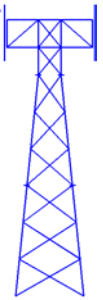




FRED A. NUDD CORPORATION

1743 ROUTE 104, BOX 577
ONTARIO, NY 14519
(315) 524-2531 FAX (315) 524-4249
www.nuddtowers.com



Design of
139' Monopole Tower
MODEL #: MJ-140
PROJECT #: 207-13312
LOCATION: Bolton, CT

MCF COMMUNICATIONS
733 Turnpike Street, Suite 105
North Andover, MA 01845
September, 2007

<i>RISATower</i> <i>Fred A Nudd Corporation</i> 1743 Rt 104 / PO Box 577 Ontario, NY 14519 Phone: (315) 524-2531 FAX: (315) 524-4249	Job 207-13312	Page 1 of 21
	Project 139' MP Bolton, CT	Date 11:02:37 09/06/07
	Client MCF Communications	Designed by Michael Withey

Tower Input Data

There is a pole section.

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Tolland County, Connecticut.
 Basic wind speed of 105 mph.
 Structure Class II.
 Exposure Category C.
 Topographic Category 1.
 Crest Height 0'.
 Nominal ice thickness of 1.0000 in.
 Ice thickness is considered to increase with height.
 Ice density of 56 pcf.
 A wind speed of 50 mph is used in combination with ice.
 Temperature drop of 50 °F.
 Deflections calculated using a wind speed of 60 mph.
 Weld together tower sections have flange connections..
 Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
 Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
 Welds are fabricated with ER-70S-6 electrodes..
 A non-linear (P-delta) analysis was used.
 Pressures are calculated at each section.
 Stress ratio used in pole design is 1.
 Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

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Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	139'-114'	25'	0'	18	24.0000	29.8750	0.2500	1.0000	A572-65 (65 ksi)
L2	114'-89'	25'	5'	18	29.8750	35.8125	0.2500	1.0000	A572-65 (65 ksi)
L3	89'-69'	25'	0'	18	34.1250	40.0000	0.3125	1.2500	A572-65 (65 ksi)
L4	69'-44'	25'	6'	18	40.0000	45.8750	0.3125	1.2500	A572-65 (65 ksi)
L5	44'-25'	25'	0'	18	43.8400	49.7500	0.3750	1.5000	A572-65 (65 ksi)
L6	25'-0'	25'		18	49.7500	55.6250	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	<i>I</i> in ⁴	<i>r</i> in	<i>C</i> in	<i>I/C</i> in ³	<i>J</i> in ⁴	<i>It/Q</i> in ³	<i>w</i> in	<i>w/t</i>
L1	24.3702	18.8456	1342.9976	8.4313	12.1920	110.1540	2687.7623	9.4246	3.7840	15.136
	30.3359	23.5074	2606.5104	10.5169	15.1765	171.7465	5216.4505	11.7560	4.8180	19.272
L2	30.3359	23.5074	2606.5104	10.5169	15.1765	171.7465	5216.4505	11.7560	4.8180	19.272
	36.3650	28.2188	4508.8027	12.6247	18.1928	247.8351	9023.5382	14.1121	5.8630	23.452
L3	35.8446	33.5378	4844.2466	12.0034	17.3355	279.4408	9694.8674	16.7721	5.4560	17.459
	40.6171	39.3650	7833.4959	14.0891	20.3200	385.5067	15677.2994	19.6863	6.4900	20.768
L4	40.6171	39.3650	7833.4959	14.0891	20.3200	385.5067	15677.2994	19.6863	6.4900	20.768
	46.5827	45.1923	11852.6929	16.1747	23.3045	508.6010	23720.9818	22.6004	7.5240	24.077
L5	45.9566	51.7342	12347.9452	15.4301	22.2707	554.4475	24712.1381	25.8720	7.0558	18.816
	50.5175	58.7686	18100.7665	17.5281	25.2730	716.2097	36225.3505	29.3899	8.0960	21.589
L6	50.5175	58.7686	18100.7665	17.5281	25.2730	716.2097	36225.3505	29.3899	8.0960	21.589
	56.4831	65.7613	25361.3570	19.6138	28.2575	897.5089	50756.0851	32.8869	9.1300	24.347

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor <i>A_f</i>	Adjust. Factor <i>A_r</i>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
ft	ft ²	in						
L1 139'-114'				1	1	1		
L2 114'-89'				1	1	1		
L3 89'-69'				1	1	1		
L4 69'-44'				1	1	1		
L5 44'-25'				1	1	1		
L6 25'-0'				1	1	1		

Monopole Base Plate Data

Base Plate Data

Base plate is square	
Base plate is grouted	
Anchor bolt grade	F1554-105
Anchor bolt size	2.0000 in
Number of bolts	20
Embedment length	24.0000 in
<i>f_c</i>	4 ksi

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Base Plate Data	
Grout space	2.0000 in
Base plate grade	A572-50
Base plate thickness	2.5000 in
Bolt circle diameter	62.0000 in
Outer diameter	68.0000 in
Inner diameter	50.0000 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		$C_A A_A$ ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	139' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	130' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	120' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	110' - 0'	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
Safety Line 3/8	C	No	CaAa (Out Of Face)	139' - 0'	1	No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	$C_A A_A$ In Face ft^2	$C_A A_A$ Out Face ft^2	Weight lb
L1	139'-114'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.938	467.98
L2	114'-89'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.938	950.14
L3	89'-69'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.750	791.60
L4	69'-44'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.938	989.50
L5	44'-25'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.713	752.02
L6	25'-0'	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.938	989.50

Feed Line/Linear Appurtenances Section Areas - With Ice

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Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _A A _A In Face ft ²	C _A A _A Out Face ft ²	Weight lb
L1	139'-114'	A	2.287	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	12.372	528.58
L2	114'-89'	A	2.237	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	12.122	1009.42
L3	89'-69'	A	2.182	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.698	839.02
L4	69'-44'	A	2.109	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.485	1045.40
L5	44'-25'	A	2.008	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	8.728	794.50
L6	25'-0'	A	1.812	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.995	1037.51

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
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Discrete Tower Loads

<i>Description</i>	<i>Face or Leg</i>	<i>Offset Type</i>	<i>Offsets: Horz Lateral Vert ft ft ft</i>	<i>Azimuth Adjustment °</i>	<i>Placement ft</i>		<i>C_AA_A Front ft²</i>	<i>C_AA_A Side ft²</i>	<i>Weight lb</i>
Lightning Rod 5/8x4'	C	None		0.0000	140'	No Ice	0.25	0.25	31.00
						1/2" Ice	0.66	0.66	33.82
						1" Ice	0.97	0.97	39.29

(4) 1' x 6' Panel	A	From Face	5.00	0.0000	140'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
(4) 1' x 6' Panel	B	From Face	5.00	0.0000	140'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
(4) 1' x 6' Panel	C	From Face	5.00	0.0000	140'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
Fred A Nudd 14' Lo-Profile Monopole	C	None		0.0000	140'	No Ice	21.13	21.13	1311.00
						1/2" Ice	28.19	28.19	1792.00
						1" Ice	35.43	35.43	2272.00
(4) 1' x 6' Panel	A	From Face	5.00	0.0000	130'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
(4) 1' x 6' Panel	B	From Face	5.00	0.0000	130'	No Ice	8.40	3.53	20.00

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight lb
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
(4) 1' x 6' Panel	C	From Face	5.00	0.0000	130'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
Fred A Nudd 14' Lo-Profile Monopole	C	None		0.0000	130'	No Ice	21.13	21.13	1311.00
						1/2" Ice	28.19	28.19	1792.00
						1" Ice	35.43	35.43	2272.00
(4) 1' x 6' Panel	A	From Face	5.00	0.0000	120'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
(4) 1' x 6' Panel	B	From Face	5.00	0.0000	120'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
(4) 1' x 6' Panel	C	From Face	5.00	0.0000	120'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
Fred A Nudd 14' Lo-Profile Monopole	C	None		0.0000	120'	No Ice	21.13	21.13	1311.00
						1/2" Ice	28.19	28.19	1792.00
						1" Ice	35.43	35.43	2272.00
(4) 1' x 6' Panel	A	From Face	5.00	0.0000	110'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
(4) 1' x 6' Panel	B	From Face	5.00	0.0000	110'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
(4) 1' x 6' Panel	C	From Face	5.00	0.0000	110'	No Ice	8.40	3.53	20.00
			0'			1/2" Ice	8.95	3.97	61.77
			0'			1" Ice	9.51	4.41	109.44
Fred A Nudd 14' Lo-Profile Monopole	C	None		0.0000	110'	No Ice	21.13	21.13	1311.00
						1/2" Ice	28.19	28.19	1792.00
						1" Ice	35.43	35.43	2272.00

Tower Pressures - No Ice

$$G_H = 1.100$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²	e	ft ²	ft ²	ft ²			
L1 139'-114'	126'19/32"	1.329	36	56.986	A	0.000	56.986	56.986	100.00	0.000	0.938
					B	0.000	56.986		100.00		
					C	0.000	56.986		100.00		
L2 114'-89'	101'1-7/16"	1.269	34	69.480	A	0.000	69.480	69.480	100.00	0.000	0.938
					B	0.000	69.480		100.00		
					C	0.000	69.480		100.00		
L3 89'-69'	78'9-15/32"	1.204	32	63.718	A	0.000	63.718	63.718	100.00	0.000	0.750
					B	0.000	63.718		100.00		
					C	0.000	63.718		100.00		

