REQUEST FOR PROPOSALS

for

Greenhouse Kit Installation

for

Annmarie Sculpture Garden & Arts Center, Solomons, Maryland

Bids will be submitted to:
Ann's Circle, Inc. dba Annmarie Sculpture Garden & Arts Center
Provide bids on or before: October 25, 2023, 4:00pm

For further information contact:

Stacey Hann-Ruff, *Director*
Annmarie Sculpture Garden & Arts Center
13470 Dowell Road, Solomons, Maryland 20688
t. 410-326-4640 jobs@annmariegarden.org

www.AnnmarieGarden.org

Ann's Circle, Inc. reserves the right to accept/reject any or all proposals.

Request for Proposal

Annmarie Sculpture Garden & Art Center
13470 Dowell Road, Solomons, MD 20688
Greenhouse Kit Installation

This request for bid proposal is for installation of a Janco Greenhouse, Standard Rancher 21 Model, including footers, basewall, concrete pads, and greenhouse structure. Greenhouse kit provided by client.

Bid proposal requested will be for:

Construction of a Rancher 21 A-Frame Greenhouse to be a Straight-Eave model designed to sit on a 36" tall basewall foundation. Bid to include footers, basewall, concrete pads, and greenhouse fabrication. Greenhouse kit provided by client.

Supporting documents include:

Concrete Foundation Floor Plan
Rancher 21 specs
Map of location

Bids should include separate quotes for:

1) Footers, knee wall, & concrete pads
2) Greenhouse kit fabrication

Important Information:

Greenhouse kit provided on site; *includes*:

- Aluminum framing & I-beam substructure
- 1/8" Clear tempered glass
- 2 Continuous manually operated ridge vent (12 sections long)
- Screen for all vent openings
- 2 Gable end walls
- Single commercial door
- Vent-o-matic vent operator
- 20" Exhaust fan with intake louver w/ thermostat
- 2 – 14" Horizontal air flow fans (includes hanging kit & plug)
- 60K BTU Natural Gas/propane hanging heater (includes thermostat & hang kit; flue pipe by others

Client will secure permit
Bidder must provide proof of liability insurance & workman's comp
Bidder must provide three references of prior relevant work

Any questions may be emailed to Stacey Hann-Ruff at director@annmariegarden.org

Proposals need to be received by October 25, 2023, 4:00pm. A pre-construction meeting after award and prior to commencement of work is required.

ANNMARIE 13470 DOWELL ROAD, SOLOMONS, MD 20688 • 410-326-4640 • WWW.ANNMARIEGARDEN.ORG
ANNMARIE SCULPTURE GARDEN & ARTS CENTER

BID SUBMITTAL SHEET

Janco Greenhouse Kit Installation

PROJECT ELEMENTS AND COSTS

Item #	Description		Cost for each item
1	Footers, knee wall & concrete pads		
2	Greenhouse kit fabrication		

Maryland Tax Exempt, do not include tax in bid: Ann's Circle, Inc., #20-5109378

Total Cost __________

Bidders Name: ______________________________

Address: ______________________________

____

Telephone: ______________________________

Fax: ______________________________

Signature: ______________________________

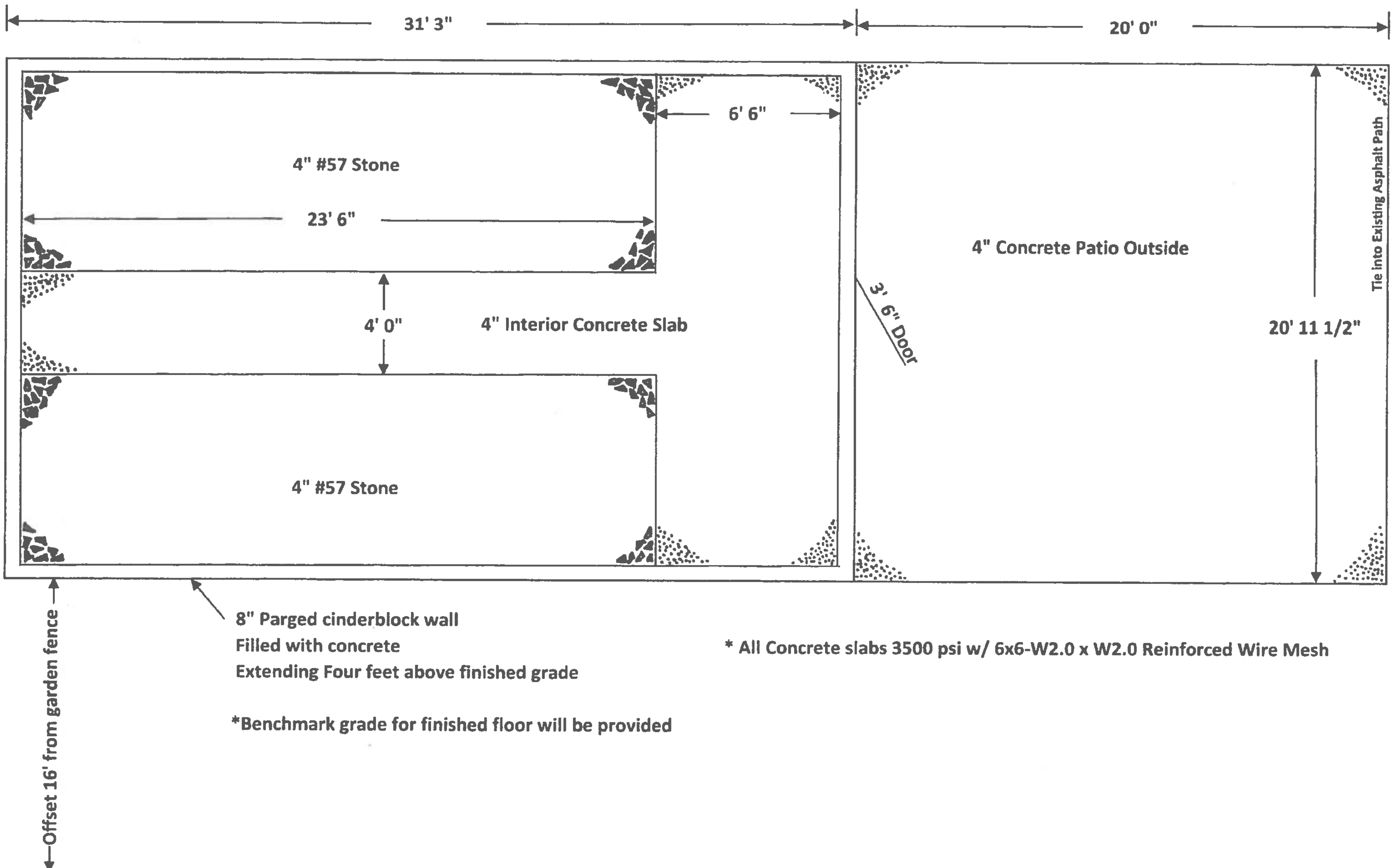
Date: ______________________________

Annmarie Sculpture Garden & Arts Center

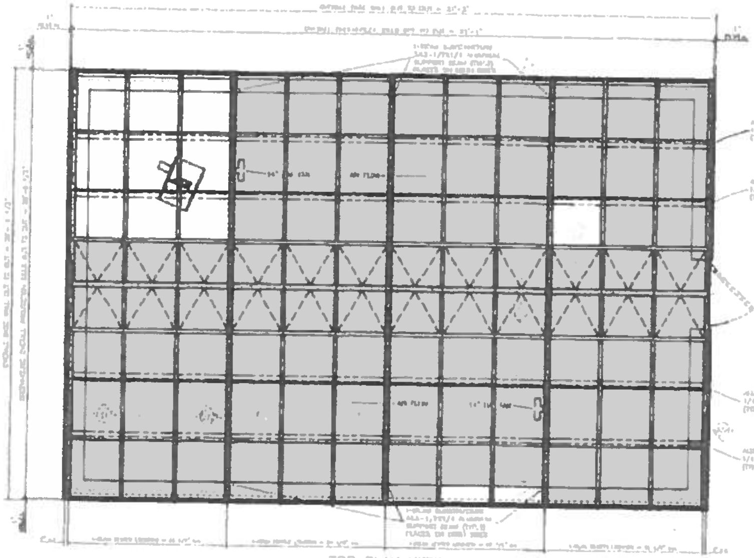
Office address: 13470 Dowell Road, Solomons, MD 20688

Greenhouse to be located at: 13320 Dowell Road, Solomons, MD 20688

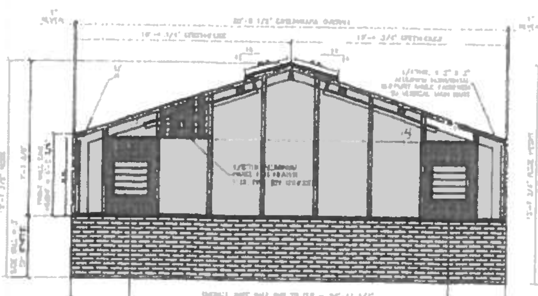
Greenhouse location indicated in red

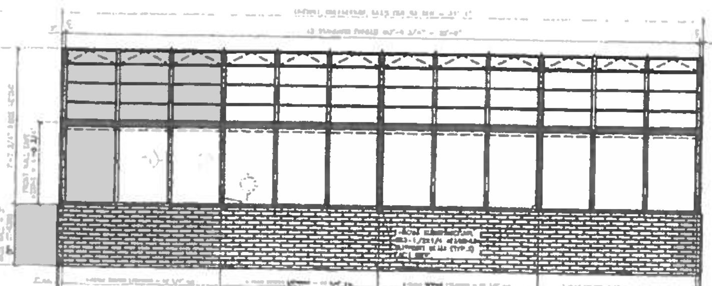


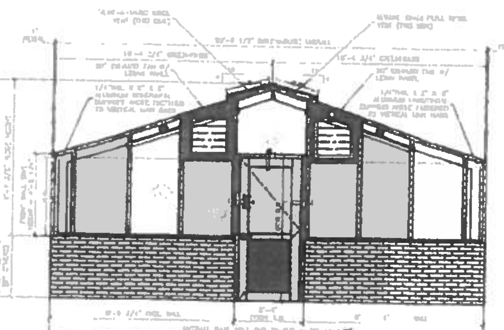
Annemarie Scupture Garden & Art Center 13470 Dowell Road Solomons, Maryland 20686	Concrete Foundation Floor Plan	Scale: Not To Scale
	Annmarie Garden Sculpture Garden	Date: 10/1/2023
	& Art Center Greenhouse	Page: 1 of 1



DESIGN LOADS TO EXCEED:
SNOW LOAD = 25 PSF
ROOF LIVE LOAD = 10 PSF
ROOF DEAD LOAD = 10 PSF
WIND LOAD = 126 MPH WIND







APPROVAL NOTE:

STANDARD / RANCHER 21

12 – STANDARD PANELS (8-10-8)
2 – FULL GABLE FRONT END (8-10-8)
1 – 17-BAY VENT-A-MATIC MOTORIZED RIDGE VENT W/SCREENS
1 – 17-BAY MANUAL RIDGE VENT W/SCREENS
2 20" EXHAUST FAN & INTAKE LOUVER KIT
1 – 36" X 84" COMMERCIAL TANG DOOR (HINGE RIGHT SWING OUT)
2 14" HAF HORIZONTAL AIR FLOW FAN WITH HANGING KIT
1 – BCK BTU NATURAL GAS/PROPANE HEATER WITH HANGING KIT & THERMOSTAT
1 PE STAMP REQUIRED

