Project Number: U2716-128-191

February 16, 2024

Sunmodo
14800 NE 65th Street
Vancouver, WA 98682

REFERENCE: Sunmodo Sunturf Ground Mount A4a
Ground Mount PV Array Installation

To Whom It May Concern:

Per request of Sunmodo, we have been asked to prepare the structural design of a ground-mounted PV solar array system with several foundation options as shown in the attached calculations. The adopted building code in this jurisdiction is the 2015 International Building Code. Vector Structural Engineering requires that we review each site specific install, and we are not liable for installs at site specific locations we have not reviewed. This document does not address site-specific installations. The following design parameters are used in our analysis:

- Minimum Design Loads for Buildings and Other Structures (ASCE 7-10)
- Design wind speed for risk category I structures: 115 mph
- Wind exposure: B
- Ground snow load: 70 psf
- The ground screws and helical piers must be tested to 1.5 times uplift and 2.0 times lateral reactions found in the table below. A minimum of one ground screw or helical pier must be tested.

Load (ASD)	Value (lbs)	Factor of Safety	Test Value (lbs)
UPLIFT	1960	1.5	2940
LATERAL	1395	2	2790

Foundation concrete shall have a minimum compressive strength of 2500 psi at 28 days. Cement for all concrete shall be Type I or II with a minimum of 6% entrained air with a water/cement ratio of 0.50. Maximum aggregate size shall be 3/4". No special inspection of concrete strength is required.

Footings are designed based on an allowable soil bearing pressure of 1500 psf an allowable skin friction of 250 psf, an allowable lateral bearing pressure of 150 pcf, and a coefficient of friction of 0.3. Vector Structural Engineering strongly recommends independent soils testing be performed by a licensed geotechnical engineer to verify the assumed soil parameters.

All ground mounts are to be installed per manufacturer's recommendations. The use of solar panel support span tables provided by the manufacturer is allowed only where the site conditions and solar panel configuration match the description of the span tables. Electrical engineering is beyond our scope. All work performed must be in accordance with accepted industry-wide methods and applicable safety standards. Vector Structural Engineering assumes no responsibility for improper installation of the solar panels.

Very truly yours,

VECTOR STRUCTURAL ENGINEERING, LLC

02/16/2024

Jacob Proctor, P.E.
License: 54953 - Expires: 06/30/2024
Project Engineer

Enclosures

JSP/stb

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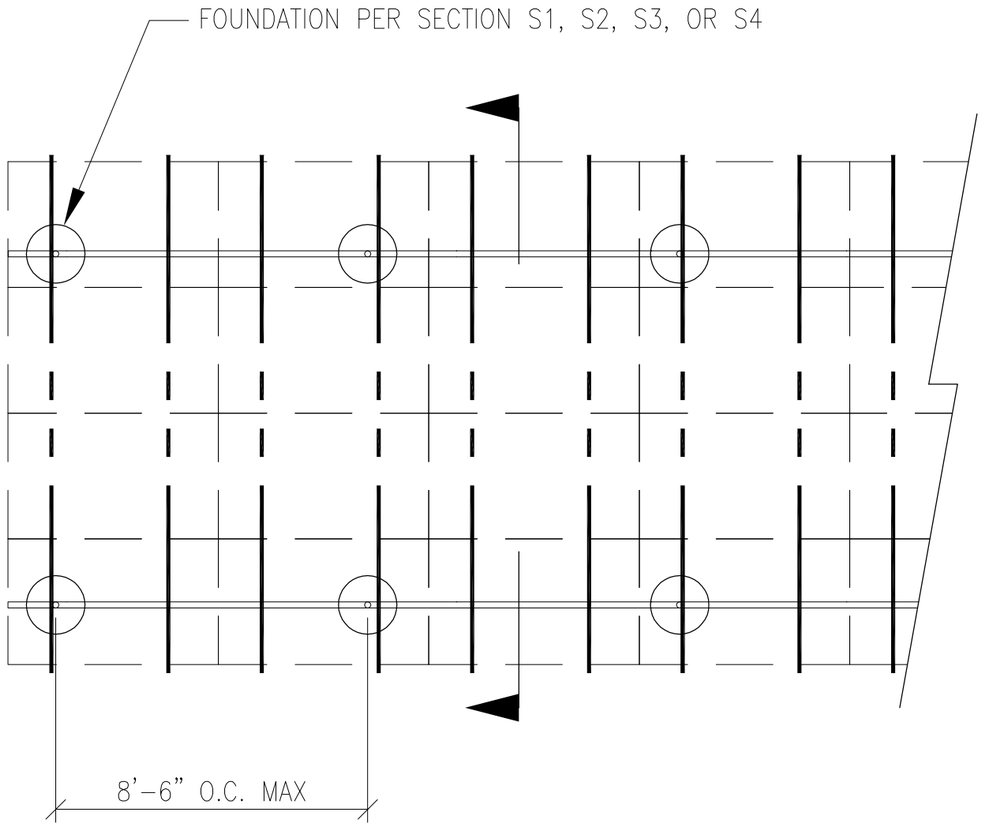
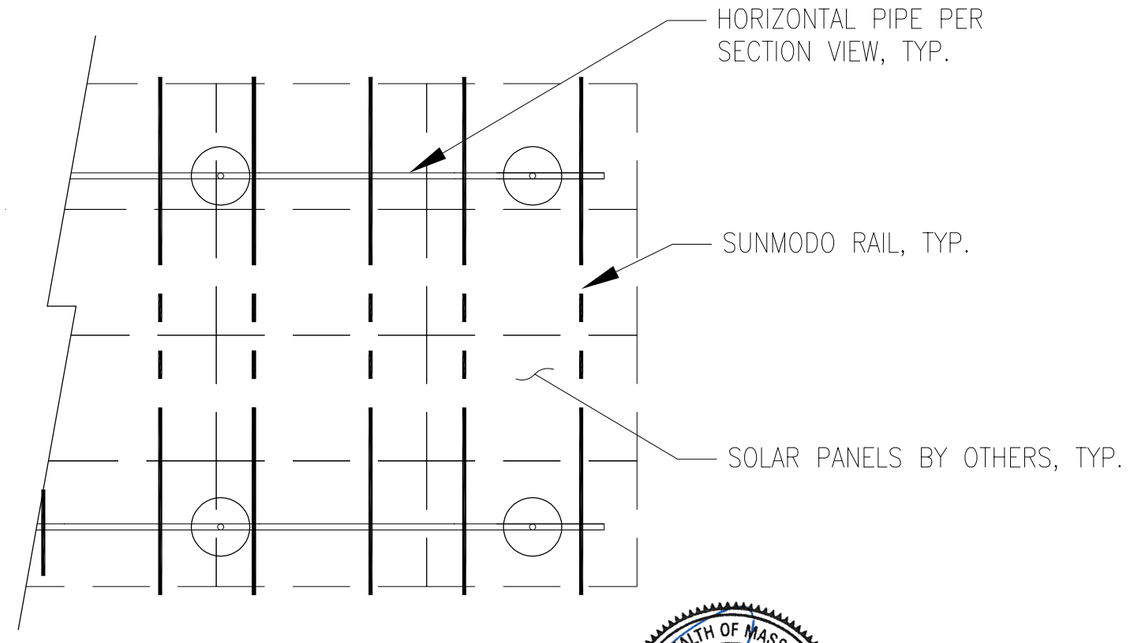
JOB NO. U2716-128-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4A

SUBJECT ALL OPTIONS





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COMMONWEALTH OF MASSACHUSETTS
JACOB S. PROCTOR
CIVIL
No. 54953
REGISTERED PROFESSIONAL ENGINEER

PV ARRAY PLAN

02/16/2024

N.T.S.

P1

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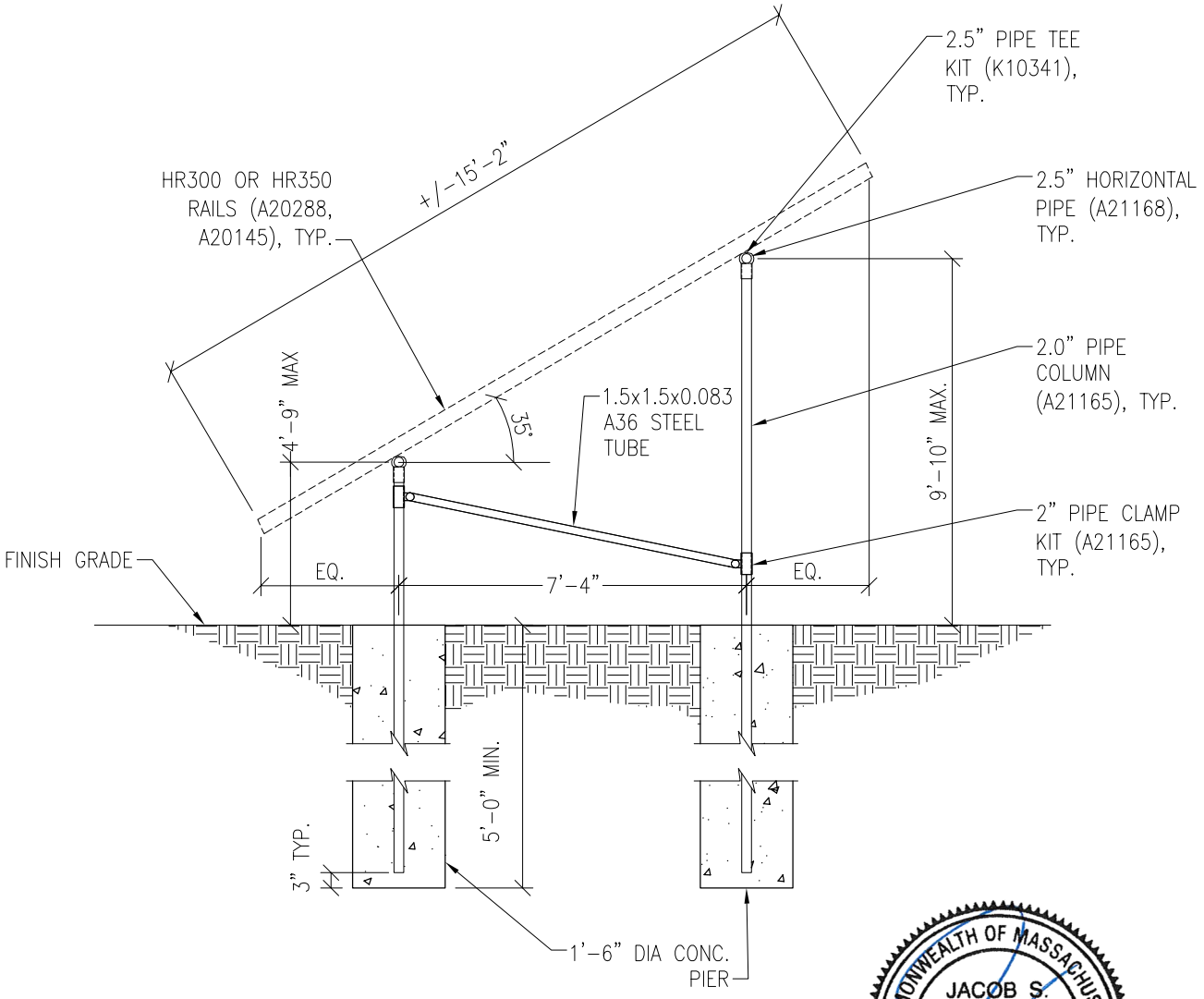
JOB NO. U2716-128-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4A

SUBJECT DRILLED PIER OPTION



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PV ARRAY SECTION 02/16/2024

N.T.S.

S1

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VECTOR ENGINEERS

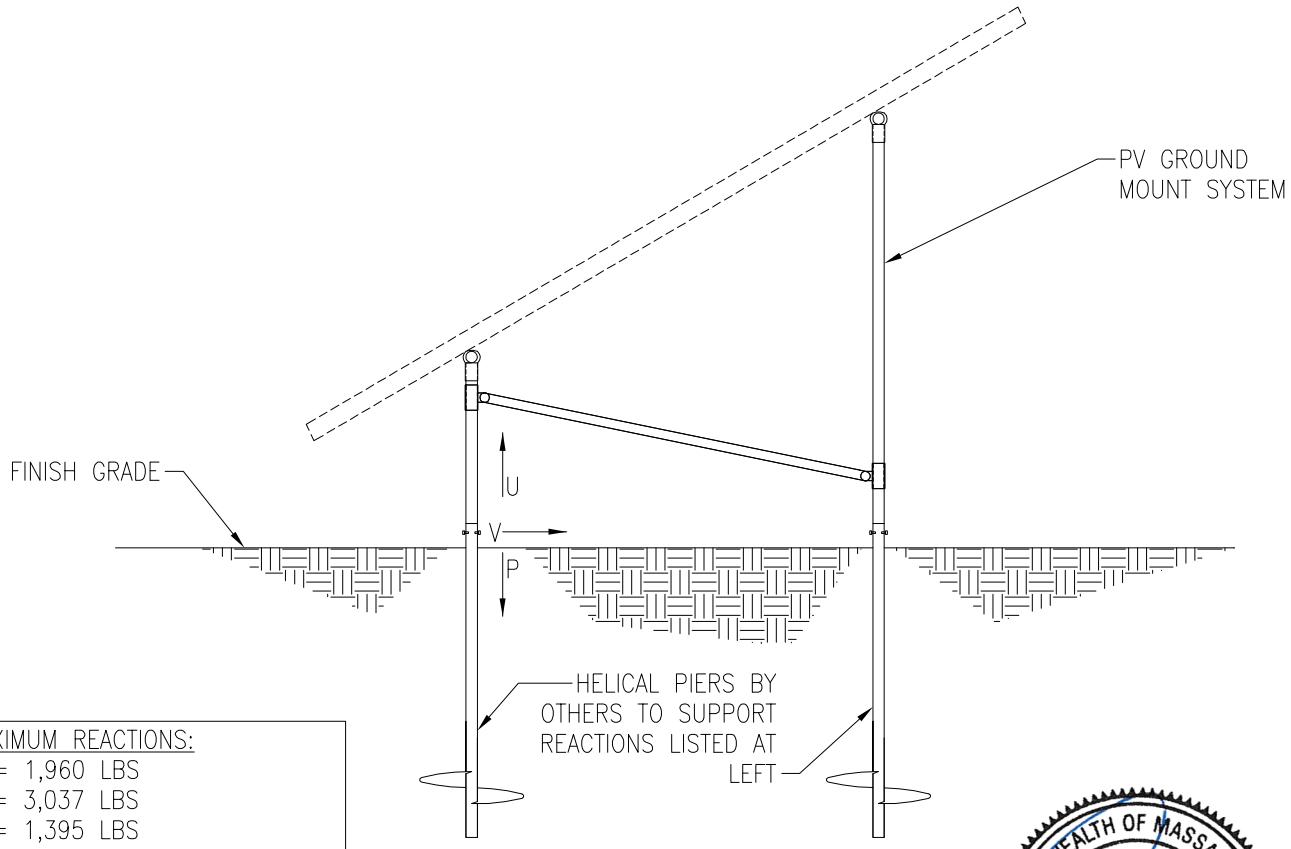
JOB NO. U2716-128-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4A

SUBJECT HELICAL PIER OPTION

NOTES:

1. For ground mount components see Section S1.
2. A minimum of (1) helical pier must be load-tested as follows:
   - 2.1. Safety factor for uplift = 1.5,
   - 2.2. Safety factor for lateral loads = 2.0
   - 2.3. Upward deflection limit = 1/2"
   - 2.4. Lateral deflection limit = 1"
   - 2.5. The load tests must be performed by an approved contractor.



MAXIMUM REACTIONS:
U = 1,960 LBS
P = 3,037 LBS
V = 1,395 LBS

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PV ARRAY SECTION 02/16/2024

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VECTOR ENGINEERS

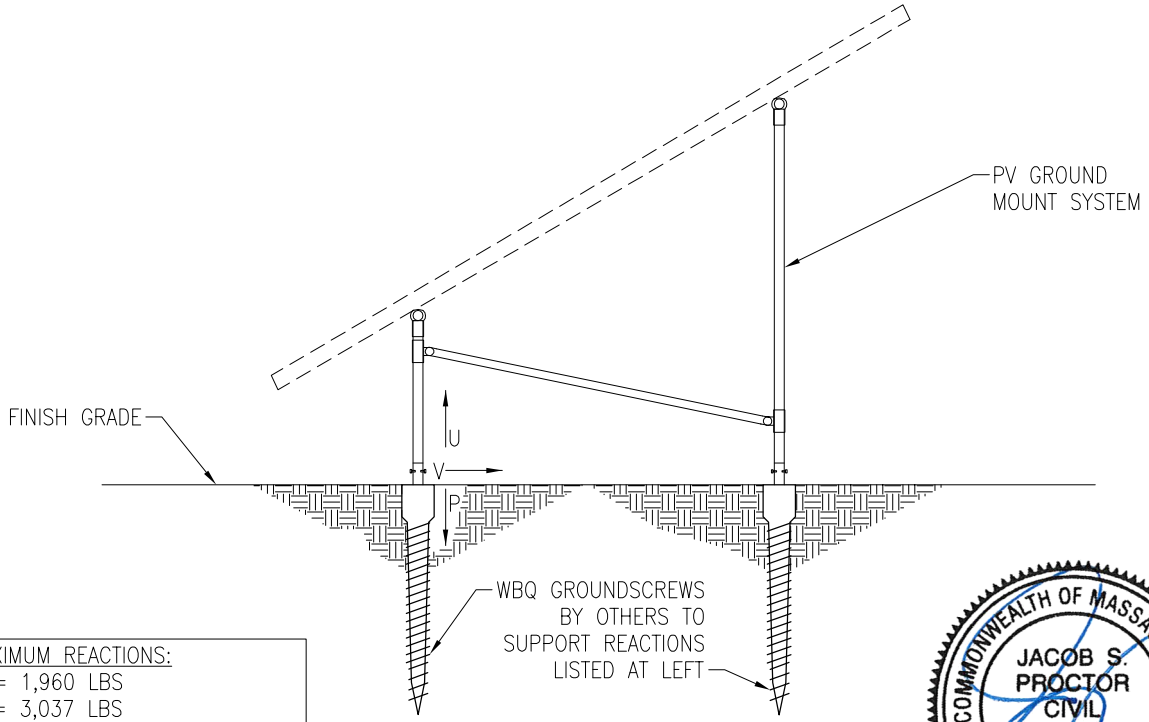
JOB NO. U2716-128-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4A

SUBJECT GROUND SCREW OPTION

NOTES:

1. For ground mount components see Section S1.
2. A minimum of (1) ground screw must be load-tested as follows:
   - 2.1. Safety factor for uplift = 1.5,
   - 2.2. Safety factor for lateral loads = 2.0
   - 2.3. Upward deflection limit = 1/2"
   - 2.4. Lateral deflection limit = 1"
   - 2.5. The load tests must be performed by an approved contractor.



MAXIMUM REACTIONS:
U = 1,960 LBS
P = 3,037 LBS
V = 1,395 LBS

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S3

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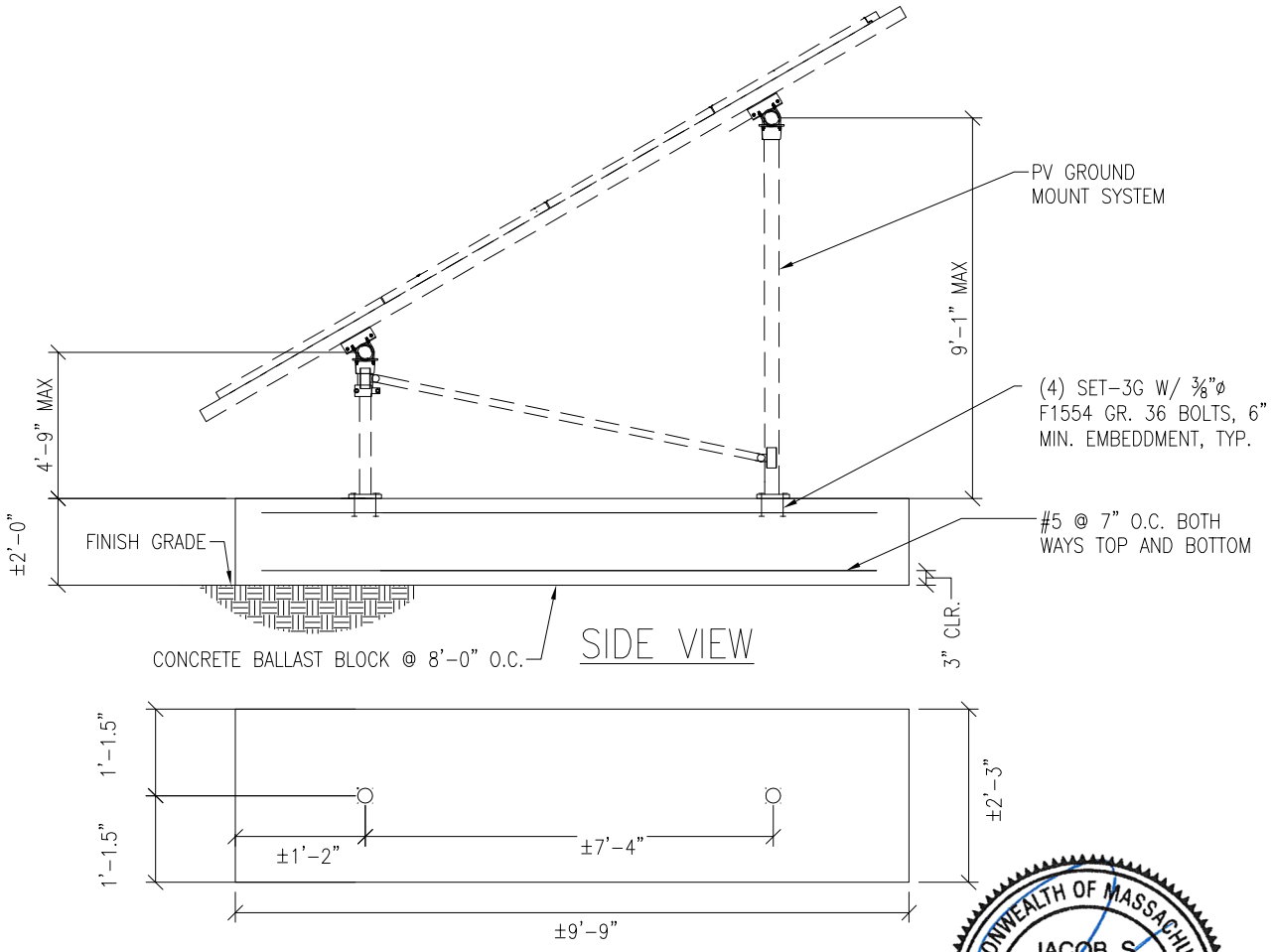
VECTOR ENGINEERS

JOB NO. U2716-128-191

PROJECT SUNMODO SUNTURF GROUND MOUNTS A4A

SUBJECT BALLASTED BLOCK OPTION

NOTES:
1. For ground mount components see Section S1.



