250	A	0.900	0.000	0.000	0.663	0.000	0.004
		B		0.000	0.000	0.789	0.000	0.006
		C		0.000	0.000	1.324	0.000	0.015
L35	58.250-58.000	A	0.900	0.000	0.000	0.663	0.000	0.004

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Client	Crown Castle	Designed by	JD Prabhu

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
		B		0.000	0.000	0.789	0.000	0.006
		C		0.000	0.000	1.324	0.000	0.015
L36	58.000-57.750	A	0.899	0.000	0.000	0.663	0.000	0.004
		B		0.000	0.000	0.789	0.000	0.006
		C		0.000	0.000	1.324	0.000	0.015
L37	57.750-56.750	A	0.898	0.000	0.000	2.651	0.000	0.018
		B		0.000	0.000	3.154	0.000	0.026
		C		0.000	0.000	5.294	0.000	0.060
L38	56.750-56.500	A	0.897	0.000	0.000	0.663	0.000	0.004
		B		0.000	0.000	0.788	0.000	0.006
		C		0.000	0.000	1.323	0.000	0.015
L39	56.500-51.500	A	0.893	0.000	0.000	7.975	0.000	0.061
		B		0.000	0.000	10.486	0.000	0.100
		C		0.000	0.000	21.181	0.000	0.273
L40	51.500-42.042	A	0.880	0.000	0.000	13.931	0.000	0.108
		B		0.000	0.000	18.674	0.000	0.182
		C		0.000	0.000	38.886	0.000	0.507
L41	42.042-41.042	A	0.870	0.000	0.000	1.473	0.000	0.011
		B		0.000	0.000	1.974	0.000	0.019
		C		0.000	0.000	4.111	0.000	0.054
L42	41.042-36.042	A	0.863	0.000	0.000	7.331	0.000	0.056
		B		0.000	0.000	9.834	0.000	0.095
		C		0.000	0.000	20.506	0.000	0.266
L43	36.042-31.250	A	0.852	0.000	0.000	12.954	0.000	0.081
		B		0.000	0.000	10.649	0.000	0.095
		C		0.000	0.000	20.869	0.000	0.258
L44	31.250-31.000	A	0.845	0.000	0.000	0.761	0.000	0.005
		B		0.000	0.000	0.573	0.000	0.005
		C		0.000	0.000	1.106	0.000	0.013
L45	31.000-27.750	A	0.840	0.000	0.000	12.326	0.000	0.072
		B		0.000	0.000	12.698	0.000	0.091
		C		0.000	0.000	14.367	0.000	0.175
L46	27.750-27.500	A	0.835	0.000	0.000	1.031	0.000	0.006
		B		0.000	0.000	1.155	0.000	0.008
		C		0.000	0.000	1.104	0.000	0.013
L47	27.500-27.250	A	0.834	0.000	0.000	1.030	0.000	0.006
		B		0.000	0.000	1.155	0.000	0.008
		C		0.000	0.000	1.104	0.000	0.013
L48	27.250-27.000	A	0.833	0.000	0.000	1.030	0.000	0.006
		B		0.000	0.000	1.155	0.000	0.008
		C		0.000	0.000	0.708	0.000	0.012
L49	27.000-22.000	A	0.825	0.000	0.000	16.826	0.000	0.099
		B		0.000	0.000	23.065	0.000	0.155
		C		0.000	0.000	11.029	0.000	0.216
L50	22.000-17.000	A	0.806	0.000	0.000	14.273	0.000	0.085
		B		0.000	0.000	22.986	0.000	0.152
		C		0.000	0.000	7.890	0.000	0.200
L51	17.000-12.000	A	0.783	0.000	0.000	14.203	0.000	0.083
		B		0.000	0.000	22.885	0.000	0.149
		C		0.000	0.000	7.866	0.000	0.199
L52	12.000-7.000	A	0.750	0.000	0.000	14.105	0.000	0.080
		B		0.000	0.000	22.748	0.000	0.144
		C		0.000	0.000	7.834	0.000	0.197
L53	7.000-2.000	A	0.696	0.000	0.000	13.943	0.000	0.074
		B		0.000	0.000	22.518	0.000	0.135
		C		0.000	0.000	7.780	0.000	0.195
L54	2.000-0.000	A	0.599	0.000	0.000	5.461	0.000	0.026
		B		0.000	0.000	8.842	0.000	0.048
		C		0.000	0.000	3.073	0.000	0.076

<p>tnxTower</p> <p>B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	<p>Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)</p>	<p>Page 16 of 59</p>
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	<p>Client Crown Castle</p>	<p>Designed by JD Prabhu</p>

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x Ice	CP _z Ice
	ft	in	in	in	in
L1	144.500-139.500	-0.003	-0.301	-0.010	-0.981
L2	139.500-134.500	-0.003	-0.301	-0.010	-0.986
L3	134.500-129.500	-0.003	-0.301	-0.010	-0.990
L4	129.500-124.500	1.847	-1.079	1.665	-1.513
L5	124.500-117.568	2.483	-1.349	2.192	-1.691
L6	117.568-116.409	2.490	-1.354	2.206	-1.702
L7	116.409-112.583	1.761	-0.958	1.772	-1.366
L8	112.583-112.333	1.218	-0.662	1.361	-1.050
L9	112.333-107.333	1.232	-0.670	1.376	-1.061
L10	107.333-106.920	1.146	-0.623	1.307	-1.008
L11	106.920-106.670	0.861	-0.468	1.046	-0.807
L12	106.670-103.500	0.746	-0.406	0.929	-0.716
L13	103.500-103.250	0.650	-0.354	0.827	-0.637
L14	103.250-98.500	0.642	-0.349	0.823	-0.634
L15	98.500-98.250	0.668	-0.363	0.863	-0.665
L16	98.250-97.580	0.669	-0.364	0.864	-0.666
L17	97.580-97.330	0.671	-0.365	0.866	-0.668
L18	97.330-92.330	0.861	-0.469	1.070	-0.824
L19	92.330-87.118	1.400	-0.762	1.561	-1.202
L20	87.118-86.118	2.557	-1.393	2.331	-1.795
L21	86.118-83.000	1.498	-0.816	1.679	-1.292
L22	83.000-82.750	1.223	-0.666	1.459	-1.122
L23	82.750-77.750	0.966	-0.526	1.214	-0.933
L24	77.750-77.250	0.772	-0.421	1.011	-0.777
L25	77.250-77.000	0.774	-0.422	1.013	-0.778
L26	77.000-76.750	0.775	-0.422	1.014	-0.779
L27	76.750-71.750	0.988	-0.538	1.225	-0.941
L28	71.750-69.000	0.851	-0.464	1.081	-0.829
L29	69.000-68.750	0.778	-0.424	1.004	-0.770
L30	68.750-63.750	0.786	-0.428	1.013	-0.777
L31	63.750-60.000	-0.827	0.659	-0.309	0.126
L32	60.000-59.750	-1.769	1.294	-1.102	0.668
L33	59.750-58.500	-1.639	2.720	-1.033	1.932
L34	58.500-58.250	-1.614	3.050	-1.020	2.228
L35	58.250-58.000	-1.616	3.054	-1.021	2.231
L36	58.000-57.750	-1.617	3.056	-1.022	2.233
L37	57.750-56.750	-1.622	3.064	-1.025	2.238
L38	56.750-56.500	-1.626	3.073	-1.028	2.244
L39	56.500-51.500	-2.142	4.046	-1.302	2.838
L40	51.500-42.042	-2.278	4.297	-1.378	2.997
L41	42.042-41.042	-2.293	4.324	-1.387	3.015
L42	41.042-36.042	-2.317	4.369	-1.406	3.050
L43	36.042-31.250	-2.883	1.559	-2.037	0.944
L44	31.250-31.000	-3.025	0.926	-2.197	0.446
L45	31.000-27.750	-1.978	2.235	-1.389	1.709
L46	27.750-27.500	-1.616	2.706	-1.101	2.173
L47	27.500-27.250	-1.618	2.709	-1.102	2.175
L48	27.250-27.000	0.591	1.400	0.795	1.029
L49	27.000-22.000	1.994	-0.202	2.008	-0.369
L50	22.000-17.000	3.196	-1.925	3.016	-1.826
L51	17.000-12.000	3.247	-1.956	3.055	-1.849
L52	12.000-7.000	3.298	-1.986	3.091	-1.869
L53	7.000-2.000	3.348	-2.016	3.121	-1.884
L54	2.000-0.000	3.383	-2.036	3.125	-1.883

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)	Page 17 of 59
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	Client Crown Castle	Designed by JD Prabhu

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	32	Safety Line 3/8	139.50 - 144.50	1.0000	1.0000
L2	32	Safety Line 3/8	134.50 - 139.50	1.0000	1.0000
L3	32	Safety Line 3/8	129.50 - 134.50	1.0000	1.0000
L4	23	LDF7-50A(1-5/8)	124.50 - 128.00	1.0000	1.0000
L4	32	Safety Line 3/8	124.50 - 129.50	1.0000	1.0000
L5	23	LDF7-50A(1-5/8)	117.57 - 124.50	1.0000	1.0000
L5	32	Safety Line 3/8	117.57 - 124.50	1.0000	1.0000
L6	23	LDF7-50A(1-5/8)	116.41 - 117.57	1.0000	1.0000
L6	32	Safety Line 3/8	116.41 - 117.57	1.0000	1.0000
L7	23	LDF7-50A(1-5/8)	112.58 - 116.41	1.0000	1.0000
L7	32	Safety Line 3/8	112.58 - 116.41	1.0000	1.0000
L7	54	CCI 4.5" x 1" Plate	112.58 - 114.08	1.0000	1.0000
L7	55	CCI 4.5" x 1" Plate	112.58 - 114.08	1.0000	1.0000
L7	56	CCI 4.5" x 1" Plate	112.58 - 114.08	1.0000	1.0000
L8	23	LDF7-50A(1-5/8)	112.33 - 112.58	1.0000	1.0000
L8	32	Safety Line 3/8	112.33 - 112.58	1.0000	1.0000
L8	54	CCI 4.5" x 1" Plate	112.33 - 112.58	1.0000	1.0000
L8	55	CCI 4.5" x 1" Plate	112.33 - 112.58	1.0000	1.0000
L8	56	CCI 4.5" x 1" Plate	112.33 - 112.58	1.0000	1.0000
L9	23	LDF7-50A(1-5/8)	107.33 - 112.33	1.0000	1.0000
L9	32	Safety Line 3/8	107.33 - 112.33	1.0000	1.0000
L9	54	CCI 4.5" x 1" Plate	107.33 - 112.33	1.0000	1.0000
L9	55	CCI 4.5" x 1" Plate	107.33 - 112.33	1.0000	1.0000
L9	56	CCI 4.5" x 1" Plate	107.33 - 112.33	1.0000	1.0000
L10	23	LDF7-50A(1-5/8)	106.92 - 107.33	1.0000	1.0000
L10	32	Safety Line 3/8	106.92 -	1.0000	1.0000

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Client	Crown Castle	Designed by	JD Prabhu

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			107.33		
L10	54	CCI 4.5" x 1" Plate	106.92 - 107.33	1.0000	1.0000
L10	55	CCI 4.5" x 1" Plate	106.92 - 107.33	1.0000	1.0000
L10	56	CCI 4.5" x 1" Plate	106.92 - 107.33	1.0000	1.0000
L10	64	CCI 4" x 0.75" Plate	106.92 - 107.00	1.0000	1.0000
L10	65	CCI 4" x 0.75" Plate	106.92 - 107.00	1.0000	1.0000
L10	66	CCI 4" x 0.75" Plate	106.92 - 107.00	1.0000	1.0000
L11	23	LDF7-50A(1-5/8)	106.67 - 106.92	1.0000	1.0000
L11	32	Safety Line 3/8	106.67 - 106.92	1.0000	1.0000
L11	54	CCI 4.5" x 1" Plate	106.67 - 106.92	1.0000	1.0000
L11	55	CCI 4.5" x 1" Plate	106.67 - 106.92	1.0000	1.0000
L11	56	CCI 4.5" x 1" Plate	106.67 - 106.92	1.0000	1.0000
L11	64	CCI 4" x 0.75" Plate	106.67 - 106.92	1.0000	1.0000
L11	65	CCI 4" x 0.75" Plate	106.67 - 106.92	1.0000	1.0000
L11	66	CCI 4" x 0.75" Plate	106.67 - 106.92	1.0000	1.0000
L12	23	LDF7-50A(1-5/8)	103.50 - 106.67	1.0000	1.0000
L12	32	Safety Line 3/8	103.50 - 106.67	1.0000	1.0000
L12	46	CCI 4.5" x 1" Plate	103.50 - 105.00	1.0000	1.0000
L12	47	CCI 4.5" x 1" Plate	103.50 - 105.00	1.0000	1.0000
L12	48	CCI 4.5" x 1" Plate	103.50 - 105.00	1.0000	1.0000
L12	54	CCI 4.5" x 1" Plate	103.50 - 106.67	1.0000	1.0000
L12	55	CCI 4.5" x 1" Plate	103.50 - 106.67	1.0000	1.0000
L12	56	CCI 4.5" x 1" Plate	103.50 - 106.67	1.0000	1.0000
L12	64	CCI 4" x 0.75" Plate	103.50 - 106.67	1.0000	1.0000
L12	65	CCI 4" x 0.75" Plate	103.50 - 106.67	1.0000	1.0000
L12	66	CCI 4" x 0.75" Plate	103.50 - 106.67	1.0000	1.0000
L13	23	LDF7-50A(1-5/8)	103.25 - 103.50	1.0000	1.0000
L13	32	Safety Line 3/8	103.25 - 103.50	1.0000	1.0000
L13	46	CCI 4.5" x 1" Plate	103.25 - 103.50	1.0000	1.0000
L13	47	CCI 4.5" x 1" Plate	103.25 - 103.50	1.0000	1.0000
L13	48	CCI 4.5" x 1" Plate	103.25 - 103.50	1.0000	1.0000
L13	54	CCI 4.5" x 1" Plate	103.25 -	1.0000	1.0000

tnxTower

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Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)	Page 19 of 59
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Client Crown Castle	Designed by JD Prabhu

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L13	55	CCI 4.5" x 1" Plate	103.50 103.25 - 103.50	1.0000	1.0000
L13	56	CCI 4.5" x 1" Plate	103.25 - 103.50	1.0000	1.0000
L13	64	CCI 4" x 0.75" Plate	103.25 - 103.50	1.0000	1.0000
L13	65	CCI 4" x 0.75" Plate	103.25 - 103.50	1.0000	1.0000
L13	66	CCI 4" x 0.75" Plate	103.25 - 103.50	1.0000	1.0000
L14	23	LDF7-50A(1-5/8)	98.50 - 103.25	1.0000	1.0000
L14	32	Safety Line 3/8	98.50 - 103.25	1.0000	1.0000
L14	34	CCI 4.5" x 1" Plate	98.50 - 100.00	1.0000	1.0000
L14	35	CCI 4.5" x 1" Plate	98.50 - 100.00	1.0000	1.0000
L14	36	CCI 4.5" x 1" Plate	98.50 - 100.00	1.0000	1.0000
L14	46	CCI 4.5" x 1" Plate	98.50 - 103.25	1.0000	1.0000
L14	47	CCI 4.5" x 1" Plate	98.50 - 103.25	1.0000	1.0000
L14	48	CCI 4.5" x 1" Plate	98.50 - 103.25	1.0000	1.0000
L14	54	CCI 4.5" x 1" Plate	99.50 - 103.25	1.0000	1.0000
L14	55	CCI 4.5" x 1" Plate	99.50 - 103.25	1.0000	1.0000
L14	56	CCI 4.5" x 1" Plate	99.50 - 103.25	1.0000	1.0000
L14	64	CCI 4" x 0.75" Plate	98.50 - 103.25	1.0000	1.0000
L14	65	CCI 4" x 0.75" Plate	98.50 - 103.25	1.0000	1.0000
L14	66	CCI 4" x 0.75" Plate	98.50 - 103.25	1.0000	1.0000
L15	23	LDF7-50A(1-5/8)	98.25 - 98.50	1.0000	1.0000
L15	32	Safety Line 3/8	98.25 - 98.50	1.0000	1.0000
L15	34	CCI 4.5" x 1" Plate	98.25 - 98.50	1.0000	1.0000
L15	35	CCI 4.5" x 1" Plate	98.25 - 98.50	1.0000	1.0000
L15	36	CCI 4.5" x 1" Plate	98.25 - 98.50	1.0000	1.0000
L15	46	CCI 4.5" x 1" Plate	98.25 - 98.50	1.0000	1.0000
L15	47	CCI 4.5" x 1" Plate	98.25 - 98.50	1.0000	1.0000
L15	48	CCI 4.5" x 1" Plate	98.25 - 98.50	1.0000	1.0000
L15	64	CCI 4" x 0.75" Plate	98.25 - 98.50	1.0000	1.0000
L15	65	CCI 4" x 0.75" Plate	98.25 - 98.50	1.0000	1.0000
L15	66	CCI 4" x 0.75" Plate	98.25 - 98.50	1.0000	1.0000
L16	23	LDF7-50A(1-5/8)	97.58 - 98.25	1.0000	1.0000
L16	32	Safety Line 3/8	97.58 - 98.25	1.0000	1.0000
L16	34	CCI 4.5" x 1" Plate	97.58 - 98.25	1.0000	1.0000
L16	35	CCI 4.5" x 1" Plate	97.58 - 98.25	1.0000	1.0000
L16	36	CCI 4.5" x 1" Plate	97.58 - 98.25	1.0000	1.0000
L16	46	CCI 4.5" x 1" Plate	97.58 - 98.25	1.0000	1.0000
L16	47	CCI 4.5" x 1" Plate	97.58 - 98.25	1.0000	1.0000
L16	48	CCI 4.5" x 1" Plate	97.58 - 98.25	1.0000	1.0000
L16	64	CCI 4" x 0.75" Plate	97.58 - 98.25	1.0000	1.0000
L16	65	CCI 4" x 0.75" Plate	97.58 - 98.25	1.0000	1.0000
L16	66	CCI 4" x 0.75" Plate	97.58 - 98.25	1.0000	1.0000
L17	23	LDF7-50A(1-5/8)	97.33 - 97.58	1.0000	1.0000
L17	32	Safety Line 3/8	97.33 - 97.58	1.0000	1.0000
L17	34	CCI 4.5" x 1" Plate	97.33 - 97.58	1.0000	1.0000
L17	35	CCI 4.5" x 1" Plate	97.33 - 97.58	1.0000	1.0000
L17	36	CCI 4.5" x 1" Plate	97.33 - 97.58	1.0000	1.0000
L17	46	CCI 4.5" x 1" Plate	97.33 - 97.58	1.0000	1.0000
L17	47	CCI 4.5" x 1" Plate	97.33 - 97.58	1.0000	1.0000
L17	48	CCI 4.5" x 1" Plate	97.33 - 97.58	1.0000	1.0000
L17	64	CCI 4" x 0.75" Plate	97.33 - 97.58	1.0000	1.0000
L17	65	CCI 4" x 0.75" Plate	97.33 - 97.58	1.0000	1.0000
L17	66	CCI 4" x 0.75" Plate	97.33 - 97.58	1.0000	1.0000
L18	23	LDF7-50A(1-5/8)	92.33 - 97.33	1.0000	1.0000
L18	32	Safety Line 3/8	92.33 - 97.33	1.0000	1.0000
L18	34	CCI 4.5" x 1" Plate	92.33 - 97.33	1.0000	1.0000
L18	35	CCI 4.5" x 1" Plate	92.33 - 97.33	1.0000	1.0000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L18	36	CCI 4.5" x 1" Plate	92.33 - 97.33	1.0000	1.0000
L18	46	CCI 4.5" x 1" Plate	92.33 - 97.33	1.0000	1.0000
L18	47	CCI 4.5" x 1" Plate	92.33 - 97.33	1.0000	1.0000
L18	48	CCI 4.5" x 1" Plate	92.33 - 97.33	1.0000	1.0000
L18	64	CCI 4" x 0.75" Plate	97.00 - 97.33	1.0000	1.0000
L18	65	CCI 4" x 0.75" Plate	97.00 - 97.33	1.0000	1.0000
L18	66	CCI 4" x 0.75" Plate	97.00 - 97.33	1.0000	1.0000
L19	23	LDF7-50A(1-5/8)	87.12 - 92.33	1.0000	1.0000
L19	32	Safety Line 3/8	87.12 - 92.33	1.0000	1.0000
L19	34	CCI 4.5" x 1" Plate	90.00 - 92.33	1.0000	1.0000
L19	35	CCI 4.5" x 1" Plate	90.00 - 92.33	1.0000	1.0000
L19	36	CCI 4.5" x 1" Plate	90.00 - 92.33	1.0000	1.0000
L19	46	CCI 4.5" x 1" Plate	90.00 - 92.33	1.0000	1.0000
L19	47	CCI 4.5" x 1" Plate	90.00 - 92.33	1.0000	1.0000
L19	48	CCI 4.5" x 1" Plate	90.00 - 92.33	1.0000	1.0000
L20	23	LDF7-50A(1-5/8)	86.12 - 87.12	1.0000	1.0000
L20	32	Safety Line 3/8	86.12 - 87.12	1.0000	1.0000
L21	23	LDF7-50A(1-5/8)	83.00 - 86.12	1.0000	1.0000
L21	32	Safety Line 3/8	83.00 - 86.12	1.0000	1.0000
L21	50	CCI 6" x 1" Plate	83.00 - 85.00	1.0000	1.0000
L21	51	CCI 6" x 1" Plate	83.00 - 85.00	1.0000	1.0000
L21	52	CCI 6" x 1" Plate	83.00 - 85.00	1.0000	1.0000
L22	23	LDF7-50A(1-5/8)	82.75 - 83.00	1.0000	1.0000
L22	32	Safety Line 3/8	82.75 - 83.00	1.0000	1.0000
L22	50	CCI 6" x 1" Plate	82.75 - 83.00	1.0000	1.0000
L22	51	CCI 6" x 1" Plate	82.75 - 83.00	1.0000	1.0000
L22	52	CCI 6" x 1" Plate	82.75 - 83.00	1.0000	1.0000
L23	23	LDF7-50A(1-5/8)	77.75 - 82.75	1.0000	1.0000
L23	32	Safety Line 3/8	77.75 - 82.75	1.0000	1.0000
L23	42	CCI 6.5" x 1.25" Plate	77.75 - 80.00	1.0000	1.0000
L23	43	CCI 6.5" x 1.25" Plate	77.75 - 80.00	1.0000	1.0000
L23	44	CCI 6.5" x 1.25" Plate	77.75 - 80.00	1.0000	1.0000
L23	50	CCI 6" x 1" Plate	77.75 - 82.75	1.0000	1.0000
L23	51	CCI 6" x 1" Plate	77.75 - 82.75	1.0000	1.0000
L23	52	CCI 6" x 1" Plate	77.75 - 82.75	1.0000	1.0000
L24	23	LDF7-50A(1-5/8)	77.25 - 77.75	1.0000	1.0000
L24	32	Safety Line 3/8	77.25 - 77.75	1.0000	1.0000
L24	42	CCI 6.5" x 1.25" Plate	77.25 - 77.75	1.0000	1.0000
L24	43	CCI 6.5" x 1.25" Plate	77.25 - 77.75	1.0000	1.0000
L24	44	CCI 6.5" x 1.25" Plate	77.25 - 77.75	1.0000	1.0000
L24	50	CCI 6" x 1" Plate	77.25 - 77.75	1.0000	1.0000
L24	51	CCI 6" x 1" Plate	77.25 - 77.75	1.0000	1.0000
L24	52	CCI 6" x 1" Plate	77.25 - 77.75	1.0000	1.0000
L25	23	LDF7-50A(1-5/8)	77.00 - 77.25	1.0000	1.0000
L25	32	Safety Line 3/8	77.00 - 77.25	1.0000	1.0000
L25	42	CCI 6.5" x 1.25" Plate	77.00 - 77.25	1.0000	1.0000
L25	43	CCI 6.5" x 1.25" Plate	77.00 - 77.25	1.0000	1.0000
L25	44	CCI 6.5" x 1.25" Plate	77.00 - 77.25	1.0000	1.0000
L25	50	CCI 6" x 1" Plate	77.00 - 77.25	1.0000	1.0000
L25	51	CCI 6" x 1" Plate	77.00 - 77.25	1.0000	1.0000
L25	52	CCI 6" x 1" Plate	77.00 - 77.25	1.0000	1.0000
L26	23	LDF7-50A(1-5/8)	76.75 - 77.00	1.0000	1.0000
L26	32	Safety Line 3/8	76.75 - 77.00	1.0000	1.0000
L26	42	CCI 6.5" x 1.25" Plate	76.75 - 77.00	1.0000	1.0000
L26	43	CCI 6.5" x 1.25" Plate	76.75 - 77.00	1.0000	1.0000
L26	44	CCI 6.5" x 1.25" Plate	76.75 - 77.00	1.0000	1.0000
L26	50	CCI 6" x 1" Plate	76.75 - 77.00	1.0000	1.0000
L26	51	CCI 6" x 1" Plate	76.75 - 77.00	1.0000	1.0000
L26	52	CCI 6" x 1" Plate	76.75 - 77.00	1.0000	1.0000
L27	23	LDF7-50A(1-5/8)	71.75 - 76.75	1.0000	1.0000
L27	32	Safety Line 3/8	71.75 - 76.75	1.0000	1.0000
L27	42	CCI 6.5" x 1.25" Plate	71.75 - 76.75	1.0000	1.0000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L27	43	CCI 6.5" x 1.25" Plate	71.75 - 76.75	1.0000	1.0000
L27	44	CCI 6.5" x 1.25" Plate	71.75 - 76.75	1.0000	1.0000
L27	50	CCI 6" x 1" Plate	75.00 - 76.75	1.0000	1.0000
L27	51	CCI 6" x 1" Plate	75.00 - 76.75	1.0000	1.0000
L27	52	CCI 6" x 1" Plate	75.00 - 76.75	1.0000	1.0000
L28	23	LDF7-50A(1-5/8)	69.00 - 71.75	1.0000	1.0000
L28	32	Safety Line 3/8	69.00 - 71.75	1.0000	1.0000
L28	42	CCI 6.5" x 1.25" Plate	69.00 - 71.75	1.0000	1.0000
L28	43	CCI 6.5" x 1.25" Plate	69.00 - 71.75	1.0000	1.0000
L28	44	CCI 6.5" x 1.25" Plate	69.00 - 71.75	1.0000	1.0000
L28	70	CCI 6" x 1" Plate	69.00 - 71.00	1.0000	1.0000
L28	71	CCI 6" x 1" Plate	69.00 - 71.00	1.0000	1.0000
L28	72	CCI 6" x 1" Plate	69.00 - 71.00	1.0000	1.0000
L29	23	LDF7-50A(1-5/8)	68.75 - 69.00	1.0000	1.0000
L29	32	Safety Line 3/8	68.75 - 69.00	1.0000	1.0000
L29	42	CCI 6.5" x 1.25" Plate	68.75 - 69.00	1.0000	1.0000
L29	43	CCI 6.5" x 1.25" Plate	68.75 - 69.00	1.0000	1.0000
L29	44	CCI 6.5" x 1.25" Plate	68.75 - 69.00	1.0000	1.0000
L29	70	CCI 6" x 1" Plate	68.75 - 69.00	1.0000	1.0000
L29	71	CCI 6" x 1" Plate	68.75 - 69.00	1.0000	1.0000
L29	72	CCI 6" x 1" Plate	68.75 - 69.00	1.0000	1.0000
L30	23	LDF7-50A(1-5/8)	63.75 - 68.75	1.0000	1.0000
L30	32	Safety Line 3/8	63.75 - 68.75	1.0000	1.0000
L30	42	CCI 6.5" x 1.25" Plate	63.75 - 68.75	1.0000	1.0000
L30	43	CCI 6.5" x 1.25" Plate	63.75 - 68.75	1.0000	1.0000
L30	44	CCI 6.5" x 1.25" Plate	63.75 - 68.75	1.0000	1.0000
L30	70	CCI 6" x 1" Plate	63.75 - 68.75	1.0000	1.0000
L30	71	CCI 6" x 1" Plate	63.75 - 68.75	1.0000	1.0000
L30	72	CCI 6" x 1" Plate	63.75 - 68.75	1.0000	1.0000
L31	23	LDF7-50A(1-5/8)	60.00 - 63.75	1.0000	1.0000
L31	32	Safety Line 3/8	60.00 - 63.75	1.0000	1.0000
L31	42	CCI 6.5" x 1.25" Plate	60.00 - 63.75	1.0000	1.0000
L31	43	CCI 6.5" x 1.25" Plate	60.00 - 63.75	1.0000	1.0000
L31	44	CCI 6.5" x 1.25" Plate	60.00 - 63.75	1.0000	1.0000
L31	62	CCI 8.5" x 1.25" Plate	60.00 - 62.25	1.0000	1.0000
L31	70	CCI 6" x 1" Plate	60.00 - 63.75	1.0000	1.0000
L31	71	CCI 6" x 1" Plate	60.00 - 63.75	1.0000	1.0000
L31	72	CCI 6" x 1" Plate	60.00 - 63.75	1.0000	1.0000
L32	23	LDF7-50A(1-5/8)	59.75 - 60.00	1.0000	1.0000
L32	32	Safety Line 3/8	59.75 - 60.00	1.0000	1.0000
L32	42	CCI 6.5" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L32	43	CCI 6.5" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L32	44	CCI 6.5" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L32	62	CCI 8.5" x 1.25" Plate	59.75 - 60.00	1.0000	1.0000
L32	70	CCI 6" x 1" Plate	59.75 - 60.00	1.0000	1.0000
L32	71	CCI 6" x 1" Plate	59.75 - 60.00	1.0000	1.0000
L32	72	CCI 6" x 1" Plate	59.75 - 60.00	1.0000	1.0000
L33	23	LDF7-50A(1-5/8)	58.50 - 59.75	1.0000	1.0000
L33	32	Safety Line 3/8	58.50 - 59.75	1.0000	1.0000
L33	42	CCI 6.5" x 1.25" Plate	58.50 - 59.75	1.0000	1.0000
L33	43	CCI 6.5" x 1.25" Plate	58.50 - 59.75	1.0000	1.0000
L33	44	CCI 6.5" x 1.25" Plate	58.50 - 59.75	1.0000	1.0000
L33	62	CCI 8.5" x 1.25" Plate	58.50 - 59.75	1.0000	1.0000
L33	68	CCI 6.5" x 1.25" Plate	58.50 - 59.50	1.0000	1.0000
L33	70	CCI 6" x 1" Plate	58.50 - 59.75	1.0000	1.0000
L33	71	CCI 6" x 1" Plate	58.50 - 59.75	1.0000	1.0000
L33	72	CCI 6" x 1" Plate	58.50 - 59.75	1.0000	1.0000
L34	23	LDF7-50A(1-5/8)	58.25 - 58.50	1.0000	1.0000
L34	32	Safety Line 3/8	58.25 - 58.50	1.0000	1.0000
L34	42	CCI 6.5" x 1.25" Plate	58.25 - 58.50	1.0000	1.0000
L34	43	CCI 6.5" x 1.25" Plate	58.25 - 58.50	1.0000	1.0000
L34	44	CCI 6.5" x 1.25" Plate	58.25 - 58.50	1.0000	1.0000

<i>Tower Section</i>	<i>Feed Line Record No.</i>	<i>Description</i>	<i>Feed Line Segment Elev.</i>	<i>K_a No Ice</i>	<i>K_a Ice</i>
L34	62	CCI 8.5" x 1.25" Plate	58.25 - 58.50	1.0000	1.0000
L34	68	CCI 6.5" x 1.25" Plate	58.25 - 58.50	1.0000	1.0000
L34	70	CCI 6" x 1" Plate	58.25 - 58.50	1.0000	1.0000
L34	71	CCI 6" x 1" Plate	58.25 - 58.50	1.0000	1.0000
L34	72	CCI 6" x 1" Plate	58.25 - 58.50	1.0000	1.0000
L35	23	LDF7-50A(1-5/8)	58.00 - 58.25	1.0000	1.0000
L35	32	Safety Line 3/8	58.00 - 58.25	1.0000	1.0000
L35	42	CCI 6.5" x 1.25" Plate	58.00 - 58.25	1.0000	1.0000
L35	43	CCI 6.5" x 1.25" Plate	58.00 - 58.25	1.0000	1.0000
L35	44	CCI 6.5" x 1.25" Plate	58.00 - 58.25	1.0000	1.0000
L35	62	CCI 8.5" x 1.25" Plate	58.00 - 58.25	1.0000	1.0000
L35	68	CCI 6.5" x 1.25" Plate	58.00 - 58.25	1.0000	1.0000
L35	70	CCI 6" x 1" Plate	58.00 - 58.25	1.0000	1.0000
L35	71	CCI 6" x 1" Plate	58.00 - 58.25	1.0000	1.0000
L35	72	CCI 6" x 1" Plate	58.00 - 58.25	1.0000	1.0000
L36	23	LDF7-50A(1-5/8)	57.75 - 58.00	1.0000	1.0000
L36	32	Safety Line 3/8	57.75 - 58.00	1.0000	1.0000
L36	42	CCI 6.5" x 1.25" Plate	57.75 - 58.00	1.0000	1.0000
L36	43	CCI 6.5" x 1.25" Plate	57.75 - 58.00	1.0000	1.0000
L36	44	CCI 6.5" x 1.25" Plate	57.75 - 58.00	1.0000	1.0000
L36	62	CCI 8.5" x 1.25" Plate	57.75 - 58.00	1.0000	1.0000
L36	68	CCI 6.5" x 1.25" Plate	57.75 - 58.00	1.0000	1.0000
L36	70	CCI 6" x 1" Plate	57.75 - 58.00	1.0000	1.0000
L36	71	CCI 6" x 1" Plate	57.75 - 58.00	1.0000	1.0000
L36	72	CCI 6" x 1" Plate	57.75 - 58.00	1.0000	1.0000
L37	23	LDF7-50A(1-5/8)	56.75 - 57.75	1.0000	1.0000
L37	32	Safety Line 3/8	56.75 - 57.75	1.0000	1.0000
L37	42	CCI 6.5" x 1.25" Plate	56.75 - 57.75	1.0000	1.0000
L37	43	CCI 6.5" x 1.25" Plate	56.75 - 57.75	1.0000	1.0000
L37	44	CCI 6.5" x 1.25" Plate	56.75 - 57.75	1.0000	1.0000
L37	62	CCI 8.5" x 1.25" Plate	56.75 - 57.75	1.0000	1.0000
L37	68	CCI 6.5" x 1.25" Plate	56.75 - 57.75	1.0000	1.0000
L37	70	CCI 6" x 1" Plate	56.75 - 57.75	1.0000	1.0000
L37	71	CCI 6" x 1" Plate	56.75 - 57.75	1.0000	1.0000
L37	72	CCI 6" x 1" Plate	56.75 - 57.75	1.0000	1.0000
L38	23	LDF7-50A(1-5/8)	56.50 - 56.75	1.0000	1.0000
L38	32	Safety Line 3/8	56.50 - 56.75	1.0000	1.0000
L38	42	CCI 6.5" x 1.25" Plate	56.50 - 56.75	1.0000	1.0000
L38	43	CCI 6.5" x 1.25" Plate	56.50 - 56.75	1.0000	1.0000
L38	44	CCI 6.5" x 1.25" Plate	56.50 - 56.75	1.0000	1.0000
L38	62	CCI 8.5" x 1.25" Plate	56.50 - 56.75	1.0000	1.0000
L38	68	CCI 6.5" x 1.25" Plate	56.50 - 56.75	1.0000	1.0000
L38	70	CCI 6" x 1" Plate	56.50 - 56.75	1.0000	1.0000
L38	71	CCI 6" x 1" Plate	56.50 - 56.75	1.0000	1.0000
L38	72	CCI 6" x 1" Plate	56.50 - 56.75	1.0000	1.0000
L39	23	LDF7-50A(1-5/8)	51.50 - 56.50	1.0000	1.0000
L39	32	Safety Line 3/8	51.50 - 56.50	1.0000	1.0000
L39	42	CCI 6.5" x 1.25" Plate	51.50 - 56.50	1.0000	1.0000
L39	43	CCI 6.5" x 1.25" Plate	51.50 - 56.50	1.0000	1.0000
L39	44	CCI 6.5" x 1.25" Plate	51.50 - 56.50	1.0000	1.0000
L39	62	CCI 8.5" x 1.25" Plate	51.50 - 56.50	1.0000	1.0000
L39	68	CCI 6.5" x 1.25" Plate	51.50 - 56.50	1.0000	1.0000
L39	70	CCI 6" x 1" Plate	56.00 - 56.50	1.0000	1.0000
L39	71	CCI 6" x 1" Plate	56.00 - 56.50	1.0000	1.0000
L39	72	CCI 6" x 1" Plate	56.00 - 56.50	1.0000	1.0000
L40	23	LDF7-50A(1-5/8)	42.04 - 51.50	1.0000	1.0000
L40	32	Safety Line 3/8	42.04 - 51.50	1.0000	1.0000
L40	42	CCI 6.5" x 1.25" Plate	42.04 - 51.50	1.0000	1.0000
L40	43	CCI 6.5" x 1.25" Plate	42.04 - 51.50	1.0000	1.0000
L40	44	CCI 6.5" x 1.25" Plate	42.04 - 51.50	1.0000	1.0000
L40	62	CCI 8.5" x 1.25" Plate	42.04 - 51.50	1.0000	1.0000
L40	68	CCI 6.5" x 1.25" Plate	42.04 - 51.50	1.0000	1.0000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L41	23	LDF7-50A(1-5/8)	41.04 - 42.04	1.0000	1.0000
L41	32	Safety Line 3/8	41.04 - 42.04	1.0000	1.0000
L41	42	CCI 6.5" x 1.25" Plate	41.04 - 42.04	1.0000	1.0000
L41	43	CCI 6.5" x 1.25" Plate	41.04 - 42.04	1.0000	1.0000
L41	44	CCI 6.5" x 1.25" Plate	41.04 - 42.04	1.0000	1.0000
L41	62	CCI 8.5" x 1.25" Plate	41.04 - 42.04	1.0000	1.0000
L41	68	CCI 6.5" x 1.25" Plate	41.04 - 42.04	1.0000	1.0000
L42	23	LDF7-50A(1-5/8)	36.04 - 41.04	1.0000	1.0000
L42	32	Safety Line 3/8	36.04 - 41.04	1.0000	1.0000
L42	42	CCI 6.5" x 1.25" Plate	36.04 - 41.04	1.0000	1.0000
L42	43	CCI 6.5" x 1.25" Plate	36.04 - 41.04	1.0000	1.0000
L42	44	CCI 6.5" x 1.25" Plate	36.04 - 41.04	1.0000	1.0000
L42	62	CCI 8.5" x 1.25" Plate	36.04 - 41.04	1.0000	1.0000
L42	68	CCI 6.5" x 1.25" Plate	36.04 - 41.04	1.0000	1.0000
L43	23	LDF7-50A(1-5/8)	31.25 - 36.04	1.0000	1.0000
L43	32	Safety Line 3/8	31.25 - 36.04	1.0000	1.0000
L43	38	CCI 8.5" x 1.25" Plate	31.25 - 35.00	1.0000	1.0000
L43	39	CCI 8.5" x 1.25" Plate	31.25 - 35.00	1.0000	1.0000
L43	40	CCI 8.5" x 1.25" Plate	31.25 - 35.00	1.0000	1.0000
L43	42	CCI 6.5" x 1.25" Plate	31.25 - 36.04	1.0000	1.0000
L43	43	CCI 6.5" x 1.25" Plate	35.00 - 36.04	1.0000	1.0000
L43	44	CCI 6.5" x 1.25" Plate	35.00 - 36.04	1.0000	1.0000
L43	62	CCI 8.5" x 1.25" Plate	31.25 - 36.04	1.0000	1.0000
L43	68	CCI 6.5" x 1.25" Plate	31.25 - 36.04	1.0000	1.0000
L44	23	LDF7-50A(1-5/8)	31.00 - 31.25	1.0000	1.0000
L44	32	Safety Line 3/8	31.00 - 31.25	1.0000	1.0000
L44	38	CCI 8.5" x 1.25" Plate	31.00 - 31.25	1.0000	1.0000
L44	39	CCI 8.5" x 1.25" Plate	31.00 - 31.25	1.0000	1.0000
L44	40	CCI 8.5" x 1.25" Plate	31.00 - 31.25	1.0000	1.0000
L44	42	CCI 6.5" x 1.25" Plate	31.00 - 31.25	1.0000	1.0000
L44	62	CCI 8.5" x 1.25" Plate	31.00 - 31.25	1.0000	1.0000
L44	68	CCI 6.5" x 1.25" Plate	31.00 - 31.25	1.0000	1.0000
L45	23	LDF7-50A(1-5/8)	27.75 - 31.00	1.0000	1.0000
L45	32	Safety Line 3/8	27.75 - 31.00	1.0000	1.0000
L45	38	CCI 8.5" x 1.25" Plate	27.75 - 31.00	1.0000	1.0000
L45	39	CCI 8.5" x 1.25" Plate	27.75 - 31.00	1.0000	1.0000
L45	40	CCI 8.5" x 1.25" Plate	27.75 - 31.00	1.0000	1.0000
L45	42	CCI 6.5" x 1.25" Plate	27.75 - 31.00	1.0000	1.0000
L45	58	CCI 5.5" x 1.25" Plate	27.75 - 30.00	1.0000	1.0000
L45	59	CCI 5.5" x 1.25" Plate	27.75 - 30.00	1.0000	1.0000
L45	60	CCI 6.5" x 1.25" Plate	27.75 - 30.00	1.0000	1.0000
L45	62	CCI 8.5" x 1.25" Plate	27.75 - 31.00	1.0000	1.0000
L45	68	CCI 6.5" x 1.25" Plate	27.75 - 31.00	1.0000	1.0000
L46	23	LDF7-50A(1-5/8)	27.50 - 27.75	1.0000	1.0000
L46	32	Safety Line 3/8	27.50 - 27.75	1.0000	1.0000
L46	38	CCI 8.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L46	39	CCI 8.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L46	40	CCI 8.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L46	42	CCI 6.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L46	58	CCI 5.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L46	59	CCI 5.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L46	60	CCI 6.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L46	62	CCI 8.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L46	68	CCI 6.5" x 1.25" Plate	27.50 - 27.75	1.0000	1.0000
L47	23	LDF7-50A(1-5/8)	27.25 - 27.50	1.0000	1.0000
L47	32	Safety Line 3/8	27.25 - 27.50	1.0000	1.0000
L47	38	CCI 8.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L47	39	CCI 8.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L47	40	CCI 8.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L47	42	CCI 6.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L47	58	CCI 5.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L47	59	CCI 5.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000

