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Phone (954) 274-2429; Fax (786) 545-7636
Web site: www.iengineerpllc.com; E-mail: juan@iengineerpllc.com

COVER SHEET

DATE: February 15, 2022

PROJECT: CANVAS AWNING

ADDRESS 10799 SW Civic Ln, Port St. Lucie, FL 34987

CLIENT:

This computation book contains manual and computerized structural calculations, certain printed manufacturer's data and Computation pages are numbered 1 thru **16**. Computations were performed to the best of our knowledge according to sound and generally accepted engineering principals and Code requirements, using nationally recognized computer software and in-house developed software. Prior to commissioning into service, the in-house developed software was thoroughly checked by performing parallel manual computations. The sign and seal provided herein are meant to cover all computation sheets pages 1 through **16**.

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INDEX

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CANVAS AWNING
12799 SW Civic Ln, Port St. Lucie, FL 34987
VALID ONLY WITH RAISED PE SEAL.
02-15-2022
iEngineer, PLLC. CA #29119
Juan C. Moreno, F.L Reg. P.E # 69818
VALID ONLY FOR ONE (1) PERMIT ONLY.
-ANY CORRECTIONS, INK MARKS, WHITE OUT OR STICK-ONS WILL VOID THESE DRAWINGS AND CALCULATIONS.

MecaWind v2400

Calculations Prepared by:
Date: Feb 14, 2022

File Location : C:\Users\user\Desktop\WIND CALC OPEN AWNING 18X18.wnd

Basic Wind Parameters

Wind Load Standard	= ASCE 7-16	Exposure Category	= C
Wind Design Speed	= 105.0 mph	Risk Category	= II
Structure Type	= Building	Building Type	= Open

General Wind Settings

Incl_LF	= Include ASD Load Factor of 0.6 in Pressures	= False
DynType	= Dynamic Type of Structure	= Rigid
Zg	= Altitude (Ground Elevation) above Sea Level	= 8.000 ft
Bdist	= Base Elevation of Structure	= 8.000 ft
SDB	= Simple Diaphragm Building	= False
Reacs	= Show the Base Reactions in the output	= False
MWFRSType	= MWFRS Method Selected	= Ch 27 Pt 1

Topographic Factor per Fig 26.8-1

Topo	= Topographic Feature	= None
Kzt	= Topographic Factor	= 1.000

Building Inputs

RoofType:	Roof Type	= Pitched	h	: Mean Roof Height	= 12.000 ft
L	: Width Normal to Ridge	= 35.580 ft	D	: Length Along Ridge	= 42.330 ft
WindFlow:	Wind Flow Method	= Clear	Slope	: Slope of Roof	= 7.46 Deg
Frames	: Incl Transverse Frames	= False	n	: Number of Frames	= 6
e	: Solidity Ratio	= 1.000			

Exposure Constants per Table 26.11-1:

Alpha:	Table 26.11-1 Const	= 9.500	Zg:	Table 26.11-1 Const	= 900.000 ft
At:	Table 26.11-1 Const	= 0.105	Bt:	Table 26.11-1 Const	= 1.000
Am:	Table 26.11-1 Const	= 0.154	Bm:	Table 26.11-1 Const	= 0.650
C:	Table 26.11-1 Const	= 0.200	Eps:	Table 26.11-1 Const	= 0.200

Gust Factor Calculation:

Gust Factor	Category I Rigid Structures - Simplified Method	
G1	= For Rigid Structures (Nat. Freq.>1 Hz) use 0.85	= 0.85
Gust Factor	Category II Rigid Structures - Complete Analysis	
Zm	= Max(0.6 * Ht, Zmin)	= 15.000 ft
Izm	= Cc * (33 / Zm) ^ 0.167	= 0.228
Lzm	= L * (Zm / 33) ^ Eps	= 427.057
Q	= (1 / (1 + 0.63 * ((B + Ht) / Lzm)^0.63))^0.5	= 0.929
G2	= 0.925*((1+0.7*Izm*3.4*Q)/(1+0.7*3.4*Izm))	= 0.888
Gust Factor	Used in Analysis	
G	= Lessor Of G1 Or G2	= 0.850

Main Wind Force Resisting System (MWFRS) Calculations per Ch 27 Part 1:

LF	= Load Factor based upon STRENGTH Design	= 1.00
h	= Mean Roof Height above grade	= 20.000 ft
Kh	= 15 ft [4.572 m]< Z <Zg -->(2.01*(Z/zg)^(2/Alpha) (Table 26.10-1)	= 0.902
Kzt	= Topographic Factor is 1 since no Topographic feature specified	= 1.000
Kd	= Wind Directionality Factor per Table 26.6-1	= 0.85
qh	= (0.00256 * Kh * Kzt * Kd * Ke * V^2) * LF	= 21.63 psf

MWFRS Pressures per Fig 27.3-4 on Pitched Free Roof - Wind Dir 0 Deg
All wind pressures include a load factor of 1.0

Load Case	Cnw	Cnl	Pnw psf	Pnl psf
Load Case A	1.200	0.300	22.06	5.52
Load Case B	-1.100	-0.100	-20.22	-1.84

Notes:

WIND PRESSURES

Pnw = Pressure on windward portion of roof: qh*G*Cnw*LF {Eqn 27.3-4}
Pnl = Pressure On Leeward portion Of roof: qh*G*Cnl*LF [Eqn 27.3-4]
All wind pressures include a load factor of 1.0
+ Pressures Acting TOWARD Surface - Pressures Acting AWAY from Surface