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PV ARRAY SECTION 02/16/2024

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JOB NO.: U2716-128-191 **DESIGNED:** STB
DATE: 08/15/19

PROJECT: A4a – Sunmodo Sunturf GM **SUBJECT:** Snow Load

SNOW LOAD (S):

ASCE 7 Standard:	10	
Panel Slope from Horizontal [°]:	35.0	
Snow Ground Load, p_g [psf]:	70.0	(Section 7.2)
Terrain Category:	B	(Table 7-2)
Exposure of Roof:	Fully Exposed	(Table 7-2)
Exposure Factor, C_e:	0.9	(Table 7-2)
Thermal Factor, C_t:	1.2	(Table 7-3)
Risk Category:	I	(Table 1.5-1)
Importance Factor, I_S:	0.8	(Table 1.5-2)
Flat Roof Snow Load, p_f [psf]:	42	(Equation 7.3-1)
Minimum Roof Snow Load, p_m [psf]:	0	(Section 7.3.4)
Unobstructed Slippery Surface?	Yes	(Section 7.4)
Slope Factor Figure:	Figure 7-2c	(Section 7.4)
Roof Slope Factor, C_s:	0.636	(Figure 7-2)
Sloped Roof Snow Load, p_s [psf]:	27	(Equation 7.4-1)
Design Snow Load, S [psf]:	27	
Tributary Transverse Length [ft]:	5.6	
Tributary Longitudinal Length [ft]:	8	
Tributary Area per Column [ft^2]:	45.0	
Snow Load per Column (1.0 S) [lb]:	**1212.3**	

JOB NO.: U2716-128-191 **DESIGNED:** STB
DATE: 08/15/19

PROJECT: A4a – Sunmodo Sunturf GM **SUBJECT:** Wind Pressure

Design Wind Load:

ASCE 7 Standard:	10	
Basic Wind Speed, V [mph]:	115	
Risk Category:	I	
Exposure Category	B	(Section 26.7.3)
Velocity Pressure Exposure Coefficient, K_h:	0.57	(Table 27.3-1)
Topographic Factor, K_{ht}:	1.0	(Section 26.8.2)
Wind Directionality Factor, K_d:	0.85	(Table 26.6-1)
Internal Pressure Coefficient, GC_{pi} :	0.00	(Table 26.11-1)
Velocity Pressure, q_h [psf]:	16.4	(Equation 27.3-1)
Gust Effect Factor, G:	0.85	(Section 26.9.1)
Panel Slope [degrees]:	35.0	

Net Pressure Coefficients (C_N) per: (Figure 27.4-4)

Clear Wind Flow	C_{NW}	C_{NL}
Case 1 (γ = 0°, Load Case A)	-1.80	-1.80
Case 2 (γ = 0°, Load Case B)	-2.43	-0.57
Case 3 (γ = 180°, Load Case A)	2.10	2.17
Case 4 (γ = 180°, Load Case B)	2.67	1.07

Design Wind Pressures (p) [psf] per: (Equation 27.4-3)

Clear Wind Flow	q_hGC_{NW}	q_hGC_{NL}
Case 1 (γ = 0°, Load Case A)	-25.1	-25.1
Case 2 (γ = 0°, Load Case B)	-33.9	-7.9
Case 3 (γ = 180°, Load Case A)	29.3	30.2
Case 4 (γ = 180°, Load Case B)	37.2	14.9

Wind Pressure on Each Side of Panels [psf]

Clear Wind Flow	Short Col. Pressure	Long Col. Pressure
Case 1 (γ = 0°, Load Case A)	-25.1	-25.1
Case 2 (γ = 0°, Load Case B)	-7.9	-33.9
Case 3 (γ = 180°, Load Case A)	29.3	30.2
Case 4 (γ = 180°, Load Case B)	37.2	14.9

JOB NO.: U2716-128-191

PROJECT: A4a – Sunmodo Sunturf GM **SUBJECT:** Open Building Wind Loads

Design Wind Load Per ASCE 7-10

$p = q_h G C_n$

Velocity Pressure Exposure Coefficient, K_h:	0.57	(Table 27.3-1)
Topographic Factor, K_{ht}:	1.0	(Section 26.8.2)
Wind Directionality Factor, K_d:	0.85	(Table 26.6-1)
Ultimate Wind Speed, V [mph]:	115	
Velocity Pressure, q_h [psf]:	16.4	(Equation 27.3-1)
Gust Effect Factor, G:	0.85	(Section 26.9.1)

γ= 90° or 270°

Force Coefficient, C_N:

Horizontal Distance from Winward Edge	Roof angle	Load Case	Obstructed Wind Flow CN
<= h	35	A	-0.8
		B	0.8
> h, <= 2h	35	A	-0.6
		B	0.5
> 2h	35	A	-0.3
		B	0.3

Design Wind Pressure, p [psf]:

	Roof angle	Load Case	Obstructed Wind Flow
<= h	35	A	-11.2
		B	11.2
> h, <= 2h	35	A	-8.4
		B	7.0
> 2h	35	A	-4.2
		B	4.2

JOB NO.: U2716-113-191 **DESIGNED:** STB

Foundation Option 1: Drilled Concrete Pier

JOB NO.: U2716-128-191
SUBJECT: CONC. PIER

PROJECT: A4a - Sunturf Ground Mount

DRILLED CONCRETE PIER DESIGN

Column Reactions:

Max. Shear, V [k]:	1.4	Max. Down, P_d [k]:	3.0
Max. Moment, M [k-ft]:	0.0	Max. Uplift, P_u [k]:	2.0

Pier Properties:

Pier Shape:	Round		
Pier Diameter, b [ft]:	1.5	Volume of Concrete [ft^3]:	9
Top of Pier Elevation [ft]:	0.00	Volume of Concrete [yd^3]:	0.3
Pier Depth, d [ft]:	5.0	Weight of Concrete [k]:	1.3

Soil Properties:

Allow. Bearing Pressure [psf]:	1,500	Optional Parameters for Uplift:	
1/3 increase for short term loads?	No		
		Skin Friction* [psf]:	250
Lateral Bearing, S [pcf]:	150	Top Length to Ignore [ft]:	0
Max. Lateral Bearing (opt'l) [psf]:		1/3 increase for short term loads?	No
Top Depth to Ignore [ft]:	0		
1/3 increase for short term loads?	No	Combine w/ Bearing:	No
1/2" deflection at t/o pier allowed:	Yes		

*per IBC Section 1810.3.3.1.4

Check Bearing:

Bearing Capacity [k]:	5.9	**Bearing capacity OK.**

Check Uplift:

Uplift Capacity [k]:	7.1	**Uplift capacity OK.**

Check Lateral Bearing:

Top of Pier Constrained?:	No	IBC Section1807.3.2.1
Applied Lateral Force, P [lb]:	1,395	
Point of Application, h [ft]:	0.0	
S_{max} [psf]:		
S [psf]:	500	
A = 2.34*P/(Sb):	4.35	
Required Pier Depth, d_{reqd} [ft]:	4.40	IBC Eq. 18-1

Result: **Lateral bearing capacity OK.**

JOB NO.: U2716-113-191 **DESIGNED:** STB

Foundation Option 2: Helical Pier

The ground screws and helical piers must be tested to 1.5 times uplift and 2.0 times lateral reactions found in the table below.

Load (ASD)	Value (lbs)	Factor of Safety	Test Value (lbs)
UPLIFT	1960	1.5	2940
LATERAL	1395	2	2790

JOB NO.: U2716-113-191 **DESIGNED:** STB

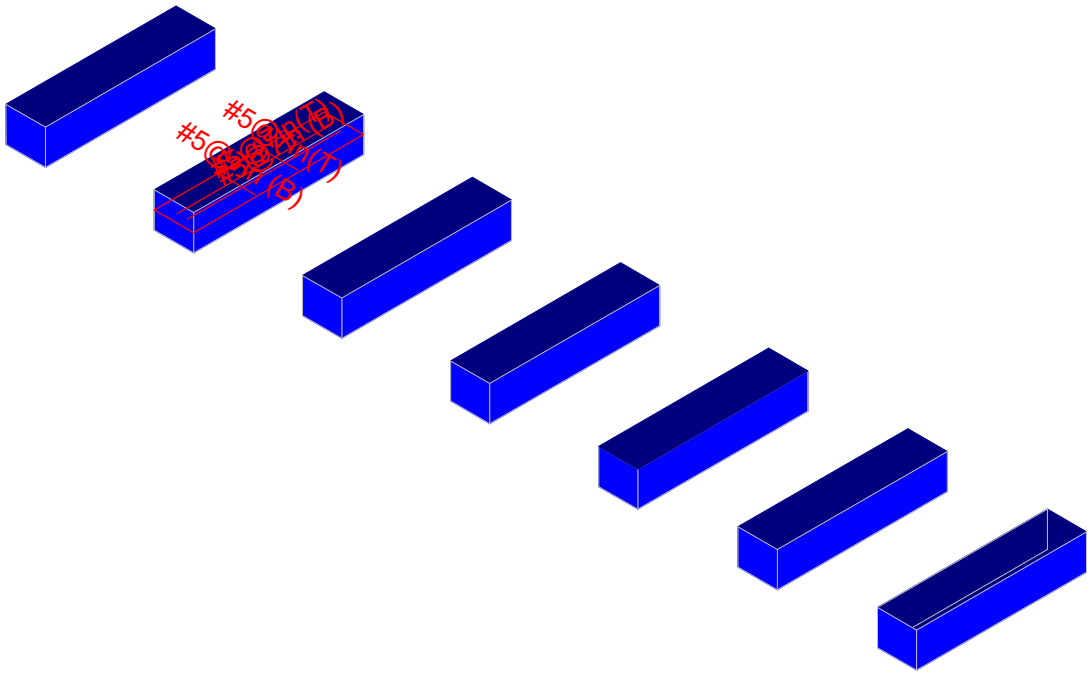
Foundation Option 3: Ground Screw

The ground screws and helical piers must be tested to 1.5 times uplift and 2.0 times lateral reactions found in the table below.

Load (ASD)	Value (lbs)	Factor of Safety	Test Value (lbs)
UPLIFT	1960	1.5	2940
LATERAL	1395	2	2790

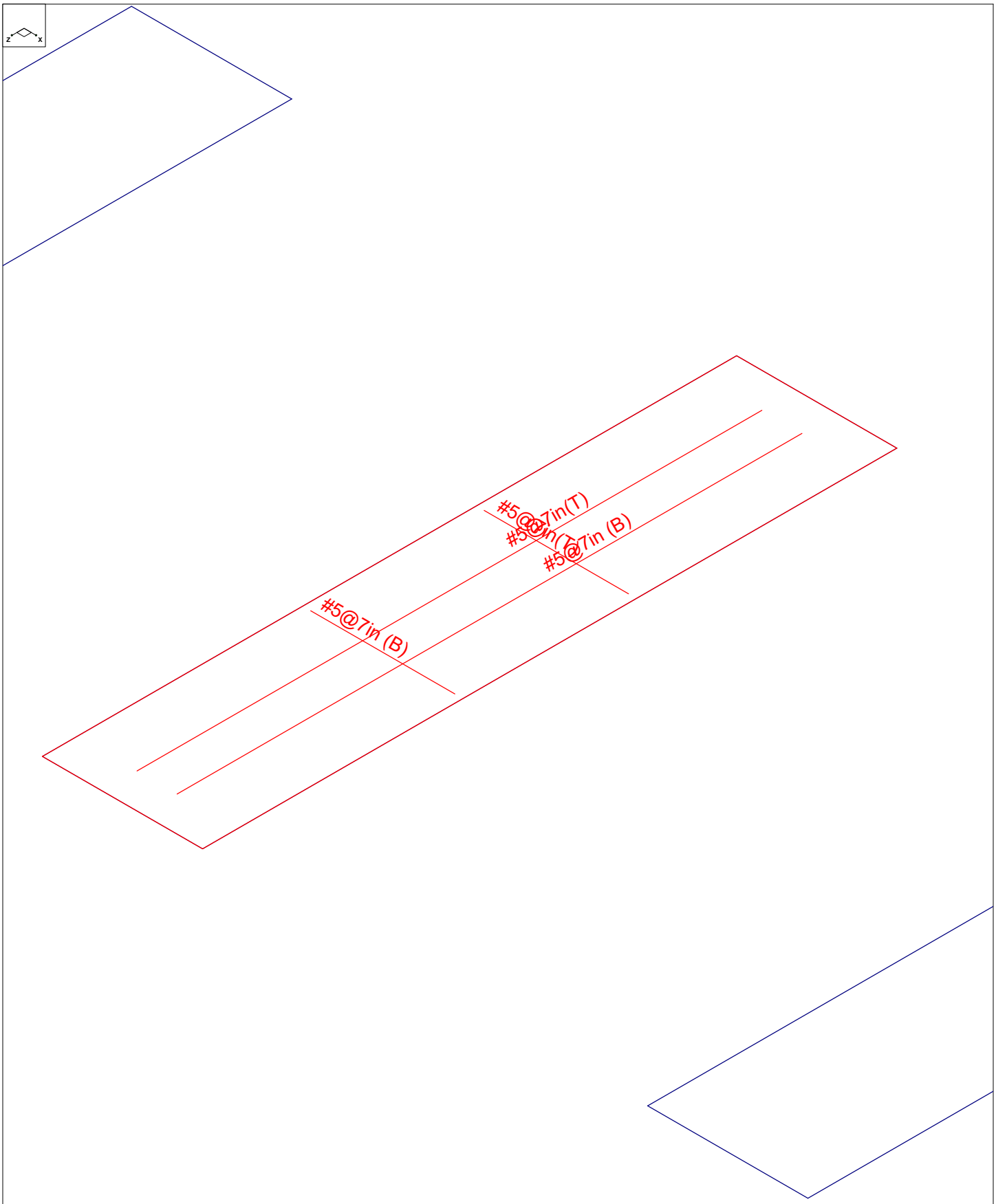
JOB NO.: U2716-113-191 **DESIGNED:** STB

Foundation Option 4: Ballasted Block



Results for LC 1, 1.0 D

Vector Structural Engineeri...	Ground Mount	SK - 2
STB		Apr 6, 2021 at 11:59 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



Results for LC 1, 1.0 D

Vector Structural Engineeri...	Ground Mount	SK - 1
STB		Apr 6, 2021 at 11:59 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	100
Mesh Size (in)	12
Max Iterations	10
Merge Tolerance (in)	.12
Solver	Sparse Accelerated
Coefficient of Friction	.3
No. of Shear Regions	4
Shear Region Spacing Increment (in)	4
Min 1 Bar Dia Spacing for Beams?	No
Optimize footings for OTM / Sliding?	Yes
Parme Beta Factor	.65
Pile Safety Factor	3
Concrete Stress Block	0
Concrete Rebar Set	Rectangular
Concrete Code	ASTM A615
HR Steel Pile Code	ACI 318-14
Wood Pile Code	AISC 14th (360-10): ASD AWC NDS-15: ASD

Concrete Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/...	Density[lb/ft^3]	f'c[psi]	Lambda	Flex Stee...	Shear St...
1	Conc3000NW	3156	1372	.15	.6	145	3000	1	60000	60000
2	Conc3500NW	3409	1482	.15	.6	145	3500	1	60000	60000
3	Conc4000NW	3644	1584	.15	.6	145	4000	1	60000	60000
4	Conc3000LW	2085	907	.15	.6	109.999	3000	.75	60000	60000
5	Conc3500LW	2252	979	.15	.6	109.999	3500	.75	60000	60000
6	Conc4000LW	2408	1047	.15	.6	109.999	4000	.75	60000	60000
7	Conc2500NW	3156	1372	.15	.6	145	2500	1	60000	60000

General Design Parameters

	Label	Max Bending Chk	Max Shear Chk	Top Cover[in]	Bottom Cover[in]
1	Typical	1	1	3	3

Slab Rebar Parameters

	Label	Top Bar	Bottom Bar	Max Top Bar Sp...	Min Top Bar Sp...	Max Bot Bar Sp...	Min Bot Bar Sp...	Spacing Incr...	Rebar Options
1	Typical	#5	#5	7	7	7	7	1	Optimize

Soil Definitions

	Label	Subgrade Modulus[lb/ft^3]	Allowable Bearing[psf]	Depth Properties	Default?
1	Default	1e+5	1500	None	Yes

Slabs

	Label	Thickness [in]	Material	Local Axis Angle ...	Analysis Offset [in]	Passive Pressur...	Soil Overburden [psf]
1	S1	24	Conc2500NW	0	0	0	0
2	S2	24	Conc2500NW	0	0	0	0
3	S3	24	Conc2500NW	0	0	0	0
4	S4	24	Conc2500NW	0	0	0	0
5	S5	24	Conc2500NW	0	0	0	0
6	S6	24	Conc2500NW	0	0	0	0
7	S7	24	Conc2500NW	0	0	0	0

Load Combinations

	Label	Solve	Service	A..	SF	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	Cat..	Fa...	C...	F...	C...	F...
1	1.0 D	Yes	Yes		1.5	DL	1																		
2	1.0 D + 1....	Yes	Yes		1.5	DL	1	RLL	1																
3	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL1	.6														
4	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL2	.6														
5	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL3	.6														
6	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL4	.6														
7	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL5	.6														
8	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL		OL6	.6														
9	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL1	.45														
10	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL2	.45														
11	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL3	.45														
12	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL4	.45														
13	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL5	.45														
14	1.0 D + 0....	Yes	Yes		1.5	DL	1	RLL	.75	OL6	.45														
15	0.9 D + 0....	Yes	Yes			DL	.9	RLL		OL1	.6														
16	0.9 D + 0....	Yes	Yes			DL	.9	RLL		OL2	.6														
17	0.9 D + 0....	Yes	Yes			DL	.9	RLL		OL3	.6														
18	0.9 D + 0....	Yes	Yes			DL	.9	RLL		OL4	.6														
19	0.9 D + 0....	Yes	Yes			DL	.9	RLL		OL5	.6														
20	0.9 D + 0....	Yes	Yes			DL	.9	RLL		OL6	.6														
21																									
22	1.4D	Yes				DL	1.4																		
23	1.2D+1.6SL	Yes				DL	1.2	RLL	1.6																
24	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL1	.5														
25	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL2	.5														
26	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL3	.5														
27	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL4	.5														
28	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL5	.5														
29	1.2D+1.6S...	Yes				DL	1.2	RLL	1.6	OL6	.5														
30	1.2D+1.0...	Yes				DL	1.2			OL1	1														
31	1.2D-1.0Wx	Yes				DL	1.2			OL2	1														
32	1.2D+1.0...	Yes				DL	1.2			OL3	1														
33	1.2D-1.0Wz	Yes				DL	1.2			OL4	1														
34	1.2D+1.0...	Yes				DL	1.2			OL5	1														
35	1.2D-1.0...	Yes				DL	1.2			OL6	1														
36	1.0D+1.0...	Yes				DL	1			OL1	1														
37	1.0D-1.0Wx	Yes				DL	1			OL2	1														
38	1.0D+1.0...	Yes				DL	1			OL3	1														
39	1.0D-1.0Wz	Yes				DL	1			OL4	1														
40	1.0D+1.0...	Yes				DL	1			OL5	1														
41	1.0D-1.0...	Yes				DL	1			OL6	1														

Design Strips

	Label	Rebar Angle from Pl...	No. of Design Cuts	Design Rule
1	DS1	0	50	Typical
2	DS2	90	50	Typical

Load Categories

	Category	Point Loads	Line Loads	Area Loads
1	DL	20		
2	RLL	30		
3	OL1	40		
4	OL2	40		
5	OL3	40		
6	OL4	40		
7	OL5	38		

Load Categories (Continued)

	Category	Point Loads	Line Loads	Area Loads
8	OL6	38		

Strip Reinforcing

	Label	UC Top	LC	Top Bars	Governing ...	UC Bot	LC	Bot B...	Gover...	UC Shear	LC	Governing De...
1	DS1	.028	26	#5@7in	DS1-X25	.025	37	#5@7in	DS1-...	.042	26	DS1-X15
2	DS2	.001	36	#5@7in	DS2-X25	.004	26	#5@7in	DS2-...	.009	26	DS2-X35

Slab Overturning Safety Factors (By Combination)

