6/22/2016

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

Notice of Exempt Modification
940 Meriden Road, Waterbury, CT 06705
N 41 33' 11.46"
W 72 69' 36.19"

Dear Ms. Bachman:

T-Mobile currently maintains 9 antennas at the 99-foot level of the existing 119-foot monopole at 940 Meriden Road, Waterbury, CT 06705. The tower is owned by SBA Properties, LLC. T-Mobile now intends to replace the 3 existing antennas with 3 new antennas, for a total of 9 antennas. These antennas would be installed at the 99-foot level of the tower. The Structural Analysis is passing with a structural usage of 59.9% and a foundation usage of 58%

This facility was approved by the City of Waterbury in Docket No. 321 on March 2, 2007. This approval included the condition(s) that will be followed per the proposed modification. This modification complies with the aforementioned condition(s).

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. g 16-50j-73, a copy of this letter is being sent to Neil M. O'Leary, Mayor, for the City of Waterbury, the property owner, as well as the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided fox its R.C.S:A. ~ 16-50j-72(b)(2}.

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 ox 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 wall not cause a change or alteration in the physical ox environmental characteristics of the site.

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

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. ~ 16-SOj-72(b}(2).

Sincerely,

Gregg Shappy
10 Industrial Ave.
Suite 3
Mahwah, NJ 07430
(845) 553-2045
gshappy@transcendwireless.com

Attachments
cc: Neil M. O'Leary – City of Waterbury Mayor
Michael Villa - SBA
Pine Grove Cemetery Association

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

Structural Analysis Report

Existing 119 ft SABRE Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT13070-A

Customer Site Name: Waterbury 4, CT

Carrier Name: T-Mobile

Carrier Site ID / Name: CTNH331B

Site Location: 940 Meriden Road

Waterbury, CT

New Haven County

Latitude: 41.553278

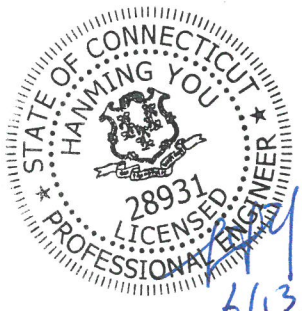
Longitude: -72.993361

Analysis Result:

Max Structural Usage: 59.9% [Pass]

Max Foundation Usage: 58% [Pass]

Report Prepared By : Jarryd Tibbetts



6/13/16

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Analysis Result:

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Introduction

The purpose of this report is to summarize the analysis results on the 119 ft SABRE Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawing prepared by Sabre, Job #07-03039 dated 4/23/07 Structural Analysis prepared by FDH, Project #12-06C54E S2 dated 6/17/11
Foundation Drawing	Foundation Drawing prepared by Sabre, Job #03039 dated 4/23/07
Geotechnical Report	Geotechnical Report prepared by Gemini Geotechnical Associates, Project #07023CT dated 3/13/07
Modification Drawings	Modification Drawing prepared by FDH, Project #09-01077E S3 dated 10/13/09

Analysis Criteria

The analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-F**.** In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Basic Wind Speed Used in the Analysis:	85.0 mph (Fastest mile)
Basic Wind Speed with Ice:	74 mph (Fastest mile) with 1/2" radial ice concurrent
Operational Wind Speed:	50 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-F / 2005 Connecticut State Building Code

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	120.0	2	Andrew - VHLP2.5-11 - Dish	(3) Standoff	(3) 5/16” (2) 1/2” (3) 5/8” (3) 3/4”	Clearwire
2	118.0	3	Argus - LLPX310R - Panel			
3		3	2.5GHz RRH			
4	99.0	6	RFS - APX16DWV-16DWVS - Panel	Low Profile Platform	(18) 1 5/8" (1) 1 5/8” Fiber	T-Mobile
5		3	Commscope - LNX-6515DS-VTM - Panel			
7		3	Ericsson - Double TMA 17/21 - TMA/TTA			
9		3	RFS - ATMAA1412D-1A20 - TMA/TTA			
11		3	Kathrein - 782 11056 - Bias T			
12	87.0	3	Antel - BXA-80063/4CF - Panel	Low Profile Platform	(18) 1 5/8" (2) 1 5/8" Hybrid	Verizon
13		9	Andrew - SBNHH-1D65B - Panel			
14		3	Alcatel Lucent - RRH4X45-19 - RRU			
15		3	Alcatel Lucent - RRH2X60-700 - RRU			
16		3	Alcatel Lucent - RRH2X60-PCS - RRU			
17		2	RFS - DB-T1-6Z-8AB-0Z - Distribution Box			
18	77.0	3	RFS - APXV18-206517S-C - Panel	Pipe	(6) 1 5/8"	Metro PCS

Proposed Carrier’s Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier’s final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
4	99.0	3	RFS - APX16DWV-16DWVS-E-A20 - Panel	Low Profile Platform	(18) 1 5/8" (1) 1 5/8" Hybrid	T-Mobile
5		3	Commscope - LNX-6515DS-A1M - Panel			
6		3	Ericsson - AIR 32 - Panel			
8		3	Ericsson - KRY 112 489/2 - TMA			
10		3	Ericsson - KRY 112 144/1 - TMA			
11		3	Kathrein - 782 11056 - Bias T			

All transmission lines are considered running inside of the pole shafts.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**52.9%**	**59.9%**	**39.8%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	3142.0	29.0	42.0
Analysis Reactions	1588.9	19.7	32.7
% of Design Reactions	50.6%	67.9%	77.9%

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Maximum twist and sway of the microwave dish under the operational wind speed as specified in the Analysis Criteria is listed in the table below:

Elevation (ft)	Dish	Carrier	Twist (deg)	Sway (deg)
119.0	Andrew - VHLP2.5-11 - Dish	Clearwire	0.003	0.706

It is recommended that the carrier reviews the twist and sway values of the microwave dish.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-F Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed or/and ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Stress 52.9% at 0.0ft

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	6/10/2016
Site Name:	Waterbury 4, CT	**Exposure:**	C	
Height:	119.00 (ft)	**Gh:**	1.69	
Base Elev:	0.000 (ft)			Page: 1

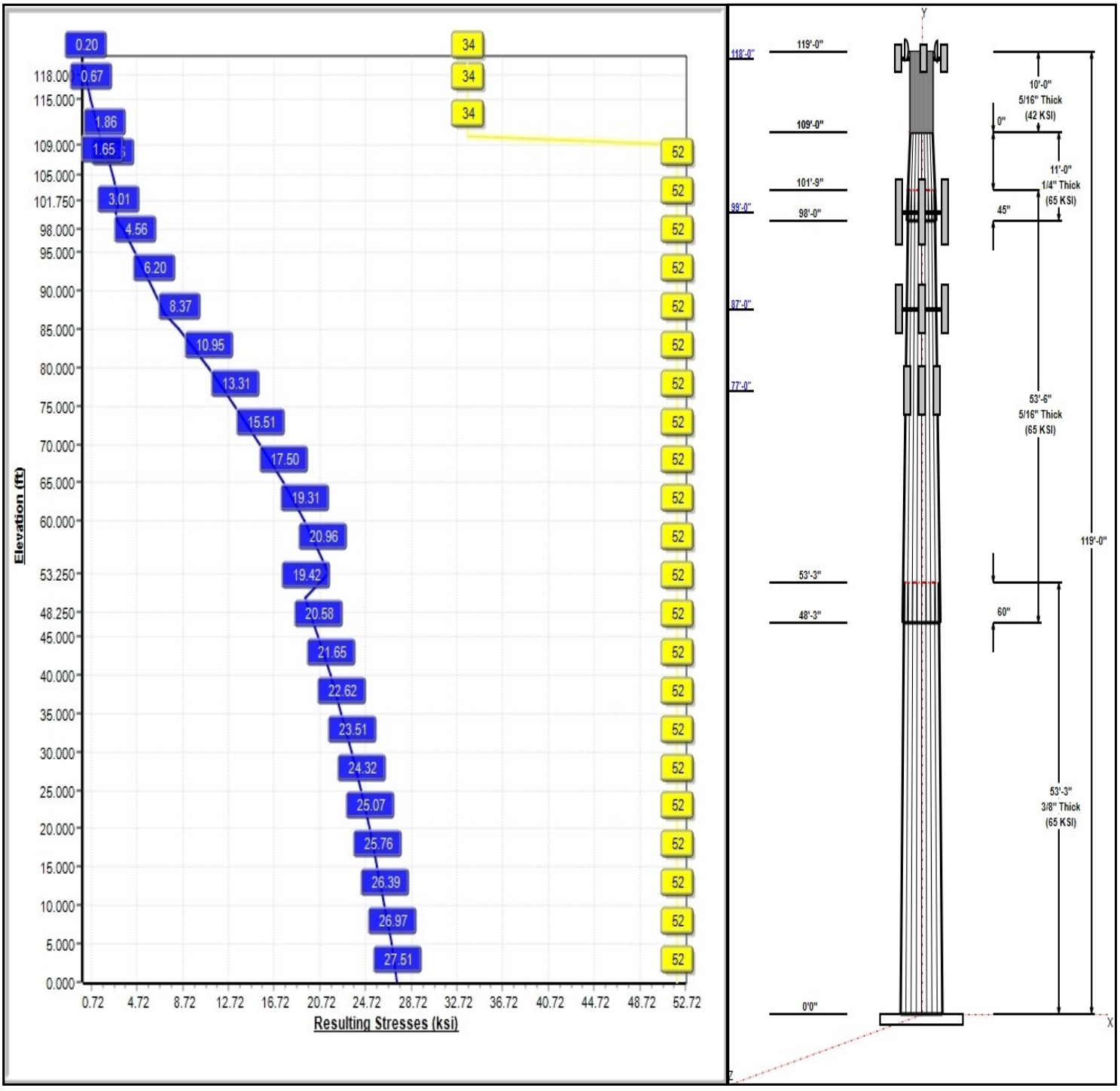
Tower Engineering Solutions

Dead Load Factor: 1.00
Wind Load Factor: 1.00

52 Alllowable Stress
28 Resulting Stress

Load Case : 85 mph Wind with 0 in Ice

Iterations: 22



Structure: CT13070-A-SBA

Type: Custom
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.21408

6/10/2016

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	53.25	37.99	49.39	0.375		0.21408	65
2	53.50	28.23	39.69	0.313	Slip	0.21408	65
3	11.00	27.18	29.53	0.250	Slip	0.21408	65
4	10.00	26.00	26.00	0.312	Butt	0.00000	42

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
119.00	120.00	2	VHLP2.5-11	Clearwire
118.00	118.00	3	2.5GHz RRH	Clearwire
118.00	118.00	3	3 ft Standoff	Clearwire
118.00	118.00	3	LLPX310R	Clearwire
99.00	99.00	3	782 11056	T-Mobile
99.00	99.00	3	AIR 32	T-Mobile
99.00	99.00	3	APX16DWV-16DWVS-E-A	T-Mobile
99.00	99.00	3	KRY 112 144/1	T-Mobile
99.00	99.00	3	KRY 112 489/2	T-Mobile
99.00	99.00	3	LNX-6515DS-A1M	T-Mobile
99.00	99.00	1	Low Profile Platform	T-Mobile
87.00	87.00	3	1900 MHz 4X45 RRH	Verizon
87.00	87.00	3	BXA-80063/4CF	Verizon
87.00	87.00	2	DB-T1-6Z-8AB-0Z	Verizon
87.00	87.00	1	Low Profile Platform	Verizon
87.00	87.00	3	RRH2X60-700	Verizon
87.00	87.00	3	RRH2X60-PCS	Verizon
87.00	87.00	9	SBNHH-1D65B	Verizon
77.00	77.00	3	APXV18-206517S-C	Metro PCS

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	118.00	Inside	1/2" Coax	Clearwire
0.00	118.00	Inside	3/4" DC	Clearwire
0.00	118.00	Inside	5/16" Coax	Clearwire
0.00	118.00	Inside	5/8" Coax	Clearwire
0.00	99.00	Inside	1 5/8" Coax	T-Mobile
0.00	99.00	Inside	1 5/8" Hybrid	T-Mobile
0.00	87.00	Inside	1 5/8" Coax	Verizon
0.00	87.00	Inside	1 5/8" Hybrid	Verizon
0.00	77.00	Inside	1 5/8" Coax	Metro PCS

Anchor Bolts

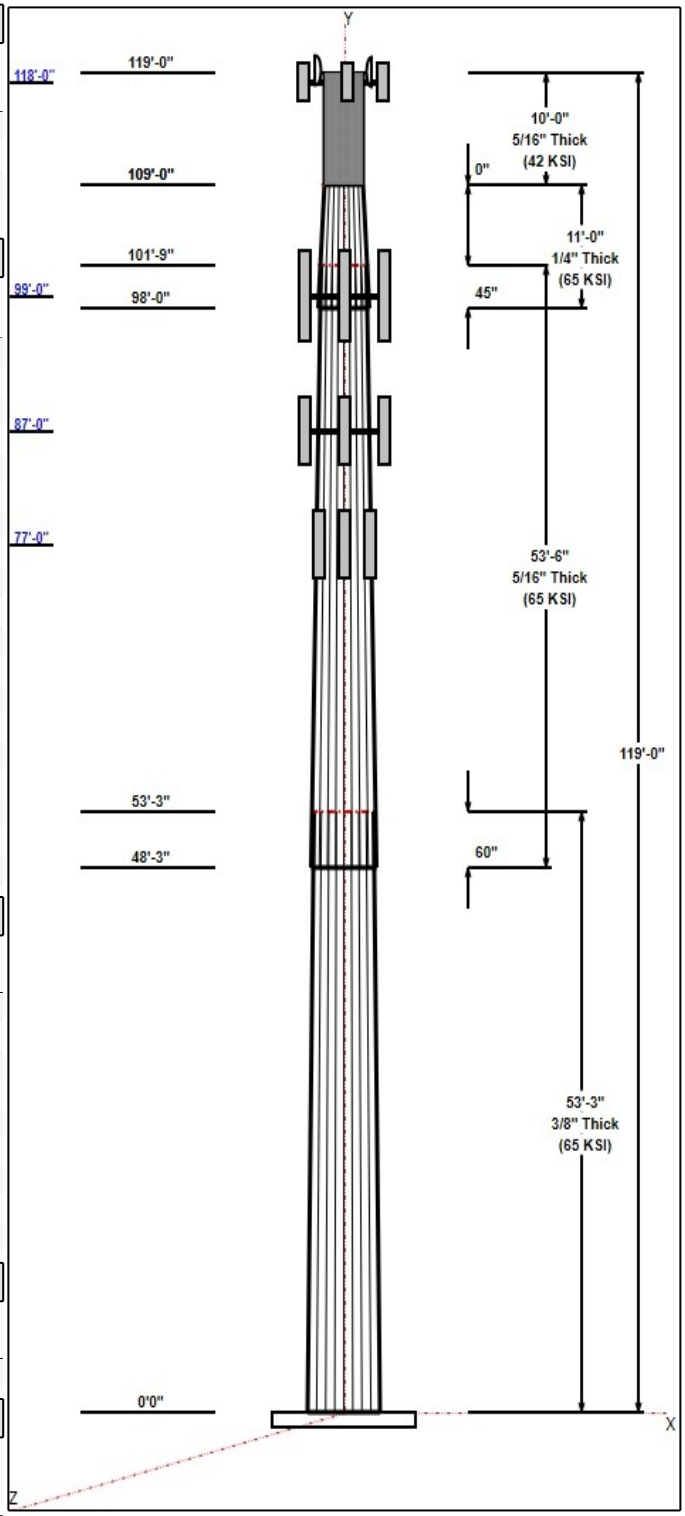
Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.0000	53.3	60.0	Clipped

