

JULIE D. KOHLER

PLEASE REPLY TO: Bridgeport
WRITER'S DIRECT DIAL: (203) 337-4157
E-Mail Address: jkohler@cohenandwolf.com

March 17, 2014

Attorney Melanie Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

**Re: Notice of Exempt Modification
Eastern Connecticut State University/T-Mobile co-location
Site ID CT11506A
83 Windham Street, Willimantic (Windham)**

Dear Attorney Bachman:

This office represents T-Mobile Northeast LLC ("T-Mobile") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Eastern Connecticut State University owns the existing monopole telecommunications tower and related facility located at 83 Windham Street, Willimantic (Windham), Connecticut (Latitude: 41.72049834 Longitude: -72.218338). T-Mobile intends to replace three antennas and related equipment at this existing telecommunications facility in Willimantic ("Willimantic Facility"). Please accept this letter as notification, pursuant to R.C.S.A. § 16-50j-73, of construction which 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 also being sent to the Mayor, Earnest Eldridge, and the property owner, which is also Eastern Connecticut State University.

The existing Willimantic Facility consists of a 175 foot tall monopole tower.¹ T-Mobile plans to replace three antennas and three TMAs with six antennas and three TMAs at a centerline of 117 feet as well as install an equipment cabinet on the existing concrete pad. (See the plans revised to March 4, 2014 attached hereto as Exhibit A). T-Mobile will also install fiber and coax cable and reuse existing coax cable. The existing Willimantic Facility is structurally capable of supporting T-Mobile's proposed modifications, as indicated in the structural analysis dated March 4, 2014 attached hereto as Exhibit B.

¹ While the online docket for the Connecticut Siting Council does not provide a docket or petition number for the approval of this structure, it does reference this structure in connection with a notice of intent captioned EM-T-MOBILE-163-110526.


March 17, 2014
Site ID CT11506A
Page 2

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

1. The proposed modification will not increase the height of the tower. T-Mobile's replacement antennas will be installed at a centerline of 117 feet merely replacing existing antennas located at the same 117 foot elevation. The enclosed tower drawing confirms that the proposed modification will not increase the height of the tower.
2. The proposed modifications will not require an extension of the site boundaries. T-Mobile's equipment will be located entirely within the existing compound and leased area as shown on Page 1 of Exhibit A.
3. The proposed modification to the Willimantic Facility will not increase the noise levels at the existing facility by six decibels or more.
4. The operation of the replacement antennas will not increase the total radio frequency (RF) power density, measured at the base of the tower, to a level at or above the applicable standard. According to a Radio Frequency Emissions Analysis Report prepared by EBI dated March 13, 2014, T-Mobile's operations would add .902% of the FCC Standard. Therefore, the calculated "worst case" power density for the planned combined operation at the site including all of the proposed antennas would be 83.482% of the FCC Standard as calculated for a mixed frequency site as evidenced by the engineering exhibit attached hereto as Exhibit C.

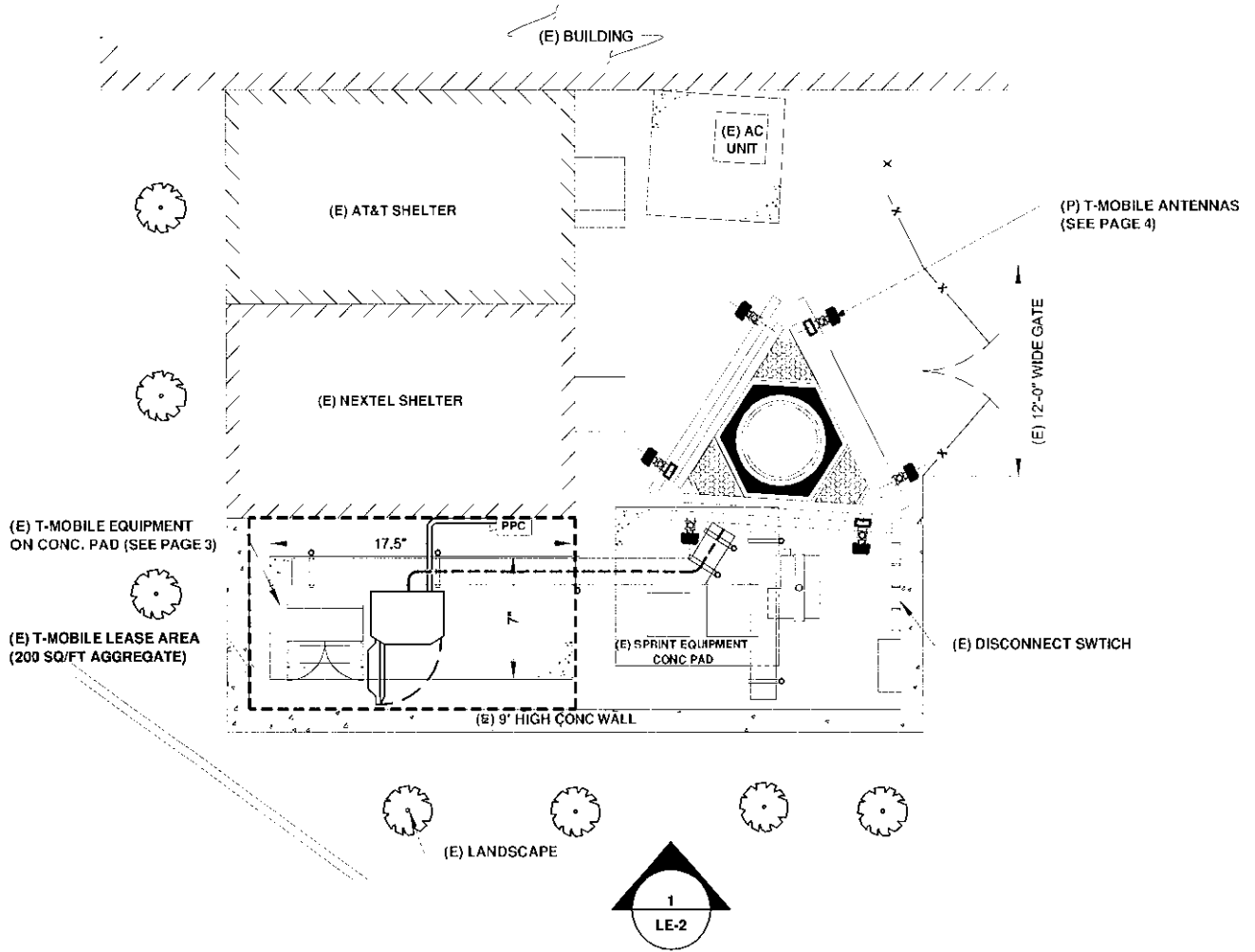
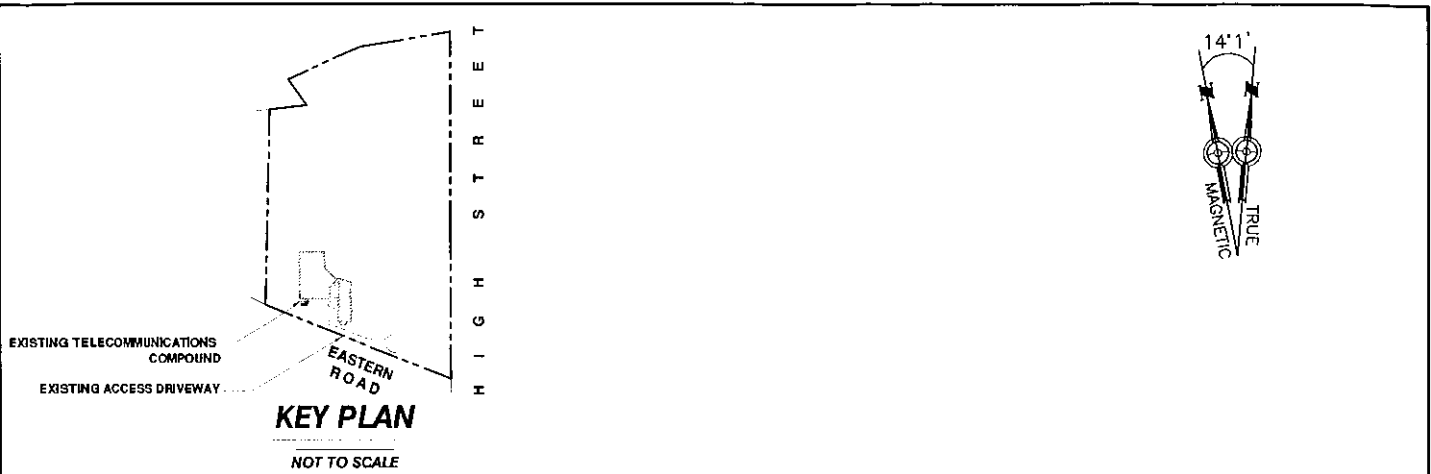
For the foregoing reasons, T-Mobile respectfully submits that the proposed replacement antennas and equipment at the Willimantic Facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Upon acknowledgement by the Council of this proposed exempt modification, T-Mobile shall commence construction approximately sixty days from the date of the Council's notice of acknowledgement.

Sincerely,


Julie D. Kohler, Esq.

cc: Town of Windham (Willimantic), Mayor Earnest Eldridge
Eastern Connecticut State University
Northeast Site Solutions, Sheldon J. Freinle

EXHIBIT A



ALL EQUIPMENT LOCATIONS ARE APPROXIMATE AND ARE SUBJECT TO APPROVAL BY LESSEE/LICENSEE'S STRUCTURAL & RF ENGINEERS. LOCATIONS OF POWER & TELEPHONE FACILITIES ARE SUBJECT TO APPROVAL BY UTILITY COMPANIES.

COMPOUND LAYOUT PLAN

SCALE: 1:10

1
LE-1

CONFIGURATION

2C

SUBMITTALS	
LE REV A	02.11.14
LE REV 0	03.04.14

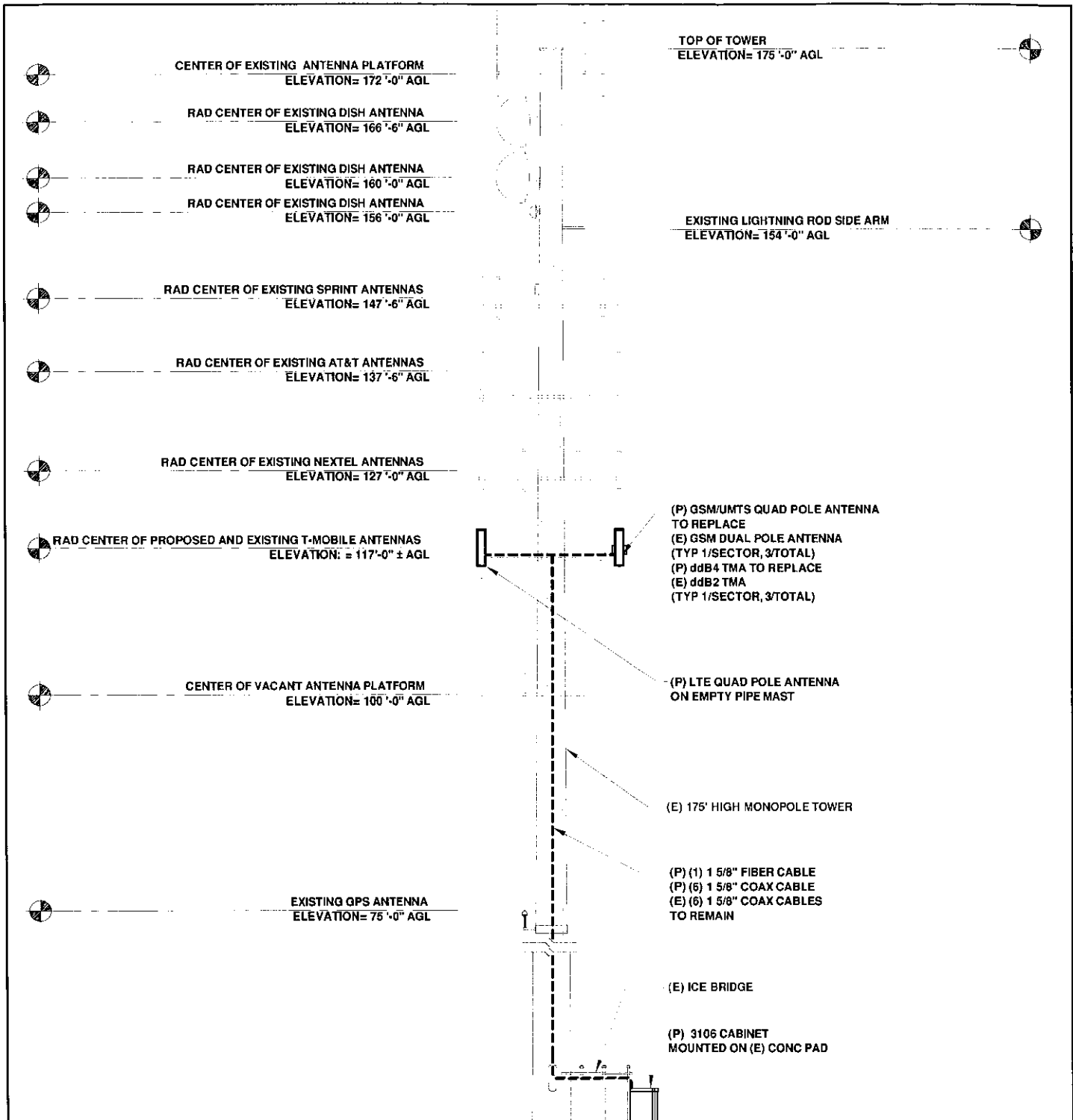
ATLANTIS GROUP
1340 Centre Street
Suite 212
Newton, MA 02459
Office: 617-965-0789
Fax: 617-213-5056

LEASE EXHIBIT
SITE NUMBER:
CT11506A
SITE NAME:
CT506/WILLIMANTIC ECSU
SITE ADDRESS:
83 WINDHAM STREET,
WILLIMANTIC, CT, 06226

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237
FOR
T-MOBILE NORTHEAST, LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 692-7100
FAX: (860) 692-7159

DRAWN BY: MB

CHECKED BY: SM



ELEVATION
SCALE: 1/16"=1'-0"

CONFIGURATION

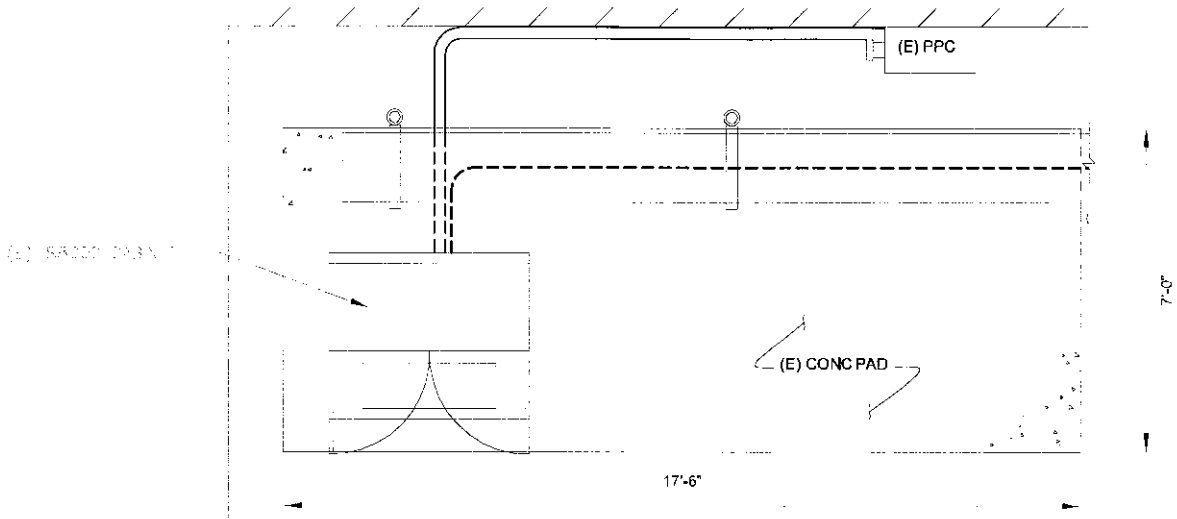
2C

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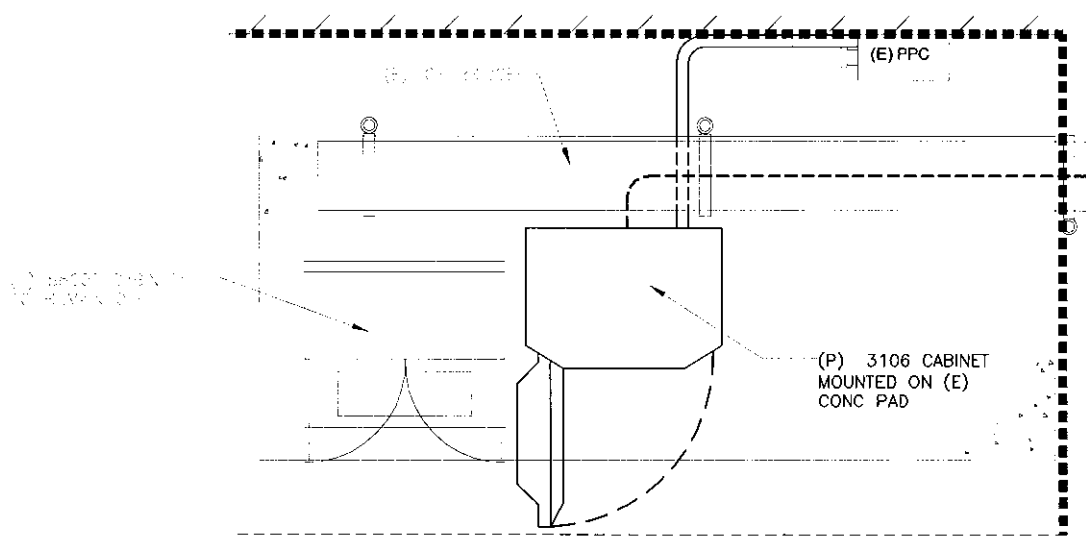
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OFFICE: (860) 692-7100
FAX: (860) 692-7159



EQUIPMENT LAYOUT PLAN (BEFORE)

SCALE: 1/4" = 1'-0"



EQUIPMENT LAYOUT PLAN (AFTER)

SCALE: 1/4" = 1'-0"

CONFIGURATION

2C

SUBMITTALS	
LE REV A	02.11.14
LE REV 0	03.04.14

ATLANTIS GROUP
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 Newton, MA 02459
 Office: 617-965-0789
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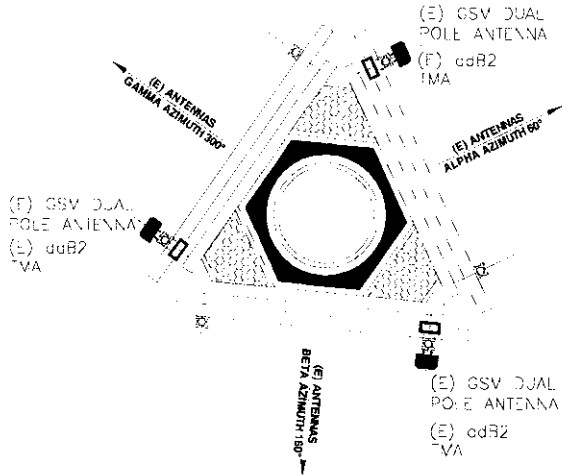
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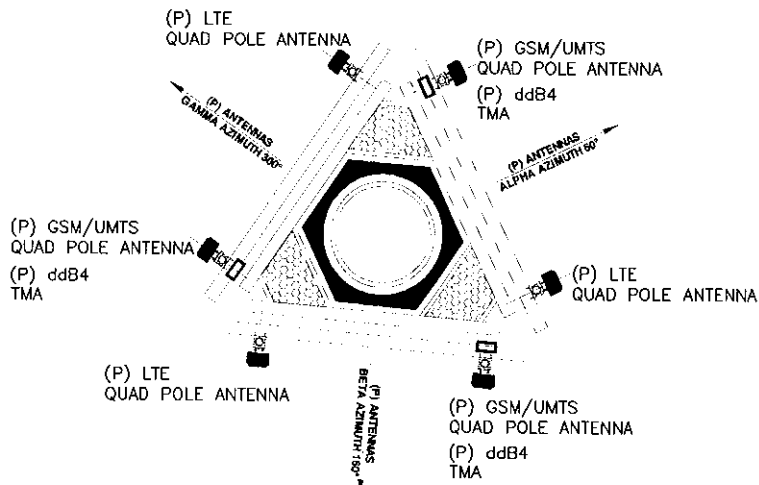
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CHECKED BY: SM

PAGE 3 OF 4



EXISTING ANTENNA CONFIGURATION



PROPOSED ANTENNA CONFIGURATION

CONFIGURATION

2C

SUBMITTALS

LE REV A	02.11.14
LE REV 0	03.04.14

ATLANTIS GROUP
 1340 Centre Street
 Suite 212
 Newton, MA 02459
 Office: 617-965-0789
 Fax: 617-213-5056

LEASE EXHIBIT

SITE NUMBER:
 CT11506A
 SITE NAME:
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 WILLIMANTIC, CT, 06226

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 35 GRIFFIN ROAD SOUTH
 BLOOMFIELD, CT 06002
 OFFICE: (860) 692-7100
 FAX: (860) 692-7159

DRAWN BY: MB

CHECKED BY: SM

EXHIBIT B

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 175' MONOPOLE TOWER AND ITS FOUNDATION FOR PROPOSED ANTENNA ARRANGEMENT

T-Mobile Site I.D.: CT11506A
Site Name: CT506 Willimantic ECSU
Site Address: 83 Windham Street
Willimantic, Connecticut

prepared for



Northeast Site Solutions/T-Mobile
54 Main Street
Sturbridge, MA 01566

prepared by



URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
ROCKY HILL, CT 06067
TEL. 860-529-8882

36928683.00000
NSS-006

March 4, 2014

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- 1. EXECUTIVE SUMMARY**
- 2. INTRODUCTION**
- 3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS**
- 4. FINDINGS AND EVALUATION**
- 5. CONCLUSIONS**
- 6. DRAWINGS AND DATA**
 - **TNX TOWER INPUT / OUTPUT SUMMARY**
 - **TNX TOWER DETAILED OUTPUT**
 - **ANCHOR BOLT AND BASE PLATE ANALYSIS**
 - **FOUNDATION ANALYSIS**

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the 175' monopole located at 83 Windham Street in Willimantic, Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code and the TIA/EIA-222-F standard for a wind velocity of 90 mph (fastest mile) and 78 mph (fastest mile) concurrent with 1/2" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction Section of this report. The proposed T-Mobile antenna modifications are listed below:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
<u>Remove:</u> (3) EMS RR90-17-00DP (3) Existing TMA's	T-Mobile (Existing)	@ 117'-0"
<u>Install:</u> (3) Ericsson AIR21 B2A B4P Panel Antennas (3) Ericsson AIR21 B4A B2P Panel Antennas (3) Ericsson KRY 112 71 Twin TMA units (6) 1 5/8" Coaxial Cables (1) 1 5/8" Fiber Optic Cable	T-Mobile (Proposed)	@ 117'-0"

The results of the analysis indicate that the existing tower structure is in compliance with the proposed loading conditions. **The tower superstructure and foundation are considered structurally adequate to support the existing and proposed antenna loadings. See Sections 4 and 6 of this report for additional information.**

1. **EXECUTIVE SUMMARY** *(continued)*

This analysis is based on:

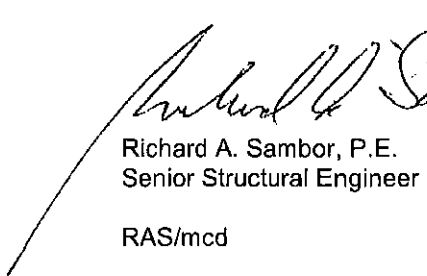
- 1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
- 2) Original tower construction drawings performed by Engineering Endeavors Incorporated on behalf of Sprint, dated June, 6, 2003.
- 3) Foundation calculations, performed by Engineering Endeavors Incorporated on behalf of Sprint, dated July 9, 2003.
- 4) Geotechnical information provided by Dr. Clarence Welti, document signed and dated, January 22, 2002.
- 5) Structural Analysis Summary Report performed by Tectonic on behalf of Sprint dated November 20, 2012.
- 6) Radio Frequency Data Sheet designed by T-Mobile, dated January, 10, 2014.
- 7) Antenna and mount configuration as specified on the following page of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

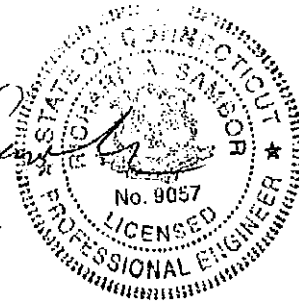
If you should have any questions, please call.

