



CRAIG CODY

16 Chestnut Street, Suite 420  
Foxboro, MA 02035  
Tel (781) 831-1281  
ccody@trmcom.com

11/30/2015

Melanie Bachman  
Acting Executive Director  
Connecticut Siting Counsel  
10 Franklin Square  
New Britain, CT 06051

Re: **Notice of Exempt Modification**  
**125 Washington Ave, North Haven**  
**41.39769273 / -72.85684991**

Dear Ms. Bachman:

T-Mobile Northeast, LLC (T-Mobile) currently maintains six (6) antennas at the One-Hundred Nine foot (109') level of the existing One-Hundred Twenty Two (122') foot tower at 125 Washington Ave, North Haven, CT. The tower is owned by American Tower Corporation. The property is owned by Candid Associates, LLC. T-Mobile now intends to add Three (3) new 700MHz antennas. These antennas would be installed at the One-Hundred Nine (109') foot level of the tower. T-Mobile also intends to remove six (6) lines of coax cable as indicated on the structural analysis.

This facility was approved by the Connecticut Siting Council and the Town of North Haven on January 16<sup>th</sup>, 1990 in Docket# 117. The approval included the conditions that tower antennas shall be no taller than necessary to provide the proposed service and in no event shall exceed 133'.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73 a copy of this letter is being sent to the Chief Elected Official, First Selectman, Michael Freda for the Town of North Haven, as well as the property owner and the tower owner.

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

- 1) The proposed modification will not result in an increase in the height of the existing structure.
- 2) The modifications will not require an extension of the site boundary.
- 3) The proposed modification will not increase the noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
- 4) The operation and replacement of antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
- 5) The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
- 6) The existing structure and its foundation can support the proposed loading.

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

Sincerely,



**Craig Cody**  
On behalf of American Tower Corporation  
c/o Tower Resource Management, Inc.  
16 Chestnut Street, Suite 420  
Foxboro, MA 02035  
781-831-1281  
ccody@trmcom.com

cc: **Town of North Haven**  
**American Tower Corporation**  
**Candid Associates, LLC**

Exhibit 1

Site Plan

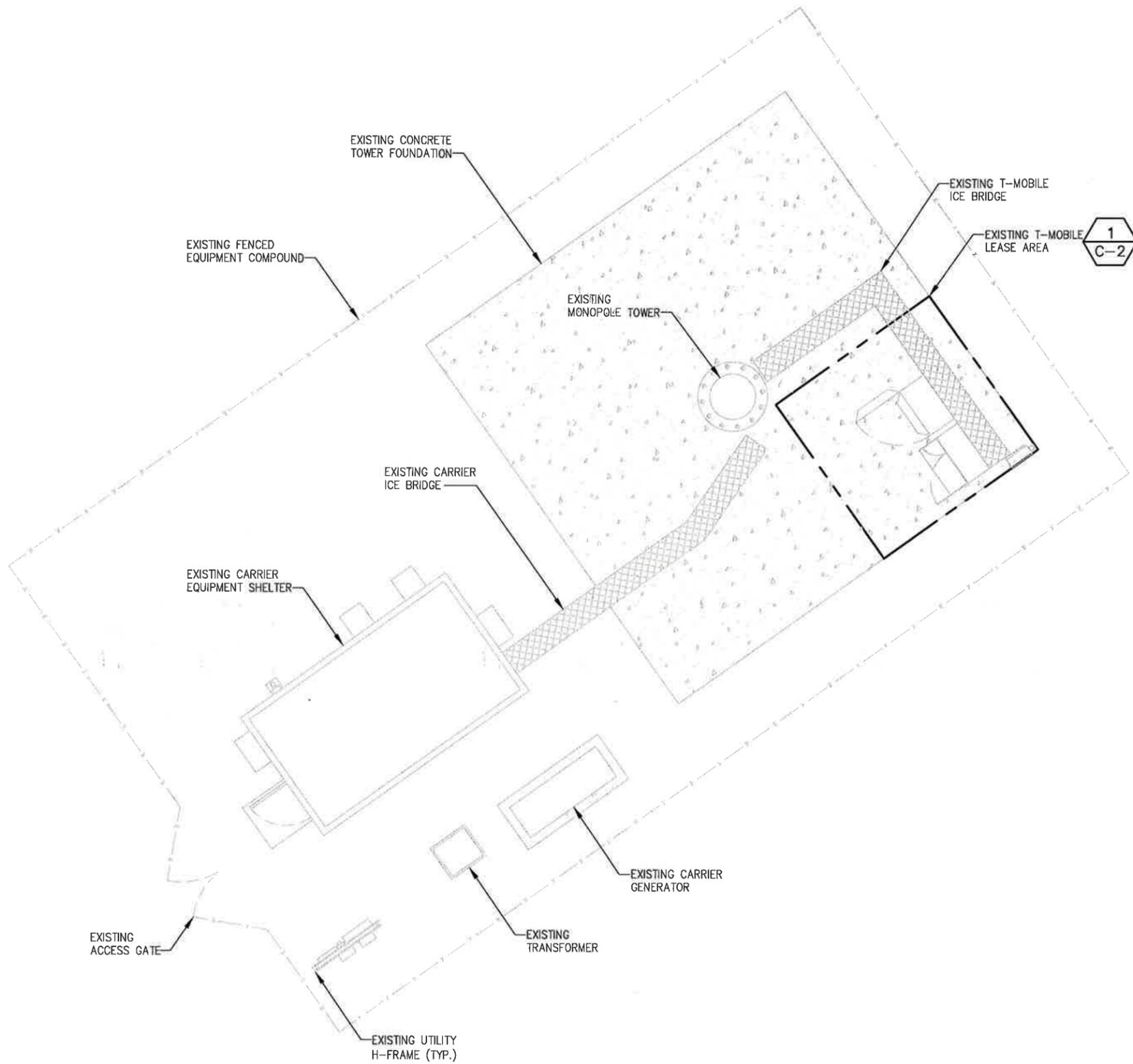
Exhibit 2

Power Density Report

Exhibit 3

Structural Analysis



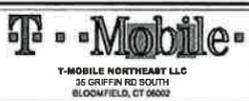


**GENERAL SITE NOTES:**

1. A COMPLETE BOUNDARY SURVEY OF THE HOST PARCEL HAS NOT BEEN PERFORMED BY INFINIGY. BOUNDARY INFORMATION IF SHOWN WAS OBTAINED FROM INFORMATION PROVIDED BY OTHERS. PROPERTY IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD.
2. BASEMAPPING INFORMATION BASED ON PROVIDED INFORMATION.
3. CONTRACTOR TO FIELD VERIFY DIMENSIONS AS NECESSARY BEFORE CONSTRUCTION.
4. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE SIGNS OF ADVERTISING.
5. THE PROPOSED DEVELOPMENT IS UNMANNED AND THEREFORE DOES NOT REQUIRE A MEANS OF WATER SUPPLY OR SEWAGE DISPOSAL.
6. NO LANDSCAPING WORK IS PROPOSED IN CONJUNCTION WITH THIS DEVELOPMENT OTHER THAN THAT WHICH IS SHOWN.
7. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES.
8. UTILITIES SHOWN ON PLAN ARE TAKEN FROM OWNERS RECORDS AND FIELD LOCATION OF VISIBLE SURFACE FEATURES. THE EXISTENCE, EXTENT AND EXACT HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES HAS NOT BEEN VERIFIED. ANY CONTRACTOR PERFORMING WORK ON THIS SITE MUST CONTACT MISS UTILITY AT LEAST 48 HOURS PRIOR TO COMMENCING WORK.
9. ALL OBSOLETE OR UNUSED FACILITIES SHALL BE REMOVED WITHIN 12 MONTHS OF CESSATION OF OPERATIONS.

**SITE LEGEND**

- SITE PROPERTY LINE
- STREET OR ROAD
- x - x - CHAIN LINK FENCE
- OPAQUE WOODEN FENCE
- ⊙ TREES/SHRUBS
- ~ TREE LINE
- ⊗ UTILITY POLE
- (E) EXISTING
- (N) NEW
- (P) PROPOSED
- (F) FUTURE



**INFINIGY**  
 1033 Waterlily Shaker Rd  
 Albany, NY 12205  
 Office # (518) 690-0790  
 Fax # (518) 690-0793

**SUBMITTALS**

DATE	DESCRIPTION	REVISION
10/02/15	FOR PERMIT	0

DEPT.	DATE	APP'D	REVISIONS
R/E			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: 317-000  
 DRAWN BY: JLM  
 CHECKED BY: ASW



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NOTE: IF DRAWINGS ARE 22"x34", USE GRAPHICAL SCALE AND/OR 1/2 TIMES OF THE NOTED SCALE.

**SITE NUMBER:**  
CTNH735A  
**SITE NAME:**  
CTNH735A\_NEWHAVEN\_WASHINGTON  
 125 WASHINGTON AVE.  
 NORTH HAVEN, CT 06473

SHEET TITLE

**SITE PLAN**

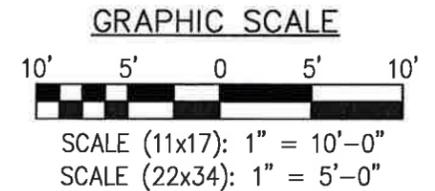
SHEET NUMBER

**C-1**

SHEET 2 OF 8 SHEETS



**1** COMPOUND PLAN  
 SCALE: AS NOTED



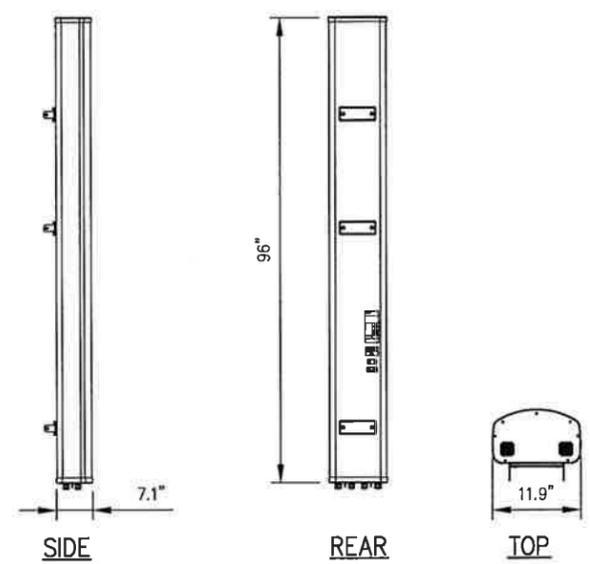


**RF SYSTEM SCHEDULE (702Cu CONFIGURATION)**

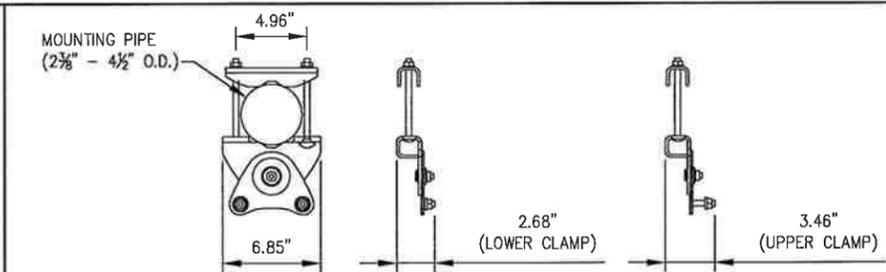
SECTOR	TECHNOLOGY	ANTENNA PORT	BAND	ANTENNA MODEL #	VENDOR	QTY (REMOVED)	QTY (NEW)	AZIMUTH	M-TILT	E-TILT	ANTENNA CENTERLINE	TMA MODEL #	VENDOR	RRU MODEL #	VENDOR	CABLE LENGTH	CABLE DIAMETER	CABLE TYPE	CABLE MODEL #	VENDOR	CABLE TAGGING	COLOR CODING	JUMPER TYPE	JUMPER TAGGING	COLOR CODING			
A	UMTS AWS	RF #1	B4P	AIR21 B2A/B4P	ERICSSON	0	0	80°	2'	0'	109'-0"	(EXISTING)	ERICSSON	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A1	-	COAX	-	-			
		RF #2										-				-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-		
	GSM	OPTICAL #1	B2A									-				-	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-
	UMTS	OPTICAL #2										-				-	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-
	LTE 700	TBD	B12P									LNx-6515DS-VTM				COMMSCOPE	0	1	80°	0°	2'	109'-0"	-	-	(PROPOSED) RRUS 11	ERICSSON	(ANTENNA CONNECTED VIA EXISTING HYBRID CABLE.)	
LTE AWS	OPTICAL #1	B4A	AIR21 B4A/B2P	ERICSSON	0	0	80°	2'	3'	109'-0"	-	-	-	-	(ANTENNA CONNECTED VIA EXISTING HYBRID CABLE.)						FIBER	-	-					
B	UMTS AWS	RF #1	B4P	AIR21 B2A/B4P	ERICSSON	0	0	190°	2'	0'	109'-0"	(EXISTING)	ERICSSON	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A1	-	COAX	-	-			
		RF #2										-				-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-		
	GSM	OPTICAL #1	B2A									-				-	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-
	UMTS	OPTICAL #2										-				-	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-
	LTE 700	TBD	B12P									LNx-6515DS-VTM				COMMSCOPE	0	1	190°	0°	2'	109'-0"	-	-	(PROPOSED) RRUS 11	ERICSSON	(ANTENNA CONNECTED VIA EXISTING HYBRID CABLE.)	
LTE AWS	OPTICAL #1	B4A	AIR21 B4A/B2P	ERICSSON	0	0	190°	2'	3'	109'-0"	-	-	-	-	(ANTENNA CONNECTED VIA EXISTING HYBRID CABLE.)						FIBER	-	-					
C	UMTS AWS	RF #1	B4P	AIR21 B2A/B4P	ERICSSON	0	0	290°	2'	0'	109'-0"	(EXISTING)	ERICSSON	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A1	-	COAX	-	-			
		RF #2										-				-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-		
	GSM	OPTICAL #1	B2A									-				-	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-
	UMTS	OPTICAL #2										-				-	-	-	EXISTING	1 1/8"	COAX	EXISTING	N/A	UMTS AWS A2	-	COAX	-	-
	LTE 700	TBD	B12P									LNx-6515DS-VTM				COMMSCOPE	0	1	290°	0°	2'	109'-0"	-	-	(PROPOSED) RRUS 11	ERICSSON	(ANTENNA CONNECTED VIA EXISTING HYBRID CABLE.)	
LTE AWS	OPTICAL #1	B4A	AIR21 B4A/B2P	ERICSSON	0	0	290°	2'	2'	109'-0"	-	-	-	-	(ANTENNA CONNECTED VIA EXISTING HYBRID CABLE.)						FIBER	-	-					