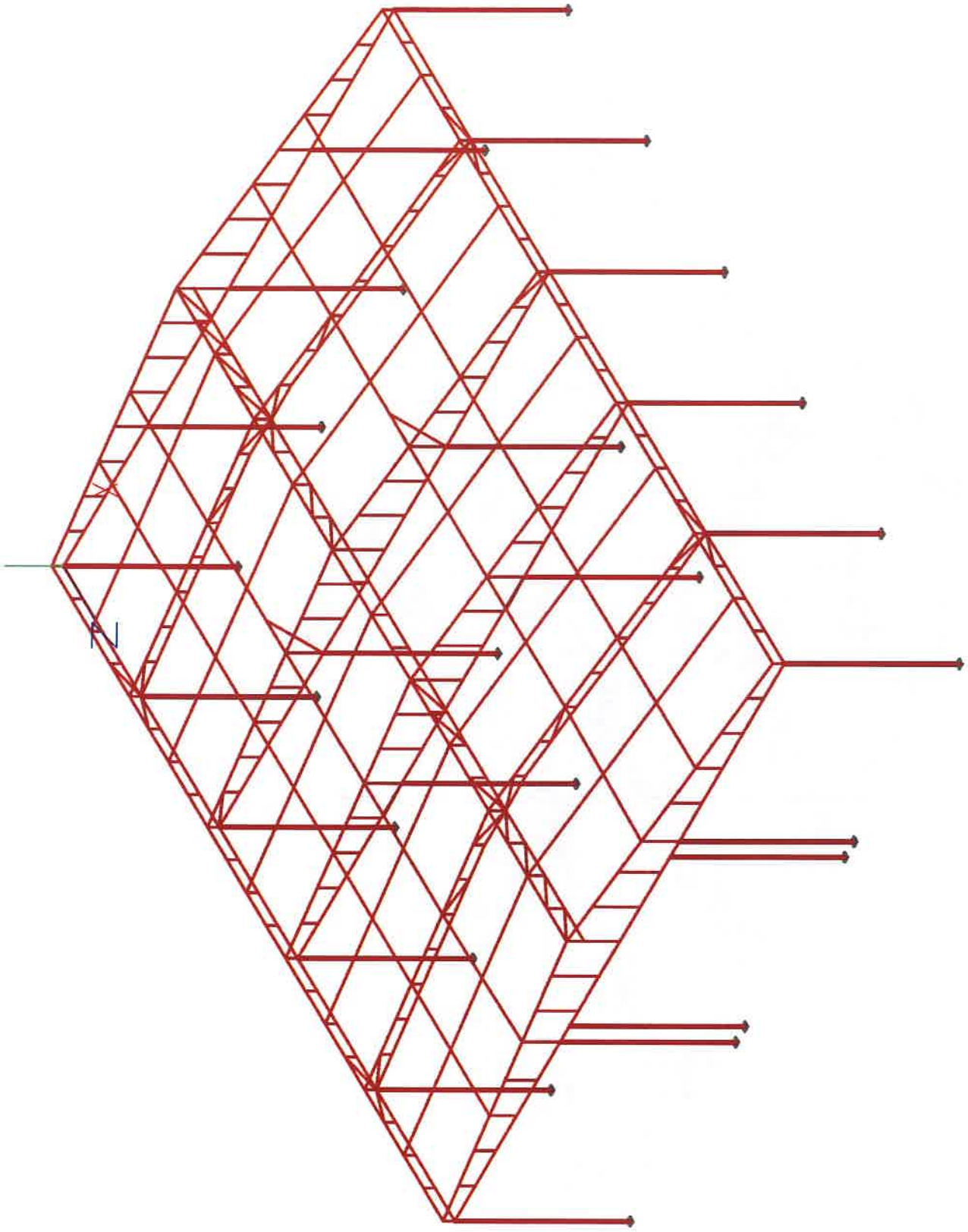
Open Building Along Ridge Pressures per Fig 27.3-7 - Wind 90 Deg
All wind pressures include a load factor of 1.0

Roof Var	Start Dist ft	End Dist ft	CnA	CnB	Pressure PnA psf	Pressure PnB psf
Roof_1	0.000	12.000	-0.800	0.800	-14.71	14.71
Roof_2	12.000	24.000	-0.600	0.500	-11.03	9.19
Roof_3	24.000	42.330	-0.300	0.300	-5.52	5.52

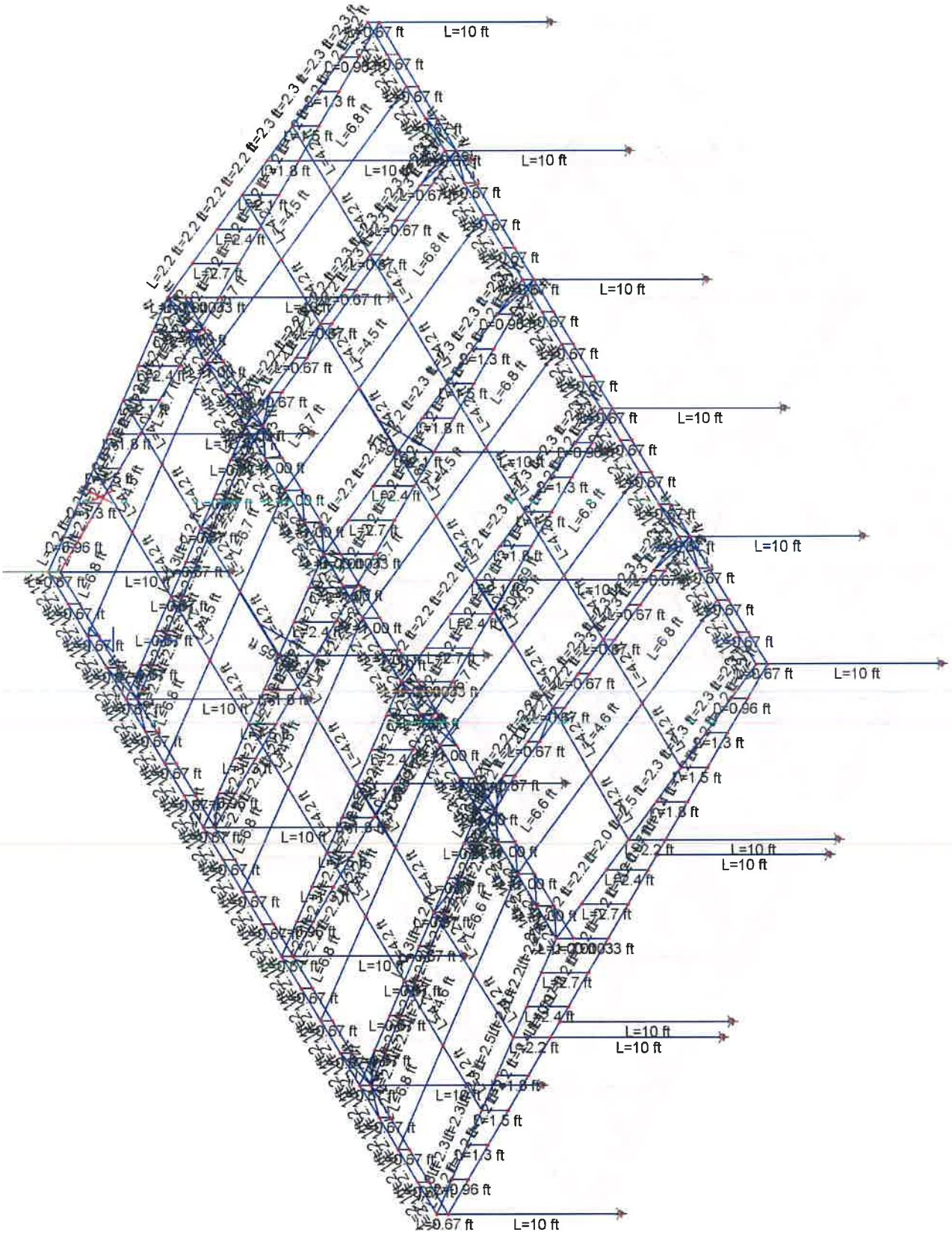
Notes Roof Pressures:
Start Dist = Start Dist from Windward Edge End Dist = End Dist from Windward Edge
CnA = Cn for Load Case A CnB = Cn for Load Case B
PnA = qh*G*CnA {Eqn 27.4-3} PnB = qh*g*CnB {Eqn 27.4-3}
+ Pressures Acting TOWARD Surface - Pressures Acting AWAY from Surface