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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L47	60	CCI 6.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L47	62	CCI 8.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L47	68	CCI 6.5" x 1.25" Plate	27.25 - 27.50	1.0000	1.0000
L48	23	LDF7-50A(1-5/8)	27.00 - 27.25	1.0000	1.0000
L48	32	Safety Line 3/8	27.00 - 27.25	1.0000	1.0000
L48	38	CCI 8.5" x 1.25" Plate	27.00 - 27.25	1.0000	1.0000
L48	39	CCI 8.5" x 1.25" Plate	27.00 - 27.25	1.0000	1.0000
L48	40	CCI 8.5" x 1.25" Plate	27.00 - 27.25	1.0000	1.0000
L48	42	CCI 6.5" x 1.25" Plate	27.00 - 27.25	1.0000	1.0000
L48	58	CCI 5.5" x 1.25" Plate	27.00 - 27.25	1.0000	1.0000
L48	59	CCI 5.5" x 1.25" Plate	27.00 - 27.25	1.0000	1.0000
L48	60	CCI 6.5" x 1.25" Plate	27.00 - 27.25	1.0000	1.0000
L48	68	CCI 6.5" x 1.25" Plate	27.00 - 27.25	1.0000	1.0000
L49	23	LDF7-50A(1-5/8)	22.00 - 27.00	1.0000	1.0000
L49	32	Safety Line 3/8	22.00 - 27.00	1.0000	1.0000
L49	38	CCI 8.5" x 1.25" Plate	22.00 - 27.00	1.0000	1.0000
L49	39	CCI 8.5" x 1.25" Plate	22.00 - 27.00	1.0000	1.0000
L49	40	CCI 8.5" x 1.25" Plate	22.00 - 27.00	1.0000	1.0000
L49	42	CCI 6.5" x 1.25" Plate	25.00 - 27.00	1.0000	1.0000
L49	58	CCI 5.5" x 1.25" Plate	22.00 - 27.00	1.0000	1.0000
L49	59	CCI 5.5" x 1.25" Plate	22.00 - 27.00	1.0000	1.0000
L49	60	CCI 6.5" x 1.25" Plate	22.00 - 27.00	1.0000	1.0000
L49	68	CCI 6.5" x 1.25" Plate	24.50 - 27.00	1.0000	1.0000
L50	23	LDF7-50A(1-5/8)	17.00 - 22.00	1.0000	1.0000
L50	32	Safety Line 3/8	17.00 - 22.00	1.0000	1.0000
L50	38	CCI 8.5" x 1.25" Plate	17.00 - 22.00	1.0000	1.0000
L50	39	CCI 8.5" x 1.25" Plate	17.00 - 22.00	1.0000	1.0000
L50	40	CCI 8.5" x 1.25" Plate	17.00 - 22.00	1.0000	1.0000
L50	58	CCI 5.5" x 1.25" Plate	17.00 - 22.00	1.0000	1.0000
L50	59	CCI 5.5" x 1.25" Plate	17.00 - 22.00	1.0000	1.0000
L50	60	CCI 6.5" x 1.25" Plate	17.00 - 22.00	1.0000	1.0000
L51	23	LDF7-50A(1-5/8)	12.00 - 17.00	1.0000	1.0000
L51	32	Safety Line 3/8	12.00 - 17.00	1.0000	1.0000
L51	38	CCI 8.5" x 1.25" Plate	12.00 - 17.00	1.0000	1.0000
L51	39	CCI 8.5" x 1.25" Plate	12.00 - 17.00	1.0000	1.0000
L51	40	CCI 8.5" x 1.25" Plate	12.00 - 17.00	1.0000	1.0000
L51	58	CCI 5.5" x 1.25" Plate	12.00 - 17.00	1.0000	1.0000
L51	59	CCI 5.5" x 1.25" Plate	12.00 - 17.00	1.0000	1.0000
L51	60	CCI 6.5" x 1.25" Plate	12.00 - 17.00	1.0000	1.0000
L52	23	LDF7-50A(1-5/8)	7.00 - 12.00	1.0000	1.0000
L52	32	Safety Line 3/8	7.00 - 12.00	1.0000	1.0000
L52	38	CCI 8.5" x 1.25" Plate	7.00 - 12.00	1.0000	1.0000
L52	39	CCI 8.5" x 1.25" Plate	7.00 - 12.00	1.0000	1.0000
L52	40	CCI 8.5" x 1.25" Plate	7.00 - 12.00	1.0000	1.0000
L52	58	CCI 5.5" x 1.25" Plate	7.00 - 12.00	1.0000	1.0000
L52	59	CCI 5.5" x 1.25" Plate	7.00 - 12.00	1.0000	1.0000
L52	60	CCI 6.5" x 1.25" Plate	7.00 - 12.00	1.0000	1.0000
L53	23	LDF7-50A(1-5/8)	2.00 - 7.00	1.0000	1.0000
L53	32	Safety Line 3/8	2.00 - 7.00	1.0000	1.0000
L53	38	CCI 8.5" x 1.25" Plate	2.00 - 7.00	1.0000	1.0000
L53	39	CCI 8.5" x 1.25" Plate	2.00 - 7.00	1.0000	1.0000
L53	40	CCI 8.5" x 1.25" Plate	2.00 - 7.00	1.0000	1.0000
L53	58	CCI 5.5" x 1.25" Plate	2.00 - 7.00	1.0000	1.0000
L53	59	CCI 5.5" x 1.25" Plate	2.00 - 7.00	1.0000	1.0000
L53	60	CCI 6.5" x 1.25" Plate	2.00 - 7.00	1.0000	1.0000
L54	23	LDF7-50A(1-5/8)	0.00 - 2.00	1.0000	1.0000
L54	32	Safety Line 3/8	0.00 - 2.00	1.0000	1.0000
L54	38	CCI 8.5" x 1.25" Plate	0.00 - 2.00	1.0000	1.0000
L54	39	CCI 8.5" x 1.25" Plate	0.00 - 2.00	1.0000	1.0000
L54	40	CCI 8.5" x 1.25" Plate	0.00 - 2.00	1.0000	1.0000
L54	58	CCI 5.5" x 1.25" Plate	0.00 - 2.00	1.0000	1.0000
L54	59	CCI 5.5" x 1.25" Plate	0.00 - 2.00	1.0000	1.0000

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)	Page 25 of 59
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Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L54	60	CCI 6.5" x 1.25" Plate	0.00 - 2.00	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
L7	54	CCI 4.5" x 1" Plate	112.58 - 114.08	Auto	0.0263
L7	55	CCI 4.5" x 1" Plate	112.58 - 114.08	Auto	0.0263
L7	56	CCI 4.5" x 1" Plate	112.58 - 114.08	Auto	0.0263
L8	54	CCI 4.5" x 1" Plate	112.33 - 112.58	Auto	0.0190
L8	55	CCI 4.5" x 1" Plate	112.33 - 112.58	Auto	0.0190
L8	56	CCI 4.5" x 1" Plate	112.33 - 112.58	Auto	0.0190
L9	54	CCI 4.5" x 1" Plate	107.33 - 112.33	Auto	0.0039
L9	55	CCI 4.5" x 1" Plate	107.33 - 112.33	Auto	0.0039
L9	56	CCI 4.5" x 1" Plate	107.33 - 112.33	Auto	0.0039
L10	54	CCI 4.5" x 1" Plate	106.92 - 107.33	Auto	0.0000
L10	55	CCI 4.5" x 1" Plate	106.92 - 107.33	Auto	0.0000
L10	56	CCI 4.5" x 1" Plate	106.92 - 107.33	Auto	0.0000
L10	64	CCI 4" x 0.75" Plate	106.92 - 107.00	Auto	0.0000
L10	65	CCI 4" x 0.75" Plate	106.92 - 107.00	Auto	0.0000
L10	66	CCI 4" x 0.75" Plate	106.92 - 107.00	Auto	0.0000
L11	54	CCI 4.5" x 1" Plate	106.67 - 106.92	Auto	0.0841
L11	55	CCI 4.5" x 1" Plate	106.67 - 106.92	Auto	0.0841
L11	56	CCI 4.5" x 1" Plate	106.67 - 106.92	Auto	0.0841
L11	64	CCI 4" x 0.75" Plate	106.67 - 106.92	Auto	0.0000
L11	65	CCI 4" x 0.75" Plate	106.67 - 106.92	Auto	0.0000
L11	66	CCI 4" x 0.75" Plate	106.67 - 106.92	Auto	0.0000
L12	46	CCI 4.5" x 1" Plate	103.50 - 105.00	Auto	0.0580
L12	47	CCI 4.5" x 1" Plate	103.50 - 105.00	Auto	0.0580
L12	48	CCI 4.5" x 1" Plate	103.50 -	Auto	0.0580

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Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L12	54	CCI 4.5" x 1" Plate	105.00 103.50 - 106.67	Auto	0.0650
L12	55	CCI 4.5" x 1" Plate	103.50 - 106.67	Auto	0.0650
L12	56	CCI 4.5" x 1" Plate	103.50 - 106.67	Auto	0.0650
L12	64	CCI 4" x 0.75" Plate	103.50 - 106.67	Auto	0.0000
L12	65	CCI 4" x 0.75" Plate	103.50 - 106.67	Auto	0.0000
L12	66	CCI 4" x 0.75" Plate	103.50 - 106.67	Auto	0.0000
L13	46	CCI 4.5" x 1" Plate	103.25 - 103.50	Auto	0.0507
L13	47	CCI 4.5" x 1" Plate	103.25 - 103.50	Auto	0.0507
L13	48	CCI 4.5" x 1" Plate	103.25 - 103.50	Auto	0.0507
L13	54	CCI 4.5" x 1" Plate	103.25 - 103.50	Auto	0.0507
L13	55	CCI 4.5" x 1" Plate	103.25 - 103.50	Auto	0.0507
L13	56	CCI 4.5" x 1" Plate	103.25 - 103.50	Auto	0.0507
L13	64	CCI 4" x 0.75" Plate	103.25 - 103.50	Auto	0.0000
L13	65	CCI 4" x 0.75" Plate	103.25 - 103.50	Auto	0.0000
L13	66	CCI 4" x 0.75" Plate	103.25 - 103.50	Auto	0.0000
L14	34	CCI 4.5" x 1" Plate	98.50 - 100.00	Auto	0.0113
L14	35	CCI 4.5" x 1" Plate	98.50 - 100.00	Auto	0.0113
L14	36	CCI 4.5" x 1" Plate	98.50 - 100.00	Auto	0.0113
L14	46	CCI 4.5" x 1" Plate	98.50 - 103.25	Auto	0.0249
L14	47	CCI 4.5" x 1" Plate	98.50 - 103.25	Auto	0.0249
L14	48	CCI 4.5" x 1" Plate	98.50 - 103.25	Auto	0.0249
L14	54	CCI 4.5" x 1" Plate	99.50 - 103.25	Auto	0.0291
L14	55	CCI 4.5" x 1" Plate	99.50 - 103.25	Auto	0.0291
L14	56	CCI 4.5" x 1" Plate	99.50 - 103.25	Auto	0.0291
L14	64	CCI 4" x 0.75" Plate	98.50 - 103.25	Auto	0.0000
L14	65	CCI 4" x 0.75" Plate	98.50 - 103.25	Auto	0.0000
L14	66	CCI 4" x 0.75" Plate	98.50 - 103.25	Auto	0.0000
L15	34	CCI 4.5" x 1" Plate	98.25 - 98.50	Auto	0.0675
L15	35	CCI 4.5" x 1" Plate	98.25 - 98.50	Auto	0.0675
L15	36	CCI 4.5" x 1" Plate	98.25 - 98.50	Auto	0.0675
L15	46	CCI 4.5" x 1" Plate	98.25 - 98.50	Auto	0.0675
L15	47	CCI 4.5" x 1" Plate	98.25 - 98.50	Auto	0.0675
L15	48	CCI 4.5" x 1" Plate	98.25 - 98.50	Auto	0.0675
L15	64	CCI 4" x 0.75" Plate	98.25 - 98.50	Auto	0.0000
L15	65	CCI 4" x 0.75" Plate	98.25 - 98.50	Auto	0.0000
L15	66	CCI 4" x 0.75" Plate	98.25 - 98.50	Auto	0.0000
L16	34	CCI 4.5" x 1" Plate	97.58 - 98.25	Auto	0.0637
L16	35	CCI 4.5" x 1" Plate	97.58 - 98.25	Auto	0.0637
L16	36	CCI 4.5" x 1" Plate	97.58 - 98.25	Auto	0.0637
L16	46	CCI 4.5" x 1" Plate	97.58 - 98.25	Auto	0.0637
L16	47	CCI 4.5" x 1" Plate	97.58 - 98.25	Auto	0.0637
L16	48	CCI 4.5" x 1" Plate	97.58 - 98.25	Auto	0.0637
L16	64	CCI 4" x 0.75" Plate	97.58 - 98.25	Auto	0.0000
L16	65	CCI 4" x 0.75" Plate	97.58 - 98.25	Auto	0.0000
L16	66	CCI 4" x 0.75" Plate	97.58 - 98.25	Auto	0.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L17	34	CCI 4.5" x 1" Plate	97.33 - 97.58	Auto	0.0159
L17	35	CCI 4.5" x 1" Plate	97.33 - 97.58	Auto	0.0159
L17	36	CCI 4.5" x 1" Plate	97.33 - 97.58	Auto	0.0159
L17	46	CCI 4.5" x 1" Plate	97.33 - 97.58	Auto	0.0159
L17	47	CCI 4.5" x 1" Plate	97.33 - 97.58	Auto	0.0159
L17	48	CCI 4.5" x 1" Plate	97.33 - 97.58	Auto	0.0159
L17	64	CCI 4" x 0.75" Plate	97.33 - 97.58	Auto	0.0000
L17	65	CCI 4" x 0.75" Plate	97.33 - 97.58	Auto	0.0000
L17	66	CCI 4" x 0.75" Plate	97.33 - 97.58	Auto	0.0000
L18	34	CCI 4.5" x 1" Plate	92.33 - 97.33	Auto	0.0012
L18	35	CCI 4.5" x 1" Plate	92.33 - 97.33	Auto	0.0012
L18	36	CCI 4.5" x 1" Plate	92.33 - 97.33	Auto	0.0012
L18	46	CCI 4.5" x 1" Plate	92.33 - 97.33	Auto	0.0012
L18	47	CCI 4.5" x 1" Plate	92.33 - 97.33	Auto	0.0012
L18	48	CCI 4.5" x 1" Plate	92.33 - 97.33	Auto	0.0012
L18	64	CCI 4" x 0.75" Plate	97.00 - 97.33	Auto	0.0000
L18	65	CCI 4" x 0.75" Plate	97.00 - 97.33	Auto	0.0000
L18	66	CCI 4" x 0.75" Plate	97.00 - 97.33	Auto	0.0000
L19	34	CCI 4.5" x 1" Plate	90.00 - 92.33	Auto	0.0000
L19	35	CCI 4.5" x 1" Plate	90.00 - 92.33	Auto	0.0000
L19	36	CCI 4.5" x 1" Plate	90.00 - 92.33	Auto	0.0000
L19	46	CCI 4.5" x 1" Plate	90.00 - 92.33	Auto	0.0000
L19	47	CCI 4.5" x 1" Plate	90.00 - 92.33	Auto	0.0000
L19	48	CCI 4.5" x 1" Plate	90.00 - 92.33	Auto	0.0000
L21	50	CCI 6" x 1" Plate	83.00 - 85.00	Auto	0.1368
L21	51	CCI 6" x 1" Plate	83.00 - 85.00	Auto	0.1368
L21	52	CCI 6" x 1" Plate	83.00 - 85.00	Auto	0.1368
L22	50	CCI 6" x 1" Plate	82.75 - 83.00	Auto	0.1297
L22	51	CCI 6" x 1" Plate	82.75 - 83.00	Auto	0.1297
L22	52	CCI 6" x 1" Plate	82.75 - 83.00	Auto	0.1297
L23	42	CCI 6.5" x 1.25" Plate	77.75 - 80.00	Auto	0.1733
L23	43	CCI 6.5" x 1.25" Plate	77.75 - 80.00	Auto	0.1733
L23	44	CCI 6.5" x 1.25" Plate	77.75 - 80.00	Auto	0.1733
L23	50	CCI 6" x 1" Plate	77.75 - 82.75	Auto	0.1131
L23	51	CCI 6" x 1" Plate	77.75 - 82.75	Auto	0.1131
L23	52	CCI 6" x 1" Plate	77.75 - 82.75	Auto	0.1131
L24	42	CCI 6.5" x 1.25" Plate	77.25 - 77.75	Auto	0.1653
L24	43	CCI 6.5" x 1.25" Plate	77.25 - 77.75	Auto	0.1653
L24	44	CCI 6.5" x 1.25" Plate	77.25 - 77.75	Auto	0.1653
L24	50	CCI 6" x 1" Plate	77.25 - 77.75	Auto	0.0957
L24	51	CCI 6" x 1" Plate	77.25 - 77.75	Auto	0.0957
L24	52	CCI 6" x 1" Plate	77.25 - 77.75	Auto	0.0957
L25	42	CCI 6.5" x 1.25" Plate	77.00 - 77.25	Auto	0.2850
L25	43	CCI 6.5" x 1.25" Plate	77.00 - 77.25	Auto	0.2850
L25	44	CCI 6.5" x 1.25" Plate	77.00 - 77.25	Auto	0.2850
L25	50	CCI 6" x 1" Plate	77.00 - 77.25	Auto	0.2254
L25	51	CCI 6" x 1" Plate	77.00 - 77.25	Auto	0.2254
L25	52	CCI 6" x 1" Plate	77.00 - 77.25	Auto	0.2254
L26	42	CCI 6.5" x 1.25" Plate	76.75 - 77.00	Auto	0.2327
L26	43	CCI 6.5" x 1.25" Plate	76.75 - 77.00	Auto	0.2327
L26	44	CCI 6.5" x 1.25" Plate	76.75 - 77.00	Auto	0.2327
L26	50	CCI 6" x 1" Plate	76.75 - 77.00	Auto	0.1688
L26	51	CCI 6" x 1" Plate	76.75 - 77.00	Auto	0.1688
L26	52	CCI 6" x 1" Plate	76.75 - 77.00	Auto	0.1688
L27	42	CCI 6.5" x 1.25" Plate	71.75 - 76.75	Auto	0.2140
L27	43	CCI 6.5" x 1.25" Plate	71.75 - 76.75	Auto	0.2140
L27	44	CCI 6.5" x 1.25" Plate	71.75 - 76.75	Auto	0.2140
L27	50	CCI 6" x 1" Plate	75.00 - 76.75	Auto	0.1588
L27	51	CCI 6" x 1" Plate	75.00 - 76.75	Auto	0.1588
L27	52	CCI 6" x 1" Plate	75.00 - 76.75	Auto	0.1588
L28	42	CCI 6.5" x 1.25" Plate	69.00 - 71.75	Auto	0.1914

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Client	Crown Castle	Designed by	JD Prabhu

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L28	43	CCI 6.5" x 1.25" Plate	69.00 - 71.75	Auto	0.1914
L28	44	CCI 6.5" x 1.25" Plate	69.00 - 71.75	Auto	0.1914
L28	70	CCI 6" x 1" Plate	69.00 - 71.00	Auto	0.1217
L28	71	CCI 6" x 1" Plate	69.00 - 71.00	Auto	0.1217
L28	72	CCI 6" x 1" Plate	69.00 - 71.00	Auto	0.1217
L29	42	CCI 6.5" x 1.25" Plate	68.75 - 69.00	Auto	0.2301
L29	43	CCI 6.5" x 1.25" Plate	68.75 - 69.00	Auto	0.2301
L29	44	CCI 6.5" x 1.25" Plate	68.75 - 69.00	Auto	0.2301
L29	70	CCI 6" x 1" Plate	68.75 - 69.00	Auto	0.1659
L29	71	CCI 6" x 1" Plate	68.75 - 69.00	Auto	0.1659
L29	72	CCI 6" x 1" Plate	68.75 - 69.00	Auto	0.1659
L30	42	CCI 6.5" x 1.25" Plate	63.75 - 68.75	Auto	0.2114
L30	43	CCI 6.5" x 1.25" Plate	63.75 - 68.75	Auto	0.2114
L30	44	CCI 6.5" x 1.25" Plate	63.75 - 68.75	Auto	0.2114
L30	70	CCI 6" x 1" Plate	63.75 - 68.75	Auto	0.1457
L30	71	CCI 6" x 1" Plate	63.75 - 68.75	Auto	0.1457
L30	72	CCI 6" x 1" Plate	63.75 - 68.75	Auto	0.1457
L31	42	CCI 6.5" x 1.25" Plate	60.00 - 63.75	Auto	0.1825
L31	43	CCI 6.5" x 1.25" Plate	60.00 - 63.75	Auto	0.1825
L31	44	CCI 6.5" x 1.25" Plate	60.00 - 63.75	Auto	0.1825
L31	62	CCI 8.5" x 1.25" Plate	60.00 - 62.25	Auto	0.3715
L31	70	CCI 6" x 1" Plate	60.00 - 63.75	Auto	0.1143
L31	71	CCI 6" x 1" Plate	60.00 - 63.75	Auto	0.1143
L31	72	CCI 6" x 1" Plate	60.00 - 63.75	Auto	0.1143
L32	42	CCI 6.5" x 1.25" Plate	59.75 - 60.00	Auto	0.1708
L32	43	CCI 6.5" x 1.25" Plate	59.75 - 60.00	Auto	0.1708
L32	44	CCI 6.5" x 1.25" Plate	59.75 - 60.00	Auto	0.1708
L32	62	CCI 8.5" x 1.25" Plate	59.75 - 60.00	Auto	0.3659
L32	70	CCI 6" x 1" Plate	59.75 - 60.00	Auto	0.1017
L32	71	CCI 6" x 1" Plate	59.75 - 60.00	Auto	0.1017
L32	72	CCI 6" x 1" Plate	59.75 - 60.00	Auto	0.1017
L33	42	CCI 6.5" x 1.25" Plate	58.50 - 59.75	Auto	0.1664
L33	43	CCI 6.5" x 1.25" Plate	58.50 - 59.75	Auto	0.1664
L33	44	CCI 6.5" x 1.25" Plate	58.50 - 59.75	Auto	0.1664
L33	62	CCI 8.5" x 1.25" Plate	58.50 - 59.75	Auto	0.3626
L33	68	CCI 6.5" x 1.25" Plate	58.50 - 59.50	Auto	0.1657
L33	70	CCI 6" x 1" Plate	58.50 - 59.75	Auto	0.0970
L33	71	CCI 6" x 1" Plate	58.50 - 59.75	Auto	0.0970
L33	72	CCI 6" x 1" Plate	58.50 - 59.75	Auto	0.0970
L34	42	CCI 6.5" x 1.25" Plate	58.25 - 58.50	Auto	0.1621
L34	43	CCI 6.5" x 1.25" Plate	58.25 - 58.50	Auto	0.1621
L34	44	CCI 6.5" x 1.25" Plate	58.25 - 58.50	Auto	0.1621
L34	62	CCI 8.5" x 1.25" Plate	58.25 - 58.50	Auto	0.3592
L34	68	CCI 6.5" x 1.25" Plate	58.25 - 58.50	Auto	0.1621
L34	70	CCI 6" x 1" Plate	58.25 - 58.50	Auto	0.0922
L34	71	CCI 6" x 1" Plate	58.25 - 58.50	Auto	0.0922
L34	72	CCI 6" x 1" Plate	58.25 - 58.50	Auto	0.0922
L35	42	CCI 6.5" x 1.25" Plate	58.00 - 58.25	Auto	0.1606
L35	43	CCI 6.5" x 1.25" Plate	58.00 - 58.25	Auto	0.1606
L35	44	CCI 6.5" x 1.25" Plate	58.00 - 58.25	Auto	0.1606
L35	62	CCI 8.5" x 1.25" Plate	58.00 - 58.25	Auto	0.3581
L35	68	CCI 6.5" x 1.25" Plate	58.00 - 58.25	Auto	0.1606
L35	70	CCI 6" x 1" Plate	58.00 - 58.25	Auto	0.0906
L35	71	CCI 6" x 1" Plate	58.00 - 58.25	Auto	0.0906
L35	72	CCI 6" x 1" Plate	58.00 - 58.25	Auto	0.0906
L36	42	CCI 6.5" x 1.25" Plate	57.75 - 58.00	Auto	0.1151
L36	43	CCI 6.5" x 1.25" Plate	57.75 - 58.00	Auto	0.1151
L36	44	CCI 6.5" x 1.25" Plate	57.75 - 58.00	Auto	0.1151
L36	62	CCI 8.5" x 1.25" Plate	57.75 - 58.00	Auto	0.3233
L36	68	CCI 6.5" x 1.25" Plate	57.75 - 58.00	Auto	0.1151
L36	70	CCI 6" x 1" Plate	57.75 - 58.00	Auto	0.0414

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L36	71	CCI 6" x 1" Plate	57.75 - 58.00	Auto	0.0414
L36	72	CCI 6" x 1" Plate	57.75 - 58.00	Auto	0.0414
L37	42	CCI 6.5" x 1.25" Plate	56.75 - 57.75	Auto	0.1115
L37	43	CCI 6.5" x 1.25" Plate	56.75 - 57.75	Auto	0.1115
L37	44	CCI 6.5" x 1.25" Plate	56.75 - 57.75	Auto	0.1115
L37	62	CCI 8.5" x 1.25" Plate	56.75 - 57.75	Auto	0.3206
L37	68	CCI 6.5" x 1.25" Plate	56.75 - 57.75	Auto	0.1115
L37	70	CCI 6" x 1" Plate	56.75 - 57.75	Auto	0.0374
L37	71	CCI 6" x 1" Plate	56.75 - 57.75	Auto	0.0374
L37	72	CCI 6" x 1" Plate	56.75 - 57.75	Auto	0.0374
L38	42	CCI 6.5" x 1.25" Plate	56.50 - 56.75	Auto	0.1417
L38	43	CCI 6.5" x 1.25" Plate	56.50 - 56.75	Auto	0.1417
L38	44	CCI 6.5" x 1.25" Plate	56.50 - 56.75	Auto	0.1417
L38	62	CCI 8.5" x 1.25" Plate	56.50 - 56.75	Auto	0.3436
L38	68	CCI 6.5" x 1.25" Plate	56.50 - 56.75	Auto	0.1417
L38	70	CCI 6" x 1" Plate	56.50 - 56.75	Auto	0.0702
L38	71	CCI 6" x 1" Plate	56.50 - 56.75	Auto	0.0702
L38	72	CCI 6" x 1" Plate	56.50 - 56.75	Auto	0.0702
L39	42	CCI 6.5" x 1.25" Plate	51.50 - 56.50	Auto	0.1230
L39	43	CCI 6.5" x 1.25" Plate	51.50 - 56.50	Auto	0.1230
L39	44	CCI 6.5" x 1.25" Plate	51.50 - 56.50	Auto	0.1230
L39	62	CCI 8.5" x 1.25" Plate	51.50 - 56.50	Auto	0.3293
L39	68	CCI 6.5" x 1.25" Plate	51.50 - 56.50	Auto	0.1230
L39	70	CCI 6" x 1" Plate	56.00 - 56.50	Auto	0.0641
L39	71	CCI 6" x 1" Plate	56.00 - 56.50	Auto	0.0641
L39	72	CCI 6" x 1" Plate	56.00 - 56.50	Auto	0.0641
L40	42	CCI 6.5" x 1.25" Plate	42.04 - 51.50	Auto	0.0774
L40	43	CCI 6.5" x 1.25" Plate	42.04 - 51.50	Auto	0.0774
L40	44	CCI 6.5" x 1.25" Plate	42.04 - 51.50	Auto	0.0774
L40	62	CCI 8.5" x 1.25" Plate	42.04 - 51.50	Auto	0.2945
L40	68	CCI 6.5" x 1.25" Plate	42.04 - 51.50	Auto	0.0774
L41	42	CCI 6.5" x 1.25" Plate	41.04 - 42.04	Auto	0.0876
L41	43	CCI 6.5" x 1.25" Plate	41.04 - 42.04	Auto	0.0876
L41	44	CCI 6.5" x 1.25" Plate	41.04 - 42.04	Auto	0.0876
L41	62	CCI 8.5" x 1.25" Plate	41.04 - 42.04	Auto	0.3023
L41	68	CCI 6.5" x 1.25" Plate	41.04 - 42.04	Auto	0.0876
L42	42	CCI 6.5" x 1.25" Plate	36.04 - 41.04	Auto	0.0702
L42	43	CCI 6.5" x 1.25" Plate	36.04 - 41.04	Auto	0.0702
L42	44	CCI 6.5" x 1.25" Plate	36.04 - 41.04	Auto	0.0702
L42	62	CCI 8.5" x 1.25" Plate	36.04 - 41.04	Auto	0.2890
L42	68	CCI 6.5" x 1.25" Plate	36.04 - 41.04	Auto	0.0702
L43	38	CCI 8.5" x 1.25" Plate	31.25 - 35.00	Auto	0.2597
L43	39	CCI 8.5" x 1.25" Plate	31.25 - 35.00	Auto	0.2597
L43	40	CCI 8.5" x 1.25" Plate	31.25 - 35.00	Auto	0.2597
L43	42	CCI 6.5" x 1.25" Plate	31.25 - 36.04	Auto	0.0349
L43	43	CCI 6.5" x 1.25" Plate	35.00 - 36.04	Auto	0.0458
L43	44	CCI 6.5" x 1.25" Plate	35.00 - 36.04	Auto	0.0458
L43	62	CCI 8.5" x 1.25" Plate	31.25 - 36.04	Auto	0.2620
L43	68	CCI 6.5" x 1.25" Plate	31.25 - 36.04	Auto	0.0349
L44	38	CCI 8.5" x 1.25" Plate	31.00 - 31.25	Auto	0.2275
L44	39	CCI 8.5" x 1.25" Plate	31.00 - 31.25	Auto	0.2275
L44	40	CCI 8.5" x 1.25" Plate	31.00 - 31.25	Auto	0.2275
L44	42	CCI 6.5" x 1.25" Plate	31.00 - 31.25	Auto	0.0000
L44	62	CCI 8.5" x 1.25" Plate	31.00 - 31.25	Auto	0.2275
L44	68	CCI 6.5" x 1.25" Plate	31.00 - 31.25	Auto	0.0000
L45	38	CCI 8.5" x 1.25" Plate	27.75 - 31.00	Auto	0.2197
L45	39	CCI 8.5" x 1.25" Plate	27.75 - 31.00	Auto	0.2197
L45	40	CCI 8.5" x 1.25" Plate	27.75 - 31.00	Auto	0.2197
L45	42	CCI 6.5" x 1.25" Plate	27.75 - 31.00	Auto	0.0000
L45	58	CCI 5.5" x 1.25" Plate	27.75 - 30.00	Auto	0.0000
L45	59	CCI 5.5" x 1.25" Plate	27.75 - 30.00	Auto	0.0000

tnxTower

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Client Crown Castle	Designed by JD Prabhu

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L45	60	CCI 6.5" x 1.25" Plate	27.75 - 30.00	Auto	0.0000
L45	62	CCI 8.5" x 1.25" Plate	27.75 - 31.00	Auto	0.2197
L45	68	CCI 6.5" x 1.25" Plate	27.75 - 31.00	Auto	0.0000
L46	38	CCI 8.5" x 1.25" Plate	27.50 - 27.75	Auto	0.2119
L46	39	CCI 8.5" x 1.25" Plate	27.50 - 27.75	Auto	0.2119
L46	40	CCI 8.5" x 1.25" Plate	27.50 - 27.75	Auto	0.2119
L46	42	CCI 6.5" x 1.25" Plate	27.50 - 27.75	Auto	0.0000
L46	58	CCI 5.5" x 1.25" Plate	27.50 - 27.75	Auto	0.0000
L46	59	CCI 5.5" x 1.25" Plate	27.50 - 27.75	Auto	0.0000
L46	60	CCI 6.5" x 1.25" Plate	27.50 - 27.75	Auto	0.0000
L46	62	CCI 8.5" x 1.25" Plate	27.50 - 27.75	Auto	0.2119
L46	68	CCI 6.5" x 1.25" Plate	27.50 - 27.75	Auto	0.0000
L47	38	CCI 8.5" x 1.25" Plate	27.25 - 27.50	Auto	0.2108
L47	39	CCI 8.5" x 1.25" Plate	27.25 - 27.50	Auto	0.2108
L47	40	CCI 8.5" x 1.25" Plate	27.25 - 27.50	Auto	0.2108
L47	42	CCI 6.5" x 1.25" Plate	27.25 - 27.50	Auto	0.0000
L47	58	CCI 5.5" x 1.25" Plate	27.25 - 27.50	Auto	0.0000
L47	59	CCI 5.5" x 1.25" Plate	27.25 - 27.50	Auto	0.0000
L47	60	CCI 6.5" x 1.25" Plate	27.25 - 27.50	Auto	0.0000
L47	62	CCI 8.5" x 1.25" Plate	27.25 - 27.50	Auto	0.2108
L47	68	CCI 6.5" x 1.25" Plate	27.25 - 27.50	Auto	0.0000
L48	38	CCI 8.5" x 1.25" Plate	27.00 - 27.25	Auto	0.2252
L48	39	CCI 8.5" x 1.25" Plate	27.00 - 27.25	Auto	0.2252
L48	40	CCI 8.5" x 1.25" Plate	27.00 - 27.25	Auto	0.2252
L48	42	CCI 6.5" x 1.25" Plate	27.00 - 27.25	Auto	0.0000
L48	58	CCI 5.5" x 1.25" Plate	27.00 - 27.25	Auto	0.0000
L48	59	CCI 5.5" x 1.25" Plate	27.00 - 27.25	Auto	0.0000
L48	60	CCI 6.5" x 1.25" Plate	27.00 - 27.25	Auto	0.0000
L48	68	CCI 6.5" x 1.25" Plate	27.00 - 27.25	Auto	0.0000
L49	38	CCI 8.5" x 1.25" Plate	22.00 - 27.00	Auto	0.2109
L49	39	CCI 8.5" x 1.25" Plate	22.00 - 27.00	Auto	0.2109
L49	40	CCI 8.5" x 1.25" Plate	22.00 - 27.00	Auto	0.2109
L49	42	CCI 6.5" x 1.25" Plate	25.00 - 27.00	Auto	0.0000
L49	58	CCI 5.5" x 1.25" Plate	22.00 - 27.00	Auto	0.0000
L49	59	CCI 5.5" x 1.25" Plate	22.00 - 27.00	Auto	0.0000
L49	60	CCI 6.5" x 1.25" Plate	22.00 - 27.00	Auto	0.0000
L49	68	CCI 6.5" x 1.25" Plate	24.50 - 27.00	Auto	0.0000
L50	38	CCI 8.5" x 1.25" Plate	17.00 - 22.00	Auto	0.1887
L50	39	CCI 8.5" x 1.25" Plate	17.00 - 22.00	Auto	0.1887
L50	40	CCI 8.5" x 1.25" Plate	17.00 - 22.00	Auto	0.1887
L50	58	CCI 5.5" x 1.25" Plate	17.00 - 22.00	Auto	0.0000
L50	59	CCI 5.5" x 1.25" Plate	17.00 - 22.00	Auto	0.0000
L50	60	CCI 6.5" x 1.25" Plate	17.00 - 22.00	Auto	0.0000
L51	38	CCI 8.5" x 1.25" Plate	12.00 - 17.00	Auto	0.1664
L51	39	CCI 8.5" x 1.25" Plate	12.00 - 17.00	Auto	0.1664
L51	40	CCI 8.5" x 1.25" Plate	12.00 - 17.00	Auto	0.1664
L51	58	CCI 5.5" x 1.25" Plate	12.00 - 17.00	Auto	0.0000
L51	59	CCI 5.5" x 1.25" Plate	12.00 - 17.00	Auto	0.0000
L51	60	CCI 6.5" x 1.25" Plate	12.00 - 17.00	Auto	0.0000
L52	38	CCI 8.5" x 1.25" Plate	7.00 - 12.00	Auto	0.1442
L52	39	CCI 8.5" x 1.25" Plate	7.00 - 12.00	Auto	0.1442
L52	40	CCI 8.5" x 1.25" Plate	7.00 - 12.00	Auto	0.1442
L52	58	CCI 5.5" x 1.25" Plate	7.00 - 12.00	Auto	0.0000
L52	59	CCI 5.5" x 1.25" Plate	7.00 - 12.00	Auto	0.0000
L52	60	CCI 6.5" x 1.25" Plate	7.00 - 12.00	Auto	0.0000
L53	38	CCI 8.5" x 1.25" Plate	2.00 - 7.00	Auto	0.1193
L53	39	CCI 8.5" x 1.25" Plate	2.00 - 7.00	Auto	0.1193
L53	40	CCI 8.5" x 1.25" Plate	2.00 - 7.00	Auto	0.1193
L53	58	CCI 5.5" x 1.25" Plate	2.00 - 7.00	Auto	0.0000
L53	59	CCI 5.5" x 1.25" Plate	2.00 - 7.00	Auto	0.0000
L53	60	CCI 6.5" x 1.25" Plate	2.00 - 7.00	Auto	0.0000

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)	Page 31 of 59
	Project	Date 18:52:00 01/18/22
	Client Crown Castle	Designed by JD Prabhu

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L54	38	CCI 8.5" x 1.25" Plate	0.00 - 2.00	Auto	0.1037
L54	39	CCI 8.5" x 1.25" Plate	0.00 - 2.00	Auto	0.1037
L54	40	CCI 8.5" x 1.25" Plate	0.00 - 2.00	Auto	0.1037
L54	58	CCI 5.5" x 1.25" Plate	0.00 - 2.00	Auto	0.0000
L54	59	CCI 5.5" x 1.25" Plate	0.00 - 2.00	Auto	0.0000
L54	60	CCI 6.5" x 1.25" Plate	0.00 - 2.00	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			ft ft ft	°	ft	ft ²	ft ²	K
Lightning Rod 5/8" x 5'	C	None		0.000	147.000	No Ice 1/2" Ice 1" Ice	0.313 0.826 1.322	0.006 0.010 0.016
Strobe	C	None		0.000	149.500	No Ice 1/2" Ice 1" Ice	4.500 4.770 5.048	0.020 0.058 0.100
5' x 2" Pipe Mount	C	None		0.000	147.000	No Ice 1/2" Ice 1" Ice	1.188 1.496 1.807	0.018 0.027 0.040
Top Hat	C	None		0.000	146.000	No Ice 1/2" Ice 1" Ice	3.000 3.480 3.960	0.081 0.111 0.141
*								
RRUS 32 B2	A	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182	1.668 1.855 2.049
RRUS 32 B2	B	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182	1.668 1.855 2.049
RRUS 32 B2	C	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	2.731 2.953 3.182	1.668 1.855 2.049
RRUS-32 B30	A	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	3.314 3.558 3.809	2.424 2.638 2.860
RRUS-32 B30	B	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	3.314 3.558 3.809	2.424 2.638 2.860
RRUS-32 B30	C	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	3.314 3.558 3.809	2.424 2.638 2.860
RRUS 4478 B14	A	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	1.059 1.197 1.342
RRUS 4478 B14	B	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	1.059 1.197 1.342
RRUS 4478 B14	C	From Leg	4.000 0.000 -2.000	0.000	147.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	1.059 1.197 1.342

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
			0.000			1/2" Ice	2.012	1.197	0.076
			-2.000			1" Ice	2.190	1.342	0.094
DC6-48-60-0-8F	B	From Leg	4.000	0.000	147.000	No Ice	0.917	0.917	0.033
			0.000			1/2" Ice	1.458	1.458	0.051
			-2.000			1" Ice	1.643	1.643	0.071
DC6-48-60-18-8F	A	From Leg	4.000	0.000	147.000	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
DC6-48-60-18-8F	C	From Leg	4.000	0.000	147.000	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
AIR 6419 B77G_CCIV2 w/ Mount Pipe	A	From Leg	4.000	0.000	147.000	No Ice	3.999	2.617	0.078
			0.000			1/2" Ice	4.311	3.022	0.115
			-2.000			1" Ice	4.634	3.444	0.157
AIR 6419 B77G_CCIV2 w/ Mount Pipe	B	From Leg	4.000	0.000	147.000	No Ice	3.999	2.617	0.078
			0.000			1/2" Ice	4.311	3.022	0.115
			-2.000			1" Ice	4.634	3.444	0.157
AIR 6419 B77G_CCIV2 w/ Mount Pipe	C	From Leg	4.000	0.000	147.000	No Ice	3.999	2.617	0.078
			0.000			1/2" Ice	4.311	3.022	0.115
			-2.000			1" Ice	4.634	3.444	0.157
AIR 6449 B77D w/ Mount Pipe	A	From Leg	4.000	0.000	147.000	No Ice	3.580	2.310	0.095
			0.000			1/2" Ice	3.920	2.600	0.130
			-4.000			1" Ice	4.270	2.910	0.173
AIR 6449 B77D w/ Mount Pipe	B	From Leg	4.000	0.000	147.000	No Ice	3.580	2.310	0.095
			0.000			1/2" Ice	3.920	2.600	0.130
			-4.000			1" Ice	4.270	2.910	0.173
AIR 6449 B77D w/ Mount Pipe	C	From Leg	4.000	0.000	147.000	No Ice	3.580	2.310	0.095
			0.000			1/2" Ice	3.920	2.600	0.130
			-4.000			1" Ice	4.270	2.910	0.173
DMP65R-BU8D w/ Mount Pipe	A	From Leg	4.000	0.000	147.000	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
DMP65R-BU8D w/ Mount Pipe	B	From Leg	4.000	0.000	147.000	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
DMP65R-BU8D w/ Mount Pipe	C	From Leg	4.000	0.000	147.000	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
TPA65R-BU8D_CCIV2 w/ Mount Pipe	A	From Leg	4.000	0.000	147.000	No Ice	15.890	7.890	0.120
			0.000			1/2" Ice	16.810	8.740	0.234
			-2.000			1" Ice	17.760	9.600	0.361
TPA65R-BU8D_CCIV2 w/ Mount Pipe	B	From Leg	4.000	0.000	147.000	No Ice	15.890	7.890	0.120
			0.000			1/2" Ice	16.810	8.740	0.234
			-2.000			1" Ice	17.760	9.600	0.361
TPA65R-BU8D_CCIV2 w/ Mount Pipe	C	From Leg	4.000	0.000	147.000	No Ice	15.890	7.890	0.120
			0.000			1/2" Ice	16.810	8.740	0.234
			-2.000			1" Ice	17.760	9.600	0.361
RRUS 4426 B66	A	From Leg	4.000	0.000	147.000	No Ice	1.644	0.725	0.048
			0.000			1/2" Ice	1.804	0.842	0.061
			-2.000			1" Ice	1.972	0.969	0.076
RRUS 4426 B66	B	From Leg	4.000	0.000	147.000	No Ice	1.644	0.725	0.048
			0.000			1/2" Ice	1.804	0.842	0.061
			-2.000			1" Ice	1.972	0.969	0.076
RRUS 4426 B66	C	From Leg	4.000	0.000	147.000	No Ice	1.644	0.725	0.048
			0.000			1/2" Ice	1.804	0.842	0.061
			-2.000			1" Ice	1.972	0.969	0.076
RRUS 4449 B5/B12	A	From Leg	4.000	0.000	147.000	No Ice	1.968	1.408	0.071