**KEY**  
 EXISTING R - RED - GSM  
 PROPOSED G - GREEN - UMS 1900  
 FIBER CONNECTION B - BLUE - UMS AWS  
 Y - YELLOW - LTE  
 O - ORANGE - FIBER CABLE

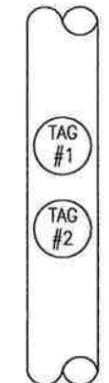
**1 RF SCHEDULE**  
 NOT TO SCALE



**2 ANTENNA DETAIL**  
 NOT TO SCALE



**COMMSCOPE MODEL NO.: LNx-6515DS-VTM**  
 RADOME MATERIAL: FIBERGLASS, UV RESISTANT  
 RADOME COLOR: LIGHT GRAY  
 DIMENSIONS, HxWxD: 96"x11.9"x7.1" (2438 x 301 x 181 mm)  
 WEIGHT, W/ PRE-MOUNTED BRACKETS: 43.7 LBS (19.8 kg)  
 CONNECTOR: 7-16 DIN FEMALE



**METALLIC TAG NOTES:**  
 1. TWO METALLIC TAGS SHALL BE ATTACHED AT EACH END OF EVERY CABLE LONGER THAN (3) THREE FEET.  
 2. CABLES LESS THAN (3) THREE FEET WILL HAVE TWO METALLIC TAGS ATTACHED AT THE CENTER OF THE CABLE.  
 3. TAGS WILL BE FASTENED WITH STAINLESS STEEL ZIP TIES APPROPRIATE FOR CABLE DIAMETER.  
 4. STANDARDIZED METALLIC TAG KITS WILL BE ASSEMBLED WITH TAGS ALREADY ENGRAVED TO ACCOMMODATE ALL CONFIGURATIONS.

**3 METALLIC TAG DETAIL**  
 NOT TO SCALE

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**SITE NUMBER:** CTNH735A  
**SITE NAME:** CTNH735A\_NEWHAVEN\_WASHINGTON  
 125 WASHINGTON AVE.  
 NORTH HAVEN, CT 06473

**SHEET TITLE**  
**ANTENNA DETAIL & RF SCHEDULE**

**SHEET NUMBER**  
**C-3**  
 SHEET 4 OF 8 SHEETS

**STRUCTURAL NOTES:**

- SPECIFICATIONS / CODES:**
  - CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH LATEST EDITION OF THE ACI CODE.
  - STEEL WORK SHALL BE PERFORMED IN ACCORDANCE WITH AISC STEEL CONSTRUCTION MANUAL, 9TH EDITION.
  - WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AMERICAN WELDING SOCIETY (AWS) D1.1-92 "STRUCTURAL WELDING" CODE-STEEL.
  - REINFORCING STEEL SHALL BE PLACED IN ACCORDANCE WITH THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI), "MANUAL OF STANDARD PRACTICE."
- MATERIALS:**
  - CONCRETE:  $f_c'$  - 3000psi. (MIN. U.N.O.)
  - REINFORCING STEEL: ASTM A615, GRADE 60.
  - WIRE MESH: ASTM A185.
  - STRUCTURAL STEEL: ASTM A36.
  - ELECTRODES FOR WELDING: E 70xx.
  - GALVANIZING: ASTM A153 (BOLTS) OR ASTM A123 (SHAPES, PLATES).
  - EXPANSION BOLTS: HILTI KWIK BOLT II, STAINLESS STEEL, 3/4"Øx43/4" EMBEDMENT OR AN APPROVED EQUAL.

SUBMITTALS		
DATE	DESCRIPTION	REVISION
10/02/15	FOR PERMIT	0

DEPT.	DATE	APP'D	REVISIONS
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO: 317-000  
 DRAWN BY: JLM  
 CHECKED BY: ASW



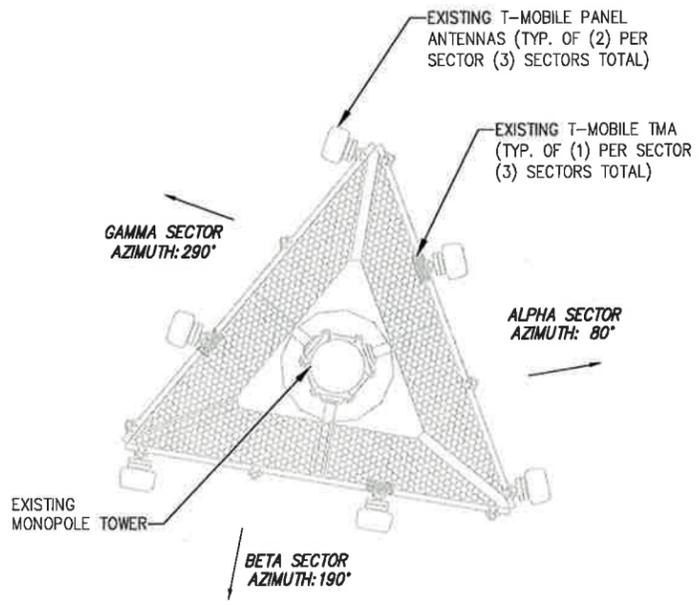
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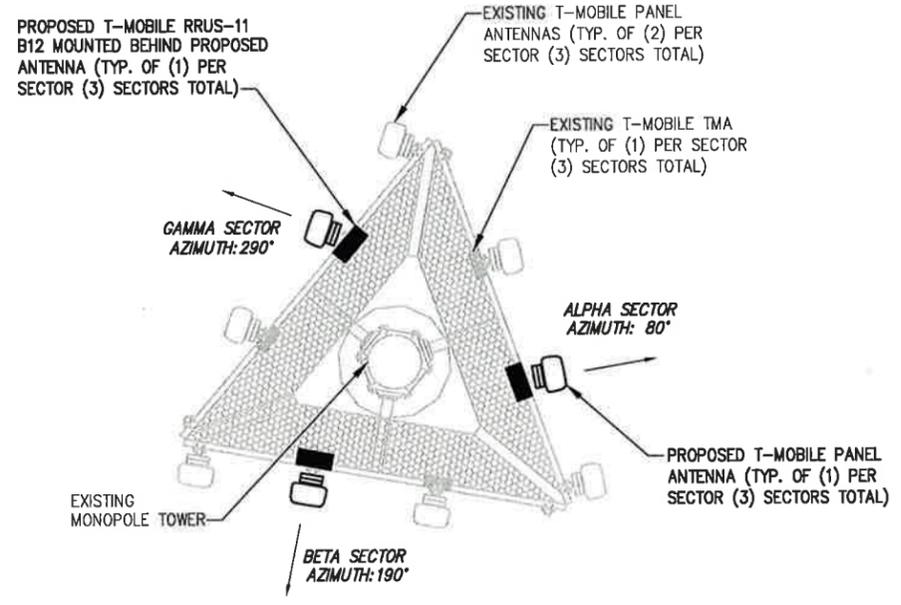
SITE NUMBER:  
**CTNH735A**  
 SITE NAME:  
 CTNH735A\_NEWHAVEN\_WASHINGTON  
 125 WASHINGTON AVE.  
 NORTH HAVEN, CT 06473

SHEET TITLE  
**EQUIPMENT SPECIFICATIONS**

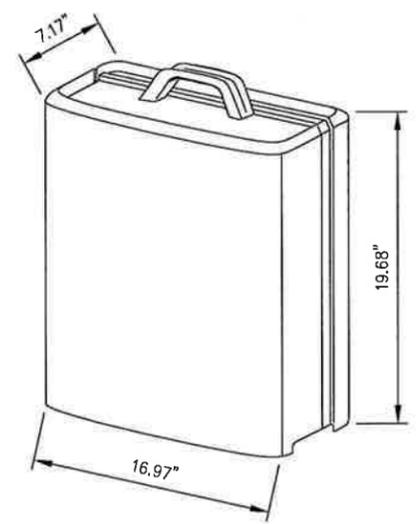
SHEET NUMBER  
**C-4**  
 SHEET 5 OF 8 SHEETS



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

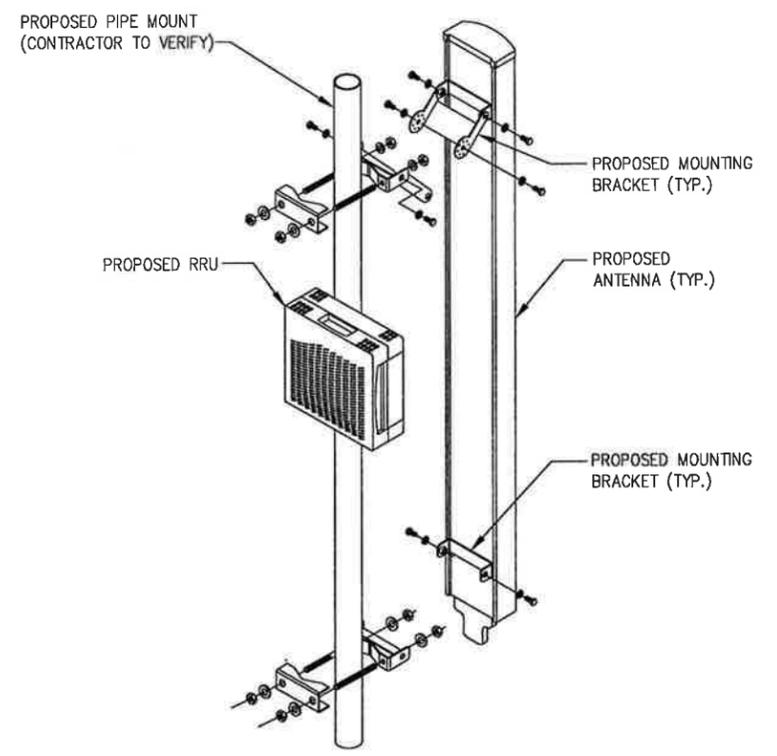


**2** PROPOSED ANTENNA ORIENTATION PLAN  
 NOT TO SCALE  
 CALLED NORTH



<b>ERICSSON MODEL NO.:</b>	<b>RRUS11 B12</b>
COLOR:	GRAY
DIMENSIONS, HxWxD:	19.68"x16.97"x7.17" (500 x 431 x 182 mm)
WEIGHT:	50.71 LBS (23 kg)

**3** RRUS11 B12 DETAIL  
 NOT TO SCALE



**4** MOUNTING DETAIL  
 NOT TO SCALE







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

T-Mobile Existing Facility

Site ID: CTNH735A

CTNH735A\_Newhaven\_washington  
125 Washington Avenue  
North Haven, CT 06473

**October 29, 2015**

**EBI Project Number: 6215005463**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general public allowable limit:	<b>6.27 %</b>

October 29, 2015

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

Emissions Analysis for Site: **CTNH735A – CTNH735A\_Newhaven\_washington**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **125 Washington Avenue, North Haven, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure 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 **125 Washington Avenue, North Haven, 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 / 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
- 2) 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.
- 3) 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.
- 4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.
- 5) 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.

