AMERICAN TOWER®
CORPORATION

Structural Analysis Report

Structure	:	**155 ft Self Supported Tower**
ATC Site Name	:	**Wshn - West Haven, CT**
ATC Site Number	:	**302505**
Engineering Number	:	**OAA681694_C3_01**
Proposed Carrier	:	**AT&T Mobility**
Carrier Site Name	:	**BANM WESTHAVEN**
Carrier Site Number	:	**CTL02064 / FA# 10035024**
Site Location	:	**204 Burwell Street** **West Haven, CT 06516-1105** **41.295322, -72.973314**
County	:	**New Haven**
Date	:	**July 19, 2016**
Max Usage	:	**77%**
Result	:	**Pass**

Reviewed by:
Scott Wirgau, PE
Structural Team Leader

STATE OF CONNECTICUT
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PROFESSIONAL ENGINEER

Prepared By:
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Jul 19 2016 4:41 PM

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COA: PEC.0001553

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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 155 ft self supported tower to reflect the change in loading by AT&T Mobility.

Supporting Documents

Tower Drawings	Stainless Report #2940-3, dated August 14, 1981
Foundation Drawing	Mapping by TEP Project #03290, dated July 28, 2003
Geotechnical Report	GEOServices Project #21-07254, dated November 28, 2007
Modifications	SpectraSite Dwg #CT-0041-E1, dated August 08, 2003 ATC Project #53874032, dated July 23, 2013

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	100 mph (3-Second Gust)
Basic Wind Speed w/ Ice:	50 mph (3-Second Gust) w/ 3/4" radial ice concurrent
Code:	ANSI/TIA-222-G / 2003 IBC w/ 2005 CT Supplement & 2009 CT Amendment
Structure Class:	II
Exposure Category:	B
Topographic Category:	3
Crest Height:	112 ft
Spectral Response:	$Ss = 0.19$, $S_1 = 0.06$
Site Class:	D - Stiff Soil

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

Existing and Reserved Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
154.0	154.0	3	CCI OPA-65R-LCUU-H6	Sector Frames	(4) 0.78" 8 AWG 6 (12) 1 5/8" Coax (2) 3" Conduit (2) 0.39" Fiber Trunk	AT&T Mobility
		3	Ericsson RRUS-32 (77 lbs)			
		6	Ericsson RRUS 12			
		3	Ericsson RRUS A2 Module (15.1"Height)			
		12	Powerwave LGP21401			
		3	Raycap DC6-48-60-18-8F			
		3	Diplexer / Coupler			
		6	Powerwave 7770.00			
		3	KMW AM-X-CD-16-65-00T-RET			
		3	Ericsson RRUS-11			
136.0	136.0	4	Andrew 844G45VTZASX	Sector Frames	(12) 1 1/4" Coax	Sprint Nextel
		8	Decibel DB844H90E-XY			
123.0	123.0	-	-	Empty Sector Frames	-	-
115.0	115.0	2	24" x 24" Ice Shield	Leg	-	City Of West Haven
113.0	113.0	2	3' HP Dish	Leg	(2) 0.41" CNT-400	
106.0	110.0	1	Lone Star Electronics LS-230	Leg	(1) 7/8" Coax	
103.0	107.7	1	7' Omni	Stand-Off	(1) 7/8" Coax (1) 1/2" Coax	S. Conecticut Gas
93.0	97.0	1	RFI Antennas BA80-67	Leg	(1) 7/8" Coax	City Of West Haven
70.0	81.5	1	Andrew DB224	Side Arm	(2) 7/8" Coax	S. Conecticut Gas
	70.0	1	Andrew ASPR766P			

Equipment to be Removed

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
No loading considered as to be removed						

Proposed Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
154.0	154.0	1	Commscope WCS-IMFQ-AMT	Sector Frames	-	AT&T Mobility

[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Legs	73%	Pass
Diagonals	77%	Pass
Horizontals	44%	Pass
Anchor Bolts	19%	Pass
Leg Bolts	53%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-ft)	3,547.8	72%
Axial (Kips)	230.5	29%
Shear (Kips)	23.9	26%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

Deflection, Twist and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Twist (°)	Sway (Rotation) (°)
154.0	Commscope WCS-IMFQ-AMT	AT&T Mobility	0.252	0.226	0.423
113.0	3' HP Dish	City of West Haven	0.135	0.142	0.143

***Deflection, Twist and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

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Standard Conditions

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessary limited, to:

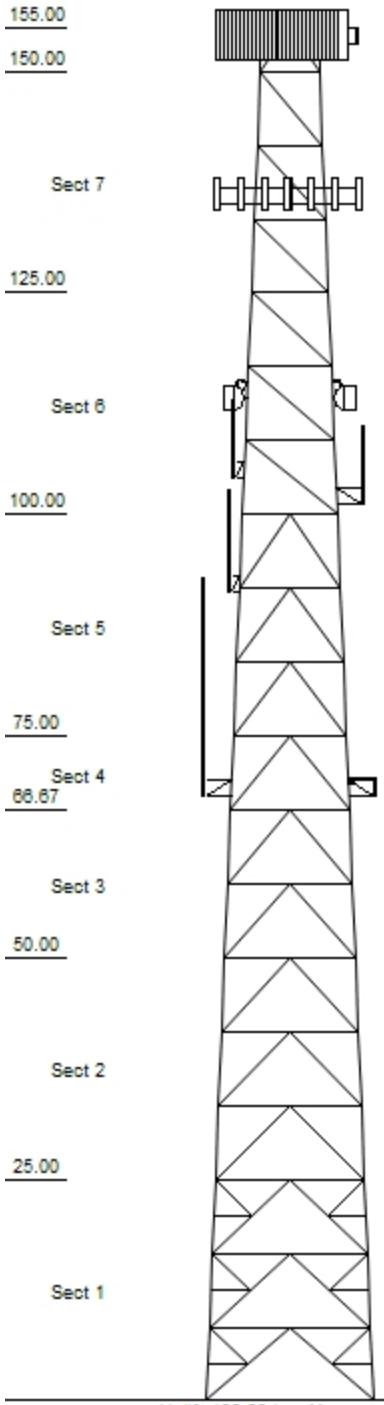
-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

-- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.



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Loads: 100 mph no ice
50 mph w / 3/4" radial ice
Site Class: D Ss: 0.19 S1: 0.06
60 mph Serviceability

Job Information

Tower : 302505	Location : Wshn - West Haven, CT	
Code: ANSI/TIA-222-G	Shape : Triangle	Base Width : 19.00 ft
Client : AT&T Mobility		Top Width : 7.00 ft

Sections Properties

Section	Leg Members		Diagonal Members	Horizontal Members
1 - 2	PSP 50 ksi	5" OD x .500"	PSP 36 ksi STLSS 3" OD X0.25"	DAL 36 ksi 3X2.5X0.25
3	PSP 50 ksi	5" OD x .500"	PSP 36 ksi STLSS 2.75" OD	SAE 36 ksi 3X3X0.25
4	PSP 50 ksi	5" OD x .500"	PSP 36 ksi STLSS 2.75" OD	DAL 36 ksi 3X2.5X0.25
5	PSP 50 ksi	5" OD x .300"	PSP 36 ksi STLSS 2.75" OD	DAL 36 ksi 3X2.5X0.25
6	PSP 50 ksi	STLSS 5" OD	PSP 36 ksi STLSS 3" OD X0.25"	DAL 36 ksi 3X2.5X0.25
7	PSP 50 ksi	STLSS 5" OD	PSP 36 ksi STLSS 2.75" OD	SAE 36 ksi 3X3X0.25
8	PSP 50 ksi	STLSS 5" OD	DAL 36 ksi 2.5X2X0.1875	CHN 36 ksi C4 x 5.4

Discrete Appurtenance

Elev (ft)	Type	Qty	Description
154.00	Panel	1	Commscope WCS-IMFO-AMT
154.00	Panel	3	CCI OPA-65R-LCUU-H6
154.00	Panel	3	Ericsson RRUS-32 (77 lbs)
154.00	Panel	6	Ericsson RRUS 12
154.00	Panel	3	Ericsson RRUS A2 Module (15.1"
154.00	Panel	12	Powerwave Allgon LGP21401
154.00	Panel	3	Raycap DC6-48-60-18-8F
154.00	Panel	3	Diplexer / Coupler
154.00	Panel	6	Powerwave Allgon 7770.00
154.00	Panel	3	KMW AM-X-CD-16-65-00T-RET
154.00	Panel	3	Ericsson RRUS-11
154.00	Mounting Frame	3	Flat Light Sector Frame
136.00	Mounting Frame	3	Flat Light Sector Frame
136.00	Panel	4	Andrew 844G45VTZASX
136.00	Panel	8	Decibel DB844H90E-XY
123.00	Mounting Frame	3	Empty Round Sector Frame
115.00	Panel	2	24" x 24" Ice Shield
113.00	Dish	2	3' HP Dish
106.00	Whip	1	Lone Star Electronics LS-230
103.00	Straight Arm	1	Stand-Off
103.00	Whip	1	7' Omni
93.00	Whip	1	RFI Antennas BA80-67
70.00	Straight Arm	1	Flat Side Arm
70.00	Whip	1	Andrew DB224
70.00	Yagi	1	Andrew ASPR766P
70.00	Straight Arm	1	Flat Side Arm

Linear Appurtenance

Elev (ft) From	To	Qty	Description
0.000	155.00	1	Climbing Ladder
5.000	154.00	1	Waveguide
5.000	154.00	2	3" Conduit
5.000	154.00	12	1 5/8" Coax
5.000	154.00	4	0.78" 8 AWG 6
5.000	154.00	2	0.39" Fiber Trunk
100.000	136.00	1	Waveguide
100.000	136.00	12	1 1/4" Coax
0.000	113.00	2	0.41" CNT-400
0.000	106.00	1	7/8" Coax
5.000	103.00	1	7/8" Coax
0.000	103.00	1	1/2" Coax
5.000	100.00	1	Waveguide
5.000	100.00	12	1 5/8" Coax
0.000	93.000	1	7/8" Coax
0.000	70.000	2	7/8" Coax

Uplift	198.83 k	Moment	3,547.76 k	Moment Ice	1,092.18 k-ft
Vert	230.52 k	Tot Down	44.72 k	Tot Down Ice	112.14 k
Horiz	23.90 k	Tot Shear	41.23 k	Tot Shear Ice	13.17 k

Site Number:	**302505**	**Code:**	**ANSI/TIA-222-G**	*© 2007 - 2016 by ATC IP LLC. All rights reserved.*
Site Name:	**Wshn - West Haven, CT**	**Engineering Number:**	**OAA681694_C3_01**	7/19/2016 3:28:45 PM
Customer:	**AT&T Mobility**			

