



PLANT SYSTEMS GROUP - SALT LAKE CITY, UTAH

CALCULATION COVER SHEET

JOB NUMBER	CLIENT	PROJECT	CALC. NUMBER
11021	CC&V	High Grade Ore	C-003

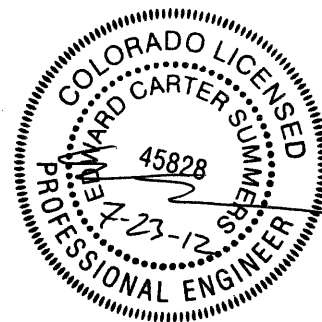
TITLE/SUBJECT:

Warehouse Area Foundation

STATEMENT OF PROBLEM:

Design foundation for Warehouse Area (using 5000psf allowable Soil Bearing and 4ft frost depth). Considered typical Spread footings, combine footings and strip wall tied between pedestals.

P.E. SEAL



SOURCES OF DATA, FORMULA & REFERENCES:

AutoDesk Robot Structural Analysis Professional 2012 for column reactions
Foundation Layout from FLSmidth SLC Civil/Structural Designer
ASCE /SEI 7-10 for Wind Load and Seismic Load
AMEC Soils Report
Foundation 3D

CONCLUSIONS & RECOMMENDATIONS:

See details in report

A	Nov-11	Ready for Check	Wchan	CK		
0	Jul-12	Issued for Permit	Wchan	CK		
0						
REV	DATE	DESCRIPTION/STATUS	CALC BY	CHKD BY	DWG./SPECS REVISED	QA REVIEW



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PROJECT

CC & V.

SUBJECT

Warehouse concrete foundation

PROJ NO. 11021

CALC NO. C-003

BY WChan DATE 10/26/2011

CHK DATE

SHEET OF REV

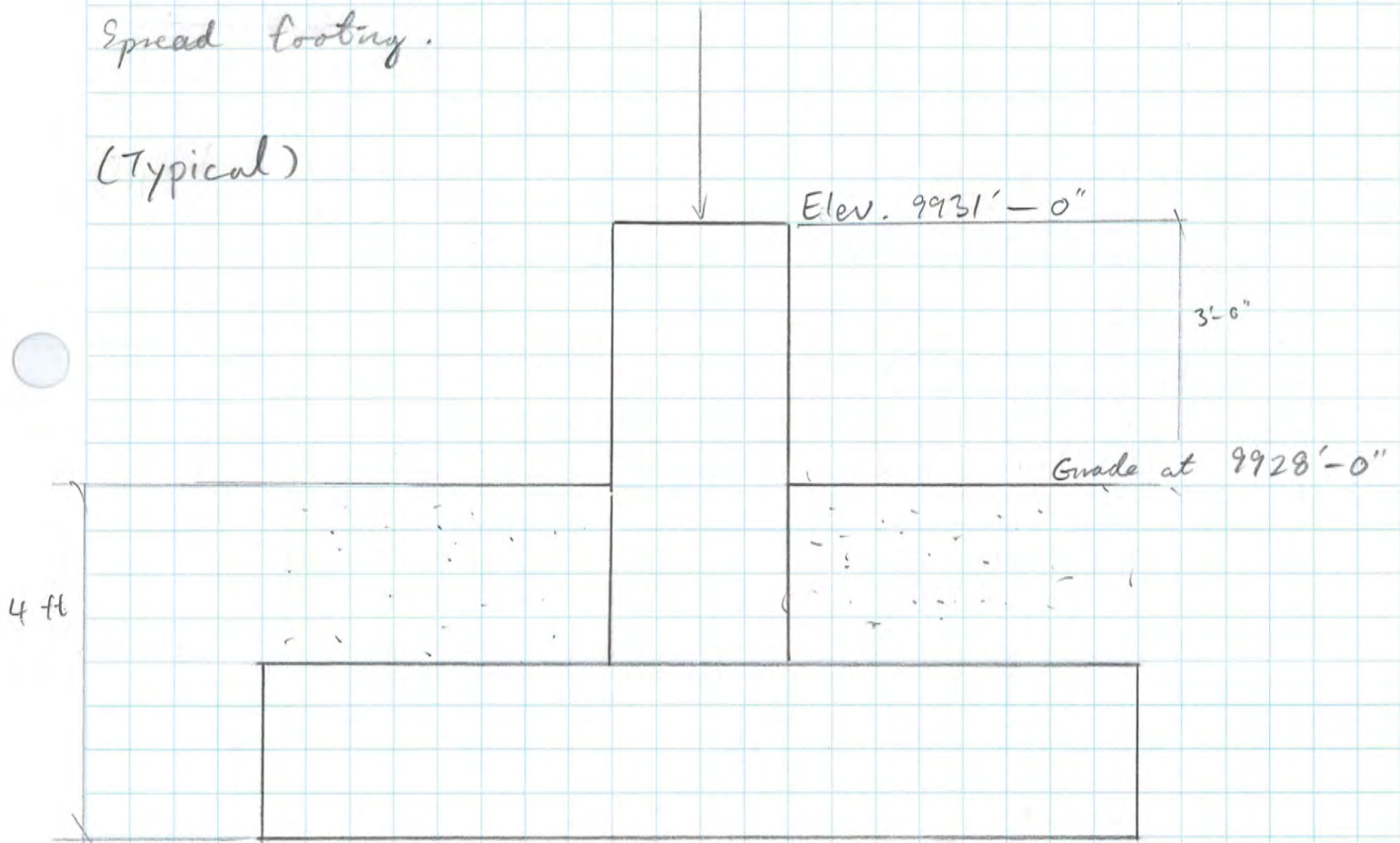
Foundation Design CriteriaAll soil bearing = 5000 psf (5 ft² footing)

