COHEN and WOLF P.C.
ATTORNEYS AT LAW

JULIE D. KOHLER

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

August 27, 2014

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

Re: Notice of Exempt Modification
Verizon Wireless/ MetroPCS co-location
Site ID CTNH524A
126 South St, (a/k/a 42 South Street), Plymouth, CT

Dear Attorney Bachman:

This office represents MetroPCS Massachusetts, LLC, a Delaware limited liability company ("MetroPCS") and has been retained to file exempt modification filings with the Connecticut Siting Council on its behalf.

In this case, Verizon Wireless owns the existing monopole tower and related facility located at 126 South St, (a/k/a 42 South Street), Plymouth, CT (Latitude: 41.664167 Longitude: -73.052222). MetroPCS intends to replace three antennas with six new antennas and related equipment at this existing telecommunications facility in Plymouth ("Plymouth 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 being sent to the Town Mayor, David V. Merchant, and the property owners, Susan and Walter Macdonald.

The existing Plymouth Facility consists of a 180 foot tall monopole tower.[1] MetroPCS plans to replace three antennas with six antennas mounted at a centerline of 169 feet. (See the plans revised to May 5, 2014 attached hereto as Exhibit A). MetroPCS will also replace an equipment cabinet and battery backup unit on the proposed 6' x 6' concrete pad, and install fiber cable. The existing Plymouth Facility is structurally capable of supporting MetroPCS' proposed modifications after the reinforcements outlined in Section 4 of the structural analysis, dated July 24, 2014 and attached hereto as Exhibit B, are completed.

[1] The Plymouth Facility was first approved by the Council in Docket No. 156, dated March 16, 1993 and was subsequently addressed in Petition No. 777, dated July 26, 2006. These decisions contain no relevant requirements or limitations on the configuration of the Plymouth Facility.

The planned modifications to the Plymouth 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. MetroPCS' replacement antennas will be installed at a centerline of 169 feet, merely replacing existing antennas located at the same 169 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. MetroPCS' equipment will be located entirely within the existing compound and equipment pad as shown on page 2 of Exhibit A.

3. The proposed modification to the Plymouth 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 June 30, 2014, MetroPCS' operations would add .392% 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 9.412% 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, MetroPCS respectfully submits that the proposed replacement antennas and equipment at the Plymouth 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, MetroPCS shall commence construction approximately sixty days from the date of the Council's notice of acknowledgement.

Sincerely,

Julie D. Kohler, Esq.

cc: Town of Plymouth, Mayor David V. Merchant
Verizon Wireless
Susan and Walter Macdonald
Northeast Site Solutions, Sheldon J. Freincle

T-MOBILE USA, INC.
12920 SE 38TH STREET
BELLEVUE, WA 98006
(425) 378-4000

2843850
5/12/2014
2000011160

Invoice Number	Inv. Date	Description	Deductions	Voucher	Amount Paid
CTNH524A-1	2/24/2014	Exempt Mod Filing Fees	0.00	1100950016	625.00

DO NOT ACCEPT THIS CHECK UNLESS THE FACE FADES FROM BLACK TO RED WITH LOGO IN BACKGROUND. THE BACK OF THIS DOCUMENT HAS HEAT-SENSITIVE INK THAT CHANGES FROM ORANGE TO YELLOW.
TRUEPAYEE CAPTURE ANTI-FRAUD PROTECTION

T-MOBILE USA, INC.
12920 SE 38th Street
Bellevue, WA 98006
(425) 378-4000

The Bank of New York Mellon
Pittsburgh, PA
60-160/433

2843850
5/12/2014
VID 2000011160

PAY $625 00 CTS CTS
SIX TWO FIVE

*$625.00

Six Hundred Twenty Five Dollars Only*******

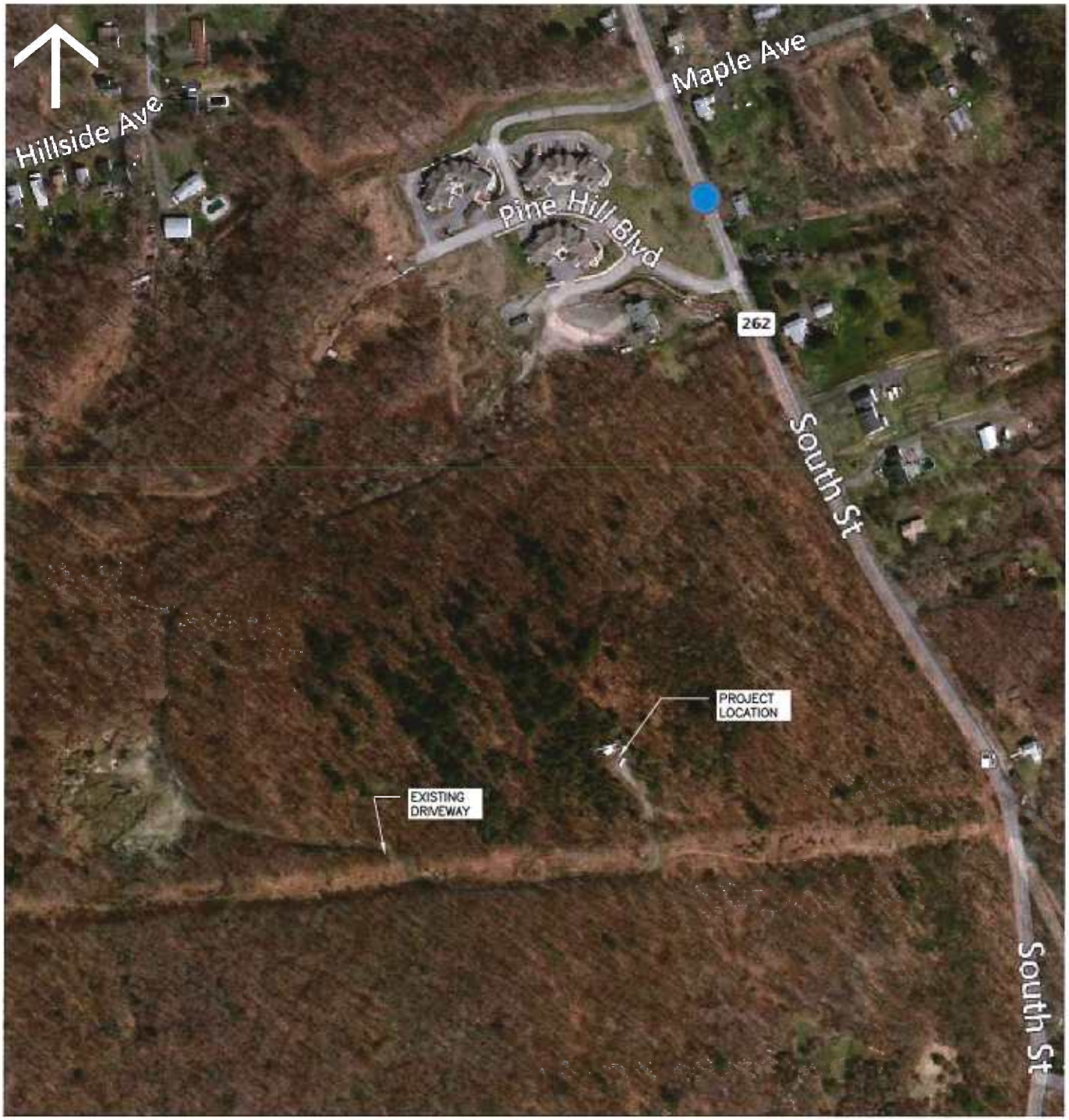
To The Order Of
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQ
NEW BRITAIN, CT 06051

VOID AFTER 180 DAYS
THIS CHECK CLEARS THROUGH POSITIVE PAY

⑈000284385O⑈ ⑆043301601⑆ 013⑈8430⑈

THE ORIGINAL DOCUMENT HAS A REFLECTIVE WATERMARK ON THE BACK. HOLD AT AN ANGLE TO VIEW, DO NOT CASH IF MISSING.

EXHIBIT A



KEY PLAN

N.T.S.

CONFIGURATION

5A

SUBMITTALS	
LE REV A	05.05.14

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

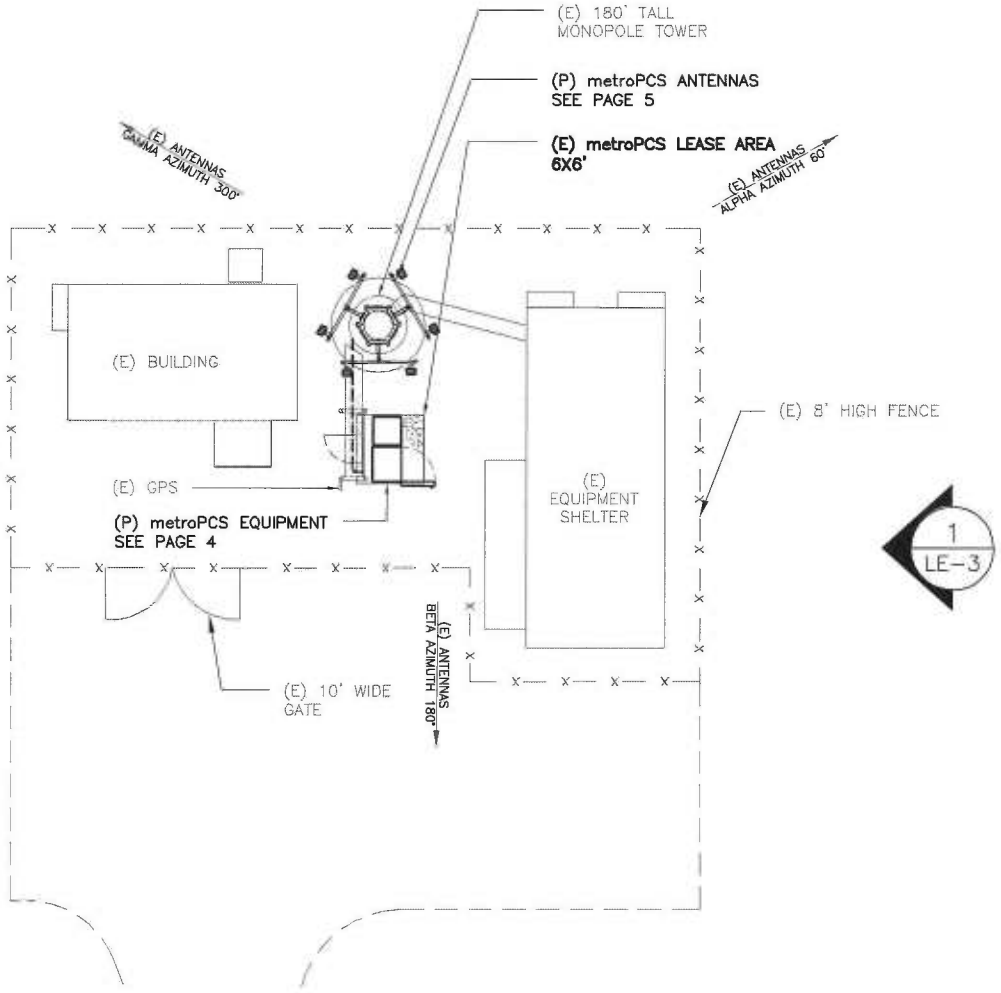
LEASE EXHIBIT

SITE NUMBER:
CTNH524A
SITE NAME:
VERIZON PLYMOUTH MONOPOLE
SITE ADDRESS:
42 SOUTH STREET
PLYMOUTH, CT 06786

NORTHEAST SITE SOLUTIONS
54 MAIN STREET, UNIT 3
STURBRIDGE, MA 01566
(508) 434-5237

FOR metroPCS.
metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

DRAWN BY: MA | CHECKED BY:SM



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.

SITE PLAN

SCALE: N.T.S.

1
LE-2

CONFIGURATION

5A

SUBMITTALS	
LE REV A	05.05.14

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

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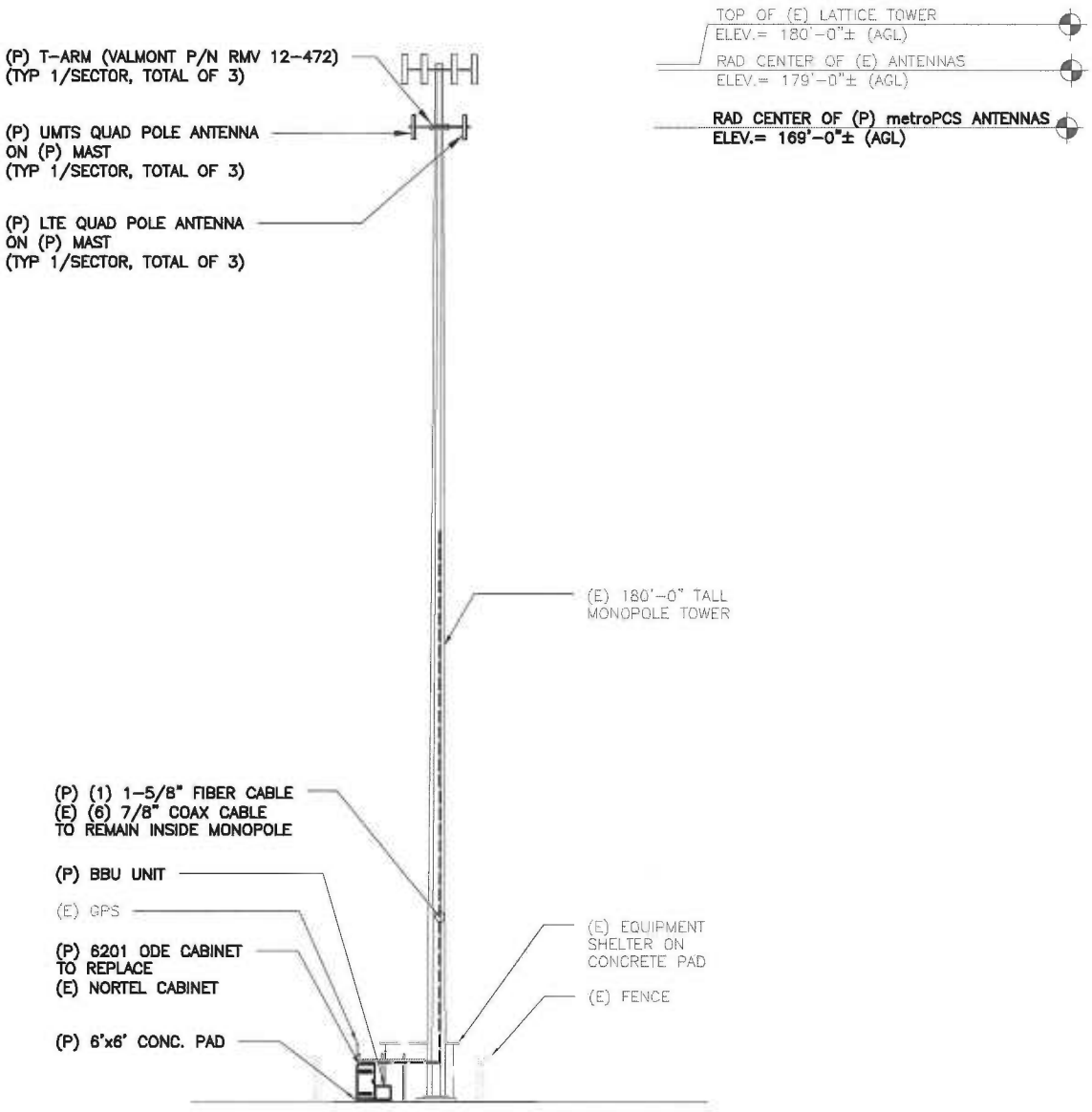
STURBRIDGE, MA 01566
(508) 434-5237
FOR
metroPCS.
metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

DRAWN BY: MA | CHECKED BY: SM



ELEVATION

N.T.S.

1
LE-3

CONFIGURATION

5A

SUBMITTALS	
LE REV A	05.05.14

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

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(508) 434-5237

FOR
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BLOOMFIELD, CT 06002

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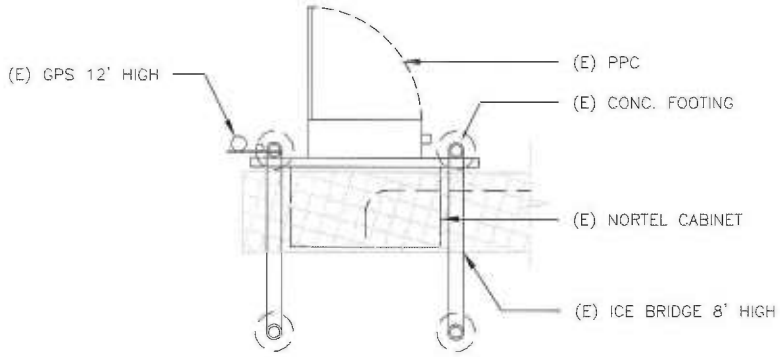
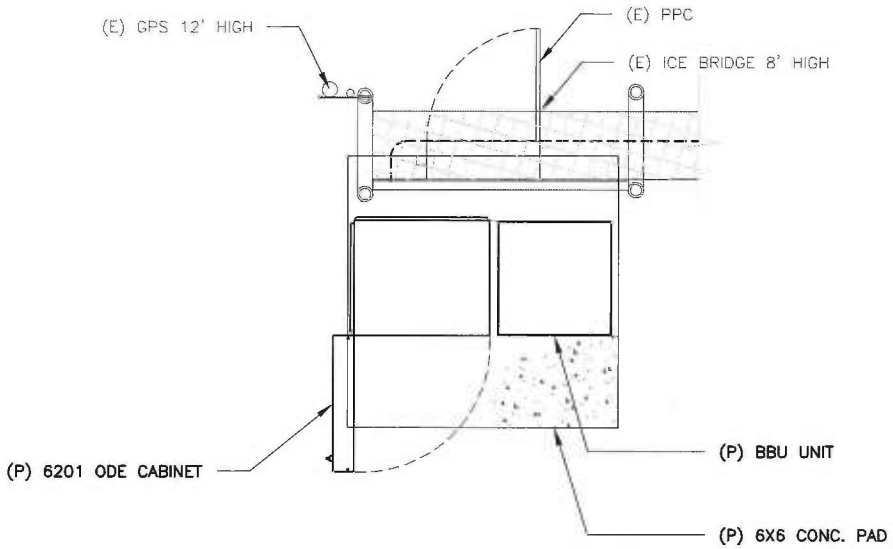


EXISTING EQUIPMENT



PROPOSED EQUIPMENT

CONFIGURATION

5A

SUBMITTALS	
LE REV A	05.05.14

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

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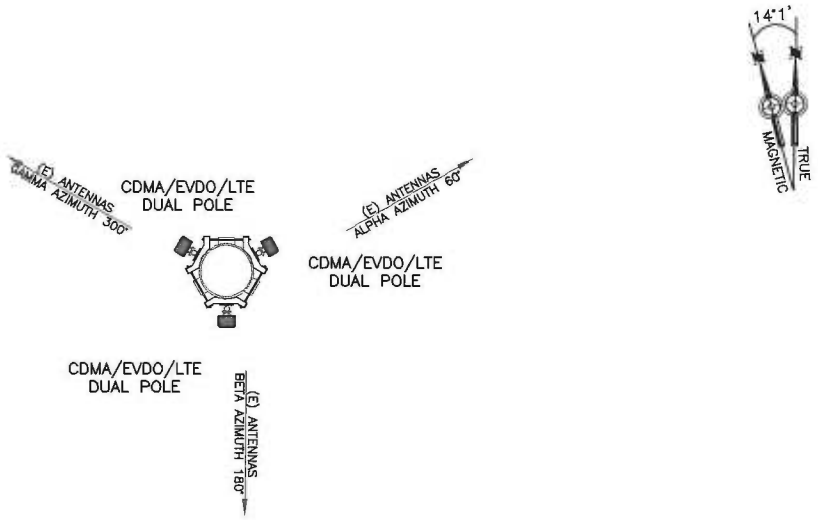
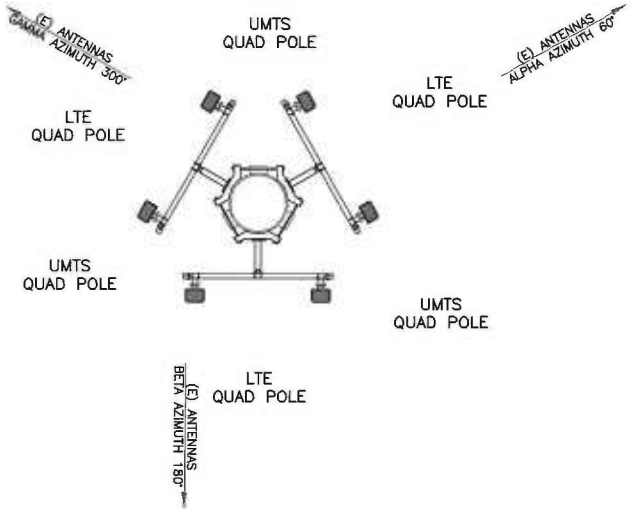


EXISTING ANTENNA CONFIGURATION



PROPOSED ANTENNA CONFIGURATION

CONFIGURATION
5A

SUBMITTALS	
LE REV A	05.05.14

ATLANTIS GROUP
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Fax: 617-213-5056

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(508) 434-5237
FOR
metroPCS.
metroPCS WIRELESS, INC.
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

DRAWN BY: MA | CHECKED BY:SM

EXHIBIT B

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report and Reinforcement Design

180-ft Existing Valmont Monopole

Proposed MetroPCS
Antenna Upgrade

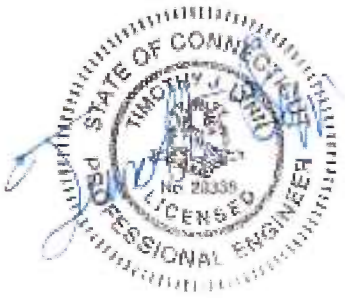
MetroPCS Site Ref: CTNH524A

Verizon Site Ref: Plymouth West

42 South Street
Plymouth, CT

CENTEK Project No. 14033.010

~~Date: July 1, 2014~~
Rev 1: July 24, 2014



Prepared for:

T-Mobile Towers
4 Sylvan Way
Parsippany, NJ 07054

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

SECTION 5 – REFERENCE MATERIAL

- RF DATA SHEET
- EQUIPMENT CUT SHEETS.

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by MetroPCS on the existing monopole (tower) owned and operated by Verizon Wireless, located in Plymouth, CT.

The host tower is a 180-ft tall, four-section, twelve sided, tapered steel monopole, originally designed and manufactured by Valmont Industries, Inc.; order no: 11610-94, dated August 15, 1994. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Centek engineering job no: 12001.CO58 dated May 21, 2012, visual verification from grade by Centek personnel on October 23, 2013 and a MetroPCS RF data sheet.

The tower consists of four (4) tapered steel vertical sections conforming to ASTM A572-65 (65ksi). The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 14.89-in at the top and 43.80-in at the base.

