



Aaron Meyers, Site Acquisition  
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DATE March 3, 2018

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

**RE: Notice of Exempt Modification // Site Number: CT1137  
50 Pine Lane, Windsor, CT 06095 (Site Name: Middlefield)  
N 41.513600 // W 72.745800**

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC (“AT&T”) currently maintains twelve (12) antennas at the 130-foot level of the existing 147.5-foot Monopole tower at 50 Pine Lane, Windsor, CT 06095. The tower is owned by Crown Castle Corp.. The property is owned by the Town of Windsor. AT&T now intends to add three (3) Remote Radio Units for its LTE upgrade. These Remote Radio Units would be installed at the 130-foot level of the tower.

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 Donald Trinks, Mayor of Windsor, CT, as well as the tower owner, Crown Castle and the ground owner, Jody Terranova, Deputy Mayor.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

Attached to accommodate this filing are construction drawings dated December 12, 2017 by Infinigy, a structural analysis dated February 1, 2018 by American Tower Corporation and an Emissions Analysis Report dated February 27, 2018 by Centerline Communications, LLC.

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications 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 Communications 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 as shown in the attached structural analysis by American Tower Corporation, dated February 1, 2018

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

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Aaron Meyers, Site Acquisition  
c/o New Cingular Wireless, PCS LLC (AT&T)  
Centerline Communications, LLC  
95 Ryan Drive, Suite 1  
Raynham, MA 02767  
Mobile: (774) 420-4202  
[ameyers@centerlincommunications.com](mailto:ameyers@centerlincommunications.com)

#### Attachments

cc: Donald Trinks, Mayor - as elected official  
Crown Castle Corp. - as tower owner  
Jody Terranova, Deputy Mayor - as property owner  
Eric Barz, AICP – Town Planner



# Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT1137

FA#: 10042353

Windsor Pine Lane

50 Pine Lane

Windsor, CT 06095

**February 26, 2018**

**Centerline Communications Project Number: 950012-030**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>10.43 %</b>



February 26, 2018

AT&T Mobility – New England  
Attn: John Benedetto, RF Manager  
550 Cochituate Road  
Suite 550 – 13&14  
Framingham, MA 06040

### Emissions Analysis for Site: **CT1137 – Windsor Pine Lane**

Centerline Communications, LLC (“Centerline”) was directed to analyze the proposed AT&T facility located at **50 Pine Lane, Windsor, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01 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 population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 700 and 850 MHz Bands are approximately  $467 \mu\text{W}/\text{cm}^2$  and  $567 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) 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 and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.



## CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **50 Pine Lane, Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	1	30
UMTS	1900 MHz (PCS)	1	30
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	4	60
LTE	850 MHz	2	30
LTE	2100 MHz (AWS)	4	60
LTE	2100 MHz (AWS)	4	30

*Table 1: Channel Data Table*



The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave P65-17-XLH-RR	130
A	2	CCI HPA-65R-BUU-H6	130
A	3	Quintel QS66512-3	130
B	1	KMW AM-X-CD-17-65-00T-RET	130
B	2	CCI HPA-65R-BUU-H8	130
B	3	CCI TPA-65R-LCUUUU-H8	130
C	1	KMW AM-X-CD-17-65-00T-RET	130
C	2	CCI HPA-65R-BUU-H6	130
C	3	Quintel QS66512-3	130

*Table 2: Antenna Data*

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



## RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Powerwave P65-17-XLH-RR	850 MHz / 1900 MHz (PCS)	15.1 / 15.1	2	60	1,941.56	0.63
Antenna A2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	6	360	9,045.02	2.62
Antenna A3	Quintel QS66512-3	850 MHz / 2100 MHz (AWS) / 2300 MHz (WCS)	11.4 / 14.15 / 15.15	10	420	10,996.70	2.72
Sector A Composite MPE%							<b>5.96</b>
Antenna B1	KMW AM-X-CD-17-65-00T-RET	850 MHz / 1900 MHz (PCS)	15.35 / 15.15	2	60	2,010.33	0.65
Antenna B2	CCI HPA-65R-BUU-H8	700 MHz / 1900 MHz (PCS)	13.15 / 14.95	6	360	9,981.05	3.00
Antenna B3	CCI TPA-65R-LCUUUU-H8	850 MHz / 2100 MHz (AWS) / 2300 MHz (WCS)	13.45 / 14.25 / 14.45	10	420	11,056.94	2.82
Sector B Composite MPE%							<b>6.47</b>
Antenna C1	KMW AM-X-CD-17-65-00T-RET	850 MHz / 1900 MHz (PCS)	15.35 / 15.15	2	60	2,010.33	0.65
Antenna C2	CCI HPA-65R-BUU-H6	700 MHz / 1900 MHz (PCS)	11.95 / 14.75	6	360	9,045.02	2.62
Antenna C3	Quintel QS66512-3	850 MHz / 2100 MHz (AWS) / 2300 MHz (WCS)	11.4 / 14.15 / 15.15	10	420	10,996.70	2.72
Sector C Composite MPE%							<b>5.99</b>

*Table 3: AT&T Emissions Levels*





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

<b>Site Composite MPE%</b>	
<b>Carrier</b>	<b>MPE%</b>
AT&T – Max Sector Value	<b>6.47 %</b>
EYE Tower	0.00 %
Town of Windsor	0.27 %
MetroPCS	0.94 %
Clearwire	0.17 %
Nextel	1.65 %
Police UHF	0.26 %
Police Back up repeater	0.10 %
Hartford County Fire	0.08 %
State Police	0.36 %
NPSAC	0.01 %
RAFS	0.12 %
<b>Site Total MPE %:</b>	<b>10.43 %</b>

*Table 4: All Carrier MPE Contributions*

AT&T Sector A Total:	5.96 %
AT&T Sector B Total:	6.47 %
AT&T Sector C Total:	5.99 %
<b>Site Total:</b>	<b>10.43 %</b>

*Table 5: Site MPE Summary*



FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, the sector with the largest calculated MPE% is Sector B.

AT&T _ Frequency Band / Technology Max Power Values (Sector B)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
AT&T 850 MHz UMTS (Antenna 1)	1	1,028.30	130	2.40	850 MHz	567	0.42%
AT&T 1900 MHz (PCS) UMTS (Antenna 1)	1	982.02	130	2.30	1900 MHz (PCS)	1000	0.23%
AT&T 700 MHz LTE (Antenna 2)	2	1,239.23	130	5.79	700 MHz	467	1.24%
AT&T 1900 MHz (PCS) LTE (Antenna 2)	4	1,875.65	130	17.54	1900 MHz (PCS)	1000	1.75%
AT&T 850 MHz LTE (Antenna 3)	2	663.93	130	3.10	850 MHz	567	0.55%
AT&T 2100 MHz (AWS) LTE (Antenna 3)	4	1,596.44	130	14.93	2100 MHz (AWS)	1000	1.49%
AT&T 2300 MHz (WCS) LTE (Antenna 3)	4	835.84	130	7.82	2300 MHz (WCS)	1000	0.78%
						<b>Total:</b>	<b>6.47%</b>

*Table 6: AT&T Maximum Sector MPE Power Values*



## Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	5.96 %
Sector B:	6.47 %
Sector C:	5.99 %
AT&T Maximum Total (per sector):	6.47 %
Site Total:	10.43 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **10.43 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

A handwritten signature in black ink, appearing to read 'Scott Heffernan', is written over a light blue horizontal line.

**Scott Heffernan**

RF Engineering Director

**Centerline Communications, LLC**

95 Ryan Drive, Suite 1

Raynham, MA 02767

Date: November 01, 2017

Marianne Dunst  
Crown Castle  
3530 Toringdon Way, Suite 300  
Charlotte, NC 28277

**JACOBS**  
Jacobs Engineering Group, Inc.  
5449 Bells Ferry Road  
Acworth, GA 30102  
(770)701-2500

**Subject:** Structural Analysis Report

**Carrier Designation:**

**AT&T Mobility Co-Locate**

**Carrier Site Number:**

CT1137

**Carrier Site Name:**

Windsor Pine Lane

**Crown Castle Designation:**

**Crown Castle BU Number:**

841793

**Crown Castle Site Name:**

WINDSOR PINE LANE

**Crown Castle JDE Job Number:**

469147

**Crown Castle Work Order Number:**

1481796

**Crown Castle Application Number:**

413693 Rev. 2

**Engineering Firm Designation:**

**Jacobs Engineering Group, Inc. Project Number:**

1481796

**Site Data:**

**50 PINE LANE, WINDSOR, Hartford County, CT**

**Latitude 41° 49' 11.43", Longitude -72° 40' 1.88"**

**147.5 Foot - Monopole Tower**

Dear Marianne Dunst,

Jacobs Engineering Group, Inc. is pleased to submit this "**Structural Analysis Report**" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1100979, in accordance with application 413693, revision 2.

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

LC5: Existing + Proposed Equipment

**Sufficient Capacity**

Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 122 mph converted to a nominal 3-second gust wind speed of 95 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C with a maximum topographic factor, Kzt, of 1.000 and Risk Category II were used in this analysis.

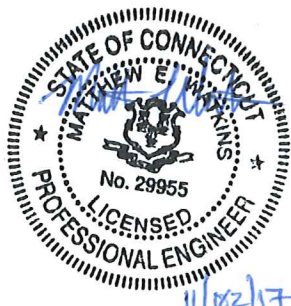
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at Jacobs Engineering Group, Inc. appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Structural analysis prepared by:

*Nikhil*

Nikhil Sharma  
Structural Engineering



Reviewed by:

Matthews E. Watkins, PE, LEED<sup>AP</sup>  
Engineering Project Manager

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## 1) INTRODUCTION

This tower is a 147.5 ft Monopole tower mapped by TEP in January of 2016. The original design standards and wind speed are unknown.

## 2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standard for Antenna Supporting Structures and Antennas using a 3-second gust wind speed of 95 mph with no ice, 50 mph with 1-inch ice thickness and 60 mph under service loads, exposure category C with topographic category 1.

**Table 1 - Proposed Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	12	cci antennas	TPX-070821	-	-	-
		3	ericsson	RRUS 32 B2			
		3	ericsson	RRUS 32 B66			
		6	powerwave technologies	CM1007-DBPXC-003			

**Table 2 - Existing Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
149.0	153.0	1	decibel	DB225-C	1	7/8	1
	149.0	1	tower mounts (crown)	Platform Mount [LP 1201-1]			
140.0	140.0	1	andrew	HP2-102	1	3/8	1
		1	tower mounts (crown)	Pipe Mount [PM 601-1]	2	3/4	
139.0	139.0	1	tower mounts (crown)	Side Arm Mount [SO 701-1]	1	7/8	1
	134.0	1	decibel	DB225-C			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	130.0	3	cci antennas	DTMABP7819VG12A	-	-	2
		3	ericsson	RRUS 11			
		3	ericsson	RRUS A2			
		1	raycap	DC6-48-60-18-8F			
		3	cci antennas	DTMABP7819VG12A	2 4 12	3/8 3/4 1-5/8	1
		2	cci antennas	HPA-65R-BUU-H6			
		1	cci antennas	HPA-65R-BUU-H8			
		1	cci antennas	TPA-65R-LCUUUU-H8			
		3	ericsson	RRU-11			
		3	ericsson	RRUS 32			
		2	kmw communications	AM-X-CD-16-65-00T-RET			
		1	powerwave technologies	P65-17-XLH-RR			
		2	quintel technology	QS66512-3			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts (crown)	Platform Mount [LP 1301-1]			
118.0	118.0	3	rfs celwave	APXV18-206517S-C	6	1-5/8	3
		1	tower mounts (crown)	Pipe Mount [PM 601-3]			
108.0	109.0	2	andrew	VHLP800-11	4 6	1/2 5/16	1
	108.0	3	argus technologies	LLPX310R w/ Mount Pipe			
		3	samsung telecommunications	RRH-2WB			
		1	tower mounts (crown)	T-Arm Mount [TA 702-3]			
107.0	2	andrew	VHLP2-18				
85.0	85.0	1	wade antenna	WH 14-69/S	5	13/32	1
		1	wade antenna	WL 14-69/S			
		1	tower mounts (crown)	Side Arm Mount [SO 104-3]			
	83.0	2	wade antenna	WL 14-69/S			
	78.0	1	wade antenna	J105-HI			

- Notes:  
 1) Existing Equipment  
 2) Equipment to Be Removed; not considered in this analysis  
 3) Abandoned Equipment; considered in this analysis

**Table 3 - Design Antenna and Cable Information**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
UNKNOWN						

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	WEI	4469790	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	WEI (Mapping)	4469791	CCISITES
4-TOWER MANUFACTURER DRAWINGS	TEP (Mapping)	6064532	CCISITES

#### 3.1) Analysis Method

tnxTower (version 7.0.7.0), 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.

#### 3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) 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. Jacobs Engineering Group, Inc. should be notified to determine the effect on the structural integrity of the tower.

### 4) ANALYSIS RESULTS

**Table 5 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	147.5 - 115.417	Pole	TP31.25x24x0.2188	1	-8.93	1407.90	23.1	Pass
L2	115.417 - 74.2967	Pole	TP37.75x29.9289x0.2188	2	-16.20	1571.94	75.3	Pass
L3	74.2967 - 39.2167	Pole	TP44.625x36.4927x0.3125	3	-23.82	2877.56	64.4	Pass
L4	39.2167 - 0	Pole	TP51.25x42.8598x0.375	4	-37.24	4097.19	65.0	Pass
							Summary	
						Pole (L2)	75.3	Pass
						RATING =	75.3	Pass



**Table 6 - Tower Component Stresses vs. Capacity – LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	56.8	Pass
1	Base Plate	0	81.8	Pass
1	Base Foundation (Structural)	0	89.4	Pass
1	Base Foundation (Soil Interaction)	0	80.5	Pass

<b>Structure Rating (max from all components) =</b>	<b>89.4%</b>
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Notes:

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

#### 4.1) Recommendations

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

**APPENDIX A**  
**TNXTOWER OUTPUT**

**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
DB225-C	149	RRUS 32 B66	130
(4) 6' x 2" Mount Pipe	149	RRUS 32 B66	130
(4) 6' x 2" Mount Pipe	149	(4) TPX-070821	130
(4) 6' x 2" Mount Pipe	149	(4) TPX-070821	130
Platform Mount [LP 1201-1]	149	(4) TPX-070821	130
Pipe Mount [PM 601-1]	140	Platform Mount [LP 1301-1]	130
HP2-102	140	QS66512-3	130
Side Arm Mount [SO 701-1]	139	APXV18-206517S-C	118
DB225-C	139	APXV18-206517S-C	118
QS66512-3	130	Pipe Mount [PM 601-3]	118
P65-17-XLH-RR	130	6' x 2" Mount Pipe	118
HPA-65R-BUU-H6	130	6' x 2" Mount Pipe	118
HPA-65R-BUU-H8	130	6' x 2" Mount Pipe	118
HPA-65R-BUU-H6	130	APXV18-206517S-C	118
AM-X-CD-16-65-00T-RET	130	LLPX310R w/ Mount Pipe	108
AM-X-CD-16-65-00T-RET	130	LLPX310R w/ Mount Pipe	108
TPA-65R-LCUUUU-H8	130	RRH-2WB	108
RRUS 32	130	RRH-2WB	108
RRUS 32	130	RRH-2WB	108
RRUS 32	130	T-Arm Mount [TA 702-3]	108
RRU-11	130	LLPX310R w/ Mount Pipe	108
RRU-11	130	VHLP2-18	108
RRU-11	130	VHLP800-11	108
DC6-48-60-18-8F	130	VHLP2-18	108
DTMABP7819VG12A	130	VHLP800-11	108
DTMABP7819VG12A	130	Side Arm Mount [SO 104-3]	85
DTMABP7819VG12A	130	WL 14-69/S	85
(2) CM1007-DBPXBC-003	130	WH 14-69/S	85
(2) CM1007-DBPXBC-003	130	WL 14-69/S	85
(2) CM1007-DBPXBC-003	130	WL 14-69/S	85
RRUS 32 B2	130	J105-HI	85
RRUS 32 B2	130	10' x 3" Pipe Mount	81.5
RRUS 32 B2	130	10' x 3" Pipe Mount	81.5
RRUS 32 B66	130		

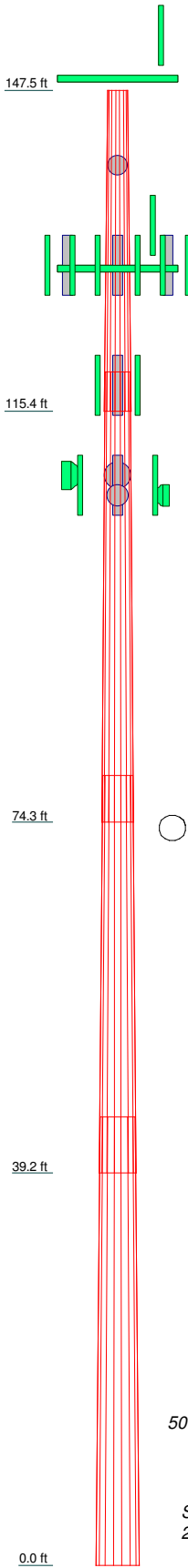
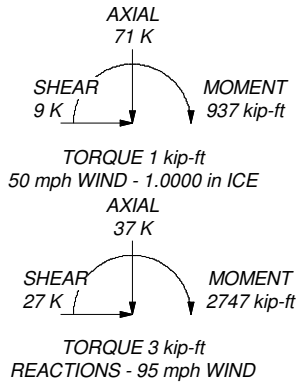
**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G 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 Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 75.3%

ALL REACTIONS  
ARE FACTORED



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	39.80	18	0.3125	5.58	36.4927	44.6250	A607-65	5.4
2	45.03	18	0.2188	4.72	29.9289	37.7500	A607-65	3.6
3	32.08	18	0.2188	3.91	24.0000	31.2500	A607-65	2.1
4	44.80	18	0.3750	42.8598	51.2500			8.5
								19.5

<p><b>JACOBS Engineering Group, Inc.</b> 5449 Bells Ferry Road Acworth, GA 30102 Phone: 770-701-2500 FAX: 770-701-2501</p>	Job: <b>WINDSOR PINE LANE</b>		
	Project: <b>BU 841793 WO 1481796</b>		
	Client: Crown Castle	Drawn by: HolderKG	App'd:
	Code: TIA-222-G	Date: 11/01/17	Scale: NTS
	Path: \\RALFIL03\Telecom\841793\WINDSOR PINE LANE\WO_1481796\Analysis\Models\BU#841793_WO#1481796.er	Dwg No. E-1	

<b>tnxTower</b>  <b>Jacobs Engineering Group, Inc.</b> 5449 Bells Ferry Road Acworth, GA 30102 Phone: 770-701-2500 FAX: 770-701-2501	<b>Job</b>	WINDSOR PINE LANE	<b>Page</b>	1 of 17
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## Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

Basic wind speed of 95 mph.

Structure Class II.

Exposure Category C.

Topographic Category 1.

Crest Height 0.00 ft.

Nominal ice thickness of 1.0000 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

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

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 60 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.