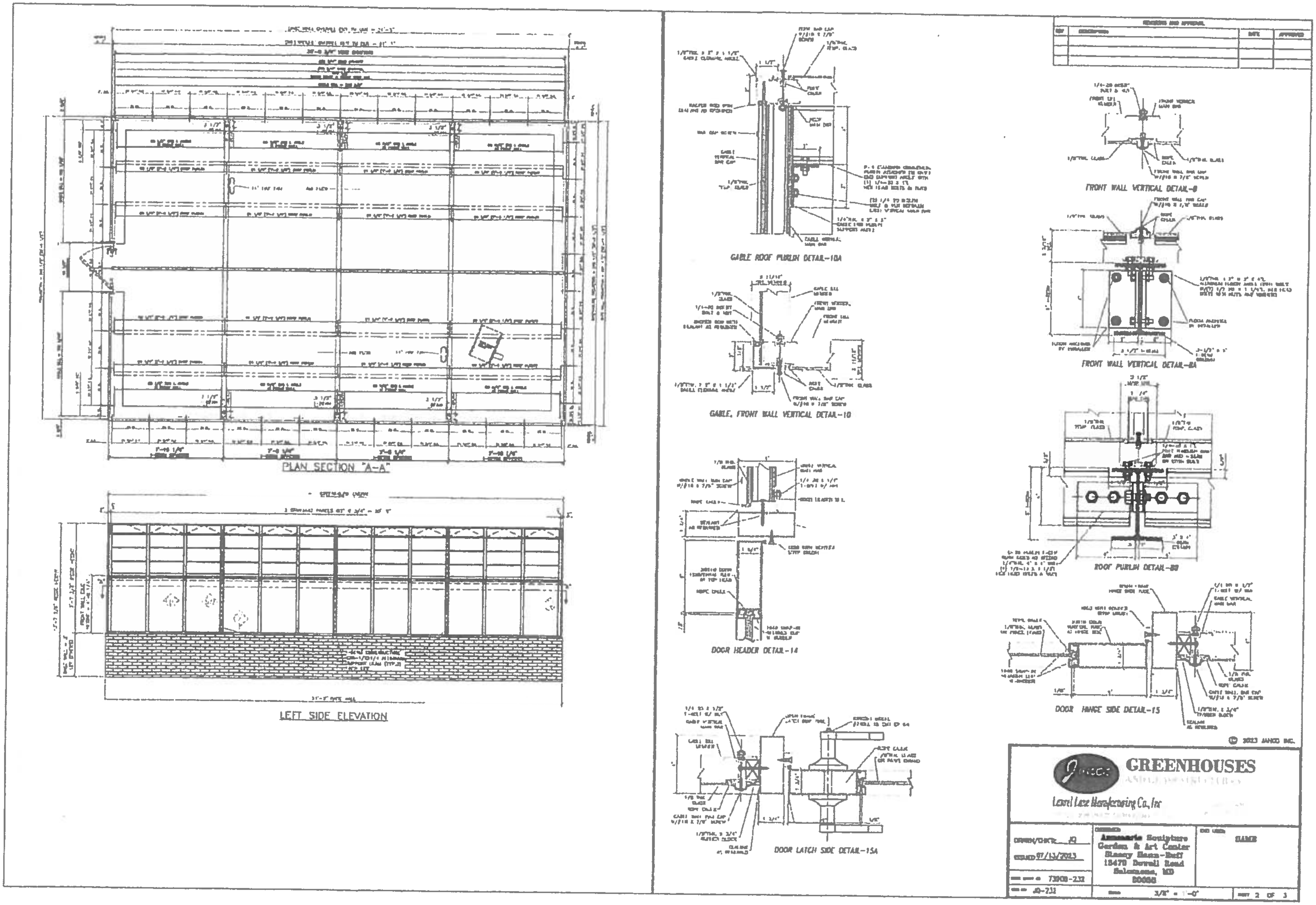
GREENHOUSE SPECIFICATIONS

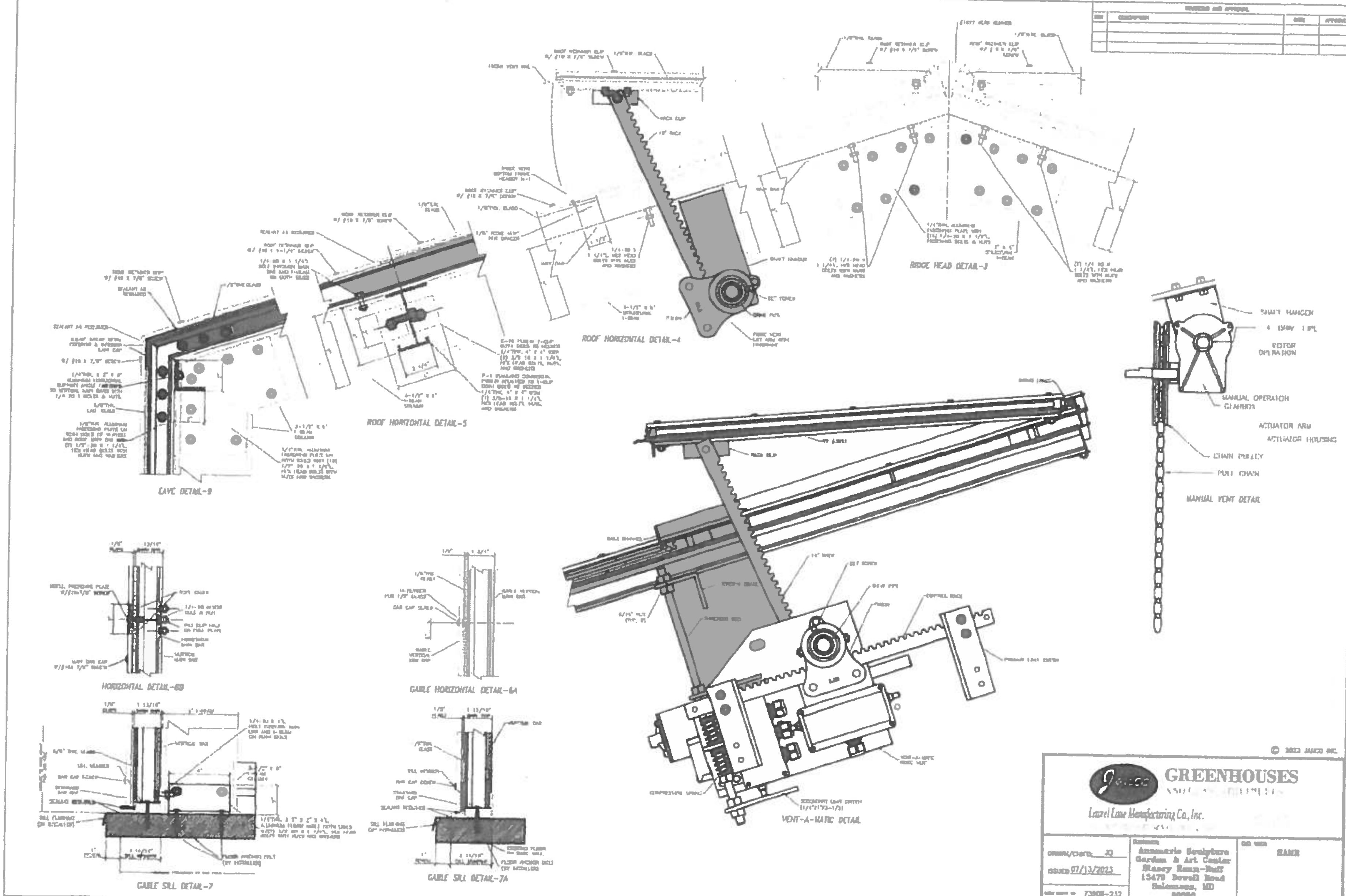
ROOF GLASS (SINGLE): CLEAR TEMPERED SAFETY (1/8" GA. THICKNESS)
WALL GLASS (SINGLE): CLEAR TEMPERED SAFETY (1/8" GA. THICKNESS)
FINISH: FRAME FINISH TO BE MILL FINISH
GASKETS: ROPE PUTTY
FLASHING: BY INSTALLER

© 2023 JANCO INC.

Janco GREENHOUSES
Laurel Lane Manufacturing Co. Inc.

DRAWN/CHK'D: JO
ISSUED: 07/13/2023
73808-232
JO-232
SCALE: 3/8" = 1'-0"
SHEET 1 OF 3
SAME


PLAN SECTION "A-A"
LEFT SIDE ELEVATION
GABLE ROOF PURLIN DETAIL-10A
GABLE, FRONT WALL VERTICAL DETAIL-10
DOOR HEADER DETAIL-14
DOOR LATCH SIDE DETAIL-15A
FRONT WALL VERTICAL DETAIL-8
FRONT WALL VERTICAL DETAIL-8A
ROOF PURLIN DETAIL-8B
DOOR HINGE SIDE DETAIL-15
© 2023 JANCO INC.
GREENHOUSES
Lessel Lee Manufacturing Co., Inc
DRAWN/CHK'D: JQ
ISSUED 07/13/2023
73908-232
JQ-232
Annmarie Sculpture Garden & Art Center
13470 Dowell Road
Solomons, MD
SAME
3/8" = 1'-0"
2 OF 3



© 2023 JANCO INC.

GREENHOUSES

Laurel Lane Manufacturing Co., Inc.

DRAWN/CHK'D: JQ ISSUED 07/13/2023	Annmarie Sculpture Garden & Art Center Stacey Ramm-Ruff 13470 Dowell Road Solomons, MD 20688	SAME
73908-232		
JO-232	SCALE 3/8" = 1'-0"	SHEET 3 OF 3

DOTec Corp.
Customized Engineering Solutions

STRUCTURAL CALCULATIONS

PROJECT NO.:	2309015	
CLIENT:	Janco Greenhouses, Inc	
PREPARED BY:	Moe Aldegeily	DATE: 09/09/2023
CHECK & QC:		DATE: 09/09/2023

PROJECT INFORMATION

SCOPE OF WORK:	Generate structural and seismic calculations for this job 13470 Dowell Road Solomons MD 20688

BILLING ADDRESS:	
ADDRESS:	3333 S Fraser Street
CITY:	Georgetown
STATE:	SC
ZIP:	29440
COUNTRY:	USA

CONTACT:	Zack Clewer
TEL:	(800) 323-6933
FAX:	
MOBILE:	
E-MAIL:	zack@jancoinc.com

SITE ADDRESS:	13470 Dowell Road
CITY:	Solomons
STATE:	MD
ZIP:	20688
CONFIRM ZIP:	20688
COUNTRY:	USA
REFERENCES:	2018 IBC/ASCE 7-16

STATE OF MARYLAND
ILDEFONSO GONZALEZ
No. 38651
PROFESSIONAL ENGINEER
09/09/2023

Acceptance and use of this report by any party constitute a contractual agreement that the Engineers total liability arising out of or in any way related to this analysis and report shall not exceed the total sum paid to the Engineer for the services provided. Liability does not exist beyond the analysis contained in this report.