MetroPCS proposes the removal of three (3) panel antennas and the installation of six (6) panel antennas mounted to the three (3) proposed mounts. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- VERIZON WIRELESS (Existing):
  Antennas: Six (6) Antel LPA-80063-4CF panel antennas, three (3) Antel BXA-70063-6CF panel antennas, six (6) BXA-171063-8CF panel antennas and six (6) RFS FD9R6004/2C-3L diplexers mounted on three (3) T-Arms with a RAD center elevation of 177-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- METROPCS (Existing to Remain):
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- METROPCS (Existing to Remove):
  Antennas: Three (3) RFS APXV18-206517-C panel antennas flush mounted with a RAD center elevation of 169-ft above grade level.
- **METROPCS (Proposed):**
  Antennas: Six (6) Ericsson AIR 21 panel antennas mounted on a Site Pro WiMax Monopole T-Arm p/n UDS-NPL with a RAD center elevation of 169-ft above grade.
  Coax Cables: One (1) 1-5/8" ∅ fiber cable running on the inside of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation of the tower analysis.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	Litchfield; v = 80 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Plymouth; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA-222-F wind speed controls.	
Load Cases:	Load Case 1; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 69 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

[1] The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses **with the reinforcements outlined in drawings T-1, N-1, N-2, MI-1, S-1 and S-2 dated July 24, 2014, located within Section 4 of this report were found** to be within allowable limits.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L1)	131.00'-180.00'	83.9%	**PASS**
Pole Shaft (L2)	86.17'-131.00'	99.4%	**PASS**
Pole Shaft (L3)	42.33-86.17'	98.1%	**PASS**
Pole Shaft (L4)	15.00'-42.33'	99.2%	**PASS**
Pole Shaft (L5)	0.00'-15.00'	81.0%	**PASS**

Foundation and Anchors

The existing foundation consists of a 5.5-ft ∅ x 14.25-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned design drawings prepared by Valmont Industries, Inc.; order no: 11610-94, dated August 15, 1994. The base of the tower is connected to the foundation by means of (12) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 9-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	21 kips
	Compression	26 kips
	Moment	2408 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	76.5%	**PASS**
	Lateral Deflection	0.034in.	**PASS**

Note 1: Lateral deflection typically limited to 1.0 in. for monopole tower structures. Caisson installed in rock.

- The tower anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	80.3%	**PASS**
Base Plate Grout	Compression	76.5%	**PASS**
Base Plate	Bending	76.5%	**PASS**

Conclusion

This analysis shows that **with the reinforcements outlined in drawings T-1, N-1, N-2, MI-1, S-1 and S-2 dated July 24, 2014, located within Section 4 of this report, the subject tower is adequate** to support the proposed MetroPCS antenna configuration.

The analysis is based, in part, on the information provided to this office by MetroPCS. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

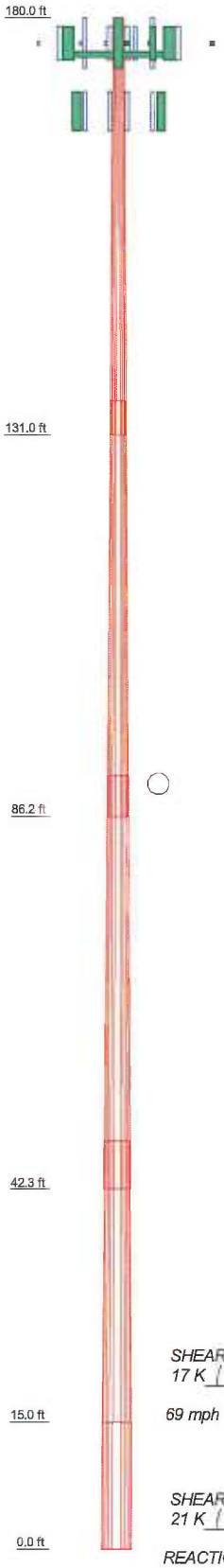
General Description of Structural Analysis Program

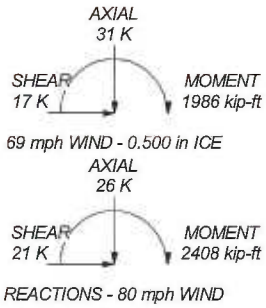
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	5	4	3	2	1
Length (ft)	15.000	33.000	48.667	48.833	49.000
Number of Sides	12	12	12	12	12
Thickness (in)	0.470	0.375	0.344	0.281	0.219
Socket Length (ft)			5.667	4.833	4.000
Top Dia (in)	41.250	35.640	29.026	22.102	14.890
Bot Dia (in)	43.800	41.250	37.290	30.410	23.220
Grade	A572-65				
Weight (K)	3.2	5.2	6.0	3.9	2.2





69 mph WIND - 0.500 in ICE

REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LPA-80063/4CF (Verizon - Existing)	177	(2) FD9R6004/2C-3L Diplexer (Verizon - Existing)	177
LPA-171063-8CF (Verizon - Existing)	177	(2) FD9R6004/2C-3L Diplexer (Verizon - Existing)	177
BXA-70063/6CF (Verizon - Existing)	177	Valmont T-Arm (3) (Verizon - Existing)	176
LPA-80063/4CF (Verizon - Existing)	177	(2) AIR21 (MetroPCS - Proposed)	169
LPA-80063/4CF (Verizon - Existing)	177	(2) AIR21 (MetroPCS - Proposed)	169
LPA-171063-8CF (Verizon - Existing)	177	(2) AIR21 (MetroPCS - Proposed)	169
BXA-70063/6CF (Verizon - Existing)	177	3-ft Standoff T-Arm (5-ft face width) (MetroPCS - Proposed)	169
LPA-80063/4CF (Verizon - Existing)	177	3-ft Standoff T-Arm (5-ft face width) (MetroPCS - Proposed)	169
LPA-80063/4CF (Verizon - Existing)	177	3-ft Standoff T-Arm (5-ft face width) (MetroPCS - Proposed)	169
LPA-171063-8CF (Verizon - Existing)	177		
BXA-70063/6CF (Verizon - Existing)	177		
LPA-80063/4CF (Verizon - Existing)	177		
(2) FD9R6004/2C-3L Diplexer (Verizon - Existing)	177		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 99.4%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **14033.010 - CTNH524A**		
Project: ***180' Valmont Monopole - 42 South Street, Plymouth, CT***		
Client: MetroPCS	Drawn by: TJL	App'd:
Code: TIA/EIA-222-F	Date: 07/24/14	Scale: NTS
Path:		Dwg No. E-1

tnxTower	Job	Page
	14033.010 - CTNH524A	1 of 32
Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Project 180' Valmont Monopole - 42 South Street, Plymouth, CT	Date 11:19:49 07/24/14
	Client MetroPCS	Designed by TJL

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 80 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Deflections calculated using a wind speed of 50 mph.
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

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

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	180.000-131.000	49.000	4.000	12	14.890	23.220	0.219	0.876	A572-65 (65 ksi)
L2	131.000-86.167	48.833	4.833	12	22.102	30.410	0.281	1.124	A572-65 (65 ksi)
L3	86.167-42.333	48.667	5.667	12	29.026	37.290	0.344	1.376	A572-65 (65 ksi)
L4	42.333-15.000	33.000	0.000	12	35.640	41.250	0.375	1.500	A572-65 (65 ksi)
L5	15.000-0.000	15.000		12	41.250	43.800	0.470	1.880	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	It/Q in^2	w in	w/t
L1	15.415	10.346	284.227	5.252	7.713	36.850	575.921	5.092	3.404	15.542
	24.039	16.220	1095.282	8.234	12.028	91.061	2219.339	7.983	5.636	25.735
L2	23.586	19.744	1199.975	7.812	11.449	104.812	2431.474	9.717	5.170	18.399
	31.483	27.261	3158.656	10.786	15.752	200.519	6400.293	13.417	7.397	26.323
L3	30.899	31.770	3335.935	10.268	15.035	221.873	6759.508	15.636	6.857	19.933
	38.605	40.924	7130.214	13.227	19.316	369.131	14447.746	20.142	9.072	26.372
L4	37.894	42.582	6759.160	12.625	18.461	366.125	13695.891	20.958	8.546	22.79
	42.705	49.357	10525.588	14.633	21.368	492.598	21327.696	24.292	10.050	26.8
L5	42.705	61.716	13100.303	14.599	21.368	613.095	26544.766	30.375	9.795	20.841
	45.345	65.576	15714.687	15.512	22.688	692.631	31842.217	32.274	10.479	22.295

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 180.000-131.000				1	1	1		
L2 131.000-86.167				1	1	1		
L3 86.167-42.333				1	1	1		
L4 42.333-15.000				1	1	1		
L5 15.000-0.000				1	1	1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	√
Anchor bolt grade	A615-75
Anchor bolt size	2.250 in
Number of bolts	12
Embedment length	108.000 in
f'_c	3.000 ksi
Grout space	3.000 in
Base plate grade	A633-60
Base plate thickness	2.625 in
Bolt circle diameter	51.840 in
Outer diameter	57.850 in
Inner diameter	24.000 in
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
1 5/8 (Verizon - Existing)	C	No	Inside Pole	177.000 - 5.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8 (MetroPCS - Existing)	B	No	Inside Pole	167.000 - 5.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
HYBRIFLEX 1-5/8" (MetroPCS - Proposed)	C	No	Inside Pole	167.000 - 5.000	1	No Ice	0.000	0.002
						1/2" Ice	0.000	0.002

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.000-131.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.225
		C	0.000	0.000	0.000	0.000	0.642
L2	131.000-86.167	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.280
		C	0.000	0.000	0.000	0.000	0.645
L3	86.167-42.333	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.274
		C	0.000	0.000	0.000	0.000	0.630
L4	42.333-15.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.171
		C	0.000	0.000	0.000	0.000	0.393
L5	15.000-0.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.062
		C	0.000	0.000	0.000	0.000	0.144

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_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.000-131.000	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.225
		C		0.000	0.000	0.000	0.000	0.642
L2	131.000-86.167	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.280
		C		0.000	0.000	0.000	0.000	0.645
L3	86.167-42.333	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.274
		C		0.000	0.000	0.000	0.000	0.630
L4	42.333-15.000	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.171
		C		0.000	0.000	0.000	0.000	0.393
L5	15.000-0.000	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.062
		C		0.000	0.000	0.000	0.000	0.144

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LPA-80063/4CF	A	From Face	4.000	0.000	177.000	No Ice	7.005	6.083	0.020
(Verizon - Existing)			-6.000			1/2" Ice	7.415	6.480	0.073
			0.000						
LPA-171063-8CF	A	From Face	4.000	0.000	177.000	No Ice	3.694	3.694	0.012
(Verizon - Existing)			-4.000			1/2" Ice	4.058	4.058	0.041
			0.000						
BXA-70063/6CF	A	From Face	4.000	0.000	177.000	No Ice	7.731	4.158	0.017
(Verizon - Existing)			0.000			1/2" Ice	8.268	4.595	0.059
			0.000						
LPA-80063/4CF	A	From Face	4.000	0.000	177.000	No Ice	7.005	6.083	0.020
(Verizon - Existing)			6.000			1/2" Ice	7.415	6.480	0.073
			0.000						
LPA-80063/4CF	B	From Face	4.000	0.000	177.000	No Ice	7.005	6.083	0.020
(Verizon - Existing)			-6.000			1/2" Ice	7.415	6.480	0.073
			0.000						
LPA-171063-8CF	B	From Face	4.000	0.000	177.000	No Ice	3.694	3.694	0.012
(Verizon - Existing)			-4.000			1/2" Ice	4.058	4.058	0.041
			0.000						
BXA-70063/6CF	B	From Face	4.000	0.000	177.000	No Ice	7.731	4.158	0.017
(Verizon - Existing)			0.000			1/2" Ice	8.268	4.595	0.059
			0.000						
LPA-80063/4CF	B	From Face	4.000	0.000	177.000	No Ice	7.005	6.083	0.020
(Verizon - Existing)			6.000			1/2" Ice	7.415	6.480	0.073
			0.000						
LPA-80063/4CF	C	From Face	4.000	0.000	177.000	No Ice	7.005	6.083	0.020
(Verizon - Existing)			-6.000			1/2" Ice	7.415	6.480	0.073
			0.000						
LPA-171063-8CF	C	From Face	4.000	0.000	177.000	No Ice	3.694	3.694	0.012
(Verizon - Existing)			-4.000			1/2" Ice	4.058	4.058	0.041
			0.000						
BXA-70063/6CF	C	From Face	4.000	0.000	177.000	No Ice	7.731	4.158	0.017
(Verizon - Existing)			0.000			1/2" Ice	8.268	4.595	0.059
			0.000						
LPA-80063/4CF	C	From Face	4.000	0.000	177.000	No Ice	7.005	6.083	0.020
(Verizon - Existing)			6.000			1/2" Ice	7.415	6.480	0.073
			0.000						
(2) FD9R6004/2C-3L	A	From Face	4.000	0.000	177.000	No Ice	0.367	0.085	0.003
Diplexer			-6.000			1/2" Ice	0.451	0.136	0.005
(Verizon - Existing)			0.000						
(2) FD9R6004/2C-3L	B	From Face	4.000	0.000	177.000	No Ice	0.367	0.085	0.003
Diplexer			-6.000			1/2" Ice	0.451	0.136	0.005
(Verizon - Existing)			0.000						
(2) FD9R6004/2C-3L	C	From Face	4.000	0.000	177.000	No Ice	0.367	0.085	0.003
Diplexer			-6.000			1/2" Ice	0.451	0.136	0.005
(Verizon - Existing)			0.000						
Valmont T-Arm (3)	C	None		0.000	176.000	No Ice	21.000	21.000	1.008
(Verizon - Existing)						1/2" Ice	29.000	29.000	1.236
(2) AIR21	A	From Face	1.000	0.000	169.000	No Ice	6.533	4.356	0.083
(MetroPCS - Proposed)			0.000			1/2" Ice	6.978	4.775	0.125
			0.000						
(2) AIR21	B	From Face	1.000	0.000	169.000	No Ice	6.533	4.356	0.083
(MetroPCS - Proposed)			0.000			1/2" Ice	6.978	4.775	0.125
			0.000						
(2) AIR21	C	From Face	1.000	0.000	169.000	No Ice	6.533	4.356	0.083
(MetroPCS - Proposed)			0.000			1/2" Ice	6.978	4.775	0.125
			0.000						
3-ft Standoff T-Arm (5-ft face	A	From Face	1.000	0.000	169.000	No Ice	1.460	1.460	0.090

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
width)			0.000			1/2" Ice	1.910	1.910	0.120
(MetroPCS - Proposed)			0.000						
3-ft Standoff T-Arm (5-ft face	B	From Face	1.000	0.000	169.000	No Ice	1.460	1.460	0.090
width)			0.000			1/2" Ice	1.910	1.910	0.120
(MetroPCS - Proposed)			0.000						
3-ft Standoff T-Arm (5-ft face	C	From Face	1.000	0.000	169.000	No Ice	1.460	1.460	0.090
width)			0.000			1/2" Ice	1.910	1.910	0.120
(MetroPCS - Proposed)			0.000						

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	153.987	1.553	0.025	77.808	A	0.000	77.808	77.808	100.00	0.000	0.000
180.000-131.0					B	0.000	77.808		100.00	0.000	0.000
00					C	0.000	77.808		100.00	0.000	0.000
L2	107.842	1.403	0.023	99.366	A	0.000	99.366	99.366	100.00	0.000	0.000
131.000-86.16					B	0.000	99.366		100.00	0.000	0.000
7					C	0.000	99.366		100.00	0.000	0.000
L3	63.979	1.208	0.020	122.619	A	0.000	122.619	122.619	100.00	0.000	0.000
86.167-42.333					B	0.000	122.619		100.00	0.000	0.000
					C	0.000	122.619		100.00	0.000	0.000
L4	28.395	1	0.016	88.665	A	0.000	88.665	88.665	100.00	0.000	0.000
42.333-15.000					B	0.000	88.665		100.00	0.000	0.000
					C	0.000	88.665		100.00	0.000	0.000
L5	7.425	1	0.016	53.156	A	0.000	53.156	53.156	100.00	0.000	0.000
15.000-0.000					B	0.000	53.156		100.00	0.000	0.000
					C	0.000	53.156		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	153.987	1.553	0.019	0.500	81.891	A	0.000	81.891	81.891	100.00	0.000	0.000
180.000-131.000						B	0.000	81.891		100.00	0.000	0.000
						C	0.000	81.891		100.00	0.000	0.000
L2	107.842	1.403	0.017	0.500	103.102	A	0.000	103.102	103.102	100.00	0.000	0.000
131.000-86.167						B	0.000	103.102		100.00	0.000	0.000
						C	0.000	103.102		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L3	63.979	1.208	0.015	0.500	126.272	A	0.000	126.272	126.272	100.00	0.000	0.000
86.167-42.333						B	0.000	126.272		100.00	0.000	0.000
						C	0.000	126.272		100.00	0.000	0.000
L4	28.395	1	0.012	0.500	90.943	A	0.000	90.943	90.943	100.00	0.000	0.000
42.333-15.000						B	0.000	90.943		100.00	0.000	0.000
						C	0.000	90.943		100.00	0.000	0.000
L5 15.000-0.000	7.425	1	0.012	0.500	54.406	A	0.000	54.406	54.406	100.00	0.000	0.000
						B	0.000	54.406		100.00	0.000	0.000
						C	0.000	54.406		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	153.987	1.553	0.010	77.808	A	0.000	77.808	77.808	100.00	0.000	0.000
180.000-131.0					B	0.000	77.808		100.00	0.000	0.000
00					C	0.000	77.808		100.00	0.000	0.000
L2	107.842	1.403	0.009	99.366	A	0.000	99.366	99.366	100.00	0.000	0.000
131.000-86.16					B	0.000	99.366		100.00	0.000	0.000
7					C	0.000	99.366		100.00	0.000	0.000
L3	63.979	1.208	0.008	122.619	A	0.000	122.619	122.619	100.00	0.000	0.000
86.167-42.333					B	0.000	122.619		100.00	0.000	0.000
					C	0.000	122.619		100.00	0.000	0.000
L4	28.395	1	0.006	88.665	A	0.000	88.665	88.665	100.00	0.000	0.000
42.333-15.000					B	0.000	88.665		100.00	0.000	0.000
					C	0.000	88.665		100.00	0.000	0.000
L5	7.425	1	0.006	53.156	A	0.000	53.156	53.156	100.00	0.000	0.000
15.000-0.000					B	0.000	53.156		100.00	0.000	0.000
					C	0.000	53.156		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.215	A	1	1.03	1	1	1	77.808	3.442	0.070	C
180.000-131.0			B	1	1.03	1	1	1	77.808			
00			C	1	1.03	1	1	1	77.808			
L2	0.924	3.905	A	1	1.03	1	1	1	99.366	3.967	0.088	C
131.000-86.16			B	1	1.03	1	1	1	99.366			
7			C	1	1.03	1	1	1	99.366			
L3	0.904	6.019	A	1	1.03	1	1	1	122.619	4.202	0.096	C
86.167-42.333			B	1	1.03	1	1	1	122.619			
			C	1	1.03	1	1	1	122.619			
L4	0.564	5.162	A	1	1.03	1	1	1	88.665	2.529	0.093	C
42.333-15.000			B	1	1.03	1	1	1	88.665			
			C	1	1.03	1	1	1	88.665			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L5	0.206	3.249	A	1	1.03	1	1	1	53.156	1.516	0.101	C
15.000-0.000			B	1	1.03	1	1	1	53.156			
			C	1	1.03	1	1	1	53.156			
Sum Weight:	3.465	20.550						OTM	1309.746 kip-ft	15.656		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.215	A	1	1.03	1	1	1	77.808	3.442	0.070	C
180.000-131.0			B	1	1.03	1	1	1	77.808			
00			C	1	1.03	1	1	1	77.808			
L2	0.924	3.905	A	1	1.03	1	1	1	99.366	3.967	0.088	C
131.000-86.16			B	1	1.03	1	1	1	99.366			
7			C	1	1.03	1	1	1	99.366			
L3	0.904	6.019	A	1	1.03	1	1	1	122.619	4.202	0.096	C
86.167-42.333			B	1	1.03	1	1	1	122.619			
			C	1	1.03	1	1	1	122.619			
L4	0.564	5.162	A	1	1.03	1	1	1	88.665	2.529	0.093	C
42.333-15.000			B	1	1.03	1	1	1	88.665			
			C	1	1.03	1	1	1	88.665			
L5	0.206	3.249	A	1	1.03	1	1	1	53.156	1.516	0.101	C
15.000-0.000			B	1	1.03	1	1	1	53.156			
			C	1	1.03	1	1	1	53.156			
Sum Weight:	3.465	20.550						OTM	1309.746 kip-ft	15.656		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.215	A	1	1.03	1	1	1	77.808	3.442	0.070	C
180.000-131.0			B	1	1.03	1	1	1	77.808			
00			C	1	1.03	1	1	1	77.808			
L2	0.924	3.905	A	1	1.03	1	1	1	99.366	3.967	0.088	C
131.000-86.16			B	1	1.03	1	1	1	99.366			
7			C	1	1.03	1	1	1	99.366			
L3	0.904	6.019	A	1	1.03	1	1	1	122.619	4.202	0.096	C
86.167-42.333			B	1	1.03	1	1	1	122.619			
			C	1	1.03	1	1	1	122.619			
L4	0.564	5.162	A	1	1.03	1	1	1	88.665	2.529	0.093	C
42.333-15.000			B	1	1.03	1	1	1	88.665			
			C	1	1.03	1	1	1	88.665			
L5	0.206	3.249	A	1	1.03	1	1	1	53.156	1.516	0.101	C
15.000-0.000			B	1	1.03	1	1	1	53.156			
			C	1	1.03	1	1	1	53.156			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
Sum Weight:	3.465	20.550						OTM	1309.746 kip-ft	15.656		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.815	A	1	1.03	1	1	1	81.891	2.717	0.055	C
180.000-131.0			B	1	1.03	1	1	1	81.891			
00			C	1	1.03	1	1	1	81.891			
L2	0.924	4.666	A	1	1.03	1	1	1	103.102	3.087	0.069	C
131.000-86.16			B	1	1.03	1	1	1	103.102			
7			C	1	1.03	1	1	1	103.102			
L3	0.904	6.954	A	1	1.03	1	1	1	126.272	3.246	0.074	C
86.167-42.333			B	1	1.03	1	1	1	126.272			
			C	1	1.03	1	1	1	126.272			
L4	0.564	5.837	A	1	1.03	1	1	1	90.943	1.945	0.071	C
42.333-15.000			B	1	1.03	1	1	1	90.943			
			C	1	1.03	1	1	1	90.943			
L5	0.206	3.653	A	1	1.03	1	1	1	54.406	1.164	0.078	C
15.000-0.000			B	1	1.03	1	1	1	54.406			
			C	1	1.03	1	1	1	54.406			
Sum Weight:	3.465	23.924						OTM	1022.823 kip-ft	12.159		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.815	A	1	1.03	1	1	1	81.891	2.717	0.055	C
180.000-131.0			B	1	1.03	1	1	1	81.891			
00			C	1	1.03	1	1	1	81.891			
L2	0.924	4.666	A	1	1.03	1	1	1	103.102	3.087	0.069	C
131.000-86.16			B	1	1.03	1	1	1	103.102			
7			C	1	1.03	1	1	1	103.102			
L3	0.904	6.954	A	1	1.03	1	1	1	126.272	3.246	0.074	C
86.167-42.333			B	1	1.03	1	1	1	126.272			
			C	1	1.03	1	1	1	126.272			
L4	0.564	5.837	A	1	1.03	1	1	1	90.943	1.945	0.071	C
42.333-15.000			B	1	1.03	1	1	1	90.943			
			C	1	1.03	1	1	1	90.943			
L5	0.206	3.653	A	1	1.03	1	1	1	54.406	1.164	0.078	C
15.000-0.000			B	1	1.03	1	1	1	54.406			
			C	1	1.03	1	1	1	54.406			
Sum Weight:	3.465	23.924						OTM	1022.823 kip-ft	12.159		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.815	A	1	1.03	1	1	1	81.891	2.717	0.055	C
180.000-131.0			B	1	1.03	1	1	1	81.891			
00			C	1	1.03	1	1	1	81.891			
L2	0.924	4.666	A	1	1.03	1	1	1	103.102	3.087	0.069	C
131.000-86.16			B	1	1.03	1	1	1	103.102			
7			C	1	1.03	1	1	1	103.102			
L3	0.904	6.954	A	1	1.03	1	1	1	126.272	3.246	0.074	C
86.167-42.333			B	1	1.03	1	1	1	126.272			
			C	1	1.03	1	1	1	126.272			
L4	0.564	5.837	A	1	1.03	1	1	1	90.943	1.945	0.071	C
42.333-15.000			B	1	1.03	1	1	1	90.943			
			C	1	1.03	1	1	1	90.943			
L5	0.206	3.653	A	1	1.03	1	1	1	54.406	1.164	0.078	C
15.000-0.000			B	1	1.03	1	1	1	54.406			
			C	1	1.03	1	1	1	54.406			
Sum Weight:	3.465	23.924						OTM	1022.823 kip-ft	12.159		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.215	A	1	1.03	1	1	1	77.808	1.345	0.027	C
180.000-131.0			B	1	1.03	1	1	1	77.808			
00			C	1	1.03	1	1	1	77.808			
L2	0.924	3.905	A	1	1.03	1	1	1	99.366	1.550	0.035	C
131.000-86.16			B	1	1.03	1	1	1	99.366			
7			C	1	1.03	1	1	1	99.366			
L3	0.904	6.019	A	1	1.03	1	1	1	122.619	1.642	0.037	C
86.167-42.333			B	1	1.03	1	1	1	122.619			
			C	1	1.03	1	1	1	122.619			
L4	0.564	5.162	A	1	1.03	1	1	1	88.665	0.988	0.036	C
42.333-15.000			B	1	1.03	1	1	1	88.665			
			C	1	1.03	1	1	1	88.665			
L5	0.206	3.249	A	1	1.03	1	1	1	53.156	0.592	0.039	C
15.000-0.000			B	1	1.03	1	1	1	53.156			
			C	1	1.03	1	1	1	53.156			
Sum Weight:	3.465	20.550						OTM	511.619 kip-ft	6.116		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.215	A	1	1.03	1	1	1	77.808	1.345	0.027	C
180.000-131.0			B	1	1.03	1	1	1	77.808			
00			C	1	1.03	1	1	1	77.808			
L2	0.924	3.905	A	1	1.03	1	1	1	99.366	1.550	0.035	C
131.000-86.16			B	1	1.03	1	1	1	99.366			
7			C	1	1.03	1	1	1	99.366			
L3	0.904	6.019	A	1	1.03	1	1	1	122.619	1.642	0.037	C
86.167-42.333			B	1	1.03	1	1	1	122.619			
			C	1	1.03	1	1	1	122.619			
L4	0.564	5.162	A	1	1.03	1	1	1	88.665	0.988	0.036	C
42.333-15.000			B	1	1.03	1	1	1	88.665			
			C	1	1.03	1	1	1	88.665			
L5	0.206	3.249	A	1	1.03	1	1	1	53.156	0.592	0.039	C
15.000-0.000			B	1	1.03	1	1	1	53.156			
			C	1	1.03	1	1	1	53.156			
Sum Weight:	3.465	20.550						OTM	511.619 kip-ft	6.116		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.867	2.215	A	1	1.03	1	1	1	77.808	1.345	0.027	C
180.000-131.0			B	1	1.03	1	1	1	77.808			
00			C	1	1.03	1	1	1	77.808			
L2	0.924	3.905	A	1	1.03	1	1	1	99.366	1.550	0.035	C
131.000-86.16			B	1	1.03	1	1	1	99.366			
7			C	1	1.03	1	1	1	99.366			
L3	0.904	6.019	A	1	1.03	1	1	1	122.619	1.642	0.037	C
86.167-42.333			B	1	1.03	1	1	1	122.619			
			C	1	1.03	1	1	1	122.619			
L4	0.564	5.162	A	1	1.03	1	1	1	88.665	0.988	0.036	C
42.333-15.000			B	1	1.03	1	1	1	88.665			
			C	1	1.03	1	1	1	88.665			
L5	0.206	3.249	A	1	1.03	1	1	1	53.156	0.592	0.039	C
15.000-0.000			B	1	1.03	1	1	1	53.156			
			C	1	1.03	1	1	1	53.156			
Sum Weight:	3.465	20.550						OTM	511.619 kip-ft	6.116		