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

## Options

<ul style="list-style-type: none"> <li>Consider Moments - Legs</li> <li>Consider Moments - Horizontals</li> <li>Consider Moments - Diagonals</li> <li>Use Moment Magnification</li> <li>√ Use Code Stress Ratios</li> <li>√ Use Code Safety Factors - Guys</li> <li>Escalate Ice</li> <li>Always Use Max Kz</li> <li>Use Special Wind Profile</li> <li>Include Bolts In Member Capacity</li> <li>Leg Bolts Are At Top Of Section</li> <li>Secondary Horizontal Braces Leg</li> <li>Use Diamond Inner Bracing (4 Sided)</li> <li>SR Members Have Cut Ends</li> <li>SR Members Are Concentric</li> </ul>	<ul style="list-style-type: none"> <li>Distribute Leg Loads As Uniform</li> <li>Assume Legs Pinned</li> <li>√ Assume Rigid Index Plate</li> <li>√ Use Clear Spans For Wind Area</li> <li>Use Clear Spans For KL/r</li> <li>Retention Guys To Initial Tension</li> <li>√ Bypass Mast Stability Checks</li> <li>√ Use Azimuth Dish Coefficients</li> <li>√ Project Wind Area of Appurt.</li> <li>Autocalc Torque Arm Areas</li> <li>Add IBC .6D+W Combination</li> <li>Sort Capacity Reports By Component</li> <li>Triangulate Diamond Inner Bracing</li> <li>Treat Feed Line Bundles As Cylinder</li> </ul>	<ul style="list-style-type: none"> <li>Use ASCE 10 X-Brace Ly Rules</li> <li>Calculate Redundant Bracing Forces</li> <li>Ignore Redundant Members in FEA</li> <li>SR Leg Bolts Resist Compression</li> <li>All Leg Panels Have Same Allowable</li> <li>Offset Girt At Foundation</li> <li>Consider Feed Line Torque</li> <li>√ Include Angle Block Shear Check</li> <li>Use TIA-222-G Bracing Resist. Exemption</li> <li>Use TIA-222-G Tension Splice Exemption</li> <li style="background-color: #e0e0e0;">Poles</li> <li>√ Include Shear-Torsion Interaction</li> <li>Always Use Sub-Critical Flow</li> <li>Use Top Mounted Sockets</li> </ul>
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## 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	147.50-115.42	32.08	3.91	18	24.0000	31.2500	0.2188	0.8750	A607-65 (65 ksi)
L2	115.42-74.30	45.03	4.72	18	29.9289	37.7500	0.2188	0.8750	A607-65 (65 ksi)

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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
L3	74.30-39.22	39.80	5.58	18	36.4927	44.6250	0.3125	1.2500	A607-65 (65 ksi)
L4	39.22-0.00	44.80		18	42.8598	51.2500	0.3750	1.5000	A607-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	24.3702	16.5116	1179.7676	8.4423	12.1920	96.7657	2361.0876	8.2574	3.8390	17.55
	31.7321	21.5454	2621.1402	11.0161	15.8750	165.1112	5245.7293	10.7747	5.1150	23.383
L2	31.0802	20.6282	2300.4286	10.5471	15.2039	151.3051	4603.8842	10.3160	4.8825	22.32
	38.3324	26.0584	4637.3676	13.3236	19.1770	241.8192	9280.8371	13.0317	6.2590	28.613
L3	38.0350	35.8862	5934.8183	12.8440	18.5383	320.1383	11877.4458	17.9465	5.8727	18.793
	45.3134	43.9525	10903.6814	15.7309	22.6695	480.9846	21821.7101	21.9804	7.3040	23.373
L4	44.5822	50.5676	11531.2855	15.0821	21.7728	529.6188	23077.7441	25.2886	6.8833	18.356
	52.0406	60.5540	19801.0813	18.0606	26.0350	760.5562	39628.2174	30.2827	8.3600	22.293

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 147.50-115.42				1	1	1			
L2 115.42-74.30				1	1	1			
L3 74.30-39.22				1	1	1			
L4 39.22-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
*** Safety Line 5/8 ****	A	Surface Ar (CaAa)	147.50 - 0.00	1	1	0.500 0.500	0.8800		0.40

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
****147.5**** LDF5-50A(7/8)	C	No	Inside Pole	147.50 - 0.00	1	No Ice 1/2" Ice 1" Ice	0.33 0.33 0.33

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C <sub>AA</sub> ft <sup>2</sup> /ft	Weight plf
***140*** LDF2-50(3/8)	C	No	Inside Pole	140.00 - 0.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
WR-VG86T(3/4")	C	No	Inside Pole	140.00 - 0.00	2	No Ice	0.00	0.53
						1/2" Ice	0.00	0.53
						1" Ice	0.00	0.53
2" Conduit	C	No	Inside Pole	140.00 - 0.00	1	No Ice	0.00	1.16
						1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
***139*** LDF5-50A(7/8)	C	No	Inside Pole	139.00 - 0.00	1	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
***130*** LDF7-50A(1-5/8)	C	No	Inside Pole	130.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	C	No	Inside Pole	130.00 - 0.00	2	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	130.00 - 0.00	4	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
***118*** LDF7-50A(1-5/8)	B	No	Inside Pole	118.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
***108*** LDF4-50A(1/2")	A	No	Inside Pole	108.00 - 0.00	4	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
9207(5/16")	A	No	Inside Pole	108.00 - 0.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
2" Conduit	A	No	Inside Pole	108.00 - 0.00	2	No Ice	0.00	1.16
						1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
***85*** 1110(13/32")	B	No	Inside Pole	85.00 - 0.00	5	No Ice	0.00	0.05
						1/2" Ice	0.00	0.05
						1" Ice	0.00	0.05
**** 2" Conduit	C	No	Inside Pole	130.00 - 0.00	2	No Ice	0.00	1.16
						1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
****								

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight K
L1	147.50-115.42	A	0.000	0.000	2.823	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.01
		C	0.000	0.000	0.000	0.000	0.29
L2	115.42-74.30	A	0.000	0.000	3.619	0.000	0.24
		B	0.000	0.000	0.000	0.000	0.21

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Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L3	74.30-39.22	C	0.000	0.000	0.000	0.000	0.72
		A	0.000	0.000	3.087	0.000	0.24
		B	0.000	0.000	0.000	0.000	0.18
L4	39.22-0.00	C	0.000	0.000	0.000	0.000	0.62
		A	0.000	0.000	3.451	0.000	0.27
		B	0.000	0.000	0.000	0.000	0.20
		C	0.000	0.000	0.000	0.000	0.69

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_{AA}$ In Face ft <sup>2</sup>	$C_{AA}$ Out Face ft <sup>2</sup>	Weight K
L1	147.50-115.42	A	2.295	0.000	0.000	17.552	0.000	0.30
		B		0.000	0.000	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.29
L2	115.42-74.30	A	2.222	0.000	0.000	22.496	0.000	0.60
		B		0.000	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	0.000	0.72
L3	74.30-39.22	A	2.111	0.000	0.000	18.674	0.000	0.54
		B		0.000	0.000	0.000	0.000	0.18
		C		0.000	0.000	0.000	0.000	0.62
L4	39.22-0.00	A	1.900	0.000	0.000	20.005	0.000	0.57
		B		0.000	0.000	0.000	0.000	0.20
		C		0.000	0.000	0.000	0.000	0.69

### Feed Line Center of Pressure

Section	Elevation ft	$CP_x$ in	$CP_z$ in	$CP_x$ Ice in	$CP_z$ Ice in
L1	147.50-115.42	0.0000	-0.1293	0.0000	-0.5966
L2	115.42-74.30	0.0000	-0.1294	0.0000	-0.6273
L3	74.30-39.22	0.0000	-0.1295	0.0000	-0.6375
L4	39.22-0.00	0.0000	-0.1296	0.0000	-0.6322

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
L1	22	Safety Line 5/8	115.42 - 147.50	1.0000	1.0000
L2	22	Safety Line 5/8	74.30 - 115.42	1.0000	1.0000
L3	22	Safety Line 5/8	39.22 - 74.30	1.0000	1.0000

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## Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
*Level 149*									
DB225-C	B	From Leg	4.00	0.00	0.000	149.00	No Ice 2.32	2.32	0.03
			0.00				1/2" Ice 4.18	4.18	0.04
			4.00				1" Ice 6.03	6.03	0.04
(4) 6' x 2" Mount Pipe	A	From Leg	4.00	0.00	0.000	149.00	No Ice 1.43	1.43	0.02
			0.00				1/2" Ice 1.92	1.92	0.03
			0.00				1" Ice 2.29	2.29	0.05
(4) 6' x 2" Mount Pipe	B	From Leg	4.00	0.00	0.000	149.00	No Ice 1.43	1.43	0.02
			0.00				1/2" Ice 1.92	1.92	0.03
			0.00				1" Ice 2.29	2.29	0.05
(4) 6' x 2" Mount Pipe	C	From Leg	4.00	0.00	0.000	149.00	No Ice 1.43	1.43	0.02
			0.00				1/2" Ice 1.92	1.92	0.03
			0.00				1" Ice 2.29	2.29	0.05
Platform Mount [LP 1201-1]	C	None			0.000	149.00	No Ice 23.10	23.10	2.10
							1/2" Ice 26.80	26.80	2.50
							1" Ice 30.50	30.50	2.90
*Level 140*									
Pipe Mount [PM 601-1]	A	From Leg	0.50	0.00	0.000	140.00	No Ice 3.00	0.90	0.07
			0.00				1/2" Ice 3.74	1.12	0.08
			0.00				1" Ice 4.48	1.34	0.09
*Level 139*									
DB225-C	B	From Leg	3.00	0.00	0.000	139.00	No Ice 2.32	2.32	0.03
			0.00				1/2" Ice 4.18	4.18	0.04
			-5.00				1" Ice 6.03	6.03	0.04
Side Arm Mount [SO 701-1]	B	From Leg	2.00	0.00	0.000	139.00	No Ice 0.85	1.67	0.07
			0.00				1/2" Ice 1.14	2.34	0.08
			0.00				1" Ice 1.43	3.01	0.09
*Level 130*									
QS66512-3	A	From Leg	4.00	0.00	0.000	130.00	No Ice 8.13	6.80	0.11
			0.00				1/2" Ice 8.59	7.27	0.16
			0.00				1" Ice 9.05	7.72	0.23
QS66512-3	C	From Leg	4.00	0.00	0.000	130.00	No Ice 8.13	6.80	0.11
			0.00				1/2" Ice 8.59	7.27	0.16
			0.00				1" Ice 9.05	7.72	0.23
P65-17-XLH-RR	A	From Leg	4.00	0.00	0.000	130.00	No Ice 11.47	6.80	0.06
			0.00				1/2" Ice 12.08	7.38	0.12
			0.00				1" Ice 12.71	7.98	0.19
HPA-65R-BUU-H6	A	From Leg	4.00	0.00	0.000	130.00	No Ice 9.66	6.45	0.05
			0.00				1/2" Ice 10.13	6.91	0.11
			0.00				1" Ice 10.61	7.38	0.18
HPA-65R-BUU-H8	B	From Leg	4.00	0.00	0.000	130.00	No Ice 13.59	9.13	0.05
			0.00				1/2" Ice 14.19	9.73	0.13
			0.00				1" Ice 14.80	10.34	0.22
HPA-65R-BUU-H6	C	From Leg	4.00	0.00	0.000	130.00	No Ice 9.66	6.45	0.05
			0.00				1/2" Ice 10.13	6.91	0.11
			0.00				1" Ice 10.61	7.38	0.18
AM-X-CD-16-65-00T-RET	B	From Leg	4.00	0.00	0.000	130.00	No Ice 8.02	4.64	0.05
			0.00				1/2" Ice 8.48	5.09	0.09
			0.00				1" Ice 8.94	5.54	0.15
AM-X-CD-16-65-00T-RET	C	From Leg	4.00	0.00	0.000	130.00	No Ice 8.02	4.64	0.05
			0.00				1/2" Ice 8.48	5.09	0.09



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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
TPA-65R-LCUUUU-H8	B	From Leg	0.00		0.000	130.00	1" Ice	8.94	5.54	0.15
			4.00				No Ice	13.30	8.82	0.08
			0.00				1/2" Ice	13.90	9.42	0.16
			0.00				1" Ice	14.50	10.03	0.25
RRUS 32	A	From Leg	4.00		0.000	130.00	No Ice	2.86	1.78	0.06
			0.00				1/2" Ice	3.08	1.97	0.08
			0.00				1" Ice	3.32	2.17	0.10
			0.00				No Ice	2.86	1.78	0.06
RRUS 32	B	From Leg	4.00		0.000	130.00	1/2" Ice	3.08	1.97	0.08
			0.00				1" Ice	3.32	2.17	0.10
			0.00				No Ice	2.86	1.78	0.06
			0.00				1/2" Ice	3.08	1.97	0.08
RRUS 32	C	From Leg	4.00		0.000	130.00	1" Ice	3.32	2.17	0.10
			0.00				No Ice	2.86	1.78	0.06
			0.00				1/2" Ice	3.08	1.97	0.08
			0.00				1" Ice	3.32	2.17	0.10
RRU-11	A	From Leg	4.00		0.000	130.00	No Ice	1.64	1.26	0.04
			0.00				1/2" Ice	1.80	1.41	0.06
			0.00				1" Ice	1.97	1.57	0.08
			0.00				No Ice	1.64	1.26	0.04
RRU-11	B	From Leg	4.00		0.000	130.00	1/2" Ice	1.80	1.41	0.06
			0.00				1" Ice	1.97	1.57	0.08
			0.00				No Ice	1.64	1.26	0.04
			0.00				1/2" Ice	1.80	1.41	0.06
RRU-11	C	From Leg	4.00		0.000	130.00	1" Ice	1.97	1.57	0.08
			0.00				No Ice	1.64	1.26	0.04
			0.00				1/2" Ice	1.80	1.41	0.06
			0.00				1" Ice	1.97	1.57	0.08
DC6-48-60-18-8F	A	From Leg	4.00		0.000	130.00	No Ice	0.92	0.92	0.03
			0.00				1/2" Ice	1.46	1.46	0.05
			0.00				1" Ice	1.64	1.64	0.07
			0.00				No Ice	0.98	0.34	0.02
DTMABP7819VG12A	A	From Leg	4.00		0.000	130.00	1/2" Ice	1.10	0.42	0.03
			0.00				1" Ice	1.23	0.51	0.04
			0.00				No Ice	0.98	0.34	0.02
			0.00				1/2" Ice	1.10	0.42	0.03
DTMABP7819VG12A	B	From Leg	4.00		0.000	130.00	1" Ice	1.23	0.51	0.04
			0.00				No Ice	0.98	0.34	0.02
			0.00				1/2" Ice	1.10	0.42	0.03
			0.00				1" Ice	1.23	0.51	0.04
DTMABP7819VG12A	C	From Leg	4.00		0.000	130.00	No Ice	0.98	0.34	0.02
			0.00				1/2" Ice	1.10	0.42	0.03
			0.00				1" Ice	1.23	0.51	0.04
			0.00				No Ice	0.98	0.34	0.02
(2) CM1007-DBPXBC-003	A	From Leg	4.00		0.000	130.00	1" Ice	1.23	0.51	0.04
			0.00				No Ice	0.37	0.13	0.01
			0.00				1/2" Ice	0.45	0.18	0.01
			0.00				1" Ice	0.54	0.24	0.01
(2) CM1007-DBPXBC-003	B	From Leg	4.00		0.000	130.00	No Ice	0.37	0.13	0.01
			0.00				1/2" Ice	0.45	0.18	0.01
			0.00				1" Ice	0.54	0.24	0.01
			0.00				No Ice	0.37	0.13	0.01
(2) CM1007-DBPXBC-003	C	From Leg	4.00		0.000	130.00	1/2" Ice	0.45	0.18	0.01
			0.00				1" Ice	0.54	0.24	0.01
			0.00				No Ice	0.37	0.13	0.01
			0.00				1/2" Ice	0.45	0.18	0.01
RRUS 32 B2	A	From Leg	4.00		0.000	130.00	1" Ice	0.54	0.24	0.01
			0.00				No Ice	2.73	1.67	0.05
			0.00				1/2" Ice	2.95	1.86	0.07
			0.00				1" Ice	3.18	2.05	0.10
RRUS 32 B2	B	From Leg	4.00		0.000	130.00	No Ice	2.73	1.67	0.05
			0.00				1/2" Ice	2.95	1.86	0.07
			0.00				1" Ice	3.18	2.05	0.10
			0.00				No Ice	2.73	1.67	0.05
RRUS 32 B2	C	From Leg	4.00		0.000	130.00	1/2" Ice	2.95	1.86	0.07
			0.00				1" Ice	3.18	2.05	0.10
			0.00				No Ice	2.73	1.67	0.05
			0.00				1/2" Ice	2.95	1.86	0.07
RRUS 32 B66	A	From Leg	4.00		0.000	130.00	1" Ice	3.18	2.05	0.10
			0.00				No Ice	2.74	1.67	0.05
			0.00				1/2" Ice	2.96	1.86	0.07
			0.00				1" Ice	3.19	2.05	0.10
RRUS 32 B66	B	From Leg	4.00		0.000	130.00	No Ice	2.74	1.67	0.05
			0.00				1/2" Ice	2.96	1.86	0.07

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	<b>Client</b>	Crown Castle	<b>Designed by</b>	HolderKG

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight	
			Horz	Lateral						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
RRUS 32 B66	C	From Leg	0.00		0.000	130.00	1" Ice	3.19	2.05	0.10
			4.00				No Ice	2.74	1.67	0.05
			0.00				1/2" Ice	2.96	1.86	0.07
(4) TPX-070821	A	From Leg	0.00		0.000	130.00	1" Ice	3.19	2.05	0.10
			4.00				No Ice	0.47	0.10	0.01
			0.00				1/2" Ice	0.56	0.15	0.01
(4) TPX-070821	B	From Leg	0.00		0.000	130.00	1" Ice	0.66	0.20	0.02
			4.00				No Ice	0.47	0.10	0.01
			0.00				1/2" Ice	0.56	0.15	0.01
(4) TPX-070821	C	From Leg	0.00		0.000	130.00	1" Ice	0.66	0.20	0.02
			4.00				No Ice	0.47	0.10	0.01
			0.00				1/2" Ice	0.56	0.15	0.01
Platform Mount [LP 1301-1]	C	None	0.00		0.000	130.00	1" Ice	0.66	0.20	0.02
							No Ice	51.70	51.70	2.26
							1/2" Ice	62.70	62.70	2.94
						1" Ice	76.00	76.00	3.81	
*Level 118*										
APXV18-206517S-C	A	From Leg	1.00		0.000	118.00	No Ice	5.17	3.04	0.03
			0.00				1/2" Ice	5.62	3.47	0.05
			0.00				1" Ice	6.08	3.91	0.09
APXV18-206517S-C	B	From Leg	1.00		0.000	118.00	No Ice	5.17	3.04	0.03
			0.00				1/2" Ice	5.62	3.47	0.05
			0.00				1" Ice	6.08	3.91	0.09
APXV18-206517S-C	C	From Leg	1.00		0.000	118.00	No Ice	5.17	3.04	0.03
			0.00				1/2" Ice	5.62	3.47	0.05
			0.00				1" Ice	6.08	3.91	0.09
Pipe Mount [PM 601-3]	C	None			0.000	118.00	No Ice	4.39	4.39	0.20
							1/2" Ice	5.48	5.48	0.24
							1" Ice	6.57	6.57	0.28
6' x 2" Mount Pipe	A	From Leg	1.00		0.000	118.00	No Ice	1.43	1.43	0.02
			0.00				1/2" Ice	1.92	1.92	0.03
			0.00				1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	B	From Leg	1.00		0.000	118.00	No Ice	1.43	1.43	0.02
			0.00				1/2" Ice	1.92	1.92	0.03
			0.00				1" Ice	2.29	2.29	0.05
6' x 2" Mount Pipe	C	From Leg	1.00		0.000	118.00	No Ice	1.43	1.43	0.02
			0.00				1/2" Ice	1.92	1.92	0.03
			0.00				1" Ice	2.29	2.29	0.05
*Level 108*										
LLPX310R w/ Mount Pipe	A	From Leg	3.00		0.000	108.00	No Ice	4.54	2.98	0.05
			0.00				1/2" Ice	4.89	3.53	0.08
			0.00				1" Ice	5.25	4.09	0.13
LLPX310R w/ Mount Pipe	B	From Leg	3.00		0.000	108.00	No Ice	4.54	2.98	0.05
			0.00				1/2" Ice	4.89	3.53	0.08
			0.00				1" Ice	5.25	4.09	0.13
LLPX310R w/ Mount Pipe	C	From Leg	3.00		0.000	108.00	No Ice	4.54	2.98	0.05
			0.00				1/2" Ice	4.89	3.53	0.08
			0.00				1" Ice	5.25	4.09	0.13
RRH-2WB	A	From Leg	3.00		0.000	108.00	No Ice	2.30	0.78	0.04
			0.00				1/2" Ice	2.50	0.92	0.06
			0.00				1" Ice	2.69	1.06	0.08
RRH-2WB	B	From Leg	3.00		0.000	108.00	No Ice	2.30	0.78	0.04
			0.00				1/2" Ice	2.50	0.92	0.06
			0.00				1" Ice	2.69	1.06	0.08
RRH-2WB	C	From Leg	3.00		0.000	108.00	No Ice	2.30	0.78	0.04
			0.00				1/2" Ice	2.50	0.92	0.06
			0.00				1" Ice	2.69	1.06	0.08

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	<b>Client</b>	Crown Castle	<b>Designed by</b>	HolderKG

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz Lateral	Vert					
T-Arm Mount [TA 702-3]	C	None			0.000	108.00	No Ice 5.64 1/2" Ice 6.55 1" Ice 7.46	5.64 6.55 7.46	0.34 0.43 0.52
*****Level 85P*****									
WL 14-69/S	B	From Leg	2.00 0.00 -2.00		0.000	85.00	No Ice 0.63 1/2" Ice 1.02 1" Ice 1.42	0.63 1.02 1.42	0.01 0.02 0.04
WH 14-69/S	B	From Leg	2.00 0.00 0.00		0.000	85.00	No Ice 2.32 1/2" Ice 3.37 1" Ice 4.42	2.32 3.37 4.42	0.00 0.00 0.00
WL 14-69/S	C	From Leg	2.00 0.00 0.00		0.000	85.00	No Ice 0.63 1/2" Ice 1.02 1" Ice 1.42	0.63 1.02 1.42	0.01 0.02 0.04
WL 14-69/S	C	From Leg	2.00 0.00 0.00		0.000	85.00	No Ice 0.63 1/2" Ice 1.02 1" Ice 1.42	0.63 1.02 1.42	0.01 0.02 0.04
J105-HI	B	From Leg	2.00 0.00 -7.00		0.000	85.00	No Ice 0.32 1/2" Ice 0.42 1" Ice 0.52	4.84 5.21 5.59	0.01 0.03 0.06
Side Arm Mount [SO 104-3]	C	None			0.000	85.00	No Ice 3.30 1/2" Ice 4.13 1" Ice 4.96	3.30 4.13 4.96	0.29 0.32 0.35
10' x 3" Pipe Mount	B	From Leg	2.00 0.00 0.00		0.000	81.50	No Ice 3.00 1/2" Ice 4.03 1" Ice 5.03	3.00 4.03 5.03	0.08 0.10 0.13
10' x 3" Pipe Mount	C	From Leg	2.00 0.00 0.00		0.000	81.50	No Ice 3.00 1/2" Ice 4.03 1" Ice 5.03	3.00 4.03 5.03	0.08 0.10 0.13
****									