WIND PRESSURES

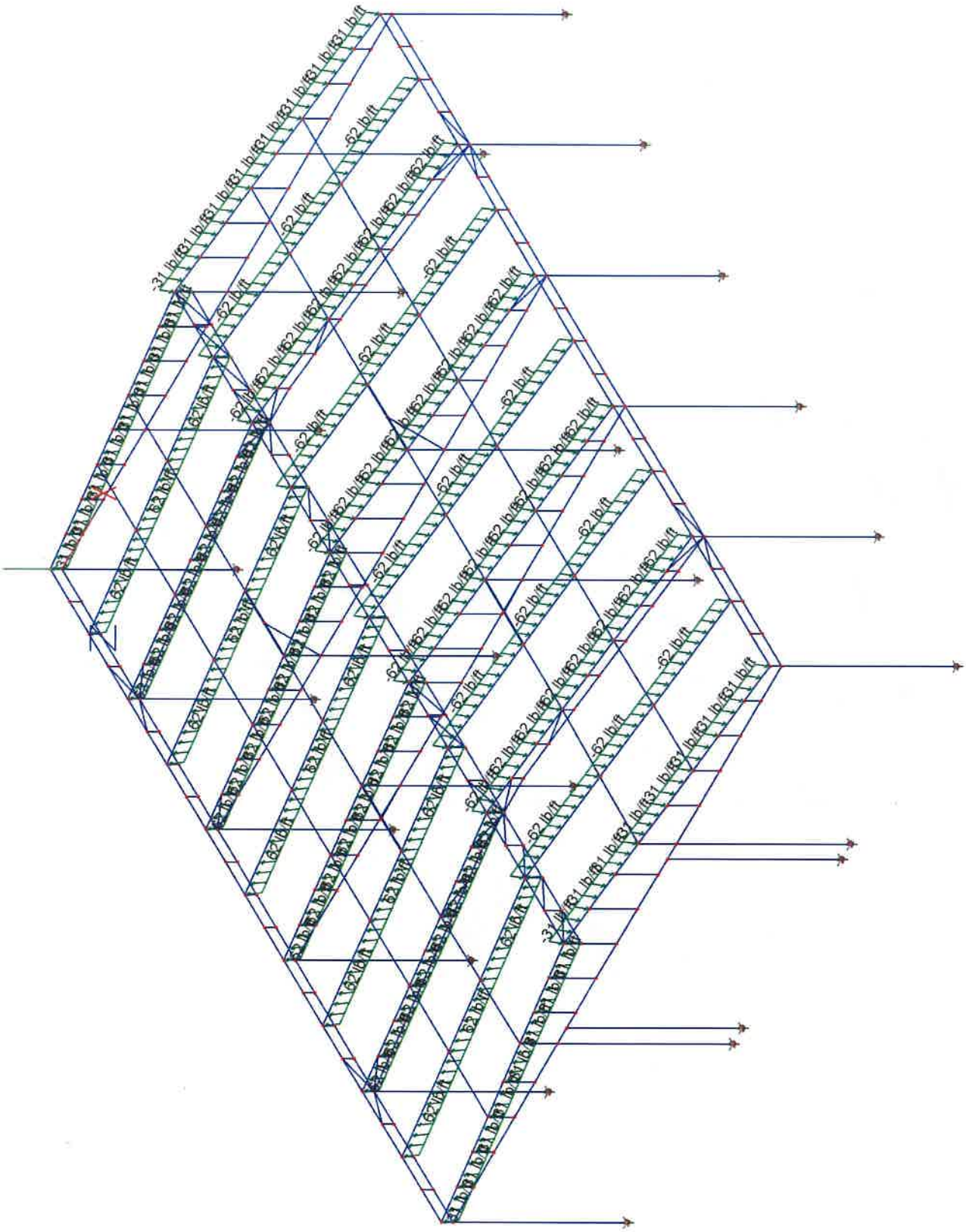
GENERAL SKECTH



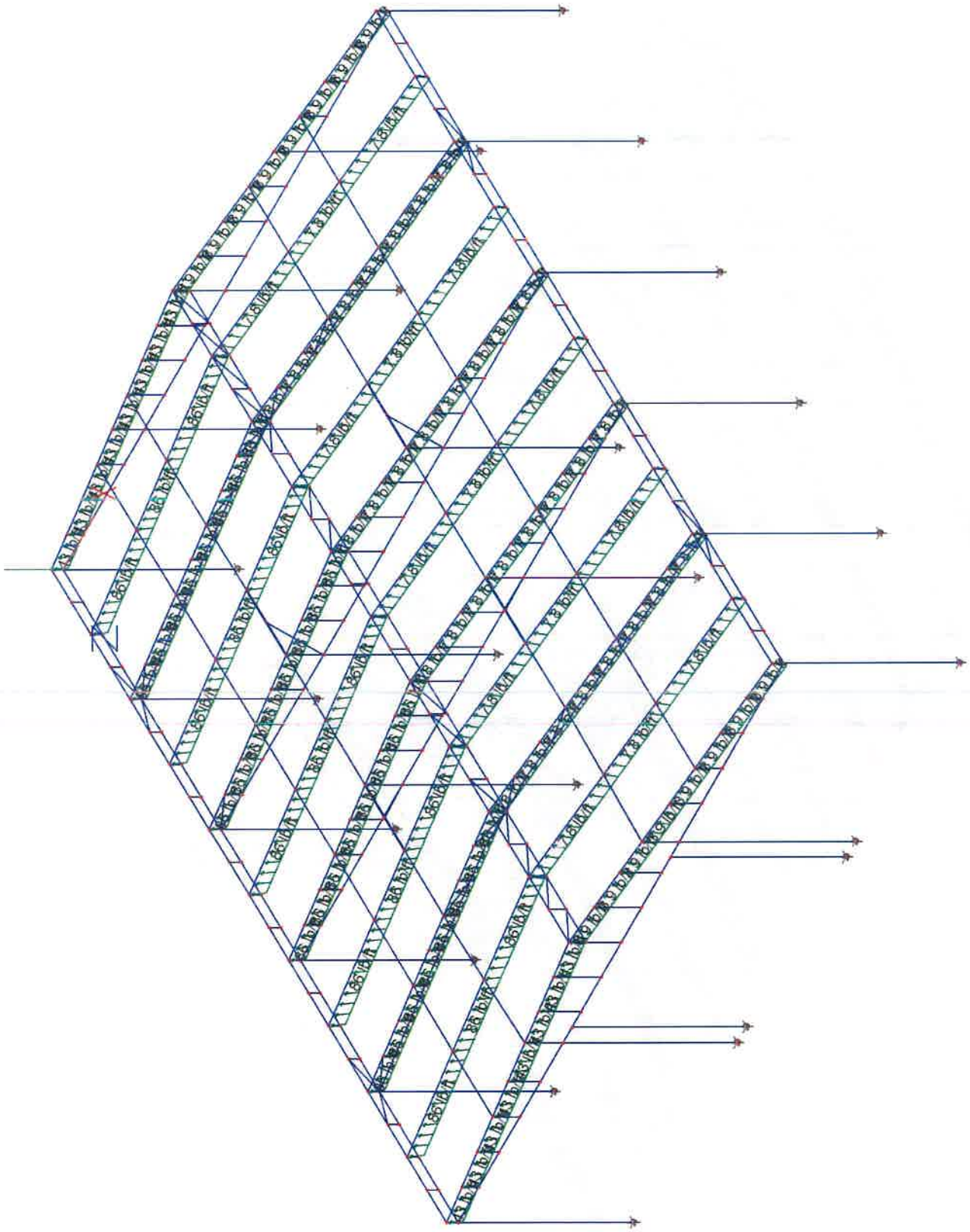
MEMBERS' LENGTH