Reactions

Load Case	Moment	Shear	Axial



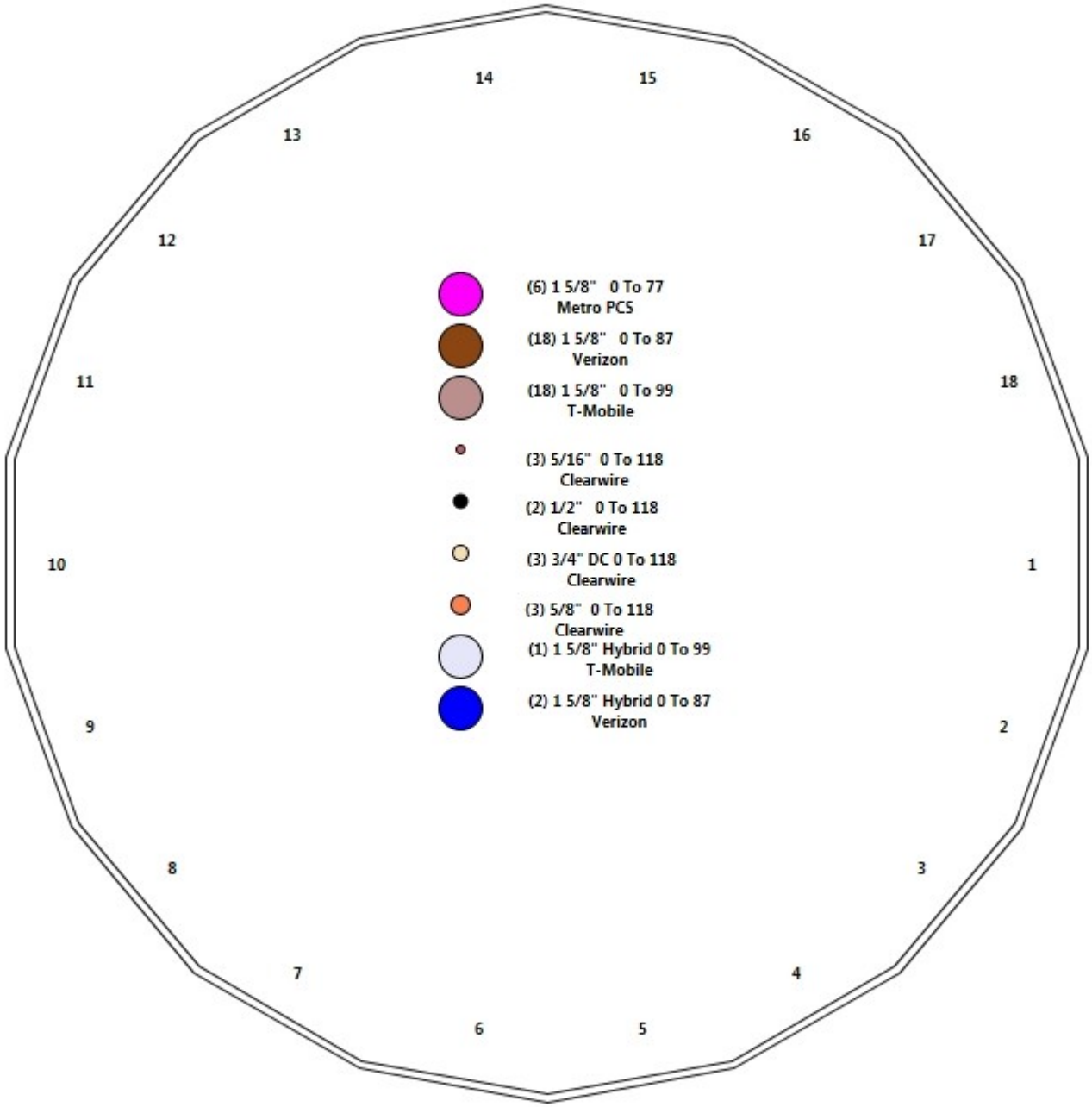
85 mph Wind with 0" Ice	1588.9	19.7	27.9
73.61 mph Wind with 0.5" Ice	1303.2	15.9	32.7
50 mph Wind with 0" Ice	549.8	6.8	27.9

Structure: CT13070-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Waterbury 4, CT
Height: 119.00 (ft)

6/10/2016

Tower Engineering Solutions



Shaft Properties

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 5	

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	53.250	0.3750	65		0.00	9,341
2	18	53.500	0.3125	65	Slip	60.00	6,075
3	18	11.000	0.2500	65	Slip	45.00	835
4	R	10.000	0.3120	42	Flange	0.00	857
					Total Shaft Weight:		**17,108**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	49.39	0.00	58.34	17707.72	21.81	131.71	37.99	53.25	44.77	8003.18	16.45	101.31	0.214083
2	39.69	48.25	39.05	7648.75	20.98	126.99	28.23	101.7	27.69	2727.23	14.52	90.34	0.214083
3	29.53	98.00	23.24	2517.77	19.42	118.14	27.18	109.0	21.37	1957.91	17.76	108.72	0.214083
4	26.00	109.0	25.18	2078.44	0.00	83.33	26.00	119.0	25.18	2078.44	0.00	83.33	0.000000

Loading Summary

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 6	

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	**Elev (ft)**	**Description**	**Qty**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Hor. Ecc. (ft)**	**Vert Ecc (ft)**
1	119.00	VHLP2.5-11	2	47.60	8.43	1.00	97.00	8.920	1.00	0.50	1.00
2	118.00	2.5GHz RRH	3	33.00	1.82	0.73	44.90	2.090	0.75	0.00	0.00
3	118.00	3 ft Standoff	3	40.00	2.63	0.75	63.00	4.340	0.75	0.00	0.00
4	118.00	LLPX310R	3	28.60	4.83	0.69	54.50	5.360	0.71	0.00	0.00
5	99.00	782 11056	3	1.80	0.17	0.78	2.83	0.230	0.82	0.00	0.00
6	99.00	AIR 32	3	132.20	6.53	0.86	171.20	6.920	0.87	0.00	0.00
7	99.00	APX16DWV-16DWVS-E-ACU	3	40.70	7.23	0.65	71.92	7.620	0.66	0.00	0.00
8	99.00	KRY 112 144/1	3	11.02	0.41	0.73	13.02	0.490	0.75	0.00	0.00
9	99.00	KRY 112 489/2	3	15.40	0.65	0.82	19.26	0.750	0.84	0.00	0.00
10	99.00	LNX-6515DS-A1M	3	50.30	11.45	0.84	112.11	11.920	0.84	0.00	0.00
11	99.00	Low Profile Platform	1	1500.00	22.00	1.00	1800.00	27.000	1.00	0.00	0.00
12	87.00	1900 MHz 4X45 RRH	3	59.50	2.77	0.99	78.37	2.980	0.99	0.00	0.00
13	87.00	BXA-80063/4CF	3	9.90	5.16	0.72	35.22	5.490	0.72	0.00	0.00
14	87.00	DB-T1-6Z-8AB-0Z	2	44.00	5.69	0.85	71.51	5.970	0.86	0.00	0.00
15	87.00	Low Profile Platform	1	1500.00	22.00	1.00	1800.00	27.000	1.00	0.00	0.00
16	87.00	RRH2X60-700	3	60.00	3.96	0.73	80.13	4.230	0.74	0.00	0.00
17	87.00	RRH2X60-PCS	3	55.00	2.57	0.89	70.82	2.760	0.90	0.00	0.00
18	87.00	SBNHH-1D65B	9	40.00	8.40	0.82	86.55	8.870	0.82	0.00	0.00
19	77.00	APXV18-206517S-C	3	26.40	5.16	0.74	53.00	5.840	0.76	0.00	0.00
		Totals:	**57**	**5,234.66**			**7,326.81**				

Linear Appurtenances

			No Ice		Ice		
Bottom Elev. (ft)	**Top Elev. (ft)**	**Description**	**Weight (lb/ft)**	**CaAa (sf/ft)**	**Weight (lb/ft)**	**CaAa (sf/ft)**	**Exposed**
0.00	118.00	(2) 1/2" Coax	0.32	0.00	0.00	0.00	Inside
0.00	118.00	(3) 3/4" DC	1.20	0.00	0.00	0.00	Inside
0.00	118.00	(3) 5/16" Coax	0.24	0.00	0.00	0.00	Inside
0.00	118.00	(3) 5/8" Coax	0.45	0.00	0.00	0.00	Inside
0.00	99.00	(18) 1 5/8" Coax	18.72	0.00	0.00	0.00	Inside
0.00	99.00	(1) 1 5/8" Hybrid	1.10	0.00	0.00	0.00	Inside
0.00	87.00	(18) 1 5/8" Coax	31.20	0.00	0.00	0.00	Inside
0.00	87.00	(2) 1 5/8" Hybrid	2.20	0.00	0.00	0.00	Inside
0.00	77.00	(6) 1 5/8" Coax	6.24	0.00	0.00	0.00	Inside
		Totals:	**5,609.24**		**0.00**		

Shaft Section Properties

Structure: CT13070-A-SBA
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/10/2016

Tower Engineering Solutions

Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)
0.00		0.3750	49.390	58.338	17707.7	21.81	131.71	65	52	0.0
5.00		0.3750	48.320	57.064	16572.7	21.31	128.85	65	52	981.7
10.00		0.3750	47.249	55.790	15487.3	20.81	126.00	65	52	960.0
15.00		0.3750	46.179	54.516	14450.4	20.30	123.14	65	52	938.4
20.00		0.3750	45.108	53.242	13460.8	19.80	120.29	65	52	916.7
25.00		0.3750	44.038	51.968	12517.4	19.30	117.43	65	52	895.0
30.00		0.3750	42.968	50.694	11619.2	18.79	114.58	65	52	873.3
35.00		0.3750	41.897	49.420	10765.0	18.29	111.73	65	52	851.7
40.00		0.3750	40.827	48.146	9953.7	17.79	108.87	65	52	830.0
45.00		0.3750	39.756	46.872	9184.3	17.28	106.02	65	52	808.3
48.25	Bot - Section 2	0.3750	39.061	46.044	8706.0	16.96	104.16	65	52	513.8
50.00		0.3750	38.686	45.598	8455.5	16.78	103.16	65	52	504.3
53.25	Top - Section 1	0.3125	38.615	37.990	7041.7	20.38	123.57	65	52	923.6
55.00		0.3125	38.240	37.618	6837.1	20.17	122.37	65	52	225.1
60.00		0.3125	37.170	36.557	6274.4	19.56	118.94	65	52	631.0
65.00		0.3125	36.100	35.495	5743.5	18.96	115.52	65	52	612.9
70.00		0.3125	35.029	34.433	5243.4	18.35	112.09	65	52	594.9
75.00		0.3125	33.959	33.372	4773.2	17.75	108.67	65	52	576.8
77.00		0.3125	33.531	32.947	4593.3	17.51	107.30	65	52	225.7
80.00		0.3125	32.888	32.310	4332.0	17.15	105.24	65	52	333.1
85.00		0.3125	31.818	31.248	3918.8	16.54	101.82	65	52	540.7
87.00		0.3125	31.390	30.824	3761.2	16.30	100.45	65	52	211.2
90.00		0.3125	30.748	30.187	3532.8	15.94	98.39	65	52	311.4
95.00		0.3125	29.677	29.125	3173.0	15.33	94.97	65	52	504.6
98.00	Bot - Section 3	0.3125	29.035	28.488	2969.3	14.97	92.91	65	52	294.1
99.00		0.3125	28.821	28.276	2903.4	14.85	92.23	65	52	175.4
100.00		0.3125	28.607	28.063	2838.5	14.73	91.54	65	52	174.1
101.75	Top - Section 2	0.2500	28.732	22.600	2316.3	18.85	114.93	65	52	301.5
105.00		0.2500	28.036	22.048	2150.7	18.36	112.15	65	52	246.9
109.00	Top - Section 3	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	295.5
109.00	Bot - Section 4	0.2500	27.180	21.368	1957.9	17.76	108.72	65	52	
110.00		0.3120	26.000	25.179	2078.4	0.00	83.33	42	34	85.7
115.00		0.3120	26.000	25.179	2078.4	0.00	83.33	42	34	428.4
118.00		0.3120	26.000	25.179	2078.4	0.00	83.33	42	34	257.0
119.00		0.3120	26.000	25.179	2078.4	0.00	83.33	42	34	85.7
										17108.3