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Section Elevation	<i>z</i>	<i>K_Z</i>	<i>q_z</i>	<i>A_G</i>	<i>F</i> <i>a</i> <i>c</i> <i>e</i>	<i>A_F</i>	<i>A_R</i>	<i>A_{leg}</i>	Leg %	<i>C_AA_A</i> In Face <i>ft</i> ²	<i>C_AA_A</i> Out Face <i>ft</i> ²
<i>ft</i>	<i>ft</i>		<i>psf</i>	<i>ft</i> ²		<i>ft</i> ²	<i>ft</i> ²	<i>ft</i> ²			
L4 69'-44'	56'2-17/32"	1.121	30	90.833	A	0.000	90.833	90.833	100.00	0.000	0.938
					B	0.000	90.833		100.00		
					C	0.000	90.833		100.00		
L5 44'-25'	34'4-3/16"	1.011	27	76.375	A	0.000	76.375	76.375	100.00	0.000	0.713
					B	0.000	76.375		100.00		
					C	0.000	76.375		100.00		
L6 25'-0'	12'3-1/4"	0.85	23	111.459	A	0.000	111.459	111.459	100.00	0.000	0.938
					B	0.000	111.459		100.00		
					C	0.000	111.459		100.00		

Tower Pressure - With Ice

$$G_H = 1.100$$

Section Elevation	<i>z</i>	<i>K_Z</i>	<i>q_z</i>	<i>t_z</i>	<i>A_G</i>	<i>F</i> <i>a</i> <i>c</i> <i>e</i>	<i>A_F</i>	<i>A_R</i>	<i>A_{leg}</i>	Leg %	<i>C_AA_A</i> In Face <i>ft</i> ²	<i>C_AA_A</i> Out Face <i>ft</i> ²
<i>ft</i>	<i>ft</i>		<i>psf</i>	<i>in</i>	<i>ft</i> ²		<i>ft</i> ²	<i>ft</i> ²	<i>ft</i> ²			
L1 139'-114'	126'19/32"	1.329	8	2.2868	66.514	A	0.000	66.514	66.514	100.00	0.000	12.372
						B	0.000	66.514		100.00		
						C	0.000	66.514		100.00		
L2 114'-89'	101'1-7/16"	1.269	8	2.2370	78.801	A	0.000	78.801	78.801	100.00	0.000	12.122
						B	0.000	78.801		100.00		
						C	0.000	78.801		100.00		
L3 89'-69'	78'9-15/32"	1.204	7	2.1819	71.175	A	0.000	71.175	71.175	100.00	0.000	9.698
						B	0.000	71.175		100.00		
						C	0.000	71.175		100.00		
L4 69'-44'	56'2-17/32"	1.121	7	2.1094	99.622	A	0.000	99.622	99.622	100.00	0.000	11.485
						B	0.000	99.622		100.00		
						C	0.000	99.622		100.00		
L5 44'-25'	34'4-3/16"	1.011	6	2.0080	83.055	A	0.000	83.055	83.055	100.00	0.000	8.728
						B	0.000	83.055		100.00		
						C	0.000	83.055		100.00		
L6 25'-0'	12'3-1/4"	0.85	5	1.8116	119.007	A	0.000	119.007	119.007	100.00	0.000	9.995
						B	0.000	119.007		100.00		
						C	0.000	119.007		100.00		

Tower Pressure - Service

$$G_H = 1.100$$

Section Elevation	<i>z</i>	<i>K_Z</i>	<i>q_z</i>	<i>A_G</i>	<i>F</i> <i>a</i> <i>c</i> <i>e</i>	<i>A_F</i>	<i>A_R</i>	<i>A_{leg}</i>	Leg %	<i>C_AA_A</i> In Face <i>ft</i> ²	<i>C_AA_A</i> Out Face <i>ft</i> ²
<i>ft</i>	<i>ft</i>		<i>psf</i>	<i>ft</i> ²		<i>ft</i> ²	<i>ft</i> ²	<i>ft</i> ²			
L1 139'-114'	126'19/32"	1.329	10	56.986	A	0.000	56.986	56.986	100.00	0.000	0.938
					B	0.000	56.986		100.00		
					C	0.000	56.986		100.00		
L2 114'-89'	101'1-7/16"	1.269	10	69.480	A	0.000	69.480	69.480	100.00	0.000	0.938
					B	0.000	69.480		100.00		
					C	0.000	69.480		100.00		
L3 89'-69'	78'9-	1.204	9	63.718	A	0.000	63.718	63.718	100.00	0.000	0.750

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	Client	MCF Communications	Designed by	Michael Withey

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
L4 69'-44'	15/32"	1.121	9	90.833	B	0.000	63.718		100.00		
	56'2-17/32"				C	0.000	63.718		100.00		
					A	0.000	90.833	90.833	100.00	0.000	0.938
					B	0.000	90.833		100.00		
					C	0.000	90.833		100.00		
L5 44'-25'	34'4-3/16"	1.011	8	76.375	A	0.000	76.375	76.375	100.00	0.000	0.713
					B	0.000	76.375		100.00		
					C	0.000	76.375		100.00		
L6 25'-0'	12'3-1/4"	0.85	7	111.459	A	0.000	111.459	111.459	100.00	0.000	0.938
					B	0.000	111.459		100.00		
					C	0.000	111.459		100.00		

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb				psf			ft ²	lb	plf	
L1 139'-114'	467.98	1801.48	A	1	0.65	36	1	1	56.986	1488.45	59.54	C
			B	1	0.65		1	1	56.986			
			C	1	0.65		1	1	56.986			
L2 114'-89'	950.14	2200.16	A	1	0.65	34	1	1	69.480	1724.87	68.99	C
			B	1	0.65		1	1	69.480			
			C	1	0.65		1	1	69.480			
L3 89'-69'	791.60	3100.90	A	1	0.65	32	1	1	63.718	1496.97	74.85	C
			B	1	0.65		1	1	63.718			
			C	1	0.65		1	1	63.718			
L4 69'-44'	989.50	3596.62	A	1	0.65	30	1	1	90.833	1983.24	79.33	C
			B	1	0.65		1	1	90.833			
			C	1	0.65		1	1	90.833			
L5 44'-25'	752.02	4700.21	A	1	0.65	27	1	1	76.375	1501.05	79.00	C
			B	1	0.65		1	1	76.375			
			C	1	0.65		1	1	76.375			
L6 25'-0'	989.50	5296.84	A	1	0.65	23	1	1	111.459	1839.78	73.59	C
			B	1	0.65		1	1	111.459			
			C	1	0.65		1	1	111.459			
Sum Weight:	4940.74	20696.21						OTM	665605.31 lb-ft	10034.35		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb				psf			ft ²	lb	plf	
L1 139'-114'	467.98	1801.48	A	1	0.65	36	1	1	56.986	1488.45	59.54	C
			B	1	0.65		1	1	56.986			
			C	1	0.65		1	1	56.986			
L2 114'-89'	950.14	2200.16	A	1	0.65	34	1	1	69.480	1724.87	68.99	C
			B	1	0.65		1	1	69.480			
			C	1	0.65		1	1	69.480			

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L3 89'-69'	791.60	3100.90	A	1	0.65	32	1	1	63.718	1496.97	74.85	C
			B	1	0.65		1	1	63.718			
			C	1	0.65		1	1	63.718			
L4 69'-44'	989.50	3596.62	A	1	0.65	30	1	1	90.833	1983.24	79.33	C
			B	1	0.65		1	1	90.833			
			C	1	0.65		1	1	90.833			
L5 44'-25'	752.02	4700.21	A	1	0.65	27	1	1	76.375	1501.05	79.00	C
			B	1	0.65		1	1	76.375			
			C	1	0.65		1	1	76.375			
L6 25'-0'	989.50	5296.84	A	1	0.65	23	1	1	111.459	1839.78	73.59	C
			B	1	0.65		1	1	111.459			
			C	1	0.65		1	1	111.459			
Sum Weight:	4940.74	20696.21						OTM	665605.31 lb-ft	10034.35		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 139'-114'	467.98	1801.48	A	1	0.65	36	1	1	56.986	1488.45	59.54	C
			B	1	0.65		1	1	56.986			
			C	1	0.65		1	1	56.986			
L2 114'-89'	950.14	2200.16	A	1	0.65	34	1	1	69.480	1724.87	68.99	C
			B	1	0.65		1	1	69.480			
			C	1	0.65		1	1	69.480			
L3 89'-69'	791.60	3100.90	A	1	0.65	32	1	1	63.718	1496.97	74.85	C
			B	1	0.65		1	1	63.718			
			C	1	0.65		1	1	63.718			
L4 69'-44'	989.50	3596.62	A	1	0.65	30	1	1	90.833	1983.24	79.33	C
			B	1	0.65		1	1	90.833			
			C	1	0.65		1	1	90.833			
L5 44'-25'	752.02	4700.21	A	1	0.65	27	1	1	76.375	1501.05	79.00	C
			B	1	0.65		1	1	76.375			
			C	1	0.65		1	1	76.375			
L6 25'-0'	989.50	5296.84	A	1	0.65	23	1	1	111.459	1839.78	73.59	C
			B	1	0.65		1	1	111.459			
			C	1	0.65		1	1	111.459			
Sum Weight:	4940.74	20696.21						OTM	665605.31 lb-ft	10034.35		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 139'-114'	528.58	2663.58	A	1	1.2	8	1	1	66.514	819.29	32.77	C