	LC	Slab	Angle[deg]	Mo-xx[lb-ft]	Ms-xx[lb-ft]	Mo-zz[lb-ft]	Ms-zz[lb-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
1	1	S1	0	0	33305.734	0	7754.72	9.999+	9.999+
2	1	S2	0	0	33559.17	0	7735.092	9.999+	9.999+
3	1	S3	0	0	33543.266	0	7752.905	9.999+	9.999+
4	1	S4	0	0	33557.548	0	7751.235	9.999+	9.999+
5	1	S5	0	0	33483.214	0	7734.108	9.999+	9.999+
6	1	S6	0	0	33391.47	0	7691.909	9.999+	9.999+
7	1	S7	0	0	33255.595	0	7678.886	9.999+	9.999+
8	2	S1	0	0	45622.999	0	10890.345	9.999+	9.999+
9	2	S2	0	0	47492.482	0	10824.089	9.999+	9.999+
10	2	S3	0	0	47361.102	0	10943.005	9.999+	9.999+
11	2	S4	0	0	47457.531	0	10926.742	9.999+	9.999+
12	2	S5	0	0	46944.889	0	10798.669	9.999+	9.999+
13	2	S6	0	0	46324.338	0	10497.431	9.999+	9.999+
14	2	S7	0	0	45270.378	0	10371.396	9.999+	9.999+
15	3	S1	0	16433.71	33599.831	1807.118	7754.72	2.045	4.291
16	3	S2	0	17246.012	33458.547	1683.957	7735.092	1.94	4.593
17	3	S3	0	18063.901	33648.694	1789.057	7752.905	1.863	4.334
18	3	S4	0	17839.294	33619.936	1773.018	7751.235	1.885	4.372
19	3	S5	0	17656.775	33587.185	1755.528	7743.65	1.902	4.411
20	3	S6	0	15773.069	33289.248	1549.968	7695.922	2.111	4.965
21	3	S7	0	16156.357	33556.105	1757.976	7739.172	2.077	4.402
22	4	S1	0	17520.878	33599.831	1622.999	7754.72	1.918	4.778
23	4	S2	0	17977.747	33458.547	1368.948	7735.092	1.861	5.65
24	4	S3	0	19072.867	33648.694	1521.121	7752.905	1.764	5.097
25	4	S4	0	18756.31	33619.936	1497.251	7751.235	1.792	5.177
26	4	S5	0	18654.634	33587.185	1486.439	7743.65	1.8	5.21
27	4	S6	0	16413.004	33289.248	1253.201	7695.922	2.028	6.141
28	4	S7	0	17236.62	33556.105	1588.831	7739.172	1.947	4.871
29	5	S1	0	2503.61	33305.734	0	9900.716	9.999+	9.999+
30	5	S2	0	3397.923	33559.17	0	9729.982	9.876	9.999+
31	5	S3	0	3199.614	33543.266	0	9874.489	9.999+	9.999+
32	5	S4	0	3109.297	33557.548	0	9842.085	9.999+	9.999+
33	5	S5	0	3175.268	33483.214	0	9780.815	9.999+	9.999+
34	5	S6	0	3022.27	33391.47	0	9499.094	9.999+	9.999+
35	5	S7	0	2508.976	33255.595	0	9461.234	9.999+	9.999+
36	6	S1	0	0	34007.057	0	9528.797	9.999+	9.999+
37	6	S2	0	0	34062.304	0	9509.74	9.999+	9.999+
38	6	S3	0	0	34068.214	0	9582.72	9.999+	9.999+
39	6	S4	0	0	34157.317	0	9567.689	9.999+	9.999+
40	6	S5	0	0	33955.345	0	9488.808	9.999+	9.999+
41	6	S6	0	0	33970.35	0	9313.647	9.999+	9.999+
42	6	S7	0	0	33881.957	0	9227.439	9.999+	9.999+
43	7	S1	0	979.93	33305.734	0	8516.617	9.999+	9.999+
44	7	S2	0	920.592	33559.17	0	8284.906	9.999+	9.999+
45	7	S3	0	487.439	33543.266	0	8078.937	9.999+	9.999+
46	7	S4	0	389.977	33557.548	0	8039.448	9.999+	9.999+
47	7	S5	0	433.071	33483.214	0	8025.924	9.999+	9.999+

Slab Overturning Safety Factors (By Combination) (Continued)

	LC	Slab	Angle[deg]	Mo-xx[lb-ft]	Ms-xx[lb-ft]	Mo-zz[lb-ft]	Ms-zz[lb-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
48	7	S6	0	424.217	33391.47	0	7935.679	9.999+	9.999+
49	7	S7	0	341.843	33255.595	0	7929.011	9.999+	9.999+
50	8	S1	0	7124.881	33599.831	747.568	7754.72	4.716	9.999+
51	8	S2	0	4817.587	33458.547	467.15	7735.092	6.945	9.999+
52	8	S3	0	3229.086	33648.694	324.869	7752.905	9.999+	9.999+
53	8	S4	0	2919.098	33619.936	290.483	7751.235	9.999+	9.999+
54	8	S5	0	2975.693	33587.185	295.908	7743.65	9.999+	9.999+
55	8	S6	0	2584.734	33289.248	253.048	7695.922	9.999+	9.999+
56	8	S7	0	2771.21	33556.105	309.914	7739.172	9.999+	9.999+
57	9	S1	0	12325.283	43405.666	1355.338	10106.439	3.522	7.457
58	9	S2	0	12934.509	42910.429	1262.967	10051.84	3.318	7.959
59	9	S3	0	13547.926	44001.577	1341.793	10145.48	3.248	7.561
60	9	S4	0	13379.47	43835.783	1329.764	10132.866	3.276	7.62
61	9	S5	0	13242.581	43662.83	1316.646	10100.275	3.297	7.671
62	9	S6	0	11829.802	41987.106	1162.476	9837.353	3.549	8.462
63	9	S7	0	12117.268	43167.358	1318.482	10017.246	3.562	7.598
64	10	S1	0	13140.659	43405.666	1217.249	10106.439	3.303	8.303
65	10	S2	0	13483.31	42910.429	1026.711	10051.84	3.182	9.79
66	10	S3	0	14304.65	44001.577	1140.841	10145.48	3.076	8.893
67	10	S4	0	14067.232	43835.783	1122.938	10132.866	3.116	9.024
68	10	S5	0	13990.976	43662.83	1109.258	10032.529	3.121	9.044
69	10	S6	0	12309.753	41987.106	939.901	9837.353	3.411	9.999+
70	10	S7	0	12927.465	43167.358	1191.623	10017.246	3.339	8.406
71	11	S1	0	1877.708	42543.682	0	11715.936	9.999+	9.999+
72	11	S2	0	2548.442	44009.154	0	11548.007	9.999+	9.999+
73	11	S3	0	2399.711	43906.643	0	11736.668	9.999+	9.999+
74	11	S4	0	2331.973	43982.535	0	11701.003	9.999+	9.999+
75	11	S5	0	2381.451	43579.47	0	11567.559	9.999+	9.999+
76	11	S6	0	2266.702	43091.121	0	11151.439	9.999+	9.999+
77	11	S7	0	1881.732	42266.682	0	11035.029	9.999+	9.999+
78	12	S1	0	0	43069.674	0	11436.997	9.999+	9.999+
79	12	S2	0	0	44386.504	0	11382.825	9.999+	9.999+
80	12	S3	0	0	44300.354	0	11517.841	9.999+	9.999+
81	12	S4	0	0	44432.362	0	11495.206	9.999+	9.999+
82	12	S5	0	0	43933.569	0	11348.554	9.999+	9.999+
83	12	S6	0	0	43525.281	0	11012.354	9.999+	9.999+
84	12	S7	0	0	42736.454	0	10859.683	9.999+	9.999+
85	13	S1	0	734.948	42543.682	0	10677.862	9.999+	9.999+
86	13	S2	0	690.444	44009.154	0	10464.2	9.999+	9.999+
87	13	S3	0	365.579	43906.643	0	10390.003	9.999+	9.999+
88	13	S4	0	292.483	43982.535	0	10349.025	9.999+	9.999+
89	13	S5	0	324.803	43579.47	0	10251.391	9.999+	9.999+
90	13	S6	0	318.163	43091.121	0	9978.877	9.999+	9.999+
91	13	S7	0	256.382	42266.682	0	9885.862	9.999+	9.999+
92	14	S1	0	5343.661	43405.666	560.676	10106.439	8.123	9.999+
93	14	S2	0	3613.19	42910.429	350.362	10051.84	9.999+	9.999+
94	14	S3	0	2421.814	44001.577	243.652	10140.998	9.999+	9.999+
95	14	S4	0	2189.324	43835.783	217.863	10132.866	9.999+	9.999+
96	14	S5	0	2231.769	43662.83	221.931	10100.275	9.999+	9.999+
97	14	S6	0	1938.551	41987.106	189.786	9837.353	9.999+	9.999+
98	14	S7	0	2078.407	43167.358	232.436	10017.246	9.999+	9.999+
99	15	S1	0	16433.71	30239.848	1807.118	6979.248	1.84	3.862
100	15	S2	0	17246.012	30112.692	1683.957	6961.583	1.746	4.134
101	15	S3	0	18063.901	30283.825	1789.057	6977.615	1.676	3.9
102	15	S4	0	17839.294	30257.943	1773.018	6976.111	1.696	3.935
103	15	S5	0	17656.775	30228.466	1755.528	6969.285	1.712	3.97
104	15	S6	0	15773.069	29960.323	1549.968	6926.33	1.899	4.469

Slab Overturning Safety Factors (By Combination) (Continued)

	LC	Slab	Angle[deg]	Mo-xx[lb-ft]	Ms-xx[lb-ft]	Mo-zz[lb-ft]	Ms-zz[lb-ft]	Ms-xx/Mo-xx	Ms-zz/Mo-zz
105	15	S7	0	16156.357	30200.494	1757.976	6965.255	1.869	3.962
106	16	S1	0	17520.878	30239.848	1622.999	6979.248	1.726	4.3
107	16	S2	0	17977.747	30112.692	1368.948	6961.583	1.675	5.085
108	16	S3	0	19072.867	30283.825	1521.121	6977.615	1.588	4.587
109	16	S4	0	18756.31	30257.943	1497.251	6976.111	1.613	4.659
110	16	S5	0	18654.634	30228.466	1486.439	6969.285	1.62	4.689
111	16	S6	0	16413.004	29960.323	1253.201	6926.33	1.825	5.527
112	16	S7	0	17236.62	30200.494	1588.831	6965.255	1.752	4.384
113	17	S1	0	2503.61	29975.161	0	9125.244	9.999+	9.999+
114	17	S2	0	3397.923	30203.253	0	8956.472	8.889	9.999+
115	17	S3	0	3199.614	30188.939	0	9099.199	9.435	9.999+
116	17	S4	0	3109.297	30201.793	0	9066.962	9.713	9.999+
117	17	S5	0	3175.268	30134.893	0	9007.404	9.491	9.999+
118	17	S6	0	3022.27	30052.323	0	8729.903	9.944	9.999+
119	17	S7	0	2508.976	29930.035	0	8693.345	9.999+	9.999+
120	18	S1	0	0	30676.483	0	8753.325	9.999+	9.999+
121	18	S2	0	0	30706.387	0	8736.231	9.999+	9.999+
122	18	S3	0	0	30713.887	0	8807.429	9.999+	9.999+
123	18	S4	0	0	30801.562	0	8792.566	9.999+	9.999+
124	18	S5	0	0	30607.024	0	8715.397	9.999+	9.999+
125	18	S6	0	0	30631.203	0	8544.456	9.999+	9.999+
126	18	S7	0	0	30556.398	0	8459.55	9.999+	9.999+
127	19	S1	0	979.93	29975.161	0	7741.145	9.999+	9.999+
128	19	S2	0	920.592	30203.253	0	7511.397	9.999+	9.999+
129	19	S3	0	487.439	30188.939	0	7303.646	9.999+	9.999+
130	19	S4	0	389.977	30201.793	0	7264.324	9.999+	9.999+
131	19	S5	0	433.071	30134.893	0	7252.513	9.999+	9.999+
132	19	S6	0	424.217	30052.323	0	7166.488	9.999+	9.999+
133	19	S7	0	341.843	29930.035	0	7161.123	9.999+	9.999+
134	20	S1	0	7124.881	30239.848	747.568	6979.248	4.244	9.336
135	20	S2	0	4817.587	30112.692	467.15	6961.583	6.251	9.999+
136	20	S3	0	3229.086	30283.825	324.869	6977.615	9.378	9.999+
137	20	S4	0	2919.098	30257.943	290.483	6976.111	9.999+	9.999+
138	20	S5	0	2975.693	30228.466	295.908	6969.285	9.999+	9.999+
139	20	S6	0	2584.734	29960.323	253.048	6926.33	9.999+	9.999+
140	20	S7	0	2771.21	30200.494	309.914	6965.255	9.999+	9.999+

Slab Sliding Safety Factors (By Combination)

	LC	Slab	Angle[deg]	Va-xx[lb]	Vr-xx[lb]	Va-zz[lb]	Vr-zz[lb]	SR-xx	SR-zz
1	1	S1	0	17.43	2058.629	0	2058.629	9.999+	9.999+
2	1	S2	0	1.146	2062.08	0	2062.08	9.999+	9.999+
3	1	S3	0	0	2067.441	0	2067.441	9.999+	9.999+
4	1	S4	0	0	2066.996	0	2066.996	9.999+	9.999+
5	1	S5	0	2.385	2063.701	0	2063.701	9.999+	9.999+
6	1	S6	0	1.003	2051.711	0	2051.711	9.999+	9.999+
7	1	S7	0	15.072	2055.741	0	2055.741	9.999+	9.999+
8	2	S1	0	120.339	2839.911	0	2839.911	9.999+	9.999+
9	2	S2	0	14.734	2878.565	0	2878.565	9.999+	9.999+
10	2	S3	0	1.494	2917.338	1.094	2917.338	9.999+	9.999+
11	2	S4	0	0	2913.798	1.582	2913.798	9.999+	9.999+
12	2	S5	0	21.787	2891.265	2.14	2891.265	9.999+	9.999+
13	2	S6	0	13.433	2806.479	1.692	2806.479	9.999+	9.999+
14	2	S7	0	101.302	2819.733	0	2819.733	9.999+	9.999+
15	3	S1	0	54.404	1615.043	963.633	1615.043	9.999+	1.676
16	3	S2	0	4.665	1616.124	1122.878	1616.124	9.999+	1.439
17	3	S3	0	1.811	1591.325	1100.934	1591.325	9.999+	1.445

Slab Sliding Safety Factors (By Combination) (Continued)

	LC	Slab	Angle[deg]	Va-xx[lb]	Vr-xx[lb]	Va-zz[lb]	Vr-zz[lb]	SR-xx	SR-zz
18	3	S4	0	2.361	1595.45	1101.77	1595.45	9.999+	1.448
19	3	S5	0	5.104	1599.555	1078.16	1599.555	9.999+	1.484
20	3	S6	0	4.986	1641.58	1029.013	1641.58	9.999+	1.595
21	3	S7	0	48.587	1620.899	947.08	1620.899	9.999+	1.711
22	4	S1	0	68.141	1671.468	813.995	1671.468	9.999+	2.053
23	4	S2	0	4.365	1699.966	948.78	1699.966	9.999+	1.792
24	4	S3	0	.756	1662.212	932.273	1662.212	9.999+	1.783
25	4	S4	0	3.152	1669.41	927.531	1669.41	9.999+	1.8
26	4	S5	0	.528	1668.308	914.946	1668.308	9.999+	1.823
27	4	S6	0	5.633	1721.063	867.15	1721.063	9.999+	1.985
28	4	S7	0	65.579	1675.066	800.878	1675.066	9.999+	2.092
29	5	S1	0	103.464	2585.01	1142.556	2585.01	9.999+	2.262
30	5	S2	0	8.114	2590.334	1331.379	2590.334	9.999+	1.946
31	5	S3	0	2.12	2632.066	1305.431	2632.066	9.999+	2.016
32	5	S4	0	2.84	2626.071	1306.233	2626.071	9.999+	2.01
33	5	S5	0	11.111	2614.143	1278.494	2614.143	9.999+	2.045
34	5	S6	0	8.164	2537.446	1220.005	2537.446	9.999+	2.08
35	5	S7	0	91.481	2571.785	1122.96	2571.785	9.999+	2.29
36	6	S1	0	69.891	2503.737	990.149	2503.737	9.999+	2.529
37	6	S2	0	5.827	2532.823	1153.547	2532.823	9.999+	2.196
38	6	S3	0	2.525	2554.046	1129.258	2554.046	9.999+	2.262
39	6	S4	0	1.433	2552.148	1134.791	2552.148	9.999+	2.249
40	6	S5	0	13.914	2537.77	1104.219	2537.77	9.999+	2.298
41	6	S6	0	5.692	2486.675	1059.107	2486.675	9.999+	2.348
42	6	S7	0	57.079	2491.093	972.399	2491.093	9.999+	2.562
43	7	S1	0	38.132	2250.761	426.746	2250.761	9.999+	5.274
44	7	S2	0	3.322	2207.537	365	2207.537	9.999+	6.048
45	7	S3	0	3.596	2156.301	205.627	2156.301	9.999+	9.999+
46	7	S4	0	0	2143.853	177.906	2143.853	9.999+	9.999+
47	7	S5	0	3.657	2142.197	181.469	2142.197	9.999+	9.999+
48	7	S6	0	2.992	2117.777	172.729	2117.777	9.999+	9.999+
49	7	S7	0	30.841	2130.852	157.942	2130.852	9.999+	9.999+
50	8	S1	0	1.038	1869.127	421.865	1869.127	9.999+	4.431
51	8	S2	0	.728	1938.506	313.161	1938.506	9.999+	6.19
52	8	S3	0	2.364	1982.07	196.192	1982.07	9.999+	9.999+
53	8	S4	0	0	1989.534	180.098	1989.534	9.999+	9.999+
54	8	S5	0	1.248	1985.399	181.023	1985.399	9.999+	9.999+
55	8	S6	0	.807	1985.197	172.814	1985.197	9.999+	9.999+
56	8	S7	0	.156	1981.052	157.932	1981.052	9.999+	9.999+
57	9	S1	0	40.736	2311.901	722.724	2311.901	9.999+	3.199
58	9	S2	0	6.979	2339.977	842.158	2339.977	9.999+	2.779
59	9	S3	0	.238	2347.777	826.521	2347.777	9.999+	2.841
60	9	S4	0	1.771	2348.438	825.141	2348.438	9.999+	2.846
61	9	S5	0	11.319	2336.264	810.225	2336.264	9.999+	2.883
62	9	S6	0	5.833	2310.189	770.491	2310.189	9.999+	2.998
63	9	S7	0	32	2302.604	710.31	2302.604	9.999+	3.242
64	10	S1	0	30.433	2354.22	610.497	2354.22	9.999+	3.856
65	10	S2	0	7.204	2402.859	711.585	2402.859	9.999+	3.377
66	10	S3	0	.554	2400.942	700.025	2400.942	9.999+	3.43
67	10	S4	0	2.364	2403.908	694.461	2403.908	9.999+	3.462
68	10	S5	0	15.544	2387.829	687.814	2387.829	9.999+	3.472
69	10	S6	0	5.349	2369.801	649.094	2369.801	9.999+	3.651
70	10	S7	0	19.257	2343.229	600.658	2343.229	9.999+	3.901
71	11	S1	0	159.137	3039.377	856.917	3039.377	9.999+	3.547
72	11	S2	0	16.563	3070.635	998.534	3070.635	9.999+	3.075
73	11	S3	0	2.711	3128.332	978.253	3128.332	9.999+	3.198
74	11	S4	0	2.13	3121.403	980.862	3121.403	9.999+	3.182

Slab Sliding Safety Factors (By Combination) (Continued)

	LC	Slab	Angle[deg]	Va-xx[lb]	Vr-xx[lb]	Va-zz[lb]	Vr-zz[lb]	SR-xx	SR-zz
75	11	S5	0	23.481	3097.205	957.266	3097.205	9.999+	3.235
76	11	S6	0	15.696	2982.088	916.272	2982.088	9.999+	3.255
77	11	S7	0	137.051	3015.768	842.22	3015.768	9.999+	3.581
78	12	S1	0	133.958	2978.422	742.611	2978.422	9.999+	4.011
79	12	S2	0	14.848	3027.501	865.16	3027.501	9.999+	3.499
80	12	S3	0	3.014	3069.817	846.123	3069.817	9.999+	3.628
81	12	S4	0	1.075	3065.962	852.28	3065.962	9.999+	3.597
82	12	S5	0	25.583	3039.926	826.559	3039.926	9.999+	3.678
83	12	S6	0	13.842	2944.01	795.599	2944.01	9.999+	3.7
84	12	S7	0	111.25	2955.249	729.3	2955.249	9.999+	4.052
85	13	S1	0	110.138	2788.689	320.06	2788.689	9.999+	8.713
86	13	S2	0	12.969	2783.537	273.75	2783.537	9.999+	9.999+
87	13	S3	0	1.577	2771.508	153.4	2771.508	9.999+	9.999+
88	13	S4	0	0	2759.74	134.616	2759.74	9.999+	9.999+
89	13	S5	0	17.89	2743.246	134.497	2743.246	9.999+	9.999+
90	13	S6	0	11.817	2667.336	130.815	2667.336	9.999+	9.999+
91	13	S7	0	91.572	2685.068	118.456	2685.068	9.999+	9.999+
92	14	S1	0	80.761	2502.464	316.399	2502.464	9.999+	7.909
93	14	S2	0	9.931	2581.764	234.871	2581.764	9.999+	9.999+
94	14	S3	0	2.893	2640.835	147.965	2640.835	9.999+	9.999+
95	14	S4	0	0	2644.001	133.887	2644.001	9.999+	9.999+
96	14	S5	0	16.083	2625.647	137.373	2625.647	9.999+	9.999+
97	14	S6	0	8.968	2567.902	128.341	2567.902	9.999+	9.999+
98	14	S7	0	68.558	2572.719	118.449	2572.719	9.999+	9.999+
99	15	S1	0	56.147	1409.18	963.633	1409.18	9.999+	1.462
100	15	S2	0	4.779	1409.916	1122.878	1409.916	9.999+	1.256
101	15	S3	0	1.811	1384.581	1100.934	1384.581	9.999+	1.258
102	15	S4	0	2.361	1388.751	1101.77	1388.751	9.999+	1.26
103	15	S5	0	5.343	1393.185	1078.16	1393.185	9.999+	1.292
104	15	S6	0	5.087	1436.409	1029.013	1436.409	9.999+	1.396
105	15	S7	0	50.094	1415.325	947.08	1415.325	9.999+	1.494
106	16	S1	0	69.884	1465.605	813.995	1465.605	9.999+	1.801
107	16	S2	0	4.479	1493.758	948.78	1493.758	9.999+	1.574
108	16	S3	0	.756	1455.468	932.273	1455.468	9.999+	1.561
109	16	S4	0	3.152	1462.711	927.531	1462.711	9.999+	1.577
110	16	S5	0	.29	1461.938	914.946	1461.938	9.999+	1.598
111	16	S6	0	5.733	1515.892	867.15	1515.892	9.999+	1.748
112	16	S7	0	67.086	1469.492	800.878	1469.492	9.999+	1.835
113	17	S1	0	101.721	2379.147	1142.556	2379.147	9.999+	2.082
114	17	S2	0	8	2384.126	1331.379	2384.126	9.999+	1.791
115	17	S3	0	2.12	2425.322	1305.431	2425.322	9.999+	1.858
116	17	S4	0	2.84	2419.371	1306.233	2419.371	9.999+	1.852
117	17	S5	0	10.872	2407.773	1278.494	2407.773	9.999+	1.883
118	17	S6	0	8.064	2332.275	1220.005	2332.275	9.999+	1.912
119	17	S7	0	89.973	2366.211	1122.96	2366.211	9.999+	2.107
120	18	S1	0	68.148	2297.874	990.149	2297.874	9.999+	2.321
121	18	S2	0	5.713	2326.615	1153.547	2326.615	9.999+	2.017
122	18	S3	0	2.525	2347.301	1129.258	2347.301	9.999+	2.079
123	18	S4	0	1.433	2345.449	1134.791	2345.449	9.999+	2.067
124	18	S5	0	13.676	2331.4	1104.219	2331.4	9.999+	2.111
125	18	S6	0	5.591	2281.504	1059.107	2281.504	9.999+	2.154
126	18	S7	0	55.572	2285.519	972.399	2285.519	9.999+	2.35
127	19	S1	0	36.389	2044.898	426.746	2044.898	9.999+	4.792
128	19	S2	0	3.207	2001.329	365	2001.329	9.999+	5.483
129	19	S3	0	3.596	1949.557	205.627	1949.557	9.999+	9.481
130	19	S4	0	0	1937.153	177.906	1937.153	9.999+	9.999+
131	19	S5	0	3.418	1935.827	181.469	1935.827	9.999+	9.999+