Frost Depth = 4 ft.

No ground water

Spread footing.

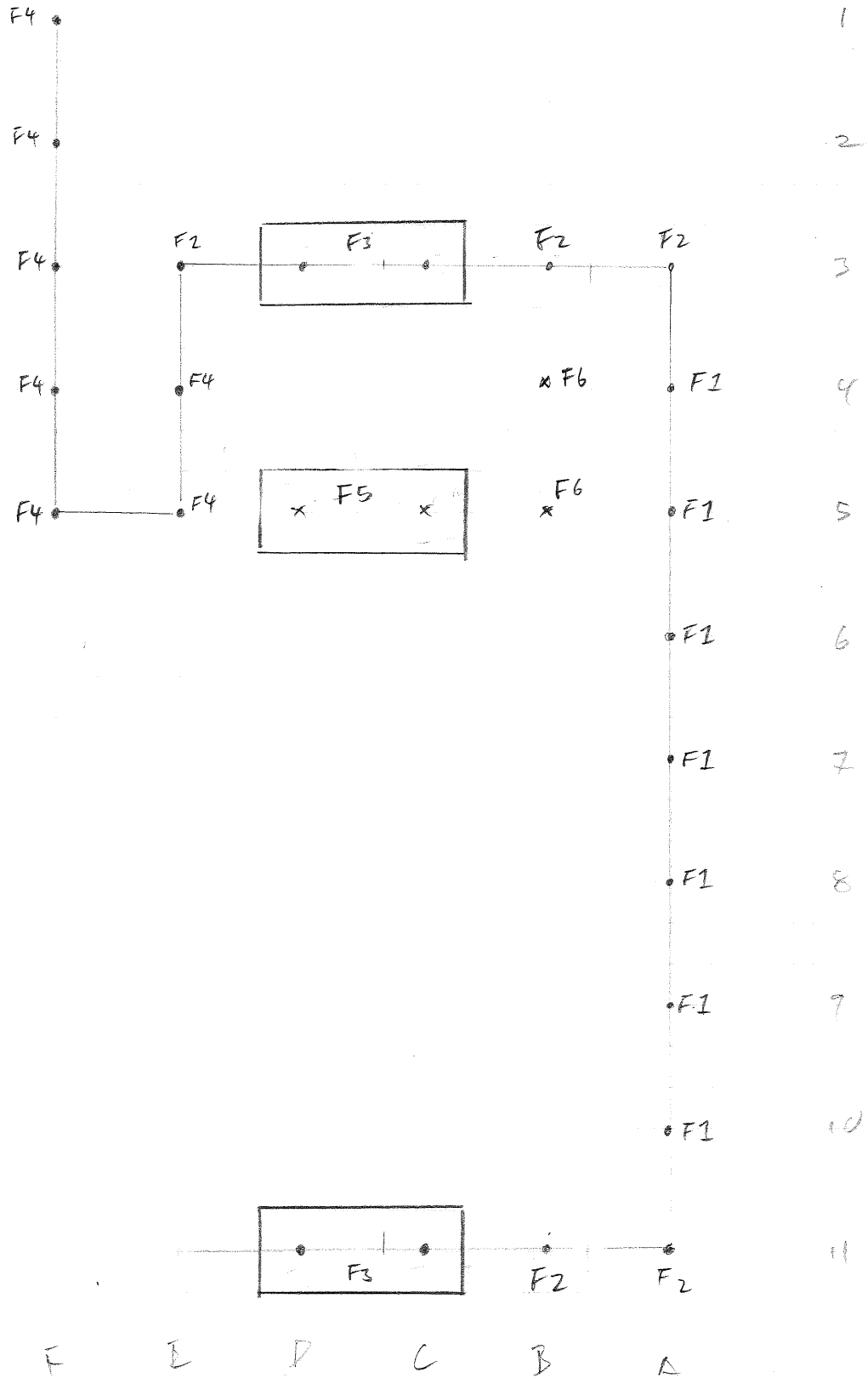