Sincerely,

URS Corporation AES


Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/mcd



2. INTRODUCTION

The subject tower is located at 83 Windham Street in Willimantic, Connecticut. The structure is a 176' monopole manufactured by Engineered Endeavors Incorporated.

The tower geometry and structure member sizes were taken from the original construction drawings (drawing no. GS53982) prepared by Engineered Endeavors Incorporated, dated June, 6, 2003.

The inventory is summarized in the table below:

Antenna Type	Carrier	Mount	Centerline Elevation	Cable
(1) RFS BA6312 Omni (1) 5' Omni (1) 10' Dipole	Unknown (existing)	Low Profile Platform	173'	(3) 7/8" (within monopole)
(1) Andrew P6-650	Unknown (existing)	Pipe Mount	170'	(1) EW 52
(1) Andrew GP6F-21A	Unknown (existing)	Pipe Mount	163'	(1) 1 5/8" (within monopole)
(1) Scala MF-900B Panel (1) Decibel ASP682 Omni	Unknown (existing)	5' Stand-off Arm	158'	(2) 7/8" (within monopole)
(3) RFS APXVSP18-C- A20 Panels (3) 1900MHz RRH units (3) 800 MHz RRH Units	Sprint (existing)	Low Profile Platform	147'	(12) 1 5/8" (within monopole) (3) 1 1/4" Hybriflex Fiber optic cables
(6) Powerwave 7770 Panel Antennas (6) TMA units (6) Diplexers	AT&T (existing)	Low Profile Platform	137'	(12) 1 5/8" (within monopole)
(12) Decibel DB844H90 Panels	Nextel (existing)	Low Profile Platform	127'	(12) 1 5/8" (within monopole)
(3) Ericsson AIR21 B2A B4P Panel Antennas (3) Ericsson AIR21 B4A B2P Panel Antennas (3) Ericsson KRY 112 71 Twin TMA units	T-Mobile (Proposed)	Low Profile Platform	117'	(6) 1 5/8" (within monopole) (6) 1 5/8" (within monopole) (1) 1 5/8" Fiber Optic Cables (within monopole)
(1) 6' Yagi Antenna	Unknown (existing)	Low Profile Platform	100'	(1) 7/8" (within monopole)
(1) GPS	Sprint (existing)	(1) 2' Stand-off Arm	75'	(1) 1/2" (within monopole)

This structural analysis of the communications tower was performed by URS Corporation (URS) for T-Mobile. The purpose of this analysis was to investigate the structural integrity of the existing tower with its existing and proposed antenna loads. This analysis was conducted to evaluate stress on the tower and the effect of forces to the foundation of the tower resulting from existing and proposed antenna arrangements.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F—Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction—Allowable Stress Design (ASD).

The analysis was conducted using TNX Tower 6.0. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load (without ice) + Tower Dead Load
Load Condition 2 = 78 mph (fastest mile Wind Load (with ice) + Ice Load + Tower Dead Load

Please note that wind pressure is a function of velocity squared. Under Load Condition 2, a 25 percent reduction in wind pressure is allowed by code to account for the unlikelihood of the full wind pressure and ice load occurring at the same time. The same results may be achieved by utilizing a lower wind pressure without taking the 25 percent reduction, as shown above.

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

Combined axial and bending stresses on the monopole structure were evaluated to compare with allowable stresses in accordance with AISC. The calculated stresses for the tower superstructure, foundation, anchor bolts and base plate under the proposed loading were below the allowable stresses. Detailed analysis and calculations for the proposed load condition are provided in section 6 of this report.

Component / Section No.	Existing Component Size	Controlling Elevation	Stress (% Capacity)	Pass/Fail
L3	TP51.41x40.552x0.3125	42.03' – 85.09'	76.4 %	Pass
Anchor Bolt	2.25" dia	Compression & Bending	64.0 %	Pass
Base Plate	78" dia x 2" thick (A572 Gr. 60)	Flexure	98.0 %	Pass
Cassion Foundation	8' Dia x 27'	Factor of Safety against Overturning Moment	85.0 %	Pass

5. CONCLUSIONS

The results of the analysis indicate that the existing tower structure is in compliance with the proposed loading conditions. **The tower superstructure and foundation are considered structurally adequate to support the existing and proposed antenna loadings. See Sections 4 and 6 of this report for additional information.**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.
10. All coaxial cable is installed within the monopole unless specified otherwise.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

- A. Adding antennas
- B. Removing/replacing antennas
- C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

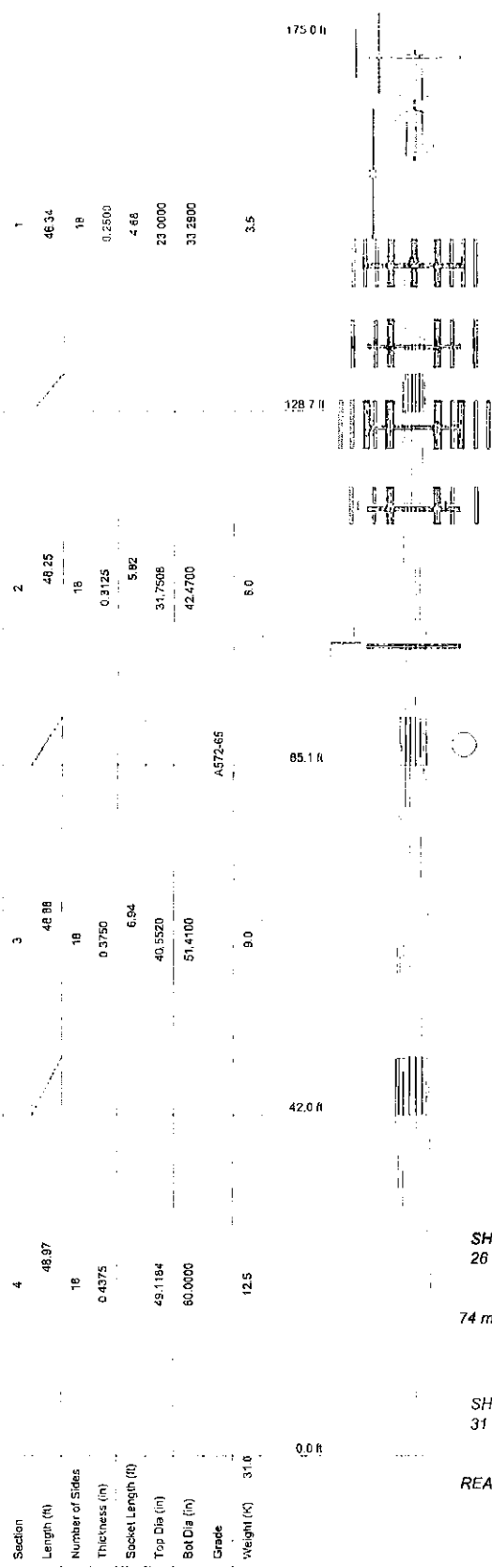
Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading conditions

6. DRAWINGS AND DATA

TNX TOWER INPUT / OUTPUT SUMMARY



DESIGNED APPURTENANCE LOADING

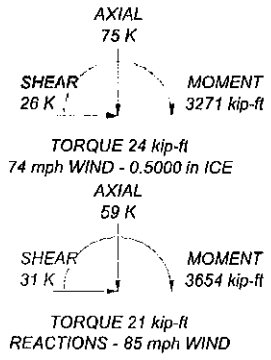
TYPE	ELEVATION	TYPE	ELEVATION
2" Dia 10' Omni	173	7770	137
2" Dia 6' Omni	173	7770	137
BA6312	173	7770	137
13'-3" Platform	173	7770	137
6'8"x4" Pipe Mount	170	7770	137
PL6-65D	170	7770	137
6'8"x4" Pipe Mount	163	TMA	137
GP&F 21A	163	TMA	137
ASFB82 Whip	158	TMA	137
4' Standoff	158	TMA	137
AIF-900B	158	DB844H90	127
DB950F85E-M	147	DB844H90	127
DB950F85E-M	147	DB844H90	127
DB950F85E-M	147	DB844H90	127
DB950F85E-M	147	DB844H90	127
DB950F85E-M	147	DB844H90	127
DB950F85E-M	147	DB844H90	127
DB950F85E-M	147	13'-3" Platform	127
13'-3" Platform	147	DB844H90	127
APXVSP18-C-A20	147	DB844H90	127
APXVSP18-C-A20	147	DB844H90	127
APXVSP18-C-A20	147	DB844H90	127
RRH	147	DB844H90	127
RRH	147	DB844H90	127
RRH	147	AIR B2A/B4P	117
PCS 1900 MHz 4x45W-65MHz	147	AIR B2A/B4P	117
PCS 1900 MHz 4x45W-65MHz	147	AIR B2A/B4P	117
PCS 1900 MHz 4x45W-65MHz	147	AIR B2A/B4P	117
Lightning Rod 58x4'	147	AIR B2A/B4P	117
TMA	137	AIR B2A/B4P	117
TMA	137	Twin TMAs	117
FD9R600/2C-3L Diplexer	137	Twin TMAs	117
FD9R600/2C-3L Diplexer	137	Twin TMAs	117
FD9R600/2C-3L Diplexer	137	Twin TMAs	117
FD9R600/2C-3L Diplexer	137	13'-3" Platform	117
FD9R600/2C-3L Diplexer	137	13'-3" Platform	100
FD9R600/2C-3L Diplexer	137	Yagi Antenna	100
FD9R600/2C-3L Diplexer	137	GPS	75
13'-3" Platform	137	4' Standoff	75

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 76.4%



URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991		Job: 175' Monopole Project: ECSU / 165 Windham Street, Willimantic, CT Client: T-Mobile / NSS-006 Code: TIA/EIA-222-F Date: 03/04/14 Scale: NTS File: E:\SERV\175' Monopole - Windham, CT.dwg	
Drawn by: MCD App'd:		Date: 03/04/14 Scale: NTS Dwg No: E-1	

TNX TOWER DETAILED OUTPUT

tnxTower URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Job 175' Monopole	Page 1 of 22
	Project ECSU / 165 Windham Street, Willimanic, CT	Date 09:15:29 03/04/14
	Client T-Mobile / NSS-006	Designed by MCD

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Windham County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 74 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

Weld together tower sections have flange connections..

Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..

Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..

Welds are fabricated with ER-70S-6 electrodes..

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

Options

<ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination 	<ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension Bypass Mast Stability Checks Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing 	<ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque Include Angle Block Shear Check <li style="text-align: center;">Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	175.00-128.66	46.34	4.68	18	23.0000	33.2900	0.2500	1.0000	A572-65 (65 ksi)
L2	128.66-85.09	48.25	5.82	18	31.7508	42.4700	0.3125	1.2500	A572-65 (65 ksi)
L3	85.09-42.03	48.88	6.94	18	40.5520	51.4100	0.3750	1.5000	A572-65

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Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	42.03-0.00	48.97		18	49.1184	60.0000	0.4375	1.7500	(65 ksi) A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	H/Q in ²	w in	w/t
L1	23.3548	18.0521	1180.3983	8.0762	11.6840	101.0269	2362.3498	9.0278	3.6080	14.432
	33.8036	26.2172	3615.8008	11.7292	16.9113	213.8095	7236.3594	13.1111	5.4190	21.676
L2	33.2963	31.1828	3893.7757	11.1606	16.1294	241.4086	7792.6750	15.5944	5.0381	16.122
	43.1252	41.8150	9388.9914	14.9659	21.5748	435.1840	18790.3370	20.9115	6.9247	22.159
L3	42.4904	47.8207	9752.3459	14.2628	20.6004	473.4050	19517.5242	23.9149	6.4772	17.272
	52.2031	60.7444	19988.4905	18.1174	26.1163	765.3651	40003.2823	30.3780	8.3882	22.368
L4	51.4420	67.5995	20239.4039	17.2817	24.9521	811.1291	40505.4394	33.8062	7.8748	18
	60.9256	82.7100	37071.5875	21.1447	30.4800	1216.2594	74191.9547	41.3628	9.7900	22.377

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _J	Adjust Factor A _A	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 175.00-128.66								
L2 128.66-85.09								
L3 85.09-42.03								
L4 42.03-0.00								

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
LDF5-50A (7/8 FOAM)	A	No	Inside Pole	100.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	117.00 - 0.00	12	No Ice 1/2" Ice	0.00 0.82
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	127.00 - 0.00	12	No Ice 1/2" Ice	0.00 0.82
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	137.00 - 0.00	12	No Ice 1/2" Ice	0.00 0.82
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	147.00 - 0.00	12	No Ice 1/2" Ice	0.00 0.82
LDF5-50A (7/8 FOAM)	A	No	Inside Pole	158.00 - 0.00	2	No Ice 1/2" Ice	0.00 0.33
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	163.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.82
EW52	A	No	Inside Pole	170.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.59
LDF5-50A (7/8 FOAM)	A	No	Inside Pole	173.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.33

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A _A		Weight
						ft ² /ft	plf	
Hybriflex Fiber Optic Cable	A	No	Inside Pole	147.00 - 0.00	3	No Ice	0.00	0.37
						1/2" Ice	0.00	0.37
1 5/8" Hybriflex (T-Mobile)	A	No	Inside Pole	117.00 - 0.00	1	No Ice	0.00	0.21
						1/2" Ice	0.00	0.21

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
L1	175.00-128.66	A	0.000	0.000	0.000	0.000	369.43
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	128.66-85.09	A	0.000	0.000	0.000	0.000	1748.46
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L3	85.09-42.03	A	0.000	0.000	0.000	0.000	1869.32
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L4	42.03-0.00	A	0.000	0.000	0.000	0.000	1824.61
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
L1	175.00-128.66	A	0.500	0.000	0.000	0.000	0.000	369.43
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	128.66-85.09	A	0.500	0.000	0.000	0.000	0.000	1748.46
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L3	85.09-42.03	A	0.500	0.000	0.000	0.000	0.000	1869.32
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L4	42.03-0.00	A	0.500	0.000	0.000	0.000	0.000	1824.61
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	175.00-128.66	0.0000	0.0000	0.0000	0.0000
L2	128.66-85.09	0.0000	0.0000	0.0000	0.0000
L3	85.09-42.03	0.0000	0.0000	0.0000	0.0000
L4	42.03-0.00	0.0000	0.0000	0.0000	0.0000

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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight
			Horz	Vert					
			Lateral		°	ft	ft'	ft'	lb
			ft	ft					
			ft						
GPS	A	None			0.0000	75.00	No Ice 1.00	1.00	10.00
							1/2" Ice 1.50	1.50	15.00
4' Standoff	A	None			0.0000	75.00	No Ice 3.42	3.42	111.16
							1/2" Ice 3.67	3.67	147.20
13'-3" Platform	A	None			0.0000	100.00	No Ice 13.92	13.92	3200.00
							1/2" Ice 17.41	17.41	4900.00
Yagi Antenna	A	From Face	6.00		0.0000	100.00	No Ice 2.95	2.95	15.00
			0.00				1/2" Ice 3.38	3.38	31.85
			0.00						
13'-3" Platform	A	None			0.0000	117.00	No Ice 13.92	13.92	3200.00
							1/2" Ice 17.41	17.41	4900.00
DB844H90	A	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			6.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	A	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			3.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	A	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			-3.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	A	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			-6.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	B	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			6.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	B	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			3.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	B	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			-3.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	B	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			-6.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	C	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			6.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	C	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			3.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	C	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			-3.00				1/2" Ice 3.39	4.10	46.30
			0.00						
DB844H90	C	From Face	6.00		0.0000	127.00	No Ice 3.06	3.73	20.00
			-6.00				1/2" Ice 3.39	4.10	46.30
			0.00						
13'-3" Platform	A	None			0.0000	127.00	No Ice 13.92	13.92	3200.00
							1/2" Ice 17.41	17.41	4900.00
7770	A	From Face	6.00		0.0000	137.00	No Ice 5.88	2.93	39.00

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight lb	
			3.00			1/2" Ice	6.31	3.27	71.63
			0.00						
7770	A	From Face	6.00	0.0000	137.00	No Ice	5.88	2.93	39.00
			-3.00			1/2" Ice	6.31	3.27	71.63
			0.00						
7770	B	From Face	6.00	0.0000	137.00	No Ice	5.88	2.93	39.00
			3.00			1/2" Ice	6.31	3.27	71.63
			0.00						
7770	B	From Face	6.00	0.0000	137.00	No Ice	5.88	2.93	39.00
			-3.00			1/2" Ice	6.31	3.27	71.63
			0.00						
7770	C	From Face	6.00	0.0000	137.00	No Ice	5.88	2.93	39.00
			3.00			1/2" Ice	6.31	3.27	71.63
			0.00						
7770	C	From Face	6.00	0.0000	137.00	No Ice	5.88	2.93	39.00
			-3.00			1/2" Ice	6.31	3.27	71.63
			0.00						
TMA	A	From Face	6.00	0.0000	137.00	No Ice	1.06	0.45	20.00
			3.00			1/2" Ice	1.21	0.57	26.53
			0.00						
TMA	A	From Face	6.00	0.0000	137.00	No Ice	1.06	0.45	20.00
			-3.00			1/2" Ice	1.21	0.57	26.53
			0.00						
TMA	B	From Face	6.00	0.0000	137.00	No Ice	1.06	0.45	20.00
			3.00			1/2" Ice	1.21	0.57	26.53
			0.00						
TMA	B	From Face	6.00	0.0000	137.00	No Ice	1.06	0.45	20.00
			-3.00			1/2" Ice	1.21	0.57	26.53
			0.00						
TMA	C	From Face	6.00	0.0000	137.00	No Ice	1.06	0.45	20.00
			3.00			1/2" Ice	1.21	0.57	26.53
			0.00						
TMA	C	From Face	6.00	0.0000	137.00	No Ice	1.06	0.45	20.00
			-3.00			1/2" Ice	1.21	0.57	26.53
			0.00						
FD9R600/2C-3L Diplexer	A	From Face	6.00	0.0000	137.00	No Ice	0.36	0.08	0.00
			3.00			1/2" Ice	0.45	0.13	2.28
			0.00						
FD9R600/2C-3L Diplexer	A	From Face	6.00	0.0000	137.00	No Ice	0.36	0.08	0.00
			-3.00			1/2" Ice	0.45	0.13	2.28
			0.00						
FD9R600/2C-3L Diplexer	B	From Face	6.00	0.0000	137.00	No Ice	0.36	0.08	0.00
			3.00			1/2" Ice	0.45	0.13	2.28
			0.00						
FD9R600/2C-3L Diplexer	B	From Face	6.00	0.0000	137.00	No Ice	0.36	0.08	0.00
			-3.00			1/2" Ice	0.45	0.13	2.28
			0.00						
FD9R600/2C-3L Diplexer	C	From Face	6.00	0.0000	137.00	No Ice	0.36	0.08	0.00
			3.00			1/2" Ice	0.45	0.13	2.28
			0.00						
FD9R600/2C-3L Diplexer	C	From Face	6.00	0.0000	137.00	No Ice	0.36	0.08	0.00
			-3.00			1/2" Ice	0.45	0.13	2.28
			0.00						
13'-3" Platform	A	None		0.0000	137.00	No Ice	13.92	13.92	3200.00
						1/2" Ice	17.41	17.41	4900.00
DB950F85E-M	A	From Face	6.00	0.0000	147.00	No Ice	2.53	4.24	11.50
			3.00			1/2" Ice	2.90	4.62	35.03