Slab Sliding Safety Factors (By Combination) (Continued)

	LC	Slab	Angle[deg]	Va-xx[lb]	Vr-xx[lb]	Va-zz[lb]	Vr-zz[lb]	SR-xx	SR-zz
132	19	S6	0	2.892	1912.605	172.729	1912.605	9.999+	9.999+
133	19	S7	0	29.334	1925.278	157.942	1925.278	9.999+	9.999+
134	20	S1	0	2.781	1663.264	421.865	1663.264	9.999+	3.943
135	20	S2	0	.843	1732.298	313.161	1732.298	9.999+	5.532
136	20	S3	0	2.364	1775.326	196.192	1775.326	9.999+	9.049
137	20	S4	0	0	1782.834	180.098	1782.834	9.999+	9.899
138	20	S5	0	1.009	1779.029	181.023	1779.029	9.999+	9.828
139	20	S6	0	.907	1780.026	172.814	1780.026	9.999+	9.999+
140	20	S7	0	1.351	1775.478	157.932	1775.478	9.999+	9.999+

Envelope Slab Soil Pressures

	Label	UC	LC	Soil Pressure[psf]	Allowable Bearing[psf]	Point
1	S1	.438	11	656.452	1500	N1
2	S2	.433	5	649.608	1500	N21
3	S3	.453	11	680.066	1500	N25
4	S4	.448	11	671.813	1500	N28
5	S5	.447	11	671.025	1500	N32
6	S6	.412	5	618.258	1500	N36
7	S7	.434	11	650.813	1500	N41

Company:		Date:	5/14/2018
Engineer:		Page:	1/6
Project:			
Address:			
Phone:			
E-mail:			

1.Project information

Customer company:
Customer contact name:
Customer e-mail:
Comment:

Project description:
Location:
Fastening description:

2. Input Data & Anchor Parameters

General
Design method:ACI 318-14
Units: Imperial units

Anchor Information:
Anchor type: Bonded anchor
Material: F1554 Grade 36
Diameter (inch): 0.375
Effective Embedment depth, h_{ef} (inch): 4.000
Code report: ICC-ES ESR-4057
Anchor category: -
Anchor ductility: Yes
h_{min} (inch): 5.25
c_{ac} (inch): 7.12
C_{min} (inch): 1.75
S_{min} (inch): 3.00

Base Material
Concrete: Normal-weight
Concrete thickness, h (inch): 30.00
State: Cracked
Compressive strength, f'_c (psi): 2500
$\Psi_{c,V}$: 1.0
Reinforcement condition: B tension, B shear
Supplemental reinforcement: Not applicable
Reinforcement provided at corners: No
Ignore concrete breakout in tension: No
Ignore concrete breakout in shear: No
Hole condition: Dry concrete
Inspection: Periodic
Temperature range, Short/Long: 150/110°F
Ignore 6do requirement: Not applicable
Build-up grout pad: No

Base Plate
Length x Width x Thickness (inch): 4.75 x 4.75 x 0.31

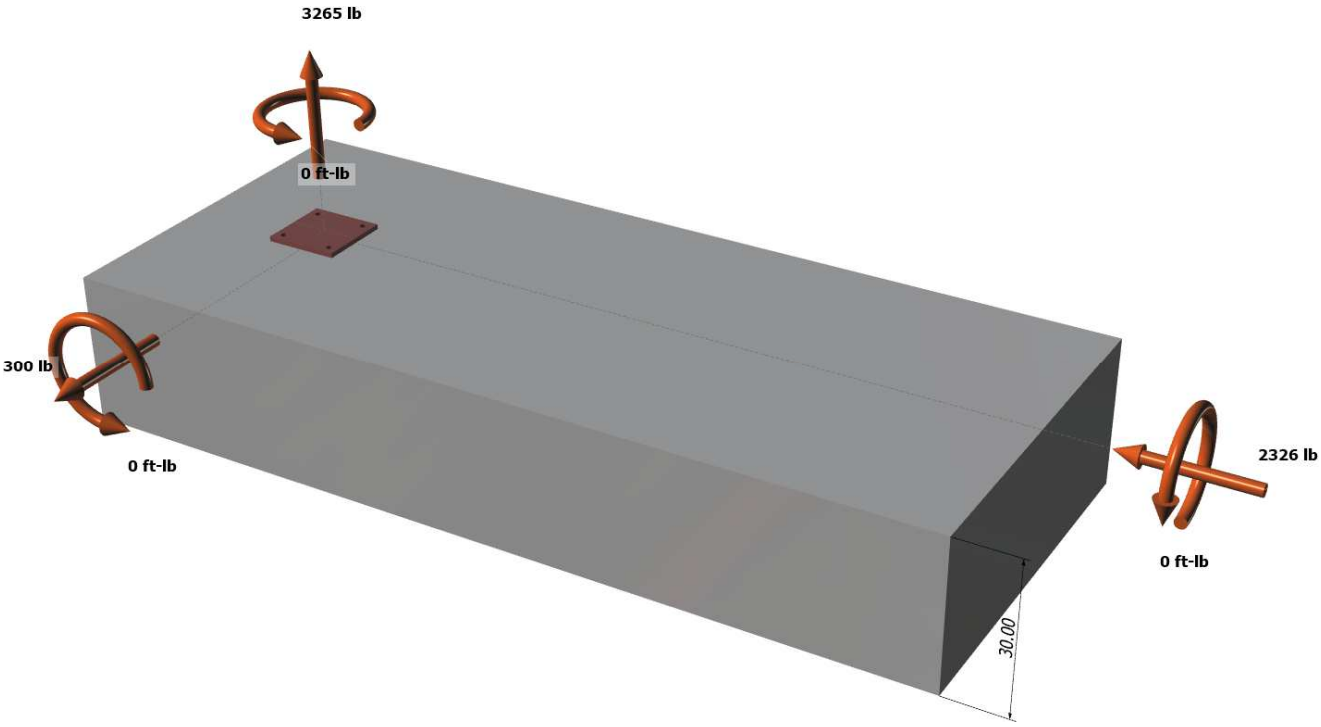
Recommended Anchor
Anchor Name: SET-3G - SET-3G w/ 3/8"Ø F1554 Gr. 36
Code Report: ICC-ES ESR-4057

Load and Geometry
Load factor source: ACI 318 Section 5.3
Load combination: not set
Seismic design: No
Anchors subjected to sustained tension: No
Apply entire shear load at front row: No
Anchors only resisting wind and/or seismic loads: No

Strength level loads:

N_{ua} [lb]: 3265
V_{uax} [lb]: 300
V_{uay} [lb]: -2326
M_{ux} [ft-lb]: 0
M_{uy} [ft-lb]: 0
M_{uz} [ft-lb]: 0

<Figure 1>



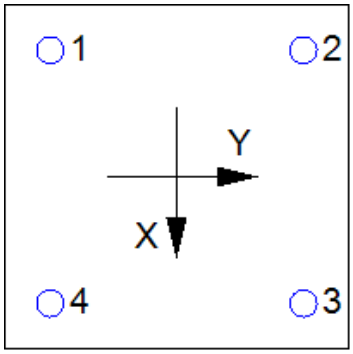
<Figure 2>

3. Resulting Anchor Forces

Anchor	Tension load, N_{ua} (lb)	Shear load x, V_{uax} (lb)	Shear load y, V_{uay} (lb)	Shear load combined, $\sqrt{(V_{uax})^2+(V_{uay})^2}$ (lb)
1	816.3	75.0	-581.5	586.3
2	816.3	75.0	-581.5	586.3
3	816.3	75.0	-581.5	586.3
4	816.3	75.0	-581.5	586.3
Sum	3265.0	300.0	-2326.0	2345.3

Maximum concrete compression strain (‰): 0.00
Maximum concrete compression stress (psi): 0
Resultant tension force (lb): 3265
Resultant compression force (lb): 0
Eccentricity of resultant tension forces in x-axis, e'_{Nx} (inch): 0.00
Eccentricity of resultant tension forces in y-axis, e'_{Ny} (inch): 0.00
Eccentricity of resultant shear forces in x-axis, e'_{Vx} (inch): 0.00
Eccentricity of resultant shear forces in y-axis, e'_{Vy} (inch): 0.00

<Figure 3>



4. Steel Strength of Anchor in Tension (Sec. 17.4.1)

N_{sa} (lb)	ϕ	ϕN_{sa} (lb)
4525	0.75	3394

5. Concrete Breakout Strength of Anchor in Tension (Sec. 17.4.2)

$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (Eq. 17.4.2.2a)

k_c	λ_a	f'_c (psi)	h_{ef} (in)	N_b (lb)
17.0	1.00	2500	4.000	6800

$\phi N_{cbg} = \phi (A_{Nc} / A_{Nco}) \Psi_{ec,N} \Psi_{ed,N} \Psi_{c,N} \Psi_{cp,N} N_b$ (Sec. 17.3.1 & Eq. 17.4.2.1b)

A_{Nc} (in²)	A_{Nco} (in²)	$c_{a,min}$ (in)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	ϕ	ϕN_{cbg} (lb)
240.25	144.00	7.25	1.000	1.000	1.00	1.000	6800	0.65	7374

6. Adhesive Strength of Anchor in Tension (Sec. 17.4.5)

$\tau_{k,cr} = \tau_{k,cr} f_{short\text{-}term} K_{sat} (f'_c / 2{,}500)^n$

$\tau_{k,cr}$ (psi)	$f_{short\text{-}term}$	K_{sat}	f'_c (psi)	n	$\tau_{k,cr}$ (psi)
1346	1.00	1.00	2500	0.24	1346

$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef}$ (Eq. 17.4.5.2)

λ_a	τ_{cr} (psi)	d_a (in)	h_{ef} (in)	N_{ba} (lb)
1.00	1346	0.38	4.000	6343

$\phi N_{ag} = \phi (A_{Na} / A_{Na0}) \Psi_{ec,Na} \Psi_{ed,Na} \Psi_{cp,Na} N_{ba}$ (Sec. 17.3.1 & Eq. 17.4.5.1b)

A_{Na} (in²)	A_{Na0} (in²)	c_{Na} (in)	$c_{a,min}$ (in)	$\Psi_{ec,Na}$	$\Psi_{ed,Na}$	$\Psi_{cp,Na}$	N_{ba}(lb)	ϕ	ϕN_{ag} (lb)
198.45	112.09	5.29	7.25	1.000	1.000	1.000	6343	0.55	6176

8. Steel Strength of Anchor in Shear (Sec. 17.5.1)

V_{sa} (lb)	ϕ_{grout}	ϕ	$\phi_{grout}\phi V_{sa}$ (lb)
2715	1.0	0.65	1765

9. Concrete Breakout Strength of Anchor in Shear (Sec. 17.5.2)

Shear perpendicular to edge in x-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
3.00	0.375	1.00	2500	13.75	16564

$\phi V_{cbgx} = \phi\,(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1 & Eq. 17.5.2.1b)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgx} (lb)
647.11	850.78	1.000	0.805	1.000	1.000	16564	0.70	7103

Shear perpendicular to edge in y-direction:

$V_{by} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
3.00	0.375	1.00	2500	10.75	11450

$\phi V_{cbgy} = \phi\,(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.3.1 & Eq. 17.5.2.1b)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbgy} (lb)
387.00	520.03	1.000	0.891	1.000	1.000	11450	0.70	5313

Shear parallel to edge in x-direction:

$V_{by} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{by} (lb)
3.00	0.375	1.00	2500	7.25	6342

$\phi V_{cbgx} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{by}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1b)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{by} (lb)	ϕ	ϕV_{cbgx} (lb)
261.00	236.53	1.000	1.000	1.000	1.000	6342	0.70	9797

Shear parallel to edge in y-direction:

$V_{bx} = \min|7(l_e / d_a)^{0.2}\sqrt{d_a}\lambda_a\sqrt{f'_c}c_{a1}^{1.5};\ 9\lambda_a\sqrt{f'_c}c_{a1}^{1.5}|$ (Eq. 17.5.2.2a & Eq. 17.5.2.2b)

l_e (in)	d_a (in)	λ_a	f'_c (psi)	c_{a1} (in)	V_{bx} (lb)
3.00	0.375	1.00	2500	10.25	10661

$\phi V_{cbgy} = \phi\,(2)(A_{Vc} / A_{Vco})\,\Psi_{ec,V}\Psi_{ed,V}\Psi_{c,V}\Psi_{h,V}V_{bx}$ (Sec. 17.3.1, 17.5.2.1(c) & Eq. 17.5.2.1b)

A_{Vc} (in²)	A_{Vco} (in²)	$\Psi_{ec,V}$	$\Psi_{ed,V}$	$\Psi_{c,V}$	$\Psi_{h,V}$	V_{bx} (lb)	ϕ	ϕV_{cbgy} (lb)
401.67	472.78	1.000	1.000	1.000	1.000	10661	0.70	12680

10. Concrete Pryout Strength of Anchor in Shear (Sec. 17.5.3)

$\phi V_{cpg} = \phi \min|k_{cp}N_{ag};\ k_{cp}N_{cbg}| = \phi \min|k_{cp}(A_{Na} / A_{Na0})\,\Psi_{ec,Na}\Psi_{ed,Na}\Psi_{cp,Na}N_{ba};\ k_{cp}(A_{Nc} / A_{Nco})\,\Psi_{ec,N}\Psi_{ed,N}\Psi_{c,N}\Psi_{cp,N}N_b|$ (Sec. 17.3.1 & Eq. 17.5.3.1b)

k_{cp}	A_{Na} (in²)	A_{Na0} (in²)	$\Psi_{ed,Na}$	$\Psi_{ec,Na}$	$\Psi_{cp,Na}$	N_{ba} (lb)	N_a (lb)
2.0	198.45	112.09	1.000	1.000	1.000	6343	11230

A_{Nc} (in²)	A_{Nco} (in²)	$\Psi_{ec,N}$	$\Psi_{ed,N}$	$\Psi_{c,N}$	$\Psi_{cp,N}$	N_b (lb)	N_{cb} (lb)	ϕ
240.25	144.00	1.000	1.000	1.000	1.000	6800	11345	0.70

ϕV_{cpg} (lb)
15722

11. Results

Interaction of Tensile and Shear Forces (Sec. R17.6)

Tension	Factored Load, N_{ua} (lb)	Design Strength, ϕN_n (lb)	Ratio	Status
Steel	816	3394	0.24	Pass
Concrete breakout	3265	7374	0.44	Pass
Adhesive	**3265**	**6176**	**0.53**	**Pass (Governs)**

Shear	Factored Load, V_{ua} (lb)	Design Strength, ϕV_n (lb)	Ratio	Status
Steel	586	1765	0.33	Pass
T Concrete breakout x+	300	7103	0.04	Pass
T Concrete breakout y-	2326	5313	0.44	Pass
|| Concrete breakout y-	150	9797	0.02	Pass
|| Concrete breakout x-	1163	12680	0.09	Pass
Concrete breakout, combined	**-**	**-**	**0.44**	**Pass (Governs)**
Pryout	2345	15722	0.15	Pass

Interaction check	$(N_{ua}/\phi N_{ua})^{5/3}$	$(V_{ua}/\phi V_{ua})^{5/3}$	Combined Ratio	Permissible	Status
Sec. R17.6	0.35	0.25	60.0%	1.0	Pass

SET-3G w/ 3/8"Ø F1554 Gr. 36 with hef = 4.000 inch meets the selected design criteria.

12. Warnings

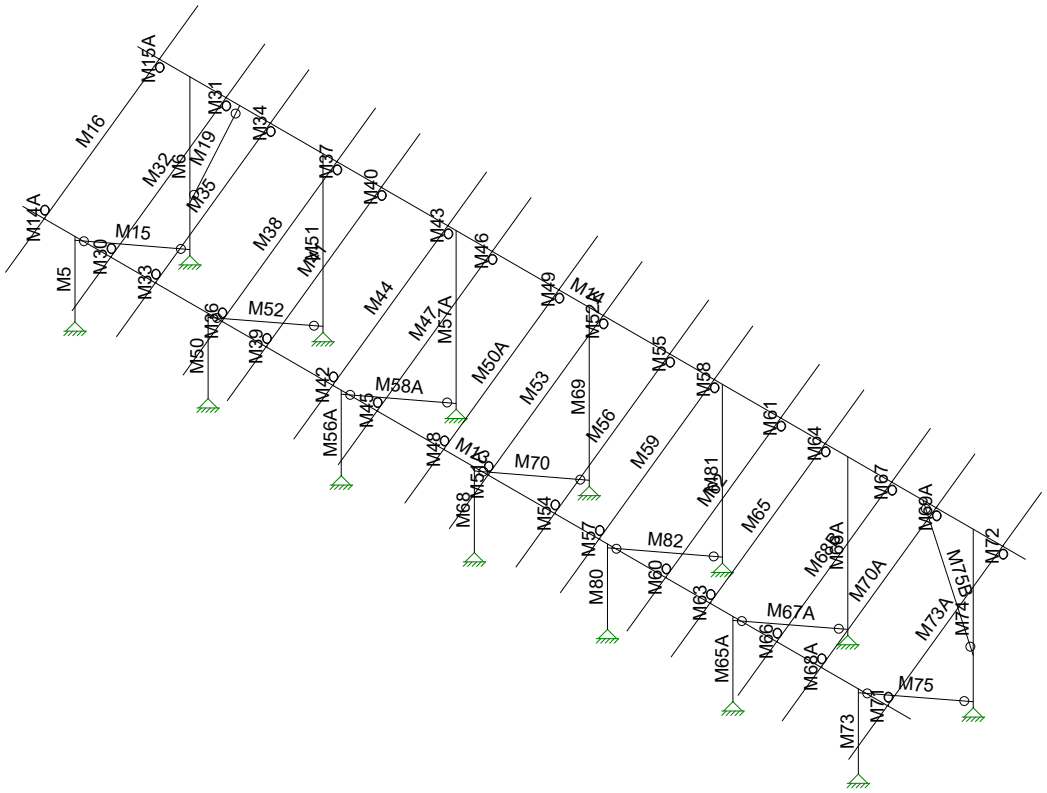
- Designer must exercise own judgement to determine if this design is suitable.

- Refer to manufacturer's product literature for hole cleaning and installation instructions.