Analysis Parameters

Location:	**New Haven County, CT**		
Code:	**ANSI/TIA-222-G**	**Height (ft):**	**155**
Shape:	**Triangle**	**Base Elevation (ft):**	**0.00**
Tower Manufacturer:	**Stainless Inc.**	**Bottom Face Width (ft):**	**19.00**
Tower Type:	**Self Support**	**Top Face Width (ft):**	**7.00**

Ice & Wind Parameters

Structure Class:	**II**	**Design Windspeed Without Ice:**	**100 mph**
Exposure Category:	**B**	**Design Windspeed With Ice:**	**50 mph**
Topographic Category:	**3**	**Operational Windspeed:**	**60 mph**
Crest Height:	**112.0 ft**	**Design Ice Thickness:**	**0.75 in**

Seismic Parameters

Analysis Method:	**Equivalent Modal Analysis & Equivalent Lateral Force Methods**
Site Class:	**D - Stiff Soil**
Period Based on Rayleigh Method (sec):	**0.81**

T_L(sec):	**6**	**p:**	**1.3**	**C_S:**	**0.041**
S_S:	**0.189**	**S_1:**	**0.063**	**C_S, Max:**	**0.041**
F_a:	**1.600**	**F_V:**	**2.400**	**C_S, Min:**	**0.030**
S_{ds}:	**0.202**	**S_{d1}:**	**0.101**		

Load Cases

1.2D + 1.6W Normal	**100 mph Normal to Face with No Ice**
1.2D + 1.6W 60 deg	**100 mph 60 degree with No Ice**
1.2D + 1.6W 90 deg	**100 mph 90 degree with No Ice**
0.9D + 1.6W Normal	**100 mph Normal to Face with No Ice (Reduced DL)**
0.9D + 1.6W 60 deg	**100 mph 60 deg with No Ice (Reduced DL)**
0.9D + 1.6W 90 deg	**100 mph 90 deg with No Ice (Reduced DL)**
1.2D + 1.0Di + 1.0Wi Normal	**50 mph Normal with 0.75 in Radial Ice**
1.2D + 1.0Di + 1.0Wi 60 deg	**50 mph 60 degree with 0.75 in Radial Ice**
1.2D + 1.0Di + 1.0Wi 90 deg	**50 mph 90 degree with 0.75 in Radial Ice**
(1.2 + 0.2Sds) * DL + E Normal	**Seismic Normal**
(1.2 + 0.2Sds) * DL + E 60 deg	**Seismic 60 degree**
(1.2 + 0.2Sds) * DL + E 90 deg	**Seismic 90 degree**
(0.9 - 0.2Sds) * DL + E Normal	**Seismic (Reduced DL) Normal**
(0.9 - 0.2Sds) * DL + E 60 deg	**Seismic (Reduced DL) 60 degree**
(0.9 - 0.2Sds) * DL + E 90 deg	**Seismic (Reduced DL) 90 degree**
1.0D + 1.0W Service Normal	**Serviceability - 60 mph Wind Normal**
1.0D + 1.0W Service 60 deg	**Serviceability - 60 mph Wind 60 degree**
1.0D + 1.0W Service 90 deg	**Serviceability - 60 mph Wind 90 degree**

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Tower Loading

Discrete Appurtenance Properties 1.2D + 1.6W

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
154.0	CCI OPA-65R-LCUU-	3	73	9.7	6.0	14.8	7.4	0.80	0.79	0.0	0.0	25.83	643	315
154.0	Commscope WCS-	1	30	1.0	0.9	10.6	6.9	0.80	0.50	0.0	0.0	25.83	14	42
154.0	Diplexer / Coupler	3	5	0.7	1.0	6.0	3.0	0.80	0.50	0.0	0.0	25.83	30	22
154.0	Ericsson RRUS 12	6	50	3.2	1.7	18.5	7.5	0.80	0.67	0.0	0.0	25.83	356	432
154.0	Ericsson RRUS A2	3	22	2.1	1.3	16.4	3.3	0.80	0.50	0.0	0.0	25.83	87	95
154.0	Ericsson RRUS-11	3	55	3.8	2.1	18.2	6.7	0.80	0.67	0.0	0.0	25.83	214	238
154.0	Ericsson RRUS-32	3	77	3.3	2.5	13.3	9.5	0.80	0.67	0.0	0.0	25.83	187	333
154.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.83	1061	1728
154.0	KMW AM-X-CD-16-	3	49	8.0	6.0	11.8	5.9	0.80	0.79	0.0	0.0	25.83	534	210
154.0	Powerwave Allgon	6	35	5.5	4.6	11.0	5.0	0.80	0.77	0.0	0.0	25.83	716	302
154.0	Powerwave Allgon	12	14	1.1	1.2	9.2	2.6	0.80	0.50	0.0	0.0	25.83	186	244
154.0	Raycap DC6-48-60-	3	32	1.3	2.0	11.0	11.0	0.80	1.00	0.0	0.0	25.83	108	137
136.0	Andrew	4	15	6.2	4.0	15.0	8.5	0.80	0.81	0.0	0.0	25.50	554	86
136.0	Decibel DB844H90E-	8	14	3.6	4.0	6.5	8.0	0.80	0.92	0.0	0.0	25.50	737	161
136.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.50	1047	1728
123.0	Empty Round Sector	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.30	836	1296
115.0	24" x 24" Ice Shield	2	50	0.9	0.3	24.0	24.0	1.00	1.00	0.0	0.0	25.20	64	144
113.0	3' HP Dish	2	140	8.9	3.0	0.0	0.0	1.00	1.00	0.0	0.0	25.18	611	403
106.0	Lone Star	1	11	1.6	7.0	2.3	2.3	1.00	1.00	4.0	220.3	25.15	55	16
103.0	7' Omni	1	25	2.1	7.0	3.0	3.0	1.00	1.00	4.7	337.4	25.13	72	36
103.0	Stand-Off	1	75	2.5	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.10	85	108
93.00	RFI Antennas BA80-	1	18	3.3	9.8	2.0	2.0	1.00	1.00	4.0	456.8	25.07	114	25
70.00	Andrew ASPR766P	1	2	0.9	1.0	30.0	0.0	1.00	1.00	0.0	0.0	25.09	32	3
70.00	Andrew DB224	1	38	6.1	23.0	3.0	3.0	1.00	1.00	11.5	2370.3	25.05	206	55
70.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.09	215	216
70.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.09	215	216
	Totals	79	5966	405.6										