Wind Loading - Shaft

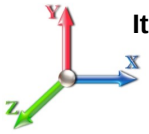
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	18.496	31.26	349.85	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	18.496	31.26	342.26	0.650	0.000	5.00	20.356	13.23	413.6	0.0	981.7
10.00		0.00	1.00	18.496	31.26	334.68	0.650	0.000	5.00	19.910	12.94	404.5	0.0	960.0
15.00		0.00	1.00	18.496	31.26	327.10	0.650	0.000	5.00	19.464	12.65	395.5	0.0	938.4
20.00		0.00	1.00	18.496	31.26	319.52	0.650	0.000	5.00	19.018	12.36	386.4	0.0	916.7
25.00		0.00	1.00	18.496	31.26	311.94	0.650	0.000	5.00	18.572	12.07	377.3	0.0	895.0
30.00		0.00	1.00	18.496	31.26	304.35	0.650	0.000	5.00	18.126	11.78	368.3	0.0	873.3
35.00		0.00	1.02	18.810	31.79	299.28	0.650	0.000	5.00	17.680	11.49	365.3	0.0	851.7
40.00		0.00	1.06	19.541	33.02	297.25	0.650	0.000	5.00	17.234	11.20	369.9	0.0	830.0
45.00		0.00	1.09	20.210	34.15	294.36	0.650	0.000	5.00	16.788	10.91	372.7	0.0	808.3
48.25	Bot - Section 2	0.00	1.11	20.617	34.84	292.11	0.650	0.000	3.25	10.673	6.94	241.7	0.0	513.8
50.00		0.00	1.13	20.827	35.20	290.78	0.650	0.000	1.75	5.760	3.74	131.8	0.0	504.3
53.25	Top - Section 1	0.00	1.15	21.206	35.84	288.13	0.650	0.000	3.25	10.552	6.86	245.8	0.0	923.6
55.00		0.00	1.16	21.402	36.17	291.38	0.650	0.000	1.75	5.604	3.64	131.8	0.0	225.1
60.00		0.00	1.19	21.941	37.08	286.76	0.650	0.000	5.00	15.711	10.21	378.7	0.0	631.0
65.00		0.00	1.21	22.449	37.94	281.71	0.650	0.000	5.00	15.265	9.92	376.4	0.0	612.9
70.00		0.00	1.24	22.929	38.75	276.26	0.650	0.000	5.00	14.819	9.63	373.2	0.0	594.9
75.00		0.00	1.26	23.386	39.52	270.47	0.650	0.000	5.00	14.373	9.34	369.2	0.0	576.8
77.00	Appurtenance(s)	0.00	1.27	23.562	39.82	268.07	0.650	0.000	2.00	5.624	3.66	145.6	0.0	225.7
80.00		0.00	1.29	23.821	40.26	264.37	0.650	0.000	3.00	8.302	5.40	217.2	0.0	333.1
85.00		0.00	1.31	24.237	40.96	257.99	0.650	0.000	5.00	13.480	8.76	358.9	0.0	540.7
87.00	Appurtenance(s)	0.00	1.32	24.399	41.23	255.37	0.650	0.000	2.00	5.267	3.42	141.2	0.0	211.2
90.00		0.00	1.33	24.636	41.63	251.36	0.650	0.000	3.00	7.767	5.05	210.2	0.0	311.4
95.00		0.00	1.35	25.020	42.28	244.49	0.650	0.000	5.00	12.588	8.18	346.0	0.0	504.6
98.00	Bot - Section 3	0.00	1.36	25.243	42.66	240.26	0.650	0.000	3.00	7.339	4.77	203.5	0.0	294.1
99.00	Appurtenance(s)	0.00	1.37	25.316	42.78	238.84	0.650	0.000	1.00	2.452	1.59	68.2	0.0	175.4
100.00		0.00	1.37	25.389	42.91	237.40	0.650	0.000	1.00	2.434	1.58	67.9	0.0	174.1
101.75	Top - Section 2	0.00	1.38	25.515	43.12	234.88	0.650	0.000	1.75	4.217	2.74	118.2	0.0	301.5
105.00		0.00	1.39	25.745	43.51	234.30	0.650	0.000	3.25	7.687	5.00	217.4	0.0	246.9
109.00	Top - Section 3	0.00	1.41	26.022	43.98	228.36	0.650	0.000	4.00	9.203	5.98	263.1	0.0	295.5
110.00		0.00	1.41	26.090	44.09	218.73	0.590	0.000	1.00	2.167	1.28	56.4	0.0	85.7
115.00		0.00	1.43	26.423	44.66	220.12	0.590	0.000	5.00	10.833	6.39	285.4	0.0	428.4
118.00	Appurtenance(s)	0.00	1.44	26.618	44.99	220.93	0.590	0.000	3.00	6.500	3.83	172.5	0.0	257.0
119.00	Appurtenance(s)	0.00	1.44	26.683	45.09	221.20	0.590	0.000	1.00	2.167	1.28	57.6	0.0	85.7
								Totals:	**119.00**			**8,631.5**		**17,108.3**

Discrete Appurtenance Forces

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	26.747	45.202	1.00	16.86	95.20	1.583	1.000	762.10	1206.6	762.10
2	118.00	LLPX310R	3	26.618	44.985	0.69	10.00	85.80	0.000	0.000	449.77	0.00	0.00
3	118.00	3 ft Standoff	3	26.618	44.985	0.75	5.92	120.00	0.000	0.000	266.20	0.00	0.00
4	118.00	2.5GHz RRH	3	26.618	44.985	0.73	3.99	99.00	0.000	0.000	179.30	0.00	0.00
5	99.00	Low Profile Platform	1	25.316	42.784	1.00	22.00	1500.00	0.000	0.000	941.26	0.00	0.00
6	99.00	LNX-6515DS-A1M	3	25.316	42.784	0.84	28.72	150.90	0.000	0.000	1228.62	0.00	0.00
7	99.00	KRY 112 489/2	3	25.316	42.784	0.82	1.60	46.20	0.000	0.000	68.66	0.00	0.00
8	99.00	KRY 112 144/1	3	25.316	42.784	0.73	0.90	33.06	0.000	0.000	38.42	0.00	0.00
9	99.00	APX16DWV-16DWVS-E-AC	3	25.316	42.784	0.65	14.08	122.10	0.000	0.000	602.27	0.00	0.00
10	99.00	AIR 32	3	25.316	42.784	0.86	16.91	396.60	0.000	0.000	723.32	0.00	0.00
11	99.00	782 11056	3	25.316	42.784	0.78	0.40	5.40	0.000	0.000	17.04	0.00	0.00
12	87.00	SBNHH-1D65B	9	24.399	41.234	0.82	62.07	360.00	0.000	0.000	2559.27	0.00	0.00
13	87.00	RRH2X60-PCS	3	24.399	41.234	0.89	6.88	165.00	0.000	0.000	283.58	0.00	0.00
14	87.00	RRH2X60-700	3	24.399	41.234	0.73	8.66	180.00	0.000	0.000	357.10	0.00	0.00
15	87.00	Low Profile Platform	1	24.399	41.234	1.00	22.00	1500.00	0.000	0.000	907.14	0.00	0.00
16	87.00	DB-T1-6Z-8AB-0Z	2	24.399	41.234	0.85	9.72	88.00	0.000	0.000	400.73	0.00	0.00
17	87.00	BXA-80063/4CF	3	24.399	41.234	0.72	11.11	29.70	0.000	0.000	458.30	0.00	0.00
18	87.00	1900 MHz 4X45 RRH	3	24.399	41.234	0.99	8.20	178.50	0.000	0.000	338.20	0.00	0.00
19	77.00	APXV18-206517S-C	3	23.562	39.820	0.74	11.46	79.20	0.000	0.000	456.15	0.00	0.00
						Totals:		**5,234.66**			**11,037.42**		

Total Applied Force Summary

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		413.59	1290.07	0.00	0.00
10.00		404.53	1268.39	0.00	0.00
15.00		395.47	1246.72	0.00	0.00
20.00		386.41	1225.04	0.00	0.00
25.00		377.35	1203.36	0.00	0.00
30.00		368.28	1181.69	0.00	0.00
35.00		365.31	1160.01	0.00	0.00
40.00		369.95	1138.34	0.00	0.00
45.00		372.71	1116.66	0.00	0.00
48.25		241.72	714.21	0.00	0.00
50.00		131.79	612.22	0.00	0.00
53.25		245.81	1124.07	0.00	0.00
55.00		131.75	333.04	0.00	0.00
60.00		378.66	939.35	0.00	0.00
65.00		376.42	921.29	0.00	0.00
70.00		373.24	903.23	0.00	0.00
75.00		369.22	885.16	0.00	0.00
77.00	(3) appurtenances	601.71	428.21	0.00	0.00
80.00		217.25	499.37	0.00	0.00
85.00		358.91	817.84	0.00	0.00
87.00	(24) appurtenances	5445.49	2823.28	0.00	0.00
90.00		210.20	377.50	0.00	0.00
95.00		345.98	614.71	0.00	0.00
98.00		203.51	360.16	0.00	0.00
99.00	(19) appurtenances	3687.78	2451.65	0.00	0.00
100.00		67.90	176.27	0.00	0.00
101.75		118.21	305.34	0.00	0.00
105.00		217.41	254.06	0.00	0.00
109.00		263.06	304.31	0.00	0.00
110.00		56.36	87.89	0.00	0.00
115.00		285.42	439.44	0.00	0.00
118.00	(9) appurtenances	1067.79	568.46	0.00	0.00
119.00	(2) appurtenances	819.75	180.88	1206.66	762.10
	Totals:	**19,668.94**	**27,952.20**	**1,206.66**	**762.10**

Resulting Forces and Deflections

Structure: CT13070-A-SB
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/10/2016

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00

Iterations: 22

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-19.700	-27.930	0.000	-0.004	-1.203	-1588.881	0.000	0.000	0.000	0.000	0.000
5.00	-19.342	-26.599	0.000	-0.004	-1.203	-1490.383	-0.067	0.000	0.067	-0.124	0.000
10.00	-18.988	-25.291	0.000	-0.004	-1.204	-1393.672	-0.263	0.000	0.263	-0.247	0.000
15.00	-18.638	-24.006	0.000	-0.005	-1.204	-1298.732	-0.589	0.000	0.589	-0.371	0.000
20.00	-18.291	-22.745	0.000	-0.005	-1.204	-1205.543	-1.045	0.000	1.045	-0.494	0.000
25.00	-17.948	-21.507	0.000	-0.006	-1.204	-1114.089	-1.629	0.000	1.629	-0.617	-0.001
30.00	-17.608	-20.293	0.000	-0.007	-1.204	-1024.351	-2.341	0.000	2.341	-0.738	-0.001
35.00	-17.267	-19.102	0.000	-0.008	-1.204	-936.310	-3.179	0.000	3.179	-0.858	-0.001
40.00	-16.915	-17.936	0.000	-0.009	-1.204	-849.977	-4.142	0.000	4.142	-0.976	-0.001
45.00	-16.550	-16.799	0.000	-0.010	-1.204	-765.403	-5.228	0.000	5.228	-1.092	-0.001
48.25	-16.310	-16.073	0.000	-0.011	-1.204	-711.616	-5.998	0.000	5.998	-1.166	-0.001
50.00	-16.181	-15.448	0.000	-0.012	-1.204	-683.073	-6.433	0.000	6.433	-1.206	-0.001
53.25	-15.924	-14.314	0.000	-0.013	-1.204	-630.486	-7.280	0.000	7.280	-1.278	-0.001
55.00	-15.804	-13.962	0.000	-0.014	-1.205	-602.619	-7.756	0.000	7.756	-1.316	-0.002
60.00	-15.429	-13.002	0.000	-0.017	-1.205	-523.597	-9.198	0.000	9.198	-1.433	-0.002
65.00	-15.051	-12.063	0.001	-0.019	-1.205	-446.453	-10.760	0.001	10.760	-1.543	-0.002
70.00	-14.672	-11.146	0.001	-0.022	-1.205	-371.198	-12.433	0.001	12.433	-1.645	-0.002
75.00	-14.287	-10.257	0.001	-0.024	-1.205	-297.840	-14.206	0.001	14.206	-1.735	-0.003
77.00	-13.680	-9.838	0.001	-0.026	-1.205	-269.266	-14.940	0.001	14.940	-1.769	-0.003
80.00	-13.456	-9.332	0.001	-0.028	-1.205	-228.227	-16.068	0.001	16.068	-1.815	-0.003
85.00	-13.077	-8.517	0.001	-0.031	-1.206	-160.948	-18.006	0.001	18.006	-1.879	-0.003
87.00	-7.544	-5.872	0.000	-0.032	-1.206	-134.794	-18.798	0.002	18.798	-1.901	-0.004
90.00	-7.324	-5.497	0.000	-0.034	-1.206	-112.162	-20.002	0.002	20.002	-1.929	-0.004
95.00	-6.960	-4.891	0.001	-0.036	-1.206	-75.541	-22.044	0.002	22.044	-1.967	-0.004
98.00	-6.745	-4.537	0.001	-0.038	-1.206	-54.661	-23.285	0.003	23.285	-1.984	-0.005
99.00	-2.975	-2.215	0.000	-0.038	-1.206	-47.916	-23.702	0.003	23.702	-1.989	-0.005
100.00	-2.901	-2.040	0.000	-0.038	-1.206	-44.941	-24.119	0.003	24.119	-1.994	-0.005
101.75	-2.772	-1.739	0.000	-0.039	-1.206	-39.865	-24.851	0.003	24.851	-2.001	-0.005
105.00	-2.547	-1.492	0.000	-0.040	-1.206	-30.855	-26.217	0.003	26.217	-2.013	-0.006
109.00	-2.273	-1.197	0.000	-0.041	-1.206	-20.669	-27.910	0.004	27.910	-2.027	-0.006
110.00	-2.214	-1.111	0.000	-0.041	-1.206	-18.396	-28.334	0.004	28.334	-2.030	-0.006
115.00	-1.913	-0.682	0.000	-0.042	-1.206	-7.327	-30.465	0.005	30.465	-2.038	-0.007
118.00	-0.826	-0.152	0.000	-0.043	-1.206	-1.588	-31.746	0.006	31.746	-2.040	-0.008
119.00	-0.820	0.000	0.000	0.000	-1.207	-0.762	0.000	0.000	32.173	-2.040	-0.008

Resulting Stresses

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)		f/Fb Stress Ratio
0.00	0.48	0.68	0.00	0.01	0.00	27.00	27.51	52.0		0.529
5.00	0.47	0.68	0.00	0.01	0.00	26.47	26.97	52.0		0.519
10.00	0.45	0.69	0.00	0.01	0.00	25.90	26.39	52.0		0.508
15.00	0.44	0.69	0.00	0.01	0.00	25.29	25.76	52.0		0.495
20.00	0.43	0.69	0.00	0.01	0.00	24.61	25.07	52.0		0.482
25.00	0.41	0.70	0.00	0.01	0.00	23.88	24.32	52.0		0.468
30.00	0.40	0.70	0.00	0.01	0.00	23.08	23.51	52.0		0.452
35.00	0.39	0.70	0.00	0.01	0.00	22.20	22.62	52.0		0.435
40.00	0.37	0.71	0.00	0.02	0.00	21.24	21.65	52.0		0.416
45.00	0.36	0.71	0.00	0.02	0.00	20.19	20.58	52.0		0.396
48.25	0.35	0.71	0.00	0.02	0.00	19.45	19.84	52.0		0.382
50.00	0.34	0.72	0.00	0.02	0.00	19.04	19.42	52.0		0.374
53.25	0.38	0.84	0.00	0.02	0.00	21.06	21.49	52.0		0.413
55.00	0.37	0.85	0.00	0.02	0.00	20.53	20.96	52.0		0.403
60.00	0.36	0.85	0.00	0.02	0.00	18.90	19.31	52.0		0.372
65.00	0.34	0.85	0.00	0.02	0.00	17.10	17.50	52.0		0.337
70.00	0.32	0.86	0.00	0.02	0.00	15.11	15.51	52.0		0.298
75.00	0.31	0.86	0.00	0.03	0.00	12.91	13.31	52.0		0.256
77.00	0.30	0.84	0.00	0.03	0.00	11.98	12.37	52.0		0.238
80.00	0.29	0.84	0.00	0.03	0.00	10.56	10.95	52.0		0.211
85.00	0.27	0.84	0.00	0.03	0.00	7.96	8.37	52.0		0.161
87.00	0.19	0.49	0.00	0.03	0.00	6.85	7.10	52.0		0.137
90.00	0.18	0.49	0.00	0.03	0.00	5.95	6.20	52.0		0.119
95.00	0.17	0.48	0.00	0.03	0.00	4.30	4.56	52.0		0.088
98.00	0.16	0.48	0.00	0.04	0.00	3.26	3.53	52.0		0.068
99.00	0.08	0.21	0.00	0.04	0.00	2.90	3.01	52.0		0.058
100.00	0.07	0.21	0.00	0.04	0.00	2.76	2.86	52.0		0.055
101.75	0.08	0.25	0.00	0.05	0.00	3.01	3.13	52.0		0.060
105.00	0.07	0.23	0.00	0.05	0.00	2.45	2.56	52.0		0.049
109.00	0.06	0.21	0.00	0.05	0.00	1.75	1.86	52.0		0.036
109.00	0.06	0.21	0.00	0.05	0.00	1.75	1.86	52.0		0.032
110.00	0.04	0.18	0.00	0.05	0.00	1.38	1.48	33.6	33.6	0.044
115.00	0.03	0.15	0.00	0.05	0.00	0.55	0.67	33.6	33.6	0.020
118.00	0.01	0.07	0.00	0.05	0.00	0.12	0.23	33.6	33.6	0.007
119.00	0.00	0.07	0.00	0.05	0.00	0.06	0.20	33.6	33.6	0.006