- 6) For the following calculations the sample point was the top of a six 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.
- 7) The antennas used in this modeling are the **Ericsson AIR21 (B4A/B2P & B2A/B4P)** 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 AIR21( B4A/B2P & B2A/B4P)** have a maximum gain of **15.9 dBd** at their main lobe. 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.
- 8) The antenna mounting height centerline of the proposed antennas is **107 feet** above ground level (AGL).
- 9) 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.

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 AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	107	Height (AGL):	107	Height (AGL):	107
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.65	Antenna B1 MPE%	1.65	Antenna C1 MPE%	1.65
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	107	Height (AGL):	107	Height (AGL):	107
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:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	1.65	Antenna B2 MPE%	1.65	Antenna C2 MPE%	1.65
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):	107	Height (AGL):	107	Height (AGL):	107
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.65	Antenna B3 MPE%	0.65	Antenna C3 MPE%	0.65

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	3.94 %
AT&T	2.14 %
XM Satellite	0.19 %
<b>Site Total MPE %:</b>	<b>6.27 %</b>

T-Mobile Sector 1 Total:	3.94 %
T-Mobile Sector 2 Total:	3.94 %
T-Mobile Sector 3 Total:	3.94 %
<b>Site Total:</b>	<b>6.27 %</b>

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	107	16.45	2100	1000	1.65 %
T-Mobile 1900 MHz (PCS) GSM/UMTS	2	1167.14	107	8.23	1900	1000	0.82 %
T-Mobile 2100 MHz (AWS) UMTS	2	1167.14	107	8.23	2100	1000	0.82 %
T-Mobile 700 MHz LTE	1	865.21	107	3.05	700	467	0.65 %
						<b>Total:</b>	<b>3.94%</b>

## 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 1:	3.94 %
Sector 2:	3.94 %
Sector 3 :	3.94 %
T-Mobile Per Sector Maximum:	3.94 %
Site Total:	6.27 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **6.27%** 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.



**Scott Heffernan**  
RF Engineering Director

**EBI Consulting**  
21 B Street  
Burlington, MA 01803



**AMERICAN TOWER®**  
CORPORATION

This report was prepared for American Tower Corporation by



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## Structural Analysis Report

**Structure** : 120 ft Monopole  
**ATC Site Name** : Northhaven I, CT  
**ATC Site Number** : 370629  
**Engineering Number** : 64072721  
**Proposed Carrier** : T-Mobile  
**Carrier Site Name** : N/A  
**Carrier Site Number** : CTNH735A  
**Site Location** : 125 Washington Ave  
North Haven, CT 06473-0000  
41.39783, -72.85667  
**County** : New Haven  
**Date** : October 22, 2015  
**Max Usage** : 43%  
**Result** : Pass

Courtney Fuhrer  
SES Structural Engineer I





**AMERICAN TOWER®**  
CORPORATION

This report was prepared for American Tower Corporation by



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## Structural Analysis Report

**Structure** : 120 ft Monopole  
**ATC Site Name** : Northhaven I, CT  
**ATC Site Number** : 370629  
**Engineering Number** : 64072721  
**Proposed Carrier** : T-Mobile  
**Carrier Site Name** : N/A  
**Carrier Site Number** : CTNH735A  
**Site Location** : 125 Washington Ave  
North Haven, CT 06473-0000  
41.39783, -72.85667  
**County** : New Haven  
**Date** : October 22, 2015  
**Max Usage** : 43%  
**Result** : Pass

Courtney Fuhrer  
SES Structural Engineer I

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## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 120 ft monopole to reflect the change in loading by T-Mobile.

## Supporting Documents

<b>Tower Drawings</b>	Valmont Project #F177, dated September 30, 1998
<b>Foundation Drawing</b>	Valmont Drawing #2652-F, dated October 9, 1998
<b>Geotechnical Report</b>	TEP Project #56829.23316, dated September 22, 2014

## 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.

<b>Basic Wind Speed:</b>	110 mph (3-Second Gust)
<b>Basic Wind Speed w/ Ice:</b>	50 mph (3-Second Gust) w/ 3/4" radial ice concurrent
<b>Code:</b>	ANSI/TIA-222-G / 2003 IBC w/ 2005 CT Supplement & 2009 CT Amendment
<b>Structure Class:</b>	II
<b>Exposure Category:</b>	B
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft

## 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](mailto: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 <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
122.0	122.0	3	KMW AM-X-CD-17-65-00T-RET	Platform w/ Handrails	(12) 1 5/8" Coax	AT&T Mobility
		6	Powerwave Allgon 7770.00			
	120.0	12	TTA			
118.0	119.0	2	Raycap DC6-48-60-18-8F	Flush	(2) 3/8" Coax (2) 2" Conduit (1) 0.39" Cable	
	118.0	6	Ericsson RRUS 11 (Band 12)			
		3	RRU			
107.0	-	-	-	Low Profile Platform	(12) 1 5/8" Coax	T-Mobile

**Equipment to be Removed**

Elevation <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
109.0	109.0	9	RFS APX16DWV-16DWVS-E-A20	-	(6) 1 5/8" Coax	T-Mobile
		9	RFS ATMAA1412D-1A20			

**Proposed Equipment**

Elevation <sup>1</sup> (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
107.0	107.0	3	Ericsson KRY 112 144/1	Existing Low Profile Platform	(1) 1 1/4" Hybriflex	T-Mobile
		3	Ericsson RRUS 11 B12			
		3	Ericsson AIR 21, 1.3M, B2A B4P			
		3	Ericsson AIR 21, 1.3M, B4A B2P			
		3	Andrew LNX-6515DS-VTM			

<sup>1</sup>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).

Install proposed coax inside the pole shaft.

**Structure Usages**

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	35%	Pass
Shaft	43%	Pass
Base Plate	42%	Pass

**Foundations**

Reaction Component	Analysis Reactions
Moment (Kips-Ft)	2,270.7
Axial (Kips)	56.0
Shear (Kips)	28.3

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 and Sway\***

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
107.0	Ericsson AIR 21, 1.3M, B2A B4P	T-Mobile	0.365	0.343
	Ericsson AIR 21, 1.3M, B4A B2P			
	Ericsson KRY 112 144/1			
	Ericsson RRUS 11 B12			
	Andrew LNX-6515DS-VTM			

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



## **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 Semaan Engineering Solutions, or generated by field inspections or measurements of the structure.

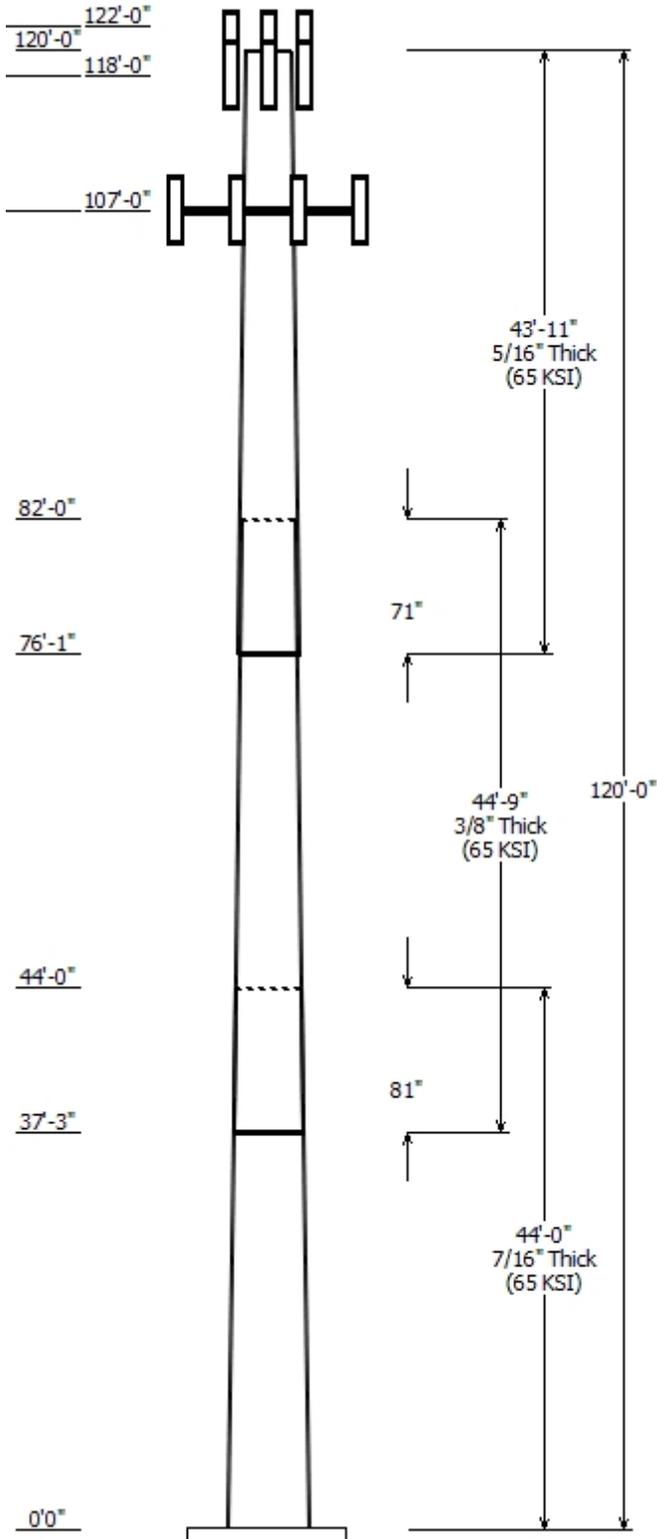
It is the responsibility of the client to ensure that the information provided to Semaan Engineering Solutions Holdings and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance 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 Semaan Engineering Solutions, 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. Semaan Engineering Solutions Holdings is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

SEMAAN ENGINEERING SOLUTIONS, LLC  
 1079 N.205th Street  
 Elkhorn, NE 68022  
 Phone: 402-289-1888  
 Fax: 402-289-1861

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Job Information	
Pole : 370629	Code: ANSI/TIA-222-G
Description : 120 ft expandable Monopole	
Client : T- Mobile	Struct Class : II
Location : Northhaven I, CT	
Shape : 12 Sides	Exposure : B
Height : 120.00 (ft)	Topo : 1
Base Elev (ft): 0.00	
Taper: 0.19996(in/ft)	

Sections Properties								
Shaft Section	Length (ft)	Diameter (in)		Thick (in)	Joint Type	Overlap Length (in)	Taper (in/ft)	Steel Grade (ksi)
		Top	Bottom					
1	44.000	45.70	54.50	0.439		0.000	0.199967	65
2	44.750	38.85	47.80	0.375	Slip Joint	81.000	0.199967	65
3	43.917	31.87	40.66	0.313	Slip Joint	71.000	0.199967	65