S001V001

Copyright. Dotec Engineering

424 Jeffereson St., St. Charles, MO 63301. Phone: (636) 724-9872

CONTENTS

Project:

For: Janco Greenhouses and Glass Structures
Location: 13470 Dowell Road Solomons MD 20688
Relevant Codes: ,IBC 2018, ASCE 7-16

Dead Load

$DL := 10\ psf$ Considered Roof Dead Load

$t_w := 6\ ft + 20.25\ in = 7.688\ ft$ Tributary Width

$DL_t := DL \cdot t_w = 76.875\ plf$

Roof Live Load

$RLL := 20\ psf$ Considered Roof Live Load
Table 4.1 (ASCE 7-16)

$RLL_t := RLL \cdot t_w = 153.75\ plf$

Snow Load

$P_g := 25\ psf$	Ground snow load ASCE 7-16 Figure 7.2-1
$\gamma := 0.13 \cdot \frac{P_g}{ft} + 14\ pcf = 17.25\ pcf$	Density of snow (ASCE 7-16; Eqn 7.7-1)
$s := \frac{4}{12}$	Roof slope (Always x/12)
$\theta := \operatorname{atan}(s) = 18.435\ deg$	Roof Angle
$C_e := 0.9$	Snow exposure factor,fully exposed (ASCE 7-16; Table 7.3-1)
$C_t := 0.85$	Thermal factor (ASCE 7-16; Table 7.3-2)
$C_s := 1$	Roof slope factor (ASCE 7-16; Fig 7.4-1)
$I_s := 1$	Importance factor (ASCE 7-16; Table 1.5-2)
$P_f := 0.7 \cdot C_e \cdot C_t \cdot I_s \cdot P_g = 13.388\ psf$	Flat Roof Snow Load

$\text{if}\left(2.38\ deg < \theta < 30.2\ deg, \text{“unbala snowload”}, \text{“No unbala snow load”}\right) = \text{“unbala snowload”}$

Table 1.5-2 Importance Factors by Risk Category of Buildings and Other Structures for Snow, Ice, and Earthquake Loads

Risk Category from Table 1.5-1	Snow Importance Factor, I_s	Ice Importance Factor—Thickness, I_i	Ice Importance Factor—Wind, I_w	Seismic Importance Factor, I_e
I	0.80	0.80	1.00	1.00
II	1.00	1.00	1.00	1.00
III	1.10	1.15	1.00	1.25
IV	1.20	1.25	1.00	1.50

Note: The component importance factor, I_p, applicable to earthquake loads, is not included in this table because it depends on the importance of the individual component rather than that of the building as a whole, or its occupancy. Refer to Section 13.1.3.

Table 7.3-1 Exposure Factor, C_e

Surface Roughness Category	Exposure of Roof[a] Fully Exposed	Partially Exposed	Sheltered
B (see Section 26.7)	0.9	1.0	1.2
C (see Section 26.7)	0.9	1.0	1.1
D (see Section 26.7)	0.8	0.9	1.0
Above the tree line in windswept mountainous areas	0.7	0.8	NA
In Alaska, in areas where trees do not exist within a 2-mi (3-km) radius of the site	0.7	0.8	NA

The terrain category and roof exposure condition chosen shall be representative of the anticipated conditions during the life of the structure. An exposure factor shall be determined for each roof of a structure.

[a]Definitions: Partially Exposed: All roofs except as indicated in the following text. Fully Exposed: Roofs exposed on all sides with no shelter[b] afforded by terrain, higher structures, or trees. Roofs that contain several large pieces of mechanical equipment, parapets that extend above the height of the balanced snow load (h_b), or other obstructions are not in this category. Sheltered: Roofs located tight in among conifers that qualify as obstructions.

[b]Obstructions within a distance of $10h_o$ provide "shelter," where h_o is the height of the obstruction above the roof level. If the only obstructions are a few deciduous trees that are leafless in winter, the "fully exposed" category shall be used. Note that these are heights above the roof. Heights used to establish the Exposure Category in Section 26.7 are heights above the ground.

Table 7.3-2 Thermal Factor, C_t

Thermal Condition[a]	C_t
All structures except as indicated below	1.0
Structures kept just above freezing and others with cold, ventilated roofs in which the thermal resistance (R-value) between the ventilated space and the heated space exceeds 25°F × h × ft²/Btu (4.4 K × m²/W)	1.1
Unheated and open air structures	1.2
Freezer building	1.3
Continuously heated greenhouses[b] with a roof having a thermal resistance (R-value) less than 2.0°F × h × ft²/Btu (0.4 K × m²/W)	0.85

[a]These conditions shall be representative of the anticipated conditions during winters for the life of the structure.

[b]Greenhouses with a constantly maintained interior temperature of 50°F (10°C) or more at any point 3 ft (0.9 m) above the floor level during winters and having either a maintenance attendant on duty at all times or a temperature alarm system to provide warning in the event of a heating failure.

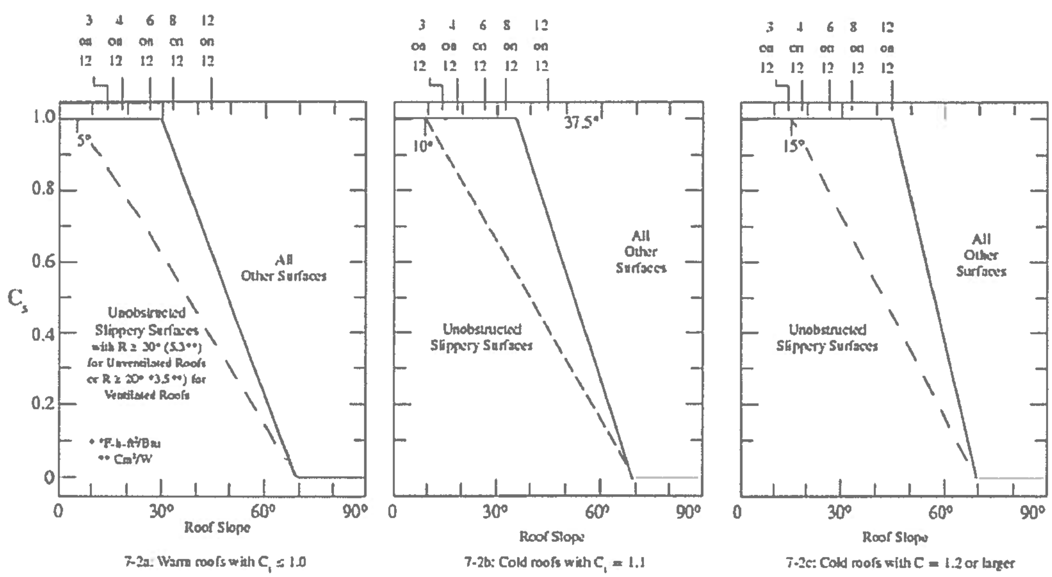
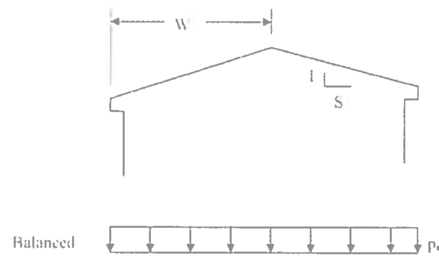


FIGURE 7.4-1 Graphs for Determining Roof Slope Factor, C_s, for Warm and Cold Roofs (See Table 7.3-2 for C_t Definitions)

Sloped Roof Snow Load

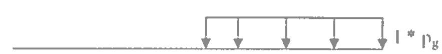
Balanced Snow Load



$P_{bal} := C_s \cdot P_f = 13.388\ psf$

$P_{bal\_t} := P_{bal} \cdot t_w = 102.916\ plf$

Unbalanced Snow Load (W<20ft)



$P_{unbal} := P_g \cdot I_s = 25\ psf$

$P_{unbal\_t} := P_{unbal} \cdot t_w = 192.188\ plf$

Wind Load (Enclosed structure)

Wind Exposure: c

$V_{ult} := 126\ mph$ — Ultimate Wind Speed

Risk category: II — Risk category

$V := V_{ult} = 126\ mph$

$\theta := \text{atan}(s) = 18.435\ deg$ — Roof Angle

$B := 31\ ft + 3\ in = 31.25\ ft$ — Horizontal dimension of building, (**measured normal to wind direction**)

$L := 20\ ft + 11.5\ in = 20.958\ ft$ — Horizontal dimension of building, (**measured parallel to wind direction**)

$h := \dfrac{4\ ft + 0.25\ in + 7\ ft + 7.375\ in}{2} = 5.818\ ft$ — **Mean roof height**, except that eave height shall be used for $\theta \le 10$ degrees

$K_z := 0.85$ — Velocity Pressure Exposure Coefficient (Table 26.10-1 of ASCE 7-16)

$K_{zt} := 1.0$ — Topographic Factor (Figure 26.8-1 of ASCE 7-16)

$K_d := 0.85$ — Wind Directionality Factor (Table 26.6-1 of ASCE 7-16)

$G := 0.85$ — Gust factor (Article 26.11.1 of ASCE 7-16)

$q_z := 0.00256\ \dfrac{psf}{mph^2} \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 = 29.364\ psf$ — Velocity pressure Equation ASCE 7-16

Internal Pressure coefficients(GC_{pi}) ASCE 7-16 Table 26.13-1

$GC_{pi\_P} := 0.18$ Internal pressure coefficient (Positive)

$GC_{pi\_N} := -0.18$ Internal pressure coefficient (Negative)

External Pressure coefficients(C_p) ASCE 7-16 Figure 27.3-1

Interpolation

$x_1 := 15$ $y_1 := -0.7$

$x_2 := 20$ $y_2 := -0.4$

$x := 18.435$

$$y := y_1 + \frac{(x - x_1) \cdot (y_1 - y_2)}{x_1 - x_2} = -0.494$$

$$\frac{L}{B} = 0.671 \qquad \frac{h}{L} = 0.278$$

$$\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_1} \\ C_{p\_WW\_Roof\_2} \\ C_{p\_LW\_Roof} \end{bmatrix} := \begin{bmatrix} 0.8 \\ -0.5 \\ -0.7 \\ -0.363 \\ -0.494 \\ -0.6 \end{bmatrix}$$

$$\begin{bmatrix} P_{WW\_Wall\_1} \\ P_{LW\_Wall\_1} \\ P_{SideWall\_1} \\ P_{WW\_Roof\_1} \\ P_{LW\_Roof\_1} \end{bmatrix} := t_w \cdot q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_1} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_P} \right) = \begin{bmatrix} 113 \\ -137 \\ -175 \\ -110 \\ -156 \end{bmatrix} plf$$

$$\begin{bmatrix} P_{WW\_Wall\_2} \\ P_{LW\_Wall\_2} \\ P_{SideWall\_2} \\ P_{WW\_Roof\_2} \\ P_{LW\_Roof\_2} \end{bmatrix} := t_w \cdot q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_2} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_P} \right) = \begin{bmatrix} 113 \\ -137 \\ -175 \\ -135 \\ -156 \end{bmatrix} plf$$

$$\begin{bmatrix} P_{WW\_Wall\_3} \\ P_{LW\_Wall\_3} \\ P_{SideWall\_3} \\ P_{WW\_Roof\_3} \\ P_{LW\_Roof\_3} \end{bmatrix} := t_w \cdot q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_1} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_N} \right) = \begin{bmatrix} 194 \\ -55 \\ -94 \\ -29 \\ -74 \end{bmatrix} plf$$

$$\begin{bmatrix} P_{WW\_Wall\_4} \\ P_{LW\_Wall\_4} \\ P_{SideWall\_4} \\ P_{WW\_Roof\_4} \\ P_{LW\_Roof\_4} \end{bmatrix} := t_w \cdot q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_2} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_N} \right) = \begin{bmatrix} 194 \\ -55 \\ -94 \\ -54 \\ -74 \end{bmatrix} plf$$

$$WWwalls\_min := 16\ psf \cdot t_w = 123\ plf$$

$$Wroof\_min := 8\ psf \cdot t_w = 61.5\ plf$$

Wall Pressure Coefficients, C_p

Surface	L/B	C_p	Use With
Windward wall	All values	0.8	q_z
	0–1	−0.5	q_h
Leeward wall	2	−0.3	q_h
	≥4	−0.2	q_h
Sidewall	All values	−0.7	q_h

Roof Pressure Coefficients, C_p, for use with q_h

		Windward								Leeward		
		Angle, θ (degrees)								Angle, θ (degrees)		
Wind Direction	h/L	10	15	20	25	30	35	45	≥60[c]	10	15	≥20
Normal	≤0.25	−0.7	−0.5	−0.3	−0.2	−0.2	0.0[a]					
to Ridge		−0.18	0.0[a]	0.2	0.3	0.3	0.4	0.4	0.01θ	−0.3	−0.5	−0.6
for	0.5	−0.9	−0.7	−0.4	−0.3	−0.2	−0.2	0.0[a]				
$\theta \geq 10°$		−0.18	−0.18	0.0[a]	0.2	0.2	0.3	0.4	0.01θ	−0.5	−0.5	−0.6
	≥1.0	−1.3[b]	−1.0	−0.7	−0.5	−0.3	−0.2	0.0[a]				
		−0.18	−0.18	−0.18	0.0[a]	0.2	0.2	0.3	0.01θ	−0.7	−0.6	−0.6

Wind Direction	h/L	Horizontal Distance from Windward Edge	C_p
Normal to Ridge for $\theta < 10°$ and Parallel to Ridge for All θ	≤0.5	0 to $h/2$	−0.9, −0.18
		$h/2$ to h	−0.9, −0.18
		h to $2h$	−0.5, −0.18
		$>2h$	−0.3, −0.18
	≥1.0	0 to $h/2$	−1.3[b], −0.18
		$>h/2$	−0.7, −0.18

[a]Value is provided for interpolation purposes.
[b]Value can be reduced linearly with area over which it is applicable as follows:
[c]For roof slopes greater than 80°, use $C_p = 0.8$.