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job		92739.021.01 - GROTON TOWER, CT (BU# 881533)		Page		33 of 59	
	Project				Date		18:52:00 01/18/22	
	Client		Crown Castle		Designed by		JD Prabhu	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			0.000						
			-2.000			1/2" Ice	2.144	1.564	0.090
			4.000	0.000	147.000	1" Ice	2.328	1.727	0.111
RRUS 4449 B5/B12	B	From Leg	0.000			No Ice	1.968	1.408	0.071
			-2.000			1/2" Ice	2.144	1.564	0.090
			4.000	0.000	147.000	1" Ice	2.328	1.727	0.111
RRUS 4449 B5/B12	C	From Leg	0.000			No Ice	1.968	1.408	0.071
			-2.000			1/2" Ice	2.144	1.564	0.090
			4.000	0.000	147.000	1" Ice	2.328	1.727	0.111
DC6-48-60-0-8F	A	From Leg	0.000			No Ice	0.917	0.917	0.033
			-2.000			1/2" Ice	1.458	1.458	0.051
			4.000	0.000	147.000	1" Ice	1.643	1.643	0.071
8' x 2" Mount Pipe	A	From Leg	0.000			No Ice	1.900	1.900	0.029
			-2.000			1/2" Ice	2.728	2.728	0.044
			4.000	0.000	147.000	1" Ice	3.401	3.401	0.063
8' x 2" Mount Pipe	B	From Leg	0.000			No Ice	1.900	1.900	0.029
			-2.000			1/2" Ice	2.728	2.728	0.044
			4.000	0.000	147.000	1" Ice	3.401	3.401	0.063
8' x 2" Mount Pipe	C	From Leg	0.000			No Ice	1.900	1.900	0.029
			-2.000			1/2" Ice	2.728	2.728	0.044
			4.000	0.000	147.000	1" Ice	3.401	3.401	0.063
Platform Mount [LP 602-1_KCKR]	C	None		0.000	147.000	No Ice	42.300	42.300	1.618
						1/2" Ice	49.040	49.040	2.384
						1" Ice	55.870	55.870	3.267
Transition Ladder	A	From Leg	3.000	0.000	147.000	No Ice	6.000	6.000	0.160
			0.000			1/2" Ice	8.000	8.000	0.240
			-2.000			1" Ice	10.000	10.000	0.320
Miscellaneous [NA 507-1]	C	None		0.000	146.000	No Ice	4.560	4.560	0.245
						1/2" Ice	6.390	6.390	0.311
						1" Ice	8.180	8.180	0.402
*									
*									
(2) MX06FRO660-02 w/ Mount Pipe	A	From Leg	4.000	0.000	135.000	No Ice	6.540	5.540	0.082
			0.000			1/2" Ice	7.060	6.050	0.164
			0.000			1" Ice	7.600	6.570	0.256
(2) MX06FRO660-02 w/ Mount Pipe	B	From Leg	4.000	0.000	135.000	No Ice	6.540	5.540	0.082
			0.000			1/2" Ice	7.060	6.050	0.164
			0.000			1" Ice	7.600	6.570	0.256
(2) MX06FRO660-02 w/ Mount Pipe	C	From Leg	4.000	0.000	135.000	No Ice	6.540	5.540	0.082
			0.000			1/2" Ice	7.060	6.050	0.164
			0.000			1" Ice	7.600	6.570	0.256
Sub6 Antenna - VZS01 w/ Mount Pipe	A	From Leg	4.000	0.000	135.000	No Ice	4.915	2.687	0.101
			0.000			1/2" Ice	5.264	3.151	0.141
			0.000			1" Ice	5.623	3.631	0.186
Sub6 Antenna - VZS01 w/ Mount Pipe	B	From Leg	4.000	0.000	135.000	No Ice	4.915	2.687	0.101
			0.000			1/2" Ice	5.264	3.151	0.141
			0.000			1" Ice	5.623	3.631	0.186
Sub6 Antenna - VZS01 w/ Mount Pipe	C	From Leg	4.000	0.000	135.000	No Ice	4.915	2.687	0.101
			0.000			1/2" Ice	5.264	3.151	0.141
			0.000			1" Ice	5.623	3.631	0.186
RFV01U-D1A	A	From Leg	4.000	0.000	135.000	No Ice	1.875	1.250	0.084
			0.000			1/2" Ice	2.045	1.393	0.103
			0.000			1" Ice	2.223	1.543	0.124
RFV01U-D1A	B	From Leg	4.000	0.000	135.000	No Ice	1.875	1.250	0.084
			0.000			1/2" Ice	2.045	1.393	0.103
			0.000			1" Ice	2.223	1.543	0.124
RFV01U-D1A	C	From Leg	4.000	0.000	135.000	No Ice	1.875	1.250	0.084
			0.000			1/2" Ice	2.045	1.393	0.103

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	Project		Date
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	Client	Designed by	
	Crown Castle	JD Prabhu	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
RFV01U-D2A	A	From Leg	0.000		0.000	135.000	1" Ice	1.543	0.124
			4.000				No Ice	1.013	0.070
			0.000				1/2" Ice	1.145	0.087
RFV01U-D2A	B	From Leg	0.000		0.000	135.000	1" Ice	1.284	0.106
			4.000				No Ice	1.013	0.070
			0.000				1/2" Ice	1.145	0.087
RFV01U-D2A	C	From Leg	0.000		0.000	135.000	1" Ice	1.284	0.106
			4.000				No Ice	1.013	0.070
			0.000				1/2" Ice	1.145	0.087
RVZDC-6627-PF-48	A	From Leg	0.000		0.000	135.000	1" Ice	1.284	0.106
			4.000				No Ice	1.013	0.070
			0.000				1/2" Ice	1.145	0.087
RVZDC-6627-PF-48	B	From Leg	0.000		0.000	135.000	1" Ice	1.284	0.106
			4.000				No Ice	1.013	0.070
			0.000				1/2" Ice	1.145	0.087
LNx-6512DS-VTM w/ Mount Pipe	A	From Leg	0.000		0.000	135.000	1" Ice	1.284	0.106
			4.000				No Ice	1.013	0.070
			0.000				1/2" Ice	1.145	0.087
LNx-6512DS-VTM w/ Mount Pipe	B	From Leg	0.000		0.000	135.000	1" Ice	1.284	0.106
			4.000				No Ice	1.013	0.070
			0.000				1/2" Ice	1.145	0.087
LNx-6512DS-VTM w/ Mount Pipe	C	From Leg	0.000		0.000	135.000	1" Ice	1.284	0.106
			4.000				No Ice	1.013	0.070
			0.000				1/2" Ice	1.145	0.087
Platform Mount [LP 601-1]	C	None	0.000		0.000	135.000	1" Ice	1.284	0.106
			0.000				No Ice	28.500	1.122
			0.000				1/2" Ice	28.500	1.122
Transition Ladder	A	From Leg	3.000		0.000	135.000	1" Ice	10.000	0.320
			0.000				No Ice	6.000	0.160
			-2.000				1/2" Ice	8.000	0.240
* **Previous 018 SA** **019 SA**									
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000		0.000	128.000	No Ice	6.870	0.186
			0.000				1/2" Ice	7.550	0.315
			0.000				1" Ice	8.250	0.458
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000		0.000	128.000	No Ice	6.870	0.186
			0.000				1/2" Ice	7.550	0.315
			0.000				1" Ice	8.250	0.458
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000		0.000	128.000	No Ice	6.870	0.186
			0.000				1/2" Ice	7.550	0.315
			0.000				1" Ice	8.250	0.458
RADIO 4449 B12/B71	A	From Leg	4.000		0.000	128.000	No Ice	1.163	0.074
			0.000				1/2" Ice	1.301	0.090
			0.000				1" Ice	1.447	0.109
RADIO 4449 B12/B71	B	From Leg	4.000		0.000	128.000	No Ice	1.163	0.074
			0.000				1/2" Ice	1.301	0.090
			0.000				1" Ice	1.447	0.109
RADIO 4449 B12/B71	C	From Leg	4.000		0.000	128.000	No Ice	1.163	0.074
			0.000				1/2" Ice	1.301	0.090
			0.000				1" Ice	1.447	0.109
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.000		0.000	128.000	No Ice	2.590	0.112
			0.000				1/2" Ice	2.880	0.164
			0.000				1" Ice	3.190	0.225
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.000		0.000	128.000	No Ice	2.590	0.112
			0.000				1/2" Ice	2.880	0.164

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	Project		Date	18:52:00 01/18/22
	Client	Crown Castle		Designed by

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral						
			ft	ft	°	ft	ft ²	ft ²	K	
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	0.000		0.000	128.000	1" Ice	3.770	3.190	0.225
			4.000				No Ice	3.140	2.590	0.112
			0.000				1/2" Ice	3.450	2.880	0.164
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	0.000		0.000	128.000	1" Ice	3.770	3.190	0.225
			4.000				No Ice	3.140	2.590	0.111
			0.000				1/2" Ice	3.450	2.880	0.163
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	0.000		0.000	128.000	1" Ice	3.770	3.190	0.224
			4.000				No Ice	3.140	2.590	0.111
			0.000				1/2" Ice	3.450	2.880	0.163
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	0.000		0.000	128.000	1" Ice	3.770	3.190	0.224
			4.000				No Ice	3.140	2.590	0.111
			0.000				1/2" Ice	3.450	2.880	0.163
KRY 112 144/1	A	From Leg	0.000		0.000	128.000	1" Ice	3.770	3.190	0.224
			4.000				No Ice	0.350	0.175	0.011
			0.000				1/2" Ice	0.426	0.234	0.014
KRY 112 144/1	B	From Leg	0.000		0.000	128.000	1" Ice	0.509	0.301	0.019
			4.000				No Ice	0.350	0.175	0.011
			0.000				1/2" Ice	0.426	0.234	0.014
KRY 112 144/1	C	From Leg	0.000		0.000	128.000	1" Ice	0.509	0.301	0.019
			4.000				No Ice	0.350	0.175	0.011
			0.000				1/2" Ice	0.426	0.234	0.014
Platform Mount [LP 602-1]	C	None	0.000		0.000	128.000	1" Ice	0.509	0.301	0.019
							No Ice	31.070	31.070	1.343
							1/2" Ice	34.820	34.820	1.967
Transition Ladder	A	From Leg	3.000		0.000	128.000	1" Ice	38.480	38.480	2.669
			0.000				No Ice	6.000	6.000	0.160
			-2.000				1/2" Ice	8.000	8.000	0.240
*							10.000	10.000	0.320	
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000		0.000	118.000	No Ice	4.600	4.010	0.095
			0.000				1/2" Ice	5.050	4.450	0.160
			0.000				1" Ice	5.500	4.890	0.235
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000		0.000	118.000	No Ice	4.600	4.010	0.095
			0.000				1/2" Ice	5.050	4.450	0.160
			0.000				1" Ice	5.500	4.890	0.235
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000		0.000	118.000	No Ice	4.600	4.010	0.095
			0.000				1/2" Ice	5.050	4.450	0.160
			0.000				1" Ice	5.500	4.890	0.235
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000		0.000	118.000	No Ice	4.090	2.860	0.077
			0.000				1/2" Ice	4.480	3.230	0.127
			0.000				1" Ice	4.880	3.610	0.185
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000		0.000	118.000	No Ice	4.090	2.860	0.077
			0.000				1/2" Ice	4.480	3.230	0.127
			0.000				1" Ice	4.880	3.610	0.185
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000		0.000	118.000	No Ice	4.090	2.860	0.077
			0.000				1/2" Ice	4.480	3.230	0.127
			0.000				1" Ice	4.880	3.610	0.185
TD-RRH8X20-25	A	From Leg	4.000		0.000	118.000	No Ice	4.045	1.535	0.070
			0.000				1/2" Ice	4.298	1.714	0.097
			0.000				1" Ice	4.557	1.901	0.128
TD-RRH8X20-25	B	From Leg	4.000		0.000	118.000	No Ice	4.045	1.535	0.070
			0.000				1/2" Ice	4.298	1.714	0.097
			0.000				1" Ice	4.557	1.901	0.128
TD-RRH8X20-25	C	From Leg	4.000		0.000	118.000	No Ice	4.045	1.535	0.070
			0.000				1/2" Ice	4.298	1.714	0.097
			0.000				1" Ice	4.557	1.901	0.128
Platform Mount [LP 601-1]	C	None			0.000	118.000	No Ice	28.500	28.500	1.122

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	Project	Date 18:52:00 01/18/22
	Client Crown Castle	Designed by JD Prabhu

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			Horz Lateral ft	Vert ft					
						1/2" Ice	31.690	31.690	1.676
						1" Ice	34.870	34.870	2.282
Transition Ladder	A	From Leg	3.000	0.000	118.000	No Ice	6.000	6.000	0.160
			0.000			1/2" Ice	8.000	8.000	0.240
			-2.000			1" Ice	10.000	10.000	0.320
*									
TME-PCS 1900MHz 4x45W-65MHz	A	From Leg	4.000	0.000	108.000	No Ice	2.322	2.238	0.060
			0.000			1/2" Ice	2.527	2.441	0.083
			0.000			1" Ice	2.739	2.651	0.110
TME-PCS 1900MHz 4x45W-65MHz	B	From Leg	4.000	0.000	108.000	No Ice	2.322	2.238	0.060
			0.000			1/2" Ice	2.527	2.441	0.083
			0.000			1" Ice	2.739	2.651	0.110
TME-PCS 1900MHz 4x45W-65MHz	C	From Leg	4.000	0.000	108.000	No Ice	2.322	2.238	0.060
			0.000			1/2" Ice	2.527	2.441	0.083
			0.000			1" Ice	2.739	2.651	0.110
TME-800MHz 2X50W RRH W/FILTER	A	From Leg	4.000	0.000	108.000	No Ice	2.058	1.932	0.064
			0.000			1/2" Ice	2.240	2.109	0.086
			-2.000			1" Ice	2.429	2.293	0.111
TME-800MHz 2X50W RRH W/FILTER	B	From Leg	4.000	0.000	108.000	No Ice	2.058	1.932	0.064
			0.000			1/2" Ice	2.240	2.109	0.086
			-2.000			1" Ice	2.429	2.293	0.111
TME-800MHz 2X50W RRH W/FILTER	C	From Leg	4.000	0.000	108.000	No Ice	2.058	1.932	0.064
			0.000			1/2" Ice	2.240	2.109	0.086
			-2.000			1" Ice	2.429	2.293	0.111
Side Arm Mount [SO 102-3]	C	None		0.000	108.000	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
*									
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	103.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	103.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	103.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
8' x 2" Mount Pipe	A	From Leg	4.000	0.000	103.000	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
8' x 2" Mount Pipe	B	From Leg	4.000	0.000	103.000	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
8' x 2" Mount Pipe	C	From Leg	4.000	0.000	103.000	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
Platform Mount [LP 601-1]	C	None		0.000	103.000	No Ice	28.500	28.500	1.122
						1/2" Ice	31.690	31.690	1.676
						1" Ice	34.870	34.870	2.282
Transition Ladder	A	From Leg	3.000	0.000	103.000	No Ice	6.000	6.000	0.160
			0.000			1/2" Ice	8.000	8.000	0.240
			-2.000			1" Ice	10.000	10.000	0.320
*									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000	0.000	98.000	No Ice	8.010	4.230	0.108
			0.000			1/2" Ice	8.520	4.690	0.194
			0.000			1" Ice	9.040	5.160	0.292
MX08FRO665-21 w/ Mount	B	From Leg	4.000	0.000	98.000	No Ice	8.010	4.230	0.108

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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	°	ft	ft ²	ft ²	K
Pipe			0.000			1/2" Ice	8.520	4.690	0.194
			0.000			1" Ice	9.040	5.160	0.292
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000	0.000	98.000	No Ice	8.010	4.230	0.108
			0.000			1/2" Ice	8.520	4.690	0.194
			0.000			1" Ice	9.040	5.160	0.292
TA08025-B604	A	From Leg	4.000	0.000	98.000	No Ice	1.964	0.981	0.064
			0.000			1/2" Ice	2.138	1.112	0.081
			0.000			1" Ice	2.320	1.250	0.100
TA08025-B604	B	From Leg	4.000	0.000	98.000	No Ice	1.964	0.981	0.064
			0.000			1/2" Ice	2.138	1.112	0.081
			0.000			1" Ice	2.320	1.250	0.100
TA08025-B604	C	From Leg	4.000	0.000	98.000	No Ice	1.964	0.981	0.064
			0.000			1/2" Ice	2.138	1.112	0.081
			0.000			1" Ice	2.320	1.250	0.100
TA08025-B605	A	From Leg	4.000	0.000	98.000	No Ice	1.964	1.129	0.075
			0.000			1/2" Ice	2.138	1.267	0.093
			0.000			1" Ice	2.320	1.411	0.114
TA08025-B605	B	From Leg	4.000	0.000	98.000	No Ice	1.964	1.129	0.075
			0.000			1/2" Ice	2.138	1.267	0.093
			0.000			1" Ice	2.320	1.411	0.114
TA08025-B605	C	From Leg	4.000	0.000	98.000	No Ice	1.964	1.129	0.075
			0.000			1/2" Ice	2.138	1.267	0.093
			0.000			1" Ice	2.320	1.411	0.114
RDIDC-9181-PF-48	A	From Leg	4.000	0.000	98.000	No Ice	2.012	1.168	0.022
			0.000			1/2" Ice	2.189	1.311	0.040
			0.000			1" Ice	2.373	1.461	0.060
(2) 8' x 2" Mount Pipe	A	From Leg	4.000	0.000	98.000	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) 8' x 2" Mount Pipe	B	From Leg	4.000	0.000	98.000	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) 8' x 2" Mount Pipe	C	From Leg	4.000	0.000	98.000	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
Commscope MC-PK8-DSH	C	None		0.000	98.000	No Ice	34.240	34.240	1.749
						1/2" Ice	62.950	62.950	2.099
						1" Ice	91.660	91.660	2.450

*

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	144.5 - 139.5	Pole	Max Tension	1	0.000	0.000	-0.000
			Max. Compression	26	-10.917	0.040	1.804
			Max. Mx	20	-4.504	68.250	0.811
			Max. My	2	-4.496	-0.010	69.201
			Max. Vy	8	11.541	-68.248	0.806
			Max. Vx	2	-11.543	-0.010	69.201
			Max. Torque	8			1.690
L2	139.5 - 134.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-17.964	-0.401	3.497
			Max. Mx	8	-7.564	-129.168	1.523

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft			
L3	134.5 - 129.5	Pole	Max. My	2	-7.551	-0.107	130.833			
			Max. Vy	8	17.295	-129.168	1.523			
			Max. Vx	2	-17.327	-0.107	130.833			
			Max. Torque	8			3.203			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-18.592	-0.400	3.575			
			Max. Mx	8	-8.057	-216.676	1.480			
			Max. My	2	-8.045	0.015	218.503			
			Max. Vy	8	17.716	-216.676	1.480			
			Max. Vx	2	-17.748	0.015	218.503			
L4	129.5 - 124.5	Pole	Max. Torque	8			3.203			
			Max Tension	1	0.000	0.000	0.000			
			Max. Compression	26	-25.893	-0.423	5.076			
			Max. Mx	8	-11.701	-322.330	2.069			
			Max. My	2	-11.687	0.131	325.087			
			Max. Vy	8	22.900	-322.330	2.069			
			Max. Vx	2	-22.934	0.131	325.087			
			Max. Torque	8			4.457			
			Max Tension	1	0.000	0.000	0.000			
			L5	124.5 - 117.568	Pole	Max. Compression	26	-26.351	-0.445	5.142
Max. Mx	8	-12.105				-393.482	2.044			
Max. My	2	-12.092				0.202	396.340			
Max. Vy	8	23.148				-393.482	2.044			
Max. Vx	2	-23.181				0.202	396.340			
Max. Torque	8						4.454			
Max Tension	1	0.000				0.000	0.000			
L6	117.568 - 116.409	Pole				Max. Compression	26	-32.144	-0.479	6.674
						Max. Mx	8	-15.126	-515.239	2.656
						Max. My	2	-15.113	0.316	519.050
			Max. Vy	8	27.056	-515.239	2.656			
			Max. Vx	2	-27.091	0.316	519.050			
			Max. Torque	8			5.790			
			Max Tension	1	0.000	0.000	0.000			
			L7	116.409 - 112.583	Pole	Max. Compression	26	-32.850	-0.507	6.757
						Max. Mx	8	-15.763	-619.299	2.621
						Max. My	2	-15.750	0.404	623.237
Max. Vy	8	27.365				-619.299	2.621			
Max. Vx	2	-27.399				0.404	623.237			
Max. Torque	8						5.788			
Max Tension	1	0.000				0.000	0.000			
L8	112.583 - 112.333	Pole				Max. Compression	26	-32.899	-0.509	6.763
						Max. Mx	8	-15.827	-626.139	2.617
						Max. My	2	-15.814	0.410	630.086
			Max. Vy	8	27.373	-626.139	2.617			
			Max. Vx	2	-27.408	0.410	630.086			
			Max. Torque	8			5.785			
			Max Tension	1	0.000	0.000	0.000			
			L9	112.333 - 107.333	Pole	Max. Compression	26	-34.763	-0.545	6.862
						Max. Mx	8	-17.157	-763.995	2.559
						Max. My	2	-17.146	0.525	768.106
Max. Vy	8	28.546				-763.995	2.559			
Max. Vx	2	-28.580				0.525	768.106			
Max. Torque	8						5.784			
Max Tension	1	0.000				0.000	0.000			
L10	107.333 - 106.92	Pole				Max. Compression	26	-34.848	-0.548	6.870

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L11	106.92 - 106.67	Pole	Max. Mx	8	-17.246	-775.786	2.553
			Max. My	2	-17.235	0.535	779.911
			Max. Vy	8	28.570	-775.786	2.553
			Max. Vx	2	-28.603	0.535	779.911
			Max. Torque	8			5.778
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-34.925	-0.550	6.875
			Max. Mx	8	-17.315	-782.931	2.550
			Max. My	2	-17.304	0.541	787.063
			Max. Vy	8	28.591	-782.931	2.550
L12	106.67 - 103.5	Pole	Max. Vx	2	-28.625	0.541	787.063
			Max. Torque	8			5.778
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-35.926	-0.573	6.934
			Max. Mx	8	-18.098	-874.059	2.513
			Max. My	2	-18.087	0.614	878.296
			Max. Vy	8	28.910	-874.059	2.513
			Max. Vx	2	-28.944	0.614	878.296
			Max. Torque	8			5.777
			Max Tension	1	0.000	0.000	0.000
L13	103.5 - 103.25	Pole	Max. Compression	26	-36.008	-0.575	6.939
			Max. Mx	8	-18.171	-881.289	2.509
			Max. My	2	-18.160	0.619	885.533
			Max. Vy	8	28.929	-881.289	2.509
			Max. Vx	2	-28.963	0.619	885.533
			Max. Torque	8			5.775
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.719	-0.610	8.488
			Max. Mx	8	-20.907	-1029.719	3.153
			Max. My	2	-20.896	0.729	1034.931
L14	103.25 - 98.5	Pole	Max. Vy	8	31.742	-1029.719	3.153
			Max. Vx	2	-31.776	0.729	1034.931
			Max. Torque	8			7.085
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.815	-0.612	8.493
			Max. Mx	8	-20.999	-1037.656	3.149
			Max. My	2	-20.988	0.735	1042.876
			Max. Vy	8	31.759	-1037.656	3.149
			Max. Vx	2	-31.794	0.735	1042.876
			Max. Torque	8			7.082
L15	98.5 - 98.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-45.925	-0.617	8.834
			Max. Mx	8	-24.144	-1060.492	3.261
			Max. My	2	-24.130	0.750	1065.887
			Max. Vy	8	35.485	-1060.492	3.261
			Max. Vx	2	-35.554	0.750	1065.887
			Max. Torque	8			7.330
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-46.013	-0.619	8.840
			Max. Mx	8	-24.220	-1069.365	3.258
L16	98.25 - 97.58	Pole	Max. My	2	-24.206	0.756	1074.778
			Max. Vy	8	35.506	-1069.365	3.258
			Max. Vx	2	-35.577	0.756	1074.778
			Max. Torque	8			7.329
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-47.713	-0.658	8.939
			Max. Mx	8	-25.638	-1248.097	3.196
			Max. My	2	-25.625	0.872	1253.851
			Max. Vy	8	35.997	-1248.097	3.196
			Max. Vx	2	-36.066	0.872	1253.851

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L19	92.33 - 87.1178	Pole	Max. Torque	8			7.329
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-47.905	-0.663	8.950
			Max. Mx	8	-25.816	-1269.245	3.188
			Max. My	2	-25.802	0.886	1275.040
			Max. Vy	8	36.048	-1269.245	3.188
			Max. Vx	2	-36.117	0.886	1275.040
L20	87.1178 - 86.1178	Pole	Max. Torque	8			7.325
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-50.575	-0.708	9.059
			Max. Mx	8	-28.069	-1473.818	3.116
			Max. My	2	-28.056	1.016	1479.997
			Max. Vy	8	36.677	-1473.818	3.116
			Max. Vx	2	-36.746	1.016	1479.997
L21	86.1178 - 83	Pole	Max. Torque	8			7.322
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.418	-0.733	9.116
			Max. Mx	8	-28.872	-1588.476	3.067
			Max. My	2	-28.861	1.088	1594.867
			Max. Vy	8	36.911	-1588.476	3.067
			Max. Vx	2	-36.980	1.088	1594.867
L22	83 - 82.75	Pole	Max. Torque	8			7.321
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-51.488	-0.735	9.121
			Max. Mx	8	-28.959	-1597.701	3.062
			Max. My	2	-28.947	1.094	1604.109
			Max. Vy	8	36.913	-1597.701	3.062
			Max. Vx	2	-36.983	1.094	1604.109
L23	82.75 - 77.75	Pole	Max. Torque	8			7.317
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-52.947	-0.775	9.205
			Max. Mx	8	-30.261	-1783.164	2.977
			Max. My	2	-30.251	1.210	1789.910
			Max. Vy	8	37.295	-1783.164	2.977
			Max. Vx	2	-37.363	1.210	1789.910
L24	77.75 - 77.25	Pole	Max. Torque	8			7.311
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-53.100	-0.779	9.213
			Max. Mx	8	-30.409	-1801.810	2.967
			Max. My	2	-30.399	1.221	1808.590
			Max. Vy	8	37.320	-1801.810	2.967
			Max. Vx	2	-37.388	1.221	1808.590
L25	77.25 - 77	Pole	Max. Torque	8			7.311
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-53.220	-0.781	9.217
			Max. Mx	8	-30.522	-1811.141	2.963
			Max. My	2	-30.512	1.227	1817.938
			Max. Vy	8	37.338	-1811.141	2.963
			Max. Vx	2	-37.407	1.227	1817.938
L26	77 - 76.75	Pole	Max. Torque	8			7.311
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-53.321	-0.783	9.221
			Max. Mx	8	-30.608	-1820.479	2.958
			Max. My	2	-30.598	1.233	1827.292
			Max. Vy	8	37.362	-1820.479	2.958
			Max. Vx	2	-37.432	1.233	1827.292
L27	76.75 - 71.75	Pole	Max. Torque	8			7.311
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-55.301	-0.823	9.298

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			JD Prabhu

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-32.341	-2008.461	2.872
			Max. My	2	-32.332	1.348	2015.609
			Max. Vy	8	37.844	-2008.461	2.872
			Max. Vx	2	-37.912	1.348	2015.609
			Max. Torque	8			7.310
L28	71.75 - 69	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.423	-0.845	9.339
			Max. Mx	8	-33.309	-2112.851	2.823
			Max. My	2	-33.301	1.411	2120.184
			Max. Vy	8	38.107	-2112.851	2.823
			Max. Vx	2	-38.175	1.411	2120.184
			Max. Torque	8			7.307
L29	69 - 68.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.545	-0.848	9.343
			Max. Mx	8	-33.436	-2122.377	2.817
			Max. My	2	-33.427	1.416	2129.726
			Max. Vy	8	38.115	-2122.377	2.817
			Max. Vx	2	-38.184	1.416	2129.726
			Max. Torque	8			7.305
L30	68.75 - 63.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-58.994	-0.889	9.416
			Max. Mx	8	-35.548	-2314.218	2.727
			Max. My	2	-35.540	1.531	2321.901
			Max. Vy	8	38.633	-2314.218	2.727
			Max. Vx	2	-38.701	1.531	2321.901
			Max. Torque	8			7.305
L31	63.75 - 60	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-60.870	-0.906	9.439
			Max. Mx	8	-37.159	-2459.758	2.657
			Max. My	2	-37.152	1.616	2467.690
			Max. Vy	8	39.013	-2459.758	2.657
			Max. Vx	2	-39.081	1.616	2467.690
			Max. Torque	8			7.303
L32	60 - 59.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-60.997	-0.906	9.439
			Max. Mx	8	-37.283	-2469.511	2.652
			Max. My	2	-37.275	1.622	2477.460
			Max. Vy	8	39.024	-2469.511	2.652
			Max. Vx	2	-39.094	1.622	2477.460
			Max. Torque	8			7.301
L33	59.75 - 58.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-61.638	-0.909	9.429
			Max. Mx	8	-37.812	-2518.368	2.629
			Max. My	2	-37.805	1.650	2526.400
			Max. Vy	8	39.163	-2518.368	2.629
			Max. Vx	2	-39.230	1.650	2526.400
			Max. Torque	8			7.301
L34	58.5 - 58.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-61.767	-0.909	9.426
			Max. Mx	8	-37.936	-2528.158	2.623
			Max. My	2	-37.928	1.656	2536.207
			Max. Vy	8	39.174	-2528.158	2.623
			Max. Vx	2	-39.243	1.656	2536.207
			Max. Torque	8			7.300
L35	58.25 - 58	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-61.896	-0.910	9.424
			Max. Mx	8	-38.045	-2537.954	2.619
			Max. My	2	-38.038	1.662	2546.020
			Max. Vy	8	39.199	-2537.954	2.619
			Max. Vx	2	-39.268	1.662	2546.020
			Max. Torque	8			7.300

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L36	58 - 57.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-62.018	-0.910	9.421
			Max. Mx	8	-38.147	-2547.757	2.614
			Max. My	2	-38.140	1.667	2555.839
			Max. Vy	8	39.222	-2547.757	2.614
			Max. Vx	2	-39.291	1.667	2555.839
			Max. Torque	8			7.300
L37	57.75 - 56.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-62.504	-0.912	9.410
			Max. Mx	8	-38.548	-2587.022	2.595
			Max. My	2	-38.541	1.690	2595.171
			Max. Vy	8	39.326	-2587.022	2.595
			Max. Vx	2	-39.394	1.690	2595.171
			Max. Torque	8			7.300
L38	56.75 - 56.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-62.634	-0.913	9.408
			Max. Mx	8	-38.673	-2596.853	2.589
			Max. My	2	-38.667	1.696	2605.019
			Max. Vy	8	39.337	-2596.853	2.589
			Max. Vx	2	-39.406	1.696	2605.019
			Max. Torque	8			7.299
L39	56.5 - 51.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-65.159	-0.920	9.326
			Max. Mx	8	-40.883	-2794.728	2.492
			Max. My	2	-40.877	1.809	2803.224
			Max. Vy	8	39.828	-2794.728	2.492
			Max. Vx	2	-39.895	1.809	2803.224
			Max. Torque	8			7.299
L40	51.5 - 42.0418	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-67.032	-0.925	9.261
			Max. Mx	8	-42.539	-2941.956	2.419
			Max. My	2	-42.533	1.892	2950.695
			Max. Vy	8	40.171	-2941.956	2.419
			Max. Vx	2	-40.238	1.892	2950.695
			Max. Torque	8			7.297
L41	42.0418 - 41.0418	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-73.155	-0.934	9.140
			Max. Mx	8	-47.916	-3216.843	2.286
			Max. My	2	-47.911	2.044	3226.029
			Max. Vy	8	40.966	-3216.843	2.286
			Max. Vx	2	-41.033	2.044	3226.029
			Max. Torque	8			7.294
L42	41.0418 - 36.0418	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-75.900	-0.941	9.052
			Max. Mx	8	-50.372	-3422.689	2.183
			Max. My	2	-50.367	2.157	3432.205
			Max. Vy	8	41.403	-3422.689	2.183
			Max. Vx	2	-41.469	2.157	3432.205
			Max. Torque	8			7.294
L43	36.0418 - 31.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-78.597	-0.918	9.000
			Max. Mx	8	-52.756	-3621.962	2.082
			Max. My	2	-52.752	2.264	3631.791
			Max. Vy	8	41.805	-3621.962	2.082
			Max. Vx	2	-41.871	2.264	3631.791
			Max. Torque	8			7.292
L44	31.25 - 31	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-78.736	-0.917	8.998

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L45	31 - 27.75	Pole	Max. Mx	8	-52.894	-3632.410	2.076
			Max. My	2	-52.890	2.269	3642.256
			Max. Vy	8	41.806	-3632.410	2.076
			Max. Vx	2	-41.874	2.269	3642.256
			Max. Torque	8			7.291
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-80.588	-0.914	8.977
			Max. Mx	8	-54.495	-3768.657	2.007
			Max. My	2	-54.491	2.341	3778.714
			Max. Vy	8	42.063	-3768.657	2.007
L46	27.75 - 27.5	Pole	Max. Vx	2	-42.129	2.341	3778.714
			Max. Torque	8			7.291
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-80.732	-0.915	8.976
			Max. Mx	8	-54.635	-3779.169	2.000
			Max. My	2	-54.631	2.347	3789.243
			Max. Vy	8	42.061	-3779.169	2.000
			Max. Vx	2	-42.129	2.347	3789.243
			Max. Torque	8			7.290
			Max Tension	1	0.000	0.000	0.000
L47	27.5 - 27.25	Pole	Max. Compression	26	-80.877	-0.915	8.975
			Max. Mx	8	-54.760	-3789.686	1.995
			Max. My	2	-54.756	2.353	3799.776
			Max. Vy	8	42.079	-3789.686	1.995
			Max. Vx	2	-42.146	2.353	3799.776
			Max. Torque	8			7.290
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-81.019	-0.917	8.977
			Max. Mx	8	-54.885	-3800.208	1.990
			Max. My	2	-54.881	2.358	3810.313
L48	27.25 - 27	Pole	Max. Vy	8	42.097	-3800.208	1.990
			Max. Vx	2	-42.165	2.358	3810.313
			Max. Torque	8			7.290
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-83.846	-1.000	9.046
			Max. Mx	8	-57.369	-4011.588	1.881
			Max. My	2	-57.367	2.468	4022.017
			Max. Vy	8	42.476	-4011.588	1.881
			Max. Vx	2	-42.541	2.468	4022.017
			Max. Torque	8			7.289
L49	27 - 22	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-86.670	-1.108	9.143
			Max. Mx	8	-59.898	-4224.710	1.770
			Max. My	2	-59.896	2.578	4235.459
			Max. Vy	8	42.811	-4224.710	1.770
			Max. Vx	2	-42.876	2.578	4235.459
			Max. Torque	8			7.288
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-89.516	-1.215	9.239
			Max. Mx	8	-62.458	-4439.431	1.657
L50	22 - 17	Pole	Max. My	2	-62.456	2.687	4450.499
			Max. Vy	8	43.117	-4439.431	1.657
			Max. Vx	2	-43.181	2.687	4450.499
			Max. Torque	8			7.287
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-92.378	-1.321	9.333
			Max. Mx	8	-65.048	-4655.673	1.543
			Max. My	2	-65.047	2.794	4667.057
			Max. Vy	8	43.420	-4655.673	1.543
			Max. Vx	2	-43.484	2.794	4667.057
L51	17 - 12	Pole	Max. Torque	8			7.287
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-92.378	-1.321	9.333
			Max. Mx	8	-65.048	-4655.673	1.543
			Max. My	2	-65.047	2.794	4667.057
L52	12 - 7	Pole	Max. Vy	8	43.420	-4655.673	1.543
			Max. Vx	2	-43.484	2.794	4667.057
			Max. Torque	8			7.287

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L53	7 - 2	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-95.242	-1.422	9.422
			Max. M _x	8	-67.671	-4873.417	1.427
			Max. M _y	2	-67.671	2.901	4885.113
			Max. V _y	8	43.718	-4873.417	1.427
			Max. V _x	2	-43.781	2.901	4885.113
			Max. Torque	8			7.286
L54	2 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-96.376	-1.458	9.453
			Max. M _x	8	-68.731	-4960.930	1.380
			Max. M _y	2	-68.731	2.944	4972.750
			Max. V _y	8	43.837	-4960.930	1.380
			Max. V _x	2	-43.900	2.944	4972.750
			Max. Torque	8			7.286

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	96.376	-0.000	0.000
	Max. H _x	20	68.747	43.812	0.024
	Max. H _z	2	68.747	0.024	43.875
	Max. M _x	2	4972.750	0.024	43.875
	Max. M _z	8	4960.930	-43.812	-0.024
	Max. Torsion	8	7.286	-43.812	-0.024
	Min. Vert	7	51.560	-37.930	21.916
	Min. H _x	8	68.747	-43.812	-0.024
	Min. H _z	14	68.747	-0.024	-43.875
	Min. M _x	14	-4963.032	-0.024	-43.875
	Min. M _z	20	-4959.938	43.812	0.024
	Min. Torsion	20	-7.284	43.812	0.024

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	57.289	0.000	-0.000	-3.948	-0.405	-0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	68.747	-0.024	-43.875	-4972.750	2.944	0.389
0.9 Dead+1.0 Wind 0 deg - No Ice	51.560	-0.024	-43.875	-4918.369	3.032	0.392
1.2 Dead+1.0 Wind 30 deg - No Ice	68.747	21.885	-37.985	-4305.468	-2477.749	-3.304
0.9 Dead+1.0 Wind 30 deg - No Ice	51.560	21.885	-37.985	-4258.221	-2451.141	-3.298
1.2 Dead+1.0 Wind 60 deg - No Ice	68.747	37.930	-21.916	-2485.813	-4294.662	-6.114
0.9 Dead+1.0 Wind 60 deg - No Ice	51.560	37.930	-21.916	-2458.020	-4248.632	-6.106
1.2 Dead+1.0 Wind 90 deg - No Ice	68.747	43.812	0.024	-1.379	-4960.930	-7.286

<p style="text-align: center;">tnxTower</p> <p style="text-align: center;">B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	<p style="text-align: center;">Job 92739.021.01 - GROTON TOWER, CT (BU# 881533)</p>	<p style="text-align: center;">Page 46 of 59</p>
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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
0.9 Dead+1.0 Wind 90 deg - No Ice	51.560	43.812	0.024	-0.143	-4907.781	-7.278
1.2 Dead+1.0 Wind 120 deg - No Ice	68.747	37.955	21.959	2482.100	-4298.041	-6.505
0.9 Dead+1.0 Wind 120 deg - No Ice	51.560	37.955	21.959	2456.797	-4251.982	-6.499
1.2 Dead+1.0 Wind 150 deg - No Ice	68.747	21.947	38.043	4302.729	-2485.699	-3.979
0.9 Dead+1.0 Wind 150 deg - No Ice	51.560	21.947	38.043	4257.981	-2459.013	-3.978
1.2 Dead+1.0 Wind 180 deg - No Ice	68.747	0.024	43.875	4963.032	-3.931	-0.387
0.9 Dead+1.0 Wind 180 deg - No Ice	51.560	0.024	43.875	4911.226	-3.762	-0.390
1.2 Dead+1.0 Wind 210 deg - No Ice	68.747	-21.885	37.985	4295.769	2476.724	3.308
0.9 Dead+1.0 Wind 210 deg - No Ice	51.560	-21.885	37.985	4251.092	2450.383	3.301
1.2 Dead+1.0 Wind 240 deg - No Ice	68.747	-37.930	21.916	2476.156	4293.635	6.115
0.9 Dead+1.0 Wind 240 deg - No Ice	51.560	-37.930	21.916	2450.923	4247.872	6.107
1.2 Dead+1.0 Wind 270 deg - No Ice	68.747	-43.812	-0.024	-8.254	4959.938	7.284
0.9 Dead+1.0 Wind 270 deg - No Ice	51.560	-43.812	-0.024	-6.937	4907.048	7.276
1.2 Dead+1.0 Wind 300 deg - No Ice	68.747	-37.955	-21.959	-2491.753	4297.087	6.501
0.9 Dead+1.0 Wind 300 deg - No Ice	51.560	-37.955	-21.959	-2463.891	4251.276	6.496
1.2 Dead+1.0 Wind 330 deg - No Ice	68.747	-21.947	-38.043	-4312.423	2484.747	3.978
0.9 Dead+1.0 Wind 330 deg - No Ice	51.560	-21.947	-38.043	-4265.106	2458.309	3.976
1.2 Dead+1.0 Ice+1.0 Temp	96.376	0.000	-0.000	-9.453	-1.458	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	96.376	-0.004	-9.991	-1126.574	-0.897	0.062
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	96.376	4.987	-8.650	-976.641	-558.806	-0.877
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	96.376	8.641	-4.992	-567.599	-967.379	-1.582
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	96.376	9.980	0.004	-9.053	-1117.139	-1.862
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	96.376	8.645	4.999	549.334	-967.959	-1.644
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	96.376	4.994	8.654	957.943	-559.814	-0.985
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	96.376	0.004	9.991	1107.291	-2.065	-0.062
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	96.376	-4.987	8.650	957.359	555.840	0.877
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	96.376	-8.641	4.992	548.322	964.413	1.581
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	96.376	-9.980	-0.004	-10.221	1114.177	1.862
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	96.376	-8.645	-4.999	-568.611	965.001	1.643
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	96.376	-4.994	-8.654	-977.225	556.856	0.984
Dead+Wind 0 deg - Service	57.289	-0.005	-9.228	-1043.434	0.305	0.082
Dead+Wind 30 deg - Service	57.289	4.603	-7.989	-903.823	-518.703	-0.709

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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
Dead+Wind 60 deg - Service	57.289	7.978	-4.610	-523.118	-898.835	-1.309
Dead+Wind 90 deg - Service	57.289	9.215	0.005	-3.328	-1038.235	-1.559
Dead+Wind 120 deg - Service	57.289	7.983	4.619	516.268	-899.551	-1.392
Dead+Wind 150 deg - Service	57.289	4.616	8.002	897.188	-520.374	-0.851
Dead+Wind 180 deg - Service	57.289	0.005	9.228	1035.337	-1.132	-0.082
Dead+Wind 210 deg - Service	57.289	-4.603	7.989	895.727	517.874	0.709
Dead+Wind 240 deg - Service	57.289	-7.978	4.610	515.024	898.006	1.309
Dead+Wind 270 deg - Service	57.289	-9.215	-0.005	-4.765	1037.408	1.559
Dead+Wind 300 deg - Service	57.289	-7.983	-4.619	-524.362	898.726	1.391
Dead+Wind 330 deg - Service	57.289	-4.616	-8.002	-905.284	519.549	0.851