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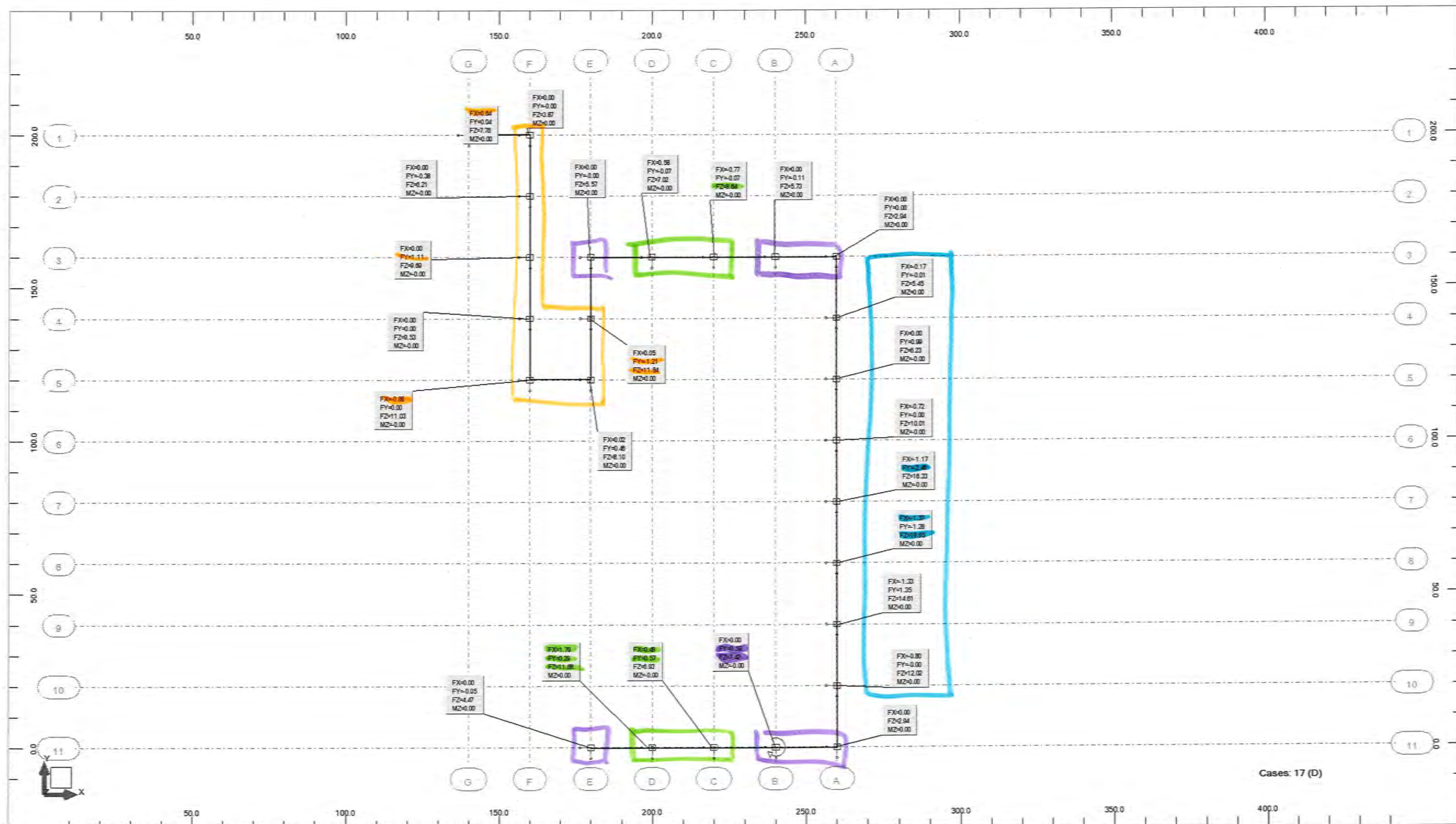