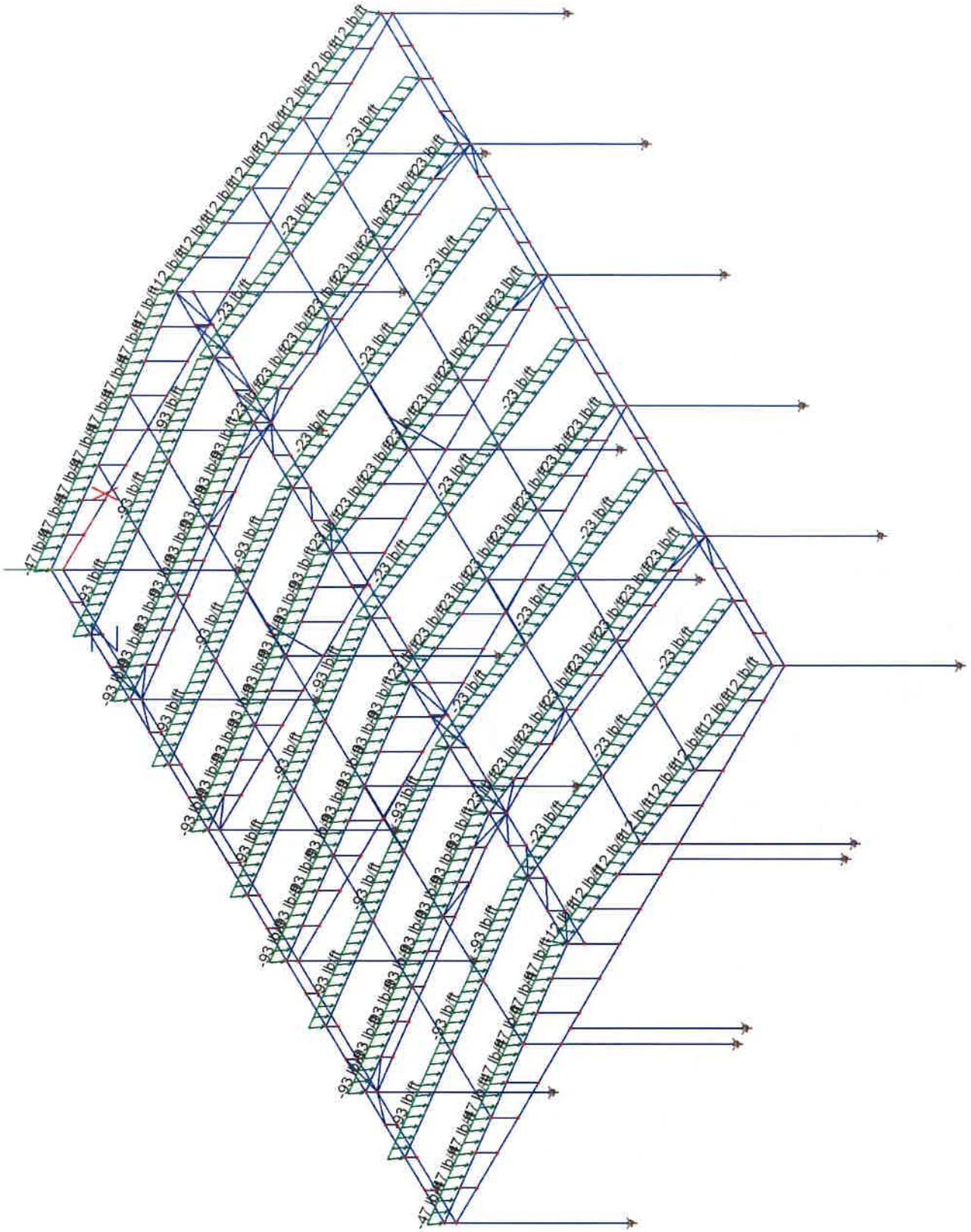
WIND LOAD (+X)



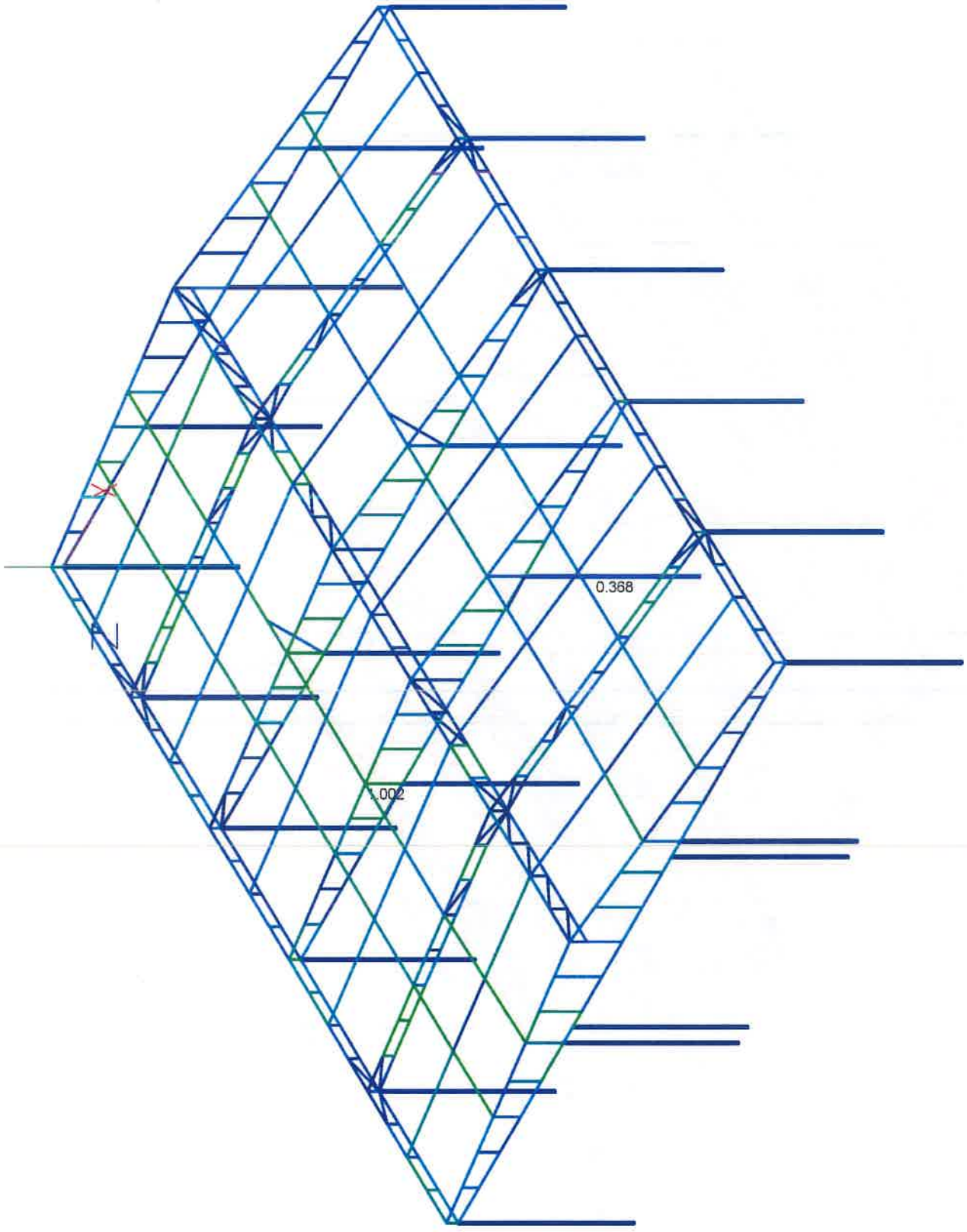
WIND LOAD (+Y)