Wind Loading - Shaft

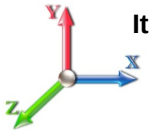
Structure: CT13070-A-SBA
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/10/2016

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	13.871	23.44	302.97	0.650	0.500	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	13.871	23.44	296.40	0.650	0.500	5.00	20.773	13.50	316.5	149.1	1130.8
10.00		0.00	1.00	13.871	23.44	289.83	0.650	0.500	5.00	20.327	13.21	309.7	145.8	1105.9
15.00		0.00	1.00	13.871	23.44	283.27	0.650	0.500	5.00	19.881	12.92	302.9	142.6	1080.9
20.00		0.00	1.00	13.871	23.44	276.70	0.650	0.500	5.00	19.435	12.63	296.1	139.3	1056.0
25.00		0.00	1.00	13.871	23.44	270.14	0.650	0.500	5.00	18.989	12.34	289.3	136.0	1031.0
30.00		0.00	1.00	13.871	23.44	263.57	0.650	0.500	5.00	18.543	12.05	282.5	132.8	1006.1
35.00		0.00	1.02	14.106	23.84	259.17	0.650	0.500	5.00	18.097	11.76	280.4	129.5	981.2
40.00		0.00	1.06	14.655	24.77	257.42	0.650	0.500	5.00	17.651	11.47	284.2	126.2	956.2
45.00		0.00	1.09	15.156	25.61	254.92	0.650	0.500	5.00	17.205	11.18	286.4	123.0	931.3
48.25	Bot - Section 2	0.00	1.11	15.462	26.13	252.97	0.650	0.500	3.25	10.944	7.11	185.9	78.5	592.3
50.00		0.00	1.13	15.620	26.40	251.82	0.650	0.500	1.75	5.906	3.84	101.3	42.6	546.9
53.25	Top - Section 1	0.00	1.15	15.903	26.88	249.52	0.650	0.500	3.25	10.823	7.04	189.1	77.7	1001.3
55.00		0.00	1.16	16.051	27.13	252.33	0.650	0.500	1.75	5.750	3.74	101.4	41.4	266.5
60.00		0.00	1.19	16.455	27.81	248.34	0.650	0.500	5.00	16.127	10.48	291.5	115.1	746.1
65.00		0.00	1.21	16.836	28.45	243.96	0.650	0.500	5.00	15.681	10.19	290.0	111.8	724.7
70.00		0.00	1.24	17.196	29.06	239.24	0.650	0.500	5.00	15.235	9.90	287.8	108.5	703.4
75.00		0.00	1.26	17.538	29.64	234.23	0.650	0.500	5.00	14.789	9.61	284.9	105.2	682.1
77.00	Appurtenance(s)	0.00	1.27	17.671	29.86	232.15	0.650	0.500	2.00	5.791	3.76	112.4	41.6	267.2
80.00		0.00	1.29	17.865	30.19	228.95	0.650	0.500	3.00	8.552	5.56	167.8	61.2	394.3
85.00		0.00	1.31	18.177	30.72	223.42	0.650	0.500	5.00	13.897	9.03	277.5	98.7	639.4
87.00	Appurtenance(s)	0.00	1.32	18.298	30.92	221.15	0.650	0.500	2.00	5.434	3.53	109.2	39.0	250.2
90.00		0.00	1.33	18.476	31.22	217.68	0.650	0.500	3.00	8.017	5.21	162.7	57.3	368.7
95.00		0.00	1.35	18.764	31.71	211.73	0.650	0.500	5.00	13.005	8.45	268.1	92.2	596.7
98.00	Bot - Section 3	0.00	1.36	18.931	31.99	208.07	0.650	0.500	3.00	7.589	4.93	157.8	54.1	348.2
99.00	Appurtenance(s)	0.00	1.37	18.986	32.09	206.83	0.650	0.500	1.00	2.536	1.65	52.9	18.2	193.6
100.00		0.00	1.37	19.041	32.18	205.59	0.650	0.500	1.00	2.518	1.64	52.7	18.1	192.1
101.75	Top - Section 2	0.00	1.38	19.135	32.34	203.40	0.650	0.500	1.75	4.363	2.84	91.7	31.2	332.7
105.00		0.00	1.39	19.308	32.63	202.90	0.650	0.500	3.25	7.958	5.17	168.8	56.7	303.5
109.00	Top - Section 3	0.00	1.41	19.515	32.98	197.76	0.650	0.500	4.00	9.536	6.20	204.4	67.6	363.1
110.00		0.00	1.41	19.566	33.07	189.42	0.590	0.500	1.00	2.250	1.33	43.9	16.2	101.9
115.00		0.00	1.43	19.816	33.49	190.63	0.590	0.500	5.00	11.250	6.64	222.3	80.9	509.3
118.00	Appurtenance(s)	0.00	1.44	19.963	33.74	191.33	0.590	0.500	3.00	6.750	3.98	134.4	48.6	305.6
119.00	Appurtenance(s)	0.00	1.44	20.011	33.82	191.56	0.590	0.500	1.00	2.250	1.33	44.9	16.2	101.9
								Totals:	**119.00**			**6,651.6**		**19,811.1**

Discrete Appurtenance Forces

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	20.059	33.899	1.00	17.84	194.00	1.583	1.000	604.76	957.54	604.76
2	118.00	LLPX310R	3	19.963	33.737	0.71	11.42	163.50	0.000	0.000	385.17	0.00	0.00
3	118.00	3 ft Standoff	3	19.963	33.737	0.75	9.77	189.00	0.000	0.000	329.44	0.00	0.00
4	118.00	2.5GHz RRH	3	19.963	33.737	0.75	4.70	134.70	0.000	0.000	158.65	0.00	0.00
5	99.00	Low Profile Platform	1	18.986	32.086	1.00	27.00	1800.00	0.000	0.000	866.33	0.00	0.00
6	99.00	LNX-6515DS-A1M	3	18.986	32.086	0.84	30.04	336.33	0.000	0.000	963.82	0.00	0.00
7	99.00	KRY 112 489/2	3	18.986	32.086	0.84	1.89	57.78	0.000	0.000	60.57	0.00	0.00
8	99.00	KRY 112 144/1	3	18.986	32.086	0.75	1.11	39.06	0.000	0.000	35.56	0.00	0.00
9	99.00	APX16DWV-16DWVS-E-AC	3	18.986	32.086	0.66	15.00	215.76	0.000	0.000	481.17	0.00	0.00
10	99.00	AIR 32	3	18.986	32.086	0.87	18.04	513.60	0.000	0.000	578.85	0.00	0.00
11	99.00	782 11056	3	18.986	32.086	0.82	0.56	8.49	0.000	0.000	18.07	0.00	0.00
12	87.00	SBNHH-1D65B	9	18.298	30.923	0.82	65.70	778.95	0.000	0.000	2031.67	0.00	0.00
13	87.00	RRH2X60-PCS	3	18.298	30.923	0.90	7.43	212.46	0.000	0.000	229.67	0.00	0.00
14	87.00	RRH2X60-700	3	18.298	30.923	0.74	9.40	240.39	0.000	0.000	290.78	0.00	0.00
15	87.00	Low Profile Platform	1	18.298	30.923	1.00	27.00	1800.00	0.000	0.000	834.93	0.00	0.00
16	87.00	DB-T1-6Z-8AB-0Z	2	18.298	30.923	0.86	10.24	143.02	0.000	0.000	316.80	0.00	0.00
17	87.00	BXA-80063/4CF	3	18.298	30.923	0.72	11.94	105.66	0.000	0.000	369.25	0.00	0.00
18	87.00	1900 MHz 4X45 RRH	3	18.298	30.923	0.99	8.82	235.11	0.000	0.000	272.86	0.00	0.00
19	77.00	APXV18-206517S-C	3	17.671	29.863	0.76	13.32	159.00	0.000	0.000	397.63	0.00	0.00
						Totals:		**7,326.81**			**9,226.00**		

Total Applied Force Summary

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Iterations: 22

Dead Load Factor 1.00

Wind Load Factor 1.00

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		316.53	1439.18	0.00	0.00
10.00		309.73	1414.23	0.00	0.00
15.00		302.93	1389.29	0.00	0.00
20.00		296.14	1364.34	0.00	0.00
25.00		289.34	1339.40	0.00	0.00
30.00		282.55	1314.45	0.00	0.00
35.00		280.42	1289.51	0.00	0.00
40.00		284.15	1264.56	0.00	0.00
45.00		286.45	1239.62	0.00	0.00
48.25		185.88	792.75	0.00	0.00
50.00		101.34	654.78	0.00	0.00
53.25		189.08	1201.72	0.00	0.00
55.00		101.38	374.46	0.00	0.00
60.00		291.51	1054.41	0.00	0.00
65.00		290.01	1033.08	0.00	0.00
70.00		287.79	1011.75	0.00	0.00
75.00		284.92	990.41	0.00	0.00
77.00	(3) appurtenances	510.04	549.58	0.00	0.00
80.00		167.83	560.56	0.00	0.00
85.00		277.49	916.55	0.00	0.00
87.00	(24) appurtenances	4455.19	3876.63	0.00	0.00
90.00		162.72	434.76	0.00	0.00
95.00		268.06	706.88	0.00	0.00
98.00		157.82	414.28	0.00	0.00
99.00	(19) appurtenances	3057.27	3186.62	0.00	0.00
100.00		52.66	194.35	0.00	0.00
101.75		91.72	336.59	0.00	0.00
105.00		168.79	310.71	0.00	0.00
109.00		204.43	371.94	0.00	0.00
110.00		43.90	104.08	0.00	0.00
115.00		222.29	520.38	0.00	0.00
118.00	(9) appurtenances	1007.61	799.43	0.00	0.00
119.00	(2) appurtenances	649.66	295.87	957.54	604.76
	Totals:	**15,877.61**	**32,747.15**	**957.54**	**604.76**

Resulting Forces and Deflections

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-15.907	-32.733	0.000	-0.003	-0.956	-1303.218	0.000	0.000	0.000	0.000	0.000
5.00	-15.645	-31.266	0.000	-0.003	-0.956	-1223.683	-0.055	0.000	0.055	-0.101	0.000
10.00	-15.385	-29.825	0.000	-0.003	-0.956	-1145.459	-0.216	0.000	0.216	-0.203	0.000
15.00	-15.126	-28.411	0.000	-0.003	-0.956	-1068.538	-0.484	0.000	0.484	-0.305	0.000
20.00	-14.869	-27.022	0.000	-0.004	-0.956	-992.910	-0.858	0.000	0.858	-0.406	0.000
25.00	-14.614	-25.659	0.000	-0.004	-0.956	-918.567	-1.338	0.000	1.338	-0.507	0.000
30.00	-14.361	-24.323	0.000	-0.005	-0.956	-845.498	-1.924	0.000	1.924	-0.608	-0.001
35.00	-14.105	-23.012	0.000	-0.006	-0.956	-773.695	-2.614	0.000	2.614	-0.707	-0.001
40.00	-13.841	-21.728	0.000	-0.006	-0.956	-703.169	-3.407	0.000	3.407	-0.804	-0.001
45.00	-13.564	-20.475	0.000	-0.007	-0.956	-633.965	-4.301	0.000	4.301	-0.900	-0.001
48.25	-13.382	-19.674	0.000	-0.008	-0.956	-589.882	-4.936	0.000	4.936	-0.961	-0.001
50.00	-13.285	-19.010	0.000	-0.008	-0.956	-566.465	-5.294	0.000	5.294	-0.994	-0.001
53.25	-13.088	-17.802	0.000	-0.009	-0.956	-523.291	-5.993	0.000	5.993	-1.054	-0.001
55.00	-13.000	-17.414	0.000	-0.010	-0.956	-500.387	-6.385	0.000	6.385	-1.086	-0.001
60.00	-12.714	-16.345	0.000	-0.011	-0.956	-435.389	-7.576	0.000	7.576	-1.183	-0.001
65.00	-12.426	-15.299	0.000	-0.013	-0.957	-371.818	-8.865	0.000	8.865	-1.275	-0.002
70.00	-12.135	-14.277	0.000	-0.014	-0.957	-309.691	-10.247	0.000	10.247	-1.359	-0.002
75.00	-11.837	-13.284	0.000	-0.016	-0.957	-249.018	-11.713	0.001	11.713	-1.435	-0.002
77.00	-11.321	-12.741	0.000	-0.017	-0.957	-225.344	-12.321	0.001	12.321	-1.463	-0.002
80.00	-11.149	-12.175	0.000	-0.018	-0.957	-191.380	-13.253	0.001	13.253	-1.502	-0.002
85.00	-10.854	-11.260	0.000	-0.020	-0.957	-135.636	-14.857	0.001	14.857	-1.556	-0.003
87.00	-6.297	-7.504	0.000	-0.021	-0.957	-113.929	-15.513	0.001	15.513	-1.574	-0.003
90.00	-6.126	-7.071	0.000	-0.022	-0.957	-95.038	-16.510	0.001	16.510	-1.597	-0.003
95.00	-5.841	-6.370	0.000	-0.024	-0.957	-64.409	-18.201	0.002	18.201	-1.630	-0.004
98.00	-5.672	-5.959	0.000	-0.025	-0.957	-46.887	-19.230	0.002	19.230	-1.645	-0.004
99.00	-2.525	-2.862	0.000	-0.025	-0.957	-41.215	-19.575	0.002	19.575	-1.649	-0.004
100.00	-2.467	-2.669	0.000	-0.025	-0.957	-38.691	-19.921	0.002	19.921	-1.653	-0.004
101.75	-2.365	-2.335	0.000	-0.026	-0.957	-34.374	-20.528	0.002	20.528	-1.659	-0.004
105.00	-2.188	-2.029	0.000	-0.026	-0.957	-26.687	-21.661	0.002	21.661	-1.669	-0.004
109.00	-1.973	-1.663	0.000	-0.027	-0.957	-17.934	-23.065	0.003	23.065	-1.681	-0.005
110.00	-1.926	-1.560	0.000	-0.027	-0.957	-15.961	-23.417	0.003	23.417	-1.684	-0.005
115.00	-1.689	-1.046	0.000	-0.028	-0.957	-6.329	-25.185	0.003	25.185	-1.691	-0.006
118.00	-0.658	-0.277	0.000	-0.028	-0.957	-1.263	-26.248	0.004	26.248	-1.693	-0.006
119.00	-0.650	0.000	0.000	0.000	-0.958	-0.605	0.000	0.000	26.603	-1.693	-0.006