PROJECT CC & V	PROJ NO.	11021
	CALC NO.	C-003
	BY WChan	DATE 10/26/201
	CHK	DATE
	SHEET	OF REV

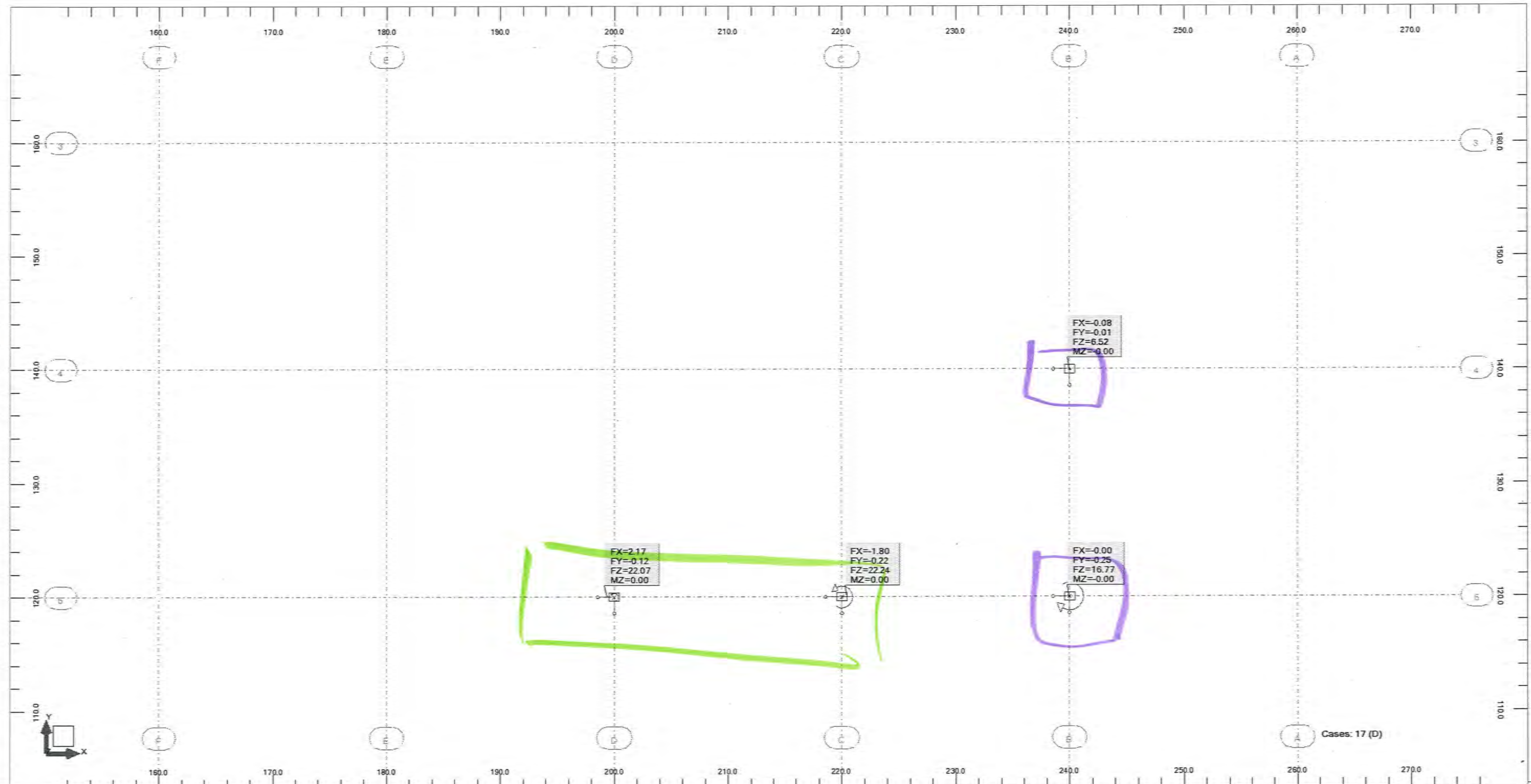
SUBJECT