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral						ft
			0.00							
DB950F85E-M	A	From Face	6.00		0.0000	147.00	No Ice	2.53	4.24	11.50
			-3.00				1/2" Ice	2.90	4.62	35.03
			0.00							
DB950F85E-M	B	From Face	6.00		0.0000	147.00	No Ice	2.53	4.24	11.50
			3.00				1/2" Ice	2.90	4.62	35.03
			0.00							
DB950F85E-M	B	From Face	6.00		0.0000	147.00	No Ice	2.53	4.24	11.50
			-3.00				1/2" Ice	2.90	4.62	35.03
			0.00							
DB950F85E-M	C	From Face	6.00		0.0000	147.00	No Ice	2.53	4.24	11.50
			3.00				1/2" Ice	2.90	4.62	35.03
			0.00							
DB950F85E-M	C	From Face	6.00		0.0000	147.00	No Ice	2.53	4.24	11.50
			-3.00				1/2" Ice	2.90	4.62	35.03
			0.00							
13'-3" Platform	A	None			0.0000	147.00	No Ice	13.92	13.92	3200.00
							1/2" Ice	17.41	17.41	4900.00
ASP682 Whip	A	From Face	5.00		0.0000	158.00	No Ice	3.25	3.25	10.00
			0.00				1/2" Ice	4.90	4.90	35.05
			0.00							
4' Standoff	A	None			0.0000	158.00	No Ice	3.42	3.42	111.16
							1/2" Ice	3.67	3.67	147.20
6'8"x4" Pipe Mount	A	None			0.0000	163.00	No Ice	2.60	2.60	72.00
							1/2" Ice	3.01	3.01	93.13
6'8"x4" Pipe Mount	A	None			0.0000	170.00	No Ice	2.60	2.60	72.00
							1/2" Ice	3.01	3.01	93.13
2" Dia 10' OMNI	A	From Face	6.00		0.0000	173.00	No Ice	2.00	2.00	25.00
			3.00				1/2" Ice	3.02	3.02	40.50
			0.00							
2" Dia 6' Omni	A	From Face	6.00		0.0000	173.00	No Ice	1.20	1.20	5.00
			-3.00				1/2" Ice	1.80	1.80	14.39
			0.00							
BA6312	A	From Face	6.00		0.0000	173.00	No Ice	0.45	0.45	3.00
			0.00				1/2" Ice	1.09	1.09	7.00
			0.00							
13'-3" Platform	A	None			0.0000	173.00	No Ice	13.92	13.92	3200.00
							1/2" Ice	17.41	17.41	4900.00
APXVSP18-C-A20	A	From Face	6.00		0.0000	147.00	No Ice	8.40	5.28	57.00
			0.00				1/2" Ice	8.95	5.74	107.04
			0.00							
APXVSP18-C-A20	B	From Face	6.00		0.0000	147.00	No Ice	8.40	5.28	57.00
			0.00				1/2" Ice	8.95	5.74	107.04
			0.00							
APXVSP18-C-A20	C	From Face	6.00		0.0000	147.00	No Ice	8.40	5.28	57.00
			0.00				1/2" Ice	8.95	5.74	107.04
			0.00							
RRH	A	From Face	6.00		0.0000	147.00	No Ice	2.25	1.23	50.00
			0.00				1/2" Ice	2.45	1.39	66.85
			0.00							
RRH	B	From Face	6.00		0.0000	147.00	No Ice	2.25	1.23	50.00
			0.00				1/2" Ice	2.45	1.39	66.85
			0.00							
RRH	C	From Face	6.00		0.0000	147.00	No Ice	2.25	1.23	50.00
			0.00				1/2" Ice	2.45	1.39	66.85
			0.00							
PCS 1900 MHz	A	From Leg	6.00		0.0000	147.00	No Ice	2.73	2.61	60.00

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft'	C _A A ₁ Side ft'	Weight lb
4x45W-65MHz			0.00 0.00		1/2" Ice	2.95	2.83	88.16
PCS 1900 MHz 4x45W-65MHz	B	From Leg	6.00 0.00 0.00	0.0000	147.00 No Ice 1/2" Ice	2.73 2.95	2.61 2.83	60.00 88.16
PCS 1900 MHz 4x45W-65MHz	C	From Leg	6.00 0.00 0.00	0.0000	147.00 No Ice 1/2" Ice	2.73 2.95	2.61 2.83	60.00 88.16
Lightning Rod 5/8x4'	C	None		0.0000	147.00 No Ice 1/2" Ice	0.25 0.66	0.25 0.66	31.00 33.82
AIR B2A/B4P	A	From Face	6.00 3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	6.42 6.86	4.22 4.64	83.00 124.00
AIR B2A/B4P	B	From Face	6.00 3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	6.42 6.86	4.22 4.64	83.00 124.00
AIR B2A/B4P	C	From Face	6.00 3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	6.42 6.86	4.22 4.64	83.00 124.00
AIR B2A/B4P	A	From Face	6.00 -3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	6.42 6.86	4.22 4.64	83.00 124.00
AIR B2A/B4P	B	From Face	6.00 -3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	6.42 6.86	4.22 4.64	83.00 124.00
AIR B2A/B4P	C	From Face	6.00 -3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	6.42 6.86	4.22 4.64	83.00 124.00
Twin TMAs	A	From Leg	5.00 3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	0.68 0.80	0.45 0.56	13.20 18.38
Twin TMAs	B	From Leg	5.00 3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	0.68 0.80	0.45 0.56	13.20 18.38
Twin TMAs	C	From Leg	5.00 3.00 0.00	0.0000	117.00 No Ice 1/2" Ice	0.68 0.80	0.45 0.56	13.20 18.38

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb	
MF-900B	A	Grid	From Face	5.00 0.00 0.00	Worst		158.00	1.33	No Ice 1/2" Ice	2.66 1.58	13.00 21.09
PL6-65D	A	Paraboloid w/o Radome	From Leg	5.00 0.00 0.00	Worst		170.00	6.00	No Ice 1/2" Ice	28.27 29.05	143.00 292.13

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	Client	T-Mobile / NSS-006	Designed by	MCD

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight lb
GP6F-21A	A	Grid	From Leg	5.00	Worst		163.00	6.00	No Ice	198.00
				0.00					1/2" Ice	347.13

Tower Pressures - No Ice

$$G_H = 1.690$$

Section Elevation ft	z ft	K _Z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{avg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 175.00-128.66	150.67	1.543	29	108.687	A	0.000	108.687	108.687	100.00	0.000	0.000
					B	0.000	108.687		100.00	0.000	0.000
					C	0.000	108.687		100.00	0.000	0.000
L2 128.66-85.09	106.26	1.397	26	136.629	A	0.000	136.629	136.629	100.00	0.000	0.000
					B	0.000	136.629		100.00	0.000	0.000
					C	0.000	136.629		100.00	0.000	0.000
L3 85.09-42.03	63.35	1.205	22	167.315	A	0.000	167.315	167.315	100.00	0.000	0.000
					B	0.000	167.315		100.00	0.000	0.000
					C	0.000	167.315		100.00	0.000	0.000
L4 42.03-0.00	20.42	1	18	193.794	A	0.000	193.794	193.794	100.00	0.000	0.000
					B	0.000	193.794		100.00	0.000	0.000
					C	0.000	193.794		100.00	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.690$$

Section Elevation ft	z ft	K _Z	q _z psf	l _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{avg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 175.00-128.66	150.67	1.543	21	0.5000	112.548	A	0.000	112.548	112.548	100.00	0.000	0.000
						B	0.000	112.548		100.00	0.000	0.000
						C	0.000	112.548		100.00	0.000	0.000
L2 128.66-85.09	106.26	1.397	19	0.5000	140.260	A	0.000	140.260	140.260	100.00	0.000	0.000
						B	0.000	140.260		100.00	0.000	0.000
						C	0.000	140.260		100.00	0.000	0.000
L3 85.09-42.03	63.35	1.205	17	0.5000	170.903	A	0.000	170.903	170.903	100.00	0.000	0.000
						B	0.000	170.903		100.00	0.000	0.000
						C	0.000	170.903		100.00	0.000	0.000
L4 42.03-0.00	20.42	1	14	0.5000	197.297	A	0.000	197.297	197.297	100.00	0.000	0.000
						B	0.000	197.297		100.00	0.000	0.000
						C	0.000	197.297		100.00	0.000	0.000

Tower Pressure - Service

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$$G_H = 1.690$$

Section Elevation	z	K _z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _s A _s In Face	C _s A _s Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
L1 175.00-128.66	150.67	1.543	10	108.687	A	0.000	108.687	108.687	100.00	0.000	0.000
					B	0.000	108.687	108.687	100.00	0.000	0.000
					C	0.000	108.687	108.687	100.00	0.000	0.000
L2 128.66-85.09	106.26	1.397	9	136.629	A	0.000	136.629	136.629	100.00	0.000	0.000
					B	0.000	136.629	136.629	100.00	0.000	0.000
					C	0.000	136.629	136.629	100.00	0.000	0.000
L3 85.09-42.03	63.35	1.205	8	167.315	A	0.000	167.315	167.315	100.00	0.000	0.000
					B	0.000	167.315	167.315	100.00	0.000	0.000
					C	0.000	167.315	167.315	100.00	0.000	0.000
L4 42.03-0.00	20.42	1	6	193.794	A	0.000	193.794	193.794	100.00	0.000	0.000
					B	0.000	193.794	193.794	100.00	0.000	0.000
					C	0.000	193.794	193.794	100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	3490.32	A		0.65				108.687	3404.24	73.46	C
			B		0.65			108.687				
			C		0.65			108.687				
L2 128.66-85.09	1748.46	5992.56	A		0.65				136.629	3869.78	88.82	C
			B		0.65			136.629				
			C		0.65			136.629				
L3 85.09-42.03	1869.32	9028.74	A		0.65				167.315	4073.82	94.61	C
			B		0.65			167.315				
			C		0.65			167.315				
L4 42.03-0.00	1824.61	12523.39	A		0.65				193.794	3937.48	93.68	C
			B		0.65			193.794				
			C		0.65			193.794				
Sum Weight:	5811.82	31035.00						OTM 15151252. 40 lb-in	15285.33			

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	3490.32	A		0.65				108.687	3404.24	73.46	C
			B		0.65			108.687				
			C		0.65			108.687				
L2 128.66-85.09	1748.46	5992.56	A		0.65				136.629	3869.78	88.82	C
			B		0.65			136.629				
			C		0.65			136.629				
L3 85.09-42.03	1869.32	9028.74	A		0.65				167.315	4073.82	94.61	C
			B		0.65			167.315				
			C		0.65			167.315				
L4 42.03-0.00	1824.61	12523.39	A		0.65				193.794	3937.48	93.68	C

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Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl Face
			B	1	0.65	1	1	1	193.794			
			C	1	0.65	1	1	1	193.794			
Sum Weight:	5811.82	31035.00						OTM	15151252.40 lb-in	15285.33		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl Face
L1 175.00-128.66	369.43	3490.32	A	1	0.65	1	1	1	108.687	3404.24	73.46	C
			B	1	0.65	1	1	1	108.687			
			C	1	0.65	1	1	1	108.687			
L2 128.66-85.09	1748.46	5992.56	A	1	0.65	1	1	1	136.629	3869.78	88.82	C
			B	1	0.65	1	1	1	136.629			
			C	1	0.65	1	1	1	136.629			
L3 85.09-42.03	1869.32	9028.74	A	1	0.65	1	1	1	167.315	4073.82	94.61	C
			B	1	0.65	1	1	1	167.315			
			C	1	0.65	1	1	1	167.315			
L4 42.03-0.00	1824.61	12523.39	A	1	0.65	1	1	1	193.794	3937.48	93.68	C
			B	1	0.65	1	1	1	193.794			
			C	1	0.65	1	1	1	193.794			
Sum Weight:	5811.82	31035.00						OTM	15151252.40 lb-in	15285.33		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	F a c e	e	C _F	R _R	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl Face
L1 175.00-128.66	369.43	3490.32	A	1	0.65	1	1	1	108.687	3404.24	73.46	C
			B	1	0.65	1	1	1	108.687			
			C	1	0.65	1	1	1	108.687			
L2 128.66-85.09	1748.46	5992.56	A	1	0.65	1	1	1	136.629	3869.78	88.82	C
			B	1	0.65	1	1	1	136.629			
			C	1	0.65	1	1	1	136.629			
L3 85.09-42.03	1869.32	9028.74	A	1	0.65	1	1	1	167.315	4073.82	94.61	C
			B	1	0.65	1	1	1	167.315			
			C	1	0.65	1	1	1	167.315			
L4 42.03-0.00	1824.61	12523.39	A	1	0.65	1	1	1	193.794	3937.48	93.68	C
			B	1	0.65	1	1	1	193.794			
			C	1	0.65	1	1	1	193.794			
Sum Weight:	5811.82	31035.00						OTM	15151252.40 lb-in	15285.33		

Tower Forces - With Ice - Wind Normal To Face

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	4309.55	A		0.65				112.548	2643.90	57.05	C
			B		0.65			112.548				
			C		0.65			112.548				
L2 128.66-85.09	1748.46	7017.88	A		0.65			140.260	2979.46	68.38	C	
			B		0.65			140.260				
			C		0.65			140.260				
L3 85.09-42.03	1869.32	10281.16	A		0.65			170.903	3120.90	72.48	C	
			B		0.65			170.903				
			C		0.65			170.903				
L4 42.03-0.00	1824.61	13971.60	A		0.65			197.297	3006.49	71.53	C	
			B		0.65			197.297				
			C		0.65			197.297				
Sum Weight:	5811.82	35580.19						OTM 11688707. 94 lb-in	11750.75			

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	4309.55	A		0.65				112.548	2643.90	57.05	C
			B		0.65			112.548				
			C		0.65			112.548				
L2 128.66-85.09	1748.46	7017.88	A		0.65			140.260	2979.46	68.38	C	
			B		0.65			140.260				
			C		0.65			140.260				
L3 85.09-42.03	1869.32	10281.16	A		0.65			170.903	3120.90	72.48	C	
			B		0.65			170.903				
			C		0.65			170.903				
L4 42.03-0.00	1824.61	13971.60	A		0.65			197.297	3006.49	71.53	C	
			B		0.65			197.297				
			C		0.65			197.297				
Sum Weight:	5811.82	35580.19						OTM 11688707. 94 lb-in	11750.75			

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	4309.55	A		0.65				112.548	2643.90	57.05	C
			B		0.65			112.548				
			C		0.65			112.548				
L2 128.66-85.09	1748.46	7017.88	A		0.65			140.260	2979.46	68.38	C	
			B		0.65			140.260				
			C		0.65			140.260				
L3 85.09-42.03	1869.32	10281.16	A		0.65			170.903	3120.90	72.48	C	
			B		0.65			170.903				

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Section Elevation	Add Weight	Self Weight	Face	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl Face
ft	lb	lb							ft ²	lb	plf	
L4 42.03-0.00	1824.61	13971.60	C		0.65				170.903			
			A		0.65				197.297	3006.49	71.53	C
			B		0.65				197.297			
			C		0.65				197.297			
Sum Weight:	5811.82	35580.19						OTM	11688707.94 lb-in	11750.75		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	Face	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	4309.55	A		0.65				112.548	2643.90	57.05	C
			B		0.65				112.548			
			C		0.65				112.548			
L2 128.66-85.09	1748.46	7017.88	A		0.65				140.260	2979.46	68.38	C
			B		0.65				140.260			
			C		0.65				140.260			
L3 85.09-42.03	1869.32	10281.16	A		0.65				170.903	3120.90	72.48	C
			B		0.65				170.903			
			C		0.65				170.903			
L4 42.03-0.00	1824.61	13971.60	A		0.65				197.297	3006.49	71.53	C
			B		0.65				197.297			
			C		0.65				197.297			
Sum Weight:	5811.82	35580.19						OTM	11688707.94 lb-in	11750.75		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	Face	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	3490.32	A		0.65				108.687	1177.94	25.42	C
			B		0.65				108.687			
			C		0.65				108.687			
L2 128.66-85.09	1748.46	5992.56	A		0.65				136.629	1339.02	30.73	C
			B		0.65				136.629			
			C		0.65				136.629			
L3 85.09-42.03	1869.32	9028.74	A		0.65				167.315	1409.63	32.74	C
			B		0.65				167.315			
			C		0.65				167.315			
L4 42.03-0.00	1824.61	12523.39	A		0.65				193.794	1362.45	32.42	C
			B		0.65				193.794			
			C		0.65				193.794			
Sum Weight:	5811.82	31035.00						OTM	5242647.89 lb-in	5289.04		

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Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	3490.32	A		0.65				108.687	1177.94	25.42	C
			B		0.65			108.687				
			C		0.65			108.687				
L2 128.66-85.09	1748.46	5992.56	A		0.65				136.629	1339.02	30.73	C
			B		0.65			136.629				
			C		0.65			136.629				
L3 85.09-42.03	1869.32	9028.74	A		0.65				167.315	1409.63	32.74	C
			B		0.65			167.315				
			C		0.65			167.315				
L4 42.03-0.00	1824.61	12523.39	A		0.65				193.794	1362.45	32.42	C
			B		0.65			193.794				
			C		0.65			193.794				
Sum Weight:	5811.82	31035.00						OTM	5242647.8 9 lb-in	5289.04		

Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	3490.32	A		0.65				108.687	1177.94	25.42	C
			B		0.65			108.687				
			C		0.65			108.687				
L2 128.66-85.09	1748.46	5992.56	A		0.65				136.629	1339.02	30.73	C
			B		0.65			136.629				
			C		0.65			136.629				
L3 85.09-42.03	1869.32	9028.74	A		0.65				167.315	1409.63	32.74	C
			B		0.65			167.315				
			C		0.65			167.315				
L4 42.03-0.00	1824.61	12523.39	A		0.65				193.794	1362.45	32.42	C
			B		0.65			193.794				
			C		0.65			193.794				
Sum Weight:	5811.82	31035.00						OTM	5242647.8 9 lb-in	5289.04		

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 175.00-128.66	369.43	3490.32	A		0.65				108.687	1177.94	25.42	C
			B		0.65			108.687				
			C		0.65			108.687				
L2 128.66-85.09	1748.46	5992.56	A		0.65				136.629	1339.02	30.73	C
			B		0.65			136.629				
			C		0.65			136.629				

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl Face
ft	lb	lb							ft ²	lb	plf	
L3 85.09-42.03	1869.32	9028.74	A		0.65				167.315	1409.63	32.74	C
			B		0.65				167.315			
			C		0.65				167.315			
L4 42.03-0.00	1824.61	12523.39	A		0.65				193.794	1362.45	32.42	C
			B		0.65				193.794			
			C		0.65				193.794			
Sum Weight:	5811.82	31035.00						OTM	5242647.8 9 lb-in	5289.04		

Force Totals

Load Case	Vertical Forces	Sum of Forces X	Sum of Forces Z	Sum of Overturning Moments, M _x	Sum of Overturning Moments, M _z	Sum of Torques
	lb	lb	lb	lb-in	lb-in	lb-in
Leg Weight	31035.00					
Bracing Weight	0.00					
Total Member Self-Weight	31035.00			-28260.43	4684.10	
Total Weight	58567.76			-28260.43	4684.10	
Wind 0 deg - No Ice		0.00	-30987.81	-41884544.09	4684.10	-37604.86
Wind 30 deg - No Ice		15493.91	-26836.23	-36276865.39	-20923457.73	-159071.45
Wind 45 deg - No Ice		21911.69	-21911.69	-29625122.44	-29592177.91	-205495.29
Wind 60 deg - No Ice		26836.23	-15493.91	-20956402.26	-36243920.86	-237914.97
Wind 90 deg - No Ice		30987.81	0.00	-28260.43	-41851599.56	-253009.37
Wind 120 deg - No Ice		26836.23	15493.91	20899881.39	-36243920.86	-200310.11
Wind 135 deg - No Ice		21911.69	21911.69	29568601.57	-29592177.91	-152313.99
Wind 150 deg - No Ice		15493.91	26836.23	36220344.52	-20923457.73	-93937.92
Wind 180 deg - No Ice		0.00	30987.81	41828023.22	4684.10	37604.86
Wind 210 deg - No Ice		-15493.91	26836.23	36220344.52	20932825.92	159071.45
Wind 225 deg - No Ice		-21911.69	21911.69	29568601.57	29601546.11	205495.29
Wind 240 deg - No Ice		-26836.23	15493.91	20899881.39	36253289.05	237914.97
Wind 270 deg - No Ice		-30987.81	0.00	-28260.43	41860967.75	253009.37
Wind 300 deg - No Ice		-26836.23	-15493.91	-20956402.26	36253289.05	200310.11
Wind 315 deg - No Ice		-21911.69	-21911.69	-29625122.44	29601546.11	152313.99
Wind 330 deg - No Ice		-15493.91	-26836.23	-36276865.39	20932825.92	93937.92
Member Ice	4545.18					
Total Weight Ice	75064.31			-53254.93	10111.47	
Wind 0 deg - Ice		0.00	-26292.37	-36713249.01	10111.47	-41497.84
Wind 30 deg - Ice		13146.19	-22769.86	-31801741.11	-18319885.57	-179231.98
Wind 45 deg - Ice		18591.52	-18591.52	-25975785.34	-25912418.94	-231991.43
Wind 60 deg - Ice		22769.86	-13146.19	-18383251.97	-31738374.70	-268941.05
Wind 90 deg - Ice		26292.37	0.00	-53254.93	-36649882.61	-286587.59
Wind 120 deg - Ice		22769.86	13146.19	18276742.11	-31738374.70	-227443.22
Wind 135 deg - Ice		18591.52	18591.52	25869275.48	-25912418.94	-173304.63
Wind 150 deg - Ice		13146.19	22769.86	31695231.25	-18319885.57	-107355.61
Wind 180 deg - Ice		0.00	26292.37	36606739.15	10111.47	41497.84
Wind 210 deg - Ice		-13146.19	22769.86	31695231.25	18340108.52	179231.98
Wind 225 deg - Ice		-18591.52	18591.52	25869275.48	25932641.89	231991.43
Wind 240 deg - Ice		-22769.86	13146.19	18276742.11	31758597.65	268941.05
Wind 270 deg - Ice		-26292.37	0.00	-53254.93	36670105.56	286587.59
Wind 300 deg - Ice		-22769.86	-13146.19	-18383251.97	31758597.65	227443.22
Wind 315 deg - Ice		-18591.52	-18591.52	-25975785.34	25932641.89	173304.63
Wind 330 deg - Ice		-13146.19	-22769.86	-31801741.11	18340108.52	107355.61
Total Weight	58567.76			-28260.43	4684.10	
Wind 0 deg - Service		0.00	-10722.43	-14511403.57	4684.10	-13012.06
Wind 30 deg - Service		5361.21	-9285.89	-12571030.31	-7236887.47	-55042.02