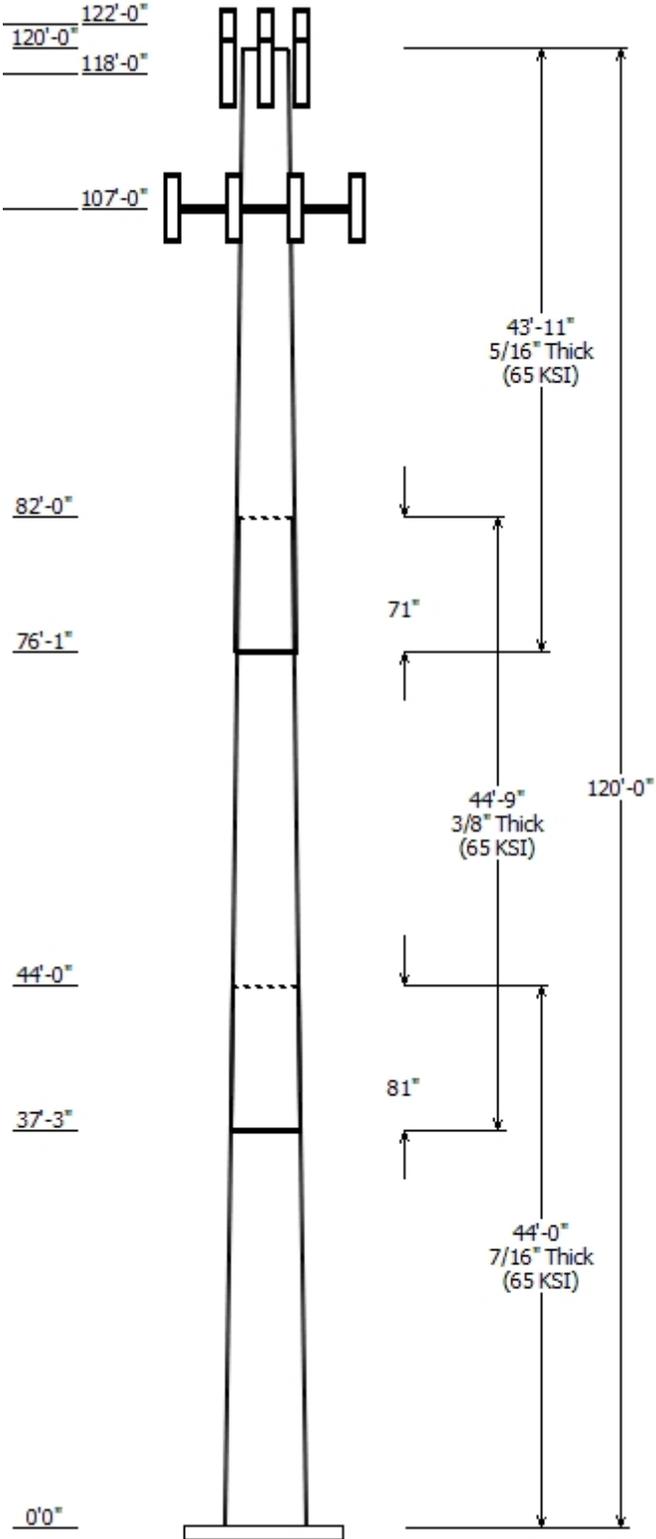
Discrete Appurtenance				
Attach Elev (ft)	Force Elev (ft)	Qty	Description	
122.000	122.000	1	Flat Platform w/ Handrails	
122.000	122.000	6	Powerwave 7770.00	
122.000	122.000	3	KMW AM-X-CD-17-65-00T-RET	
122.000	120.000	12	TTA	
118.000	118.000	1	Flush Mounts	
118.000	118.000	3	RRU	
118.000	118.000	6	Ericsson RRUS 11 (Band 12)	
118.000	119.000	2	Raycap DC6-48-60-18-8F	
107.000	107.000	3	Andrew LNX-6515DS-VTM	
107.000	107.000	3	Ericsson RRUS 11 B12	
107.000	107.000	3	Ericsson KRY 112 144/1	
107.000	107.000	1	Flat Low Profile Platform	
107.000	107.000	3	Ericsson AIR 21, 1.3M, B4A B2P	
107.000	107.000	3	Ericsson AIR 21, 1.3M, B2A B4P	

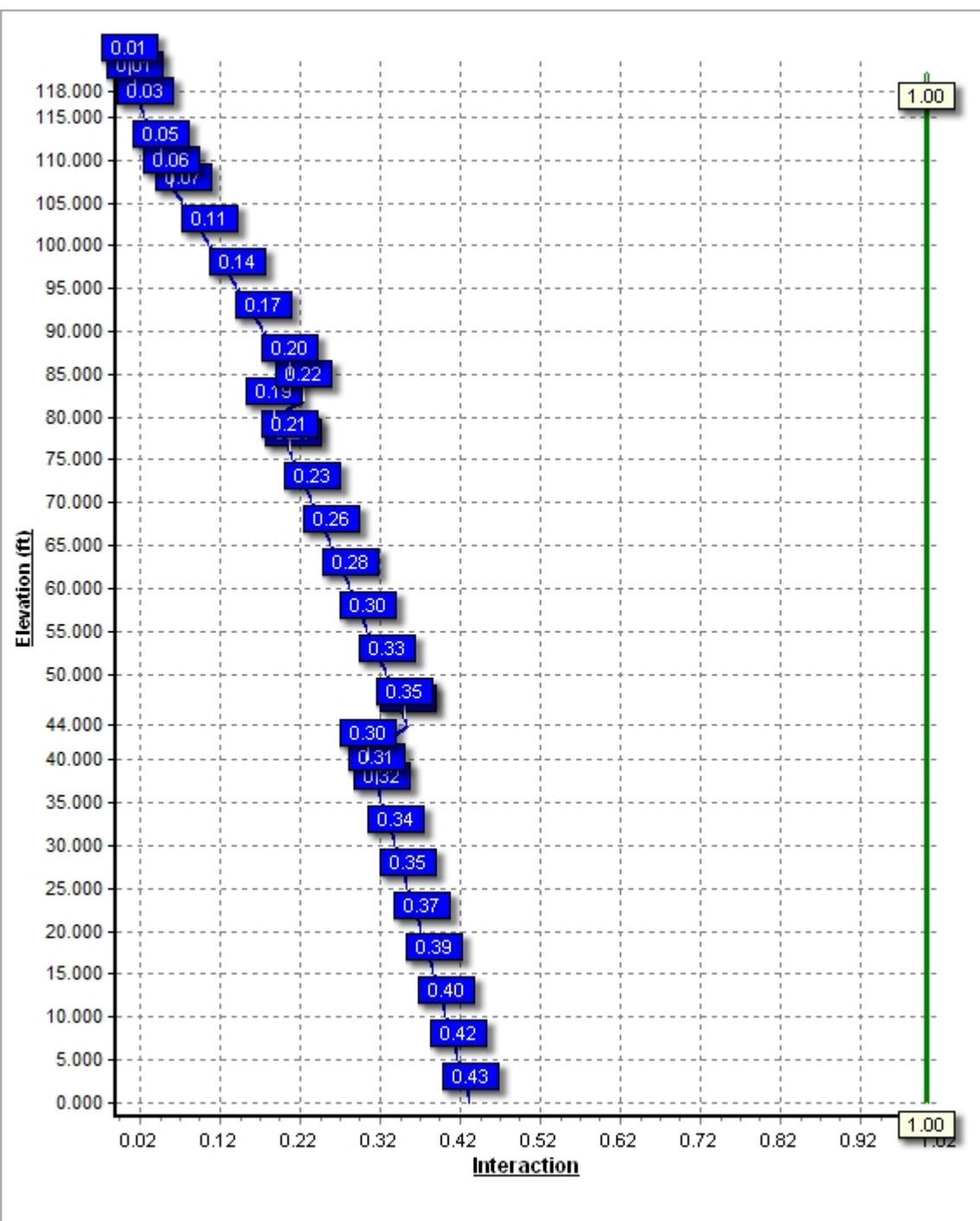
Linear Appurtenance			
Elev (ft)		Description	Exposed To Wind
From	To		
5.000	107.0	1 1/4" Hybriflex	No
5.000	107.0	1 5/8" Coax	No
5.000	118.0	0.39" Cable	No
5.000	118.0	2" Conduit	No
5.000	118.0	3/8" Coax	No
5.000	122.0	1 5/8" Coax	No

Load Cases	
1.2D + 1.6W	110 mph with No Ice
0.9D + 1.6W	110 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
1.0D + 1.0W	Serviceability 60 mph

Reactions			
Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.6W	2270.72	28.32	39.08
0.9D + 1.6W	2261.08	28.31	29.30
1.2D + 1.0Di + 1.0Wi	393.05	4.79	56.04
1.0D + 1.0W	421.06	5.26	32.59

Dish Deflections			
Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
	0.00	0.000	0.000





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Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

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Customer: T-Mobile

### Analysis Parameters

Location:	New Haven County, CT	Height (ft):	120
Code:	ANSI/TIA-222-G	Base Diameter (in):	54.50
Shape:	12 Sides	Top Diameter (in):	31.88
Pole Type:	Taper	Taper (in/ft) :	0.200
Pole Manufacturer:	Valmont		

---

### Ice & Wind Parameters

Structure Class:	II	Design Wind Speed Without Ice:	110 mph
Exposure Category:	B	Design Wind Speed With Ice:	50 mph
Topographic Category:	1	Operational Wind Speed:	60 mph
Crest Height:	0.0 ft	Design Ice Thickness:	0.50 in

### Load Cases

1.2D + 1.6W	110 mph with No Ice
0.9D + 1.6W	110 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
1.0D + 1.0W	Serviceability 60 mph

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

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Customer: T-Mobile

**Shaft Section Properties**

Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Slip Joint Len (in)	Weight (lb)	Bottom						Top						
							Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Taper (in/ft)
1-12	44.000	0.4388	65		0.00	10,506	54.50	0.00	76.39	28494.8	31.14	124.20	45.70	44.00	63.95	16723.6	25.76	104.15	0.199967
2-12	44.750	0.3750	65	Slip	81.00	7,898	47.80	37.25	57.27	16441.0	32.01	127.47	38.85	82.00	46.46	8780.1	25.62	103.61	0.199967
3-12	43.917	0.3125	65	Slip	71.00	5,407	40.66	76.08	40.60	8436.6	32.72	130.11	31.87	120.00	31.76	4039.9	25.19	102.01	0.199967
Shaft Weight						23,811													

**Discrete Appurtenance Properties**

Attach Elev (ft)	Description	Qty	No Ice			Ice			Distance From Face (ft)	Vert Ecc (ft)
			Weight (lb)	EPAA (sf)	Orientation Factor	Weight (lb)	EPAA (sf)	Orientation Factor		
122.00	Flat Platform w/ Handrails	1	2000.00	42.400	1.00	3,391.49	62.934	1.00	0.000	0.000
122.00	KMW AM-X-CD-17-65-00T-	3	30.80	4.990	0.79	159.15	5.951	0.79	0.000	0.000
122.00	Powerwave 7770.00	6	35.00	5.510	0.77	166.39	6.539	0.77	0.000	0.000
122.00	TTA	12	25.00	1.200	0.50	69.43	1.654	0.50	0.000	-2.000
118.00	Ericsson RRUS 11 (Band 12)	6	50.00	2.570	0.67	128.99	3.203	0.67	0.000	0.000
118.00	Flush Mounts	1	200.00	3.500	1.00	540.33	7.074	1.00	0.000	0.000
118.00	Raycap DC6-48-60-18-8F	2	31.80	2.200	1.00	121.92	2.835	1.00	0.000	1.000
118.00	RRU	3	55.00	4.560	0.67	175.56	5.408	0.67	0.000	0.000
107.00	Andrew LNX-6515DS-VTM	3	51.30	11.430	0.84	304.15	13.036	0.84	0.000	0.000
107.00	Ericsson AIR 21, 1.3M, B2A	3	91.50	6.040	0.85	251.83	7.092	0.85	0.000	0.000
107.00	Ericsson AIR 21, 1.3M, B4A	3	81.50	6.090	0.85	243.65	7.153	0.85	0.000	0.000
107.00	Ericsson KRY 112 144/1	3	11.00	0.410	0.50	26.54	0.623	0.50	0.000	0.000
107.00	Ericsson RRUS 11 B12	3	50.70	2.790	0.67	133.51	3.444	0.67	0.000	0.000
107.00	Flat Low Profile Platform	1	1500.00	26.100	1.00	2,127.07	44.578	1.00	0.000	0.000
Totals		50	5689.00			12,791.29			Number of Loadings : 14	

**Linear Appurtenance Properties**

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Diameter (in)	Coax Weight (lb/ft)	Protected Flat	Protected Width (in)	Exposed To Wind	Carrier
5.00	122.00	12	1 5/8" Coax	1.98	0.82	N	0.00	N	AT&T Mobility
5.00	118.00	1	0.39" Cable	0.39	0.07	N	0.00	N	AT&T Mobility
5.00	118.00	2	2" Conduit	2.38	3.65	N	0.00	N	AT&T Mobility
5.00	118.00	2	3/8" Coax	0.44	0.08	N	0.00	N	AT&T Mobility
5.00	107.00	1	1 1/4" Hybriflex	1.54	1.00	N	0.00	N	T-Mobile
5.00	107.00	12	1 5/8" Coax	1.98	0.82	N	0.00	N	T-Mobile