WIND LOAD (-Y)



UNITY CHECK DESIGN ELEMENT



Design Group Results

Design Group: COLUMNS per AISC ASD (2005)
Designed As: Pipe2-1/2STD, Material: \Steel\ASTM A53 Grade B

Combined Check

Member Name	Result Case	Offset ft	Code Ref.	Unity Check	Details
COL001	D+0.6W »+X	0.0	H1-1b	0.4 OK	KLz = 8.2 ft, KLy = 9 ft, Lb = 10 ft

Axial Check

Member Name	Result Case	Offset ft	Demand Fx lb	Capacity Fx lb	Code Ref.	Unity Check	Details
COL001	D+0.6W »+X	0.0	1074.6	17316.0	E3-2FB	0.1 OK	KLz = 8.2 ft, KLy = 9 ft

Strong Flexure Check

Member Name	Result Case	Offset ft	Demand Mz lb-ft	Capacity Mz lb-ft	Code Ref.	Unity Check	Details
COL001	0.6D+0.6W »+X	0.0	612.0	2392.7	F8-1	0.3 OK	Lbz = 10 ft, Cb = 1

Weak Flexure Check

Member Name	Result Case	Offset ft	Demand My lb-ft	Capacity My lb-ft	Code Ref.	Unity Check	Details
COL001	D+0.6W »+X	10.0	266.8	2392.7	F8-1	0.1 OK	Lby = 10 ft

Strong Shear Check

Member Name	Result Case	Offset ft	Demand Vy lb	Capacity Vy lb	Code Ref.	Unity Check	Details
COL001	0.6D+0.6W »+X	10.0	-165.2	9997.0	G6-1, 2b+St.Venant	0.0 OK	

Weak Shear Check

Member Name	Result Case	Offset ft	Demand Vz lb	Capacity Vz lb	Code Ref.	Unity Check	Details
COL001	D+0.6W »+X	10.0	102.0	9997.0	G6-1, 2b+St.Venant	0.0 OK	

Design Group: MEMBERS per AISC ASD (2005)
Designed As: Pipe1-1/4STD, Material: \Steel\ASTM A53 Grade B

Combined Check

Member Name	Result Case	Offset ft	Code Ref.	Unity Check	Details
MEMBERS314	D+0.6W »-Y	0.0	H1-1b	1.0 OK	KLz = 2.0 ft, KLy = 1.9 ft, Lb = 2.1 ft

Axial Check

Member Name	Result Case	Offset ft	Demand Fx lb	Capacity Fx lb	Code Ref.	Unity Check	Details
MEMBERS314	D+0.6W »-Y	0.0	775.8	11812.1	E3-2FB	0.1 OK	KLz = 2.0 ft, KLy = 1.9 ft

Strong Flexure Check

Member Name	Result Case	Offset ft	Demand Mz lb-ft	Capacity Mz lb-ft	Code Ref.	Unity Check	Details
MEMBERS314	D+0.6W »-Y	0.0	175.8	532.7	F8-1	0.3 OK	Lbz = 2.1 ft, Cb = 1

Weak Flexure Check

Member Name	Result Case	Offset ft	Demand My lb-ft	Capacity My lb-ft	Code Ref.	Unity Check	Details
MEMBERS314	D+0.6W »-Y	0.0	340.4	532.7	F8-1	0.6 OK	Lby = 2.1 ft