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight
				Horz Lateral	Vert						
HP2-102	A	Paraboloid w/Radome	From Leg	1.00 0.00 0.00		0.000		140.00	2.00	No Ice 3.14 1/2" Ice 3.41 1" Ice 3.68	0.03 0.04 0.06
***											
VHLP2-18	A	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00 -1.00		0.000		108.00	2.17	No Ice 3.72 1/2" Ice 4.01 1" Ice 4.30	0.03 0.05 0.07
VHLP800-11	A	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00 1.00		0.000		108.00	2.80	No Ice 6.16 1/2" Ice 6.53 1" Ice 6.90	0.05 0.08 0.12
VHLP2-18	B	Paraboloid w/Shroud (HP)	From Leg	3.00 0.00 -1.00		0.000		108.00	2.17	No Ice 3.72 1/2" Ice 4.01 1" Ice 4.30	0.03 0.05 0.07
VHLP800-11	C	Paraboloid	From	3.00		0.000		108.00	2.80	No Ice 6.16	0.05

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Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K
		w/Shroud (HP)	Leg	0.00				1/2" Ice	6.53	0.08
				1.00				1" Ice	6.90	0.12
****										

## Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 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

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Comb. No.	Description
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	147.5 - 115.417	Pole	Max Tension	33	0.00	0.00	0.00
			Max. Compression	26	-24.20	-1.88	1.04
			Max. Mx	8	-8.96	-192.41	-0.61
			Max. My	14	-8.93	-0.67	-195.89
			Max. Vy	8	12.65	-192.41	-0.61
			Max. Vx	14	12.83	-0.67	-195.89
			Max. Torque	14			2.02
L2	115.417 - 74.2967	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.81	-1.96	0.92
			Max. Mx	8	-16.25	-867.13	-0.52
			Max. My	14	-16.20	-1.56	-882.44
			Max. Vy	8	19.68	-867.13	-0.52
			Max. Vx	14	20.11	-1.56	-882.44
			Max. Torque	5			-2.95
L3	74.2967 - 39.2167	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.62	-1.96	1.44
			Max. Mx	8	-23.84	-1594.53	3.57
			Max. My	14	-23.82	0.83	-1624.37
			Max. Vy	8	22.79	-1594.53	3.57
			Max. Vx	14	23.22	0.83	-1624.37
			Max. Torque	5			-2.94
L4	39.2167 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.54	-1.96	2.18
			Max. Mx	8	-37.24	-2698.27	8.91
			Max. My	14	-37.24	4.00	-2746.81
			Max. Vy	8	26.28	-2698.27	8.91
			Max. Vx	14	26.69	4.00	-2746.81
			Max. Torque	5			-2.94

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	70.54	-0.03	8.75
	Max. H <sub>x</sub>	20	37.26	26.22	-0.02
	Max. H <sub>z</sub>	2	37.26	-0.10	26.54
	Max. M <sub>x</sub>	2	2732.67	-0.10	26.54
	Max. M <sub>z</sub>	8	2698.27	-26.25	0.12
	Max. Torsion	17	2.93	13.14	-23.15
	Min. Vert	23	27.94	22.67	13.25
	Min. H <sub>x</sub>	8	37.26	-26.25	0.12
	Min. H <sub>z</sub>	14	37.26	0.07	-26.66
	Min. M <sub>x</sub>	14	-2746.81	0.07	-26.66

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. M <sub>z</sub>	20	-2694.25	26.22	-0.02
	Min. Torsion	5	-2.94	-13.19	23.02

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overtuning Moment, M <sub>x</sub> kip-ft	Overtuning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	31.05	0.00	0.00	-0.16	-0.19	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	37.26	0.10	-26.54	-2732.67	-7.83	2.62
0.9 Dead+1.6 Wind 0 deg - No Ice	27.94	0.10	-26.54	-2705.65	-7.73	2.62
1.2 Dead+1.6 Wind 30 deg - No Ice	37.26	13.19	-23.02	-2368.51	-1353.18	2.93
0.9 Dead+1.6 Wind 30 deg - No Ice	27.94	13.19	-23.02	-2345.10	-1339.80	2.94
1.2 Dead+1.6 Wind 60 deg - No Ice	37.26	22.72	-13.36	-1372.64	-2333.97	1.94
0.9 Dead+1.6 Wind 60 deg - No Ice	27.94	22.72	-13.36	-1359.07	-2310.90	1.94
1.2 Dead+1.6 Wind 90 deg - No Ice	37.26	26.25	-0.12	-8.91	-2698.27	0.36
0.9 Dead+1.6 Wind 90 deg - No Ice	27.94	26.25	-0.12	-8.80	-2671.59	0.36
1.2 Dead+1.6 Wind 120 deg - No Ice	37.26	22.67	13.33	1376.35	-2332.96	-0.56
0.9 Dead+1.6 Wind 120 deg - No Ice	27.94	22.67	13.33	1362.80	-2309.85	-0.55
1.2 Dead+1.6 Wind 150 deg - No Ice	37.26	13.04	23.12	2384.86	-1344.23	-1.52
0.9 Dead+1.6 Wind 150 deg - No Ice	27.94	13.04	23.12	2361.37	-1330.87	-1.51
1.2 Dead+1.6 Wind 180 deg - No Ice	37.26	-0.07	26.66	2746.81	4.00	-2.59
0.9 Dead+1.6 Wind 180 deg - No Ice	27.94	-0.07	26.66	2719.75	4.05	-2.59
1.2 Dead+1.6 Wind 210 deg - No Ice	37.26	-13.14	23.15	2383.94	1348.77	-2.93
0.9 Dead+1.6 Wind 210 deg - No Ice	27.94	-13.14	23.15	2360.49	1335.53	-2.93
1.2 Dead+1.6 Wind 240 deg - No Ice	37.26	-22.68	13.45	1383.31	2329.34	-2.06
0.9 Dead+1.6 Wind 240 deg - No Ice	27.94	-22.68	13.45	1369.75	2306.42	-2.07
1.2 Dead+1.6 Wind 270 deg - No Ice	37.26	-26.22	0.02	-1.37	2694.25	-0.32
0.9 Dead+1.6 Wind 270 deg - No Ice	27.94	-26.22	0.02	-1.28	2667.73	-0.33
1.2 Dead+1.6 Wind 300 deg - No Ice	37.26	-22.67	-13.25	-1366.44	2331.23	0.65
0.9 Dead+1.6 Wind 300 deg - No Ice	27.94	-22.67	-13.25	-1352.88	2308.28	0.65
1.2 Dead+1.6 Wind 330 deg - No Ice	37.26	-13.08	-22.96	-2365.33	1347.72	1.48
0.9 Dead+1.6 Wind 330 deg - No Ice	27.94	-13.08	-22.96	-2341.92	1334.45	1.48

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Load Combination	Vertical	Shear <sub>x</sub>	Shear <sub>z</sub>	Overturning Moment, M <sub>x</sub>	Overturning Moment, M <sub>z</sub>	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Ice+1.0 Temp	70.54	0.00	-0.00	-2.18	-1.96	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	70.54	0.03	-8.75	-937.42	-5.14	1.27
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	70.54	4.35	-7.59	-813.24	-465.69	1.49
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	70.54	7.50	-4.40	-472.41	-801.36	1.19
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	70.54	8.66	-0.03	-5.63	-924.93	0.56
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	70.54	7.48	4.38	466.60	-799.75	-0.05
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	70.54	4.30	7.61	811.35	-461.28	-0.69
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	70.54	-0.02	8.78	936.38	0.24	-1.26
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	70.54	-4.34	7.62	812.59	460.64	-1.49
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	70.54	-7.49	4.42	470.56	796.33	-1.23
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	70.54	-8.65	0.01	-1.16	919.99	-0.56
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	70.54	-7.48	-4.36	-468.60	795.25	0.07
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	70.54	-4.31	-7.57	-811.13	457.96	0.69
Dead+Wind 0 deg - Service	31.05	0.02	-5.92	-606.36	-1.89	0.59
Dead+Wind 30 deg - Service	31.05	2.94	-5.13	-525.57	-300.35	0.66
Dead+Wind 60 deg - Service	31.05	5.07	-2.98	-304.64	-517.92	0.43
Dead+Wind 90 deg - Service	31.05	5.86	-0.03	-2.11	-598.73	0.08
Dead+Wind 120 deg - Service	31.05	5.06	2.97	305.20	-517.69	-0.12
Dead+Wind 150 deg - Service	31.05	2.91	5.16	528.94	-298.36	-0.34
Dead+Wind 180 deg - Service	31.05	-0.02	5.95	609.24	0.74	-0.58
Dead+Wind 210 deg - Service	31.05	-2.93	5.16	528.74	299.07	-0.66
Dead+Wind 240 deg - Service	31.05	-5.06	3.00	306.75	516.59	-0.47
Dead+Wind 270 deg - Service	31.05	-5.85	0.00	-0.43	597.54	-0.08
Dead+Wind 300 deg - Service	31.05	-5.06	-2.96	-303.26	517.01	0.15
Dead+Wind 330 deg - Service	31.05	-2.92	-5.12	-524.86	298.83	0.34

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-31.05	0.00	0.00	31.05	0.00	0.000%
2	0.10	-37.26	-26.54	-0.10	37.26	26.54	0.000%
3	0.10	-27.94	-26.54	-0.10	27.94	26.54	0.000%
4	13.19	-37.26	-23.02	-13.19	37.26	23.02	0.000%
5	13.19	-27.94	-23.02	-13.19	27.94	23.02	0.000%
6	22.72	-37.26	-13.36	-22.72	37.26	13.36	0.000%
7	22.72	-27.94	-13.36	-22.72	27.94	13.36	0.000%
8	26.25	-37.26	-0.12	-26.25	37.26	0.12	0.000%
9	26.25	-27.94	-0.12	-26.25	27.94	0.12	0.000%
10	22.67	-37.26	13.33	-22.67	37.26	-13.33	0.000%
11	22.67	-27.94	13.33	-22.67	27.94	-13.33	0.000%
12	13.04	-37.26	23.12	-13.04	37.26	-23.12	0.000%
13	13.04	-27.94	23.12	-13.04	27.94	-23.12	0.000%
14	-0.07	-37.26	26.66	0.07	37.26	-26.66	0.000%
15	-0.07	-27.94	26.66	0.07	27.94	-26.66	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	
16	-13.14	-37.26	23.15	13.14	37.26	-23.15	0.000%
17	-13.14	-27.94	23.15	13.14	27.94	-23.15	0.000%
18	-22.68	-37.26	13.45	22.68	37.26	-13.45	0.000%
19	-22.68	-27.94	13.45	22.68	27.94	-13.45	0.000%
20	-26.22	-37.26	0.02	26.22	37.26	-0.02	0.000%
21	-26.22	-27.94	0.02	26.22	27.94	-0.02	0.000%
22	-22.67	-37.26	-13.25	22.67	37.26	13.25	0.000%
23	-22.67	-27.94	-13.25	22.67	27.94	13.25	0.000%
24	-13.08	-37.26	-22.96	13.08	37.26	22.96	0.000%
25	-13.08	-27.94	-22.96	13.08	27.94	22.96	0.000%
26	0.00	-70.54	0.00	-0.00	70.54	0.00	0.000%
27	0.03	-70.54	-8.75	-0.03	70.54	8.75	0.000%
28	4.35	-70.54	-7.59	-4.35	70.54	7.59	0.000%
29	7.50	-70.54	-4.40	-7.50	70.54	4.40	0.000%
30	8.66	-70.54	-0.03	-8.66	70.54	0.03	0.000%
31	7.48	-70.54	4.38	-7.48	70.54	-4.38	0.000%
32	4.30	-70.54	7.61	-4.30	70.54	-7.61	0.000%
33	-0.02	-70.54	8.78	0.02	70.54	-8.78	0.000%
34	-4.34	-70.54	7.62	4.34	70.54	-7.62	0.000%
35	-7.49	-70.54	4.42	7.49	70.54	-4.42	0.000%
36	-8.65	-70.54	0.01	8.65	70.54	-0.01	0.000%
37	-7.48	-70.54	-4.36	7.48	70.54	4.36	0.000%
38	-4.31	-70.54	-7.57	4.31	70.54	7.57	0.000%
39	0.02	-31.05	-5.92	-0.02	31.05	5.92	0.000%
40	2.94	-31.05	-5.13	-2.94	31.05	5.13	0.000%
41	5.07	-31.05	-2.98	-5.07	31.05	2.98	0.000%
42	5.86	-31.05	-0.03	-5.86	31.05	0.03	0.000%
43	5.06	-31.05	2.97	-5.06	31.05	-2.97	0.000%
44	2.91	-31.05	5.16	-2.91	31.05	-5.16	0.000%
45	-0.02	-31.05	5.95	0.02	31.05	-5.95	0.000%
46	-2.93	-31.05	5.16	2.93	31.05	-5.16	0.000%
47	-5.06	-31.05	3.00	5.06	31.05	-3.00	0.000%
48	-5.85	-31.05	0.00	5.85	31.05	-0.00	0.000%
49	-5.06	-31.05	-2.96	5.06	31.05	2.96	0.000%
50	-2.92	-31.05	-5.12	2.92	31.05	5.12	0.000%

## Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.0000001	0.0000001
2	Yes	5	0.0000001	0.00014412
3	Yes	5	0.0000001	0.00006677
4	Yes	6	0.0000001	0.00006440
5	Yes	5	0.0000001	0.00060081
6	Yes	6	0.0000001	0.00005775
7	Yes	5	0.0000001	0.00053752
8	Yes	4	0.0000001	0.00038220
9	Yes	4	0.0000001	0.00016564
10	Yes	6	0.0000001	0.00005918
11	Yes	5	0.0000001	0.00055137
12	Yes	6	0.0000001	0.00006330
13	Yes	5	0.0000001	0.00059005
14	Yes	5	0.0000001	0.00013460
15	Yes	5	0.0000001	0.00006232
16	Yes	6	0.0000001	0.00005663



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17	Yes	5	0.00000001	0.00052645
18	Yes	6	0.00000001	0.00006271
19	Yes	5	0.00000001	0.00058529
20	Yes	4	0.00000001	0.00037836
21	Yes	4	0.00000001	0.00016309
22	Yes	6	0.00000001	0.00006138
23	Yes	5	0.00000001	0.00057256
24	Yes	6	0.00000001	0.00005776
25	Yes	5	0.00000001	0.00053754
26	Yes	4	0.00000001	0.00003262
27	Yes	5	0.00000001	0.00072050
28	Yes	6	0.00000001	0.00013941
29	Yes	6	0.00000001	0.00012747
30	Yes	5	0.00000001	0.00068304
31	Yes	6	0.00000001	0.00012774
32	Yes	6	0.00000001	0.00013351
33	Yes	5	0.00000001	0.00071510
34	Yes	6	0.00000001	0.00012489
35	Yes	6	0.00000001	0.00013320
36	Yes	5	0.00000001	0.00067617
37	Yes	6	0.00000001	0.00012856
38	Yes	6	0.00000001	0.00012564
39	Yes	4	0.00000001	0.00017784
40	Yes	4	0.00000001	0.00050375
41	Yes	4	0.00000001	0.00036120
42	Yes	4	0.00000001	0.00004607
43	Yes	4	0.00000001	0.00037637
44	Yes	4	0.00000001	0.00046607
45	Yes	4	0.00000001	0.00017209
46	Yes	4	0.00000001	0.00035005
47	Yes	4	0.00000001	0.00045556
48	Yes	4	0.00000001	0.00004593
49	Yes	4	0.00000001	0.00042655
50	Yes	4	0.00000001	0.00035842

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 115.417	20.03	45	1.132	0.005
L2	119.327 - 74.2967	13.47	45	1.071	0.003
L3	79.0167 - 39.2167	5.76	45	0.695	0.002
L4	44.7967 - 0	1.85	45	0.375	0.001

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	DB225-C	45	20.03	1.132	0.005	57905
140.00	HP2-102	45	18.25	1.127	0.005	38604
139.00	DB225-C	45	18.01	1.126	0.005	34062
130.00	QS66512-3	45	15.90	1.111	0.004	16544
118.00	APXV18-206517S-C	45	13.18	1.063	0.003	10008
109.00	VHLP800-11	45	11.24	0.999	0.003	8289

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Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
108.00	LLPX310R w/ Mount Pipe	45	11.04	0.991	0.003	8137
107.00	VHLP2-18	45	10.83	0.982	0.003	7990
85.00	WL 14-69/S	45	6.71	0.759	0.002	5711
81.50	10' x 3" Pipe Mount	45	6.15	0.721	0.002	5470

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 115.417	90.44	14	5.119	0.023
L2	119.327 - 74.2967	60.80	14	4.841	0.016
L3	79.0167 - 39.2167	25.99	14	3.139	0.007
L4	44.7967 - 0	8.35	14	1.693	0.003

### Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
149.00	DB225-C	14	90.44	5.119	0.023	13037
140.00	HP2-102	14	82.38	5.095	0.021	8690
139.00	DB225-C	14	81.31	5.090	0.021	7668
130.00	QS66512-3	14	71.77	5.024	0.018	3723
118.00	APXV18-206517S-C	14	59.48	4.808	0.015	2248
109.00	VHLP800-11	14	50.75	4.517	0.013	1856
108.00	LLPX310R w/ Mount Pipe	14	49.81	4.479	0.013	1821
107.00	VHLP2-18	14	48.88	4.440	0.013	1788
85.00	WL 14-69/S	14	30.30	3.427	0.008	1272
81.50	10' x 3" Pipe Mount	14	27.74	3.257	0.008	1217

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio P <sub>u</sub> / φP <sub>n</sub>
L1	147.5 - 115.417 (1)	TP31.25x24x0.2188	32.08	0.00	0.0	20.9319	-8.93	1407.90	0.006
L2	115.417 - 74.2967 (2)	TP37.75x29.9289x0.2188	45.03	0.00	0.0	25.4892	-16.20	1571.94	0.010
L3	74.2967 - 39.2167 (3)	TP44.625x36.4927x0.3125	39.80	0.00	0.0	42.8216	-23.82	2877.56	0.008
L4	39.2167 - 0 (4)	TP51.25x42.8598x0.375	44.80	0.00	0.0	60.5540	-37.24	4097.19	0.009

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Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
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### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>ux</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	M <sub>uy</sub> kip-ft	φM <sub>uy</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{uy}}$
L1	147.5 - 115.417 (1)	TP31.25x24x0.2188	195.90	873.33	0.224	0.00	873.33	0.000
L2	115.417 - 74.2967 (2)	TP37.75x29.9289x0.2188	882.43	1188.92	0.742	0.00	1188.92	0.000
L3	74.2967 - 39.2167 (3)	TP44.625x36.4927x0.3125	1624.37	2556.18	0.635	0.00	2556.18	0.000
L4	39.2167 - 0 (4)	TP51.25x42.8598x0.375	2746.81	4288.38	0.641	0.00	4288.38	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V <sub>u</sub> K	φV <sub>n</sub> K	Ratio $\frac{V_u}{\phi V_n}$	Actual T <sub>u</sub> kip-ft	φT <sub>n</sub> kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	147.5 - 115.417 (1)	TP31.25x24x0.2188	12.86	703.95	0.018	1.65	1748.80	0.001
L2	115.417 - 74.2967 (2)	TP37.75x29.9289x0.2188	20.11	782.23	0.026	2.60	2380.73	0.001
L3	74.2967 - 39.2167 (3)	TP44.625x36.4927x0.3125	23.22	1438.78	0.016	2.59	5118.60	0.001
L4	39.2167 - 0 (4)	TP51.25x42.8598x0.375	26.69	2048.59	0.013	2.59	8587.25	0.000