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L2 114'-89'	1009.42	3244.52	B	1	1.2	8	1	1	66.514	905.14	36.21	C
			C	1	1.2		1	1	66.514			
			A	1	1.2		1	1	78.801			
L3 89'-69'	839.02	4055.04	B	1	1.2	7	1	1	78.801	765.63	38.28	C
			C	1	1.2		1	1	78.801			
			A	1	1.2		1	1	71.175			
L4 69'-44'	1045.40	4952.46	B	1	1.2	7	1	1	71.175	982.45	39.30	C
			C	1	1.2		1	1	71.175			
			A	1	1.2		1	1	99.622			
L5 44'-25'	794.50	5837.74	B	1	1.2	6	1	1	99.622	732.67	38.56	C
			C	1	1.2		1	1	99.622			
			A	1	1.2		1	1	83.055			
L6 25'-0'	1037.51	6953.55	B	1	1.2	5	1	1	83.055	868.66	34.75	C
			C	1	1.2		1	1	83.055			
			A	1	1.2		1	1	119.007			
Sum Weight:	5254.44	27706.90	B	1	1.2		1	1	119.007			
			C					OTM	346177.23 lb-ft	5073.85		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 139'-114'	528.58	2663.58	A	1	1.2	8	1	1	66.514	819.29	32.77	C
			B	1	1.2		1	1	66.514			
			C	1	1.2		1	1	66.514			
L2 114'-89'	1009.42	3244.52	A	1	1.2	8	1	1	78.801	905.14	36.21	C
			B	1	1.2		1	1	78.801			
			C	1	1.2		1	1	78.801			
L3 89'-69'	839.02	4055.04	A	1	1.2	7	1	1	71.175	765.63	38.28	C
			B	1	1.2		1	1	71.175			
			C	1	1.2		1	1	71.175			
L4 69'-44'	1045.40	4952.46	A	1	1.2	7	1	1	99.622	982.45	39.30	C
			B	1	1.2		1	1	99.622			
			C	1	1.2		1	1	99.622			
L5 44'-25'	794.50	5837.74	A	1	1.2	6	1	1	83.055	732.67	38.56	C
			B	1	1.2		1	1	83.055			
			C	1	1.2		1	1	83.055			
L6 25'-0'	1037.51	6953.55	A	1	1.2	5	1	1	119.007	868.66	34.75	C
			B	1	1.2		1	1	119.007			
			C	1	1.2		1	1	119.007			
Sum Weight:	5254.44	27706.90						OTM	346177.23 lb-ft	5073.85		

Tower Forces - With Ice - Wind 90 To Face

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	Client	MCF Communications	Designed by	Michael Withey

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 139'-114'	528.58	2663.58	A	1	1.2	8	1	1	66.514	819.29	32.77	C
			B	1	1.2		1	1	66.514			
			C	1	1.2		1	1	66.514			
L2 114'-89'	1009.42	3244.52	A	1	1.2	8	1	1	78.801	905.14	36.21	C
			B	1	1.2		1	1	78.801			
			C	1	1.2		1	1	78.801			
L3 89'-69'	839.02	4055.04	A	1	1.2	7	1	1	71.175	765.63	38.28	C
			B	1	1.2		1	1	71.175			
			C	1	1.2		1	1	71.175			
L4 69'-44'	1045.40	4952.46	A	1	1.2	7	1	1	99.622	982.45	39.30	C
			B	1	1.2		1	1	99.622			
			C	1	1.2		1	1	99.622			
L5 44'-25'	794.50	5837.74	A	1	1.2	6	1	1	83.055	732.67	38.56	C
			B	1	1.2		1	1	83.055			
			C	1	1.2		1	1	83.055			
L6 25'-0'	1037.51	6953.55	A	1	1.2	5	1	1	119.007	868.66	34.75	C
			B	1	1.2		1	1	119.007			
			C	1	1.2		1	1	119.007			
Sum Weight:	5254.44	27706.90						OTM	346177.23 lb-ft	5073.85		

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E	F	w	Ctrl. Face
ft	lb	lb							ft ²	lb	plf	
L1 139'-114'	467.98	1801.48	A	1	0.65	10	1	1	56.986	434.86	17.39	C
			B	1	0.65		1	1	56.986			
			C	1	0.65		1	1	56.986			
L2 114'-89'	950.14	2200.16	A	1	0.65	10	1	1	69.480	503.94	20.16	C
			B	1	0.65		1	1	69.480			
			C	1	0.65		1	1	69.480			
L3 89'-69'	791.60	3100.90	A	1	0.65	9	1	1	63.718	437.35	21.87	C
			B	1	0.65		1	1	63.718			
			C	1	0.65		1	1	63.718			
L4 69'-44'	989.50	3596.62	A	1	0.65	9	1	1	90.833	579.42	23.18	C
			B	1	0.65		1	1	90.833			
			C	1	0.65		1	1	90.833			
L5 44'-25'	752.02	4700.21	A	1	0.65	8	1	1	76.375	438.54	23.08	C
			B	1	0.65		1	1	76.375			
			C	1	0.65		1	1	76.375			
L6 25'-0'	989.50	5296.84	A	1	0.65	7	1	1	111.459	537.51	21.50	C
			B	1	0.65		1	1	111.459			
			C	1	0.65		1	1	111.459			
Sum Weight:	4940.74	20696.21						OTM	194462.56 lb-ft	2931.63		

Tower Forces - Service - Wind 60 To Face

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
ft	lb	lb										
L1 139'-114'	467.98	1801.48	A	1	0.65	10	1	1	56.986	434.86	17.39	C
			B	1	0.65		1	1	56.986			
			C	1	0.65		1	1	56.986			
L2 114'-89'	950.14	2200.16	A	1	0.65	10	1	1	69.480	503.94	20.16	C
			B	1	0.65		1	1	69.480			
			C	1	0.65		1	1	69.480			
L3 89'-69'	791.60	3100.90	A	1	0.65	9	1	1	63.718	437.35	21.87	C
			B	1	0.65		1	1	63.718			
			C	1	0.65		1	1	63.718			
L4 69'-44'	989.50	3596.62	A	1	0.65	9	1	1	90.833	579.42	23.18	C
			B	1	0.65		1	1	90.833			
			C	1	0.65		1	1	90.833			
L5 44'-25'	752.02	4700.21	A	1	0.65	8	1	1	76.375	438.54	23.08	C
			B	1	0.65		1	1	76.375			
			C	1	0.65		1	1	76.375			
L6 25'-0'	989.50	5296.84	A	1	0.65	7	1	1	111.459	537.51	21.50	C
			B	1	0.65		1	1	111.459			
			C	1	0.65		1	1	111.459			
Sum Weight:	4940.74	20696.21						OTM	194462.56 lb-ft	2931.63		

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	q _z psf	D _F	D _R	A _E ft ²	F lb	w plf	Ctrl. Face
ft	lb	lb										
L1 139'-114'	467.98	1801.48	A	1	0.65	10	1	1	56.986	434.86	17.39	C
			B	1	0.65		1	1	56.986			
			C	1	0.65		1	1	56.986			
L2 114'-89'	950.14	2200.16	A	1	0.65	10	1	1	69.480	503.94	20.16	C
			B	1	0.65		1	1	69.480			
			C	1	0.65		1	1	69.480			
L3 89'-69'	791.60	3100.90	A	1	0.65	9	1	1	63.718	437.35	21.87	C
			B	1	0.65		1	1	63.718			
			C	1	0.65		1	1	63.718			
L4 69'-44'	989.50	3596.62	A	1	0.65	9	1	1	90.833	579.42	23.18	C
			B	1	0.65		1	1	90.833			
			C	1	0.65		1	1	90.833			
L5 44'-25'	752.02	4700.21	A	1	0.65	8	1	1	76.375	438.54	23.08	C
			B	1	0.65		1	1	76.375			
			C	1	0.65		1	1	76.375			
L6 25'-0'	989.50	5296.84	A	1	0.65	7	1	1	111.459	537.51	21.50	C
			B	1	0.65		1	1	111.459			
			C	1	0.65		1	1	111.459			
Sum Weight:	4940.74	20696.21						OTM	194462.56 lb-ft	2931.63		

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Force Totals

Load Case	Vertical Forces <i>lb</i>	Sum of Forces <i>X</i> <i>lb</i>	Sum of Forces <i>Z</i> <i>lb</i>	Sum of Overturning Moments, <i>M_x</i> <i>lb-ft</i>	Sum of Overturning Moments, <i>M_z</i> <i>lb-ft</i>	Sum of Torques <i>lb-ft</i>
Leg Weight	20696.21					
Bracing Weight	0.00					
Total Member Self-Weight	20696.21			0.00	0.00	
Total Weight	31871.95			0.00	0.00	
Wind 0 deg - No Ice		0.00	-24545.65	-2482731.86	0.00	0.00
Wind 30 deg - No Ice		12272.82	-21257.15	-2150108.87	-1241365.93	0.00
Wind 60 deg - No Ice		21257.15	-12272.82	-1241365.93	-2150108.87	0.00
Wind 90 deg - No Ice		24545.65	0.00	0.00	-2482731.86	0.00
Wind 120 deg - No Ice		21257.15	12272.82	1241365.93	-2150108.87	0.00
Wind 150 deg - No Ice		12272.82	21257.15	2150108.87	-1241365.93	0.00
Wind 180 deg - No Ice		0.00	24545.65	2482731.86	0.00	0.00
Wind 210 deg - No Ice		-12272.82	21257.15	2150108.87	1241365.93	0.00
Wind 240 deg - No Ice		-21257.15	12272.82	1241365.93	2150108.87	0.00
Wind 270 deg - No Ice		-24545.65	0.00	0.00	2482731.86	0.00
Wind 300 deg - No Ice		-21257.15	-12272.82	-1241365.93	2150108.87	0.00
Wind 330 deg - No Ice		-12272.82	-21257.15	-2150108.87	1241365.93	0.00
Member Ice	7010.69					
Total Weight Ice	59869.61			0.00	0.00	
Wind 0 deg - Ice		0.00	-10569.45	-1034750.00	0.00	0.00
Wind 30 deg - Ice		5284.72	-9153.41	-896119.79	-517375.00	0.00
Wind 60 deg - Ice		9153.41	-5284.72	-517375.00	-896119.79	0.00
Wind 90 deg - Ice		10569.45	0.00	0.00	-1034750.00	0.00
Wind 120 deg - Ice		9153.41	5284.72	517375.00	-896119.79	0.00
Wind 150 deg - Ice		5284.72	9153.41	896119.79	-517375.00	0.00
Wind 180 deg - Ice		0.00	10569.45	1034750.00	0.00	0.00
Wind 210 deg - Ice		-5284.72	9153.41	896119.79	517375.00	0.00
Wind 240 deg - Ice		-9153.41	5284.72	517375.00	896119.79	0.00
Wind 270 deg - Ice		-10569.45	0.00	0.00	1034750.00	0.00
Wind 300 deg - Ice		-9153.41	-5284.72	-517375.00	896119.79	0.00
Wind 330 deg - Ice		-5284.72	-9153.41	-896119.79	517375.00	0.00
Total Weight	31871.95			0.00	0.00	
Wind 0 deg - Service		0.00	-7171.23	-725352.38	0.00	0.00
Wind 30 deg - Service		3585.62	-6210.47	-628173.59	-362676.19	0.00
Wind 60 deg - Service		6210.47	-3585.62	-362676.19	-628173.59	0.00
Wind 90 deg - Service		7171.23	0.00	0.00	-725352.38	0.00
Wind 120 deg - Service		6210.47	3585.62	362676.19	-628173.59	0.00
Wind 150 deg - Service		3585.62	6210.47	628173.59	-362676.19	0.00
Wind 180 deg - Service		0.00	7171.23	725352.38	0.00	0.00
Wind 210 deg - Service		-3585.62	6210.47	628173.59	362676.19	0.00
Wind 240 deg - Service		-6210.47	3585.62	362676.19	628173.59	0.00
Wind 270 deg - Service		-7171.23	0.00	0.00	725352.38	0.00
Wind 300 deg - Service		-6210.47	-3585.62	-362676.19	628173.59	0.00
Wind 330 deg - Service		-3585.62	-6210.47	-628173.59	362676.19	0.00