Area, ft²	Area, m²	Reduction Factor
≤100	≤9.3	1.0
250	23.2	0.9
≥1,000	≥92.9	0.8

Notes

1. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
2. Linear interpolation is permitted for values of L/B, h/L, and θ other than shown. Interpolation shall only be carried out between values of the same sign. Where no value of the same sign is given, assume 0.0 for interpolation purposes.
3. Where two values of C_p are listed, this indicates that the windward roof slope is subjected to either positive or negative pressures and the roof structure shall be designed for both conditions. Interpolation for intermediate ratios of h/L in this case shall only be carried out between C_p values of like sign.
4. For monoslope roofs, entire roof surface is either a windward or leeward surface.
5. Refer to Fig. 27.3-2 for domes and Fig. 27.3-3 for arched roofs.
6. For mansard roofs, the top horizontal surface and leeward inclined surface shall be treated as leeward surfaces from the table.
7. Except for MWFRSs at the roof consisting of moment-resisting frames, the total horizontal shear shall not be less than that determined by neglecting wind forces on roof surfaces.

FIGURE 27.3-1 (*Continued*). Main Wind Force Resisting System, Part 1 (All Heights): External Pressure Coefficients, C_p, for Enclosed and Partially Enclosed Buildings—Walls and Roofs

Earthquake load

Risk Category II

S_S	0.115	S_1	0.041	F_a	1.6	F_v	2.4
S_{MS}	0.184	S_{M1}	0.099	S_{DS}	0.123	S_{D1}	0.066
T_L	8	PGA	0.058	PGA_M	0.093	F_{PGA}	1.6
I_e	1	C_v	0.7				

Seismic Design Category A

General Input

ASCE 7-16 Loading
Soil Site Class D
Risk Category II

SDC D

USGS-Provided output

$S_s := 0.115$	MCER ground motion (period=0.2s)
$S_1 := 0.041$	MCER ground motion (period=1.0s)
$S_{MS} := 0.184$	Site-modified spectral acceleration value
$F_v := 2.4$	Long-period site Coefficient, ASCE 7-16, Table 11.4-2
$S_{M1} := 0.099$	Site-modified spectral acceleration value ASCE 7-16, Equation 11.4-2
$S_{DS} := 0.123$	Numeric seismic design value at 0.2s SA
$S_{D1} := 0.66$	Numeric seismic design value at 1.0s SA ASCE 7-16, Equation 11.4-4
$R := 2$	Response Modification factor for Steel ordinary moment frames ASCE 7-16: Table 12.2-1
$I_e := 1$	Seismic Importance Factor

Seismic Response Coefficient

$$C_s := \frac{S_{DS}}{\frac{R}{I_e}} = 0.062$$

ASCE 7-16: Equation 12.8-2

Approximate Fundamental Period

$C_t := 0.028$ ASCE 7-16: Table 12.8-2

$h_n := \frac{h}{ft} = 5.818 \quad ft$

$x := 0.8$ ASCE 7-16: Table 12.8-2

$T_a := \left(C_t \cdot {h_n}^x\right)\ s = 0.038$

Fundamental Period

$C_u := 1.7$ ASCE 7-16: Table 12.8-1

$T := C_u \cdot T_a = 0.065$

$T_L := 6\ s$ ASCE 7-16: Figure 22-12

Maximum seismic response coefficient

$$C_{s\_max} := \text{if}\left(T \le T_L, \frac{S_{D1} \cdot 1}{T \cdot \left(\frac{R}{I_e}\right)}, \frac{S_{D1} \cdot T_L \cdot 1}{T^2 \cdot \left(\frac{R}{I_e}\right)}\right) = 5.084$$

Minimum seismic response coefficient

$$C_{s\_min} := 0.5\ \frac{S_1}{\frac{R}{I_e}} = 0.01$$

$$\text{if}\left(C_{s\_max} > C_s > C_{s\_min}, \text{“OK”}, \text{“NOT OK”}\right) = \text{“OK”}$$

Weight of the Structure

$SL := P_g = 25\ psf$ Snow Load

$RLL = 20\ psf$ Roof live load

$DL = 10\ psf$ Dead load

$$TL := DL + \max(0.2 \cdot SL, 0.25 \cdot RLL) = 15\ psf$$

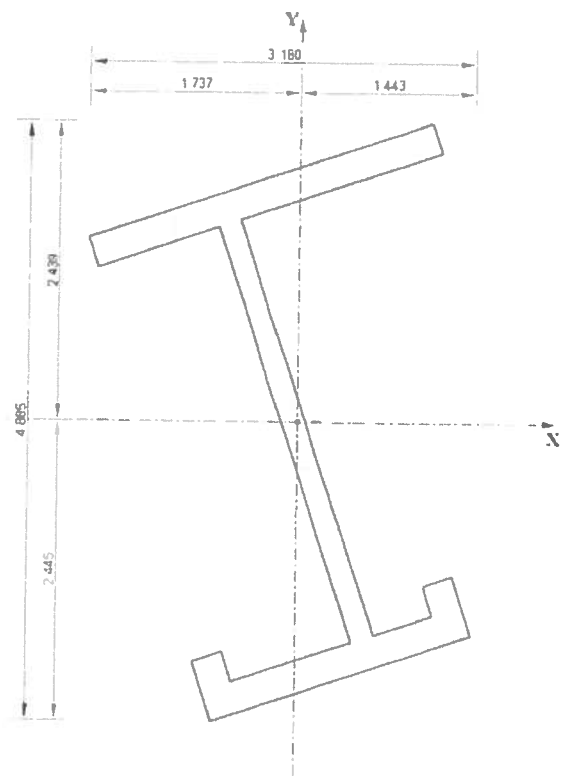
$$W := t_w \cdot L \cdot TL = (2.417 \cdot 10^3)\ lbf$$

Base Shear

$$V := C_s \cdot W = 148.631\ lbf$$

$$V_{each} := \frac{V}{2} = 74.315\ lbf$$

Purlin Analysis



Total Width =	3.180	in
Total Height =	4.885	in
Centroid, Xo =	81.037	in
Centroid, Yo =	35.372	in
X-Bar (Right) =	1.443	in
X-Bar (Left) =	1.737	in
Y-Bar (Top) =	2.439	in
Y-Bar (Bot) =	2.445	in
Max Thick =	4.885	in
Area, Ax =	2.138	in^2
Inertia, Ixx =	5.942	in^4
Inertia, Iyy =	1.047	in^4
Inertia, Ixy =	-0.768	in^4
Sx (Top) =	2.436	in^3
Sx (Bot) =	2.430	in^3
Sy (Left) =	0.603	in^3
Sy (Right) =	0.726	in^3
rx =	1.667	in
ry =	0.700	in
Plastic Zx =	3.324	in^3
Plastic Zy =	1.209	in^3
Torsional J =	0.040	in^4
As-xx Def =	1.000	
As-yy Def =	1.000	
As-xx Stress =	1.000	
As-yy Stress =	1.000	

Mechanical properties of 6061-T6

$E := 10000\ ksi$

$F_{tu} := 38\ ksi$

$F_{ty} := 35\ ksi$

$F_{cy} := 35\ ksi$

$F_{sy} := 20\ ksi$

$\phi_y := 0.95$

$\phi_u := 0.85$

$\phi F_L t := \phi_y \cdot F_{ty} = 33.25\ ksi$

Allowable extreme tension fibers stress

$$B_c := F_{cy} \cdot \left(1 + \left(\frac{F_{cy} \cdot \frac{1}{ksi}}{(2250)}\right)^{0.5}\right) = 39.365\ ksi$$

Allowable extreme tension fibers stress

$$D_c := \frac{B_c}{10} \cdot \left(\frac{B_c}{E}\right)^{0.5} = 0.247\ ksi$$

$$C_c := 0.41 \cdot \frac{B_c}{D_c} = 65.347$$

$$\phi_b := 0.85$$

$$S_1 := 1.2 \cdot \frac{\left(B_c - \frac{\phi_y \cdot F_{cy}}{\phi_b}\right)}{D_c} = 1.203$$

$$S_2 := 1.2 \cdot C_c = 78.417$$

$$L_b := 122\ in \qquad r_y := 1.667\ in$$

$$\frac{L_b}{r_y} = 73.185$$

$$\phi F_L c1 := \phi_y \cdot F_{cy} = 33.25\ ksi$$

$$\phi F_L c2 := \phi_b \cdot \left(B_c - \frac{D_c \cdot L_b}{12 \cdot r_y}\right) = 32.18\ ksi$$

$$\phi F_L c3 := \frac{\phi_b \cdot \pi^2 \cdot E}{\left(\frac{L_b}{1.2 \cdot r_y}\right)^2} = 22.554\ ksi$$

$$\phi F_L c := \text{if}\left(\frac{L_b}{r_y} < S_1, \phi F_L c1, \text{if}\left(S_1 < \frac{L_b}{r_y} < S_2, \phi F_L c2, \phi F_L c3\right)\right) = 32.18\ ksi$$

Loads Applied on the purlin

Wind Loads:

$$\begin{bmatrix} P_{WW\_Wall\_1} \\ P_{LW\_Wall\_1} \\ P_{SideWall\_1} \\ P_{WW\_Roof\_1} \\ P_{LW\_Roof\_1} \end{bmatrix} := q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_1} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_P} \right) = \begin{bmatrix} 15 \\ -18 \\ -23 \\ -14 \\ -20 \end{bmatrix} psf$$

$$\begin{bmatrix} P_{WW\_Wall\_2} \\ P_{LW\_Wall\_2} \\ P_{SideWall\_2} \\ P_{WW\_Roof\_2} \\ P_{LW\_Roof\_2} \end{bmatrix} := q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_2} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_P} \right) = \begin{bmatrix} 15 \\ -18 \\ -23 \\ -18 \\ -20 \end{bmatrix} psf$$

$$\begin{bmatrix} P_{WW\_Wall\_3} \\ P_{LW\_Wall\_3} \\ P_{SideWall\_3} \\ P_{WW\_Roof\_3} \\ P_{LW\_Roof\_3} \end{bmatrix} := q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_1} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_N} \right) = \begin{bmatrix} 25 \\ -7 \\ -12 \\ -4 \\ -10 \end{bmatrix} psf$$

$$\begin{bmatrix} P_{WW\_Wall\_4} \\ P_{LW\_Wall\_4} \\ P_{SideWall\_4} \\ P_{WW\_Roof\_4} \\ P_{LW\_Roof\_4} \end{bmatrix} := q_z \cdot \left(\begin{bmatrix} C_{p\_WW\_Wall} \\ C_{p\_LW\_Wall} \\ C_{p\_SideWall} \\ C_{p\_WW\_Roof\_2} \\ C_{p\_LW\_Roof} \end{bmatrix} \cdot G - GC_{pi\_N} \right) = \begin{bmatrix} 25 \\ -7 \\ -12 \\ -7 \\ -10 \end{bmatrix} psf$$