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

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Customer: T-Mobile

**Segment Properties** (Max Len : 5.ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Fy (ksi)	S (in <sup>3</sup> )	Z (in <sup>3</sup> )	Weight (lb)
0.00		0.4388	54.500	76.385	28,494.8	31.14	124.20	70.8	1010.	0.0	0.0
5.00		0.4388	53.500	74.972	26,942.9	30.53	121.92	71.4	972.9	0.0	1,287.6
10.00		0.4388	52.500	73.560	25,448.3	29.92	119.65	72.1	936.4	0.0	1,263.6
15.00		0.4388	51.500	72.147	24,010.1	29.30	117.37	72.8	900.7	0.0	1,239.5
20.00		0.4388	50.501	70.734	22,627.1	28.69	115.09	73.4	865.6	0.0	1,215.5
25.00		0.4388	49.501	69.322	21,298.3	28.08	112.81	74.1	831.2	0.0	1,191.4
30.00		0.4388	48.501	67.909	20,022.6	27.47	110.53	74.8	797.5	0.0	1,167.4
35.00		0.4388	47.501	66.496	18,798.8	26.86	108.25	75.4	764.5	0.0	1,143.4
37.25	Bot - Section 2	0.4388	47.051	65.860	18,264.8	26.59	107.23	75.7	749.9	0.0	506.7
40.00		0.4388	46.501	65.083	17,625.9	26.25	105.97	76.1	732.3	0.0	1,145.4
44.00	Top - Section 1	0.3750	46.451	55.637	15,076.9	31.05	123.87	70.9	627.0	0.0	1,642.0
45.00		0.3750	46.252	55.396	14,881.4	30.90	123.34	71.0	621.6	0.0	188.9
50.00		0.3750	45.252	54.189	13,929.5	30.19	120.67	71.8	594.7	0.0	932.2
55.00		0.3750	44.252	52.981	13,019.0	29.48	118.00	72.6	568.4	0.0	911.7
60.00		0.3750	43.252	51.774	12,149.2	28.76	115.34	73.3	542.6	0.0	891.1
65.00		0.3750	42.252	50.567	11,318.9	28.05	112.67	74.1	517.5	0.0	870.6
70.00		0.3750	41.252	49.359	10,527.4	27.33	110.01	74.9	493.0	0.0	850.1
75.00		0.3750	40.253	48.152	9,773.7	26.62	107.34	75.7	469.1	0.0	829.5
76.08	Bot - Section 3	0.3750	40.036	47.891	9,615.2	26.46	106.76	75.9	464.0	0.0	177.0
80.00		0.3750	39.253	46.945	9,056.8	25.90	104.67	76.5	445.7	0.0	1,167.8
82.00	Top - Section 2	0.3125	39.478	39.410	7,716.0	31.71	126.33	70.1	377.6	0.0	587.4
85.00		0.3125	38.878	38.806	7,366.9	31.19	124.41	70.7	366.1	0.0	399.2
90.00		0.3125	37.878	37.800	6,808.6	30.33	121.21	71.6	347.3	0.0	651.7
95.00		0.3125	36.878	36.794	6,279.3	29.48	118.01	72.6	328.9	0.0	634.6
100.0		0.3125	35.878	35.788	5,778.2	28.62	114.81	73.5	311.1	0.0	617.5
105.0		0.3125	34.879	34.782	5,304.4	27.76	111.61	74.4	293.8	0.0	600.3
107.0		0.3125	34.479	34.380	5,122.4	27.42	110.33	74.8	287.0	0.0	235.3
110.0		0.3125	33.879	33.776	4,857.3	26.91	108.41	75.4	277.0	0.0	347.9
115.0		0.3125	32.879	32.770	4,436.1	26.05	105.21	76.3	260.6	0.0	566.1
118.0		0.3125	32.279	32.166	4,195.4	25.53	103.29	76.9	251.1	0.0	331.4
120.0		0.3125	31.879	31.764	4,039.9	25.19	102.01	77.2	244.8	0.0	217.5
23,810.5											

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

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Customer: T- Mobile

<b>Load Case:</b> 1.2D + 1.6W	110 mph with No Ice	18 Iterations
Gust Response Factor : 1.10		Wind Importance Factor : 1.00
Dead Load Factor : 1.20		
Wind Load Factor : 1.60		

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		422.2	0.0					0.0	0.0	422.2	0.0	0.0	0.0
5.00		836.7	1,545.1					0.0	0.0	836.7	1,545.1	0.0	0.0
10.00		821.0	1,516.3					0.0	169.3	821.0	1,685.5	0.0	0.0
15.00		805.4	1,487.4					0.0	169.3	805.4	1,656.7	0.0	0.0
20.00		789.8	1,458.6					0.0	169.3	789.8	1,627.8	0.0	0.0
25.00		774.1	1,429.7					0.0	169.3	774.1	1,599.0	0.0	0.0
30.00		767.5	1,400.9					0.0	169.3	767.5	1,570.2	0.0	0.0
35.00		559.9	1,372.1					0.0	169.3	559.9	1,541.3	0.0	0.0
37.25	Bot - Section 2	395.5	608.0					0.0	76.2	395.5	684.2	0.0	0.0
40.00		542.8	1,374.5					0.0	93.1	542.8	1,467.6	0.0	0.0
44.00	Top - Section 1	404.1	1,970.4					0.0	135.4	404.1	2,105.8	0.0	0.0
45.00		489.5	226.7					0.0	33.9	489.5	260.5	0.0	0.0
50.00		819.2	1,118.7					0.0	169.3	819.2	1,287.9	0.0	0.0
55.00		823.3	1,094.0					0.0	169.3	823.3	1,263.3	0.0	0.0
60.00		825.0	1,069.4					0.0	169.3	825.0	1,238.6	0.0	0.0
65.00		824.6	1,044.7					0.0	169.3	824.6	1,214.0	0.0	0.0
70.00		822.3	1,020.1					0.0	169.3	822.3	1,189.3	0.0	0.0
75.00		499.0	995.4					0.0	169.3	499.0	1,164.7	0.0	0.0
76.08	Bot - Section 3	413.0	212.4					0.0	36.7	413.0	249.1	0.0	0.0
80.00		489.4	1,401.4					0.0	132.6	489.4	1,534.0	0.0	0.0
82.00	Top - Section 2	411.4	704.9					0.0	67.7	411.4	772.6	0.0	0.0
85.00		654.3	479.1					0.0	101.6	654.3	580.6	0.0	0.0
90.00		811.3	782.0					0.0	169.3	811.3	951.3	0.0	0.0
95.00		802.2	761.5					0.0	169.3	802.2	930.7	0.0	0.0
100.00		792.0	740.9					0.0	169.3	792.0	910.2	0.0	0.0
105.00		549.0	720.4					0.0	169.3	549.0	889.7	0.0	0.0
107.00	Appertunance(s)	387.4	282.4	4,115.4	0.0	0.0	2,829.6	0.0	67.7	4,502.8	3,179.7	0.0	0.0
110.00		612.8	417.5					0.0	62.5	612.8	480.0	0.0	0.0
115.00		606.5	679.3					0.0	104.2	606.5	783.5	0.0	0.0
118.00	Appertunance(s)	374.3	397.7	1,214.1	0.0	189.3	874.3	0.0	62.5	1,588.4	1,334.6	0.0	0.0
120.00		148.9	261.0					0.0	23.6	148.9	284.7	0.0	0.0
<b>Totals:</b>										<b>24,604.0</b>	<b>35,982.3</b>	<b>0.00</b>	<b>0.00</b>

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:14 PM

Customer: T- Mobile

**Load Case:** 1.2D + 1.6W

110 mph with No Ice

18 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Wind Load Factor : 1.60

**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-39.08	-28.32	0.00	-2,270.72	0.00	2,270.72	4,864.22	2,432.11	10,853.2	5,360.02	0.00	0.00	0.432
5.00	-37.48	-27.56	0.00	-2,129.11	0.00	2,129.11	4,819.19	2,409.59	10,552.3	5,211.40	0.06	-0.11	0.416
10.00	-35.75	-26.80	0.00	-1,991.33	0.00	1,991.33	4,772.47	2,386.23	10,251.4	5,062.83	0.23	-0.22	0.401
15.00	-34.05	-26.05	0.00	-1,857.35	0.00	1,857.35	4,724.05	2,362.02	9,950.98	4,914.42	0.52	-0.33	0.385
20.00	-32.38	-25.31	0.00	-1,727.11	0.00	1,727.11	4,673.94	2,336.97	9,651.00	4,766.27	0.92	-0.43	0.369
25.00	-30.74	-24.57	0.00	-1,600.58	0.00	1,600.58	4,622.14	2,311.07	9,351.77	4,618.49	1.43	-0.54	0.353
30.00	-29.14	-23.84	0.00	-1,477.70	0.00	1,477.70	4,568.64	2,284.32	9,053.49	4,471.18	2.05	-0.64	0.337
35.00	-27.57	-23.30	0.00	-1,358.49	0.00	1,358.49	4,513.45	2,256.72	8,756.37	4,324.44	2.77	-0.74	0.320
37.25	-26.87	-22.92	0.00	-1,306.07	0.00	1,306.07	4,488.06	2,244.03	8,623.11	4,258.63	3.13	-0.79	0.313
40.00	-25.39	-22.38	0.00	-1,243.04	0.00	1,243.04	4,456.57	2,228.28	8,460.64	4,178.39	3.60	-0.84	0.303
44.00	-23.27	-21.97	0.00	-1,153.51	0.00	1,153.51	3,547.86	1,773.93	6,746.79	3,331.99	4.34	-0.92	0.353
45.00	-22.99	-21.50	0.00	-1,131.54	0.00	1,131.54	3,540.23	1,770.11	6,702.83	3,310.28	4.54	-0.94	0.348
50.00	-21.68	-20.70	0.00	-1,024.05	0.00	1,024.05	3,501.07	1,750.54	6,483.06	3,201.74	5.57	-1.04	0.326
55.00	-20.40	-19.88	0.00	-920.57	0.00	920.57	3,460.22	1,730.11	6,263.48	3,093.30	6.72	-1.14	0.304
60.00	-19.15	-19.06	0.00	-821.16	0.00	821.16	3,417.68	1,708.84	6,044.31	2,985.06	7.96	-1.23	0.281
65.00	-17.93	-18.24	0.00	-725.84	0.00	725.84	3,373.45	1,686.72	5,825.75	2,877.12	9.31	-1.33	0.258
70.00	-16.73	-17.41	0.00	-634.65	0.00	634.65	3,327.52	1,663.76	5,608.02	2,769.59	10.74	-1.41	0.234
75.00	-15.57	-16.90	0.00	-547.58	0.00	547.58	3,279.90	1,639.95	5,391.33	2,662.57	12.26	-1.49	0.211
76.08	-15.32	-16.49	0.00	-529.27	0.00	529.27	3,269.36	1,634.68	5,344.54	2,639.46	12.60	-1.51	0.205
80.00	-13.79	-15.97	0.00	-464.70	0.00	464.70	3,230.58	1,615.29	5,175.88	2,556.17	13.86	-1.57	0.186
82.00	-13.02	-15.54	0.00	-432.76	0.00	432.76	2,487.60	1,243.80	4,021.63	1,986.13	14.53	-1.59	0.223
85.00	-12.44	-14.89	0.00	-386.13	0.00	386.13	2,469.09	1,234.55	3,930.08	1,940.92	15.54	-1.63	0.204
90.00	-11.50	-14.06	0.00	-311.70	0.00	311.70	2,436.89	1,218.44	3,777.45	1,865.54	17.29	-1.70	0.172
95.00	-10.58	-13.24	0.00	-241.41	0.00	241.41	2,402.99	1,201.50	3,624.95	1,790.23	19.10	-1.76	0.139
100.00	-9.68	-12.43	0.00	-175.22	0.00	175.22	2,367.40	1,183.70	3,472.79	1,715.08	20.97	-1.81	0.106
105.00	-8.81	-11.85	0.00	-113.09	0.00	113.09	2,330.12	1,165.06	3,321.17	1,640.20	22.88	-1.84	0.073
107.00	-5.77	-7.25	0.00	-89.38	0.00	89.38	2,314.73	1,157.36	3,260.72	1,610.35	23.66	-1.85	0.058
110.00	-5.31	-6.62	0.00	-67.63	0.00	67.63	2,291.14	1,145.57	3,170.31	1,565.70	24.83	-1.87	0.046
115.00	-4.55	-5.99	0.00	-34.51	0.00	34.51	2,250.47	1,125.24	3,020.42	1,491.67	26.79	-1.88	0.025
118.00	-3.27	-4.36	0.00	-16.35	0.00	16.35	2,225.26	1,112.63	2,931.04	1,447.53	27.97	-1.88	0.013
120.00	0.00	-4.25	0.00	-7.62	0.00	7.62	2,208.11	1,104.05	2,871.71	1,418.23	28.76	-1.89	0.005

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:14 PM

Customer: T- Mobile

**Load Case:** 0.9D + 1.6W

110 mph with No Ice (Reduced DL)