### Pole Interaction Design Data

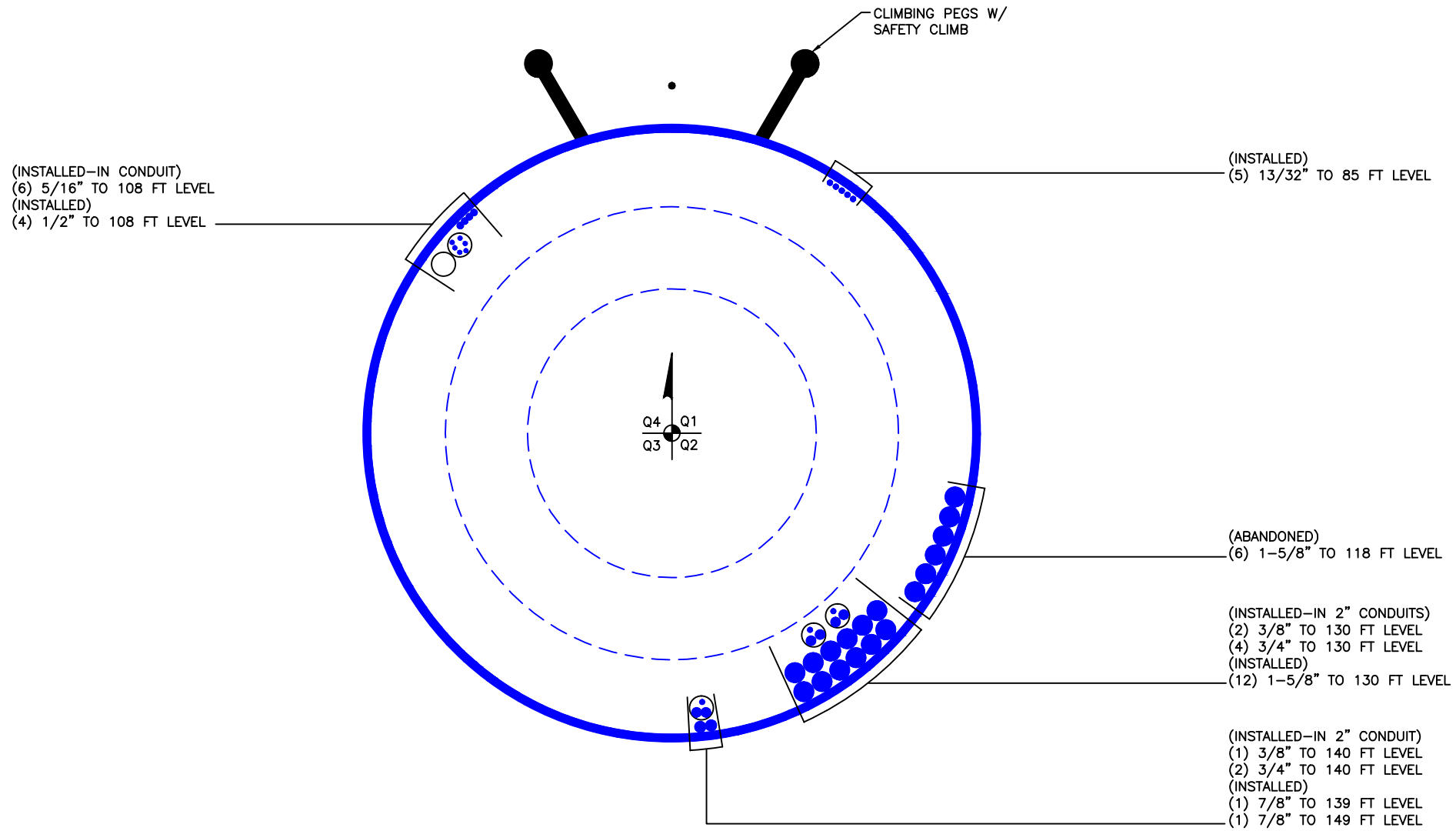
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{ux}}$	Ratio $\frac{M_{uy}}{\phi M_{uy}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	147.5 - 115.417 (1)	0.006	0.224	0.000	0.018	0.001	0.231	1.000	4.8.2 ✓
L2	115.417 - 74.2967 (2)	0.010	0.742	0.000	0.026	0.001	0.753	1.000	4.8.2 ✓
L3	74.2967 - 39.2167 (3)	0.008	0.635	0.000	0.016	0.001	0.644	1.000	4.8.2 ✓
L4	39.2167 - 0 (4)	0.009	0.641	0.000	0.013	0.000	0.650	1.000	4.8.2 ✓

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### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail	
L1	147.5 - 115.417	Pole	TP31.25x24x0.2188	1	-8.93	1407.90	23.1	Pass	
L2	115.417 - 74.2967	Pole	TP37.75x29.9289x0.2188	2	-16.20	1571.94	75.3	Pass	
L3	74.2967 - 39.2167	Pole	TP44.625x36.4927x0.3125	3	-23.82	2877.56	64.4	Pass	
L4	39.2167 - 0	Pole	TP51.25x42.8598x0.375	4	-37.24	4097.19	65.0	Pass	
							Summary		
							Pole (L2)	75.3	Pass
							<b>RATING =</b>	<b>75.3</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



CROWN REGION ADDRESS  
USA

DW ADJ CJR ALM ARR CRM GG ALM MR

17/09/14	UPDATED PER WORK ORDER # 769299
07/01/15	UPDATED PER WORK ORDER # 987467
26/10/2015	UPDATED PER WORK ORDER 1113100
24/11/2015	UPDATED PER WORK ORDER 1156361
02/03/16	UPDATED PER WORK ORDER 1199229
02/03/16	UPDATED PER WORK ORDER 1202771
13/09/16	UPDATED PER WORK ORDER 1237123
06/12/16	UPDATED PER WORK ORDER 1323632
14/12/16	UPDATED PER WORK ORDER 1337818

DRAWN BY: **WMW**  
CHECKED BY: **BWT**  
DRAWING DATE: 13-5-14

AT&T MOBILITY

SITE NUMBER:

SITE NAME:

SITE NAME

WINDSOR PINE LANE

BUSINESS UNIT NUMBER

841793

SITE ADDRESS

50 PINE LANE  
WINDSOR, CT 06095  
HARTFORD COUNTY  
USA

SHEET TITLE

**BASE LEVEL**

SHEET NUMBER

BUSINESS UNIT: 841793 TOWER ID: C\_BASELEVEL

**BASE LEVEL DRAWING**

1" = 1'-0"

**1**

**A1-0**

**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

- Assumptions:**
- 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
  - 2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
  - 3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)\*(Rod Diameter)

## Site Data

BU#: 841793		
Site Name: WINDSOR PINE LANE		
App #: 413693 Rev#2		
Anchor Rod Data		
Eta Factor, $\eta$	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, $F_y$ :	75	ksi
Strength, $F_u$ :	100	ksi
Bolt Circle:	58	in
Anchor Spacing:	6	in

## Base Reactions

TIA Revision:	G	
Factored Moment, $M_u$ :	2747	ft-kips
Factored Axial, $P_u$ :	37	kips
Factored Shear, $V_u$ :	27	kips

## Anchor Rod Results

TIA G --> Max Rod ( $C_u + V_u/\eta$ ): 147.8 Kips  
 Axial Design Strength,  $\Phi * F_u * A_{net}$ : 260.0 Kips  
 Anchor Rod Stress Ratio: 56.8% **Pass**

## Plate Data

W=Side:	57	in
Thick:	2.75	in
Grade:	36	ksi
Clip Distance:	11	in

## Base Plate Results

Base Plate Stress: 26.5 ksi  
 PL Design Bending Strength,  $\Phi * F_y$ : 32.4 ksi  
 Base Plate Stress Ratio: 81.8% **Pass**

## Flexural Check

PL Ref. Data	
Yield Line (in):	29.36
Max PL Length:	29.36

## Stiffener Data (Welding at both sides)

Configuration:	Unstiffened
Weld Type:	**
Groove Depth:	in **
Groove Angle:	degrees
Fillet H. Weld:	<-- Disregard
Fillet V. Weld:	in
Width:	in
Height:	in
Thick:	in
Notch:	in
Grade:	ksi
Weld str.:	ksi

## N/A - Unstiffened

## Stiffener Results

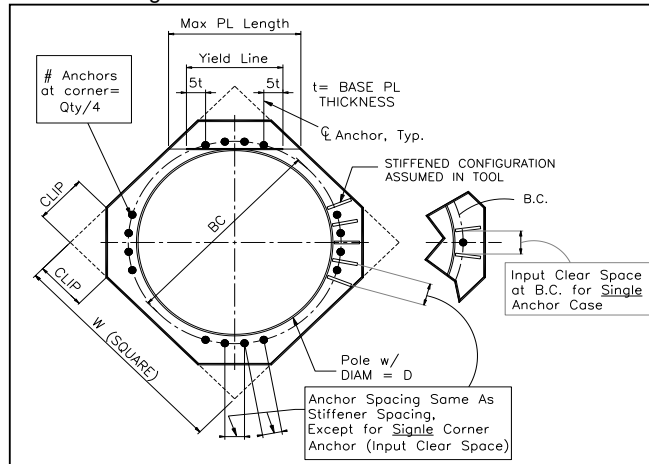
Horizontal Weld : N/A  
 Vertical Weld: N/A  
 Plate Flex+Shear,  $f_b/F_b + (f_v/F_v)^2$ : N/A  
 Plate Tension+Shear,  $f_t/F_t + (f_v/F_v)^2$ : N/A  
 Plate Comp. (AISC Bracket): N/A

## Pole Results

Pole Punching Shear Check: N/A

## Pole Data

Diam:	51.25	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round



\*\* Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes



## Drilled Pier Foundation



BU #: 841793  
 Site Name: WINDSOR PINE LANE  
 App. Number: 413693 Rev#2

TIA-222 Revison: G  
 Tower Type: Monopole

Applied Loads		
	Comp.	Uplift
Moment (kip-ft)	2747	
Axial Force (kips)	37	
Shear Force (kips)	27	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi

Pier Design Data		
Depth	32	ft
Ext. Above Grade	0	ft
Pier Section 1		
<i>From 0' below grade to 32' below grade</i>		
Pier Diameter	7	ft
Rebar Quantity	24	
Rebar Size	8	
Clear Cover to Ties	3	in
Tie Size	3	

Analysis Results		
Soil Lateral Capacity		
D <sub>v=0</sub> (ft from TOC)	5.07	-
Soil Safety Factor	1.90	-
Max Moment (kip-ft)	2888.47	-
Rating	70.1%	-
Soil Vertical Capacity		
Skin Friction (kips)	145.15	-
End Bearing (kips)	86.59	-
Weight of Concrete (kips)	149.63	-
Total Capacity (kips)	231.74	-
Axial (kips)	186.63	-
Rating	80.5%	-
Reinforced Concrete Capacity		
Critical Depth (ft from TOC)	5.30	-
Critical Moment (kip-ft)	2887.96	-
Critical Moment Capacity	3229.42	-
Rating	89.4%	-
<b>Soil Interaction Rating</b>		<b>80.5%</b>
<b>Structural Foundation Rating</b>		<b>89.4%</b>

Min. Steel is assumed

Soil Profile				
Groundwater Depth	7	ft	# of Layers	3

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ <sub>soil</sub> (pcf)	γ <sub>concrete</sub> (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.5	3.5	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.5	7	3.5	120	150	0	30	0.550	0.550				11	Cohesionless
3	7	32	25	50	87.6	0.5	0	0.275	0.275			3		Cohesive



**GENERAL CONSTRUCTION NOTES:**

**TOWER OWNER NOTIFICATION: CROWN CASTLE NOTICE TO PROCEED IS REQUIRED PRIOR TO STARTING WORK. ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER NOTED ON THE NTP A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1-800-788-7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.**

- FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:  
GENERAL CONTRACTOR  
SUBCONTRACTOR – CONTRACTOR (CONSTRUCTION)  
OWNER – AT&T
- ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.
- GENERAL CONTRACTOR AND SUBCONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR AND SUBCONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT/ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
- ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL 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 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.
- PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ARCHITECT/ENGINEER PRIOR TO PROCEEDING WITH WORK.
- THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE SPACE FOR APPROVAL BY THE ARCHITECT/ENGINEER PRIOR TO PROCEEDING. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.
- GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINE.
- ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMEN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.
- SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. SUBCONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.
- WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. SUBCONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
- SUBCONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
- THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
- THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
- GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND SUBCONTRACTORS TO THE SITE AND/OR BUILDING.
- THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.
- THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.
- 

- THE GENERAL CONTRACTOR AND SUBCONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2-A OT 2-A-10-B-C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.
- ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ARCHITECT/ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, D) TRENCHING & EXCAVATION.
- ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ARCHITECT/ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.
- THE AREAS OF THE OWNER'S 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.
- SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.
- NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
- THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE-APPROVED BY THE LOCAL JURISDICTION.
- ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.
- ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.
- SUBCONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS-BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.
- SUBCONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.
- THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).
- OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.
- NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.
- ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION OF AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING." IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.
- SUBCONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF SUBCONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.
- SUBCONTRACTOR SHALL REMOVED ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
- INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
- NO WHITE STROBE LIGHTS ARE PERMITTED. ANY REQUIRED LIGHTING MUST MEET FAA STANDARDS AND REQUIREMENTS.
- ALL COAXIAL CABLE INSTALLATIONS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
- NO SIGNIFICANT NOISE, SMOKE, DUST OR VIBRATIONS WILL RESULT FROM THIS FACILITY. (DISREGARD THIS NOTE IF THIS SITE HAS A GENERATOR)
- NO ADDITIONAL PARKING TO BE PROPOSED. EXISTING ACCESS AND PARKING TO REMAIN, UNLESS NOTED OTHERWISE.
- NO LANDSCAPING IS PROPOSED AT THIS SITE, UNLESS NOTED OTHERWISE.

**ELECTRICAL NOTES:**

- ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL ANY/ALL ELECTRICAL WORK INDICATED. ANY/ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH DRAWINGS AND ANY/ALL APPLICABLE SPECIFICATIONS. IF ANY PROBLEMS ARE ENCOUNTERED BY COMPLYING WITH THESE REQUIREMENTS, CONTRACTOR SHALL NOTIFY 'CONSTRUCTION MANAGER' AS SOON AS POSSIBLE, AFTER THE DISCOVERY OF THE PROBLEMS, AND SHALL NOT PROCEED WITH THAT PORTION OF WORK, UNTIL THE 'CONSTRUCTION MANAGER' HAS DIRECTED THE CORRECTIVE ACTIONS TO BE TAKEN.
- ELECTRICAL CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE HIMSELF WITH ANY/ALL CONDITIONS AFFECTING ELECTRICAL AND COMMUNICATION INSTALLATION AND MAKE PROVISIONS AS TO THE COST THEREOF. ALL EXISTING CONDITIONS OF ELECTRICAL EQUIP., LIGHT FIXTURES, ETC., THAT ARE PART OF THE FINAL SYSTEM, SHALL BE VERIFIED BY THE CONTRACTOR, PRIOR TO THE SUBMITTING OF HIS BID. FAILURE TO COMPLY WITH THIS PARAGRAPH WILL IN NO WAY RELIEVE CONTRACTOR OF PERFORMING ALL WORK NECESSARY FOR A COMPLETE AND WORKING SYSTEM.

- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF THE NEC AND ALL CODES AND LOCAL ORDINANCES OF THE LOCAL POWER & TELEPHONE COMPANIES HAVING JURISDICTION AND SHALL INCLUDE BUT NOT BE LIMITED TO:  
C – NATIONAL FIRE CODES  
A. UL – UNDERWRITERS LABORATORIES  
B. NEC – NATIONAL ELECTRICAL CODE  
C. NEMA – NATIONAL ELECTRICAL MANUFACTURERS ASSOC.  
D. OSHA – OCCUPATIONAL SAFETY AND HEALTH ACT  
E. SBC – STANDARD BUILDING CODE
- DO NOT SCALE ELECTRICAL DRAWINGS; REFER TO SITE PLANS AND ELEVATIONS FOR EXACT LOCATIONS OF ALL EQUIPMENT, AND CONFIRM WITH 'CONSTRUCTION MANAGER' ANY SIZES AND LOCATIONS WHEN NEEDED. EXISTING SERVICES: CONTRACTOR SHALL NOT INTERRUPT EXISTING SERVICES WITHOUT WRITTEN PERMISSION OF THE OWNER.
- CONTRACTOR SHALL PAY FOR ANY/ALL PERMITS, FEES, INSPECTIONS, AND TESTING. CONTRACTOR IS TO OBTAIN PERMITS AND APPROVED SUBMITTALS PRIOR TO THE WORK BEGINNING OR ORDERING EQUIPMENT.
- THE TERM "PROVIDE" USED IN CONSTRUCTION DOCUMENTS AND SPECIFICATIONS, INDICATES THAT THE CONTRACTOR SHALL FURNISH AND INSTALL.
- CONTRACTOR SHALL CONFIRM WITH LOCAL UTILITY COMPANY ANY/ALL REQUIREMENTS, SUCH AS THE: LUG SIZE RESTRICTIONS, CONDUIT ENTRY, SIZE OF TRANSFORMERS, SCHEDULED DOWNTIME FOR THE OWNERS' CONFIRMATION, ETC... ANY/ALL CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE CONSTRUCTION MANAGER, PRIOR TO BEGINNING ANY WORK.
- MINIMUM WIRE SIZE SHALL BE #12 AWG, NOT INCLUDING CONTROL WIRING, UNLESS NOTED OTHERWISE. ALL CONDUCTORS SHALL BE COPPER WITH THWN INSULATION.
- OUTLET BOXES SHALL BE PRESSED STEEL IN DRY LOCATIONS, CAST ALLOY WITH THREADED HUBS IN WET/DAMP LOCATIONS AND SPECIAL ENCLOSURES FOR OTHER CLASSIFIED AREAS.
- IT IS NOT THE INTENT OF THESE PLANS TO SHOW EVERY MINOR DETAIL OF THE CONSTRUCTION. CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL ITEMS FOR A COMPLETE ELECTRICAL SYSTEM AND PROVIDE ALL REQUIREMENTS FOR THE EQUIPMENT TO BE PLACED IN PROPER WORKING ORDER.
- ELECTRICAL SYSTEM SHALL BE AS COMPLETELY AND EFFECTIVELY GROUNDING, AS REQUIRED BY SPECIFICATIONS, SET FORTY BY AT&T.
- ALL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR IN A FIRST CLASS, WORKMANLIKE MANNER. THE COMPLETED SYSTEM SHALL BE FULLY OPERATIVE AND SUBJECT TO REGULATORY INSPECTION & APPROVAL BY CONSTRUCTION MANAGER.
- ALL WORK SHALL BE COORDINATED WITH OTHER TRADES TO AVOID INTERFERENCE WITH THE PROGRESS OF CONSTRUCTION.
- CONTRACTOR SHALL GUARANTEE ANY/ALL MATERIALS AND WORK FREE FROM DEFECTS FOR A PERIOD OF NOT LESS THAN ONE YEAR FROM DATE OF ACCEPTANCE.
- THE CORRECTION OF ANY DEFECTS SHALL BE COMPLETED WITHOUT ANY ADDITIONAL CHARGE AND SHALL INCLUDE THE REPLACEMENT OR THE REPAIR OF ANY OTHER PHASE OF THE INSTALLATION, WHICH MAY HAVE BEEN DAMAGED THEREIN.
- ADEQUATE AND REQUIRED LIABILITY INSURANCE SHALL BE PROVIDED FOR PROTECTION AGAINST PUBLIC LOSS AND ANY/ALL PROPERTY DAMAGE FOR THE DURATION OF WORK.
- PROVIDE AND INSTALL CONDUIT, CONDUCTORS, PULL WIRES, BOXES, COVER PLATES AND DEVICES FOR ALL OUTLETS AS INDICATED.
- DITCHING AND BACK FILL: CONTRACTOR SHALL PROVIDE FOR ALL UNDERGROUND INSTALLED CONDUIT AND/OR CABLES INCLUDING EXCAVATION, BACKFILLING AND COMPACTION. REFER TO 'FOUNDATION, EXCAVATION, AND BACKFILLING NOTES.'
- MATERIALS, PRODUCTS AND EQUIPMENT, INCLUDING ALL COMPONENTS THEREOF, SHALL BE NEW AND SHALL APPEAR ON THE LIST OF U.L. APPROVED ITEMS AND SHALL MEET OR EXCEED THE REQUIREMENTS OF THE NEC, NEMA, AND ICEE.
- CONTRACTOR SHALL SUBMIT SHOP DRAWINGS OR MANUFACTURERS CATALOG INFORMATION OF ANY/ALL LIGHTING FIXTURES, SWITCHES, AND ALL OTHER ELECTRICAL ITEMS FOR APPROVAL BY THE CONSTRUCTION MANAGER PRIOR TO INSTALLATION.
- ANY CUTTING OR PATCHING DEEMED NECESSARY FOR ELECTRICAL WORK IS THE ELECTRICAL CONTRACTORS RESPONSIBILITY AND SHALL BE INCLUDED IN THE COST FOR WORK AND PERFORMED TO THE SATISFACTION OF THE 'CONSTRUCTION MANAGER' UPON FINAL ACCEPTANCE.
- THE ELECTRICAL CONTRACTOR SHALL LABEL AL PANELS WITH ONLY TYPEWRITTEN DIRECTORIES. ALL ELECTRICAL WIRING SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
- DISCONNECT SWITCHES SHALL BE H.P. RATED HEAVY-DUTY, QUICK-MADE AND QUICK-BREAK ENCLOSURES, AS REQUIRED BY EXPOSURE TYPE.
- ALL CONNECTIONS SHALL BE MADE WITH A PROTECTIVE COATING OF AN ANTI-OXIDE COMPOUND SUCH AS "NO-OXIDE A" BY DEARBORNE CHEMICAL CO. COAT ALL WIRE SURFACES BEFORE CONNECTING. EXPOSED COPPER SURFACES, INCLUDING GROUND BARS, SHALL BE TREATED – NO SUBSTITUTIONS.
- RACEWAYS: CONDUIT SHALL BE SCHEDULE 40 PVC MEETING OR EXCEEDING NEMA TC2 – 1990. CONTRACTOR SHALL PLUG AND CAP EACH END OF SPARE AND EMPTY CONDUITS AND PROVIDE TWO SEPARATE PULL STRINGS – 200 LBS TEST POLYETHYLENE CORD. ALL CONDUIT BENDS SHALL BE A MINIMUM OF 2 FT. RADIUS. RGS CONDUITS WHEN SPECIFIED, SHALL MEET UL-6 FOR GALVANIZED STEEL. ALL FITTINGS SHALL BE SUITABLE FOR USE WITH THREADING RIGID CONDUIT. COAT ALL THREADS WITH 'BRITE ZINC' OR 'GOLD CALV.'
- SUPPORT OF ALL ELECTRICAL WORK SHALL BE AS REQUIRED BY NEC.
- CONDUCTORS: CONTRACTOR SHALL USE 98% CONDUCTIVITY COPPER WITH TYPE THWN INSULATION, 800 VOLT, COLOR CODED. USE SOLID CONDUCTORS FOR WIRE UP TO AND INCLUDING NO. 8 AWG. USE STRANDED CONDUCTORS FOR WIRE ABOVE NO. 8 AWG.