$W_u := P_{LW\_Roof\_1} = -20.261\ psf$ Uplift wind load

$W_d := P_{WW\_Roof\_4} = -7.044\ psf$ Dead load

$SL := P_{unbal} = 25\ psf$ Dead load

$DL = 10\ psf$ Dead load

$t_w := 8.282\ ft$ Tributary width of purlins

Load combinations

$LC1 := 1.4\ DL = 14\ psf$

$LC2 := 1.2\ DL + 0.5\ RLL = 22\ psf$

$LC3 := 1.2\ DL + 0.5\ SL = 24.5\ psf$

$LC4 := 1.2\ DL + 1.0\ W_d + SL = 29.956\ psf$

$LC5 := 1.2\ DL + 1.0\ W_u + SL = 16.739\ psf$

$LC6 := 0.9\ DL + 1.0\ W_d = 1.956\ psf$

$LC7 := 0.9\ DL + 1.0\ W_u = -11.261\ psf$

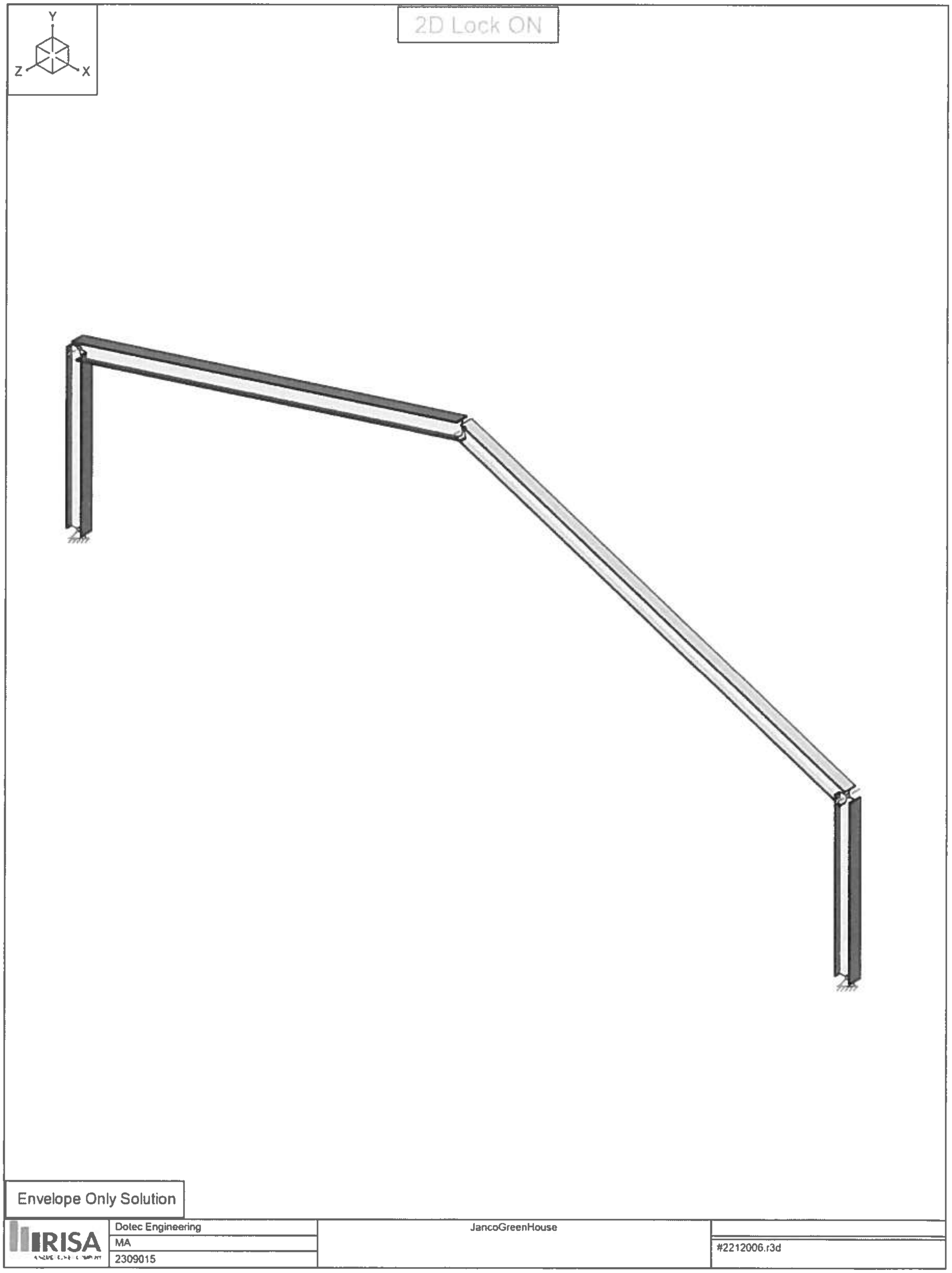
$$M_{b\_up} := \frac{t_w \cdot LC7 \cdot {L_b}^2}{8} = -1.205 \cdot 10^3\ ft \cdot lbf$$

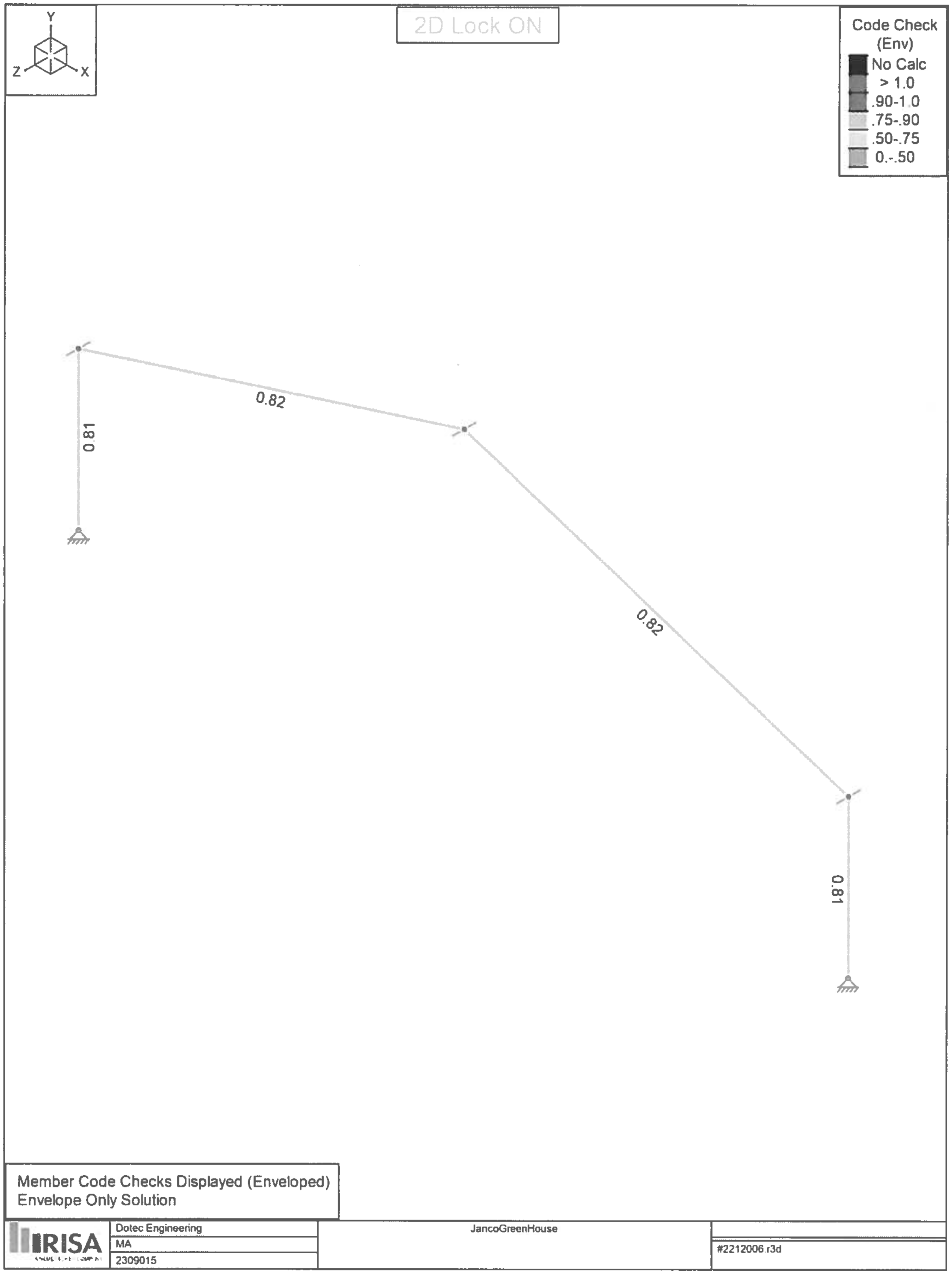
$$M_{b\_dn} := \frac{t_w \cdot LC4 \cdot {L_b}^2}{8} = \left(3.205 \cdot 10^3\right)\ ft \cdot lbf$$