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Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M _x lb-in	Sum of Overturning Moments, M _y lb-in	Sum of Torques lb-in
Wind 45 deg - Service		7581.90	-7581.90	-10269389.16	-10236444.63	-71105.64
Wind 60 deg - Service		9285.89	-5361.21	-7269832.00	-12538085.78	-82323.52
Wind 90 deg - Service		10722.43	0.00	-28260.43	-14478459.04	-87546.49
Wind 120 deg - Service		9285.89	5361.21	7213311.13	-12538085.78	-69311.46
Wind 135 deg - Service		7581.90	7581.90	10212868.29	-10236444.63	-52703.80
Wind 150 deg - Service		5361.21	9285.89	12514509.45	-7236887.47	-32504.47
Wind 180 deg - Service		0.00	10722.43	14454882.70	4684.10	13012.06
Wind 210 deg - Service		-5361.21	9285.89	12514509.45	7246255.66	55042.02
Wind 225 deg - Service		-7581.90	7581.90	10212868.29	10245812.82	71105.64
Wind 240 deg - Service		-9285.89	5361.21	7213311.13	12547453.98	82323.52
Wind 270 deg - Service		-10722.43	0.00	-28260.43	14487827.23	87546.49
Wind 300 deg - Service		-9285.89	-5361.21	-7269832.00	12547453.98	69311.46
Wind 315 deg - Service		-7581.90	-7581.90	-10269389.16	10245812.82	52703.80
Wind 330 deg - Service		-5361.21	-9285.89	-12571030.31	7246255.66	32504.47

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service

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Comb. No.	Description
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-in	Minor Axis Moment lb-in
L1	175 - 128.66	Pole	Max Tension	43	0.01	-7.15	0.05
			Max. Compression	18	-21558.15	7897.02	53743.66
			Max. Mx	14	-13658.79	3563556.39	15738.72
			Max. My	2	-13657.06	2286.12	3588100.07
			Max. Vy	14	-14165.42	3563556.39	15738.72
			Max. Vx	2	-14166.96	2286.12	3588100.07
			Max. Torque	23			279732.64
L2	128.66 - 85.09	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-45754.44	10976.45	58296.08
			Max. Mx	14	-31045.43	13727508.3	24663.73
			Max. My	2	-31044.26	4185.50	13752423.7
			Max. Vy	14	-23766.35	13727508.3	24663.73
			Max. Vx	2	-23767.79	4185.50	13752423.7
			Max. Torque	23			284192.05
L3	85.09 - 42.03	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-57334.95	11063.97	58760.86
			Max. Mx	14	-41853.55	26636214.6	28377.01
			Max. My	2	-41853.06	4751.45	26661701.9
			Max. Vy	14	-27400.65	26636214.6	28377.01
			Max. Vx	2	-27401.38	4751.45	26661701.9
			Max. Torque	23			284017.35
L4	42.03 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	18	-75064.31	11063.71	58759.37
			Max. Mx	14	-58550.89	43818956.5	28622.91
			Max. My	2	-58550.88	4792.80	43844679.3
			Max. Vy	14	-31019.69	43818956.5	28622.91
			Max. Vx	2	-31019.71	4792.80	43844679.3
			Max. Torque	23			283641.74

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Section No	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force lb	Major Axis Moment lb-in	Minor Axis Moment lb-in
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Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	19	75064.31	-0.00	26292.48
	Max. H _x	14	58567.76	30987.81	0.00
	Max. H _z	2	58567.76	0.00	30987.81
	Max. M _x	2	43844679.36	0.00	30987.81
	Max. M _z	6	43808779.81	-30987.81	0.00
	Max. Torsion	23	283520.87	-26292.38	-0.00
	Min. Vert	1	58567.76	0.00	0.00
	Min. H _x	6	58567.76	-30987.81	0.00
	Min. H _z	10	58567.76	0.00	-30987.81
	Min. M _x	10	-43783054.86	0.00	-30987.81
	Min. M _z	14	-43818956.56	30987.81	0.00
	Min. Torsion	31	-283509.11	26292.38	-0.00

Tower Mast Reaction Summary

Load Combination	Vertical lb	Shear _y lb	Shear _x lb	Overtuning Moment, M _x lb-in	Overtuning Moment, M _z lb-in	Torque lb-in
Dead Only	58567.76	-0.00	-0.00	-29393.61	4846.35	-0.66
Dead+Wind 0 deg - No Ice	58567.76	-0.00	-30987.81	-43844679.36	4786.65	-37389.75
Dead+Wind 30 deg - No Ice	58567.76	15493.91	-26836.23	-37974046.18	-21903040.27	-157572.17
Dead+Wind 45 deg - No Ice	58567.76	21911.69	-21911.69	-31010642.03	-30977277.34	-203488.61
Dead+Wind 60 deg - No Ice	58567.76	26836.23	-15493.91	-21935951.39	-37939894.65	-235539.38
Dead+Wind 90 deg - No Ice	58567.76	30987.81	-0.00	-28583.37	-43808779.81	-250399.62
Dead+Wind 120 deg - No Ice	58567.76	26836.23	15493.91	21877662.44	-37937946.06	-198162.79
Dead+Wind 135 deg - No Ice	58567.76	21911.69	21911.69	30951248.18	-30975046.23	-150626.19
Dead+Wind 150 deg - No Ice	58567.76	15493.91	26836.23	37913536.58	-21901108.62	-92824.23
Dead+Wind 180 deg - No Ice	58567.76	-0.00	30987.81	43783054.86	4788.01	37392.57
Dead+Wind 210 deg - No Ice	58567.76	-15493.91	26836.23	37913814.86	21910842.94	157587.52
Dead+Wind 225 deg - No Ice	58567.76	-21911.69	21911.69	30951549.71	30984921.92	203504.39
Dead+Wind 240 deg - No Ice	58567.76	-26836.23	15493.91	21877924.04	37947972.11	235551.49
Dead+Wind 270 deg - No Ice	58567.76	-30987.81	-0.00	-28581.76	43818956.56	250395.38
Dead+Wind 300 deg - No Ice	58567.76	-26836.23	-15493.91	-21936211.37	37949920.99	198145.86
Dead+Wind 315 deg - No Ice	58567.76	-21911.69	-21911.69	-31010942.93	30987152.74	150608.98
Dead+Wind 330 deg - No Ice	58567.76	-15493.91	-26836.23	-37974306.96	21912764.78	92809.82
Dead+Ice+Temp	75064.31	-0.00	-0.00	-58759.37	11063.71	-2.18
Dead+Wind 0 deg+Ice+Temp	75064.31	0.00	-26292.48	-39256430.18	10969.21	-41318.58
Dead+Wind 30 deg+Ice+Temp	75064.31	13146.19	-22769.87	-34004220.21	-19588397.46	-177527.27
Dead+Wind 45 deg+Ice+Temp	75064.31	18591.52	-18591.52	-27774358.26	-27706262.91	-229678.49
Dead+Wind 60 deg+Ice+Temp	75064.31	22769.87	-13146.19	-19655777.93	-33934883.01	-266180.95
Dead+Wind 90 deg+Ice+Temp	75064.31	26292.38	0.00	-57139.91	-39184531.99	-283520.87
Dead+Wind 120 deg+Ice+Temp	75064.31	22769.87	13146.19	19539771.19	-33931888.16	-224889.22
Dead+Wind 135 deg+Ice+Temp	75064.31	18591.52	18591.52	27656624.41	-27702803.81	-171276.12
Dead+Wind 150 deg+Ice+Temp	75064.31	13146.19	22769.87	33884759.06	-19585400.20	-105987.68
Dead+Wind 180 deg+Ice+Temp	75064.31	0.00	26292.48	39135242.29	10973.89	41322.43
Dead+Wind 210 deg+Ice+Temp	75064.31	-13146.19	22769.87	33885157.95	19607574.41	177556.19
Dead+Wind 225 deg+Ice+Temp	75064.31	-18591.52	18591.52	27657086.14	27725206.13	229707.66

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Load Combination	Vertical	Shear _x	Shear _y	Overturing Moment, M _x	Overturing Moment, M _y	Torque
	lb	lb	lb	lb-in	lb-in	lb-in
Dead+Wind 240 deg+Ice+Temp	75064.31	-22769.87	13146.19	19540173.00	33954518.88	265201.50
Dead+Wind 270 deg+Ice+Temp	75064.31	-26292.38	0.00	-57133.80	39207391.42	283509.11
Dead+Wind 300 deg+Ice+Temp	75064.31	-22769.87	-13146.19	-19656171.00	33957512.26	224852.96
Dead+Wind 315 deg+Ice+Temp	75064.31	-18591.52	-18591.52	-27774814.37	27728661.65	171239.05
Dead+Wind 330 deg+Ice+Temp	75064.31	-13146.19	-22769.87	-34004616.21	19610565.40	105958.67
Dead+Wind 0 deg - Service	58567.76	-0.00	-10722.44	-15203372.65	5080.14	-13018.12
Dead+Wind 30 deg - Service	58567.76	5361.22	-9285.90	-13170583.85	-7581193.97	-54891.02
Dead+Wind 45 deg - Service	58567.76	7581.90	-7581.90	-10759446.34	-10723595.06	-70888.92
Dead+Wind 60 deg - Service	58567.76	9285.89	-5361.21	-7617059.90	-13134756.45	-82056.37
Dead+Wind 90 deg - Service	58567.76	10722.43	-0.00	-30772.73	-15167356.85	-87235.75
Dead+Wind 120 deg - Service	58567.76	9285.89	5361.21	7555380.22	-13134523.57	-69040.37
Dead+Wind 135 deg - Service	58567.76	7581.90	7581.90	10697632.42	-10723326.08	-52481.08
Dead+Wind 150 deg - Service	58567.76	5361.21	9285.89	13108756.03	-7581030.99	-32345.13
Dead+Wind 180 deg - Service	58567.76	-0.00	10722.44	15141291.70	5080.62	13017.46
Dead+Wind 210 deg - Service	58567.76	-5361.21	9285.89	13108787.68	7591209.90	54891.61
Dead+Wind 225 deg - Service	58567.76	-7581.90	7581.90	10697669.06	10733523.03	70889.83
Dead+Wind 240 deg - Service	58567.76	-9285.89	5361.21	7555412.10	13144738.56	82056.79
Dead+Wind 270 deg - Service	58567.76	-10722.43	-0.00	-30772.16	15177589.76	87234.24
Dead+Wind 300 deg - Service	58567.76	-9285.89	-5361.21	-7617090.84	13144971.02	69037.35
Dead+Wind 315 deg - Service	58567.76	-7581.90	-7581.90	-10759482.24	10733791.39	52477.99
Dead+Wind 330 deg - Service	58567.76	-5361.22	-9285.90	-13170614.77	7591372.31	32342.66

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-58567.76	0.00	0.00	58567.76	0.00	0.000%
2	0.00	-58567.76	-30987.81	0.00	58567.76	30987.81	0.000%
3	15493.91	-58567.76	-26836.23	-15493.91	58567.76	26836.23	0.000%
4	21911.69	-58567.76	-21911.69	-21911.69	58567.76	21911.69	0.000%
5	26836.23	-58567.76	-15493.91	-26836.23	58567.76	15493.91	0.000%
6	30987.81	-58567.76	0.00	-30987.81	58567.76	0.00	0.000%
7	26836.23	-58567.76	15493.91	-26836.23	58567.76	-15493.91	0.000%
8	21911.69	-58567.76	21911.69	-21911.69	58567.76	-21911.69	0.000%
9	15493.91	-58567.76	26836.23	-15493.91	58567.76	-26836.23	0.000%
10	0.00	-58567.76	30987.81	0.00	58567.76	-30987.81	0.000%
11	-15493.91	-58567.76	26836.23	15493.91	58567.76	-26836.23	0.000%
12	-21911.69	-58567.76	21911.69	21911.69	58567.76	-21911.69	0.000%
13	-26836.23	-58567.76	15493.91	26836.23	58567.76	-15493.91	0.000%
14	-30987.81	-58567.76	0.00	30987.81	58567.76	0.00	0.000%
15	-26836.23	-58567.76	-15493.91	26836.23	58567.76	15493.91	0.000%
16	-21911.69	-58567.76	-21911.69	21911.69	58567.76	21911.69	0.000%
17	-15493.91	-58567.76	-26836.23	15493.91	58567.76	26836.23	0.000%
18	0.00	-75064.31	0.00	0.00	75064.31	0.00	0.000%
19	0.00	-75064.31	-26292.37	-0.00	75064.31	26292.48	0.000%
20	13146.19	-75064.31	-22769.86	-13146.19	75064.31	22769.87	0.000%
21	18591.52	-75064.31	-18591.52	-18591.52	75064.31	18591.52	0.000%
22	22769.86	-75064.31	-13146.19	-22769.87	75064.31	13146.19	0.000%
23	26292.37	-75064.31	0.00	-26292.38	75064.31	-0.00	0.000%
24	22769.86	-75064.31	13146.19	-22769.87	75064.31	-13146.19	0.000%
25	18591.52	-75064.31	18591.52	-18591.52	75064.31	-18591.52	0.000%
26	13146.19	-75064.31	22769.86	-13146.19	75064.31	-22769.87	0.000%
27	0.00	-75064.31	26292.37	-0.00	75064.31	-26292.48	0.000%
28	-13146.19	-75064.31	22769.86	13146.19	75064.31	-22769.87	0.000%
29	-18591.52	-75064.31	18591.52	18591.52	75064.31	-18591.52	0.000%
30	-22769.86	-75064.31	13146.19	22769.87	75064.31	-13146.19	0.000%
31	-26292.37	-75064.31	0.00	26292.38	75064.31	-0.00	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
32	-22769.86	-75064.31	-13146.19	22769.87	75064.31	13146.19	0.000%
33	-18591.52	-75064.31	-18591.52	18591.52	75064.31	18591.52	0.000%
34	-13146.19	-75064.31	-22769.86	13146.19	75064.31	22769.87	0.000%
35	0.00	-58567.76	-10722.43	0.00	58567.76	10722.44	0.000%
36	5361.21	-58567.76	-9285.89	-5361.22	58567.76	9285.90	0.000%
37	7581.90	-58567.76	-7581.90	-7581.90	58567.76	7581.90	0.000%
38	9285.89	-58567.76	-5361.21	-9285.89	58567.76	5361.21	0.000%
39	10722.43	-58567.76	0.00	-10722.43	58567.76	0.00	0.000%
40	9285.89	-58567.76	5361.21	-9285.89	58567.76	-5361.21	0.000%
41	7581.90	-58567.76	7581.90	-7581.90	58567.76	-7581.90	0.000%
42	5361.21	-58567.76	9285.89	-5361.21	58567.76	-9285.89	0.000%
43	0.00	-58567.76	10722.43	0.00	58567.76	-10722.44	0.000%
44	-5361.21	-58567.76	9285.89	5361.21	58567.76	-9285.89	0.000%
45	-7581.90	-58567.76	7581.90	7581.90	58567.76	-7581.90	0.000%
46	-9285.89	-58567.76	5361.21	9285.89	58567.76	-5361.21	0.000%
47	-10722.43	-58567.76	0.00	10722.43	58567.76	0.00	0.000%
48	-9285.89	-58567.76	-5361.21	9285.89	58567.76	5361.21	0.000%
49	-7581.90	-58567.76	-7581.90	7581.90	58567.76	7581.90	0.000%
50	-5361.21	-58567.76	-9285.89	5361.22	58567.76	9285.90	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00009012
3	Yes	5	0.00000001	0.00074206
4	Yes	6	0.00000001	0.00006405
5	Yes	6	0.00000001	0.00007497
6	Yes	5	0.00000001	0.00067014
7	Yes	5	0.00000001	0.00075748
8	Yes	6	0.00000001	0.00005989
9	Yes	5	0.00000001	0.00099682
10	Yes	5	0.00000001	0.00008996
11	Yes	6	0.00000001	0.00006425
12	Yes	6	0.00000001	0.00006382
13	Yes	5	0.00000001	0.00078375
14	Yes	5	0.00000001	0.00067036
15	Yes	6	0.00000001	0.00007051
16	Yes	6	0.00000001	0.00006021
17	Yes	5	0.00000001	0.00075433
18	Yes	4	0.00000001	0.00003656
19	Yes	5	0.00000001	0.00063194
20	Yes	6	0.00000001	0.00015829
21	Yes	6	0.00000001	0.00022333
22	Yes	6	0.00000001	0.00025088
23	Yes	6	0.00000001	0.00014742
24	Yes	6	0.00000001	0.00016377
25	Yes	6	0.00000001	0.00020820
26	Yes	6	0.00000001	0.00019326
27	Yes	5	0.00000001	0.00062843
28	Yes	6	0.00000001	0.00021527
29	Yes	6	0.00000001	0.00022171
30	Yes	6	0.00000001	0.00017123
31	Yes	6	0.00000001	0.00014756
32	Yes	6	0.00000001	0.00023655

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33	Yes	6	0.00000001	0.00021058
34	Yes	6	0.00000001	0.00015659
35	Yes	4	0.00000001	0.00025129
36	Yes	4	0.00000001	0.00098615
37	Yes	5	0.00000001	0.00009982
38	Yes	5	0.00000001	0.00012551
39	Yes	5	0.00000001	0.00010191
40	Yes	5	0.00000001	0.00007370
41	Yes	5	0.00000001	0.00008385
42	Yes	5	0.00000001	0.00007483
43	Yes	4	0.00000001	0.00024880
44	Yes	5	0.00000001	0.00009490
45	Yes	5	0.00000001	0.00009889
46	Yes	5	0.00000001	0.00008487
47	Yes	5	0.00000001	0.00010205
48	Yes	5	0.00000001	0.00011321
49	Yes	5	0.00000001	0.00008509
50	Yes	4	0.00000001	0.00078792

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 128.66	32.700	35	1.5718	0.0723
L2	133.34 - 85.09	19.485	35	1.3917	0.0302
L3	90.91 - 42.03	8.862	35	0.9435	0.0121
L4	48.97 - 0	2.521	35	0.4703	0.0044

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
173.00	2" Dia 10' OMNI	35	32.041	1.5664	0.0700	56245
170.00	PL6-65D	35	31.053	1.5580	0.0666	56245
163.00	GP6F-21A	35	28.758	1.5374	0.0586	23435
158.00	MF-900B	35	27.133	1.5207	0.0531	16542
147.00	DB950F85E-M	35	23.629	1.4750	0.0418	10043
137.00	7770	35	20.567	1.4176	0.0330	7401
127.00	DB844H90	35	17.667	1.3400	0.0259	6415
117.00	13'-3" Platform	35	14.954	1.2433	0.0206	5951
100.00	13'-3" Platform	35	10.812	1.0517	0.0145	5298
75.00	GPS	35	5.928	0.7570	0.0086	4750

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	175 - 128.66	93.958	2	4.5014	0.2275

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	133.34 - 85.09	56.080	2	4.0009	0.0983
L3	90.91 - 42.03	25.531	2	2.7170	0.0394
L4	48.97 - 0	7.267	2	1.3555	0.0143

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
173.00	2" Dia 10' OMNI	2	92.070	4.4865	0.2205	20137
170.00	PL6-65D	2	89.240	4.4640	0.2100	20137
163.00	GP6F-21A	2	82.664	4.4080	0.1859	8389
158.00	MF-900B	2	78.008	4.3625	0.1691	5921
147.00	DB950F85E-M	2	67.966	4.2358	0.1345	3593
137.00	7770	2	59.186	4.0743	0.1071	2646
127.00	DB844H90	2	50.859	3.8537	0.0849	2283
117.00	13'-3" Platform	2	43.062	3.5775	0.0678	2104
100.00	13'-3" Platform	2	31.147	3.0281	0.0474	1856
75.00	GPS	2	17.081	2.1808	0.0279	1654

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P lb	Allow. P _a lb	Ratio P/P _a
L1	175 - 128.66 (1)	TP33.29x23x0.25	46.34	175.00	184.9	4.370	25.3926	-20721.80	110968.00	0.187
L2	128.66 - 85.09 (2)	TP42.47x31.7508x0.3125	48.25	175.00	144.8	7.126	40.5325	-31044.30	288846.00	0.107
L3	85.09 - 42.03 (3)	TP51.41x40.552x0.375	48.88	175.00	119.5	10.454	58.9095	-41853.10	615813.00	0.068
L4	42.03 - 0 (4)	TP60x49.1184x0.4375	48.97	175.00	99.3	15.140	82.7100	-58550.90	1252200.00	0.047

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x lb-in	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} /F _{bx}	Actual M _y lb-in	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} /F _{by}
L1	175 - 128.66 (1)	TP33.29x23x0.25	3543560.00	-17.672	39.000	0.453	0.00	0.000	39.000	0.000
L2	128.66 - 85.09 (2)	TP42.47x31.7508x0.3125	1375240.00	-33.641	39.000	0.863	0.00	0.000	39.000	0.000
L3	85.09 - 42.03 (3)	TP51.41x40.552x0.375	2666170.00	-37.048	39.000	0.950	0.00	0.000	39.000	0.000
L4	42.03 - 0 (4)	TP60x49.1184x0.4375	4384470.00	-36.049	39.000	0.924	0.00	0.000	39.000	0.000

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Section No.	Elevation ft	Size	Actual M_x lb-in	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-in	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
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Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	175 - 128.66 (1)	TP33.29x23x0.25	0.187	0.453	0.000	0.640	1.333	H1-3 ✓
L2	128.66 - 85.09 (2)	TP42.47x31.7508x0.3125	0.107	0.863	0.000	0.970	1.333	H1-3 ✓
L3	85.09 - 42.03 (3)	TP51.41x40.552x0.375	0.068	0.950	0.000	1.018	1.333	H1-3 ✓
L4	42.03 - 0 (4)	TP60x49.1184x0.4375	0.047	0.924	0.000	0.971	1.333	H1-3 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF* P_{allow} lb	% Capacity	Pass Fail
L1	175 - 128.66	Pole	TP33.29x23x0.25	1	-20721.80	147920.34	48.0	Pass
L2	128.66 - 85.09	Pole	TP42.47x31.7508x0.3125	2	-31044.30	385031.70	72.8	Pass
L3	85.09 - 42.03	Pole	TP51.41x40.552x0.375	3	-41853.10	820878.69	76.4	Pass
L4	42.03 - 0	Pole	TP60x49.1184x0.4375	4	-58550.90	1669182.53	72.8	Pass
Summary								
Pole (L3)							76.4	Pass
RATING =							76.4	Pass

ANCHOR BOLT AND BASE PLATE ANALYSIS

Job 176' Monopole - Williamantic, CT
 Description Anchor Bolt and Base Plate Analysis

Project No. NSS-006

Sheet 1 of 6

Computed by MCD

Date 03/04/14

Checked by

Date

ANCHOR BOLT AND BASE PLATE ANALYSIS

Input Data

Tower Reactions:

Overturning Moment:	OM := 3654ft-kips	<i>user input</i>
Shear Force:	Shear := 31-kips	<i>user input</i>
Axial Force:	Axial := 59 kips	<i>user input</i>

Anchor Bolt Data:

Use ASTM A615-Grade 75	<i>user input</i>	
Number of Anchor Bolts = N	$N_{\text{Anchor}} := 20$	<i>user input</i>
Diameter of Bolt Circle:	$D_{bc} := 72\text{in}$	<i>user input</i>
Bolt "Column" Distance:	$l_w := 3\text{in}$	<i>user input</i>
Bolt Ultimate Strength:	$F_u := 100\text{ ksi}$	<i>user input</i>
Bolt Yield Strength:	$F_y := 75\text{ ksi}$	<i>user input</i>
Bolt Modulus:	$E := 29000\text{ ksi}$	<i>user input</i>
Anchor Bolt Diameter	$D := 2.25\text{in}$	<i>user input</i>
Threads per Inch:	$n := 4.5$	<i>user input</i>

Base Plate Data:

Use ASTM A572-60	<i>user input</i>	
Plate Yield Strength:	$F_{y_{bp}} := 60\text{ ksi}$	<i>user input</i>
Base Plate Thickness:	PlateThickness := 2 in	<i>user input</i>
Base Plate Diameter:	$D_{bp} := 78\text{ in}$	<i>user input</i>
Outer Pole Diameter:	$D_{pole} := 60\text{in}$	<i>user input</i>

Gusset Data:

Gusset Thickness:	$t_{\text{Gusset}} := 0.375\text{ in}$	<i>user input</i>
Gusset Height:	$H_{\text{Gusset}} := 6.5\text{ in}$	<i>user input</i>
Number of Gussets Within Bend Line:	$n_{\text{gusset}} := 0$	<i>user input</i>

Geometric Layout Data:

Distance from the center of gravity of the group to bolt in question = $d(i)$

Radius of Bolt Circle: $R_{bc} := \frac{D_{bc}}{2}$

Distance to Bolts: $i := 1..N$

$$d_i := \begin{cases} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{cases}$$

$d_1 = 11.12$ in	$d_7 = 29.12$ in
$d_2 = 21.16$ in	$d_8 = 21.16$ in
$d_3 = 29.12$ in	$d_9 = 11.12$ in
$d_4 = 34.24$ in	$d_{10} = 0.00$ in
$d_5 = 36.00$ in	$d_{11} = -11.12$ in
$d_6 = 34.24$ in	etc.