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice

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<i>Comb. No.</i>	<i>Description</i>
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

<i>Section No.</i>	<i>Elevation ft</i>	<i>Component Type</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Axial lb</i>	<i>Major Axis Moment lb-ft</i>	<i>Minor Axis Moment lb-ft</i>
L1	139 - 114	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-24860.81	0.00	-0.00
			Max. Mx	8	-6328.51	-322667.94	0.00
			Max. My	14	-6328.51	0.00	-322667.94
			Max. Vy	8	20677.39	-322667.94	0.00
			Max. Vx	14	20677.39	0.00	-322667.94
			Max. Torque	4			-0.00
L2	114 - 89	Pole	Max Tension	1	0.00	0.00	0.00

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L3	89 - 69	Pole	Max. Compression	26	-35670.05	0.00	-0.00
			Max. Mx	8	-10861.61	-851520.64	0.00
			Max. My	14	-10861.61	0.00	-851520.64
			Max. Vy	8	28759.04	-851520.64	0.00
			Max. Vx	14	28759.04	0.00	-851520.64
			Max. Torque	4			-0.01
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42596.43	0.00	-0.00
			Max. Mx	8	-16769.85	-	0.00
						1609241.39	
L4	69 - 44	Pole	Max. My	2	-16769.85	0.00	1609241.39
			Max. Vy	8	31823.14	-	0.00
						1609241.39	
			Max. Vx	2	-31823.14	0.00	1609241.39
			Max. Torque	4			-0.01
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47797.64	0.00	-0.00
			Max. Mx	8	-21417.63	-	0.00
						2234468.78	
			Max. My	14	-21417.63	0.00	-
L5	44 - 25	Pole					2234468.78
			Max. Vy	8	34027.07	-	0.00
			Max. Vx	14	34027.07	0.00	-
							2234468.78
			Max. Torque	4			-0.02
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57593.43	0.00	-0.00
			Max. Mx	8	-29928.15	-	0.00
						3123167.14	
			Max. My	2	-29928.15	0.00	3123167.14
L6	25 - 0	Pole	Max. Vy	8	36970.49	-	0.00
			Max. Vx	2	-36970.49	0.00	3123167.14
			Max. Torque	4			-0.02
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-66841.76	0.00	0.00
			Max. Mx	8	-38226.67	-	0.00
						4075925.79	
			Max. My	14	-38226.67	0.00	-
							4075925.79
			Max. Vy	8	39292.19	-	0.00
			Max. Vx	2	-39292.19	0.00	4075925.79
			Max. Torque	4			-0.02

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	30	66841.76	-10569.53	0.00
	Max. H _x	20	38246.35	39273.04	0.00
	Max. H _z	2	38246.35	0.00	39273.04
	Max. M _x	2	4075925.79	0.00	39273.04
	Max. M _z	8	4075925.79	-39273.04	0.00
	Max. Torsion	24	0.02	19636.52	34011.45

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<i>Location</i>	<i>Condition</i>	<i>Gov. Load Comb.</i>	<i>Vertical lb</i>	<i>Horizontal, X lb</i>	<i>Horizontal, Z lb</i>
	Min. Vert	5	28684.76	-19636.52	34011.45
	Min. H _x	8	38246.35	-39273.04	0.00
	Min. H _z	14	38246.35	0.00	-39273.04
	Min. M _x	14	-4075925.79	0.00	-39273.04
	Min. M _z	20	-4075925.79	39273.04	0.00
	Min. Torsion	4	-0.02	-19636.52	34011.45

Tower Mast Reaction Summary

<i>Load Combination</i>	<i>Vertical lb</i>	<i>Shear_x lb</i>	<i>Shear_z lb</i>	<i>Overturning Moment, M_x lb-ft</i>	<i>Overturning Moment, M_z lb-ft</i>	<i>Torque lb-ft</i>
Dead Only	31871.95	0.00	0.00	0.00	0.00	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	38246.35	0.00	-39273.04	-4075925.79	0.00	0.00
0.9 Dead+1.6 Wind 0 deg - No Ice	28684.76	0.00	-39273.04	-4047729.30	0.00	0.00
1.2 Dead+1.6 Wind 30 deg - No Ice	38246.34	19636.52	-34011.45	-3529857.49	-2037964.18	0.02
0.9 Dead+1.6 Wind 30 deg - No Ice	28684.76	19636.52	-34011.45	-3505436.98	-2023864.99	0.01
1.2 Dead+1.6 Wind 60 deg - No Ice	38246.34	34011.45	-19636.52	-2037964.18	-3529857.49	-0.02
0.9 Dead+1.6 Wind 60 deg - No Ice	28684.76	34011.45	-19636.52	-2023864.99	-3505436.98	-0.01
1.2 Dead+1.6 Wind 90 deg - No Ice	38246.35	39273.04	0.00	0.00	-4075925.79	0.00
0.9 Dead+1.6 Wind 90 deg - No Ice	28684.76	39273.04	0.00	0.00	-4047729.30	0.00
1.2 Dead+1.6 Wind 120 deg - No Ice	38246.34	34011.45	19636.52	2037964.18	-3529857.49	0.02
0.9 Dead+1.6 Wind 120 deg - No Ice	28684.76	34011.45	19636.52	2023864.99	-3505436.98	0.01
1.2 Dead+1.6 Wind 150 deg - No Ice	38246.34	19636.52	34011.45	3529857.49	-2037964.18	-0.02
0.9 Dead+1.6 Wind 150 deg - No Ice	28684.76	19636.52	34011.45	3505436.98	-2023864.99	-0.01
1.2 Dead+1.6 Wind 180 deg - No Ice	38246.35	0.00	39273.04	4075925.79	0.00	0.00
0.9 Dead+1.6 Wind 180 deg - No Ice	28684.76	0.00	39273.04	4047729.30	0.00	0.00
1.2 Dead+1.6 Wind 210 deg - No Ice	38246.34	-19636.52	34011.45	3529857.49	2037964.18	0.02
0.9 Dead+1.6 Wind 210 deg - No Ice	28684.76	-19636.52	34011.45	3505436.98	2023864.99	0.01
1.2 Dead+1.6 Wind 240 deg - No Ice	38246.34	-34011.45	19636.52	2037964.18	3529857.49	-0.02
0.9 Dead+1.6 Wind 240 deg - No Ice	28684.76	-34011.45	19636.52	2023864.99	3505436.98	-0.01
1.2 Dead+1.6 Wind 270 deg - No Ice	38246.35	-39273.04	0.00	0.00	4075925.79	0.00
0.9 Dead+1.6 Wind 270 deg - No Ice	28684.76	-39273.04	0.00	0.00	4047729.30	0.00
1.2 Dead+1.6 Wind 300 deg - No Ice	38246.34	-34011.45	-19636.52	-2037964.18	3529857.49	0.02
0.9 Dead+1.6 Wind 300 deg - No Ice	28684.76	-34011.45	-19636.52	-2023864.99	3505436.98	0.01

