Date: **October 17, 2018**

Denice Nicholson
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Crown Castle
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Subject:	**Structural Analysis Report**	
Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC091
	Carrier Site Name:	CT03XC091S18.2
Crown Castle Designation:	**Crown Castle BU Number:**	806370
	Crown Castle Site Name:	HRT 099 943226
	Crown Castle JDE Job Number:	531057
	Crown Castle Work Order Number:	1647554
	Crown Castle Order Number:	459178 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	1647554
Site Data:	**570 NEW PARK AVENUE, WEST HARTFORD, Hartford County, CT** **Latitude *41° 44' 10.5"*, Longitude *-72° 43' 14.2"*** **150 Foot - Monopole Tower**	

Dear Denice Nicholson,

Crown Castle is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

LC7: Proposed Equipment Configuration **Sufficient Capacity**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Tyler Ho, E.I.T. / MAS

Respectfully submitted by:

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LICENSED
PROFESSIONAL ENGINEER

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10/18/2018

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1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Valmont.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2.0 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
139.0	139.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
	138.0	3	nokia	AAHC w/ Mount Pipe		
137.0	138.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3 1	1-1/4 1-1/2
		3	rfs celwave	IBC1900BB-1		
		3	rfs celwave	IBC1900HG-2A		
	137.0	1	tower mounts	Platform Mount [LP 713-1]		

Table 2 – Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
147.0	147.0	3	antel	BXA-70063-6CF-EDIN-4 w/ Mount Pipe	7 1	1-1/4 1-5/8
		3	antel	BXA-70063-6CF-EDIN-5 w/ Mount Pipe		
		6	commscope	SBNHH-1D65B w/ Mount Pipe		
		1	raycap	RVZDC-6627-PF-48		
		1	rfs celwave	DB-T1-6Z-8AB-0Z		
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		
		1	tower mounts	Platform Mount [LP 713-1]		
117.0	122.0	1	antel	BCD-87010	1	1-1/4
	117.0	1	tower mounts	Side Arm Mount [SO 702-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Tower Engineering Professionals	2308053	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Tower Engineering Professionals (Mapping)	2308022	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont Industries, Inc	260794	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built and have been maintained in accordance with the manufacturer's specifications.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 96.8333	Pole	TP39.21x26.19x0.313	1	-13.424	2525.292	33.6	Pass
L2	96.8333 - 48	Pole	TP50.55x37.197x0.406	2	-25.991	4252.899	41.4	Pass
L3	48 - 0	Pole	TP61.5x48.022x0.5	3	-48.753	6517.381	43.0	Pass
							Summary	
						Pole (L3)	43.0	Pass
						Rating =	43.0	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	38.9	Pass
1	Base Plate	0	25.6	Pass
1	Base Foundation Structure	0	23.1	Pass
1	Base Foundation Soil Interaction	0	53.7	Pass

Structure Rating (max from all components) =	53.7%

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

4.1) Recommendations

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