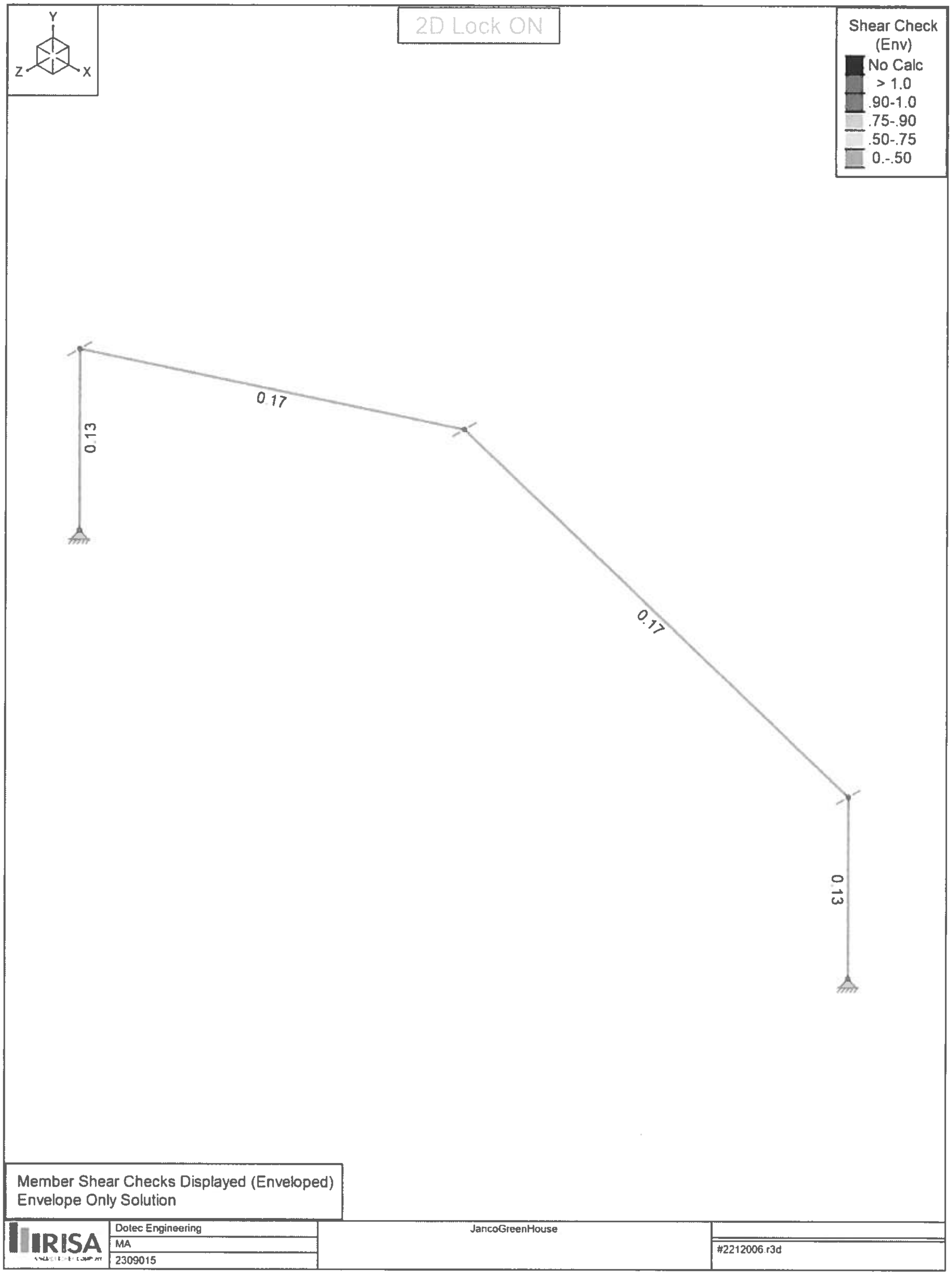
$S_{xx} := 2.43\ in^3$

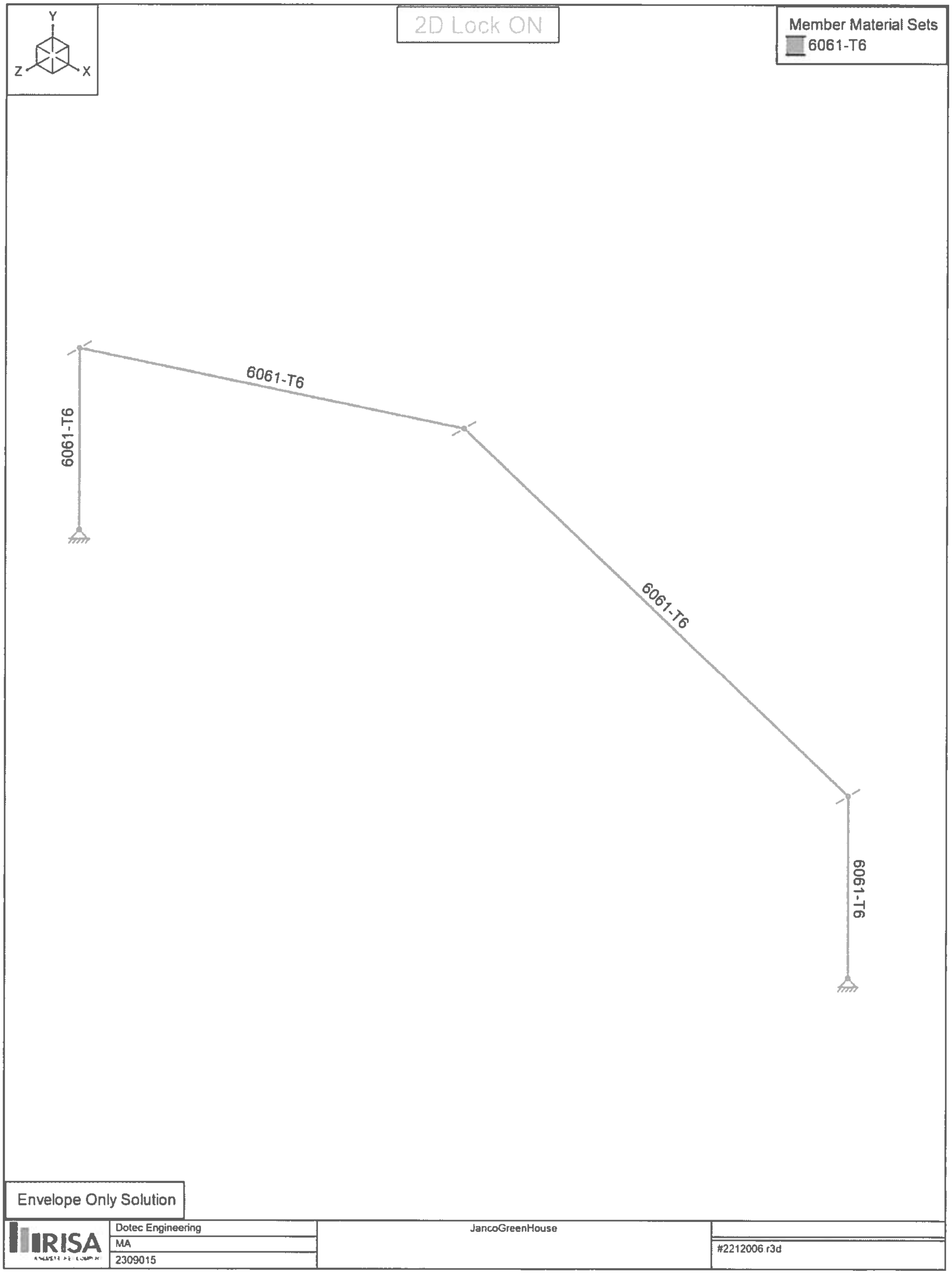
$$\sigma_{max} := \frac{M_{b\_dn}}{S_{xx}} = 15.829\ ksi$$

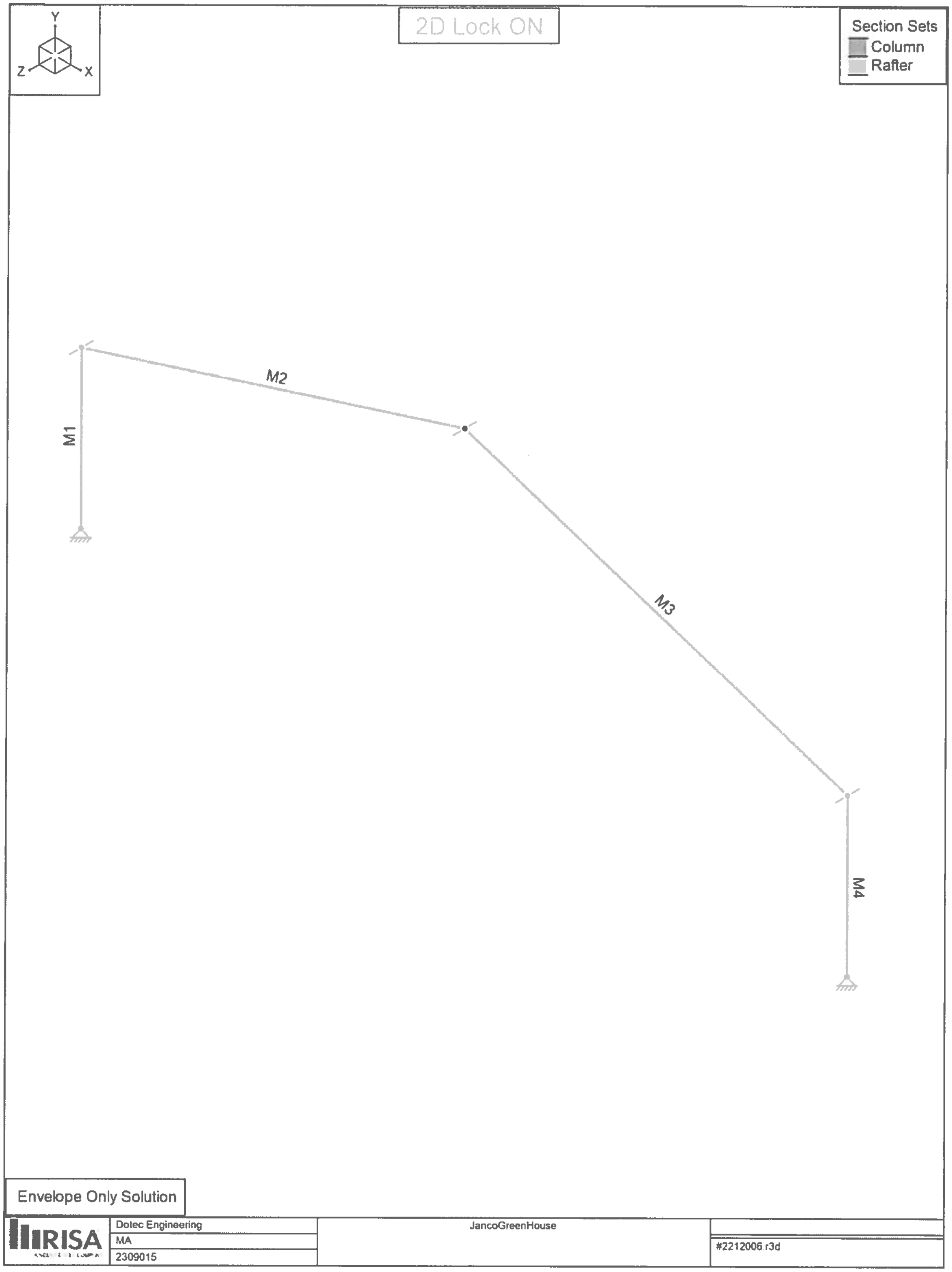
$$Check := \text{if}\left(\frac{\sigma_{max}}{\phi F_L c} < 1, \text{“pass”}, \text{“fail”}\right) = \text{“pass”}$$


Y
Z
X
2D Lock ON
Envelope Only Solution
RISA
Dotec Engineering
MA
2309015
JancoGreenHouse
#2212006.r3d


2D Lock ON
Code Check
(Env)
No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50
0.81
0.82
0.82
0.81
Member Code Checks Displayed (Enveloped)
Envelope Only Solution
RISA
Dotec Engineering
MA
2309015
JancoGreenHouse
#2212006.r3d


2D Lock ON
Shear Check
(Env)
No Calc
> 1.0
.90-1.0
.75-.90
.50-.75
0.-.50
0.13
0.17
0.17
0.13
Member Shear Checks Displayed (Enveloped)
Envelope Only Solution
Dotec Engineering
MA
2309015
JancoGreenHouse
#2212006.r3d


Y
Z
X
2D Lock ON
Member Material Sets
6061-T6
6061-T6
6061-T6
6061-T6
6061-T6
Envelope Only Solution
RISA
Dotec Engineering
MA
2309015
JancoGreenHouse
#2212006 r3d


2D Lock ON
Section Sets
Column
Rafter
M1
M2
M3
M4
Envelope Only Solution
Dotec Engineering
MA
2309015
JancoGreenHouse
#2212006.r3d

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	N2	Reaction	Reaction	Reaction
2	N1	Reaction	Reaction	Reaction
3	ALL			Fixed

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N5	Column	Column	A-N Wide Flange	6061-T6	Typical
2	M2	N5	N7	Rafter	Beam	A-N Tee	6061-T6	Typical
3	M3	N7	N6	Rafter	Beam	A-N Tee	6061-T6	Typical
4	M4	N6	N2	Column	Column	A-N Wide Flange	6061-T6	Typical

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed
1	DL	DL	-1			2
2	LL	LL				
3	RLL	RLL				2
4	SLb	SL				2
5	Slub	SL				1
6	WL1	WL				4
7	WL2	WL				4
8	WL3	WL			1	4
9	WL4	WL				4
10	WL5	WL				
11	EL	EL		2		
12	ER	EL				