JOB NO.: U2716-070-181 **DESIGNED:** STB

PROJECT: Ground Mount Package for Ontario Canada

Framing Analysis



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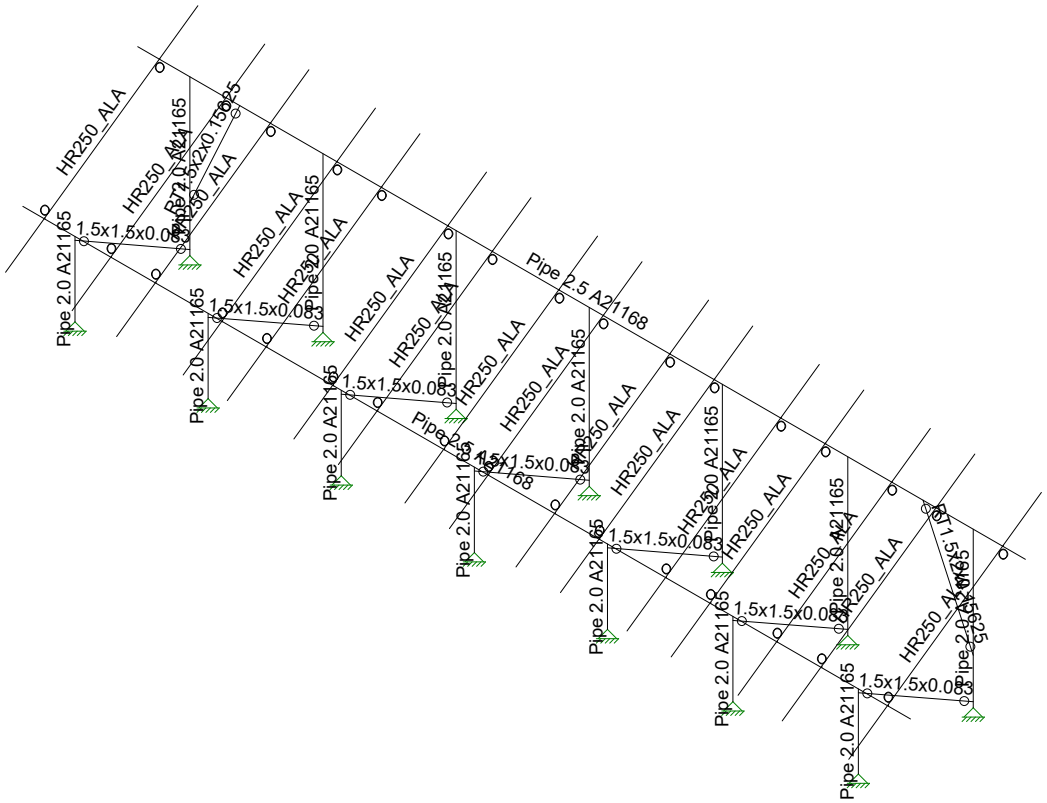
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



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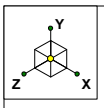
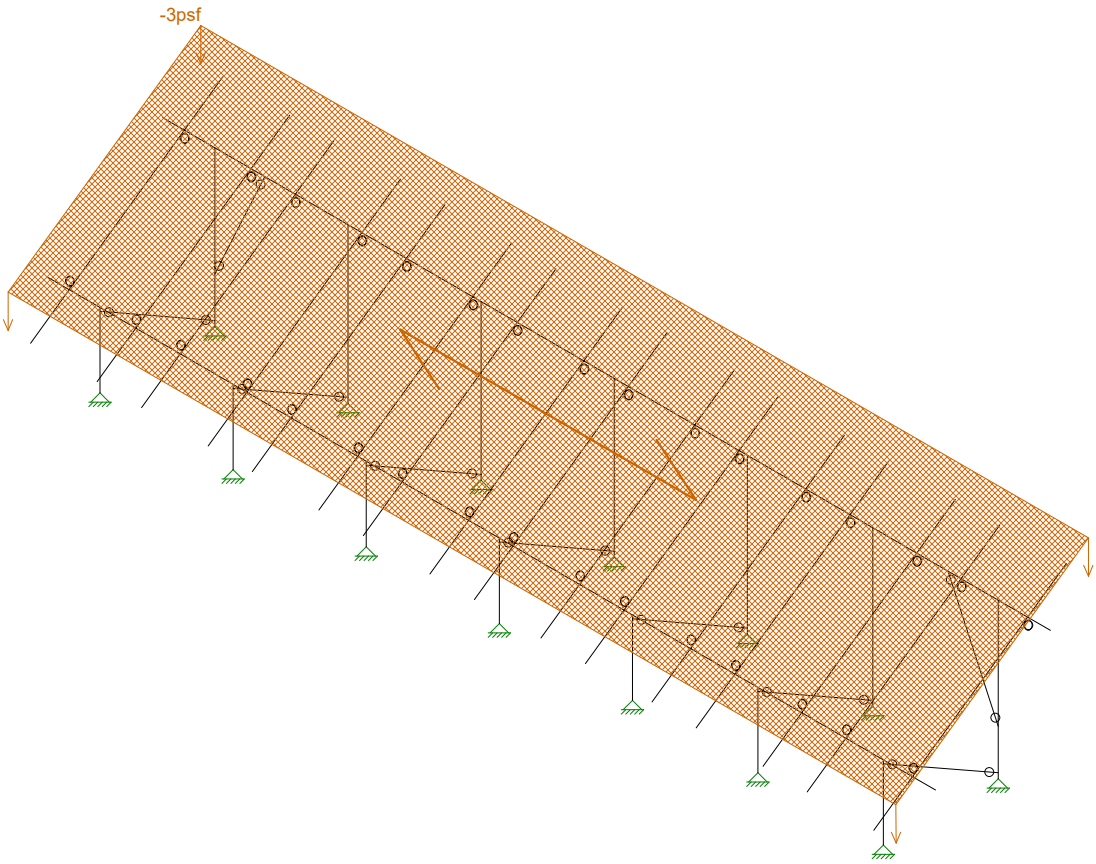
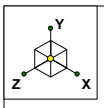
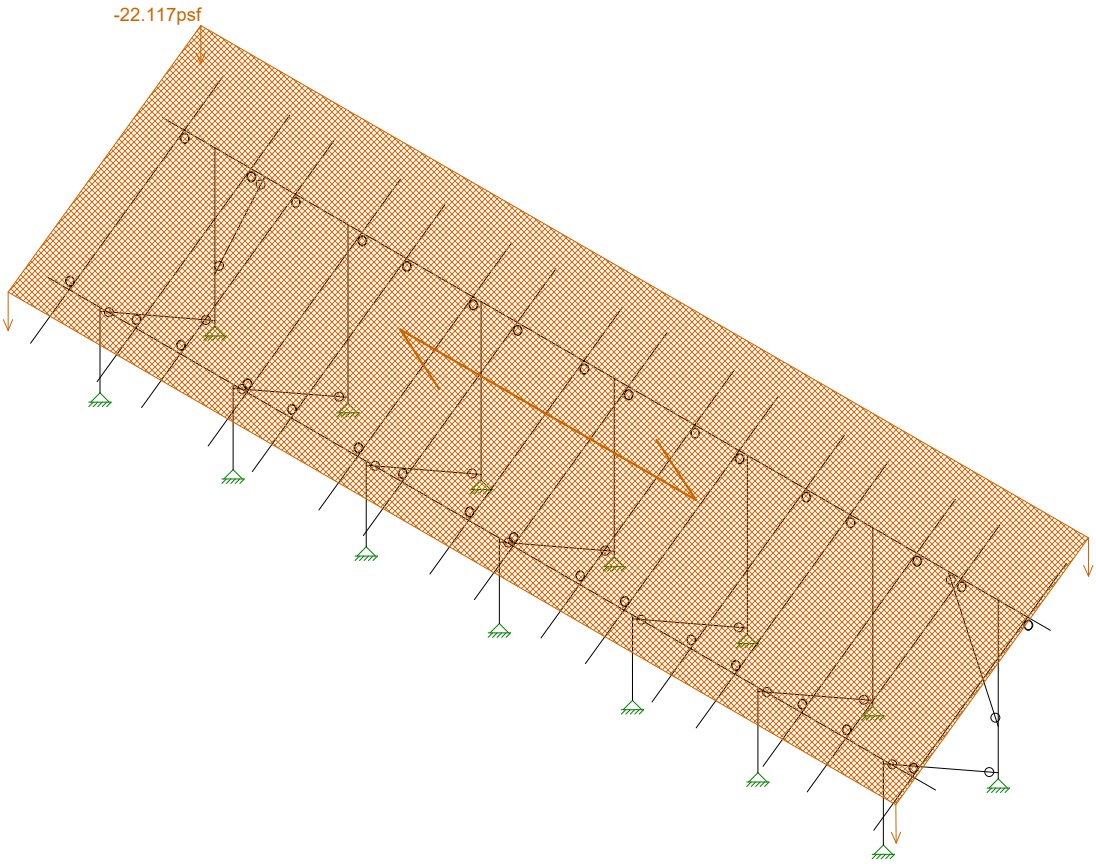




Loads: BLC 2, Solar Panel Weight

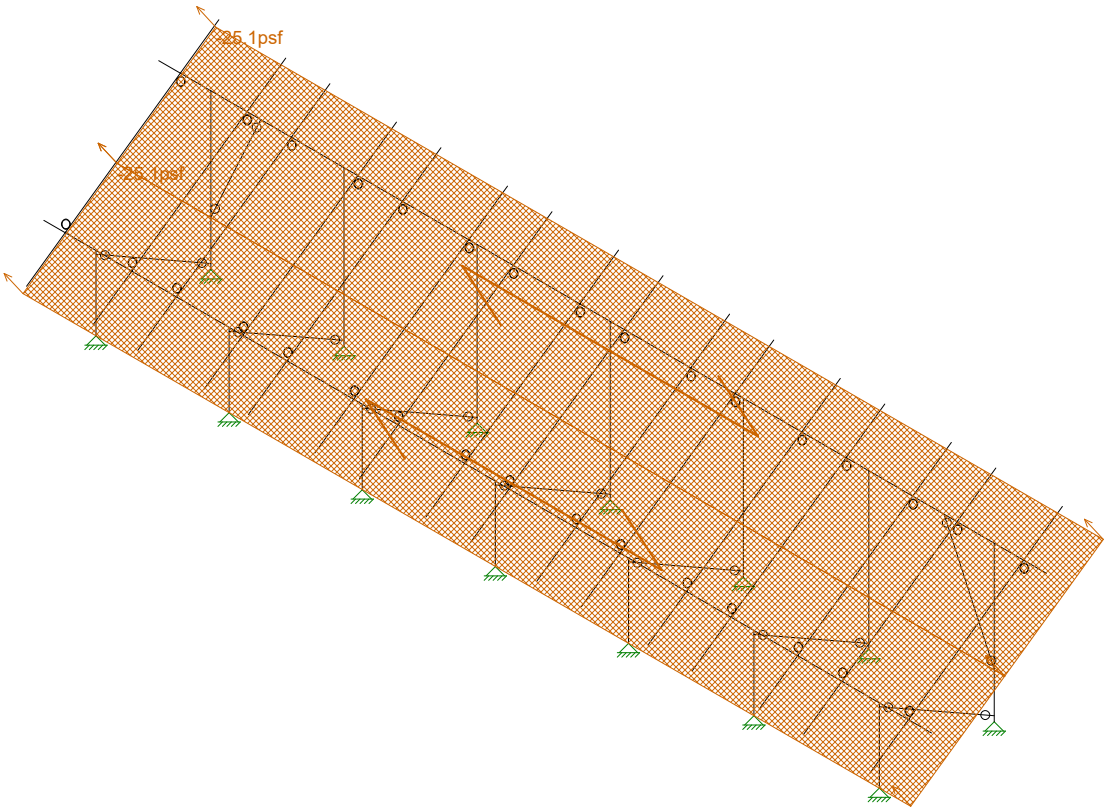
Vector Structural Engineeri...		SK - 5
STB	Ground Mount	Apr 6, 2021 at 11:31 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d





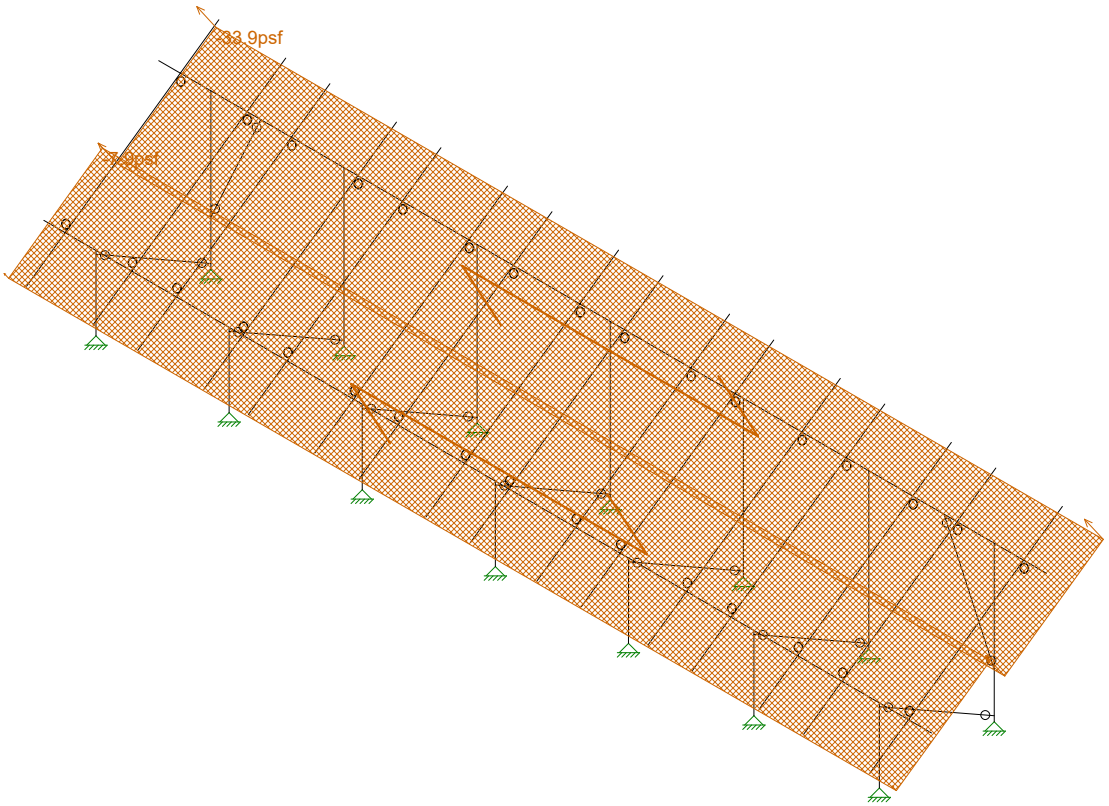
Loads: BLC 3, Roof Live/Snow

Vector Structural Engineeri...		SK - 6
STB	Ground Mount	Apr 6, 2021 at 11:31 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



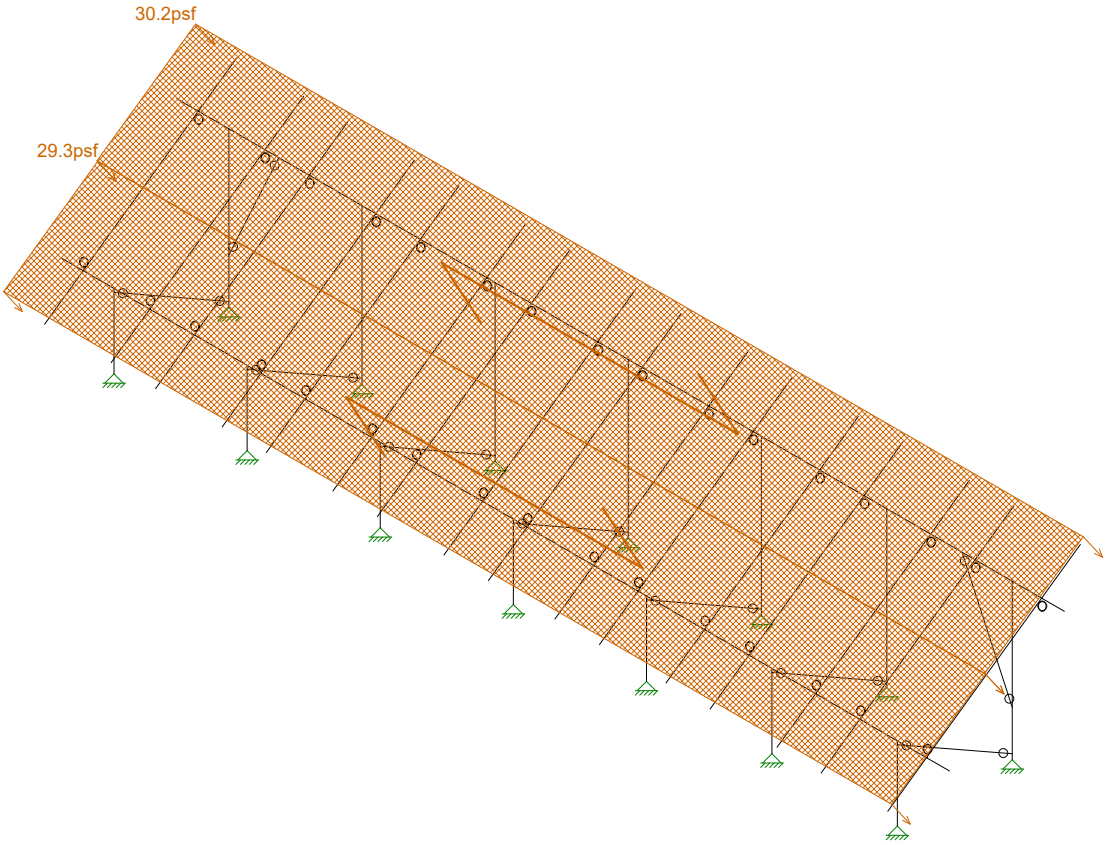
Loads: BLC 4, Wind A 0 deg

Vector Structural Engineeri...		SK - 7
STB	Ground Mount	Apr 6, 2021 at 11:32 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



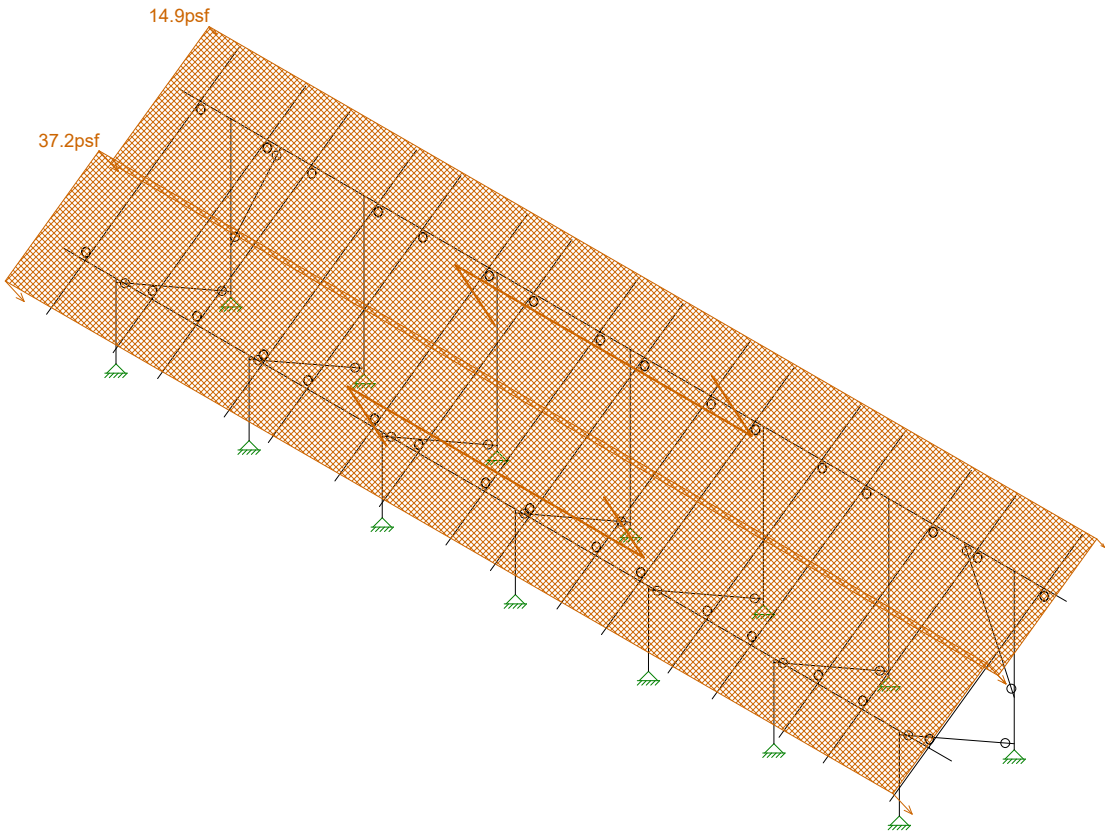
Loads: BLC 5, Wind B 0 deg

Vector Structural Engineeri...		SK - 8
STB	Ground Mount	Apr 6, 2021 at 11:32 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



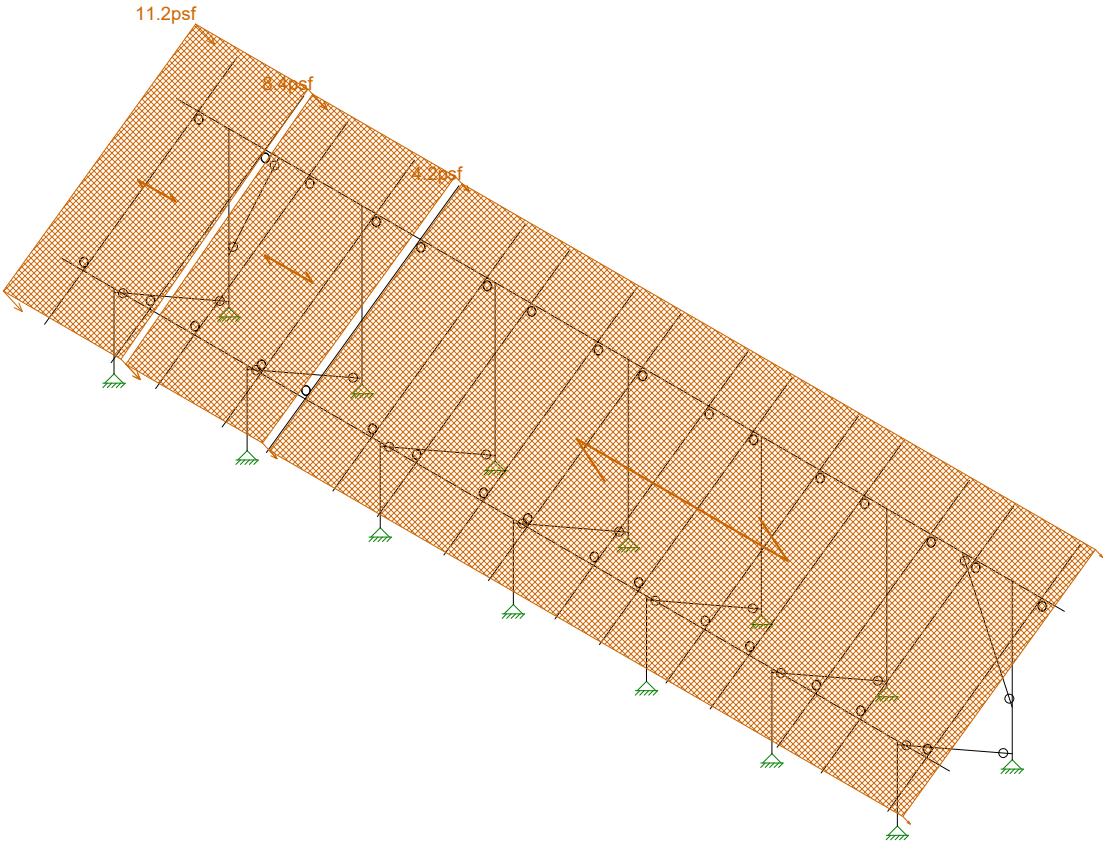
Loads: BLC 6, Wind A 180 deg

Vector Structural Engineeri...		SK - 9
STB	Ground Mount	Apr 6, 2021 at 11:32 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