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	-57.289	0.000	0.000	57.289	0.000	0.000%
2	-0.024	-68.747	-43.875	0.024	68.747	43.875	0.000%
3	-0.024	-51.560	-43.875	0.024	51.560	43.875	0.000%
4	21.885	-68.747	-37.985	-21.885	68.747	37.985	0.000%
5	21.885	-51.560	-37.985	-21.885	51.560	37.985	0.000%
6	37.930	-68.747	-21.916	-37.930	68.747	21.916	0.000%
7	37.930	-51.560	-21.916	-37.930	51.560	21.916	0.000%
8	43.812	-68.747	0.024	-43.812	68.747	-0.024	0.000%
9	43.812	-51.560	0.024	-43.812	51.560	-0.024	0.000%
10	37.955	-68.747	21.959	-37.955	68.747	-21.959	0.000%
11	37.955	-51.560	21.959	-37.955	51.560	-21.959	0.000%
12	21.947	-68.747	38.043	-21.947	68.747	-38.043	0.000%
13	21.947	-51.560	38.043	-21.947	51.560	-38.043	0.000%
14	0.024	-68.747	43.875	-0.024	68.747	-43.875	0.000%
15	0.024	-51.560	43.875	-0.024	51.560	-43.875	0.000%
16	-21.885	-68.747	37.985	21.885	68.747	-37.985	0.000%
17	-21.885	-51.560	37.985	21.885	51.560	-37.985	0.000%
18	-37.930	-68.747	21.916	37.930	68.747	-21.916	0.000%
19	-37.930	-51.560	21.916	37.930	51.560	-21.916	0.000%
20	-43.812	-68.747	-0.024	43.812	68.747	0.024	0.000%
21	-43.812	-51.560	-0.024	43.812	51.560	0.024	0.000%
22	-37.955	-68.747	-21.959	37.955	68.747	21.959	0.000%
23	-37.955	-51.560	-21.959	37.955	51.560	21.959	0.000%
24	-21.947	-68.747	-38.043	21.947	68.747	38.043	0.000%
25	-21.947	-51.560	-38.043	21.947	51.560	38.043	0.000%
26	0.000	-96.376	0.000	-0.000	96.376	0.000	0.000%
27	-0.004	-96.376	-9.991	0.004	96.376	9.991	0.000%
28	4.987	-96.376	-8.650	-4.987	96.376	8.650	0.000%
29	8.641	-96.376	-4.992	-8.641	96.376	4.992	0.000%
30	9.980	-96.376	0.004	-9.980	96.376	-0.004	0.000%
31	8.645	-96.376	4.999	-8.645	96.376	-4.999	0.000%
32	4.994	-96.376	8.654	-4.994	96.376	-8.654	0.000%
33	0.004	-96.376	9.991	-0.004	96.376	-9.991	0.000%
34	-4.987	-96.376	8.650	4.987	96.376	-8.650	0.000%
35	-8.641	-96.376	4.992	8.641	96.376	-4.992	0.000%
36	-9.980	-96.376	-0.004	9.980	96.376	0.004	0.000%
37	-8.645	-96.376	-4.999	8.645	96.376	4.999	0.000%
38	-4.994	-96.376	-8.654	4.994	96.376	8.654	0.000%
39	-0.005	-57.289	-9.228	0.005	57.289	9.228	0.000%
40	4.603	-57.289	-7.989	-4.603	57.289	7.989	0.000%
41	7.978	-57.289	-4.610	-7.978	57.289	4.610	0.000%
42	9.215	-57.289	0.005	-9.215	57.289	-0.005	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
43	7.983	-57.289	4.619	-7.983	57.289	-4.619	0.000%
44	4.616	-57.289	8.002	-4.616	57.289	-8.002	0.000%
45	0.005	-57.289	9.228	-0.005	57.289	-9.228	0.000%
46	-4.603	-57.289	7.989	4.603	57.289	-7.989	0.000%
47	-7.978	-57.289	4.610	7.978	57.289	-4.610	0.000%
48	-9.215	-57.289	-0.005	9.215	57.289	0.005	0.000%
49	-7.983	-57.289	-4.619	7.983	57.289	4.619	0.000%
50	-4.616	-57.289	-8.002	4.616	57.289	8.002	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000787
2	Yes	5	0.00000001	0.00027071
3	Yes	5	0.00000001	0.00009947
4	Yes	7	0.00000001	0.00004629
5	Yes	6	0.00000001	0.00030349
6	Yes	7	0.00000001	0.00005233
7	Yes	6	0.00000001	0.00034514
8	Yes	6	0.00000001	0.00015154
9	Yes	6	0.00000001	0.00004899
10	Yes	6	0.00000001	0.00098115
11	Yes	6	0.00000001	0.00029238
12	Yes	7	0.00000001	0.00005085
13	Yes	6	0.00000001	0.00033497
14	Yes	5	0.00000001	0.00032063
15	Yes	5	0.00000001	0.00012574
16	Yes	7	0.00000001	0.00005025
17	Yes	6	0.00000001	0.00033098
18	Yes	6	0.00000001	0.00098192
19	Yes	6	0.00000001	0.00029309
20	Yes	6	0.00000001	0.00015565
21	Yes	6	0.00000001	0.00005030
22	Yes	7	0.00000001	0.00005269
23	Yes	6	0.00000001	0.00034757
24	Yes	7	0.00000001	0.00004604
25	Yes	6	0.00000001	0.00030166
26	Yes	5	0.00000001	0.00017021
27	Yes	6	0.00000001	0.00057622
28	Yes	6	0.00000001	0.00067469
29	Yes	6	0.00000001	0.00068711
30	Yes	6	0.00000001	0.00057250
31	Yes	6	0.00000001	0.00065110
32	Yes	6	0.00000001	0.00065892
33	Yes	6	0.00000001	0.00055353
34	Yes	6	0.00000001	0.00065506
35	Yes	6	0.00000001	0.00064789
36	Yes	6	0.00000001	0.00057053
37	Yes	6	0.00000001	0.00068632
38	Yes	6	0.00000001	0.00067336
39	Yes	5	0.00000001	0.00005082
40	Yes	5	0.00000001	0.00028152
41	Yes	5	0.00000001	0.00038539
42	Yes	5	0.00000001	0.00017129
43	Yes	5	0.00000001	0.00026623

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44	Yes	5	0.00000001	0.00034618
45	Yes	5	0.00000001	0.00005011
46	Yes	5	0.00000001	0.00033467
47	Yes	5	0.00000001	0.00026432
48	Yes	5	0.00000001	0.00017195
49	Yes	5	0.00000001	0.00039188
50	Yes	5	0.00000001	0.00027955

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	144.5 - 139.5	21.681	39	1.525	0.013
L2	139.5 - 134.5	20.091	39	1.508	0.012
L3	134.5 - 129.5	18.529	39	1.472	0.011
L4	129.5 - 124.5	17.014	39	1.418	0.010
L5	124.5 - 117.568	15.566	39	1.345	0.008
L6	121.409 - 116.409	14.713	39	1.291	0.008
L7	116.409 - 112.583	13.384	39	1.238	0.007
L8	112.583 - 112.333	12.419	39	1.170	0.006
L9	112.333 - 107.333	12.358	39	1.166	0.006
L10	107.333 - 106.92	11.188	39	1.069	0.005
L11	106.92 - 106.67	11.096	39	1.060	0.005
L12	106.67 - 103.5	11.040	39	1.058	0.005
L13	103.5 - 103.25	10.348	39	1.026	0.005
L14	103.25 - 98.5	10.295	39	1.023	0.004
L15	98.5 - 98.25	9.302	39	0.971	0.004
L16	98.25 - 97.58	9.252	39	0.969	0.004
L17	97.58 - 97.33	9.116	39	0.963	0.004
L18	97.33 - 92.33	9.066	39	0.961	0.004
L19	92.33 - 87.1178	8.088	50	0.906	0.003
L20	91.7428 - 86.1178	7.977	50	0.900	0.003
L21	86.1178 - 83	6.940	50	0.851	0.003
L22	83 - 82.75	6.403	50	0.796	0.003
L23	82.75 - 77.75	6.361	50	0.792	0.003
L24	77.75 - 77.25	5.579	50	0.703	0.002
L25	77.25 - 77	5.505	50	0.694	0.002
L26	77 - 76.75	5.469	50	0.692	0.002
L27	76.75 - 71.75	5.433	50	0.689	0.002
L28	71.75 - 69	4.740	50	0.634	0.002
L29	69 - 68.75	4.384	50	0.604	0.002
L30	68.75 - 63.75	4.353	50	0.601	0.002
L31	63.75 - 60	3.746	50	0.557	0.002
L32	60 - 59.75	3.322	50	0.523	0.001
L33	59.75 - 58.5	3.294	50	0.521	0.001
L34	58.5 - 58.25	3.159	50	0.510	0.001
L35	58.25 - 58	3.133	50	0.508	0.001
L36	58 - 57.75	3.106	50	0.506	0.001
L37	57.75 - 56.75	3.080	50	0.503	0.001
L38	56.75 - 56.5	2.976	50	0.492	0.001
L39	56.5 - 51.5	2.950	50	0.489	0.001
L40	51.5 - 42.0418	2.462	50	0.442	0.001
L41	47.8178 - 41.0418	2.135	50	0.407	0.001
L42	41.0418 - 36.0418	1.579	50	0.372	0.001
L43	36.0418 - 31.25	1.213	50	0.328	0.001
L44	31.25 - 31	0.906	50	0.285	0.001
L45	31 - 27.75	0.891	50	0.282	0.001
L46	27.75 - 27.5	0.710	50	0.248	0.001
L47	27.5 - 27.25	0.697	50	0.246	0.001

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L48	27.25 - 27	0.685	50	0.243	0.001
L49	27 - 22	0.672	50	0.241	0.001
L50	22 - 17	0.444	50	0.195	0.000
L51	17 - 12	0.264	50	0.149	0.000
L52	12 - 7	0.131	50	0.105	0.000
L53	7 - 2	0.044	50	0.061	0.000
L54	2 - 0	0.004	50	0.017	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.500	Strobe	39	21.681	1.525	0.013	10697
147.000	Lightning Rod 5/8" x 5'	39	21.681	1.525	0.013	10697
146.000	Top Hat	39	21.681	1.525	0.013	10697
135.000	(2) MX06FRO660-02 w/ Mount Pipe	39	18.684	1.477	0.011	6653
128.000	APXVAARR24_43-U-NA20 w/ Mount Pipe	39	16.572	1.399	0.009	4054
118.000	APXVSPPI18-C-A20 w/ Mount Pipe	39	13.800	1.256	0.007	4272
108.000	TME-PCS 1900MHz 4x45W-65MHz	39	11.338	1.084	0.005	3434
103.000	6' x 2" Mount Pipe	39	10.241	1.021	0.004	5330
98.000	MX08FRO665-21 w/ Mount Pipe	39	9.201	0.967	0.004	5482

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	144.5 - 139.5	102.839	2	7.209	0.059
L2	139.5 - 134.5	95.343	2	7.131	0.055
L3	134.5 - 129.5	87.975	2	6.968	0.052
L4	129.5 - 124.5	80.821	2	6.716	0.046
L5	124.5 - 117.568	73.974	2	6.377	0.039
L6	121.409 - 116.409	69.937	24	6.124	0.035
L7	116.409 - 112.583	63.654	24	5.877	0.032
L8	112.583 - 112.333	59.083	24	5.559	0.028
L9	112.333 - 107.333	58.794	24	5.538	0.028
L10	107.333 - 106.92	53.244	24	5.081	0.023
L11	106.92 - 106.67	52.808	24	5.042	0.023
L12	106.67 - 103.5	52.544	24	5.031	0.022
L13	103.5 - 103.25	49.262	24	4.879	0.021
L14	103.25 - 98.5	49.007	24	4.867	0.021
L15	98.5 - 98.25	44.296	24	4.622	0.019
L16	98.25 - 97.58	44.054	24	4.612	0.019
L17	97.58 - 97.33	43.410	24	4.585	0.018
L18	97.33 - 92.33	43.171	24	4.572	0.018
L19	92.33 - 87.1178	38.524	24	4.316	0.016
L20	91.7428 - 86.1178	37.996	24	4.285	0.016
L21	86.1178 - 83	33.067	24	4.052	0.014

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L22	83 - 82.75	30.509	24	3.793	0.013
L23	82.75 - 77.75	30.311	24	3.772	0.013
L24	77.75 - 77.25	26.587	24	3.349	0.010
L25	77.25 - 77	26.239	24	3.307	0.010
L26	77 - 76.75	26.066	24	3.296	0.010
L27	76.75 - 71.75	25.894	24	3.284	0.010
L28	71.75 - 69	22.595	24	3.022	0.009
L29	69 - 68.75	20.898	24	2.877	0.008
L30	68.75 - 63.75	20.748	24	2.867	0.008
L31	63.75 - 60	17.858	24	2.655	0.007
L32	60 - 59.75	15.837	24	2.495	0.007
L33	59.75 - 58.5	15.707	24	2.485	0.007
L34	58.5 - 58.25	15.063	24	2.432	0.006
L35	58.25 - 58	14.936	24	2.421	0.006
L36	58 - 57.75	14.810	24	2.411	0.006
L37	57.75 - 56.75	14.684	24	2.397	0.006
L38	56.75 - 56.5	14.188	24	2.345	0.006
L39	56.5 - 51.5	14.065	24	2.334	0.006
L40	51.5 - 42.0418	11.740	24	2.109	0.005
L41	47.8178 - 41.0418	10.178	24	1.943	0.005
L42	41.0418 - 36.0418	7.529	24	1.773	0.004
L43	36.0418 - 31.25	5.783	24	1.562	0.004
L44	31.25 - 31	4.319	24	1.357	0.003
L45	31 - 27.75	4.248	24	1.345	0.003
L46	27.75 - 27.5	3.387	24	1.185	0.003
L47	27.5 - 27.25	3.326	24	1.173	0.003
L48	27.25 - 27	3.265	24	1.161	0.003
L49	27 - 22	3.204	24	1.150	0.002
L50	22 - 17	2.116	24	0.929	0.002
L51	17 - 12	1.258	24	0.712	0.001
L52	12 - 7	0.624	24	0.499	0.001
L53	7 - 2	0.212	24	0.290	0.001
L54	2 - 0	0.017	24	0.082	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.500	Strobe	2	102.839	7.209	0.059	2409
147.000	Lightning Rod 5/8" x 5'	2	102.839	7.209	0.059	2409
146.000	Top Hat	2	102.839	7.209	0.059	2409
135.000	(2) MX06FRO660-02 w/ Mount Pipe	2	88.703	6.988	0.052	1484
128.000	APXVAARR24_43-U-NA20 w/ Mount Pipe	2	78.729	6.627	0.044	895
118.000	APXVSPPI18-C-A20 w/ Mount Pipe	24	65.620	5.961	0.033	931
108.000	TME-PCS 1900MHz 4x45W-65MHz	24	53.957	5.151	0.024	740
103.000	6' x 2" Mount Pipe	24	48.753	4.854	0.021	1145
98.000	MX08FRO665-21 w/ Mount Pipe	24	43.814	4.602	0.019	1175

Compression Checks

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Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	A in ²	P _u K	φP _n K	Ratio $\frac{P_u}{\phi P_n}$
L1	144.5 - 139.5 (1)	TP22.092x21x0.188	5.000	0.000	0.0	13.036	-4.496	762.603	0.006
L2	139.5 - 134.5 (2)	TP23.184x22.092x0.188	5.000	0.000	0.0	13.686	-7.551	800.623	0.009
L3	134.5 - 129.5 (3)	TP24.276x23.184x0.188	5.000	0.000	0.0	14.336	-8.045	838.642	0.010
L4	129.5 - 124.5 (4)	TP25.368x24.276x0.188	5.000	0.000	0.0	14.986	-11.684	876.662	0.013
L5	124.5 - 117.568 (5)	TP26.882x25.368x0.188	6.932	0.000	0.0	15.387	-12.090	900.167	0.013
L6	117.568 - 116.409 (6)	TP26.737x25.668x0.25	5.000	0.000	0.0	21.017	-15.110	1229.520	0.012
L7	116.409 - 112.583 (7)	TP27.555x26.737x0.25	3.826	0.000	0.0	21.666	-15.748	1267.470	0.012
L8	112.583 - 112.333 (8)	TP27.608x27.555x0.25	0.250	0.000	0.0	21.709	-15.812	1269.950	0.012
L9	112.333 - 107.333 (9)	TP28.677x27.608x0.25	5.000	0.000	0.0	22.557	-17.143	1319.560	0.013
L10	107.333 - 106.92 (10)	TP28.765x28.677x0.25	0.413	0.000	0.0	22.627	-17.232	1323.660	0.013
L11	106.92 - 106.67 (11)	TP28.818x28.765x0.538	0.250	0.000	0.0	48.248	-17.301	2822.500	0.006
L12	106.67 - 103.5 (12)	TP29.496x28.818x0.525	3.170	0.000	0.0	48.276	-18.083	2824.120	0.006
L13	103.5 - 103.25 (13)	TP29.549x29.496x0.525	0.250	0.000	0.0	48.365	-18.157	2829.330	0.006
L14	103.25 - 98.5 (14)	TP30.564x29.549x0.513	4.750	0.000	0.0	48.885	-20.891	2859.760	0.007
L15	98.5 - 98.25 (15)	TP30.618x30.564x0.675	0.250	0.000	0.0	64.151	-20.983	3752.840	0.006
L16	98.25 - 97.58 (16)	TP30.761x30.618x0.675	0.670	0.000	0.0	64.458	-24.125	3770.790	0.006
L17	97.58 - 97.33 (17)	TP30.815x30.761x0.563	0.250	0.000	0.0	54.011	-24.201	3159.660	0.008
L18	97.33 - 92.33 (18)	TP31.883x30.815x0.55	5.000	0.000	0.0	54.698	-25.619	3199.850	0.008
L19	92.33 - 87.1178 (19)	TP32.997x31.883x0.55	5.212	0.000	0.0	54.917	-25.797	3212.660	0.008
L20	87.1178 - 86.1178 (20)	TP32.72x31.509x0.375	5.625	0.000	0.0	38.499	-28.051	2252.200	0.012
L21	86.1178 - 83 (21)	TP33.392x32.72x0.375	3.118	0.000	0.0	39.299	-28.856	2298.970	0.013
L22	83 - 82.75 (22)	TP33.446x33.392x0.375	0.250	0.000	0.0	39.363	-28.942	2302.720	0.013
L23	82.75 - 77.75 (23)	TP34.523x33.446x0.375	5.000	0.000	0.0	40.645	-30.246	2377.720	0.013
L24	77.75 - 77.25 (24)	TP34.631x34.523x0.375	0.500	0.000	0.0	40.773	-30.395	2385.220	0.013
L25	77.25 - 77 (25)	TP34.685x34.631x0.825	0.250	0.000	0.0	88.663	-30.508	5186.790	0.006
L26	77 - 76.75 (26)	TP34.738x34.685x0.638	0.250	0.000	0.0	69.001	-30.594	4036.540	0.008
L27	76.75 - 71.75 (27)	TP35.816x34.738x0.625	5.000	0.000	0.0	69.809	-32.328	4083.850	0.008
L28	71.75 - 69 (28)	TP36.408x35.816x0.625	2.750	0.000	0.0	70.985	-33.297	4152.600	0.008
L29	69 - 68.75 (29)	TP36.462x36.408x0.8	0.250	0.000	0.0	90.553	-33.424	5297.330	0.006
L30	68.75 - 63.75 (30)	TP37.539x36.462x0.788	5.000	0.000	0.0	91.861	-35.536	5373.890	0.007

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			18:52:00 01/18/22
	Client	Designed by	
	Crown Castle	JD Prabhu	

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L31	63.75 - 60 (31)	TP38.347x37.539x0.775	3.750	0.000	0.0	92.421	-37.149	5406.630	0.007
L32	60 - 59.75 (32)	TP38.401x38.347x0.775	0.250	0.000	0.0	92.554	-37.272	5414.380	0.007
L33	59.75 - 58.5 (33)	TP38.67x38.401x0.775	1.250	0.000	0.0	93.216	-37.801	5453.130	0.007
L34	58.5 - 58.25 (34)	TP38.724x38.67x0.775	0.250	0.000	0.0	93.349	-37.925	5460.880	0.007
L35	58.25 - 58 (35)	TP38.778x38.724x0.775	0.250	0.000	0.0	93.481	-38.034	5468.630	0.007
L36	58 - 57.75 (36)	TP38.832x38.778x0.613	0.250	0.000	0.0	74.301	-38.137	4346.590	0.009
L37	57.75 - 56.75 (37)	TP39.047x38.832x0.613	1.000	0.000	0.0	74.719	-38.538	4371.090	0.009
L38	56.75 - 56.5 (38)	TP39.101x39.047x0.738	0.250	0.000	0.0	89.802	-38.663	5253.410	0.007
L39	56.5 - 51.5 (39)	TP40.178x39.101x0.725	5.000	0.000	0.0	90.787	-40.874	5311.050	0.008
L40	51.5 - 42.0418 (40)	TP42.216x40.178x0.713	9.458	0.000	0.0	91.044	-42.530	5326.080	0.008
L41	42.0418 - 41.0418 (41)	TP41.678x40.221x0.788	6.776	0.000	0.0	102.206	-47.908	5979.060	0.008
L42	41.0418 - 36.0418 (42)	TP42.753x41.678x0.788	5.000	0.000	0.0	104.893	-50.365	6136.220	0.008
L43	36.0418 - 31.25 (43)	TP43.783x42.753x0.763	4.792	0.000	0.0	104.116	-52.750	6090.790	0.009
L44	31.25 - 31 (44)	TP43.836x43.783x0.65	0.250	0.000	0.0	89.098	-52.889	5212.210	0.010
L45	31 - 27.75 (45)	TP44.535x43.836x0.65	3.250	0.000	0.0	90.539	-54.489	5296.530	0.010
L46	27.75 - 27.5 (46)	TP44.589x44.535x0.65	0.250	0.000	0.0	90.650	-54.630	5303.020	0.010
L47	27.5 - 27.25 (47)	TP44.642x44.589x0.65	0.250	0.000	0.0	90.761	-54.755	5309.500	0.010
L48	27.25 - 27 (48)	TP44.696x44.642x0.725	0.250	0.000	0.0	101.184	-54.880	5919.280	0.009
L49	27 - 22 (49)	TP45.771x44.696x0.713	5.000	0.000	0.0	101.899	-57.365	5961.060	0.010
L50	22 - 17 (50)	TP46.846x45.771x0.713	5.000	0.000	0.0	104.329	-59.895	6103.250	0.010
L51	17 - 12 (51)	TP47.921x46.846x0.713	5.000	0.000	0.0	106.760	-62.455	6245.440	0.010
L52	12 - 7 (52)	TP48.995x47.921x0.713	5.000	0.000	0.0	109.190	-65.047	6387.640	0.010
L53	7 - 2 (53)	TP50.07x48.995x0.7	5.000	0.000	0.0	109.690	-67.671	6416.890	0.011
L54	2 - 0 (54)	TP50.5x50.07x0.7	2.000	0.000	0.0	110.646	-68.731	6472.770	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{ux} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M_{uy} kip-ft	ϕM_{uy} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	144.5 - 139.5 (1)	TP22.092x21x0.188	69.201	412.151	0.168	0.000	412.151	0.000
L2	139.5 - 134.5 (2)	TP23.184x22.092x0.188	130.833	447.433	0.292	0.000	447.433	0.000
L3	134.5 - 129.5 (3)	TP24.276x23.184x0.188	218.503	483.412	0.452	0.000	483.412	0.000
L4	129.5 - 124.5 (4)	TP25.368x24.276x0.188	324.815	519.990	0.625	0.000	519.990	0.000
L5	124.5 - 117.568 (5)	TP26.882x25.368x0.188	396.110	542.862	0.730	0.000	542.862	0.000
L6	117.568 - 116.409 (6)	TP26.737x25.668x0.25	518.783	825.969	0.628	0.000	825.969	0.000
L7	116.409 - 112.583 (7)	TP27.555x26.737x0.25	623.021	870.592	0.716	0.000	870.592	0.000
L8	112.583 - 112.333 (8)	TP27.608x27.555x0.25	629.873	873.533	0.721	0.000	873.533	0.000

Section No.	Elevation ft	Size	M_{ux}	ϕM_{rx}	Ratio	M_{uy}	ϕM_{ry}	Ratio
			kip-ft	kip-ft	$\frac{M_{ux}}{\phi M_{rx}}$	kip-ft	kip-ft	$\frac{M_{uy}}{\phi M_{ry}}$
L9	112.333 - 107.333 (9)	TP28.677x27.608x0.25	767.968	932.942	0.823	0.000	932.942	0.000
L10	107.333 - 106.92 (10)	TP28.765x28.677x0.25	779.779	937.892	0.831	0.000	937.892	0.000
L11	106.92 - 106.67 (11)	TP28.818x28.765x0.538	786.936	2061.800	0.382	0.000	2061.800	0.000
L12	106.67 - 103.5 (12)	TP29.496x28.818x0.525	878.233	2115.150	0.415	0.000	2115.150	0.000
L13	103.5 - 103.25 (13)	TP29.549x29.496x0.525	885.475	2123.033	0.417	0.000	2123.033	0.000
L14	103.25 - 98.5 (14)	TP30.564x29.549x0.513	1034.933	2224.100	0.465	0.000	2224.100	0.000
L15	98.5 - 98.25 (15)	TP30.618x30.564x0.675	1042.892	2892.475	0.361	0.000	2892.475	0.000
L16	98.25 - 97.58 (16)	TP30.761x30.618x0.675	1065.917	2920.508	0.365	0.000	2920.508	0.000
L17	97.58 - 97.33 (17)	TP30.815x30.761x0.563	1074.817	2469.958	0.435	0.000	2469.958	0.000
L18	97.33 - 92.33 (18)	TP31.883x30.815x0.55	1254.100	2593.417	0.484	0.000	2593.417	0.000
L19	92.33 - 87.1178 (19)	TP32.997x31.883x0.55	1275.317	2614.417	0.488	0.000	2614.417	0.000
L20	87.1178 - 86.1178 (20)	TP32.72x31.509x0.375	1480.517	1895.433	0.781	0.000	1895.433	0.000
L21	86.1178 - 83 (21)	TP33.392x32.72x0.375	1595.525	1975.433	0.808	0.000	1975.433	0.000
L22	83 - 82.75 (22)	TP33.446x33.392x0.375	1604.783	1981.917	0.810	0.000	1981.917	0.000
L23	82.75 - 77.75 (23)	TP34.523x33.446x0.375	1790.800	2113.875	0.847	0.000	2113.875	0.000
L24	77.75 - 77.25 (24)	TP34.631x34.523x0.375	1809.508	2127.300	0.851	0.000	2127.300	0.000
L25	77.25 - 77 (25)	TP34.685x34.631x0.825	1818.867	4512.550	0.403	0.000	4512.550	0.000
L26	77 - 76.75 (26)	TP34.738x34.685x0.638	1828.233	3556.550	0.514	0.000	3556.550	0.000
L27	76.75 - 71.75 (27)	TP35.816x34.738x0.625	2016.767	3716.608	0.543	0.000	3716.608	0.000
L28	71.75 - 69 (28)	TP36.408x35.816x0.625	2121.467	3843.908	0.552	0.000	3843.908	0.000
L29	69 - 68.75 (29)	TP36.462x36.408x0.8	2131.017	4863.200	0.438	0.000	4863.200	0.000
L30	68.75 - 63.75 (30)	TP37.539x36.462x0.788	2323.417	5089.233	0.457	0.000	5089.233	0.000
L31	63.75 - 60 (31)	TP38.347x37.539x0.775	2469.367	5238.642	0.471	0.000	5238.642	0.000
L32	60 - 59.75 (32)	TP38.401x38.347x0.775	2479.150	5253.825	0.472	0.000	5253.825	0.000
L33	59.75 - 58.5 (33)	TP38.67x38.401x0.775	2528.150	5330.058	0.474	0.000	5330.058	0.000
L34	58.5 - 58.25 (34)	TP38.724x38.67x0.775	2537.967	5345.367	0.475	0.000	5345.367	0.000
L35	58.25 - 58 (35)	TP38.778x38.724x0.775	2547.792	5360.708	0.475	0.000	5360.708	0.000
L36	58 - 57.75 (36)	TP38.832x38.778x0.613	2557.617	4303.483	0.594	0.000	4303.483	0.000
L37	57.75 - 56.75 (37)	TP39.047x38.832x0.613	2596.992	4352.517	0.597	0.000	4352.517	0.000
L38	56.75 - 56.5 (38)	TP39.101x39.047x0.738	2606.850	5204.558	0.501	0.000	5204.558	0.000
L39	56.5 - 51.5 (39)	TP40.178x39.101x0.725	2805.275	5415.617	0.518	0.000	5415.617	0.000
L40	51.5 - 42.0418 (40)	TP42.216x40.178x0.713	2952.908	5545.550	0.532	0.000	5545.550	0.000
L41	42.0418 - 41.0418 (41)	TP41.678x40.221x0.788	3228.542	6313.417	0.511	0.000	6313.417	0.000
L42	41.0418 - 36.0418 (42)	TP42.753x41.678x0.788	3434.942	6652.891	0.516	0.000	6652.891	0.000
L43	36.0418 - 31.25 (43)	TP43.783x42.753x0.763	3634.733	6776.591	0.536	0.000	6776.591	0.000

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	Client Crown Castle	Designed by JD Prabhu

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
L44	31.25 - 31 (44)	TP43.836x43.783x0.65	3645.208	5836.825	0.625	0.000	5836.825	0.000
L45	31 - 27.75 (45)	TP44.535x43.836x0.65	3781.808	6028.617	0.627	0.000	6028.617	0.000
L46	27.75 - 27.5 (46)	TP44.589x44.535x0.65	3792.350	6043.500	0.628	0.000	6043.500	0.000
L47	27.5 - 27.25 (47)	TP44.642x44.589x0.65	3802.892	6058.400	0.628	0.000	6058.400	0.000
L48	27.25 - 27 (48)	TP44.696x44.642x0.725	3813.442	6739.541	0.566	0.000	6739.541	0.000
L49	27 - 22 (49)	TP45.771x44.696x0.713	4025.367	6959.567	0.578	0.000	6959.567	0.000
L50	22 - 17 (50)	TP46.846x45.771x0.713	4239.025	7298.191	0.581	0.000	7298.191	0.000
L51	17 - 12 (51)	TP47.921x46.846x0.713	4454.275	7644.858	0.583	0.000	7644.858	0.000
L52	12 - 7 (52)	TP48.995x47.921x0.713	4671.050	7999.575	0.584	0.000	7999.575	0.000
L53	7 - 2 (53)	TP50.07x48.995x0.7	4889.325	8221.867	0.595	0.000	8221.867	0.000
L54	2 - 0 (54)	TP50.5x50.07x0.7	4977.042	8366.667	0.595	0.000	8366.667	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	144.5 - 139.5 (1)	TP22.092x21x0.188	11.543	226.500	0.051	0.068	438.868	0.000
L2	139.5 - 134.5 (2)	TP23.184x22.092x0.188	17.327	240.187	0.072	0.394	483.718	0.001
L3	134.5 - 129.5 (3)	TP24.276x23.184x0.188	17.748	251.593	0.071	0.394	530.751	0.001
L4	129.5 - 124.5 (4)	TP25.368x24.276x0.188	22.948	262.999	0.087	2.566	579.964	0.004
L5	124.5 - 117.568 (5)	TP26.882x25.368x0.188	23.196	270.050	0.086	2.564	611.482	0.004
L6	117.568 - 116.409 (6)	TP26.737x25.668x0.25	27.105	368.856	0.073	3.233	855.600	0.004
L7	116.409 - 112.583 (7)	TP27.555x26.737x0.25	27.414	380.242	0.072	3.231	909.233	0.004
L8	112.583 - 112.333 (8)	TP27.608x27.555x0.25	27.422	380.986	0.072	3.230	912.800	0.004
L9	112.333 - 107.333 (9)	TP28.677x27.608x0.25	28.597	395.868	0.072	3.227	985.500	0.003
L10	107.333 - 106.92 (10)	TP28.765x28.677x0.25	28.620	397.097	0.072	3.226	991.625	0.003
L11	106.92 - 106.67 (11)	TP28.818x28.765x0.538	28.641	846.750	0.034	3.226	2097.142	0.002
L12	106.67 - 103.5 (12)	TP29.496x28.818x0.525	28.968	847.237	0.034	3.225	2149.542	0.002
L13	103.5 - 103.25 (13)	TP29.549x29.496x0.525	28.988	848.799	0.034	3.225	2157.483	0.001
L14	103.25 - 98.5 (14)	TP30.564x29.549x0.513	31.824	857.928	0.037	3.878	2257.900	0.002
L15	98.5 - 98.25 (15)	TP30.618x30.564x0.675	31.842	1125.850	0.028	3.878	2952.267	0.001
L16	98.25 - 97.58 (16)	TP30.761x30.618x0.675	35.595	1131.240	0.031	4.002	2980.575	0.001
L17	97.58 - 97.33 (17)	TP30.815x30.761x0.563	35.617	947.897	0.038	4.002	2511.283	0.002
L18	97.33 - 92.33 (18)	TP31.883x30.815x0.55	36.111	959.955	0.038	4.000	2634.117	0.002
L19	92.33 - 87.1178 (19)	TP32.997x31.883x0.55	36.163	963.799	0.038	3.999	2655.258	0.002
L20	87.1178 - 86.1178 (20)	TP32.72x31.509x0.375	36.791	675.660	0.054	3.998	1913.908	0.002
L21	86.1178 - 83 (21)	TP33.392x32.72x0.375	37.025	689.690	0.054	3.995	1994.217	0.002
L22	83 - 82.75 (22)	TP33.446x33.392x0.375	37.027	690.815	0.054	3.995	2000.725	0.002
L23	82.75 - 77.75 (23)	TP34.523x33.446x0.375	37.409	713.315	0.052	3.992	2133.175	0.002
L24	77.75 - 77.25 (24)	TP34.631x34.523x0.375	37.433	715.565	0.052	3.991	2146.658	0.002
L25	77.25 - 77 (25)	TP34.685x34.631x0.825	37.452	1556.040	0.024	3.991	4614.050	0.001
L26	77 - 76.75 (26)	TP34.738x34.685x0.638	37.476	1210.960	0.031	3.991	3616.408	0.001

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Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio V_u ϕV_n	Actual T_u kip-ft	ϕT_n kip-ft	Ratio T_u ϕT_n
L27	76.75 - 71.75 (27)	TP35.816x34.738x0.625	37.958	1225.150	0.031	3.990	3775.700	0.001
L28	71.75 - 69 (28)	TP36.408x35.816x0.625	38.220	1245.780	0.031	3.989	3903.892	0.001
L29	69 - 68.75 (29)	TP36.462x36.408x0.8	38.228	1589.200	0.024	3.988	4963.208	0.001
L30	68.75 - 63.75 (30)	TP37.539x36.462x0.788	38.746	1612.170	0.024	3.987	5188.775	0.001
L31	63.75 - 60 (31)	TP38.347x37.539x0.775	39.126	1621.990	0.024	3.986	5336.925	0.001
L32	60 - 59.75 (32)	TP38.401x38.347x0.775	39.137	1624.320	0.024	3.986	5352.233	0.001
L33	59.75 - 58.5 (33)	TP38.67x38.401x0.775	39.276	1635.940	0.024	3.986	5429.117	0.001
L34	58.5 - 58.25 (34)	TP38.724x38.67x0.775	39.287	1638.270	0.024	3.986	5444.558	0.001
L35	58.25 - 58 (35)	TP38.778x38.724x0.775	39.312	1640.590	0.024	3.985	5460.025	0.001
L36	58 - 57.75 (36)	TP38.832x38.778x0.613	39.335	1303.980	0.030	3.985	4364.458	0.001
L37	57.75 - 56.75 (37)	TP39.047x38.832x0.613	39.439	1311.330	0.030	3.985	4413.792	0.001
L38	56.75 - 56.5 (38)	TP39.101x39.047x0.738	39.450	1576.020	0.025	3.985	5294.908	0.001
L39	56.5 - 51.5 (39)	TP40.178x39.101x0.725	39.940	1593.320	0.025	3.984	5505.050	0.001
L40	51.5 - 42.0418 (40)	TP42.216x40.178x0.713	40.283	1597.820	0.025	3.983	5633.375	0.001
L41	42.0418 - 41.0418 (41)	TP41.678x40.221x0.788	41.079	1793.720	0.023	3.982	6423.241	0.001
L42	41.0418 - 36.0418 (42)	TP42.753x41.678x0.788	41.515	1840.870	0.023	3.981	6765.341	0.001
L43	36.0418 - 31.25 (43)	TP43.783x42.753x0.763	41.917	1827.240	0.023	3.980	6884.083	0.001
L44	31.25 - 31 (44)	TP43.836x43.783x0.65	41.918	1563.660	0.027	3.980	5913.841	0.001
L45	31 - 27.75 (45)	TP44.535x43.836x0.65	42.174	1588.960	0.027	3.980	6106.725	0.001
L46	27.75 - 27.5 (46)	TP44.589x44.535x0.65	42.172	1590.910	0.027	3.980	6121.683	0.001
L47	27.5 - 27.25 (47)	TP44.642x44.589x0.65	42.190	1592.850	0.026	3.980	6136.675	0.001
L48	27.25 - 27 (48)	TP44.696x44.642x0.725	42.208	1775.780	0.024	3.980	6838.133	0.001
L49	27 - 22 (49)	TP45.771x44.696x0.713	42.586	1788.320	0.024	3.979	7056.691	0.001
L50	22 - 17 (50)	TP46.846x45.771x0.713	42.921	1830.980	0.023	3.978	7397.358	0.001
L51	17 - 12 (51)	TP47.921x46.846x0.713	43.226	1873.630	0.023	3.978	7746.050	0.001
L52	12 - 7 (52)	TP48.995x47.921x0.713	43.529	1916.290	0.023	3.978	8102.775	0.000
L53	7 - 2 (53)	TP50.07x48.995x0.7	43.826	1925.070	0.023	3.978	8323.191	0.000
L54	2 - 0 (54)	TP50.5x50.07x0.7	43.944	1941.830	0.023	3.978	8468.750	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	144.5 - 139.5 (1)	0.006	0.168	0.000	0.051	0.000	0.176	1.050	4.8.2 ✓
L2	139.5 - 134.5 (2)	0.009	0.292	0.000	0.072	0.001	0.307	1.050	4.8.2 ✓
L3	134.5 - 129.5 (3)	0.010	0.452	0.000	0.071	0.001	0.467	1.050	4.8.2 ✓
L4	129.5 - 124.5 (4)	0.013	0.625	0.000	0.087	0.004	0.646	1.050	4.8.2 ✓
L5	124.5 - 117.568 (5)	0.013	0.730	0.000	0.086	0.004	0.751	1.050	4.8.2 ✓
L6	117.568 - 116.409 (6)	0.012	0.628	0.000	0.073	0.004	0.646	1.050	4.8.2 ✓
L7	116.409 - 112.583 (7)	0.012	0.716	0.000	0.072	0.004	0.734	1.050	4.8.2 ✓
L8	112.583 - 112.333 (8)	0.012	0.721	0.000	0.072	0.004	0.739	1.050	4.8.2 ✓
L9	112.333 - 107.333	0.013	0.823	0.000	0.072	0.003	0.842	1.050	4.8.2 ✓

tnxTower

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Designed by
JD Prabhu

Section No.	Elevation ft	Ratio P_u ϕP_n	Ratio M_{ux} ϕM_{nx}	Ratio M_{uy} ϕM_{ny}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	(9)						✓		
L10	107.333 - 106.92 (10)	0.013	0.831	0.000	0.072	0.003	0.850	1.050	4.8.2 ✓
L11	106.92 - 106.67 (11)	0.006	0.382	0.000	0.034	0.002	0.389	1.050	4.8.2 ✓
L12	106.67 - 103.5 (12)	0.006	0.415	0.000	0.034	0.002	0.423	1.050	4.8.2 ✓
L13	103.5 - 103.25 (13)	0.006	0.417	0.000	0.034	0.001	0.425	1.050	4.8.2 ✓
L14	103.25 - 98.5 (14)	0.007	0.465	0.000	0.037	0.002	0.474	1.050	4.8.2 ✓
L15	98.5 - 98.25 (15)	0.006	0.361	0.000	0.028	0.001	0.367	1.050	4.8.2 ✓
L16	98.25 - 97.58 (16)	0.006	0.365	0.000	0.031	0.001	0.372	1.050	4.8.2 ✓
L17	97.58 - 97.33 (17)	0.008	0.435	0.000	0.038	0.002	0.444	1.050	4.8.2 ✓
L18	97.33 - 92.33 (18)	0.008	0.484	0.000	0.038	0.002	0.493	1.050	4.8.2 ✓
L19	92.33 - 87.1178 (19)	0.008	0.488	0.000	0.038	0.002	0.497	1.050	4.8.2 ✓
L20	87.1178 - 86.1178 (20)	0.012	0.781	0.000	0.054	0.002	0.797	1.050	4.8.2 ✓
L21	86.1178 - 83 (21)	0.013	0.808	0.000	0.054	0.002	0.823	1.050	4.8.2 ✓
L22	83 - 82.75 (22)	0.013	0.810	0.000	0.054	0.002	0.825	1.050	4.8.2 ✓
L23	82.75 - 77.75 (23)	0.013	0.847	0.000	0.052	0.002	0.863	1.050	4.8.2 ✓
L24	77.75 - 77.25 (24)	0.013	0.851	0.000	0.052	0.002	0.866	1.050	4.8.2 ✓
L25	77.25 - 77 (25)	0.006	0.403	0.000	0.024	0.001	0.410	1.050	4.8.2 ✓
L26	77 - 76.75 (26)	0.008	0.514	0.000	0.031	0.001	0.523	1.050	4.8.2 ✓
L27	76.75 - 71.75 (27)	0.008	0.543	0.000	0.031	0.001	0.552	1.050	4.8.2 ✓
L28	71.75 - 69 (28)	0.008	0.552	0.000	0.031	0.001	0.561	1.050	4.8.2 ✓
L29	69 - 68.75 (29)	0.006	0.438	0.000	0.024	0.001	0.445	1.050	4.8.2 ✓
L30	68.75 - 63.75 (30)	0.007	0.457	0.000	0.024	0.001	0.464	1.050	4.8.2 ✓
L31	63.75 - 60 (31)	0.007	0.471	0.000	0.024	0.001	0.479	1.050	4.8.2 ✓
L32	60 - 59.75 (32)	0.007	0.472	0.000	0.024	0.001	0.479	1.050	4.8.2 ✓
L33	59.75 - 58.5 (33)	0.007	0.474	0.000	0.024	0.001	0.482	1.050	4.8.2 ✓
L34	58.5 - 58.25 (34)	0.007	0.475	0.000	0.024	0.001	0.482	1.050	4.8.2 ✓
L35	58.25 - 58 (35)	0.007	0.475	0.000	0.024	0.001	0.483	1.050	4.8.2 ✓