Warehouse Concrete Foundation



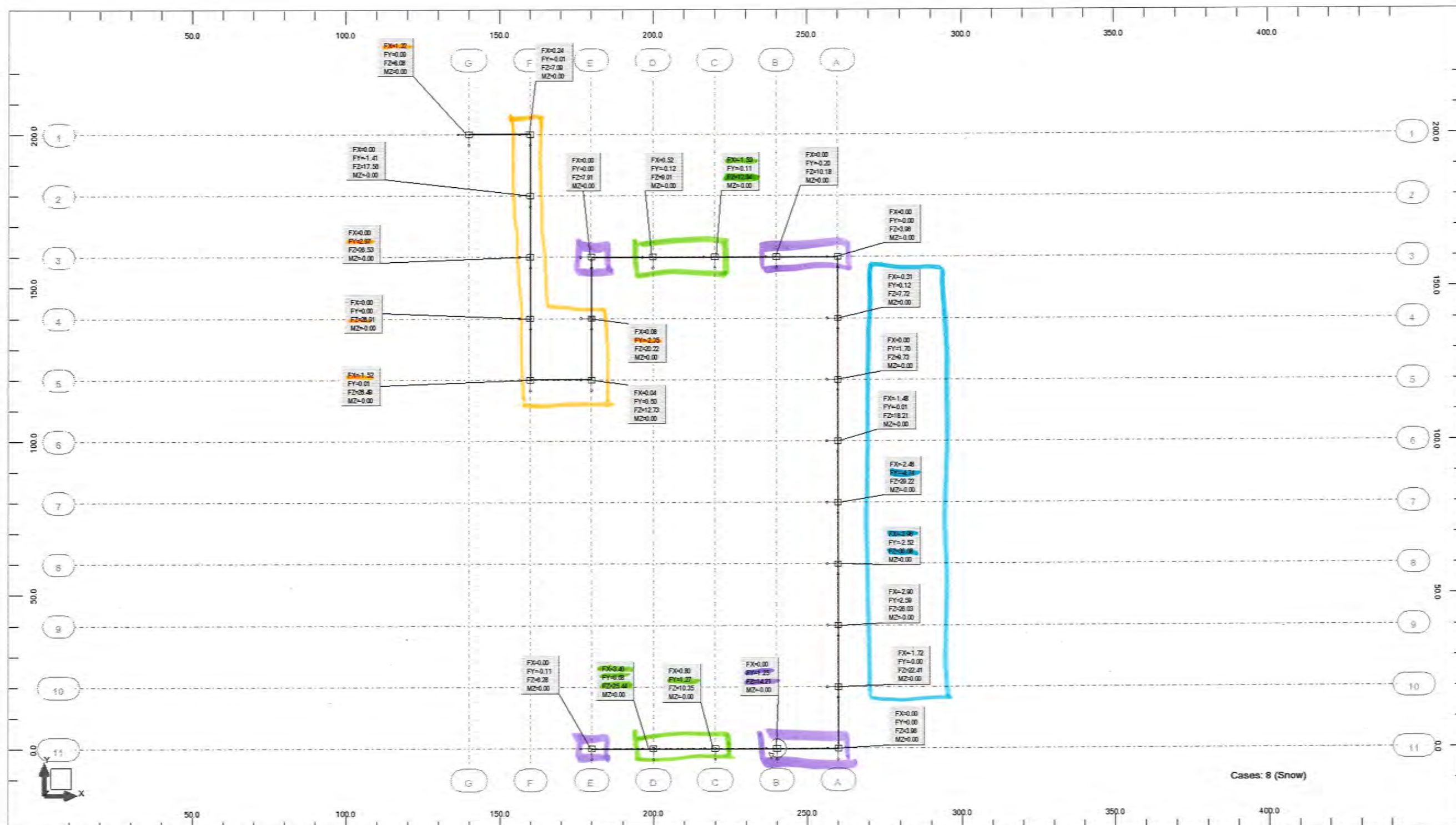
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 17 (D)