Critical Distances For Bending in Plate:

Outer Pole Radius: $R_{pole} := \frac{D_{pole}}{2}$ $R_{pole} = 30.00$ in

Moment Arms of Bolts about Neutral Axis: $MA_i := \text{if}(d_i \geq R_{pole}, d_i - R_{pole}, 0 \text{ in})$

$MA_1 = 0.00$ in	$MA_7 = 0.00$ in
$MA_2 = 0.00$ in	$MA_8 = 0.00$ in
$MA_3 = 0.00$ in	$MA_9 = 0.00$ in
$MA_4 = 4.24$ in	$MA_{10} = 0.00$ in
$MA_5 = 6.00$ in	$MA_{11} = 0.00$ in
$MA_6 = 4.24$ in	etc.

Effective Width of Baseplate for Bending: $\text{EffectiveWidth} := .9 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2}$ $\text{EffectiveWidth} = 44.86$ in

Anchor Bolt Analysis:

Polar Moment of Inertia I_p :

$$I_p := \sum_i (d_i)^2 \quad I_p = 1.296 \times 10^4 \cdot \text{in}^2$$

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \quad A_g = 3.976 \cdot \text{in}^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot \text{in}}{n} \right)^2 \quad A_n = 3.248 \cdot \text{in}^2$$

Net Diameter:

$$D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} \quad D_n = 2.03 \cdot \text{in}$$

Radius of Gyration of Bolt:

$$r := \frac{D_n}{4} \quad r = 0.51 \cdot \text{in}$$

Section Modulus of Bolt:

$$S_x := \frac{\pi \cdot D_n^3}{32} \quad S_x = 0.826 \cdot \text{in}^3$$

Anchor Bolt Bending Stress:

Maximum Applied Bending:

$$M_x := \left(\frac{\text{Shear}}{N} \right) \cdot l \quad M_x = 0.387 \cdot \text{ft} \cdot \text{kips}$$

$$f_{bx} := \frac{M_x}{S_x} \quad f_{bx} = 5.6 \cdot \text{ksi}$$

Allowable Bending

$$F_{bx} := 1.333 \cdot 0.60 \cdot F_y \quad F_{bx} = 60.0 \cdot \text{ksi}$$

Note: 1.333 increase allowed per TIA/EIA

Job 176' Monopole - Williamantic, CT

 Project No. NSS-006

 Sheet 4 of 6

 Description Anchor Bolt and Base Plate Analysis

 Computed by MCD

 Date 03/04/14

 Checked by

 Date

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$\text{AllowableTension} := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) \qquad \text{AllowableTension} = 174.9 \text{ kips}$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{\text{net.area}} := 1.333 \cdot (0.60 \cdot A_n \cdot F_y) \qquad F_{\text{net.area}} = 194.8 \text{ kips}$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$\text{MaxTension} := \frac{OM \cdot R_{bc}}{I_p} - \frac{\text{Axial}}{N} \qquad \text{MaxTension} = 118.9 \text{ kips}$$

Check Stresses:

Note: Bolts supplied are "upset bolts." Use net area for checking per AISC.

$$\frac{\text{MaxTension}}{F_{\text{net.area}}} = 0.61$$

$$\text{Condition} := \text{if} \left(\frac{\text{MaxTension}}{F_{\text{net.area}}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition = "OK"

Job 176' Monopole - Williamantic, CT

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 Sheet 5 of 6

 Description Anchor Bolt and Base Plate Analysis

 Computed by MCD

 Date 03/04/14

 Checked by

 Date

Check Compression & Combined Stresses (if required):

Check to see if a complete combined stress analysis is required:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required."

Set the clear space between the plate and bolt to zero and remove bending stresses if a combined stress analysis is not required:

$$l_w := \begin{cases} 1 & \text{if } l > 2 \cdot D_n \\ 0.00 \text{ in} & \text{otherwise} \end{cases} \quad l = 0.00 \text{ in}$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0.0 \text{ ksi} & \text{otherwise} \end{cases} \quad f_{bx} = 0.0 \text{ ksi}$$

Allowable Compressive Force:

$$K_w := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} \quad C_c = 87.36$$

$$F_a := \begin{cases} \frac{\left[1 - \frac{\left(\frac{K \cdot l}{r} \right)^2}{2 \cdot C_c^2} \right] \cdot F_y}{\frac{5}{3} + \frac{3 \cdot \left(\frac{K \cdot l}{r} \right)}{8 \cdot C_c} - \frac{\left(\frac{K \cdot l}{r} \right)^3}{8 \cdot C_c^3}} & \text{if } \frac{K \cdot l}{r} \leq C_c \\ \frac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r} \right)^2} & \text{if } \frac{K \cdot l}{r} > C_c \end{cases} \quad F_a = 45.0 \text{ ksi}$$

$$F_{ax} := 1.333 \cdot F_a \quad \text{Note: 1.333 increase allowed per TIA/EIA} \quad F_a = 60.0 \text{ ksi}$$

Applied Compressive Force:

$$\text{MaxCompression} := \frac{OM \cdot R_{bc}}{I_p} + \frac{\text{Axial}}{N} \quad \text{MaxCompression} = 124.8 \text{ kips}$$

$$f_a := \frac{\text{MaxCompression}}{A_n} \quad f_a = 38.4 \text{ ksi}$$

Check Combined Stresses:

$$\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} = 0.64$$

$$\text{Condition} := \text{if} \left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right) \quad \text{Condition} = \text{"OK"}$$

Job 176' Monopole - Williamantic, CT
 Description Anchor Bolt and Base Plate Analysis

 Project No. NSS-006
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Base Plate Analysis:

Force from Bolt(s):

$$C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$$

- | | |
|----------------------------|-------------------------------|
| $C_1 = 40.6 \text{ kips}$ | $C_7 = 101.5 \text{ kips}$ |
| $C_2 = 74.5 \text{ kips}$ | $C_8 = 74.5 \text{ kips}$ |
| $C_3 = 101.5 \text{ kips}$ | $C_9 = 40.6 \text{ kips}$ |
| $C_4 = 118.8 \text{ kips}$ | $C_{10} = 3.0 \text{ kips}$ |
| $C_5 = 124.8 \text{ kips}$ | $C_{11} = -34.7 \text{ kips}$ |
| $C_6 = 118.8 \text{ kips}$ | etc. |

Bending Stress in Plate:

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(\text{EffectiveWidth} \cdot \text{PlateThickness}^2 \right) + n_{\text{gusset}} \left(t_{\text{Gusset}} \cdot H_{\text{Gusset}}^2 \right)} \quad f_{bp} = 58.7 \text{ ksi}$$

Check Stresses:

$$\frac{f_{bp}}{1.333 \cdot 0.75 F_{y_{bp}}} = 0.98$$

$$\text{Condition} := \text{if} \left(\frac{f_{bp}}{1.333 \cdot 0.75 F_{y_{bp}}} < 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition = "OK"

FOUNDATION ANALYSIS

Job 175' Monopole - Willimantic, CT

 Project No. NSS-006

 Sheet 1 of 2

 Description Caisson Foundation Evaluation

 Computed by MCD

 Date 03/04/14

Checked by _____

Date _____

Check Foundation Depth TIA/EIA-222-F 7.2.5

 Shear Force: $S_x := 34.74 \text{ k}$ *USER INPUT*

 Overturning Moment: $M := 3654 \text{ ft}\cdot\text{k}$ *USER INPUT*

 Foundation Diameter: $d := 8 \text{ ft}$ *USER INPUT*

 Overall Length of Caisson: $L_c := 27 \text{ ft}$ *USER INPUT*

 Depth From Top of Caisson to Grade: $L_{\text{pag}} := 1 \text{ ft}$ *USER INPUT*

 Depth of Caisson Below Ground Level: $LD := L_c - L_{\text{pag}} \quad LD = 26.0 \text{ ft}$ *USER INPUT*

 Depth Required:
$$LD1 := 2.0 \text{ ft} + \left(\frac{S \cdot \text{ft}^2}{3k \cdot d} \right) + 2 \text{ ft} \cdot \left(\frac{M \cdot \text{ft}}{3k \cdot d} + \frac{S \cdot \text{ft}}{2k} + \frac{S^2 \cdot \text{ft}^3}{18k^2 \cdot d^2} \right)^{.5} \quad LD1 = 29.6 \text{ ft}$$

DepthCheck := if(LD1 ≤ LD, "OK", "NO GOOD") DepthCheck = "NO GOOD" Note: Result not applicable. Actual soil is better than normal soil as defined in TIA/EIA 222 F. Refer to L-Pile analysis.

Moment Capacity:

 Bending Moment: $M_u := 3790.455667 \text{ ft}\cdot\text{k}$ *USER INPUT-FROM LPILE*

 Moment Capacity: $M_n := 8937.02608 \text{ ft}\cdot\text{k}$ *USER INPUT-FROM LPILE*

 Factor of Safety: $FS := \frac{M_n}{M_u} \quad FS = 2.4$

 Factor of Safety Required: $FS_{\text{reqd}} := 2 \quad \text{FOSCheck} := \text{if}(FS \geq FS_{\text{reqd}}, \text{"OK"}, \text{"NO GOOD"}) \quad \text{FOSCheck} = \text{"OK"}$

 Factor of Safety Ratio: $FS_{\text{ratio}} := \left(\frac{FS_{\text{reqd}}}{FS} \right) = 0.85$

Axial Capacity:

Applied Axial Load:	A1 := 58.593k	USER INPUT	
Concrete Weight:	$A2 := .150 \frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4}$		A2 = 196.0 k
Total Axial Load:	AT := A1 + A2		AT = 254.6 k
Number of Rebar:	n := 20	USER INPUT	
Area of Rebar:	Ar := 1.56in ²	USER INPUT	#11
Rebar Yield Strength:	fy := 60ksi	USER INPUT	
Area of Concrete:	$Ag := \pi \frac{d^2}{4}$		Ag = 50.3 ft ^{2.0}
Concrete Comp Strength:	fc := 4ksi	USER INPUT	
Axial Capacity:	Po := n · Ar · fy + (Ag - n · Ar) · 0.85 · fc		Po = 26375.9 · k
AxialCheck := if(AT ≤ Po, "OK", "NO GOOD")			AxialCheck = "OK"

Pile Plus for Windows, Version 2012-06.031
Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method
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URS Corporation
Rocky Hill, CT

Serial Number of Security Device: 138585063
Company Name Stored in Security Device: URS

Files Used for Analysis

Path to file locations: P:\08\MathCAD\LPILE\
Name of input data file: willimanticCT.lp6d
Name of output report file: willimanticCT.lp6o
Name of plot output file: willimanticCT.lp6p
Name of runtime message file: willimanticCT.lp6r

Date and Time of Analysis

Date: March 4, 2014 Time: 9:36:32

Problem Title

Project Name: Monopole Foundation

Job Number: 36928683.00000

Client: Northeast Site Solutions

Engineer: MCD

Description: Monopole Foundation Check

Program Options

Engineering units are US Customary Units: pounds, inches, feet

Basic Program Options:

This analysis computes pile response to lateral loading and will compute nonlinear moment-curvature and nominal moment capacity for section types with nonlinear properties.

Computation Options:

- Analysis does not use p-y multipliers (individual pile or shaft only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix values
- Report pile response for full length of pile
- Analysis assumes no loading by soil movements acting on pile
- No p-y curves to be computed and reported for user-specified depths

Solution Control Parameters:

- Number of pile increments = 100
- Maximum number of iterations allowed = 200
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 100.0000 in

Pile Response Output Options:

- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (nodal spacing of output points) = 1

 Pile Structural Properties and Geometry

Total Number of Sections = 1
 Total Pile Length = 27.00 ft
 Depth of ground surface below top of pile = 0.00 ft

Pile dimensions used for p-y curve computations defined using 2 points.
 p-y curves are computed using values of pile diameter interpolated over the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	96.0000000
2	27.000000	96.0000000

 Input Structural Properties:

Pile Section No. 1:

Section Type = Drilled Shaft with Permanent Casing
 Section Length = 27.00000000 ft
 Section Diameter = 96.00000000 in

 Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
 = 0.000 radians
 Pile Batter Angle = 0.000 degrees
 = 0.000 radians

 Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 0.0000 ft
 Distance from top of pile to bottom of layer = 5.00000 ft
 Effective unit weight at top of layer = 125.00000 pcf
 Effective unit weight at bottom of layer = 125.00000 pcf
 Friction angle at top of layer = 30.00000 deg.
 Friction angle at bottom of layer = 30.00000 deg.
 Subgrade k at top of layer = 0.0000 pci
 Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 5.00000 ft
 Distance from top of pile to bottom of layer = 14.00000 ft
 Effective unit weight at top of layer = 135.00000 pcf
 Effective unit weight at bottom of layer = 135.00000 pcf
 Friction angle at top of layer = 38.00000 deg.
 Friction angle at bottom of layer = 38.00000 deg.
 Subgrade k at top of layer = 0.0000 pci
 Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer = 14.00000 ft
 Distance from top of pile to bottom of layer = 24.00000 ft
 Effective unit weight at top of layer = 75.00000 pcf
 Effective unit weight at bottom of layer = 75.00000 pcf
 Friction angle at top of layer = 38.00000 deg.
 Friction angle at bottom of layer = 38.00000 deg.
 Subgrade k at top of layer = 0.0000 pci
 Subgrade k at bottom of layer = 0.0000 pci

NOTE: Internal default values for subgrade k will be computed for the above soil layer.

Layer 4 is strong rock (vuggy limestone)

Distance from top of pile to top of layer = 24.00000 ft
 Distance from top of pile to bottom of layer = 29.00000 ft
 Effective unit weight at top of layer = 75.00000 pcf
 Effective unit weight at bottom of layer = 75.00000 pcf
 Uniaxial compressive strength at top of layer = 5000.00000 psi
 Uniaxial compressive strength at bottom of layer = 5000.00000 psi

(Depth of lowest soil layer extends 2.00 ft below pile tip)

 Summary of Soil Properties

Layer	Uniaxial In-situ Layer qu psi	RQD % In-situ or GSI	Layer Soil Type Subgrade Mod. pci	Strain Elastic Factor Epsilon 50	Layer Depth ft	Effective Unit wt. Rock pcf	Undrained Rock Mass Cohesion Emass psi	Angle of Friction deg.	Test Type
1	Sand (Reese, et al.)	--	--	--	0.00 default	125.000	--	30.000	--
	--	--	--	--	5.000 default	125.000	--	30.000	--
2	Sand (Reese, et al.)	--	--	--	5.000 default	135.000	--	38.000	--
	--	--	--	--	14.000 default	135.000	--	38.000	--
3	Sand (Reese, et al.)	--	--	--	14.000 default	75.000	--	38.000	--
	--	--	--	--	24.000 default	75.000	--	38.000	--
4	Vuggy Limestone	--	--	--	24.000	75.000	--	--	--
	5000.000	--	--	--	29.000	75.000	--	--	--
	5000.000	--	--	--	--	--	--	--	--

 Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

 Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile
1	1	V = 26292. lbs	M = 39256432. in-lbs	75064.	False
2	1	V = 30988. lbs	M = 43844680. in-lbs	58568.	False

V = perpendicular shear force applied to pile head
 M = bending moment applied to pile head
 y = lateral deflection relative to pile axis
 S = pile slope relative to original pile batter angle
 R = rotational stiffness applied to pile head
 Axial thrust is assumed to be acting axially for all pile batter angles.

 Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 1

Pile Section No. 1:

 Dimensions and Properties of Drilled Shaft with Permanent Casing:

Length of Section	=	27.00000000	ft
Outer Diameter of Casing	=	96.00000000	in
Concrete Cover Thickness Inside Casing	=	3.00000000	in
Casing Wall Thickness	=	0.00000000	in
Moment of Inertia of Steel Casing	=	0.00000000	in ⁴
Yield Stress of Casing	=	36.00000000	ksi
Elastic Modulus of Casing	=	29000.	ksi
Number of Reinforcing Bars	=	27	bars
Area of Single Reinforcing Bar	=	1.56000000	sq. in.
Edge-to-Edge Bar Spacing	=	8.87467126	in
Rebar Offset	=	0.00000000	in
Yield Stress of Reinforcing Bars	=	60.00000000	ksi
Elastic Modulus of Reinforcing Bars	=	29000.	ksi
Area of Concrete	=	7196.10947387	sq. in.
Cross-sectional Area of Steel Casing	=	0.00000000	sq. in.
Area of All Steel (Casing and Bars)	=	42.12000000	sq. in.
Area Ratio of All Steel	=	0.59	percent

 Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	26993.973	kips
Tensile Load for Cracking of Concrete	=	-3133.853	kips
Nominal Axial Tensile Capacity	=	-2527.200	kips

 Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	44.29500	0.00000
2	1.41000	1.56000	43.10102	10.21513
3	1.41000	1.56000	39.58346	19.87956
4	1.41000	1.56000	33.93194	28.47228
5	1.41000	1.56000	26.45114	35.53005
6	1.41000	1.56000	17.54435	40.67238
7	1.41000	1.56000	7.69175	43.62206
8	1.41000	1.56000	-2.57553	44.22006
9	1.41000	1.56000	-12.70395	42.43415
10	1.41000	1.56000	-22.14750	38.36060
11	1.41000	1.56000	-30.39707	32.21902
12	1.41000	1.56000	-37.00793	24.34050
13	1.41000	1.56000	-41.62368	15.14978
14	1.41000	1.56000	-43.99549	5.14234

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15	1.41000	1.56000	-43.99549	-5.14234
16	1.41000	1.56000	-41.62368	-15.14978
17	1.41000	1.56000	-37.00793	-24.34050
18	1.41000	1.56000	-30.39707	-32.21902
19	1.41000	1.56000	-22.14750	-38.36060
20	1.41000	1.56000	-12.70395	-42.43415
21	1.41000	1.56000	-2.57553	-44.22006
22	1.41000	1.56000	7.69175	-43.62206
23	1.41000	1.56000	17.54435	-40.67238
24	1.41000	1.56000	26.45114	-35.53005
25	1.41000	1.56000	33.93194	-28.47228
26	1.41000	1.56000	39.58346	-19.87956
27	1.41000	1.56000	43.10102	-10.21513

Concrete Properties:

Compressive Strength of Concrete	=	4.00000000	ksi
Modulus of Elasticity of Concrete	=	3604.99653259	ksi
Modulus of Rupture of Concrete	=	-0.47434164	ksi
Compression Strain at Peak Stress	=	0.00188627	
Tensile Strain at Fracture of Concrete	=	-0.00011537	
Maximum Coarse Aggregate Size	=	0.00000000	in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 2

Number	Axial Thrust Force kips
1	58.568
2	75.064

Definitions of Run Messages and Notes:

- C = concrete in section has cracked in tension.
- Y = stress in reinforcing steel has reached yield stress.
- T = ACI 318-08 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
- Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
 Position of neutral axis is measured from edge of compression side of pile.
 Compressive stresses and strains are positive in sign.
 Tensile stresses and strains are negative in sign.