- CONNECTORS FOR POWER CONDUCTORS: CONTRACTOR SHALL USE PRESSURE TYPE INSULATED TWIST-ON CONNECTORS FOR NO. 10 AWG AND SMALLER. USE SOLDERLESS MECHANICAL TERMINAL LUGS FOR NO. 8 AWG AND LARGER.
- SERVICES: 240/120V, SINGLE PHASE, 3 WIRE CONNECTION AVAILABLE FROM UTILITY COMPANY. OWNER OR OWNERS AGENT WILL APPLY FOR POWER.
- TELEPHONE SERVICE: CONTRACTOR SHALL PROVIDE EMPTY CONDUITS WITH PULL STRINGS AS INDICATED ON DRAWINGS.
- ELECTRICAL AND TELCO RACEWAYS TO BE BURIED A MINIMUM OF 2' DEPTH. CONTRACTOR SHALL PLACE TWO LENGTHS OF WARNING TAPE AT A DEPTH OF 12" BELOW GROUND AND DIRECTLY ABOVE ELECTRICAL AND TELCO SERVICE CONDUITS. CAUTION TAPE TO READ "CAUTION BURIED ELECTRIC" OR "BURIED TELECOMM."
- ALL BOLTS SHALL BE STAINLESS STEEL

**GROUNDING NOTES:**

- COMPRESSION CONNECTIONS (2), 2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
- EC SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P," "A," "N," "I") WITH 1" LETTERS. ALL HARDWARE 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8 INCH DIAMETER OR LARGER. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
- NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE.
- NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
- WHEN THE SCOPE OF WORK REQUIRES THE ADDITION OF A GROUNDING BAR TO AN EXISTING TOWER, THE SUBCONTRACTOR SHALL OBTAIN APPROVAL FROM THE TOWER OWNER PRIOR TO MOUNTING THE GROUNDING BAR TO THE TOWER.
- ALL ELECTRICAL AND GROUNDING AT THE CELL SITE SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 780 (LATEST EDITION), AND MANUFACTURER.

**FOUNDATION, EXCAVATION, & BACKFILL NOTES:**

- ALL FINAL GRADED SLOPES SHALL BE A MAXIMUM OF 3 HORIZONTAL TO 1 VERTICAL.
- ALL EXCAVATIONS PREPARED FOR PLACEMENT OF CONCRETE SHALL BE OF UNDISTURBED SOILS, SUBSTANTIALLY HORIZONTAL, AND FREE FROM ANY LOOSE, UNSUITABLE MATERIAL OR FROZEN SOILS, AND WITHOUT THE PRESENCE OF POUNDING WATER. DEWATERING FOR EXCESS GROUND WATER SHALL BE PROVIDED WHEN REQUIRED. COMPACTION OF SOILS UNDER CONCRETE PAD FOUNDATIONS SHALL NOT BE LESS THAN 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY FOR THE SOIL IN ACCORDANCE WITH ASTM D1557.
- CONCRETE FOUNDATIONS SHALL NOT BE PLACED ON ORGANIC OR UNSUITABLE MATERIAL. IF INADEQUATE BEARING CAPACITY IS REACHED AT THE DESIGNED EXCAVATION DEPTH, THE UNSATISFACTORY SOIL SHALL BE EXCAVATED TO ITS FULL DEPTH AND EITHER BE REPLACED WITH MECHANICALLY COMPACTED GRANULAR MATERIAL OR THE EXCAVATION SHALL BE FILLED WITH CONCRETE OF THE SAME TYPE SPECIFIED FOR THE FOUNDATION. CRUSHED STONE MAY BE USED TO STABILIZE THE BOTTOM OF THE EXCAVATION. ANY STONE SUB BASE MATERIAL, IF USED, SHALL NOT SUBSTITUTE FOR REQUIRED THICKNESS OF CONCRETE.
- ALL EXCAVATIONS SHALL BE CLEAN OF UNSUITABLE MATERIAL SUCH AS VEGETATION, TRASH, DEBRIS, AND SO FORTH PRIOR TO BACK FILLING. BACK FILL SHALL CONSIST OF APPROVED MATERIALS SUCH AS EARTH, LOAM, SANDY CLAY, SAND AND GRAVEL, OR SOFT SHALE, FREE FROM CLODS OR LARGE STONES OVER 2 1/2 MAX DIMENSIONS. ALL BACK FILL SHALL BE PLACED IN COMPACTED LAYERS.
- ALL FILL MATERIALS AND FOUNDATION BACK FILL SHALL BE PLACED IN MAXIMUM 6" THICK LIFTS BEFORE COMPACTION. EACH LIFT SHALL BE WETTED IF REQUIRED AND COMPACTED TO NOT LESS THAN 95% OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY FOR SOIL IN ACCORDANCE WITH ASTM D1557
- NEWLY PLACED CONCRETE FOUNDATIONS SHALL CURE A MINIMUM OF 72 HOURS PRIOR TO BACK FILLING.
- FINISHED GRADING SHALL BE SLOPED TO PROVIDE POSITIVE DRAINAGE AND PREVENT STANDING WATER. THE FINAL (FINISH) ELEVATION OF SLAB FOUNDATIONS SHALL SLOPE AWAY IN ALL DIRECTIONS FROM THE CENTER. FINISH GRADE OF CONCRETE PADS SHALL BE A MAXIMUM OF 4 INCHES ABOVE FINAL FINISH GRADE ELEVATIONS. PROVIDE SURFACE FILL GRAVEL TO ESTABLISH SPECIFIED ELEVATIONS WHERE REQUIRED.
- NEWLY GRADED SURFACE AREAS TO RECEIVE GRAVEL SHALL BE COVERED WITH GEOTEXTILE FABRIC TYPE: TYPAR-3401 AS MANUFACTURED BY "CONSTRUCTION MATERIAL 1-800-239-3841" OR AN APPROVED EQUIVALENT, SHOWN ON PLANS. THE GEOTEXTILE FABRIC SHALL BE BLACK IN COLOR TO CONTROL THE RECURRENCE OF VEGETATIVE GROWTH AND EXTEND TO WITHIN 1 FOOT OUTSIDE THE SITE FENCING OR ELECTRICAL GROUNDING SYSTEM PERIMETER WHICHEVER IS GREATER. ALL FABRIC SHALL BE COVERED WITH A MINIMUM OF 4" DEEP COMPACTED STONE OR GRAVEL AS SPECIFIED. I.E. FDOT TYPE NO.57 FOR FENCED COMPOUND; FDOT TYPE NO. 67 FOR ACCESS DRIVE AREA.
- IN ALL AREAS TO RECEIVE FILL, REMOVE ALL VEGETATION, TOPSOIL, DEBRIS, WET AND UNSATISFACTORY SOIL MATERIALS, OBSTRUCTIONS, AND DELETERIOUS MATERIALS FROM GROUND SURFACE. FLOW STRIP OR BREAK UP SLOPED SURFACES STEEPER THAN 1 VERTICAL TO 4 HORIZONTAL SUCH THAT FILL MATERIAL WILL BIND WITH EXISTING/PREPARED SOIL SURFACE.

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**GENERAL NOTES**

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**C1**



10. WHEN SUBGRADE OR PREPARED GROUND SURFACE HAS A DENSITY LESS THAN THAT REQUIRED FOR THE FILL MATERIAL, SCARIFY THE GROUND SURFACE TO DEPTH REQUIRED, PULVERIZE, MOISTURE-CONDITION AND/OR AERATE THE SOILS AND RE-COMPACT TO THE REQUIRED DENSITY PRIOR TO PLACEMENT OR FILLS.
11. IN AREAS WHICH EXISTING GRAVEL SURFACING IS REMOVED OR DISTURBED DURING CONSTRUCTION OPERATIONS, REPLACE GRAVEL SURFACING TO MATCH ADJACENT GRAVEL SURFACING AND RESTORED TO THE SAME THICKNESS AND COMPACTION AS SPECIFIED. ALL RESTORED GRAVEL SURFACING SHALL BE FREE FROM CORRUGATIONS AND WAVES.
12. EXISTING GRAVEL SURFACING MAY BE EXCAVATED SEPARATELY AND REUSED WITH THE CONDITION THAT ANY UNFAVORABLE AMOUNTS OF ORGANIC MATTER, OR OTHER DELETERIOUS MATERIALS ARE REMOVED PRIOR TO REUSE. FURNISH ANY ADDITIONAL GRAVEL RESURFACING MATERIAL AS NEEDED TO PROVIDE A FULL DEPTH COMPACTED SURFACE THROUGHOUT SITE.
13. GRAVEL SUB SURFACE SHALL BE PREPARED TO REQUIRED COMPACTION AND SUBGRADE ELEVATIONS BEFORE GRAVEL SURFACING IS PLACED AND/OR RESTORED. ANY LOOSE OR DISTURBED MATERIALS SHALL BE THOROUGHLY COMPACTED AND ANY DEPRESSIONS IN THE SUBGRADE SHALL BE FILLED AND COMPACTED WITH APPROVED SELECTED MATERIAL. GRAVEL SURFACING MATERIAL SHALL NOT BE USED FOR FILLING DEPRESSIONS IN THE SUBGRADE.
14. PROTECT EXISTING GRAVEL SURFACING AND SUBGRADE IN AREAS WHERE EQUIPMENT LOADS WILL OPERATE. USE PLANKING 'MATT'S' OR OTHER SUITABLE PROTECTION DESIGNED TO SPREAD EQUIPMENT LOADS AS MAY BE NECESSARY. REPAIR ANY DAMAGE TO EXISTING GRAVEL SURFACING OR SUB GRADE WHERE SUCH DAMAGE IS DUE TO THE CONTRACTORS OPERATIONS.
15. DAMAGE TO EXISTING STRUCTURES AND/OR UTILITIES RESULTING FROM CONTRACTORS NEGLIGENCE SHALL BE REPAIRED AND/OR REPLACED TO THE OWNERS SATISFACTION AT NO ADDITIONAL COST TO THE CONTRACT.
16. ALL SUITABLE BORROW MATERIAL FOR BACK FILL OF THE SITE SHALL BE INCLUDED IN THE BID. EXCESS TOPSOIL AND UNSUITABLE MATERIAL SHALL BE DISPOSED OF OFF SITE AT LOCATIONS APPROVED BY GOVERNING AGENCIES AT NO ADDITIONAL COST TO THE CONTRACT.

**ENVIRONMENTAL NOTES:**

1. ALL WORK PERFORMED SHALL BE DONE IN ACCORDANCE WITH ISSUED PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYMENT OF FINES AND PROPER CLEAN UP FOR AREAS IN VIOLATION.
2. CONTRACTOR AND/OR DEVELOPER SHALL BE RESPONSIBLE FOR CONSTRUCTION AND MAINTENANCE OF EROSION AND SEDIMENTATION CONTROLS DURING CONSTRUCTION FOR PROTECTION OF ADJACENT PROPERTIES, ROADWAYS AND WATERWAYS AND SHALL BE MAINTAINED IN PLACE THROUGH FINAL JURISDICTIONAL INSPECTION & RELEASE OF SITE.
3. CONTRACTOR SHALL INSTALL/CONSTRUCT ALL NECESSARY SEDIMENT/SILT CONTROL FENCING AND PROTECTIVE MEASURES WITHIN THE LIMITS OF SITE DISTURBANCE PRIOR TO CONSTRUCTION.
4. NO SEDIMENT SHALL BE ALLOWED TO EXIT THE PROPERTY. THE CONTRACTOR IS RESPONSIBLE FOR TAKING ADEQUATE MEASURES FOR CONTROLLING EROSION. ADDITIONAL SEDIMENT CONTROL FENCING MAY BE REQUIRED IN ANY AREAS SUBJECT TO EROSION.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR DAILY INSPECTIONS AND ANY REPAIRS OF ALL SEDIMENT CONTROL MEASURES INCLUDING SEDIMENT REMOVAL AS NECESSARY.
6. CLEARING OF VEGETATION AND TREE REMOVAL SHALL BE ONLY AS PERMITTED AND BE HELD TO A MINIMUM. ONLY TREES NECESSARY FOR CONSTRUCTION OF THE FACILITIES SHALL BE REMOVED.
7. SEEDING AND MULCHING AND/OR SODDING OF THE SITE WILL BE ACCOMPLISHED AS SOON AS POSSIBLE AFTER COMPLETION OF THE PROJECT FACILITIES AFFECTING LAND DISTURBANCE.
8. CONTRACTOR SHALL PROVIDE ALL EROSION AND SEDIMENTATION CONTROL MEASURES AS REQUIRED BY LOCAL, COUNTY AND STATE CODES AND ORDINANCES TO PROTECT EMBANKMENTS FROM SOIL LOSS AND TO PREVENT ACCUMULATION OF SOIL AND SILT IN STREAMS AND DRAINAGE PATHS LEAVING THE CONSTRUCTION AREA. THIS MAY INCLUDE SUCH MEASURES AS SILT FENCES, STRAW BALE SEDIMENT BARRIERS, AND CHECK DAMS.
9. RIP RAP OF SIZES INDICATED SHALL CONSIST OF CLEAN, HARD, SOUND, DURABLE, UNIFORM IN QUALITY STONE FREE OF ANY DETRIMENTAL QUANTITY OF SOFT, FRIABLE, THIN, ELONGATED OR LAMINATED PIECES, DISINTEGRATED MATERIAL, ORGANIC MATTER, OIL, ALKALI, OR OTHER DELETERIOUS SUBSTANCES.

**CONCRETE MASONRY NOTES:**

1. CONCRETE MASONRY UNITS SHALL BE MEDIUM WEIGHT UNITS CONFORMING TO ASTM C90, GRADE N-1, (F'M=1,500 PSI). MEDIUM WEIGHT (115).
2. MORTAR SHALL BE TYPE "S" (MINIMUM 1,800 PSI AT 28 DAYS).
3. GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI AT 28 DAYS.
4. ALL CELLS CONTAINING REINFORCING STEEL OR EMBEDDED ITEMS AND ALL CELLS IN RETAINING WALLS AND WALLS BELOW GRADE SHALL BE SOLID GROUTED.
5. ALL HORIZONTAL REINFORCING STEEL SHALL BE PLACED IN BOND BEAM OR LINTEL BEAM UNITS.
6. WHEN GROUTING IS STOPPED FOR ONE HOUR OR LONGER, HORIZONTAL CONSTRUCTION JOINTS SHALL BE FORMED BY STOPPING THE GROUT POUR 1-1/2" BELOW TOP OF THE UPPERMOST UNIT.
7. ALL BOND BEAM BLOCK SHALL BE "DEEP CUT" UNITS.
8. PROVIDE INSPECTION AND CLEAN-OUT HOLES AT BASE OF VERTICAL CELLS HAVING GROUT LIFTS IN EXCESS OF 4'-0" OF HEIGHT.
9. ALL GROUT SHALL BE CONSOLIDATED WITH A MECHANICAL VIBRATOR.
10. CEMENT SHALL BE AS SPECIFIED FOR CONCRETE.
11. REINFORCING BARS - SEE NOTES UNDER "REINFORCING STEEL" FOR REQUIREMENTS.

31. PROVIDE ONE BAR DIAMETER (A MINIMUM OF 1/2") GROUT BETWEEN MAIN REINFORCING AND MASONRY UNITS.
32. LOW LIFT CONSTRUCTION, MAXIMUM GROUT POUR HEIGHT IS 4 FEET.
33. LIFT GROUTED CONSTRUCTION MAY BE USED IN CONFORMANCE WITH PROJECT SPECIFICATIONS AND SECTION 2104.6.1 OF CURRENT BUILDING CODE.
34. ALL CELLS IN CONCRETE BLOCKS SHALL BE FILLED SOLID WITH GROUT, EXCEPT AS NOTED IN THE DRAWINGS OR SPECIFICATIONS.
35. CELLS SHALL BE IN VERTICAL ALIGNMENT, DOWELS IN FOOTINGS SHALL BE SET TO ALIGN WITH CORES CONTAINING REINFORCING STEEL.
36. REFER TO ARCHITECTURAL DRAWINGS FOR SURFACE AND HEIGHT OF UNITS, LAYING PATTERN AND JOINT TYPE.
37. SAND SHALL BE CLEAN, SHARP AND WELL GRADED, FREE FROM INJURIOUS AMOUNTS OF DUST, LUMPS, SHALE, ALKAU OR ORGANIC MATERIAL.
38. BRICK SHALL CONFORM TO ASTM C-62 AND SHALL BE GRADE MW OR BETTER.

**STRUCTURAL CONCRETE NOTES:**

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI-301-10
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH  $f'_c=2,500$  PSI AT 28 DAYS UNLESS NOTED OTHERWISE.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
 

CONCRETE CAST AGAINST EARTH	3 IN.
CONCRETE EXPOSED TO EARTH OR WEATHER:	
#6 AND LARGER	2 IN.
#5 AND SMALLER & WWF	1-1/2 IN.
CONCRETE NOT EXPOSED TO EARTH OR WEATHER, NOR CAST AGAINST THE GROUND:	
SLAB AND WALL	3/4 IN.
BEAMS AND COLUMNS	1-1/2 IN.
5. A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE U.N.O. IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. HOLES TO RECEIVE EXPANSION/WEDGE ANCHORS SHALL BE 1/8" LARGER IN DIAMETER THAN THE ANCHOR BOLD, DOWEL OR ROD AND SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. LOCATE AND AVOID CUTTING EXISTING REBAR WHEN DRILLING HOLES IN ELEVATED CONCRETE SLABS.
7. USE AND INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER ICBO & MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURES.

**STRUCTURAL STEEL NOTES:**

1. ALL STEEL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION. STEEL SECTIONS SHALL BE IN ACCORDANCE WITH ASTM AS INDICATED BELOW:  
W-SHAPES: ASTM A992, 50 KSI  
ANGLES, BARS CHANNELS: ASTM A36, 36 KSI  
HSS SECTIONS: ASTM 500, 46 KSI  
PIPE SECTIONS: ASTM A53-E, 35 KSI
2. ALL EXTERIOR EXPOSED STEEL AND HARDWARE SHALL BE HOT DIPPED GALVANIZED.
3. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION." PAINTED SURFACES SHALL BE TOUCHED UP.
4. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE 3/4" Ø CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
5. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" Ø ASTM A307 BOLTS UNLESS NOTED OTHERWISE.
6. FIELD MODIFICATIONS ARE TO BE COATED WITH ZINC ENRICHED PAINT.

**SITE WORK & DRAINAGE:**

**PART 1 - GENERAL**

CLEARING, GRUBBING, STRIPPING, EROSION CONTROL, SURVEY, LAYOUT, SUBGRADE PREPARATION AND FINISH GRADING AS REQUIRED TO COMPLETE THE PROPOSED WORK SHOWN IN THESE PLANS.

**1.1 REFERENCES:**

- A. DOT (STATE DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR WAY CONSTRUCTION - CURRENT EDITION)
- B. ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)
- C. OSHA (OCCUPATION SAFETY AND HEALTH ADMINISTRATION)

**1.2 INSPECTION AND TESTING:**

- A. FIELD TESTING OF EARTHWORK COMPACTION AND CONCRETE CYLINDERS
- B. ALL WORK SHALL BE INSPECTED AND RELEASED BY THE GENERAL CONTRACTOR WHO SHALL CARRY OUT THE GENERAL INSPECTION OF THE WORK WITH SPECIFIC CONCERN TO PROPER PERFORMANCE OF THE WORK AS SPECIFIED AND/OR CALLED FOR ON THE DRAWINGS. IT IS THE SUBCONTRACTOR'S RESPONSIBILITY TO REQUEST TIMELY INSPECTIONS PRIOR TO PROCEEDING WITH FURTHER WORK THAT WOULD MAKE PARTS OF WORK INACCESSIBLE OR DIFFICULT TO INSPECT.

