PV Powersite

Project Information

Project Name:	Crauford	**Design By:**	Crauford
Project Address:	Granby, MO	**Email:**	brian@eco-distributing.com
City,State,Zip:	,	**Date:**	Monday ,October 23, 2017
Module Size:	72 Cell		
System Type:	Ground Mount , FS System		
Schletter Sales Associate:	Fernando Figueroa		

Engineering Report

Building Code:	ASCE7-10	**Rack Setup:**	2V X 16
Wind Speed:	115 mph	**Vertical Count:**	2V
Snow Load:	20 psf	**Horizontal Count:**	16
Tilt:	30 degrees		
Module Thickness	40 mm	**Rack Count:**	1
		Module Count:	992 mm
		Total Wattage:	

Installation Details

Max Span:	11.5 ft	**Tension Force**	6.65 kips
Shear Force:	4.02 kips	**Shaft Depth:**	6.25ft

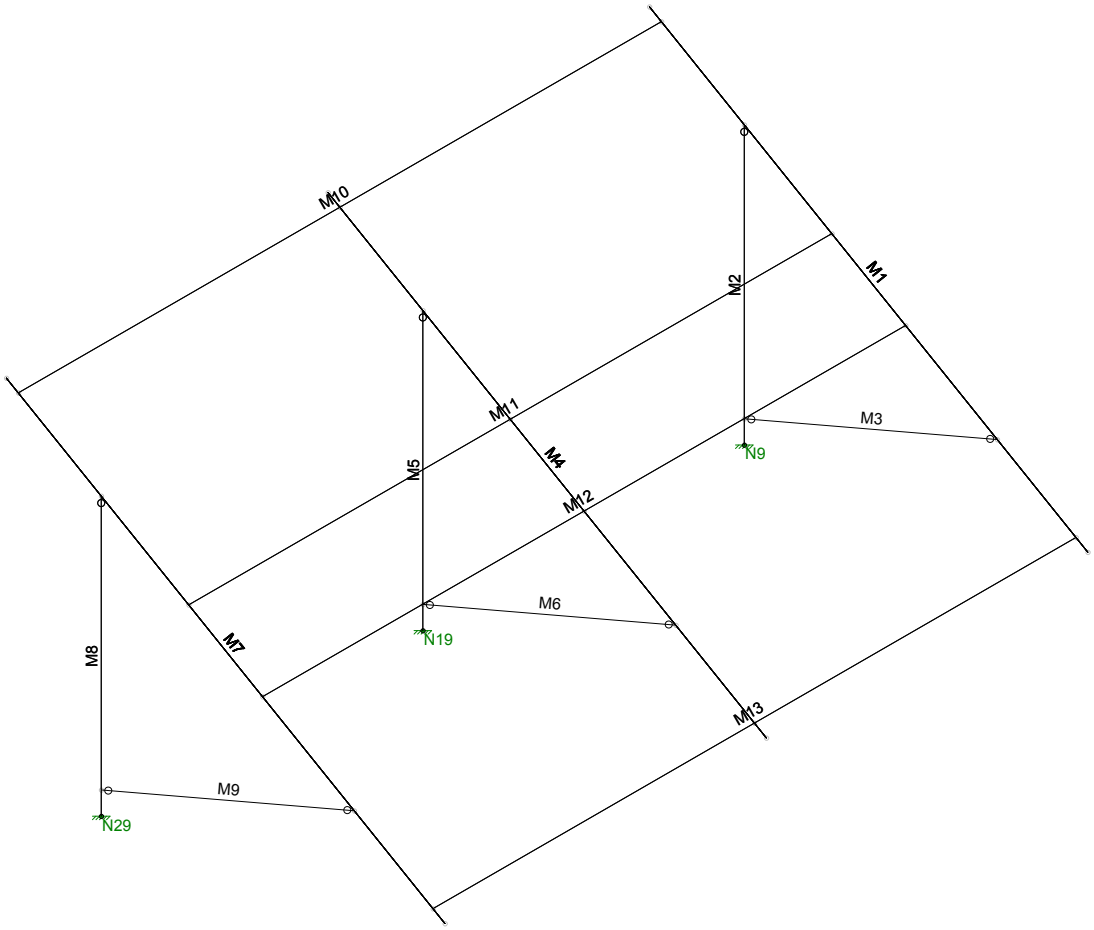
Billing Material

Part Number	Description	Quantity
124303-06200	S1.5 Rail 6200	4
124303-04200	S1.5 Rail 4200	12
140003-008	Standard FS 30 degrees	5
129303-000	S1.5 Splice Kit	16
135007-140	Rapid5k End Clamp	8
135002-006	Grounding Rapid5k Mid Clamp Assembly	60

Module Rail Arrangement & Cuts

Location of Rail	Rails Per Row	Required Rail Length
Center	1	1750
Intermediate	2	3510
End	2	3770

Cut (4) 1752.6mm rail(s) & (4) 3767mm rail(s) from (4) 6200mm stock rails. Cut (8) 3505.2mm rail(s) from (8) 4200mm stock rails. Cut (4) 3767mm rail(s) from (4) 4200mm stock rails.



Schletter, Inc.		30° Tilt w/o Seismic Design
HCV	Standard FS Racking System	
	Representative Calculations - ASCE 7-10	

1. INTRODUCTION

1.1 Project Description

The following sections will cover the determination of forces and structural design calculations for the Schletter, Inc. FS ground mount system.

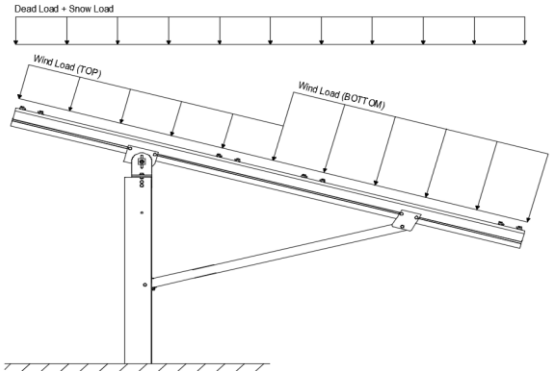
1.2 Construction

Photovoltaic modules are attached to aluminum purlins using clamp fasteners. Purlins are clamped to inclined aluminum girders, which are then connected to galvanized steel posts. Each support structure is equally spaced.

PV modules are required to meet the following specifications:

	Maximum		Minimum
Height =	2000 mm	Height =	1900 mm
Width =	1050 mm	Width =	970 mm
Dead Load =	3.00 psf	Dead Load =	1.75 psf

Modules Per Row =	2
Module Tilt =	30°
Maximum Height Above Grade =	3 ft



Typical loading conditions of the module dead loads, snow loads, and wind loads are shown on the left.

1.3 Technical Codes

- ASCE 7-10 - Chapter 26-31, Wind Loads
- ASCE 7-10 - Chapter 7, Snow Loads
- ASCE 7-10 - Chapter 2, Combination of Loads
- International Building Code, IBC, 2012, 2015
- Aluminum Design Manual, Eighth Edition, 2005

2. LOAD ACTIONS

2.1 Permanent Loads

g_{MAX} =	3.00 psf	*Self-weight of the PV modules.*
g_{MIN} =	1.75 psf	

2.2 Snow Loads

Ground Snow Load, P_g =	30.00 psf	
Sloped Roof Snow Load, P_s =	16.49 psf	*(ASCE 7-10, Eq. 7.4-1)*
I_s =	1.00	
C_s =	0.73	
C_e =	0.90	
C_t =	1.20	

2.3 Wind Loads

Design Wind Speed, V =	115 mph	Exposure Category = C
Height <	15 ft	Importance Category = II

Peak Velocity Pressure, q_z = 20.76 psf *Including the gust factor, G=0.85. (ASCE 7-10, Eq. 27.3-1)*

Pressure Coefficients

$Cf+_{TOP}$ =	1.15	*(Pressure)*
$Cf+_{BOTTOM}$ =	1.85	
$Cf-_{TOP}$ =	-2.3	*(Suction)*
$Cf-_{BOTTOM}$ =	-1.1	

Provided pressure coefficients are the result of wind tunnel testing done by Ruscheweyh Consult. Coefficients are located in test report # 1127/0510-e. Negative forces are applied away from the surface.

2.4 Seismic Loads - N/A

S_S =	0.00	R =	1.25
S_{DS} =	0.00	C_S =	0
S_1 =	0.00	ρ =	1.3
S_{D1} =	0.00	Ω =	1.25
T_a =	0.00	C_d =	1.25

ASCE 7, Section 12.8.1.3: A maximum S_s of 1.5 may be used to calculate the base shear, C_s, of structures under five stories and with a period, T, of 0.5 or less. Therefore, a S_{ds} of 1.0 was used to calculate C_s.

2.5 Combination of Loads

ASCE 7 requires that all structures be checked by specified combinations of loads. Applicable load combinations are provided below.

Strength Design, LRFD

Component stresses are checked using the following LRFD load combinations:

1.2D + 1.6S + 0.5W		
1.2D + 1.0W + 0.5S		
0.9D + 1.0W	M	
1.54D + 1.3E + 0.2S	R	*(ASCE 7, Eq 2.3.2-1 through 2.3.2-7) & (ASCE 7, Section 12.4.3.2)*
0.56D + 1.3E	R	
1.54D + 1.25E + 0.2S	O	
0.56D + 1.25E	O	

Allowable Stress Design, ASD

Member deflection checks and foundation designs are done according to the following ASD load combinations:

1.0D + 1.0S		
1.0D + 0.6W		
1.0D + 0.75L + 0.45W + 0.75S		
0.6D + 0.6W	M	*(ASCE 7, Eq 2.4.1-1 through 2.4.1-8) & (ASCE 7, Section 12.4.3.2)*
1.238D + 0.875E	O	
1.1785D + 0.65625E + 0.75S	O	
0.362D + 0.875E	O	

M *Uses the minimum allowable module dead load.*

R *Include redundancy factor of 1.3.*

O *Includes overstrength factor of 1.25. Used to check seismic drift.*

3. STRUCTURAL ANALYSIS

3.1 RISA Results

Appendix B.1 contains outputs from the structural analysis software package, RISA. These outputs are used to accurately determine resultant member and reaction forces from the loads seen throughout Section 2.

3.2 RISA Components

A member and node list has been provided below to correlate the RISA components with the design calculations in Section 4. Items of significance have been listed.

Purlins	Location
M10	Top
M11	Mid-Top
M12	Mid-Bottom
M13	Bottom

Posts	Location
M2	Outer
M5	Inner
M8	Outer

Girders	Location
M1	Outer
M4	Inner
M7	Outer

Reactions	Location
N9	Outer
N19	Inner
N29	Outer

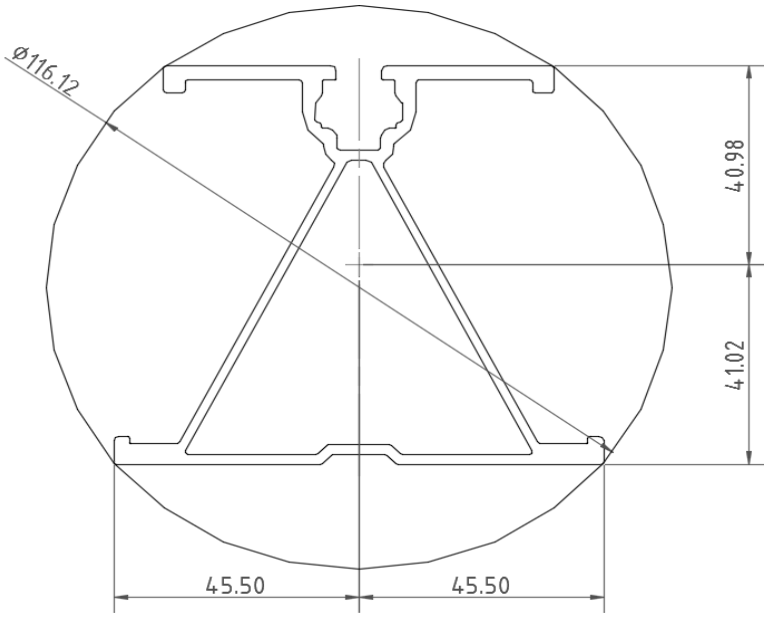
Struts	Location
M3	Outer
M6	Inner
M9	Outer

4. MEMBER DESIGN CALCULATIONS

4.1 Purlin Design

Aluminum purlins are used to transfer loads to the support structure. Purlins are designed as continous beams with cantilevers. These are considered beams with internal hinges that can be joined with splices at 25% of the support respective span. See Appendix A.1 for detailed member calculations. Section units are in (mm).

Purlin Type =	**S1.5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	132	in
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	25.07	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	23.08	ksi
S_y =	1.33	in^3
S_x =	0.6	in^3
E =	10100	ksi
I_y =	2.16	in^4
I_x =	1.07	in^4
A =	1.25	in^2
g =	1.50	lbs/ft
M_y =	1.962	k-ft
M_z =	0.300	k-ft
$M_{y\ allowable}$ =	2.779	k-ft
$M_{z\ allowable}$ =	1.154	k-ft
Utilization =	97%	

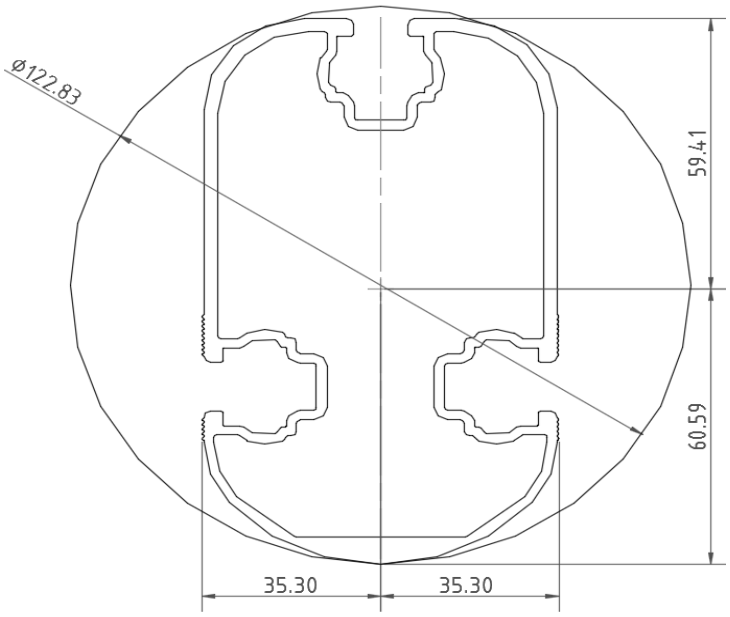


DETAIL VIEW

4.2 Girder Design

Loads from purlins are transferred to the posts using an inclined girder, which is connected to the steel post. Loads on the girder result from the support reactions of the purlins. See Appendix A.2 for detailed member calculations. Section units are in (mm).

Girder Type =	**T5**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	81.77	in
$\Phi F_{ty\ AXIAL}$ =	30.80	ksi
$\Phi F_{ty\ STRONG\text{-}AXIS}$ =	30.06	ksi
$\Phi F_{ty\ WEAK\text{-}AXIS}$ =	31.56	ksi
S_y =	1.98	in^3
S_x =	1.32	in^3
E =	10100	ksi
I_y =	4.74	in^4
I_x =	1.83	in^4
A =	1.93	in^2
g =	2.32	lbs/ft
M_y =	4.112	k-ft
M_z =	0.000	k-ft
P_n =	1.356	k
$M_{y\ allowable}$ =	4.960	k-ft
$M_{z\ allowable}$ =	3.472	k-ft
$P_{n\ allowable}$ =	59.439	k
Utilization =	85%	

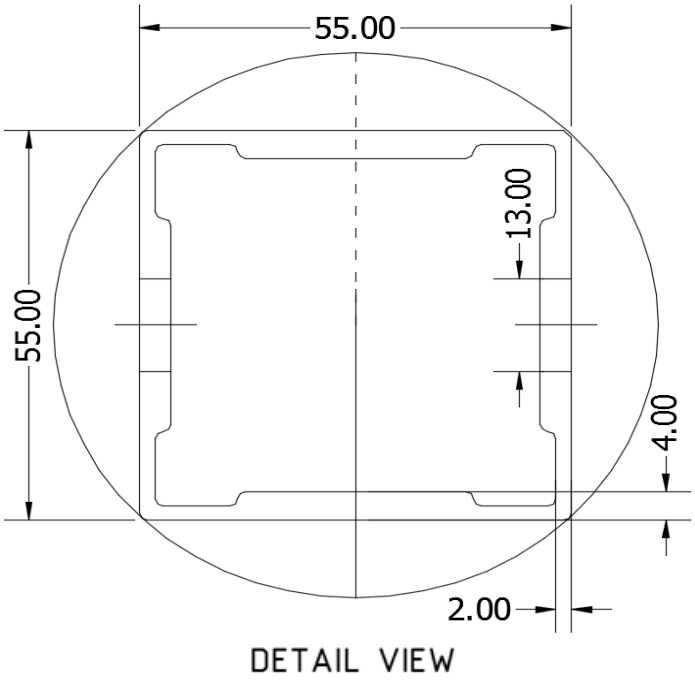


DETAIL VIEW

4.3 Strut Design

The aluminum strut connects a portion of the girder to the galvanized steel post. Girder forces are then transferred down through the strut into the post. The strut is attached with single M10 bolts at each end. See Appendix A.3 for detailed member calculations. Section units are in (mm).

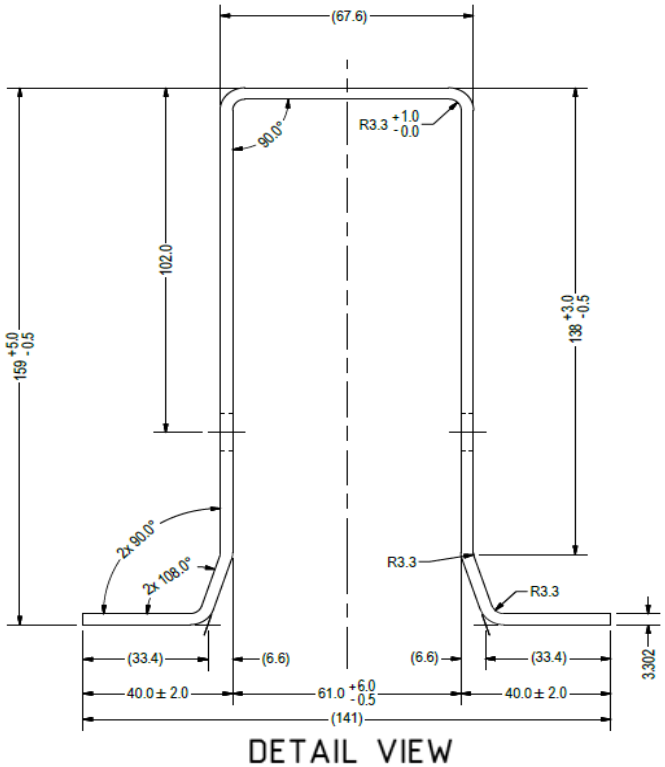
Strut Type =	**55x55**	
Aluminum Type =	6105-T5	
F_{ty} =	35	ksi
L_b =	74.80	in
$\Phi F_{ty\ AXIAL}$ =	9.61	ksi
$\Phi F_{ty\ BENDING}$ =	28.22	ksi
S_y =	0.60	in^3
S_x =	0.60	in^3
E =	10100	ksi
I_y =	0.67	in^4
I_x =	0.67	in^4
A =	0.98	in^2
g =	1.18	lbs/ft
M_y =	0.007	k-ft
M_z =	0.000	k-ft
P_n =	5.077	k
$M_{y\ allowable}$ =	1.408	k-ft
$M_{z\ allowable}$ =	1.408	k-ft
$P_{n\ allowable}$ =	9.441	k
Utilization =	54%	



4.4 Post Design

Galvanized steel posts are a roll formed steel section, that are either ram driven into the ground or placed in a concrete foundation at a defined depth. Embedment depths will be provided on the structural drawings or through a geotechnical testing report. See Appendix A.4 for detailed member calculations. Section units are in (mm).

Post Type =	**FG8**	
Steel Type =	J2340	
F_{ty} =	60	ksi
L_b =	89.60	in
Φ =	0.90	
ΦF_{ty} =	54.00	ksi
S_y =	3.46	in^3
S_x =	1.55	in^3
E =	29000	ksi
I_y =	10.94	in^4
I_x =	4.31	in^4
A =	2.23	in^2
g =	7.59	lbs/ft
M_y =	13.478	k-ft
M_z =	0.000	k-ft
P_r =	6.814	k
$M_{y\ allowable}$ =	19.207	k-ft
$M_{z\ allowable}$ =	14.389	k-ft
P_c =	25.874	k
Utilization =	99%	



5. FOUNDATION DESIGN CALCULATIONS

5.1 Rammed Post Foundations

The following LRFD loads include a safety factor of 1.3, and are to be used in conjunction with a Schletter, Inc. Geotechnical Investigation Report. The forces below should fall within the guidelines provided in the Geotechnical Investigation Report. If a Geotechnical Investigation Report is not present, please proceed to Section 5.2 for a concrete footing design.

Maximum Tensile Load =	6.37	k
Maximum Lateral Load =	3.88	k

5.2 Design of Drilled Shaft Foundations

The galvanized steel post is to be embedded into a cylindrical drilled shaft foundation. For the purpose of design, the post is considered to be fixed to the ground. The applicable lateral force, uplift, and compression resistance checks are seen below.

5.3 Lateral Force Resistance

The equivalent lateral force is applied at the top of the post to determine the required embedment depth. A lateral soil bearing capacity for clay is assumed. Footing is unrestrained at ground level. (IBC, Eq. 18-1)

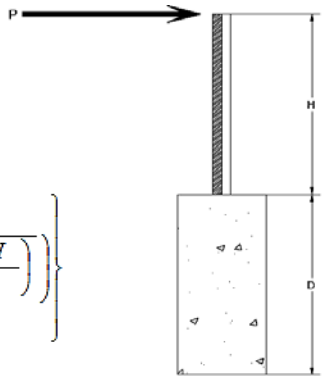
Lateral Force @ Top of Pole, P =	1.19	k
Height of Pole Above Grade, H =	6.47	ft
Diameter of Pole Footing, B =	2.00	ft
Lateral Soil Bearing Capacity, S =	0.10	ksf/ft
Isolated Pole Factor, F =	2	
First Trial Depth, D =	3.25	ft

$$S_3 = Min\ (D, 12')$$

$$S_1 = Min\left(\frac{D}{3}, 12'\right)$$

$$A = 2.34\ P/S_1 B$$

$$D = \left\{0.5A\left(1+\sqrt{1+\left(\frac{4.36\ H}{A}\right)}\right)\right\}$$



Lateral Bearing @ Bottom =	S_3
Lateral Bearing @ D/3 =	S_1
Required Depth =	D

Non-Constrained

Lateral Force @ Top of Pole, P =	1.19	k
Height of Pole Above Grade, H =	6.47	ft
Diameter of Pole Footing, B =	2.00	ft
Lateral Soil Bearing Capacity, S =	0.20	ksf/ft

1st Trial @ D_1 =	3.25	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.22	ksf	
Lateral Soil Bearing @ D, S_3 =	0.65	ksf	
Constant 2.34P/(S_1B), A =	6.44		
Required Footing Depth, D =	10.69	ft	
2nd Trial @ D_2 =	6.97	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.46	ksf	
Lateral Soil Bearing @ D, S_3 =	1.39	ksf	
Constant 2.34P/(S_1B), A =	3.00		
Required Footing Depth, D =	6.34	ft	
3rd Trial @ D_3 =	6.66	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.44	ksf	
Lateral Soil Bearing @ D, S_3 =	1.33	ksf	
Constant 2.34P/(S_1B), A =	3.15		
Required Footing Depth, D =	6.54	ft	
4th Trial @ D_4 =	6.60	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.44	ksf	
Lateral Soil Bearing @ D, S_3 =	1.32	ksf	
Constant 2.34P/(S_1B), A =	3.17		
Required Footing Depth, D =	6.58	ft	
5th Trial @ D_5 =	6.59	ft	
Lateral Soil Bearing @ D/3, S_1 =	0.44	ksf	
Lateral Soil Bearing @ D, S_3 =	1.32	ksf	
Constant 2.34P/(S_1B), A =	3.18		
Required Footing Depth, D =	6.75	ft	

A 2ft diameter x 6.75ft deep footing unrestrained at ground level is required for the racking structure.