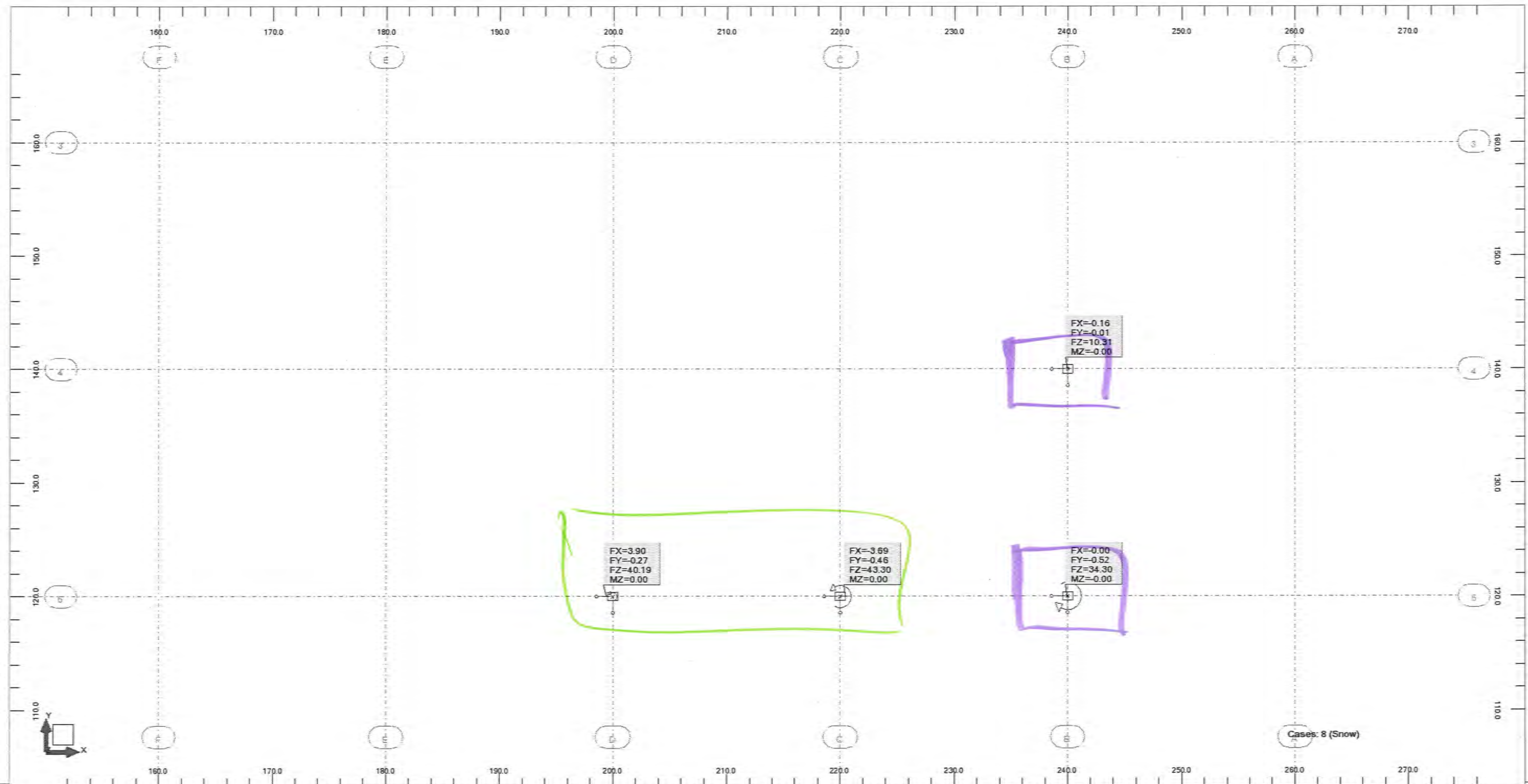
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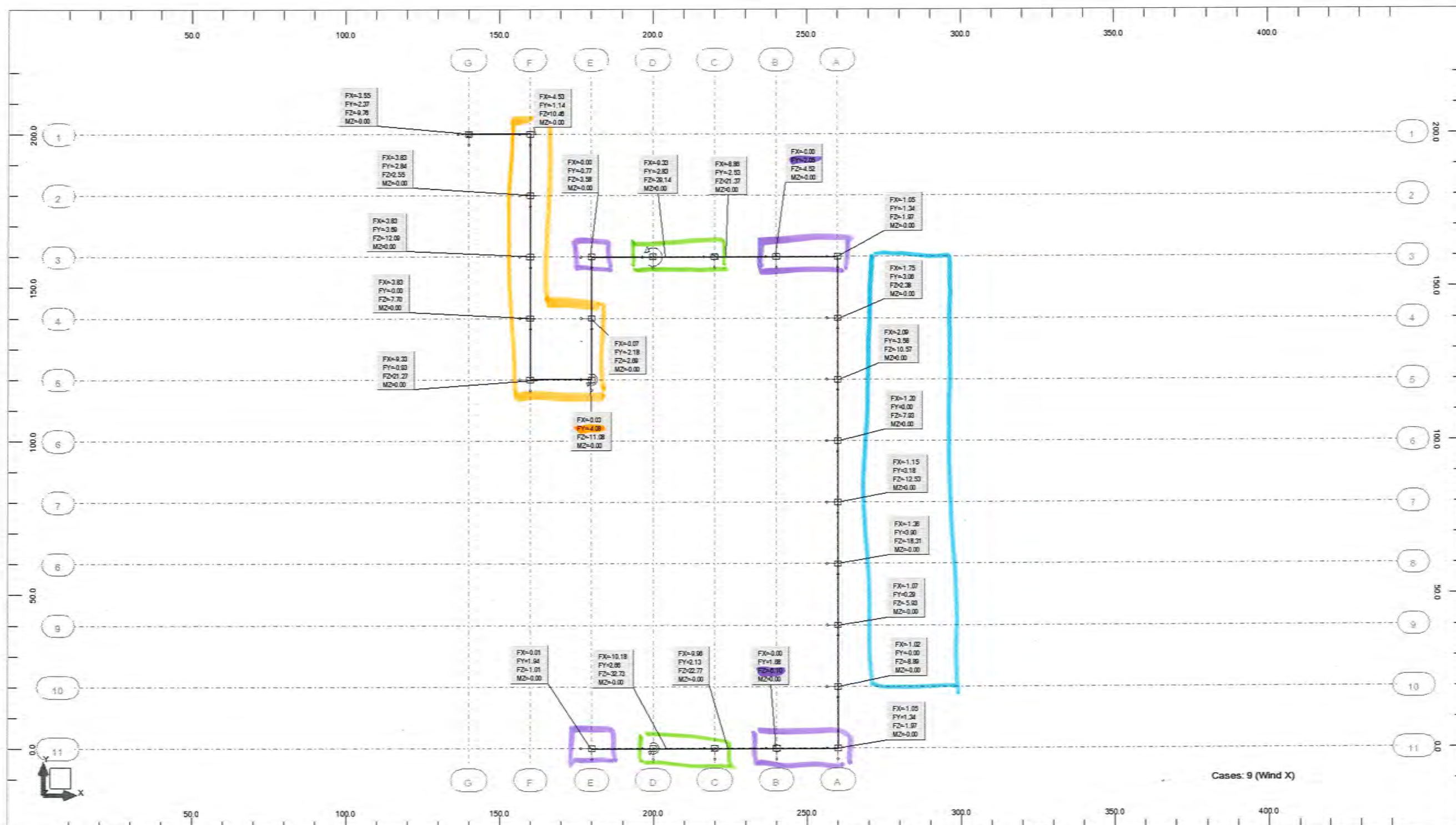
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 8 (Snow)