**1.3 SITE MAINTENANCE AND PROTECTION:**

- A. PROVIDE ALL NECESSARY JOB SITE MAINTENANCE FROM COMMENCEMENT OF WORK UNTIL COMPLETION OF THE SUBCONTRACT.
- B. AVOID DAMAGE TO THE SITE AND TO EXISTING FACILITIES, STRUCTURES, TREES, AND SHRUBS DESIGNATED TO REMAIN. TAKE PROTECTIVE MEASURES TO PREVENT EXISTING FACILITIES THAT ARE NOT DESIGNATED FOR REMOVAL FROM BEING DAMAGED BY THE WORK.
- C. KEEP SITE FREE OF ALL PONDING WATER.
- D. PROVIDE EROSION CONTROL MEASURES IN ACCORDANCE WITH STATE DOT AND EPA REQUIREMENTS.
- E. PROVIDE AND MAINTAIN ALL TEMPORARY FENCING, BARRICADES, WARNING SIGNALS AND SIMILAR DEVICES NECESSARY TO PROTECT AGAINST THEFT FROM PROPERTY DURING THE ENTIRE PERIOD OF CONSTRUCTION. REMOVE ALL SUCH DEVICES UPON COMPLETION OF THE WORK.
- F. EXISTING UTILITIES: DO NOT INTERRUPT EXISTING UTILITIES SERVING FACILITIES OCCUPIED BY THE OWNER OR OTHERS, EXCEPT WHEN PERMITTED IN WRITING BY THE ENGINEER, AND THEN ONLY AFTER ACCEPTABLE TEMPORARY UTILITY SERVICES HAVE BEEN PROVIDED.

PROVIDE A MINIMUM 48-HOUR NOTICE TO THE ENGINEER AND RECEIVE WRITTEN NOTICE TO PROCEED BEFORE INTERRUPTING ANY UTILITY SERVICE.

**PART 2 - PRODUCTS**

- 2.1 SUITABLE BACKFILL: ASTM D2321 (CLASS I, II, III, OR IVA) FREE FROM FROZEN LUMPS, REFUSE, STONES OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- 2.2 NON-POROUS GRANULAR EMBANKMENT AND BACKFILL: ASTM D2321 (CLASS III, IVA OR IVB) COARSE AGGREGATE. FREE FROM FROZEN LUMPS, REFUSE, STONES, OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- 2.3 POROUS GRANULAR EMBANKMENT AND BACKFILL: ASTM D2321 (CLASS IA, IB, OR II) COARSE AGGREGATE FREE FROM FROZEN LUMPS, REFUSE, STONES, OR ROCKS LARGER THAN 3 INCHES IN ANY DIMENSION OR OTHER MATERIAL THAT MAY MAKE THE INORGANIC MATERIAL UNSUITABLE FOR BACKFILL.
- 2.4 SELECT STRUCTURAL FILL: GRANULAR FILL MATERIAL MEETING THE REQUIREMENTS OF ASTM E850-95. FOR USE AROUND AND UNDER STRUCTURES WHERE STRUCTURAL FILL MATERIAL ARE REQUIRED.
- 2.5 GRANULAR BEDDING AND TRENCH BACKFILL: WELL-GRADED SAND MEETING THE GRADATION REQUIREMENTS OF ASTM D2487 (SE OR SW-SM).
- 2.6 COARSE AGGREGATE FOR ACCESS ROAD SUB BASE COURSE SHALL CONFORM TO ASTM D2940.
- 2.7 UNSUITABLE MATERIAL: AND MODERATELY PLASTIC SILTS AND CLAYS (LL>45). MATERIAL CONTAINING REFUSE, FROZEN LUMPS, DEMOLISHED BITUMINOUS MATERIAL, VEGETATIVE MATTER, WOOD, STONES IN EXCESS OF 3 INCHES IN ANY DIMENSION, AND DEBRIS AS DETERMINED BY THE CONSTRUCTION MANAGER. TYPICAL THESE WILL BE SOILS CLASSIFIED BY ASTM AS PT, MH, CH, OH, ML, AND OL.
- 2.8 GEOTEXTILE FABRIC: MIRAFI 500X OR APPROVED EQUAL.
- 2.9 PLASTIC MARKING TAPE: SHALL BE ACID AND ALKALI RESISTANT POLYETHYLENE FILM SPECIFICALLY MANUFACTURED FOR MARKING AND LOCATING UNDERGROUND UTILITIES, 6 INCHES WIDE WITH A MINIMUM THICKNESS OF 0.004 INCH. TAPE SHALL HAVE MINIMUM STRENGTH OF 1500 PSI IN BOTH DIRECTIONS AND MANUFACTURED WITH INTEGRAL CONDUCTORS, FOIL BACKING OR OTHER MEANS TO ENABLE DETECTION BY A METAL DETECTOR WHEN BURIED UP TO 3 FEET DEEP. THE METALLIC CORE OF THE TAPE SHALL BE ENCASED IN A PROTECTIVE JACKET OR PROVIDED WITH OTHER MEANS TO PROTECT IT FROM CORROSION. TAPE COLOR SHALL BE RED FOR ELECTRIC UTILITIES AND ORANGE FOR TELECOMMUNICATION UTILITIES.

**PART 2 - EXECUTION**

**3.1 GENERAL:**

- A. BEFORE STARTING GENERAL SITE PREPARATION ACTIVITIES, INSTALL EROSION AND SEDIMENT CONTROL MEASURES. THE WORK AREA SHALL BE CONSTRUCTED AND MAINTAINED IN SUCH A CONDITION THAT IN THE EVENT OF RAIN THE SITE WILL BE DRAINED AT ANY TIME.
- B. BEFORE ALL SURVEY, LAYOUT, STAKING, AND MARKING, ESTABLISH AND MAINTAIN ALL LINES, GRADES, ELEVATIONS AND BENCHMARKS NEEDED FOR EXECUTION OF THE WORK.
- C. CLEAR AND GRUB THE AREA WITHIN THE LIMITS OF THE SITE. REMOVE TREES, BRUSH, STUMPS, RUBBISH AND OTHER DEBRIS AND VEGETATION RESTING ON OR PROTRUDING THROUGH THE SURFACE OF THE SITE AREA TO BE CLEARED.
  1. REMOVE THE FOLLOWING MATERIALS TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE ORIGINAL GROUND SURFACE: ROOTS, STUMPS, AND OTHER DEBRIS, BRUSH, AND REFUSE EMBEDDED IN OR PROTRUDING THROUGH THE GROUND SURFACE, RAKE, DISK OR PLOW THE AREA TO A DEPTH OF NO LESS THAN 6 INCHES, AND REMOVE TO A DEPTH OF 12 INCHES ALL ROOTS AND OTHER DEBRIS THEREBY EXPOSED.
  2. REMOVE TOPSOIL MATERIAL COMPLETELY FROM THE SURFACE UNTIL THE SOIL NO LONGER MEETS THE DEFINITION OF TOPSOIL. AVOID MIXING TOPSOIL WITH SUBSOIL OR OTHER UNDESIRABLE MATERIALS. EXCEPT WHERE EXCAVATION TO GREATER DEPTH IS INDICATED, FILL DEPRESSIONS RESULTING FROM CLEARING, GRUBBING, AND DEMOLITION WORK COMPLETELY WITH SUITABLE FILL.
  3. REMOVE FROM THE SITE AND DISPOSE IN AN AUTHORIZED LANDFILL ALL DEBRIS RESULTING FROM CLEARING AND GRUBBING OPERATIONS. BURNING WILL NOT BE PERMITTED.

- E. PRIOR TO EXCAVATING, THOROUGHLY EXAMINE THE AREA TO BE EXCAVATED AND/OR TRENCHED TO VERIFY THE LOCATIONS OF FEATURES INDICATED ON THE DRAWINGS AND TO ASCERTAIN THE EXISTENCE AND LOCATION OF ANY STRUCTURE, UNDERGROUND STRUCTURE, OR OTHER ITEM NOT SHOWN THAT MIGHT INTERFERE WITH THE PROPOSED CONSTRUCTION. NOTIFY THE CONSTRUCTION MANAGER OF ANY OBSTRUCTIONS THAT WILL PREVENT ACCOMPLISHMENT OF THE WORK AS INDICATED ON THE DRAWINGS.
- F. SEPARATE AND STOCK PILE AL EXCAVATED MATERIALS SUITABLE FOR BACKFILL. ALL EXCESS EXCAVATED AND UNSUITABLE MATERIALS SHALL BE DISPOSED OF OFF-SITE IN A LEGAL MANNER.

**3.2 BACKFILL:**

- A. AS SOON AS PRACTICAL, AFTER COMPLETING CONSTRUCTION OF THE RELATED STRUCTURE, INCLUDING EXPIRATION OF THE SPECIFIED MINIMUM CURING PERIOD FOR CAST-IN-PLACE CONCRETE, BACKFILL THE EXCAVATION WITH APPROVED MATERIAL TO RESTORE THE REQUIRED FINISHED GRADE.
- B. PRIOR TO PLACING BACKFILL AROUND STRUCTURES, ALL FORMS SHALL BE REMOVED AND THE EXCAVATION CLEANED OF ALL TRASH, DEBRIS, AND UNSUITABLE MATERIALS.
- C. BACKFILL BY PLACING AND COMPACTING SUITABLE BACKFILL MATERIAL OR SELECT GRANULAR BACKFILL MATERIAL WHEN REQUIRED IN UNIFORM HORIZONTAL LAYERS OF NO GREATER THAN 8-INCHES LOOSE THICKNESS AND COMPACTED. WHERE HAND OPERATED COMPACTORS ARE USED, THE FILL MATERIAL SHALL BE PLACED IN LIFTS NOT TO EXCEED 4 INCHES IN LOOSE DEPTH AND COMPACTED.
- D. WHENEVER THE DENSITY TESTING INDICATES THAT THE CONTRACTOR HAS NOT OBTAINED THE SPECIFIED DENSITY, THE SUCCEEDING LAYER SHALL NOT BE PLACED UNTIL THE SPECIFICATION REQUIREMENTS ARE MET UNLESS OTHERWISE AUTHORIZED BY THE GEOTECHNICAL ENGINEER. THE CONTRACTOR SHALL TAKE WHATEVER APPROPRIATE ACTION IS NECESSARY , SUCH AS DISKING AND DRYING, ADDING WATER, OR INCREASING THE COMPACTIVE EFFORT TO MEET THE MINIMUM COMPACTION REQUIREMENTS.
- E. THOROUGHLY COMPACT EACH LAYER OF BACKFILL TO A MINIMUM 95% OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.

**3.3 TRENCH EXCAVATION:**

- A. UTILITY TRENCHES SHALL BE EXCAVATED TO THE LINES AND GRADES SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE GENERAL CONTRACTOR. PROVIDE SHORING, SHEETING AND BRACING AS REQUIRED TO PREVENT CAVING OR SLOUGHING OF THE TRENCH WALLS.
- B. EXTEND THE TRENCH WIDTH A MINIMUM OF 6 INCHES BEYOND THE OUTSIDE EDGE OF THE OUTERMOST CONDUIT.
- C. WHEN SOFT YIELDING, OR OTHERWISE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, BACKFILL AT THE REQUIRED TRENCH TO A DEPTH OF NO LESS THAN 12 INCHES BELOW THE REQUIRED ELEVATION AND BACKFILL WITH GRANULAR BEDDING MATERIAL.

**3.4 TRENCH BACKFILL:**

- A. PROVIDE GRANULAR BEDDING MATERIAL IN ACCORDANCE WITH THE DRAWINGS AND THE UTILITY REQUIREMENTS.
- B. NOTIFY THE GENERAL CONTRACTOR 24 HOURS IN ADVANCE OF BACKFILLING.
- C. CONDUCT UTILITY CHECK TESTS BEFORE BACKFILLING. BACKFILL AND COMPACT TRENCH BEFORE ACCEPTANCE TESTING.
- D. PLACE GRANULAR TRENCH BACKFILL UNIFORMLY ON BOTH SIDES OF THE CONDUITS IN 6-INCH UNCOMPACTED LIFTS UNTIL 12 INCHES OVER THE CONDUITS. SOLIDLY RAM AND TAMP BACKFILL INTO SPACE AROUND CONDUITS.
- E. PROTECT CONDUIT FROM LATERAL MOVEMENT, IMPACT DAMAGE, OR UNBALANCED LOADING.
- F. ABOVE THE CONDUIT EMBEDMENT ZONE, PLACE AND COMPACT SATISFACTORY BACKFILL MATERIAL IN 8-INCH MAXIMUM LOOSE THICKNESS LIFTS TO RESTORE THE REQUIRED FINISHED SURFACE GRADE.
- G. COMPACT FINAL TRENCH BACKFILL TO A DENSITY EQUAL TO OR GREATER THAN THAT OF THE EXISTING UNDISTURBED MATERIAL IMMEDIATELY ADJACENT TO THE TRENCH BUT NO LESS THAN A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY AS PROVIDED BY THE STANDARD PROCTOR TEST, ASTM D 698.

**3.5 FINISH GRADING:**

- A. PERFORM ALL GRADING TO PROVIDE POSITIVE DRAINAGE AWAY FROM STRUCTURES AND SMOOTH, EVEN SURFACE DRAINAGE OF THE ENTIRE AREA WITHIN THE IMITS OF CONSTRUCTION. GRADING SHALL BE COMPATIBLE WITH ALL SURROUNDING TOPOGRAPHY AND STRUCTURES.
- B. UTILIZE SATISFACTORY FILL MATERIAL RESULTING FROM THE EXCAVATION WORK IN THE CONSTRUCTION OF FILLS, EMBANKMENTS AND FOR REPLACEMENT OF REMOVED UNSUITABLE MATERIALS.
- C. ACHIEVE FINISHED GRADE BY PLACING A MINIMUM OF 4 INCHES OF 1/2" - 3/4" CRUSHED STONE ON TOP SOIL STABILIZER FABRIC.
- D. REPAIR ALL ACCESS ROADS AND SURROUNDING AREAS USED DURING THE CORSE OF THIS WORK TO THEIR ORIGINAL CONDITION.

**3.7 ASPHALT PAVING ROAD:**

- A. DIVISION 600 - KDOT FLEXIBLE PAVEMENT. (UPDATE PER LOCAL DOT)
- B. SECTION 403 - MODOT ASPHALT CONCRETE PAVEMENT.

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Project Number:   406-000

Project Title:   FA# 10042353

**WINDSOR PINE LANE**  
  841793    
 50 PINE LANE  
 WINDSOR, CT 06095

Prepared For:   CROWN CASTLE

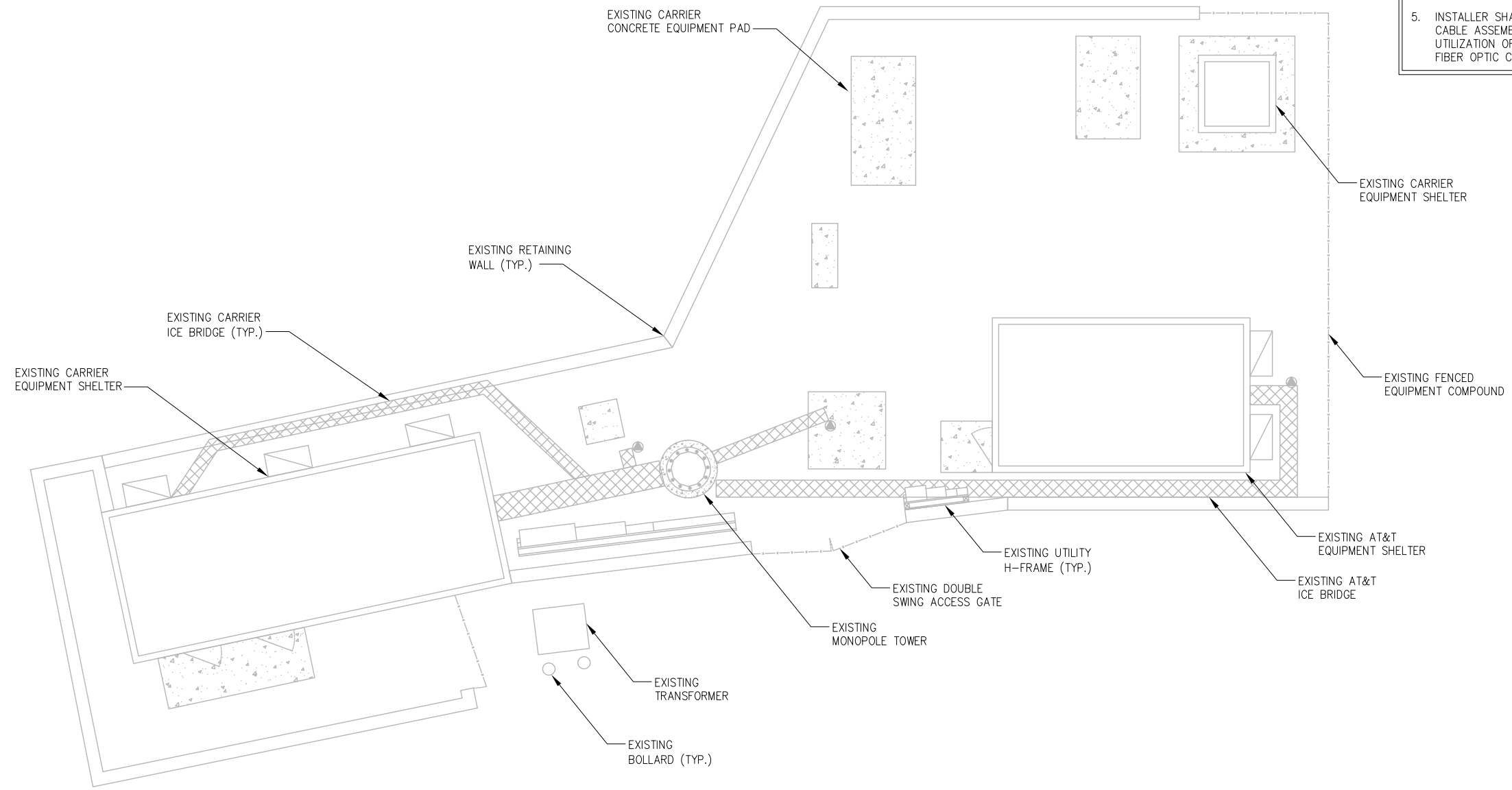
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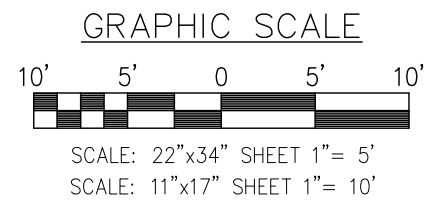
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Drawing Title  
**OVERALL SITE PLAN**

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**1** OVERALL SITE PLAN  
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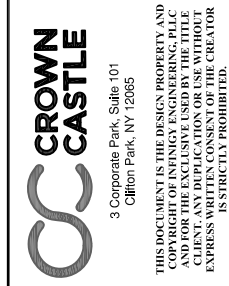
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**841793**  
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Prepared For:



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Drawing Title

**EQUIPMENT SITE PLAN**

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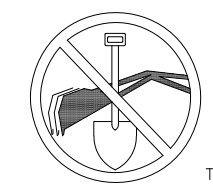
**C4**

**ELECTRICAL NOTES:**

- ALL ELECTRICAL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (N.E.C.), AND APPLICABLE LOCAL CODES.
- GROUNDING SHALL COMPLY WITH THE ARTICLE 250 OF NATIONAL ELECTRICAL CODE.
- ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED.
- ALL WIRES SHALL BE AWG MIN #12 THHN COPPER UNLESS NOTED.
- CONDUCTORS SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT UNLESS NOTED OTHERWISE.
- LABEL AT&T SERVICE DISCONNECTS WITH SWITCH AND PANEL WITH ENGRAVED LAMACOID LABELS, LETTERS 1" IN HEIGHT.
- ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 8" RADIUS.
- ENGAGE AN INDEPENDENT TESTING FIRM TO TEST AND VERIFY THAT RESISTANCE DOES NOT EXCEED 5 OHMS TO GROUND. TEST GROUND RING RESISTANCE PRIOR TO MAKING FINAL GROUND CONNECTIONS TO INFRASTRUCTURE AND EQUIPMENT. GROUNDING AND OTHER OPERATIONAL TESTING SHALL BE WITNESSED BY AT&T'S REPRESENTATIVE.
- PROVIDE PULL BOXES AND JUNCTION BOXES WHERE REQUIRED SO THAT CONDUIT BENDS DO NOT EXCEED 360 DEGREES.
- OBTAIN PERMITS AND PAY FEES RELATED TO ELECTRICAL WORK PERFORMED ON THIS PROJECT. DELIVER COPIES OF ALL PERMITS TO AT&T REPRESENTATIVE.
- SCHEDULE AND ATTEND INSPECTIONS RELATED TO ELECTRICAL WORK REQUIRED BY JURISDICTION HAVING AUTHORITY. CORRECT AND PAY FOR ANY WORK REQUIRED TO PASS ANY FAILED INSPECTION.
- REDLINED AS-BUILTS ARE TO BE DELIVERED TO AN AT&T REPRESENTATIVE.
- PROVIDE TWO COPIES OF OPERATION AND MAINTENANCE MANUALS IN THREE-RING BINDER.
- FURNISH AND INSTALL THE COMPLETE ELECTRICAL SERVICE, TELCO CONDUIT, AND THE COMPLETE GROUNDING SYSTEM.
- ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND LOCAL ORDINANCES, INSTALLED IN A NEAT MANNER AND SHALL BE SUBJECT TO APPROVAL BY AN AT&T REPRESENTATIVE.
- CONDUCT A PRE-CONSTRUCTION SITE VISIT AND VERIFY EXISTING SITE CONDITIONS AFFECTING THIS WORK. REPORT ANY OMISSIONS OR DISCREPANCIES FOR CLARIFICATION PRIOR TO THE START OF CONSTRUCTION.
- PROJECT ADJACENT STRUCTURES AND FINISHES FROM DAMAGE, REPAIR TO ORIGINAL CONDITION ANY DAMAGED AREA.
- REMOVE DEBRIS ON A DAILY BASIS. DEBRIS NOT REMOVED IN A TIMELY FASHION WILL BE REMOVED BY OTHERS AND THE RESPONSIBLE SUBCONTRACTOR SHALL BE CHARGED ACCORDINGLY. REMOVAL OF DEBRIS SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE. DEBRIS SHALL BE REMOVED FROM THE PROPERTY AND DISPOSED OF LEGALLY.
- UPON COMPLETION OF WORK, THE SITE SHALL BE CLEAN AND FREE OF DUST AND FINGERPRINTS.
- PRIOR TO ANY TRENCHING, CONTACT LOCAL UTILITY TO VERIFY LOCATION OF ANY EXISTING BURIED SERVICE CONDUITS.
- DOCUMENT GROUND RING INSTALLATION AND CONNECTIONS TO IT WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PRESENT PHOTO ARCHIVE A SITE "PUNCH LIST" WALK TO AT&T'S REPRESENTATIVE.
- ALL ABOVE GRADE CONDUIT TO BE RIGID METALLIC.