Axial Thrust Force = 58.568 kips

Bending Concrete Curvature	Max Stress rad/in. ksi	Bending Steel Moment Stress in-kip ksi	Max Casing Stiffness Msg kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Stress ksi
0.000000313	5830.8011117	18658563557.	53.9238289	0.0000169	-0.0000131		
0.0705191	0.4843347	0.4843347					
0.000000625	11633.	18612244923.	50.9715254	0.0000319	-0.0000281		
0.1327200	0.9151589	0.9151589					
0.000000938	17405.	18565335151.	49.9874825	0.0000469	-0.0000431		
0.1944249	1.3459847	1.3459847					
0.000001250	23148.	18518276699.	49.4954958	0.0000619	-0.0000581		
0.2556337	1.7768117	1.7768117					
0.000001563	28861.	18471158709.	49.2003308	0.0000769	-0.0000731		
0.3163465	2.2076400	2.2076400					
0.000001875	34545.	18424010911.	49.0035759	0.0000919	-0.0000881		
0.3765631	2.6384694	2.6384694					
0.000002188	40199.	18376846077.	48.8630555	0.0001069	-0.0001031		
0.4362838	3.0693001	3.0693001					
0.000002500	40199.	16079740318.	23.2756135	0.0000582	-0.0001818		
0.2380491	-5.2377180	-5.2377180					
0.000002813	40199.	14293102504.	22.8991717	0.0000644	-0.0002056		
0.2629529	-5.9231363	-5.9231363					
0.000003125	40199.	12863792254.	22.5990624	0.0000706	-0.0002294		
0.2877872	-6.6084600	-6.6084600					
0.000003438	40199.	11694356595.	22.3438515	0.0000768	-0.0002532		
0.3124035	-7.2947473	-7.2947473					

0.000003750	40199.	10719826878.	22.1303896	0.0000830	-0.0002770
0.3369259	-7.9811201	-7.9811201 C			
0.000004063	40199.	9895224811.	21.9505952	0.0000892	-0.0003008
0.3613801	-8.6673955	-8.6673955 C			
0.000004375	40199.	9188423039.	21.7972561	0.0000954	-0.0003246
0.3857660	-9.3535731	-9.3535731 C			
0.000004688	40199.	8575861503.	21.6650831	0.0001016	-0.0003484
0.4100834	-10.0396528	-10.0396528 C			
0.000005000	40199.	8039870159.	21.5474208	0.0001077	-0.0003723
0.4342786	-10.7260240	-10.7260240 C			
0.000005313	40199.	7566936620.	21.4411712	0.0001139	-0.0003961
0.4583403	-11.4127695	-11.4127695 C			
0.000005625	40199.	7146551252.	21.3473536	0.0001201	-0.0004199
0.4823347	-12.0994129	-12.0994129 C			
0.000005938	40199.	6770416976.	21.2640069	0.0001263	-0.0004437
0.5062615	-12.7859538	-12.7859538 C			
0.000006250	40199.	6431896127.	21.1895620	0.0001324	-0.0004676
0.5301206	-13.4723919	-13.4723919 C			
0.000006563	40199.	6125615359.	21.1227490	0.0001386	-0.0004914
0.5539120	-14.1587268	-14.1587268 C			
0.000006875	40199.	5847178297.	21.0625285	0.0001448	-0.0005152
0.5776356	-14.8449584	-14.8449584 C			
0.000007188	40199.	5592953154.	21.0080423	0.0001510	-0.0005390
0.6012912	-15.5310862	-15.5310862 C			
0.000007500	40199.	5359913439.	20.9585749	0.0001572	-0.0005628
0.6248787	-16.2171099	-16.2171099 C			
0.000007813	40199.	5145516902.	20.9135255	0.0001634	-0.0005866
0.6483981	-16.9030294	-16.9030294 C			
0.000008125	40199.	4947612405.	20.8723856	0.0001696	-0.0006104
0.6718492	-17.5888441	-17.5888441 C			
0.000008438	40199.	4764367501.	20.8347221	0.0001758	-0.0006342
0.6952319	-18.2745539	-18.2745539 C			
0.000008750	40199.	4594211519.	20.8001638	0.0001820	-0.0006580
0.7185461	-18.9601584	-18.9601584 C			
0.000009063	40199.	4435790432.	20.7683908	0.0001882	-0.0006818
0.7417918	-19.6456573	-19.6456573 C			
0.000009375	40199.	4287930751.	20.7391255	0.0001944	-0.0007056
0.7649687	-20.3310502	-20.3310502 C			
0.000009688	40199.	4149610405.	20.7121266	0.0002006	-0.0007294
0.7880768	-21.0163369	-21.0163369 C			
0.0000100	40199.	4019935079.	20.6871826	0.0002069	-0.0007531
0.8111161	-21.7015170	-21.7015170 C			
0.0000103	40199.	3898118865.	20.6641079	0.0002131	-0.0007769
0.8340863	-22.3865902	-22.3865902 C			
0.0000106	40199.	3783468310.	20.6427385	0.0002193	-0.0008007
0.8569874	-23.0715562	-23.0715562 C			
0.0000109	40199.	3675369215.	20.6219546	0.0002256	-0.0008244
0.8797793	-23.7567237	-23.7567237 C			
0.0000113	40199.	3573275626.	20.6025249	0.0002318	-0.0008482
0.9024966	-24.4418265	-24.4418265 C			
0.0000116	40199.	3476700609.	20.5844843	0.0002380	-0.0008720
0.9251455	-25.1268153	-25.1268153 C			
0.0000119	40199.	3385208488.	20.5677243	0.0002442	-0.0008958
0.9477259	-25.8116902	-25.8116902 C			
0.0000122	40199.	3298408270.	20.5521473	0.0002505	-0.0009195
0.9702376	-26.4964506	-26.4964506 C			
0.0000128	40199.	3137510306.	20.5242002	0.0002630	-0.0009670
1.0150546	-27.8656268	-27.8656268 C			
0.0000134	40199.	2991579594.	20.5000385	0.0002755	-0.0010145
1.0595956	-29.2343412	-29.2343412 C			
0.0000141	40199.	2858620501.	20.4791650	0.0002880	-0.0010620
1.1038597	-30.6025905	-30.6025905 C			
0.0000147	40199.	2736977075.	20.4611671	0.0003005	-0.0011095
1.1478458	-31.9703716	-31.9703716 C			
0.0000153	40879.	2669657381.	20.4457000	0.0003131	-0.0011569
1.1915531	-33.3376817	-33.3376817 C			
0.0000159	42465.	2664444867.	20.4324728	0.0003256	-0.0012044
1.2349807	-34.7045167	-34.7045167 C			
0.0000166	44049.	2659551548.	20.4212386	0.0003382	-0.0012518
1.2781275	-36.0708740	-36.0708740 CY			
0.0000172	45632.	2654942183.	20.4117866	0.0003508	-0.0012992
1.3209926	-37.4367502	-37.4367502 CY			
0.0000178	47214.	2650586471.	20.4039357	0.0003634	-0.0013466
1.3635750	-38.8021420	-38.8021420 CY			
0.0000184	48794.	2646458216.	20.3975292	0.0003761	-0.0013939
1.4058737	-40.1670461	-40.1670461 CY			
0.0000191	50373.	2642534651.	20.3924313	0.0003887	-0.0014413
1.4478877	-41.5314591	-41.5314591 CY			
0.0000197	51951.	2638795898.	20.3885234	0.0004014	-0.0014886
1.4896160	-42.8953774	-42.8953774 CY			
0.0000203	53528.	2635224521.	20.3857016	0.0004141	-0.0015359
1.5310576	-44.2587976	-44.2587976 CY			
0.0000209	55103.	2631805159.	20.3838743	0.0004268	-0.0015832
1.5722114	-45.6217163	-45.6217163 CY			

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0.0000216	56678.	2628524230.	20.3829609	0.0004395	-0.0016305
1.6130764	-46.9841297	-36.0000000 CY			
0.0000222	58250.	2625369678.	20.3828897	0.0004522	-0.0016778
1.6536516	-48.3460344	-36.0000000 CY			
0.0000228	59822.	2622330762.	20.3835971	0.0004650	-0.0017250
1.6939358	-49.7074265	-36.0000000 CY			
0.0000234	61392.	2619397886.	20.3850262	0.0004778	-0.0017722
1.7339281	-51.0683024	-36.0000000 CY			
0.0000241	62961.	2616562443.	20.3871263	0.0004906	-0.0018194
1.7736272	-52.4286584	-36.0000000 CY			
0.0000247	64529.	2613816697.	20.3898516	0.0005034	-0.0018666
1.8130322	-53.7884906	-36.0000000 CY			
0.0000253	66095.	2611153670.	20.3931612	0.0005162	-0.0019138
1.8521419	-55.1477951	-36.0000000 CY			
0.0000259	67660.	2608567052.	20.3970180	0.0005290	-0.0019610
1.8909552	-56.5065680	-36.0000000 CY			
0.0000266	69223.	2606051125.	20.4013885	0.0005419	-0.0020081
1.9294709	-57.8648054	-36.0000000 CY			
0.0000272	70785.	2603600690.	20.4062425	0.0005548	-0.0020552
1.9676879	-59.2225032	-36.0000000 CY			
0.0000278	72346.	2601211015.	20.4115524	0.0005677	-0.0021023
2.0056051	-60.0000000	-36.0000000 CY			
0.0000284	73906.	2598877777.	20.4172931	0.0005806	-0.0021494
2.0432213	-60.0000000	-36.0000000 CY			
0.0000291	75395.	2594224581.	20.4171487	0.0005934	-0.0021966
2.0799979	-60.0000000	-36.0000000 CY			
0.0000297	76631.	2581252113.	20.3948087	0.0006055	-0.0022445
2.1145069	-60.0000000	-36.0000000 CY			
0.0000303	77745.	2564781649.	20.3628885	0.0006173	-0.0022927
2.1477843	-60.0000000	-36.0000000 CY			
0.0000309	78741.	2545148376.	20.3220245	0.0006287	-0.0023413
2.1798598	-60.0000000	-36.0000000 CY			
0.0000316	79668.	2524143096.	20.2770481	0.0006400	-0.0023900
2.2111422	-60.0000000	-36.0000000 CY			
0.0000322	80516.	2501456390.	20.2269353	0.0006511	-0.0024389
2.2415305	-60.0000000	-36.0000000 CY			
0.0000328	81324.	2478437749.	20.1755207	0.0006620	-0.0024880
2.2713647	-60.0000000	-36.0000000 CY			
0.0000334	82055.	2453990882.	20.1193964	0.0006727	-0.0025373
2.3003306	-60.0000000	-36.0000000 CY			
0.0000341	82773.	2430024971.	20.0644043	0.0006834	-0.0025866
2.3289652	-60.0000000	-36.0000000 CY			
0.0000347	83438.	2405410941.	20.0068754	0.0006940	-0.0026360
2.3569306	-60.0000000	-36.0000000 CY			
0.0000353	84048.	2380116107.	19.9466796	0.0007044	-0.0026856
2.3842123	-60.0000000	-36.0000000 CY			
0.0000359	84655.	2355604833.	19.8885817	0.0007147	-0.0027353
2.4112660	-60.0000000	-36.0000000 CY			
0.0000366	85242.	2331409568.	19.8310070	0.0007251	-0.0027849
2.4379495	-60.0000000	-36.0000000 CY			
0.0000372	85755.	2306015576.	19.7686936	0.0007351	-0.0028349
2.4637548	-60.0000000	-36.0000000 CY			
0.0000397	87688.	2209462597.	19.5211830	0.0007747	-0.0030353
2.5630230	-60.0000000	-36.0000000 CY			
0.0000422	89311.	2116997690.	19.2723980	0.0008131	-0.0032369
2.6558030	-60.0000000	-36.0000000 CY			
0.0000447	90666.	2028897321.	19.0288985	0.0008504	-0.0034396
2.7430923	-60.0000000	-36.0000000 CY			
0.0000472	91914.	1947837147.	18.8037810	0.0008873	-0.0036427
2.8266475	-60.0000000	-36.0000000 CY			
0.0000497	92935.	1870394902.	18.5723855	0.0009228	-0.0038472
2.9041402	-60.0000000	-36.0000000 CY			
0.0000522	93919.	1799642714.	18.3562982	0.0009580	-0.0040520
2.9782184	-60.0000000	-36.0000000 CY			
0.0000547	94707.	1731788212.	18.1415931	0.0009921	-0.0042579
3.0476261	-60.0000000	-36.0000000 CY			
0.0000572	95489.	1669759374.	17.9472538	0.0010264	-0.0044636
3.1147746	-60.0000000	-36.0000000 CY			
0.0000597	96193.	1611617706.	17.7627237	0.0010602	-0.0046698
3.1787266	-60.0000000	-36.0000000 CY			
0.0000622	96778.	1556234594.	17.5684223	0.0010925	-0.0048775
3.2374499	-60.0000000	-36.0000000 CY			
0.0000647	97358.	1505052227.	17.3901878	0.0011249	-0.0050851
3.2941161	-60.0000000	-36.0000000 CY			
0.0000672	97910.	1457268109.	17.2236537	0.0011572	-0.0052928
3.3484149	-60.0000000	-36.0000000 CY			
0.0000697	98371.	1411600673.	17.0598235	0.0011889	-0.0055011
3.3994827	-60.0000000	-36.0000000 CY			
0.0000722	98803.	1368698010.	16.9055547	0.0012204	-0.0057096
3.4482636	-60.0000000	-36.0000000 CY			
0.0000747	99229.	1328586255.	16.7592849	0.0012517	-0.0059183
3.4947164	-60.0000000	-36.0000000 CY			
0.0000772	99636.	1290836528.	16.6133481	0.0012823	-0.0061277
3.5381103	-60.0000000	-36.0000000 CY			

0.0000797	100001.	1254915597.	16.4722224	0.0013126	-0.0063374
3.5790800	-60.0000000	36.0000000	CY		
0.0000822	100305.	1220443725.	16.3330101	0.0013424	-0.0065476
3.6174284	-60.0000000	36.0000000	CY		
0.0000847	100606.	1187963841.	16.2028148	0.0013722	-0.0067578
3.6540298	-60.0000000	36.0000000	CY		
0.0000872	100904.	1157325726.	16.0811120	0.0014021	-0.0069679
3.6888970	-60.0000000	36.0000000	CY		
0.0000897	101201.	1128375046.	15.9672019	0.0014321	-0.0071779
3.7220138	-60.0000000	36.0000000	CY		
0.0000922	101494.	1100955635.	15.8602249	0.0014621	-0.0073879
3.7533407	-60.0000000	36.0000000	CY		
0.0000947	101748.	1074567875.	15.7468319	0.0014910	-0.0075990
3.7816648	-60.0000000	36.0000000	CY		
0.0000972	101964.	1049150784.	15.6330376	0.0015193	-0.0078107
3.8076990	-60.0000000	36.0000000	CY		
0.0000997	102165.	1024852390.	15.5236562	0.0015475	-0.0080225
3.8319688	-60.0000000	36.0000000	CY		
0.0001022	102364.	1001729011.	15.4204526	0.0015758	-0.0082342
3.8546702	-60.0000000	36.0000000	CY		
0.0001047	102562.	979696254.	15.3229929	0.0016041	-0.0084459
3.8757887	-60.0000000	36.0000000	CY		
0.0001072	102758.	958677597.	15.2308837	0.0016326	-0.0086574
3.8953092	-60.0000000	36.0000000	CY		
0.0001097	102953.	938603490.	15.1437677	0.0016611	-0.0088689
3.9132163	-60.0000000	36.0000000	CY		
0.0001122	103146.	919410580.	15.0613198	0.0016897	-0.0090803
3.9294947	-60.0000000	36.0000000	CY		
0.0001147	103331.	900975235.	14.9820338	0.0017183	-0.0092917
3.9440590	-60.0000000	36.0000000	CY		
0.0001172	103484.	883064653.	14.9022937	0.0017464	-0.0095036
3.9567421	-60.0000000	36.0000000	CY		
0.0001197	103627.	865813141.	14.8193594	0.0017737	-0.0097163
3.9674990	-60.0000000	36.0000000	CY		
0.0001222	103751.	849116818.	14.7352463	0.0018005	-0.0099295
3.9765396	-60.0000000	36.0000000	CY		
0.0001247	103875.	833080881.	14.6551700	0.0018273	-0.0101427
3.9841322	-60.0000000	36.0000000	CY		
0.0001272	103997.	817666247.	14.5788999	0.0018543	-0.0103557
3.9902626	-60.0000000	36.0000000	CY		
0.0001297	104118.	802836844.	14.5062236	0.0018813	-0.0105687
3.9949164	-60.0000000	36.0000000	CY		
0.0001322	104238.	788559326.	14.4369447	0.0019084	-0.0107816
3.9980790	-60.0000000	36.0000000	CY		
0.0001347	104356.	774802820.	14.3708817	0.0019356	-0.0109944
3.9997354	-60.0000000	36.0000000	CY		
0.0001372	104473.	761535675.	14.3080038	0.0019629	-0.0112071
3.9966270	-60.0000000	36.0000000	CY		
0.0001522	105080.	690462713.	13.9746590	0.0021268	-0.0124832
3.9933070	-60.0000000	36.0000000	CY		
0.0001672	105485.	630936540.	13.6611786	0.0022840	-0.0137660
3.9999859	60.0000000	36.0000000	CY		
0.0001822	105847.	580978711.	13.4064289	0.0024425	-0.0150475
3.9964824	60.0000000	36.0000000	CY		
0.0001972	106169.	538416322.	13.1978137	0.0026024	-0.0163276
3.9831880	60.0000000	36.0000000	CY		
0.0002122	106397.	501427385.	13.0100923	0.0027606	-0.0176094
3.9979844	60.0000000	36.0000000	CY		
0.0002272	106560.	469038925.	12.8369870	0.0029164	-0.0188936
3.9847370	60.0000000	36.0000000	CY		
0.0002422	106702.	440576970.	12.6844494	0.0030720	-0.0201780
3.9902754	60.0000000	36.0000000	CY		
0.0002572	106821.	415344610.	12.5639469	0.0032313	-0.0214587
3.9998120	60.0000000	36.0000000	CY		
0.0002722	106913.	392791207.	12.4721396	0.0033948	-0.0227352
3.9776333	60.0000000	36.0000000	CY		
0.0002872	106992.	372550057.	12.3915361	0.0035587	-0.0240113
3.9839118	60.0000000	36.0000000	CY		
0.0003022	107022.	354156860.	12.3176055	0.0037222	-0.0252878
3.9972237	60.0000000	36.0000000	CY		
0.0003172	107040.	337466912.	12.2587844	0.0038883	-0.0265617
3.9928478	60.0000000	36.0000000	CY		

Axial Thrust Force = 75.064 kips

Bending Concrete Curvature Stress rad/in. ksi	Bending Max Steel Moment Stress in-kip ksi	Bending Max Casing Stiffness Msg kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Stress ksi
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0.000000313	5830.4427595	18657416830.	55.5924322	0.0000174	-0.0000126
0.0727107	0.4994564	0.4994564			
0.000000625	11632.	18611663459.	51.8085058	0.0000324	-0.0000276
0.1349012	0.9303292	0.9303292			
0.000000938	17405.	18564944419.	50.5472848	0.0000474	-0.0000426
0.1965956	1.3612043	1.3612043			
0.000001250	23147.	18517981596.	49.9167216	0.0000624	-0.0000576
0.2577940	1.7920812	1.7920812			
0.000001563	28861.	18470920999.	49.5384185	0.0000774	-0.0000726
0.3184962	2.2229596	2.2229596			
0.000001875	34545.	18423811497.	49.2862455	0.0000924	-0.0000876
0.3787023	2.6538396	2.6538396			
0.000002188	40199.	18376674010.	49.1061461	0.0001074	-0.0001026
0.4384122	3.0847211	3.0847211			
0.000002500	40199.	16079589759.	24.2177476	0.0000605	-0.0001795
0.2477305	-5.1694133	-5.1694133 C			
0.000002813	40199.	14292968675.	23.7561744	0.0000668	-0.0002032
0.2728272	-5.8532370	-5.8532370 C			
0.000003125	40199.	12863671807.	23.3814662	0.0000731	-0.0002269
0.2977702	-6.5375546	-6.5375546 C			
0.000003438	40199.	11694247098.	23.0663622	0.0000793	-0.0002507
0.3225104	-7.2227220	-7.2227220 C			
0.000003750	40199.	10719726506.	22.8046521	0.0000855	-0.0002745
0.3471809	-7.9077941	-7.9077941 C			
0.000004063	40199.	9895132159.	22.5840163	0.0000917	-0.0002983
0.3717817	-8.5927706	-8.5927706 C			
0.000004375	40199.	9188337005.	22.3871313	0.0000979	-0.0003221
0.3961625	-9.2787327	-9.2787327 C			
0.000004688	40199.	8575781205.	22.2161419	0.0001041	-0.0003459
0.4204545	-9.9647432	-9.9647432 C			
0.000005000	40199.	8039794880.	22.0672057	0.0001103	-0.0003697
0.4446779	-10.6506552	-10.6506552 C			
0.000005313	40199.	7566865769.	21.9364326	0.0001165	-0.0003935
0.4688326	-11.3364683	-11.3364683 C			
0.000005625	40199.	7146484337.	21.8207971	0.0001227	-0.0004173
0.4929186	-12.0221825	-12.0221825 C			
0.000005938	40199.	6770353583.	21.7179107	0.0001290	-0.0004410
0.5169357	-12.7077972	-12.7077972 C			
0.000006250	40199.	6431835904.	21.6258626	0.0001352	-0.0004648
0.5408839	-13.3933124	-13.3933124 C			
0.000006563	40199.	6125558003.	21.5400208	0.0001414	-0.0004886
0.5646833	-14.0793148	-14.0793148 C			
0.000006875	40199.	5847123549.	21.4612295	0.0001475	-0.0005125
0.5883804	-14.7654674	-14.7654674 C			
0.000007188	40199.	5592900786.	21.3897885	0.0001537	-0.0005363
0.6120094	-15.4515159	-15.4515159 C			
0.000007500	40199.	5359863253.	21.3247807	0.0001599	-0.0005601
0.6355703	-16.1374602	-16.1374602 C			
0.000007813	40199.	5145468723.	21.2654352	0.0001661	-0.0005839
0.6590630	-16.8232998	-16.8232998 C			
0.000008125	40199.	4947566080.	21.2111003	0.0001723	-0.0006077
0.6824873	-17.5090345	-17.5090345 C			
0.000008438	40199.	4764322892.	21.1612203	0.0001785	-0.0006315
0.7058433	-18.1946639	-18.1946639 C			
0.000008750	40199.	4594168503.	21.1153193	0.0001848	-0.0006552
0.7291306	-18.8801877	-18.8801877 C			
0.000009063	40199.	4435748899.	21.0729868	0.0001910	-0.0006790
0.7523494	-19.5656056	-19.5656056 C			
0.000009375	40199.	4287890602.	21.0338673	0.0001972	-0.0007028
0.7754993	-20.2509173	-20.2509173 C			
0.000009688	40199.	4149571551.	20.9976508	0.0002034	-0.0007266
0.7985804	-20.9361224	-20.9361224 C			
0.0000100	40199.	4019897440.	20.9640664	0.0002096	-0.0007504
0.8215926	-21.6212207	-21.6212207 C			
0.0000103	40199.	3898082366.	20.9328759	0.0002159	-0.0007741
0.8445356	-22.3062118	-22.3062118 C			
0.0000106	40199.	3783432885.	20.9038692	0.0002221	-0.0007979
0.8674095	-22.9910953	-22.9910953 C			
0.0000109	40199.	3675334802.	20.8768600	0.0002283	-0.0008217
0.8902140	-23.6758709	-23.6758709 C			
0.0000113	40199.	3573242169.	20.8516830	0.0002346	-0.0008454
0.9129492	-24.3605384	-24.3605384 C			
0.0000116	40199.	3476668056.	20.8281906	0.0002408	-0.0008692
0.9356148	-25.0450973	-25.0450973 C			
0.0000119	40199.	3385176791.	20.8062508	0.0002471	-0.0008929
0.9582108	-25.7295474	-25.7295474 C			
0.0000122	40199.	3298377386.	20.7857451	0.0002533	-0.0009167
0.9807371	-26.4138882	-26.4138882 C			
0.0000128	40199.	3137480929.	20.7486200	0.0002658	-0.0009642
1.0255800	-27.7822408	-27.7822408 C			
0.0000134	40199.	2991551583.	20.7160800	0.0002784	-0.0010116
1.0701425	-29.1501525	-29.1501525 C			
0.0000141	40199.	2858593735.	20.6875206	0.0002909	-0.0010591
1.1144239	-30.5176205	-30.5176205 C			