Discrete Appurtenance Properties 0.9D + 1.6W

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
154.0	CCI OPA-65R-LCUU-	3	73	9.7	6.0	14.8	7.4	0.80	0.79	0.0	0.0	25.83	643	177
154.0	Commscope WCS-	1	30	1.0	0.9	10.6	6.9	0.80	0.50	0.0	0.0	25.83	14	24
154.0	Diplexer / Coupler	3	5	0.7	1.0	6.0	3.0	0.80	0.50	0.0	0.0	25.83	30	12
154.0	Ericsson RRUS 12	6	50	3.2	1.7	18.5	7.5	0.80	0.67	0.0	0.0	25.83	356	243
154.0	Ericsson RRUS A2	3	22	2.1	1.3	16.4	3.3	0.80	0.50	0.0	0.0	25.83	87	53
154.0	Ericsson RRUS-11	3	55	3.8	2.1	18.2	6.7	0.80	0.67	0.0	0.0	25.83	214	134
154.0	Ericsson RRUS-32	3	77	3.3	2.5	13.3	9.5	0.80	0.67	0.0	0.0	25.83	187	187
154.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.83	1061	972
154.0	KMW AM-X-CD-16-	3	49	8.0	6.0	11.8	5.9	0.80	0.79	0.0	0.0	25.83	534	118
154.0	Powerwave Allgon	6	35	5.5	4.6	11.0	5.0	0.80	0.77	0.0	0.0	25.83	716	170
154.0	Powerwave Allgon	12	14	1.1	1.2	9.2	2.6	0.80	0.50	0.0	0.0	25.83	186	137
154.0	Raycap DC6-48-60-	3	32	1.3	2.0	11.0	11.0	0.80	1.00	0.0	0.0	25.83	108	77
136.0	Andrew	4	15	6.2	4.0	15.0	8.5	0.80	0.81	0.0	0.0	25.50	554	49
136.0	Decibel DB844H90E-	8	14	3.6	4.0	6.5	8.0	0.80	0.92	0.0	0.0	25.50	737	91
136.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.50	1047	972
123.0	Empty Round Sector	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.0	25.30	836	729
115.0	24" x 24" Ice Shield	2	50	0.9	0.3	24.0	24.0	1.00	1.00	0.0	0.0	25.20	64	81
113.0	3' HP Dish	2	140	8.9	3.0	0.0	0.0	1.00	1.00	0.0	0.0	25.18	611	227
106.0	Lone Star	1	11	1.6	7.0	2.3	2.3	1.00	1.00	4.0	220.3	25.15	55	9
103.0	7' Omni	1	25	2.1	7.0	3.0	3.0	1.00	1.00	4.7	337.4	25.13	72	20

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Tower Loading

103.0	Stand-Off	1	75	2.5	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.10	85	61
93.00	RFI Antennas BA80-	1	18	3.3	9.8	2.0	2.0	1.00	1.00	4.0	456.8	25.07	114	14
70.00	Andrew ASPR766P	1	2	0.9	1.0	30.0	0.0	1.00	1.00	0.0	0.0	25.09	32	1
70.00	Andrew DB224	1	38	6.1	23.0	3.0	3.0	1.00	1.00	11.5	2370.3	25.05	206	31
70.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.09	215	122
70.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	25.09	215	122
	Totals	79	5966	405.6										