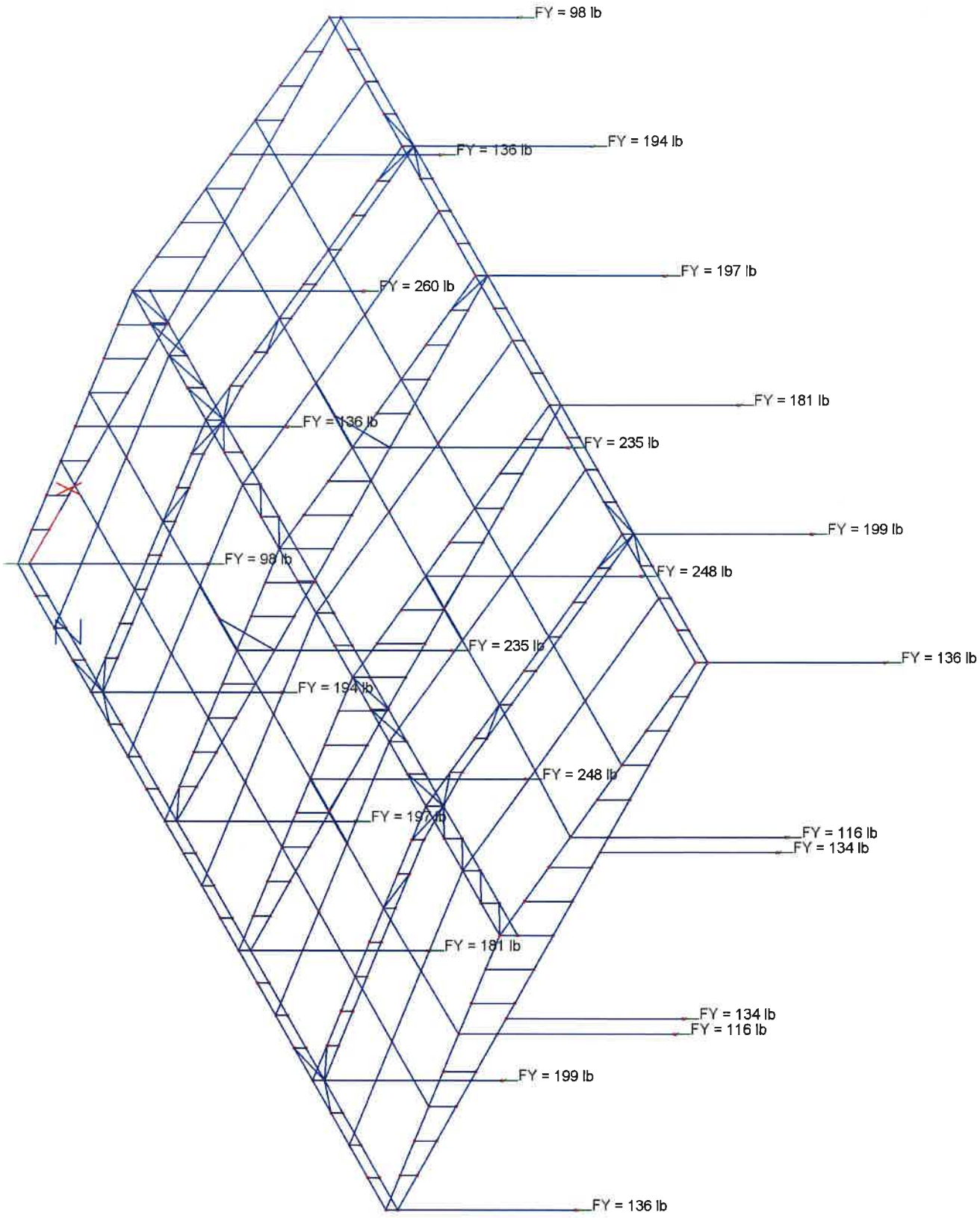
Strong Shear Check

Member Name	Result Case	Offset ft	Demand Vy lb	Capacity Vy lb	Code Ref.	Unity Check	Details
MEMBERS314	D+0.6W »-Y	2.1	-247.9	3898.2	G6-1, 2b+St.Venant	0.1 OK	

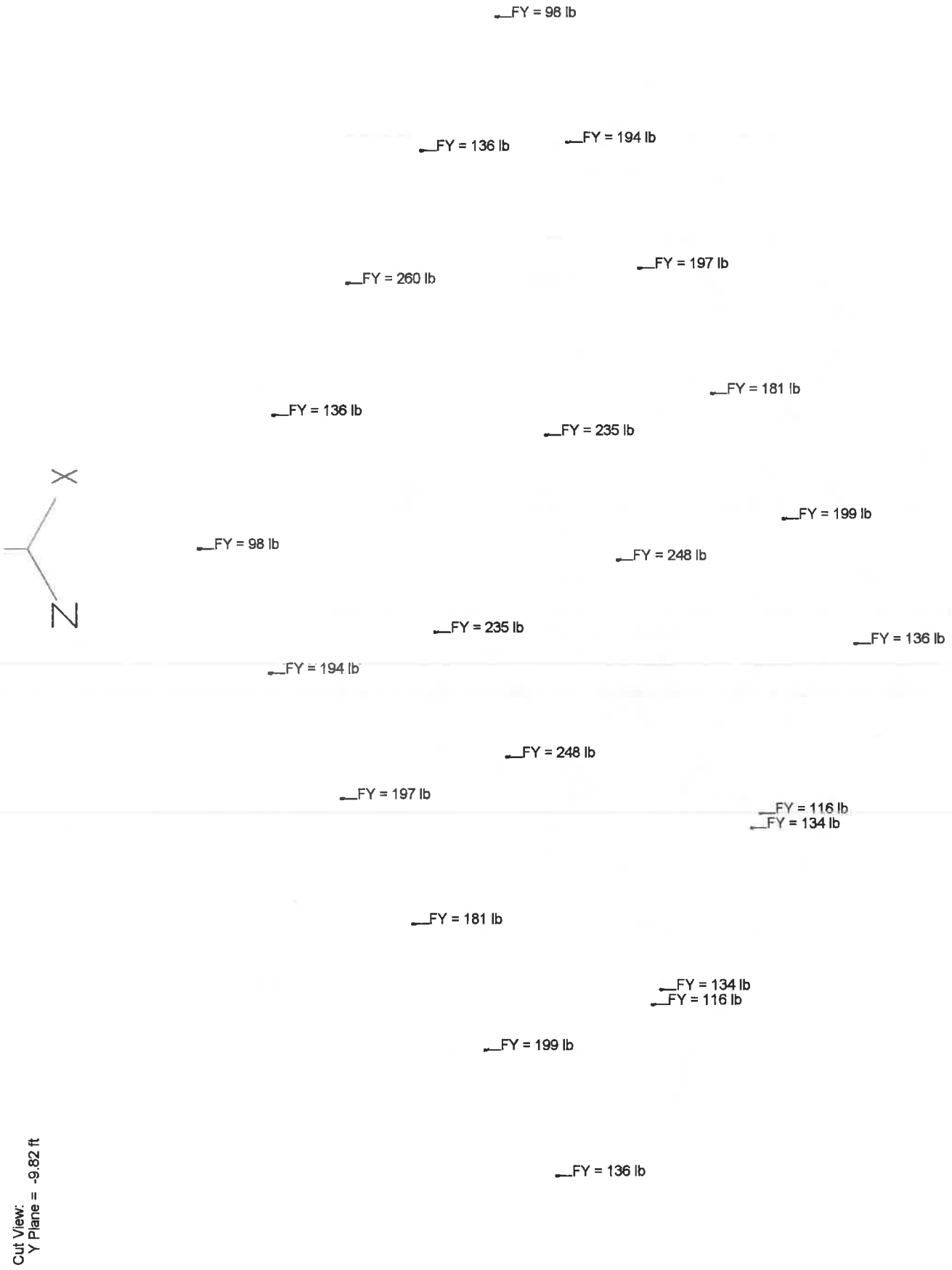
Weak Shear Check

Member Name	Result Case	Offset ft	Demand Vz lb	Capacity Vz lb	Code Ref.	Unity Check	Details
MEMBERS314	D+0.6W »-Y	2.1	-421.4	3898.2	G6-1, 2b+St.Venant	0.1 OK	