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Load Combination	Vertical lb	Shear _x lb	Shear _z lb	Overturning Moment, M _x lb-ft	Overturning Moment, M _z lb-ft	Torque lb-ft
1.2 Dead+1.6 Wind 330 deg - No Ice	38246.34	-19636.52	-34011.45	-3529857.49	2037964.18	-0.02
0.9 Dead+1.6 Wind 330 deg - No Ice	28684.76	-19636.52	-34011.45	-3505436.98	2023864.99	-0.01
1.2 Dead+1.0 Ice+1.0 Temp	66841.76	0.00	0.00	0.00	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	66841.76	0.00	-10569.53	-1107412.90	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	66841.76	5284.73	-9153.42	-959051.42	-553708.60	0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	66841.76	9153.42	-5284.73	-553708.60	-959051.42	-0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	66841.76	10569.53	0.00	0.00	-1107412.90	0.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	66841.76	9153.42	5284.73	553708.60	-959051.42	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	66841.76	5284.73	9153.42	959051.42	-553708.60	-0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	66841.76	0.00	10569.53	1107412.90	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	66841.76	-5284.73	9153.42	959051.42	553708.60	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	66841.76	-9153.42	5284.73	553708.60	959051.42	-0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	66841.76	-10569.53	0.00	0.00	1107412.90	0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	66841.76	-9153.42	-5284.73	-553708.60	959051.42	0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	66841.76	-5284.73	-9153.42	-959051.42	553708.60	-0.00
Dead+Wind 0 deg - Service	31871.95	0.00	-7171.23	-742071.97	0.00	0.00
Dead+Wind 30 deg - Service	31871.95	3585.62	-6210.47	-642653.18	-371035.99	0.00
Dead+Wind 60 deg - Service	31871.95	6210.47	-3585.62	-371035.99	-642653.18	-0.00
Dead+Wind 90 deg - Service	31871.95	7171.23	0.00	0.00	-742071.97	0.00
Dead+Wind 120 deg - Service	31871.95	6210.47	3585.62	371035.99	-642653.18	0.00
Dead+Wind 150 deg - Service	31871.95	3585.62	6210.47	642653.18	-371035.99	-0.00
Dead+Wind 180 deg - Service	31871.95	0.00	7171.23	742071.97	0.00	0.00
Dead+Wind 210 deg - Service	31871.95	-3585.62	6210.47	642653.18	371035.99	0.00
Dead+Wind 240 deg - Service	31871.95	-6210.47	3585.62	371035.99	642653.18	-0.00
Dead+Wind 270 deg - Service	31871.95	-7171.23	0.00	0.00	742071.97	0.00
Dead+Wind 300 deg - Service	31871.95	-6210.47	-3585.62	-371035.99	642653.18	0.00
Dead+Wind 330 deg - Service	31871.95	-3585.62	-6210.47	-642653.18	371035.99	-0.00

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
1	0.00	-31871.95	0.00	0.00	31871.95	0.00	0.000%
2	0.00	-38246.34	-39273.04	0.00	38246.35	39273.04	0.000%
3	0.00	-28684.76	-39273.04	0.00	28684.76	39273.04	0.000%
4	19636.52	-38246.34	-34011.45	-19636.52	38246.34	34011.45	0.000%
5	19636.52	-28684.76	-34011.45	-19636.52	28684.76	34011.45	0.000%
6	34011.45	-38246.34	-19636.52	-34011.45	38246.34	19636.52	0.000%
7	34011.45	-28684.76	-19636.52	-34011.45	28684.76	19636.52	0.000%
8	39273.04	-38246.34	0.00	-39273.04	38246.35	0.00	0.000%
9	39273.04	-28684.76	0.00	-39273.04	28684.76	0.00	0.000%
10	34011.45	-38246.34	19636.52	-34011.45	38246.34	-19636.52	0.000%
11	34011.45	-28684.76	19636.52	-34011.45	28684.76	-19636.52	0.000%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	
12	19636.52	-38246.34	34011.45	-19636.52	38246.34	-34011.45	0.000%
13	19636.52	-28684.76	34011.45	-19636.52	28684.76	-34011.45	0.000%
14	0.00	-38246.34	39273.04	0.00	38246.35	-39273.04	0.000%
15	0.00	-28684.76	39273.04	0.00	28684.76	-39273.04	0.000%
16	-19636.52	-38246.34	34011.45	19636.52	38246.34	-34011.45	0.000%
17	-19636.52	-28684.76	34011.45	19636.52	28684.76	-34011.45	0.000%
18	-34011.45	-38246.34	19636.52	34011.45	38246.34	-19636.52	0.000%
19	-34011.45	-28684.76	19636.52	34011.45	28684.76	-19636.52	0.000%
20	-39273.04	-38246.34	0.00	39273.04	38246.35	0.00	0.000%
21	-39273.04	-28684.76	0.00	39273.04	28684.76	0.00	0.000%
22	-34011.45	-38246.34	-19636.52	34011.45	38246.34	19636.52	0.000%
23	-34011.45	-28684.76	-19636.52	34011.45	28684.76	19636.52	0.000%
24	-19636.52	-38246.34	-34011.45	19636.52	38246.34	34011.45	0.000%
25	-19636.52	-28684.76	-34011.45	19636.52	28684.76	34011.45	0.000%
26	0.00	-66841.76	0.00	0.00	66841.76	0.00	0.000%
27	0.00	-66841.76	-10569.45	0.00	66841.76	10569.53	0.000%
28	5284.72	-66841.76	-9153.41	-5284.73	66841.76	9153.42	0.000%
29	9153.41	-66841.76	-5284.72	-9153.42	66841.76	5284.73	0.000%
30	10569.45	-66841.76	0.00	-10569.53	66841.76	0.00	0.000%
31	9153.41	-66841.76	5284.72	-9153.42	66841.76	-5284.73	0.000%
32	5284.72	-66841.76	9153.41	-5284.73	66841.76	-9153.42	0.000%
33	0.00	-66841.76	10569.45	0.00	66841.76	-10569.53	0.000%
34	-5284.72	-66841.76	9153.41	5284.73	66841.76	-9153.42	0.000%
35	-9153.41	-66841.76	5284.72	9153.42	66841.76	-5284.73	0.000%
36	-10569.45	-66841.76	0.00	10569.53	66841.76	0.00	0.000%
37	-9153.41	-66841.76	-5284.72	9153.42	66841.76	5284.73	0.000%
38	-5284.72	-66841.76	-9153.41	5284.73	66841.76	9153.42	0.000%
39	0.00	-31871.95	-7171.23	0.00	31871.95	7171.23	0.000%
40	3585.62	-31871.95	-6210.47	-3585.62	31871.95	6210.47	0.000%
41	6210.47	-31871.95	-3585.62	-6210.47	31871.95	3585.62	0.000%
42	7171.23	-31871.95	0.00	-7171.23	31871.95	0.00	0.000%
43	6210.47	-31871.95	3585.62	-6210.47	31871.95	-3585.62	0.000%
44	3585.62	-31871.95	6210.47	-3585.62	31871.95	-6210.47	0.000%
45	0.00	-31871.95	7171.23	0.00	31871.95	-7171.23	0.000%
46	-3585.62	-31871.95	6210.47	3585.62	31871.95	-6210.47	0.000%
47	-6210.47	-31871.95	3585.62	6210.47	31871.95	-3585.62	0.000%
48	-7171.23	-31871.95	0.00	7171.23	31871.95	0.00	0.000%
49	-6210.47	-31871.95	-3585.62	6210.47	31871.95	3585.62	0.000%
50	-3585.62	-31871.95	-6210.47	3585.62	31871.95	6210.47	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	4	0.00000001	0.00027167
3	Yes	4	0.00000001	0.00011408
4	Yes	5	0.00000001	0.00090832
5	Yes	5	0.00000001	0.00033682
6	Yes	5	0.00000001	0.00090832
7	Yes	5	0.00000001	0.00033682
8	Yes	4	0.00000001	0.00027167
9	Yes	4	0.00000001	0.00011408
10	Yes	5	0.00000001	0.00090832
11	Yes	5	0.00000001	0.00033682
12	Yes	5	0.00000001	0.00090832

<i>RISATower</i> <i>Fred A Nudd Corporation</i> 1743 Rt 104 / PO Box 577 Ontario, NY 14519 Phone: (315) 524-2531 FAX: (315) 524-4249	Job	207-13312	Page	18 of 21
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13	Yes	5	0.00000001	0.00033682
14	Yes	4	0.00000001	0.00027167
15	Yes	4	0.00000001	0.00011408
16	Yes	5	0.00000001	0.00090832
17	Yes	5	0.00000001	0.00033682
18	Yes	5	0.00000001	0.00090832
19	Yes	5	0.00000001	0.00033682
20	Yes	4	0.00000001	0.00027167
21	Yes	4	0.00000001	0.00011408
22	Yes	5	0.00000001	0.00090832
23	Yes	5	0.00000001	0.00033682
24	Yes	5	0.00000001	0.00090832
25	Yes	5	0.00000001	0.00033682
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00099365
28	Yes	6	0.00000001	0.00011997
29	Yes	6	0.00000001	0.00011997
30	Yes	5	0.00000001	0.00099365
31	Yes	6	0.00000001	0.00011997
32	Yes	6	0.00000001	0.00011997
33	Yes	5	0.00000001	0.00099365
34	Yes	6	0.00000001	0.00011997
35	Yes	6	0.00000001	0.00011997
36	Yes	5	0.00000001	0.00099365
37	Yes	6	0.00000001	0.00011997
38	Yes	6	0.00000001	0.00011997
39	Yes	4	0.00000001	0.00007319
40	Yes	4	0.00000001	0.00042354
41	Yes	4	0.00000001	0.00042354
42	Yes	4	0.00000001	0.00007319
43	Yes	4	0.00000001	0.00042354
44	Yes	4	0.00000001	0.00042354
45	Yes	4	0.00000001	0.00007319
46	Yes	4	0.00000001	0.00042354
47	Yes	4	0.00000001	0.00042354
48	Yes	4	0.00000001	0.00007319
49	Yes	4	0.00000001	0.00042354
50	Yes	4	0.00000001	0.00042354

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	139 - 114	17.913	42	1.1079	0.0000
L2	114 - 89	12.247	42	1.0303	0.0000
L3	94 - 69	8.270	42	0.8535	0.0000
L4	69 - 44	4.343	42	0.6231	0.0000
L5	50 - 25	2.269	42	0.4192	0.0000
L6	25 - 0	0.559	42	0.2159	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
-----------------	--------------	-----------------------	------------------	-----------	------------	------------------------------