Discrete Appurtenance Properties 1.2D + 1.0Di + 1.0Wi

Elevation (ft)	Description	Qty	Ice Wt (lb)	Ice EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
154.0	CCI OPA-65R-LCUU-	3	311	11.1	6.0	14.8	7.4	0.80	0.79	0.0	0.0	6.46	115	1173
154.0	Commscope WCS-	1	74	1.4	0.9	10.6	6.9	0.80	0.50	0.0	0.0	6.46	3	96
154.0	Diplexer / Coupler	3	30	1.0	1.0	6.0	3.0	0.80	0.50	0.0	0.0	6.46	6	111
154.0	Ericsson RRUS 12	6	148	3.9	1.7	18.5	7.5	0.80	0.67	0.0	0.0	6.46	69	1139
154.0	Ericsson RRUS A2	3	79	2.7	1.3	16.4	3.3	0.80	0.50	0.0	0.0	6.46	18	299
154.0	Ericsson RRUS-11	3	163	4.6	2.1	18.2	6.7	0.80	0.67	0.0	0.0	6.46	41	627
154.0	Ericsson RRUS-32	3	194	4.1	2.5	13.3	9.5	0.80	0.67	0.0	0.0	6.46	36	753
154.0	Flat Light Sector	3	709	33.4	0.0	0.0	0.0	0.75	0.75	0.0	0.0	6.46	309	2839
154.0	KMW AM-X-CD-16-	3	243	9.3	6.0	11.8	5.9	0.80	0.79	0.0	0.0	6.46	97	909
154.0	Powerwave Allgon	6	174	6.6	4.6	11.0	5.0	0.80	0.77	0.0	0.0	6.46	134	1303
154.0	Powerwave Allgon	12	49	1.6	1.2	9.2	2.6	0.80	0.50	0.0	0.0	6.46	42	744
154.0	Raycap DC6-48-60-	3	127	2.9	2.0	11.0	11.0	0.80	1.00	0.0	0.0	6.46	38	482
136.0	Andrew	4	191	7.2	4.0	15.0	8.5	0.80	0.81	0.0	0.0	6.37	101	929
136.0	Decibel DB844H90E-	8	127	3.9	4.0	6.5	8.0	0.80	0.92	0.0	0.0	6.37	126	1250
136.0	Flat Light Sector	3	707	33.3	0.0	0.0	0.0	0.75	0.75	0.0	0.0	6.37	305	2835
123.0	Empty Round Sector	3	674	31.2	0.0	0.0	0.0	0.75	0.75	0.0	0.0	6.32	283	2643
115.0	24" x 24" Ice Shield	2	144	1.9	0.3	24.0	24.0	1.00	1.00	0.0	0.0	6.30	21	370
113.0	3' HP Dish	2	325	10.7	3.0	0.0	0.0	1.00	1.00	0.0	0.0	6.30	115	848
106.0	Lone Star	1	93	3.5	7.0	2.3	2.3	1.00	1.00	4.0	74.2	6.29	19	115
103.0	7' Omni	1	122	3.7	7.0	3.0	3.0	1.00	1.00	4.7	94.0	6.28	20	152
103.0	Stand-Off	1	112	3.8	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.27	20	153
93.00	RFI Antennas BA80-	1	123	5.3	9.8	2.0	2.0	1.00	1.00	4.0	112.8	6.27	28	152
70.00	Andrew ASPR766P	1	42	2.7	1.0	30.0	0.0	1.00	1.00	0.0	0.0	6.27	15	51
70.00	Andrew DB224	1	345	15.2	23.0	3.0	3.0	1.00	1.00	11.5	932.8	6.26	81	423
70.00	Flat Side Arm	1	224	8.8	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.27	47	305
70.00	Flat Side Arm	1	224	8.8	0.0	0.0	0.0	1.00	1.00	0.0	0.0	6.27	47	305
	Totals	79	16310	621.4										

Discrete Appurtenance Properties 1.0D + 1.0W Service

Elevation (ft)	Description	Qty	Wt. (lb)	EPA (sf)	Length (ft)	Width (in)	Depth (in)	K_a	Orient. Factor	Vert. Ecc.(ft)	M_u (lb-ft)	Q_z (psf)	F_a (WL) (lb)	P_a (DL) (lb)
154.0	CCI OPA-65R-LCUU-	3	73	9.7	6.0	14.8	7.4	0.80	0.79	0.0	0.0	9.30	145	219
154.0	Commscope WCS-	1	30	1.0	0.9	10.6	6.9	0.80	0.50	0.0	0.0	9.30	3	30
154.0	Diplexer / Coupler	3	5	0.7	1.0	6.0	3.0	0.80	0.50	0.0	0.0	9.30	7	15
154.0	Ericsson RRUS 12	6	50	3.2	1.7	18.5	7.5	0.80	0.67	0.0	0.0	9.30	80	300
154.0	Ericsson RRUS A2	3	22	2.1	1.3	16.4	3.3	0.80	0.50	0.0	0.0	9.30	20	66
154.0	Ericsson RRUS-11	3	55	3.8	2.1	18.2	6.7	0.80	0.67	0.0	0.0	9.30	48	165
154.0	Ericsson RRUS-32	3	77	3.3	2.5	13.3	9.5	0.80	0.67	0.0	0.0	9.30	42	231
154.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	9.30	239	1200
154.0	KMW AM-X-CD-16-	3	49	8.0	6.0	11.8	5.9	0.80	0.79	0.0	0.0	9.30	120	146
154.0	Powerwave Allgon	6	35	5.5	4.6	11.0	5.0	0.80	0.77	0.0	0.0	9.30	161	210