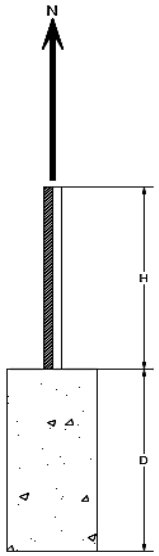
5.4 Uplifting Force Resistance

Uplifting forces of the racking system are checked against the uplift resistance of the soil. Clay soils are assumed.

Weight of Concrete, g_{con} =	145	pcf
Uplifting Force, N =	2.91	k
Footing Diameter, B =	2.00	ft
Factor of Safety =	2.50	
Cohesion =	208.85	psf
γ_s =	120.43	pcf
α =	0.45	
Required Concrete Weight, g =	1.87	k
Required Concrete Volume, V =	12.92	ft^3
Required Footing Depth, D =	4.25	ft

Iteration	z	dz	Qs	Side
1	0.2	0.2	118.10	6.29
2	0.4	0.2	118.10	6.19
3	0.6	0.2	118.10	6.08
4	0.8	0.2	118.10	5.98
5	1	0.2	118.10	5.88
6	1.2	0.2	118.10	5.77
7	1.4	0.2	118.10	5.67
8	1.6	0.2	118.10	5.56
9	1.8	0.2	118.10	5.46
10	2	0.2	118.10	5.36
11	2.2	0.2	118.10	5.25
12	2.4	0.2	118.10	5.15
13	2.6	0.2	118.10	5.05
14	2.8	0.2	118.10	4.94
15	3	0.2	118.10	4.84
16	3.2	0.2	118.10	4.73
17	3.4	0.2	118.10	4.63
18	3.6	0.2	118.10	4.53
19	3.8	0.2	118.10	4.42
20	4	0.2	118.10	4.32
21	4.2	0.2	118.10	4.22
22	4.4	0.2	118.10	4.11
23	0	0.0	0.00	4.11
24	0	0.0	0.00	4.11
25	0	0.0	0.00	4.11
26	0	0.0	0.00	4.11
27	0	0.0	0.00	4.11
28	0	0.0	0.00	4.11
29	0	0.0	0.00	4.11
30	0	0.0	0.00	4.11
31	0	0.0	0.00	4.11
32	0	0.0	0.00	4.11
33	0	0.0	0.00	4.11
34	0	0.0	0.00	4.11
Max	4.4	Sum	1.04	

A 2ft diameter x 4.25ft deep footing unrestrained at ground level is required for the racking structure.



5.5 Compressive Force Resistance

Skin friction of the soil is checked against the compression force from the racking and the weight of the drilled shaft foundation. Skin friction starts at 3ft below grade. Clay soils are again assumed.

Depth Below Grade, D =	6.75	ft
Footing Diameter, B =	2.00	ft
Compressive Force, P =	4.49	k
Footing Area =	3.14	ft^2
Circumference =	6.28	ft
Skin Friction Area =	23.56	ft^2
Concrete Weight =	0.145	kcf

Bearing Pressure

Bearing Area =	3.14	ft^2
Bearing Capacity =	1.5	ksf
Resistance =	4.71	k

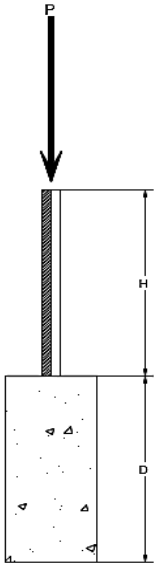
Weight of Concrete

Footing Volume	21.21	ft^3
Weight	3.07	k

Skin Friction Resistance

Skin Friction =	0.15	ksf
Resistance =	3.53	k
1/3 Increase for Wind =	1.33	
Total Resistance =	11.00	k
Applied Force =	7.56	k
Utilization =	69%	

A 2ft diameter footing passes at a depth of 6.75ft.



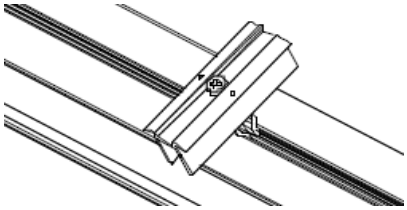
6. DESIGN OF JOINTS AND CONNECTIONS

6.1 Anchorage of Modules to Purlins and Connection of Purlins to Girders

Modules are secured to the purlins with Schletter, Inc. Rapid2+ mounting clamps. Purlins are secured to the girders with the use of 40mm mounting clamps. The reliability of calculations is uncertain due to limited standards, therefore the strength of the clamp fasteners has been evaluated by load testing.

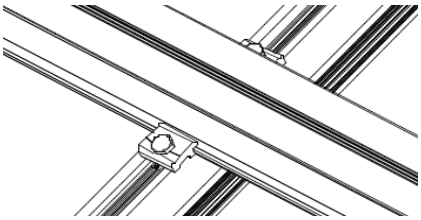
Fastening of Modules to Purlins

Maximum Uplifting Force	=	0.522 k
Allowable Uplift	=	1.214 k
Utilization	=	43%



Fastening of Purlins to Girders

Maximum Uplifting Force	=	2.031 k
Allowable Uplift	=	2.180 k
Utilization	=	93%

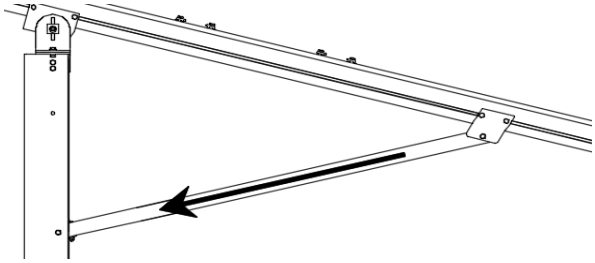


6.2 Strut Connections

The aluminum struts connect the front end of girder to a center section of the steel post. Single M10 bolts are used to attach each end of the strut to the girder and post. ASTM A193/A193M-86 equivalent stainless steel bolts are used.

Maximum Axial Load	=	5.077 k
M10 Bolt Shear Capacity	=	8.894 k
Utilization	=	57%

Bolt capacity is accounting for double shear. (ASCE 8-02, Eq. 5.3.4-1)

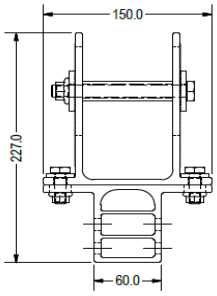


A strut under compression is shown to demonstrate the load transfer from the girder. Single M10 bolts are located at each end of the strut and are subjected to double shear.

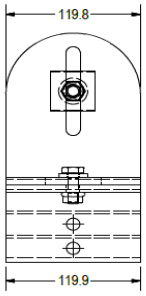
6.3 Girder to Post Connection

In order to connect the girder to the post, custom extruded sections are assembled to create a post head piece. The reliability of calculations is uncertain due to limited standards, therefore the strength of the head piece has been evaluated by load testing.

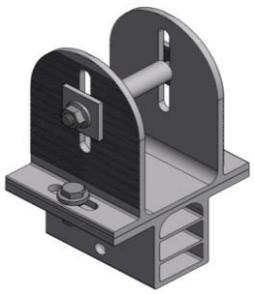
Maximum Tensile Load	=	4.210 k
Allowable Load	=	5.649 k
Utilization	=	75%



FRONT VIEW



SIDE VIEW



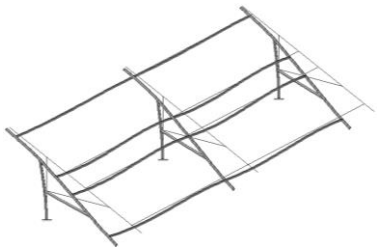
7. SEISMIC DESIGN

7.1 Seismic Drift - N/A

The racking structure has been analyzed under seismic loading. The allowable story drift of the structure must fall within the limits provided by (ASCE 7, Table 12.12-1).

Mean Height, h_{sx}	=	79.13 in
Allowable Story Drift for All Other Structures, Δ	= {	$0.020h_{sx}$
		1.583 in
Max Drift, Δ_{MAX}	=	0 in
N/A		

The racking structure's reaction to seismic loads is shown to the right. The deflections have been magnified to provide a clear portrayal of potential story drift.



APPENDIX A

A.1 Design of Aluminum Purlins - Aluminum Design Manual, 2005 Edition

Purlin = **S1.5**

Strong Axis:		Weak Axis:	
3.4.14		**3.4.14**	
L_b =	132 in	L_b =	132
J =	0.432	J =	0.432
	365.174		232.229
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$		$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b}Fcy}{1.6Dc}\right)^2$	
S1 =	0.51461	S1 =	0.51461
$S2 = \left(\frac{C_c}{1.6}\right)^2$		$S2 = \left(\frac{C_c}{1.6}\right)^2$	
S2 =	1701.56	S2 =	1701.56
φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]	φF_L=	φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L=	27.1 ksi	φF_L=	28.4
3.4.16		**3.4.16**	
b/t =	32.195	b/t =	37.0588
$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$		$S1 = \frac{Bp - \frac{\theta_y}{\theta_b}Fcy}{1.6Dp}$	
S1 =	12.2	S1 =	12.2
$S2 = \frac{k_1 Bp}{1.6Dp}$		$S2 = \frac{k_1 Bp}{1.6Dp}$	
S2 =	46.7	S2 =	46.7
φF_L=	φb[Bp-1.6Dp*b/t]	φF_L=	φb[Bp-1.6Dp*b/t]
φF_L=	25.1 ksi	φF_L=	23.1 ksi
3.4.16.1	Not Used	**3.4.16.1**	
Rb/t =		N/A for Weak Direction	
$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$			
S1 =	1.1		
$S2 = C_t$			
S2 =	141.0		
φF_L=	1.17φyFcy		
φF_L=	38.9 ksi		
3.4.18		**3.4.18**	
h/t =	37.0588	h/t =	32.195
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$		$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$	
S1 =	36.9	S1 =	36.9
m =	0.65	m =	0.65
C_0 =	40.985	C_0 =	45.5
Cc =	41.015	Cc =	45.5
$S2 = \frac{k_1 Bbr}{mDbr}$		$S2 = \frac{k_1 Bbr}{mDbr}$	
S2 =	77.2	S2 =	77.3
φF_L=	φb[Bbr-mDbr*h/t]	φF_L=	1.3φyFcy
φF_L=	43.2 ksi	φF_L=	43.2 ksi
φF_LSt=	25.1 ksi	φF_LWk=	23.1 ksi
Ix =	897074 mm^4	Iy =	446476 mm^4
	2.155 in^4		1.073 in^4
y =	41.015 mm	x =	45.5 mm
Sx =	1.335 in^3	Sy =	0.599 in^3
M_{max}St =	2.788 k-ft	M_{max}Wk =	1.152 k-ft

Compression

3.4.9

b/t = 32.195
S1 = 12.21 (See 3.4.16 above for formula)
S2 = 32.70 (See 3.4.16 above for formula)
φF_L = φc[Bp-1.6Dp*b/t]
φF_L = 25.1 ksi

b/t = 37.0588
S1 = 12.21
S2 = 32.70
φF_L = (φck2*√(BpE))/(1.6b/t)
φF_L = 21.9 ksi

3.4.10

Rb/t = 0.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b} Fcy}{Dt}\right)^2$$

S1 = 6.87
S2 = 131.3
φF_L = φyFcy
φF_L = 33.25 ksi

φF_L = 21.94 ksi
A = 1215.13 mm^2
1.88 in^2
P_{max} = 41.32 kips

A.2 Design of Aluminum Girders - Aluminum Design Manual, 2005 Edition

Girder = **T5**

Strong Axis:

3.4.14

L_b = 81.7717 in
J = 1.98
105.231

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 30.1 ksi

3.4.16

b/t = 4.5

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7
φF_L = φyFcy
φF_L = 33.3 ksi

Weak Axis:

3.4.14

L_b = 81.7717
J = 1.98
114.202

$$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$$

S1 = 0.51461

$$S2 = \left(\frac{C_c}{1.6}\right)^2$$

S2 = 1701.56
φF_L = φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L = 29.9

3.4.16

b/t = 16.3333

$$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$$

S1 = 12.2

$$S2 = \frac{k_1 Bp}{1.6Dp}$$

S2 = 46.7
φF_L = φb[Bp-1.6Dp*b/t]
φF_L = 31.6 ksi

3.4.16.1 Used

Rb/t = 20.0

$$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b}Fcy}{1.6Dt}\right)^2$$

S1 = 1.1

$$S2 = C_t$$

S2 = 141.0

φF_L = φb[Bt-Dt*√(Rb/t)]

φF_L = 30.8 ksi

3.4.16.1

N/A for Weak Direction

3.4.18

h/t = 16.3333

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 37.9

m = 0.63

C_0 = 61.046

Cc = 58.954

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 79.4

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

3.4.18

h/t = 4.5

$$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b}1.3Fcy}{mDbr}$$

S1 = 36.9

m = 0.65

C_0 = 35

Cc = 35

$$S2 = \frac{k_1 Bbr}{mDbr}$$

S2 = 77.3

φF_L = 1.3φyFcy

φF_L = 43.2 ksi

$\varphi F_L St$ = 30.1 ksi

Ix = 1970917 mm^4

4.735 in^4

y = 61.046 mm

Sx = 1.970 in^3

$M_{max}St$ = 4.935 k-ft

$\varphi F_L Wk$ = 31.6 ksi

Iy = 763048 mm^4

1.833 in^4

x = 35 mm

Sy = 1.330 in^3

$M_{max}Wk$ = 3.499 k-ft

Compression

3.4.9

b/t = 4.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L = φyFcy

φF_L = 33.3 ksi

b/t = 16.3333

S1 = 12.21

S2 = 32.70

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 31.6 ksi

3.4.10

Rb/t = 20.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b}Fcy}{Dt}\right)^2$$

S1 = 6.87

S2 = 131.3

φF_L = φc[Bt-Dt*√(Rb/t)]

φF_L = 30.80 ksi

φF_L = 30.80 ksi

A = 1215.13 mm^2

1.88 in^2

P_{max} = 58.01 kips

A.3 Design of Aluminum Struts - Aluminum Design Manual, 2005 Edition

Strut = **55x55**

Strong Axis:	Weak Axis:
3.4.14	**3.4.14**
L_b = 74.8031 in	L_b = 74.8031
J = 1.98	J = 1.98
80.5199	80.5199
$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$	$S1 = \left(\frac{Bc - \frac{\theta_y}{\theta_b} Fcy}{1.6Dc}\right)^2$
S1 = 0.51461	S1 = 0.51461
$S2 = \left(\frac{C_c}{1.6}\right)^2$	$S2 = \left(\frac{C_c}{1.6}\right)^2$
S2 = 1701.56	S2 = 1701.56
φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]	φF_L= φb[Bc-1.6Dc*√((LbSc)/(Cb*√(IyJ)/2))]
φF_L= 30.5 ksi	φF_L= 30.5
3.4.16	**3.4.16**
b/t = 24.5	b/t = 24.5
$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$	$S1 = \frac{Bp - \frac{\theta_y}{\theta_b} Fcy}{1.6Dp}$
S1 = 12.2	S1 = 12.2
$S2 = \frac{k_1 Bp}{1.6Dp}$	$S2 = \frac{k_1 Bp}{1.6Dp}$
S2 = 46.7	S2 = 46.7
φF_L= φb[Bp-1.6Dp*b/t]	φF_L= φb[Bp-1.6Dp*b/t]
φF_L= 28.2 ksi	φF_L= 28.2 ksi
3.4.16.1 Not Used	**3.4.16.1**
Rb/t = 0.0	N/A for Weak Direction
$S1 = \left(\frac{Bt - 1.17\frac{\theta_y}{\theta_b} Fcy}{1.6Dt}\right)^2$	
S1 = 1.1	
$S2 = C_t$	
S2 = 141.0	
φF_L= 1.17φyFcy	
φF_L= 38.9 ksi	
3.4.18	**3.4.18**
h/t = 24.5	h/t = 24.5
$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$	$S1 = \frac{Bbr - \frac{\theta_y}{\theta_b} 1.3Fcy}{mDbr}$
S1 = 36.9	S1 = 36.9
m = 0.65	m = 0.65
C_0 = 27.5	C_0 = 27.5
Cc = 27.5	Cc = 27.5
$S2 = \frac{k_1 Bbr}{mDbr}$	$S2 = \frac{k_1 Bbr}{mDbr}$
S2 = 77.3	S2 = 77.3
φF_L= 1.3φyFcy	φF_L= 1.3φyFcy
φF_L= 43.2 ksi	φF_L= 43.2 ksi
φF_LSt= 28.2 ksi	φF_LWk= 28.2 ksi
Ix = 279836 mm^4	Iy = 279836 mm^4
0.672 in^4	0.672 in^4
y = 27.5 mm	x = 27.5 mm
Sx = 0.621 in^3	Sy = 0.621 in^3
M_{max}St = 1.460 k-ft	M_{max}Wk = 1.460 k-ft

Compression

3.4.7

λ = 1.73045

r = 0.81 in

$$S1^* = \frac{Bc - Fcy}{1.6Dc^*}$$

$S1^*$ = 0.33515

$$S2^* = \frac{Cc}{\pi}\sqrt{Fcy/E}$$

$S2^*$ = 1.23671

φcc = 0.82226

$\varphi F_L = (\varphi ccFcy)/(\lambda^2)$

φF_L = 9.61085 ksi

3.4.9

b/t = 24.5

S1 = 12.21 (See 3.4.16 above for formula)

S2 = 32.70 (See 3.4.16 above for formula)

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

b/t = 24.5

S1 = 12.21

S2 = 32.70

φF_L = φc[Bp-1.6Dp*b/t]

φF_L = 28.2 ksi

3.4.10

Rb/t = 0.0

$$S1 = \left(\frac{Bt - \frac{\theta_y}{\theta_b}Fcy}{Dt}\right)^2$$

S1 = 6.87

S2 = 131.3

φF_L = φyFcy

φF_L = 33.25 ksi

φF_L = 9.61 ksi

A = 663.99 mm^2

1.03 in^2

P_{max} = 9.89 kips

A.4 Design of Galvanized Steel Posts

Post Type = **FG8**

Unbraced Length =	89.60	in	
Pr =	6.81	k	(LRFD Factored Load)
Mr (Strong) =	13.48	k-ft	(LRFD Factored Load)
Mr (Weak) =	0.00	k-ft	(LRFD Factored Load)

Flexural Buckling:

kL/r =	128.92		
4.71√(E/Fy) =	103.55	=> kL/r	> 4.71√(E/Fy)
Fcr =	15.10	ksi	
Fe =	17.22	ksi	
Pn =	33.677	k	

Torsional/Flexural Torsional Buckling:

Fcr =	11.6026	ksi
Fey =	43.9243	ksi
Fez =	14.9387	ksi
Pn =	25.8738	k

Bending (Strong Axis):

Yielding:

Mn =	21.95	k-ft

Flange Local Buckling:

Mn =	19.207	k-ft

Pr/Pc =	0.2926	≥	0.2	
Utilization =	0.99	<	1.0	OK

Bending (Weak Axis):

Yielding:

Mn =	14.65	k-ft

Flange Local Buckling:

Mn =	14.39	k-ft

Pr/Pc =	0.293	≥	0.2	
Utilization =	0.00	<	1.0	OK

Combined Forces

Utilization = 99%

APPENDIX B

B.1

The following pages will contain the results from RISA. Please refer back to Section 2 for load information and Section 4-5 for member and foundation design.