Discrete Appurtenance Pressures - No Ice $G_H = 1.690$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft²	C_AA_C Side ft²
LPA-80063/4CF	300.000	0.020	-7.020	2.875	177.000	1.616	0.026	7.005	6.083
LPA-171063-8CF	300.000	0.012	-6.020	1.143	177.000	1.616	0.026	3.694	3.694
BXA-70063/6CF	300.000	0.017	-4.020	-2.321	177.000	1.616	0.026	7.731	4.158
LPA-80063/4CF	300.000	0.020	-1.020	-7.517	177.000	1.616	0.026	7.005	6.083

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
LPA-80063/4CF	60.000	0.020	1.020	-7.517	177.000	1.616	0.026	7.005	6.083
LPA-171063-8CF	60.000	0.012	2.020	-5.785	177.000	1.616	0.026	3.694	3.694
BXA-70063/6CF	60.000	0.017	4.020	-2.321	177.000	1.616	0.026	7.731	4.158
LPA-80063/4CF	60.000	0.020	7.020	2.875	177.000	1.616	0.026	7.005	6.083
LPA-80063/4CF	180.000	0.020	6.000	4.642	177.000	1.616	0.026	7.005	6.083
LPA-171063-8CF	180.000	0.012	4.000	4.642	177.000	1.616	0.026	3.694	3.694
BXA-70063/6CF	180.000	0.017	0.000	4.642	177.000	1.616	0.026	7.731	4.158
LPA-80063/4CF	180.000	0.020	-6.000	4.642	177.000	1.616	0.026	7.005	6.083
FD9R6004/2C-3L Diplexer	300.000	0.006	-7.020	2.875	177.000	1.616	0.026	0.733	0.169
FD9R6004/2C-3L Diplexer	60.000	0.006	1.020	-7.517	177.000	1.616	0.026	0.733	0.169
FD9R6004/2C-3L Diplexer	180.000	0.006	6.000	4.642	177.000	1.616	0.026	0.733	0.169
Valmont T-Arm (3)	0.000	1.008	0.000	0.000	176.000	1.613	0.026	21.000	21.000
AIR21	300.000	0.166	-1.471	-0.849	169.000	1.595	0.026	13.067	8.711
AIR21	60.000	0.166	1.471	-0.849	169.000	1.595	0.026	13.067	8.711
AIR21	180.000	0.166	0.000	1.698	169.000	1.595	0.026	13.067	8.711
3-ft Standoff T-Arm (5-ft face width)	300.000	0.090	-1.471	-0.849	169.000	1.595	0.026	1.460	1.460
3-ft Standoff T-Arm (5-ft face width)	60.000	0.090	1.471	-0.849	169.000	1.595	0.026	1.460	1.460
3-ft Standoff T-Arm (5-ft face width)	180.000	0.090	0.000	1.698	169.000	1.595	0.026	1.460	1.460
	Sum Weight:	2.001							

Discrete Appurtenance Pressures - With Ice $G_H = 1.690$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
LPA-80063/4CF	300.000	0.073	-7.020	2.875	177.000	1.616	0.020	7.415	6.480	0.500
LPA-171063-8CF	300.000	0.041	-6.020	1.143	177.000	1.616	0.020	4.058	4.058	0.500
BXA-70063/6CF	300.000	0.059	-4.020	-2.321	177.000	1.616	0.020	8.268	4.595	0.500
LPA-80063/4CF	300.000	0.073	-1.020	-7.517	177.000	1.616	0.020	7.415	6.480	0.500
LPA-80063/4CF	60.000	0.073	1.020	-7.517	177.000	1.616	0.020	7.415	6.480	0.500
LPA-171063-8CF	60.000	0.041	2.020	-5.785	177.000	1.616	0.020	4.058	4.058	0.500
BXA-70063/6CF	60.000	0.059	4.020	-2.321	177.000	1.616	0.020	8.268	4.595	0.500
LPA-80063/4CF	60.000	0.073	7.020	2.875	177.000	1.616	0.020	7.415	6.480	0.500
LPA-80063/4CF	180.000	0.073	6.000	4.642	177.000	1.616	0.020	7.415	6.480	0.500
LPA-171063-8CF	180.000	0.041	4.000	4.642	177.000	1.616	0.020	4.058	4.058	0.500
BXA-70063/6CF	180.000	0.059	0.000	4.642	177.000	1.616	0.020	8.268	4.595	0.500
LPA-80063/4CF	180.000	0.073	-6.000	4.642	177.000	1.616	0.020	7.415	6.480	0.500
FD9R6004/2C-3L Diplexer	300.000	0.011	-7.020	2.875	177.000	1.616	0.020	0.901	0.272	0.500
FD9R6004/2C-3L Diplexer	60.000	0.011	1.020	-7.517	177.000	1.616	0.020	0.901	0.272	0.500
FD9R6004/2C-3L Diplexer	180.000	0.011	6.000	4.642	177.000	1.616	0.020	0.901	0.272	0.500
Valmont T-Arm (3)	0.000	1.236	0.000	0.000	176.000	1.613	0.020	29.000	29.000	0.500
AIR21	300.000	0.250	-1.471	-0.849	169.000	1.595	0.020	13.957	9.549	0.500
AIR21	60.000	0.250	1.471	-0.849	169.000	1.595	0.020	13.957	9.549	0.500
AIR21	180.000	0.250	0.000	1.698	169.000	1.595	0.020	13.957	9.549	0.500
3-ft Standoff T-Arm (5-ft face width)	300.000	0.120	-1.471	-0.849	169.000	1.595	0.020	1.910	1.910	0.500
3-ft Standoff T-Arm (5-ft face width)	60.000	0.120	1.471	-0.849	169.000	1.595	0.020	1.910	1.910	0.500

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_s in
3-ft Standoff T-Arm (5-ft face width)	180.000	0.120	0.000	1.698	169.000	1.595	0.020	1.910	1.910	0.500
	Sum Weight:	3.114								

Discrete Appurtenance Pressures - Service $G_H = 1.690$

Description	Aiming Azimuth °	Weight K	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z ksf	C_AA_C Front ft^2	C_AA_C Side ft^2
LPA-80063/4CF	300.000	0.020	-7.020	2.875	177.000	1.616	0.010	7.005	6.083
LPA-171063-8CF	300.000	0.012	-6.020	1.143	177.000	1.616	0.010	3.694	3.694
BXA-70063/6CF	300.000	0.017	-4.020	-2.321	177.000	1.616	0.010	7.731	4.158
LPA-80063/4CF	300.000	0.020	-1.020	-7.517	177.000	1.616	0.010	7.005	6.083
LPA-80063/4CF	60.000	0.020	1.020	-7.517	177.000	1.616	0.010	7.005	6.083
LPA-171063-8CF	60.000	0.012	2.020	-5.785	177.000	1.616	0.010	3.694	3.694
BXA-70063/6CF	60.000	0.017	4.020	-2.321	177.000	1.616	0.010	7.731	4.158
LPA-80063/4CF	60.000	0.020	7.020	2.875	177.000	1.616	0.010	7.005	6.083
LPA-80063/4CF	180.000	0.020	6.000	4.642	177.000	1.616	0.010	7.005	6.083
LPA-171063-8CF	180.000	0.012	4.000	4.642	177.000	1.616	0.010	3.694	3.694
BXA-70063/6CF	180.000	0.017	0.000	4.642	177.000	1.616	0.010	7.731	4.158
LPA-80063/4CF	180.000	0.020	-6.000	4.642	177.000	1.616	0.010	7.005	6.083
FD9R6004/2C-3L Diplexer	300.000	0.006	-7.020	2.875	177.000	1.616	0.010	0.733	0.169
FD9R6004/2C-3L Diplexer	60.000	0.006	1.020	-7.517	177.000	1.616	0.010	0.733	0.169
FD9R6004/2C-3L Diplexer	180.000	0.006	6.000	4.642	177.000	1.616	0.010	0.733	0.169
Valmont T-Arm (3)	0.000	1.008	0.000	0.000	176.000	1.613	0.010	21.000	21.000
AIR21	300.000	0.166	-1.471	-0.849	169.000	1.595	0.010	13.067	8.711
AIR21	60.000	0.166	1.471	-0.849	169.000	1.595	0.010	13.067	8.711
AIR21	180.000	0.166	0.000	1.698	169.000	1.595	0.010	13.067	8.711
3-ft Standoff T-Arm (5-ft face width)	300.000	0.090	-1.471	-0.849	169.000	1.595	0.010	1.460	1.460
3-ft Standoff T-Arm (5-ft face width)	60.000	0.090	1.471	-0.849	169.000	1.595	0.010	1.460	1.460
3-ft Standoff T-Arm (5-ft face width)	180.000	0.090	0.000	1.698	169.000	1.595	0.010	1.460	1.460
	Sum Weight:	2.001							

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	20.550					
Bracing Weight	0.000					
Total Member Self-Weight	20.550			0.000	0.000	
Total Weight	26.016			0.000	0.000	
Wind 0 deg - No Ice		0.000	-21.341	-2301.970	0.000	0.000
Wind 30 deg - No Ice		10.670	-18.482	-1993.564	-1150.985	0.000
Wind 60 deg - No Ice		18.482	-10.670	-1150.985	-1993.564	0.000
Wind 90 deg - No Ice		21.341	0.000	0.000	-2301.970	0.000

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 120 deg - No Ice		18.482	10.670	1150.985	-1993.564	0.000
Wind 150 deg - No Ice		10.670	18.482	1993.564	-1150.985	0.000
Wind 180 deg - No Ice		0.000	21.341	2301.970	0.000	0.000
Wind 210 deg - No Ice		-10.670	18.482	1993.564	1150.985	0.000
Wind 240 deg - No Ice		-18.482	10.670	1150.985	1993.564	0.000
Wind 270 deg - No Ice		-21.341	0.000	0.000	2301.970	0.000
Wind 300 deg - No Ice		-18.482	-10.670	-1150.985	1993.564	0.000
Wind 330 deg - No Ice		-10.670	-18.482	-1993.564	1150.985	0.000
Member Ice	3.374					
Total Weight Ice	30.503			0.000	0.000	
Wind 0 deg - Ice		0.000	-17.002	-1868.195	0.000	0.000
Wind 30 deg - Ice		8.501	-14.724	-1617.904	-934.097	0.000
Wind 60 deg - Ice		14.724	-8.501	-934.097	-1617.904	0.000
Wind 90 deg - Ice		17.002	0.000	0.000	-1868.195	0.000
Wind 120 deg - Ice		14.724	8.501	934.097	-1617.904	0.000
Wind 150 deg - Ice		8.501	14.724	1617.904	-934.097	0.000
Wind 180 deg - Ice		0.000	17.002	1868.195	0.000	0.000
Wind 210 deg - Ice		-8.501	14.724	1617.904	934.097	0.000
Wind 240 deg - Ice		-14.724	8.501	934.097	1617.904	0.000
Wind 270 deg - Ice		-17.002	0.000	0.000	1868.195	0.000
Wind 300 deg - Ice		-14.724	-8.501	-934.097	1617.904	0.000
Wind 330 deg - Ice		-8.501	-14.724	-1617.904	934.097	0.000
Total Weight	26.016			0.000	0.000	
Wind 0 deg - Service		0.000	-8.336	-899.207	0.000	0.000
Wind 30 deg - Service		4.168	-7.219	-778.736	-449.603	0.000
Wind 60 deg - Service		7.219	-4.168	-449.603	-778.736	0.000
Wind 90 deg - Service		8.336	0.000	0.000	-899.207	0.000
Wind 120 deg - Service		7.219	4.168	449.603	-778.736	0.000
Wind 150 deg - Service		4.168	7.219	778.736	-449.603	0.000
Wind 180 deg - Service		0.000	8.336	899.207	0.000	0.000
Wind 210 deg - Service		-4.168	7.219	778.736	449.603	0.000
Wind 240 deg - Service		-7.219	4.168	449.603	778.736	0.000
Wind 270 deg - Service		-8.336	0.000	0.000	899.207	0.000
Wind 300 deg - Service		-7.219	-4.168	-449.603	778.736	0.000
Wind 330 deg - Service		-4.168	-7.219	-778.736	449.603	0.000

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 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice

Comb. No.	Description
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 131	Pole	Max Tension	27	0.000	0.000	-0.000
			Max. Compression	14	-6.449	0.000	0.000
			Max. Mx	5	-3.426	-309.614	0.000
			Max. My	2	-3.426	0.000	309.614
			Max. Vy	5	9.416	-309.614	0.000
			Max. Vx	2	-9.416	0.000	309.614
			Max. Torque	16			-0.000
L2	131 - 86.167	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-11.752	0.000	0.000
			Max. Mx	5	-8.174	-811.687	0.000
			Max. My	8	-8.174	0.000	-811.687
			Max. Vy	5	13.434	-811.687	0.000
			Max. Vx	8	13.434	0.000	-811.687
			Max. Torque	16			-0.000
L3	86.167 - 42.333	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-19.216	0.000	0.000
			Max. Mx	5	-15.187	-1476.740	0.000
			Max. My	2	-15.187	0.000	1476.740
			Max. Vy	5	17.421	-1476.740	0.000
			Max. Vx	2	-17.421	0.000	1476.740
			Max. Torque	26			0.000
L4	42.333 - 15	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-26.644	0.000	0.000
			Max. Mx	5	-22.314	-2097.174	0.000
			Max. My	8	-22.314	0.000	-2097.174
			Max. Vy	5	20.103	-2097.174	0.000
			Max. Vx	8	20.103	0.000	-2097.174
			Max. Torque	26			0.000
L5	15 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.503	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	5	-26.008	-2407.856	0.000
			Max. My	2	-26.008	0.000	2407.856
			Max. Vy	5	21.351	-2407.856	0.000
			Max. Vx	2	-21.351	0.000	2407.856
			Max. Torque	26			0.000

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	18	30.503	-17.002	0.000
	Max. H_x	11	26.016	21.341	0.000
	Max. H_z	2	26.016	0.000	21.341
	Max. M_x	2	2407.856	0.000	21.341
	Max. M_z	5	2407.856	-21.341	0.000
	Max. Torsion	26	0.000	8.501	14.724
	Min. Vert	1	26.016	0.000	0.000
	Min. H_x	5	26.016	-21.341	0.000
	Min. H_z	8	26.016	0.000	-21.341
	Min. M_x	8	-2407.856	0.000	-21.341
	Min. M_z	11	-2407.856	21.341	0.000
	Min. Torsion	16	-0.000	-8.501	14.724

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	26.016	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg - No Ice	26.016	0.000	-21.341	-2407.856	0.000	0.000
Dead+Wind 30 deg - No Ice	26.016	10.670	-18.482	-2085.265	-1203.928	0.000
Dead+Wind 60 deg - No Ice	26.016	18.482	-10.670	-1203.928	-2085.265	-0.000
Dead+Wind 90 deg - No Ice	26.016	21.341	0.000	0.000	-2407.856	0.000
Dead+Wind 120 deg - No Ice	26.016	18.482	10.670	1203.928	-2085.265	0.000
Dead+Wind 150 deg - No Ice	26.016	10.670	18.482	2085.265	-1203.928	-0.000
Dead+Wind 180 deg - No Ice	26.016	0.000	21.341	2407.856	0.000	0.000
Dead+Wind 210 deg - No Ice	26.016	-10.670	18.482	2085.265	1203.928	0.000
Dead+Wind 240 deg - No Ice	26.016	-18.482	10.670	1203.928	2085.265	-0.000
Dead+Wind 270 deg - No Ice	26.016	-21.341	0.000	0.000	2407.856	0.000
Dead+Wind 300 deg - No Ice	26.016	-18.482	-10.670	-1203.928	2085.265	0.000
Dead+Wind 330 deg - No Ice	26.016	-10.670	-18.482	-2085.265	1203.928	-0.000
Dead+Ice	30.503	0.000	0.000	0.000	0.000	0.000
Dead+Wind 0 deg+Ice	30.503	0.000	-17.002	-1986.037	0.000	0.000
Dead+Wind 30 deg+Ice	30.503	8.501	-14.724	-1719.962	-993.020	0.000
Dead+Wind 60 deg+Ice	30.503	14.724	-8.501	-993.020	-1719.962	-0.000
Dead+Wind 90 deg+Ice	30.503	17.002	0.000	0.000	-1986.037	0.000
Dead+Wind 120 deg+Ice	30.503	14.724	8.501	993.020	-1719.962	0.000
Dead+Wind 150 deg+Ice	30.503	8.501	14.724	1719.962	-993.020	-0.000
Dead+Wind 180 deg+Ice	30.503	0.000	17.002	1986.037	0.000	0.000
Dead+Wind 210 deg+Ice	30.503	-8.501	14.724	1719.962	993.020	0.000
Dead+Wind 240 deg+Ice	30.503	-14.724	8.501	993.020	1719.962	-0.000
Dead+Wind 270 deg+Ice	30.503	-17.002	0.000	0.000	1986.037	0.000

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 300 deg+Ice	30.503	-14.724	-8.501	-993.020	1719.962	0.000
Dead+Wind 330 deg+Ice	30.503	-8.501	-14.724	-1719.962	993.020	-0.000
Dead+Wind 0 deg - Service	26.016	0.000	-8.336	-944.020	0.000	0.000
Dead+Wind 30 deg - Service	26.016	4.168	-7.219	-817.555	-472.015	0.000
Dead+Wind 60 deg - Service	26.016	7.219	-4.168	-472.015	-817.555	-0.000
Dead+Wind 90 deg - Service	26.016	8.336	0.000	0.000	-944.020	0.000
Dead+Wind 120 deg - Service	26.016	7.219	4.168	472.015	-817.555	0.000
Dead+Wind 150 deg - Service	26.016	4.168	7.219	817.555	-472.015	-0.000
Dead+Wind 180 deg - Service	26.016	0.000	8.336	944.020	0.000	0.000
Dead+Wind 210 deg - Service	26.016	-4.168	7.219	817.555	472.015	0.000
Dead+Wind 240 deg - Service	26.016	-7.219	4.168	472.015	817.555	-0.000
Dead+Wind 270 deg - Service	26.016	-8.336	0.000	0.000	944.020	0.000
Dead+Wind 300 deg - Service	26.016	-7.219	-4.168	-472.015	817.555	0.000
Dead+Wind 330 deg - Service	26.016	-4.168	-7.219	-817.555	472.015	-0.000