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Tower Loading

154.0	Powerwave Allgon	12	14	1.1	1.2	9.2	2.6	0.80	0.50	0.0	0.0	9.30	42	169
154.0	Raycap DC6-48-60-	3	32	1.3	2.0	11.0	11.0	0.80	1.00	0.0	0.0	9.30	24	95
136.0	Andrew	4	15	6.2	4.0	15.0	8.5	0.80	0.81	0.0	0.0	9.18	125	60
136.0	Decibel DB844H90E-	8	14	3.6	4.0	6.5	8.0	0.80	0.92	0.0	0.0	9.18	166	112
136.0	Flat Light Sector	3	400	17.9	0.0	0.0	0.0	0.75	0.75	0.0	0.0	9.18	236	1200
123.0	Empty Round Sector	3	300	14.4	0.0	0.0	0.0	0.75	0.75	0.0	0.0	9.11	188	900
115.0	24" x 24" Ice Shield	2	50	0.9	0.3	24.0	24.0	1.00	1.00	0.0	0.0	9.07	14	100
113.0	3' HP Dish	2	140	8.9	3.0	0.0	0.0	1.00	1.00	0.0	0.0	9.07	137	280
106.0	Lone Star	1	11	1.6	7.0	2.3	2.3	1.00	1.00	4.0	49.6	9.06	12	11
103.0	7' Omni	1	25	2.1	7.0	3.0	3.0	1.00	1.00	4.7	75.9	9.05	16	25
103.0	Stand-Off	1	75	2.5	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.04	19	75
93.00	RFI Antennas BA80-	1	18	3.3	9.8	2.0	2.0	1.00	1.00	4.0	102.8	9.02	26	18
70.00	Andrew ASPR766P	1	2	0.9	1.0	30.0	0.0	1.00	1.00	0.0	0.0	9.03	7	2
70.00	Andrew DB224	1	38	6.1	23.0	3.0	3.0	1.00	1.00	11.5	533.3	9.02	46	38
70.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.03	48	150
70.00	Flat Side Arm	1	150	6.3	0.0	0.0	0.0	1.00	1.00	0.0	0.0	9.03	48	150
	Totals	79	5966	405.6										

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Tower Loading

Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out Of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	155.0	Climbing Ladder	1	1.00	6.90	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
5.00	154.0	0.39" Fiber Trunk	2	0.39	0.06	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	154.0	0.78" 8 AWG 6	4	0.78	0.59	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	154.0	1 5/8" Coax	12	1.98	0.82	50	3	Block	0.00	N	0.00	1.00	0.00
5.00	154.0	3" Conduit	2	3.50	7.58	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	154.0	Waveguide	1	1.00	6.00	0	3	Individual	0.00	N	1.00	1.00	0.00
100.0	136.0	1 1/4" Coax	12	1.55	0.63	50	3	Block	0.00	N	0.00	1.00	0.00
100.0	136.0	Waveguide	1	1.00	6.00	0	3	Individual	0.00	N	1.00	1.00	0.00
0.00	113.0	0.41" CNT-400	2	0.41	0.07	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	106.0	7/8" Coax	1	1.09	0.33	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	103.0	1/2" Coax	1	0.63	0.15	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
5.00	103.0	7/8" Coax	1	1.09	0.33	0	3	Individual	0.00	N	1.00	1.00	0.00
5.00	100.0	1 5/8" Coax	12	1.98	0.82	50	Lin App	Block	0.00	N	0.00	1.00	0.00
5.00	100.0	Waveguide	1	1.00	6.00	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	93.00	7/8" Coax	1	1.09	0.33	0	Lin App	Individual	0.00	N	1.00	1.00	0.00
0.00	70.00	7/8" Coax	2	1.09	0.33	0	Lin App	Individual	0.00	N	1.00	1.00	0.00

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Force/Stress Summary

Section: 1 1 Bot Elev (ft): 0.00 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	-216.67	1.2D + 1.6W	8.34	50	50	50	31.3	50.0	296.21	0	0	0.00	0.00	73	Member X
HORIZ DAL - 3X2.5X0.25	-8.08	1.2D + 1.6W 90	9.167	100	67	50	122.9	36.0	38.47	4	2	49.72	69.60	21	Member Y
DIAG PSP - STLSS 3" OD X0	-11.65	1.2D + 1.6W 90	12.63	50	50	50	77.7	36.0	50.93	1	1	0.00	27.84	22	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	186.83	0.9D + 1.6W 60	50	65	318.15	0	0	0.00	0.00	58	Member
HORIZ DAL - 3X2.5X0.25	8.27	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	16	Bolt Shear
DIAG PSP - STLSS 3" OD X0	11.09	0.9D + 1.6W 90	36	58	69.98	1	1	0.00	16.97	65	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	162.17	0.9D + 1.6W 60	0.00	0	0	
Top Compression	188.25	1.2D + 1.6W	0.00	0		
Bot Tension	199.91	0.9D + 1.6W 60	1025.70	19	6	1 3/4 A325
Bot Compression	230.94	1.2D + 1.6W	0.00	0		

Section: 2 2 Bot Elev (ft): 25.00 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	-175.02	1.2D + 1.6W	8.34	100	100	100	62.5	50.0	239.05	0	0	0.00	0.00	73	Member X
HORIZ DAL - 3X2.5X0.25	-7.01	1.2D + 1.6W 90	8.167	100	67	50	110.7	36.0	44.69	4	2	49.72	69.60	15	Member Y
DIAG PSP - STLSS 3" OD X0	-10.73	1.2D + 1.6W 90	11.90	100	100	100	146.4	36.0	22.78	1	1	0.00	27.84	47	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	150.80	0.9D + 1.6W 60	50	65	318.15	0	0	0.00	0.00	47	Member
HORIZ DAL - 3X2.5X0.25	7.23	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	14	Bolt Shear
DIAG PSP - STLSS 3" OD X0	10.08	1.2D + 1.6W 90	36	58	69.98	1	1	0.00	16.97	59	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	126.81	0.9D + 1.6W 60	0.00	0	0	
Top Compression	147.18	1.2D + 1.6W	0.00	0		
Bot Tension	162.17	0.9D + 1.6W 60	436.16	37	8	1 A325
Bot Compression	188.25	1.2D + 1.6W	0.00	0		