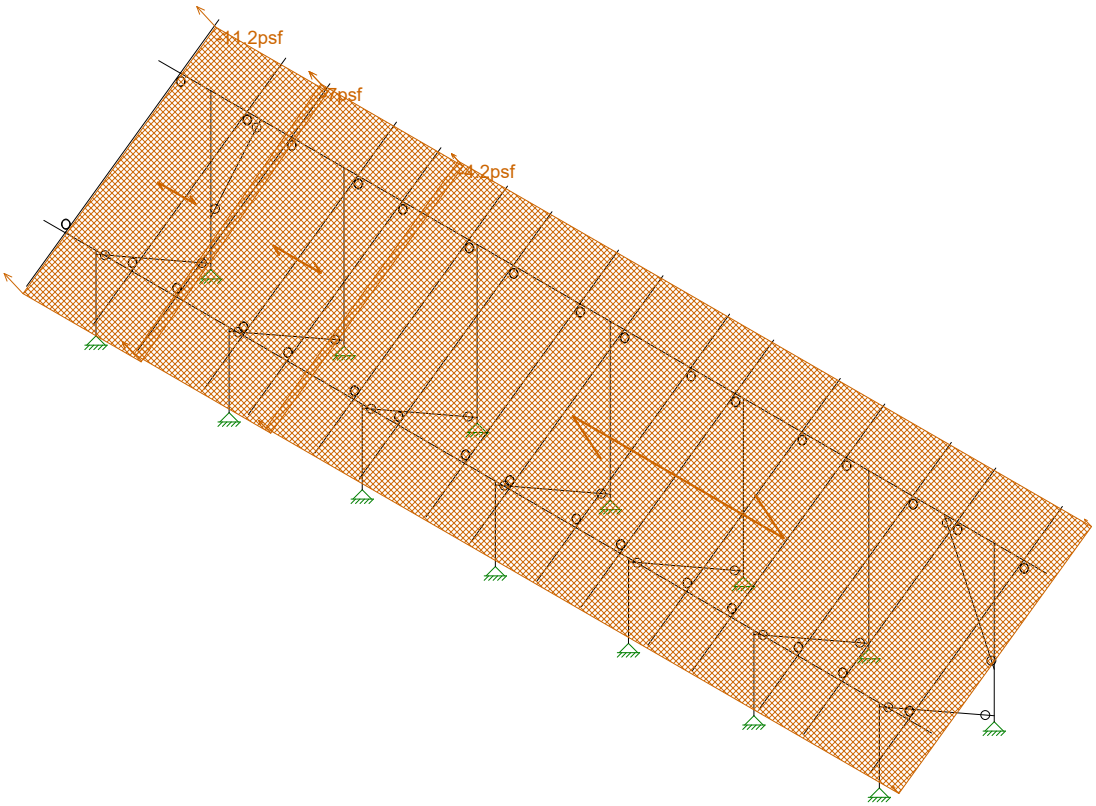
Loads: BLC 7, Wind B 180 deg

Vector Structural Engineeri...		SK - 10
STB	Ground Mount	Apr 6, 2021 at 11:32 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



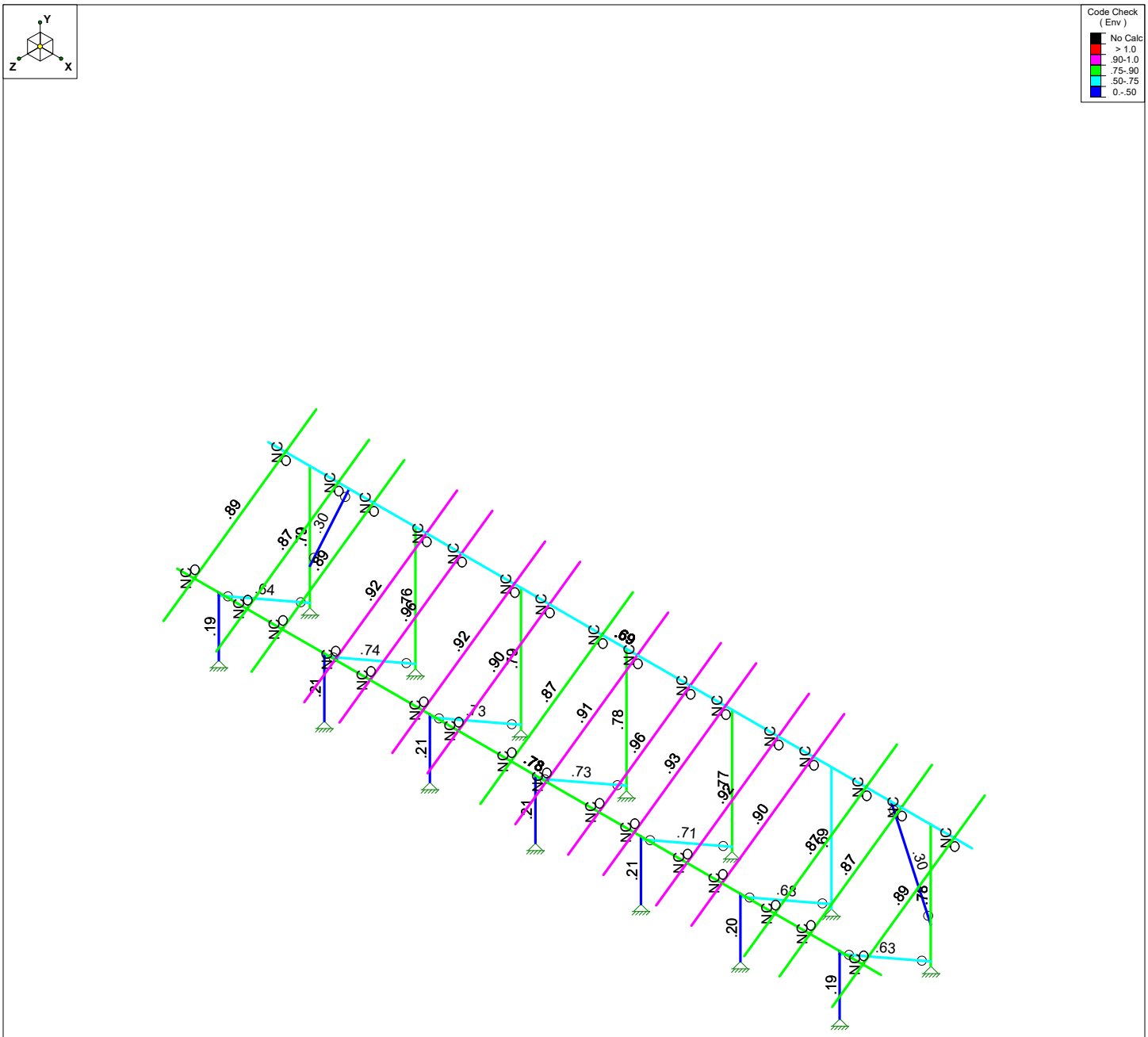
Loads: BLC 8, Wind A 90

Vector Structural Engineeri...		SK - 11
STB	Ground Mount	Apr 6, 2021 at 11:32 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



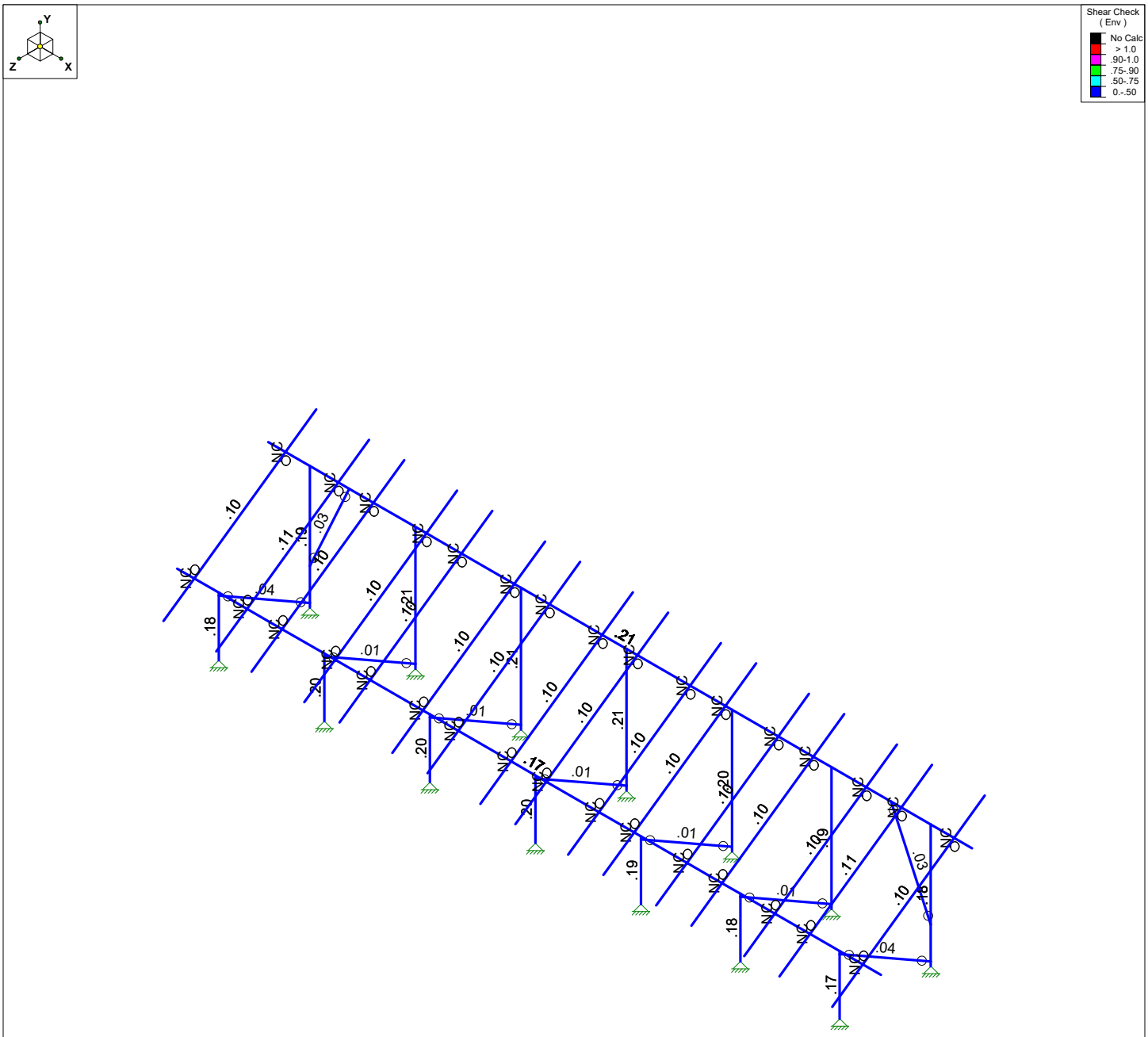
Loads: BLC 9, Wind B 90

Vector Structural Engineeri...		SK - 12
STB	Ground Mount	Apr 6, 2021 at 11:32 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Vector Structural Engineeri...		SK - 1
STB	Ground Mount	Apr 6, 2021 at 11:30 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Vector Structural Engineeri...		SK - 2
STB	Ground Mount	Apr 6, 2021 at 11:31 AM
U2716.128.191		Sunmodo Sunturf A4a v3 85x45.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-16: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-15: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (in)	15600
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E5 F)	Density[lb/ft^3]	Yield[psi]	Ry	Fu[psi]	Rt
1	A992	29000	11154	.3	.65	490	50000	1.1	65000	1.1
2	A36 Gr.36	29000	11154	.3	.65	490	36000	1.5	58000	1.2
3	A572 Gr.50	29000	11154	.3	.65	490	50000	1.1	65000	1.1
4	A500 Gr.B R...	29000	11154	.3	.65	527	42000	1.4	58000	1.3
5	A500 Gr.B Re...	29000	11154	.3	.65	527	46000	1.4	58000	1.3
6	A53 Gr.B	29000	11154	.3	.65	490	35000	1.6	60000	1.2
7	A1085	29000	11154	.3	.65	490	50000	1.4	65000	1.3

Aluminum Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (...	Density[...	Table B.4	kt	Ftu[psi]	Fty[psi]	Fcy[psi]	Fsu[psi]	Ct
1	3003-H14	10100	3787.5	.33	1.3	172.8	Table B.4-1	1	19000	16000	13000	12000	141
2	6061-T6	10100	3787.5	.33	1.3	172.8	Table B.4-2	1	38000	35000	35000	24000	141
3	6063-T5	10100	3787.5	.33	1.3	172.8	Table B.4-2	1	22000	16000	16000	13000	141
4	6063-T6	10100	3787.5	.33	1.3	172.8	Table B.4-2	1	30000	25000	25000	19000	141
5	5052-H34	10200	3787.5	.33	1.3	172.8	Table B.4-1	1	34000	26000	24000	20000	141
6	6061-T6 W	10100	3787.5	.33	1.3	172.8	Table B.4-1	1	24000	15000	15000	15000	141
7	6005-T5	10100	3787.5	.33	1.3	172.8	Table B.4-1	1	38000	35000	35000	24000	141

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Post	Pipe 2.0 A21165	Column	Pipe	A572 Gr.50	Typical	.776	.499	.499	.998
2	Cross Beam	Pipe 2.5 A21168	Beam	Wide Flange	A572 Gr.50	Typical	.947	.907	.907	1.814
3	Diagonal Brace	1.5x1.5x0.083	HBrace	SquareTube	A572 Gr.50	Typical	.47	.158	.158	.236

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	AL Posts	2.375ODX0.188	Column	Pipe	6005-T5	Typical	1.29	.778	.778	1.54
2	AL Brace	RT1.5x2x0.15625	VBrace	Rectangular Tubes	6005-T5	Typical	.996	.327	.524	.602
3	AL Rails	HR250 ALA	Beam	Rectangular Tubes	6005-T5	Typical	.723	.095	.486	.261
4	AL Cross Beam	Cross Rail	Beam	Rectangular Tubes	6005-T5	Typical	1.909	1.97	4.366	4.017

Member Area Loads (BLC 2 : Solar Panel Weight)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N199	N196	Y	A-B	-3

Member Area Loads (BLC 3 : Roof Live/Snow)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N199	N196	PY	A-B	-27

Member Area Loads (BLC 4 : Wind A 0 deg)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N201	N198	Perp	A-B	-25.1
2	N198	N201	N199	N196	Perp	A-B	-25.1

Member Area Loads (BLC 5 : Wind B 0 deg)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N201	N198	Perp	A-B	-33.9
2	N198	N201	N199	N196	Perp	A-B	-7.9

Member Area Loads (BLC 6 : Wind A 180 deg)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N201	N198	Perp	A-B	30.2
2	N198	N201	N199	N196	Perp	A-B	29.3

Member Area Loads (BLC 7 : Wind B 180 deg)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N200	N201	N198	Perp	A-B	14.9
2	N198	N201	N199	N196	Perp	A-B	37.2

Member Area Loads (BLC 8 : Wind A 90)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N203	N202	N196	Perp	A-B	11.2
2	N203	N209	N208	N202	Perp	A-B	8.4
3	N209	N200	N199	N208	Perp	A-B	4.2

Member Area Loads (BLC 9 : Wind B 90)

	Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
1	N197	N203	N202	N196	Perp	A-B	-11.2
2	N203	N209	N208	N202	Perp	A-B	-7
3	N209	N200	N199	N208	Perp	A-B	-4.2

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(M...	Surface...
1	Self Weight	DL		-1.05						
2	Solar Panel Weight	DL							1	

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(M...	Surface...
3	Roof Live/Snow	RLL							1	
4	Wind A 0 deg	OL1							2	
5	Wind B 0 deg	OL2							2	
6	Wind A 180 deg	OL3							2	
7	Wind B 180 deg	OL4							2	
8	Wind A 90	OL5							3	
9	Wind B 90	OL6							3	
10	BLC 2 Transient Area ...	None						40		
11	BLC 3 Transient Area ...	None						40		
12	BLC 4 Transient Area ...	None						128		
13	BLC 5 Transient Area ...	None						128		
14	BLC 6 Transient Area ...	None						128		
15	BLC 7 Transient Area ...	None						128		
16	BLC 8 Transient Area ...	None						118		
17	BLC 9 Transient Area ...	None						118		

Load Combinations

	Description	S...	PD...	SRSS	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.0 D	Yes	Y		DL	1																		
2	1.0 D + 1.0 S	Yes	Y		DL	1	RLL	1																
3	1.0 D + 0.6 W1	Yes	Y		DL	1	RLL		OL1	.6														
4	1.0 D + 0.6 W2	Yes	Y		DL	1	RLL		OL2	.6														
5	1.0 D + 0.6 W3	Yes	Y		DL	1	RLL		OL3	.6														
6	1.0 D + 0.6 W4	Yes	Y		DL	1	RLL		OL4	.6														
7	1.0 D + 0.6 W5	Yes	Y		DL	1	RLL		OL5	.6														
8	1.0 D + 0.6 W6	Yes	Y		DL	1	RLL		OL6	.6														
9	1.0 D + 0.45 W1 + 0....	Yes	Y		DL	1	RLL	.75	OL1	.45														
10	1.0 D + 0.45 W2 + 0....	Yes	Y		DL	1	RLL	.75	OL2	.45														
11	1.0 D + 0.45 W3 + 0....	Yes	Y		DL	1	RLL	.75	OL3	.45														
12	1.0 D + 0.45 W4 + 0....	Yes	Y		DL	1	RLL	.75	OL4	.45														
13	1.0 D + 0.45 W5 + 0....	Yes	Y		DL	1	RLL	.75	OL5	.45														
14	1.0 D + 0.45 W6 + 0....	Yes	Y		DL	1	RLL	.75	OL6	.45														
15	0.6 D + 0.6 W1	Yes	Y		DL	.6	RLL		OL1	.6														
16	0.6 D + 0.6 W2	Yes	Y		DL	.6	RLL		OL2	.6														
17	0.6 D + 0.6 W3	Yes	Y		DL	.6	RLL		OL3	.6														
18	0.6 D + 0.6 W4	Yes	Y		DL	.6	RLL		OL4	.6														
19	0.6 D + 0.6 W5	Yes	Y		DL	.6	RLL		OL5	.6														
20	0.6 D + 0.6 W6	Yes	Y		DL	.6	RLL		OL6	.6														

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb...	LC	MZ [lb-ft]	LC
1	N2	max	15.018	12	1670.97	10	49.776	3	0	20	0	20	0	20
2		min	-1.911	15	-191.835	17	-57.975	5	0	1	0	1	0	1
3	N1	max	134.824	11	2828.103	11	1200.6...	5	0	20	0	20	0	20
4		min	-83.183	16	-1792.979	16	-1013....	3	0	1	0	1	0	1
5	N132	max	3.249	16	2965.943	11	1339.6...	5	0	20	0	20	0	20
6		min	-4.807	11	-1916.275	16	-1132....	3	0	1	0	1	0	1
7	N133	max	3.226	15	1858.478	10	53.423	3	0	20	0	20	0	20
8		min	-21.395	12	-240.766	17	-62.29	5	0	1	0	1	0	1
9	N109	max	10.917	11	2849.114	11	1395.4...	5	0	20	0	20	0	20
10		min	-6.668	16	-1835.659	16	-1176....	3	0	1	0	1	0	1
11	N110A	max	8.385	2	1944.897	10	54.221	3	0	20	0	20	0	20
12		min	-.571	20	-239.399	17	-63.523	5	0	1	0	1	0	1
13	N121	max	1.629	16	3036.903	11	1368.4...	5	0	20	0	20	0	20

Envelope Joint Reactions (Continued)

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb...	LC	MZ [lb-ft]	LC
14		min	-1.842	7	-1959.687	16	-1156....	3	0	1	0	1	0	1
15	N122	max	4.495	12	1902.696	10	54.841	3	0	20	0	20	0	20
16		min	-2.882	15	-240.948	17	-63.951	5	0	1	0	1	0	1
17	N133B	max	1.586	11	2999.103	11	1370.2...	5	0	20	0	20	0	20
18		min	-.826	10	-1922.118	16	-1156....	3	0	1	0	1	0	1
19	N134B	max	3.119	4	1906.579	10	54.528	3	0	20	0	20	0	20
20		min	-3.084	5	-225.759	17	-63.626	5	0	1	0	1	0	1
21	N151	max	79.695	16	2788.275	11	1179.1...	5	0	20	0	20	0	20
22		min	-129.3...	11	-1763.715	16	-995.4...	3	0	1	0	1	0	1
23	N152	max	2.921	5	1633.161	10	48.299	3	0	20	0	20	0	20
24		min	-5.229	16	-194.542	17	-56.185	5	0	1	0	1	0	1
25	N139A	max	6.328	16	2604.021	11	1280.8...	5	0	20	0	20	0	20
26		min	-8.701	11	-1672.967	16	-1079....	3	0	1	0	1	0	1
27	N140A	max	.073	15	1799.941	10	50.892	3	0	20	0	20	0	20
28		min	-6.799	2	-205.472	17	-59.921	5	0	1	0	1	0	1
29	Totals:	max	.007	10	26982.836	11	8707.0...	17						
30		min	-.013	11	-8355.063	15	-7343....	3						

Envelope AISC 14th(360-10): ASD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	Pnc/om [...	Pnt/om [lb]	Mnyy/om...	Mnzz/om...	Cb	Eqn
1	M5	Pipe 2.0 A2...	.194	54.274	5	.177	54.274		5	16135.206	23232.186	1397.505	1397.505	2....	H1-1b
2	M6	Pipe 2.0 A2...	.792	34.578	11	.185	0		5	5338.536	23232.186	1397.505	1397.505	1....	H1-1a
3	M13	Pipe 2.5 A2...	.779	141....	12	.170	446.25		12	11641.036	28358.413	2081.747	2081.747	1....	H1-1b
4	M14	Pipe 2.5 A2...	.688	141....	11	.208	446.25		11	11641.036	28358.413	2081.747	2081.747	1....	H1-1b
5	M15	1.5x1.5x0.083	.640	52.737	5	.042	0	y	11	2315.999	14085.15	624.421	624.421	1....	H1-1a
6	M80	Pipe 2.0 A2...	.209	54.274	5	.192	54.274		5	16135.206	23232.186	1397.505	1397.505	1....	H1-1b
7	M81	Pipe 2.0 A2...	.768	3.705	11	.204	0		5	5338.536	23232.186	1397.505	1397.505	1....	H1-1a
8	M82	1.5x1.5x0.083	.710	52.737	5	.011	0	y	2	2315.999	14085.15	624.421	624.421	1....	H1-1a
9	M50	Pipe 2.0 A2...	.211	54.274	5	.201	54.274		5	16135.206	23232.186	1397.505	1397.505	3....	H1-1b
10	M51	Pipe 2.0 A2...	.755	3.705	11	.212	0		5	5338.536	23232.186	1397.505	1397.505	1....	H1-1a
11	M52	1.5x1.5x0.083	.739	52.737	5	.010	0	y	14	2315.999	14085.15	624.421	624.421	1....	H1-1a
12	M56A	Pipe 2.0 A2...	.213	54.274	5	.196	54.274		5	16135.206	23232.186	1397.505	1397.505	1....	H1-1b
13	M57A	Pipe 2.0 A2...	.786	3.705	11	.209	0		5	5338.536	23232.186	1397.505	1397.505	1....	H1-1a
14	M58A	1.5x1.5x0.083	.725	52.737	5	.006	0	y	13	2315.999	14085.15	624.421	624.421	1....	H1-1a
15	M68	Pipe 2.0 A2...	.212	54.274	5	.197	54.274		5	16135.206	23232.186	1397.505	1397.505	1....	H1-1b
16	M69	Pipe 2.0 A2...	.780	3.705	11	.209	0		5	5338.536	23232.186	1397.505	1397.505	2....	H1-1a
17	M70	1.5x1.5x0.083	.726	52.737	5	.006	0	y	11	2315.999	14085.15	624.421	624.421	1....	H1-1a
18	M73	Pipe 2.0 A2...	.187	54.274	5	.174	54.274		5	16135.206	23232.186	1397.505	1397.505	1....	H1-1b
19	M74	Pipe 2.0 A2...	.779	34.578	11	.182	0		5	5338.536	23232.186	1397.505	1397.505	1....	H1-1a
20	M75	1.5x1.5x0.083	.629	52.737	5	.041	101....	y	11	2315.999	14085.15	624.421	624.421	1....	H1-1a
21	M65A	Pipe 2.0 A2...	.200	54.274	5	.184	54.274		5	16135.206	23232.186	1397.505	1397.505	1....	H1-1b
22	M66A	Pipe 2.0 A2...	.690	3.705	11	.194	0		5	5338.536	23232.186	1397.505	1397.505	1....	H1-1a
23	M67A	1.5x1.5x0.083	.680	52.737	5	.013	101....	y	2	2315.999	14085.15	624.421	624.421	1....	H1-1a