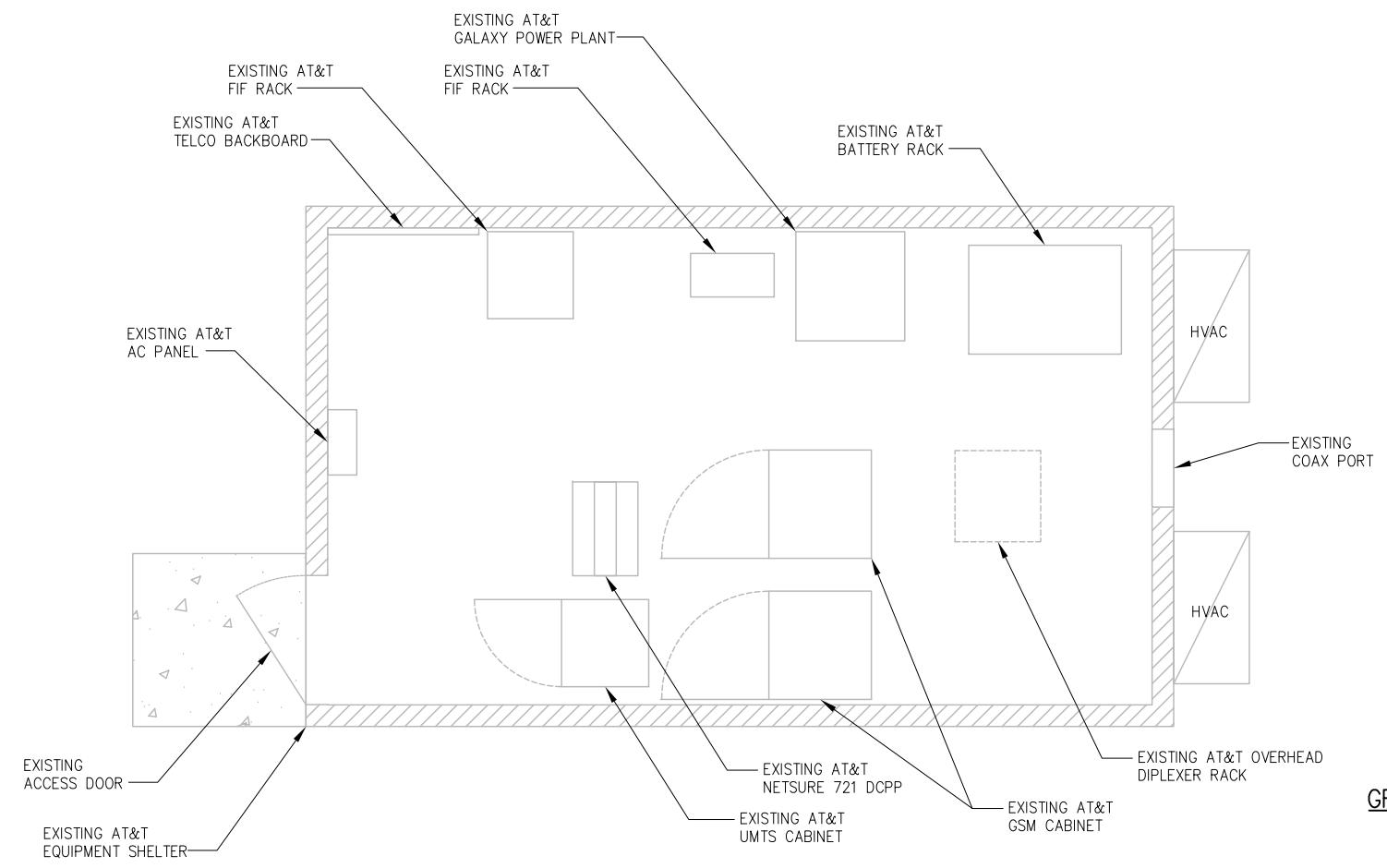
**GROUNDING NOTES:**

- ALL DOWN CONDUCTORS AND GROUND RING AND CONDUCTOR SHALL BE #2 AWG, SOLID, BARE, TINNED COPPER, UNO. ALL CONNECTIONS TO GROUND RING SHALL BE EXOTHERMICALLY WELDED. CONDUCTOR SHALL BE A MINIMUM DEPTH BELOW GRADE OF 30 INCHES OR TO THE LEDGE. MINIMUM BEND RADIUS SHALL BE 8 INCHES. CONDUCTOR SHALL BE AT LEAST 24 INCHES FROM ANY FOUNDATION, UNO.
- WHERE MECHANICAL CONDUCTOR CONNECTIONS ARE SPECIFIED, BOLTED, COMPRESSION-TYPE CLAMPS OR SPLIT-BOLT TYPE CONNECTORS SHALL BE USED.
- GRIND OFF GALVANIZING IN AFFECTED AREA. EXOTHERMICALLY WELD #2 CONDUCTOR AT 6 INCHES ABOVE GRADE R FOUNDATION, WHICHEVER IS HIGHER. COLD-GALY AFTER. EXOTHERMICALLY WELD OTHER END TO THE GROUND.
- GROUND CONDUCTORS ON EXTERIOR WALL OF SHELTER SHALL BE ENCASED IN 3/4" PVC CONDUIT TO GRADE. MOUNT PVC WITH GALVANIZED "C" CLAMPS. SEAL TOP ENDS.
- FOLLOWING COMPLETION OF WORK, CONDUCT GROUND TEST. SUBMIT WRITTEN TEST TO CONSTRUCTION MANAGER AND PROJECT MANAGER.
- ALL GROUNDING WORK SHALL COMPLY WITH CARRIER(S) STANDARDS.
- GROUNDING REQUIREMENTS SHOWN ON THIS PLAN ARE FOR ITEMS THAT ARE LOCATED NEAR GRADE LEVEL AND THAT NEED TO BE TIED TO THE BELOW GRADE GROUND RING.
- UNLESS NOTED OTHERWISE, ALL GROUNDING SHALL BE IN ACCORDANCE WITH AT&T'S SSEQ DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES", AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING". ALL GROUNDING SHALL ALSO COMPLY WITH ALL STATE AND LOCAL CODES, AND THE NATIONAL ELECTRICAL CODE (NEC).
- UNLESS NOTED OTHERWISE, ALL GROUNDING CONNECTIONS SHALL BE MADE BY AN EXOTHERMIC WELD.
- RESISTANCE TO EARTH TESTING IS REQUIRED PER AT&T STANDARDS ON ALL NEW SITES.



**UNDERGROUND SERVICE ALERT**  
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THREE WORKING DAYS BEFORE YOU DIG



**NOTES:**  
 CONTRACTOR TO GROUND ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

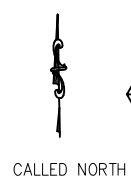
**SYMBOL**

	COPPER GROUND ROD
	CONNECT PER MANUFACTURER SPECS
	CADWELD CONNECTION
	MECHANICAL CONNECTION
	GROUND BAR
	ELECTRICAL CONDUIT
	GROUND WIRE
	DC/FIBER LINE

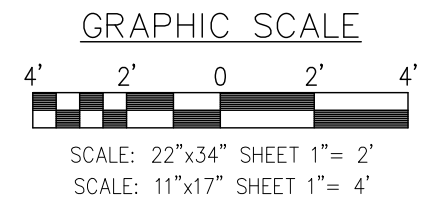
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  - WHEN ADDITIONAL FIBER TRUNK CABLE EXISTS, CONTRACTOR TO PROVIDE AND INSTALL A NEMA 3R 24"x24"x8" WITH COIL DOWN SPOOL AND SCREW-IN COVER. MOUNT ENCLOSURE TO EXISTING ICE BRIDGE POST. WHEN ENCLOSURE REQUIRED, USE ENCLOSURE FOR DC TRUNK PASS THROUGH. GROUND TO EXISTING EXTERIOR GROUND SYSTEM.
  - ROUTE ALL PROPOSED CABLING ON EXISTING CABLE LADDER. ACTUAL ROUTE ON DRAWINGS MAY VARY FROM FIELD LOCATION OF EXISTING CABLE LADDER.
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**ABBREVIATIONS:**

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL



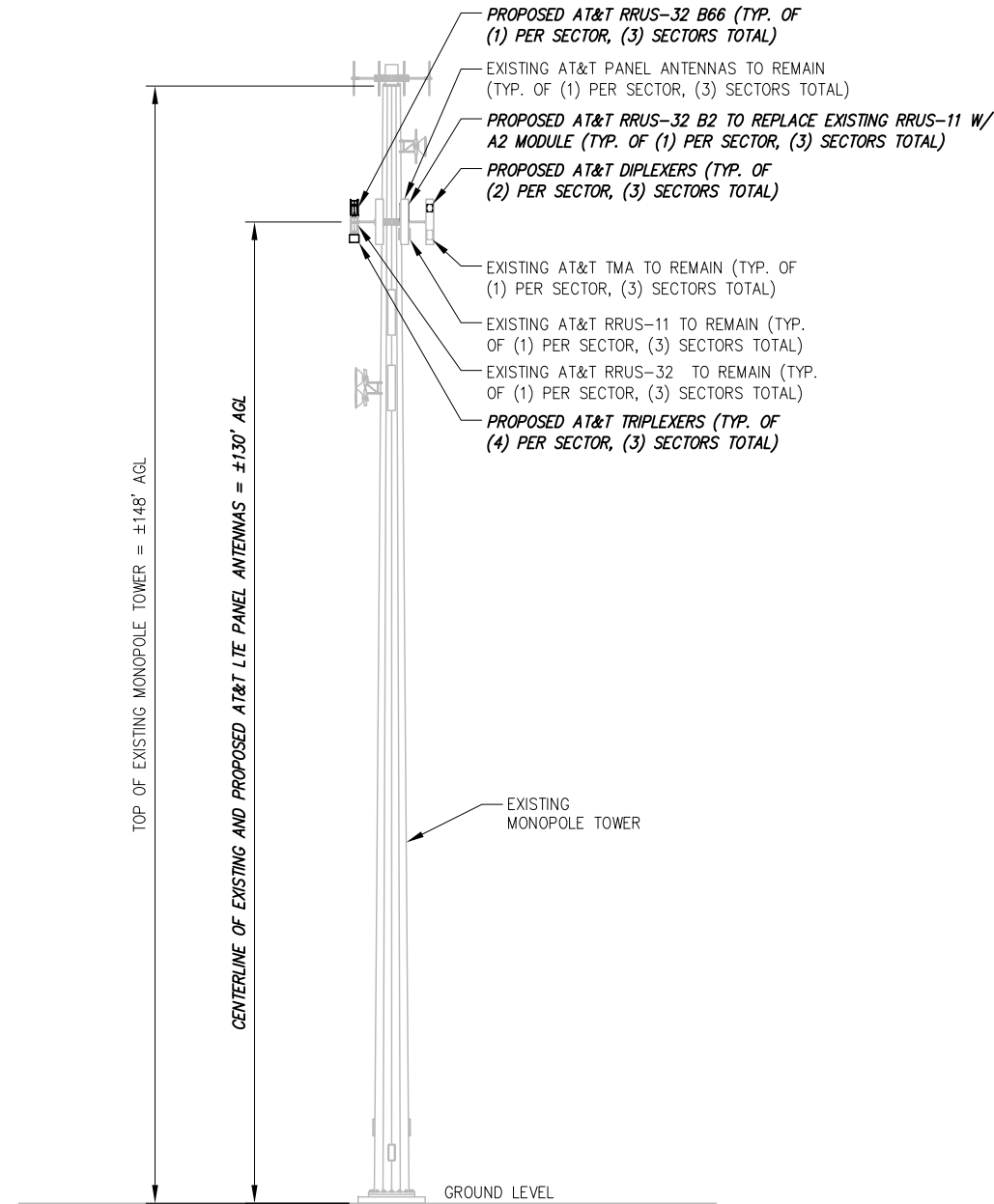
**1 EQUIPMENT SITE PLAN**  
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1 TOWER ELEVATION VIEW  
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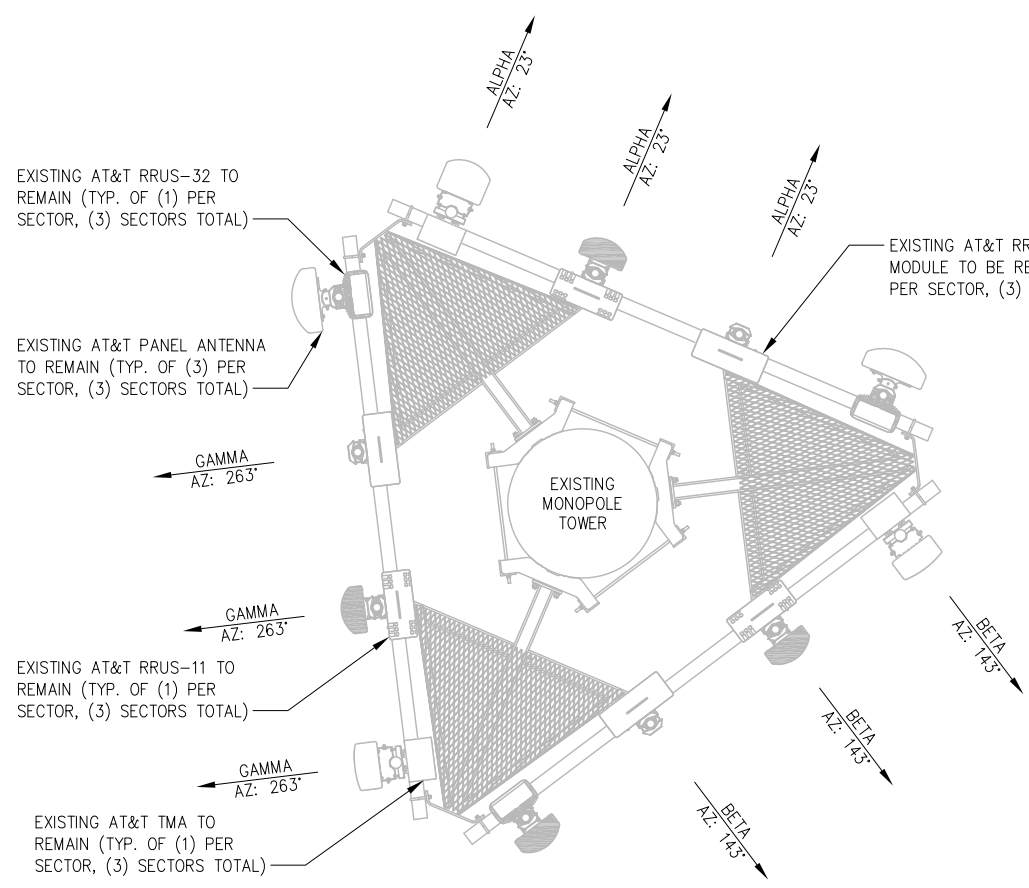
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**WINDSOR PINE LANE**  
**841793**  
 50 PINE LANE  
 WINDSOR, CT 06095

Prepared For:  
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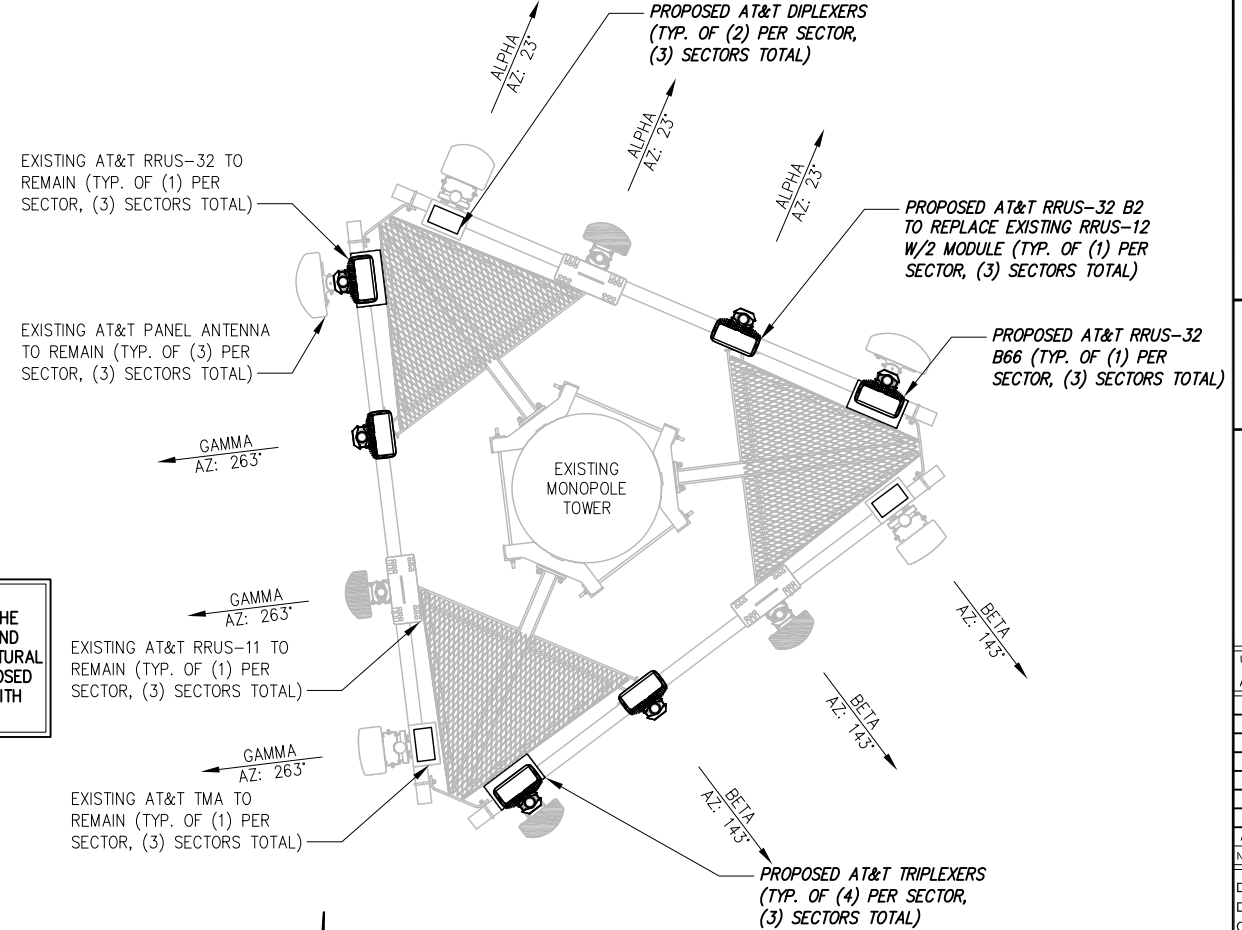


**1 ANTENNA ORIENTATION PLAN (EXISTING)**  
NOT TO SCALE  
CALLED NORTH

**NOTES:**  
ALL ANTENNA AZIMUTHS MUST BE CORRECT UPON COMPLETION OF CONSTRUCTION

**NOTES:**  
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**2 ANTENNA ORIENTATION PLAN (PROPOSED)**  
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CALLED NORTH