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-26.016	0.000	0.000	26.016	0.000	0.000%
2	0.000	-26.016	-21.341	0.000	26.016	21.341	0.000%
3	10.670	-26.016	-18.482	-10.670	26.016	18.482	0.000%
4	18.482	-26.016	-10.670	-18.482	26.016	10.670	0.000%
5	21.341	-26.016	0.000	-21.341	26.016	0.000	0.000%
6	18.482	-26.016	10.670	-18.482	26.016	-10.670	0.000%
7	10.670	-26.016	18.482	-10.670	26.016	-18.482	0.000%
8	0.000	-26.016	21.341	0.000	26.016	-21.341	0.000%
9	-10.670	-26.016	18.482	10.670	26.016	-18.482	0.000%
10	-18.482	-26.016	10.670	18.482	26.016	-10.670	0.000%
11	-21.341	-26.016	0.000	21.341	26.016	0.000	0.000%
12	-18.482	-26.016	-10.670	18.482	26.016	10.670	0.000%
13	-10.670	-26.016	-18.482	10.670	26.016	18.482	0.000%
14	0.000	-30.503	0.000	0.000	30.503	0.000	0.000%
15	0.000	-30.503	-17.002	0.000	30.503	17.002	0.000%
16	8.501	-30.503	-14.724	-8.501	30.503	14.724	0.000%
17	14.724	-30.503	-8.501	-14.724	30.503	8.501	0.000%
18	17.002	-30.503	0.000	-17.002	30.503	0.000	0.000%
19	14.724	-30.503	8.501	-14.724	30.503	-8.501	0.000%
20	8.501	-30.503	14.724	-8.501	30.503	-14.724	0.000%
21	0.000	-30.503	17.002	0.000	30.503	-17.002	0.000%
22	-8.501	-30.503	14.724	8.501	30.503	-14.724	0.000%
23	-14.724	-30.503	8.501	14.724	30.503	-8.501	0.000%
24	-17.002	-30.503	0.000	17.002	30.503	0.000	0.000%
25	-14.724	-30.503	-8.501	14.724	30.503	8.501	0.000%
26	-8.501	-30.503	-14.724	8.501	30.503	14.724	0.000%
27	0.000	-26.016	-8.336	0.000	26.016	8.336	0.000%
28	4.168	-26.016	-7.219	-4.168	26.016	7.219	0.000%
29	7.219	-26.016	-4.168	-7.219	26.016	4.168	0.000%
30	8.336	-26.016	0.000	-8.336	26.016	0.000	0.000%
31	7.219	-26.016	4.168	-7.219	26.016	-4.168	0.000%
32	4.168	-26.016	7.219	-4.168	26.016	-7.219	0.000%
33	0.000	-26.016	8.336	0.000	26.016	-8.336	0.000%
34	-4.168	-26.016	7.219	4.168	26.016	-7.219	0.000%
35	-7.219	-26.016	4.168	7.219	26.016	-4.168	0.000%
36	-8.336	-26.016	0.000	8.336	26.016	0.000	0.000%
37	-7.219	-26.016	-4.168	7.219	26.016	4.168	0.000%
38	-4.168	-26.016	-7.219	4.168	26.016	7.219	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	0.00001148
3	Yes	6	0.00000001	0.00010838
4	Yes	6	0.00000001	0.00010838
5	Yes	5	0.00000001	0.00001148
6	Yes	6	0.00000001	0.00010838
7	Yes	6	0.00000001	0.00010838
8	Yes	5	0.00000001	0.00001148
9	Yes	6	0.00000001	0.00010838
10	Yes	6	0.00000001	0.00010838
11	Yes	5	0.00000001	0.00001148
12	Yes	6	0.00000001	0.00010838
13	Yes	6	0.00000001	0.00010838
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00003192
16	Yes	6	0.00000001	0.00032461
17	Yes	6	0.00000001	0.00032461
18	Yes	5	0.00000001	0.00003192
19	Yes	6	0.00000001	0.00032461
20	Yes	6	0.00000001	0.00032461
21	Yes	5	0.00000001	0.00003192
22	Yes	6	0.00000001	0.00032461
23	Yes	6	0.00000001	0.00032461
24	Yes	5	0.00000001	0.00003192
25	Yes	6	0.00000001	0.00032461
26	Yes	6	0.00000001	0.00032461
27	Yes	4	0.00000001	0.00054976
28	Yes	5	0.00000001	0.00037435
29	Yes	5	0.00000001	0.00037435
30	Yes	4	0.00000001	0.00054976
31	Yes	5	0.00000001	0.00037435
32	Yes	5	0.00000001	0.00037435
33	Yes	4	0.00000001	0.00054976
34	Yes	5	0.00000001	0.00037435
35	Yes	5	0.00000001	0.00037435
36	Yes	4	0.00000001	0.00054976
37	Yes	5	0.00000001	0.00037435
38	Yes	5	0.00000001	0.00037435

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 131	80.692	27	4.267	0.000
L2	135 - 86.167	43.505	27	3.342	0.000
L3	91 - 42.333	18.463	33	2.032	0.000
L4	48 - 15	4.800	33	0.964	0.000
L5	15 - 0	0.409	33	0.262	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.000	LPA-80063/4CF	27	78.050	4.213	0.000	14993
176.000	Valmont T-Arm (3)	27	77.170	4.195	0.000	14993
169.000	(2) AIR21	27	71.038	4.070	0.000	6814

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 131	204.489	2	10.824	0.000
L2	135 - 86.167	110.524	2	8.488	0.000
L3	91 - 42.333	46.998	2	5.171	0.000
L4	48 - 15	12.232	2	2.457	0.000
L5	15 - 0	1.042	2	0.668	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
177.000	LPA-80063/4CF	2	197.818	10.689	0.000	6257
176.000	Valmont T-Arm (3)	2	195.597	10.645	0.000	6257
169.000	(2) AIR21	2	180.112	10.327	0.000	2842

Base Plate Design Data

Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension K	Actual Allowable Ratio Concrete Stress ksi	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Critical Ratio
2.625	12	2.250	140.052 131.211 1.07	2.135 2.100 1.02	45.873 45.000 1.02		Bolt T	1.07 ✔

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 K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	180 - 177.632	TP23.22x14.89x0.219	49.000	0.000	0.0	39.000	10.630	-0.098	414.555	0.000
	177.632 - 175.263					39.000	10.914	-0.649	425.629	0.002
	175.263 - 172.895					39.000	11.198	-0.752	436.702	0.002
	172.895 - 170.526					39.000	11.481	-0.859	447.775	0.002
	170.526 - 168.158					39.000	11.765	-1.419	458.848	0.003
	168.158 - 165.789					39.000	12.049	-1.534	469.921	0.003
	165.789 - 163.421					39.000	12.333	-1.654	480.994	0.003
	163.421 - 161.053					39.000	12.617	-1.779	492.068	0.004
	161.053 - 158.684					39.000	12.901	-1.908	503.141	0.004
	158.684 - 156.316					39.000	13.185	-2.041	514.214	0.004
	156.316 - 153.947					39.000	13.469	-2.178	525.287	0.004
	153.947 - 151.579					39.000	13.753	-2.320	536.360	0.004
	151.579 - 149.211					39.000	14.037	-2.466	547.434	0.005
	149.211 - 146.842					39.000	14.321	-2.616	558.507	0.005
	146.842 - 144.474					39.000	14.605	-2.770	569.580	0.005
	144.474 - 142.105					39.000	14.889	-2.928	580.653	0.005
	142.105 - 139.737					39.000	15.172	-3.090	591.726	0.005
	139.737 - 137.368					39.000	15.456	-3.256	602.799	0.005
	137.368 - 135					39.000	15.740	-3.426	613.873	0.006
	135 - 131					39.000	16.220	-1.764	632.574	0.003
L2	135 - 131	TP30.41x22.102x0.281	48.833	0.000	0.0	39.000	20.360	-2.200	794.033	0.003
	131 - 128.778					39.000	20.702	-4.165	807.375	0.005
	128.778 - 126.556					39.000	21.044	-4.371	820.716	0.005
	126.556 - 124.333					39.000	21.386	-4.581	834.057	0.005
	124.333 - 122.111					39.000	21.728	-4.794	847.398	0.006
	122.111 - 119.889					39.000	22.070	-5.011	860.740	0.006
	119.889 - 117.667					39.000	22.412	-5.232	874.081	0.006
	117.667 - 115.444					39.000	22.754	-5.457	887.422	0.006
	115.444 - 113.222					39.000	23.097	-5.685	900.764	0.006
	113.222 - 111					39.000	23.439	-5.918	914.105	0.006
	111 - 108.778					39.000	23.781	-6.153	927.446	0.007

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	108.778 - 106.556					39.000	24.123	-6.393	940.787	0.007
	106.556 - 104.333					39.000	24.465	-6.636	954.129	0.007
	104.333 - 102.111					39.000	24.807	-6.883	967.470	0.007
	102.111 - 99.8889					39.000	25.149	-7.134	980.811	0.007
	99.8889 - 97.6667					39.000	25.491	-7.388	994.152	0.007
	97.6667 - 95.4444					39.000	25.833	-7.646	1007.490	0.008
	95.4444 - 93.2222					39.000	26.175	-7.908	1020.840	0.008
	93.2222 - 91					39.000	26.517	-8.174	1034.180	0.008
	91 - 86.167					39.000	27.261	-4.219	1063.190	0.004
L3	91 - 86.167	TP37.29x29.026x0.344	48.667	0.000	0.0	39.000	32.679	-5.022	1274.490	0.004
	86.167 - 84.0466					39.000	33.078	-9.544	1290.050	0.007
	84.0466 - 81.9262					39.000	33.477	-9.846	1305.600	0.008
	81.9262 - 79.8058					39.000	33.876	-10.153	1321.160	0.008
	79.8058 - 77.6854					39.000	34.275	-10.462	1336.710	0.008
	77.6854 - 75.5651					39.000	34.674	-10.776	1352.270	0.008
	75.5651 - 73.4447					39.000	35.072	-11.093	1367.820	0.008
	73.4447 - 71.3243					39.000	35.471	-11.414	1383.380	0.008
	71.3243 - 69.2039					39.000	35.870	-11.739	1398.930	0.008
	69.2039 - 67.0835					39.000	36.269	-12.067	1414.480	0.009
	67.0835 - 64.9631					39.000	36.668	-12.399	1430.040	0.009
	64.9631 - 62.8427					39.000	37.067	-12.735	1445.590	0.009
	62.8427 - 60.7223					39.000	37.465	-13.075	1461.150	0.009
	60.7223 - 58.6019					39.000	37.864	-13.418	1476.700	0.009
	58.6019 - 56.4816					39.000	38.263	-13.764	1492.260	0.009
	56.4816 - 54.3612					39.000	38.662	-14.115	1507.810	0.009
	54.3612 - 52.2408					39.000	39.061	-14.469	1523.370	0.009
	52.2408 - 50.1204					39.000	39.460	-14.826	1538.920	0.010
	50.1204 - 48					39.000	39.858	-15.187	1554.480	0.010
	48 - 42.333					39.000	40.924	-8.212	1596.050	0.005
L4	48 - 42.333	TP41.25x35.64x0.375	33.000	0.000	0.0	39.000	43.745	-8.726	1706.070	0.005
	42.333 - 40.8944					39.000	44.041	-17.219	1717.590	0.010
	40.8944 - 39.4558					39.000	44.336	-17.488	1729.110	0.010
	39.4558 - 38.0173					39.000	44.631	-17.759	1740.630	0.010