Envelope AA ADM1-15: ASD - Building Aluminum Code Checks

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	Pnc/O...	Pnt/Om...	Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
1	M19	RT1.5x2x...	.304	58.39	11	.026	0	z	5	1988.668	19411....	770.742	927.083	5889.423	3966.346	1....	H.1-1
2	M16	HR250_A...	.887	90.015	11	.099	37.506	y	11	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1
3	M75B	RT1.5x2x...	.301	58.456	11	.026	0	z	5	1984.174	19411....	770.742	927.083	5889.423	3966.346	1....	H.1-1
4	M32	HR250_A...	.870	37.506	12	.114	37.506	y	12	2162.5	14089....	309.506	597.274	4940.308	1617.231	1....	H.1-1
5	M35	HR250_A...	.887	37.506	12	.104	37.506	y	12	2162.5	14089....	309.506	599.425	4940.308	1617.231	1....	H.1-1
6	M38	HR250_A...	.920	90.015	11	.100	37.506	y	12	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1
7	M41	HR250_A...	.960	37.506	12	.101	37.506	y	12	2162.5	14089....	309.506	599.656	4940.308	1617.231	1....	H.1-1
8	M44	HR250_A...	.919	90.015	11	.100	37.506	y	12	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1

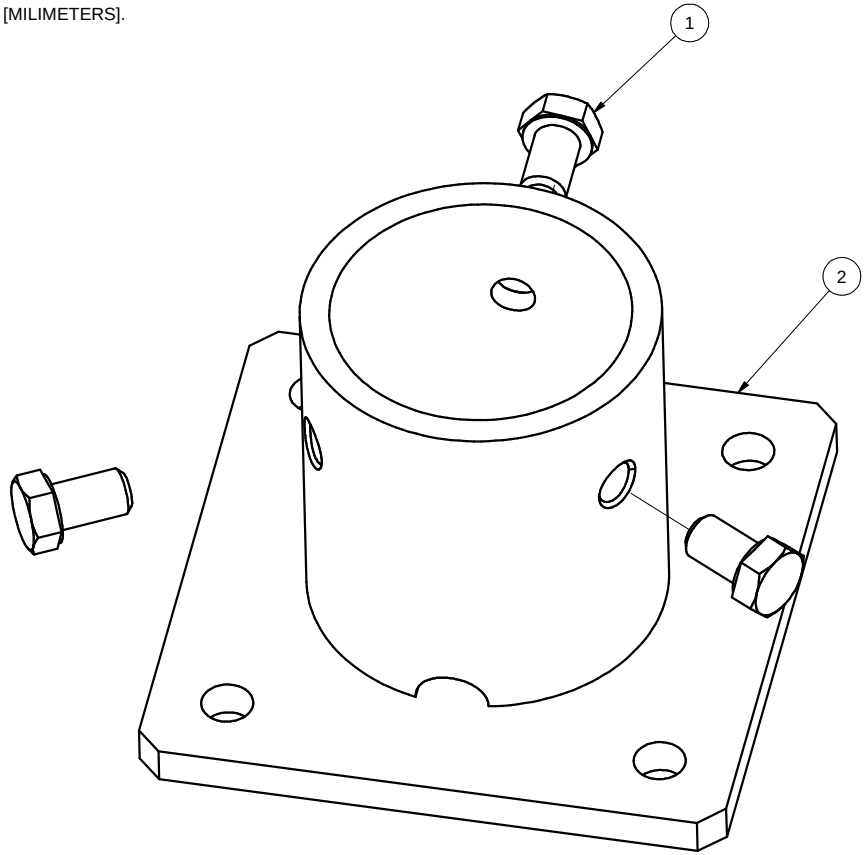
Envelope AA ADM1-15: ASD - Building Aluminum Code Checks (Continued)

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	Pnc/O...	Pnt/Om...	Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
9	M47	HR250_A...	.902	37.506	12	.102	37.506	y	12	2162.5	14089....	309.506	599.489	4940.308	1617.231	1....	H.1-1
10	M50A	HR250_A...	.873	91.89	11	.101	37.506	y	12	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1
11	M53	HR250_A...	.907	90.015	11	.101	37.506	y	12	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1
12	M56	HR250_A...	.960	37.506	12	.101	37.506	y	12	2162.5	14089....	309.506	599.651	4940.308	1617.231	1....	H.1-1
13	M59	HR250_A...	.926	90.015	11	.101	37.506	y	12	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1
14	M62	HR250_A...	.924	37.506	12	.100	37.506	y	12	2162.5	14089....	309.506	599.555	4940.308	1617.231	1....	H.1-1
15	M65	HR250_A...	.902	90.015	11	.100	37.506	y	12	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1
16	M68B	HR250_A...	.872	91.89	11	.105	37.506	y	12	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1
17	M70A	HR250_A...	.869	37.506	12	.112	37.506	y	12	2162.5	14089....	309.506	597.274	4940.308	1617.231	1....	H.1-1
18	M73A	HR250_A...	.886	90.015	11	.098	37.506	y	11	2162.5	14089....	309.506	687.273	4940.308	1617.231	1....	H.1-1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	10/20/2016

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].



ITEM	PART NUMBER	DESCRIPTION	QTY
2	A21120-001	2" PIPE BASE	1
1	B15018-011	HEX CAP SCREW 3/8-16 X 5/8	3

MATERIAL: SEE NOTES

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 10/20/2016
CHECKED BY:
APPROVALS:

Sunmodo Corp.

1905 E 5TH STREET, STE A, VANCOUVER, WA 98661

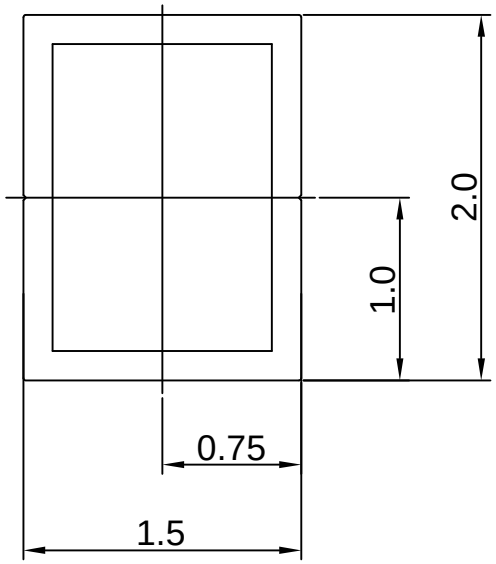
TITLE: 2" PIPE BASE KIT

B
DRAWING NUMBER: K10268-001

SCALE: NONE
SHEET 1 of 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERAIL: ALUMINUM 6005-T5.
   FINISH: CLEAR ANODIZED 10 ųm THICK.
3. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.



Section properties:

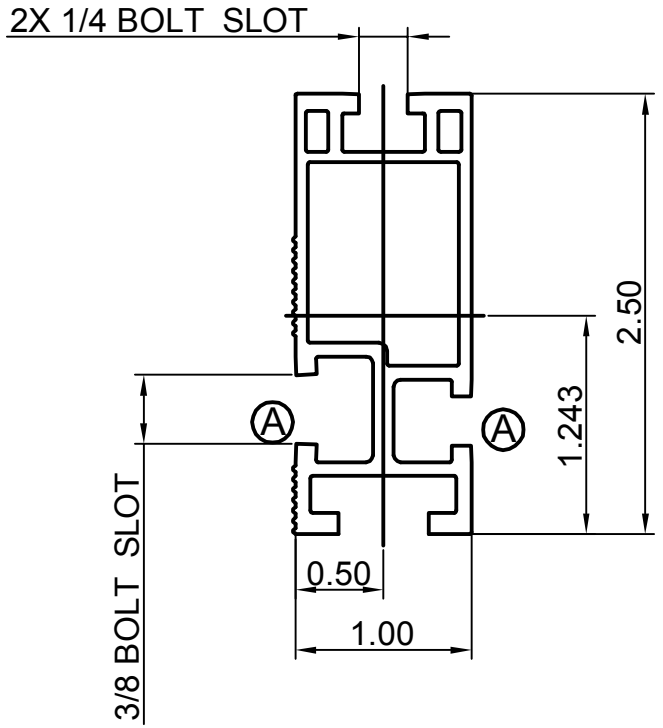
Weight: 1.156 lbs/ft
Area: 0.992 in^2
Perimeter: 12.601 in
Bounding Box: X: -1.000,1.000
Y: -0.750, 0.750
Centroid:(0.000,0.000)
Moments of Inertia(in^4): Ix=0.506,Iy=0.322
Section modulus in bending(in^3): Wx=0.675,Wy=0.322
Radii of Gyration: X: 0.714, Y: 0.570

MATERIAL: SEE NOTES		**Sunmodo Corp.**
Third Angle Projection:		1905 E 5TH STREET, SUITE A, VANCOUVER, WA 98661
GENERAL SPECIFICATIONS: All Dimensions in inches [millimeters]. Tolerances: X.XXX ± 0.01 [0.25mm]; X.XX ± 0.02 [0.50mm]; X.X ± 0.039 [1.0mm]; Unless otherwise spec'd. Break all sharp edges .010-.020 unless otherwise specified.		TITLE: 1.5X2 AL TUBE BRACE EXTRUSION
DRAWN BY: zcg	DATE: 03/12/2014	B — DRAWING NUMBER: A20164
CHECKED BY		
APPROVALS		SCALE: NONE — SHEET 1 of 1

REVISIONS			
REV	DESCRIPTON	BY	DATE
A	ADDED BOTTOM CHANNEL & CHANGED ONE 3/8 CHANNEL TO 1/4	zcg	02/21/2013

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERAIL: ALUMINUM 6005-T5.
   FINISH: CLEAR ANODIZED 15 µm THICK.
3. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.



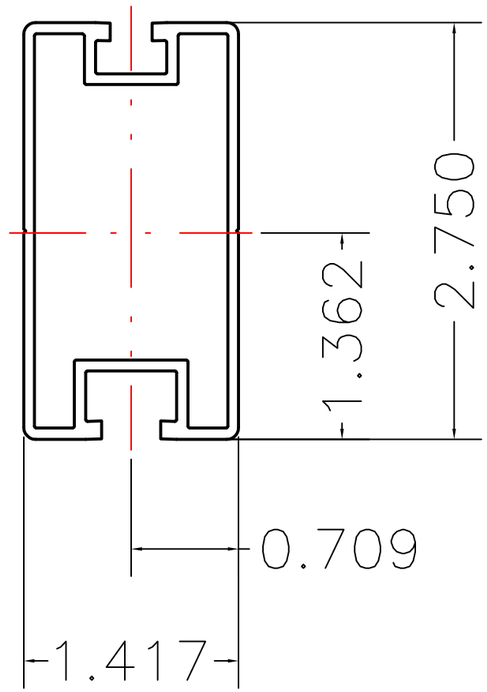
Section properties:

Weight: 0.850 lbs/ft
Area: 0.723 in^2
Perimeter: 17.325 in
Bounding Box: X: -0.500,0.500
Y: -1.243,1.257
Centroid:(0.000,0.000)
Moments of Incertia(in^4): Ix=0.486,Iy=0.095
Section modulus in bending(in^3): Wx=0.387,Wy=0.190
Radii of Gyration: X: 0.820, Y: 0.363

MATERIAL: SEE NOTES		**Sunmodo Corp.**	
Third Angle Projection:		1905 E 5TH STREET, SUITE A, VANCOUVER, WA 98661	
GENERAL SPECIFICATIONS All Dimensions in inches [millimeters] Tolerances X.XXX ± 0.01 [0.25mm] X.XX ± 0.02 [0.50mm] X.X ± 0.039 [1.0mm] Unless otherwise spec'd Break all sharp edges .010-.020 unless otherwise specified.		TITLE: HELIO STANDARD RAIL	
DRAWN BY: zcg	DATE: 02/21/2013	B	DRAWING NUMBER: A20144
CHECKED BY			
APPROVALS		SCALE: NONE	SHEET 1 of 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERIAL: 6005-T5.
   FINISH: CLEAR ANODIZED 10um THICK.
3. THE UNSPECIFIED RADII ARE .02" MAX.
4. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.



Section properties:

Weight: 0.862 lbs/ft
Area: 0.736 in^2
Perimeter: 19.824 in
Bounding Box: X: -0.709,0.709
Y: -1.362,1.388
Centroid:(0.000,0.000)
Moments of Incertia(in^4): Ix=0.727,Iy=0.214
Section modulus in bending(in^3): Wx=0.524,Wy=0.302
Radii of Gyration: X: 994, Y: 0.539

MATERIAL	SEE NOTES
Third Angle Projection:	
GENERAL SPECIFICATIONS	All Dimensions in Inches [millimeters]
Tolerances	X.XXX ±0.01 [0.25mm] X.XX ±0.02 [0.50mm] X.X ±0.039 [1.0mm] Unless otherwise spec'd
	Break all sharp edges .010-.020 unless otherwise specified.
DRAWN BY	KYY
DATE	01/18/2018
CHECKED BY	
APPROVALS	

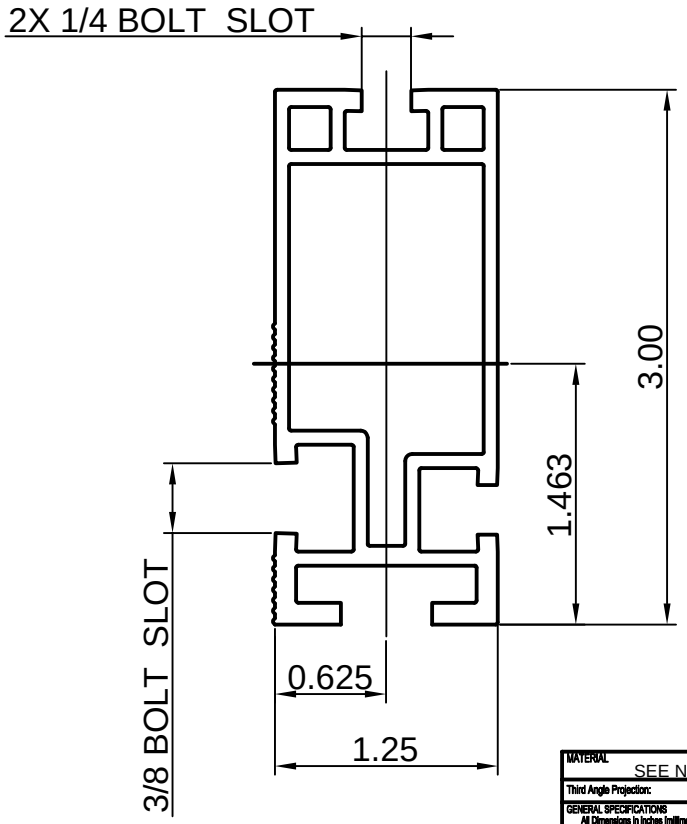
SunModo Corp.
14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE	RAIL, HR300 (SUNRAY), EXTRUSION
B	DRAWING NUMBER A20288
SCALE:	NONE
SHEET	1 of 1

REV	DESCRIPTON	BY	DATE
A	0.44 WAS 0.41, 0.44 WAS 0.33	LWF	11/30/2015

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].
2. MATERAIL: ALUMINUM 6005-T5.
   FINISH: CLEAR ANODIZED 15 ųm THICK.
3. THE UNSPECIFIED DIMENSIONS ARE SPECIFIED BY 2D CAD FILE.



Section properties:

Weight: 1.151 lbs/ft
Area: 0.980 in^2
Perimeter: 22.104 in
Bounding Box: X: -0.625,0.625
Y: -1.463,1.537
Centroid:(0.000,0.000)
Moments of Inertia(in^4): Ix=1.047,Iy=0.207
Section modulus in bending(in^3): Wx=0.681,Wy=0.331
Radii of Gyration: X: 1.034, Y: 0.460

MATERIAL	SEE NOTES
Third Angle Projection:	
GENERAL SPECIFICATIONS All Dimensions in Inches [millimeters] Tolerances X.XXX ±0.01 [0.25mm] X.XX ±0.02 [0.50mm] X.X ±0.039 [1.0mm] Unless otherwise specfd	Break all sharp edges .010-.020 unless otherwise specified.
DRAWN BY: zcg	DATE: 02/21/2013
CHECKED BY	
APPROVALS	

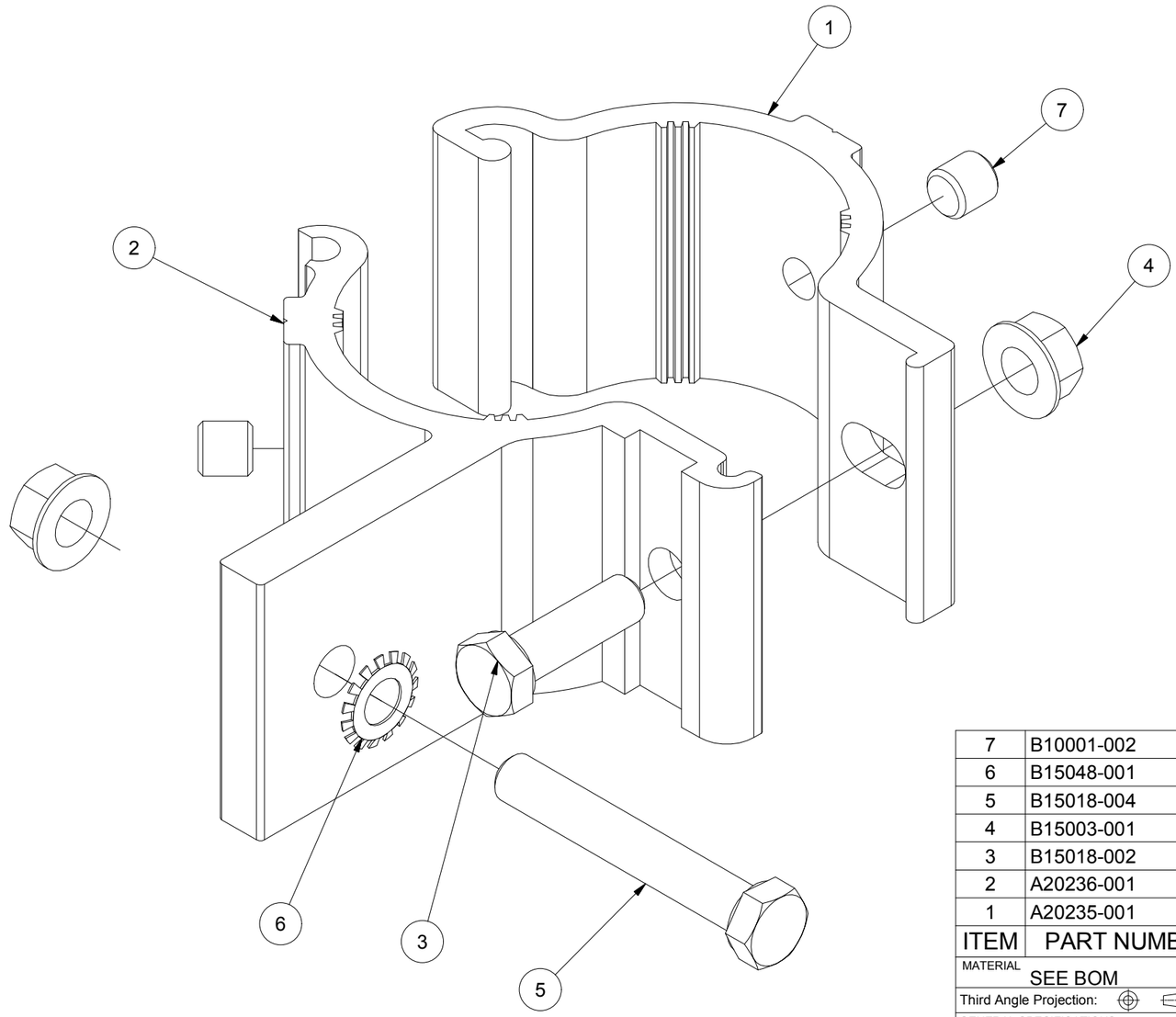
Sunmodo Corp.

1905 E 5TH STREET, SUITE A, VANCOUVER, WA 98661

TITLE: HELIO HEAVY RAIL

B | DRAWING NUMBER: A20145

SCALE: NONE | SHEET 1 of 1



ITEM	PART NUMBER	DESCRIPTION	QTY
7	B10001-002	SET SCREW M10X10	2
6	B15048-001	STAR WASHER FOR 3/8 BOLT	1
5	B15018-004	HEX CAP SCREW 3/8-16 X2.5	1
4	B15003-001	FLANGE NUT 3/8-16	2
3	B15018-002	HEX CAP SCREW 3/8-16 X 1.25	1
2	A20236-001	2 AL PIPE CLAMP, FEMALE	1
1	A20235-001	2 AL PIPE CLAMP, MALE	1

MATERIAL: SEE BOM

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd

Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: zcg
DATE: 08/12/2015
CHECKED BY:
APPROVALS:

Sunmodo Corp.