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC
1	DL	Yes	Y	DL	1					
2	DL+LL	Yes	Y	DL	1	LL	1			
3	DL+RLL	Yes	Y	DL	1	RLL	1			
4	DL+SL	Yes	Y	DL	1	4	1			
5	DL+SLU	Yes	Y	DL	1	5	1			
6	DL+0.75LL+0.75RLL	Yes	Y	DL	1	LL	0.75	RLL	0.75	
7	DL+0.75LL+0.75SL	Yes	Y	DL	1	LL	0.75	4	0.75	
8	DL+0.75LL+0.75SLU	Yes	Y	DL	1	LL	0.75	5	0.75	
9	DL+0.6WL1	Yes	Y	DL	1	6	0.6			
10	DL+0.45WL1+0.75LL+0.75RLL	Yes	Y	DL	1	6	0.45	LL	0.75	RLL
11	DL+0.45WL1+0.75LL+0.75SL	Yes	Y	DL	1	6	0.45	LL	0.75	4
12	DL+0.45WL1+0.75LL+0.75SLU	Yes	Y	DL	1	6	0.45	LL	0.75	5
13	DL+0.45WL1+0.75LL	Yes	Y	DL	1	6	0.45	LL	0.75	
14	0.6DL+0.6WL1	Yes	Y	DL	0.6	6	0.6			
15	DL+0.6WL2	Yes	Y	DL	1	7	0.6			
16	DL+0.45WL2+0.75LL+0.75RLL	Yes	Y	DL	1	7	0.45	LL	0.75	RLL
17	DL+0.45WL2+0.75LL+0.75SL	Yes	Y	DL	1	7	0.45	LL	0.75	4
18	DL+0.45WL2+0.75LL+0.75SLU	Yes	Y	DL	1	7	0.45	LL	0.75	5
19	DL+0.45WL2+0.75LL	Yes	Y	DL	1	7	0.45	LL	0.75	
20	0.6DL+0.6WL2	Yes	Y	DL	0.6	7	0.6			
21	DL+0.6WL3	Yes	Y	DL	1	8	0.6			
22	DL+0.45WL3+0.75LL+0.75RLL	Yes	Y	DL	1	8	0.45	LL	0.75	RLL
23	DL+0.45WL3+0.75LL+0.75SL	Yes	Y	DL	1	8	0.45	LL	0.75	4
24	DL+0.45WL3+0.75LL+0.75SLU	Yes	Y	DL	1	8	0.45	LL	0.75	5
25	DL+0.45WL3+0.75LL	Yes	Y	DL	1	8	0.45	LL	0.75	
26	0.6DL+0.6WL3	Yes	Y	DL	0.6	8	0.6			
27	DL+0.6WL4	Yes	Y	DL	1	9	0.6			
28	DL+0.45WL4+0.75LL+0.75RLL	Yes	Y	DL	1	9	0.45	LL	0.75	RLL
29	DL+0.45WL4+0.75LL+0.75SL	Yes	Y	DL	1	9	0.45	LL	0.75	4
30	DL+0.45WL4+0.75LL+0.75SLU	Yes	Y	DL	1	9	0.45	LL	0.75	5
31	DL+0.45WL4+0.75LL	Yes	Y	DL	1	9	0.45	LL	0.75	
32	0.6DL+0.6WL4	Yes	Y	DL	0.6	9	0.6			
33	DL+0.6WL5	Yes	Y	DL	1	10	0.6			
34	DL+0.45WL5+0.75LL+0.75RLL	Yes	Y	DL	1	10	0.45	LL	0.75	RLL
35	DL+0.45WL5+0.75LL+0.75SL	Yes	Y	DL	1	10	0.45	LL	0.75	4
36	DL+0.45WL5+0.75LL+0.75SLU	Yes	Y	DL	1	10	0.45	LL	0.75	5
37	DL+0.45WL5+0.75LL	Yes	Y	DL	1	10	0.45	LL	0.75	
38	0.6DL+0.6WL5	Yes	Y	DL	0.6	10	0.6			
39	DL+0.7EL1	Yes	Y	DL	1	11	0.7			
40	DL+0.525EL1+0.75LL+0.75SL	Yes	Y	DL	1	11	0.525	LL	0.75	4
41	DL+0.525EL1+0.75LL+0.75SLU	Yes	Y	DL	1	11	0.525	LL	0.75	5
42	0.6DL+0.7EL1	Yes	Y	DL	0.6	11	0.7			
43	DL+0.7EL2	Yes	Y	DL	1	12	0.7			
44	DL+0.525EL2+0.75LL+0.75SL	Yes	Y	DL	1	12	0.525	LL	0.75	4
45	DL+0.525EL2+0.75LL+0.75SLU	Yes	Y	DL	1	12	0.525	LL	0.75	5
46	0.6DL+0.7EL2	Yes	Y	DL	0.6	12	0.7			

Aluminum Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [$1e^{5}\,°F^{-1}$]	Density [k/ft^3]	Table B.4	kt	Ftu [ksi]	Fty [ksi]	Fcy [ksi]	Fsu [ksi]	Ct
1	3003-H14	10100	3787.5	0.33	1.3	0.173	Table B.4-1	1	19	16	13	12	141
2	6061-T6	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	38	35	35	24	141
3	6063-T5	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	22	16	16	13	141
4	6063-T6	10100	3787.5	0.33	1.3	0.173	Table B.4-2	1	30	25	25	19	141
5	5052-H34	10200	3787.5	0.33	1.3	0.173	Table B.4-1	1	34	26	24	20	141

Aluminum Properties (Continued)

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Table B.4	kt	Ftu [ksi]	Fty [ksi]	Fcy [ksi]	Fsu [ksi]	Ct
6	6061-T6 W	10100	3787.5	0.33	1.3	0.173	Table B.4-1	1	24	15	15	15	141

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Column	5X3.5IBEAM	Column	A-N Wide Flange	6061-T6	Typical	3.068	2.289	13.597	0.085
2	Rafter	5X3.5IBEAM	Beam	A-N Tee	6061-T6	Typical	3.068	2.289	13.597	0.085
3	Collar tie	5.0X6X0.41X0.29	Beam	None	6061-T6	Typical	4.305	9.009	7.948	0.28
4	Tension tie	BACK-BACKL2X2X0.25	VBrace	A-N Tee	6061-T6	Typical	1.875	1.352	0.695	0.105
5	Support Angle	L2X2X0.25_ALA	VBrace	A-N Tee	6061-T6	Typical	0.938	0.348	0.348	0.018
6	AL1	AAI3X1.64	Beam	None	6061-T6	Typical	1.39	0.522	2.24	0.019

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N2	max	-105.293	26	2594.679	3	0	46	0	46	0	46	0	46
1		min	-1489.462	3	-254.973	20	0	1	0	1	0	1	0	1
2	N1	max	1489.462	3	2594.679	3	0	46	0	46	0	46	0	46
3		min	-662.722	20	-492.022	20	0	1	0	1	0	1	0	1
4	Totals:	max	0	46	5189.359	3	0	46						
5		min	-952.45	15	-746.995	20	0	1						

Envelope Maximum Member Section Forces

	Member		Axial[lb]	Loc[ft]	LC	y Shear[lb]	Loc[ft]	LC	z Shear[lb]	Loc[ft]	LC	Torque[k-ft]	Loc[ft]	LC	y-y Moment[k-ft]	Loc[ft]	LC	z-z Moment[k-ft]	Loc[ft]	LC
0	M1	max	2594.679	0	3	653.888	0	20	0	4.25	46	0	4.25	46	0	4.25	46	6.499	4.25	3
1		min	-501.411	4.25	20	-1529.333	0	3	0	0	1	0	0	1	0	0	1	-2.167	4.25	20
2	M2	max	2206.643	0	3	2036.089	0	3	0	11.007	46	0	11.007	46	0	11.007	46	6.499	0	3
3		min	-509.951	0	20	-833.888	11.007	5	0	0	1	0	0	1	0	0	1	-3.104	7.797	5
4	M3	max	2206.643	11.007	3	419.449	0	3	0	11.007	46	0	11.007	46	0	11.007	46	6.499	11.007	3
5		min	-300.229	0	20	-2036.089	11.007	3	0	0	1	0	0	1	0	0	1	-2.792	1.835	3
6	M4	max	2594.679	4.25	3	63.281	0	20	0	4.25	46	0	4.25	46	0	4.25	46	0	4.25	46
7		min	-264.361	0	20	-1529.333	0	3	0	0	1	0	0	1	0	0	1	-6.499	0	3

Envelope AA ADM1-15: ASD - BUILDING Member Aluminum Code Checks

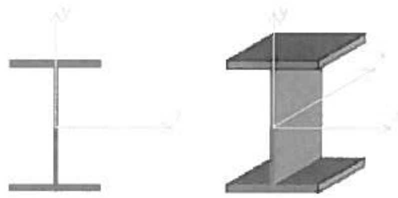
	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	Pnc/Om[lb]	Pnt/Om[lb]	Mny/Om[k-ft]	Mnz/Om[k-ft]	Vny/Om[lb]	Vnz/Om[lb]	Cb	Eqn
0	M1	5X3.5IBEAM	0.814	4.25	3	0.131	4.25	y	3	48463.9	59794.462	3.247	8.541	11692.308	27569.231	1	H.1-1
1	M2	5X3.5IBEAM	0.819	0	3	0.174	0	y	3	37834.76	59794.462	3.247	8.541	11692.308	27569.231	1	H.1-1
2	M3	5X3.5IBEAM	0.819	11.007	3	0.174	11.007	y	3	37834.76	59794.462	3.247	8.541	11692.308	27569.231	1	H.1-1
3	M4	5X3.5IBEAM	0.814	0	3	0.131	4.25	y	3	48463.9	59794.462	3.247	8.541	11692.308	27569.231	1	H.1-1

Aluminum Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	Lb z-z [ft]	Lcomp top [ft]	Lcomp bot [ft]	L-Torque [ft]	K y-y	K z-z	Function
1	M1	Column	4.25	3	Segment	3	3	Segment			Lateral
2	M2	Rafter	11.007	3	Segment	3	3	Segment	0.65	0.65	Lateral
3	M3	Rafter	11.007	3	Segment	3	3	Segment	0.65	0.65	Lateral
4	M4	Column	4.25	3	Segment	3	3	Segment			Lateral

Detail Report: M1

Load Combination: Envelope **Code check:** 0.814 (LC 3)



Input Data

Shape:	5X3.5IBEAM	**I Node:**	N1
Member Type:	Column	**J Node:**	N5
Length (ft):	4.25	**I Release:**	Fixed
Material Type:	Aluminum	**J Release:**	Fixed
Design Rule:	Typical	**I Offset:**	N/A
Internal Sections:	97	**J Offset:**	N/A
Design Code:	AA ADM1-15: ASD - Building	**T/C Only:**	Both Way

Material Properties

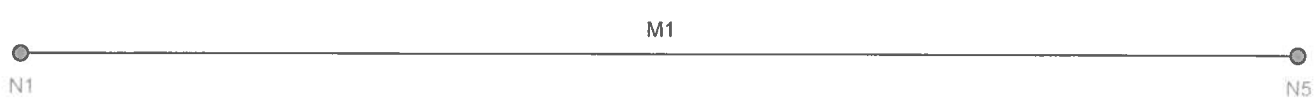
Material:	6061-T6	**Density (k/ft^3):**	0.173	**F_{su} (ksi):**	24
E (ksi):	10100	**k_t:**	1	**F_{sy} (ksi):**	21
G (ksi):	3787.5	**F_{tu} (ksi):**	38	**C_t:**	141
Nu:	0.33	**F_{ty} (ksi):**	35		
Therm. Coeff. (/1E5 F):	1.3	**F_{cy} (ksi):**	35		