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Dead Load, Max	DL		-1				4		
2	Dead Load, Min	DL		-1				4		
3	Snow Load	SL						4		
4	Wind Load - Pressure	WL						4		
5	Wind Load - Suction	WL						4		
6	Seismic - Lateral	EL								

Member Distributed Loads (BLC 1 : Dead Load, Max)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	Y	-9.843	-9.843	0	0
2	M11	Y	-9.843	-9.843	0	0
3	M12	Y	-9.843	-9.843	0	0
4	M13	Y	-9.843	-9.843	0	0

Member Distributed Loads (BLC 2 : Dead Load, Min)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	Y	-5.454	-5.454	0	0
2	M11	Y	-5.454	-5.454	0	0
3	M12	Y	-5.454	-5.454	0	0
4	M13	Y	-5.454	-5.454	0	0

Member Distributed Loads (BLC 3 : Snow Load)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	Y	-46.866	-46.866	0	0
2	M11	Y	-46.866	-46.866	0	0
3	M12	Y	-46.866	-46.866	0	0
4	M13	Y	-46.866	-46.866	0	0

Member Distributed Loads (BLC 4 : Wind Load - Pressure)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	y	-78.344	-78.344	0	0
2	M11	y	-78.344	-78.344	0	0
3	M12	y	-126.031	-126.031	0	0
4	M13	y	-126.031	-126.031	0	0

Member Distributed Loads (BLC 5 : Wind Load - Suction)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M10	y	156.688	156.688	0	0
2	M11	y	156.688	156.688	0	0
3	M12	y	74.938	74.938	0	0
4	M13	y	74.938	74.938	0	0

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	LRFD 1.2D + 1.6S + 0.5W	Yes	Y		1	1.2	3	1.6	4	.5														
2	LRFD 1.2D + 1.0W + 0.5S	Yes	Y		1	1.2	3	.5	4	1														
3	LRFD 0.9D + 1.0W	Yes	Y		2	.9					5	1												
4	LATERAL - LRFD 1.54D + 1.3E ...	Yes	Y		1	1.54	3	.2			6	1.3												
5	LATERAL - LRFD 0.56D + 1.3E	Yes	Y		1	.56					6	1.3												
6	LATERAL - LRFD 1.54D + 1.25...	Yes	Y		1	1.54	3	.2			6	1.25												
7	LATERAL - LRFD 0.56D + 1.25E	Yes	Y		1	.56					6	1.25												

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
8																								
9	ASD 1.0D + 1.0S	Yes	Y		1	1	3	1																
10	ASD 1.0D + 0.6W	Yes	Y		1	1			4	.6														
11	ASD 1.0D + 0.75L + 0.45W + 0....	Yes	Y		1	1	3	.75	4	.45														
12	ASD 0.6D + 0.6W	Yes	Y		2	.6					5	.6												
13	LATERAL - ASD 1.238D + 0.875E	Yes	Y		1	1.2...					6	.875												
14	LATERAL - ASD 1.1785D + 0.65...	Yes	Y		1	1.1...	3	.75			6	.656												
15	LATERAL - ASD 0.362D + 0.875E	Yes	Y		1	.362					6	.875												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N9	max	769.357	2	2579.297	1	219.704	1	.365	1	.007	3	7.21	1
2		min	-1069.425	3	-1578.986	3	-228.533	3	-.352	3	-.017	2	.316	15
3	N19	max	2957.535	2	6836.292	1	0	3	0	1	0	15	13.256	1
4		min	-2956.921	3	-4889.026	3	0	1	0	3	0	3	.53	15
5	N29	max	769.357	2	2579.297	1	228.533	3	.352	3	.017	2	7.21	1
6		min	-1069.425	3	-1578.986	3	-219.704	1	-.365	1	-.007	3	.316	15
7	Totals:	max	4496.25	2	11994.887	1	0	11						
8		min	-5095.772	3	-8046.998	3	0	3						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
1	M1	1	max	0	1	.004	1	0	5	0	1	0	1	0	1
2			min	0	1	0	3	0	1	0	1	0	1	0	1
3		2	max	-11.851	15	293.747	3	-8.056	15	.057	3	.422	1	.261	2
4			min	-257.745	1	-712.861	2	-194.705	1	-.269	2	.018	15	-.104	3
5		3	max	-12.127	15	292.559	3	-8.056	15	.057	3	.294	1	.729	2
6			min	-258.66	1	-714.445	2	-194.705	1	-.269	2	.013	15	-.296	3
7		4	max	-12.402	15	291.371	3	-8.056	15	.057	3	.166	1	1.199	2
8			min	-259.575	1	-716.029	2	-194.705	1	-.269	2	.008	15	-.488	3
9		5	max	388.657	3	678.481	2	10.419	3	.065	2	.217	1	1.413	2
10			min	-1206.438	1	-268.097	3	-250.907	1	-.084	3	-.048	3	-.576	3
11		6	max	387.971	3	676.897	2	10.419	3	.065	2	.07	2	.968	2
12			min	-1207.353	1	-269.285	3	-250.907	1	-.084	3	-.041	3	-.4	3
13		7	max	387.285	3	675.312	2	10.419	3	.065	2	-.005	15	.524	2
14			min	-1208.268	1	-270.474	3	-250.907	1	-.084	3	-.112	1	-.223	3
15		8	max	386.599	3	673.728	2	10.419	3	.065	2	-.012	15	.082	2
16			min	-1209.182	1	-271.662	3	-250.907	1	-.084	3	-.276	1	-.045	3
17		9	max	361.681	3	4.801	3	27.768	3	-.003	15	.129	1	.043	3
18			min	-1480.072	1	-21.016	2	-301.301	1	-.205	2	.006	15	-.12	2
19		10	max	360.995	3	3.613	3	27.768	3	-.003	15	.071	3	.04	3
20			min	-1480.986	1	-22.601	2	-301.301	1	-.205	2	-.068	2	-.106	2
21		11	max	360.309	3	2.424	3	27.768	3	-.003	15	.089	3	.038	3
22			min	-1481.901	1	-24.185	2	-301.301	1	-.205	2	-.266	1	-.091	2
23		12	max	330.894	3	691.502	3	82.989	2	.344	3	.191	1	.092	1
24			min	-1747.402	1	-515.724	1	-257.303	3	-.331	2	.009	15	-.182	3
25		13	max	330.208	3	690.314	3	82.989	2	.344	3	.192	1	.431	1
26			min	-1748.317	1	-517.308	1	-257.303	3	-.331	2	-.054	3	-.635	3
27		14	max	329.521	3	689.125	3	82.989	2	.344	3	.194	1	.771	1
28			min	-1749.232	1	-518.893	1	-257.303	3	-.331	2	-.223	3	-1.088	3
29		15	max	328.835	3	687.937	3	82.989	2	.344	3	.234	2	1.112	1
30			min	-1750.147	1	-520.477	1	-257.303	3	-.331	2	-.391	3	-1.54	3
31		16	max	260.021	1	512.791	1	-7.167	15	.265	1	.039	3	.846	1
32			min	12.456	15	-701.239	3	-159.648	1	-.489	3	-.238	1	-1.176	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
33		17	max	259.106	1	511.207	1	-7.167	15	.265	1	.003	3	.51	1
34			min	12.18	15	-702.427	3	-159.648	1	-.489	3	-.342	1	-.715	3
35		18	max	258.191	1	509.622	1	-7.167	15	.265	1	-.019	15	.175	1
36			min	11.904	15	-703.616	3	-159.648	1	-.489	3	-.447	1	-.254	3
37		19	max	0	1	0	2	0	1	0	1	0	1	0	1
38			min	0	1	-.002	3	0	5	0	1	0	1	0	1
39	M4	1	max	0	1	.009	1	0	1	0	1	0	1	0	1
40			min	0	1	-.001	3	0	1	0	1	0	1	0	1
41		2	max	-15.27	12	938.102	3	0	1	0	1	0	1	.64	2
42			min	-461.878	1	-2048.391	2	0	1	0	1	0	1	-.303	3
43		3	max	-15.727	12	936.914	3	0	1	0	1	0	1	1.985	2
44			min	-462.792	1	-2049.975	2	0	1	0	1	0	1	-.918	3
45		4	max	-16.185	12	935.725	3	0	1	0	1	0	1	3.331	2
46			min	-463.707	1	-2051.56	2	0	1	0	1	0	1	-1.533	3
47		5	max	1394.881	3	2009.036	2	0	1	0	1	0	1	3.931	2
48			min	-3271.31	2	-953.948	3	0	1	0	1	0	1	-1.799	3
49		6	max	1394.195	3	2007.451	2	0	1	0	1	0	1	2.613	2
50			min	-3272.225	2	-955.136	3	0	1	0	1	0	1	-1.173	3
51		7	max	1393.509	3	2005.867	2	0	1	0	1	0	1	1.296	2
52			min	-3273.14	2	-956.325	3	0	1	0	1	0	1	-.546	3
53		8	max	1392.823	3	2004.282	2	0	1	0	1	0	1	.082	3
54			min	-3274.054	2	-957.513	3	0	1	0	1	0	1	-.049	1
55		9	max	1371.711	3	14.807	3	0	1	0	1	0	1	.376	3
56			min	-3629.261	1	-93.933	2	0	1	0	1	0	1	-.636	2
57		10	max	1371.025	3	13.618	3	0	1	0	1	0	1	.367	3
58			min	-3630.176	1	-95.517	2	0	1	0	1	0	1	-.574	2
59		11	max	1370.339	3	12.43	3	0	1	0	1	0	1	.358	3
60			min	-3631.09	1	-97.101	2	0	1	0	1	0	1	-.51	2
61		12	max	1358.222	3	1953.878	3	0	1	0	1	0	1	.068	1
62			min	-4077.456	1	-1644.06	1	0	1	0	1	0	1	-.269	3
63		13	max	1357.535	3	1952.69	3	0	1	0	1	0	1	1.147	1
64			min	-4078.371	1	-1645.644	1	0	1	0	1	0	1	-1.551	3
65		14	max	1356.849	3	1951.502	3	0	1	0	1	0	1	2.227	1
66			min	-4079.285	1	-1647.228	1	0	1	0	1	0	1	-2.832	3
67		15	max	1356.163	3	1950.313	3	0	1	0	1	0	1	3.309	1
68			min	-4080.2	1	-1648.813	1	0	1	0	1	0	1	-4.112	3
69		16	max	462.815	1	1537.354	1	0	1	0	1	0	1	2.519	1
70			min	18.546	12	-1915.891	3	0	1	0	1	0	1	-3.121	3
71		17	max	461.9	1	1535.77	1	0	1	0	1	0	1	1.511	1
72			min	18.088	12	-1917.08	3	0	1	0	1	0	1	-1.864	3
73		18	max	460.986	1	1534.185	1	0	1	0	1	0	1	.504	1
74			min	17.631	12	-1918.268	3	0	1	0	1	0	1	-.605	3
75		19	max	0	1	.001	2	0	1	0	1	0	1	0	1
76			min	0	1	-.005	3	0	1	0	1	0	1	0	1
77	M7	1	max	0	1	.004	1	0	1	0	1	0	1	0	1
78			min	0	1	0	3	0	5	0	1	0	1	0	1
79		2	max	-11.851	15	293.747	3	194.705	1	.269	2	-.018	15	.261	2
80			min	-257.745	1	-712.861	2	8.056	15	-.057	3	-.422	1	-.104	3
81		3	max	-12.127	15	292.559	3	194.705	1	.269	2	-.013	15	.729	2
82			min	-258.66	1	-714.445	2	8.056	15	-.057	3	-.294	1	-.296	3
83		4	max	-12.402	15	291.371	3	194.705	1	.269	2	-.008	15	1.199	2
84			min	-259.575	1	-716.029	2	8.056	15	-.057	3	-.166	1	-.488	3
85		5	max	388.657	3	678.481	2	250.907	1	.084	3	.048	3	1.413	2
86			min	-1206.438	1	-268.097	3	-10.419	3	-.065	2	-.217	1	-.576	3
87		6	max	387.971	3	676.897	2	250.907	1	.084	3	.041	3	.968	2
88			min	-1207.353	1	-269.285	3	-10.419	3	-.065	2	-.07	2	-.4	3
89		7	max	387.285	3	675.312	2	250.907	1	.084	3	.112	1	.524	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
90			min	-1208.268	1	-270.474	3	-10.419	3	-.065	2	.005	15	-.223	3
91		8	max	386.599	3	673.728	2	250.907	1	.084	3	.276	1	.082	2
92			min	-1209.182	1	-271.662	3	-10.419	3	-.065	2	.012	15	-.045	3
93		9	max	361.681	3	4.801	3	301.301	1	.205	2	-.006	15	.043	3
94			min	-1480.072	1	-21.016	2	-27.768	3	.003	15	-.129	1	-.12	2
95		10	max	360.995	3	3.613	3	301.301	1	.205	2	.068	2	.04	3
96			min	-1480.986	1	-22.601	2	-27.768	3	.003	15	-.071	3	-.106	2
97		11	max	360.309	3	2.424	3	301.301	1	.205	2	.266	1	.038	3
98			min	-1481.901	1	-24.185	2	-27.768	3	.003	15	-.089	3	-.091	2
99		12	max	330.894	3	691.502	3	257.303	3	.331	2	-.009	15	.092	1
100			min	-1747.402	1	-515.724	1	-82.989	2	-.344	3	-.191	1	-.182	3
101		13	max	330.208	3	690.314	3	257.303	3	.331	2	.054	3	.431	1
102			min	-1748.317	1	-517.308	1	-82.989	2	-.344	3	-.192	1	-.635	3
103		14	max	329.521	3	689.125	3	257.303	3	.331	2	.223	3	.771	1
104			min	-1749.232	1	-518.893	1	-82.989	2	-.344	3	-.194	1	-1.088	3
105		15	max	328.835	3	687.937	3	257.303	3	.331	2	.391	3	1.112	1
106			min	-1750.147	1	-520.477	1	-82.989	2	-.344	3	-.234	2	-1.54	3
107		16	max	260.021	1	512.791	1	159.648	1	.489	3	.238	1	.846	1
108			min	12.456	15	-701.239	3	7.167	15	-.265	1	-.039	3	-1.176	3
109		17	max	259.106	1	511.207	1	159.648	1	.489	3	.342	1	.51	1
110			min	12.18	15	-702.427	3	7.167	15	-.265	1	-.003	3	-.715	3
111		18	max	258.191	1	509.622	1	159.648	1	.489	3	.447	1	.175	1
112			min	11.904	15	-703.616	3	7.167	15	-.265	1	.019	15	-.254	3
113		19	max	0	1	0	2	0	5	0	1	0	1	0	1
114			min	0	1	-.002	3	0	1	0	1	0	1	0	1
115	M10	1	max	159.705	1	508.395	1	-11.629	15	.006	2	.501	1	.265	1
116			min	7.168	15	-704.736	3	-257.865	1	-.018	3	.021	15	-.489	3
117		2	max	159.705	1	366.734	1	-9.119	15	.006	2	.218	1	.259	3
118			min	7.168	15	-519.858	3	-203.719	1	-.018	3	.009	15	-.269	1
119		3	max	159.705	1	225.074	1	-6.609	15	.006	2	.03	2	.782	3
120			min	7.168	15	-334.979	3	-149.573	1	-.018	3	-.011	9	-.631	1
121		4	max	159.705	1	83.414	1	-4.098	15	.006	2	-.006	12	1.078	3
122			min	7.168	15	-150.1	3	-95.427	1	-.018	3	-.147	1	-.82	1
123		5	max	159.705	1	34.778	3	-1.588	15	.006	2	-.011	15	1.149	3
124			min	7.168	15	-58.246	1	-41.282	1	-.018	3	-.231	1	-.835	1
125		6	max	159.705	1	219.657	3	12.872	9	.006	2	-.011	15	.993	3
126			min	7.168	15	-199.906	1	-4.824	10	-.018	3	-.248	1	-.677	1
127		7	max	159.705	1	404.536	3	67.01	1	.006	2	-.009	15	.612	3
128			min	7.168	15	-341.566	1	.909	12	-.018	3	-.199	1	-.346	1
129		8	max	159.705	1	589.414	3	121.156	1	.006	2	-.003	15	.158	1
130			min	7.168	15	-483.226	1	3.46	12	-.018	3	-.084	1	.003	12
131		9	max	159.705	1	774.293	3	175.302	1	.006	2	.097	1	.835	1
132			min	7.168	15	-624.886	1	6.012	12	-.018	3	-.016	10	-.829	3
133		10	max	159.705	1	959.172	3	22.913	10	.018	3	.344	1	1.685	1
134			min	7.168	15	-373.327	10	-229.447	1	0	15	-.001	3	-1.888	3
135		11	max	159.705	1	624.886	1	-6.012	12	.018	3	.097	1	.835	1
136			min	7.168	15	-774.293	3	-175.302	1	-.006	2	-.016	10	-.829	3
137		12	max	159.705	1	483.226	1	-3.46	12	.018	3	-.003	15	.158	1
138			min	7.168	15	-589.414	3	-121.156	1	-.006	2	-.084	1	.003	12
139		13	max	159.705	1	341.566	1	-.909	12	.018	3	-.009	15	.612	3
140			min	7.168	15	-404.536	3	-67.01	1	-.006	2	-.199	1	-.346	1
141		14	max	159.705	1	199.906	1	4.824	10	.018	3	-.011	15	.993	3
142			min	7.168	15	-219.657	3	-12.872	9	-.006	2	-.248	1	-.677	1
143		15	max	159.705	1	58.246	1	41.282	1	.018	3	-.011	15	1.149	3
144			min	7.168	15	-34.778	3	1.588	15	-.006	2	-.231	1	-.835	1
145		16	max	159.705	1	150.1	3	95.427	1	.018	3	-.006	12	1.078	3
146			min	7.168	15	-83.414	1	4.098	15	-.006	2	-.147	1	-.82	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
147		17	max	159.705	1	334.979	3	149.573	1	.018	3	.03	2	.782	3
148			min	7.168	15	-225.074	1	6.609	15	-.006	2	-.011	9	-.631	1
149		18	max	159.705	1	519.858	3	203.719	1	.018	3	.218	1	.259	3
150			min	7.168	15	-366.734	1	9.119	15	-.006	2	.009	15	-.269	1
151		19	max	159.705	1	704.736	3	257.865	1	.018	3	.501	1	.265	1
152			min	7.168	15	-508.395	1	11.629	15	-.006	2	.021	15	-.489	3
153	M11	1	max	303.296	1	500.375	1	-12.017	15	0	15	.558	1	.174	1
154			min	-284.874	3	-690.689	3	-265.711	1	-.01	1	.024	15	-.487	3
155		2	max	303.296	1	358.715	1	-9.507	15	0	15	.266	1	.244	3
156			min	-284.874	3	-505.81	3	-211.565	1	-.01	1	.011	15	-.368	2
157		3	max	303.296	1	217.055	1	-6.997	15	0	15	.041	2	.749	3
158			min	-284.874	3	-320.932	3	-157.419	1	-.01	1	.001	15	-.703	1
159		4	max	303.296	1	75.395	1	-4.487	15	0	15	.015	3	1.029	3
160			min	-284.874	3	-136.053	3	-103.273	1	-.01	1	-.119	1	-.882	1
161		5	max	303.296	1	48.826	3	-1.976	15	0	15	-.003	12	1.082	3
162			min	-284.874	3	-68.182	2	-49.127	1	-.01	1	-.212	1	-.887	1
163		6	max	303.296	1	233.704	3	7.341	9	0	15	-.011	15	.909	3
164			min	-284.874	3	-207.925	1	-9.273	3	-.01	1	-.239	1	-.72	1
165		7	max	303.296	1	418.583	3	59.164	1	0	15	-.009	15	.511	3
166			min	-284.874	3	-349.585	1	-5.446	3	-.01	1	-.2	1	-.379	1
167		8	max	303.296	1	603.462	3	113.31	1	0	15	-.003	15	.135	1
168			min	-284.874	3	-491.245	1	-1.619	3	-.01	1	-.094	1	-.114	3
169		9	max	303.296	1	788.34	3	167.456	1	0	15	.077	1	.822	1
170			min	-284.874	3	-632.906	1	2.059	12	-.01	1	-.03	3	-.964	3
171		10	max	303.296	1	973.219	3	221.601	1	.01	1	.315	1	1.682	1
172			min	-284.874	3	-774.566	1	-4.61	12	-.004	10	-.025	3	-2.041	3
173		11	max	303.296	1	632.906	1	-2.059	12	.01	1	.077	1	.822	1
174			min	-284.874	3	-788.34	3	-167.456	1	0	15	-.03	3	-.964	3
175		12	max	303.296	1	491.245	1	1.619	3	.01	1	-.003	15	.135	1
176			min	-284.874	3	-603.462	3	-113.31	1	0	15	-.094	1	-.114	3
177		13	max	303.296	1	349.585	1	5.446	3	.01	1	-.009	15	.511	3
178			min	-284.874	3	-418.583	3	-59.164	1	0	15	-.2	1	-.379	1
179		14	max	303.296	1	207.925	1	9.273	3	.01	1	-.011	15	.909	3
180			min	-284.874	3	-233.704	3	-7.341	9	0	15	-.239	1	-.72	1
181		15	max	303.296	1	68.182	2	49.127	1	.01	1	-.003	12	1.082	3
182			min	-284.874	3	-48.826	3	1.976	15	0	15	-.212	1	-.887	1
183		16	max	303.296	1	136.053	3	103.273	1	.01	1	.015	3	1.029	3
184			min	-284.874	3	-75.395	1	4.487	15	0	15	-.119	1	-.882	1
185		17	max	303.296	1	320.932	3	157.419	1	.01	1	.041	2	.749	3
186			min	-284.874	3	-217.055	1	6.997	15	0	15	.001	15	-.703	1
187		18	max	303.296	1	505.81	3	211.565	1	.01	1	.266	1	.244	3
188			min	-284.874	3	-358.715	1	9.507	15	0	15	.011	15	-.368	2
189		19	max	303.296	1	690.689	3	265.711	1	.01	1	.558	1	.174	1
190			min	-284.874	3	-500.375	1	12.017	15	0	15	.024	15	-.487	3
191	M12	1	max	17.407	3	692.572	2	-12.138	15	0	15	.587	1	.27	2
192			min	-48.919	1	-277.777	3	-269.792	1	-.007	1	.025	15	.004	15
193		2	max	17.407	3	499.318	2	-9.627	15	0	15	.291	1	.347	3
194			min	-48.919	1	-192.815	3	-215.647	1	-.007	1	.012	15	-.458	2
195		3	max	17.407	3	306.064	2	-7.117	15	0	15	.061	2	.531	3
196			min	-48.919	1	-107.853	3	-161.501	1	-.007	1	.002	15	-.95	2
197		4	max	17.407	3	112.81	2	-4.607	15	0	15	0	10	.611	3
198			min	-48.919	1	-22.891	3	-107.355	1	-.007	1	-.104	1	-1.206	2
199		5	max	17.407	3	62.071	3	-2.097	15	0	15	-.009	12	.587	3
200			min	-48.919	1	-80.444	2	-53.209	1	-.007	1	-.202	1	-1.226	2
201		6	max	17.407	3	147.033	3	5.643	9	0	15	-.011	15	.459	3
202			min	-48.919	1	-273.698	2	-10.851	2	-.007	1	-.234	1	-1.01	2
203		7	max	17.407	3	231.995	3	55.082	1	0	15	-.009	15	.227	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
204			min	-48.919	1	-466.952	2	-1.288	3	-.007	1	-.2	1	-.557	2
205		8	max	17.407	3	316.957	3	109.228	1	0	15	-.004	15	.132	2
206			min	-48.919	1	-660.205	2	1.991	12	-.007	1	-.099	1	-.108	3
207		9	max	17.407	3	401.919	3	163.374	1	0	15	.067	1	1.057	2
208			min	-48.919	1	-853.459	2	4.542	12	-.007	1	-.022	10	-.547	3
209		10	max	17.407	3	-23.711	15	217.52	1	.003	3	.3	1	2.218	2
210			min	-48.919	1	-1046.713	2	-10.194	3	-.007	1	-.009	3	-1.09	3
211		11	max	17.407	3	853.459	2	-4.542	12	.007	1	.067	1	1.057	2
212			min	-48.919	1	-401.919	3	-163.374	1	0	15	-.022	10	-.547	3
213		12	max	17.407	3	660.205	2	-1.991	12	.007	1	-.004	15	.132	2
214			min	-48.919	1	-316.957	3	-109.228	1	0	15	-.099	1	-.108	3
215		13	max	17.407	3	466.952	2	1.288	3	.007	1	-.009	15	.227	3
216			min	-48.919	1	-231.995	3	-55.082	1	0	15	-.2	1	-.557	2
217		14	max	17.407	3	273.698	2	10.851	2	.007	1	-.011	15	.459	3
218			min	-48.919	1	-147.033	3	-5.643	9	0	15	-.234	1	-1.01	2
219		15	max	17.407	3	80.444	2	53.209	1	.007	1	-.009	12	.587	3
220			min	-48.919	1	-62.071	3	2.097	15	0	15	-.202	1	-1.226	2
221		16	max	17.407	3	22.891	3	107.355	1	.007	1	0	10	.611	3
222			min	-48.919	1	-112.81	2	4.607	15	0	15	-.104	1	-1.206	2
223		17	max	17.407	3	107.853	3	161.501	1	.007	1	.061	2	.531	3
224			min	-48.919	1	-306.064	2	7.117	15	0	15	.002	15	-.95	2
225		18	max	17.407	3	192.815	3	215.647	1	.007	1	.291	1	.347	3
226			min	-48.919	1	-499.318	2	9.627	15	0	15	.012	15	-.458	2
227		19	max	17.407	3	277.777	3	269.792	1	.007	1	.587	1	.27	2
228			min	-48.919	1	-692.572	2	12.138	15	0	15	.025	15	.004	15
229	M13	1	max	-8.055	15	712.249	2	-11.574	15	.005	3	.487	1	.269	2
230			min	-194.379	1	-294.957	3	-256.101	1	-.023	2	.021	15	-.057	3
231		2	max	-8.055	15	518.995	2	-9.063	15	.005	3	.207	1	.251	3
232			min	-194.379	1	-209.995	3	-201.956	1	-.023	2	.008	15	-.483	2
233		3	max	-8.055	15	325.741	2	-6.553	15	.005	3	.021	2	.456	3
234			min	-194.379	1	-125.033	3	-147.81	1	-.023	2	-.015	9	-.999	2
235		4	max	-8.055	15	132.487	2	-4.043	15	.005	3	-.001	3	.557	3
236			min	-194.379	1	-40.071	3	-93.664	1	-.023	2	-.155	1	-1.279	2
237		5	max	-8.055	15	44.891	3	-1.533	15	.005	3	-.01	12	.554	3
238			min	-194.379	1	-60.767	2	-39.518	1	-.023	2	-.236	1	-1.323	2
239		6	max	-8.055	15	129.853	3	14.628	1	.005	3	-.011	15	.447	3
240			min	-194.379	1	-254.02	2	-4.694	3	-.023	2	-.251	1	-1.131	2
241		7	max	-8.055	15	214.815	3	68.773	1	.005	3	-.009	15	.236	3
242			min	-194.379	1	-447.274	2	-.867	3	-.023	2	-.2	1	-.702	2
243		8	max	-8.055	15	299.777	3	122.919	1	.005	3	-.003	15	-.003	15
244			min	-194.379	1	-640.528	2	2.31	12	-.023	2	-.083	1	-.078	3
245		9	max	-8.055	15	384.739	3	177.065	1	.005	3	.1	1	.864	2
246			min	-194.379	1	-833.782	2	4.862	12	-.023	2	-.018	3	-.496	3
247		10	max	-8.055	15	-22.761	15	231.211	1	.023	2	.35	1	2.001	2
248			min	-194.379	1	-1027.036	2	-10.614	3	-.005	3	-.008	3	-1.019	3
249		11	max	-8.055	15	833.782	2	-4.862	12	.023	2	.1	1	.864	2
250			min	-194.379	1	-384.739	3	-177.065	1	-.005	3	-.018	3	-.496	3
251		12	max	-8.055	15	640.528	2	-2.31	12	.023	2	-.003	15	-.003	15
252			min	-194.379	1	-299.777	3	-122.919	1	-.005	3	-.083	1	-.078	3
253		13	max	-8.055	15	447.274	2	.867	3	.023	2	-.009	15	.236	3
254			min	-194.379	1	-214.815	3	-68.773	1	-.005	3	-.2	1	-.702	2
255		14	max	-8.055	15	254.02	2	4.694	3	.023	2	-.011	15	.447	3
256			min	-194.379	1	-129.853	3	-14.628	1	-.005	3	-.251	1	-1.131	2
257		15	max	-8.055	15	60.767	2	39.518	1	.023	2	-.01	12	.554	3
258			min	-194.379	1	-44.891	3	1.533	15	-.005	3	-.236	1	-1.323	2
259		16	max	-8.055	15	40.071	3	93.664	1	.023	2	-.001	3	.557	3
260			min	-194.379	1	-132.487	2	4.043	15	-.005	3	-.155	1	-1.279	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
261		17	max	-8.055	15	125.033	3	147.81	1	.023	2	.021	2	.456	3
262			min	-194.379	1	-325.741	2	6.553	15	-.005	3	-.015	9	-.999	2
263		18	max	-8.055	15	209.995	3	201.956	1	.023	2	.207	1	.251	3
264			min	-194.379	1	-518.995	2	9.063	15	-.005	3	.008	15	-.483	2
265		19	max	-8.055	15	294.957	3	256.101	1	.023	2	.487	1	.269	2
266			min	-194.379	1	-712.249	2	11.574	15	-.005	3	.021	15	-.057	3
267	M2	1	max	2579.297	1	1068.805	3	219.983	1	.007	3	.352	3	7.21	1
268			min	-1578.986	3	-768.063	2	-228.368	3	-.017	2	-.365	1	.316	15
269		2	max	2576.026	1	1068.805	3	219.983	1	.007	3	.27	3	7.288	1
270			min	-1581.439	3	-768.063	2	-228.368	3	-.017	2	-.286	1	.312	15
271		3	max	1966.246	1	1233.458	1	162.026	1	.002	2	.209	3	7.09	1
272			min	-1315.836	3	52.282	15	-203.445	3	-.001	3	-.248	1	.301	15
273		4	max	1962.974	1	1233.458	1	162.026	1	.002	2	.135	3	6.647	1
274			min	-1318.29	3	52.282	15	-203.445	3	-.001	3	-.19	1	.282	15
275		5	max	1959.703	1	1233.458	1	162.026	1	.002	2	.062	3	6.204	1
276			min	-1320.744	3	52.282	15	-203.445	3	-.001	3	-.132	1	.263	15
277		6	max	1956.431	1	1233.458	1	162.026	1	.002	2	-.003	15	5.761	1
278			min	-1323.197	3	52.282	15	-203.445	3	-.001	3	-.073	1	.244	15
279		7	max	1953.16	1	1233.458	1	162.026	1	.002	2	.018	2	5.318	1
280			min	-1325.651	3	52.282	15	-203.445	3	-.001	3	-.084	3	.225	15
281		8	max	1949.889	1	1233.458	1	162.026	1	.002	2	.073	2	4.875	1
282			min	-1328.104	3	52.282	15	-203.445	3	-.001	3	-.157	3	.207	15
283		9	max	1946.617	1	1233.458	1	162.026	1	.002	2	.129	2	4.431	1
284			min	-1330.558	3	52.282	15	-203.445	3	-.001	3	-.23	3	.188	15
285		10	max	1943.346	1	1233.458	1	162.026	1	.002	2	.185	2	3.988	1
286			min	-1333.012	3	52.282	15	-203.445	3	-.001	3	-.303	3	.169	15
287		11	max	1940.074	1	1233.458	1	162.026	1	.002	2	.24	2	3.545	1
288			min	-1335.465	3	52.282	15	-203.445	3	-.001	3	-.376	3	.15	15
289		12	max	1936.803	1	1233.458	1	162.026	1	.002	2	.296	2	3.102	1
290			min	-1337.919	3	52.282	15	-203.445	3	-.001	3	-.449	3	.131	15
291		13	max	1933.531	1	1233.458	1	162.026	1	.002	2	.352	2	2.659	1
292			min	-1340.372	3	52.282	15	-203.445	3	-.001	3	-.522	3	.113	15
293		14	max	1930.26	1	1233.458	1	162.026	1	.002	2	.407	2	2.216	1
294			min	-1342.826	3	52.282	15	-203.445	3	-.001	3	-.596	3	.094	15
295		15	max	1926.988	1	1233.458	1	162.026	1	.002	2	.463	2	1.773	1
296			min	-1345.279	3	52.282	15	-203.445	3	-.001	3	-.669	3	.075	15
297		16	max	1923.717	1	1233.458	1	162.026	1	.002	2	.519	2	1.329	1
298			min	-1347.733	3	52.282	15	-203.445	3	-.001	3	-.742	3	.056	15
299		17	max	1920.446	1	1233.458	1	162.026	1	.002	2	.574	2	.886	1
300			min	-1350.187	3	52.282	15	-203.445	3	-.001	3	-.815	3	.038	15
301		18	max	1917.174	1	1233.458	1	162.026	1	.002	2	.63	2	.443	1
302			min	-1352.64	3	52.282	15	-203.445	3	-.001	3	-.888	3	.019	15
303		19	max	1913.903	1	1233.458	1	162.026	1	.002	2	.686	2	0	1
304			min	-1355.094	3	52.282	15	-203.445	3	-.001	3	-.961	3	0	1
305	M5	1	max	6836.292	1	2953.065	3	0	1	0	1	0	1	13.256	1
306			min	-4889.026	3	-2950.767	2	0	1	0	1	0	1	.53	15
307		2	max	6833.021	1	2953.065	3	0	1	0	1	0	1	13.902	1
308			min	-4891.48	3	-2950.767	2	0	1	0	1	0	1	.537	15
309		3	max	5139.765	1	2392.267	1	0	1	0	1	0	1	13.752	1
310			min	-3979.705	3	91.008	15	0	1	0	1	0	1	.523	15
311		4	max	5136.493	1	2392.267	1	0	1	0	1	0	1	12.892	1
312			min	-3982.158	3	91.008	15	0	1	0	1	0	1	.49	15
313		5	max	5133.222	1	2392.267	1	0	1	0	1	0	1	12.033	1
314			min	-3984.612	3	91.008	15	0	1	0	1	0	1	.458	15
315		6	max	5129.95	1	2392.267	1	0	1	0	1	0	1	11.173	1
316			min	-3987.066	3	91.008	15	0	1	0	1	0	1	.425	15
317		7	max	5126.679	1	2392.267	1	0	1	0	1	0	1	10.314	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
318			min	-3989.519	3	91.008	15	0	1	0	1	0	1	.392	15
319		8	max	5123.407	1	2392.267	1	0	1	0	1	0	1	9.454	1
320			min	-3991.973	3	91.008	15	0	1	0	1	0	1	.36	15
321		9	max	5120.136	1	2392.267	1	0	1	0	1	0	1	8.595	1
322			min	-3994.426	3	91.008	15	0	1	0	1	0	1	.327	15
323		10	max	5116.865	1	2392.267	1	0	1	0	1	0	1	7.735	1
324			min	-3996.88	3	91.008	15	0	1	0	1	0	1	.294	15
325		11	max	5113.593	1	2392.267	1	0	1	0	1	0	1	6.876	1
326			min	-3999.333	3	91.008	15	0	1	0	1	0	1	.262	15
327		12	max	5110.322	1	2392.267	1	0	1	0	1	0	1	6.016	1
328			min	-4001.787	3	91.008	15	0	1	0	1	0	1	.229	15
329		13	max	5107.05	1	2392.267	1	0	1	0	1	0	1	5.157	1
330			min	-4004.241	3	91.008	15	0	1	0	1	0	1	.196	15
331		14	max	5103.779	1	2392.267	1	0	1	0	1	0	1	4.297	1
332			min	-4006.694	3	91.008	15	0	1	0	1	0	1	.163	15
333		15	max	5100.507	1	2392.267	1	0	1	0	1	0	1	3.438	1
334			min	-4009.148	3	91.008	15	0	1	0	1	0	1	.131	15
335		16	max	5097.236	1	2392.267	1	0	1	0	1	0	1	2.578	1
336			min	-4011.601	3	91.008	15	0	1	0	1	0	1	.098	15
337		17	max	5093.964	1	2392.267	1	0	1	0	1	0	1	1.719	1
338			min	-4014.055	3	91.008	15	0	1	0	1	0	1	.065	15
339		18	max	5090.693	1	2392.267	1	0	1	0	1	0	1	.859	1
340			min	-4016.509	3	91.008	15	0	1	0	1	0	1	.033	15
341		19	max	5087.422	1	2392.267	1	0	1	0	1	0	1	0	1
342			min	-4018.962	3	91.008	15	0	1	0	1	0	1	0	1
343	M8	1	max	2579.297	1	1068.805	3	228.368	3	.017	2	.365	1	7.21	1
344			min	-1578.986	3	-768.063	2	-219.983	1	-.007	3	-.352	3	.316	15
345		2	max	2576.026	1	1068.805	3	228.368	3	.017	2	.286	1	7.288	1
346			min	-1581.439	3	-768.063	2	-219.983	1	-.007	3	-.27	3	.312	15
347		3	max	1966.246	1	1233.458	1	203.445	3	.001	3	.248	1	7.09	1
348			min	-1315.836	3	52.282	15	-162.026	1	-.002	2	-.209	3	.301	15
349		4	max	1962.974	1	1233.458	1	203.445	3	.001	3	.19	1	6.647	1
350			min	-1318.29	3	52.282	15	-162.026	1	-.002	2	-.135	3	.282	15
351		5	max	1959.703	1	1233.458	1	203.445	3	.001	3	.132	1	6.204	1
352			min	-1320.744	3	52.282	15	-162.026	1	-.002	2	-.062	3	.263	15
353		6	max	1956.431	1	1233.458	1	203.445	3	.001	3	.073	1	5.761	1
354			min	-1323.197	3	52.282	15	-162.026	1	-.002	2	.003	15	.244	15
355		7	max	1953.16	1	1233.458	1	203.445	3	.001	3	.084	3	5.318	1
356			min	-1325.651	3	52.282	15	-162.026	1	-.002	2	-.018	2	.225	15
357		8	max	1949.889	1	1233.458	1	203.445	3	.001	3	.157	3	4.875	1
358			min	-1328.104	3	52.282	15	-162.026	1	-.002	2	-.073	2	.207	15
359		9	max	1946.617	1	1233.458	1	203.445	3	.001	3	.23	3	4.431	1
360			min	-1330.558	3	52.282	15	-162.026	1	-.002	2	-.129	2	.188	15
361		10	max	1943.346	1	1233.458	1	203.445	3	.001	3	.303	3	3.988	1
362			min	-1333.012	3	52.282	15	-162.026	1	-.002	2	-.185	2	.169	15
363		11	max	1940.074	1	1233.458	1	203.445	3	.001	3	.376	3	3.545	1
364			min	-1335.465	3	52.282	15	-162.026	1	-.002	2	-.24	2	.15	15
365		12	max	1936.803	1	1233.458	1	203.445	3	.001	3	.449	3	3.102	1
366			min	-1337.919	3	52.282	15	-162.026	1	-.002	2	-.296	2	.131	15
367		13	max	1933.531	1	1233.458	1	203.445	3	.001	3	.522	3	2.659	1
368			min	-1340.372	3	52.282	15	-162.026	1	-.002	2	-.352	2	.113	15
369		14	max	1930.26	1	1233.458	1	203.445	3	.001	3	.596	3	2.216	1
370			min	-1342.826	3	52.282	15	-162.026	1	-.002	2	-.407	2	.094	15
371		15	max	1926.988	1	1233.458	1	203.445	3	.001	3	.669	3	1.773	1
372			min	-1345.279	3	52.282	15	-162.026	1	-.002	2	-.463	2	.075	15
373		16	max	1923.717	1	1233.458	1	203.445	3	.001	3	.742	3	1.329	1
374			min	-1347.733	3	52.282	15	-162.026	1	-.002	2	-.519	2	.056	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
375		17	max	1920.446	1	1233.458	1	203.445	3	.001	3	.815	3	.886	1
376			min	-1350.187	3	52.282	15	-162.026	1	-.002	2	-.574	2	.038	15
377		18	max	1917.174	1	1233.458	1	203.445	3	.001	3	.888	3	.443	1
378			min	-1352.64	3	52.282	15	-162.026	1	-.002	2	-.63	2	.019	15
379		19	max	1913.903	1	1233.458	1	203.445	3	.001	3	.961	3	0	1
380			min	-1355.094	3	52.282	15	-162.026	1	-.002	2	-.686	2	0	1
381	M3	1	max	1749.838	2	5.617	4	61.25	2	.018	3	.001	3	0	1
382			min	-692.35	3	1.32	15	-25.561	3	-.039	2	-.004	1	0	1
383		2	max	1749.629	2	4.993	4	61.25	2	.018	3	.018	2	0	15
384			min	-692.507	3	1.174	15	-25.561	3	-.039	2	-.008	3	-.002	4
385		3	max	1749.421	2	4.369	4	61.25	2	.018	3	.039	2	0	15
386			min	-692.663	3	1.027	15	-25.561	3	-.039	2	-.017	3	-.004	4
387		4	max	1749.212	2	3.745	4	61.25	2	.018	3	.061	2	-.001	15
388			min	-692.82	3	.88	15	-25.561	3	-.039	2	-.026	3	-.005	4
389		5	max	1749.003	2	3.121	4	61.25	2	.018	3	.083	2	-.001	15
390			min	-692.976	3	.734	15	-25.561	3	-.039	2	-.035	3	-.006	4
391		6	max	1748.795	2	2.497	4	61.25	2	.018	3	.105	2	-.002	15
392			min	-693.133	3	.587	15	-25.561	3	-.039	2	-.044	3	-.007	4
393		7	max	1748.586	2	1.872	4	61.25	2	.018	3	.127	2	-.002	15
394			min	-693.289	3	.44	15	-25.561	3	-.039	2	-.053	3	-.008	4
395		8	max	1748.378	2	1.248	4	61.25	2	.018	3	.149	2	-.002	15
396			min	-693.445	3	.293	15	-25.561	3	-.039	2	-.062	3	-.009	4
397		9	max	1748.169	2	.624	4	61.25	2	.018	3	.171	2	-.002	15
398			min	-693.602	3	.147	15	-25.561	3	-.039	2	-.071	3	-.009	4
399		10	max	1747.96	2	0	1	61.25	2	.018	3	.192	2	-.002	15
400			min	-693.758	3	0	1	-25.561	3	-.039	2	-.081	3	-.009	4
401		11	max	1747.752	2	-.147	15	61.25	2	.018	3	.214	2	-.002	15
402			min	-693.915	3	-.624	4	-25.561	3	-.039	2	-.09	3	-.009	4
403		12	max	1747.543	2	-.293	15	61.25	2	.018	3	.236	2	-.002	15
404			min	-694.071	3	-1.248	4	-25.561	3	-.039	2	-.099	3	-.009	4
405		13	max	1747.335	2	-.44	15	61.25	2	.018	3	.258	2	-.002	15
406			min	-694.228	3	-1.872	4	-25.561	3	-.039	2	-.108	3	-.008	4
407		14	max	1747.126	2	-.587	15	61.25	2	.018	3	.28	2	-.002	15
408			min	-694.384	3	-2.497	4	-25.561	3	-.039	2	-.117	3	-.007	4
409		15	max	1746.917	2	-.734	15	61.25	2	.018	3	.302	2	-.001	15
410			min	-694.541	3	-3.121	4	-25.561	3	-.039	2	-.126	3	-.006	4
411		16	max	1746.709	2	-.88	15	61.25	2	.018	3	.324	2	-.001	15
412			min	-694.697	3	-3.745	4	-25.561	3	-.039	2	-.135	3	-.005	4
413		17	max	1746.5	2	-1.027	15	61.25	2	.018	3	.345	2	0	15
414			min	-694.854	3	-4.369	4	-25.561	3	-.039	2	-.144	3	-.004	4
415		18	max	1746.292	2	-1.174	15	61.25	2	.018	3	.367	2	0	15
416			min	-695.01	3	-4.993	4	-25.561	3	-.039	2	-.154	3	-.002	4
417		19	max	1746.083	2	-1.32	15	61.25	2	.018	3	.389	2	0	1
418			min	-695.166	3	-5.617	4	-25.561	3	-.039	2	-.163	3	0	1
419	M6	1	max	5077.325	2	5.617	4	0	1	0	1	0	1	0	1
420			min	-2354.919	3	1.32	15	0	1	0	1	0	1	0	1
421		2	max	5077.116	2	4.993	4	0	1	0	1	0	1	0	15
422			min	-2355.075	3	1.174	15	0	1	0	1	0	1	-.002	4
423		3	max	5076.908	2	4.369	4	0	1	0	1	0	1	0	15
424			min	-2355.232	3	1.027	15	0	1	0	1	0	1	-.004	4
425		4	max	5076.699	2	3.745	4	0	1	0	1	0	1	-.001	15
426			min	-2355.388	3	.88	15	0	1	0	1	0	1	-.005	4
427		5	max	5076.49	2	3.121	4	0	1	0	1	0	1	-.001	15
428			min	-2355.545	3	.734	15	0	1	0	1	0	1	-.006	4
429		6	max	5076.282	2	2.497	4	0	1	0	1	0	1	-.002	15
430			min	-2355.701	3	.587	15	0	1	0	1	0	1	-.007	4
431		7	max	5076.073	2	1.872	4	0	1	0	1	0	1	-.002	15