18 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 0.90

Wind Load Factor : 1.60

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		422.2	0.0					0.0	0.0	422.2	0.0	0.0	0.0
5.00		836.7	1,158.8					0.0	0.0	836.7	1,158.8	0.0	0.0
10.00		821.0	1,137.2					0.0	126.9	821.0	1,264.1	0.0	0.0
15.00		805.4	1,115.6					0.0	126.9	805.4	1,242.5	0.0	0.0
20.00		789.8	1,093.9					0.0	126.9	789.8	1,220.9	0.0	0.0
25.00		774.1	1,072.3					0.0	126.9	774.1	1,199.2	0.0	0.0
30.00		767.5	1,050.7					0.0	126.9	767.5	1,177.6	0.0	0.0
35.00		559.9	1,029.0					0.0	126.9	559.9	1,156.0	0.0	0.0
37.25	Bot - Section 2	395.5	456.0					0.0	57.1	395.5	513.1	0.0	0.0
40.00		542.8	1,030.9					0.0	69.8	542.8	1,100.7	0.0	0.0
44.00	Top - Section 1	404.1	1,477.8					0.0	101.6	404.1	1,579.4	0.0	0.0
45.00		489.5	170.0					0.0	25.4	489.5	195.4	0.0	0.0
50.00		819.2	839.0					0.0	126.9	819.2	966.0	0.0	0.0
55.00		823.3	820.5					0.0	126.9	823.3	947.5	0.0	0.0
60.00		825.0	802.0					0.0	126.9	825.0	929.0	0.0	0.0
65.00		824.6	783.5					0.0	126.9	824.6	910.5	0.0	0.0
70.00		822.3	765.1					0.0	126.9	822.3	892.0	0.0	0.0
75.00		499.0	746.6					0.0	126.9	499.0	873.5	0.0	0.0
76.08	Bot - Section 3	413.0	159.3					0.0	27.5	413.0	186.8	0.0	0.0
80.00		489.4	1,051.0					0.0	99.4	489.4	1,150.5	0.0	0.0
82.00	Top - Section 2	411.4	528.7					0.0	50.8	411.4	579.5	0.0	0.0
85.00		654.3	359.3					0.0	76.2	654.3	435.5	0.0	0.0
90.00		811.3	586.5					0.0	126.9	811.3	713.5	0.0	0.0
95.00		802.2	571.1					0.0	126.9	802.2	698.1	0.0	0.0
100.00		792.0	555.7					0.0	126.9	792.0	682.7	0.0	0.0
105.00		549.0	540.3					0.0	126.9	549.0	667.2	0.0	0.0
107.00	Appertunance(s)	387.4	211.8	4,115.4	0.0	0.0	2,122.2	0.0	50.8	4,502.8	2,384.8	0.0	0.0
110.00		612.8	313.1					0.0	46.9	612.8	360.0	0.0	0.0
115.00		606.5	509.5					0.0	78.2	606.5	587.7	0.0	0.0
118.00	Appertunance(s)	374.3	298.3	1,214.1	0.0	189.3	655.7	0.0	46.9	1,588.4	1,000.9	0.0	0.0
120.00		148.9	195.8					0.0	17.7	148.9	213.5	0.0	0.0
<b>Totals:</b>										<b>24,604.0</b>	<b>26,986.7</b>	<b>0.00</b>	<b>0.00</b>

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:15 PM

Customer: T- Mobile

**Load Case:** 0.9D + 1.6W

110 mph with No Ice (Reduced DL)

18 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 0.90

Wind Load Factor : 1.60

**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-29.30	-28.31	0.00	-2,261.08	0.00	2,261.08	4,864.22	2,432.11	10,853.2	5,360.02	0.00	0.00	0.428
5.00	-28.09	-27.53	0.00	-2,119.52	0.00	2,119.52	4,819.19	2,409.59	10,552.3	5,211.40	0.06	-0.11	0.413
10.00	-26.78	-26.75	0.00	-1,981.88	0.00	1,981.88	4,772.47	2,386.23	10,251.4	5,062.83	0.23	-0.22	0.397
15.00	-25.49	-25.99	0.00	-1,848.11	0.00	1,848.11	4,724.05	2,362.02	9,950.98	4,914.42	0.52	-0.32	0.382
20.00	-24.23	-25.24	0.00	-1,718.16	0.00	1,718.16	4,673.94	2,336.97	9,651.00	4,766.27	0.92	-0.43	0.366
25.00	-22.99	-24.49	0.00	-1,591.98	0.00	1,591.98	4,622.14	2,311.07	9,351.77	4,618.49	1.42	-0.53	0.350
30.00	-21.78	-23.75	0.00	-1,469.51	0.00	1,469.51	4,568.64	2,284.32	9,053.49	4,471.18	2.04	-0.64	0.334
35.00	-20.60	-23.21	0.00	-1,350.75	0.00	1,350.75	4,513.45	2,256.72	8,756.37	4,324.44	2.76	-0.74	0.317
37.25	-20.08	-22.82	0.00	-1,298.53	0.00	1,298.53	4,488.06	2,244.03	8,623.11	4,258.63	3.12	-0.78	0.309
40.00	-18.96	-22.28	0.00	-1,235.78	0.00	1,235.78	4,456.57	2,228.28	8,460.64	4,178.39	3.59	-0.84	0.300
44.00	-17.37	-21.87	0.00	-1,146.65	0.00	1,146.65	3,547.86	1,773.93	6,746.79	3,331.99	4.32	-0.91	0.349
45.00	-17.16	-21.40	0.00	-1,124.78	0.00	1,124.78	3,540.23	1,770.11	6,702.83	3,310.28	4.51	-0.93	0.345
50.00	-16.17	-20.59	0.00	-1,017.80	0.00	1,017.80	3,501.07	1,750.54	6,483.06	3,201.74	5.55	-1.03	0.323
55.00	-15.20	-19.77	0.00	-914.85	0.00	914.85	3,460.22	1,730.11	6,263.48	3,093.30	6.68	-1.13	0.300
60.00	-14.26	-18.95	0.00	-815.99	0.00	815.99	3,417.68	1,708.84	6,044.31	2,985.06	7.92	-1.23	0.278
65.00	-13.34	-18.13	0.00	-721.23	0.00	721.23	3,373.45	1,686.72	5,825.75	2,877.12	9.26	-1.32	0.255
70.00	-12.44	-17.30	0.00	-630.59	0.00	630.59	3,327.52	1,663.76	5,608.02	2,769.59	10.68	-1.40	0.232
75.00	-11.57	-16.79	0.00	-544.08	0.00	544.08	3,279.90	1,639.95	5,391.33	2,662.57	12.20	-1.48	0.208
76.08	-11.38	-16.38	0.00	-525.89	0.00	525.89	3,269.36	1,634.68	5,344.54	2,639.46	12.54	-1.50	0.203
80.00	-10.23	-15.87	0.00	-461.73	0.00	461.73	3,230.58	1,615.29	5,175.88	2,556.17	13.79	-1.56	0.184
82.00	-9.66	-15.45	0.00	-429.99	0.00	429.99	2,487.60	1,243.80	4,021.63	1,986.13	14.45	-1.58	0.221
85.00	-9.23	-14.79	0.00	-383.65	0.00	383.65	2,469.09	1,234.55	3,930.08	1,940.92	15.46	-1.62	0.202
90.00	-8.52	-13.97	0.00	-309.70	0.00	309.70	2,436.89	1,218.44	3,777.45	1,865.54	17.20	-1.69	0.170
95.00	-7.84	-13.15	0.00	-239.86	0.00	239.86	2,402.99	1,201.50	3,624.95	1,790.23	19.00	-1.75	0.137
100.00	-7.17	-12.34	0.00	-174.11	0.00	174.11	2,367.40	1,183.70	3,472.79	1,715.08	20.86	-1.80	0.105
105.00	-6.51	-11.78	0.00	-112.38	0.00	112.38	2,330.12	1,165.06	3,321.17	1,640.20	22.76	-1.83	0.071
107.00	-4.27	-7.20	0.00	-88.83	0.00	88.83	2,314.73	1,157.36	3,260.72	1,610.35	23.53	-1.84	0.057
110.00	-3.93	-6.58	0.00	-67.23	0.00	67.23	2,291.14	1,145.57	3,170.31	1,565.70	24.69	-1.85	0.045
115.00	-3.36	-5.95	0.00	-34.34	0.00	34.34	2,250.47	1,125.24	3,020.42	1,491.67	26.64	-1.87	0.025
118.00	-2.42	-4.33	0.00	-16.29	0.00	16.29	2,225.26	1,112.63	2,931.04	1,447.53	27.82	-1.87	0.012
120.00	0.00	-4.25	0.00	-7.62	0.00	7.62	2,208.11	1,104.05	2,871.71	1,418.23	28.60	-1.88	0.005

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:15 PM

Customer: T- Mobile

**Load Case:** 1.2D + 1.0Di + 1.0Wi

50 mph with 0.75 in Radial Ice

17 Iterations

Gust Response Factor : 1.10

Ice Dead Load Factor : 1.00

Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Ice Importance Factor : 1.00

Wind Load Factor : 1.00

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		68.1	0.0					0.0	0.0	68.1	0.0	0.0	0.0
5.00		135.4	1,955.4					0.0	0.0	135.4	1,955.4	0.0	0.0
10.00		133.4	1,966.9					0.0	169.3	133.4	2,136.2	0.0	0.0
15.00		131.3	1,953.4					0.0	169.3	131.3	2,122.7	0.0	0.0
20.00		129.1	1,931.8					0.0	169.3	129.1	2,101.1	0.0	0.0
25.00		126.8	1,906.0					0.0	169.3	126.8	2,075.3	0.0	0.0
30.00		126.0	1,877.5					0.0	169.3	126.0	2,046.8	0.0	0.0
35.00		92.0	1,847.2					0.0	169.3	92.0	2,016.5	0.0	0.0
37.25	Bot - Section 2	65.1	822.2					0.0	76.2	65.1	898.4	0.0	0.0
40.00		89.4	1,639.2					0.0	93.1	89.4	1,732.3	0.0	0.0
44.00	Top - Section 1	66.6	2,352.4					0.0	135.4	66.6	2,487.8	0.0	0.0
45.00		80.8	322.4					0.0	33.9	80.8	356.2	0.0	0.0
50.00		135.4	1,590.1					0.0	169.3	135.4	1,759.4	0.0	0.0
55.00		136.4	1,560.2					0.0	169.3	136.4	1,729.5	0.0	0.0
60.00		136.9	1,529.7					0.0	169.3	136.9	1,698.9	0.0	0.0
65.00		137.2	1,498.6					0.0	169.3	137.2	1,667.9	0.0	0.0
70.00		137.1	1,467.2					0.0	169.3	137.1	1,636.4	0.0	0.0
75.00		83.3	1,435.3					0.0	169.3	83.3	1,604.6	0.0	0.0
76.08	Bot - Section 3	69.0	307.7					0.0	36.7	69.0	344.3	0.0	0.0
80.00		81.8	1,745.5					0.0	132.6	81.8	1,878.1	0.0	0.0
82.00	Top - Section 2	68.9	879.6					0.0	67.7	68.9	947.3	0.0	0.0
85.00		109.7	738.1					0.0	101.6	109.7	839.7	0.0	0.0
90.00		136.4	1,205.2					0.0	169.3	136.4	1,374.4	0.0	0.0
95.00		135.2	1,176.3					0.0	169.3	135.2	1,345.6	0.0	0.0
100.00		133.8	1,147.2					0.0	169.3	133.8	1,316.5	0.0	0.0
105.00		92.9	1,117.9					0.0	169.3	92.9	1,287.2	0.0	0.0
107.00	Appertunance(s)	65.7	440.2	715.6	0.0	0.0	5,277.7	0.0	67.7	781.4	5,785.6	0.0	0.0
110.00		104.2	650.8					0.0	62.5	104.2	713.3	0.0	0.0
115.00		103.3	1,058.7					0.0	104.2	103.3	1,162.9	0.0	0.0
118.00	Appertunance(s)	63.9	622.2	212.2	0.0	31.5	2,130.5	0.0	62.5	276.1	2,815.3	0.0	0.0
120.00		25.4	409.3					0.0	23.6	25.4	432.9	0.0	0.0
<b>Totals:</b>										<b>4,128.35</b>	<b>50,268.3</b>	<b>0.00</b>	<b>0.00</b>

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:16 PM

Customer: T- Mobile

Load Case: 1.2D + 1.0Di + 1.0Wi

50 mph with 0.75 in Radial Ice

17 Iterations

Gust Response Factor : 1.10

Ice Dead Load Factor : 1.00

Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Ice Importance Factor : 1.00