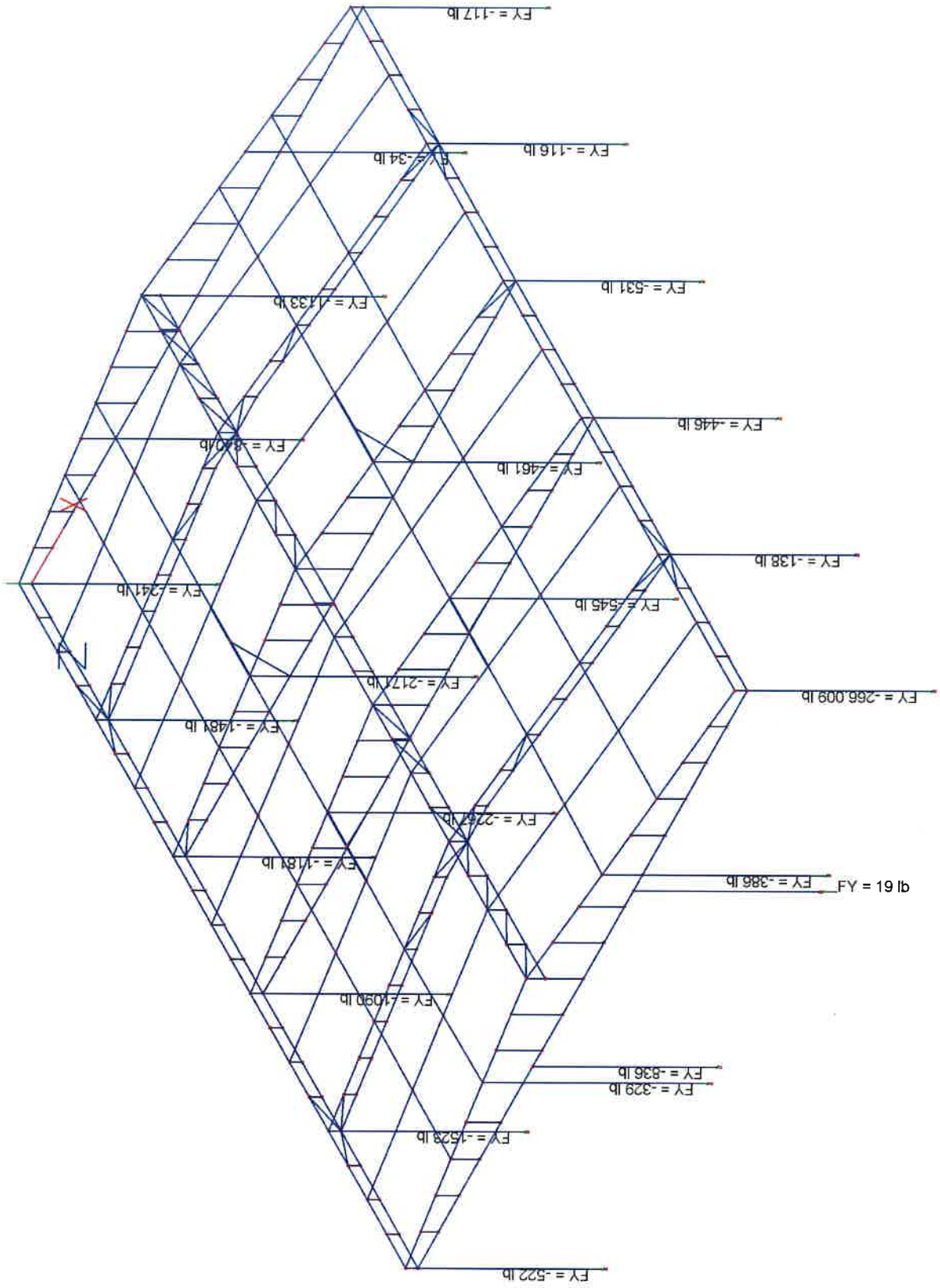
DEAD LOAD REACTIONS



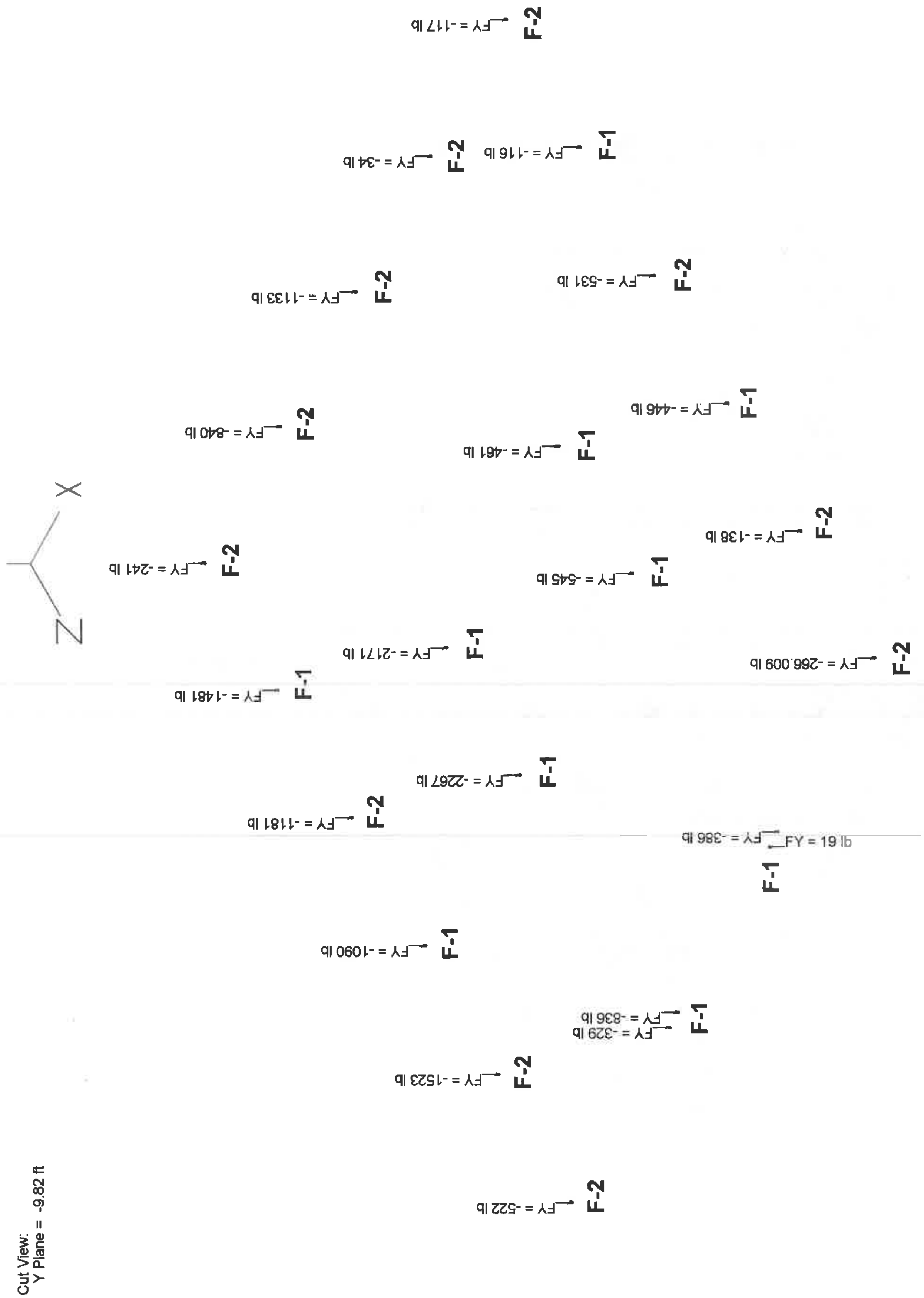
DEAD LOAD REACTIONS
(members are not shown for clarirty)