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
	38.0173 - 36.5787					39.000	44.927	-18.031	1752.140	0.010
	36.5787 - 35.1401					39.000	45.222	-18.305	1763.660	0.010
	35.1401 - 33.7015					39.000	45.517	-18.580	1775.180	0.010
	33.7015 - 32.2629					39.000	45.813	-18.857	1786.700	0.011
	32.2629 - 30.8244					39.000	46.108	-19.136	1798.210	0.011
	30.8244 - 29.3858					39.000	46.403	-19.416	1809.730	0.011
	29.3858 - 27.9472					39.000	46.699	-19.699	1821.250	0.011
	27.9472 - 26.5086					39.000	46.994	-19.983	1832.770	0.011
	26.5086 - 25.0701					39.000	47.289	-20.268	1844.280	0.011
	25.0701 - 23.6315					39.000	47.585	-20.555	1855.800	0.011
	23.6315 - 22.1929					39.000	47.880	-20.844	1867.320	0.011
	22.1929 - 20.7543					39.000	48.175	-21.135	1878.840	0.011
	20.7543 - 19.3157					39.000	48.471	-21.427	1890.350	0.011
	19.3157 - 17.8772					39.000	48.766	-21.721	1901.870	0.011
	17.8772 - 16.4386					39.000	49.061	-22.017	1913.390	0.012
	16.4386 - 15					39.000	49.357	-22.314	1924.910	0.012
L5	15 - 14	TP43.8x41.25x0.47	15.000	0.000	0.0	39.000	61.974	-22.560	2416.980	0.009
	14 - 13					39.000	62.231	-22.800	2427.010	0.009
	13 - 12					39.000	62.488	-23.041	2437.040	0.009
	12 - 11					39.000	62.746	-23.283	2447.080	0.010
	11 - 10					39.000	63.003	-23.526	2457.110	0.010
	10 - 9					39.000	63.260	-23.769	2467.140	0.010
	9 - 8					39.000	63.517	-24.014	2477.180	0.010
	8 - 7					39.000	63.775	-24.260	2487.210	0.010
	7 - 6					39.000	64.032	-24.507	2497.250	0.010
	6 - 5					39.000	64.289	-24.755	2507.280	0.010
	5 - 4					39.000	64.547	-25.003	2517.310	0.010
	4 - 3					39.000	64.804	-25.253	2527.350	0.010
	3 - 2					39.000	65.061	-25.504	2537.380	0.010
	2 - 1					39.000	65.318	-25.756	2547.420	0.010
	1 - 0					39.000	65.576	-26.008	2557.450	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	180 - 177.632	TP23.22x14.89x0.219	0.187	0.058	39.000	0.001	0.000	0.000	39.000	0.000
	177.632 - 175.263		6.943	2.030	39.000	0.052	0.000	0.000	39.000	0.000
	175.263 -		17.863	4.960	39.000	0.127	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	172.895									
	172.895 - 170.526		29.178	7.703	39.000	0.198	0.000	0.000	39.000	0.000
	170.526 - 168.158		42.371	10.650	39.000	0.273	0.000	0.000	39.000	0.000
	168.158 - 165.789		58.637	14.048	39.000	0.360	0.000	0.000	39.000	0.000
	165.789 - 163.421		75.315	17.217	39.000	0.441	0.000	0.000	39.000	0.000
	163.421 - 161.053		92.412	20.180	39.000	0.517	0.000	0.000	39.000	0.000
	161.053 - 158.684		109.932	22.954	39.000	0.589	0.000	0.000	39.000	0.000
	158.684 - 156.316		127.881	25.558	39.000	0.655	0.000	0.000	39.000	0.000
	156.316 - 153.947		146.265	28.006	39.000	0.718	0.000	0.000	39.000	0.000
	153.947 - 151.579		165.090	30.312	39.000	0.777	0.000	0.000	39.000	0.000
	151.579 - 149.211		184.360	32.487	39.000	0.833	0.000	0.000	39.000	0.000
	149.211 - 146.842		204.080	34.543	39.000	0.886	0.000	0.000	39.000	0.000
	146.842 - 144.474		224.257	36.489	39.000	0.936	0.000	0.000	39.000	0.000
	144.474 - 142.105		244.893	38.334	39.000	0.983	0.000	0.000	39.000	0.000
	142.105 - 139.737		265.995	40.085	39.000	1.028	0.000	0.000	39.000	0.000
	139.737 - 137.368		287.568	41.751	39.000	1.071	0.000	0.000	39.000	0.000
	137.368 - 135		309.614	43.337	39.000	1.111	0.000	0.000	39.000	0.000
	135 - 131		158.254	20.855	39.000	0.535	0.000	0.000	39.000	0.000
L2	135 - 131	TP30.41x22.102x0.281	189.791	20.427	39.000	0.524	0.000	0.000	39.000	0.000
	131 - 128.778		370.052	38.515	39.000	0.988	0.000	0.000	39.000	0.000
	128.778 - 126.556		392.488	39.525	39.000	1.013	0.000	0.000	39.000	0.000
	126.556 - 124.333		415.358	40.493	39.000	1.038	0.000	0.000	39.000	0.000
	124.333 - 122.111		438.662	41.421	39.000	1.062	0.000	0.000	39.000	0.000
	122.111 - 119.889		462.402	42.312	39.000	1.085	0.000	0.000	39.000	0.000
	119.889 - 117.667		486.582	43.169	39.000	1.107	0.000	0.000	39.000	0.000
	117.667 - 115.444		511.203	43.992	39.000	1.128	0.000	0.000	39.000	0.000
	115.444 - 113.222		536.268	44.785	39.000	1.148	0.000	0.000	39.000	0.000
	113.222 - 111		561.777	45.548	39.000	1.168	0.000	0.000	39.000	0.000
	111 - 108.778		587.733	46.285	39.000	1.187	0.000	0.000	39.000	0.000
	108.778 - 106.556		614.138	46.995	39.000	1.205	0.000	0.000	39.000	0.000
	106.556 - 104.333		640.993	47.681	39.000	1.223	0.000	0.000	39.000	0.000
	104.333 - 102.111		668.302	48.344	39.000	1.240	0.000	0.000	39.000	0.000
	102.111 - 99.8889		696.064	48.985	39.000	1.256	0.000	0.000	39.000	0.000
	99.8889 -		724.282	49.605	39.000	1.272	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	97.6667									
	97.6667 - 95.4444		752.957	50.206	39.000	1.287	0.000	0.000	39.000	0.000
	95.4444 - 93.2222		782.092	50.788	39.000	1.302	0.000	0.000	39.000	0.000
	93.2222 - 91		811.688	51.352	39.000	1.317	0.000	0.000	39.000	0.000
	91 - 86.167		408.682	24.457	39.000	0.627	0.000	0.000	39.000	0.000
L3	91 - 86.167	TP37.29x29.026x0.344	469.158	23.974	39.000	0.615	0.000	0.000	39.000	0.000
	86.167 - 84.0466		907.633	45.263	39.000	1.161	0.000	0.000	39.000	0.000
	84.0466 - 81.9262		937.842	45.655	39.000	1.171	0.000	0.000	39.000	0.000
	81.9262 - 79.8058		968.467	46.036	39.000	1.180	0.000	0.000	39.000	0.000
	79.8058 - 77.6854		999.500	46.406	39.000	1.190	0.000	0.000	39.000	0.000
	77.6854 - 75.5651		1030.942	46.766	39.000	1.199	0.000	0.000	39.000	0.000
	75.5651 - 73.4447		1062.800	47.115	39.000	1.208	0.000	0.000	39.000	0.000
	73.4447 - 71.3243		1095.067	47.454	39.000	1.217	0.000	0.000	39.000	0.000
	71.3243 - 69.2039		1127.742	47.783	39.000	1.225	0.000	0.000	39.000	0.000
	69.2039 - 67.0835		1160.825	48.103	39.000	1.233	0.000	0.000	39.000	0.000
	67.0835 - 64.9631		1194.317	48.415	39.000	1.241	0.000	0.000	39.000	0.000
	64.9631 - 62.8427		1228.208	48.718	39.000	1.249	0.000	0.000	39.000	0.000
	62.8427 - 60.7223		1262.508	49.013	39.000	1.257	0.000	0.000	39.000	0.000
	60.7223 - 58.6019		1297.208	49.299	39.000	1.264	0.000	0.000	39.000	0.000
	58.6019 - 56.4816		1332.317	49.578	39.000	1.271	0.000	0.000	39.000	0.000
	56.4816 - 54.3612		1367.825	49.850	39.000	1.278	0.000	0.000	39.000	0.000
	54.3612 - 52.2408		1403.733	50.114	39.000	1.285	0.000	0.000	39.000	0.000
	52.2408 - 50.1204		1440.033	50.371	39.000	1.292	0.000	0.000	39.000	0.000
	50.1204 - 48		1476.742	50.622	39.000	1.298	0.000	0.000	39.000	0.000
	48 - 42.333		778.154	25.297	39.000	0.649	0.000	0.000	39.000	0.000
L4	48 - 42.333	TP41.25x35.64x0.375	798.867	24.802	39.000	0.636	0.000	0.000	39.000	0.000
	42.333 - 40.8944		1602.975	49.099	39.000	1.259	0.000	0.000	39.000	0.000
	40.8944 - 39.4558		1629.083	49.233	39.000	1.262	0.000	0.000	39.000	0.000
	39.4558 - 38.0173		1655.350	49.363	39.000	1.266	0.000	0.000	39.000	0.000
	38.0173 - 36.5787		1681.767	49.491	39.000	1.269	0.000	0.000	39.000	0.000
	36.5787 - 35.1401		1708.350	49.615	39.000	1.272	0.000	0.000	39.000	0.000
	35.1401 - 33.7015		1735.083	49.737	39.000	1.275	0.000	0.000	39.000	0.000
	33.7015 - 32.2629		1761.983	49.855	39.000	1.278	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	32.2629 - 30.8244		1789.033	49.971	39.000	1.281	0.000	0.000	39.000	0.000
	30.8244 - 29.3858		1816.250	50.085	39.000	1.284	0.000	0.000	39.000	0.000
	29.3858 - 27.9472		1843.625	50.196	39.000	1.287	0.000	0.000	39.000	0.000
	27.9472 - 26.5086		1871.158	50.304	39.000	1.290	0.000	0.000	39.000	0.000
	26.5086 - 25.0701		1898.842	50.410	39.000	1.293	0.000	0.000	39.000	0.000
	25.0701 - 23.6315		1926.700	50.513	39.000	1.295	0.000	0.000	39.000	0.000
	23.6315 - 22.1929		1954.708	50.614	39.000	1.298	0.000	0.000	39.000	0.000
	22.1929 - 20.7543		1982.875	50.713	39.000	1.300	0.000	0.000	39.000	0.000
	20.7543 - 19.3157		2011.208	50.810	39.000	1.303	0.000	0.000	39.000	0.000
	19.3157 - 17.8772		2039.708	50.905	39.000	1.305	0.000	0.000	39.000	0.000
	17.8772 - 16.4386		2068.358	50.998	39.000	1.308	0.000	0.000	39.000	0.000
	16.4386 - 15		2097.175	51.089	39.000	1.310	0.000	0.000	39.000	0.000
L5	15 - 14	TP43.8x41.25x0.47	2117.300	41.096	39.000	1.054	0.000	0.000	39.000	0.000
	14 - 13		2137.517	41.144	39.000	1.055	0.000	0.000	39.000	0.000
	13 - 12		2157.808	41.192	39.000	1.056	0.000	0.000	39.000	0.000
	12 - 11		2178.183	41.239	39.000	1.057	0.000	0.000	39.000	0.000
	11 - 10		2198.650	41.285	39.000	1.059	0.000	0.000	39.000	0.000
	10 - 9		2219.192	41.330	39.000	1.060	0.000	0.000	39.000	0.000
	9 - 8		2239.817	41.375	39.000	1.061	0.000	0.000	39.000	0.000
	8 - 7		2260.533	41.420	39.000	1.062	0.000	0.000	39.000	0.000
	7 - 6		2281.325	41.464	39.000	1.063	0.000	0.000	39.000	0.000
	6 - 5		2302.200	41.507	39.000	1.064	0.000	0.000	39.000	0.000
	5 - 4		2323.167	41.550	39.000	1.065	0.000	0.000	39.000	0.000
	4 - 3		2344.208	41.593	39.000	1.066	0.000	0.000	39.000	0.000
	3 - 2		2365.342	41.634	39.000	1.068	0.000	0.000	39.000	0.000
	2 - 1		2386.558	41.676	39.000	1.069	0.000	0.000	39.000	0.000
	1 - 0		2407.858	41.717	39.000	1.070	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	180 - 177.632	TP23.22x14.89x0.219	0.158	0.015	26.000	0.001	0.000	0.000	26.000	0.000
	177.632 - 175.263		4.529	0.415	26.000	0.032	0.000	0.000	26.000	0.000
	175.263 - 172.895		4.694	0.419	26.000	0.033	0.000	0.000	26.000	0.000
	172.895 - 170.526		4.862	0.423	26.000	0.033	0.000	0.000	26.000	0.000
	170.526 - 168.158		6.783	0.576	26.000	0.045	0.000	0.000	26.000	0.000
	168.158 - 165.789		6.956	0.577	26.000	0.045	0.000	0.000	26.000	0.000
	165.789 - 163.421		7.131	0.578	26.000	0.045	0.000	0.000	26.000	0.000
	163.421 - 161.053		7.309	0.579	26.000	0.045	0.000	0.000	26.000	0.000
	161.053 - 158.684		7.490	0.581	26.000	0.045	0.000	0.000	26.000	0.000
	158.684 - 156.316		7.673	0.582	26.000	0.045	0.000	0.000	26.000	0.000
	156.316 - 153.947		7.858	0.583	26.000	0.046	0.000	0.000	26.000	0.000
	153.947 - 151.579		8.045	0.585	26.000	0.046	0.000	0.000	26.000	0.000
	151.579 - 149.211		8.235	0.587	26.000	0.046	0.000	0.000	26.000	0.000
	149.211 - 146.842		8.426	0.588	26.000	0.046	0.000	0.000	26.000	0.000
	146.842 - 144.474		8.620	0.590	26.000	0.046	0.000	0.000	26.000	0.000
	144.474 - 142.105		8.816	0.592	26.000	0.046	0.000	0.000	26.000	0.000
	142.105 - 139.737		9.014	0.594	26.000	0.046	0.000	0.000	26.000	0.000
	139.737 - 137.368		9.214	0.596	26.000	0.047	0.000	0.000	26.000	0.000
	137.368 - 135		9.416	0.598	26.000	0.047	0.000	0.000	26.000	0.000
	135 - 131		4.551	0.281	26.000	0.022	0.000	0.000	26.000	0.000
L2	135 - 131	TP30.41x22.102x0.281	5.261	0.258	26.000	0.020	0.000	0.000	26.000	0.000
	131 - 128.778		10.006	0.483	26.000	0.038	0.000	0.000	26.000	0.000
	128.778 - 126.556		10.200	0.485	26.000	0.038	0.000	0.000	26.000	0.000
	126.556 - 124.333		10.396	0.486	26.000	0.038	0.000	0.000	26.000	0.000
	124.333 - 122.111		10.592	0.487	26.000	0.038	0.000	0.000	26.000	0.000
	122.111 - 119.889		10.790	0.489	26.000	0.038	0.000	0.000	26.000	0.000
	119.889 - 117.667		10.988	0.490	26.000	0.038	0.000	0.000	26.000	0.000
	117.667 - 115.444		11.188	0.492	26.000	0.038	0.000	0.000	26.000	0.000
	115.444 - 113.222		11.388	0.493	26.000	0.039	0.000	0.000	26.000	0.000
	113.222 - 111		11.589	0.494	26.000	0.039	0.000	0.000	26.000	0.000
	111 - 108.778		11.791	0.496	26.000	0.039	0.000	0.000	26.000	0.000
	108.778 - 106.556		11.993	0.497	26.000	0.039	0.000	0.000	26.000	0.000
	106.556 - 104.333		12.197	0.499	26.000	0.039	0.000	0.000	26.000	0.000
	104.333 -		12.401	0.500	26.000	0.039	0.000	0.000	26.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	102.111									
	102.111 - 99.8889		12.607	0.501	26.000	0.039	0.000	0.000	26.000	0.000
	99.8889 - 97.6667		12.813	0.503	26.000	0.039	0.000	0.000	26.000	0.000
	97.6667 - 95.4444		13.019	0.504	26.000	0.039	0.000	0.000	26.000	0.000
	95.4444 - 93.2222		13.227	0.505	26.000	0.039	0.000	0.000	26.000	0.000
	93.2222 - 91		13.435	0.507	26.000	0.040	0.000	0.000	26.000	0.000
	91 - 86.167		6.627	0.243	26.000	0.019	0.000	0.000	26.000	0.000
L3	91 - 86.167	TP37.29x29.026x0.344	7.340	0.225	26.000	0.018	0.000	0.000	26.000	0.000
	86.167 - 84.0466		14.161	0.428	26.000	0.033	0.000	0.000	26.000	0.000
	84.0466 - 81.9262		14.357	0.429	26.000	0.034	0.000	0.000	26.000	0.000
	81.9262 - 79.8058		14.552	0.430	26.000	0.034	0.000	0.000	26.000	0.000
	79.8058 - 77.6854		14.746	0.430	26.000	0.034	0.000	0.000	26.000	0.000
	77.6854 - 75.5651		14.941	0.431	26.000	0.034	0.000	0.000	26.000	0.000
	75.5651 - 73.4447		15.134	0.432	26.000	0.034	0.000	0.000	26.000	0.000
	73.4447 - 71.3243		15.328	0.432	26.000	0.034	0.000	0.000	26.000	0.000
	71.3243 - 69.2039		15.521	0.433	26.000	0.034	0.000	0.000	26.000	0.000
	69.2039 - 67.0835		15.713	0.433	26.000	0.034	0.000	0.000	26.000	0.000
	67.0835 - 64.9631		15.905	0.434	26.000	0.034	0.000	0.000	26.000	0.000
	64.9631 - 62.8427		16.096	0.434	26.000	0.034	0.000	0.000	26.000	0.000
	62.8427 - 60.7223		16.287	0.435	26.000	0.034	0.000	0.000	26.000	0.000
	60.7223 - 58.6019		16.478	0.435	26.000	0.034	0.000	0.000	26.000	0.000
	58.6019 - 56.4816		16.668	0.436	26.000	0.034	0.000	0.000	26.000	0.000
	56.4816 - 54.3612		16.857	0.436	26.000	0.034	0.000	0.000	26.000	0.000
	54.3612 - 52.2408		17.046	0.436	26.000	0.034	0.000	0.000	26.000	0.000
	52.2408 - 50.1204		17.234	0.437	26.000	0.034	0.000	0.000	26.000	0.000
	50.1204 - 48		17.421	0.437	26.000	0.034	0.000	0.000	26.000	0.000
	48 - 42.333		9.029	0.221	26.000	0.017	0.000	0.000	26.000	0.000
L4	48 - 42.333	TP41.25x35.64x0.375	8.983	0.205	26.000	0.016	0.000	0.000	26.000	0.000
	42.333 - 40.8944		18.108	0.411	26.000	0.032	0.000	0.000	26.000	0.000
	40.8944 - 39.4558		18.217	0.411	26.000	0.032	0.000	0.000	26.000	0.000
	39.4558 - 38.0173		18.326	0.411	26.000	0.032	0.000	0.000	26.000	0.000
	38.0173 - 36.5787		18.436	0.410	26.000	0.032	0.000	0.000	26.000	0.000
	36.5787 - 35.1401		18.545	0.410	26.000	0.032	0.000	0.000	26.000	0.000
	35.1401 -		18.655	0.410	26.000	0.032	0.000	0.000	26.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	33.7015									
	33.7015 - 32.2629		18.765	0.410	26.000	0.032	0.000	0.000	26.000	0.000
	32.2629 - 30.8244		18.876	0.409	26.000	0.032	0.000	0.000	26.000	0.000
	30.8244 - 29.3858		18.986	0.409	26.000	0.032	0.000	0.000	26.000	0.000
	29.3858 - 27.9472		19.097	0.409	26.000	0.032	0.000	0.000	26.000	0.000
	27.9472 - 26.5086		19.208	0.409	26.000	0.032	0.000	0.000	26.000	0.000
	26.5086 - 25.0701		19.319	0.409	26.000	0.032	0.000	0.000	26.000	0.000
	25.0701 - 23.6315		19.431	0.408	26.000	0.032	0.000	0.000	26.000	0.000
	23.6315 - 22.1929		19.542	0.408	26.000	0.032	0.000	0.000	26.000	0.000
	22.1929 - 20.7543		19.654	0.408	26.000	0.032	0.000	0.000	26.000	0.000
	20.7543 - 19.3157		19.766	0.408	26.000	0.032	0.000	0.000	26.000	0.000
	19.3157 - 17.8772		19.878	0.408	26.000	0.032	0.000	0.000	26.000	0.000
	17.8772 - 16.4386		19.990	0.407	26.000	0.032	0.000	0.000	26.000	0.000
	16.4386 - 15		20.103	0.407	26.000	0.032	0.000	0.000	26.000	0.000
L5	15 - 14	TP43.8x41.25x0.47	20.179	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	14 - 13		20.262	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	13 - 12		20.345	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	12 - 11		20.428	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	11 - 10		20.512	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	10 - 9		20.595	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	9 - 8		20.679	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	8 - 7		20.762	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	7 - 6		20.846	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	6 - 5		20.930	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	5 - 4		21.014	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	4 - 3		21.098	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	3 - 2		21.182	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	2 - 1		21.267	0.326	26.000	0.025	0.000	0.000	26.000	0.000
	1 - 0		21.351	0.326	26.000	0.025	0.000	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 177.632	0.000	0.001	0.000	0.001	0.000	0.002 ✔	1.333	H1-3+VT ✔
	177.632 - 175.263	0.002	0.052	0.000	0.032	0.000	0.054 ✔	1.333	H1-3+VT ✔
	175.263 - 172.895	0.002	0.127	0.000	0.033	0.000	0.129 ✔	1.333	H1-3+VT ✔
	172.895 -	0.002	0.198	0.000	0.033	0.000	0.200	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	170.526						✔		
	170.526 - 168.158	0.003	0.273	0.000	0.045	0.000	0.277 ✔	1.333	H1-3+VT ✔
	168.158 - 165.789	0.003	0.360	0.000	0.045	0.000	0.364 ✔	1.333	H1-3+VT ✔
	165.789 - 163.421	0.003	0.441	0.000	0.045	0.000	0.445 ✔	1.333	H1-3+VT ✔
	163.421 - 161.053	0.004	0.517	0.000	0.045	0.000	0.522 ✔	1.333	H1-3+VT ✔
	161.053 - 158.684	0.004	0.589	0.000	0.045	0.000	0.593 ✔	1.333	H1-3+VT ✔
	158.684 - 156.316	0.004	0.655	0.000	0.045	0.000	0.660 ✔	1.333	H1-3+VT ✔
	156.316 - 153.947	0.004	0.718	0.000	0.046	0.000	0.723 ✔	1.333	H1-3+VT ✔
	153.947 - 151.579	0.004	0.777	0.000	0.046	0.000	0.782 ✔	1.333	H1-3+VT ✔
	151.579 - 149.211	0.005	0.833	0.000	0.046	0.000	0.838 ✔	1.333	H1-3+VT ✔
	149.211 - 146.842	0.005	0.886	0.000	0.046	0.000	0.891 ✔	1.333	H1-3+VT ✔
	146.842 - 144.474	0.005	0.936	0.000	0.046	0.000	0.941 ✔	1.333	H1-3+VT ✔
	144.474 - 142.105	0.005	0.983	0.000	0.046	0.000	0.988 ✔	1.333	H1-3+VT ✔
	142.105 - 139.737	0.005	1.028	0.000	0.046	0.000	1.034 ✔	1.333	H1-3+VT ✔
	139.737 - 137.368	0.005	1.071	0.000	0.047	0.000	1.076 ✔	1.333	H1-3+VT ✔
	137.368 - 135	0.006	1.111	0.000	0.047	0.000	1.117 ✔	1.333	H1-3+VT ✔
	135 - 131	0.003	0.535	0.000	0.022	0.000	0.538 ✔	1.333	H1-3+VT ✔
L2	135 - 131	0.003	0.524	0.000	0.020	0.000	0.527 ✔	1.333	H1-3+VT ✔
	131 - 128.778	0.005	0.988	0.000	0.038	0.000	0.993 ✔	1.333	H1-3+VT ✔
	128.778 - 126.556	0.005	1.013	0.000	0.038	0.000	1.019 ✔	1.333	H1-3+VT ✔
	126.556 - 124.333	0.005	1.038	0.000	0.038	0.000	1.044 ✔	1.333	H1-3+VT ✔
	124.333 - 122.111	0.006	1.062	0.000	0.038	0.000	1.068 ✔	1.333	H1-3+VT ✔
	122.111 - 119.889	0.006	1.085	0.000	0.038	0.000	1.091 ✔	1.333	H1-3+VT ✔
	119.889 - 117.667	0.006	1.107	0.000	0.038	0.000	1.113 ✔	1.333	H1-3+VT ✔
	117.667 - 115.444	0.006	1.128	0.000	0.038	0.000	1.135 ✔	1.333	H1-3+VT ✔
	115.444 - 113.222	0.006	1.148	0.000	0.039	0.000	1.155 ✔	1.333	H1-3+VT ✔
	113.222 - 111	0.006	1.168	0.000	0.039	0.000	1.175	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	111 - 108.778	0.007	1.187	0.000	0.039	0.000	1.194	1.333	H1-3+VT
	108.778 - 106.556	0.007	1.205	0.000	0.039	0.000	1.212	1.333	H1-3+VT
	106.556 - 104.333	0.007	1.223	0.000	0.039	0.000	1.230	1.333	H1-3+VT
	104.333 - 102.111	0.007	1.240	0.000	0.039	0.000	1.247	1.333	H1-3+VT
	102.111 - 99.8889	0.007	1.256	0.000	0.039	0.000	1.264	1.333	H1-3+VT
	99.8889 - 97.6667	0.007	1.272	0.000	0.039	0.000	1.280	1.333	H1-3+VT
	97.6667 - 95.4444	0.008	1.287	0.000	0.039	0.000	1.295	1.333	H1-3+VT
	95.4444 - 93.2222	0.008	1.302	0.000	0.039	0.000	1.310	1.333	H1-3+VT
	93.2222 - 91	0.008	1.317	0.000	0.040	0.000	1.325	1.333	H1-3+VT
	91 - 86.167	0.004	0.627	0.000	0.019	0.000	0.631	1.333	H1-3+VT
L3	91 - 86.167	0.004	0.615	0.000	0.018	0.000	0.619	1.333	H1-3+VT
	86.167 - 84.0466	0.007	1.161	0.000	0.033	0.000	1.168	1.333	H1-3+VT
	84.0466 - 81.9262	0.008	1.171	0.000	0.034	0.000	1.178	1.333	H1-3+VT
	81.9262 - 79.8058	0.008	1.180	0.000	0.034	0.000	1.188	1.333	H1-3+VT
	79.8058 - 77.6854	0.008	1.190	0.000	0.034	0.000	1.198	1.333	H1-3+VT
	77.6854 - 75.5651	0.008	1.199	0.000	0.034	0.000	1.207	1.333	H1-3+VT
	75.5651 - 73.4447	0.008	1.208	0.000	0.034	0.000	1.216	1.333	H1-3+VT
	73.4447 - 71.3243	0.008	1.217	0.000	0.034	0.000	1.225	1.333	H1-3+VT
	71.3243 - 69.2039	0.008	1.225	0.000	0.034	0.000	1.234	1.333	H1-3+VT
	69.2039 - 67.0835	0.009	1.233	0.000	0.034	0.000	1.242	1.333	H1-3+VT
	67.0835 - 64.9631	0.009	1.241	0.000	0.034	0.000	1.250	1.333	H1-3+VT
	64.9631 - 62.8427	0.009	1.249	0.000	0.034	0.000	1.258	1.333	H1-3+VT
	62.8427 - 60.7223	0.009	1.257	0.000	0.034	0.000	1.266	1.333	H1-3+VT
	60.7223 - 58.6019	0.009	1.264	0.000	0.034	0.000	1.273	1.333	H1-3+VT
	58.6019 - 56.4816	0.009	1.271	0.000	0.034	0.000	1.281	1.333	H1-3+VT
	56.4816 - 54.3612	0.009	1.278	0.000	0.034	0.000	1.288	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	54.3612 - 52.2408	0.009	1.285	0.000	0.034	0.000	1.295	1.333	H1-3+VT
	52.2408 - 50.1204	0.010	1.292	0.000	0.034	0.000	1.301	1.333	H1-3+VT
	50.1204 - 48	0.010	1.298	0.000	0.034	0.000	1.308	1.333	H1-3+VT
	48 - 42.333	0.005	0.649	0.000	0.017	0.000	0.654	1.333	H1-3+VT
L4	48 - 42.333	0.005	0.636	0.000	0.016	0.000	0.641	1.333	H1-3+VT
	42.333 - 40.8944	0.010	1.259	0.000	0.032	0.000	1.269	1.333	H1-3+VT
	40.8944 - 39.4558	0.010	1.262	0.000	0.032	0.000	1.273	1.333	H1-3+VT
	39.4558 - 38.0173	0.010	1.266	0.000	0.032	0.000	1.276	1.333	H1-3+VT
	38.0173 - 36.5787	0.010	1.269	0.000	0.032	0.000	1.280	1.333	H1-3+VT
	36.5787 - 35.1401	0.010	1.272	0.000	0.032	0.000	1.283	1.333	H1-3+VT
	35.1401 - 33.7015	0.010	1.275	0.000	0.032	0.000	1.286	1.333	H1-3+VT
	33.7015 - 32.2629	0.011	1.278	0.000	0.032	0.000	1.289	1.333	H1-3+VT
	32.2629 - 30.8244	0.011	1.281	0.000	0.032	0.000	1.292	1.333	H1-3+VT
	30.8244 - 29.3858	0.011	1.284	0.000	0.032	0.000	1.295	1.333	H1-3+VT
	29.3858 - 27.9472	0.011	1.287	0.000	0.032	0.000	1.298	1.333	H1-3+VT
	27.9472 - 26.5086	0.011	1.290	0.000	0.032	0.000	1.301	1.333	H1-3+VT
	26.5086 - 25.0701	0.011	1.293	0.000	0.032	0.000	1.304	1.333	H1-3+VT
	25.0701 - 23.6315	0.011	1.295	0.000	0.032	0.000	1.307	1.333	H1-3+VT
	23.6315 - 22.1929	0.011	1.298	0.000	0.032	0.000	1.309	1.333	H1-3+VT
	22.1929 - 20.7543	0.011	1.300	0.000	0.032	0.000	1.312	1.333	H1-3+VT
	20.7543 - 19.3157	0.011	1.303	0.000	0.032	0.000	1.314	1.333	H1-3+VT
	19.3157 - 17.8772	0.011	1.305	0.000	0.032	0.000	1.317	1.333	H1-3+VT
	17.8772 - 16.4386	0.012	1.308	0.000	0.032	0.000	1.319	1.333	H1-3+VT
	16.4386 - 15	0.012	1.310	0.000	0.032	0.000	1.322	1.333	H1-3+VT
L5	15 - 14	0.009	1.054	0.000	0.025	0.000	1.063	1.333	H1-3+VT
	14 - 13	0.009	1.055	0.000	0.025	0.000	1.065	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	13 - 12	0.009	1.056	0.000	0.025	0.000	1.066 ✔	1.333	H1-3+VT ✔
	12 - 11	0.010	1.057	0.000	0.025	0.000	1.067 ✔	1.333	H1-3+VT ✔
	11 - 10	0.010	1.059	0.000	0.025	0.000	1.068 ✔	1.333	H1-3+VT ✔
	10 - 9	0.010	1.060	0.000	0.025	0.000	1.070 ✔	1.333	H1-3+VT ✔
	9 - 8	0.010	1.061	0.000	0.025	0.000	1.071 ✔	1.333	H1-3+VT ✔
	8 - 7	0.010	1.062	0.000	0.025	0.000	1.072 ✔	1.333	H1-3+VT ✔
	7 - 6	0.010	1.063	0.000	0.025	0.000	1.073 ✔	1.333	H1-3+VT ✔
	6 - 5	0.010	1.064	0.000	0.025	0.000	1.074 ✔	1.333	H1-3+VT ✔
	5 - 4	0.010	1.065	0.000	0.025	0.000	1.075 ✔	1.333	H1-3+VT ✔
	4 - 3	0.010	1.066	0.000	0.025	0.000	1.077 ✔	1.333	H1-3+VT ✔
	3 - 2	0.010	1.068	0.000	0.025	0.000	1.078 ✔	1.333	H1-3+VT ✔
	2 - 1	0.010	1.069	0.000	0.025	0.000	1.079 ✔	1.333	H1-3+VT ✔
	1 - 0	0.010	1.070	0.000	0.025	0.000	1.080 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	180 - 131	Pole	TP23.22x14.89x0.219	1	-3.426	818.293	83.8	Pass
L2	131 - 86.167	Pole	TP30.41x22.102x0.281	2	-8.174	1378.562	99.4	Pass
L3	86.167 - 42.333	Pole	TP37.29x29.026x0.344	3	-15.187	2072.122	98.1	Pass
L4	42.333 - 15	Pole	TP41.25x35.64x0.375	4	-22.314	2565.905	99.2	Pass
L5	15 - 0	Pole	TP43.8x41.25x0.47	5	-26.008	3409.081	81.0	Pass
							Summary	
						Pole (L2)	99.4	Pass
						Base Plate	80.1	Pass
						RATING =	**99.4**	**Pass**

Element Map

Section No.	Section Elevation ft	Component Type	Element List
L1	180.000-131.000	Pole	1
L2	131.000-86.167	Pole	2
L3	86.167-42.333	Pole	3
L4	42.333-15.000	Pole	4
L5	15.000-0.000	Pole	5
			Total number of elements: 5

Program Version 6.0.0.8 - 9/7/2011 File:J:/Jobs/1403300.WI/010 - Plymouth CTNH524A/04_Structural/Backup Documentation/Calcs/Rev (1)/ERI Files/reinforced/180' Monopole_ Plymouth_CT.eri

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Subject:	Monopole Reinforcement
Location:	Plymouth, CT
Rev. 1: 7/24/14	Designed by: T.J.L. Checked by: C.F.C. Job No. 14033.010

MONOPOLE REINFORCEMENT DESIGN

Note: Existing monopole is a 12 sided polygon. Proposed reinforcements shall comprise of flat bar stock attached to the exterior of the pole.