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Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_u	M_{ux}	M_{uy}	V_u	T_u			
L36	58 - 57.75 (36)	0.009	0.594	0.000	0.030	0.001	0.604	1.050	4.8.2 ✓
L37	57.75 - 56.75 (37)	0.009	0.597	0.000	0.030	0.001	0.606	1.050	4.8.2 ✓
L38	56.75 - 56.5 (38)	0.007	0.501	0.000	0.025	0.001	0.509	1.050	4.8.2 ✓
L39	56.5 - 51.5 (39)	0.008	0.518	0.000	0.025	0.001	0.526	1.050	4.8.2 ✓
L40	51.5 - 42.0418 (40)	0.008	0.532	0.000	0.025	0.001	0.541	1.050	4.8.2 ✓
L41	42.0418 - 41.0418 (41)	0.008	0.511	0.000	0.023	0.001	0.520	1.050	4.8.2 ✓
L42	41.0418 - 36.0418 (42)	0.008	0.516	0.000	0.023	0.001	0.525	1.050	4.8.2 ✓
L43	36.0418 - 31.25 (43)	0.009	0.536	0.000	0.023	0.001	0.546	1.050	4.8.2 ✓
L44	31.25 - 31 (44)	0.010	0.625	0.000	0.027	0.001	0.635	1.050	4.8.2 ✓
L45	31 - 27.75 (45)	0.010	0.627	0.000	0.027	0.001	0.638	1.050	4.8.2 ✓
L46	27.75 - 27.5 (46)	0.010	0.628	0.000	0.027	0.001	0.639	1.050	4.8.2 ✓
L47	27.5 - 27.25 (47)	0.010	0.628	0.000	0.026	0.001	0.639	1.050	4.8.2 ✓
L48	27.25 - 27 (48)	0.009	0.566	0.000	0.024	0.001	0.576	1.050	4.8.2 ✓
L49	27 - 22 (49)	0.010	0.578	0.000	0.024	0.001	0.589	1.050	4.8.2 ✓
L50	22 - 17 (50)	0.010	0.581	0.000	0.023	0.001	0.591	1.050	4.8.2 ✓
L51	17 - 12 (51)	0.010	0.583	0.000	0.023	0.001	0.593	1.050	4.8.2 ✓
L52	12 - 7 (52)	0.010	0.584	0.000	0.023	0.000	0.595	1.050	4.8.2 ✓
L53	7 - 2 (53)	0.011	0.595	0.000	0.023	0.000	0.606	1.050	4.8.2 ✓
L54	2 - 0 (54)	0.011	0.595	0.000	0.023	0.000	0.606	1.050	4.8.2 ✓

Section Capacity Table

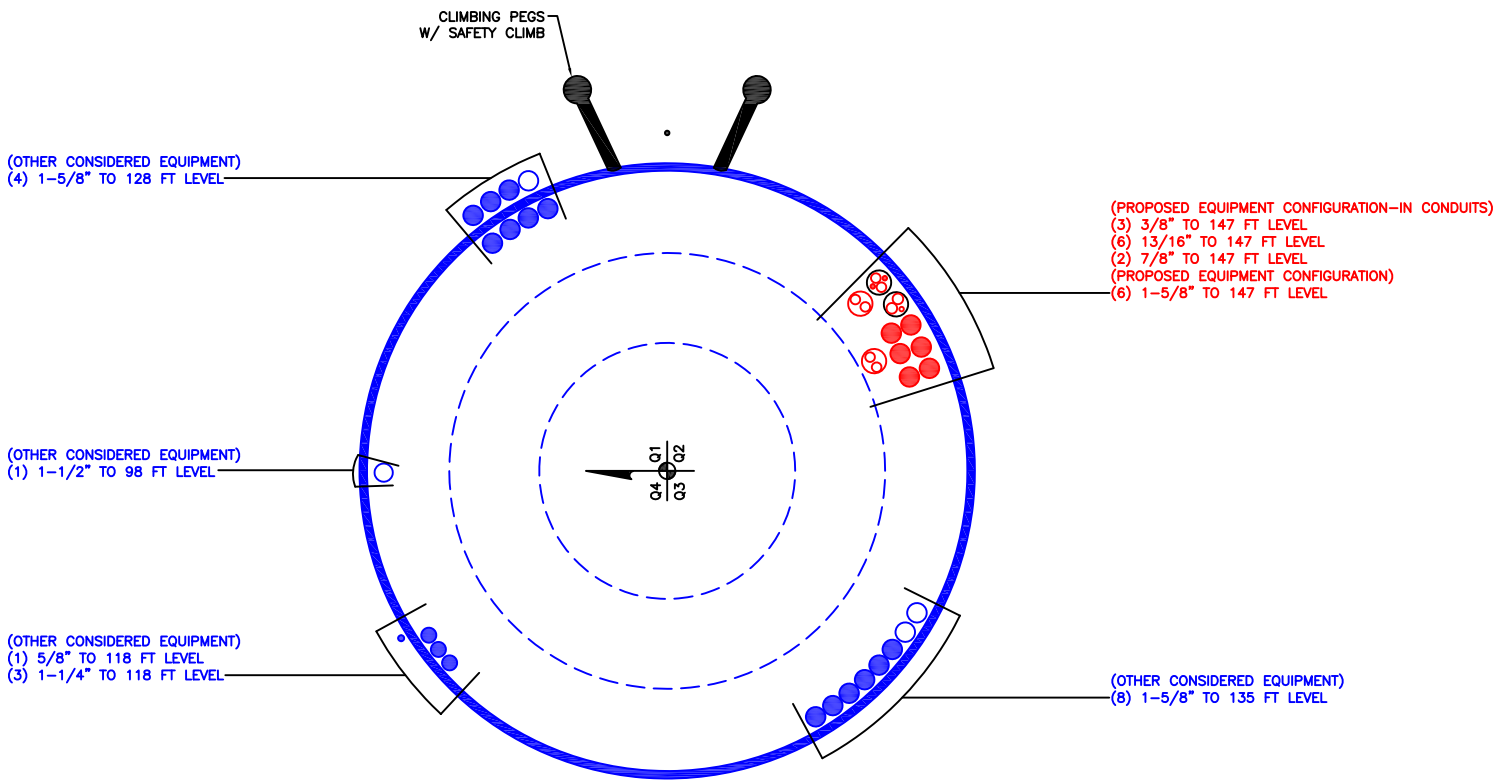
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	144.5 - 139.5	Pole	TP22.092x21x0.188	1	-4.496	800.733	**	**
L2	139.5 - 134.5	Pole	TP23.184x22.092x0.188	2	-7.551	840.654	**	**
L3	134.5 - 129.5	Pole	TP24.276x23.184x0.188	3	-8.045	880.574	**	**
L4	129.5 - 124.5	Pole	TP25.368x24.276x0.188	4	-11.684	920.495	**	**
L5	124.5 - 117.568	Pole	TP26.882x25.368x0.188	5	-12.090	945.175	**	**
L6	117.568 - 116.409	Pole	TP26.737x25.668x0.25	6	-15.110	1290.996	**	**
L7	116.409 - 112.583	Pole	TP27.555x26.737x0.25	7	-15.748	1330.843	**	**

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail	
L8	112.583 - 112.333	Pole	TP27.608x27.555x0.25	8	-15.812	1333.447	**	**	
L9	112.333 - 107.333	Pole	TP28.677x27.608x0.25	9	-17.143	1385.538	**	**	
L10	107.333 - 106.92	Pole	TP28.765x28.677x0.25	10	-17.232	1389.843	**	**	
L11	106.92 - 106.67	Pole	TP28.818x28.765x0.538	11	-17.301	2963.625	**	**	
L12	106.67 - 103.5	Pole	TP29.496x28.818x0.525	12	-18.083	2965.326	**	**	
L13	103.5 - 103.25	Pole	TP29.549x29.496x0.525	13	-18.157	2970.796	**	**	
L14	103.25 - 98.5	Pole	TP30.564x29.549x0.513	14	-20.891	3002.748	**	**	
L15	98.5 - 98.25	Pole	TP30.618x30.564x0.675	15	-20.983	3940.482	**	**	
L16	98.25 - 97.58	Pole	TP30.761x30.618x0.675	16	-24.125	3959.329	**	**	
L17	97.58 - 97.33	Pole	TP30.815x30.761x0.563	17	-24.201	3317.643	**	**	
L18	97.33 - 92.33	Pole	TP31.883x30.815x0.55	18	-25.619	3359.842	**	**	
L19	92.33 - 87.1178	Pole	TP32.997x31.883x0.55	19	-25.797	3373.293	**	**	
L20	87.1178 - 86.1178	Pole	TP32.72x31.509x0.375	20	-28.051	2364.810	**	**	
L21	86.1178 - 83	Pole	TP33.392x32.72x0.375	21	-28.856	2413.918	**	**	
L22	83 - 82.75	Pole	TP33.446x33.392x0.375	22	-28.942	2417.856	**	**	
L23	82.75 - 77.75	Pole	TP34.523x33.446x0.375	23	-30.246	2496.606	**	**	
L24	77.75 - 77.25	Pole	TP34.631x34.523x0.375	24	-30.395	2504.481	**	**	
L25	77.25 - 77	Pole	TP34.685x34.631x0.825	25	-30.508	5446.129	**	**	
L26	77 - 76.75	Pole	TP34.738x34.685x0.638	26	-30.594	4238.367	**	**	
L27	76.75 - 71.75	Pole	TP35.816x34.738x0.625	27	-32.328	4288.042	**	**	
L28	71.75 - 69	Pole	TP36.408x35.816x0.625	28	-33.297	4360.230	**	**	
L29	69 - 68.75	Pole	TP36.462x36.408x0.8	29	-33.424	5562.196	**	**	
L30	68.75 - 63.75	Pole	TP37.539x36.462x0.788	30	-35.536	5642.584	**	**	
L31	63.75 - 60	Pole	TP38.347x37.539x0.775	31	-37.149	5676.961	**	**	
L32	60 - 59.75	Pole	TP38.401x38.347x0.775	32	-37.272	5685.099	**	**	
L33	59.75 - 58.5	Pole	TP38.67x38.401x0.775	33	-37.801	5725.786	**	**	
L34	58.5 - 58.25	Pole	TP38.724x38.67x0.775	34	-37.925	5733.924	**	**	
L35	58.25 - 58	Pole	TP38.778x38.724x0.775	35	-38.034	5742.061	**	**	
L36	58 - 57.75	Pole	TP38.832x38.778x0.613	36	-38.137	4563.919	**	**	
L37	57.75 - 56.75	Pole	TP39.047x38.832x0.613	37	-38.538	4589.644	**	**	
L38	56.75 - 56.5	Pole	TP39.101x39.047x0.738	38	-38.663	5516.080	**	**	
L39	56.5 - 51.5	Pole	TP40.178x39.101x0.725	39	-40.874	5576.602	**	**	
L40	51.5 - 42.0418	Pole	TP42.216x40.178x0.713	40	-42.530	5592.384	**	**	
L41	42.0418 - 41.0418	Pole	TP41.678x40.221x0.788	41	-47.908	6278.013	**	**	
L42	41.0418 - 36.0418	Pole	TP42.753x41.678x0.788	42	-50.365	6443.031	**	**	
L43	36.0418 - 31.25	Pole	TP43.783x42.753x0.763	43	-52.750	6395.329	**	**	
L44	31.25 - 31	Pole	TP43.836x43.783x0.65	44	-52.889	5472.820	**	**	
L45	31 - 27.75	Pole	TP44.535x43.836x0.65	45	-54.489	5561.356	**	**	
L46	27.75 - 27.5	Pole	TP44.589x44.535x0.65	46	-54.630	5568.171	**	**	
L47	27.5 - 27.25	Pole	TP44.642x44.589x0.65	47	-54.755	5574.975	**	**	
L48	27.25 - 27	Pole	TP44.696x44.642x0.725	48	-54.880	6215.244	**	**	
L49	27 - 22	Pole	TP45.771x44.696x0.713	49	-57.365	6259.113	**	**	
L50	22 - 17	Pole	TP46.846x45.771x0.713	50	-59.895	6408.412	**	**	
L51	17 - 12	Pole	TP47.921x46.846x0.713	51	-62.455	6557.712	**	**	
L52	12 - 7	Pole	TP48.995x47.921x0.713	52	-65.047	6707.022	**	**	
L53	7 - 2	Pole	TP50.07x48.995x0.7	53	-67.671	6737.734	**	**	
L54	2 - 0	Pole	TP50.5x50.07x0.7	54	-68.731	6796.408	**	**	
							Summary		
							Pole (L24)	**	**
							RATING =	**	**

** Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.

APPENDIX B
BASE LEVEL DRAWING



BUSINESS UNIT: 881533

APPENDIX C
ADDITIONAL CALCULATIONS

TNX Geometry Input

Increment (ft): [Export to TNX](#)

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	144.5 - 139.5	5		18	21.000	22.092	0.1875	A572-65	1.000
2	139.5 - 134.5	5		18	22.092	23.184	0.1875	A572-65	1.000
3	134.5 - 129.5	5		18	23.184	24.276	0.1875	A572-65	1.000
4	129.5 - 124.5	5		18	24.276	25.368	0.1875	A572-65	1.000
5	124.5 - 121.4088	6.9323	3.8411	18	25.368	26.882	0.1875	A572-65	1.000
6	121.4088 - 116.4088	5		18	25.668	26.737	0.25	A572-65	1.000
7	116.4088 - 112.583	3.8258		18	26.737	27.555	0.25	A572-65	1.000
8	112.583 - 112.333	0.25		18	27.555	27.608	0.25	A572-65	1.000
9	112.333 - 107.333	5		18	27.608	28.677	0.25	A572-65	1.000
10	107.333 - 106.92	0.413		18	28.677	28.765	0.25	A572-65	1.000
11	106.92 - 106.67	0.25		18	28.765	28.818	0.5375	A572-65	0.936
12	106.67 - 103.5	3.17		18	28.818	29.496	0.525	A572-65	0.947
13	103.5 - 103.25	0.25		18	29.496	29.549	0.525	A572-65	0.946
14	103.25 - 98.5	4.75		18	29.549	30.564	0.5125	A572-65	0.952
15	98.5 - 98.25	0.25		18	30.564	30.618	0.675	A572-65	0.937
16	98.25 - 97.58	0.67		18	30.618	30.761	0.675	A572-65	0.934
17	97.58 - 97.33	0.25		18	30.761	30.815	0.5625	A572-65	0.949
18	97.33 - 92.33	5		18	30.815	31.883	0.55	A572-65	0.953
19	92.33 - 91.7428	5.2122	4.625	18	31.883	32.997	0.55	A572-65	0.951
20	91.7428 - 86.1178	5.625		18	31.509	32.720	0.375	A572-65	1.000
21	86.1178 - 83	3.1178		18	32.720	33.392	0.375	A572-65	1.000
22	83 - 82.75	0.25		18	33.392	33.446	0.375	A572-65	1.000
23	82.75 - 77.75	5		18	33.446	34.523	0.375	A572-65	1.000
24	77.75 - 77.25	0.5		18	34.523	34.631	0.375	A572-65	1.000
25	77.25 - 77	0.25		18	34.631	34.685	0.825	A572-65	0.939
26	77 - 76.75	0.25		18	34.685	34.738	0.6375	A572-65	0.946
27	76.75 - 71.75	5		18	34.738	35.816	0.625	A572-65	0.953
28	71.75 - 69	2.75		18	35.816	36.408	0.625	A572-65	0.948
29	69 - 68.75	0.25		18	36.408	36.462	0.8	A572-65	0.942
30	68.75 - 63.75	5		18	36.462	37.539	0.7875	A572-65	0.943
31	63.75 - 60	3.75		18	37.539	38.347	0.775	A572-65	0.948
32	60 - 59.75	0.25		18	38.347	38.401	0.775	A572-65	0.947
33	59.75 - 58.5	1.25		18	38.401	38.670	0.775	A572-65	0.944
34	58.5 - 58.25	0.25		18	38.670	38.724	0.775	A572-65	0.943
35	58.25 - 58	0.25		18	38.724	38.778	0.775	A572-65	0.942
36	58 - 57.75	0.25		18	38.778	38.832	0.6125	A572-65	1.087
37	57.75 - 56.75	1		18	38.832	39.047	0.6125	A572-65	1.084
38	56.75 - 56.5	0.25		18	39.047	39.101	0.7375	A572-65	0.994
39	56.5 - 51.5	5		18	39.101	40.178	0.725	A572-65	0.997
40	51.5 - 47.8178	9.4582	5.776	18	40.178	42.216	0.7125	A572-65	1.004
41	47.8178 - 41.0418	6.776		18	40.221	41.678	0.7875	A572-65	0.982
42	41.0418 - 36.0418	5		18	41.678	42.753	0.7875	A572-65	0.971
43	36.0418 - 31.25	4.7918		18	42.753	43.783	0.7625	A572-65	0.992
44	31.25 - 31	0.25		18	43.783	43.836	0.65	A572-65	1.125
45	31 - 27.75	3.25		18	43.836	44.535	0.65	A572-65	1.118
46	27.75 - 27.5	0.25		18	44.535	44.589	0.65	A572-65	1.118
47	27.5 - 27.25	0.25		18	44.589	44.642	0.65	A572-65	1.117
48	27.25 - 27	0.25		18	44.642	44.696	0.725	A572-65	1.003
49	27 - 22	5		18	44.696	45.771	0.7125	A572-65	1.010
50	22 - 17	5		18	45.771	46.846	0.7125	A572-65	1.001
51	17 - 12	5		18	46.846	47.921	0.7125	A572-65	0.992
52	12 - 7	5		18	47.921	48.995	0.7125	A572-65	0.984
53	7 - 2	5		18	48.995	50.070	0.7	A572-65	0.993
54	2 - 0	2		18	50.070	50.500	0.7	A572-65	0.990

TNX Section Forces

Increment (ft):		TNX Output		
5				
	Section Height (ft)	P _u (K)	M _{ux} (kip-ft)	V _u (K)
1	144.5 - 139.5	4.50	69.20	11.54
2	139.5 - 134.5	7.55	130.83	17.33
3	134.5 - 129.5	8.04	218.50	17.75
4	129.5 - 124.5	11.69	325.09	22.93
5	124.5 - 121.4088	12.09	396.34	23.18
6	121.4088 - 116.4088	15.11	519.05	27.09
7	116.4088 - 112.583	15.75	623.24	27.40
8	112.583 - 112.333	15.81	630.09	27.41
9	112.333 - 107.333	17.15	768.11	28.58
10	107.333 - 106.92	17.23	779.91	28.60
11	106.92 - 106.67	17.30	787.06	28.62
12	106.67 - 103.5	18.09	878.30	28.94
13	103.5 - 103.25	18.16	885.53	28.96
14	103.25 - 98.5	20.89	1034.93	31.82
15	98.5 - 98.25	20.98	1042.89	31.84
16	98.25 - 97.58	24.12	1065.91	35.60
17	97.58 - 97.33	24.20	1074.81	35.62
18	97.33 - 92.33	25.62	1254.10	36.11
19	92.33 - 91.7428	25.80	1275.31	36.16
20	91.7428 - 86.1178	28.05	1480.52	36.79
21	86.1178 - 83	28.86	1595.53	37.03
22	83 - 82.75	28.94	1604.78	37.03
23	82.75 - 77.75	30.25	1790.80	37.41
24	77.75 - 77.25	30.39	1809.51	37.43
25	77.25 - 77	30.51	1818.87	37.45
26	77 - 76.75	30.59	1828.23	37.48
27	76.75 - 71.75	32.33	2016.77	37.96
28	71.75 - 69	33.30	2121.47	38.22
29	69 - 68.75	33.42	2131.02	38.23
30	68.75 - 63.75	35.54	2323.41	38.75
31	63.75 - 60	37.15	2469.37	39.13
32	60 - 59.75	37.27	2479.15	39.14
33	59.75 - 58.5	37.80	2528.15	39.28
34	58.5 - 58.25	37.93	2537.96	39.29
35	58.25 - 58	38.03	2547.79	39.31
36	58 - 57.75	38.14	2557.62	39.34
37	57.75 - 56.75	38.54	2596.99	39.44
38	56.75 - 56.5	38.66	2606.85	39.45
39	56.5 - 51.5	40.87	2805.28	39.94
40	51.5 - 47.8178	42.53	2952.91	40.28
41	47.8178 - 41.0418	47.91	3228.54	41.08
42	41.0418 - 36.0418	50.36	3434.94	41.51
43	36.0418 - 31.25	52.75	3634.74	41.92
44	31.25 - 31	52.89	3645.21	41.92
45	31 - 27.75	54.49	3781.81	42.17
46	27.75 - 27.5	54.63	3792.35	42.17
47	27.5 - 27.25	54.75	3802.89	42.19
48	27.25 - 27	54.88	3813.44	42.21
49	27 - 22	57.37	4025.36	42.59
50	22 - 17	59.89	4239.02	42.92
51	17 - 12	62.46	4454.28	43.23
52	12 - 7	65.05	4671.05	43.53
53	7 - 2	67.67	4889.32	43.83
54	2 - 0	68.73	4977.04	43.94

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
144.5 - 139.5	Pole	TP22.092x21x0.1875	Pole	16.8%	Pass
139.5 - 134.5	Pole	TP23.184x22.092x0.1875	Pole	29.2%	Pass
134.5 - 129.5	Pole	TP24.276x23.184x0.1875	Pole	44.4%	Pass
129.5 - 124.5	Pole	TP25.368x24.276x0.1875	Pole	61.5%	Pass
124.5 - 121.41	Pole	TP26.882x25.368x0.1875	Pole	71.5%	Pass
121.41 - 116.41	Pole	TP26.737x25.668x0.25	Pole	61.5%	Pass
116.41 - 112.58	Pole	TP27.555x26.737x0.25	Pole	69.9%	Pass
112.58 - 112.33	Pole	TP27.608x27.555x0.25	Pole	70.4%	Pass
112.33 - 107.33	Pole	TP28.677x27.608x0.25	Pole	80.2%	Pass
107.33 - 106.92	Pole	TP28.765x28.677x0.25	Pole	80.9%	Pass
106.92 - 106.67	Pole + Reinf.	TP28.818x28.765x0.5375	Reinf. 11 Tension Rupture	67.4%	Pass
106.67 - 103.5	Pole + Reinf.	TP29.496x28.818x0.525	Reinf. 11 Tension Rupture	72.6%	Pass
103.5 - 103.25	Pole + Reinf.	TP29.549x29.496x0.525	Reinf. 11 Tension Rupture	73.0%	Pass
103.25 - 98.5	Pole + Reinf.	TP30.564x29.549x0.5125	Reinf. 11 Tension Rupture	81.2%	Pass
98.5 - 98.25	Pole + Reinf.	TP30.618x30.564x0.675	Reinf. 11 Tension Rupture	62.6%	Pass
98.25 - 97.58	Pole + Reinf.	TP30.761x30.618x0.675	Reinf. 11 Tension Rupture	63.7%	Pass
97.58 - 97.33	Pole + Reinf.	TP30.815x30.761x0.5625	Reinf. 1 Tension Rupture	72.5%	Pass
97.33 - 92.33	Pole + Reinf.	TP31.883x30.815x0.55	Reinf. 1 Tension Rupture	80.4%	Pass
92.33 - 91.74	Pole + Reinf.	TP32.997x31.883x0.55	Reinf. 1 Tension Rupture	81.3%	Pass
91.74 - 86.12	Pole	TP32.72x31.509x0.375	Pole	75.8%	Pass
86.12 - 83	Pole	TP33.392x32.72x0.375	Pole	78.3%	Pass
83 - 82.75	Pole	TP33.446x33.392x0.375	Pole	78.5%	Pass
82.75 - 77.75	Pole	TP34.523x33.446x0.375	Pole	82.1%	Pass
77.75 - 77.25	Pole	TP34.631x34.523x0.375	Pole	82.4%	Pass
77.25 - 77	Pole + Reinf.	TP34.685x34.631x0.825	Reinf. 6 Tension Rupture	61.0%	Pass
77 - 76.75	Pole + Reinf.	TP34.738x34.685x0.6375	Reinf. 4 Tension Rupture	77.8%	Pass
76.75 - 71.75	Pole + Reinf.	TP35.816x34.738x0.625	Reinf. 4 Tension Rupture	81.6%	Pass
71.75 - 69	Pole + Reinf.	TP36.408x35.816x0.625	Reinf. 4 Tension Rupture	83.6%	Pass
69 - 68.75	Pole + Reinf.	TP36.462x36.408x0.8	Reinf. 13 Tension Rupture	66.4%	Pass
68.75 - 63.75	Pole + Reinf.	TP37.539x36.462x0.7875	Reinf. 13 Tension Rupture	69.3%	Pass
63.75 - 60	Pole + Reinf.	TP38.347x37.539x0.775	Reinf. 13 Tension Rupture	71.4%	Pass
60 - 59.75	Pole + Reinf.	TP38.401x38.347x0.775	Reinf. 13 Tension Rupture	71.5%	Pass
59.75 - 58.5	Pole + Reinf.	TP38.67x38.401x0.775	Reinf. 13 Tension Rupture	72.1%	Pass
58.5 - 58.25	Pole + Reinf.	TP38.724x38.67x0.775	Reinf. 13 Tension Rupture	72.3%	Pass
58.25 - 58	Pole + Reinf.	TP38.778x38.724x0.775	Reinf. 13 Tension Rupture	72.4%	Pass
58 - 57.75	Pole + Reinf.	TP38.832x38.778x0.6125	Reinf. 3 Tension Rupture	82.5%	Pass
57.75 - 56.75	Pole + Reinf.	TP39.047x38.832x0.6125	Reinf. 3 Tension Rupture	83.0%	Pass
56.75 - 56.5	Pole + Reinf.	TP39.101x39.047x0.7375	Reinf. 3 Tension Rupture	75.4%	Pass
56.5 - 51.5	Pole + Reinf.	TP40.178x39.101x0.725	Reinf. 3 Tension Rupture	77.8%	Pass
51.5 - 47.82	Pole + Reinf.	TP42.216x40.178x0.7125	Reinf. 3 Tension Rupture	79.4%	Pass
47.82 - 41.04	Pole + Reinf.	TP41.678x40.221x0.7875	Reinf. 3 Tension Rupture	77.3%	Pass
41.04 - 36.04	Pole + Reinf.	TP42.753x41.678x0.7875	Reinf. 3 Tension Rupture	79.0%	Pass
36.04 - 31.25	Pole + Reinf.	TP43.783x42.753x0.7625	Reinf. 3 Tension Rupture	80.4%	Pass
31.25 - 31	Pole + Reinf.	TP43.836x43.783x0.65	Reinf. 2 Bolt Shear	79.1%	Pass
31 - 27.75	Pole + Reinf.	TP44.535x43.836x0.65	Reinf. 2 Compression	77.0%	Pass
27.75 - 27.5	Pole + Reinf.	TP44.589x44.535x0.65	Reinf. 2 Compression	77.0%	Pass
27.5 - 27.25	Pole + Reinf.	TP44.642x44.589x0.65	Reinf. 2 Compression	77.1%	Pass
27.25 - 27	Pole + Reinf.	TP44.696x44.642x0.725	Reinf. 2 Compression	78.6%	Pass
27 - 22	Pole + Reinf.	TP45.771x44.696x0.7125	Reinf. 2 Compression	79.8%	Pass
22 - 17	Pole + Reinf.	TP46.846x45.771x0.7125	Reinf. 2 Compression	80.9%	Pass
17 - 12	Pole + Reinf.	TP47.921x46.846x0.7125	Reinf. 2 Compression	81.8%	Pass
12 - 7	Pole + Reinf.	TP48.995x47.921x0.7125	Reinf. 2 Compression	82.7%	Pass
7 - 2	Pole + Reinf.	TP50.07x48.995x0.7	Reinf. 2 Compression	83.5%	Pass
2 - 0	Pole + Reinf.	TP50.5x50.07x0.7	Reinf. 2 Compression	83.8%	Pass
				Summary	
			Pole	82.4%	Pass
			Reinforcement	83.8%	Pass
			Overall	83.8%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in ⁴)			Area (in ²)			% Capacity*													
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13
144.5 - 139.5	790	n/a	790	13.04	n/a	13.04	16.8%													
139.5 - 134.5	914	n/a	914	13.69	n/a	13.69	29.2%													
134.5 - 129.5	1051	n/a	1051	14.34	n/a	14.34	44.4%													
129.5 - 124.5	1200	n/a	1200	14.99	n/a	14.99	61.5%													
124.5 - 121.41	1299	n/a	1299	15.39	n/a	15.39	71.5%													
121.41 - 116.41	1862	n/a	1862	21.02	n/a	21.02	61.5%													
116.41 - 112.58	2040	n/a	2040	21.67	n/a	21.67	69.9%													
112.58 - 112.33	2052	n/a	2052	21.71	n/a	21.71	70.4%													
112.33 - 107.33	2302	n/a	2302	22.56	n/a	22.56	80.2%													
107.33 - 106.92	2324	n/a	2324	22.63	n/a	22.63	80.9%													
106.92 - 106.67	2337	2502	4839	22.67	22.50	45.17	38.7%							64.7%				67.4%		
106.67 - 103.5	2507	2617	5124	23.21	22.50	45.71	42.0%							69.7%				72.6%		
103.5 - 103.25	2521	2626	5146	23.25	22.50	45.75	42.2%					70.1%						73.0%		
103.25 - 98.5	2792	2803	5594	24.05	22.50	46.55	47.5%					77.9%						81.2%		
98.5 - 98.25	2807	4511	7318	24.10	36.00	60.10	36.7%	60.1%				60.1%						62.6%		
98.25 - 97.58	2846	4552	7398	24.21	36.00	60.21	37.4%	61.2%				61.2%						63.7%		
97.58 - 97.33	2861	3440	6301	24.25	27.00	51.25	44.4%	72.5%				72.5%								
97.33 - 92.33	3172	3673	6845	25.10	27.00	52.10	49.8%	80.4%				80.4%								
92.33 - 91.74	3210	3701	6911	25.20	27.00	52.20	50.4%	81.3%				81.3%								
91.74 - 86.12	5087	n/a	5087	38.50	n/a	38.50	75.8%													
86.12 - 83	5411	n/a	5411	39.30	n/a	39.30	78.3%													
83 - 82.75	5437	n/a	5437	39.36	n/a	39.36	78.5%													
82.75 - 77.75	5986	n/a	5986	40.64	n/a	40.64	82.1%													
77.75 - 77.25	6043	n/a	6043	40.77	n/a	40.77	82.4%													
77.25 - 77	6071	6872	12943	40.84	42.38	83.21	38.2%				60.2%		61.0%							
77 - 76.75	6100	3991	10091	40.90	24.38	65.27	49.3%				77.8%									
76.75 - 71.75	6692	4230	10922	42.18	24.38	66.56	51.8%				81.6%									
71.75 - 69	7033	4365	11398	42.89	24.38	67.26	53.2%				83.6%									
69 - 68.75	7064	7563	14627	42.95	42.38	85.33	41.7%				65.5%							65.5%		66.4%
68.75 - 63.75	7716	7998	15714	44.23	42.38	86.61	43.9%				68.4%									69.3%
63.75 - 60	8230	8333	16563	45.19	42.38	87.57	45.5%				70.4%									71.4%
60 - 59.75	8265	8355	16621	45.26	42.38	87.63	45.6%			70.5%										71.5%
59.75 - 58.5	8442	8469	16911	45.58	42.38	87.95	46.1%			71.2%										72.1%
58.5 - 58.25	8478	8491	16969	45.64	42.38	88.02	46.2%			71.3%										72.3%
58.25 - 58	8514	8514	17028	45.71	42.38	88.08	46.3%			71.4%										72.4%
58 - 57.75	8571	5226	13797	45.77	35.00	80.77	59.9%			82.5%							58.7%			
57.75 - 56.75	8715	5281	13997	46.03	35.00	81.03	60.4%			83.0%							59.2%			
56.75 - 56.5	8809	7891	16700	46.09	43.13	89.22	52.0%			75.4%							59.3%		67.5%	
56.5 - 51.5	9562	8314	17876	47.37	43.13	90.50	54.0%			77.8%							61.4%		69.7%	
51.5 - 47.82	10144	8633	18776	48.32	43.13	91.44	55.5%			79.4%							62.8%		71.3%	
47.82 - 41.04	12369	9355	21724	57.27	43.13	100.39	51.5%			77.3%							62.4%		70.5%	
41.04 - 36.04	13359	9826	23185	58.76	43.13	101.88	52.9%			79.0%							63.9%		72.1%	
36.04 - 31.25	14356	10288	24645	60.19	43.13	103.31	54.2%			80.4%							67.9%		73.5%	
31.25 - 31	14751	6753	21504	60.26	40.00	100.26	66.3%		79.1%										74.5%	
31 - 27.75	15466	6968	22434	61.23	40.00	101.23	67.2%		77.0%										75.4%	
27.75 - 27.5	15522	6984	22506	61.31	40.00	101.31	67.3%		77.0%										75.5%	
27.5 - 27.25	15578	7001	22579	61.38	40.00	101.38	67.3%		77.1%										75.5%	
27.25 - 27	15256	9465	24721	61.46	40.00	101.46	57.1%		78.6%							76.1%				
27 - 22	16393	9909	26302	62.95	40.00	102.95	58.3%		79.8%							77.3%				
22 - 17	17556	10786	28342	64.44	40.00	104.44	58.6%		80.9%							78.5%				
17 - 12	18803	11269	30072	65.93	40.00	105.93	59.8%		81.8%							79.5%				
12 - 7	20108	11763	31871	67.43	40.00	107.43	60.8%		82.7%							80.5%				
7 - 2	21472	12268	33740	68.92	40.00	108.92	61.8%		83.5%							81.4%				
2 - 0	22035	12472	34507	69.52	40.00	109.52	62.2%		83.8%							81.7%				

Note: Section capacity checked using 5 degree increments.
Rating per TIA-222-H Section 15.5.

Monopole Base Plate Connection

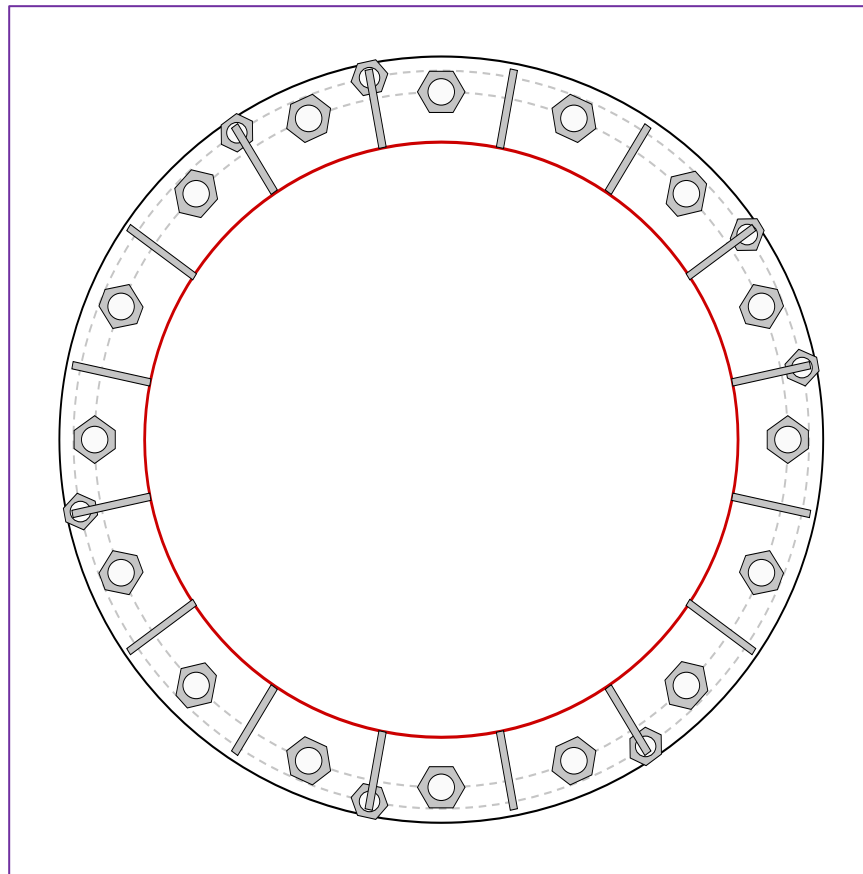


Site Info	
BU #	881533
Site Name	GROTON TOWER, CT
Order #	586248, Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	4977.04
Axial Force (kips)	68.73
Shear Force (kips)	43.94

*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
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Anchor Rod Data
 GROUP 1: (16) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 59" BC
 GROUP 2: (7) 1-3/4" ϕ bolts (F1554-105 N; $F_y=105$ ksi, $F_u=125$ ksi) on 62.61" BC
 pos. (deg): 11.2, 33.8, 101.2, 123.8, 191.2, 258.8, 303.8

Base Plate Data
 65" OD x 2" Plate (A572-60; $F_y=60$ ksi, $F_u=75$ ksi)

Stiffener Data
 (16) 17.75"H x 6.75"W x 0.625"T, Notch: 0.75"
 plate: $F_y= 50$ ksi ; weld: $F_y= 70$ ksi
 horiz. weld: 0.625" fillet
 vert. weld: 0.375" fillet

Pole Data
 50.5" x 0.4375" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

Anchor Rod Summary (units of kips, kip-in)
 GROUP 1:
 $P_{u,t} = 198.27$ $\phi P_{n,t} = 243.75$ **Stress Rating**
 $V_u = 2.75$ $\phi V_n = 149.1$ **77.5%**
 $M_u = n/a$ $\phi M_n = n/a$ **Pass**

GROUP 2:
 $P_{u,t} = 125.4$ $\phi P_{n,t} = 178.13$ **Stress Rating**
 $V_u = 0$ $\phi V_n = 112.75$ **67.0%**
 $M_u = n/a$ $\phi M_n = n/a$ **Pass**

Base Plate Summary
 Max Stress (ksi): 34.85 (Roark's Flexural)
 Allowable Stress (ksi): 54
 Stress Rating: **61.5%** **Pass**

Stiffener Summary
 Horizontal Weld: **65.8%** **Pass**
 Vertical Weld: **43.2%** **Pass**
 Plate Flexure+Shear: **24.7%** **Pass**
 Plate Tension+Shear: **71.3%** **Pass**
 Plate Compression: **76.4%** **Pass**

Pole Summary
 Punching Shear: **11.0%** **Pass**

CClplate

Elevation (ft) 0 (Base)

note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	No	No	
2	No	No	No	No	No	

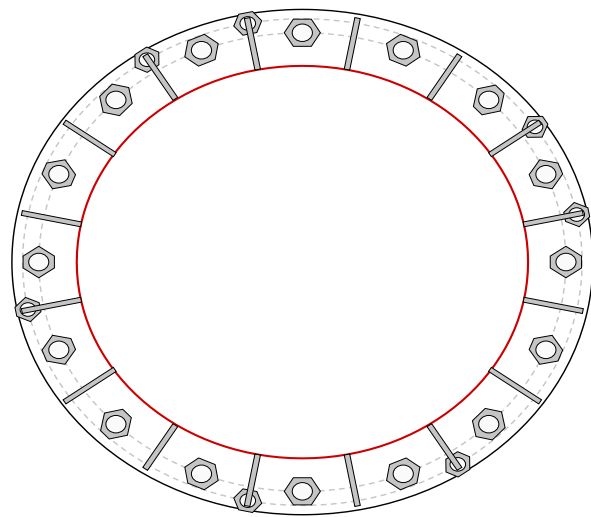
Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η	I_{br} (in)	Thread Type	Area Override, in ²	Tension Only
1	1	0	2.25	A615-75	59	0.5	0	N-Included		No
2	1	22.5	2.25	A615-75	59	0.5	0	N-Included		No
3	1	45	2.25	A615-75	59	0.5	0	N-Included		No
4	1	67.5	2.25	A615-75	59	0.5	0	N-Included		No
5	1	90	2.25	A615-75	59	0.5	0	N-Included		No
6	1	112.5	2.25	A615-75	59	0.5	0	N-Included		No
7	1	135	2.25	A615-75	59	0.5	0	N-Included		No
8	1	157.5	2.25	A615-75	59	0.5	0	N-Included		No
9	1	180	2.25	A615-75	59	0.5	0	N-Included		No
10	1	202.5	2.25	A615-75	59	0.5	0	N-Included		No
11	1	225	2.25	A615-75	59	0.5	0	N-Included		No
12	1	247.5	2.25	A615-75	59	0.5	0	N-Included		No
13	1	270	2.25	A615-75	59	0.5	0	N-Included		No
14	1	292.5	2.25	A615-75	59	0.5	0	N-Included		No
15	1	315	2.25	A615-75	59	0.5	0	N-Included		No
16	1	337.5	2.25	A615-75	59	0.5	0	N-Included		No
17	2	11.25	1.75	F1554-105	62.61	0.5	0	N-Included		No
18	2	33.75	1.75	F1554-105	62.61	0.5	0	N-Included		No
19	2	101.25	1.75	F1554-105	62.61	0.5	0	N-Included		No
20	2	123.75	1.75	F1554-105	62.61	0.5	0	N-Included		No
21	2	191.25	1.75	F1554-105	62.61	0.5	0	N-Included		No
22	2	258.75	1.75	F1554-105	62.61	0.5	0	N-Included		No
23	2	303.75	1.75	F1554-105	62.61	0.5	0	N-Included		No

Custom Stiffener Connection

Stiffener	Stiffener Group ID	Location (deg.)	Width (in)	Height (in)	Thickness (in)	H. Notch (in)	V. Notch (in)	Grade (ksi)	Weld Type	Groove Depth (in)	Groove Angle (deg.)	H. Fillet Weld Size (in)	V. Fillet Weld Size (in)	Weld Strength (ksi)
1	1	11.25	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
2	1	33.75	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
3	1	56.25	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
4	1	78.75	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
5	1	101.25	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
6	1	123.75	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
7	1	146.25	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
8	1	168.75	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
9	1	191.25	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
10	1	213.75	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
11	1	236.25	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
12	1	258.75	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
13	1	281.25	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
14	1	303.75	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
15	1	326.25	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70
16	1	348.75	6.75	17.75	0.625	0.75	0.75	50	Fillet			0.625	0.375	70