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
432			min	-2355.858	3	.44	15	0	1	0	1	0	1	-.008	4
433		8	max	5075.865	2	1.248	4	0	1	0	1	0	1	-.002	15
434			min	-2356.014	3	.293	15	0	1	0	1	0	1	-.009	4
435		9	max	5075.656	2	.624	4	0	1	0	1	0	1	-.002	15
436			min	-2356.17	3	.147	15	0	1	0	1	0	1	-.009	4
437		10	max	5075.447	2	0	1	0	1	0	1	0	1	-.002	15
438			min	-2356.327	3	0	1	0	1	0	1	0	1	-.009	4
439		11	max	5075.239	2	-.147	15	0	1	0	1	0	1	-.002	15
440			min	-2356.483	3	-.624	4	0	1	0	1	0	1	-.009	4
441		12	max	5075.03	2	-.293	15	0	1	0	1	0	1	-.002	15
442			min	-2356.64	3	-1.248	4	0	1	0	1	0	1	-.009	4
443		13	max	5074.822	2	-.44	15	0	1	0	1	0	1	-.002	15
444			min	-2356.796	3	-1.872	4	0	1	0	1	0	1	-.008	4
445		14	max	5074.613	2	-.587	15	0	1	0	1	0	1	-.002	15
446			min	-2356.953	3	-2.497	4	0	1	0	1	0	1	-.007	4
447		15	max	5074.404	2	-.734	15	0	1	0	1	0	1	-.001	15
448			min	-2357.109	3	-3.121	4	0	1	0	1	0	1	-.006	4
449		16	max	5074.196	2	-.88	15	0	1	0	1	0	1	-.001	15
450			min	-2357.266	3	-3.745	4	0	1	0	1	0	1	-.005	4
451		17	max	5073.987	2	-1.027	15	0	1	0	1	0	1	0	15
452			min	-2357.422	3	-4.369	4	0	1	0	1	0	1	-.004	4
453		18	max	5073.779	2	-1.174	15	0	1	0	1	0	1	0	15
454			min	-2357.579	3	-4.993	4	0	1	0	1	0	1	-.002	4
455		19	max	5073.57	2	-1.32	15	0	1	0	1	0	1	0	1
456			min	-2357.735	3	-5.617	4	0	1	0	1	0	1	0	1
457	M9	1	max	1749.838	2	5.617	4	25.561	3	.039	2	.004	1	0	1
458			min	-692.35	3	1.32	15	-61.25	2	-.018	3	-.001	3	0	1
459		2	max	1749.629	2	4.993	4	25.561	3	.039	2	.008	3	0	15
460			min	-692.507	3	1.174	15	-61.25	2	-.018	3	-.018	2	-.002	4
461		3	max	1749.421	2	4.369	4	25.561	3	.039	2	.017	3	0	15
462			min	-692.663	3	1.027	15	-61.25	2	-.018	3	-.039	2	-.004	4
463		4	max	1749.212	2	3.745	4	25.561	3	.039	2	.026	3	-.001	15
464			min	-692.82	3	.88	15	-61.25	2	-.018	3	-.061	2	-.005	4
465		5	max	1749.003	2	3.121	4	25.561	3	.039	2	.035	3	-.001	15
466			min	-692.976	3	.734	15	-61.25	2	-.018	3	-.083	2	-.006	4
467		6	max	1748.795	2	2.497	4	25.561	3	.039	2	.044	3	-.002	15
468			min	-693.133	3	.587	15	-61.25	2	-.018	3	-.105	2	-.007	4
469		7	max	1748.586	2	1.872	4	25.561	3	.039	2	.053	3	-.002	15
470			min	-693.289	3	.44	15	-61.25	2	-.018	3	-.127	2	-.008	4
471		8	max	1748.378	2	1.248	4	25.561	3	.039	2	.062	3	-.002	15
472			min	-693.445	3	.293	15	-61.25	2	-.018	3	-.149	2	-.009	4
473		9	max	1748.169	2	.624	4	25.561	3	.039	2	.071	3	-.002	15
474			min	-693.602	3	.147	15	-61.25	2	-.018	3	-.171	2	-.009	4
475		10	max	1747.96	2	0	1	25.561	3	.039	2	.081	3	-.002	15
476			min	-693.758	3	0	1	-61.25	2	-.018	3	-.192	2	-.009	4
477		11	max	1747.752	2	-.147	15	25.561	3	.039	2	.09	3	-.002	15
478			min	-693.915	3	-.624	4	-61.25	2	-.018	3	-.214	2	-.009	4
479		12	max	1747.543	2	-.293	15	25.561	3	.039	2	.099	3	-.002	15
480			min	-694.071	3	-1.248	4	-61.25	2	-.018	3	-.236	2	-.009	4
481		13	max	1747.335	2	-.44	15	25.561	3	.039	2	.108	3	-.002	15
482			min	-694.228	3	-1.872	4	-61.25	2	-.018	3	-.258	2	-.008	4
483		14	max	1747.126	2	-.587	15	25.561	3	.039	2	.117	3	-.002	15
484			min	-694.384	3	-2.497	4	-61.25	2	-.018	3	-.28	2	-.007	4
485		15	max	1746.917	2	-.734	15	25.561	3	.039	2	.126	3	-.001	15
486			min	-694.541	3	-3.121	4	-61.25	2	-.018	3	-.302	2	-.006	4
487		16	max	1746.709	2	-.88	15	25.561	3	.039	2	.135	3	-.001	15
488			min	-694.697	3	-3.745	4	-61.25	2	-.018	3	-.324	2	-.005	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-ft]	LC	y-y Mome...	LC	z-z Mome...	LC
489		17	max	1746.5	2	-1.027	15	25.561	3	.039	2	.144	3	0	15
490			min	-694.854	3	-4.369	4	-61.25	2	-.018	3	-.345	2	-.004	4
491		18	max	1746.292	2	-1.174	15	25.561	3	.039	2	.154	3	0	15
492			min	-695.01	3	-4.993	4	-61.25	2	-.018	3	-.367	2	-.002	4
493		19	max	1746.083	2	-1.32	15	25.561	3	.039	2	.163	3	0	1
494			min	-695.166	3	-5.617	4	-61.25	2	-.018	3	-.389	2	0	1