Design Forces:

Moment =	$M_{act} := 2413 \cdot ft \cdot kips$	(User Input)
Axial =	$P := 25 \cdot kips$	(User Input)
Shear =	$V := 21 \cdot kips$	(User Input)

Existing Monopole data:

Youngs Modulus of Elasticity for Steel =	$E := 29000ksi$	(User Input)
Pole Yield Strength =	$Fy := 65 \cdot ksi$	(User Input)
Pole Section Diameter =	$D_{o.pole} := 41.25in$	(User Input)
Pole Section Wall Thickness =	$t := 0.375in$	(User Input)
Pole Cross-Sectional Area =	$A_{pole} := 49.29in^2$	(User Input)
Pole Section Moment of Inertia =	$I_{pole} := 10540in^4$	(User Input)

Stiffener Reinforcement Data:

Stiffener Yield Strength =	$Fy_{stiff} := 50 \cdot ksi$	(User Input)	
Stiffener Width =	$b := 9in$	(User Input)	
Stiffener Depth =	$d := 0.625in$	(User Input)	
Unbraced Length of Stiffener =	$l := 12in$	(User Input)	(Equal to Bolt Spacing. Assumed pin-pin Between Bolts)
Effective Length K Factor =	$K := 1.0$	(User Input)	
Number of Stiffeners =	$n_{stiff} := 3$	(User Input)	
Distance to Stiffener Centroid =	$d_1 := 21in$	(User Input)	
	$d_2 := 10.625in$	(User Input)	

AJAX Bolt Data:

Bolt Grade =	AS1252 PC 8.8	(User Input)	NOTE: AJAX bolts conform to AS 1252 Property Class 8.8 similar to A325 Fu = 120ksi
Number of Bolts per Stiffener =	$n_b := 9$	(User Input)	
Bolt Diameter =	$d_b := 0.75in$	(User Input)	
Allowable Shear Stress =	$Fv_{bolt} := 27 \cdot ksi$	(User Input)	
Number of Shear Planes =	$n_{plane} := 1$	(User Input)	

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Calculated Properties:

Distance from Centroid to Extreme Fiber (Pole)

$c := D_{o.pole} \cdot 0.5 = 20.625 \cdot in$

Pole Allowable Axial Stress =

$Fa := 0.6 \cdot 1.33Fy = 51.87 \cdot ksi$

Note: 1.333 increase allowed per TIA/EIA

Pole Allowable Bending Stress =

$Fb := 0.6 \cdot 1.33Fy = 51.87 \cdot ksi$

Stiffener Area =

$A_{stiff} := b \cdot d = 5.625 \cdot in^2$

Distance from Centroid to Extreme Fiber =

$c_{total} := c + d = 21.25 \cdot in$

Stiffener Allowable Bending Stress =

$Fb_{stiff} := 0.60 \cdot 1.33Fy_{stiff} = 39.9 \cdot ksi$

Note: 1.33 increase allowed per TIA/EIA

Stiffener Moment of Inertia =

$$I_{stiff} := \left(\frac{bd^3}{12}\right) = 0.183 \cdot in^4$$

Stiffener Moment Area =

$Q_{stiff} := A_{stiff} \cdot d_1 = 118.125 \cdot in^3$

Total Stiffener Moment of Inertia =

$$I_{stifftotal} := I_{stiff} \cdot n_{stiff} + A_{stiff}\left[(d_1)^2 \cdot 1 + (d_2)^2 \cdot 2\right] = 3751.19 \cdot in^4$$

Total Moment of Inertia =

$I_{total} := I_{stifftotal} + I_{pole} = 14291.2 \cdot in^4$

Stiffener Radius of Gyration =

$$r := \sqrt{\frac{I_{stiff}}{A_{stiff}}} = 0.18 \cdot in$$

Stiffener Slenderness Ratio =

$$SRatio := \left(\frac{K \cdot l}{r}\right) = 66.511$$

Stiffener Compression Index =

$$C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{Fy_{stiff}}} = 107$$

Stiffener Allowable Compressive Force =

$$Fa_{stiff} := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^2}\right] \cdot Fy_{stiff}}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^3}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} = 21.575 \cdot ksi$$

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Location:	Plymouth, CT
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Check Existing Monopole:

Moment Capacity of Existing Section = $Mn_{pole} := \left(\frac{Fb \cdot I_{pole}}{c}\right) = 2209 \cdot kip \cdot ft$

$PoleShaft := if\left(Mn_{pole} > M_{act}, "Okay", "Reinforcement\_Reqd"\right)$

$\frac{M_{act}}{Mn_{pole}} = 1.092$ PoleShaft = "Reinforcement_Reqd"

Design Moment of Stiffeners:

Moment Capacity (Moment of Inertia) = $Mn_{stiff1} := \frac{Fb_{stiff} \cdot I_{stifftotal}}{c_{total}} = 586.952\,ft \cdot kips$

Allowable compressive strength of stiffener = $Pa_{stiff} := 1.333 Fa_{stiff} \cdot A_{stiff} = 161.774 \cdot kips$

Moment Capacity (Compression) = $Mn_{stiff2} := Pa_{stiff}\left(d_1 + d_2\right) = 426.342\,ft \cdot kips$

Stiffener Design Moment = $Mn_{stiff} := \begin{cases} Mn_{stiff1} & \text{if } Mn_{stiff1} \le Mn_{stiff2} \\ Mn_{stiff2} & \text{otherwise} \end{cases} = 426.342 \cdot ft \cdot kips$

Check Reinforced Monopole:

Moment Capacity Reinforced Section = $Mn_{reinf} := \left(Mn_{pole} + Mn_{stiff}\right) = 2635 \cdot kip \cdot ft$

Compression Force on Pole Section = $P_{pole} := P = 25 \cdot kips$

Allowable Compression = $Pa_{pole} := Fa \cdot A_{pole} = 2.557 \times 10^{3} \cdot kips$

$Reinforced\_PoleShaft := if\left(\frac{P_{pole}}{Pa_{pole}} + \frac{M_{act}}{Mn_{reinf}} \le 1.00, "OK", "Overstressed"\right)$

$\frac{P_{pole}}{Pa_{pole}} + \frac{M_{act}}{Mn_{reinf}} = 0.93$ Reinforced_PoleShaft = "OK"

Calculate Equivalent Pole Thickness for RISA Input:

Equivalent Moment of Inertia = $Eq_I := \left(\frac{Mn_{reinf} \cdot c}{Fb}\right) = 12574.3 \cdot in^4$

Equivalent Pole Inside Diameter = $Eq_{Idpole} := \sqrt[4]{\left(D_{o.pole}^4 - \frac{Eq_I \cdot 64}{\pi}\right)}$

Equivalent Pole Thickness = $Eq_{polethk} := \frac{\left(D_{o.pole} - Eq_{Idpole}\right)}{2} = 0.472 \cdot in$ Use 0.47in for RISA input

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Location:	Plymouth, CT
Rev. 1: 7/24/14	Designed by: T.J.L. Checked by: C.F.C. Job No. 14033.010

Design AJAX Bolts:

Bolt Area =

$$a_b := \frac{1}{4}\cdot\pi\cdot d_b^{\,2} = 0.442\cdot in^2$$

Bolt Spacing =

$$s_b := l = 1ft$$

Total Force at Stiffener Ends =

$$F := \frac{Mn_{stiff}\,Q_{stiff}}{I_{stifftotal}} = 161.106\cdot kips$$

Number of Bolts Required at Ends =

$$NB_{req} := \frac{F}{Fv_{bolt}\cdot a_b\cdot 1.33} = 10.155$$

$NB_{req} = 10$

Equivalent Shear Force =

$$V_{eq} := V\cdot\left(\frac{Mn_{reinf}}{M_{act}}\right) = 22.934\cdot kips$$

Shear Flow =

$$q := \frac{V_{eq}\cdot Q_{stiff}}{I_{total}} = 2.275\cdot klf$$

Shear per Bolt =

$$V_{bolt} := q\cdot s_b = 2.275\cdot kips$$

Bolt Shear Stress =

$$fv_{bolt} := \frac{V_{bolt}}{a_b} = 5.149\cdot ksi$$

Note: 1.333 increase allowed per AISC 9th edition for transient loading

$$Boltcheck := if\left(\frac{fv_{bolt}}{Fv_{bolt}} \le 1.33, "OK", "Increase\ number\ of\ bolts"\right)$$

Boltcheck = "OK"

$$\frac{fv_{bolt}}{Fv_{bolt}} = 0.19$$

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Subject:	CAISSON FOUNDATION
Location:	180-ft Valmont Monopole Plymouth, CT
Rev. 1: 7/24/14	Prepared by: TJL Checked by: C.F.C. Job No. 14033.010

Caisson Foundation:

Input Data:

Shear Force =	S := 21k	*USER INPUT-FROM RISATower*
Overturning Moment =	M := 2408ft·k	*USER INPUT-FROM RISATower*
Applied Axial Load =	A1 := 26k	*USER INPUT-FROM RISATower*
Bending Moment =	Mu := 2432ft·k	*USER INPUT–FROM LPILE*
Moment Capacity =	Mn := 4206ft·k	*USER INPUT–FROM LPILE*
Foundation Diameter =	d := 5.5ft	*USER INPUT*
Overall Length of Caisson =	L_c := 14.25ft	*USER INPUT*
Depth From Top of Caisson to Grade =	L_{pag} := 1.0ft	*USER INPUT*
Number of Rebar =	n := 20	*USER INPUT*
Area of Rebar =	$Ar := 1.56in^2$	*USER INPUT*
Rebar Yield Strength =	fy := 60ksi	*USER INPUT*
Concrete Comp Strength =	f'c := 4ksi	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{Mn}{Mu} = 1.7$

Factor of Safety Required = $FS_{reqd} := 1.3$

$FOSCheck := if(FS \geq FS_{reqd}, "OK", "NO\ GOOD")$

FOSCheck = "OK"

Check Axial Capacity:

Concrete Weight = $A2 := .150\frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 47.2 \cdot kips$

Total Axial Load = $AT := A1 + A2 = 73.2 \cdot kips$

Area of Concrete = $Ag := \pi \cdot \frac{d^2}{4} = 23.76ft^2$

Axial Capacity = $Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c = 13398 \cdot kips$

AxialCheck := if(AT ≤ Po, "OK", "NO GOOD")

AxialCheck = "OK"

LPILE Plus for Windows, Version 5.0 (5.0.47)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\1403300.WI\010 - Plymouth CTNH524A\04_Structural\Backup Documentation\Calcs\Rev (1)\LPile\
Name of input data file: Plymouth Drilled Foundation.lpd
Name of output file: Plymouth Drilled Foundation.lpo
Name of plot output file: Plymouth Drilled Foundation.lpp
Name of runtime file: Plymouth Drilled Foundation.lpr

Time and Date of Analysis

Date: July 24, 2014 Time: 12:02:32

Problem Title

14033.010 - CTNH542A

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- No computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum bending moment, and shear force only
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-05 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Only summary tables of pile-head deflection, maximum bending moment, and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 171.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	66.00000000	931420.0000	3421.0000	3604996.
2	171.0000	66.00000000	931420.0000	3421.0000	3604996.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 1 layers

Layer 1 is strong rock (vuggy limestone)
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 300.000 in

(Depth of lowest layer extends 129.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 2 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	0.07800
2	300.00	0.07800

Shear Strength of Soils

Shear strength parameters with depth defined using 2 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	3280.00000	0.00	------	------
2	300.000	3280.00000	0.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 21000.000 lbs
Bending moment at pile head = 28896000.000 in-lbs
Axial load at pile head = 26000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head

(zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 66.0000 in

Material Properties:

Compressive Strength of Concrete	=	4.000 kip/in**2
Yield Stress of Reinforcement	=	60. kip/in**2
Modulus of Elasticity of Reinforcement	=	29000. kip/in**2
Number of Reinforcing Bars	=	20
Area of Single Bar	=	1.56000 in**2
Number of Rows of Reinforcing Bars	=	11
Area of Steel	=	31.200 in**2
Area of Shaft	=	3421.194 in**2
Percentage of Steel Reinforcement	=	0.912 percent
Cover Thickness (edge to bar center)	=	4.500 in

Unfactored Axial Squash Load Capacity = 13397.98 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	28.500
2	3.120	27.105
3	3.120	23.057
4	3.120	16.752
5	3.120	8.807
6	3.120	0.000
7	3.120	-8.807
8	3.120	-16.752
9	3.120	-23.057
10	3.120	-27.105
11	1.560	-28.500

Axial Thrust Force = 26000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
3121766.	3.746120E+12	8.333333E-07	0.00002956	35.46970457	105.00128	748.43453
6215494.	3.729296E+12	0.00000167	0.00005716	34.29571277	201.45781	1440.12612
9281394.	3.712557E+12	0.00000250	0.00008480	33.91939133	296.61185	2132.90587
12318560.	3.695568E+12	0.00000333	0.00011240	33.71989900	390.19982	2824.59024
15327429.	3.678583E+12	0.00000417	0.00014000	33.60014302	482.35410	3516.26728
15327429.	3.065486E+12	0.00000500	0.00008923	17.84671193	307.23461	6329.72677
15327429.	2.627559E+12	0.00000583	0.00010293	17.64474910	352.97162	7418.84661
15327429.	2.299114E+12	0.00000667	0.00011685	17.52747935	399.14699	8501.35399
15327429.	2.043657E+12	0.00000750	0.00013054	17.40545350	444.18618	9590.56386
15327429.	1.839291E+12	0.00000833	0.00014425	17.30982810	488.94077	10679.29154
15327429.	1.672083E+12	0.00000917	0.00015797	17.23341590	533.40987	11767.53361
15327429.	1.532743E+12	0.00001000	0.00017171	17.17142147	577.59244	12855.28777
15327429.	1.414840E+12	0.00001083	0.00018547	17.12053245	621.48770	13942.54939
15327429.	1.313780E+12	0.00001167	0.00019925	17.07837278	665.09448	15029.31721
15327429.	1.226194E+12	0.00001250	0.00021304	17.04321152	708.41207	16115.58582
15327429.	1.149557E+12	0.00001333	0.00022685	17.01374263	751.43937	17201.35285
15327429.	1.081936E+12	0.00001417	0.00024068	16.98897082	794.17546	18286.61449
15327429.	1.021829E+12	0.00001500	0.00025452	16.96811718	836.61918	19371.36903
15327429.	9.680481E+11	0.00001583	0.00026838	16.95057589	878.76979	20455.61057
15327429.	9.196457E+11	0.00001667	0.00028226	16.93585128	920.62596	21539.33855
15327429.	8.758531E+11	0.00001750	0.00029616	16.92355388	962.18701	22622.54640
15327429.	8.360416E+11	0.00001833	0.00031008	16.91336113	1003.45201	23705.22966
15327429.	7.996919E+11	0.00001917	0.00032401	16.90499765	1044.41947	24787.38881
15918319.	7.959159E+11	0.00002000	0.00033796	16.89824313	1085.08849	25869.01899
16553901.	7.945873E+11	0.00002083	0.00035194	16.89291269	1125.45813	26950.11525
17188729.	7.933259E+11	0.00002167	0.00036593	16.88884896	1165.52739	28030.67324
17822794.	7.921242E+11	0.00002250	0.00037993	16.88591427	1205.29500	29110.69094
18456097.	7.909756E+11	0.00002333	0.00039396	16.88399845	1244.76022	30190.16105
19088623.	7.898740E+11	0.00002417	0.00040801	16.88299137	1283.92123	31269.08688
19720379.	7.888152E+11	0.00002500	0.00042207	16.88281828	1322.77768	32347.45675

20351357.	7.877945E+11	0.00002583	0.00043615	16.88340050	1361.32820	33425.26913
20981551.	7.868082E+11	0.00002667	0.00045026	16.88467115	1399.57156	34502.52098
21610953.	7.858528E+11	0.00002750	0.00046438	16.88657123	1437.50648	35579.20945
22239564.	7.849258E+11	0.00002833	0.00047852	16.88905352	1475.13207	36655.32769
22867381.	7.840245E+11	0.00002917	0.00049269	16.89207476	1512.44728	37730.87010
23494389.	7.831463E+11	0.00003000	0.00050687	16.89558774	1549.45033	38805.83866
24120593.	7.822895E+11	0.00003083	0.00052107	16.89956492	1586.14066	39880.22237
24745985.	7.814521E+11	0.00003167	0.00053529	16.90397090	1622.51674	40954.02006
25370559.	7.806326E+11	0.00003250	0.00054954	16.90877813	1658.57743	42027.22661
26617235.	7.790410E+11	0.00003417	0.00057808	16.91949803	1729.74768	44171.84737
27860578.	7.775045E+11	0.00003583	0.00060671	16.93154758	1799.64114	46314.05014
29100554.	7.760148E+11	0.00003750	0.00063543	16.94478911	1868.24795	48453.79184
30337110.	7.745645E+11	0.00003917	0.00066423	16.95910066	1935.55716	50591.03816
31570199.	7.731477E+11	0.00004083	0.00069312	16.97438389	2001.55790	52725.75041
32799789.	7.717597E+11	0.00004250	0.00072210	16.99056405	2066.23973	54857.87981
34025817.	7.703959E+11	0.00004417	0.00075117	17.00756639	2129.59070	56987.39205
35248249.	7.690527E+11	0.00004583	0.00078033	17.02533978	2191.59981	59114.23587
36380194.	7.658988E+11	0.00004750	0.00080890	17.02938384	2250.80429	60000.00000
37246948.	7.575650E+11	0.00004917	0.00083542	16.99155933	2304.30393	60000.00000
38018401.	7.479030E+11	0.00005083	0.00086125	16.94252712	2355.12613	60000.00000
38787639.	7.388122E+11	0.00005250	0.00088714	16.89783794	2404.86856	60000.00000
39347076.	7.264076E+11	0.00005417	0.00091119	16.82200009	2449.87127	60000.00000
39854878.	7.138187E+11	0.00005583	0.00093484	16.74339277	2493.06765	60000.00000
40361128.	7.019327E+11	0.00005750	0.00095854	16.67020637	2535.35023	60000.00000
40865813.	6.906898E+11	0.00005917	0.00098228	16.60199243	2576.71343	60000.00000
41368914.	6.800369E+11	0.00006083	0.00100608	16.53834969	2617.15135	60000.00000
41919822.	6.707171E+11	0.00006250	0.00103125	16.50000197	2658.89681	60000.00000
42159228.	6.570269E+11	0.00006417	0.00105407	16.42699260	2695.61083	60000.00000
42456537.	6.449094E+11	0.00006583	0.00107534	16.33431762	2728.90960	60000.00000
42752823.	6.333752E+11	0.00006750	0.00109666	16.24681181	2761.46518	60000.00000
43048072.	6.223818E+11	0.00006917	0.00111802	16.16410536	2793.27320	60000.00000
43342275.	6.118909E+11	0.00007083	0.00113942	16.08586389	2824.32934	60000.00000
43635446.	6.018682E+11	0.00007250	0.00116085	16.01179236	2854.63010	60000.00000
43927553.	5.922816E+11	0.00007417	0.00118234	15.94160753	2884.17030	60000.00000
44218585.	5.831022E+11	0.00007583	0.00120386	15.87505764	2912.94543	60000.00000
44508549.	5.743039E+11	0.00007750	0.00122542	15.81191844	2940.95156	60000.00000
44797428.	5.658623E+11	0.00007917	0.00124703	15.75197750	2968.18386	60000.00000
44970635.	5.563377E+11	0.00008083	0.00126685	15.67235523	2992.33168	60000.00000
45125865.	5.469802E+11	0.00008250	0.00128642	15.59302014	3015.48920	60000.00000
45280361.	5.379845E+11	0.00008417	0.00130603	15.51722556	3038.00942	60000.00000
45434113.	5.293295E+11	0.00008583	0.00132568	15.44476694	3059.88885	60000.00000
45490831.	5.198952E+11	0.00008750	0.00134750	15.39999908	3083.51125	60000.00000
45771653.	5.133270E+11	0.00008917	0.00136997	15.36417693	3106.97620	60000.00000
45919002.	5.055303E+11	0.00009083	0.00138914	15.29323679	3126.13253	60000.00000
46065647.	4.980070E+11	0.00009250	0.00140833	15.22521561	3144.67478	60000.00000
46211607.	4.907427E+11	0.00009417	0.00142756	15.15996784	3162.60021	60000.00000
46356861.	4.837238E+11	0.00009583	0.00144683	15.09734792	3179.90507	60000.00000
46501412.	4.769376E+11	0.00009750	0.00146613	15.03722602	3196.58611	60000.00000
46645243.	4.703722E+11	0.00009917	0.00148546	14.97947627	3212.63961	60000.00000
46930766.	4.578611E+11	0.00010250	0.00152424	14.87065262	3242.85077	60000.00000
47213356.	4.461104E+11	0.00010583	0.00156316	14.77003902	3270.50930	60000.00000
47492986.	4.350503E+11	0.00010917	0.00160223	14.67691165	3295.58614	60000.00000
47765345.	4.245808E+11	0.00011250	0.00164133	14.58961040	3317.98626	60000.00000
47895350.	4.134850E+11	0.00011583	0.00167681	14.47606212	3335.88901	60000.00000
48023268.	4.029925E+11	0.00011917	0.00171241	14.36987025	3351.64199	60000.00000
48280974.	3.941304E+11	0.00012250	0.00175175	14.30000013	3366.54098	60000.00000
48312534.	3.839407E+11	0.00012583	0.00179202	14.24123150	3378.97112	60000.00000
48426308.	3.749134E+11	0.00012917	0.00182657	14.14117652	3387.28659	60000.00000
48538147.	3.663256E+11	0.00013250	0.00186124	14.04707354	3393.53999	60000.00000
48648035.	3.581450E+11	0.00013583	0.00189603	13.95850164	3397.70826	60000.00000
48755948.	3.503421E+11	0.00013917	0.00193095	13.87507921	3399.76762	60000.00000
48859945.	3.428768E+11	0.00014250	0.00196599	13.79645222	3395.30987	60000.00000
48960965.	3.357323E+11	0.00014583	0.00200117	13.72231382	3388.37816	60000.00000
49060828.	3.288994E+11	0.00014917	0.00203648	13.65237683	3393.85195	60000.00000
49159514.	3.223575E+11	0.00015250	0.00207192	13.58638161	3397.61063	60000.00000
49256987.	3.160876E+11	0.00015583	0.00210750	13.52408820	3399.63072	60000.00000
49352667.	3.100691E+11	0.00015917	0.00214327	13.46557528	3397.15254	60000.00000
49446298.	3.042849E+11	0.00016250	0.00217925	13.41074055	3389.10021	60000.00000
49539020.	2.987278E+11	0.00016583	0.00221534	13.35880905	3388.11053	60000.00000
49630811.	2.933841E+11	0.00016917	0.00225154	13.30961949	3393.21474	60000.00000
49721662.	2.882415E+11	0.00017250	0.00228787	13.26302630	3396.90997	60000.00000
49811545.	2.832884E+11	0.00017583	0.00232432	13.21889180	3399.17729	60000.00000
50014822.	2.791525E+11	0.00017917	0.00236500	13.20000118	3399.35989	60000.00000
50296784.	2.755988E+11	0.00018250	0.00240900	13.20000118	3390.15585	60000.00000
50296784.	2.706553E+11	0.00018583	0.00245085	13.18844336	3382.41532	60000.00000
50296784.	2.658861E+11	0.00018917	0.00248509	13.13701540	3387.56673	60000.00000
50296784.	2.612820E+11	0.00019250	0.00251712	13.07596904	3391.43157	60000.00000
50296784.	2.568346E+11	0.00019583	0.00254923	13.01736563	3394.58943	60000.00000
50296784.	2.525362E+11	0.00019917	0.00258142	12.96108323	3397.03229	60000.00000
50296784.	2.483792E+11	0.00020250	0.00261367	12.90701562	3398.75220	60000.00000
50296784.	2.443568E+11	0.00020583	0.00264600	12.85505265	3399.74082	60000.00000
50297605.	2.404666E+11	0.00020917	0.00267843	12.80525333	3399.13566	60000.00000
50318956.	2.367951E+11	0.00021250	0.00271108	12.75803858	3393.89921	60000.00000
50340150.	2.332362E+11	0.00021583	0.00274378	12.71251541	3388.64946	60000.00000
50361188.	2.297849E+11	0.00021917	0.00277654	12.66860908	3383.38627	60000.00000
50382047.	2.264362E+11	0.00022250	0.00280934	12.62624484	3378.10977	60000.00000
50402741.	2.231856E+11	0.00022583	0.00284219	12.58535975	3379.39948	60000.00000
50423264.	2.200288E+11	0.00022917	0.00287510	12.54589087	3383.78190	60000.00000

50443594.	2.169617E+11	0.00023250	0.00290806	12.50777525	3387.65213	60000.00000
50483770.	2.110820E+11	0.00023917	0.00297413	12.43540710	3393.83730	60000.00000
50523197.	2.055181E+11	0.00024583	0.00304043	12.36783832	3397.91401	60000.00000
50561878.	2.002451E+11	0.00025250	0.00310694	12.30471092	3399.84067	60000.00000
50598781.	1.952365E+11	0.00025917	0.00317390	12.24657172	3394.40918	60000.00000
50634605.	1.904750E+11	0.00026583	0.00324116	12.19244903	3385.35764	60000.00000
50666390.	1.859317E+11	0.00027250	0.00330930	12.14420754	3376.07332	60000.00000
50691097.	1.815800E+11	0.00027917	0.00337894	12.10366076	3368.53257	60000.00000
50691097.	1.773449E+11	0.00028583	0.00345858	12.09999830	3380.78300	60000.00000
50691097.	1.733029E+11	0.00029250	0.00353925	12.09999830	3390.22830	60000.00000
50691097.	1.694410E+11	0.00029917	0.00361992	12.09999830	3396.50977	60000.00000
50802604.	1.661121E+11	0.00030583	0.00370058	12.09999830	3399.62739	60000.00000
50830105.	1.626563E+11	0.00031250	0.00377036	12.06515962	3397.39256	60000.00000
50848272.	1.593157E+11	0.00031917	0.00384004	12.03144211	3389.64014	60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 50499.15292 in-kip

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

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head = 21000.000 lbs
Specified moment at pile head = 28896000.000 in-lbs
Specified axial load at pile head = 26000.000 lbs

Output Verification:

Computed forces and moments are within specified convergence limits.