<i>RISATower</i> <i>Fred A Nudd Corporation</i> 1743 Rt 104 / PO Box 577 Ontario, NY 14519 Phone: (315) 524-2531 FAX: (315) 524-4249	Job	207-13312	Page	19 of 21
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<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection in</i>	<i>Tilt °</i>	<i>Twist °</i>	<i>Radius of Curvature ft</i>
<i>ft</i>						
140'	Lightning Rod 5/8x4'	42	17.913	1.1079	0.0000	41329
130'	(4) 1' x 6' Panel	42	15.826	1.0932	0.0000	22960
120'	(4) 1' x 6' Panel	42	13.558	1.0625	0.0000	10875
110'	(4) 1' x 6' Panel	42	11.401	1.0014	0.0000	7896

Maximum Tower Deflections - Design Wind

<i>Section No.</i>	<i>Elevation ft</i>	<i>Horz. Deflection in</i>	<i>Gov. Load Comb.</i>	<i>Tilt °</i>	<i>Twist °</i>
L1	139 - 114	98.292	2	6.0846	0.0000
L2	114 - 89	67.230	2	5.6591	0.0000
L3	94 - 69	45.413	2	4.6887	0.0000
L4	69 - 44	23.857	2	3.4234	0.0000
L5	50 - 25	12.465	2	2.3035	0.0000
L6	25 - 0	3.069	2	1.1863	0.0000

Critical Deflections and Radius of Curvature - Design Wind

<i>Elevation</i>	<i>Appurtenance</i>	<i>Gov. Load Comb.</i>	<i>Deflection in</i>	<i>Tilt °</i>	<i>Twist °</i>	<i>Radius of Curvature ft</i>
<i>ft</i>						
140'	Lightning Rod 5/8x4'	2	98.292	6.0846	0.0000	7695
130'	(4) 1' x 6' Panel	2	86.851	6.0046	0.0000	4274
120'	(4) 1' x 6' Panel	2	74.420	5.8361	0.0000	2022
110'	(4) 1' x 6' Panel	2	62.589	5.4999	0.0000	1465

Base Plate Design Data

<i>Plate Thickness</i>	<i>Number of Anchor Bolts</i>	<i>Anchor Bolt Size</i>	<i>Actual Allowable Ratio Bolt Tension lb</i>	<i>Actual Allowable Ratio Bolt Compression lb</i>	<i>Actual Allowable Ratio Plate Stress ksi</i>	<i>Actual Allowable Ratio Stiffener Stress ksi</i>	<i>Controlling Condition</i>	<i>Ratio</i>
<i>in</i>		<i>in</i>						
2.5000	20	2.0000	155866.54	159689.21	37.283		Bolt T	0.94 ✓
			165669.93	275012.08	45.000			
			0.94	0.58	0.83			

Compression Checks

Pole Design Data

<i>RISATower</i> <i>Fred A Nudd Corporation</i> 1743 Rt 104 / PO Box 577 Ontario, NY 14519 Phone: (315) 524-2531 FAX: (315) 524-4249	Job	207-13312	Page	20 of 21
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Section No.	Elevation <i>ft</i>	Size	<i>L</i> <i>ft</i>	<i>L_u</i> <i>ft</i>	<i>Kl/r</i>	<i>A</i> <i>in²</i>	<i>P_u</i> <i>lb</i>	ϕP_n <i>lb</i>	Ratio $\frac{P_u}{\phi P_n}$
L1	139 - 114 (1)	TP29.875x24x0.25	25'	139'	158.6	23.5074	-6328.46	199390.00	0.032
L2	114 - 89 (2)	TP35.8125x29.875x0.25	25'	139'	136.7	27.2766	-10861.50	311498.00	0.035
L3	89 - 69 (3)	TP40x34.125x0.3125	25'	139'	118.4	39.3650	-16769.80	599238.00	0.028
L4	69 - 44 (4)	TP45.875x40x0.3125	25'	139'	106.4	43.7938	-21417.60	825095.00	0.026
L5	44 - 25 (5)	TP49.75x43.84x0.375	25'	139'	95.2	58.7686	-29928.10	1372940.00	0.022
L6	25 - 0 (6)	TP55.625x49.75x0.375	25'	139'	85.0	65.7613	-38226.70	1827060.00	0.021

Pole Bending Design Data

Section No.	Elevation <i>ft</i>	Size	<i>M_{ux}</i> <i>lb-ft</i>	ϕM_{nx} <i>lb-ft</i>	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	<i>M_{uy}</i> <i>lb-ft</i>	ϕM_{ny} <i>lb-ft</i>	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	139 - 114 (1)	TP29.875x24x0.25	322668.33	837266.67	0.385	0.00	837266.67	0.000
L2	114 - 89 (2)	TP35.8125x29.875x0.25	851525.00	1128583.33	0.755	0.00	1128583.33	0.000
L3	89 - 69 (3)	TP40x34.125x0.3125	1609241.67	1879341.67	0.856	0.00	1879341.67	0.000
L4	69 - 44 (4)	TP45.875x40x0.3125	2234466.67	2327841.67	0.960	0.00	2327841.67	0.000
L5	44 - 25 (5)	TP49.75x43.84x0.375	3123166.67	3491525.00	0.895	0.00	3491525.00	0.000
L6	25 - 0 (6)	TP55.625x49.75x0.375	4075925.00	4375358.33	0.932	0.00	4375358.33	0.000

Pole Shear Design Data

Section No.	Elevation <i>ft</i>	Size	Actual <i>V_u</i> <i>lb</i>	ϕV_n <i>lb</i>	Ratio $\frac{V_u}{\phi V_n}$	Actual <i>T_u</i> <i>lb-ft</i>	ϕT_n <i>lb-ft</i>	Ratio $\frac{T_u}{\phi T_n}$
L1	139 - 114 (1)	TP29.875x24x0.25	20678.10	412634.00	0.050	0.00	294855829.33	0.000
L2	114 - 89 (2)	TP35.8125x29.875x0.25	28759.80	478795.00	0.060	0.01	535117482.67	0.000
L3	89 - 69 (3)	TP40x34.125x0.3125	31823.60	690988.00	0.046	0.01	1484749994.67	0.000
L4	69 - 44 (4)	TP45.875x40x0.3125	34027.00	768727.00	0.044	0.02	2276166656.00	0.000
L5	44 - 25 (5)	TP49.75x43.84x0.375	36970.20	1031580.00	0.036	0.02	5123308202.67	0.000
L6	25 - 0 (6)	TP55.625x49.75x0.375	39292.20	1154330.00	0.034	0.02	8038950229.33	0.000

Pole Interaction Design Data

Section No.	Elevation <i>ft</i>	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	139 - 114 (1)	0.032	0.385	0.000	0.050	0.000	0.420 ✓	1.000	4.10-1a ✓
L2	114 - 89 (2)	0.035	0.755	0.000	0.060	0.000	0.793 ✓	1.000	4.10-1a ✓
L3	89 - 69 (3)	0.028	0.856	0.000	0.046	0.000	0.886 ✓	1.000	4.10-1a ✓
L4	69 - 44 (4)	0.026	0.960	0.000	0.044	0.000	0.988 ✓	1.000	4.10-1a ✓
L5	44 - 25 (5)	0.022	0.895	0.000	0.036	0.000	0.918 ✓	1.000	4.10-1a ✓
L6	25 - 0 (6)	0.021	0.932	0.000	0.034	0.000	0.954 ✓	1.000	4.10-1a ✓

<i>RISATower</i> <i>Fred A Nudd Corporation</i> 1743 Rt 104 / PO Box 577 Ontario, NY 14519 Phone: (315) 524-2531 FAX: (315) 524-4249	Job	207-13312	Page	21 of 21
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Section No.	Elevation <i>ft</i>	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			

Section Capacity Table

Section No.	Elevation <i>ft</i>	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	139 - 114	Pole	TP29.875x24x0.25	1	-6328.46	199390.00	42.0	Pass
L2	114 - 89	Pole	TP35.8125x29.875x0.25	2	-10861.50	311498.00	79.3	Pass
L3	89 - 69	Pole	TP40x34.125x0.3125	3	-16769.80	599238.00	88.6	Pass
L4	69 - 44	Pole	TP45.875x40x0.3125	4	-21417.60	825095.00	98.8	Pass
L5	44 - 25	Pole	TP49.75x43.84x0.375	5	-29928.10	1372940.00	91.8	Pass
L6	25 - 0	Pole	TP55.625x49.75x0.375	6	-38226.70	1827060.00	95.4	Pass
							Summary	
							Pole (L4)	98.8 Pass
							Base Plate	94.1 Pass
							RATING = 98.8	Pass

BORING LOG

SHEET 1 OF 1

SUBSURFACE DRILLING & REMEDIATION CO.