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Force/Stress Summary

Section: 3 3 (bot 2 bays) Bot Elev (ft): 50.00 Height (ft): 16.667

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Bracing % Y	Bracing % Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	-134.26	1.2D + 1.6W	8.34	100	100	100	62.5	50.0	239.05	0	0	0.00	0.00	56	Member X
HORIZ SAE - 3X3X0.25	-6.07	1.2D + 1.6W 90	7.167	100	67	67	108.7	36.0	25.06	2	1	24.86	34.80	24	Bolt Shear
DIAG PSP - STLSS 2.75" OD	-9.87	1.2D + 1.6W 90	11.21	100	100	100	147.9	36.0	14.98	1	1	0.00	20.04	65	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	115.53	0.9D + 1.6W 60	50	65	318.15	0	0	0.00	0.00	36	Member
HORIZ SAE - 3X3X0.25	6.23	1.2D + 1.6W 90	36	58	40.86	2	1	24.86	27.84	25	Bolt Shear
DIAG PSP - STLSS 2.75" OD	9.45	0.9D + 1.6W 90	36	58	46.98	1	1	0.00	12.21	77	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	103.42	0.9D + 1.6W 60	0.00	0	0	
Top Compression	120.42	1.2D + 1.6W	0.00	0		
Bot Tension	126.81	0.9D + 1.6W 60	240.80	53	8	3/4 A325
Bot Compression	147.18	1.2D + 1.6W	0.00	0		

Section: 4 3 (top bay) Bot Elev (ft): 66.67 Height (ft): 8.333

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Bracing % Y	Bracing % Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	-107.79	1.2D + 1.6W	8.34	100	100	100	62.5	50.0	239.05	0	0	0.00	0.00	45	Member X
HORIZ DAL - 3X2.5X0.25	-5.18	1.2D + 1.6W 90	6.500	100	67	50	87.1	36.0	57.13	4	2	49.72	69.60	10	Bolt Shear
DIAG PSP - STLSS 2.75" OD	-9.00	1.2D + 1.6W 90	10.77	100	100	100	142.1	36.0	16.22	1	1	0.00	20.04	55	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .500"	92.76	0.9D + 1.6W 60	50	65	318.15	0	0	0.00	0.00	29	Member
HORIZ DAL - 3X2.5X0.25	5.33	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	10	Bolt Shear
DIAG PSP - STLSS 2.75" OD	8.49	1.2D + 1.6W 90	36	58	46.98	1	1	0.00	12.21	69	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	92.41	0.9D + 1.6W 60	0.00	0	0	
Top Compression	107.42	1.2D + 1.6W	0.00	0		
Bot Tension	103.42	0.9D + 1.6W 60	0.00	0		
Bot Compression	120.42	1.2D + 1.6W	0.00	0		

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Force/Stress Summary

Section: 5 4 Bot Elev (ft): 75.00 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .300"	-95.08	1.2D + 1.6W	8.34	100	100	100	60.1	50.0	153.05	0	0	0.00	0.00	62	Member X
HORIZ DAL - 3X2.5X0.25	-7.71	1.2D + 1.6W	5.500	100	67	50	73.7	36.0	64.00	4	2	49.72	69.60	15	Bolt Shear
DIAG PSP - STLSS 2.75" OD	-8.90	1.2D + 1.6W 90	10.57	100	100	100	139.4	36.0	16.86	1	1	0.00	20.04	52	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - 5" OD x .300"	80.04	1.2D + 1.6W 60	50	65	199.35	0	0	0.00	0.00	40	Member
HORIZ DAL - 3X2.5X0.25	8.45	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	16	Bolt Shear
DIAG PSP - STLSS 2.75" OD	8.48	1.2D + 1.6W 90	36	58	46.98	1	1	0.00	12.21	69	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	58.90	0.9D + 1.6W 60	0.00	0	0	
Top Compression	69.50	1.2D + 1.6W	0.00	0		
Bot Tension	92.41	0.9D + 1.6W 60	240.80	38	8	3/4 A325
Bot Compression	107.42	1.2D + 1.6W	0.00	0		

Section: 6 5 Bot Elev (ft): 100.0 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	-63.58	1.2D + 1.6W	8.34	100	100	100	58.6	50.0	87.89	0	0	0.00	0.00	72	Member X
HORIZ DAL - 3X2.5X0.25	-7.47	1.2D + 1.6W	10.33	100	100	50	160.7	36.0	23.00	4	2	49.72	69.60	32	Member Y
DIAG PSP - STLSS 3" OD X0	-10.73	1.2D + 1.6W 90	13.53	100	100	100	166.4	36.0	17.61	1	1	0.00	27.84	60	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	53.76	0.9D + 1.6W 60	50	65	112.95	0	0	0.00	0.00	47	Member
HORIZ DAL - 3X2.5X0.25	8.20	1.2D + 1.6W 90	36	58	73.57	4	2	49.72	55.68	16	Bolt Shear
DIAG PSP - STLSS 3" OD X0	9.46	1.2D + 1.6W	36	58	69.98	1	1	0.00	16.97	55	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	26.06	0.9D + 1.6W 60	0.00	0	0	
Top Compression	33.30	1.2D + 1.6W	0.00	0		
Bot Tension	58.90	0.9D + 1.6W 60	120.40	49	4	3/4 A325
Bot Compression	69.50	1.2D + 1.6W	0.00	0		