EXISTING AND PROPOSED ANTENNA, TMA AND DIPLEXER MODEL NUMBERS								
SECTOR	EXISTING/PROPOSED	BAND	ANTENNA	ANTENNA Q. HEIGHT	AZIMUTH	TMA	RRU	CABLE
ALPHA	EXISTING	--	P65-17-XLH-RR	130'-0"	23°	(2) CM1007-DBPXBC-003	--	COAX
	EXISTING	--	HPA-65R-BUU-H6	130'-0"	23°	--	RRUS-11 RRUS-32 B2	COAX
	--	--	--	--	--	--	--	--
BETA	EXISTING	--	QS66512-3	130'-0"	23°	(4) TPX-070821	RRUS-32 RRUS-32 B66	COAX
	EXISTING	--	AM-X-CD-16-65-00T-RET	130'-0"	143°	(2) CM1007-DBPXBC-003	--	COAX
	EXISTING	--	HPA-65R-BUU-H8	130'-0"	143°	--	RRUS-11 RRUS-32 B2	COAX
GAMMA	EXISTING	--	TPA-65R-LCUUUU-H8	130'-0"	143°	(4) TPX-070821	RRUS-32 RRUS-32 B66	COAX
	EXISTING	--	AM-X-CD-16-65-00T-RET	130'-0"	263°	(2) CM1007-DBPXBC-003	--	COAX
	EXISTING	--	HPA-65R-BUU-H6	130'-0"	263°	--	RRUS-11 RRUS-32 B2	COAX
GAMMA	--	--	--	--	--	--	--	--
	EXISTING	--	QS66512-3	130'-0"	263°	(4) TPX-070821	RRUS-32 RRUS-32 B66	COAX

PROPOSED RRU AND CABLE SCHEDULE					
SECTOR	FIBER TRUNK	SINGLE FIBER JUMPER	DC 3-PAIR	DC 1-PAIR JUMPER	RRU'S
ALPHA		(1) 5M		(2) ±15'	(1) EXISTING RRUS-11 (1) EXISTING RRUS-32 (1) PROPOSED RRUS-32 B2 (1) PROPOSED RRUS-32 B66
BETA	EXISTING	(1) 5M	EXISTING	(2) ±15'	(1) EXISTING RRUS-11 (1) EXISTING RRUS-32 (1) PROPOSED RRUS-32 B2 (1) PROPOSED RRUS-32 B66
BETA		(1) 5M		(2) ±15'	(1) EXISTING RRUS-11 (1) EXISTING RRUS-32 (1) PROPOSED RRUS-32 B2 (1) PROPOSED RRUS-32 B66

**3 RF EQUIPMENT SCHEDULE**  
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WINDSOR PINE LANE 841793  
50 PINE LANE WINDSOR, CT 06095

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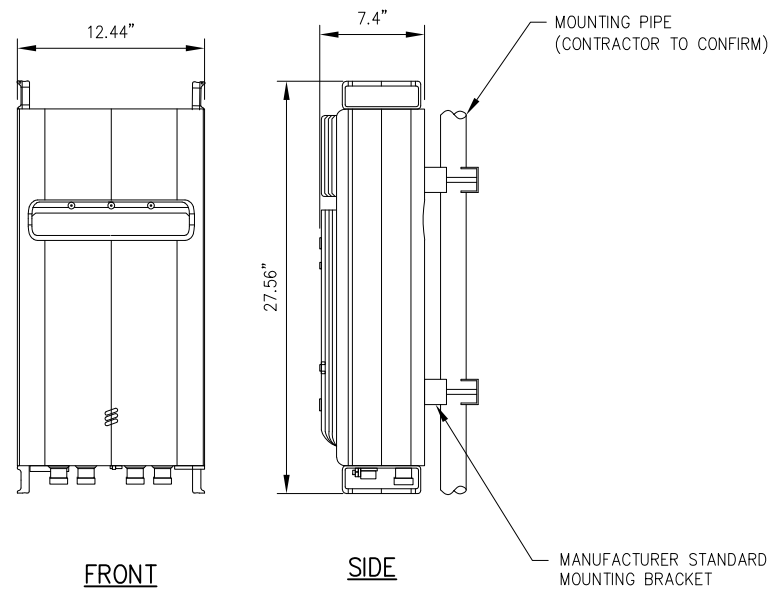
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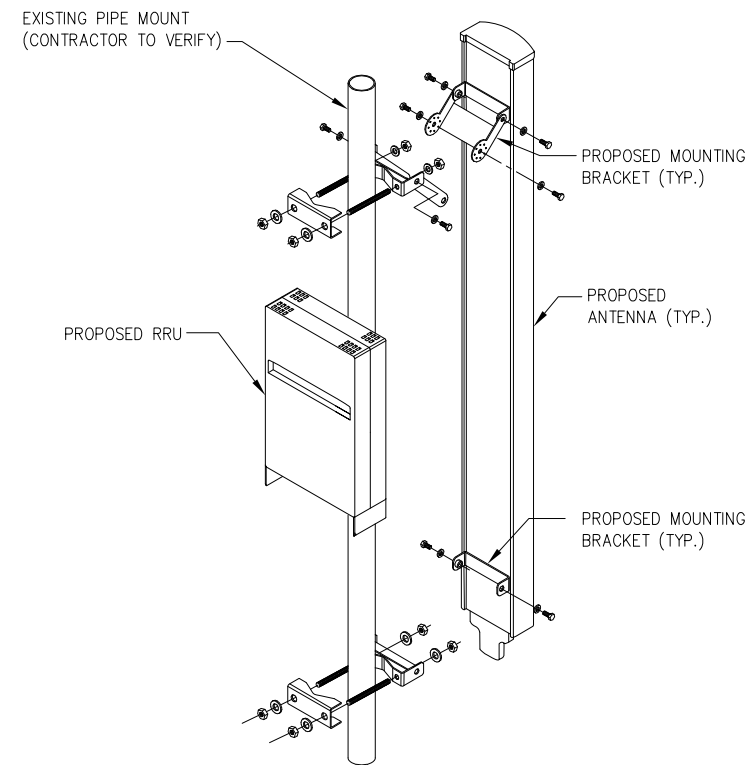


FRONT

SIDE

- RRUS-32 SPECIFICATIONS**
- HXWXD, (INCHES) : 27.56"x12.44"x7.4"
  - WEIGHT (LBS) : 55.12
  - COLOR : GRAY

**1** ERICSSON RRUS-32 DETAIL  
-- NOT TO SCALE



**2** ANTENNA MOUNTING DETAIL  
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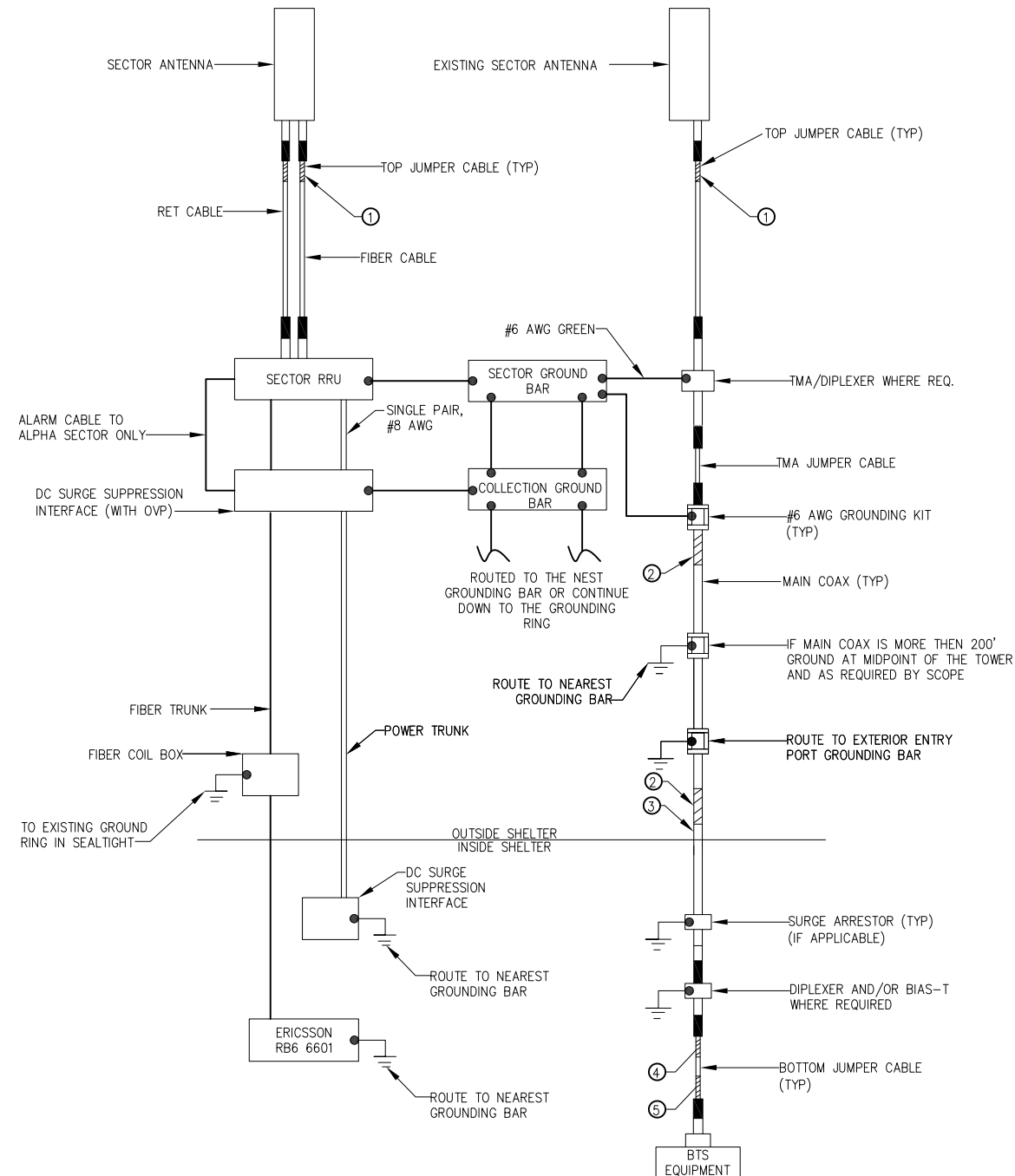
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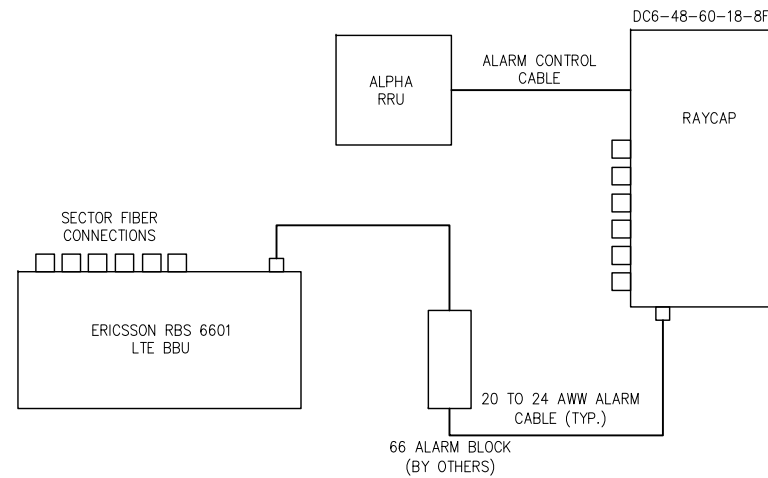
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Drawing Number  
**C7**

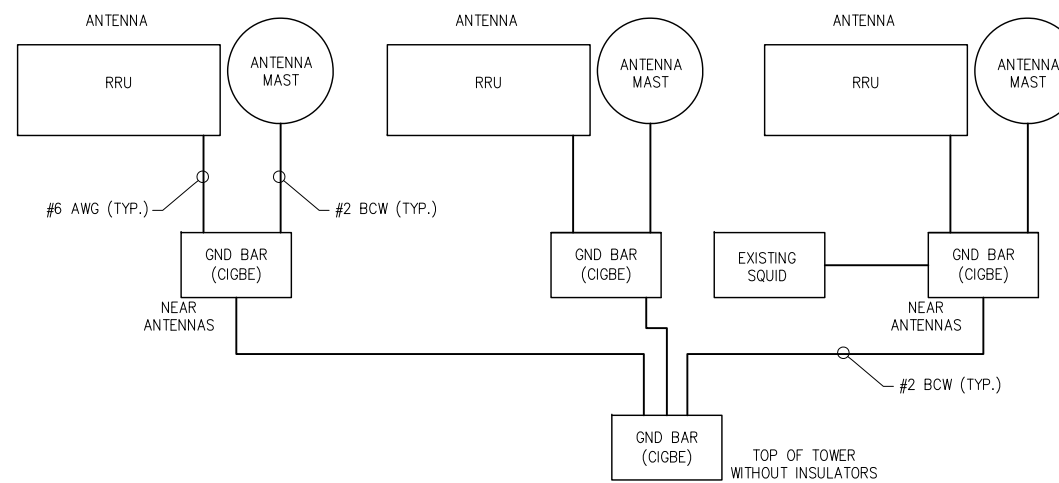
CABLE MARKING LOCATIONS TABLE	
NO.	LOCATIONS
①	EACH TOP JUMPER SHALL BE COLOR CODED WITH ONE (1) SET OF 3" WIDE BANDS
②	EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS NEAR THE TOP OF THE JUMPER CONNECTION AND WITH (1) SET OF 3/4" WIDE COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING
③	CABLE ENTRY PORT ON THE INTERIOR OF THE SHELTER
④	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER
⑤	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER



**1** CABLE MARKING LOCATIONS DIAGRAM  
SCALE: NOT TO SCALE



**2** ALARM BLOCK CONNECTIONS  
SCALE: NOT TO SCALE



**3** SCHEMATIC DIAGRAM GROUNDING SYSTEM  
SCALE: NOT TO SCALE

**COAX COLOR CODING & IDENTIFICATION NOTES:**

1. SECTOR ORIENTATION/ AZIMUTH WILL VARY FROM REGION AND IS SITE SPECIFIC. REFER TO RF REPORT FOR EACH SITE TO DETERMINE THE ANTENNA LOCATION AND FUNCTION OF EACH TOWER SECTOR FACE.
2. THE ANTENNA SYSTEM COAX SHALL BE LABELED WITH VINYL TAPE EXCEPT IN LOCATIONS WHERE ENVIRONMENTAL CONDITIONS CAUSE PHYSICAL DAMAGE, THEN PHYSICAL TAGS ARE PREFERRED.
3. THE STANDARD IS BASED ON EIGHT COLORED TAPES- RED, BLUE, GREEN, YELLOW, ORANGE, BROWN, WHITE AND VIOLET. THESE TAPES MUST BE 3/4" WIDE AND UV RESISTANT SUCH AS SCOTCH 35 VINYL ELECTRICAL COLOR CODING TAPE AND SHOULD BE READILY AVAILABLE TO THE ELECTRICIAN OR SUBCONTRACTOR ON SITE.
4. USING COLOR BANDS ON THE CABLES MARK ALL RF CABLE BY SECTOR AND NUMBER AS SHOWN ON "CABLE MARKING COLOR CONVENTION TABLE".
5. WHEN AN EXISTING COAXIAL LINE THAT IS INTENDED TO BE A SHARED LINE BETWEEN GSM/3G TDMA IS ENCOUNTERED, THE SUBCONTRACTOR SHALL REMOVE THE COLOR CODING SCHEME AND REPLACE IT WITH THE COLOR CODING AND TAGGING STANDARD THAT IS OUTLINED IN THE CURRENT VERSION OF THE STANDARD. IN THE ABSENCE OF AN EXISTING COLOR CODING AND TAGGING SCHEME, OR WHEN INSTALLING PROPOSED COAXIAL CABLES, THIS GUIDELINE SHALL BE IMPLEMENTED AT THAT SITE REGARDLESS OF TECHNOLOGY.
6. ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE A MINIMUM OF (3) THREE WRAPS OF TAPE AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT SO AS TO AVOID ANY UNRAVELING.
7. ALL COLOR BANDS INSTALLED AT THE TOP OF THE TOWER SHALL BE A MINIMUM IF 3" WIDE, AND SHALL HAVE A MINIMUM OF 3/4" OF SPACE IN BETWEEN EACH COLOR.
8. ALL COLOR CODES SHALL BE INSTALLED AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE TO SIDE.
9. IF EXISTING CABLES AT THE SITE ALREADY HAVE A COLOR CODING SCHEME AND THEY ARE NOT INTENDED TO BE REUSED OR SHARED WITH THE GSM TECHNOLOGY, THE EXISTING COLOR CODING SCHEME SHALL REMAIN UNTOUCHED.

**CABLE MARKING TAGS:**

WHEN USING THE ALTERNATIVE LABELING METHOD, EACH RF CABLE SHALL BE IDENTIFIED WITH A METAL ID TAG MADE OF STAINLESS STEEL OR BRASS. THE TAG SHALL BE 1' 1-1/2" IN DIAMETER WITH 1/4" STAMPED LETTERS AND NUMBERS INDICATING THE SECTOR, ANTENNA POSITION, AND CABLE NUMBER. THE ID MARKING LOCATIONS SHOULD BE AS PER "CABLE MARKING LOCATIONS TABLE". THE TAG SHOULD BE ATTACHED WITH CORROSION PROOF WIRE AROUND THE CABLE AT THE SAME LOCATIONS AS DEFINED ABOVE. THE TAG SHOULD BE LABELED AS SHOWN ON THE "GSM AND UMTS LINE TAG" DETAIL.



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Designed: ASW Date: 12/14/17  
Checked: ASW Date: 12/14/17

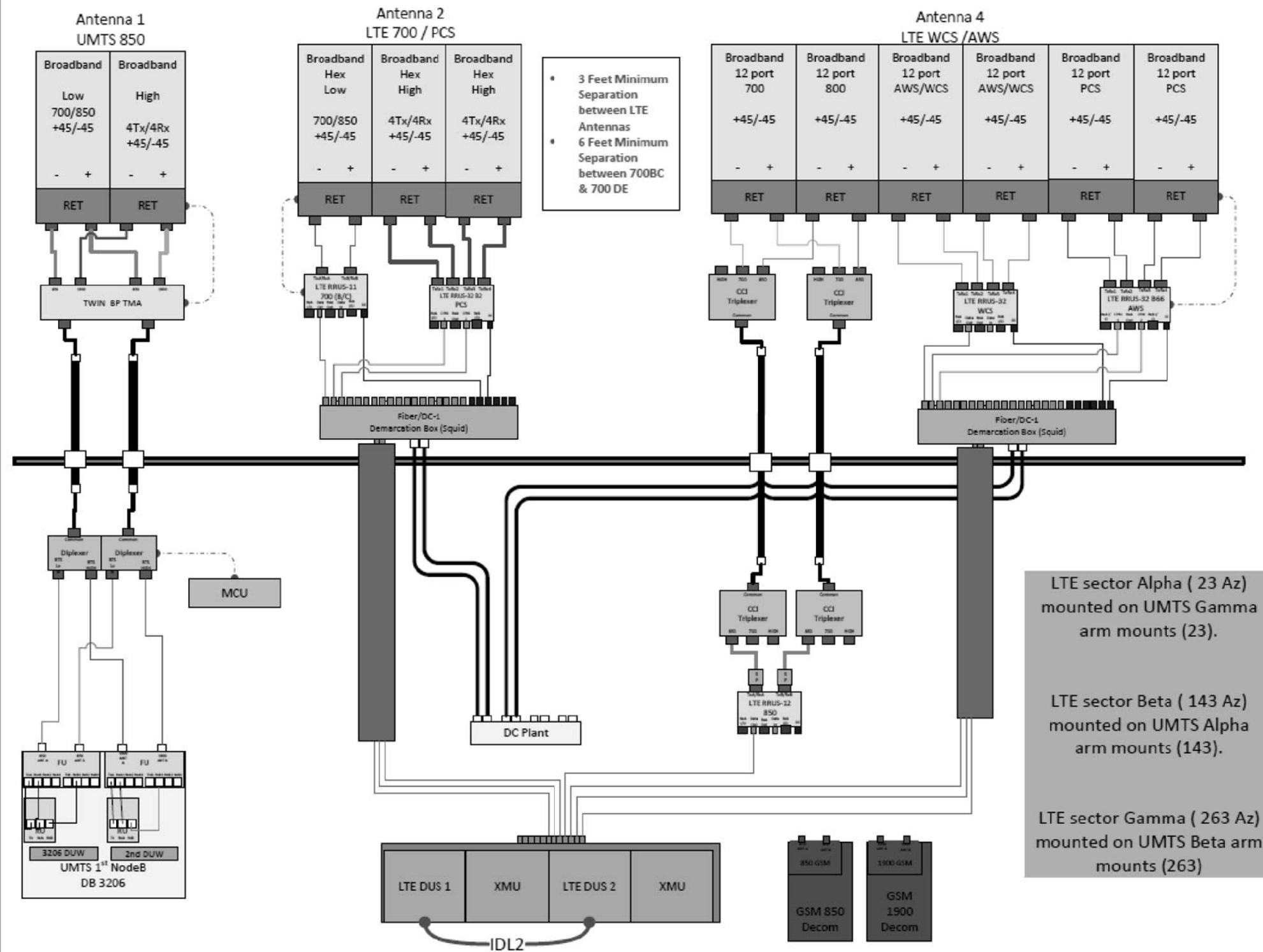
Project Number: 406-000  
Project Title: FA# 10042353  
WINDSOR PINE LANE  
841793  
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Prepared For:  
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Drawing Number: **C8**



1 ANTENNA/EQUIPMENT SCHEMATIC  
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**PLUMBING DIAGRAM**

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**C9**