PO BOX 3729

TOWN, STATE: Bolton, CT

PROJECT NAME:

CRANSTON, RHODE ISLAND 02910

CLIENT: MCF Communication

800-292-1640

HOLE# B-1

FAX: 401-275-6420

BORING TYPE: H S ADATE STARTED: 7/24/07DATE FINISHED: 7/24/07DRILLER: John Halaburda

	AUGER	CASING	SAMPLER	CORE BARREL
TYPE	<u>H S A</u>		<u>SS</u>	
SIZE ID	<u>4-1/4"</u>		<u>1-3/8"</u>	
HAMMER WT.			<u>140lbs.</u>	
HAMMER FALL			<u>30"</u>	

DEPTH BELOW SURFACE	CASING BLOWS/ FOOT	SAMPLE DEPTH FROM-TO	SAMPLE TYPE	BLOWS PER 6" ON SAMPLER FROM-TO				STRATA CHANGE DEPTH	FIELD IDENTIFICATION OF SOIL & ROCK INCL. COLOR, LOSS OF WASH WATER, JOINTS IN ROCK, ETC.	SAMPLE			PID READING (PPM)
				0-6	6-12	12-18	18-24			NO.	PEN.	REC.	
0								1'	Top Soil				
									Red Brown fine to medium Sand				
5		5-7'	SS	6	6	8	9			1	2'	12"	
10		10-12'	SS	3	4	6	6			2	2'	11"	
								13'	Red Brown fine to coarse Sand & Gravel				
15		15-17'	SS	5	8	9	10			3	2'	10"	
								18'	Red Brown fine to medium Sand, Trace Gravel				
20		20-22'	SS	6	7	11	13			4	2'	15"	
25		25-27'	SS	6	9	13	12			5	2'	14"	
30		30-32'	SS	5	11	15	19			6	2'	14"	
								32'	Bottom of Boring				
35													
40													

GROUNDWATER OBSERVATION AT Dry AFTER HRS

TYPE OF SAMPLE

D=DRY W=WASHED C=CORED
TP=TEST PIT A=AUGER V=VANE TEST
UP= UNDISTURBED, PISTON
US= UNDISTURBED, SHELBY

PROPORTIONS USED:

TRACE=0-6%
LITTLE=6-12%
SOME=12-30%
AND=30-60%

COHENSION LESS DENSITY:

0-4 VERY LOOSE
5-9 LOOSE
10-29 MEDIUM DENSE
30-49 DENSE
50+ VERY DENSE

FOOTAGE IN EARTH: 32'

FOOTAGE IN ROCK 0
WELL FOOTAGE: N/A
NO. OF SAMPLES: 6
WELL DIAMETER: N/A
SCREEN LENGTH: N/A

Monopole Pad & Pier Calculations

Client: MCF Communications

Project: Bolton, CT

09/06/07 11:05

Applied Factored Loads:

OTM: 4075.928 kip-ft
Shear: 39.273 kip
Deadload: 66.842 kip

Pad Dimensions:

Width: 23 ft
Thickness: 2.5 ft
OADepth: 6 ft
ABolt Circle 62 in
ABolt QTY/φ: 20 2 in
Pier Diam: 7 ft 6.50 ft min
Pier Height: 0.5 ft above Grade
Pier Depth: 3.5 ft
Total Moment: 4233 kip-ft

Specific Gravity: 2.65
Soil Unit Weight: 120 pcf
Submerged Unit Wt: 74.72 pcf
Soil Ang: 30°
Concrete Unit Wt: 150 pcf
Concrete f'c: 3000 psi
Rebar Fy: 60000 psi
Concrete Volume: 54.7 cuyd
Depth to Water: 6 ft

Soil Resistance:

Soil1: 2555.1 kip-ft
Soil2: 455.5 kip-ft
Soil3: 26.3 kip-ft

Concrete Resistance:

OTM Capacity: 2281 kip-ft
4559 kip-ft
φs: TIA 222G 0.75 92.8% Loaded

Bearing Capacity:

φs: 0.75
Soil Type @ Bearing Location: Sand
SPT-N @ Bearing Location: 4

fb(max): 4432 psf
Fb: 25014 psf
17.7% Loaded

Pad Reinforcement:

φ=.9
Pad Moment: 2377 kip-ft
ρ strength: 0.00271
ρ min: 0.00274 ACI 10.5.3
Req'd Steel: 20.4 inch²
Bar QTY / #: 24 10 30.4 inch²

Pad Cover: 3 in ρ ACI: 0.00274

Bar Spacing: 67.1% Loaded
11.74 in

Pier Reinforcement:

φ=.9
Pier Cover: 3 in
Bar QTY / #: 35 11 52.0 inch²
Bar Load: 76941 lbf
Capacity: 80184 lbf

C-C Spacing: 6.77 inch
Clear Spacing: 5.39 inch
96.0% Loaded
Hoop #: 5 22 in Spacing

Min Req Steel: 47.78 inch² PASS

Development Length: ACI 12.2.3

L_{db}: 45.19 inch

Cage Wt: 1059 lbf
Pad Bars: 9302 lbf

10361 lbf Total Steel Wt

Pier Bar Circle: 75.4 inch
Hoop Lap Length: 27.4 in Tied
Hoop Cut Length: 270.4 in

Anchor Bolts: AISC Table J3.5

φ: 0.75

of Bolts: 20
Bolt φ/Length: 2 72 inch
Cluster Plt φ: 68 in
Bolt Load: 157.8 kip

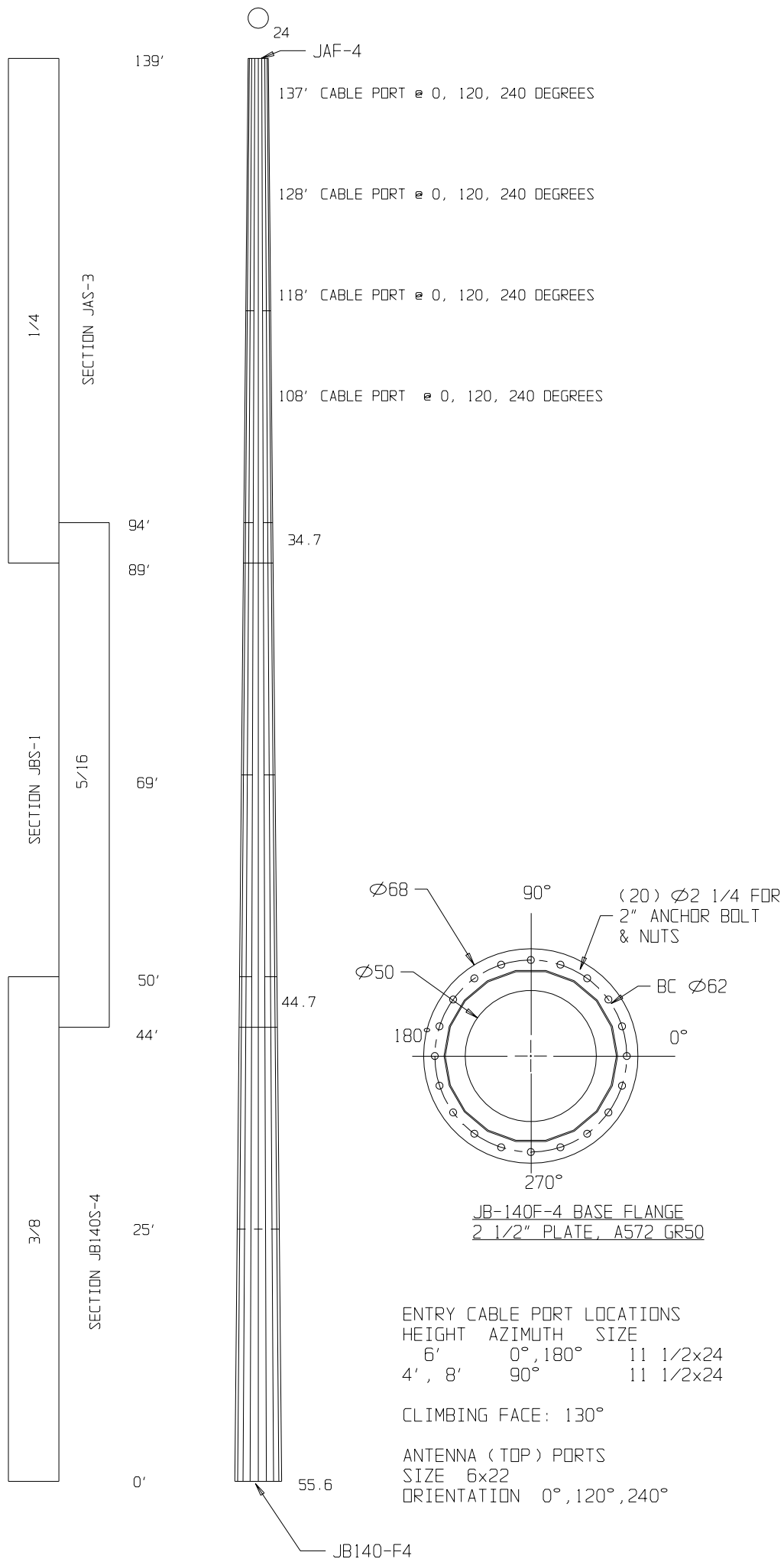
Material: F1554-105
Bolt Fu: 125 ksi

Capacity: 294.5 kip 73.6% Loaded

A.Bolt Projection:

11 inch
Min. Anchor Bolt Length: 64.19 inch

Note: Clear spacing between concrete
and flange shall be ≤ 3.0 in



Tower Loading Conditions			Elevation
QTY	Antenna		
12	1' X 6' PANEL ANTENNAS		139
1	14' Low Prof. Platform		139
12	1' X 6' PANEL ANTENNAS		130
1	14' Low Prof. Platform		130
12	1' X 6' PANEL ANTENNAS		120
1	14' Low Prof. Platform		120
12	1' X 6' PANEL ANTENNAS		110
1	14' Low Prof. Platform		110

NOTE: Any deviation from the proposed design antenna loading will require a tower analysis for verification of structural integrity.

NOTE: All antenna cables are supported inside the pole and therefore do not affect the pole design.

TOWER DESIGN CONDITIONS
This tower was designed per ANSI/TIA 222-G, with the following:

Wind Speed with out ice 105 mph

Wind Speed with 3/4" ice 50 mph.

Structure Class II

Exposure C

Topographic Catagory 1

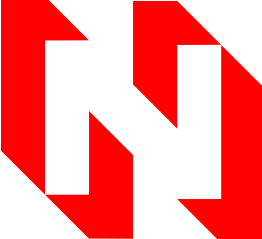
Worst case load condition is wind without ice.
Allowable steel stresses per AISC ASD 13th Edition
Allowable concrete stresses per ACI 318-05.