Plot Graphic



Pier and Pad Foundation



BU #: 881533
 Site Name: GROTON TOWER
 App. Number: 586248, Rev. 0

TIA-222 Revision: H
 Tower Type: Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	68.73	kips
Base Shear, Vu_{comp} :	43.94	kips
Moment, M_u :	4977.04	ft-kips
Tower Height, H :	145	ft
BP Dist. Above Fdn, bp_{dist} :	3.25	in
Bolt Circle / Bearing Plate Width, BC :	59	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	257.37	43.94	16.3%	Pass
<i>Bearing Pressure (ksf)</i>	18.00	2.74	15.2%	Pass
<i>Overturning (kip*ft)</i>	9375.16	5208.64	55.6%	Pass
<i>Pad Flexure (kip*ft)</i>	8579.25	2320.40	25.8%	Pass
<i>Pad Shear - 1-way (kips)</i>	1861.32	240.23	12.3%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.003	1.4%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	8603.29	0.00	0.0%	Pass

*Rating per TIA-222-H Section 15.5

Structural Rating*:	25.8%
Soil Rating*:	55.6%

Pad Properties		
Depth, D :	5	ft
Pad Width, W_1 :	30	ft
Pad Thickness, T :	5	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	45	
Pad Clear Cover, cc_{pad} :	4	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	4	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	165	pcf
Ultimate Gross Bearing, Q_{ult} :	24.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	30	degrees
SPT Blow Count, N_{blows} :	0	
Base Friction, μ :		
Neglected Depth, N :	3.33	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, gw :	N/A	ft

<--Toggle between Gross and Net

CONCRETE BREAKOUT FAILURE ANALYSIS

$f_c = 4000$ psi
 $h_{ef} = 56$ in
 $BC = 59$ in
 square failure = 44795.83 in^2
 $A_{nco} = 28224 \text{ in}^2$
 $A_{nc} = 44795.83 \text{ in}^2$
 Cast-In $K=24$
 Post - Installed $K=17$
 $N_b = 865526$
 $\Phi N_{cbg} = 1021706$
 $N_{ua} = 1236148$
 Rating 0.898152
 Rev H rating **85.54%**

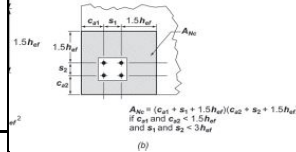
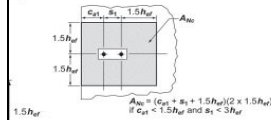
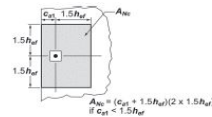
Steel Strength

$N_{sa} = \text{Asen} \cdot f_{uta}$ Asen **3.25** sq.in $f_{uta} = 125000$
 $N_{sa} = 406250$ lbs
 $\Phi N_{sa} = 304687.5$ lbs
 $\Phi N_{sa} = 304.6875$ k
 $N_{ua} = 112.997$ k
 Rating 0.370862
 Rev H rating **35.32%**

Anchor Rod Pullout

Nut distance across flats **3.5** AR Dia **2.25** in
 Nut Bearing Area: $A_{brg} = 7.17$
 $N_{pN} = \psi_{c,br} N_p$ ACI 318-14 Eq. (17.4.3.1)
 $N_p = 8 A_{brg} f_c$ ACI 318-14 Eq. (17.4.3.4)
 $\Phi N_{pN} \geq N_{br}$ ACI 318-14 Table 17.3.1.1
 $N_p = 229286.9$ lbs 229.2869 k
 $\Phi N_p = 160.5008$ k
 Rating 0.704027
 Rev H rating **67.05%**
 $N_{ua} = 112.997$ k

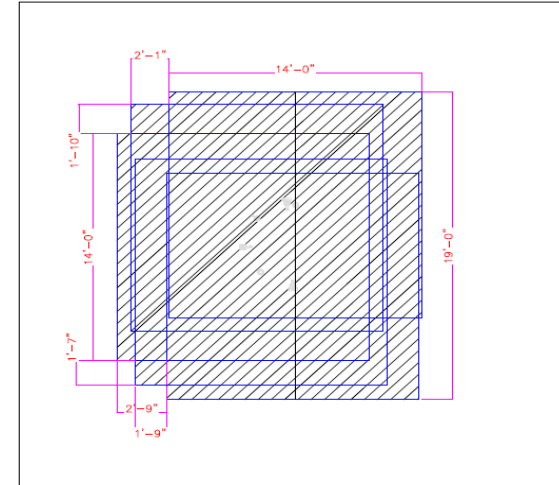
COMMENTARY



17.4.2.6 For anchors located in a region of a concrete member where analysis indicates no cracking at service load levels, the following modification factor shall be permitted:

- (a) $\psi_{c,N} = 1.25$ for cast-in anchors
- (b) $\psi_{c,N} = 1.4$ for post-installed anchors, where the value of k_c used in Eq. (17.4.2.2a) is 17

$$A_{nco} = 14' \times 19' + 2.75' \times 14' + 2.083' \times 1.83' + 1.583' \times 1.75' = 44795.83 \text{ in}^2$$




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Company:	B+T Grp	Page:	1
Address:	1717 S. Boulder,Suite 300	Specifier:	Pavithra
Phone Fax:	918-587-4630	E-Mail:	
Design:	Drafts_92739.021.01 - GROTON TOWER, CT	Date:	1/18/2022
Fastening point:			

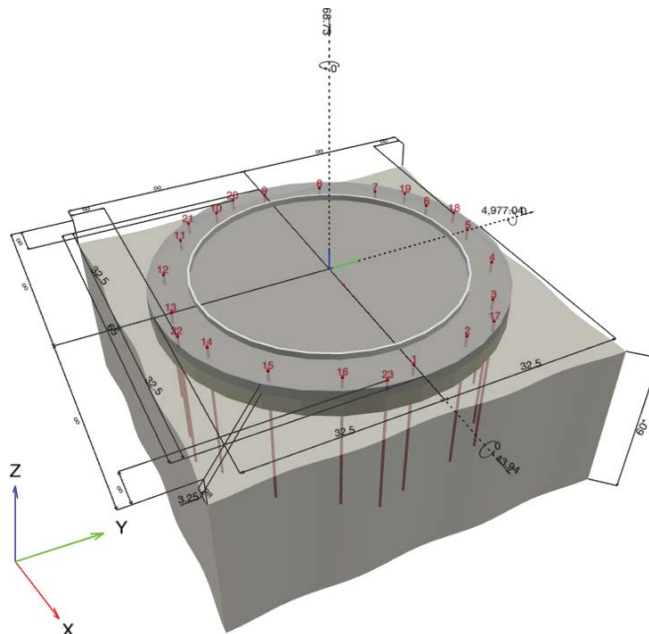
Specifier's comments:

1 Input data

Anchor type and diameter:	Heavy Hex Head 2.25 in dia AR	
Item number:	not available	
Effective embedment depth:	$h_{ef} = 56$ in	
Material:	ASTM F 1554	
Evaluation Service Report:	Hilti Technical Data	
Issued Valid:	- -	
Proof:	Design Method ACI 318-14 / CIP	
Stand-off installation:	without clamping (anchor); restraint level (anchor plate): 2.00; $e_b = 3.250$ in.; $t = 2.000$ in. Hilti Grout: CB-G EG, epoxy, $f_{c,Grout} = 14,939$ psi	
Anchor plate ^R :	$l_x \times l_y \times t = 65.000$ in. x 65.000 in. x 2.000 in.; (Recommended plate thickness: not calculated)	
Profile:	Steel pipe, ; (L x W x T) = 50.500 in. x 50.500 in. x 0.437 in.	
Base material:	cracked concrete, 4000, $f_c' = 4,000$ psi; $h = 60.000$ in.	
Reinforcement:	tension: condition B, shear: condition B; edge reinforcement: none or < No. 4 bar	

^R - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [kip, ft.kip]



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Company:	B+T Grp	Page:	2
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Phone Fax:	918-587-4630	E-Mail:	
Design:	Drafts_92739.021.01 - GROTON TOWER, CT	Date:	1/18/2022
Fastening point:			

1.1 Design results

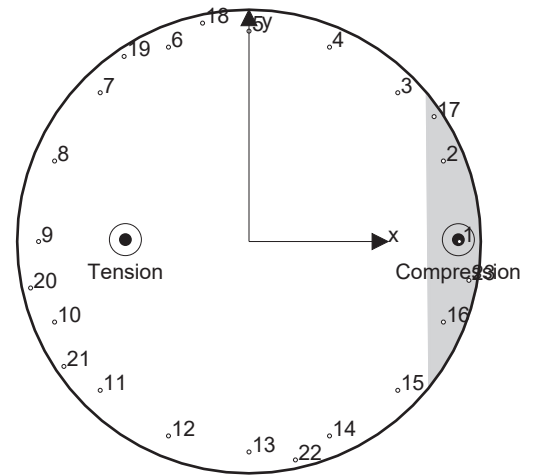
Case	Description	Forces [kip] / Moments [ft.kip]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = -68.730; V _x = 43.940; V _y = 0.000; M _x = 0.00000; M _y = 4,977.04000; M _z = 0.00000;	no	∞

2 Load case/Resulting anchor forces

Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	0.000	1.912	1.911	0.039
2	0.000	1.897	1.897	0.036
3	8.304	1.885	1.884	0.028
4	27.566	1.876	1.876	0.016
5	50.379	1.873	1.873	0.001
6	73.271	1.876	1.876	-0.014
7	92.758	1.885	1.884	-0.026
8	105.871	1.897	1.897	-0.034
9	110.615	1.912	1.911	-0.037
10	106.268	1.926	1.926	-0.034
11	93.492	1.938	1.938	-0.026
12	74.230	1.946	1.946	-0.014
13	51.417	1.949	1.949	0.001
14	28.525	1.946	1.946	0.016
15	9.038	1.938	1.938	0.028
16	0.000	1.926	1.926	0.036
17	0.000	1.889	1.889	0.034
18	63.537	1.872	1.872	-0.007
19	85.887	1.878	1.878	-0.022
20	112.997	1.920	1.920	-0.038
21	103.737	1.934	1.934	-0.032
22	38.258	1.951	1.951	0.009
23	0.000	1.919	1.918	0.041



max. concrete compressive strain: 3.62 [%]
 max. concrete compressive stress: 15,731 [psi]
 resulting tension force in (x/y)=(-17.328/0.269): 1,236.148 [kip]
 resulting compression force in (x/y)=(29.354/0.255): 1,304.878 [kip]

Anchor forces are calculated based on the assumption of a rigid anchor plate.



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Company:	B+T Grp	Page:	3
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Phone Fax:	918-587-4630	E-Mail:	
Design:	Drafts_92739.021.01 - GROTON TOWER, CT	Date:	1/18/2022
Fastening point:			

3 Tension load

	Load N_{ua} [kip]	Capacity ϕN_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Rev H
Steel Strength*	112.997	304.6875	37.08%	35.32%
Pullout Strength*	112.997	160.5	70.40%	67.05%
Concrete Breakout Failure**	1,236.148	1376.32	89.81%	85.54%

Governing rating

3.1 Steel Strength

$$N_{sa} = A_{se,N} f_{uta} \quad \text{ACI 318-14 Eq. (17.4.1.2)}$$

$$\phi N_{sa} \geq N_{ua} \quad \text{ACI 318-14 Table 17.3.1.1}$$

Variables

$A_{se,N}$ [in. ²]	f_{uta} [psi]
3.25	125000

Calculations

N_{sa} [kip]
406.25

Results

N_{sa} [kip]	ϕ_{steel}	ϕN_{sa} [kip]	N_{ua} [kip]
406.25	0.750	304.6875	112.997

3.2 Pullout Strength

$$N_{pn} = \psi_{c,p} N_p \quad \text{ACI 318-14 Eq. (17.4.3.1)}$$

$$N_p = 8 A_{brg} f'_c \quad \text{ACI 318-14 Eq. (17.4.3.4)}$$

$$\phi N_{pn} \geq N_{ua} \quad \text{ACI 318-14 Table 17.3.1.1}$$

Variables

$\psi_{c,p}$	A_{brg} [in. ²]	λ_a	f'_c [psi]
1.000	7.17	1.000	4,000

Calculations

N_p [kip]
229.2869

Results

N_{pn} [kip]	$\phi_{concrete}$	ϕN_{pn} [kip]	N_{ua} [kip]
229.2869	0.700	160.5	112.997

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Company:	B+T Grp	Page:	4
Address:	1717 S. Boulder,Suite 300	Specifier:	Pavithra
Phone Fax:	918-587-4630	E-Mail:	
Design:	Drafts_92739.021.01 - GROTON TOWER, CT	Date:	1/18/2022
Fastening point:			

3.3 Concrete Breakout Failure

$$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b \quad \text{ACI 318-14 Eq. (17.4.2.1b)}$$

$$\phi N_{cbg} \geq N_{ua} \quad \text{ACI 318-14 Table 17.3.1.1}$$

$$A_{Nc} \text{ see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)}$$

$$A_{Nc0} = 9 h_{ef}^2 \quad \text{ACI 318-14 Eq. (17.4.2.1c)}$$

$$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2 e_N}{3 h_{ef}}} \right) \leq 1.0 \quad \text{ACI 318-14 Eq. (17.4.2.4)}$$

$$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0 \quad \text{ACI 318-14 Eq. (17.4.2.5b)}$$

$$\psi_{cp,N} = \text{MAX} \left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0 \quad \text{ACI 318-14 Eq. (17.4.2.7b)}$$

$$N_b = 16 \lambda_a \sqrt{f'_c} h_{ef}^{5/3} \quad \text{ACI 318-14 Eq. (17.4.2.2b)}$$

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
56	8.546	0.162	∞	1.000
c_{ac} [in.]	k_c	λ_a	f'_c [psij]	
-	16	1.000	4,000	

Calculations

A_{Nc} [in. ²]	A_{Nc0} [in. ²]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
44795.83	28224	0.85	0.996	1.000	1.000	202.070

Results

N_{cbg} [kip]	$\phi_{concrete}$	ϕN_{cbg} [kip]	N_{ua} [kip]
1966.176	0.700	1376.32	1,236.148

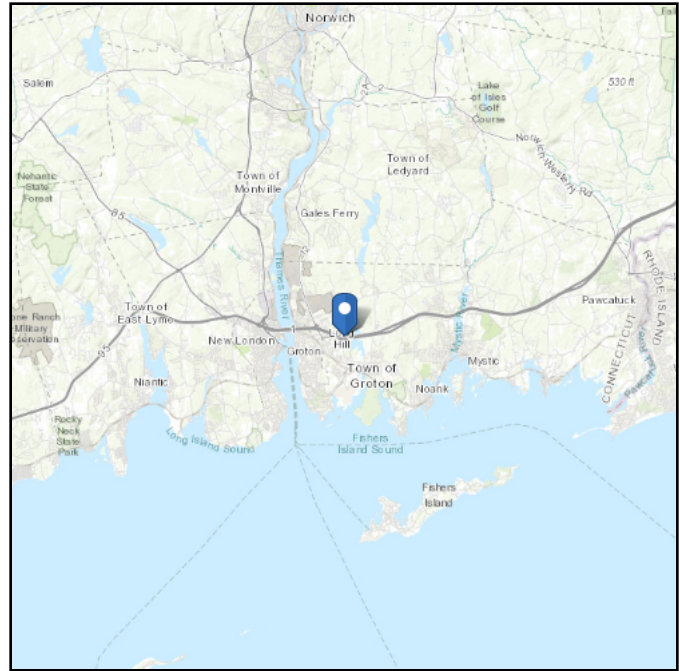
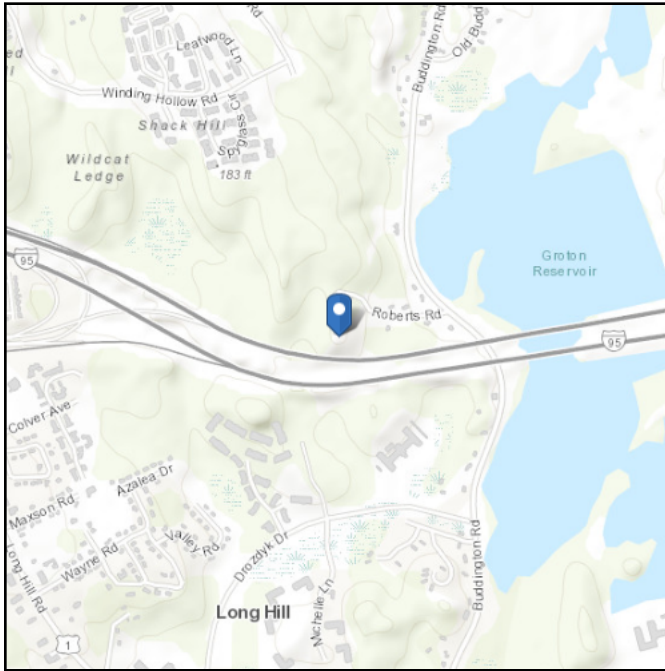
***Please refer excel sheet for calculations**

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 128.26 ft (NAVD 88)
Latitude: 41.360222
Longitude: -72.048639



Wind

Results:

Wind Speed	127 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	99 Vmph
100-year MRI	105 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon Jan 17 2022

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

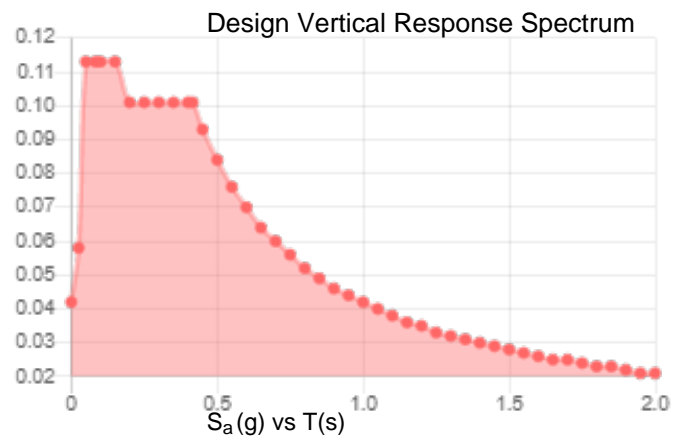
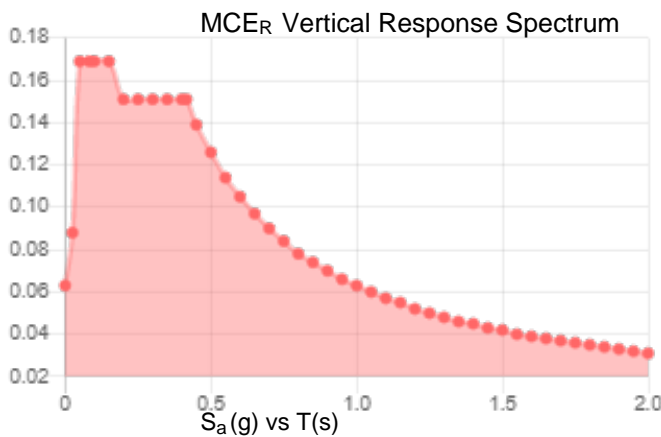
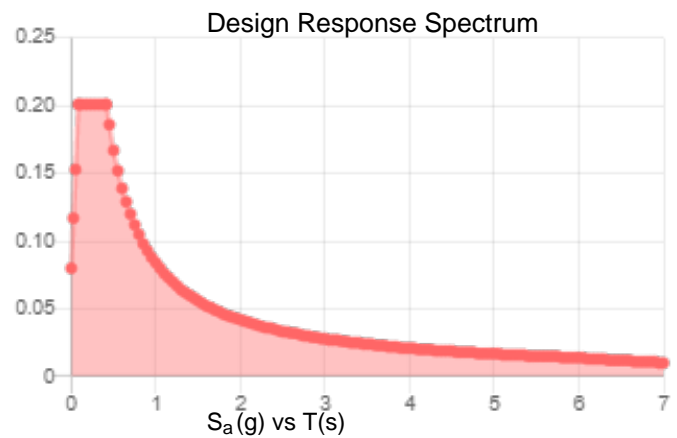
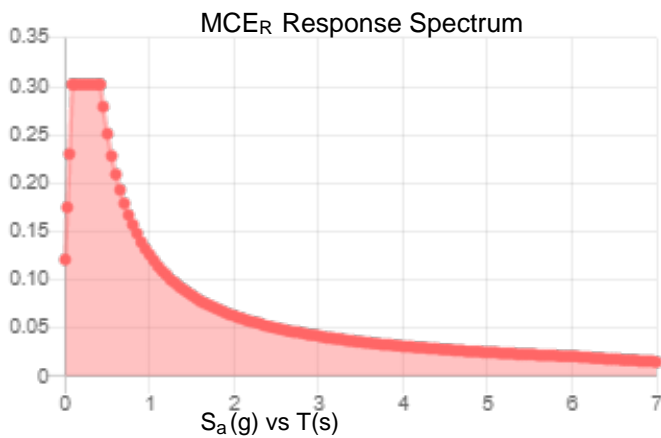
Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Site Soil Class: D - Stiff Soil

Results:

S_s :	0.189	S_{D1} :	0.084
S_1 :	0.052	T_L :	6
F_a :	1.6	PGA :	0.104
F_v :	2.4	PGA _M :	0.165
S_{MS} :	0.302	F_{PGA} :	1.593
S_{M1} :	0.126	I_e :	1
S_{DS} :	0.201	C_v :	0.7

Seismic Design Category B



Data Accessed: Mon Jan 17 2022

Date Source:

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

Ice

Results:

Ice Thickness: 1.00 in.
Concurrent Temperature: 15 F
Gust Speed 50 mph

Data Source: Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8

Date Accessed: Mon Jan 17 2022

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

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

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

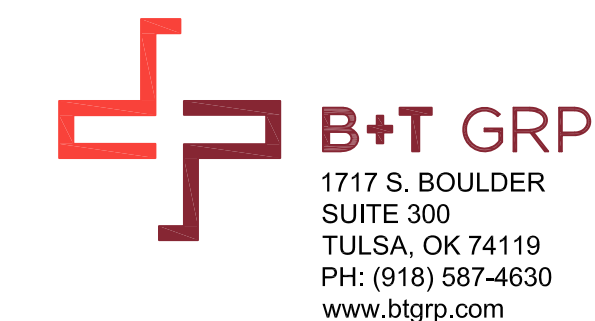
ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting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

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AT&T SITE NUMBER: CTL02182
AT&T SITE NAME: GROTON ROBERTS RD
AT&T FA CODE: 10035316
AT&T PACE NUMBER: MRCTB056368, MRCTB053809, MRCTB053809, MRCTB056190, MRCTB054612, MRCTB054188, MRCTB054834
AT&T PROJECT: 5G NR 1SR CBAND, 5G NR ACTIVATION, 5G NR ACTIVATION, BBU RECONFIGURATION WITH NEW IDS, ANTENNA RETROFIT, 5G NR 1SR CBAND, 5G NR UPGRADE

BUSINESS UNIT #: 881533
SITE ADDRESS: 75 ROBERTS ROAD
COUNTY: GROTON, CT 06340
SITE TYPE: NEW LONDON
TOWER HEIGHT: MONOPOLE
 145'-0"



AT&T SITE NUMBER: CTL02182
BU #: 881533
GROTON TOWER
 75 ROBERTS ROAD
 GROTON, CT 06340
 EXISTING
 145'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	1/20/22	JTS	PRELIMINARY REVIEW	CMV
0	1/25/22	CMV	CONSTRUCTION	CMV
1	3/31/22	GAC	CONSTRUCTION	KT
2	5/31/22	GAC	CONSTRUCTION	KT

SITE INFORMATION

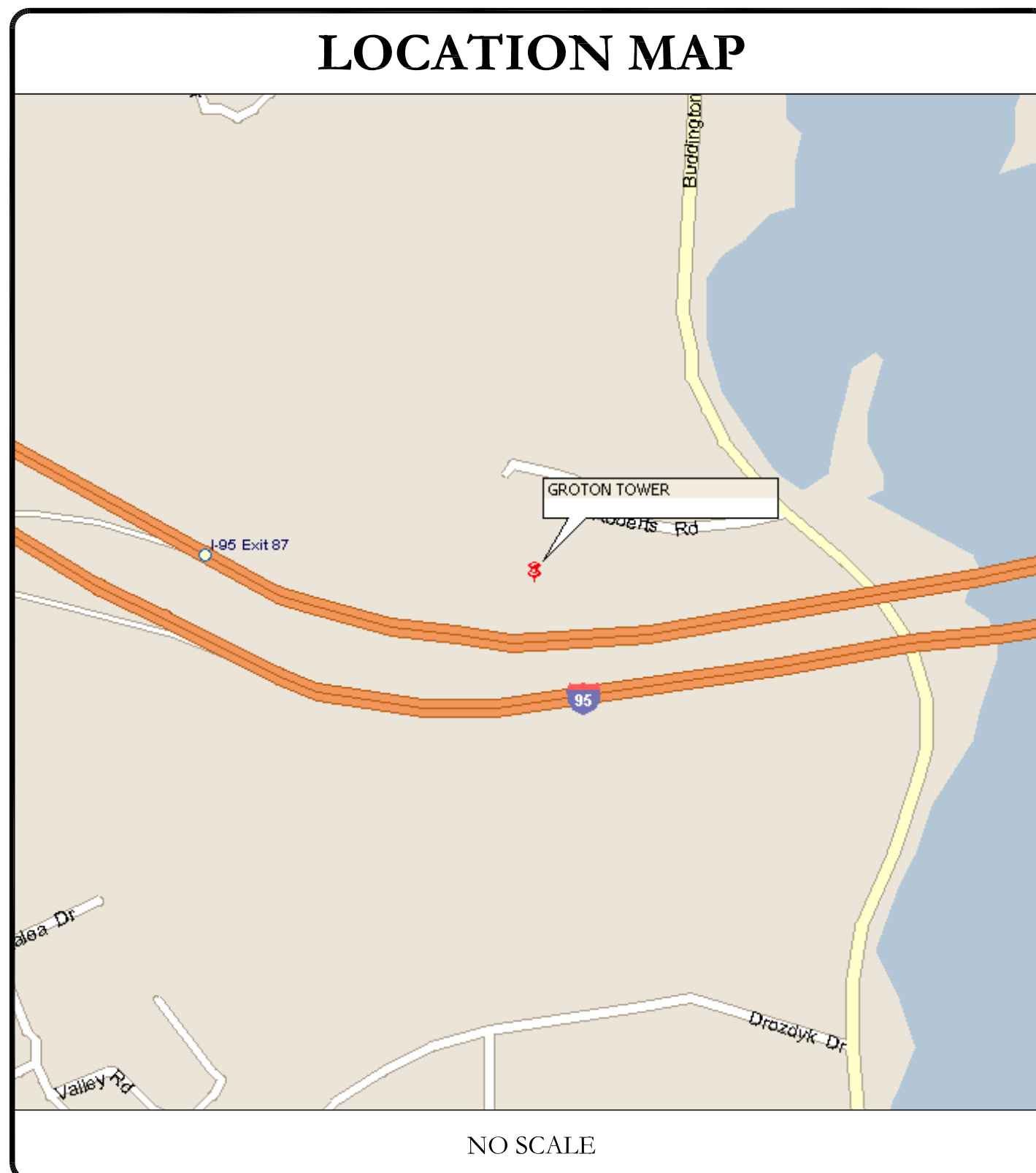
CROWN CASTLE USA INC. SITE NAME:	GROTON TOWER
SITE ADDRESS:	75 ROBERTS ROAD GROTON, CT 06340
COUNTY:	NEW LONDON
MAP/PARCEL #:	59-169914226707
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 21' 36.6084"
LONGITUDE:	-72° 2' 54.132"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	115'
CURRENT ZONING:	RU-20
JURISDICTION:	CONNECTICUT SITING COUNCIL
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	PERROTTA DANIEL J & STACEY A 75 ROBERTS RD GROTON, CT 06340
TOWER OWNER:	CROWN CASTLE USA INC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T TOWER ASSET GROUP 575 MOROSGO DRIVE ATLANTA, GA 30324-3300
ELECTRIC PROVIDER:	BOZRAH LIGHT & POWER CO 860-889-7388
TELCO PROVIDER:	AT&T 800-288-2020

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	SITE PLAN
C-1.2	EXISTING & FINAL EQUIPMENT PLANS
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	FINAL EQUIPMENT SCHEDULE
C-4	EQUIPMENT MOUNTING DETAILS
C-4.1	EQUIPMENT MOUNTING DETAILS
C-5	EQUIPMENT SPECS
E-1	POWER ANALYSIS
G-1	GROUNDING SCHEMATIC
G-2	GROUNDING DETAILS
ATTACHED	PLUMBING DIAGRAM
ATTACHED	EQUIPMENT SPECIFICATIONS

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

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



PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S. BOULDER AVE. TULSA, OK 74119 MARVIN PHILLIPS marvin.phillips@btgrp.com
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3530 TORINGDON WAY, SUITE 300 CHARLOTTE, NC 28277 PAUL PEDICONE - PROJECT MANAGER PAUL.PEDICONE@CROWNCastle.COM JASON D'AMICO - CONSTRUCTION MANAGER JASON.DAMICO@CROWNCastle.COM

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

PROJECT DESCRIPTION

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

TOWER SCOPE OF WORK:

- REMOVE (3) POWERWAVE - 7770 ANTENNAS
- REMOVE (3) KATHERIN - 840-370799 ANTENNAS
- REMOVE (2) KMW - AM-X-CD-17-65-00T-RET ANTENNAS
- REMOVE (1) ANDREW - SBNH-1D6565C ANTENNA
- REMOVE (6) POWERWAVE - LGP 21401 TMA's
- REMOVE (3) ERICSSON - 4478 B5 RRHs
- REMOVE (3) ERICSSON - RRUS-11 B12 RRHs
- REMOVE (3) ERICSSON - RRUS-11 B4 RRHs
- REMOVE (6) KAEUS - DBCT108F1V92-1 DIPLEXERS
- REMOVE (6) 1-5/8" COAX CABLE
- RELOCATE (3) ERICSSON - RRUS-32 B30 RRHs
- RELOCATE (3) ERICSSON - RRUS-32 B2 RRHs
- RELOCATE (3) ERICSSON - 4478 B14 RRHs
- INSTALL (3) CCI - TPA65R-BU8DA-K ANTENNAS
- INSTALL (3+3) ERICSSON - AIR649 B77D+AIR6419 B77G STACKED ANTENNAS
- INSTALL (3) CCI - DMP65R-BU8DA ANTENNAS

GROUND SCOPE OF WORK:

- INSTALL (3) RETIFIERS IN EXISTING POWER PLANT
- INSTALL (6) UP-CONVERTERS IN EXISTING POWER PLANT
- INSTALL (1) DC12-48-60-RM IN EXISTING FIF RACK
- INSTALL 4-WAY GPS SPLITTER
- INSTALL (1) 6648 W/ XCEDE CABLE

- INSTALL (3) ERICSSON - 4426 B66 RRHs
- INSTALL (3) ERICSSON - 4449 B5/B12 RRHs
- INSTALL (1) RAYCAP - DC6-48-60-18-8F SQUID
- INSTALL (1) FB-1.98B-034 FIBER TRUNK
- INSTALL (2) PWRT-606-S DC TRUNK
- INSTALL (3) Y-CABLES
- INSTALL (9) SITEPRO1 - SCX1-K CROSSOVER PLATES
- INSTALL MOUNT MODIFICATIONS PER MOUNT MODIFICATION ANALYSIS BY TOWER ENGINEERING PROFESSIONALS DATED 2/22/22

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: 1/19/22

MOUNT ANALYSIS: TEP
DATED: 3/22/22

RFDS REVISION: PRELIMINARY
DATED: 10/8/21

ORDER ID: 586248
REVISION: 0

PROFESSIONAL ENGINEER
 No. 23924
 5/31/22

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

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

SHEET NUMBER: T-1	REVISION: 2
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92739.020.01_GROTON_TOWER.dwg - SheetT-1 - User: kevin.turkoll - May 31, 2022 - 1:56pm

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

- 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.
- "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.
- 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.
- 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).
- 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."
- 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.
- 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.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- 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.
- ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
- 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.
- 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.
- 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.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
- 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.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
- 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:

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
- ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
- USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
- EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
- ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
- COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
- ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
- APPROVED ANTI-OXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
- ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
- MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
- BOND ALL METALLIC OBJECTS WITHIN 6 FT OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
- 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.
- 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).
- 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:

- FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
CARRIER: AT&T
TOWER OWNER: CROWN CASTLE USA INC.
- 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.
- 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.
- 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.
- 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.
- 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.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

- 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.
- UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
- 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.
- 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.
- 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
- 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"
- 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:

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
- CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
- WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
- 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.
- 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.
- 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).
- PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
- ALL THE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
- 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.
- 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.
- POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
- 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.
- 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).
- RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEC AND NEC.
- ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
- ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
- SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
- LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
- CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SIZING FITTINGS ARE NOT ACCEPTABLE.
- CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEC AND THE NEC.
- WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOULD SPECMATE WIREWAY).
- SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
- 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 LOCKRUT ON OUTSIDE AND INSIDE.
- 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.
- 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.
- 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.
- 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.
- 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.
- INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "AT&T".
- ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

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

* 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

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



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**AT&T SITE NUMBER:
CTL02182**

**BU #: 881533
GROTON TOWER**

**75 ROBERTS ROAD
GROTON, CT 06340**

**EXISTING
145'-0" MONOPOLE**

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	1/20/22	JTS	PRELIMINARY REVIEW	CMV
0	1/25/22	CMV	CONSTRUCTION	CMV
1	3/31/22	GAC	CONSTRUCTION	KT
2	5/31/22	GAC	CONSTRUCTION	KT



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

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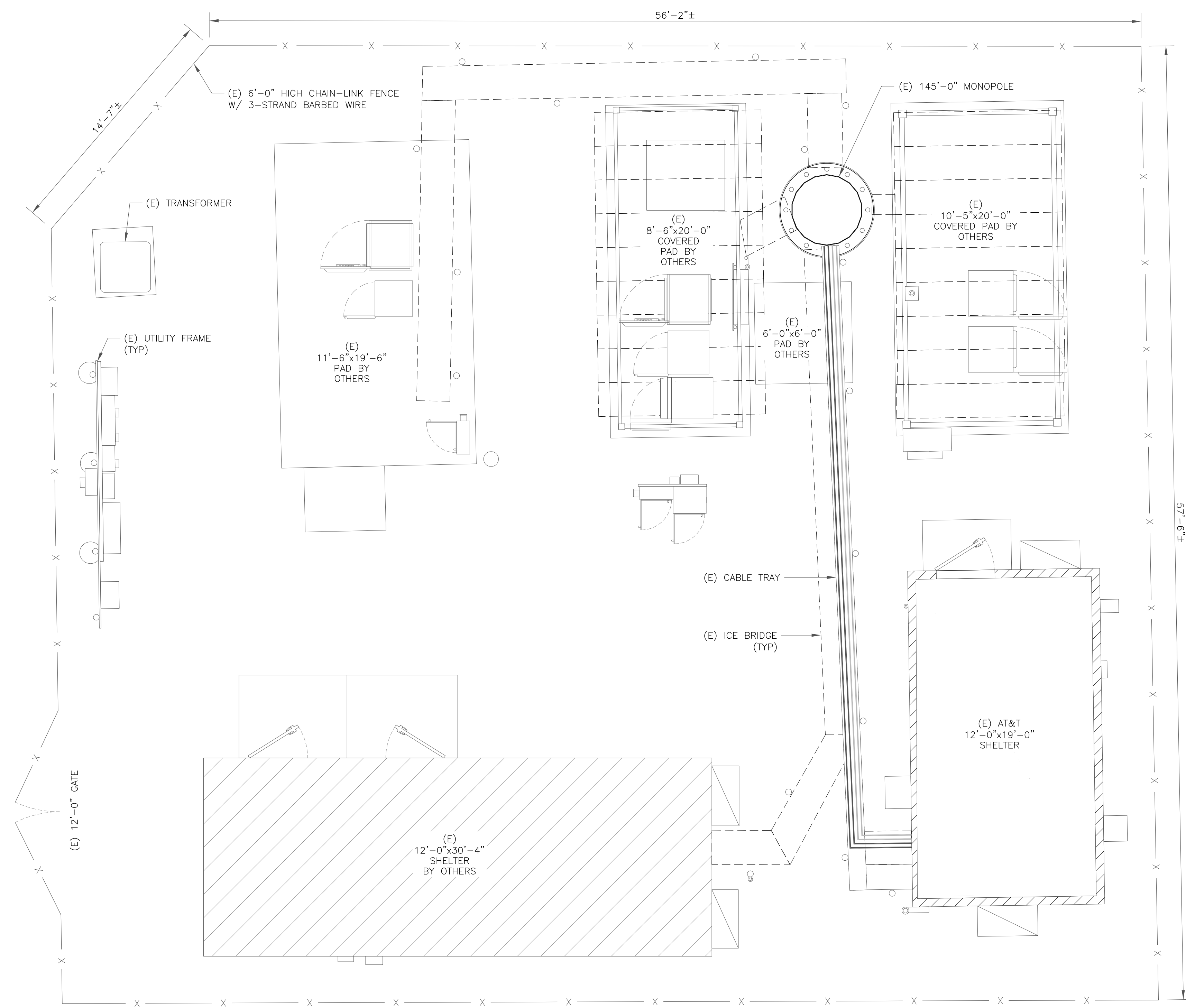


5/31/22

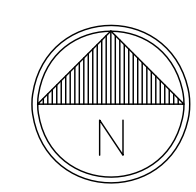
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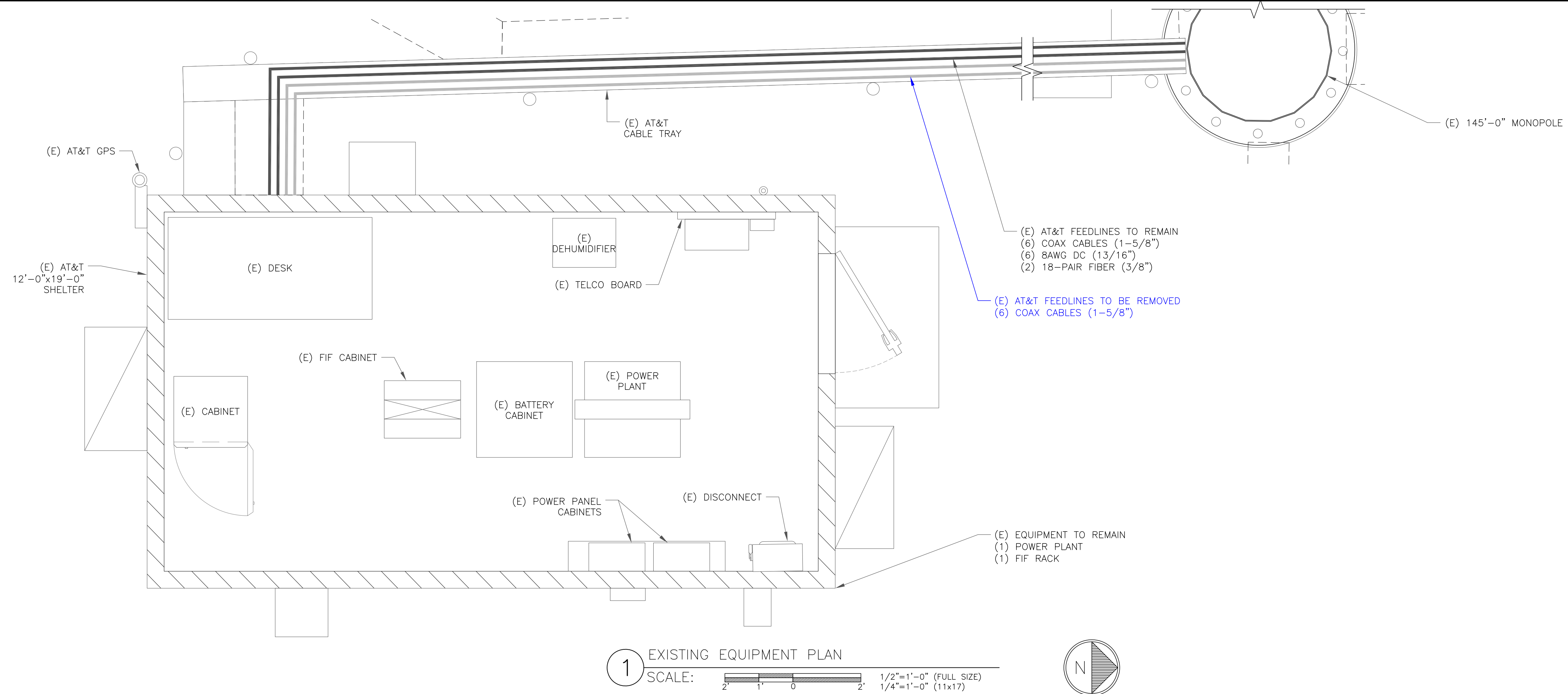
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SHEET NUMBER: **C-1.1** REVISION: **2**

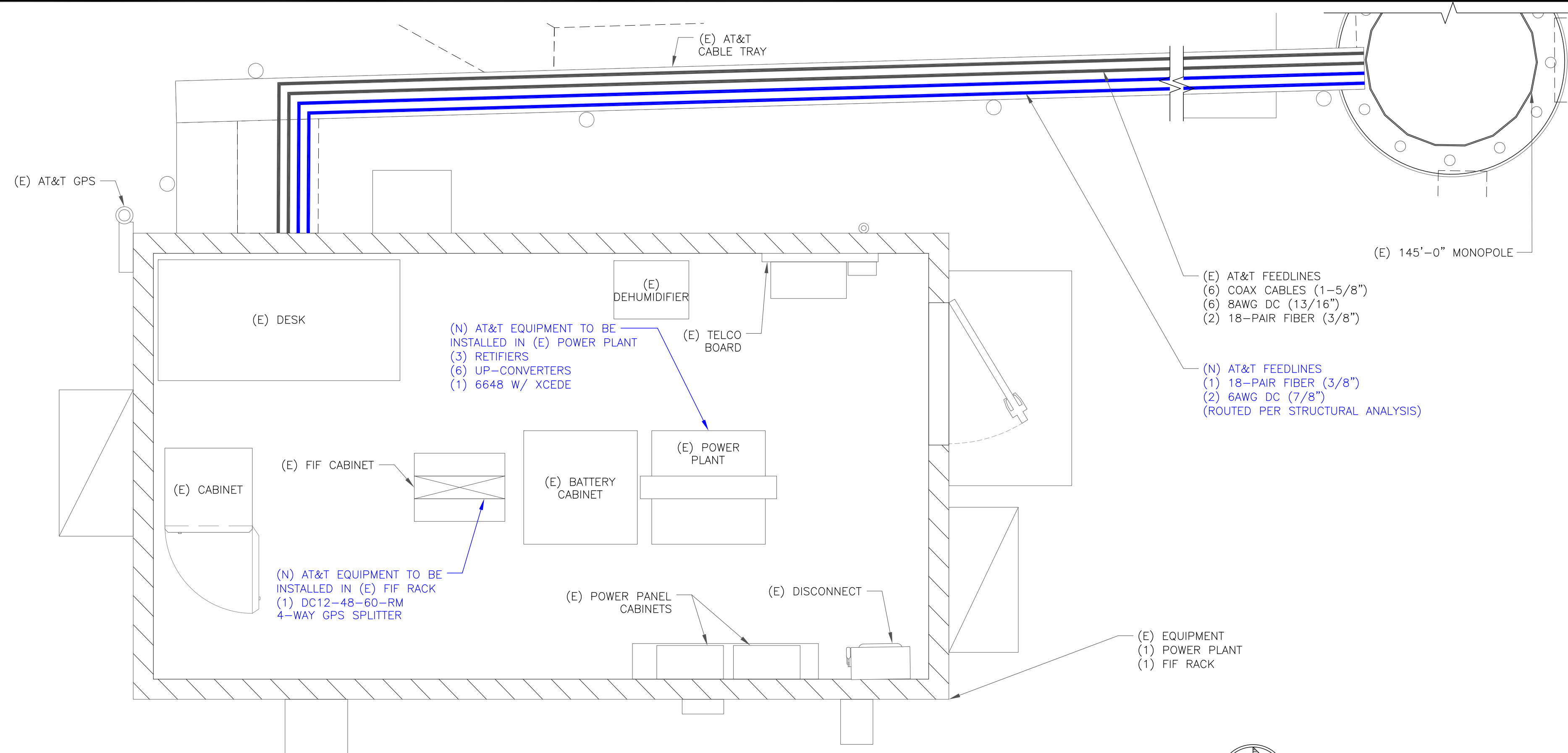
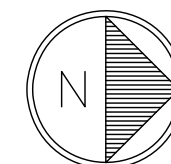


1 SITE PLAN
SCALE: 1/4"=1'-0" (FULL SIZE)
1/8"=1'-0" (11x17)

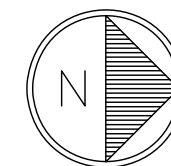




1 EXISTING EQUIPMENT PLAN
SCALE: 1/2"=1'-0" (FULL SIZE)
1/4"=1'-0" (11x17)



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



- GROUND SCOPE OF WORK:**
- INSTALL (3) RETIFIERS IN EXISTING POWER PLANT
 - INSTALL (6) UP-CONVERTERS IN EXISTING POWER PLANT
 - INSTALL (1) DC12-48-60-RM IN EXISTING FIF RACK
 - INSTALL 4-WAY GPS SPLITTER
 - INSTALL 6648 W/ XCEDE
- NOTE:**
- THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. AT&T IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.