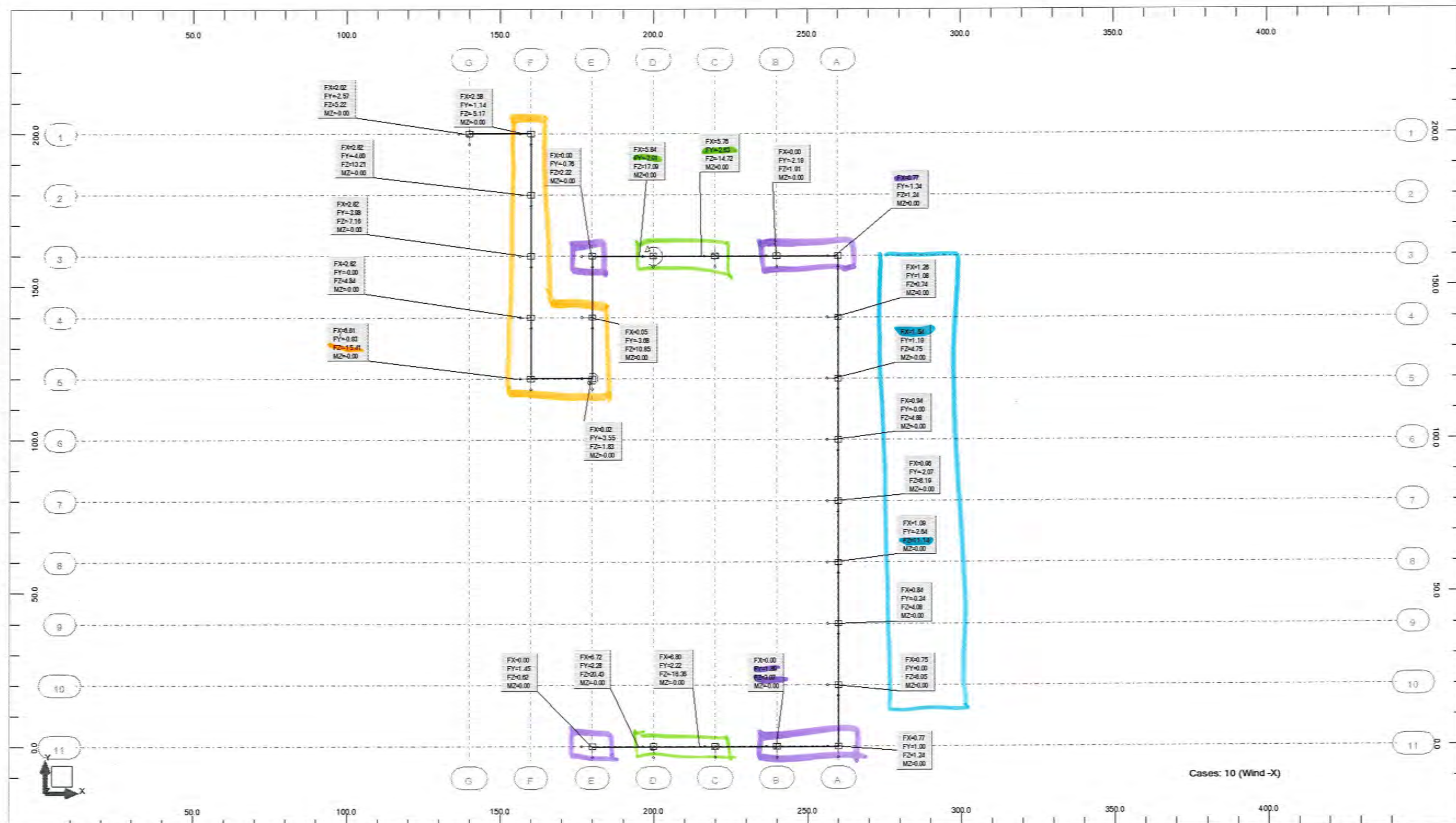
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 8 (Snow)