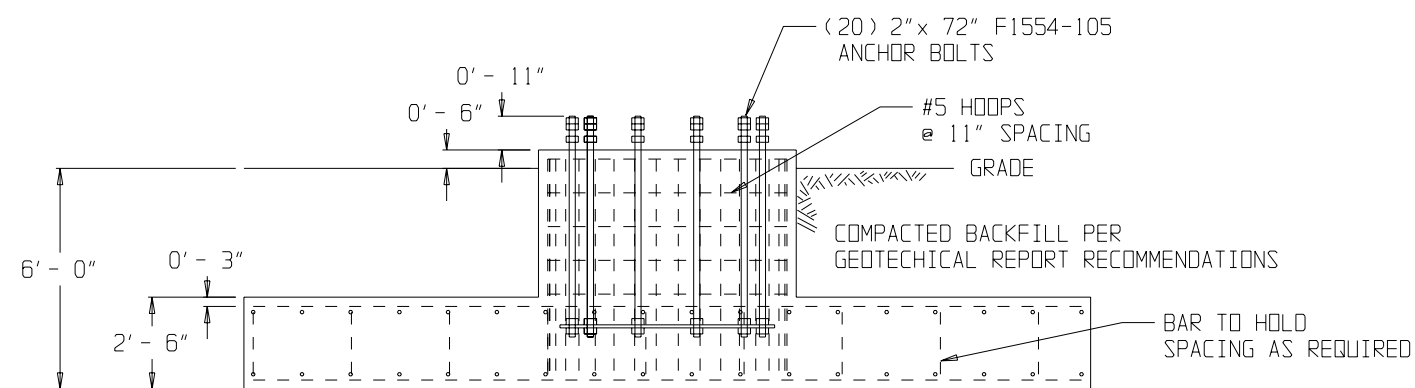
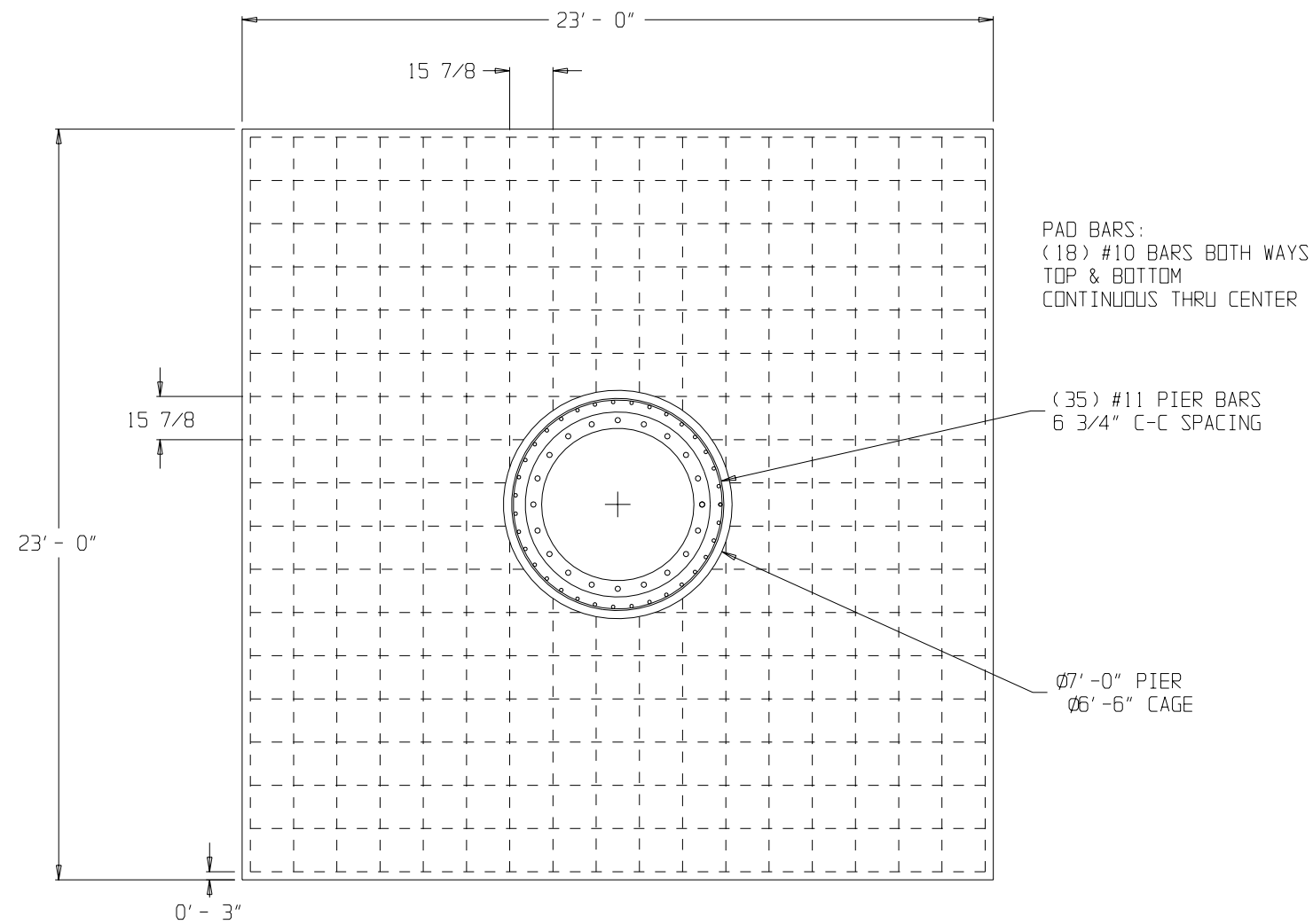
MATERIAL SPECIFICATIONS
Monopole Plate: ASTM A572, Fy > 65 ksi
Flanges: ASTM A572, Fy > 50 ksi
All other steel: ASTM A36, Fy > 36 ksi
Hardware: A325 Hot Dipped Galvanized Bolts with Anco Nuts
Galvanizing: ASTM A123
Anchor Bolts: ASTM F1554-105, Fu > 125 ksi

INSTALLATION GENERAL NOTES
1. Installation of tower must be performed by a qualified tower erector.
2. Install sections such that climbing device is aligned.
3. Install safety climb per manufacturer's recommendations.
4. Slip-joint jacking force: Minimum 6000 lb.
5. Tighten all structural and anchor bolts per AISC snug tight specifications.
6. Sections are numbered at the bottom, near the climbing face.
7. Installer must grind outside/top and inside/bottom of each section and at the weld locations of the squaring bracing to facilitate slip joint fit. Cover grind area with spray galvanizing.
9. When setting pole on foundation anchor bolts, remove template prior to setting pole. Return template to Nudd Corporation for reimbursement.
10.Tighten flange bolts uniformly in alternating pattern. (ie: car wheel lug bolt pattern)
11.Thermite welding of grounding should not be attached to pole tube. A grounding channel is provided at the base.

Pole section weights:

Section JAS-1:	4320 +/-
Section JBS-1:	7100 +/-
Section JB140S-4:	11,850 +/-

0	07xxx	MJW	09/05/07	Released for Fabrication	TSW 09/05/07		
REV	ECN	BY	DATE	DESCRIPTION	CHECKED BY & DATE		
				FRED A. NUDD CORPORATION			
				Route 104*Ontario, New York 14519*315/524-2531			
				SCALE: N/S	DRAWN BY: MJW	THIS DRAWING IS THE PROPERTY OF THE FRED A. NUDD CORPORATION AND IS NOT TO BE REPRODUCED IN WHOLE OR IN PART BY ANY MEANS WITHOUT PRIOR WRITTEN PERMISSION BY THE FRED A. NUDD CORPORATION.	
				DATE: 09/05/07			
139 FT MONOPOLE DESIGN							
MCF COMMUNICATIONS BOLTON, CT					DRAWING NUMBER: 207-13312-1		



NOTE: ANCHOR BOLT CLUSTER MUST BE CENTERED IN PIER REBAR
TOP CLUSTER PLATE MUST BE REMOVED PRIOR TO SETTING POLE

CONCRETE SPECIFICATIONS

- Concrete shall have a minimum compressive strength of at least 3000 psi at 28 days. It is our recommendation that 4000 psi concrete be installed to account for any unknown installation variables that could degrade the concrete.
- Concrete installation shall meet ACI 318-05 installation requirements for reinforced concrete.
- All concrete shall be placed against undisturbed soil free of free standing water and all foreign objects and materials.
- Minimum concrete cover shall be 3" over all reinforcing bars.
- Reinforcing bars shall be ASTM A-615 Grade 60 deformed bars.
- Assemble bars with tie wires.
- Chamfer all sharp corners of exposed concrete.
- Proportion pouring: 80% 1's and 2's, 20% 1's only for finishing.

SOIL SPECIFICATIONS

Soil is assumed to be per a boring log provided by subsurface drilling and remediation, supplied by MCF Communications.

- Soil is sand, with gravel.
- All foundations shall be free of free standing water as far as possible prior to pouring concrete and shall be kept thus until backfill is in place.
- Backfill shall be compacted to 120 pcf in 6" lifts using excavated material.
- Backfill shall be placed so as to prevent accumulation of water around foundations or anchors.

Total Concrete: 54.9 cuyd

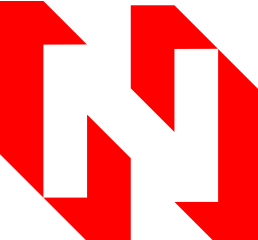
Template Flange: JB140T-4

FACTORED DESIGN LOADS

Moment = 4075.9 kip-ft

Shear = 39.3 kips

Download = 66.8 kips

0	07xxx	MJW	09/05/07	Released for Fabrication	TSW 09/05/07		
REV	ECN	BY	DATE	DESCRIPTION	CHECKED BY & DATE		
				FRED A. NUDD CORPORATION			
				Route 104*Ontario, New York 14519*315/524-2531			
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