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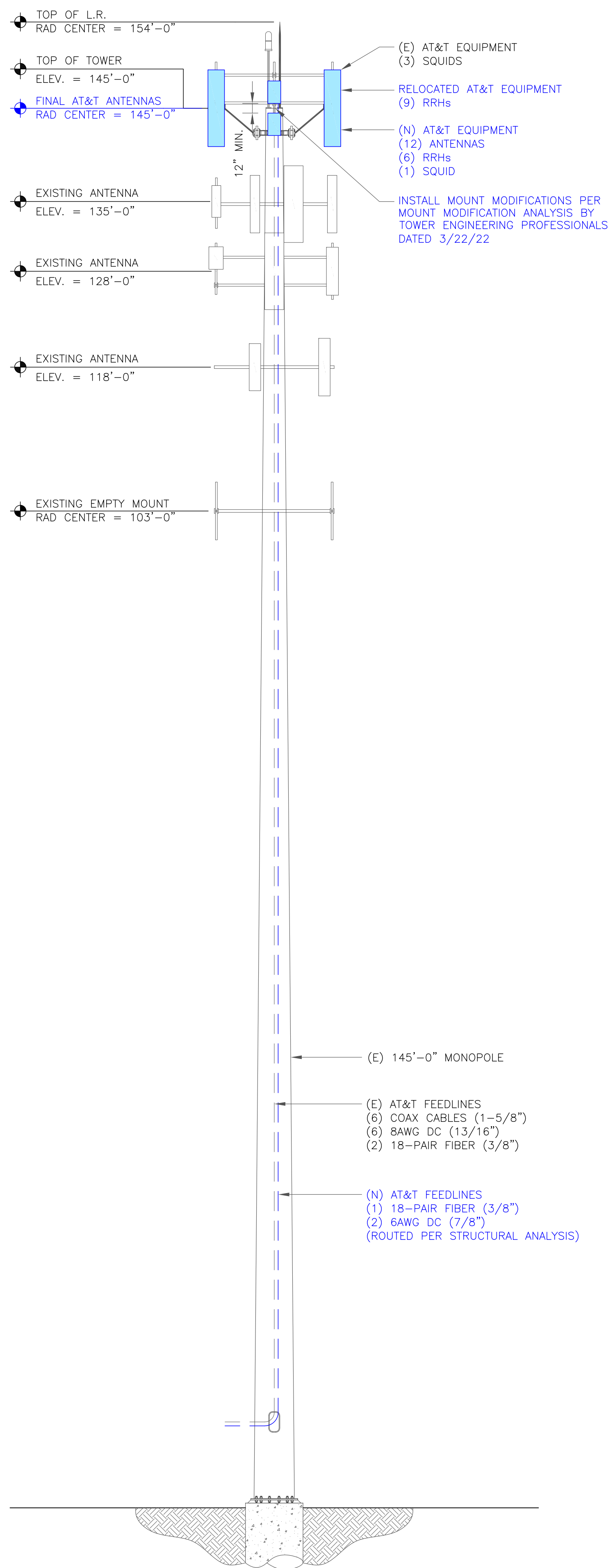
5/31/22

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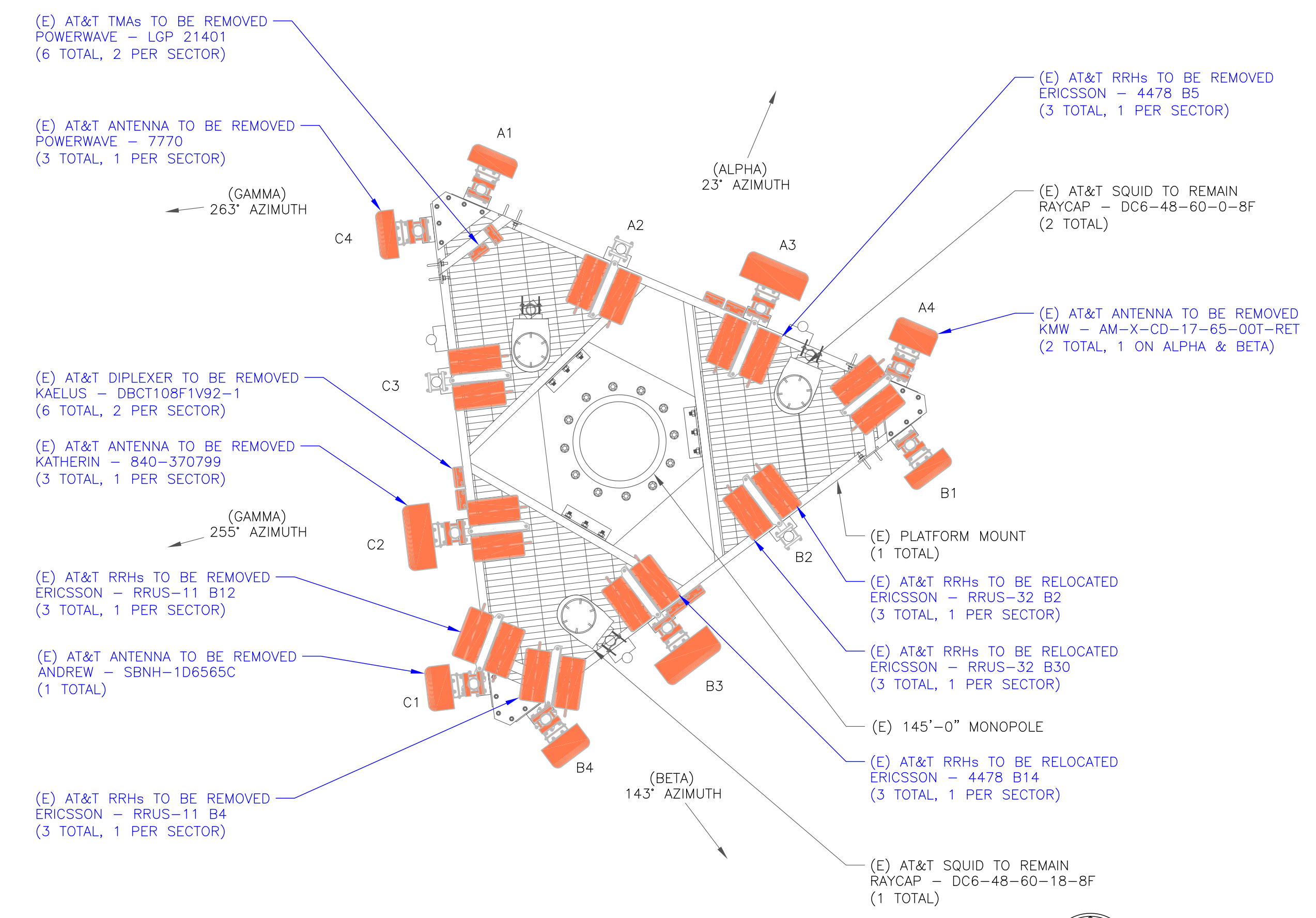
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SHEET NUMBER: **C-1.2** REVISION: **2**

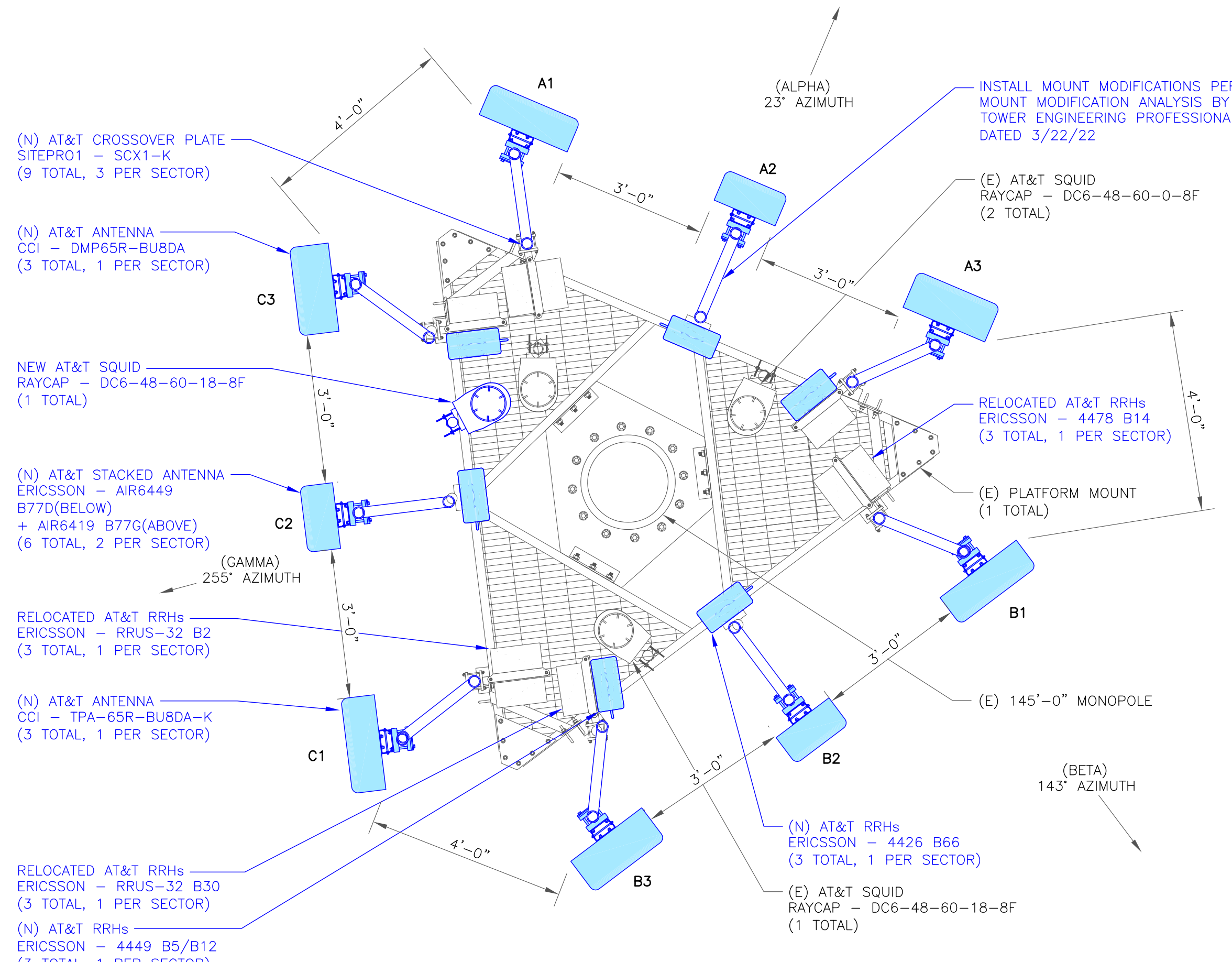
92739.020.01_GROTON_TOWER.dwg - Sheet: C-1.2 - User: Kevin.Turkoll - May 31, 2022 - 1:58pm



1 FINAL ELEVATION
SCALE: NOT TO SCALE



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



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

"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.

- INSTALLER NOTES:
- REFERENCE C-3 FOR FINAL EQUIPMENT SCHEDULE.
 - REFERENCE C-4 FOR NEW EQUIPMENT SPECIFICATIONS.
 - CONTRACTOR TO VERIFY ALL ANTENNA TIP HEIGHTS DO NOT EXCEED BEACON BASE HEIGHT.
 - 3'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE ANTENNAS ON SAME SECTOR.
 - 6'-0" MINIMUM DISTANCE REQUIRED BETWEEN 700BC & 700DE ANTENNAS ON SAME SECTOR.
 - 4'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE 700 ANTENNAS ON OPPOSING SECTORS.
 - ALL ANTENNA MEASUREMENT DISTANCES MUST BE EDGE TO EDGE (RELOCATE ANTENNAS AS NEEDED).
 - 8" MINIMUM DISTANCE REQUIRED BETWEEN ANTENNA & RADIO. SEE GENERIC EXAMPLE DETAIL ON SHEET C-4.

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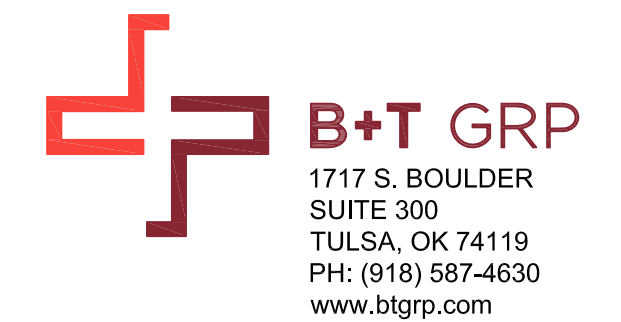
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SHEET NUMBER:
C-3

REVISION:
2

FINAL ANTENNA AND FEEDLINE SCHEDULE

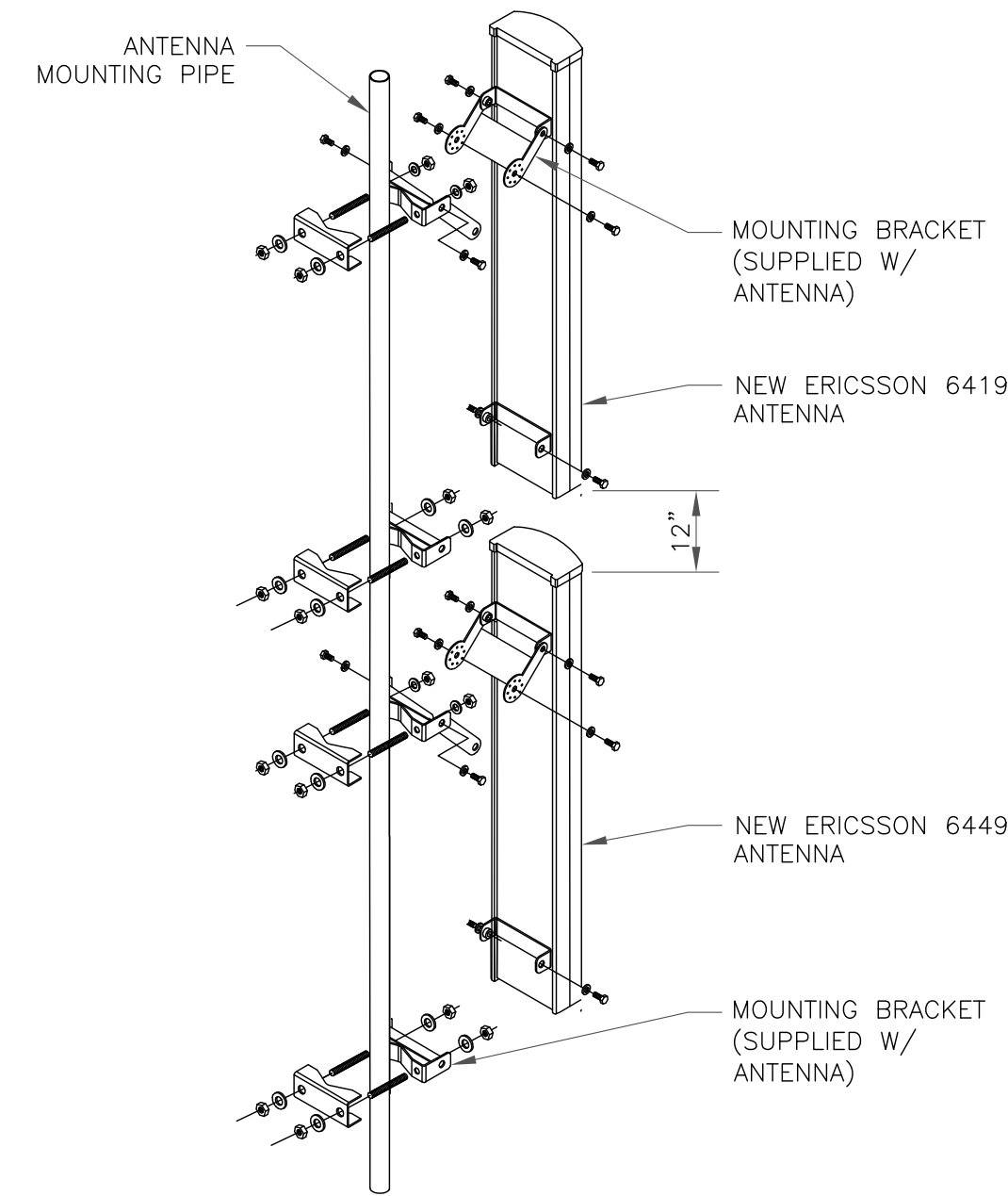
POS.	TECH	STATUS	AZIMUTH	ANTENNA TYPE	ANTENNA RAD CENTER	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	MAIN COAX SIZE	MAIN COAX LENGTH	COAX QTY	TMA QTY AND MODEL	SURGE PROTECTION	DC/FIBER CABLES	RRHs QTY & MODEL ON TOWER	LOCATION	DIPLEXER ON TOWER	DIPLEXER ON GROUND	RET CABLE
ALPHA SECTOR																		
A1	LTE 700/LTE 1900/LTE AWS/5G 1900/5G AWS	NEW	23°	CCI TPA65R-BU8DA-K	145'-0"	0°	3°/3°/3°/5°/5°	1 5/8"	145'-0"	2	-	(1) DC6-48-60-18-8F (1) DC6-48-60-18-8F	(1) 18 PAIR FIBER (1) 18-PAIR FIBER (2) 8AWG DC (2) 6AWG DC	(1) 4478 B14 (1) RRUS-32 B2 (1) 4426 B66	TOWER	N	N	N
A2	5G CBAND	NEW	23°	ERICSSON AIR6449 N77D + AIR6419 N77G STACKED	145'-0"	0°	0°	-	-	-	-	-	-	-	-	N	N	N
A3	LTE 700/LTE WCS/5G 850	NEW	23°	CCI DMP65R-BU8DA	145'-0"	0°	8°/3°/4°	-	-	-	-	-	-	(1) 4449 B5/B12 (1) RRUS-32 B30	TOWER	N	N	N
BETA SECTOR																		
B1	LTE 700/LTE 1900/LTE AWS/5G 1900/5G AWS	NEW	143°	CCI TPA65R-BU8DA-K	145'-0"	0°	3°/3°/3°/5°/5°	1 5/8"	145'-0"	2	-	(1) DC6-48-60-18-8F	(1) 18-PAIR FIBER (2) 8AWG DC	(1) 4478 B14 (1) RRUS-32 B2 (1) 4426 B66	TOWER	N	N	N
B2	5G CBAND	NEW	143°	ERICSSON AIR6449 N77D + AIR6419 N77G STACKED	145'-0"	0°	0°	-	-	-	-	-	-	-	-	N	N	N
B3	LTE 700/LTE WCS/5G 850	NEW	143°	CCI DMP65R-BU8DA	145'-0"	0°	8°/3°/4°	-	-	-	-	-	-	(1) 4449 B5/B12 (1) RRUS-32 B30	TOWER	N	N	N
GAMMA SECTOR																		
C1	LTE 700/LTE 1900/LTE AWS/5G 1900/5G AWS	NEW	255°	CCI TPA65R-BU8DA-K	145'-0"	0°	3°/3°/3°/5°/5°	1 5/8"	145'-0"	2	-	(1) DC6-48-60-0-8F	(2) 8AWG DC	(1) 4478 B14 (1) RRUS-32 B2 (1) 4426 B66	TOWER	N	N	N
C2	5G CBAND	NEW	255°	ERICSSON AIR6449 N77D + AIR6419 N77G STACKED	145'-0"	0°	0°	-	-	-	-	-	-	-	-	N	N	N
C3	LTE 700/LTE WCS/5G 850	NEW	255°	CCI DMP65R-BU8DA	145'-0"	0°	8°/3°/4°	-	-	-	-	-	-	(1) 4449 B5/B12 (1) RRUS-32 B30	TOWER	N	N	N

NOTE: BOLD DENOTES NEW EQUIPMENT

1 FINAL ANTENNA AND FEEDLINE 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.



1 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE

575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

AT&T SITE NUMBER:
CTL02182

BU #: **881533**
GROTON TOWER

75 ROBERTS ROAD
GROTON, CT 06340

EXISTING
145'-0" MONOPOLE

ISSUED FOR:

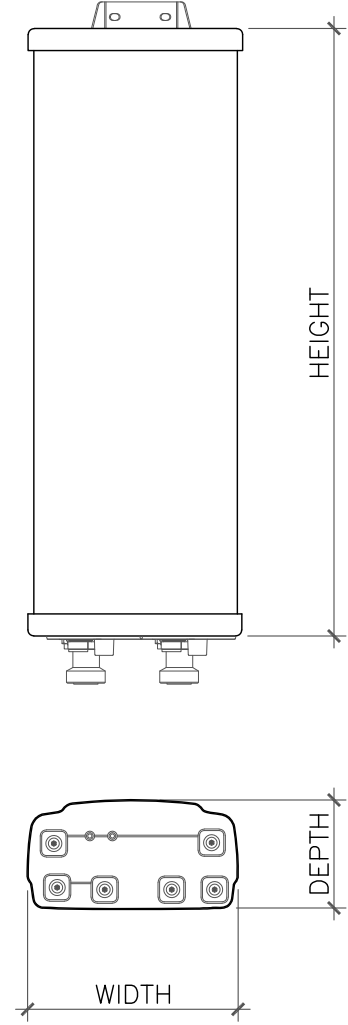
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	1/20/22	JTS	PRELIMINARY REVIEW	CMV
0	1/25/22	CMV	CONSTRUCTION	CMV
1	3/31/22	GAC	CONSTRUCTION	KT
2	5/31/22	GAC	CONSTRUCTION	KT

5/31/22

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PEC.0001564
Expires 2/10/22

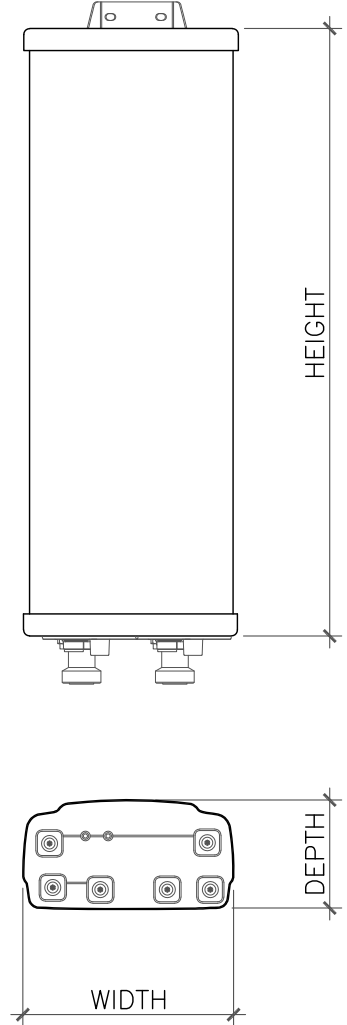
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SHEET NUMBER: **C-4.1** REVISION: **2**



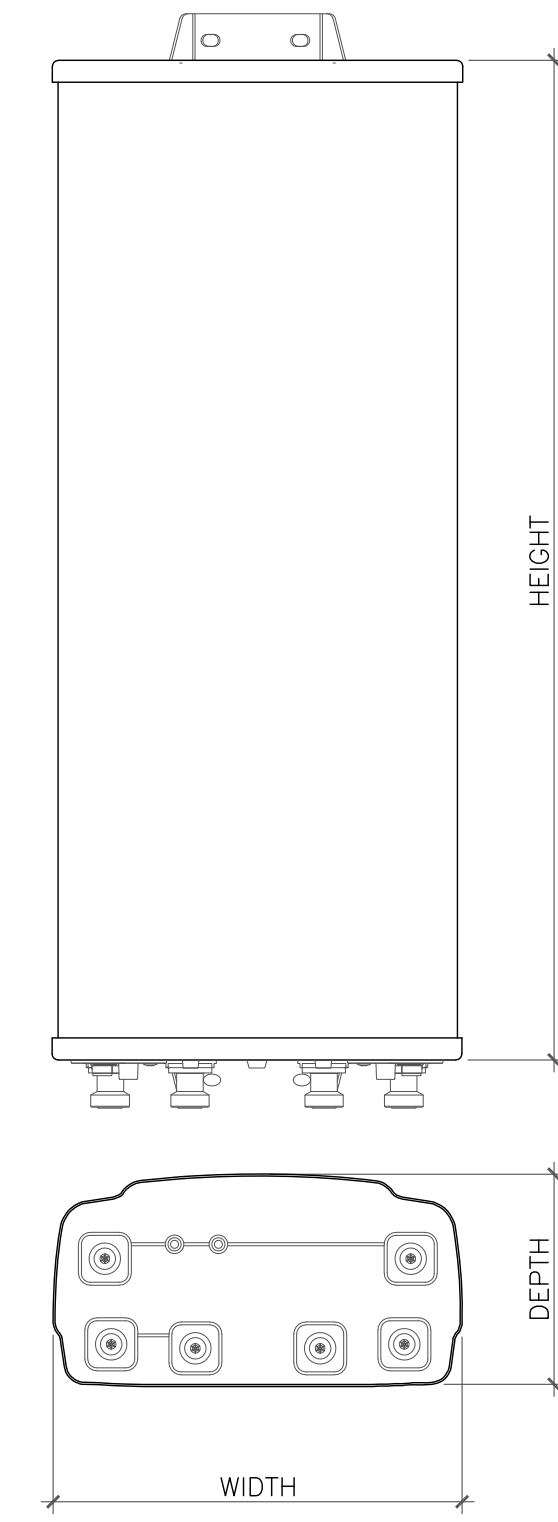
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
AIR6449 B77D	30.39"	15.87"	8.07"	81.60 lbs

1 ANTENNA DETAIL
SCALE: NOT TO SCALE



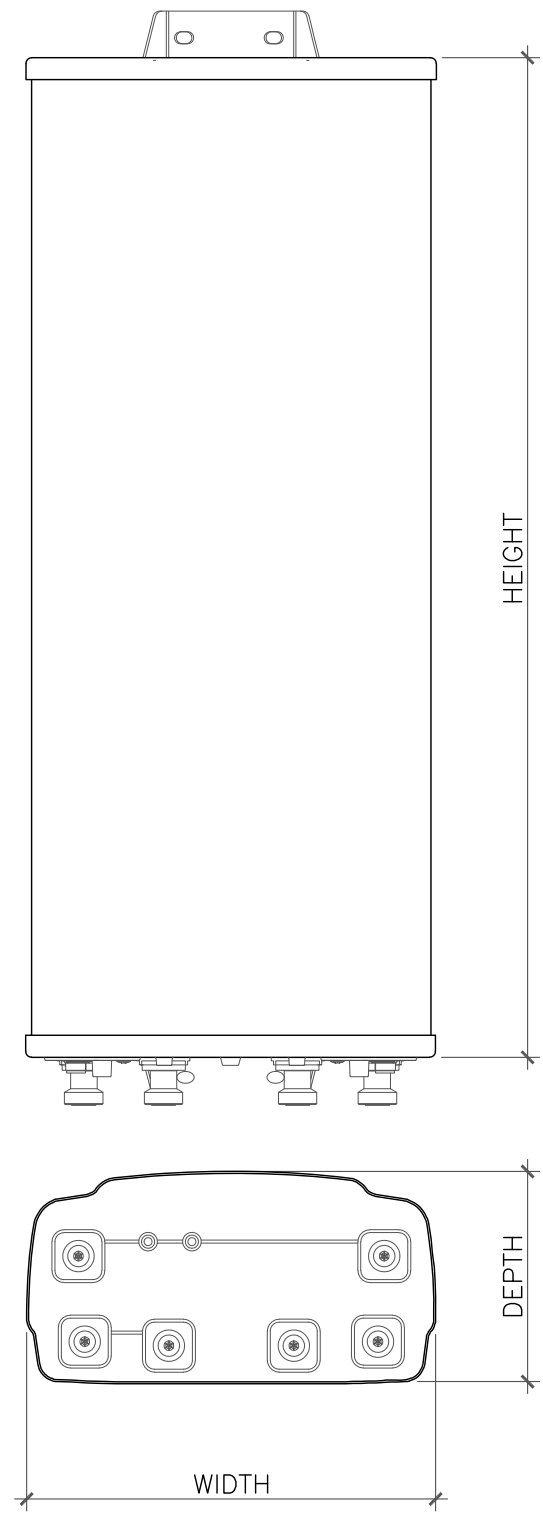
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
AIR6419 B77G	28.30"	16.10"	7.90"	66.10 lbs

2 ANTENNA DETAIL
SCALE: NOT TO SCALE



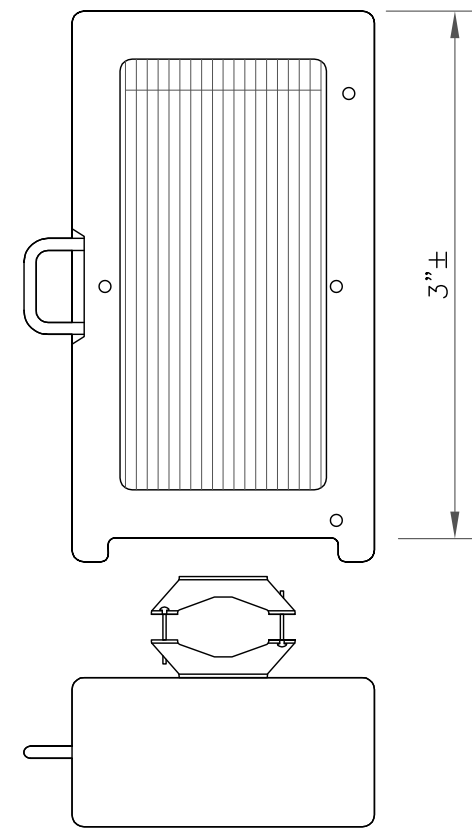
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
TPA-65R-BU8DA-K	96"	20.70"	7.7"	87.10 lbs

3 ANTENNA DETAIL
SCALE: NOT TO SCALE



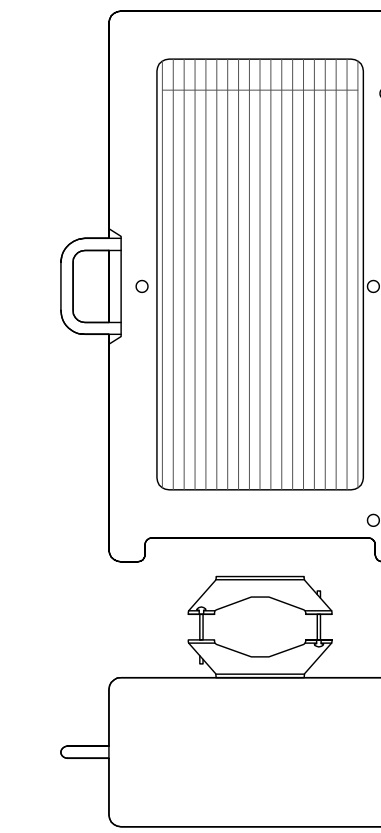
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
DMP65R-BU8DA	96"	20.70"	7.7"	105.6 lbs

4 ANTENNA DETAIL
SCALE: NOT TO SCALE



ERICSSON - 4426 B66
WEIGHT (FULLY EQUIPPED): 48.40 LBS
SIZE (HxWxD): 14.60x13.19x5.80 IN.
CONNECTOR TYPE: 4.3-10 FEMALE (4 TOTAL PORTS)

5 ERICSSON - 4426 B66
SCALE: NOT TO SCALE



ERICSSON - 4449 B5/B12
WEIGHT (FULLY EQUIPPED): 71.0 LBS
SIZE (HxWxD): 17.90x13.19x9.44 IN.
CONNECTOR TYPE: 4.3-10 FEMALE (4 TOTAL PORTS)

6 ERICSSON - 4449 B5/B12
SCALE: NOT TO SCALE

575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

AT&T SITE NUMBER:
CTL02182

BU #: **881533**
GROTON TOWER

75 ROBERTS ROAD
GROTON, CT 06340

EXISTING
145'-0" MONOPOLE

ISSUED FOR:

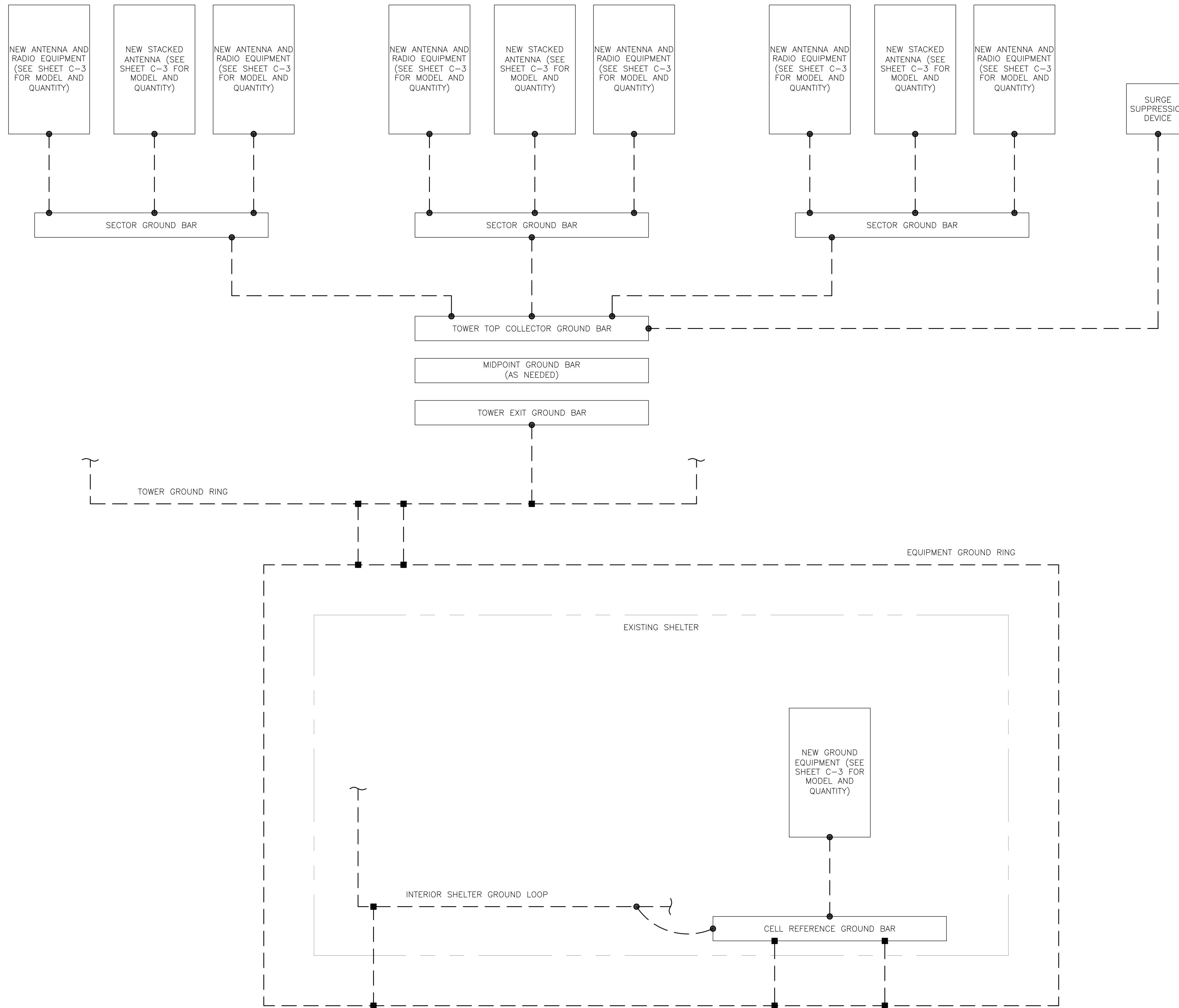
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	1/20/22	JTS	PRELIMINARY REVIEW	CMV
0	1/25/22	CMV	CONSTRUCTION	CMV
1	3/31/22	GAC	CONSTRUCTION	KT
2	5/31/22	GAC	CONSTRUCTION	KT

5/31/22

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SHEET NUMBER: C-5	REVISION: 2
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GROUNDING PLAN LEGEND:

---	GROUND WIRE	⊙	COPPER GROUND ROD
■	EXOTHERMIC WELD	⊗	GROUND ROD W/ TEST WELL
●	MECHANICAL CONNECTION		

CELL REFERENCE GROUND BAR: POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUITS (ATT-TP-76416 7.6.7).

HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CELL SITE REFERENCE GROUND BAR MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS.

EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE (ATT-TP-76416 7.6.7.2).

DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICES CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR PER TP76300 SECTION H 6 AND TP76416 FIGURE 7-11 REQUIREMENTS.