0.0000147	40199.	2736951448.	20.6624403	0.0003035	-0.0011065
1.1584231	-31.8846418	-31.8846418 C			
0.0000153	41339.	2699713091.	20.6404194	0.0003161	-0.0011539
1.2021392	-33.2512137	-33.2512137 C			
0.0000159	42924.	2693294728.	20.6200044	0.0003286	-0.0012014
1.2455097	-34.6178417	-34.6178417 C			
0.0000166	44508.	2687286328.	20.6021056	0.0003412	-0.0012488
1.2885978	-35.9840011	-35.9840011 C			
0.0000172	46091.	2681642662.	20.5864769	0.0003538	-0.0012962
1.3314038	-37.3496784	-36.0000000 CY			
0.0000178	47672.	2676325228.	20.5728856	0.0003665	-0.0013435
1.3739268	-38.7148691	-36.0000000 CY			
0.0000184	49252.	2671300284.	20.5611311	0.0003791	-0.0013909
1.4161659	-40.0795705	-36.0000000 CY			
0.0000191	50831.	2666538665.	20.5510387	0.0003918	-0.0014382
1.4581200	-41.4437791	-36.0000000 CY			
0.0000197	52408.	2662014905.	20.5424562	0.0004044	-0.0014856
1.4997880	-42.8074915	-36.0000000 CY			
0.0000203	53985.	2657706671.	20.5352503	0.0004171	-0.0015329
1.5411690	-44.1707042	-36.0000000 CY			
0.0000209	55560.	2653594288.	20.5293034	0.0004298	-0.0015802
1.5822619	-45.5334136	-36.0000000 CY			
0.0000216	57133.	2649660360.	20.5245120	0.0004426	-0.0016274
1.6230657	-46.8956161	-36.0000000 CY			
0.0000222	58706.	2645889447.	20.5207839	0.0004553	-0.0016747
1.6635792	-48.2573081	-36.0000000 CY			
0.0000228	60277.	2642267796.	20.5180374	0.0004681	-0.0017219
1.7038015	-49.6184858	-36.0000000 CY			
0.0000234	61846.	2638783117.	20.5161995	0.0004808	-0.0017692
1.7437315	-50.9791456	-36.0000000 CY			
0.0000241	63415.	2635424392.	20.5152048	0.0004936	-0.0018164
1.7833681	-52.3392836	-36.0000000 CY			
0.0000247	64982.	2632181717.	20.5149946	0.0005065	-0.0018635
1.8227101	-53.6988960	-36.0000000 CY			
0.0000253	66548.	2629046160.	20.5155161	0.0005193	-0.0019107
1.8617564	-55.0579789	-36.0000000 CY			
0.0000259	68112.	2626009645.	20.5167216	0.0005322	-0.0019578
1.9005060	-56.4165284	-36.0000000 CY			
0.0000266	69675.	2623064856.	20.5185682	0.0005450	-0.0020050
1.9389577	-57.7745404	-36.0000000 CY			
0.0000272	71237.	2620205140.	20.5210166	0.0005579	-0.0020521
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0.0000278	72797.	2617424444.	20.5240314	0.0005708	-0.0020992
2.0149627	-60.0000000	-36.0000000 CY			
0.0000284	74356.	2614717238.	20.5275804	0.0005838	-0.0021462
2.0525137	-60.0000000	-36.0000000 CY			
0.0000291	75859.	2610215792.	20.5266930	0.0005966	-0.0021934
2.0893412	-60.0000000	-36.0000000 CY			
0.0000297	77108.	2597323684.	20.5034555	0.0006087	-0.0022413
2.1238872	-60.0000000	-36.0000000 CY			
0.0000303	78233.	2580895106.	20.4705972	0.0006205	-0.0022895
2.1571950	-60.0000000	-36.0000000 CY			
0.0000309	79231.	2560990179.	20.4279489	0.0006320	-0.0023380
2.1892232	-60.0000000	-36.0000000 CY			
0.0000316	80168.	2539961638.	20.3819496	0.0006433	-0.0023867
2.2205206	-60.0000000	-36.0000000 CY			
0.0000322	81015.	2516979730.	20.3300464	0.0006544	-0.0024356
2.2508510	-60.0000000	-36.0000000 CY			
0.0000328	81828.	2493811304.	20.2773152	0.0006653	-0.0024847
2.2806647	-60.0000000	-36.0000000 CY			
0.0000334	82564.	2469214894.	20.2199041	0.0006761	-0.0025339
2.3096091	-60.0000000	-36.0000000 CY			
0.0000341	83283.	2445002385.	20.1633590	0.0006868	-0.0025832
2.3381923	-60.0000000	-36.0000000 CY			
0.0000347	83955.	2420331620.	20.1049156	0.0006974	-0.0026326
2.3661616	-60.0000000	-36.0000000 CY			
0.0000353	84566.	2394783386.	20.0431865	0.0007078	-0.0026822
2.3933854	-60.0000000	-36.0000000 CY			
0.0000359	85172.	2370009777.	19.9835506	0.0007182	-0.0027318
2.4203753	-60.0000000	-36.0000000 CY			
0.0000366	85762.	2345616359.	19.9246770	0.0007285	-0.0027815
2.4470133	-60.0000000	-36.0000000 CY			
0.0000372	86281.	2320169310.	19.8615816	0.0007386	-0.0028314
2.4728205	-60.0000000	-36.0000000 CY			
0.0000397	88225.	2223000867.	19.6155796	0.0007785	-0.0030315
2.5725306	-60.0000000	-36.0000000 CY			
0.0000422	89852.	2129813807.	19.3620824	0.0008168	-0.0032332
2.6650892	-60.0000000	-36.0000000 CY			
0.0000447	91213.	2041129208.	19.1146282	0.0008542	-0.0034358
2.7521839	-60.0000000	-36.0000000 CY			
0.0000472	92468.	1959583563.	18.8862072	0.0008912	-0.0036388
2.8355648	-60.0000000	-36.0000000 CY			
0.0000497	93494.	1881646971.	18.6571741	0.0009270	-0.0038430
2.9134725	-60.0000000	-36.0000000 CY			

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0.0000522	94485.	1810495753.	18.4382802	0.0009622	-0.0040478
2.9873689	-60.0000000	-36.0000000	CY		
0.0000547	95273.	1742140941.	18.2201864	0.0009964	-0.0042536
3.0565001	-60.0000000	-36.0000000	CY		
0.0000572	96055.	1679650534.	18.0227340	0.0010307	-0.0044593
3.1233660	-60.0000000	-36.0000000	CY		
0.0000597	96764.	1621183680.	17.8359887	0.0010646	-0.0046654
3.1871090	-60.0000000	-36.0000000	CY		
0.0000622	97357.	1565534584.	17.6453911	0.0010973	-0.0048727
3.2462878	-60.0000000	-36.0000000	CY		
0.0000647	97936.	1513982630.	17.4644677	0.0011297	-0.0050803
3.3026509	-60.0000000	-36.0000000	CY		
0.0000672	98491.	1465914320.	17.2959209	0.0011621	-0.0052879
3.3566997	-60.0000000	-36.0000000	CY		
0.0000697	98955.	1419982810.	17.1302118	0.0011938	-0.0054962
3.4075163	-60.0000000	-36.0000000	CY		
0.0000722	99386.	1376781115.	16.9737390	0.0012253	-0.0057047
3.4559894	-60.0000000	-36.0000000	CY		
0.0000747	99815.	1336440282.	16.8290311	0.0012569	-0.0059131
3.5025381	-60.0000000	-36.0000000	CY		
0.0000772	100227.	1298486315.	16.6840587	0.0012878	-0.0061222
3.5459429	-60.0000000	-36.0000000	CY		
0.0000797	100597.	1262391728.	16.5417710	0.0013182	-0.0063318
3.5866704	-60.0000000	-36.0000000	CY		
0.0000822	100901.	1227687691.	16.4006962	0.0013479	-0.0065421
3.6246902	-60.0000000	-36.0000000	CY		
0.0000847	101200.	1194987011.	16.2687269	0.0013778	-0.0067522
3.6609572	-60.0000000	-36.0000000	CY		
0.0000872	101499.	1164140692.	16.1453569	0.0014077	-0.0069623
3.6954870	-60.0000000	-36.0000000	CY		
0.0000897	101795.	1134993345.	16.0298777	0.0014377	-0.0071723
3.7282632	-60.0000000	-36.0000000	CY		
0.0000922	102088.	1107389839.	15.9214460	0.0014678	-0.0073822
3.7592488	-60.0000000	-36.0000000	CY		
0.0000947	102353.	1080958780.	15.8140172	0.0014974	-0.0075926
3.7879228	-60.0000000	-36.0000000	CY		
0.0000972	102570.	1055380575.	15.6988611	0.0015257	-0.0078043
3.8136019	-60.0000000	-36.0000000	CY		
0.0000997	102770.	1030926601.	15.5881453	0.0015539	-0.0080161
3.8375106	-60.0000000	-36.0000000	CY		
0.0001022	102969.	1007649123.	15.4835856	0.0015822	-0.0082278
3.8598388	-60.0000000	-36.0000000	CY		
0.0001047	103166.	985469569.	15.3848395	0.0016106	-0.0084394
3.8805805	-60.0000000	-36.0000000	CY		
0.0001072	103362.	964310905.	15.2915088	0.0016391	-0.0086509
3.8997204	-60.0000000	-36.0000000	CY		
0.0001097	103556.	944103116.	15.2032321	0.0016676	-0.0088624
3.9172431	-60.0000000	-36.0000000	CY		
0.0001122	103749.	924782422.	15.1196802	0.0016962	-0.0090738
3.9331332	-60.0000000	-36.0000000	CY		
0.0001147	103937.	906263799.	15.0400580	0.0017249	-0.0092851
3.9473469	-60.0000000	-36.0000000	CY		
0.0001172	104090.	888235497.	14.9592813	0.0017530	-0.0094970
3.9596374	-60.0000000	-36.0000000	CY		
0.0001197	104242.	870948561.	14.8826122	0.0017813	-0.0097087
3.9703288	-60.0000000	-36.0000000	CY		
0.0001222	104366.	854148399.	14.7978307	0.0018081	-0.0099219
3.9789577	-60.0000000	-36.0000000	CY		
0.0001247	104489.	838007154.	14.7167340	0.0018350	-0.0101350
3.9861165	-60.0000000	-36.0000000	CY		
0.0001272	104611.	822491303.	14.6394891	0.0018620	-0.0103480
3.9918084	-60.0000000	-36.0000000	CY		
0.0001297	104731.	807564533.	14.5658809	0.0018890	-0.0105610
3.9960189	-60.0000000	-36.0000000	CY		
0.0001322	104850.	793193280.	14.4957108	0.0019162	-0.0107738
3.9987331	-60.0000000	-36.0000000	CY		
0.0001347	104968.	779346466.	14.4287952	0.0019434	-0.0109866
3.9999360	-60.0000000	-36.0000000	CY		
0.0001372	105084.	765990192.	14.3651957	0.0019707	-0.0111993
3.9941671	-60.0000000	-36.0000000	CY		
0.0001522	105692.	694484906.	14.0284864	0.0021350	-0.0124750
3.9907387	-60.0000000	-36.0000000	CY		
0.0001672	106103.	634637251.	13.7198296	0.0022938	-0.0137562
3.9980364	60.0000000	36.0000000	CY		
0.0001822	106463.	584361228.	13.4614628	0.0024525	-0.0150375
3.9976304	60.0000000	36.0000000	CY		
0.0001972	106784.	541534046.	13.2502811	0.0026128	-0.0163172
3.9823408	60.0000000	36.0000000	CY		
0.0002122	107014.	504338826.	13.0607669	0.0027713	-0.0175987
3.9988781	60.0000000	36.0000000	CY		
0.0002272	107181.	471773234.	12.8971423	0.0029301	-0.0188799
3.9804522	60.0000000	36.0000000	CY		
0.0002422	107322.	443136508.	12.7418507	0.0030859	-0.0201641
3.9929653	60.0000000	36.0000000	CY		

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0.0002572	107435.	417728881.	12.6220285	0.0032462	-0.0214438	
3.9993708	60.0000000	36.0000000	CY			
0.0002722	107524.	395036377.	12.5286602	0.0034101	-0.0227199	
3.9728100	60.0000000	36.0000000	CY			
0.0002872	107606.	374690542.	12.4480146	0.0035749	-0.0239951	
3.9879787	60.0000000	36.0000000	CY			
0.0003022	107632.	356175409.	12.3744829	0.0037394	-0.0252706	
3.9988120	60.0000000	36.0000000	CY			
0.0003172	107648.	339382386.	12.3149144	0.0039061	-0.0265439	
3.9872659	60.0000000	36.0000000	CY			

 Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
 or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	58.568	106636.309	0.00300000
2	75.064	107244.313	0.00300000

Note note that the values of moment capacity in the table above are not factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether the transverse reinforcing steel bars are spirals or tied hoops.

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318-08, Section 9.3.2.2 or the value required by the design standard being followed.

For Analysis Case 1, Iteration 196, Y(top) = 2.5176E-01, dYmax = 1.1378E-04, Delta dYmax = 1.5909E-05
 For Analysis Case 1, Iteration 197, Y(top) = 2.5187E-01, dYmax = 1.0809E-04, Delta dYmax = 5.6911E-06
 For Analysis Case 1, Iteration 198, Y(top) = 2.5196E-01, dYmax = 9.0126E-05, Delta dYmax = 1.7963E-05

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 26292.000 lbs
 Applied moment at pile head = 39256432.000 in-lbs
 Axial thrust load on pile head = 75064.000 lbs

Depth Distrib. X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. p	Soil Spr. Es*h
Lat. Load inches lb/inch	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in	lb/inch
0.00	0.2520	39256432.	26292.	-0.001610	0.000	1.838E+13	0.000	
0.000	0.000							
3.240	0.2468	39342009.	26252.	-0.001603	0.000	1.838E+13	-24.9431	
327.5169	0.000							
6.480	0.2416	39427322.	26132.	-0.001596	0.000	1.838E+13	-48.8381	
655.0339	0.000							
9.720	0.2364	39512121.	25937.	-0.001589	0.000	1.838E+13	-71.6920	
982.5508	0.000							
12.960	0.2313	39596166.	25669.	-0.001583	0.000	1.838E+13	-93.5116	
1310.0678	0.000							
16.200	0.2262	39679227.	25333.	-0.001576	0.000	1.838E+13	-114.3037	
1637.5847	0.000							
19.440	0.2211	39761087.	24930.	-0.001569	0.000	1.838E+13	-134.0753	
1965.1017	0.000							
22.680	0.2160	39841538.	24465.	-0.001562	0.000	1.838E+13	-152.8332	
2292.6186	0.000							
25.920	0.2109	39920382.	23941.	-0.001554	0.000	1.838E+13	-170.5844	
2620.1356	0.000							
29.160	0.2059	39997434.	23362.	-0.001547	0.000	1.838E+13	-187.3357	
2947.6525	0.000							
32.400	0.2009	40072518.	22729.	-0.001540	0.000	1.838E+13	-203.0943	

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3275.1694	0.000							
35.640	0.1959	40145468.	22047.	-0.001533	0.000	1.838E+13	-217.8670	
3602.6864	0.000							
38.880	0.1910	40216129.	21319.	-0.001526	0.000	1.657E+13	-231.6608	
3930.2033	0.000							
42.120	0.1860	40284356.	20548.	-0.001516	0.000	1.182E+13	-244.4860	
4257.7203	0.000							
45.360	0.1812	40350015.	19736.	-0.001503	0.000	8.539E+12	-256.3650	
4585.2372	0.000							
48.600	0.1763	40412978.	18888.	-0.001485	0.000	6.249E+12	-267.3296	
4912.7542	0.000							
51.840	0.1715	40473130.	18005.	-0.001460	0.000	4.635E+12	-277.4243	
5240.2711	0.000							
55.080	0.1668	40530362.	17091.	-0.001427	0.000	3.487E+12	-286.7107	
5567.7880	0.000							
58.320	0.1623	40584576.	16149.	-0.001385	0.000	2.725E+12	-295.2717	
5895.3050	0.000							
61.560	0.1579	40635679.	14150.	-0.001336	0.000	2.722E+12	-938.3731	
19258.	0.000							
64.800	0.1536	40676918.	11054.	-0.001288	0.000	2.721E+12	-972.7743	
20517.	0.000							
68.040	0.1495	40707935.	7850.1214	-0.001239	0.000	2.720E+12	-1004.9280	
21775.	0.000							
71.280	0.1456	40728390.	4545.4085	-0.001191	0.000	2.719E+12	-1035.0183	
23034.	0.000							
74.520	0.1418	40737968.	1146.2476	-0.001142	0.000	2.719E+12	-1063.2292	
24292.	0.000							
77.760	0.1382	40736373.	-2341.5693	-0.001094	0.000	2.719E+12	-1089.7443	
25551.	0.000							
81.000	0.1347	40723327.	-5912.8448	-0.001045	0.000	2.719E+12	-1114.7468	
26809.	0.000							
84.240	0.1314	40698567.	-9562.9739	-0.000997	0.000	2.720E+12	-1138.4193	
28068.	0.000							
87.480	0.1283	40661844.	-13288.	-0.000948	0.000	2.721E+12	-1160.9438	
29326.	0.000							
90.720	0.1253	40612922.	-17084.	-0.000900	0.000	2.723E+12	-1182.5012	
30585.	0.000							
93.960	0.1224	40551575.	-20949.	-0.000852	0.000	2.732E+12	-1203.2716	
31843.	0.000							
97.200	0.1198	40477585.	-24881.	-0.000811	0.000	3.838E+12	-1223.4299	
33101.	0.000							
100.440	0.1172	40390743.	-28876.	-0.000782	0.000	5.768E+12	-1242.6792	
34360.	0.000							
103.680	0.1147	40290851.	-32931.	-0.000764	0.000	9.246E+12	-1260.7395	
35618.	0.000							
106.920	0.1122	40177721.	-37043.	-0.000753	0.000	1.581E+13	-1277.3804	
36877.	0.000							
110.160	0.1098	40051179.	-41206.	-0.000745	0.000	1.838E+13	-1292.4309	
38135.	0.000							
113.400	0.1074	39911068.	-45415.	-0.000738	0.000	1.838E+13	-1305.8758	
39394.	0.000							
116.640	0.1050	39757247.	-49666.	-0.000731	0.000	1.838E+13	-1317.7408	
40652.	0.000							
119.880	0.1027	39589591.	-53952.	-0.000724	0.000	1.838E+13	-1328.0512	
41911.	0.000							
123.120	0.1003	39407992.	-58269.	-0.000717	0.000	1.838E+13	-1336.8323	
43169.	0.000							
126.360	0.0980	39212358.	-62612.	-0.000710	0.000	1.838E+13	-1344.1089	
44428.	0.000							
129.600	0.0957	39002612.	-66976.	-0.000703	0.000	1.839E+13	-1349.9057	
45686.	0.000							
132.840	0.0935	38778694.	-71357.	-0.000696	0.000	1.839E+13	-1354.2469	
46945.	0.000							
136.080	0.0912	38540557.	-75749.	-0.000689	0.000	1.839E+13	-1357.1567	
48203.	0.000							
139.320	0.0890	38288173.	-80149.	-0.000683	0.000	1.839E+13	-1358.6586	
49462.	0.000							
142.560	0.0868	38021523.	-84551.	-0.000676	0.000	1.839E+13	-1358.7760	
50720.	0.000							
145.800	0.0846	37740609.	-88952.	-0.000669	0.000	1.840E+13	-1357.5320	
51978.	0.000							
149.040	0.0825	37445442.	-93346.	-0.000663	0.000	1.840E+13	-1354.9491	
53237.	0.000							
152.280	0.0803	37136049.	-97730.	-0.000656	0.000	1.840E+13	-1351.0495	
54495.	0.000							
155.520	0.0782	36812473.	-102099.	-0.000650	0.000	1.840E+13	-1345.8551	
55754.	0.000							
158.760	0.0761	36474766.	-106449.	-0.000643	0.000	1.841E+13	-1339.3872	
57012.	0.000							
162.000	0.0740	36122997.	-110776.	-0.000637	0.000	1.841E+13	-1331.6668	
58271.	0.000							
165.240	0.0720	35757248.	-115076.	-0.000630	0.000	1.841E+13	-1322.7144	
59529.	0.000							
168.480	0.0700	35377612.	-119326.	-0.000624	0.000	1.842E+13	-1300.5657	