Shape Properties

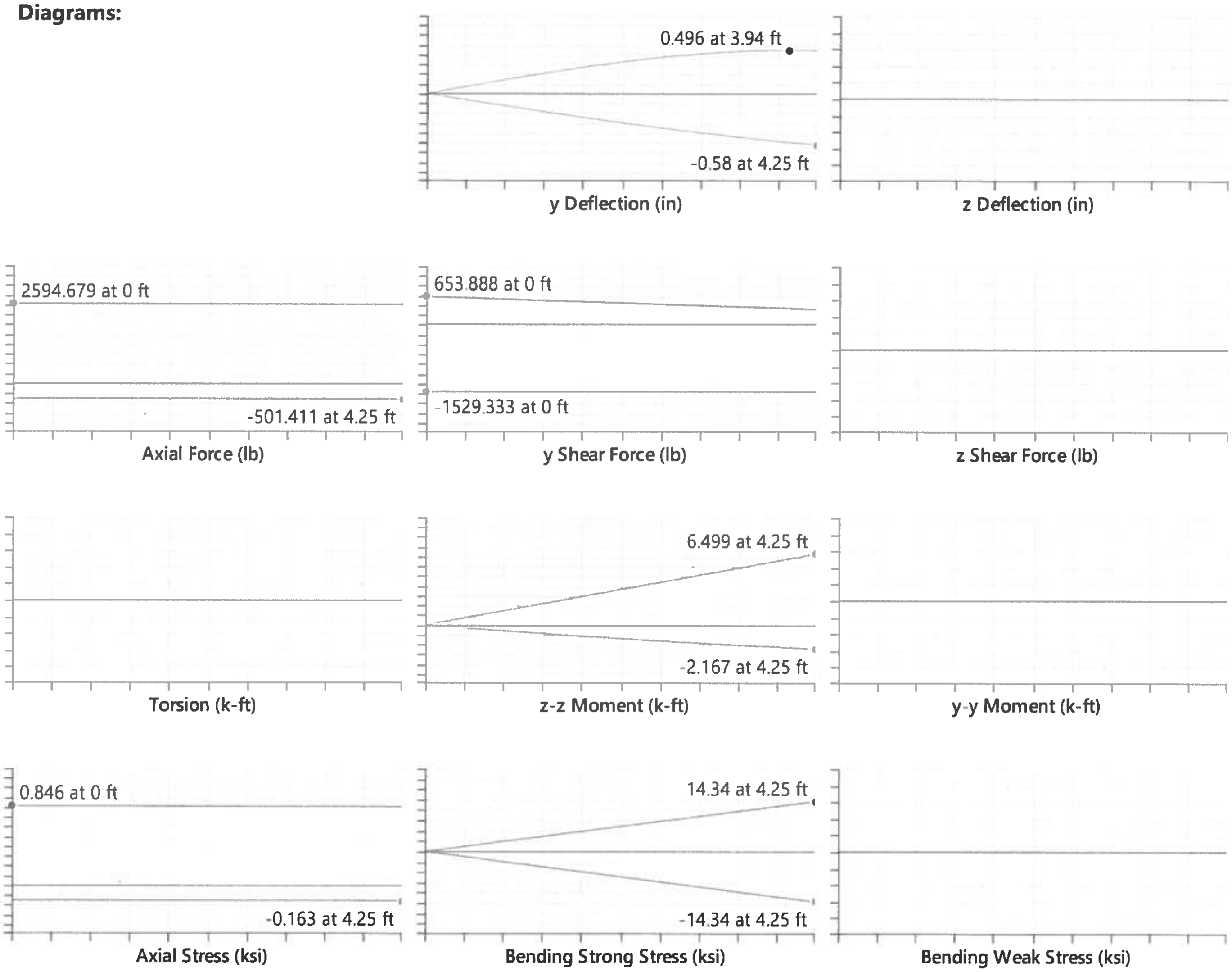
d (in):	5	**I_{zz} (in^4):**	13.597	**S_{zz} (in^3):**	5.439
b_f (in):	3.5	**Area (in^2):**	3.068	**C_w (in^6):**	12.535
t_f (in):	0.32	**Z_{yy} (in^3):**	1.999	**J (in^4):**	0.085
t_w (in):	0.19	**Z_{zz} (in^3):**	6.145	**R (in):**	0
I_{yy} (in^4):	2.289	**S_{yy} (in^3):**	1.308	**r_o (in):**	2.275

Design Properties

$L_{b\ y\text{-}y}$ (ft):	3	**$K_{y\text{-}y}$:**	1	**Max Defl Location:**	4.25
$L_{b\ z\text{-}z}$:	Segment	**$K_{z\text{-}z}$:**	1	**Span:**	N/A
$L_{comp\ top}$ (ft):	3	**Welded?:**	False	**τ_b:**	1
$L_{comp\ bot}$ (ft):	3	**Function:**	Lateral		
C_b:	1	**Max Defl Ratio:**	L/241		



Diagrams:

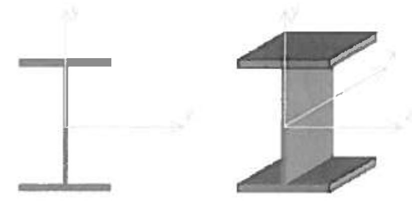


AA ADM1-15: ASD - Building Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	3	-	-	-	-
Applied Loading - Shear + Torsion	3	-	-	-	-
Axial Tension Analysis	-	0 lb	59794.461 lb	-	-
Axial Compression Analysis	-	2579.031 lb	48463.898 lb	-	-
Flexural Analysis (Strong Axis)	-	6.499 k-ft	8.541 k-ft	-	-
Flexural Analysis (Weak Axis)	-	0 k-ft	3.247 k-ft	-	-
Shear Analysis (Major Axis y)	-	1529.333 lb	11692.308 lb	**0.131**	PASS
Shear Analysis (Minor Axis z)	-	0 lb	27569.23 lb	**0**	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	-	**0.814**	PASS

Detail Report: M2

Load Combination: Envelope **Code check:** 0.819 (LC 3)



Input Data

Shape:	5X3.5IBEAM	**I Node:**	N5
Member Type:	Beam	**J Node:**	N7
Length (ft):	11.007	**I Release:**	Fixed
Material Type:	Aluminum	**J Release:**	Fixed
Design Rule:	Typical	**I Offset:**	N/A
Internal Sections:	97	**J Offset:**	N/A
Design Code:	AA ADM1-15: ASD - Building	**T/C Only:**	Both Way

Material Properties

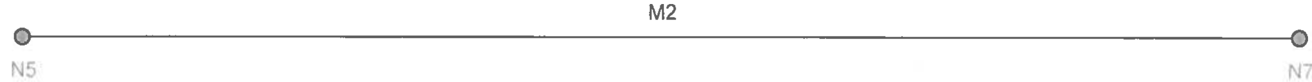
Material:	6061-T6	**Density (k/ft^3):**	0.173	**F_{su} (ksi):**	24
E (ksi):	10100	**k_t:**	1	**F_{sy} (ksi):**	21
G (ksi):	3787.5	**F_{tu} (ksi):**	38	**C_t:**	141
Nu:	0.33	**F_{ty} (ksi):**	35		
Therm. Coeff. (/1E5 F):	1.3	**F_{cy} (ksi):**	35		

Shape Properties

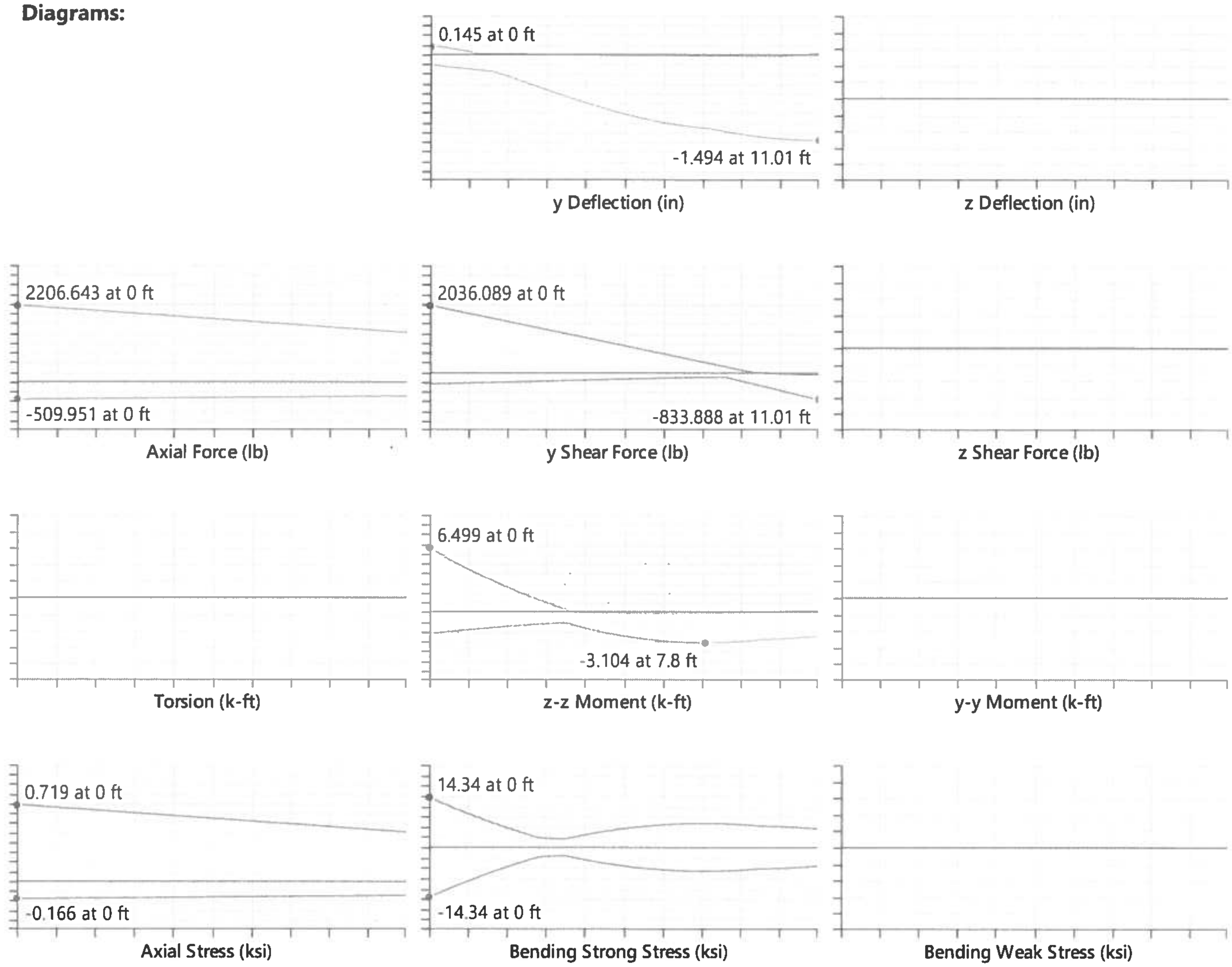
d (in):	5	**I_{zz} (in^4):**	13.597	**S_{zz} (in^3):**	5.439
b_f (in):	3.5	**Area (in^2):**	3.068	**C_w (in^6):**	12.535
t_f (in):	0.32	**Z_{yy} (in^3):**	1.999	**J (in^4):**	0.085
t_w (in):	0.19	**Z_{zz} (in^3):**	6.145	**R (in):**	0
I_{yy} (in^4):	2.289	**S_{yy} (in^3):**	1.308	**r_o (in):**	2.275

Design Properties

$L_{b\ y\text{-}y}$ (ft):	3	**$K_{y\text{-}y}$:**	0.65	**Max Defl Location:**	10.204
$L_{b\ z\text{-}z}$:	Segment	**$K_{z\text{-}z}$:**	0.65	**Span:**	1
$L_{comp\ top}$ (ft):	3	**Welded?:**	False	**τ_b:**	1
$L_{comp\ bot}$ (ft):	3	**Function:**	Lateral		
C_b:	1	**Max Defl Ratio:**	L/208		



Diagrams:



AA ADM1-15: ASD - Building Code Check

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	3	-	-	-	-
Applied Loading - Shear + Torsion	3	-	-	-	-
Axial Tension Analysis	-	0 lb	59794.461 lb	-	-
Axial Compression Analysis	-	2206.643 lb	37834.758 lb	-	-
Flexural Analysis (Strong Axis)	-	6.499 k-ft	8.541 k-ft	-	-
Flexural Analysis (Weak Axis)	-	0 k-ft	3.247 k-ft	-	-
Shear Analysis (Major Axis y)	-	2036.089 lb	11692.308 lb	**0.174**	PASS
Shear Analysis (Minor Axis z)	-	0 lb	27569.23 lb	**0**	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	-	**0.819**	PASS