1905 E 5TH STREET, STE A, VANCOUVER, WA 98661

TITLE: 2 AL PIPE CLAMP KIT

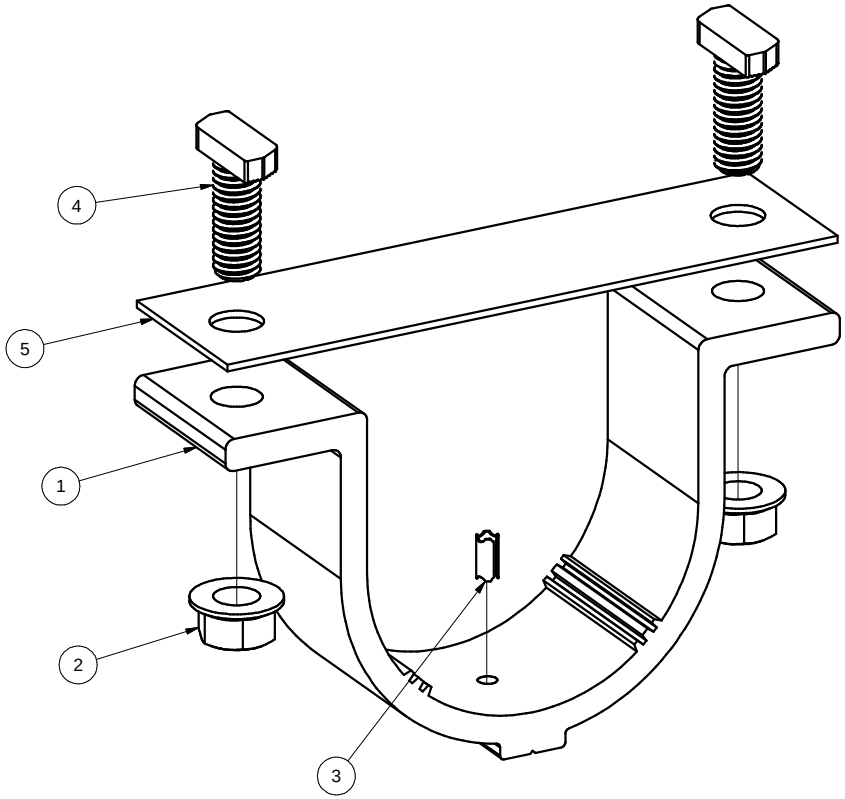
B

DRAWING NUMBER: K10219-001

SCALE: NONE

SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	06/12/2018
B	ADD C10005-006	LWF	06/27/2018



ITEM	PART NUMBER	DESCRIPTION	QTY
5	C10005-006	PVC GASKTE T=1.5mm	1
4	B50033-001	T-BOLT, RAIL BOTTOM SLOT, 3/8-16 X 1"	2
3	B20018-002	GROUNDING PIN	1
2	B15003-001	FLANGE NUT 3/8-16	2
1	A20329-001	2.5" AL PIPE U-BOLT	1

MATERIAL: SEE NOTES

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: KYY
DATE: 06/12/2018
CHECKED BY:
APPROVALS:

SunModo Corp.

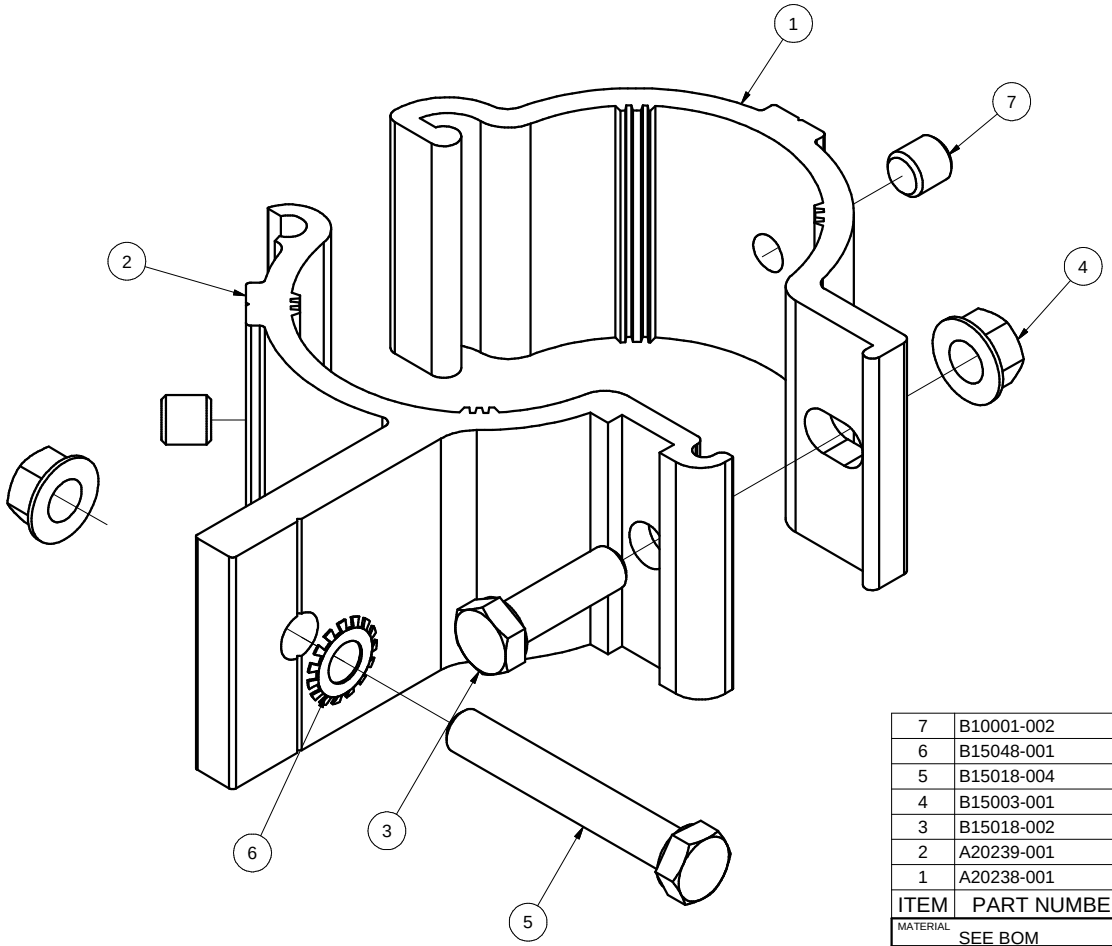
14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: 2.5" AL PIPE U-CLAMP KIT

B | DRAWING NUMBER: K10343-001

SCALE: NONE | SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	zcg	09/25/2015



ITEM	PART NUMBER	DESCRIPTION	QTY
7	B10001-002	SET SCREW M10X10	2
6	B15048-001	STAR WASHER FOR 3/8 BOLT	1
5	B15018-004	HEX CAP SCREW 3/8-16 X2.5	1
4	B15003-001	FLANGE NUT 3/8-16	2
3	B15018-002	HEX CAP SCREW 3/8-16 X 1.25	1
2	A20239-001	2.5 AL PIPE CLAMP, FEMALE	1
1	A20238-001	2.5 AL PIPE CLAMP, MALE	1

MATERIAL: SEE BOM

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 08/21/2015
CHECKED BY:
APPROVALS:

Sunmodo Corp.

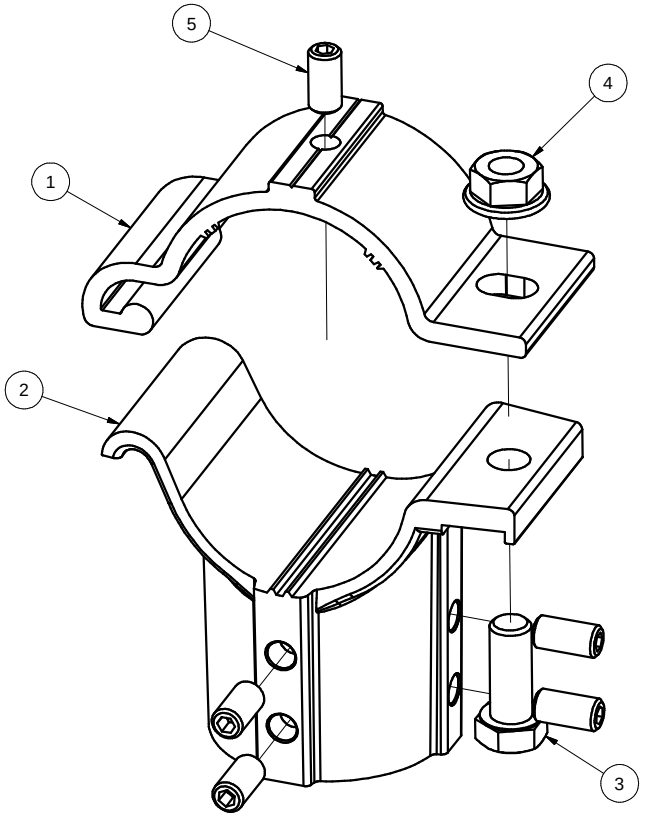
1905 E 5TH STREET, STE A, VANCOUVER, WA 98661

TITLE: 2.5 AL PIPE CLAMP KIT

B | DRAWING NUMBER: K10222-001

SCALE: NONE | SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	06/12/2018



ITEM	PART NUMBER	DESCRIPTION	QTY
5	B10001-001	SET SCREW M10X20	5
4	B15020-001	FLANGE NUT 1/2-13	1
3	B15014-005	HEX CAP SCREW 1/2-13 X 1.25", 304 SS	1
2	A20327-001	2.5" AL PIPE TEE, FEMALE	1
1	A20326-001	2.5" AL PIPE TEE, MALE	1

MATERIAL: SEE NOTES

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 06/12/2018
CHECKED BY:
APPROVALS:

SunModo Corp.

14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: 2.5" PIPE TEE KIT

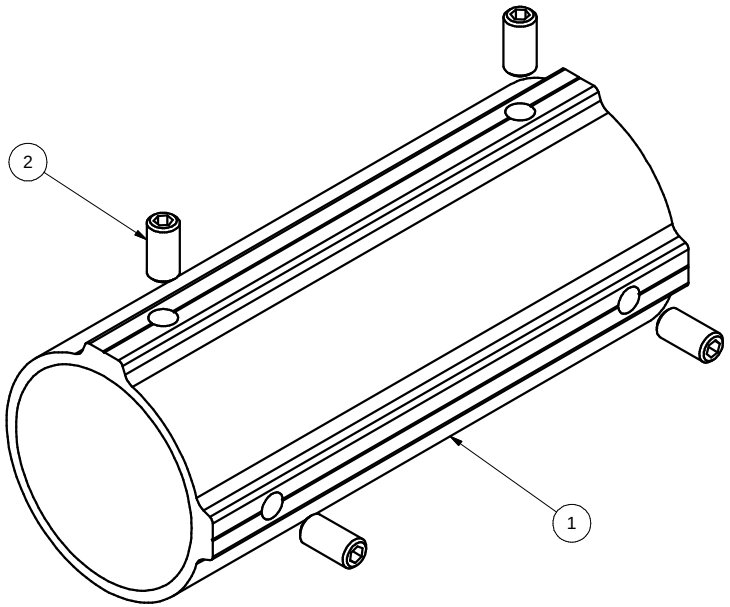
B

DRAWING NUMBER: K10341-001

SCALE: NONE

SHEET 1 of 1

REVISIONS			
REV	DESCRIPTION	BY	DATE
A	INITIAL RELEASE	LWF	06/12/2018



ITEM	PART NUMBER	DESCRIPTION	QTY
2	B10001-001	SET SCREW M10X20	4
1	A20328-001	2.5" PIPE SPLICE	1

MATERIAL: SEE NOTES

Third Angle Projection:

GENERAL SPECIFICATIONS
All Dimensions in inches [millimeters]
Tolerances
X.XXX ±0.01 [0.25mm]
X.XX ±0.02 [0.50mm]
X.X ±0.039 [1.0mm]
Unless otherwise spec'd
Break all sharp edges .010-.020 unless otherwise specified.

DRAWN BY: LWF
DATE: 06/12/2018
CHECKED BY:
APPROVALS:

SunModo Corp.

14800 NE 65TH STREET, VANCOUVER WA 98682

TITLE: 2.5" PIPE SPLICE KIT

B

DRAWING NUMBER: K10342-001

SCALE: NONE

SHEET 1 of 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].

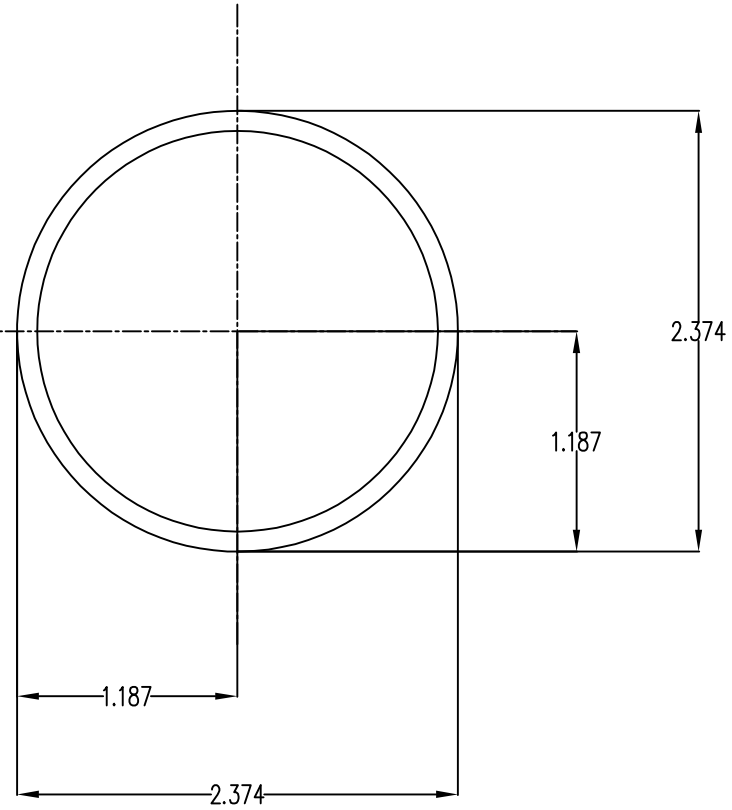
2. MATERAIL:HIGH STRENGTH STEEL PIPE OR TUBE.

3. FINISH: HOT DIP GALVANIZE PER ASTM A123 / A123M - 02.

   MINIMUM 50 KSI YIELD STRESS.

4. BREAK ALL BURRS AND SHARP EDGES.

5. ALL WELDING MUST BE IN COMPLIANCE WITH AWS CODE D1;1.



Section properties:

Weight: 2.641 lbs/ft
Area: 0.776 in^2
Perimeter: 14.238 in
Bounding Box: X: -1.187,1.187
Y: -1.187,1.187
Centroid:(0.000,0.000)
Moments of Inertia(in^4): Ix=0.499,Iy=0.499
Section modulus in bending(in^3): Wx=0.420,Wy=0.420
Radii of Gyration: X: 0.802, Y: 0.802

MATERIAL: SEE NOTES		**Sunmodo Corp.**	
Third Angle Projection:		14800 NE 65TH STREET, VANCOUVER WA 98682	
GENERAL SPECIFICATIONS All Dimensions in Inches [millimeters] Tolerances XXXX ±0.01 [0.25mm] XXX ±0.02 [0.50mm] XX ±0.039 [1.0mm] Unless otherwise spec'd Break all sharp edges .010-.020 unless otherwise specified.		TITLE: PIPE, HSS, 2.375" OD X 12 GAUGE,L=XXX	
DRAWN BY: LWF	DATE: 04/03/2019	B	DRAWING NUMBER: A21165
CHECKED BY			
APPROVALS		SCALE: NONE	SHEET 1 of 1

NOTES: UNLESS OTHERWISE SPECIFIED

1. DIMENSIONS SHOWN ARE INCHES [MILIMETERS].

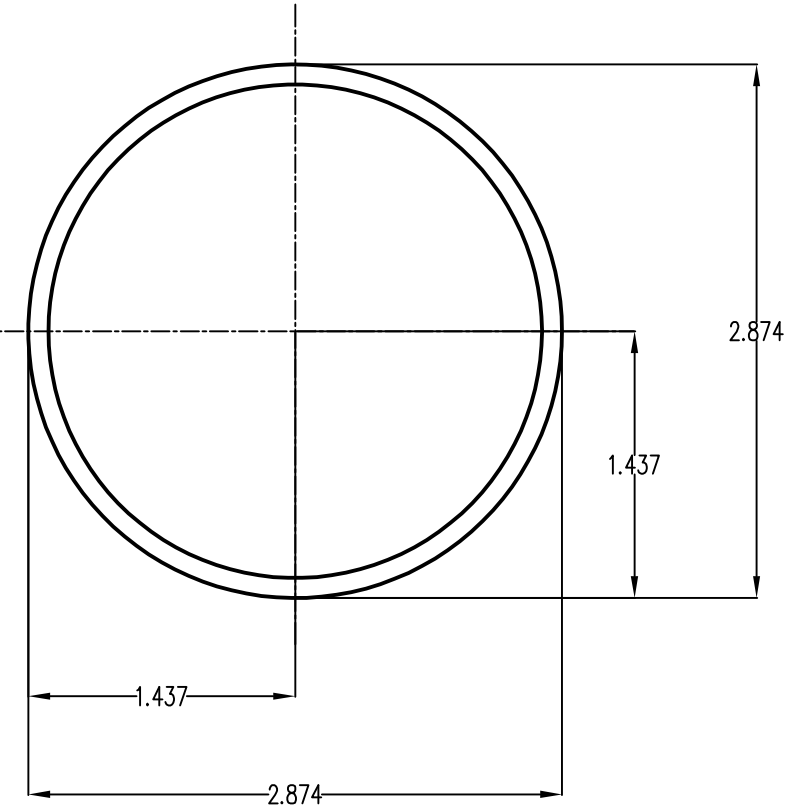
2. MATERAIL:HIGH STRENGTH STEEL PIPE OR TUBE.

3. FINISH: HOT DIP GALVANIZE PER ASTM A123 / A123M - 02.

   MINIMUM 50 KSI YIELD STRESS.

4. BREAK ALL BURRS AND SHARP EDGES.

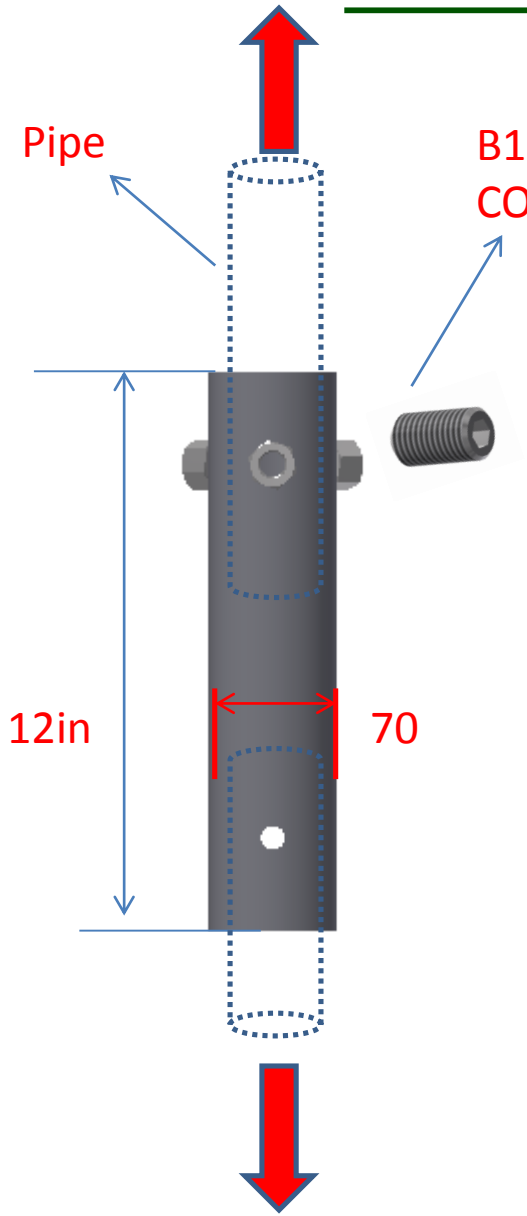
5. ALL WELDING MUST BE IN COMPLIANCE WITH AWS CODE D1;1.



Section properties:

Weight: 3.201 lbs/ft
Area: 0.941 in^2
Perimeter: 17.378 in
Bounding Box: X: -1.437,1.437
Y: -1.437,1.437
Centroid:(0.000,0.000)
Moments of Inertia(in^4): Ix=0.901,Iy=0.901
Section modulus in bending(in^3): Wx=0.627,Wy=0.627
Radii of Gyration: X: 0.979, Y: 0.979

MATERIAL: SEE NOTES		**Sunmodo Corp.**	
Third Angle Projection:		14800 NE 65TH STREET, VANCOUVER WA 98682	
GENERAL SPECIFICATIONS All Dimensions in Inches [millimeters] Tolerances X.XXX ±0.01 [0.25mm] X.XX ±0.02 [0.50mm] X.X ±0.039 [1.0mm] Unless otherwise spec'd Break all sharp edges .010-.020 unless otherwise specified.		TITLE: PIPE, HSS, 2.875" OD X 12 GAUGE,L=XXX	
DRAWN BY: LWF	DATE: 04/03/2019	B	DRAWING NUMBER: A21168
CHECKED BY			
APPROVALS		SCALE: NONE	SHEET 1 of 1



B10051-002, SET SCREW M16X30
CONE TIPPED SET SCRE M16X30

Conditions for load test：

1. The helical auger and ground screw use the same top section, so only one was used for testing
2. A 12 inch section from the top of the auger/ground screw was used
3. Three tests on each pipe type was used
4. The auger/screw material supplied by the auger/screw supplier.