Envelope Member Section Deflections

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
1	M1	1	max	-.022	15	-.033	15	.018	1	1.185e-2	3	NC	3	NC	1
2			min	-.529	1	-.874	1	0	15	-3.341e-2	2	114.265	1	NC	1
3		2	max	-.022	15	-.029	15	0	15	1.148e-2	3	NC	3	NC	3
4			min	-.529	1	-.738	1	-.012	1	-3.166e-2	2	128.347	1	4994.114	1
5		3	max	-.022	15	-.024	15	-.001	15	1.075e-2	3	NC	12	NC	3
6			min	-.529	1	-.605	1	-.028	1	-2.823e-2	2	145.88	1	3359.15	1
7		4	max	-.022	15	-.02	15	0	12	1.002e-2	3	9263.906	12	NC	3
8			min	-.529	1	-.482	1	-.032	1	-2.481e-2	2	166.956	1	3205.246	1
9		5	max	-.022	15	-.016	15	.001	3	9.786e-3	3	NC	12	NC	3
10			min	-.529	1	-.376	1	-.029	1	-2.257e-2	2	190.721	1	3608.863	1
11		6	max	-.022	15	-.013	15	.003	3	1.085e-2	3	NC	12	NC	3
12			min	-.528	1	-.29	1	-.019	1	-2.34e-2	2	215.722	1	5130.437	1
13		7	max	-.022	15	-.01	15	.003	3	1.191e-2	3	NC	3	NC	1
14			min	-.528	1	-.217	1	-.007	1	-2.424e-2	2	242.586	1	NC	1
15		8	max	-.022	15	-.007	15	.001	3	1.298e-2	3	8652.143	12	NC	1
16			min	-.527	1	-.152	1	0	2	-2.507e-2	2	273.213	1	NC	1
17		9	max	-.022	15	-.004	15	0	2	1.443e-2	3	6420.843	15	NC	1
18			min	-.527	1	-.087	1	-.001	3	-2.413e-2	2	312.004	1	NC	1
19		10	max	-.022	15	-.001	15	.002	1	1.625e-2	3	7363.108	15	NC	1
20			min	-.526	1	-.037	3	-.002	3	-2.152e-2	2	365.334	1	NC	1
21		11	max	-.022	15	.047	1	0	1	1.807e-2	3	8663.627	15	NC	1
22			min	-.526	1	-.017	3	0	15	-1.892e-2	2	442.69	1	NC	1
23		12	max	-.022	15	.116	1	.007	3	1.689e-2	3	NC	15	NC	1
24			min	-.525	1	.002	12	-.008	1	-1.553e-2	2	564.932	1	NC	1
25		13	max	-.022	15	.184	1	.017	3	1.251e-2	3	NC	15	NC	1
26			min	-.524	1	.007	15	-.012	2	-1.133e-2	1	775.133	1	7227.905	3
27		14	max	-.022	15	.245	1	.026	3	8.134e-3	3	NC	5	NC	1
28			min	-.523	1	.01	15	-.013	2	-7.163e-3	1	922.313	3	5018.418	3
29		15	max	-.022	15	.295	1	.025	3	3.758e-3	3	NC	2	NC	1
30			min	-.523	1	.013	15	-.007	2	-2.996e-3	1	702.637	3	5071.941	3
31		16	max	-.022	15	.327	1	.017	3	8.868e-3	3	NC	5	NC	2
32			min	-.523	1	.014	15	0	10	-5.583e-3	1	518.732	3	5508.792	1
33		17	max	-.022	15	.347	1	.02	1	1.509e-2	3	NC	4	NC	2
34			min	-.523	1	.016	15	0	15	-8.961e-3	1	390.362	3	4501.361	1
35		18	max	-.022	15	.365	3	.01	1	2.131e-2	3	NC	1	NC	2
36			min	-.523	1	.017	15	0	15	-1.234e-2	1	305.463	3	6029.775	1
37		19	max	-.022	15	.469	3	0	15	2.449e-2	3	NC	1	NC	1
38			min	-.523	1	.018	15	-.015	1	-1.406e-2	1	249.281	3	NC	1
39	M4	1	max	-.039	15	-.05	12	0	1	0	1	NC	3	NC	1
40			min	-1.024	1	-1.828	1	0	1	0	1	59.343	1	NC	1
41		2	max	-.039	15	-.053	15	0	1	0	1	4573.549	12	NC	1
42			min	-1.024	1	-1.525	1	0	1	0	1	67.967	1	NC	1
43		3	max	-.039	15	-.044	15	0	1	0	1	2387.727	12	NC	1
44			min	-1.024	1	-1.23	1	0	1	0	1	79.167	1	NC	1
45		4	max	-.039	15	-.035	15	0	1	0	1	2350.484	15	NC	1
46			min	-1.024	1	-.962	1	0	1	0	1	93.122	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
47		5	max	-.039	15	-.028	15	0	1	0	1	2674.053	15	NC	1
48			min	-1.023	1	-.74	1	0	1	0	1	109.067	1	NC	1
49		6	max	-.039	15	-.022	15	0	1	0	1	3009.799	15	NC	1
50			min	-1.022	1	-.571	1	0	1	0	1	125.381	1	NC	1
51		7	max	-.039	15	-.017	15	0	1	0	1	3368.756	15	NC	1
52			min	-1.021	1	-.436	1	0	1	0	1	142.256	1	NC	1
53		8	max	-.039	15	-.012	15	0	1	0	1	5779.342	12	NC	1
54			min	-1.02	1	-.319	1	0	1	0	1	161.179	1	NC	1
55		9	max	-.039	15	-.008	15	0	1	0	1	NC	3	NC	1
56			min	-1.018	1	-.201	1	0	1	0	1	186.249	1	NC	1
57		10	max	-.039	15	-.003	15	0	1	0	1	5915.122	12	NC	1
58			min	-1.017	1	-.073	1	0	1	0	1	223.95	1	NC	1
59		11	max	-.039	15	.063	1	0	1	0	1	6244.36	15	NC	1
60			min	-1.015	1	-.013	3	0	1	0	1	285.432	1	NC	1
61		12	max	-.039	15	.207	1	0	1	0	1	8201.306	15	NC	1
62			min	-1.014	1	.008	15	0	1	0	1	402.146	1	NC	1
63		13	max	-.039	15	.351	1	0	1	0	1	NC	10	NC	1
64			min	-1.012	1	.013	15	0	1	0	1	678.422	1	NC	1
65		14	max	-.039	15	.477	1	0	1	0	1	NC	5	NC	1
66			min	-1.01	1	.018	15	0	1	0	1	894.939	3	NC	1
67		15	max	-.039	15	.568	1	0	1	0	1	NC	1	NC	1
68			min	-1.009	1	.022	15	0	1	0	1	558.434	3	NC	1
69		16	max	-.039	15	.609	1	0	1	0	1	NC	4	NC	1
70			min	-1.009	1	.024	15	0	1	0	1	344.123	3	NC	1
71		17	max	-.039	15	.611	1	0	1	0	1	NC	4	NC	1
72			min	-1.009	1	.025	15	0	1	0	1	229.105	3	NC	1
73		18	max	-.039	15	.786	3	0	1	0	1	NC	4	NC	1
74			min	-1.009	1	.025	15	0	1	0	1	165.916	3	NC	1
75		19	max	-.039	15	1.03	3	0	1	0	1	NC	1	NC	1
76			min	-1.009	1	.025	15	0	1	0	1	129.006	3	NC	1
77	M7	1	max	-.022	15	-.033	15	0	15	3.341e-2	2	NC	3	NC	1
78			min	-.529	1	-.874	1	-.018	1	-1.185e-2	3	114.265	1	NC	1
79		2	max	-.022	15	-.029	15	.012	1	3.166e-2	2	NC	3	NC	3
80			min	-.529	1	-.738	1	0	15	-1.148e-2	3	128.347	1	4994.114	1
81		3	max	-.022	15	-.024	15	.028	1	2.823e-2	2	NC	12	NC	3
82			min	-.529	1	-.605	1	.001	15	-1.075e-2	3	145.88	1	3359.15	1
83		4	max	-.022	15	-.02	15	.032	1	2.481e-2	2	9263.906	12	NC	3
84			min	-.529	1	-.482	1	0	12	-1.002e-2	3	166.956	1	3205.246	1
85		5	max	-.022	15	-.016	15	.029	1	2.257e-2	2	NC	12	NC	3
86			min	-.529	1	-.376	1	-.001	3	-9.786e-3	3	190.721	1	3608.863	1
87		6	max	-.022	15	-.013	15	.019	1	2.34e-2	2	NC	12	NC	3
88			min	-.528	1	-.29	1	-.003	3	-1.085e-2	3	215.722	1	5130.437	1
89		7	max	-.022	15	-.01	15	.007	1	2.424e-2	2	NC	3	NC	1
90			min	-.528	1	-.217	1	-.003	3	-1.191e-2	3	242.586	1	NC	1
91		8	max	-.022	15	-.007	15	0	2	2.507e-2	2	8652.143	12	NC	1
92			min	-.527	1	-.152	1	-.001	3	-1.298e-2	3	273.213	1	NC	1
93		9	max	-.022	15	-.004	15	.001	3	2.413e-2	2	6420.843	15	NC	1
94			min	-.527	1	-.087	1	0	2	-1.443e-2	3	312.004	1	NC	1
95		10	max	-.022	15	-.001	15	.002	3	2.152e-2	2	7363.108	15	NC	1
96			min	-.526	1	-.037	3	-.002	1	-1.625e-2	3	365.334	1	NC	1
97		11	max	-.022	15	.047	1	0	15	1.892e-2	2	8663.627	15	NC	1
98			min	-.526	1	-.017	3	0	1	-1.807e-2	3	442.69	1	NC	1
99		12	max	-.022	15	.116	1	.008	1	1.553e-2	2	NC	15	NC	1
100			min	-.525	1	.002	12	-.007	3	-1.689e-2	3	564.932	1	NC	1
101		13	max	-.022	15	.184	1	.012	2	1.133e-2	1	NC	15	NC	1
102			min	-.524	1	.007	15	-.017	3	-1.251e-2	3	775.133	1	7227.905	3
103		14	max	-.022	15	.245	1	.013	2	7.163e-3	1	NC	5	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
104			min	-.523	1	.01	15	-.026	3	-8.134e-3	3	922.313	3	5018.418	3
105		15	max	-.022	15	.295	1	.007	2	2.996e-3	1	NC	2	NC	1
106			min	-.523	1	.013	15	-.025	3	-3.758e-3	3	702.637	3	5071.941	3
107		16	max	-.022	15	.327	1	0	10	5.583e-3	1	NC	5	NC	2
108			min	-.523	1	.014	15	-.017	3	-8.868e-3	3	518.732	3	5508.792	1
109		17	max	-.022	15	.347	1	0	15	8.961e-3	1	NC	4	NC	2
110			min	-.523	1	.016	15	-.02	1	-1.509e-2	3	390.362	3	4501.361	1
111		18	max	-.022	15	.365	3	0	15	1.234e-2	1	NC	1	NC	2
112			min	-.523	1	.017	15	-.01	1	-2.131e-2	3	305.463	3	6029.775	1
113		19	max	-.022	15	.469	3	.015	1	1.406e-2	1	NC	1	NC	1
114			min	-.523	1	.018	15	0	15	-2.449e-2	3	249.281	3	NC	1
115	M10	1	max	.002	1	.418	3	.523	1	1.326e-2	3	NC	1	NC	1
116			min	0	15	.017	15	.022	15	-1.209e-3	2	NC	1	NC	1
117		2	max	.001	1	.79	3	.623	1	1.522e-2	3	NC	5	NC	3
118			min	0	15	-.027	10	.027	15	-1.803e-3	2	709.993	3	2642.445	1
119		3	max	.001	1	1.133	3	.776	1	1.719e-2	3	NC	5	NC	5
120			min	0	15	-.186	2	.033	15	-2.397e-3	2	369.155	3	1042.8	1
121		4	max	.001	1	1.386	3	.931	1	1.916e-2	3	NC	5	NC	15
122			min	0	15	-.297	2	.039	15	-2.992e-3	2	272.725	3	646.511	1
123		5	max	0	1	1.513	3	1.053	1	2.112e-2	3	NC	5	NC	15
124			min	0	15	-.318	2	.044	15	-3.586e-3	2	241.035	3	498.311	1
125		6	max	0	1	1.507	3	1.121	1	2.309e-2	3	NC	5	NC	15
126			min	0	15	-.245	2	.046	15	-4.181e-3	2	242.512	3	441.77	1
127		7	max	0	1	1.384	3	1.131	1	2.505e-2	3	NC	5	NC	15
128			min	0	15	-.096	2	.046	15	-4.775e-3	2	273.173	3	434.477	1
129		8	max	0	1	1.192	3	1.095	1	2.702e-2	3	NC	4	NC	15
130			min	0	15	.011	10	.043	15	-5.37e-3	2	341.112	3	461.932	1
131		9	max	0	1	1.001	3	1.04	1	2.899e-2	3	NC	5	NC	15
132			min	0	15	.022	15	.04	15	-5.964e-3	2	452.7	3	510.995	1
133		10	max	0	1	.911	3	1.009	1	3.095e-2	3	NC	5	NC	5
134			min	0	1	.025	15	.039	15	-6.559e-3	2	535.609	3	543.03	1
135		11	max	0	15	1.001	3	1.04	1	2.899e-2	3	NC	5	NC	15
136			min	0	1	.022	15	.04	15	-5.964e-3	2	452.7	3	510.995	1
137		12	max	0	15	1.192	3	1.095	1	2.702e-2	3	NC	4	NC	15
138			min	0	1	.011	10	.043	15	-5.37e-3	2	341.112	3	461.932	1
139		13	max	0	15	1.384	3	1.131	1	2.505e-2	3	NC	5	NC	15
140			min	0	1	-.096	2	.046	15	-4.775e-3	2	273.173	3	434.477	1
141		14	max	0	15	1.507	3	1.121	1	2.309e-2	3	NC	5	NC	15
142			min	0	1	-.245	2	.046	15	-4.181e-3	2	242.512	3	441.77	1
143		15	max	0	15	1.513	3	1.053	1	2.112e-2	3	NC	5	NC	15
144			min	0	1	-.318	2	.044	15	-3.586e-3	2	241.035	3	498.311	1
145		16	max	0	15	1.386	3	.931	1	1.916e-2	3	NC	5	NC	15
146			min	-.001	1	-.297	2	.039	15	-2.992e-3	2	272.725	3	646.511	1
147		17	max	0	15	1.133	3	.776	1	1.719e-2	3	NC	5	NC	5
148			min	-.001	1	-.186	2	.033	15	-2.397e-3	2	369.155	3	1042.8	1
149		18	max	0	15	.79	3	.623	1	1.522e-2	3	NC	5	NC	3
150			min	-.001	1	-.027	10	.027	15	-1.803e-3	2	709.993	3	2642.445	1
151		19	max	0	15	.418	3	.523	1	1.326e-2	3	NC	1	NC	1
152			min	-.002	1	.017	15	.022	15	-1.209e-3	2	NC	1	NC	1
153	M11	1	max	.003	1	.082	1	.525	1	8.781e-3	1	NC	1	NC	1
154			min	-.003	3	-.007	3	.022	15	3.748e-4	15	NC	1	NC	1
155		2	max	.003	1	.284	3	.601	1	9.832e-3	1	NC	5	NC	3
156			min	-.003	3	-.193	2	.025	15	4.094e-4	15	905.098	3	3465.88	1
157		3	max	.002	1	.549	3	.742	1	1.088e-2	1	NC	5	NC	3
158			min	-.002	3	-.405	2	.031	15	4.439e-4	15	474.273	3	1216.357	1
159		4	max	.002	1	.728	3	.894	1	1.193e-2	1	NC	15	NC	5
160			min	-.002	3	-.536	2	.038	15	4.785e-4	15	359.189	3	715.638	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
161		5	max	.002	1	.786	3	1.019	1	1.298e-2	1	NC	15	NC	15
162			min	-.002	3	-.567	2	.042	15	5.13e-4	15	332.653	3	534.624	1
163		6	max	.001	1	.719	3	1.095	1	1.403e-2	1	NC	5	NC	15
164			min	-.001	3	-.497	2	.045	15	5.476e-4	15	363.529	3	463.508	1
165		7	max	.001	1	.546	3	1.115	1	1.509e-2	1	NC	5	NC	15
166			min	0	3	-.347	2	.045	15	5.821e-4	15	477.189	3	447.631	1
167		8	max	0	1	.315	3	1.089	1	1.614e-2	1	NC	5	NC	15
168			min	0	3	-.155	2	.043	15	6.167e-4	15	820.005	3	468.287	1
169		9	max	0	1	.099	3	1.042	1	1.719e-2	1	NC	4	NC	15
170			min	0	3	.003	15	.04	15	6.513e-4	15	2481.602	3	511.006	1
171		10	max	0	1	.136	1	1.014	1	1.824e-2	1	NC	3	NC	5
172			min	0	1	0	3	.039	15	6.858e-4	15	4853.688	1	539.596	1
173		11	max	0	3	.099	3	1.042	1	1.719e-2	1	NC	4	NC	15
174			min	0	1	.003	15	.04	15	6.513e-4	15	2481.602	3	511.006	1
175		12	max	0	3	.315	3	1.089	1	1.614e-2	1	NC	5	NC	15
176			min	0	1	-.155	2	.043	15	6.167e-4	15	820.005	3	468.287	1
177		13	max	0	3	.546	3	1.115	1	1.509e-2	1	NC	5	NC	15
178			min	-.001	1	-.347	2	.045	15	5.821e-4	15	477.189	3	447.631	1
179		14	max	.001	3	.719	3	1.095	1	1.403e-2	1	NC	5	NC	15
180			min	-.001	1	-.497	2	.045	15	5.476e-4	15	363.529	3	463.508	1
181		15	max	.002	3	.786	3	1.019	1	1.298e-2	1	NC	15	NC	15
182			min	-.002	1	-.567	2	.042	15	5.13e-4	15	332.653	3	534.624	1
183		16	max	.002	3	.728	3	.894	1	1.193e-2	1	NC	15	NC	5
184			min	-.002	1	-.536	2	.038	15	4.785e-4	15	359.189	3	715.638	1
185		17	max	.002	3	.549	3	.742	1	1.088e-2	1	NC	5	NC	3
186			min	-.002	1	-.405	2	.031	15	4.439e-4	15	474.273	3	1216.357	1
187		18	max	.003	3	.284	3	.601	1	9.832e-3	1	NC	5	NC	3
188			min	-.003	1	-.193	2	.025	15	4.094e-4	15	905.098	3	3465.88	1
189		19	max	.003	3	.082	1	.525	1	8.781e-3	1	NC	1	NC	1
190			min	-.003	1	-.007	3	.022	15	3.748e-4	15	NC	1	NC	1
191	M12	1	max	0	3	-.006	15	.527	1	8.214e-3	1	NC	1	NC	1
192			min	0	1	-.121	1	.022	15	3.505e-4	15	NC	1	NC	1
193		2	max	0	3	.12	3	.591	1	8.977e-3	1	NC	5	NC	3
194			min	0	1	-.463	1	.025	15	3.774e-4	15	706.764	2	4122.697	1
195		3	max	0	3	.268	3	.726	1	9.74e-3	1	NC	5	NC	5
196			min	0	1	-.773	2	.031	15	4.043e-4	15	379.805	2	1328.969	1
197		4	max	0	3	.354	3	.876	1	1.05e-2	1	NC	15	NC	5
198			min	0	1	-.984	2	.037	15	4.312e-4	15	291.282	2	756.565	1
199		5	max	0	3	.368	3	1.003	1	1.127e-2	1	NC	15	NC	15
200			min	0	1	-1.055	2	.042	15	4.581e-4	15	270.237	2	554.87	1
201		6	max	0	3	.314	3	1.083	1	1.203e-2	1	NC	15	NC	15
202			min	0	1	-.982	2	.045	15	4.85e-4	15	291.876	2	474.988	1
203		7	max	0	3	.206	3	1.108	1	1.279e-2	1	NC	15	NC	15
204			min	0	1	-.793	2	.045	15	5.119e-4	15	369.377	2	454.088	1
205		8	max	0	3	.073	3	1.088	1	1.355e-2	1	NC	5	NC	15
206			min	0	1	-.567	1	.043	15	5.388e-4	15	572.364	2	470.851	1
207		9	max	0	3	-.013	15	1.045	1	1.432e-2	1	NC	3	NC	15
208			min	0	1	-.359	1	.04	15	5.657e-4	15	1109.678	1	510.022	1
209		10	max	0	1	-.01	15	1.019	1	1.508e-2	1	NC	5	NC	5
210			min	0	1	-.264	1	.039	15	5.926e-4	15	1852.448	1	536.716	1
211		11	max	0	1	-.013	15	1.045	1	1.432e-2	1	NC	3	NC	15
212			min	0	3	-.359	1	.04	15	5.657e-4	15	1109.678	1	510.022	1
213		12	max	0	1	.073	3	1.088	1	1.355e-2	1	NC	5	NC	15
214			min	0	3	-.567	1	.043	15	5.388e-4	15	572.364	2	470.851	1
215		13	max	0	1	.206	3	1.108	1	1.279e-2	1	NC	15	NC	15
216			min	0	3	-.793	2	.045	15	5.119e-4	15	369.377	2	454.088	1
217		14	max	0	1	.314	3	1.083	1	1.203e-2	1	NC	15	NC	15