Wind Load Factor : 1.00

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-56.04	-4.79	0.00	-393.05	0.00	393.05	4,864.22	2,432.11	10,853.2	5,360.02	0.00	0.00	0.085
5.00	-54.08	-4.68	0.00	-369.08	0.00	369.08	4,819.19	2,409.59	10,552.3	5,211.40	0.01	-0.02	0.082
10.00	-51.94	-4.56	0.00	-345.70	0.00	345.70	4,772.47	2,386.23	10,251.4	5,062.83	0.04	-0.04	0.079
15.00	-49.82	-4.44	0.00	-322.91	0.00	322.91	4,724.05	2,362.02	9,950.98	4,914.42	0.09	-0.06	0.076
20.00	-47.72	-4.33	0.00	-300.70	0.00	300.70	4,673.94	2,336.97	9,651.00	4,766.27	0.16	-0.08	0.073
25.00	-45.64	-4.21	0.00	-279.08	0.00	279.08	4,622.14	2,311.07	9,351.77	4,618.49	0.25	-0.09	0.070
30.00	-43.59	-4.09	0.00	-258.03	0.00	258.03	4,568.64	2,284.32	9,053.49	4,471.18	0.36	-0.11	0.067
35.00	-41.58	-4.01	0.00	-237.56	0.00	237.56	4,513.45	2,256.72	8,756.37	4,324.44	0.48	-0.13	0.064
37.25	-40.68	-3.95	0.00	-228.55	0.00	228.55	4,488.06	2,244.03	8,623.11	4,258.63	0.54	-0.14	0.063
40.00	-38.94	-3.86	0.00	-217.70	0.00	217.70	4,456.57	2,228.28	8,460.64	4,178.39	0.63	-0.15	0.061
44.00	-36.46	-3.79	0.00	-202.26	0.00	202.26	3,547.86	1,773.93	6,746.79	3,331.99	0.75	-0.16	0.071
45.00	-36.10	-3.72	0.00	-198.46	0.00	198.46	3,540.23	1,770.11	6,702.83	3,310.28	0.79	-0.16	0.070
50.00	-34.34	-3.59	0.00	-179.88	0.00	179.88	3,501.07	1,750.54	6,483.06	3,201.74	0.97	-0.18	0.066
55.00	-32.61	-3.45	0.00	-161.95	0.00	161.95	3,460.22	1,730.11	6,263.48	3,093.30	1.17	-0.20	0.062
60.00	-30.91	-3.32	0.00	-144.67	0.00	144.67	3,417.68	1,708.84	6,044.31	2,985.06	1.39	-0.22	0.058
65.00	-29.24	-3.18	0.00	-128.07	0.00	128.07	3,373.45	1,686.72	5,825.75	2,877.12	1.62	-0.23	0.053
70.00	-27.61	-3.05	0.00	-112.15	0.00	112.15	3,327.52	1,663.76	5,608.02	2,769.59	1.87	-0.25	0.049
75.00	-26.00	-2.96	0.00	-96.91	0.00	96.91	3,279.90	1,639.95	5,391.33	2,662.57	2.14	-0.26	0.044
76.08	-25.66	-2.89	0.00	-93.70	0.00	93.70	3,269.36	1,634.68	5,344.54	2,639.46	2.20	-0.26	0.043
80.00	-23.78	-2.81	0.00	-82.37	0.00	82.37	3,230.58	1,615.29	5,175.88	2,556.17	2.42	-0.27	0.040
82.00	-22.83	-2.74	0.00	-76.76	0.00	76.76	2,487.60	1,243.80	4,021.63	1,986.13	2.53	-0.28	0.048
85.00	-21.99	-2.63	0.00	-68.55	0.00	68.55	2,469.09	1,234.55	3,930.08	1,940.92	2.71	-0.29	0.044
90.00	-20.62	-2.49	0.00	-55.43	0.00	55.43	2,436.89	1,218.44	3,777.45	1,865.54	3.02	-0.30	0.038
95.00	-19.27	-2.35	0.00	-43.00	0.00	43.00	2,402.99	1,201.50	3,624.95	1,790.23	3.34	-0.31	0.032
100.00	-17.96	-2.21	0.00	-31.26	0.00	31.26	2,367.40	1,183.70	3,472.79	1,715.08	3.66	-0.32	0.026
105.00	-16.67	-2.11	0.00	-20.22	0.00	20.22	2,330.12	1,165.06	3,321.17	1,640.20	4.00	-0.32	0.019
107.00	-10.89	-1.30	0.00	-16.01	0.00	16.01	2,314.73	1,157.36	3,260.72	1,610.35	4.13	-0.32	0.015
110.00	-10.18	-1.19	0.00	-12.12	0.00	12.12	2,291.14	1,145.57	3,170.31	1,565.70	4.34	-0.33	0.012
115.00	-9.01	-1.08	0.00	-6.18	0.00	6.18	2,250.47	1,125.24	3,020.42	1,491.67	4.68	-0.33	0.008
118.00	-6.20	-0.79	0.00	-2.92	0.00	2.92	2,225.26	1,112.63	2,931.04	1,447.53	4.89	-0.33	0.005
120.00	0.00	-0.75	0.00	-1.35	0.00	1.35	2,208.11	1,104.05	2,871.71	1,418.23	5.03	-0.33	0.001

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:16 PM

Customer: T- Mobile

**Load Case:** 1.0D + 1.0W

Serviceability 60 mph

17 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 1.00

Wind Load Factor : 1.00

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		78.5	0.0					0.0	0.0	78.5	0.0	0.0	0.0
5.00		155.6	1,287.6					0.0	0.0	155.6	1,287.6	0.0	0.0
10.00		152.7	1,263.6					0.0	141.1	152.7	1,404.6	0.0	0.0
15.00		149.8	1,239.5					0.0	141.1	149.8	1,380.6	0.0	0.0
20.00		146.9	1,215.5					0.0	141.1	146.9	1,356.5	0.0	0.0
25.00		144.0	1,191.4					0.0	141.1	144.0	1,332.5	0.0	0.0
30.00		142.7	1,167.4					0.0	141.1	142.7	1,308.5	0.0	0.0
35.00		104.1	1,143.4					0.0	141.1	104.1	1,284.4	0.0	0.0
37.25	Bot - Section 2	73.5	506.7					0.0	63.5	73.5	570.1	0.0	0.0
40.00		100.9	1,145.4					0.0	77.6	100.9	1,223.0	0.0	0.0
44.00	Top - Section 1	75.1	1,642.0					0.0	112.8	75.1	1,754.9	0.0	0.0
45.00		91.0	188.9					0.0	28.2	91.0	217.1	0.0	0.0
50.00		152.3	932.2					0.0	141.1	152.3	1,073.3	0.0	0.0
55.00		153.1	911.7					0.0	141.1	153.1	1,052.7	0.0	0.0
60.00		153.4	891.1					0.0	141.1	153.4	1,032.2	0.0	0.0
65.00		153.3	870.6					0.0	141.1	153.3	1,011.7	0.0	0.0
70.00		152.9	850.1					0.0	141.1	152.9	991.1	0.0	0.0
75.00		92.8	829.5					0.0	141.1	92.8	970.6	0.0	0.0
76.08	Bot - Section 3	76.8	177.0					0.0	30.6	76.8	207.6	0.0	0.0
80.00		91.0	1,167.8					0.0	110.5	91.0	1,278.3	0.0	0.0
82.00	Top - Section 2	76.5	587.4					0.0	56.4	76.5	643.8	0.0	0.0
85.00		121.7	399.2					0.0	84.6	121.7	483.9	0.0	0.0
90.00		150.9	651.7					0.0	141.1	150.9	792.7	0.0	0.0
95.00		149.2	634.6					0.0	141.1	149.2	775.6	0.0	0.0
100.00		147.3	617.5					0.0	141.1	147.3	758.5	0.0	0.0
105.00		102.1	600.3					0.0	141.1	102.1	741.4	0.0	0.0
107.00	Appertunance(s)	72.0	235.3	765.3	0.0	0.0	2,358.0	0.0	56.4	837.3	2,649.8	0.0	0.0
110.00		114.0	347.9					0.0	52.1	114.0	400.0	0.0	0.0
115.00		112.8	566.1					0.0	86.9	112.8	653.0	0.0	0.0
118.00	Appertunance(s)	69.6	331.4	225.8	0.0	35.2	728.6	0.0	52.1	295.4	1,112.2	0.0	0.0
120.00		27.7	217.5					0.0	19.7	27.7	237.2	0.0	0.0
<b>Totals:</b>										4,575.14	29,985.3	0.00	0.00

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:16 PM

Customer: T- Mobile

**Load Case:** 1.0D + 1.0W

Serviceability 60 mph

17 Iterations

Gust Response Factor : 1.10

Wind Importance Factor : 1.00

Dead Load Factor : 1.00

Wind Load Factor : 1.00

**Calculated Forces**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-32.59	-5.26	0.00	-421.06	0.00	421.06	4,864.22	2,432.11	10,853.2	5,360.02	0.00	0.00	0.085
5.00	-31.30	-5.12	0.00	-394.74	0.00	394.74	4,819.19	2,409.59	10,552.3	5,211.40	0.01	-0.02	0.082
10.00	-29.89	-4.98	0.00	-369.14	0.00	369.14	4,772.47	2,386.23	10,251.4	5,062.83	0.04	-0.04	0.079
15.00	-28.51	-4.84	0.00	-344.25	0.00	344.25	4,724.05	2,362.02	9,950.98	4,914.42	0.10	-0.06	0.076
20.00	-27.15	-4.70	0.00	-320.08	0.00	320.08	4,673.94	2,336.97	9,651.00	4,766.27	0.17	-0.08	0.073
25.00	-25.82	-4.56	0.00	-296.59	0.00	296.59	4,622.14	2,311.07	9,351.77	4,618.49	0.27	-0.10	0.070
30.00	-24.51	-4.42	0.00	-273.80	0.00	273.80	4,568.64	2,284.32	9,053.49	4,471.18	0.38	-0.12	0.067
35.00	-23.22	-4.32	0.00	-251.69	0.00	251.69	4,513.45	2,256.72	8,756.37	4,324.44	0.51	-0.14	0.063
37.25	-22.65	-4.25	0.00	-241.96	0.00	241.96	4,488.06	2,244.03	8,623.11	4,258.63	0.58	-0.15	0.062
40.00	-21.43	-4.15	0.00	-230.28	0.00	230.28	4,456.57	2,228.28	8,460.64	4,178.39	0.67	-0.16	0.060
44.00	-19.67	-4.07	0.00	-213.68	0.00	213.68	3,547.86	1,773.93	6,746.79	3,331.99	0.80	-0.17	0.070
45.00	-19.46	-3.98	0.00	-209.61	0.00	209.61	3,540.23	1,770.11	6,702.83	3,310.28	0.84	-0.17	0.069
50.00	-18.38	-3.84	0.00	-189.68	0.00	189.68	3,501.07	1,750.54	6,483.06	3,201.74	1.03	-0.19	0.064
55.00	-17.33	-3.68	0.00	-170.51	0.00	170.51	3,460.22	1,730.11	6,263.48	3,093.30	1.25	-0.21	0.060
60.00	-16.30	-3.53	0.00	-152.09	0.00	152.09	3,417.68	1,708.84	6,044.31	2,985.06	1.48	-0.23	0.056
65.00	-15.28	-3.38	0.00	-134.43	0.00	134.43	3,373.45	1,686.72	5,825.75	2,877.12	1.72	-0.25	0.051
70.00	-14.29	-3.22	0.00	-117.54	0.00	117.54	3,327.52	1,663.76	5,608.02	2,769.59	1.99	-0.26	0.047
75.00	-13.32	-3.13	0.00	-101.42	0.00	101.42	3,279.90	1,639.95	5,391.33	2,662.57	2.27	-0.28	0.042
76.08	-13.11	-3.05	0.00	-98.03	0.00	98.03	3,269.36	1,634.68	5,344.54	2,639.46	2.34	-0.28	0.041
80.00	-11.84	-2.96	0.00	-86.07	0.00	86.07	3,230.58	1,615.29	5,175.88	2,556.17	2.57	-0.29	0.037
82.00	-11.19	-2.88	0.00	-80.15	0.00	80.15	2,487.60	1,243.80	4,021.63	1,986.13	2.69	-0.30	0.045
85.00	-10.71	-2.76	0.00	-71.52	0.00	71.52	2,469.09	1,234.55	3,930.08	1,940.92	2.88	-0.30	0.041
90.00	-9.92	-2.60	0.00	-57.73	0.00	57.73	2,436.89	1,218.44	3,777.45	1,865.54	3.20	-0.32	0.035
95.00	-9.14	-2.45	0.00	-44.71	0.00	44.71	2,402.99	1,201.50	3,624.95	1,790.23	3.54	-0.33	0.029
100.00	-8.38	-2.30	0.00	-32.46	0.00	32.46	2,367.40	1,183.70	3,472.79	1,715.08	3.89	-0.33	0.022
105.00	-7.64	-2.20	0.00	-20.95	0.00	20.95	2,330.12	1,165.06	3,321.17	1,640.20	4.24	-0.34	0.016
107.00	-5.00	-1.34	0.00	-16.56	0.00	16.56	2,314.73	1,157.36	3,260.72	1,610.35	4.38	-0.34	0.012
110.00	-4.60	-1.23	0.00	-12.53	0.00	12.53	2,291.14	1,145.57	3,170.31	1,565.70	4.60	-0.35	0.010
115.00	-3.95	-1.11	0.00	-6.40	0.00	6.40	2,250.47	1,125.24	3,020.42	1,491.67	4.96	-0.35	0.006
118.00	-2.83	-0.81	0.00	-3.03	0.00	3.03	2,225.26	1,112.63	2,931.04	1,447.53	5.18	-0.35	0.003
120.00	0.00	-0.79	0.00	-1.42	0.00	1.42	2,208.11	1,104.05	2,871.71	1,418.23	5.33	-0.35	0.001