Resulting Stresses

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)		f/Fb Stress Ratio
0.00	0.56	0.55	0.00	0.01	0.00	22.15	22.73	52.0		0.437
5.00	0.55	0.55	0.00	0.01	0.00	21.74	22.31	52.0		0.429
10.00	0.53	0.56	0.00	0.01	0.00	21.29	21.85	52.0		0.420
15.00	0.52	0.56	0.00	0.01	0.00	20.80	21.35	52.0		0.411
20.00	0.51	0.56	0.00	0.01	0.00	20.27	20.80	52.0		0.400
25.00	0.49	0.57	0.00	0.01	0.00	19.69	20.21	52.0		0.389
30.00	0.48	0.57	0.00	0.01	0.00	19.05	19.55	52.0		0.376
35.00	0.47	0.58	0.00	0.01	0.00	18.35	18.84	52.0		0.362
40.00	0.45	0.58	0.00	0.01	0.00	17.57	18.05	52.0		0.347
45.00	0.44	0.58	0.00	0.01	0.00	16.72	17.19	52.0		0.331
48.25	0.43	0.59	0.00	0.01	0.00	16.12	16.58	52.0		0.319
50.00	0.42	0.59	0.00	0.01	0.00	15.79	16.24	52.0		0.312
53.25	0.47	0.69	0.00	0.02	0.00	17.48	17.99	52.0		0.346
55.00	0.46	0.70	0.00	0.02	0.00	17.05	17.56	52.0		0.338
60.00	0.45	0.70	0.00	0.02	0.00	15.71	16.21	52.0		0.312
65.00	0.43	0.71	0.00	0.02	0.00	14.24	14.72	52.0		0.283
70.00	0.41	0.71	0.00	0.02	0.00	12.61	13.08	52.0		0.252
75.00	0.40	0.71	0.00	0.02	0.00	10.79	11.26	52.0		0.217
77.00	0.39	0.69	0.00	0.02	0.00	10.02	10.48	52.0		0.202
80.00	0.38	0.70	0.00	0.02	0.00	8.85	9.31	52.0		0.179
85.00	0.36	0.70	0.00	0.02	0.00	6.71	7.18	52.0		0.138
87.00	0.24	0.41	0.00	0.02	0.00	5.79	6.08	52.0		0.117
90.00	0.23	0.41	0.00	0.03	0.00	5.04	5.33	52.0		0.102
95.00	0.22	0.40	0.00	0.03	0.00	3.67	3.96	52.0		0.076
98.00	0.21	0.40	0.00	0.03	0.00	2.79	3.09	52.0		0.060
99.00	0.10	0.18	0.00	0.03	0.00	2.49	2.62	52.0		0.050
100.00	0.10	0.18	0.00	0.03	0.00	2.38	2.50	52.0		0.048
101.75	0.10	0.21	0.00	0.04	0.00	2.60	2.73	52.0		0.053
105.00	0.09	0.20	0.00	0.04	0.00	2.12	2.25	52.0		0.043
109.00	0.08	0.19	0.00	0.04	0.00	1.52	1.64	52.0		0.032
109.00	0.08	0.19	0.00	0.04	0.00	1.52	1.64	52.0		0.028
110.00	0.06	0.15	0.00	0.04	0.00	1.20	1.30	33.6	33.6	0.039
115.00	0.04	0.13	0.00	0.04	0.00	0.48	0.59	33.6	33.6	0.018
118.00	0.01	0.05	0.00	0.04	0.00	0.09	0.19	33.6	33.6	0.006
119.00	0.00	0.05	0.00	0.04	0.00	0.05	0.16	33.6	33.6	0.005

Wind Loading - Shaft

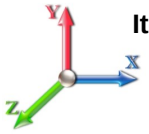
Structure: CT13070-A-SBA
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

6/10/2016

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 20

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	6.400	10.82	205.79	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	6.400	10.82	201.33	0.650	0.000	5.00	20.356	13.23	143.1	0.0	981.7
10.00		0.00	1.00	6.400	10.82	196.87	0.650	0.000	5.00	19.910	12.94	140.0	0.0	960.0
15.00		0.00	1.00	6.400	10.82	192.41	0.650	0.000	5.00	19.464	12.65	136.8	0.0	938.4
20.00		0.00	1.00	6.400	10.82	187.95	0.650	0.000	5.00	19.018	12.36	133.7	0.0	916.7
25.00		0.00	1.00	6.400	10.82	183.49	0.650	0.000	5.00	18.572	12.07	130.6	0.0	895.0
30.00		0.00	1.00	6.400	10.82	179.03	0.650	0.000	5.00	18.126	11.78	127.4	0.0	873.3
35.00		0.00	1.02	6.509	11.00	176.04	0.650	0.000	5.00	17.680	11.49	126.4	0.0	851.7
40.00		0.00	1.06	6.762	11.43	174.85	0.650	0.000	5.00	17.234	11.20	128.0	0.0	830.0
45.00		0.00	1.09	6.993	11.82	173.16	0.650	0.000	5.00	16.788	10.91	129.0	0.0	808.3
48.25	Bot - Section 2	0.00	1.11	7.134	12.06	171.83	0.650	0.000	3.25	10.673	6.94	83.6	0.0	513.8
50.00		0.00	1.13	7.207	12.18	171.05	0.650	0.000	1.75	5.760	3.74	45.6	0.0	504.3
53.25	Top - Section 1	0.00	1.15	7.338	12.40	169.49	0.650	0.000	3.25	10.552	6.86	85.1	0.0	923.6
55.00		0.00	1.16	7.406	12.52	171.40	0.650	0.000	1.75	5.604	3.64	45.6	0.0	225.1
60.00		0.00	1.19	7.592	12.83	168.68	0.650	0.000	5.00	15.711	10.21	131.0	0.0	631.0
65.00		0.00	1.21	7.768	13.13	165.71	0.650	0.000	5.00	15.265	9.92	130.2	0.0	612.9
70.00		0.00	1.24	7.934	13.41	162.51	0.650	0.000	5.00	14.819	9.63	129.1	0.0	594.9
75.00		0.00	1.26	8.092	13.68	159.10	0.650	0.000	5.00	14.373	9.34	127.8	0.0	576.8
77.00	Appurtenance(s)	0.00	1.27	8.153	13.78	157.69	0.650	0.000	2.00	5.624	3.66	50.4	0.0	225.7
80.00		0.00	1.29	8.242	13.93	155.51	0.650	0.000	3.00	8.302	5.40	75.2	0.0	333.1
85.00		0.00	1.31	8.387	14.17	151.76	0.650	0.000	5.00	13.480	8.76	124.2	0.0	540.7
87.00	Appurtenance(s)	0.00	1.32	8.442	14.27	150.22	0.650	0.000	2.00	5.267	3.42	48.8	0.0	211.2
90.00		0.00	1.33	8.525	14.41	147.86	0.650	0.000	3.00	7.767	5.05	72.7	0.0	311.4
95.00		0.00	1.35	8.657	14.63	143.82	0.650	0.000	5.00	12.588	8.18	119.7	0.0	504.6
98.00	Bot - Section 3	0.00	1.36	8.735	14.76	141.33	0.650	0.000	3.00	7.339	4.77	70.4	0.0	294.1
99.00	Appurtenance(s)	0.00	1.37	8.760	14.80	140.49	0.650	0.000	1.00	2.452	1.59	23.6	0.0	175.4
100.00		0.00	1.37	8.785	14.85	139.65	0.650	0.000	1.00	2.434	1.58	23.5	0.0	174.1
101.75	Top - Section 2	0.00	1.38	8.829	14.92	138.16	0.650	0.000	1.75	4.217	2.74	40.9	0.0	301.5
105.00		0.00	1.39	8.908	15.06	137.82	0.650	0.000	3.25	7.687	5.00	75.2	0.0	246.9
109.00	Top - Section 3	0.00	1.41	9.004	15.22	134.33	0.650	0.000	4.00	9.203	5.98	91.0	0.0	295.5
110.00		0.00	1.41	9.028	15.26	128.66	0.590	0.000	1.00	2.167	1.28	19.5	0.0	85.7
115.00		0.00	1.43	9.143	15.45	129.48	0.590	0.000	5.00	10.833	6.39	98.8	0.0	428.4
118.00	Appurtenance(s)	0.00	1.44	9.211	15.57	129.96	0.590	0.000	3.00	6.500	3.83	59.7	0.0	257.0
119.00	Appurtenance(s)	0.00	1.44	9.233	15.60	130.12	0.590	0.000	1.00	2.167	1.28	19.9	0.0	85.7
								Totals:	**119.00**			**2,986.7**		**17,108.3**

Discrete Appurtenance Forces

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 20

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	9.255	15.641	1.00	16.86	95.20	1.583	1.000	263.70	417.53	263.70
2	118.00	LLPX310R	3	9.211	15.566	0.69	10.00	85.80	0.000	0.000	155.63	0.00	0.00
3	118.00	3 ft Standoff	3	9.211	15.566	0.75	5.92	120.00	0.000	0.000	92.11	0.00	0.00
4	118.00	2.5GHz RRH	3	9.211	15.566	0.73	3.99	99.00	0.000	0.000	62.04	0.00	0.00
5	99.00	Low Profile Platform	1	8.760	14.804	1.00	22.00	1500.00	0.000	0.000	325.69	0.00	0.00
6	99.00	LNX-6515DS-A1M	3	8.760	14.804	0.84	28.72	150.90	0.000	0.000	425.13	0.00	0.00
7	99.00	KRY 112 489/2	3	8.760	14.804	0.82	1.60	46.20	0.000	0.000	23.76	0.00	0.00
8	99.00	KRY 112 144/1	3	8.760	14.804	0.73	0.90	33.06	0.000	0.000	13.29	0.00	0.00
9	99.00	APX16DWV-16DWVS-E-AC	3	8.760	14.804	0.65	14.08	122.10	0.000	0.000	208.40	0.00	0.00
10	99.00	AIR 32	3	8.760	14.804	0.86	16.91	396.60	0.000	0.000	250.28	0.00	0.00
11	99.00	782 11056	3	8.760	14.804	0.78	0.40	5.40	0.000	0.000	5.90	0.00	0.00
12	87.00	SBNHH-1D65B	9	8.442	14.268	0.82	62.07	360.00	0.000	0.000	885.56	0.00	0.00
13	87.00	RRH2X60-PCS	3	8.442	14.268	0.89	6.88	165.00	0.000	0.000	98.12	0.00	0.00
14	87.00	RRH2X60-700	3	8.442	14.268	0.73	8.66	180.00	0.000	0.000	123.57	0.00	0.00
15	87.00	Low Profile Platform	1	8.442	14.268	1.00	22.00	1500.00	0.000	0.000	313.89	0.00	0.00
16	87.00	DB-T1-6Z-8AB-0Z	2	8.442	14.268	0.85	9.72	88.00	0.000	0.000	138.66	0.00	0.00
17	87.00	BXA-80063/4CF	3	8.442	14.268	0.72	11.11	29.70	0.000	0.000	158.58	0.00	0.00
18	87.00	1900 MHz 4X45 RRH	3	8.442	14.268	0.99	8.20	178.50	0.000	0.000	117.02	0.00	0.00
19	77.00	APXV18-206517S-C	3	8.153	13.779	0.74	11.46	79.20	0.000	0.000	157.84	0.00	0.00
						Totals:		**5,234.66**			**3,819.18**		

Total Applied Force Summary

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 20	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 20

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		143.11	1290.07	0.00	0.00
10.00		139.98	1268.39	0.00	0.00
15.00		136.84	1246.72	0.00	0.00
20.00		133.71	1225.04	0.00	0.00
25.00		130.57	1203.36	0.00	0.00
30.00		127.43	1181.69	0.00	0.00
35.00		126.41	1160.01	0.00	0.00
40.00		128.01	1138.34	0.00	0.00
45.00		128.96	1116.66	0.00	0.00
48.25		83.64	714.21	0.00	0.00
50.00		45.60	612.22	0.00	0.00
53.25		85.06	1124.07	0.00	0.00
55.00		45.59	333.04	0.00	0.00
60.00		131.02	939.35	0.00	0.00
65.00		130.25	921.29	0.00	0.00
70.00		129.15	903.23	0.00	0.00
75.00		127.76	885.16	0.00	0.00
77.00	(3) appurtenances	208.21	428.21	0.00	0.00
80.00		75.17	499.37	0.00	0.00
85.00		124.19	817.84	0.00	0.00
87.00	(24) appurtenances	1884.25	2823.28	0.00	0.00
90.00		72.73	377.50	0.00	0.00
95.00		119.72	614.71	0.00	0.00
98.00		70.42	360.16	0.00	0.00
99.00	(19) appurtenances	1276.05	2451.65	0.00	0.00
100.00		23.49	176.27	0.00	0.00
101.75		40.90	305.34	0.00	0.00
105.00		75.23	254.06	0.00	0.00
109.00		91.02	304.31	0.00	0.00
110.00		19.50	87.89	0.00	0.00
115.00		98.76	439.44	0.00	0.00
118.00	(9) appurtenances	369.48	568.46	0.00	0.00
119.00	(2) appurtenances	283.65	180.88	417.53	263.70
	Totals:	**6,805.86**	**27,952.20**	**417.53**	**263.70**