WIND LOAD (+Y) REACTIONS



WIND LOAD (+Y) REACTIONS
(members are not shown for clarity)



CIRCULAR CONCRETE FOOTING (UPLIFT) DESIGN. F-1

WIND UPLIFT = 2267 LB **DL =** 248 LB

CONC. ABOVE FOOTING = 8 IN THK

CONC. ABOVE FOOTING = 2.5 FT (DIAMETER)

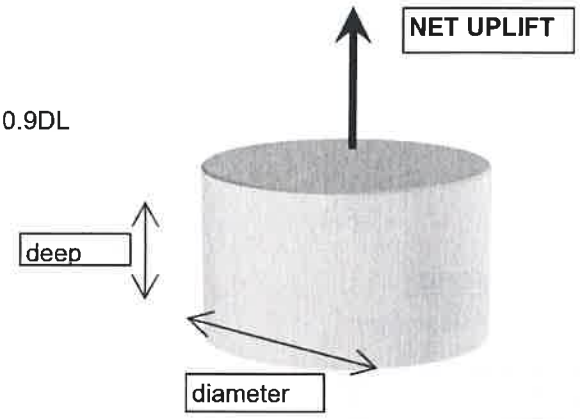
0.9 DL + 1.0WL

FORCE = 1602.013 LB = 1.0WL - 0.9DL

$\Delta_{CONCRETE}$ = 150 LB/CF

$VOL_{REQUIERED} = \frac{FORCE}{0.9 \times \Delta_{CONCRETE}}$

$VOL_{REQUIERED}$ = 11.8668 CF



TO DEEP =	$AREA_{MINIMUN}$=	$DIAM_{MINIMUN}$=	$DIAM_{APPLIED}$=	$VOL_{APPLIED}$=	$VOL_{REQUIERED}$=
12 in	11.9 SQF	46.6 in	**4.0** ft	16.0 ft^3	> 11.9 ft^3
18 in	7.9 SQF	38.1 in	**3.5** ft	18.4 ft^3	> 11.9 ft^3
24 in	5.9 SQF	33.0 in	**3.0** ft	18.0 ft^3	> 11.9 ft^3
30 in	4.7 SQF	29.5 in	**2.5** ft	15.6 ft^3	> 11.9 ft^3
36 in	4.0 SQF	26.9 in	**2.5** ft	18.8 ft^3	> 11.9 ft^3
42 in	3.4 SQF	24.9 in	**2.5** ft	21.9 ft^3	> 11.9 ft^3
48 in	3.0 SQF	23.3 in	**2.0** ft	16.0 ft^3	> 11.9 ft^3
54 in	2.6 SQF	22.0 in	**2.0** ft	18.0 ft^3	> 11.9 ft^3
60 in	2.4 SQF	20.9 in	**2.0** ft	20.0 ft^3	> 11.9 ft^3
66 in	2.2 SQF	19.9 in	**2.0** ft	22.0 ft^3	> 11.9 ft^3
72 in	2.0 SQF	19.0 in	**2.0** ft	24.0 ft^3	> 11.9 ft^3
78 in	1.8 SQF	18.3 in	**2.0** ft	26.0 ft^3	> 11.9 ft^3

USE

CIRCULAR CONCRETE FOOTING.
2'-6" DIAMETER X 30" DEEP
W / 1 # 5 @ 9" TOP & BOTTOM E.W.

CIRCULAR CONCRETE FOOTING (UPLIFT) DESIGN. F-2

WIND UPLIFT = 1181 LB **DL =** 197 LB

CONC. ABOVE FOOTING = 8 IN THK

CONC. ABOVE FOOTING = 2 FT (DIAMETER)

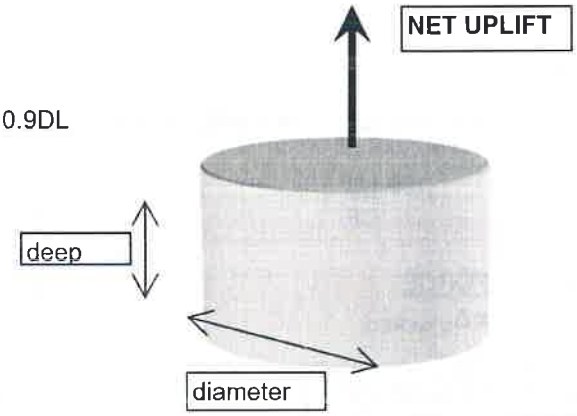
0.9 DL + 1.0WL

FORCE = 720.956 LB = 1.0WL - 0.9DL

$\Delta_{CONCRETE}$ = 150 LB/CF

$VOL_{REQUIERED} = \frac{FORCE}{0.9 \times \Delta_{CONCRETE}}$

$VOL_{REQUIERED}$ = 5.34041 CF



TO DEEP =	$AREA_{MINIMUN}$=	$DIAM_{MINIMUN}$=	$DIAM_{APPLIED}$=	$VOL_{APPLIED}$=	$VOL_{REQUIERED}$=
12 in	5.3 SQF	31.3 in	**3.0** ft	9.0 ft^3	> 5.34 ft^3
18 in	3.6 SQF	25.5 in	**2.5** ft	9.4 ft^3	> 5.34 ft^3
24 in	2.7 SQF	22.1 in	**2.0** ft	8.0 ft^3	> 5.34 ft^3
30 in	2.1 SQF	19.8 in	**2.0** ft	10.0 ft^3	> 5.34 ft^3
36 in	1.8 SQF	18.1 in	**2.0** ft	12.0 ft^3	> 5.34 ft^3
42 in	1.5 SQF	16.7 in	**1.5** ft	7.9 ft^3	> 5.34 ft^3
48 in	1.3 SQF	15.6 in	**1.5** ft	9.0 ft^3	> 5.34 ft^3
54 in	1.2 SQF	14.8 in	**1.5** ft	10.1 ft^3	> 5.34 ft^3
60 in	1.1 SQF	14.0 in	**1.5** ft	11.3 ft^3	> 5.34 ft^3
66 in	1.0 SQF	13.3 in	**1.5** ft	12.4 ft^3	> 5.34 ft^3
72 in	0.9 SQF	12.8 in	**1.5** ft	13.5 ft^3	> 5.34 ft^3
78 in	0.8 SQF	12.3 in	**1.5** ft	14.6 ft^3	> 5.34 ft^3

USE

CIRCULAR CONCRETE FOOTING.
2'-0" DIAMETER X 24" DEEP
W / 1 # 5 @ 9" TOP & BOTTOM E.W.