575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

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PH: (918) 587-4630
www.blgrp.com

AT&T SITE NUMBER:
CTL02182

BU #: 881533
GROTON TOWER

75 ROBERTS ROAD
GROTON, CT 06340

EXISTING
145'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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0	1/25/22	CMV	CONSTRUCTION	CMV
1	3/31/22	GAC	CONSTRUCTION	KT
2	5/31/22	GAC	CONSTRUCTION	KT

5/31/22

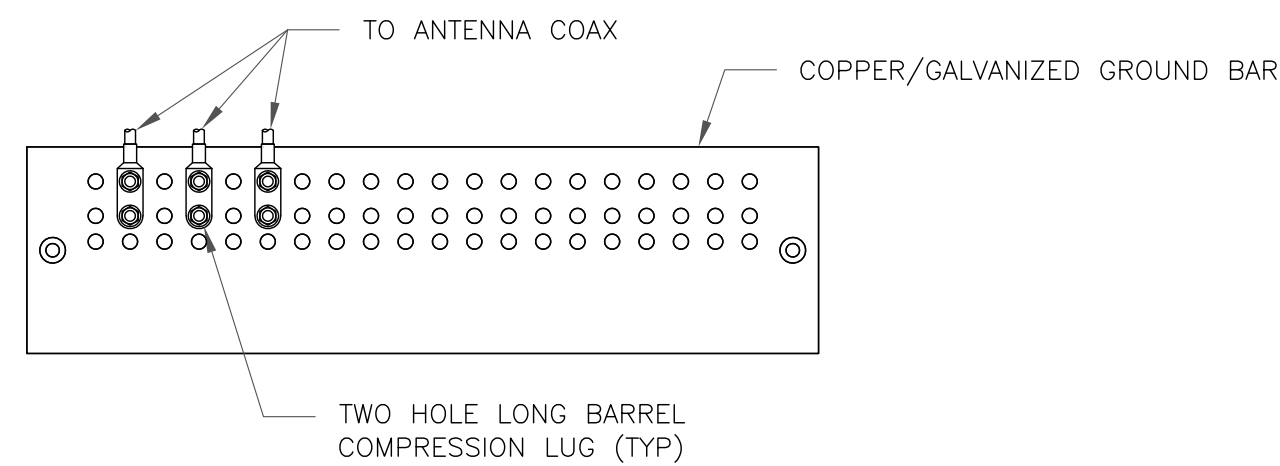
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PEC.0001564
Expires 2/10/22

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

1 GROUNDING SCHEMATIC
SCALE: NOT TO SCALE

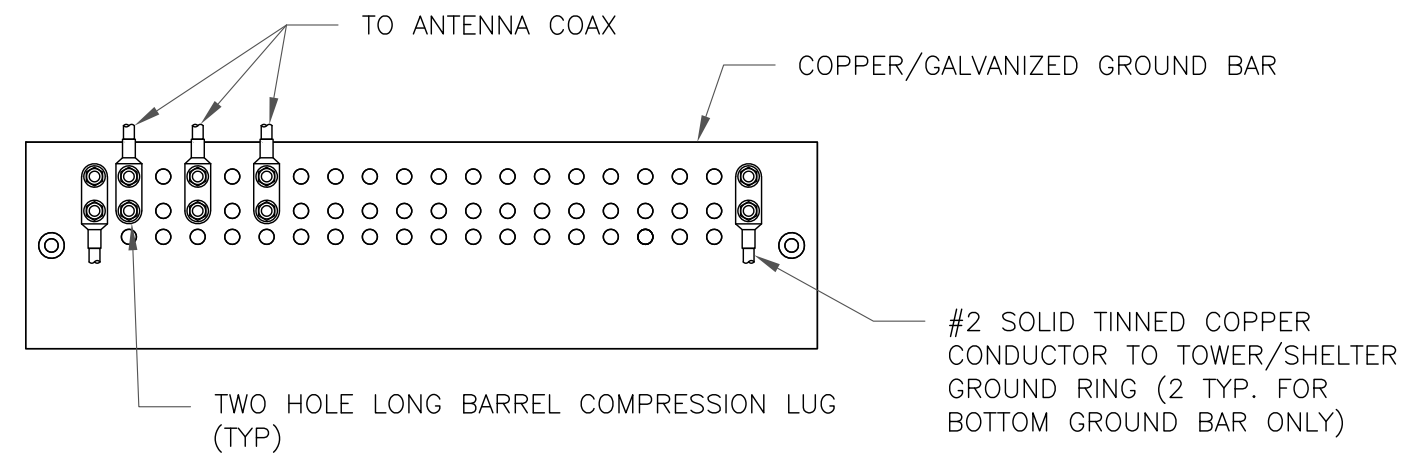
92739.020.01_GROTON_TOWER.dwg - Sheet:G-1 - User: kevin.turkall - May, 31, 2022 - 1:58pm



NOTES:

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

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE

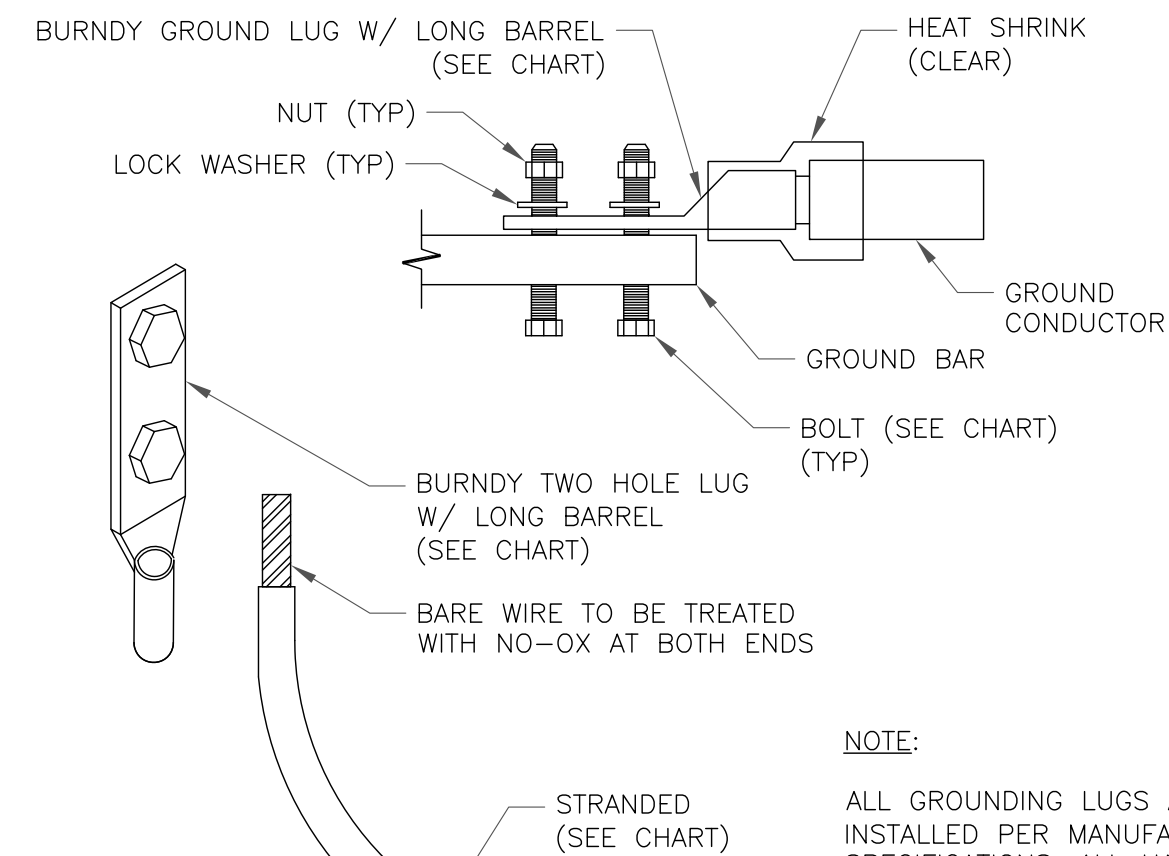


NOTES:

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

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

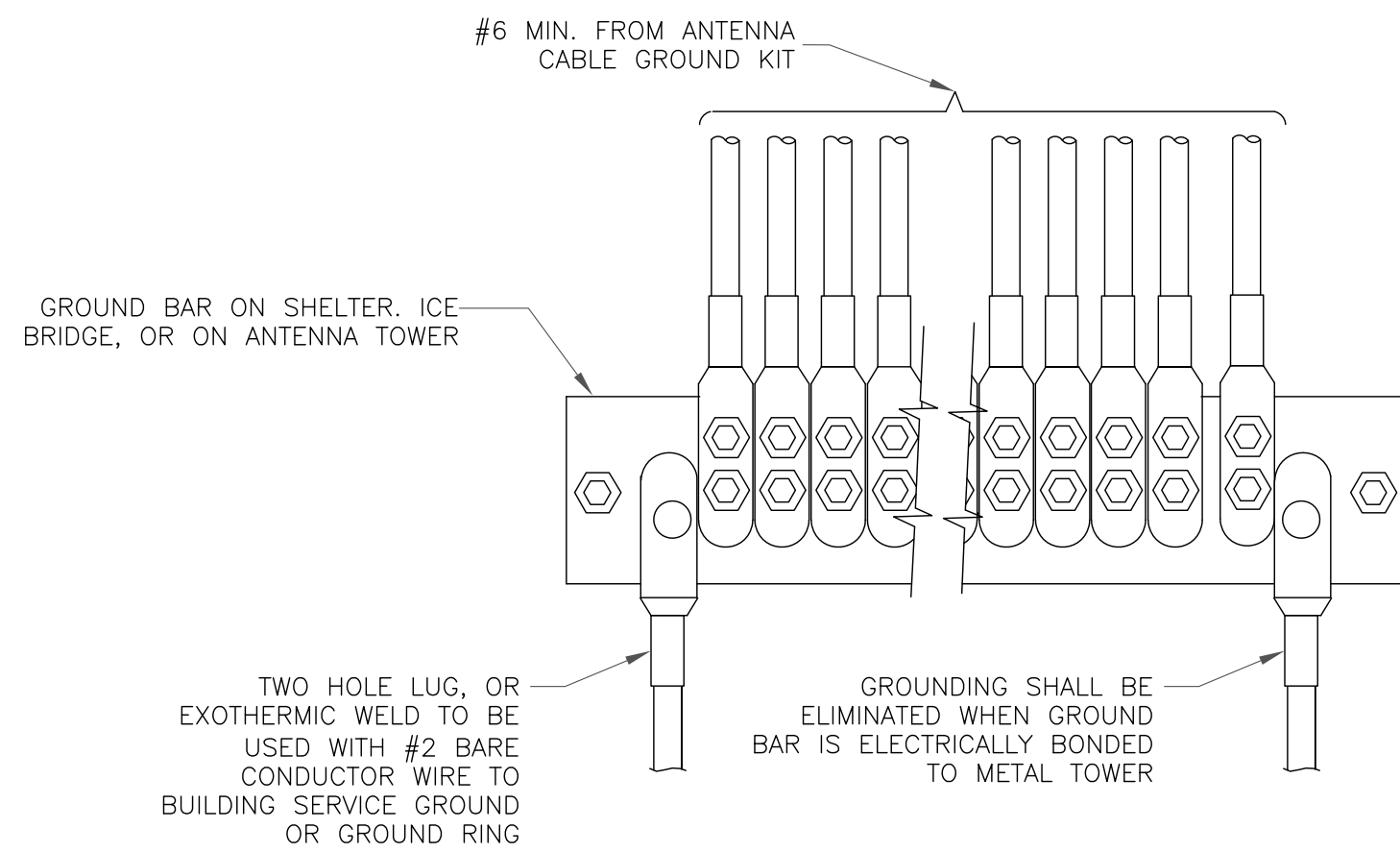
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 SOLID TINNED	YA3C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 STRANDED	YA2C-2TC38	3/8" - 16 NC SS 2 BOLT
#2/0 STRANDED	YA26-2TC38	3/8" - 16 NC SS 2 BOLT
#4/0 STRANDED	YA28-2N	1/2" - 16 NC SS 2 BOLT



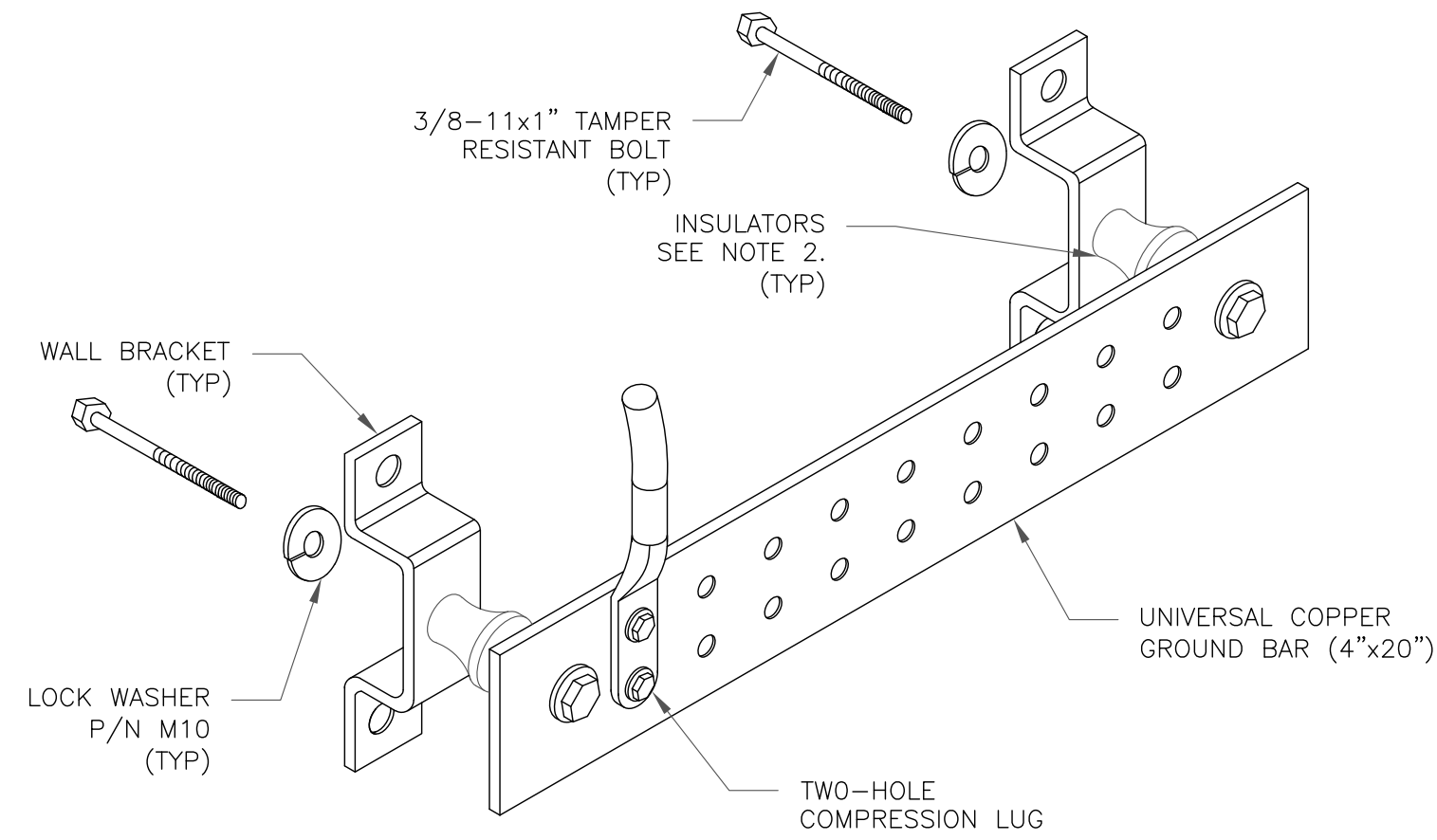
NOTE:

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.

3 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



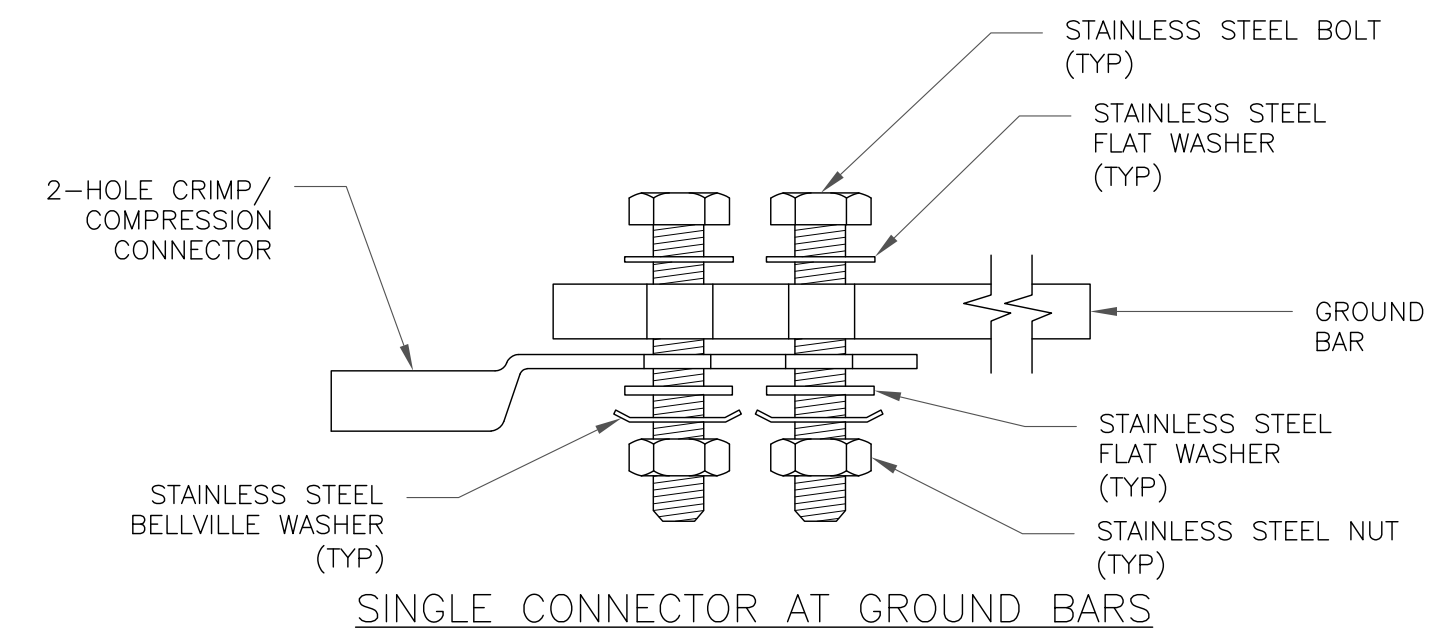
4 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



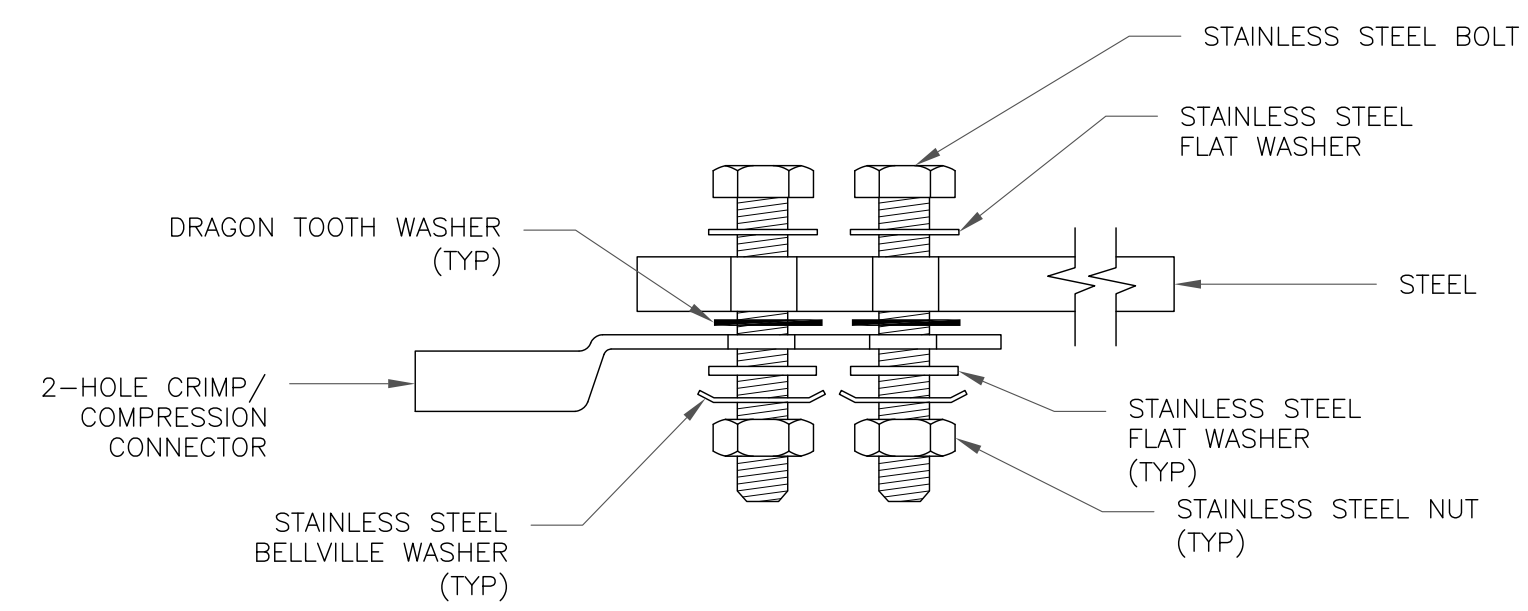
NOTES:

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

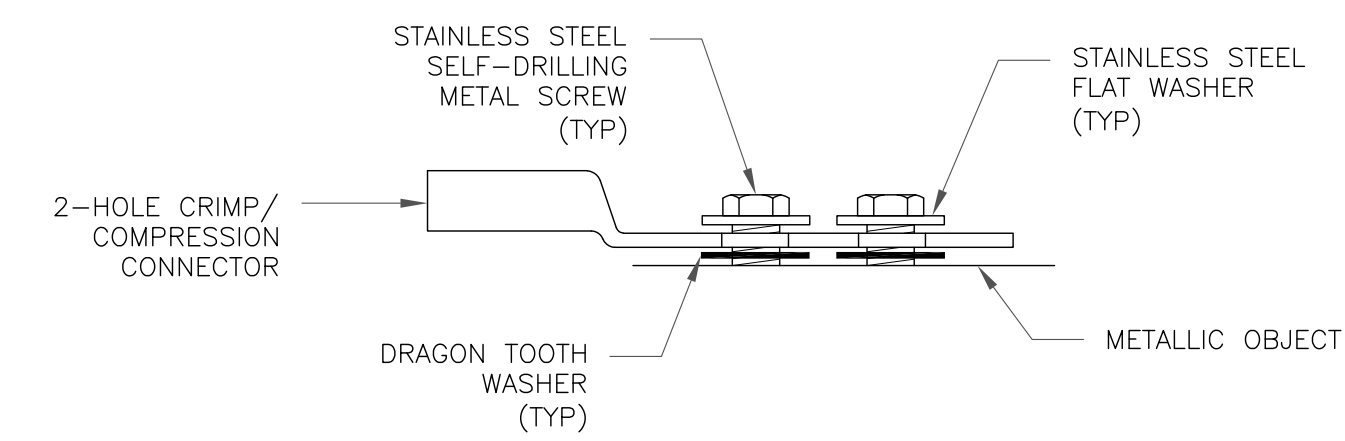
5 GROUND BAR DETAIL
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

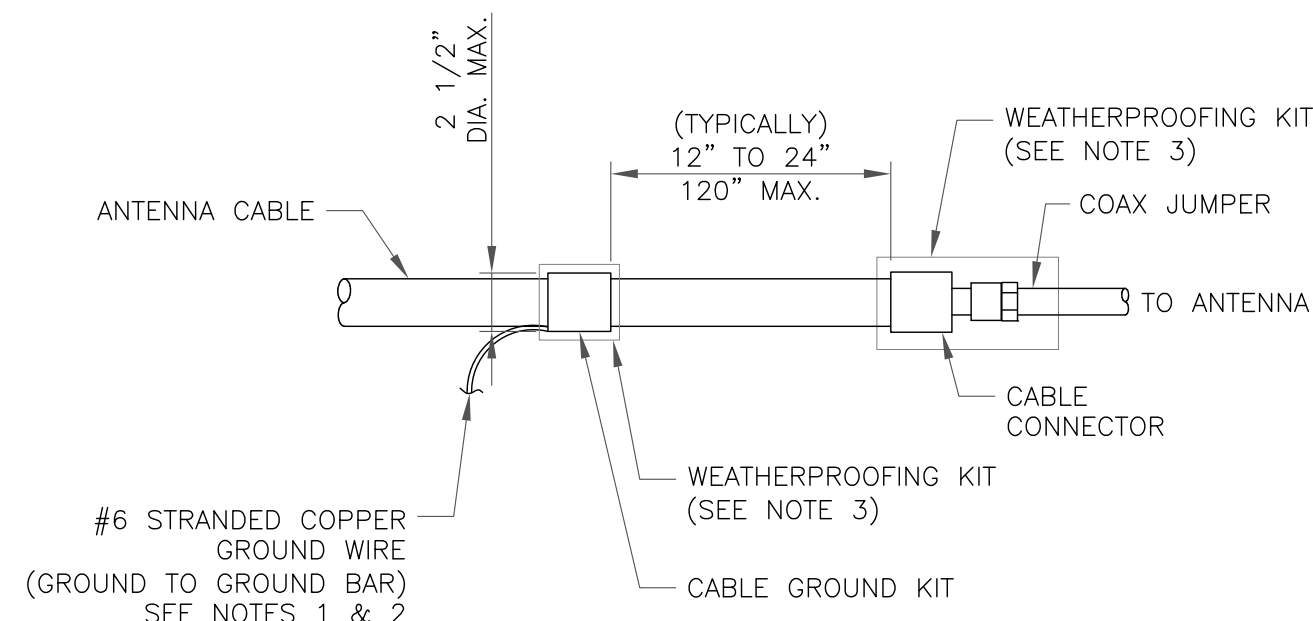


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

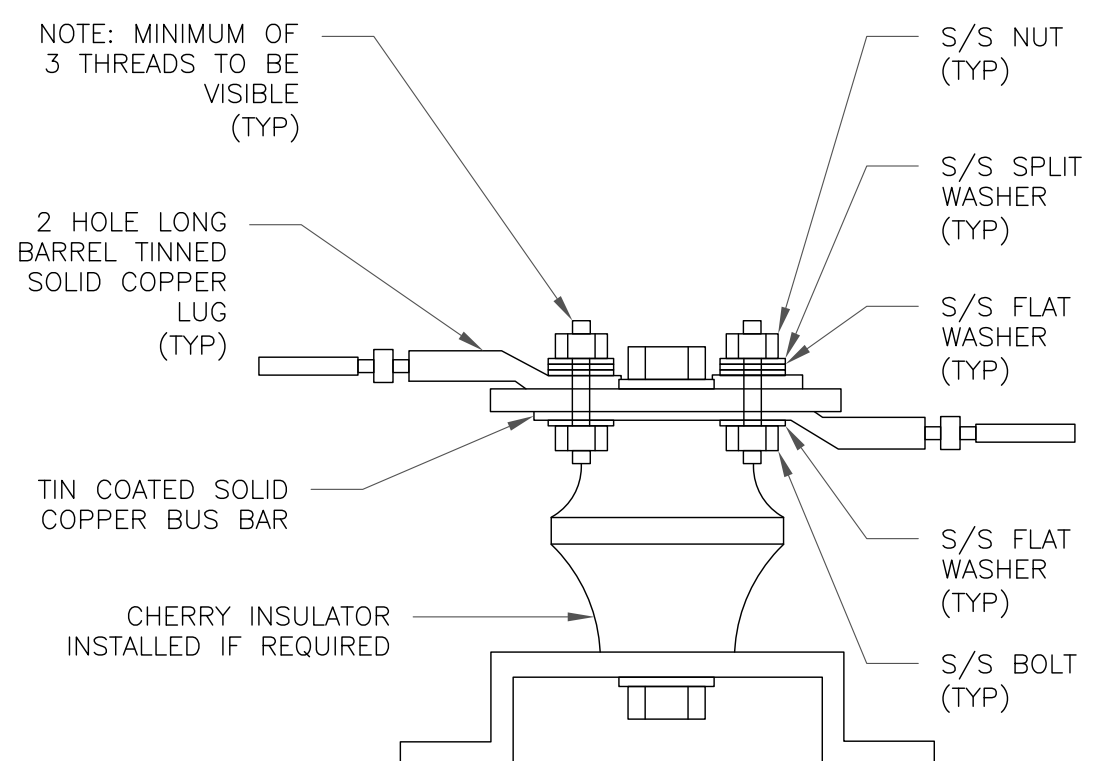
8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



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.

6 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

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

AT&T SITE NUMBER:
CTL02182

BU #: **881533**
GROTON TOWER

75 ROBERTS ROAD
GROTON, CT 06340

EXISTING
145'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	1/20/22	JTS	PRELIMINARY REVIEW	CMV
0	1/25/22	CMV	CONSTRUCTION	CMV
1	3/31/22	GAC	CONSTRUCTION	KT
2	5/31/22	GAC	CONSTRUCTION	KT

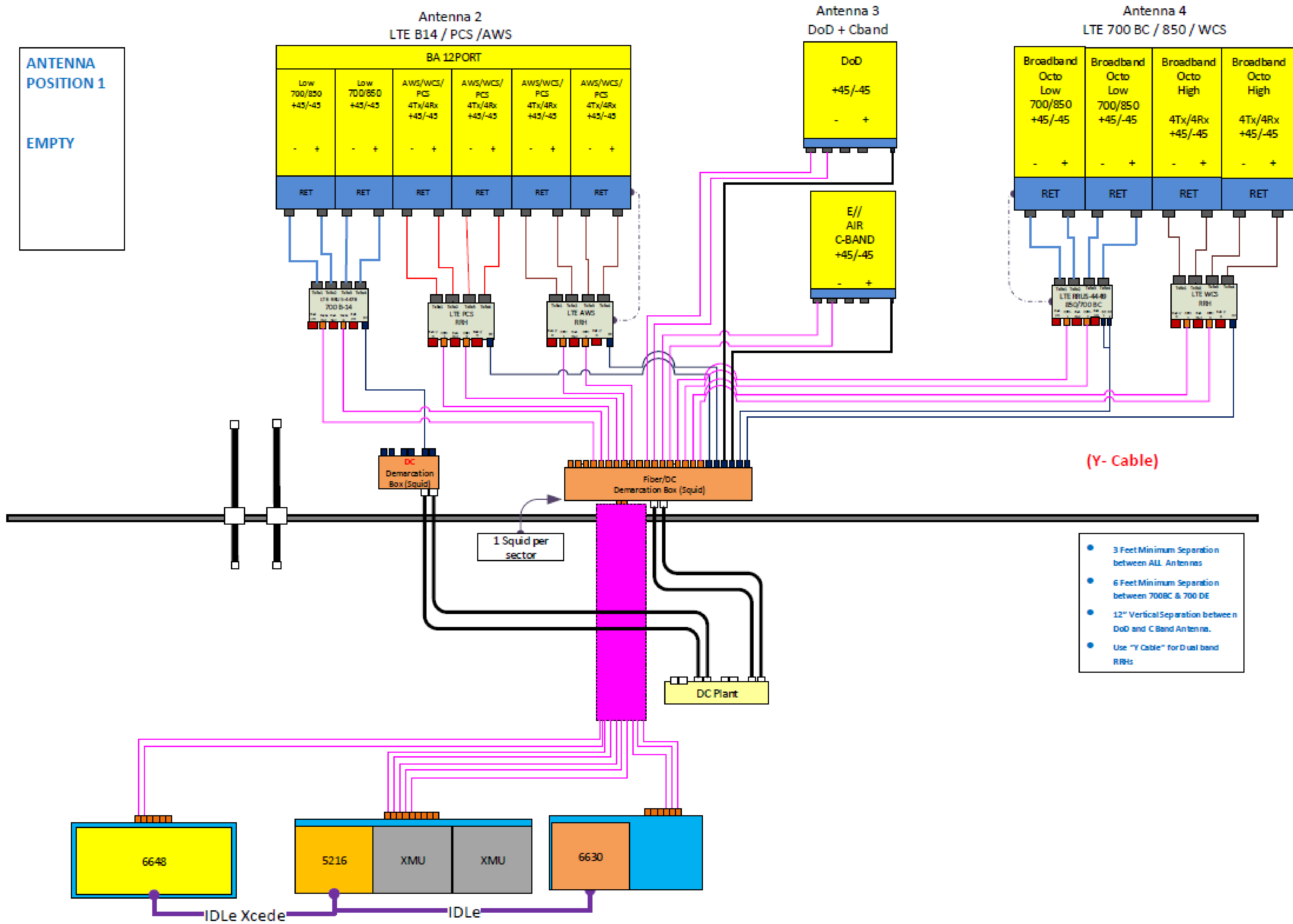
5/31/22

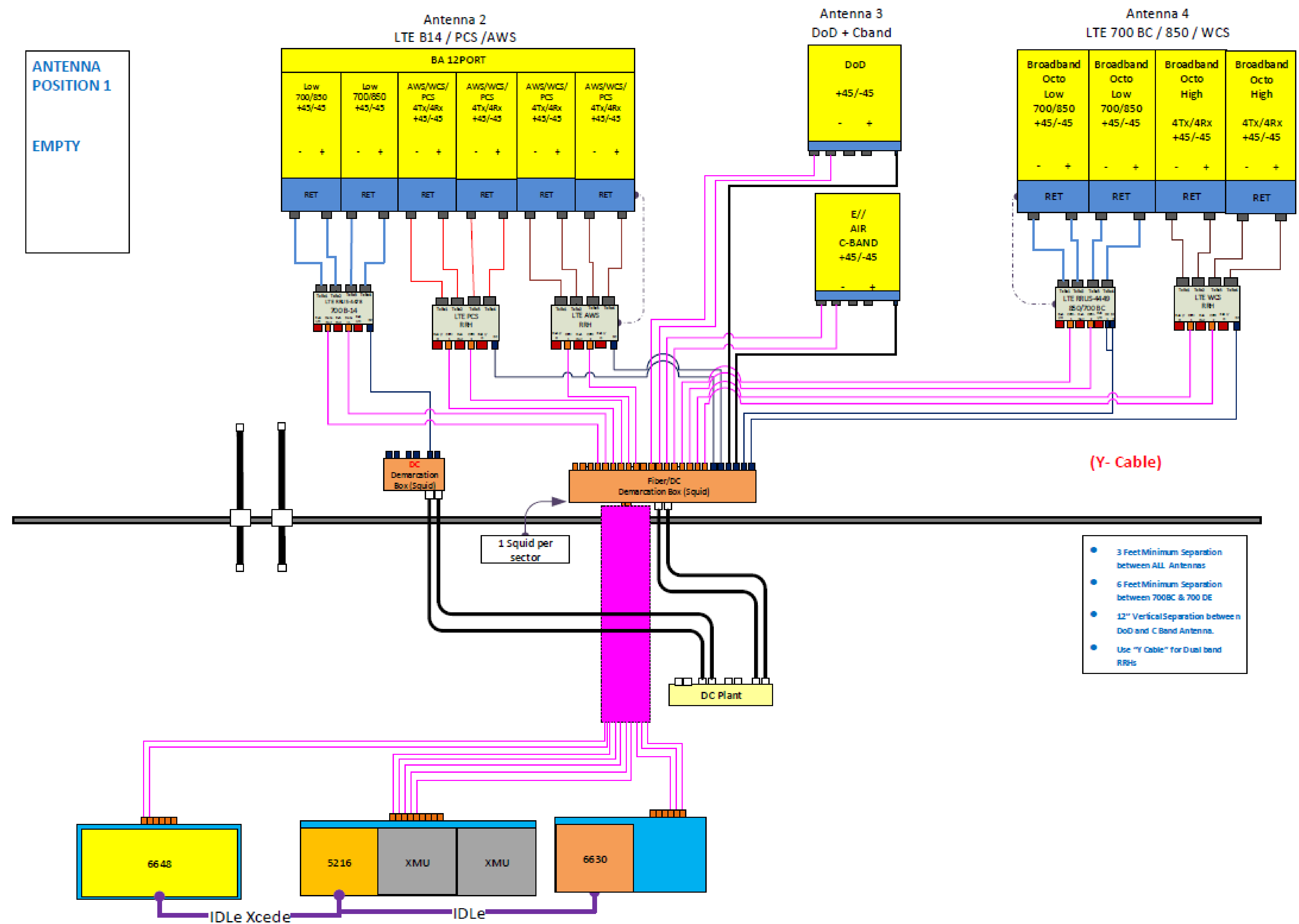
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

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

92739.020.01_GROTON_TOWER.dwg - Sheet:G-2 - User: kevin.turkoll - May, 31, 2022 - 1:58pm

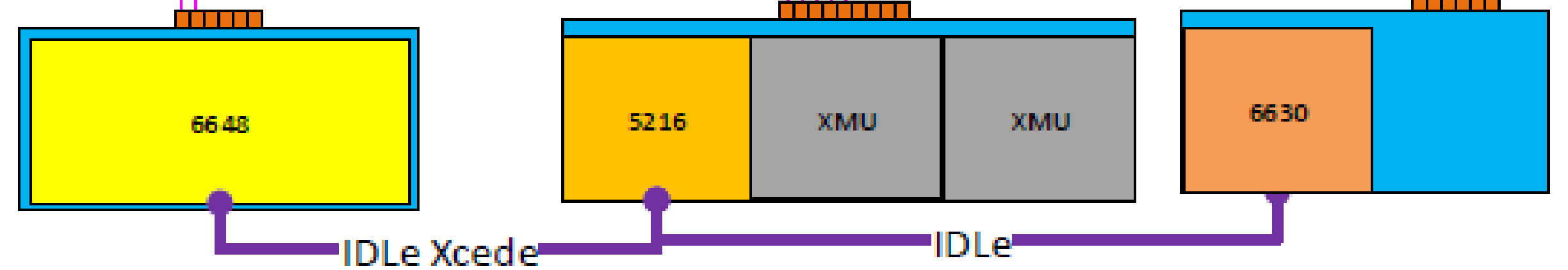


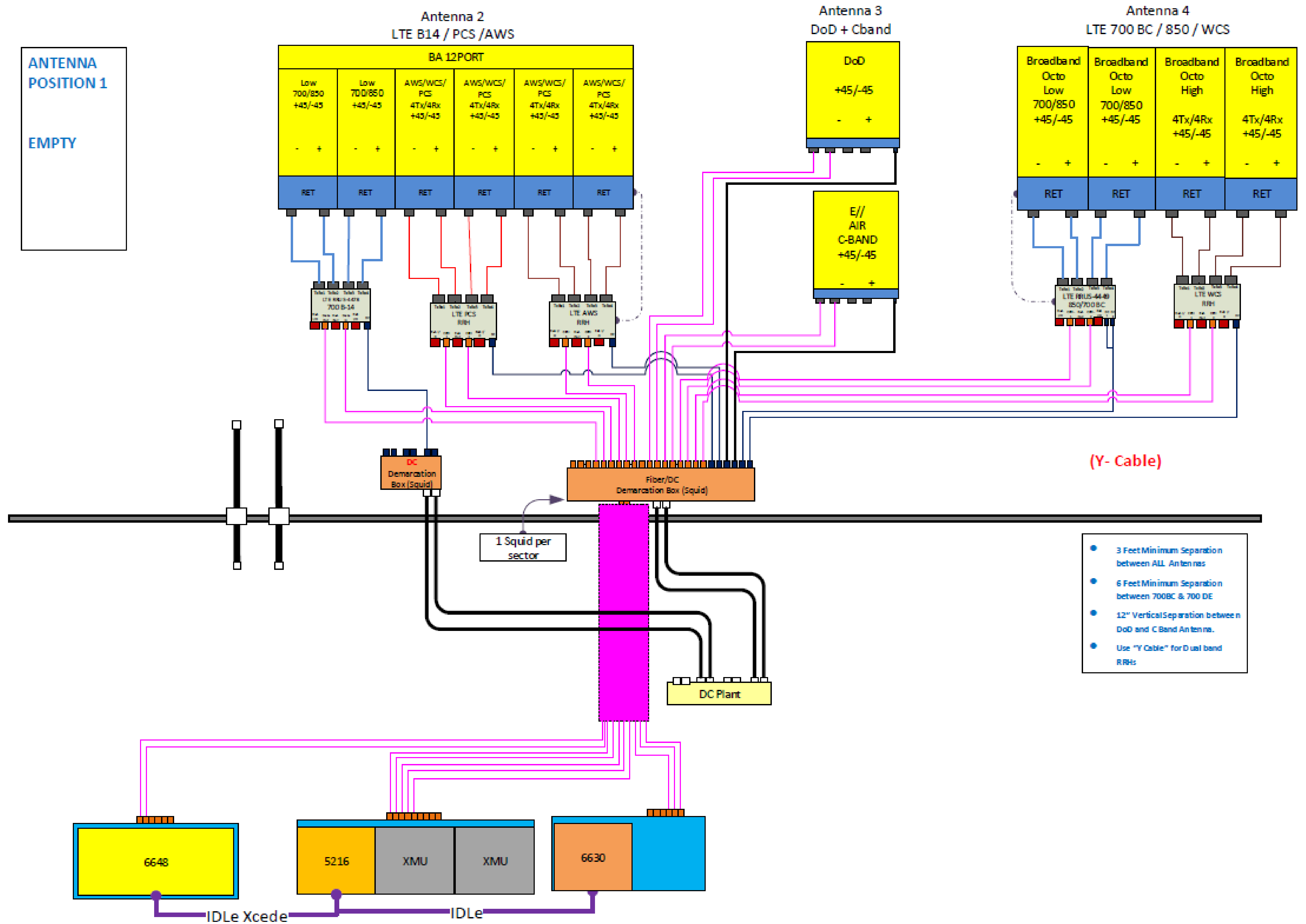


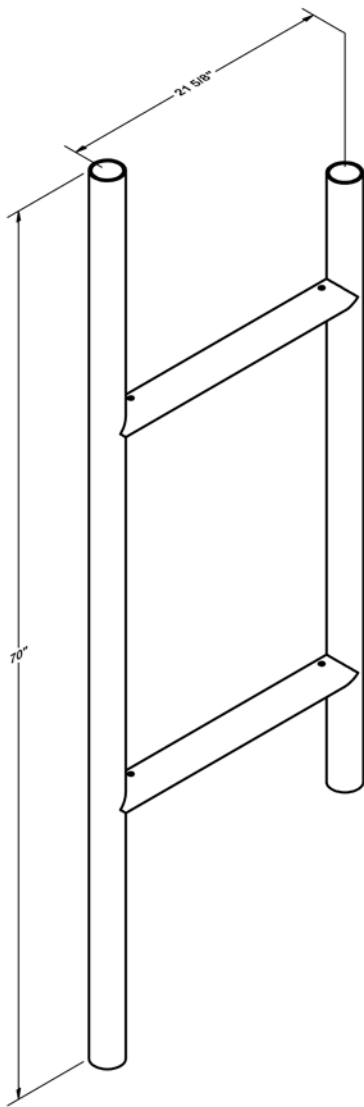
ANTENNA POSITION 1
EMPTY

(Y- Cable)

- 3 Feet Minimum Separation between ALL Antennas
- 6 Feet Minimum Separation between 700BC & 700 DE
- 12" Vertical Separation between DoD and C Band Antenna.
- Use "Y Cable" for Dual band RRs







PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	X-PM2	PM2 STANDOFF MOUNT WELDMENT		51.04	51.04

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 AND ANGLES 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
**2' PANEL
 STAND-OFF MOUNT**

SITE PRO 1
 Engineering Support Team:
 1-888-753-7446

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

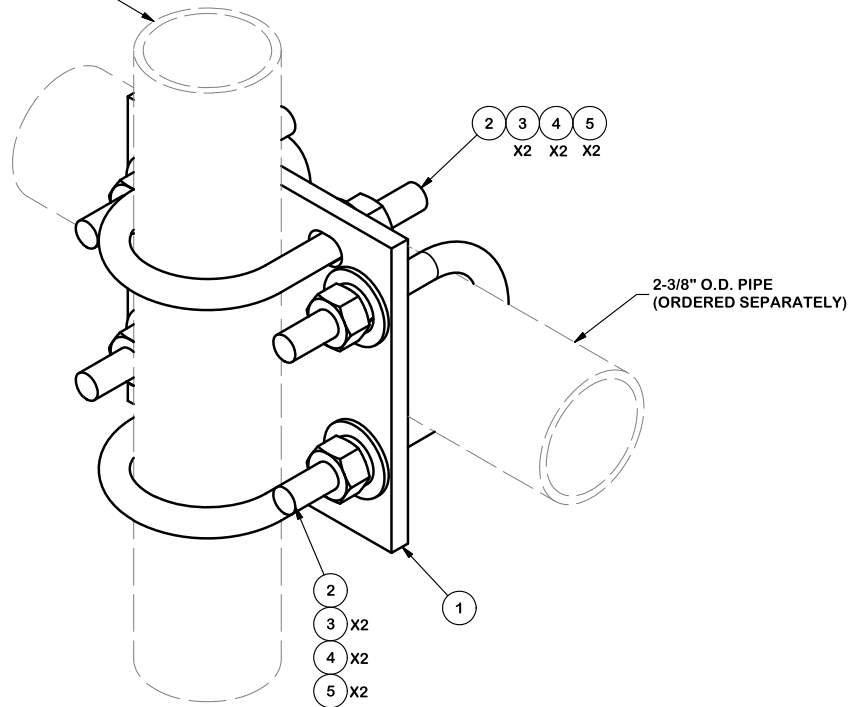
A valmont COMPANY

CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	CUSTOMER	BMC 8/21/2019

PART NO.	PM2
DWG. NO.	PM2

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	1	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"		3.71	3.71
2	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.63	2.50
3	8	G12FW	1/2" HDG USS FLATWASHER		0.03	0.27
4	8	G12LW	1/2" HDG LOCKWASHER		0.01	0.11
5	8	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	0.57
					TOTAL WT. #	7.16

2-3/8" O.D. ANTENNA PIPE
(ORDERED SEPARATELY)



2-3/8" O.D. PIPE
(ORDERED SEPARATELY)

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:
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DESCRIPTION
 CROSSOVER PLATE



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

CPD NO.	DRAWN BY	ENG. APPROVAL
CLASS	DRAWING USAGE	CHECKED BY
81	CUSTOMER	CEK 8/23/2012

PART NO.	SCX1-K
DWG. NO.	SCX1-K

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	ADDED MISSING U-BOLT AND HRDWE		KC8	7/5/2012
REVISION HISTORY				