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60233.	0.000							
171.720	0.0679	34984321.	-123522.	-0.000618	0.000	1.842E+13	-1289.5534	
61491.	0.000							
174.960	0.0660	34577492.	-127680.	-0.000612	0.000	1.842E+13	-1277.3643	
62750.	0.000							
178.200	0.0640	34157252.	-131797.	-0.000606	0.000	1.843E+13	-1264.0169	
64008.	0.000							
181.440	0.0620	33723741.	-135869.	-0.000600	0.000	1.843E+13	-1249.5293	
65267.	0.000							
184.680	0.0601	33277112.	-139892.	-0.000594	0.000	1.843E+13	-1233.9190	
66525.	0.000							
187.920	0.0582	32817528.	-143863.	-0.000588	0.000	1.844E+13	-1217.2031	
67783.	0.000							
191.160	0.0563	32345166.	-147778.	-0.000582	0.000	1.844E+13	-1199.3979	
69042.	0.000							
194.400	0.0544	31860211.	-151633.	-0.000577	0.000	1.844E+13	-1180.5193	
70300.	0.000							
197.640	0.0525	31362862.	-155426.	-0.000571	0.000	1.845E+13	-1160.5825	
71559.	0.000							
200.880	0.0507	30853328.	-159152.	-0.000566	0.000	1.845E+13	-1139.6024	
72817.	0.000							
204.120	0.0489	30331830.	-162809.	-0.000560	0.000	1.846E+13	-1117.5929	
74076.	0.000							
207.360	0.0471	29798598.	-166393.	-0.000555	0.000	1.846E+13	-1094.5674	
75334.	0.000							
210.600	0.0453	29253875.	-169900.	-0.000550	0.000	1.847E+13	-1070.5389	
76593.	0.000							
213.840	0.0435	28697913.	-173328.	-0.000545	0.000	1.847E+13	-1045.5195	
77851.	0.000							
217.080	0.0418	28130974.	-176674.	-0.000540	0.000	1.848E+13	-1019.5207	
79110.	0.000							
220.320	0.0400	27553331.	-179933.	-0.000535	0.000	1.848E+13	-992.5536	
80368.	0.000							
223.560	0.0383	26965268.	-183104.	-0.000530	0.000	1.848E+13	-964.6283	
81627.	0.000							
226.800	0.0366	26367077.	-186182.	-0.000525	0.000	1.849E+13	-935.7544	
82885.	0.000							
230.040	0.0349	25759062.	-189166.	-0.000521	0.000	1.849E+13	-905.9409	
84144.	0.000							
233.280	0.0332	25141536.	-192051.	-0.000516	0.000	1.850E+13	-875.1961	
85402.	0.000							
236.520	0.0315	24514821.	-194836.	-0.000512	0.000	1.850E+13	-843.5274	
86660.	0.000							
239.760	0.0299	23879250.	-197516.	-0.000508	0.000	1.851E+13	-810.9418	
87919.	0.000							
243.000	0.0282	23235165.	-200089.	-0.000504	0.000	1.852E+13	-777.4453	
89177.	0.000							
246.240	0.0266	22582918.	-202552.	-0.000500	0.000	1.852E+13	-743.0436	
90436.	0.000							
249.480	0.0250	21922869.	-204903.	-0.000496	0.000	1.853E+13	-707.7412	
91694.	0.000							
252.720	0.0234	21255390.	-207137.	-0.000492	0.000	1.853E+13	-671.5424	
92953.	0.000							
255.960	0.0218	20580861.	-209253.	-0.000488	0.000	1.854E+13	-634.4506	
94211.	0.000							
259.200	0.0202	19899671.	-211247.	-0.000485	0.000	1.854E+13	-596.4684	
95470.	0.000							
262.440	0.0187	19212218.	-213116.	-0.000481	0.000	1.855E+13	-557.5977	
96728.	0.000							
265.680	0.0171	18518911.	-214859.	-0.000478	0.000	1.855E+13	-517.8399	
97987.	0.000							
268.920	0.0156	17820167.	-216471.	-0.000475	0.000	1.856E+13	-477.1955	
99245.	0.000							
272.160	0.0140	17116413.	-217949.	-0.000472	0.000	1.857E+13	-435.6642	
100504.	0.000							
275.400	0.0125	16408085.	-219292.	-0.000469	0.000	1.857E+13	-393.2454	
101762.	0.000							
278.640	0.0110	15695628.	-220496.	-0.000466	0.000	1.858E+13	-349.9373	
103020.	0.000							
281.880	0.009499	14979496.	-221558.	-0.000464	0.000	1.858E+13	-305.7378	
104279.	0.000							
285.120	0.008002	14260155.	-222476.	-0.000461	0.000	1.859E+13	-260.6440	
105537.	0.000							
288.360	0.006512	13538077.	-275647.	-0.000459	0.000	1.859E+13	-32561.	
16200000.	0.000							
291.600	0.005030	12474187.	-369140.	-0.000456	0.000	1.860E+13	-25151.	
16200000.	0.000							
294.840	0.003555	11146271.	-438683.	-0.000454	0.000	1.861E+13	-17777.	
16200000.	0.000							
298.080	0.002087	9631743.	-484383.	-0.000452	0.000	1.862E+13	-10433.	
16200000.	0.000							
301.320	0.000623	8007690.	-506335.	-0.000451	0.000	1.863E+13	-3117.3603	
16200000.	0.000							
304.560	-0.000835	6350911.	-504620.	-0.000450	0.000	1.865E+13	4176.0837	

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16200000.	0.000							
307.800	-0.002290	4737972.	-479303.	-0.000449	0.000	1.866E+13	11452.	
16200000.	0.000							
311.040	-0.003743	3245247.	-430435.	-0.000448	0.000	1.866E+13	18714.	
16200000.	0.000							
314.280	-0.005193	1948972.	-358052.	-0.000448	0.000	1.866E+13	25967.	
16200000.	0.000							
317.520	-0.006643	925289.	-262177.	-0.000447	0.000	1.866E+13	33215.	
16200000.	0.000							
320.760	-0.008092	250280.	-142825.	-0.000447	0.000	1.866E+13	40460.	
16200000.	0.000							
324.000	-0.009541	0.000	0.000	-0.000447	0.000	1.866E+13	47704.	
8100000.	0.000							

* This analysis makes computations of pile response using nonlinear moment-curvature relationships.
 The above values of total stress are computed for combined axial and bending stress in elastic sections and do not equal actual stresses in concrete and steel in the range of nonlinear bending.

Output Verification: Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	0.2519584 inches
Computed slope at pile head	=	-0.0016103 radians
Maximum bending moment	=	40737968. inch-lbs
Maximum shear force	=	-506335. lbs
Depth of maximum bending moment	=	74.5200000 inches below pile head
Depth of maximum shear force	=	301.3200000 inches below pile head
Number of iterations	=	198
Number of zero deflection points	=	1

 Computed Values of Pile Loading and Deflection
 for Lateral Loading for Load Case Number 2

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head	=	30988.000 lbs
Applied moment at pile head	=	43844680.000 in-lbs
Axial thrust load on pile head	=	58568.000 lbs

Depth Distrib. X	Deflect. y	Bending Moment	Shear Force	Slope S	Total Stress	Bending Stiffness	Soil Res. p	Soil Spr. Es*h
Lat. Load inches lb/inch	inches	in-lbs	lbs	radians	psi*	lb-in^2	lb/in	lb/inch
0.000	0.3814	43844680.	30988.	-0.003239	0.000	2.660E+12	0.000	
327.5169	0.3710	43945691.	30927.	-0.003185	0.000	2.660E+12	-37.4994	
655.0339	0.3607	44046297.	30748.	-0.003131	0.000	2.660E+12	-72.9300	
982.5508	0.3507	44146128.	30458.	-0.003078	0.000	2.659E+12	-106.3445	
1310.0678	0.3408	44244833.	30062.	-0.003024	0.000	2.659E+12	-137.7958	
1637.5847	0.3311	44342081.	29568.	-0.002970	0.000	2.659E+12	-167.3371	
1965.1017	0.3215	44437561.	28981.	-0.002916	0.000	2.658E+12	-195.0214	
2292.6186	0.3122	44530985.	28307.	-0.002862	0.000	2.658E+12	-220.9022	
2620.1356	0.3030	44622079.	27552.	-0.002807	0.000	2.658E+12	-245.0330	
2947.6525	0.2940	44710590.	26722.	-0.002753	0.000	2.658E+12	-267.4674	
3275.1694	0.2852	44796283.	25822.	-0.002698	0.000	2.657E+12	-288.2594	
3602.6864	0.2765	44878940.	24857.	-0.002644	0.000	2.657E+12	-307.4628	
3930.2033	0.2680	44958359.	23832.	-0.002589	0.000	2.657E+12	-325.1318	
4257.7203	0.2597	45034355.	22752.	-0.002534	0.000	2.657E+12	-341.3204	

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45.360	0.2516	45106757.	21623.	-0.002479	0.000	2.656E+12	-356.0831
4585.2372	0.000						
48.600	0.2437	45175410.	20447.	-0.002424	0.000	2.656E+12	-369.4743
4912.7542	0.000						
51.840	0.2359	45240175.	19231.	-0.002369	0.000	2.656E+12	-381.5485
5240.2711	0.000						
55.080	0.2283	45300923.	17977.	-0.002314	0.000	2.656E+12	-392.3602
5567.7880	0.000						
58.320	0.2209	45357542.	16690.	-0.002258	0.000	2.656E+12	-401.9642
5895.3050	0.000						
61.560	0.2137	45409932.	13981.	-0.002203	0.000	2.656E+12	-1270.1502
19258.	0.000						
64.800	0.2066	45448977.	9803.7557	-0.002147	0.000	2.655E+12	-1308.5229
20517.	0.000						
68.040	0.1998	45474275.	5508.8903	-0.002092	0.000	2.655E+12	-1342.6285
21775.	0.000						
71.280	0.1931	45485468.	1110.0954	-0.002036	0.000	2.655E+12	-1372.6770
23034.	0.000						
74.520	0.1866	45482241.	-3379.8243	-0.001981	0.000	2.655E+12	-1398.8783
24292.	0.000						
77.760	0.1802	45464319.	-7948.7427	-0.001925	0.000	2.655E+12	-1421.4418
25551.	0.000						
81.000	0.1741	45431464.	-12585.	-0.001870	0.000	2.656E+12	-1440.5763
26809.	0.000						
84.240	0.1681	45383476.	-17278.	-0.001815	0.000	2.656E+12	-1456.4902
28068.	0.000						
87.480	0.1623	45320188.	-22018.	-0.001759	0.000	2.656E+12	-1469.3909
29326.	0.000						
90.720	0.1567	45241465.	-26796.	-0.001704	0.000	2.656E+12	-1479.4850
30585.	0.000						
93.960	0.1513	45147200.	-31601.	-0.001649	0.000	2.656E+12	-1486.9781
31843.	0.000						
97.200	0.1460	45037315.	-36427.	-0.001594	0.000	2.657E+12	-1492.0744
33101.	0.000						
100.440	0.1410	44911756.	-41266.	-0.001539	0.000	2.657E+12	-1494.9770
34360.	0.000						
103.680	0.1361	44770493.	-46112.	-0.001484	0.000	2.657E+12	-1495.8877
35618.	0.000						
106.920	0.1314	44613517.	-50957.	-0.001430	0.000	2.658E+12	-1495.0065
36877.	0.000						
110.160	0.1268	44440836.	-55797.	-0.001376	0.000	2.658E+12	-1492.5318
38135.	0.000						
113.400	0.1224	44252477.	-60626.	-0.001322	0.000	2.659E+12	-1488.6603
39394.	0.000						
116.640	0.1182	44048480.	-65441.	-0.001268	0.000	2.660E+12	-1483.5866
40652.	0.000						
119.880	0.1142	43828899.	-70238.	-0.001214	0.000	2.660E+12	-1477.5034
41911.	0.000						
123.120	0.1104	43593798.	-75014.	-0.001161	0.000	2.661E+12	-1470.6012
43169.	0.000						
126.360	0.1067	43343249.	-79767.	-0.001108	0.000	2.662E+12	-1463.0681
44428.	0.000						
129.600	0.1032	43077331.	-84494.	-0.001056	0.000	2.663E+12	-1455.0900
45686.	0.000						
132.840	0.0999	42796128.	-89195.	-0.001003	0.000	2.663E+12	-1446.8501
46945.	0.000						
136.080	0.0967	42499727.	-93869.	-0.000951	0.000	2.664E+12	-1438.5288
48203.	0.000						
139.320	0.0937	42188215.	-98517.	-0.000900	0.000	2.665E+12	-1430.3042
49462.	0.000						
142.560	0.0909	41861679.	-103138.	-0.000849	0.000	2.666E+12	-1422.3511
50720.	0.000						
145.800	0.0882	41520201.	-107735.	-0.000798	0.000	2.667E+12	-1414.8414
51978.	0.000						
149.040	0.0857	41163862.	-112307.	-0.000748	0.000	2.669E+12	-1407.9439
53237.	0.000						
152.280	0.0833	40792733.	-116859.	-0.000708	0.000	4.518E+12	-1401.8239
54495.	0.000						
155.520	0.0811	40406883.	-121391.	-0.000686	0.000	8.232E+12	-1395.5149
55754.	0.000						
158.760	0.0789	40006380.	-125901.	-0.000674	0.000	1.545E+13	-1388.3664
57012.	0.000						
162.000	0.0767	39591301.	-130386.	-0.000666	0.000	1.838E+13	-1380.0004
58271.	0.000						
165.240	0.0746	39161734.	-134841.	-0.000659	0.000	1.838E+13	-1370.3648
59529.	0.000						
168.480	0.0725	38717780.	-139243.	-0.000652	0.000	1.839E+13	-1347.0685
60233.	0.000						
171.720	0.0704	38259684.	-143589.	-0.000645	0.000	1.839E+13	-1335.3181
61491.	0.000						
174.960	0.0683	37787569.	-147894.	-0.000639	0.000	1.840E+13	-1322.3577
62750.	0.000						
178.200	0.0662	37301571.	-152156.	-0.000632	0.000	1.840E+13	-1308.2074
64008.	0.000						

181.440	0.0642	36801839.	-156370.	-0.000626	0.000	1.840E+13	-1292.8864
65267.	0.000						
184.680	0.0622	36288533.	-160532.	-0.000619	0.000	1.841E+13	-1276.4138
66525.	0.000						
187.920	0.0602	35761827.	-164639.	-0.000613	0.000	1.841E+13	-1258.8077
67783.	0.000						
191.160	0.0582	35221906.	-168687.	-0.000607	0.000	1.842E+13	-1240.0858
69042.	0.000						
194.400	0.0562	34668965.	-172673.	-0.000600	0.000	1.842E+13	-1220.2649
70300.	0.000						
197.640	0.0543	34103213.	-176593.	-0.000594	0.000	1.843E+13	-1199.3614
71559.	0.000						
200.880	0.0524	33524869.	-180443.	-0.000588	0.000	1.843E+13	-1177.3910
72817.	0.000						
204.120	0.0505	32934165.	-184221.	-0.000583	0.000	1.844E+13	-1154.3687
74076.	0.000						
207.360	0.0486	32331342.	-187922.	-0.000577	0.000	1.844E+13	-1130.3088
75334.	0.000						
210.600	0.0468	31716652.	-191543.	-0.000571	0.000	1.845E+13	-1105.2249
76593.	0.000						
213.840	0.0449	31090358.	-195082.	-0.000566	0.000	1.845E+13	-1079.1300
77851.	0.000						
217.080	0.0431	30452736.	-198534.	-0.000560	0.000	1.846E+13	-1052.0363
79110.	0.000						
220.320	0.0413	29804068.	-201897.	-0.000555	0.000	1.846E+13	-1023.9551
80368.	0.000						
223.560	0.0395	29144650.	-205168.	-0.000550	0.000	1.847E+13	-994.8974
81627.	0.000						
226.800	0.0377	28474788.	-208343.	-0.000545	0.000	1.847E+13	-964.8731
82885.	0.000						
230.040	0.0360	27794795.	-211419.	-0.000540	0.000	1.848E+13	-933.8915
84144.	0.000						
233.280	0.0342	27104998.	-214393.	-0.000535	0.000	1.848E+13	-901.9611
85402.	0.000						
236.520	0.0325	26405732.	-217262.	-0.000530	0.000	1.849E+13	-869.0898
86660.	0.000						
239.760	0.0308	25697342.	-220023.	-0.000526	0.000	1.849E+13	-835.2846
87919.	0.000						
243.000	0.0291	24980182.	-222673.	-0.000521	0.000	1.850E+13	-800.5518
89177.	0.000						
246.240	0.0274	24254617.	-225209.	-0.000517	0.000	1.851E+13	-764.8969
90436.	0.000						
249.480	0.0257	23521022.	-227628.	-0.000513	0.000	1.851E+13	-728.3246
91694.	0.000						
252.720	0.0241	22779781.	-229927.	-0.000509	0.000	1.852E+13	-690.8389
92953.	0.000						
255.960	0.0224	22031287.	-232103.	-0.000505	0.000	1.853E+13	-652.4429
94211.	0.000						
259.200	0.0208	21275942.	-234154.	-0.000501	0.000	1.853E+13	-613.1391
95470.	0.000						
262.440	0.0192	20514161.	-236075.	-0.000497	0.000	1.854E+13	-572.9292
96728.	0.000						
265.680	0.0176	19746365.	-237865.	-0.000494	0.000	1.854E+13	-531.8141
97987.	0.000						
268.920	0.0160	18972985.	-239520.	-0.000491	0.000	1.855E+13	-489.7938
99245.	0.000						
272.160	0.0144	18194463.	-241037.	-0.000487	0.000	1.856E+13	-446.8677
100504.	0.000						
275.400	0.0128	17411249.	-242414.	-0.000484	0.000	1.857E+13	-403.0343
101762.	0.000						
278.640	0.0113	16623804.	-243647.	-0.000481	0.000	1.857E+13	-358.2913
103020.	0.000						
281.880	0.009714	15832597.	-244734.	-0.000478	0.000	1.857E+13	-312.6360
104279.	0.000						
285.120	0.008168	15038108.	-245672.	-0.000476	0.000	1.858E+13	-266.0645
105537.	0.000						
288.360	0.006631	14240825.	-299815.	-0.000473	0.000	1.859E+13	-33156.
16200000.	0.000						
291.600	0.005102	13095488.	-394853.	-0.000471	0.000	1.860E+13	-25510.
16200000.	0.000						
294.840	0.003580	11682353.	-465182.	-0.000469	0.000	1.861E+13	-17902.
16200000.	0.000						
298.080	0.002065	10081289.	-510913.	-0.000467	0.000	1.862E+13	-10327.
16200000.	0.000						
301.320	0.000556	8371817.	-532146.	-0.000465	0.000	1.863E+13	-2779.9966
16200000.	0.000						
304.560	-0.000949	6633162.	-528965.	-0.000464	0.000	1.865E+13	4743.2703
16200000.	0.000						
307.800	-0.002450	4944299.	-501439.	-0.000463	0.000	1.866E+13	12248.
16200000.	0.000						
311.040	-0.003948	3384010.	-449621.	-0.000462	0.000	1.866E+13	19739.
16200000.	0.000						
314.280	-0.005444	2030928.	-373549.	-0.000462	0.000	1.866E+13	27220.
16200000.	0.000						

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317.520 -0.006939 963587. -273247. -0.000461 0.000 1.866E+13 34695.
16200000. 0.000
320.760 -0.008434 260463. -148729. -0.000461 0.000 1.866E+13 42168.
16200000. 0.000
324.000 -0.009928 0.000 0.000 -0.000461 0.000 1.866E+13 49640.
8100000. 0.000

```

* This analysis makes computations of pile response using nonlinear moment-curvature relationships.
The above values of total stress are computed for combined axial and bending stress in elastic sections and do not equal actual stresses in concrete and steel in the range of nonlinear bending.

Output Verification: Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 2:

```

Pile-head deflection = 0.3813732 inches
Computed slope at pile head = -0.0032385 radians
Maximum bending moment = 45485468. inch-lbs
Maximum shear force = -532146. lbs
Depth of maximum bending moment = 71.2800000 inches below pile head
Depth of maximum shear force = 301.3200000 inches below pile head
Number of iterations = 67
Number of zero deflection points = 1

```

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

```

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

```

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or Rotation y(inches) radians	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in-lbs	lbs
1	1	V = 26292.	M = 39256432.	75064.	0.25195839	40737968.	
-506335.		-0.00161031					
2	1	V = 30988.	M = 43844680.	58568.	0.38137324	45485468.	
-532146.		-0.00323852					

The analysis ended normally.

EXHIBIT C



EBI Consulting

environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11506A

CT506 / Willimantic ECSU
83 Windham Street
Willimantic, CT 06226

March 13, 2014

EBI Project Number: 62141244

March 13, 2014

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

Re: Emissions Values for Site: **CT11506A - CT506 / Willimantic ECSU**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at 83 Windham Street, Willimantic, 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 cellular band is $567 \mu\text{W}/\text{cm}^2$, 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 83 Windham Street, Willimantic, 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, the actual antenna pattern gain value in the direction of the sample area was used. For this report the sample point is 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 (1935.000 MHz to 1945.000 MHz / 1983.000 MHz to 1984.000 MHz) were considered for each sector of the proposed installation.
- 2) 4 UMTS / LTE channels (2110.000 to 2120.000 MHz / 2140.000 MHz to 2145.000 MHz) were considered for each sector of the proposed installation
- 3) 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.
- 4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
- 5) The antenna used in this modeling is the Ericsson AIR21 for LTE, UMTS and GSM. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.6 dBd gain value at its main lobe. Actual antenna gain values were used for all calculations as per the manufacturers specifications



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- 6) The antenna mounting height centerline of the proposed antennas is **117 feet** above ground level (AGL)
- 7) 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 calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT11506A - CT506 / Willimantic ECSU
Site Address	83 Windham Street, Willimantic, CT 06226
Site Type	Monopole

Sector 1																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	117	111	None	0	0	48.326044	1.410072	0.14101%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	0	0	0	-3.95	117	111	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	117	111	None	0	0	24.163022	0.705036	0.07050%
1b	Ericsson	AIR21 B4A/B2P	Passive	AWS - 2100 MHz	UMTS	40	2	80	-3.95	117	114	None	0	0	32.217363	0.891223	0.08912%
															Sector total Power Density Value:		0.301%
Sector 2																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	117	111	None	0	0	48.326044	1.410072	0.14101%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	0	0	0	-3.95	117	111	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	117	111	None	0	0	24.163022	0.705036	0.07050%
1b	Ericsson	AIR21 B4A/B2P	Passive	AWS - 2100 MHz	UMTS	40	2	80	-3.95	117	114	None	0	0	32.217363	0.891223	0.08912%
															Sector total Power Density Value:		0.301%
Sector 3																	
Antenna Number	Antenna Make	Antenna Model	Status	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	Ericsson	AIR21 B4A/B2P	Active	AWS - 2100 MHz	LTE	60	2	120	-3.95	117	111	None	0	0	48.326044	1.410072	0.14101%
1b	Ericsson	AIR21 B4A/B2P	Not Used	-	-	0	0	0	-3.95	117	111	None	0	0	0	0	0.00000%
2a	Ericsson	AIR21 B2A / B4P	Active	PCS - 1950 MHz	GSM / UMTS	30	2	60	-3.95	117	111	None	0	0	24.163022	0.705036	0.07050%
1b	Ericsson	AIR21 B4A/B2P	Passive	AWS - 2100 MHz	UMTS	40	2	80	-3.95	117	114	None	0	0	32.217363	0.891223	0.08912%
															Sector total Power Density Value:		0.301%

Site Composite MPE %	
Carrier	MPE %
T-Mobile	0.902%
FM Broadcast	52.800%
UHF Whip	0.170%
Parabolis Dish	0.060%
VHF Whip	0.450%
CPTV	0.900%
AT&T	18.310%
Noxel	4.720%
Sprint	5.170%
Total Site MPE %	83.482%



Summary

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

The anticipated Maximum Composite contributions from the T-Mobile facility are **0.902% (0.301% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **83.482%** 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.

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