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:16 PM

Customer: T- Mobile

**Analysis Summary**

Load Case	Reactions						Max Usage	
	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.6W	28.32	0.00	39.08	0.00	0.00	2270.72	0.00	0.43
0.9D + 1.6W	28.31	0.00	29.30	0.00	0.00	2261.08	0.00	0.43
1.2D + 1.0Di + 1.0Wi	4.79	0.00	56.04	0.00	0.00	393.05	0.00	0.08
1.0D + 1.0W	5.26	0.00	32.59	0.00	0.00	421.06	0.00	0.09

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 64072721

10/22/2015 2:16:16 PM

Customer: T- Mobile

**Base Summary**

**Reactions**

Original Design			Analysis			
Moment (kip-ft)	Axial (kip)	Shear (kip)	Moment (kip-ft)	Axial (kip)	Shear (kip)	Moment Design %
4,149.00	39.20	37.10	2,270.72	56.04	28.32	40.54

**Base Plate**

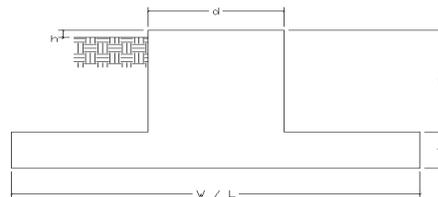
Yield (ksi)	Thick (in)	Width (in)	Style	Poly Sides	Clip Len (in)	Effective Len (in)	Mu (kip-in)	Phi Mn (kip-in)	Ratio
60.0	2.750	68.920	Polygon	12	0.00	8.762	376.44	894.54	0.42

**Anchor Bolts**

Bolt Circle	Num Bolts	Bolt Type	Bolt Dia (in)	Yield (ksi)	Ultimate (ksi)	Arrange	Cluster Dist (in)	Start Angle (deg)	Compression			Tension		
									Force (kip)	Allow (kip)	Ratio	Force (kip)	Allow (kip)	Ratio
62.92	20	2.25" 18J	2.25	75.00	100.00	Radial	0.00	0.0	89.42	260.00	0.35	83.81	260.00	0.33

Site Name: Northhaven I  
 Site Number: 370629  
 Engineering Number: 64072721  
 Engineer: L. Paulson  
 Date: 10/22/15  
 Tower Type: MP

Program Last Updated: 11/15/2012



**Design Loads (Factored) - Analysis per TIA-222-G Standards**

Design / Analysis / Mapping:

	Analysis
Compression/Leg:	56.0 k
Uplift/Leg:	0.0 k
Total Shear:	28.3 k
Moment:	2270.7 k-ft
Tower + Appurtenance Weight:	32.6 k
Depth to Base of Foundation (l + t - h):	4.50 ft
Diameter of Pier (d):	5.74 ft
Height of Pier above Ground (h):	0.00
Width of Pad (W):	35.00 ft
Length of Pad (L):	35.00 ft
Thickness of Pad (t):	5.00 ft
Tower Leg Center to Center:	0.00 ft
Number of Tower Legs:	1.0 (1 if MP or GT)
Tower Center from Mat Center:	0.00 ft
Depth Below Ground Surface to Water Table:	100.00 ft
Unit Weight of Concrete:	150.0 pcf
Unit Weight of Soil Above Water Table:	100.0 pcf
Unit Weight of Water:	62.4 pcf
Unit Weight of Soil Below Water Table:	50.0 pcf
Friction Angle of Uplift:	0.0 Degrees
Ultimate Coefficient of Shear Friction:	0.35
Ultimate Compressive Bearing Pressure:	10300.0 psf
Ultimate Passive Pressure on Pad Face:	0.0 psf
$\phi_{\text{Soil and Concrete Weight}}$ :	0.9
$\phi_{\text{Soil}}$ :	0.75

Concrete Strength ( $f'_c$ ):	4000 psi
Pad Tension Steel Depth:	56.00 in
$\phi_{\text{Shear}}$ :	0.75
$\phi_{\text{Flexure / Tension}}$ :	0.90
$\phi_{\text{Compression}}$ :	0.65
$\beta$ :	0.85
Bottom Pad Rebar Size #:	10
# of Bottom Pad Rebar:	70
Pad Bottom Steel Area:	88.90 in <sup>2</sup>
Pad Steel $F_y$ :	60000 psi
Top Pad Rebar Size #:	8
# of Top Pad Rebar:	48
Pad Top Steel Area:	37.92 in <sup>2</sup>

**Overturning Moment Usage**

Design OTM:	2398.1 k-ft
OTM Resistance:	14898.2 k-ft
Design OTM / OTM Resistance:	0.16 Result: OK

**Soil Bearing Pressure Usage**

Net Bearing Pressure:	880 psf
Factored Nominal Bearing Pressure:	7725 psf
Net Bearing Pressure/Factored Nominal Bearing Pressure:	0.11 Result: OK
Load Direction Controlling Design Bearing Pressure:	Diagonal to Pad Edge

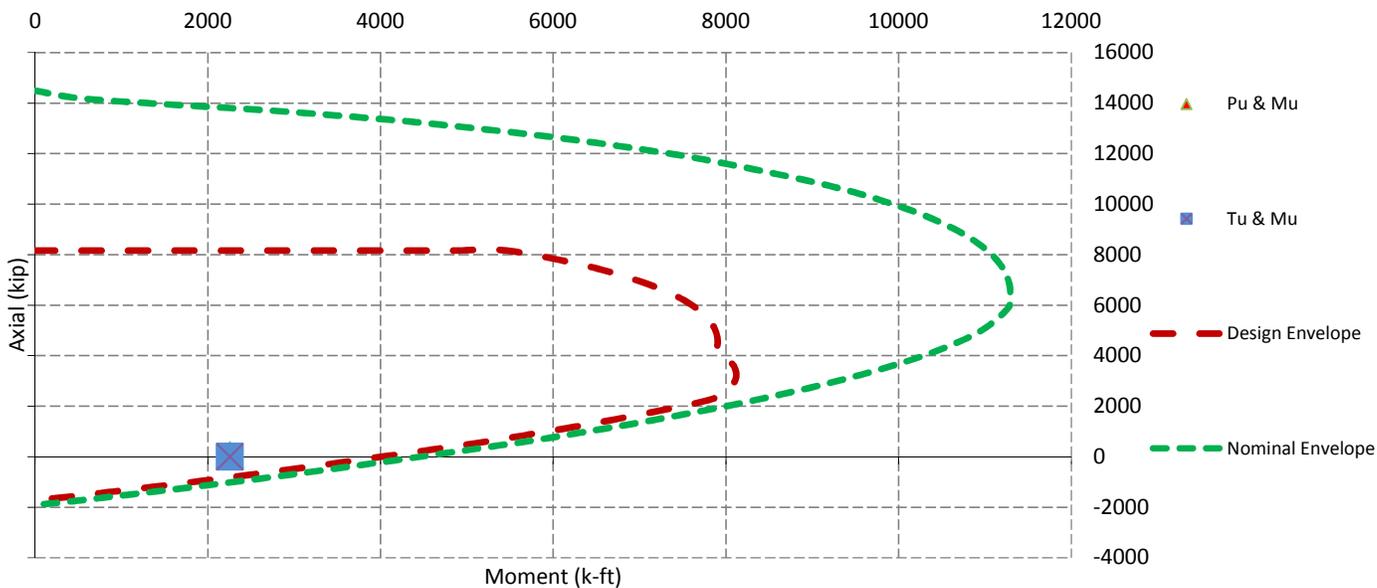
**Sliding Factor of Safety**

Total Factored Sliding Resistance:	248.3 k
Sliding Design / Sliding Resistance:	0.11 Result: OK

### One Way Shear, Flexural Capacity, and Punching Shear

Factored One Way Shear ( $V_u$ ):	235.0 k
One Way Shear Capacity ( $\phi V_c$ ):	2231.3 k - ACI11.3.1.1
$V_u / \phi V_c$ :	0.11 Result: OK
Load Direction Controlling Shear Capacity:	Parallel to Pad Edge
Lower Steel Pad Factored Moment ( $M_u$ ):	2532.0 k-ft
Lower Steel Pad Moment Capacity ( $\phi M_n$ ):	21767.7 k-ft - ACI10.3
$M_u / \phi M_n$ :	0.12 Result: OK
Load Direction Controlling Flexural Capacity:	Parallel to Pad Edge
Upper Steel Pad Factored Moment ( $M_u$ ):	768.3 k-ft
Upper Steel Pad Moment Capacity ( $\phi M_n$ ):	9440.3 k-ft
$M_u / \phi M_n$ :	0.08 Result: OK
Lower Pad Flexural Reinforcement Ratio:	0.0038 OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Upper Pad Flexural Reinforcement Ratio:	0.0016 OK - Minimum Reinforcement Ratio Met - ACI10.5.1
Lower Pad Reinforcement Spacing:	6 in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Upper Pad Reinforcement Spacing:	9 in - Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4
Factored Punching Shear ( $V_u$ ):	6.7 k
Nominal Punching Shear Capacity ( $\phi_c V_n$ ):	4169.7 k - ACI11.12.2.1
$V_u / \phi V_c$ :	0.00 Result: OK

Nominal and Design Moment Capacity and Factored Design Loads







CT-5040  
ZA



# TOWN OF NORTH HAVEN

MEMORIAL TOWN HALL / 18 CHURCH STREET

NORTH HAVEN, CONNECTICUT 06473



REPLY TO:

PLANNING & ZONING COMMISSION

Tel. (203) 239-5321  
Fax (203) 234-2130

August 12, 1998

RECEIVED AND FILED  
TOWN CLERKS OFFICE  
NORTH HAVEN, CONN.

AUG 17 1998 e 455 P M.

*Elinor C. Pedelina*

TOWN CLERK

Mr. Vincent A. Longobardi  
110 Washington Avenue  
North Haven, CT 06473

Re: #P98-46 Special Permit application of Vincent A. Longobardi, relative to 129T Washington Avenue (Rear), Ferro Lane. Plan Entitled: Proposed Monopole Tower With Service Building, North Haven, Connecticut, Prepared By Vincent C. Amore, Registered Architect, Dated June 10, 1996, Revised June 30, 1998. Scale 1" = 30'. IL-20/IL-30 Zoning Districts.

Dear Mr. Longobardi:

Please be advised that during the deliberation session of the Planning & Zoning Commission meeting held on Monday, August 3, 1998, the Commission unanimously voted to approve the above referenced application subject to the following conditions:

1. Submit three (3) revised plans which include:
  - a.) The title block must reference the nature of the application, i.e., "#P98-46, Special Permit, Section 3.0 - Required Lot Frontage".
  - b.) Address/include all conditions of the related site plan approval #P98-47.

In accordance with the Connecticut State Statutes, Section 8-3d, the Special Permit is not effective until a certified copy of the Commission's decision has been recorded on the Land Records, at the owner's expense. Accordingly, you must record this certified decision letter at the Town Clerk's Office, 18 Church Street, North Haven, CT. Immediately after filing with the Town Clerk, please submit a copy of the decision letter, stamped as recorded, to the Land Use Office, for our permanent record.

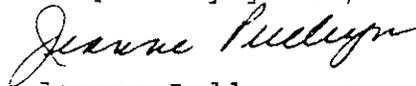
#P98-46  
Page 2

Please note that one (1) set of revised drawings should be submitted for review after all outstanding issues (conditions of approval as set forth above), are adequately addressed. If there are any questions relative to the conditions of approval, please call the Town prior to submitting the revised plans. This will avoid costly and time consuming revisions and reviews, therefore expediting the process for you as the applicant.

This approval is subject to compliance with any and all Zoning Regulations of the Town of North Haven.

You may not proceed with this approval until you have received a signed plan from the Land Use Office.

Very truly yours,



Jeanne Pulleyn, Secretary  
Planning & Zoning Commission

JP/ts  
cc: First Selectman  
Engineering Dept.  
Building Dept.  
CERTIFIED MAIL R/R