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Force/Stress Summary

Section: 7 6 Bot Elev (ft): 125.0 Height (ft): 25.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	-27.49	1.2D + 1.6W	8.34	100	100	100	58.6	50.0	87.89	0	0	0.00	0.00	31	Member X
HORIZ SAE - 3X3X0.25	-5.03	1.2D + 1.6W	8.333	100	100	100	168.9	36.0	11.40	2	1	24.86	34.80	44	Member Z
DIAG PSP - STLSS 2.75" OD	-8.55	1.2D + 1.6W 90	12.02	100	100	100	158.6	36.0	13.03	1	1	0.00	20.04	65	Member X

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	21.81	0.9D + 1.6W 60	50	65	112.95	0	0	0.00	0.00	19	Member
HORIZ SAE - 3X3X0.25	5.11	1.2D + 1.6W 90	36	58	40.86	2	1	24.86	27.84	20	Bolt Shear
DIAG PSP - STLSS 2.75" OD	7.50	1.2D + 1.6W	36	58	46.98	1	1	0.00	12.21	61	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	2.22	0.9D + 1.6W 60	0.00	0	0	
Top Compression	5.58	1.2D + 1.0Di +	0.00	0		
Bot Tension	26.06	0.9D + 1.6W 60	120.40	22	4	3/4 A325
Bot Compression	33.30	1.2D + 1.6W	0.00	0		

Section: 8 7 Bot Elev (ft): 150.0 Height (ft): 5.000

Max Compression Member	Pu (kip)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	F'y (ksi)	Phic Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG PSP - STLSS 5" OD X0	-3.26	1.2D + 1.0Di +	5.00	100	100	100	35.1	50.0	103.22	0	0	0.00	0.00	3	Member X
HORIZ CHN - C4 x 5.4	-1.45	1.2D + 1.6W	3.500	100	100	100	100.2	36.0	30.38	2	2	24.86	44.36	5	Bolt Shear
DIAG DAL - 2.5X2X0.1875	-2.65	1.2D + 1.6W 90	6.103	100	100	50	116.8	36.0	25.58	2	2	24.86	26.10	10	Bolt Shear

Max Tension Member	Pu (kip)	Load Case	Fy (ksi)	Fu (ksi)	Phit Pn (kip)	Num Bolts	Num Holes	Shear phiRnv (kip)	Bear phiRn (kip)	Use %	Controls
LEG	0.00		0	0	0.00	0	0	0.00	0.00	0	
HORIZ CHN - C4 x 5.4	1.71	1.2D + 1.6W 60	36	58	36.28	2	2	24.86	35.49	6	Bolt Shear
DIAG DAL - 2.5X2X0.1875	2.51	1.2D + 1.6W 90	36	58	43.68	2	2	24.86	15.66	16	Bolt Bear

Max Splice Forces	Pu (kip)	Load Case	phiRnt (kip)	Use %	Num Bolts	Bolt Type
Top Tension	0.00		0.00	0	0	
Top Compression	3.26	1.2D + 1.0Di +	0.00	0		
Bot Tension	2.22	0.9D + 1.6W 60	120.40	2	4	3/4 A325
Bot Compression	5.58	1.2D + 1.0Di +	0.00	0		

Triangular Mat & Pier Foundation Capacity Calculations *Last Updated: 7/26/2011*

For Self Supported Towers

Site #:	302505
Site Name:	Wshn - West Haven, CT
Eng. #:	OAA681694_C3_01
Date:	7/19/2016
Engineer:	I. Dodson
Code:	TIA-222-G

Total Down (Tower + Appurt. Wt.):	44.7	k
Total Shear:	41.2	k
Moment (Overturning):	3547.8	k-ft
Pier Diameter:	3.50	ft
Depth to Base of Foundation:	7.75	ft
Number of Tower Legs/Piers:	3	
Pier Height Above Ground (Average):	1.25	ft
Edge of Tower Face to Edge of Pad:	4.75	ft
Pad Thickness:	6.50	ft
Tower Face Width:	19.00	ft
Mat Edge Type:	Round	

Depth to Groundwater:	99.00	ft
Concrete Density:	150	pcf
Soil Density Above Water Line:	100	pcf
Soil Density Below Water Line:	50	pcf
Water Density:	62.4	pcf
Ultimate Bearing Capacity:	15000	psf
Sliding Resistance Factor:	0.40	
Allowable Stress Increase:	1.00	
$\phi_{\text{Soil and Concrete Weight}}$:	0.9	
$\phi_{\text{Bearing \& Sliding}}$:	0.75	

Overturning Resistance:

OTM Capacity:	5455.2	k-ft
OTM Design Load:	3918.8	k-ft
OTM Usage:	0.72	Result: OK

Bearing Pressure Usage:

Bearing Stress (Due to OTM):	3284	psf
Nominal Bearing Pressure:	11250	psf
Bearing Usage:	0.29	Result: OK

Sliding Resistance:

Acting Sliding Force:	41.2	k
Nominal Sliding Resistance:	159.9	k
Sliding Factor of Safety:	0.26	Result: OK