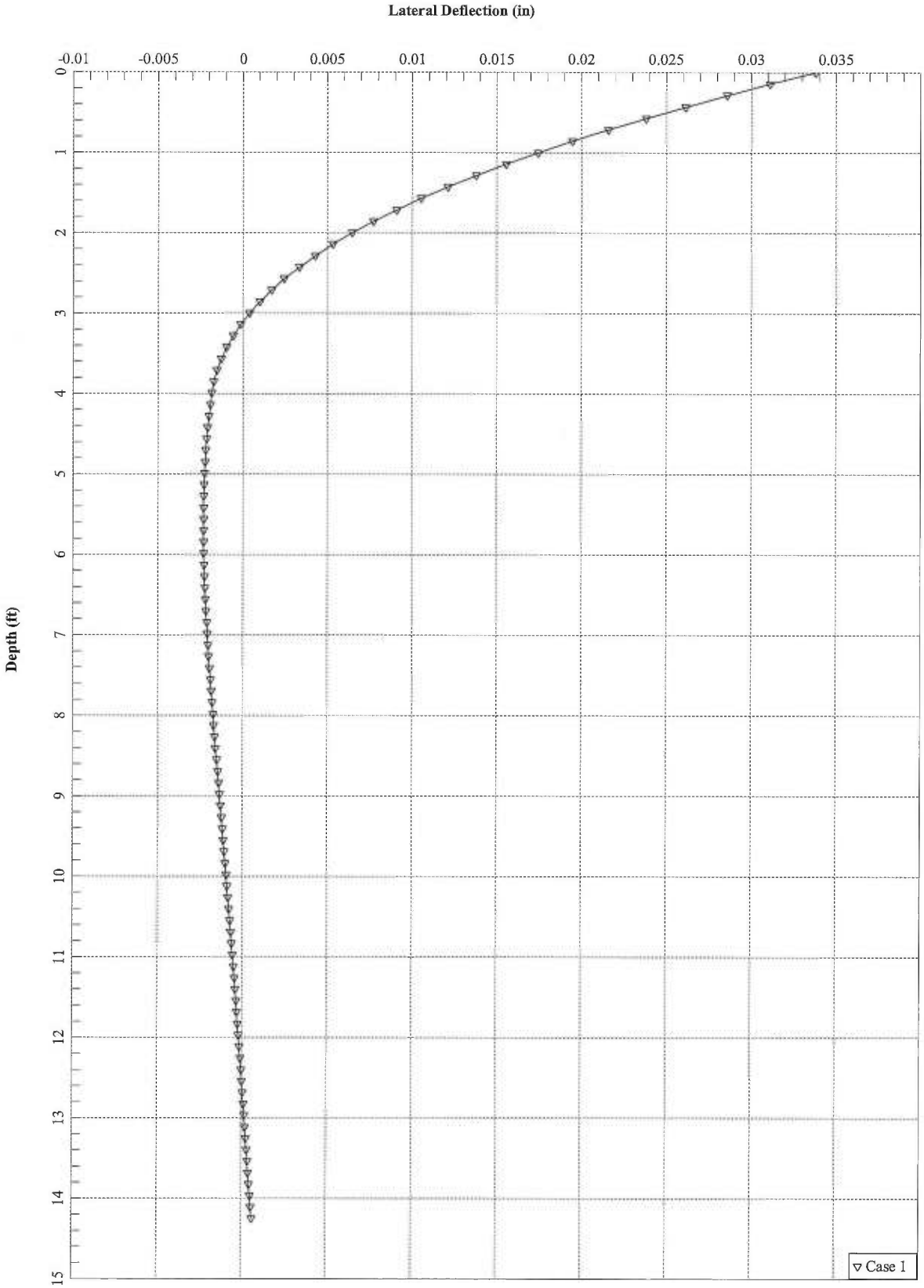
Summary of Pile Response(s)

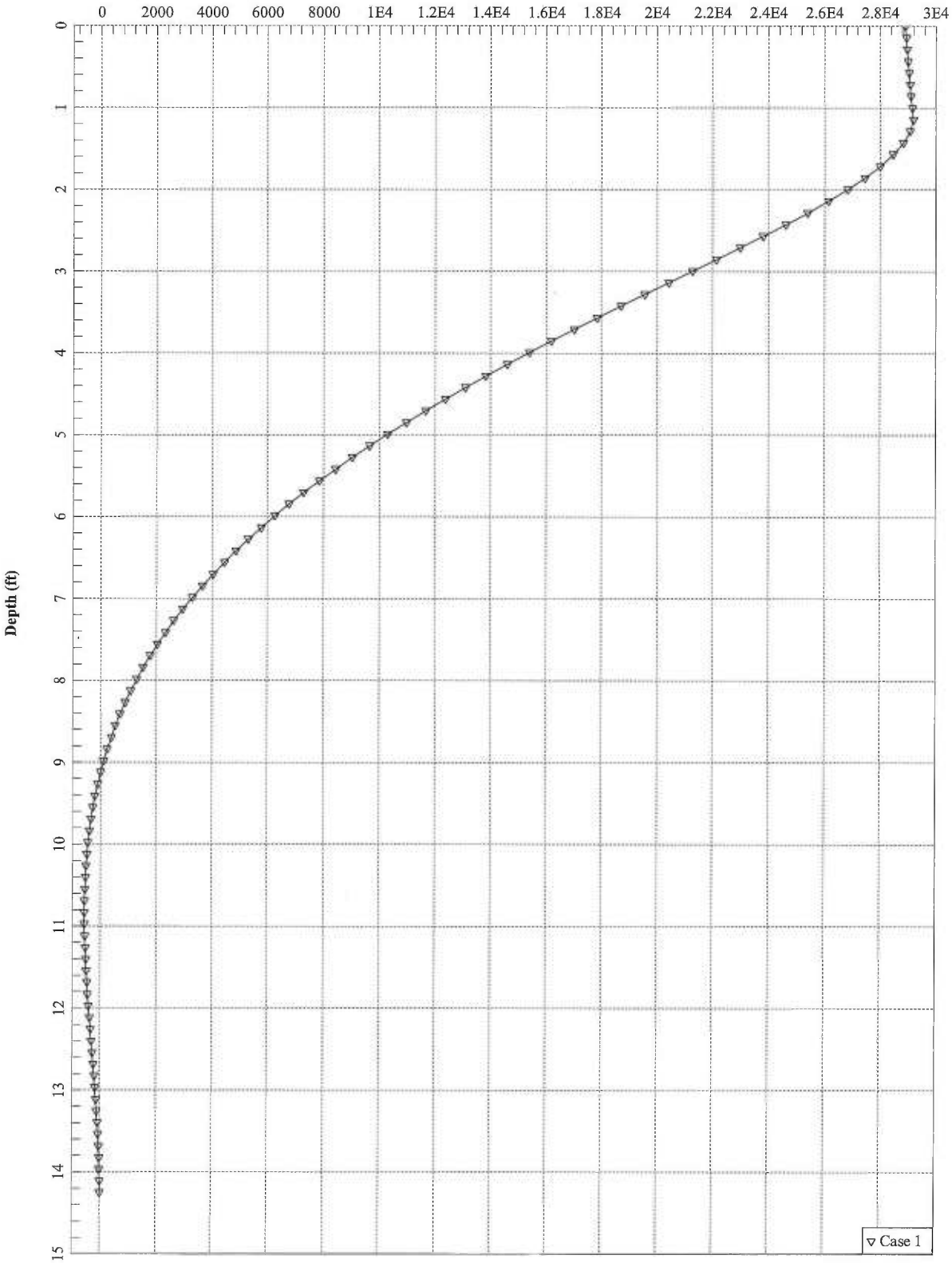
Definition of Symbols for Pile-Head Loading Conditions:

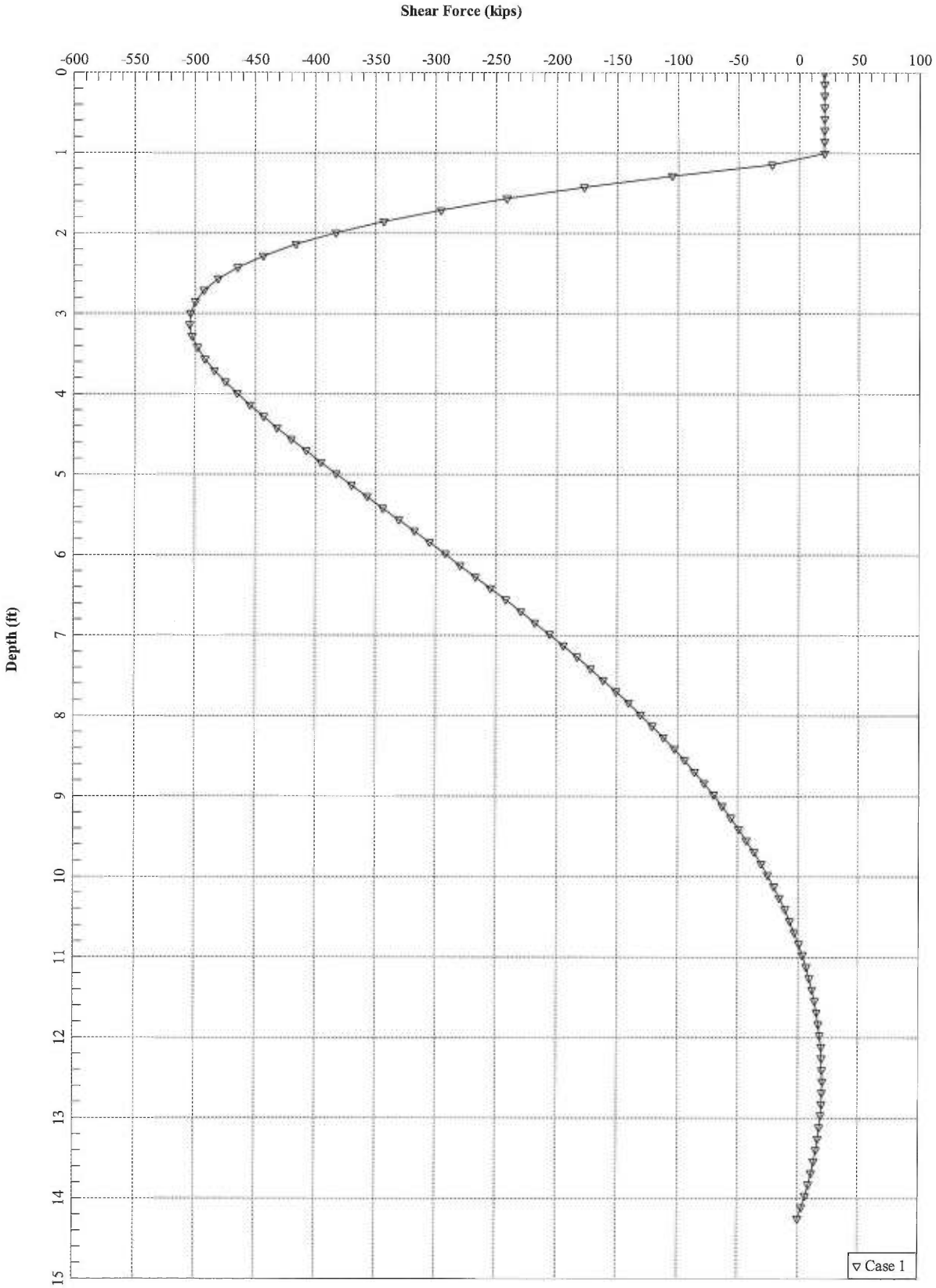
Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 21000.	M= 2.89E+07	26000.0000	0.0337809	2.9184E+07	-504290.

The analysis ended normally.


Lateral Deflection (in)
-0.01
-0.005
0
0.005
0.01
0.015
0.02
0.025
0.03
0.035
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Case 1


Bending Moment (in-kips)
0
2000
4000
6000
8000
1E4
1.2E4
1.4E4
1.6E4
1.8E4
2E4
2.2E4
2.4E4
2.6E4
2.8E4
3E4
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Case 1


Shear Force (kips)
-600
-550
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Case 1

TOWER REINFORCEMENT DESIGN

CTNH524A
PLYMOUTH WEST
42 SOUTH STREET
PLYMOUTH, CT 06782

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	42 SOUTH STREET PLYMOUTH, CT 06782
PROJECT COORDINATES:	LAT: 41°–39'–50.66N LON: 73°–33'–06.00W ELEV: ±979' AMSL
TOWER OWNER:	VERIZON WIRELESS 99 E. RIVER DRIVE EAST HARTFORD, CT 06108
VERIZON SITE REF.:	PLYMOUTH WEST
VERIZON CONTACT:	ALEKSEY TYURIN 860.803.8213
METROPCS CONTACT:	SHELDON FREINCLE 570.606.4257
METROPCS SITE NUMBER:	CTNH524A
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	CARLO F. CENTORE, PE 203.488.0580 ext. 122

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T–1	TITLE SHEET	0
N–1	DESIGN BASIS & GENERAL NOTES	0
N–2	STRUCTURAL STEEL NOTES	0
MI–1	MODIFICATION INSPECTION REQUIREMENTS	0
S–1	TOWER REINFORCEMENT ELEVATIONS	0
S–2	TOWER REINFORCEMENT DETAILS	0

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/23/14	TJL	CFC	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

CENTEK engineering
Centered on Solutions℠
www.CentekEng.com
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405

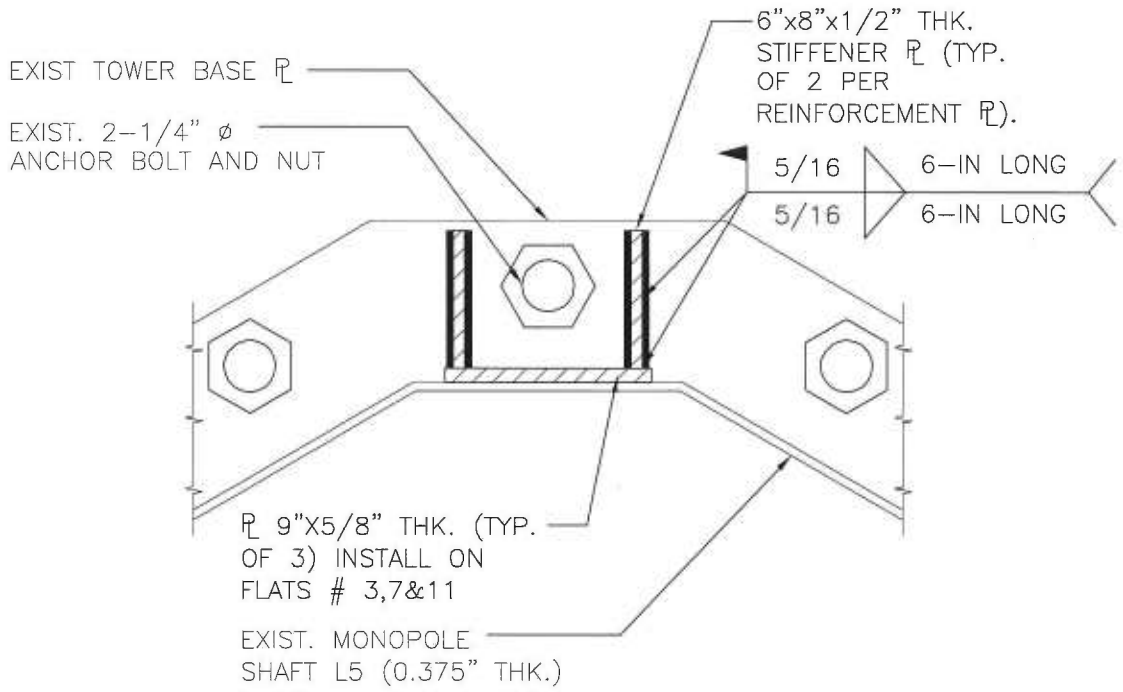
METROPCS
PROPOSED TOWER REINFORCEMENT DESIGN

CTNH524A
PLYMOUTH WEST
42 SOUTH STREET
PLYMOUTH, CT 06782

DATE:	7/24/14
SCALE:	AS SHOWN
JOB NO.	14033.010

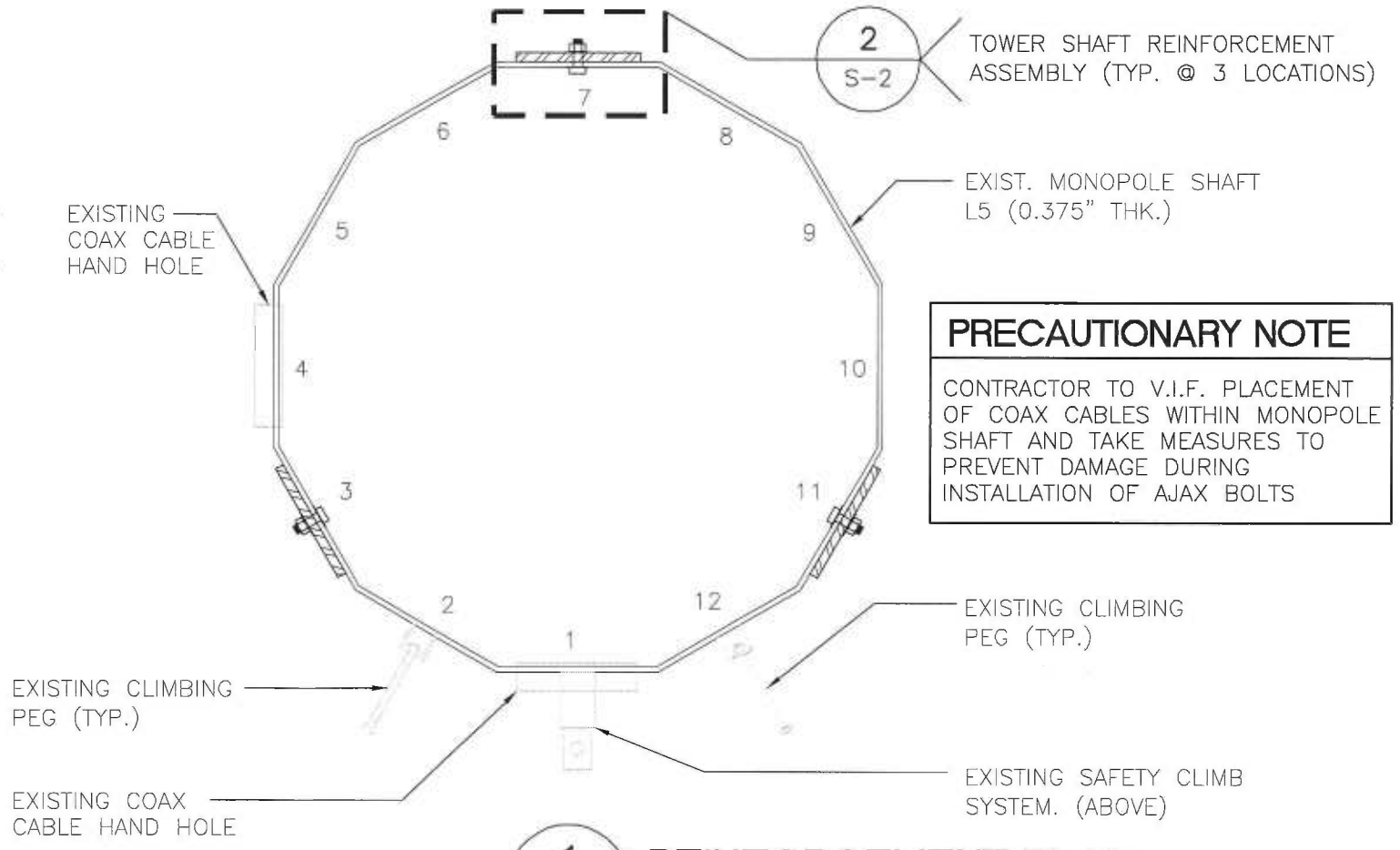
TITLE SHEET

SHEET NO.
T-1
Sheet No. 1 of 6



3 S-2 STIFFENER PLAN

SCALE: 1-1/2" = 1'-0"