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
218			min	0	3	-.982	2	.045	15	4.85e-4	15	291.876	2	474.988	1
219		15	max	0	1	.368	3	1.003	1	1.127e-2	1	NC	15	NC	15
220			min	0	3	-1.055	2	.042	15	4.581e-4	15	270.237	2	554.87	1
221		16	max	0	1	.354	3	.876	1	1.05e-2	1	NC	15	NC	5
222			min	0	3	-.984	2	.037	15	4.312e-4	15	291.282	2	756.565	1
223		17	max	0	1	.268	3	.726	1	9.74e-3	1	NC	5	NC	5
224			min	0	3	-.773	2	.031	15	4.043e-4	15	379.805	2	1328.969	1
225		18	max	0	1	.12	3	.591	1	8.977e-3	1	NC	5	NC	3
226			min	0	3	-.463	1	.025	15	3.774e-4	15	706.764	2	4122.697	1
227		19	max	0	1	-.006	15	.527	1	8.214e-3	1	NC	1	NC	1
228			min	0	3	-.121	1	.022	15	3.505e-4	15	NC	1	NC	1
229	M13	1	max	0	15	-.031	15	.529	1	1.726e-2	1	NC	1	NC	1
230			min	-.002	1	-.807	1	.022	15	-1.513e-3	3	NC	1	NC	1
231		2	max	0	15	.065	3	.636	1	1.961e-2	1	NC	5	NC	3
232			min	-.002	1	-1.262	1	.027	15	-2.1e-3	3	539.342	2	2460.946	1
233		3	max	0	15	.207	3	.794	1	2.196e-2	1	NC	15	NC	5
234			min	-.002	1	-1.669	1	.034	15	-2.686e-3	3	285.702	2	995.808	1
235		4	max	0	15	.295	3	.952	1	2.431e-2	1	8324.892	15	NC	15
236			min	-.001	1	-1.973	1	.04	15	-3.273e-3	3	212.48	2	624.712	1
237		5	max	0	15	.319	3	1.074	1	2.666e-2	1	7189.063	15	NC	15
238			min	-.001	1	-2.145	1	.045	15	-3.859e-3	3	187.025	2	484.78	1
239		6	max	0	15	.278	3	1.141	1	2.901e-2	1	6920.143	15	NC	15
240			min	0	1	-2.178	1	.047	15	-4.446e-3	3	185.111	2	431.605	1
241		7	max	0	15	.185	3	1.149	1	3.136e-2	1	7241.537	15	NC	15
242			min	0	1	-2.091	1	.046	15	-5.033e-3	3	201.673	2	425.631	1
243		8	max	0	15	.065	3	1.112	1	3.371e-2	1	8064.517	15	NC	15
244			min	0	1	-1.93	1	.044	15	-5.619e-3	3	235.149	1	453.243	1
245		9	max	0	15	-.036	12	1.055	1	3.606e-2	1	9194.959	15	NC	15
246			min	0	1	-1.762	1	.041	15	-6.206e-3	3	276.581	1	501.697	1
247		10	max	0	1	-.058	15	1.024	1	3.84e-2	1	NC	3	NC	5
248			min	0	1	-1.68	1	.039	15	-6.792e-3	3	302.31	1	533.164	1
249		11	max	0	1	-.036	12	1.055	1	3.606e-2	1	9194.959	15	NC	15
250			min	0	15	-1.762	1	.041	15	-6.206e-3	3	276.581	1	501.697	1
251		12	max	0	1	.065	3	1.112	1	3.371e-2	1	8064.517	15	NC	15
252			min	0	15	-1.93	1	.044	15	-5.619e-3	3	235.149	1	453.243	1
253		13	max	0	1	.185	3	1.149	1	3.136e-2	1	7241.537	15	NC	15
254			min	0	15	-2.091	1	.046	15	-5.033e-3	3	201.673	2	425.631	1
255		14	max	0	1	.278	3	1.141	1	2.901e-2	1	6920.143	15	NC	15
256			min	0	15	-2.178	1	.047	15	-4.446e-3	3	185.111	2	431.605	1
257		15	max	.001	1	.319	3	1.074	1	2.666e-2	1	7189.063	15	NC	15
258			min	0	15	-2.145	1	.045	15	-3.859e-3	3	187.025	2	484.78	1
259		16	max	.001	1	.295	3	.952	1	2.431e-2	1	8324.892	15	NC	15
260			min	0	15	-1.973	1	.04	15	-3.273e-3	3	212.48	2	624.712	1
261		17	max	.002	1	.207	3	.794	1	2.196e-2	1	NC	15	NC	5
262			min	0	15	-1.669	1	.034	15	-2.686e-3	3	285.702	2	995.808	1
263		18	max	.002	1	.065	3	.636	1	1.961e-2	1	NC	5	NC	3
264			min	0	15	-1.262	1	.027	15	-2.1e-3	3	539.342	2	2460.946	1
265		19	max	.002	1	-.031	15	.529	1	1.726e-2	1	NC	1	NC	1
266			min	0	15	-.807	1	.022	15	-1.513e-3	3	NC	1	NC	1
267	M2	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
268			min	0	1	0	1	0	1	0	1	NC	1	NC	1
269		2	max	0	3	0	15	0	3	6.142e-3	2	NC	1	NC	1
270			min	0	1	-.003	1	0	1	-2.613e-3	3	NC	1	NC	1
271		3	max	0	3	0	15	.001	3	8.665e-3	2	NC	2	NC	1
272			min	0	1	-.01	1	-.001	1	-3.635e-3	3	7557.756	1	NC	1
273		4	max	0	3	0	15	.002	3	7.964e-3	2	NC	4	NC	1
274			min	0	1	-.023	1	-.002	1	-3.241e-3	3	3355.6	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
275		5	max	0	3	-.002	15	.004	3	7.264e-3	2	NC	5	NC	1
276			min	0	1	-.041	1	-.004	1	-2.847e-3	3	1909.264	1	NC	1
277		6	max	0	3	-.003	15	.005	3	6.563e-3	2	NC	5	NC	1
278			min	0	1	-.063	1	-.006	1	-2.452e-3	3	1241.076	1	NC	1
279		7	max	0	3	-.004	15	.007	3	5.863e-3	2	NC	5	NC	1
280			min	0	1	-.088	1	-.008	1	-2.058e-3	3	877.203	1	9323.132	2
281		8	max	0	3	-.005	15	.008	3	5.162e-3	2	NC	15	NC	4
282			min	0	1	-.118	1	-.01	1	-1.663e-3	3	656.923	1	7630.292	2
283		9	max	0	3	-.006	15	.009	3	4.462e-3	2	NC	15	NC	4
284			min	-.001	1	-.151	1	-.012	1	-1.269e-3	3	513.114	1	6529.126	2
285		10	max	0	3	-.008	15	.01	3	3.761e-3	2	9708.085	15	NC	4
286			min	-.001	1	-.187	1	-.014	1	-8.744e-4	3	414.01	1	5803.172	2
287		11	max	0	3	-.01	15	.01	3	3.061e-3	2	8039.143	15	NC	4
288			min	-.001	1	-.226	1	-.015	1	-4.8e-4	3	342.66	1	5341.896	2
289		12	max	.001	3	-.011	15	.01	3	2.36e-3	2	6796.802	15	NC	4
290			min	-.001	1	-.268	1	-.016	1	-8.552e-5	3	289.587	1	5086.78	2
291		13	max	.001	3	-.013	15	.008	3	1.66e-3	2	5845.863	15	NC	4
292			min	-.002	1	-.312	1	-.017	1	1.211e-5	15	248.988	1	5021.566	2
293		14	max	.001	3	-.015	15	.006	3	9.595e-4	2	5101.721	15	NC	3
294			min	-.002	1	-.357	1	-.017	1	-1.003e-4	9	217.233	1	5164.489	2
295		15	max	.001	3	-.017	15	.003	3	1.098e-3	3	4508.263	15	NC	3
296			min	-.002	1	-.404	1	-.016	1	-3.747e-4	9	191.919	1	5594.502	2
297		16	max	.001	3	-.019	15	0	15	1.492e-3	3	4027.406	15	NC	3
298			min	-.002	1	-.453	1	-.015	1	-9.998e-4	1	171.415	1	6527.086	2
299		17	max	.001	3	-.021	15	0	15	1.887e-3	3	3632.509	15	NC	4
300			min	-.002	1	-.502	1	-.012	1	-1.681e-3	1	154.582	1	8637.132	2
301		18	max	.002	3	-.023	15	.001	10	2.281e-3	3	3304.401	15	NC	1
302			min	-.002	1	-.552	1	-.015	3	-2.362e-3	1	140.6	1	5128.3	3
303		19	max	.002	3	-.026	15	.005	2	2.676e-3	3	3029.102	15	NC	1
304			min	-.002	1	-.602	1	-.024	3	-3.044e-3	1	128.871	1	3231.553	3
305	M5	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
306			min	0	1	0	1	0	1	0	1	NC	1	NC	1
307		2	max	0	3	0	15	0	1	0	1	NC	1	NC	1
308			min	0	1	-.004	1	0	1	0	1	NC	1	NC	1
309		3	max	0	3	0	15	0	1	0	1	NC	4	NC	1
310			min	0	1	-.019	1	0	1	0	1	4085.26	1	NC	1
311		4	max	0	3	-.002	15	0	1	0	1	NC	5	NC	1
312			min	-.001	1	-.044	1	0	1	0	1	1781.587	1	NC	1
313		5	max	.001	3	-.003	15	0	1	0	1	NC	5	NC	1
314			min	-.002	1	-.077	1	0	1	0	1	1005.739	1	NC	1
315		6	max	.001	3	-.005	15	0	1	0	1	NC	5	NC	1
316			min	-.002	1	-.119	1	0	1	0	1	650.889	1	NC	1
317		7	max	.002	3	-.007	15	0	1	0	1	NC	15	NC	1
318			min	-.002	1	-.169	1	0	1	0	1	458.767	1	NC	1
319		8	max	.002	3	-.009	15	0	1	0	1	8909.986	15	NC	1
320			min	-.003	1	-.226	1	0	1	0	1	342.9	1	NC	1
321		9	max	.002	3	-.011	15	0	1	0	1	6958.907	15	NC	1
322			min	-.003	1	-.29	1	0	1	0	1	267.458	1	NC	1
323		10	max	.002	3	-.014	15	0	1	0	1	5614.491	15	NC	1
324			min	-.003	1	-.36	1	0	1	0	1	215.571	1	NC	1
325		11	max	.003	3	-.017	15	0	1	0	1	4646.669	15	NC	1
326			min	-.004	1	-.435	1	0	1	0	1	178.27	1	NC	1
327		12	max	.003	3	-.02	15	0	1	0	1	3926.818	15	NC	1
328			min	-.004	1	-.515	1	0	1	0	1	150.559	1	NC	1
329		13	max	.003	3	-.023	15	0	1	0	1	3376.177	15	NC	1
330			min	-.004	1	-.6	1	0	1	0	1	129.38	1	NC	1
331		14	max	.004	3	-.026	15	0	1	0	1	2945.518	15	NC	1

Envelope Member Section Deflections (Continued)

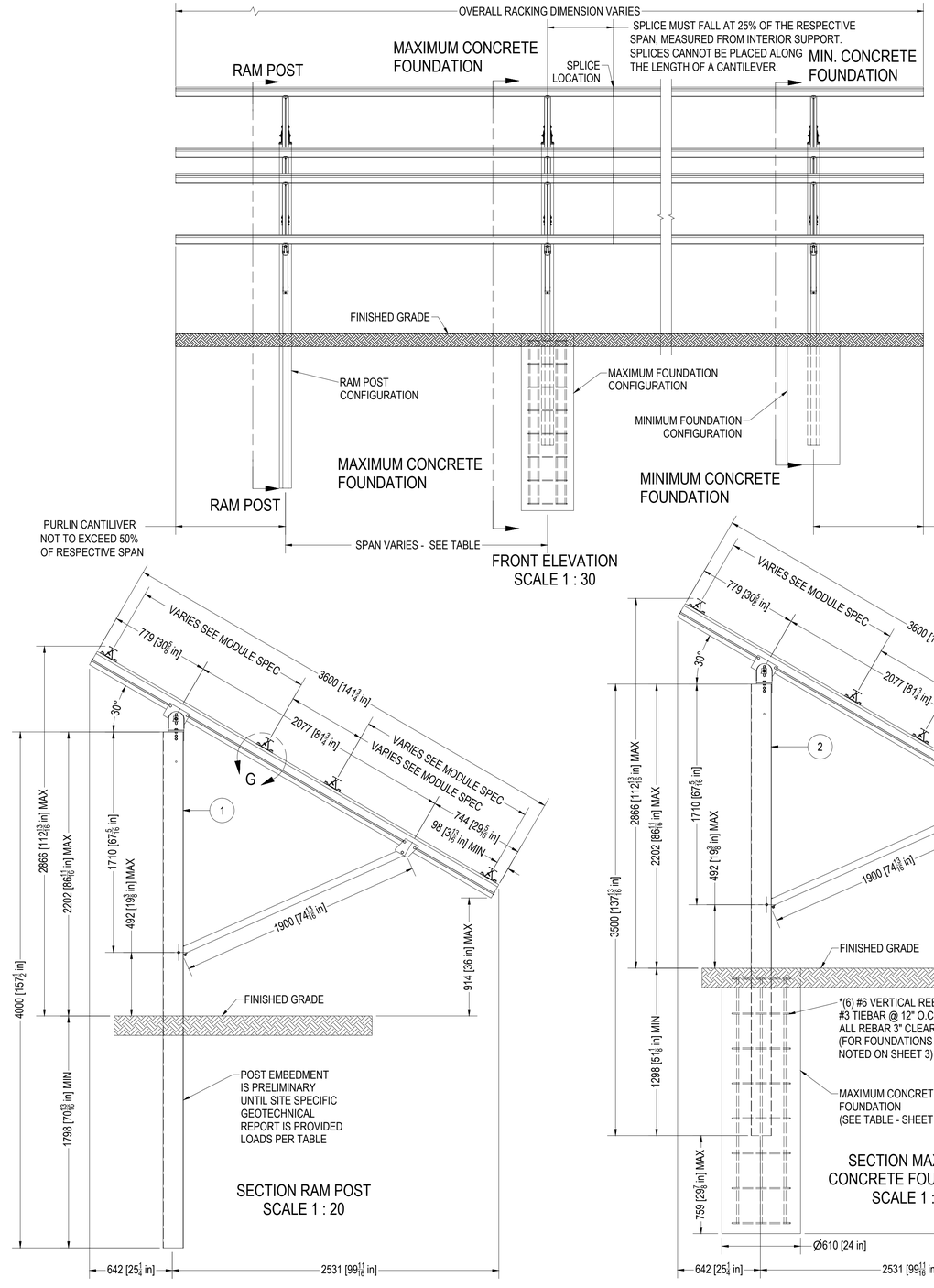
	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
332			min	-.005	1	-.688	1	0	1	0	1	112.829	1	NC	1
333		15	max	.004	3	-.03	15	0	1	0	1	2602.222	15	NC	1
334			min	-.005	1	-.779	1	0	1	0	1	99.644	1	NC	1
335		16	max	.004	3	-.033	15	0	1	0	1	2324.171	15	NC	1
336			min	-.005	1	-.872	1	0	1	0	1	88.971	1	NC	1
337		17	max	.004	3	-.037	15	0	1	0	1	2095.904	15	NC	1
338			min	-.006	1	-.967	1	0	1	0	1	80.213	1	NC	1
339		18	max	.005	3	-.041	15	0	1	0	1	1906.3	15	NC	1
340			min	-.006	1	-1.064	1	0	1	0	1	72.941	1	NC	1
341		19	max	.005	3	-.044	15	0	1	0	1	1747.255	15	NC	1
342			min	-.006	1	-1.161	1	0	1	0	1	66.843	1	NC	1
343	M8	1	max	0	1	0	1	0	1	0	1	NC	1	NC	1
344			min	0	1	0	1	0	1	0	1	NC	1	NC	1
345		2	max	0	3	0	15	0	1	2.613e-3	3	NC	1	NC	1
346			min	0	1	-.003	1	0	3	-6.142e-3	2	NC	1	NC	1
347		3	max	0	3	0	15	.001	1	3.635e-3	3	NC	2	NC	1
348			min	0	1	-.01	1	-.001	3	-8.665e-3	2	7557.756	1	NC	1
349		4	max	0	3	0	15	.002	1	3.241e-3	3	NC	4	NC	1
350			min	0	1	-.023	1	-.002	3	-7.964e-3	2	3355.6	1	NC	1
351		5	max	0	3	-.002	15	.004	1	2.847e-3	3	NC	5	NC	1
352			min	0	1	-.041	1	-.004	3	-7.264e-3	2	1909.264	1	NC	1
353		6	max	0	3	-.003	15	.006	1	2.452e-3	3	NC	5	NC	1
354			min	0	1	-.063	1	-.005	3	-6.563e-3	2	1241.076	1	NC	1
355		7	max	0	3	-.004	15	.008	1	2.058e-3	3	NC	5	NC	1
356			min	0	1	-.088	1	-.007	3	-5.863e-3	2	877.203	1	9323.132	2
357		8	max	0	3	-.005	15	.01	1	1.663e-3	3	NC	15	NC	4
358			min	0	1	-.118	1	-.008	3	-5.162e-3	2	656.923	1	7630.292	2
359		9	max	0	3	-.006	15	.012	1	1.269e-3	3	NC	15	NC	4
360			min	-.001	1	-.151	1	-.009	3	-4.462e-3	2	513.114	1	6529.126	2
361		10	max	0	3	-.008	15	.014	1	8.744e-4	3	9708.085	15	NC	4
362			min	-.001	1	-.187	1	-.01	3	-3.761e-3	2	414.01	1	5803.172	2
363		11	max	0	3	-.01	15	.015	1	4.8e-4	3	8039.143	15	NC	4
364			min	-.001	1	-.226	1	-.01	3	-3.061e-3	2	342.66	1	5341.896	2
365		12	max	.001	3	-.011	15	.016	1	8.552e-5	3	6796.802	15	NC	4
366			min	-.001	1	-.268	1	-.01	3	-2.36e-3	2	289.587	1	5086.78	2
367		13	max	.001	3	-.013	15	.017	1	-1.211e-5	15	5845.863	15	NC	4
368			min	-.002	1	-.312	1	-.008	3	-1.66e-3	2	248.988	1	5021.566	2
369		14	max	.001	3	-.015	15	.017	1	1.003e-4	9	5101.721	15	NC	3
370			min	-.002	1	-.357	1	-.006	3	-9.595e-4	2	217.233	1	5164.489	2
371		15	max	.001	3	-.017	15	.016	1	3.747e-4	9	4508.263	15	NC	3
372			min	-.002	1	-.404	1	-.003	3	-1.098e-3	3	191.919	1	5594.502	2
373		16	max	.001	3	-.019	15	.015	1	9.998e-4	1	4027.406	15	NC	3
374			min	-.002	1	-.453	1	0	15	-1.492e-3	3	171.415	1	6527.086	2
375		17	max	.001	3	-.021	15	.012	1	1.681e-3	1	3632.509	15	NC	4
376			min	-.002	1	-.502	1	0	15	-1.887e-3	3	154.582	1	8637.132	2
377		18	max	.002	3	-.023	15	.015	3	2.362e-3	1	3304.401	15	NC	1
378			min	-.002	1	-.552	1	-.001	10	-2.281e-3	3	140.6	1	5128.3	3
379		19	max	.002	3	-.026	15	.024	3	3.044e-3	1	3029.102	15	NC	1
380			min	-.002	1	-.602	1	-.005	2	-2.676e-3	3	128.871	1	3231.553	3
381	M3	1	max	.005	1	0	15	0	3	3.417e-3	2	NC	1	NC	1
382			min	0	15	-.002	1	0	1	-1.352e-3	3	NC	1	NC	1
383		2	max	.004	1	-.002	15	.016	3	3.974e-3	2	NC	1	NC	4
384			min	0	15	-.041	1	-.036	2	-1.609e-3	3	NC	1	2085.729	2
385		3	max	.004	1	-.004	15	.031	3	4.53e-3	2	NC	1	NC	5
386			min	0	15	-.079	1	-.072	2	-1.866e-3	3	NC	1	1050.981	2
387		4	max	.003	3	-.006	15	.046	3	5.086e-3	2	NC	1	NC	5
388			min	0	10	-.117	1	-.106	2	-2.124e-3	3	NC	1	710.761	2