Resulting Forces and Deflections

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 20

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-6.816	-27.950	0.000	0.000	-0.417	-549.814	0.000	0.000	0.000	0.000	0.000
5.00	-6.692	-26.655	0.000	0.000	-0.417	-515.736	-0.023	0.000	0.023	-0.043	0.000
10.00	-6.570	-25.381	0.000	0.000	-0.417	-482.276	-0.091	0.000	0.091	-0.086	0.000
15.00	-6.448	-24.130	0.000	-0.001	-0.417	-449.429	-0.204	0.000	0.204	-0.128	0.000
20.00	-6.329	-22.901	0.000	-0.001	-0.417	-417.187	-0.362	0.000	0.362	-0.171	0.000
25.00	-6.210	-21.693	0.000	-0.001	-0.417	-385.545	-0.564	0.000	0.564	-0.213	0.000
30.00	-6.093	-20.508	0.000	-0.001	-0.417	-354.496	-0.810	0.000	0.810	-0.256	0.000
35.00	-5.975	-19.344	0.000	-0.001	-0.417	-324.033	-1.100	0.000	1.100	-0.297	0.000
40.00	-5.853	-18.202	0.000	-0.001	-0.417	-294.161	-1.434	0.000	1.434	-0.338	0.000
45.00	-5.727	-17.083	0.000	-0.001	-0.417	-264.897	-1.809	0.000	1.809	-0.378	0.000
48.25	-5.644	-16.368	0.000	-0.001	-0.417	-246.285	-2.076	0.000	2.076	-0.404	0.000
50.00	-5.599	-15.754	0.000	-0.001	-0.417	-236.408	-2.226	0.000	2.226	-0.417	0.000
53.25	-5.511	-14.629	0.000	-0.002	-0.417	-218.211	-2.519	0.000	2.519	-0.442	-0.001
55.00	-5.469	-14.293	0.000	-0.002	-0.417	-208.567	-2.684	0.000	2.684	-0.456	-0.001
60.00	-5.340	-13.351	0.000	-0.002	-0.417	-181.221	-3.183	0.000	3.183	-0.496	-0.001
65.00	-5.209	-12.428	0.000	-0.002	-0.417	-154.523	-3.724	0.000	3.724	-0.534	-0.001
70.00	-5.078	-11.523	0.000	-0.003	-0.417	-128.478	-4.303	0.000	4.303	-0.569	-0.001
75.00	-4.945	-10.638	0.000	-0.003	-0.417	-103.089	-4.916	0.000	4.916	-0.601	-0.001
77.00	-4.735	-10.210	0.000	-0.003	-0.417	-93.199	-5.171	0.000	5.171	-0.612	-0.001
80.00	-4.658	-9.710	0.000	-0.003	-0.417	-78.995	-5.561	0.000	5.561	-0.628	-0.001
85.00	-4.527	-8.893	0.000	-0.004	-0.417	-55.707	-6.232	0.000	6.232	-0.650	-0.001
87.00	-2.611	-6.091	0.000	-0.004	-0.417	-46.654	-6.506	0.000	6.506	-0.658	-0.001
90.00	-2.535	-5.714	0.000	-0.004	-0.417	-38.821	-6.923	0.000	6.923	-0.668	-0.001
95.00	-2.409	-5.100	0.000	-0.004	-0.417	-26.146	-7.629	0.000	7.629	-0.681	-0.002
98.00	-2.335	-4.741	0.000	-0.004	-0.417	-18.919	-8.059	0.000	8.059	-0.687	-0.002
99.00	-1.029	-2.304	0.000	-0.005	-0.417	-16.584	-8.203	0.000	8.203	-0.688	-0.002
100.00	-1.004	-2.128	0.000	-0.005	-0.417	-15.555	-8.348	0.000	8.348	-0.690	-0.002
101.75	-0.959	-1.824	0.000	-0.005	-0.417	-13.798	-8.601	0.000	8.601	-0.693	-0.002
105.00	-0.881	-1.570	0.000	-0.005	-0.417	-10.679	-9.074	0.000	9.074	-0.697	-0.002
109.00	-0.787	-1.267	0.000	-0.005	-0.417	-7.154	-9.660	0.000	9.660	-0.701	-0.002
110.00	-0.766	-1.179	0.000	-0.005	-0.417	-6.367	-9.807	0.001	9.807	-0.702	-0.002
115.00	-0.662	-0.741	0.000	-0.005	-0.417	-2.536	-10.544	0.001	10.544	-0.705	-0.003
118.00	-0.286	-0.177	0.000	-0.005	-0.417	-0.549	-10.988	0.001	10.988	-0.706	-0.003
119.00	-0.284	0.000	0.000	0.000	-0.418	-0.264	0.000	0.000	11.136	-0.706	-0.003

Resulting Stresses

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 20

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)		f/Fb Stress Ratio
0.00	0.48	0.24	0.00	0.00	0.00	9.34	9.83	52.0		0.189
5.00	0.47	0.24	0.00	0.00	0.00	9.16	9.64	52.0		0.185
10.00	0.45	0.24	0.00	0.00	0.00	8.96	9.43	52.0		0.181
15.00	0.44	0.24	0.00	0.00	0.00	8.75	9.20	52.0		0.177
20.00	0.43	0.24	0.00	0.00	0.00	8.52	8.96	52.0		0.172
25.00	0.42	0.24	0.00	0.00	0.00	8.26	8.69	52.0		0.167
30.00	0.40	0.24	0.00	0.00	0.00	7.99	8.40	52.0		0.162
35.00	0.39	0.24	0.00	0.00	0.00	7.68	8.09	52.0		0.156
40.00	0.38	0.25	0.00	0.01	0.00	7.35	7.74	52.0		0.149
45.00	0.36	0.25	0.00	0.01	0.00	6.99	7.36	52.0		0.142
48.25	0.36	0.25	0.00	0.01	0.00	6.73	7.10	52.0		0.137
50.00	0.35	0.25	0.00	0.01	0.00	6.59	6.95	52.0		0.134
53.25	0.39	0.29	0.00	0.01	0.00	7.29	7.69	52.0		0.148
55.00	0.38	0.29	0.00	0.01	0.00	7.11	7.51	52.0		0.144
60.00	0.37	0.29	0.00	0.01	0.00	6.54	6.93	52.0		0.133
65.00	0.35	0.30	0.00	0.01	0.00	5.92	6.29	52.0		0.121
70.00	0.33	0.30	0.00	0.01	0.00	5.23	5.59	52.0		0.108
75.00	0.32	0.30	0.00	0.01	0.00	4.47	4.82	52.0		0.093
77.00	0.31	0.29	0.00	0.01	0.00	4.15	4.48	52.0		0.086
80.00	0.30	0.29	0.00	0.01	0.00	3.65	3.99	52.0		0.077
85.00	0.28	0.29	0.00	0.01	0.00	2.76	3.09	52.0		0.059
87.00	0.20	0.17	0.00	0.01	0.00	2.37	2.59	52.0		0.050
90.00	0.19	0.17	0.00	0.01	0.00	2.06	2.27	52.0		0.044
95.00	0.18	0.17	0.00	0.01	0.00	1.49	1.69	52.0		0.033
98.00	0.17	0.17	0.00	0.01	0.00	1.13	1.33	52.0		0.026
99.00	0.08	0.07	0.00	0.01	0.00	1.00	1.09	52.0		0.021
100.00	0.08	0.07	0.00	0.01	0.00	0.96	1.04	52.0		0.020
101.75	0.08	0.09	0.00	0.02	0.00	1.04	1.14	52.0		0.022
105.00	0.07	0.08	0.00	0.02	0.00	0.85	0.93	52.0		0.018
109.00	0.06	0.07	0.00	0.02	0.00	0.61	0.68	52.0		0.013
109.00	0.06	0.07	0.00	0.02	0.00	0.61	0.68	52.0		0.012
110.00	0.05	0.06	0.00	0.02	0.00	0.48	0.54	33.6	33.6	0.016
115.00	0.03	0.05	0.00	0.02	0.00	0.19	0.25	33.6	33.6	0.007
118.00	0.01	0.02	0.00	0.02	0.00	0.04	0.08	33.6	33.6	0.002
119.00	0.00	0.02	0.00	0.02	0.00	0.02	0.07	33.6	33.6	0.002

Final Analysis Summary

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	6/10/2016	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
85 mph Wind with 0" Ice	19.7	0.00	27.93	0.00	1.20	1588.88
73.61 mph Wind with 0.5" Ice	15.9	0.00	32.73	0.00	0.96	1303.22
50 mph Wind with 0" Ice	6.8	0.00	27.95	0.00	0.42	549.81

Max Stresses

Load Case	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
85 mph Wind with 0" Ice	0.48	0.68	0.00	0.01	0.00	27.00	27.51	52.0	0.00	0.529
73.61 mph Wind with 0.5" Ice	0.56	0.55	0.00	0.01	0.00	22.15	22.73	52.0	0.00	0.437
50 mph Wind with 0" Ice	0.48	0.24	0.00	0.00	0.00	9.34	9.83	52.0	0.00	0.189

Monopole Mat Foundation Design

			Date: 6/10/2016
Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-F
Site Name:	Waterbury 4, CT	**Structure Height (Ft.):**	119
Site Number:	CT13070-A-SBA	**Engineer Name:**	J. Tibbetts
Engr. Number:	23331	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

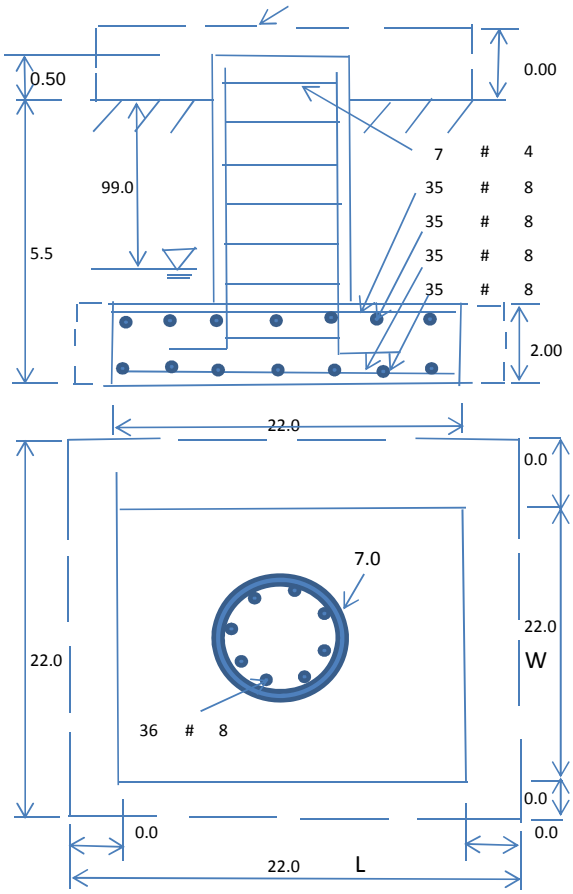
Analysis or Design? Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	27.9	Shear Force (Kips):	19.7
Uplift Force (Kips):	0.0	Moment (Kips-ft):	1588.9
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	5.5
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	2.00
Length of Pad (ft.):	22	Width of Pad (ft.):	22
Final Length of pad (ft)	22.0	Final width of pad (ft):	22.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	130.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Allowable Net Soil Bearing (psf):	16000	Allowable Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hori. force for O.T.M.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design:

Total Dry Soil Volume (cu. Ft.):	1559.30	Total Dry Soil Weight (Kips):	202.71
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	202.71	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1121.94	Total Dry Concrete Weight (Kips):	168.29
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	168.29	Total Vertical Load on Base (Kips):	398.93

Check Soil Capacities:

				Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1523	<	Allowable Soil Bearing (psf): 16000	0.10	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	2925.5	>	Applied Momont (kips-ft): 1707	0.58	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.57	OK!			

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.30		
				Load/ Capacity Ratio	
(1) Concrete Pier:					
Vertical Steel Rebar Area (sq. in./each):	0.79	Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	4845.7 >	Design Factored Moment (Mu, Kips-Ft	1667.7	0.34	OK!
Calculated Shear Capacity (Kips):	660.1 >	Design Factored Shear (Kips):	25.6	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	1535.8 >	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9747.6 >	Design Factored Axial Load (Pu Kips):	36.3	0.00	OK!
Moment & Axial Strength Combination:	0.34 OK!	Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.005	Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:					
One-Way Design Shear Capacity (L-Direction, Kips):	513.4 >	One-Way Factored Shear (L-D. Kips):	133.9	0.26	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	513.4 >	One-Way Factored Shear (W-D., Kips)	133.9	0.26	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	562.7 >	One-Way Factored Shear (C-C, Kips):	192.7	0.34	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0051 OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0051		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	2435.7 >	Moment at Bottom (L-Direct. K-Ft):	298.3	0.12	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	2435.7 >	Moment at Bottom (W-Direct. K-Ft):	298.3	0.12	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	3397.4 >	Moment at Bottom (C-C Dir. K-Ft):	421.9	0.12	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0051 OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0051		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	2435.7 >	Moment at the top (L-Dir Kips-Ft):	57.8	0.02	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	2435.7 >	Moment at the top (W-Dir Kips-Ft):	57.8	0.02	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	3397.4 >	Moment at the top (C-C Direc. K-Ft):	334.6	0.10	OK!

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

T-Mobile Existing Facility

Site ID: CTNH331B

NH331/OPTA Pine Grove
940 Meriden Road
Waterbury, CT 06705

June 16, 2016

EBI Project Number: 6216002836

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	16.40 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

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June 16, 2016

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

Emissions Analysis for Site: **CTNH331B – NH331/OPTA Pine Grove**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **940 Meriden Road, Waterbury, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **940 Meriden Road, Waterbury, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

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

3) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel

6) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

7) Since some radios are ground mounted there are additional cabling losses accounted for. For each passive ground mounted RF path the following losses were calculated. 0.77 dB of additional cable loss for all ground mounted 700 MHz Channels, 1.42 dB of additional cable loss for all ground mounted passive 1900 MHz channels and 1.46 dB of additional cable loss for all ground mounted passive 2100 MHz channels. This is based on manufacturers Specifications for 138 feet of 1-5/8" coax cable on each path.

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

9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antennas used in this modeling are the **Ericsson AIR32 B66Aa/B2A** & **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B66Aa/B2A** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. 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.

11) The antenna mounting height centerline of the proposed antennas is **99 feet** above ground level (AGL).

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

13) All calculations were done with respect to uncontrolled / general public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A	Make / Model:	Ericsson AIR32 B66Aa/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	3.88	Antenna B1 MPE%	3.88	Antenna C1 MPE%	3.88
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	5,520.05	ERP (W):	5,520.05	ERP (W):	5,520.05
Antenna A2 MPE%	2.29	Antenna B2 MPE%	2.29	Antenna C2 MPE%	2.29
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	724.64	ERP (W):	724.64	ERP (W):	724.64
Antenna A3 MPE%	0.64	Antenna B3 MPE%	0.64	Antenna C3 MPE%	0.64

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**6.82 %**
Nextel	0.37 %
Clearwire	0.15 %
MetroPCS	2.41 %
Verizon Wireless	6.65 %
Site Total MPE %:	**16.40 %**

T-Mobile Sector A Total:	6.82 %
T-Mobile Sector B Total:	6.82 %
T-Mobile Sector C Total:	6.82 %
Site Total:	16.40 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	**2**	**2,334.27**	**99**	**19.41**	**AWS - 2100 MHz**	**1000**	**1.94%**
T-Mobile 2100 MHz (AWS) LTE	**2**	**2,334.27**	**99**	**19.41**	**PCS - 1900 MHz**	**1000**	**1.94%**
T-Mobile 1900 MHz (PCS) GSM	**2**	**914.37**	**99**	**7.60**	**AWS - 2100 MHz**	**1000**	**0.76%**
T-Mobile 1900 MHz (PCS) UMTS	**2**	**922.83**	**99**	**7.67**	**PCS - 1950 MHz**	**1000**	**0.77%**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**922.83**	**99**	**7.67**	**PCS - 1950 MHz**	**1000**	**0.77%**
T-Mobile 700 MHz LTE	**1**	**724.64**	**99**	**3.01**	**700 MHz**	**467**	**0.64%**
						Total*:	**6.82%**

***Note: Total may vary by 0.01% due to summing of remainders**

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	6.82 %
Sector B:	6.82 %
Sector C:	6.82 %
T-Mobile Per Sector Maximum:	6.82 %
Site Total:	16.40 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **16.40%** of the allowable FCC established general public 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.

SITE NUMBER: CTNH331B

940 MERIDEN ROAD
WATERBURY, CT 06705
NEW HAVEN COUNTY

SITE NAME: NH331/OPTA PINE GROVE

RF DESIGN GUIDELINE: 794DB

T-MOBILE TECHNICIAN SITE SAFETY NOTES	
LOCATION	SPECIAL RESTRICTIONS
SECTOR A: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
SECTOR B: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
SECTOR C: ANTENNA/TMA/RRH	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

GENERAL NOTES

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T–MOBILE. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T–MOBILE NORTHEAST, LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SPECIAL STRUCTURAL NOTES

TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE–BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.