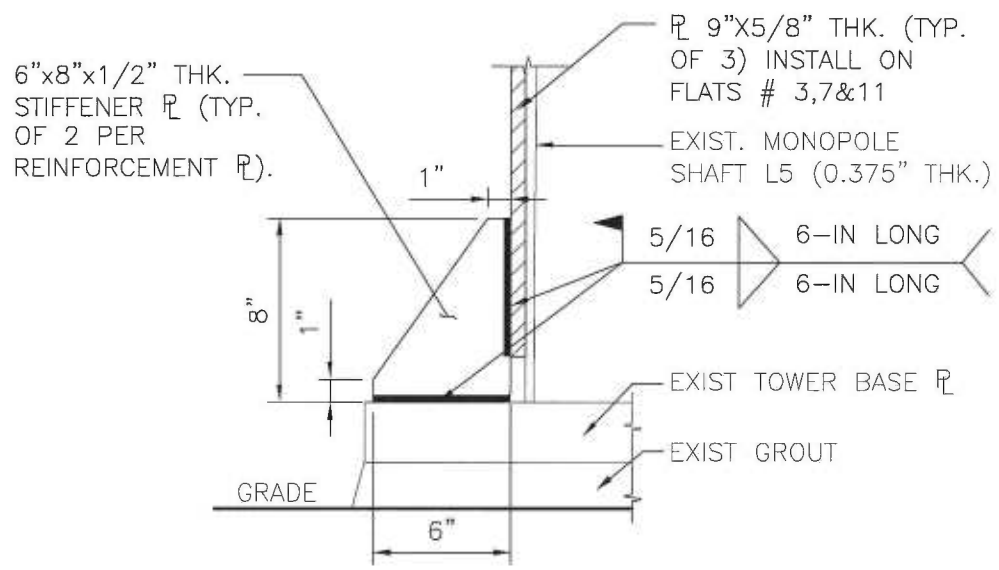


PRECAUTIONARY NOTE

CONTRACTOR TO V.I.F. PLACEMENT OF COAX CABLES WITHIN MONOPOLE SHAFT AND TAKE MEASURES TO PREVENT DAMAGE DURING INSTALLATION OF AJAX BOLTS

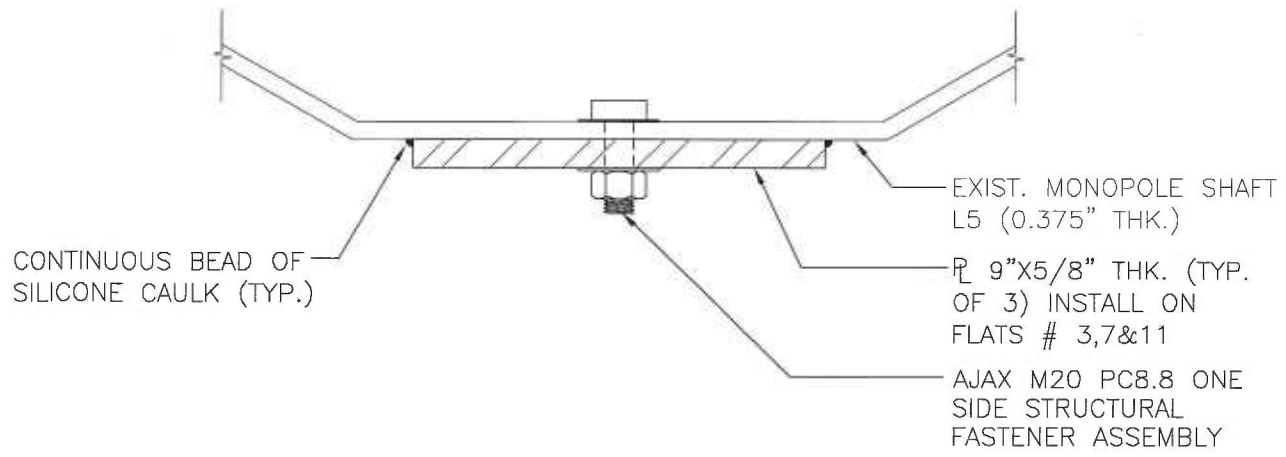
1 S-2 REINFORCEMENT PLAN

SCALE: 1" = 1'-0"



4 S-2 STIFFENER DETAIL

SCALE: 1-1/2" = 1'-0"



2 S-2 REINFORCEMENT DETAIL

SCALE: 3" = 1'-0"

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/23/14	TJL	CFC	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road, Branford, CT 06405
www.CentekEng.com

METROPCS
PROPOSED TOWER REINFORCEMENT DESIGN

CTNH524A
PLYMOUTH WEST
40 SOUTH STREET
PLYMOUTH, CT 06782

DATE:	7/24/14
SCALE:	AS SHOWN
JOB NO.	14033.010

TOWER REINFORCEMENT DETAILS

SHEET NO.
S-2
Sheet No. 6 of 6

Network Modernization RFDS v4.0

Site ID	**CTNH524A**	**Latitude**	41.664167
		Longitude	-73.052222
Site Name	Verizon Plymouth Monopole	**Site Type**	Monopole
Address	42 South St, Plymouth, CT	**Site Class**	Monopole
Market	Connecticut	**Landlord**	Verizon

Configuration
5A

Approvals	
Market RF	Jason Overbey
Market Development	Sam Simons

RFDS Revision	1	**Date**	07/01/2014
RFDS Final			
Work Order #		**NOC#**	(888) 218-6664

Site Information

Existing Configuration					Proposed Configuration			
1	2	3	4	Cabinet #	1	2	3	4
CDMA				Technology		UMTS/LTE		
Nortel				Cabinet type		6201 ODE V2		
				CBU				
				DUW30		1		
				DUL20				
				DUG20				
				DUS31		1		
				RBS6601				
				dTRU/TRX				
				RU22 B4				
				RUS01 B2				
				RUS01 B4 60W				
				RUS01 B4 80W		3		
				ALU CDMA B2				
				ALU CDMA B4				
				ALU EV-DO				
				E// EV-DO				
1				Nortel 3231				

[ ] Relocate cabinet	Add 6201 cabinet with DUS31 and DUW30. Add two AIR21 B2A B4P to each sector. Re-use existing GPS antenna and add splitter and GPS02. Remove existing Metro BTS.
[ ] Add cabinet	
[X] Swap cabinet	
[ ] Remove cabinet	
[ ] Make cabinet dark	

ALPHA - Scope of Work

[X] Add new mount	[ ] Add RRU	Swap existing antenna with one AIR21 B2A B4P in position 1. Install one AIR21 B4A B2P and one new mount in position 2. Install HCS and 4 fiber jumpers per sector. Connect two fiber jumpers to each AIR21.
[ ] Relocate antenna	[ ] Swap existing RRU	
[X] Add antenna	[ ] Remove RRU	
[X] Swap antenna	[ ] Consolidate coax cables	
[ ] Remove antenna	[ ] Add coax cables	
[ ] Add TMA	[X] Add fiber cables	
[ ] Swap TMA	[ ] Add hybrid combiner	
[ ] Remove TMA	[ ] Add filter combiner	

BETA - Scope of Work

[X] Add new mount	[ ] Add RRU	Swap existing antenna with one AIR21 B2A B4P in position 1. Install one AIR21 B4A B2P and one new mount in position 2. Install HCS and 4 fiber jumpers per sector. Connect two fiber jumpers to each AIR21.
[ ] Relocate antenna	[ ] Swap existing RRU	
[X] Add antenna	[ ] Remove RRU	
[X] Swap antenna	[ ] Consolidate coax cables	
[ ] Remove antenna	[ ] Add coax cables	
[ ] Add TMA	[X] Add fiber cables	
[ ] Swap TMA	[ ] Add hybrid combiner	
[ ] Remove TMA	[ ] Add filter combiner	

GAMMA - Scope of Work

[X] Add new mount	[ ] Add RRU	Swap existing antenna with one AIR21 B2A B4P in position 1. Install one AIR21 B4A B2P and one new mount in position 2. Install HCS and 4 fiber jumpers per sector. Connect two fiber jumpers to each AIR21.
[ ] Relocate antenna	[ ] Swap existing RRU	
[X] Add antenna	[ ] Remove RRU	
[X] Swap antenna	[ ] Consolidate coax cables	
[ ] Remove antenna	[ ] Add coax cables	
[ ] Add TMA	[X] Add fiber cables	
[ ] Swap TMA	[ ] Add hybrid combiner	
[ ] Remove TMA	[ ] Add filter combiner	

DELTA - Scope of Work

	Add new mount		Add RRU	NA
	Relocate antenna		Swap existing RRU	
	Add antenna		Remove RRU	
	Swap antenna		Consolidate coax cables	
	Remove antenna		Add coax cables	
	Add TMA		Add fiber cables	
	Swap TMA		Add hybrid combiner	
	Remove TMA		Add filter combiner	

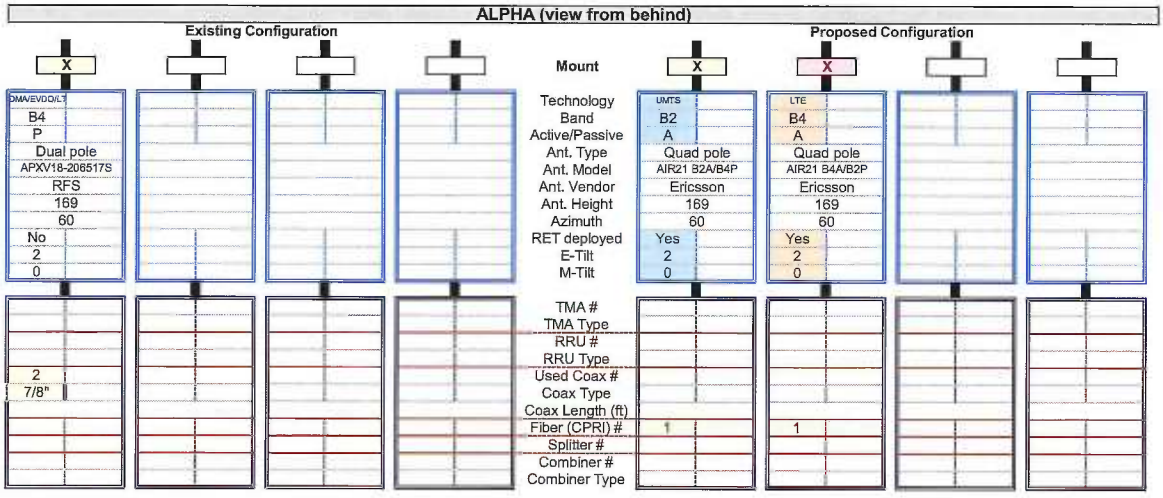
EPSILON - Scope of Work

	Add new mount		Add RRU	NA
	Relocate antenna		Swap existing RRU	
	Add antenna		Remove RRU	
	Swap antenna		Consolidate coax cables	
	Remove antenna		Add coax cables	
	Add TMA		Add fiber cables	
	Swap TMA		Add hybrid combiner	
	Remove TMA		Add filter combiner	

ZETA - Scope of Work

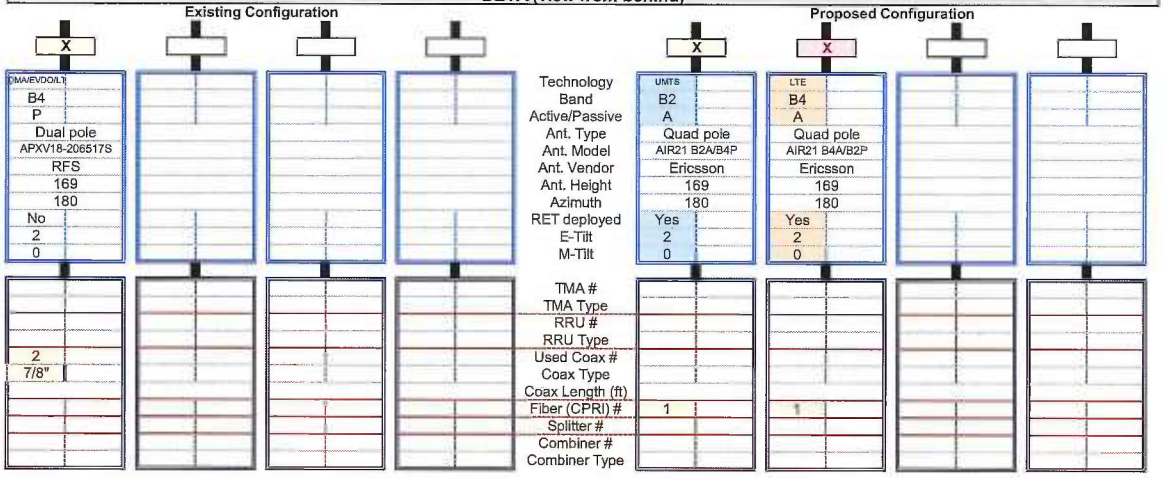
	Add new mount		Add RRU	NA
	Relocate antenna		Swap existing RRU	
	Add antenna		Remove RRU	
	Swap antenna		Consolidate coax cables	
	Remove antenna		Add coax cables	
	Add TMA		Add fiber cables	
	Swap TMA		Add hybrid combiner	
	Remove TMA		Add filter combiner	

ALPHA (view from behind)



X	Add new mount		Add RRU	Scope of work
	Relocate antenna		Swap existing RRU	Swap existing antenna with one AIR21 B2A B4P in position 1. Install one AIR21 B4A B2P and one new mount in position 2. Install HCS and 4 fiber jumpers per sector. Connect two fiber jumpers to each AIR21.
X	Add antenna		Remove RRU	
X	Swap antenna		Consolidate coax cables	
	Remove antenna		Add coax cables	
	Add TMA	X	Add fiber cables	
	Swap TMA		Add hybrid combiner	
	Remove TMA		Add filter combiner	

BETA (view from behind)

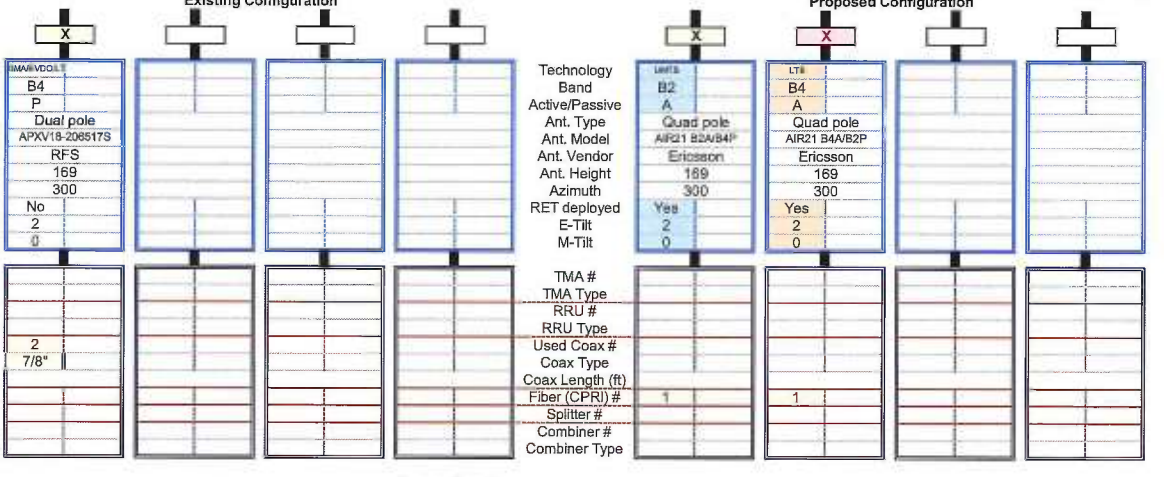


X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA	X	Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Swap existing antenna with one AIR21 B2A B4P in position 1. Install one AIR21 B4A B2P and one new mount in position 2. Install HCS and 4 fiber jumpers per sector. Connect two fiber jumpers to each AIR21.

GAMMA (view from behind)



X	Add new mount		Add RRU
	Relocate antenna		Swap existing RRU
X	Add antenna		Remove RRU
X	Swap antenna		Consolidate coax cables
	Remove antenna		Add coax cables
	Add TMA	X	Add fiber cables
	Swap TMA		Add hybrid combiner
	Remove TMA		Add filter combiner

Scope of work

Swap existing antenna with one AIR21 B2A B4P in position 1. Install one AIR21 B4A B2P and one new mount in position 2. Install HCS and 4 fiber jumpers per sector. Connect two fiber jumpers to each AIR21.

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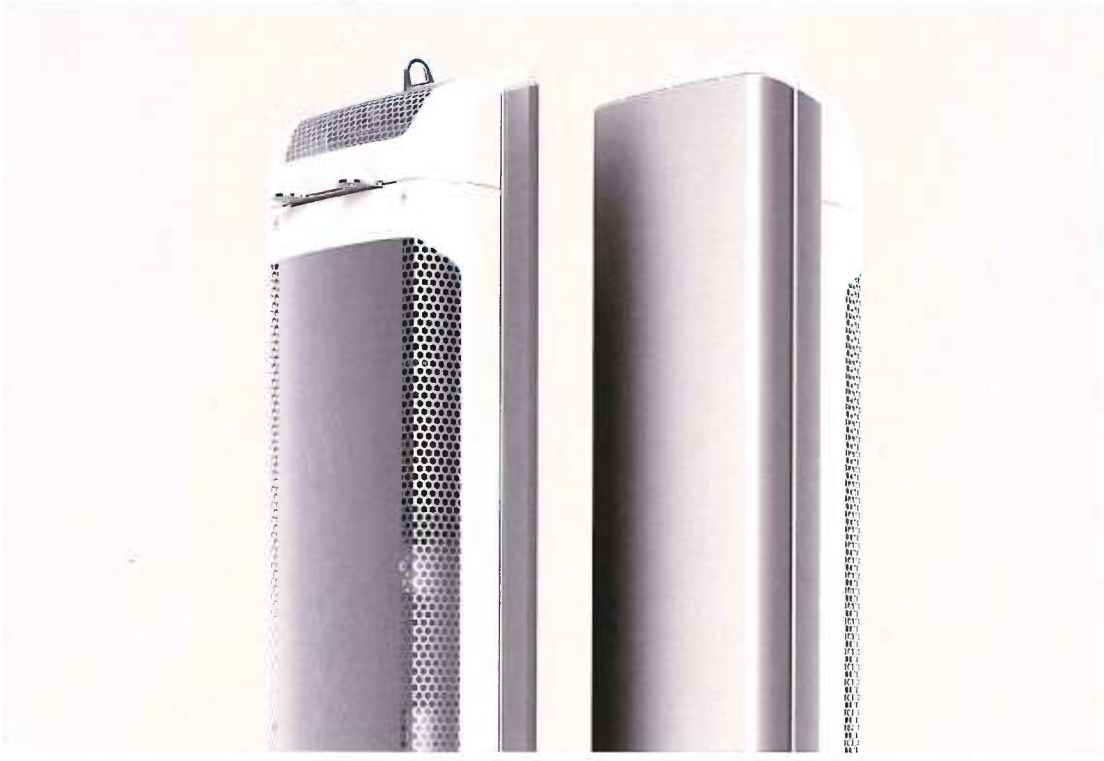
DATA-SHEET FOR

AIR 21, 1.3 M, B2A B4P



The Antenna-Integrated Radio (AIR) is a single tower-mounted unit that can replace the antenna/s and radio for one sector. Additional electronics such as ASC? and a RET Actuator and control are also included. A passive antenna function for an extra band is optional.

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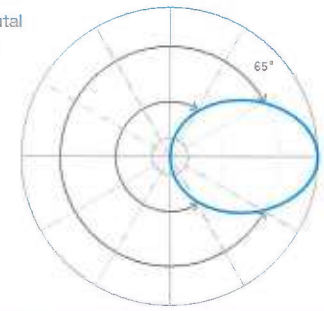
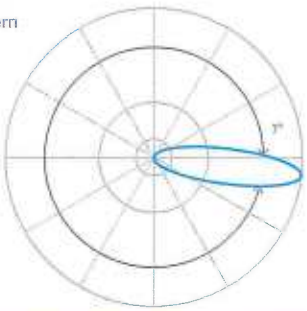
Figure 4
Antenna
Characteristics

Horizontal pattern



Vertical pattern
2° to 10°
electrical
down-tilt

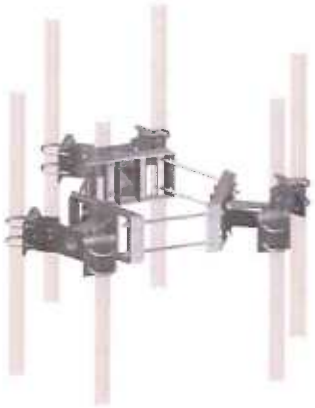


Technical Specification

RADIO	
Active frequency band	Band 2 (1850-1910 / 1930-1990 MHz)
Passive frequency band (optional)	Band 4 (1710-1755 / 2110-2155 MHz)
Downlink EIRP in bore-sight direction for the active band	2 x 63 dBm
Uplink sensitivity	TBD*
Remote electrical tilt	-2° to -12°, independently controlled per frequency band
MIMO	2 x 2 for DL 4 RX branches to be used for diversity/beam-steering
Instantaneous bandwidth	20 MHz
Capacity (single standard per sector)	Up to 8 carriers GSM Up to 4 carriers WCDMA with 2 x 2 DL MIMO Up to 20 MHz LTE with 2 x 2 DL MIMO
Multi-RAT capability	Single standard or two simultaneous standards (Capacity above is reduced for multi-RAT)
Bore-sight antenna gain for passive antenna option	17.5 dBi
Nominal beam-width, azimuth	65°
Nominal beam-width, elevation	7°
Additional antenna parameters	See Figure 3
MECHANICAL	
Weight	32 kg (70 lb) for active only 38 kg (83 lb) for active and passive
Size (H x W x D)	56" x 12" x 8" (1422 mm x 300 mm x 200 mm)
Wind load (frontal/lateral/rear-side) @ 150 km/h wind speed	580 N / 300 N / 720 N
INTERFACES	
AIR – DU	DATA 1, Data 2: CPRI links (SFP modules with LC socket + flanges that match protective cover TYCO C20611458)
Power	- 48 V DC (TYCO/Ericsson RPT 447 04)
Passive antenna (option)	TX/RX 1, TX/RX 2: RF connectors (7/16 female)
SUPPORTING BASE-BAND	
RBS 6601	One or two units depending on configuration.

*Target: 1 dB better than best-in-class RRU connected to same size best-in-class antenna
** Other base-band configurations are available

Monopole Mounts



Compact Monopole Mount

- Antenna mounting pipes stand 14-1/2" off pole. Antenna separation is 21-5/8".
- 0° - 30° down-tilt adjustment.
- Accepts 2-3/8" OD, 2-7/8" OD, and 3-1/2" OD antenna mounting pipes.
- Purchase antenna mounting pipes separately (page 142).

Part #	Pole Diameter	Weight	Price
UWS6-NP	10-1/2" - 28"	287#	**$995.00**
LP-42	28" - 42" Large-Pole Adapter Kit	71#	**$205.00**

WiMax Monopole T-Arm

- Antenna mounting pipes stand 18" off pole on standard kit, 32" on long kit.
- 3-1/2" horizontal pipe (5') allows 48" antenna separation.
- Antenna mounting pipe bracket swivels for easy taper adjustment.
- Accepts 2-3/8" OD to 4-1/2" OD antenna mounting pipes.
- Purchase antenna mounting pipes separately (page 142).

Part #	Standoff	Pole Diameter	Weight	Price
UDS-NP	18"	10-1/2" - 28"	380#	**$1,030.00**
UDS-NPL	32"	10-1/2" - 28"	418#	**$1,080.00**
LP-42	28" - 42" Large-Pole Adapter Kit		71#	**$205.00**

Lightweight Monopole T-Arm

- Antenna mounting pipes stand 19" off of pole. Antenna separation is 30"
- Accepts 2-3/8" , 2-7/8", 3-1/2", 4" & 4-1/2" OD antenna mounting pipes.
- Purchase antenna mounting pipes separately (page 14).
- No down tilt adjustment.
- Low cost/light weight mounting solution.

Part #	Pole Diameter	Weight	Price
MP-LSM	10-1/2" - 28"	238#	**$740.00**
LP-42	28" - 42" Large-Pole Adapter Kit	71#	**$205.00**

EXHIBIT C