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
389		5	max	.003	3	-.008	15	.06	3	5.643e-3	2	NC	1	NC	5
390			min	0	10	-.155	1	-.138	2	-2.381e-3	3	NC	1	544.481	2
391		6	max	.004	3	-.01	15	.072	3	6.199e-3	2	NC	1	NC	5
392			min	0	10	-.192	1	-.167	2	-2.638e-3	3	NC	1	448.166	2
393		7	max	.004	3	-.011	15	.084	3	6.756e-3	2	NC	1	NC	15
394			min	-.001	2	-.23	1	-.193	2	-2.895e-3	3	8990.605	4	387.317	2
395		8	max	.004	3	-.013	15	.093	3	7.312e-3	2	NC	1	NC	15
396			min	-.002	2	-.267	1	-.215	2	-3.152e-3	3	8301.976	4	347.335	2
397		9	max	.005	3	-.015	15	.101	3	7.868e-3	2	NC	1	NC	15
398			min	-.003	2	-.305	1	-.232	2	-3.41e-3	3	7931.316	4	321.158	2
399		10	max	.005	3	-.016	15	.106	3	8.425e-3	2	NC	1	NC	15
400			min	-.003	2	-.342	1	-.243	2	-3.667e-3	3	7814.056	4	305.186	2
401		11	max	.005	3	-.018	15	.108	3	8.981e-3	2	NC	1	NC	15
402			min	-.004	2	-.378	1	-.248	2	-3.924e-3	3	7931.316	4	297.731	2
403		12	max	.005	3	-.019	15	.108	3	9.538e-3	2	NC	1	NC	15
404			min	-.005	2	-.415	1	-.247	2	-4.181e-3	3	8301.976	4	298.446	2
405		13	max	.006	3	-.021	15	.104	3	1.009e-2	2	NC	1	NC	15
406			min	-.006	2	-.451	1	-.237	2	-4.438e-3	3	8990.605	4	308.322	2
407		14	max	.006	3	-.022	15	.097	3	1.065e-2	2	NC	1	NC	15
408			min	-.006	2	-.487	1	-.219	2	-4.696e-3	3	NC	1	330.298	2
409		15	max	.006	3	-.023	15	.087	3	1.121e-2	2	NC	1	NC	15
410			min	-.007	2	-.523	1	-.193	2	-4.953e-3	3	NC	1	371.179	2
411		16	max	.007	3	-.025	15	.072	3	1.176e-2	2	NC	1	NC	5
412			min	-.008	2	-.559	1	-.156	2	-5.21e-3	3	NC	1	447.663	2
413		17	max	.007	3	-.026	15	.052	3	1.232e-2	2	NC	1	NC	5
414			min	-.008	2	-.594	1	-.109	2	-5.467e-3	3	NC	1	610.688	2
415		18	max	.007	3	-.027	15	.028	3	1.288e-2	2	NC	1	NC	5
416			min	-.009	2	-.63	1	-.051	2	-5.724e-3	3	NC	1	1116.131	2
417		19	max	.007	3	-.028	15	.03	1	1.343e-2	2	NC	1	NC	1
418			min	-.01	2	-.665	1	0	3	-5.981e-3	3	NC	1	NC	1
419	M6	1	max	.009	1	0	15	0	1	0	1	NC	1	NC	1
420			min	0	15	-.005	1	0	1	0	1	NC	1	NC	1
421		2	max	.007	1	-.003	15	0	1	0	1	NC	1	NC	1
422			min	0	15	-.078	1	0	1	0	1	NC	1	NC	1
423		3	max	.007	3	-.006	15	0	1	0	1	NC	1	NC	1
424			min	0	10	-.151	1	0	1	0	1	NC	1	NC	1
425		4	max	.008	3	-.01	15	0	1	0	1	NC	1	NC	1
426			min	0	10	-.224	1	0	1	0	1	NC	1	NC	1
427		5	max	.009	3	-.013	15	0	1	0	1	NC	1	NC	1
428			min	-.003	2	-.297	1	0	1	0	1	NC	1	NC	1
429		6	max	.01	3	-.016	15	0	1	0	1	NC	1	NC	1
430			min	-.005	2	-.369	1	0	1	0	1	NC	1	NC	1
431		7	max	.011	3	-.019	15	0	1	0	1	NC	1	NC	1
432			min	-.007	2	-.442	1	0	1	0	1	8990.605	4	NC	1
433		8	max	.012	3	-.021	15	0	1	0	1	NC	1	NC	1
434			min	-.009	2	-.514	1	0	1	0	1	8301.976	4	NC	1
435		9	max	.013	3	-.024	15	0	1	0	1	NC	1	NC	1
436			min	-.011	2	-.586	1	0	1	0	1	7931.316	4	NC	1
437		10	max	.014	3	-.027	15	0	1	0	1	NC	1	NC	1
438			min	-.013	2	-.658	1	0	1	0	1	7814.056	4	NC	1
439		11	max	.014	3	-.03	15	0	1	0	1	NC	1	NC	1
440			min	-.015	2	-.73	1	0	1	0	1	7931.316	4	NC	1
441		12	max	.015	3	-.032	15	0	1	0	1	NC	1	NC	1
442			min	-.017	2	-.801	1	0	1	0	1	8301.976	4	NC	1
443		13	max	.016	3	-.035	15	0	1	0	1	NC	1	NC	1
444			min	-.019	2	-.872	1	0	1	0	1	8990.605	4	NC	1
445		14	max	.017	3	-.037	15	0	1	0	1	NC	1	NC	1

Envelope Member Section Deflections (Continued)

	Member	Sec		x [in]	LC	y [in]	LC	z [in]	LC	x Rotate [r...	LC	(n) L/y Ratio	LC	(n) L/z Ratio	LC
446			min	-.021	2	-.943	1	0	1	0	1	NC	1	NC	1
447		15	max	.018	3	-.04	15	0	1	0	1	NC	1	NC	1
448			min	-.024	2	-1.014	1	0	1	0	1	NC	1	NC	1
449		16	max	.019	3	-.042	15	0	1	0	1	NC	1	NC	1
450			min	-.026	2	-1.085	1	0	1	0	1	NC	1	NC	1
451		17	max	.02	3	-.045	15	0	1	0	1	NC	1	NC	1
452			min	-.028	2	-1.155	1	0	1	0	1	NC	1	NC	1
453		18	max	.021	3	-.047	15	0	1	0	1	NC	1	NC	1
454			min	-.03	2	-1.226	1	0	1	0	1	NC	1	NC	1
455		19	max	.022	3	-.049	15	0	1	0	1	NC	1	NC	1
456			min	-.032	2	-1.296	1	0	1	0	1	NC	1	NC	1
457	M9	1	max	.005	1	0	15	0	1	1.352e-3	3	NC	1	NC	1
458			min	0	15	-.002	1	0	3	-3.417e-3	2	NC	1	NC	1
459		2	max	.004	1	-.002	15	.036	2	1.609e-3	3	NC	1	NC	4
460			min	0	15	-.041	1	-.016	3	-3.974e-3	2	NC	1	2085.729	2
461		3	max	.004	1	-.004	15	.072	2	1.866e-3	3	NC	1	NC	5
462			min	0	15	-.079	1	-.031	3	-4.53e-3	2	NC	1	1050.981	2
463		4	max	.003	3	-.006	15	.106	2	2.124e-3	3	NC	1	NC	5
464			min	0	10	-.117	1	-.046	3	-5.086e-3	2	NC	1	710.761	2
465		5	max	.003	3	-.008	15	.138	2	2.381e-3	3	NC	1	NC	5
466			min	0	10	-.155	1	-.06	3	-5.643e-3	2	NC	1	544.481	2
467		6	max	.004	3	-.01	15	.167	2	2.638e-3	3	NC	1	NC	5
468			min	0	10	-.192	1	-.072	3	-6.199e-3	2	NC	1	448.166	2
469		7	max	.004	3	-.011	15	.193	2	2.895e-3	3	NC	1	NC	15
470			min	-.001	2	-.23	1	-.084	3	-6.756e-3	2	8990.605	4	387.317	2
471		8	max	.004	3	-.013	15	.215	2	3.152e-3	3	NC	1	NC	15
472			min	-.002	2	-.267	1	-.093	3	-7.312e-3	2	8301.976	4	347.335	2
473		9	max	.005	3	-.015	15	.232	2	3.41e-3	3	NC	1	NC	15
474			min	-.003	2	-.305	1	-.101	3	-7.868e-3	2	7931.316	4	321.158	2
475		10	max	.005	3	-.016	15	.243	2	3.667e-3	3	NC	1	NC	15
476			min	-.003	2	-.342	1	-.106	3	-8.425e-3	2	7814.056	4	305.186	2
477		11	max	.005	3	-.018	15	.248	2	3.924e-3	3	NC	1	NC	15
478			min	-.004	2	-.378	1	-.108	3	-8.981e-3	2	7931.316	4	297.731	2
479		12	max	.005	3	-.019	15	.247	2	4.181e-3	3	NC	1	NC	15
480			min	-.005	2	-.415	1	-.108	3	-9.538e-3	2	8301.976	4	298.446	2
481		13	max	.006	3	-.021	15	.237	2	4.438e-3	3	NC	1	NC	15
482			min	-.006	2	-.451	1	-.104	3	-1.009e-2	2	8990.605	4	308.322	2
483		14	max	.006	3	-.022	15	.219	2	4.696e-3	3	NC	1	NC	15
484			min	-.006	2	-.487	1	-.097	3	-1.065e-2	2	NC	1	330.298	2
485		15	max	.006	3	-.023	15	.193	2	4.953e-3	3	NC	1	NC	15
486			min	-.007	2	-.523	1	-.087	3	-1.121e-2	2	NC	1	371.179	2
487		16	max	.007	3	-.025	15	.156	2	5.21e-3	3	NC	1	NC	5
488			min	-.008	2	-.559	1	-.072	3	-1.176e-2	2	NC	1	447.663	2
489		17	max	.007	3	-.026	15	.109	2	5.467e-3	3	NC	1	NC	5
490			min	-.008	2	-.594	1	-.052	3	-1.232e-2	2	NC	1	610.688	2
491		18	max	.007	3	-.027	15	.051	2	5.724e-3	3	NC	1	NC	5
492			min	-.009	2	-.63	1	-.028	3	-1.288e-2	2	NC	1	1116.131	2
493		19	max	.007	3	-.028	15	0	3	5.981e-3	3	NC	1	NC	1
494			min	-.01	2	-.665	1	-.03	1	-1.343e-2	2	NC	1	NC	1

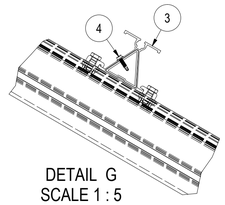


FRONT ELEVATION
SCALE 1 : 30

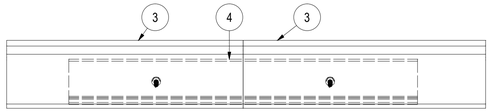
SECTION RAM POST
SCALE 1 : 20

SECTION MAXIMUM CONCRETE FOUNDATION
SCALE 1 : 20

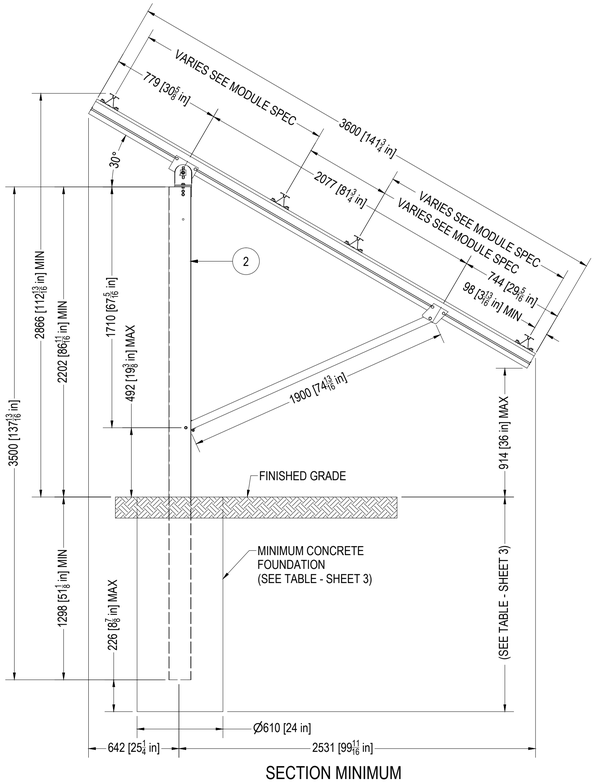
PARTS LIST		
ITEM	PART NUMBER	DESCRIPTION
1	140003-008	Standard, FS, Ram Post, 72 Cell, 30°, Triangle
2	140004-008	Standard, FS, Foundation, 72 Cell, 30°, Triangle
3	124303-06200	Rail, S1.5, L = 6200 mm
4	129303-000	Splice, S1.5, Kit



DETAIL G
SCALE 1 : 5



SPLICE DETAIL
SCALE 1 : 4



SECTION MINIMUM CONCRETE FOUNDATION
SCALE 1 : 20

DESIGN CRITERIA:
FOR STRUCTURAL DESIGN INFORMATION AND APPLICABLE BUILDING CODES, REFERENCE ACCOMPANYING LETTER OF ACCEPTANCE AND CALCULATIONS.

LOADS:
MODULE DEAD LOAD = 3.0 PSF, MIN 1.75 PSF
SNOW LOAD = SEE TABLE FOR SPECIFIC SNOW LOAD
Is = 1.00, Ct= 1.20, Ce = 0.90, Cs = 0.91

SEISMIC LOADS:
SEISMIC DESIGN CATEGORY: E
SOIL SITE CLASS = D
Sds = 1.67 SD1 = 1.4
Ie = 1.0 SS = 2.5
S1 = 1.0 R = 1.25

WIND DESIGN:
BASIC WIND SPEED = SEE TABLE FOR SPECIFIC WIND SPEED
EXPOSURE: C
RISK CATEGORY = II (ASCE 7-10)
Iw = 1.0 (ASCE 7-05)

INSTALLATION TOLERANCES:
LATERAL POST PLACEMENT IS ±5.0"
TOTAL LATERAL DEVIATION OF POSTS WITHIN AN ARRAY IS ±5.0"
POST HEIGHT VARIATION TOLERANCE IS ±0.40"
POST VERTICALITY TOLERANCE <2.0° IN ALL DIRECTIONS
POST ROTATIONAL TOLERANCE <±7.0°
ARRAY TILT ANGULAR TOLERANCE ±1.0°

GENERAL:
1. THE STRUCTURAL CONSTRUCTION DOCUMENTS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OR SEQUENCE OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. THE STRUCTURAL ENGINEER SHALL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S MEANS, METHODS, TECHNIQUES, SEQUENCES FOR PROCEDURE OF CONSTRUCTION, OR THE SAFETY PRECAUTIONS AND THE PROGRAMS INCIDENT THERE TO (NOR SHALL OBSERVATION VISITS TO THE SITE INCLUDE INSPECTION OF THESE ITEMS). THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND IMPLEMENTATION OF ALL SCAFFOLDING, BRACING AND SHORING.
2. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDA.

ALUMINUM:
1. ALL ALUMINUM SHALL CONFORM WITH THE LATEST ALUMINUM DESIGN HANDBOOK.
2. ALL ALUMINUM SECTIONS SHALL BE:
a. SEMI-HOLLOWS AND HOLLOWS SHALL BE 6105-T5, 6005A-T6, OR 6005-T5
b. SOLIDS SHALL BE 6063-T6

STEEL:
1: ALL BOLTS AND WASHERS SHALL BE 304 STAINLESS STEEL CLASS 2 (A2-70).
2. ALL NUTS SHALL BE 316 STAINLESS STEEL CLASS 2 (A4-70)

TORQUE:
TORX BOLT FOR RAPID 2+ MODULE CLAMPS IS 14 N-M (10.5 FT-LBS)
M6 AND 1/4" BOLT TORQUE IS 6 N-M (4.5 FT-LBS)
M8 AND 5/16" BOLT TORQUE IS 14 N-M (10.5 FT-LBS)
M10 AND 3/8" BOLT TORQUE IS 30 N-M (23 FT-LBS)
M12 AND 1/2" BOLT TORQUE IS 50 N-M (37 FT-LBS)
M16 AND 5/8" BOLT TORQUE IS 121 N-M (89 FT-LBS)
M20 AND 3/4" BOLT TORQUE IS 244 N-M (180 FT-LBS)

NOTE: RECOMMENDED SPEED FOR INSTALLATION OF SELF-DRILLING 1/4" DIAMETER SCREWS IS 1200-1800 RPMS.

MODULE SIZE:
RACKING SYSTEM DESIGNED FOR MODULE SIZE: MINIMUM = 1900 X 970
VERTICAL MODULE GAP: 23 mm MAXIMUM = 2000 X 1050
HORIZONTAL MODULE GAP: 5 mm

NOTE:
1. MODULES MUST BE CENTERED ON ARRAY
2. ARRAY LENGTH NOT TO EXCEED 150 FT

RAM POST FOUNDATIONS:
1. FOUNDATION DESIGN IS BASED UPON GEOTECHNICAL REPORT/TESTING REQUIREMENTS. ALL CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF THE GEOTECHNICAL REPORT.
2. THE STRUCTURAL ENGINEER IS NOT RESPONSIBLE FOR ANY GEOTECHNICAL ASPECTS OF THIS PROJECT. IF THE INSTALLER NOTICES ANY SOIL THAT HAS DIFFERENT DRIVING CHARACTERISTICS THAN EXISTED FOR TESTED DRIVEN POSTS, CONTACT THE ENGINEER IMMEDIATELY.
NOTE:
THE POST EMBEDMENT DEPTH IS PRELIMINARY AND SHALL BE VERIFIED BY THE STRUCTURAL ENGINEER OF RECORD PRIOR TO CONSTRUCTION. BASED UPON ON SITE TESTING BY THE GEOTECHNICAL ENGINEER.

CONCRETE FOUNDATIONS:
1. NO SOILS REPORT PROVIDED. FOUNDATION DESIGN IS BASED ON MINIMUM IBC SOIL BEARING VALUE = 1500 PSF PER IBC TABLE 1804.2 (2003, 2006), & 1806.2 (2009, 2012, 2015). DRILLED SHAFT FOUNDATIONS SHALL BE BUILT IN UNDISTURBED SOIL OR COMPACTED FILL MATERIAL NOT LESS THAN 12" IN DEPTH.
2. THE STRUCTURAL ENGINEER IS NOT RESPONSIBLE FOR ANY GEOTECHNICAL ASPECTS OF THIS PROJECT. IT IS RECOMMENDED THAT THE OWNER RETAIN A REGISTERED GEOTECHNICAL ENGINEER TO CONDUCT A GEOTECHNICAL INVESTIGATION AND PREPARE A REPORT WITH RECOMMENDATIONS FOR FOUNDATION AND EARTHWORK PROCEDURES.

CONCRETE:
1. ALL CONCRETE WORK SHALL CONFORM WITH THE REQUIREMENTS OF ACI 301 AND ACI 318. CEMENT PER ASTM C150, TYPE II. AGGREGATE PER ASTM C33. CONCRETE SHALL BE READY MIXED IN ACCORDANCE WITH ASTM C94 AND SHALL BE DESIGNED FOR A MINIMUM 28 DAY COMPRESSIVE STRENGTH AS FOLLOWS:
FOUNDATIONS.....3,000 PSI*
*DESIGNED FOR 2,500 PSI

NO.	DRAWN:	CHECKED:	REVIEWED:	APPROVED:	REVISIONS:
0	BushBr 8/4/2014				New Drawing
1	BushBr 1/14/2015				Update Post Lengths and Embedments
2	BushBr 1/20/2015				Update Post Lengths and Embedments
3	BushBr 2/5/2015				Update Embedment
4	BushBr 2/11/2015				Update Post Lengths

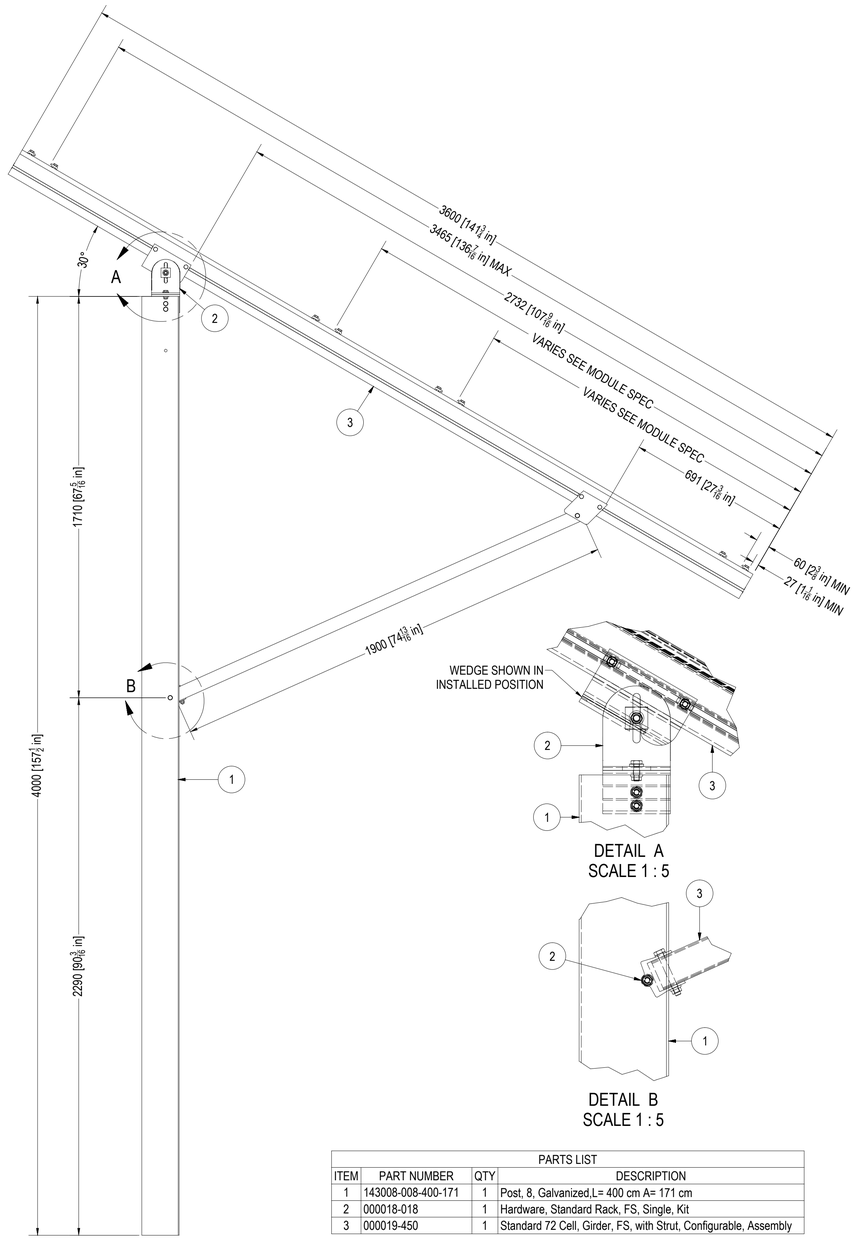
Client:
Schletter Inc.
2201 North Forbes Boulevard
Tucson, AZ 85745

SCHLETTER
3761 E. FARNUM PLACE | TUCSON, AZ 85706
TEL: (520) 289 - 8700 | FAX: (520) 289 - 8695
EMAIL: MAIL@SCHLETTER.US
WWW.SCHLETTER.US

Standard FS 72 Cell - 30°
Racking Structure
Dimensions and Specifications
ISSUED BY: SCHLETTER INC.
PROPRIETARY AND CONFIDENTIAL