STRUCTURAL DESIGNS AND DETAILS FOR ANTENNA MOUNTS COMPLETED BY HUDSON DESIGN ON BEHALF OF T–MOBILE ARE INCLUSIVE OF THE ENTIRE ANTENNA SUPPORT STRUCTURE (GLOBAL STRUCTURAL STABILITY ANALYSIS BY OTHERS), EXISTING TOWER PLATFORM, EXISTING ANTENNA MOUNTS AND ALL OTHER ASPECTS OF THE STRUCTURE THAT WILL SUPPORT THE T–MOBILE MODERNIZATION EQUIPMENT DEPLOYMENT AS DEPICTED HEREIN.

HUDSON DESIGN ASSUMES THAT THE TOWER IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES

PROJECT SUMMARY

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T–MOBILE EQUIPMENT INSTALLATION
ZONING JURISDICTION: (CITY OF WATERBURY)	BASED ON INFORMATION PROVIDED BY T–MOBILE, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A), AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE–EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).
SITE ADDRESS:	940 MERIDEN ROAD WATERBURY, CT 06705
LATITUDE:	41° 33' 11.46" N
LONGITUDE:	72° 59' 36.19" W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	SBA COMMUNICATIONS CORPORATION 8051 CONGRESS AVENUE BOCA RATON, FL 33487
SBA SITE NAME:	WATERBURY 4, CT
SBA SITE ID:	CT13070–A

APPROVALS

PROJECT MANAGER	DATE
CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING / SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

DRIVING DIRECTIONS:

HEAD NORTHEAST ON GRIFFIN RD S AND TURN RIGHT ONTO DAY HILL RD. USE THE RIGHT LANE TO MERGE ONTO I–91 S. CONTINUE ON I–91 S AND TAKE EXIT 32A–32B FOR I–84 W. MERGE ONTO I–84 W. TAKE EXIT 25A FOR AUSTIN RD. TURN RIGHT ONTO AUSTIN RD. TURN LEFT ONTO E MAIN ST. TURN RIGHT ONTO NORRIS ST. TURN LEFT ONTO MERIDAN RD. DESTINATION WILL BE ON THE LEFT.

ARRIVE AT 940 MERIDAN ROAD WATERBURY, CT 06705.

CALL BEFORE YOU DIG
CALL TOLL FREE 1–800–922–4455 OR CALL 811
UNDERGROUND SERVICE ALERT

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T–1	TITLE SHEET	0
GN–1	GENERAL NOTES	0
A–1	COMPOUND PLAN & EQUIPMENT PLAN	0
A–2	ANTENNA LAYOUT & ELEVATION	0
A–3	DETAILS	0
E–1	GROUNDING DIAGRAM	0

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N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

CHECKED BY: DR

APPROVED BY: DPH

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	05/05/16	ISSUED FOR REVIEW	VP

SITE NUMBER:
CTNH331B
SBA SITE ID:
CT13070–A
SITE NAME:
NH331/OPTA PINE GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705
NEW HAVEN COUNTY

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

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

   CONTRACTOR – TRANSCEND WIRELESS
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T-MOBILE

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
    BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT, + 2009 & 2013 CT AMENDMENTS
    ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
    LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

    SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

    MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

    TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

    EQUIPMENT AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	GC	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BBU	BATTERY BACKUP UNIT	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
BTCW	BARE TINNED SOLID COPPER WIRE	MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	P	PROPOSED	TYP	TYPICAL
E	EXISTING	NTS	NOT TO SCALE	UG	UNDER GROUND
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTER LINE (ANTENNA)	VIF	VERIFY IN FIELD
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

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CHECKED BY: DR

APPROVED BY: DPH

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	05/05/16	ISSUED FOR REVIEW	VP

SITE NUMBER:
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SBA SITE ID:
CT13070-A
SITE NAME:
NH331/OPTA
PINE GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705
NEW HAVEN COUNTY

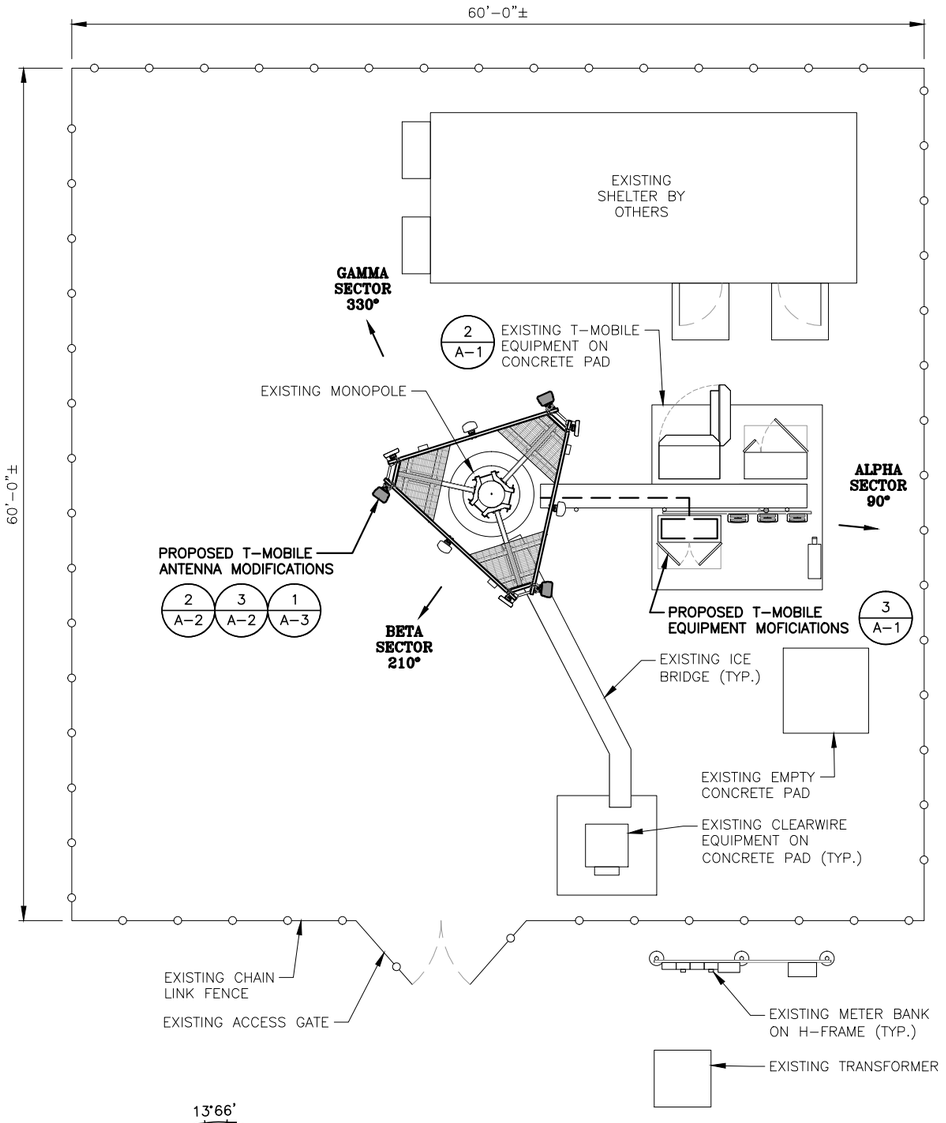
SHEET TITLE
GENERAL NOTES

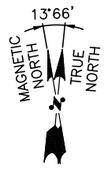
SHEET NUMBER
GN-1

STRUCTURAL NOTES:
PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO STRUCTURAL ANALYSIS PROVIDED BY TOWER OWNER TO DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.

NOTE:

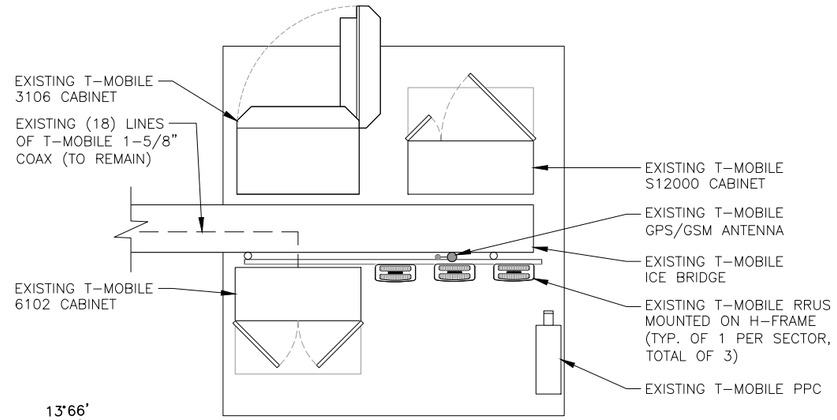
*RF DATA BASED ON PRELIMINARY INFORMATION. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

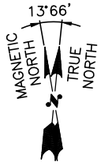




COMPOUND PLAN 1 A-1
22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

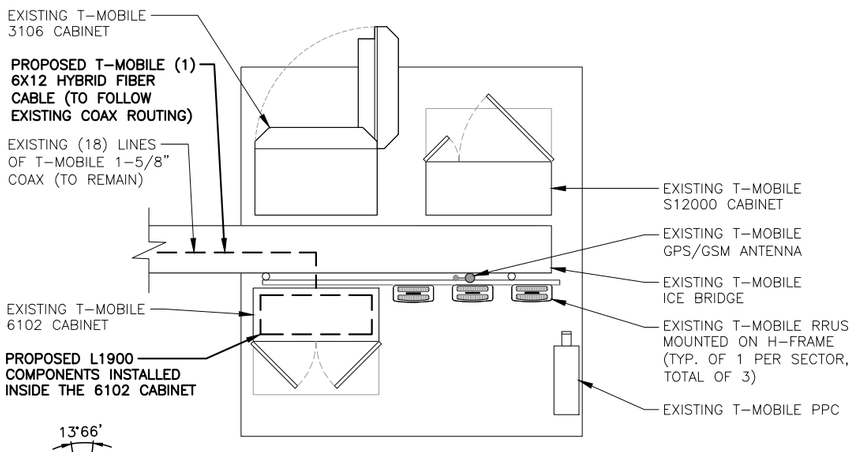
0 2'-8" 5'-4" 10'-8" 16'-0"





EXISTING EQUIPMENT PLAN 2 A-1
22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"

0 1'-4" 2'-8" 5'-4" 8'-0"



PROPOSED EQUIPMENT PLAN 3 A-1
22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"

0 1'-4" 2'-8" 5'-4" 8'-0"

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CHECKED BY: DR

APPROVED BY: DPH

SUBMITTALS

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0	05/05/16	ISSUED FOR REVIEW	VP

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SBA SITE ID:
CT13070-A
SITE NAME:
NH331/OPTA
PINE GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705
NEW HAVEN COUNTY

SHEET TITLE
COMPOUND & EQUIPMENT PLAN

SHEET NUMBER
A-1

STRUCTURAL NOTES:
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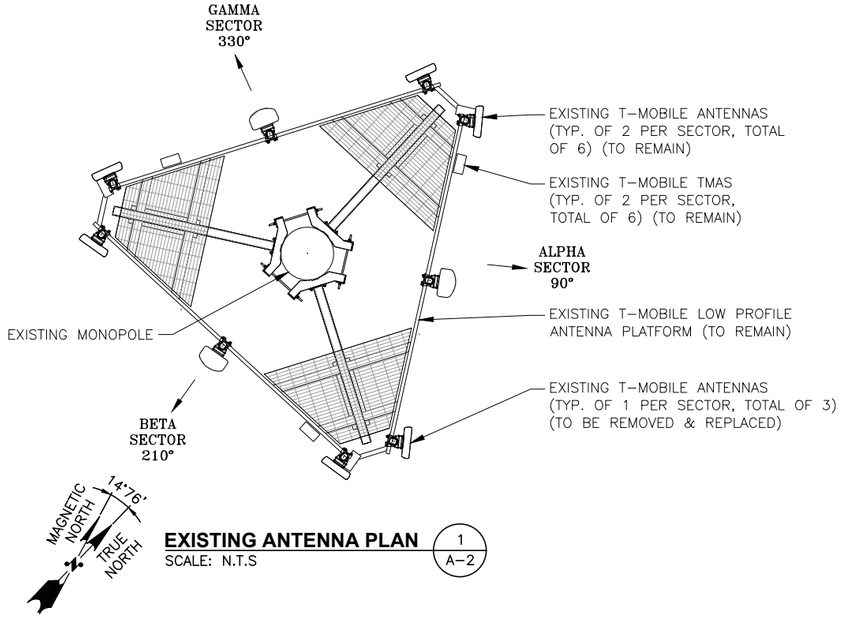
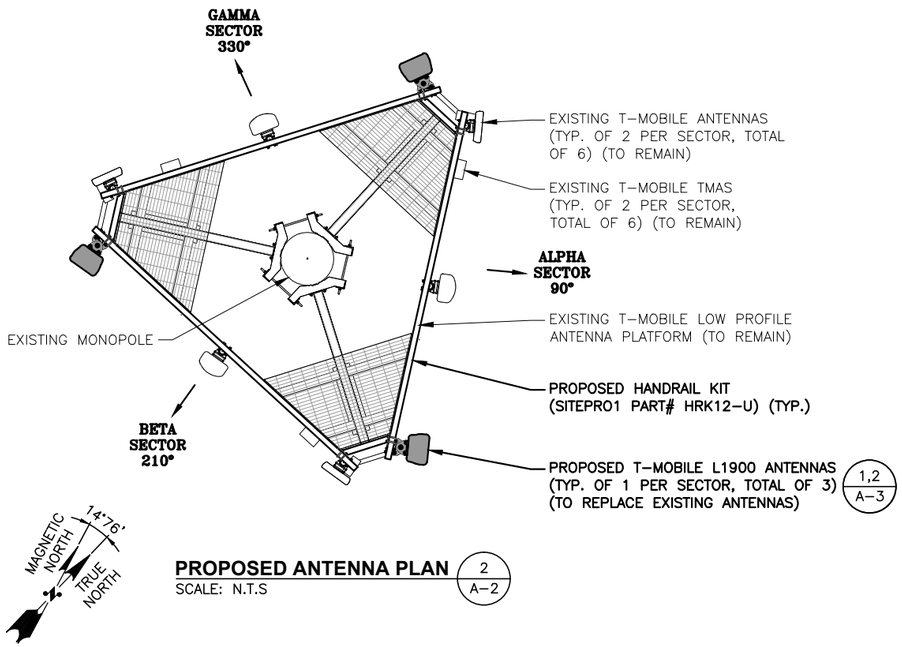
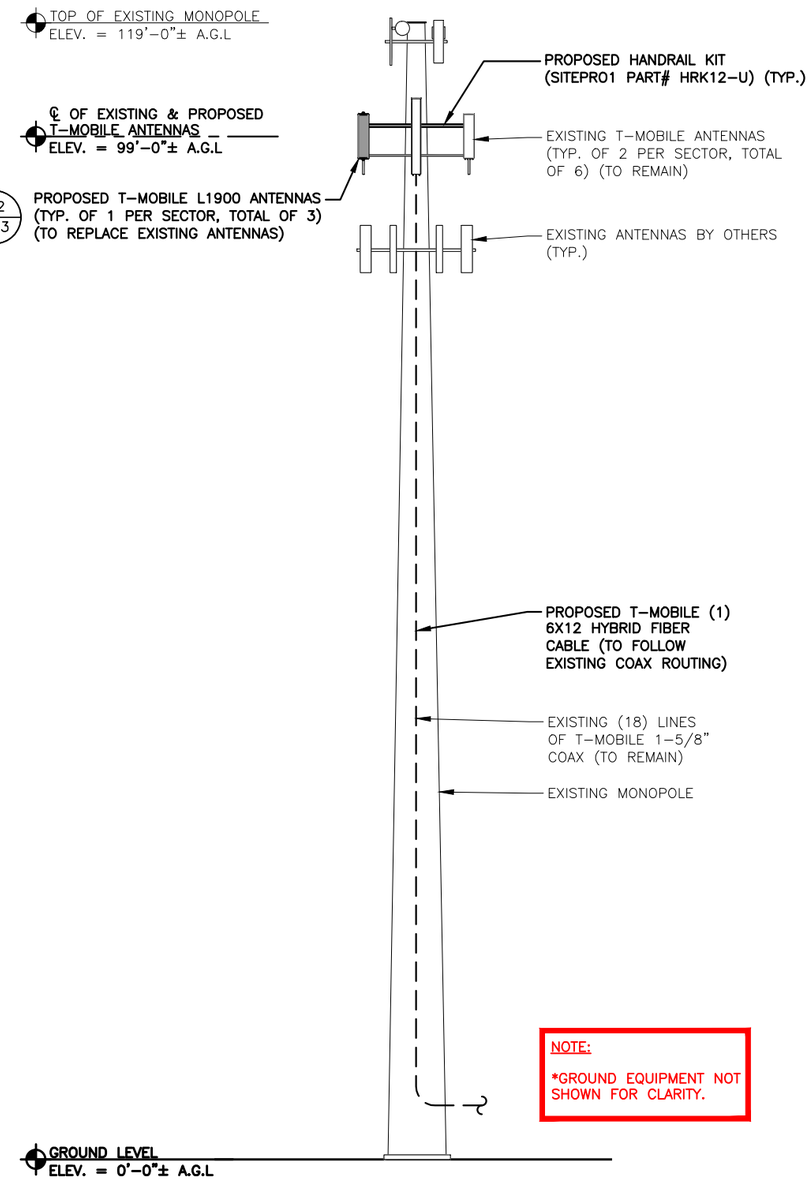