Project Site:
Schletter Inc.
1001 Commerce Center Dr
Shelby, NC 28150

Drawing Number:
v.03
JOB NUMBER: V
SHEET: 1 of 3
SCALE:
SEE DRAWING VIEWS

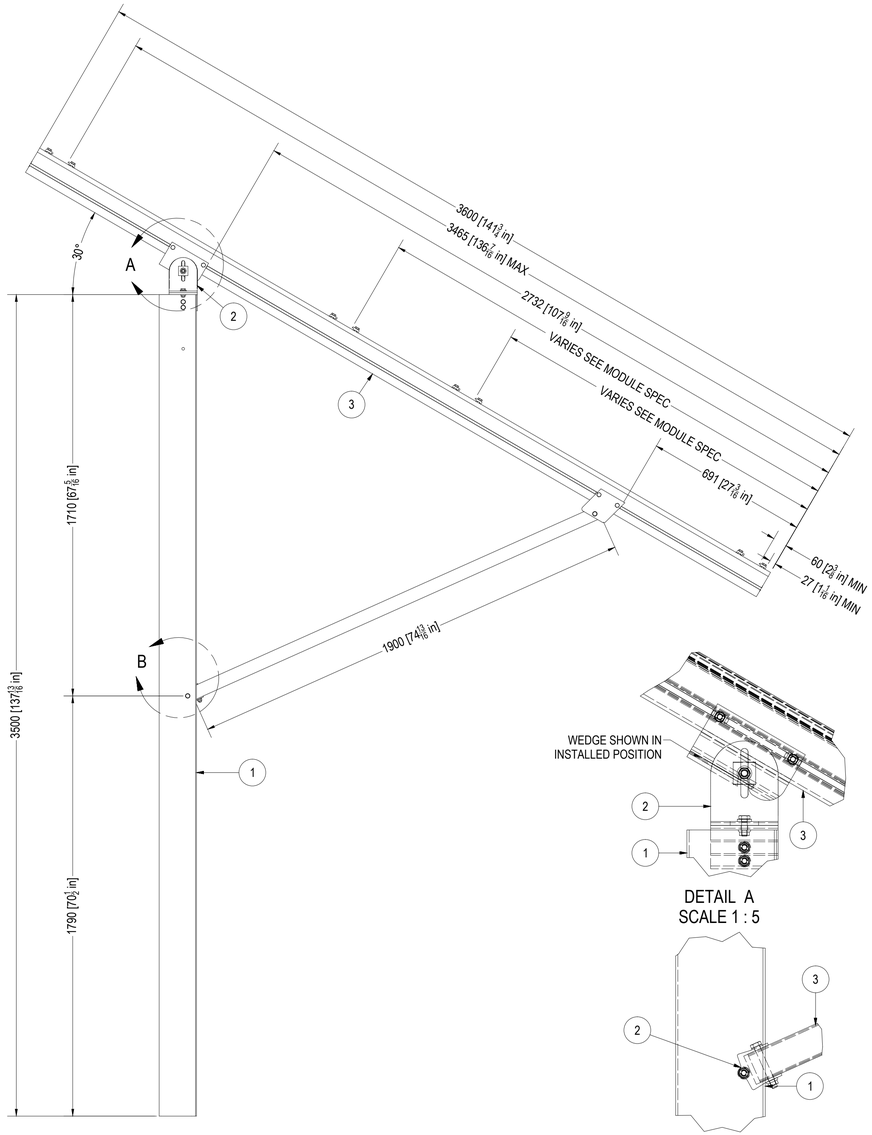


DETAIL A
SCALE 1 : 5

DETAIL B
SCALE 1 : 5

PARTS LIST			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	143008-008-400-171	1	Post, 8, Galvanized,L= 400 cm A= 171 cm
2	000018-018	1	Hardware, Standard Rack, FS, Single, Kit
3	000019-450	1	Standard 72 Cell, Girder, FS, with Strut, Configurable, Assembly

140003-008 - Standard, FS, Ram Post, 72 Cell, 30°, Triangle
SCALE 1 : 12



DETAIL A
SCALE 1 : 5

DETAIL B
SCALE 1 : 5

PARTS LIST			
ITEM	PART NUMBER	QTY	DESCRIPTION
1	143008-008-350-171	1	Post, 8, Galvanized,L= 350 cm A= 171 cm
2	000018-018	1	Hardware, Standard Rack, FS, Single, Kit
3	000019-450	1	Standard 72 Cell, Girder, FS, with Strut, Configurable, Assembly

140004-008 - Standard, FS, Foundation, 72 Cell, 30°, Triangle
SCALE 1 : 12

NO.	DRAWN:	CHECKED:	REVIEWED:	APPROVED:	REVISIONS:
0	BushBr 8/4/2014				New Drawing
1	BushBr 1/14/2015				Update Post Lengths and Embedments
2	BushBr 1/20/2015				Update Post Lengths and Embedments
3	BushBr 2/5/2015				Update Embedments
4	BushBr 2/11/2015				Update Post Lengths

Client:
Schletter Inc.
2201 North Forbes Boulevard
Tucson, AZ 85745

SCHLETTER
3761 E. FARNUM PLACE | TUCSON, AZ 85706
TEL: (520) 289 - 8700 | FAX: (520) 289 - 8695
EMAIL: MAIL@SCHLETTER.US
WWW.SCHLETTER.US

Standard FS 72 Cell - 30°
Racking Structure
Dimensions and Specifications

Project Site:
Schletter Inc.
1001 Commerce Center Dr
Shelby, NC 28150

Drawing Number:
v.03

JOB NUMBER: V
SHEET: 2 of 3
SCALE:
SEE DRAWING VIEWS

ASCE 7-05

TILT	WIND	GROUND SNOW	SLOPED ROOF SNOW	MAX SPAN	TENSION FORCE	SHEAR FORCE	DRILLED SHAFT DEPTH 2 FT DIAMETER X
30°	85 MPH	0 PSF	0.00 PSF	13.5 FT	6.73 KIP	4.13 KIP	6.00 FT
		10 PSF	5.50 PSF	13.0 FT	6.49 KIP	3.98 KIP	6.00 FT
		20 PSF	11.00 PSF	12.5 FT	6.24 KIP	3.82 KIP	6.50 FT
		30 PSF	16.49 PSF	11.0 FT	5.50 KIP	3.42 KIP	6.75 FT
		40 PSF	21.99 PSF	9.5 FT	4.75 KIP	3.06 KIP	6.75 FT
		50 PSF	27.49 PSF	8.0 FT	3.99 KIP	2.67 KIP	6.50 FT
		60 PSF	32.99 PSF	7.5 FT	3.73 KIP	2.56 KIP	6.75 FT
	90 MPH	0 PSF	0.00 PSF	12.0 FT	6.79 KIP	4.12 KIP	6.00 FT
		10 PSF	5.50 PSF	12.0 FT	6.79 KIP	4.12 KIP	6.00 FT
		20 PSF	11.00 PSF	12.0 FT	6.79 KIP	4.12 KIP	6.50 FT
		30 PSF	16.49 PSF	11.0 FT	6.23 KIP	3.81 KIP	6.75 FT
		40 PSF	21.99 PSF	9.5 FT	5.38 KIP	3.39 KIP	6.75 FT
		50 PSF	27.49 PSF	8.0 FT	4.52 KIP	2.95 KIP	6.50 FT
		60 PSF	32.99 PSF	7.0 FT	3.94 KIP	2.65 KIP	6.50 FT
	100 MPH	0 PSF	0.00 PSF	9.5 FT	6.75 KIP	4.00 KIP	5.75 FT
		10 PSF	5.50 PSF	9.5 FT	6.75 KIP	4.00 KIP	5.75 FT
		20 PSF	11.00 PSF	9.5 FT	6.75 KIP	4.02 KIP	6.00 FT
		30 PSF	16.49 PSF	9.5 FT	6.75 KIP	4.07 KIP	6.50 FT
		40 PSF	21.99 PSF	9.0 FT	6.40 KIP	3.93 KIP	6.50 FT
		50 PSF	27.49 PSF	8.0 FT	5.68 KIP	3.57 KIP	6.50 FT
		60 PSF	32.99 PSF	7.0 FT	4.94 KIP	3.19 KIP	6.50 FT
	110 MPH	0 PSF	0.00 PSF	7.5 FT	6.51 KIP	3.78 KIP	5.50 FT
		10 PSF	5.50 PSF	7.5 FT	6.51 KIP	3.82 KIP	5.50 FT
		20 PSF	11.00 PSF	7.5 FT	6.51 KIP	3.87 KIP	5.50 FT
		30 PSF	16.49 PSF	7.5 FT	6.51 KIP	3.92 KIP	5.75 FT
		40 PSF	21.99 PSF	7.5 FT	6.51 KIP	3.96 KIP	6.00 FT
		50 PSF	27.49 PSF	7.5 FT	6.51 KIP	4.01 KIP	6.50 FT
		60 PSF	32.99 PSF	7.0 FT	6.06 KIP	3.80 KIP	6.50 FT
	120 MPH	0 PSF	0.00 PSF	6.5 FT	6.73 KIP	3.90 KIP	5.50 FT
		10 PSF	5.50 PSF	6.5 FT	6.73 KIP	3.94 KIP	5.50 FT
		20 PSF	11.00 PSF	6.5 FT	6.73 KIP	3.98 KIP	5.50 FT
		30 PSF	16.49 PSF	6.5 FT	6.73 KIP	4.02 KIP	5.50 FT
		40 PSF	21.99 PSF	6.5 FT	6.73 KIP	4.06 KIP	5.75 FT
		50 PSF	27.49 PSF	6.5 FT	6.73 KIP	4.10 KIP	6.00 FT
		60 PSF	32.99 PSF	6.5 FT	6.73 KIP	4.14 KIP	6.25 FT
	130 MPH	0 PSF	0.00 PSF	5.5 FT	6.64 KIP	3.85 KIP	5.50 FT
		10 PSF	5.50 PSF	5.5 FT	6.64 KIP	3.89 KIP	5.50 FT
		20 PSF	11.00 PSF	5.5 FT	6.64 KIP	3.92 KIP	5.50 FT
		30 PSF	16.49 PSF	5.5 FT	6.64 KIP	3.96 KIP	5.50 FT
		40 PSF	21.99 PSF	5.5 FT	6.64 KIP	3.99 KIP	5.50 FT
		50 PSF	27.49 PSF	5.5 FT	6.64 KIP	4.03 KIP	5.75 FT
		60 PSF	32.99 PSF	5.5 FT	6.64 KIP	4.06 KIP	5.75 FT

ASCE 7-05 W/ SEISMIC DESIGN

TILT	WIND	GROUND SNOW	SLOPED ROOF SNOW	MAX SPAN	TENSION FORCE	SHEAR FORCE	DRILLED SHAFT DEPTH 2 FT DIAMETER X
30°	85 MPH	0 PSF	0.00 PSF	12.0 FT	5.99 KIP	3.67 KIP	5.75 FT
		10 PSF	5.50 PSF	12.0 FT	5.99 KIP	3.67 KIP	5.75 FT
		20 PSF	11.00 PSF	12.0 FT	5.99 KIP	3.67 KIP	6.50 FT
		30 PSF	16.49 PSF	11.0 FT	5.50 KIP	3.42 KIP	6.75 FT
		40 PSF	21.99 PSF	5.0 FT	2.39 KIP	1.65 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	1.82 KIP	1.30 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	1.23 KIP	0.91 KIP	5.00 FT
	90 MPH	0 PSF	0.00 PSF	12.0 FT	6.79 KIP	4.12 KIP	6.00 FT
		10 PSF	5.50 PSF	12.0 FT	6.79 KIP	4.12 KIP	6.00 FT
		20 PSF	11.00 PSF	12.0 FT	6.79 KIP	4.12 KIP	6.50 FT
		30 PSF	16.49 PSF	11.0 FT	6.23 KIP	3.81 KIP	6.75 FT
		40 PSF	21.99 PSF	5.0 FT	2.72 KIP	1.82 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	2.07 KIP	1.44 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	1.41 KIP	1.00 KIP	5.00 FT
	100 MPH	0 PSF	0.00 PSF	9.5 FT	6.75 KIP	4.00 KIP	5.75 FT
		10 PSF	5.50 PSF	9.5 FT	6.75 KIP	4.00 KIP	5.75 FT
		20 PSF	11.00 PSF	9.5 FT	6.75 KIP	4.02 KIP	6.00 FT
		30 PSF	16.49 PSF	9.5 FT	6.75 KIP	4.07 KIP	6.50 FT
		40 PSF	21.99 PSF	5.0 FT	3.42 KIP	2.21 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	2.61 KIP	1.74 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	1.78 KIP	1.21 KIP	5.00 FT
	110 MPH	0 PSF	0.00 PSF	7.5 FT	6.51 KIP	3.78 KIP	5.50 FT
		10 PSF	5.50 PSF	7.5 FT	6.51 KIP	3.82 KIP	5.50 FT
		20 PSF	11.00 PSF	7.5 FT	6.51 KIP	3.87 KIP	5.50 FT
		30 PSF	16.49 PSF	7.5 FT	6.51 KIP	3.92 KIP	5.75 FT
		40 PSF	21.99 PSF	5.0 FT	4.20 KIP	2.63 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	3.21 KIP	2.07 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	2.20 KIP	1.43 KIP	5.00 FT
	120 MPH	0 PSF	0.00 PSF	6.5 FT	6.73 KIP	3.90 KIP	5.50 FT
		10 PSF	5.50 PSF	6.5 FT	6.73 KIP	3.94 KIP	5.50 FT
		20 PSF	11.00 PSF	6.5 FT	6.73 KIP	3.98 KIP	5.50 FT
		30 PSF	16.49 PSF	6.5 FT	6.73 KIP	4.02 KIP	5.50 FT
		40 PSF	21.99 PSF	5.0 FT	5.05 KIP	3.10 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	3.87 KIP	2.43 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	2.65 KIP	1.68 KIP	5.00 FT
	130 MPH	0 PSF	0.00 PSF	5.5 FT	6.64 KIP	3.85 KIP	5.50 FT
		10 PSF	5.50 PSF	5.5 FT	6.64 KIP	3.89 KIP	5.50 FT
		20 PSF	11.00 PSF	5.5 FT	6.64 KIP	3.92 KIP	5.50 FT
		30 PSF	16.49 PSF	5.5 FT	6.64 KIP	3.96 KIP	5.50 FT
		40 PSF	21.99 PSF	5.0 FT	5.97 KIP	3.61 KIP	5.25 FT
		50 PSF	27.49 PSF	4.0 FT	4.58 KIP	2.82 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	3.14 KIP	1.96 KIP	5.00 FT

ASCE 7-10

TILT	WIND	GROUND SNOW	SLOPED ROOF SNOW	MAX SPAN	TENSION FORCE	SHEAR FORCE	DRILLED SHAFT DEPTH 2 FT DIAMETER X
30°	110 MPH	0 PSF	0.00 PSF	13.0 FT	6.82 KIP	4.17 KIP	6.00 FT
		10 PSF	5.50 PSF	13.0 FT	6.82 KIP	4.17 KIP	6.00 FT
		20 PSF	11.00 PSF	12.5 FT	6.56 KIP	4.00 KIP	6.50 FT
		30 PSF	16.49 PSF	11.0 FT	5.78 KIP	3.57 KIP	6.75 FT
		40 PSF	21.99 PSF	9.5 FT	5.00 KIP	3.19 KIP	6.75 FT
		50 PSF	27.49 PSF	8.0 FT	4.20 KIP	2.78 KIP	6.50 FT
		60 PSF	32.99 PSF	7.5 FT	3.93 KIP	2.66 KIP	6.75 FT
	115 MPH	0 PSF	0.00 PSF	11.5 FT	6.65 KIP	4.02 KIP	5.75 FT
		10 PSF	5.50 PSF	11.5 FT	6.65 KIP	4.02 KIP	5.75 FT
		20 PSF	11.00 PSF	11.5 FT	6.65 KIP	4.02 KIP	6.25 FT
		30 PSF	16.49 PSF	11.0 FT	6.37 KIP	3.88 KIP	6.75 FT
		40 PSF	21.99 PSF	9.5 FT	5.50 KIP	3.46 KIP	6.75 FT
		50 PSF	27.49 PSF	8.0 FT	4.62 KIP	3.00 KIP	6.50 FT
		60 PSF	32.99 PSF	7.0 FT	4.02 KIP	2.70 KIP	6.50 FT
	130 MPH	0 PSF	0.00 PSF	9.0 FT	6.78 KIP	3.99 KIP	5.75 FT
		10 PSF	5.50 PSF	9.0 FT	6.78 KIP	3.99 KIP	5.75 FT
		20 PSF	11.00 PSF	9.0 FT	6.78 KIP	4.03 KIP	5.75 FT
		30 PSF	16.49 PSF	9.0 FT	6.78 KIP	4.08 KIP	6.25 FT
		40 PSF	21.99 PSF	9.0 FT	6.78 KIP	4.13 KIP	6.50 FT
		50 PSF	27.49 PSF	8.0 FT	6.02 KIP	3.76 KIP	6.50 FT
		60 PSF	32.99 PSF	7.0 FT	5.24 KIP	3.35 KIP	6.50 FT
	140 MPH	0 PSF	0.00 PSF	7.5 FT	6.59 KIP	3.82 KIP	5.50 FT
		10 PSF	5.50 PSF	7.5 FT	6.59 KIP	3.87 KIP	5.50 FT
		20 PSF	11.00 PSF	7.5 FT	6.59 KIP	3.92 KIP	5.50 FT
		30 PSF	16.49 PSF	7.5 FT	6.59 KIP	3.96 KIP	5.75 FT
		40 PSF	21.99 PSF	7.5 FT	6.59 KIP	4.01 KIP	6.00 FT
		50 PSF	27.49 PSF	7.5 FT	6.59 KIP	4.05 KIP	6.50 FT
		60 PSF	32.99 PSF	7.0 FT	6.14 KIP	3.84 KIP	6.50 FT
	150 MPH	0 PSF	0.00 PSF	6.5 FT	6.57 KIP	3.81 KIP	5.25 FT
		10 PSF	5.50 PSF	6.5 FT	6.57 KIP	3.85 KIP	5.25 FT
		20 PSF	11.00 PSF	6.5 FT	6.57 KIP	3.89 KIP	5.25 FT
		30 PSF	16.49 PSF	6.5 FT	6.57 KIP	3.93 KIP	5.50 FT
		40 PSF	21.99 PSF	6.5 FT	6.57 KIP	3.97 KIP	5.75 FT
		50 PSF	27.49 PSF	6.5 FT	6.57 KIP	4.01 KIP	6.00 FT
		60 PSF	32.99 PSF	6.5 FT	6.57 KIP	4.05 KIP	6.25 FT
	160 MPH	0 PSF	0.00 PSF	5.5 FT	6.27 KIP	3.65 KIP	5.25 FT
		10 PSF	5.50 PSF	5.5 FT	6.27 KIP	3.68 KIP	5.25 FT
		20 PSF	11.00 PSF	5.5 FT	6.27 KIP	3.72 KIP	5.25 FT
		30 PSF	16.49 PSF	5.5 FT	6.27 KIP	3.75 KIP	5.25 FT
		40 PSF	21.99 PSF	5.5 FT	6.27 KIP	3.79 KIP	5.25 FT
		50 PSF	27.49 PSF	5.5 FT	6.27 KIP	3.82 KIP	5.50 FT
		60 PSF	32.99 PSF	5.5 FT	6.27 KIP	3.86 KIP	5.75 FT

ASCE 7-10 W/ SEISMIC DESIGN

TILT	WIND	GROUND SNOW	SLOPED ROOF SNOW	MAX SPAN	TENSION FORCE	SHEAR FORCE	DRILLED SHAFT DEPTH 2 FT DIAMETER X
30°	110 MPH	0 PSF	0.00 PSF	12.0 FT	6.30 KIP	3.84 KIP	5.75 FT
		10 PSF	5.50 PSF	12.0 FT	6.30 KIP	3.84 KIP	5.75 FT
		20 PSF	11.00 PSF	12.0 FT	6.30 KIP	3.84 KIP	6.50 FT
		30 PSF	16.49 PSF	11.0 FT	5.78 KIP	3.57 KIP	6.75 FT
		40 PSF	21.99 PSF	5.0 FT	2.52 KIP	1.71 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	1.92 KIP	1.35 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	1.30 KIP	0.94 KIP	5.00 FT
	115 MPH	0 PSF	0.00 PSF	11.5 FT	6.65 KIP	4.02 KIP	5.75 FT
		10 PSF	5.50 PSF	11.5 FT	6.65 KIP	4.02 KIP	5.75 FT
		20 PSF	11.00 PSF	11.5 FT	6.65 KIP	4.02 KIP	6.25 FT
		30 PSF	16.49 PSF	11.0 FT	6.37 KIP	3.88 KIP	6.75 FT
		40 PSF	21.99 PSF	5.0 FT	2.78 KIP	1.86 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	2.12 KIP	1.46 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	1.44 KIP	1.02 KIP	5.00 FT
	130 MPH	0 PSF	0.00 PSF	9.0 FT	6.78 KIP	3.99 KIP	5.75 FT
		10 PSF	5.50 PSF	9.0 FT	6.78 KIP	3.99 KIP	5.75 FT
		20 PSF	11.00 PSF	9.0 FT	6.78 KIP	4.03 KIP	5.75 FT
		30 PSF	16.49 PSF	9.0 FT	6.78 KIP	4.08 KIP	6.25 FT
		40 PSF	21.99 PSF	5.0 FT	3.63 KIP	2.32 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	2.77 KIP	1.83 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	1.89 KIP	1.27 KIP	5.00 FT
	140 MPH	0 PSF	0.00 PSF	7.5 FT	6.59 KIP	3.82 KIP	5.50 FT
		10 PSF	5.50 PSF	7.5 FT	6.59 KIP	3.87 KIP	5.50 FT
		20 PSF	11.00 PSF	7.5 FT	6.59 KIP	3.92 KIP	5.50 FT
		30 PSF	16.49 PSF	7.5 FT	6.59 KIP	3.96 KIP	5.75 FT
		40 PSF	21.99 PSF	5.0 FT	4.25 KIP	2.66 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	3.25 KIP	2.09 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	2.23 KIP	1.45 KIP	5.00 FT
	150 MPH	0 PSF	0.00 PSF	6.5 FT	6.57 KIP	3.81 KIP	5.25 FT
		10 PSF	5.50 PSF	6.5 FT	6.57 KIP	3.85 KIP	5.25 FT
		20 PSF	11.00 PSF	6.5 FT	6.57 KIP	3.89 KIP	5.25 FT
		30 PSF	16.49 PSF	6.5 FT	6.57 KIP	3.93 KIP	5.50 FT
		40 PSF	21.99 PSF	5.0 FT	4.92 KIP	3.03 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	3.77 KIP	2.38 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	2.58 KIP	1.65 KIP	5.00 FT
	160 MPH	0 PSF	0.00 PSF	5.5 FT	6.27 KIP	3.65 KIP	5.25 FT
		10 PSF	5.50 PSF	5.5 FT	6.27 KIP	3.68 KIP	5.25 FT
		20 PSF	11.00 PSF	5.5 FT	6.27 KIP	3.72 KIP	5.25 FT
		30 PSF	16.49 PSF	5.5 FT	6.27 KIP	3.75 KIP	5.25 FT
		40 PSF	21.99 PSF	5.0 FT	5.64 KIP	3.43 KIP	5.00 FT
		50 PSF	27.49 PSF	4.0 FT	4.32 KIP	2.68 KIP	5.00 FT
		60 PSF	32.99 PSF	3.0 FT	2.97 KIP	1.86 KIP	5.00 FT

CONCRETE FOOTING NOTES:
WHERE THE DISTANCE BETWEEN BOTTOM OF POST TO THE BOTTOM OF CONCRETE FOOTING IS GREATER THAN 12". REINFORCEMENT IS REQUIRED.
IF EMBEDDED POST LENGTH EXCEEDS DEPTH OF CONCRETE FOOTING, POST CAN EITHER BE CUT TO LENGTH AS REQUIRED, OR DEPTH OF FOOTING MAY BE INCREASED.
3" CLEAR COVER IS TO BE MAINTAINED.
GROUND CLEARANCE MAY VARY FROM 3" MAXIMUM TO 2" MINIMUM.

NO.	DRAWN:	CHECKED:	REVIEWED:	APPROVED:	REVISIONS:
0	BushBr 8/4/2014				New Drawing
1	BushBr 1/14/2015				Update Post Lengths and Embedments
2	BushBr 1/20/2015				Update Post Lengths and Embedments
3	BushBr 2/5/2015				Update Embedments
4	BushBr 2/11/2015				Update Post Lengths

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Standard FS 72 Cell - 30°
Racking Structure
Design Tables

Project Site:
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1001 Commerce Center Dr
Shelby, NC 28150

Drawing Number:
v.03

JOB NUMBER: V
SHEET: 3 of 3
SCALE:
SEE DRAWING VIEWS