EXISTING ANTENNA PLAN (1 / A–2)
SCALE: N.T.S



PROPOSED ANTENNA PLAN (2 / A–2)
SCALE: N.T.S



TOWER ELEVATION (3 / A–2)
22x34 SCALE: 1/8"=1'–0"
11x17 SCALE: 1/16"=1'–0"

0 4'–0" 8'–0" 16'–0" 24'–0"

NOTE:

*GROUND EQUIPMENT NOT SHOWN FOR CLARITY.

T-MOBILE NORTHEAST LLC
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CHECKED BY: DR

APPROVED BY: DPH

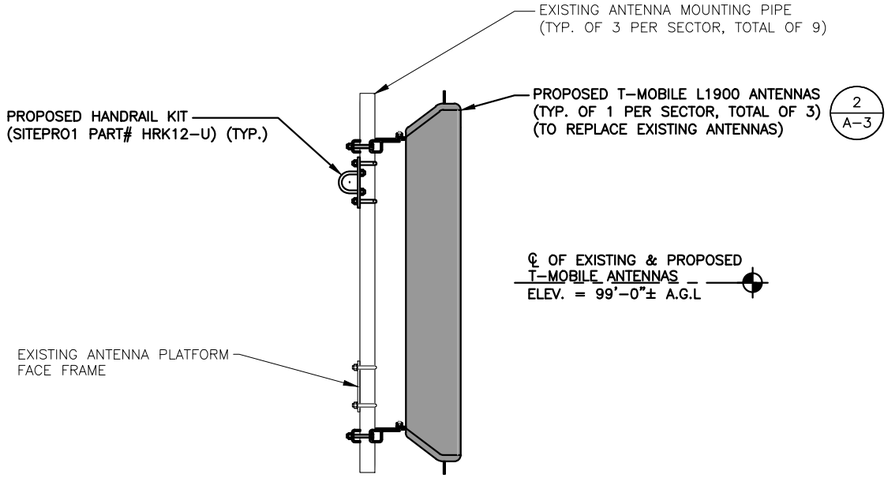
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	05/05/16	ISSUED FOR REVIEW	VP

SITE NUMBER:
CTNH331B
SBA SITE ID:
CT13070–A
SITE NAME:
NH331/OPTA
PINE GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705
NEW HAVEN COUNTY

SHEET TITLE
ANTENNA LAYOUT & ELEVATION

SHEET NUMBER
A-2

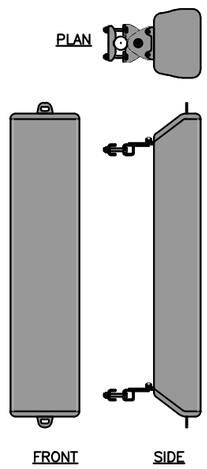


PROPOSED L1900 ANTENNA MOUNT (1 / A-3)

22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

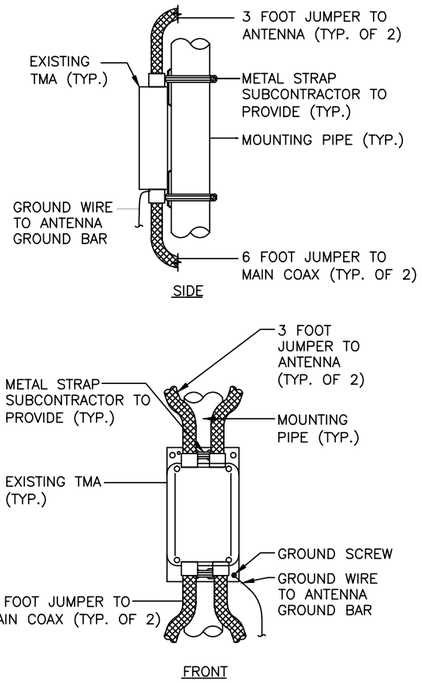
0 0'-6" 1'-0" 2'-0" 3'-0"

L1900 ANTENNA DIMENSIONS	
MODEL #	AIR 32 B66Aa/B2a
MANUF.	ERICSSON
WIDTH	12.9"
DEPTH	8.7"
HEIGHT	56.6"
WEIGHT	132.2 LBS



L1900 ANTENNA DETAIL (2 / A-3)

SCALE: N.T.S



TMA MOUNTING DETAIL (3 / A-3)

SCALE: N.T.S

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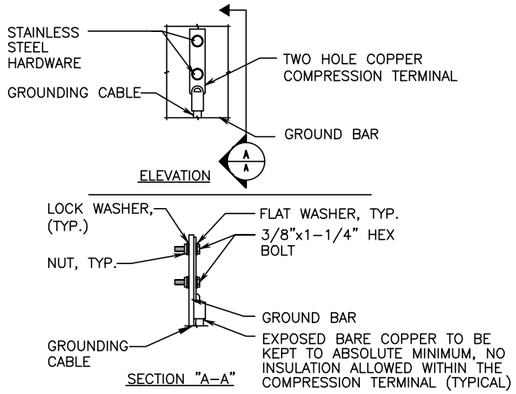
NEW HAVEN COUNTY

SHEET TITLE

DETAILS

SHEET NUMBER

A-3



NOTE:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER AGB/EGB, LOWER EGB, AND MGB.

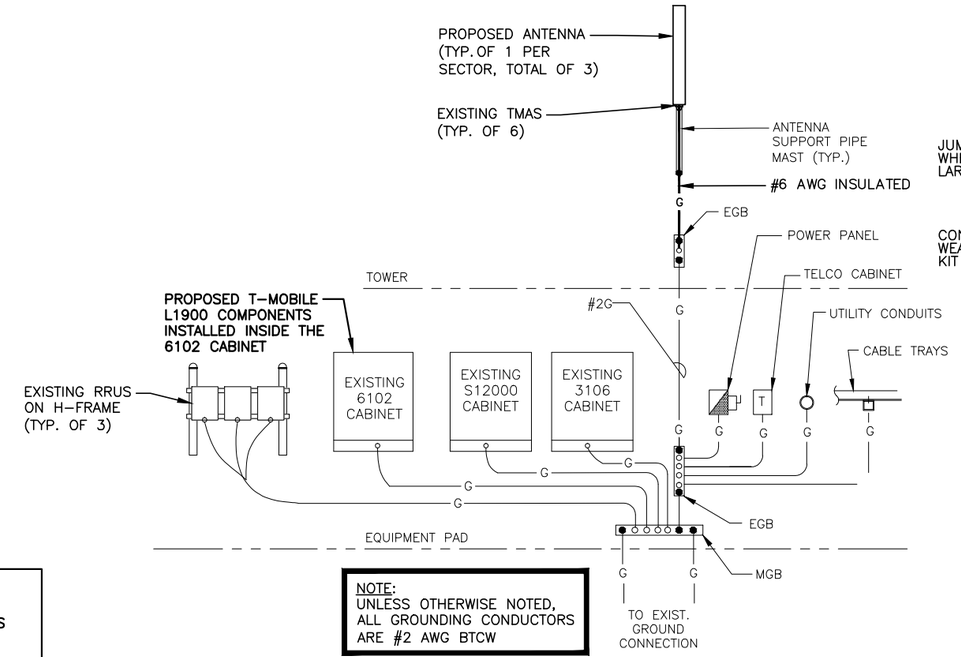
TYPICAL GROUND BAR CONNECTION DETAIL

1 / E-1

SCALE: N.T.S

NOTE:

G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

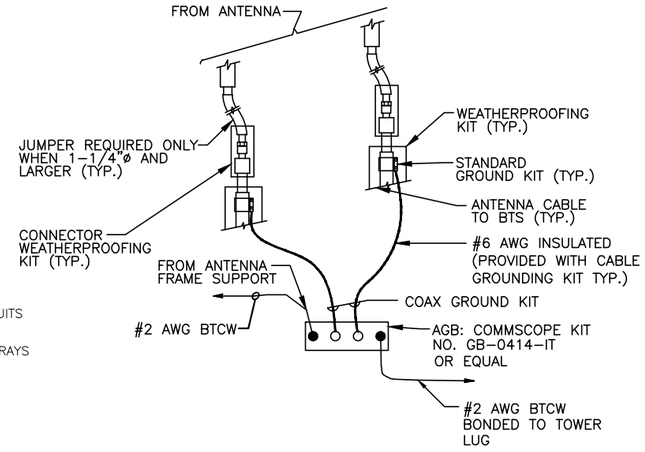


NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

GROUNDING RISER DIAGRAM

2 / E-1

SCALE: N.T.S

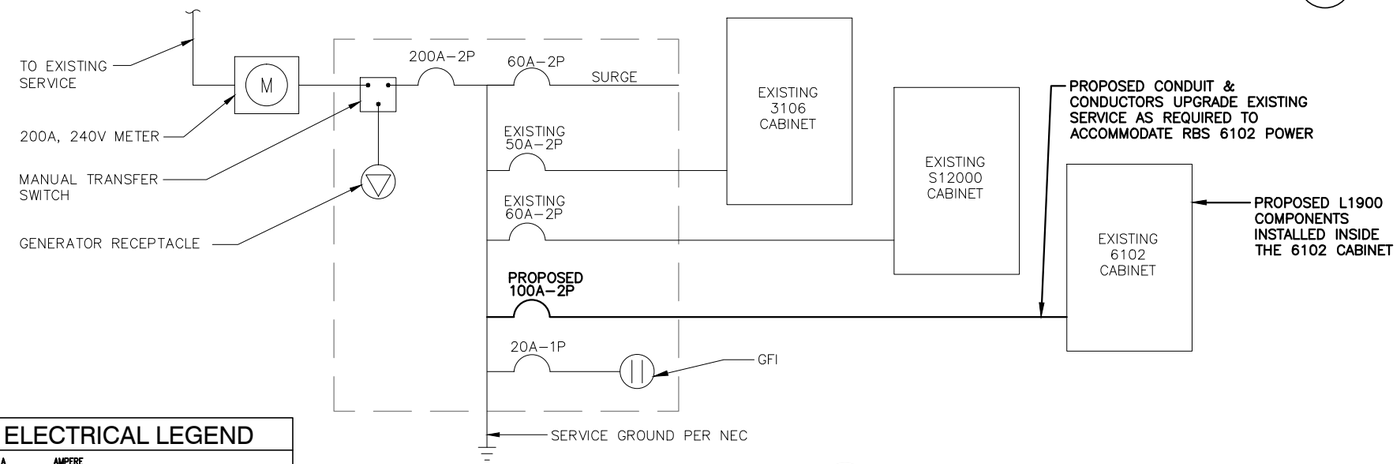


NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL

3 / E-1

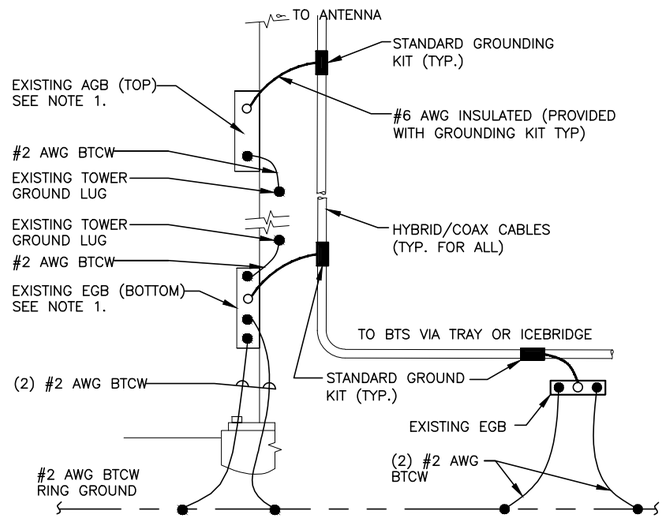
SCALE: N.T.S



ONE LINE POWER DIAGRAM

4 / E-1

SCALE: N.T.S



NOTE:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE ADDITIONAL AGB/EGB AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

TOWER BOTTOM CABLE GROUNDING DETAIL

5 / E-1

SCALE: N.T.S

ELECTRICAL LEGEND

A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
MGB	GROUND
AGB/EGB	MASTER GROUND BAR / EQUIPMENT GROUND BAR/ANTENNA GROUND BAR (○ MECHANICAL CONNECTION ● CADWELD CONNECTION)
G	GROUND COPPER WIRE, SIZE AS NOTED
	EXPOSED WIRING
	INSULATED GROUNDING CONDUCTOR(#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
	5/8"x8' COPPER CLAD STAINLESS STEEL GROUND ROD
	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
PPC	POWER PROTECTION CABINET
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

ELECTRICAL & GROUNDING NOTES:

ELECTRICAL & GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

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