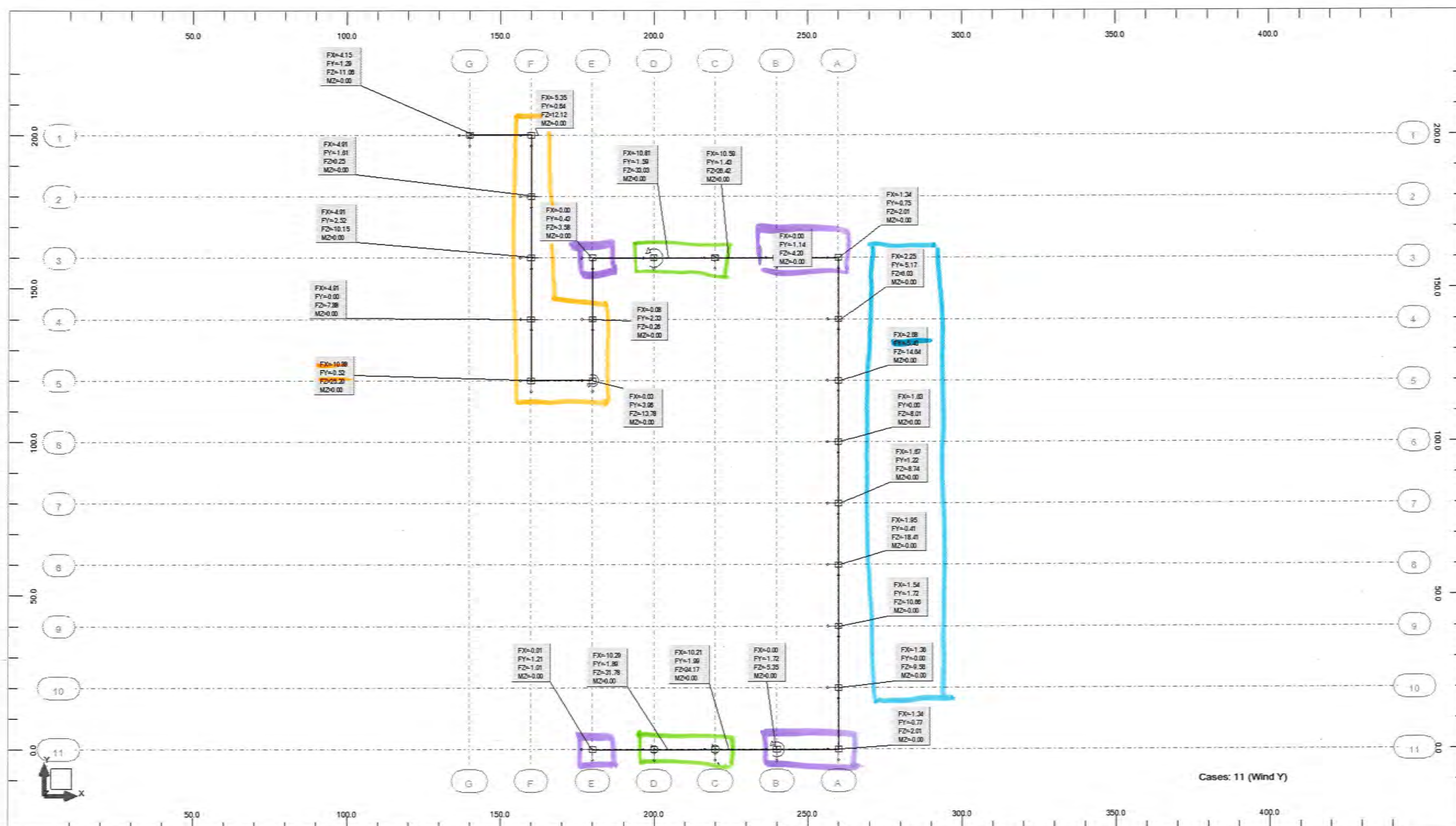
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 9 (Wind X)



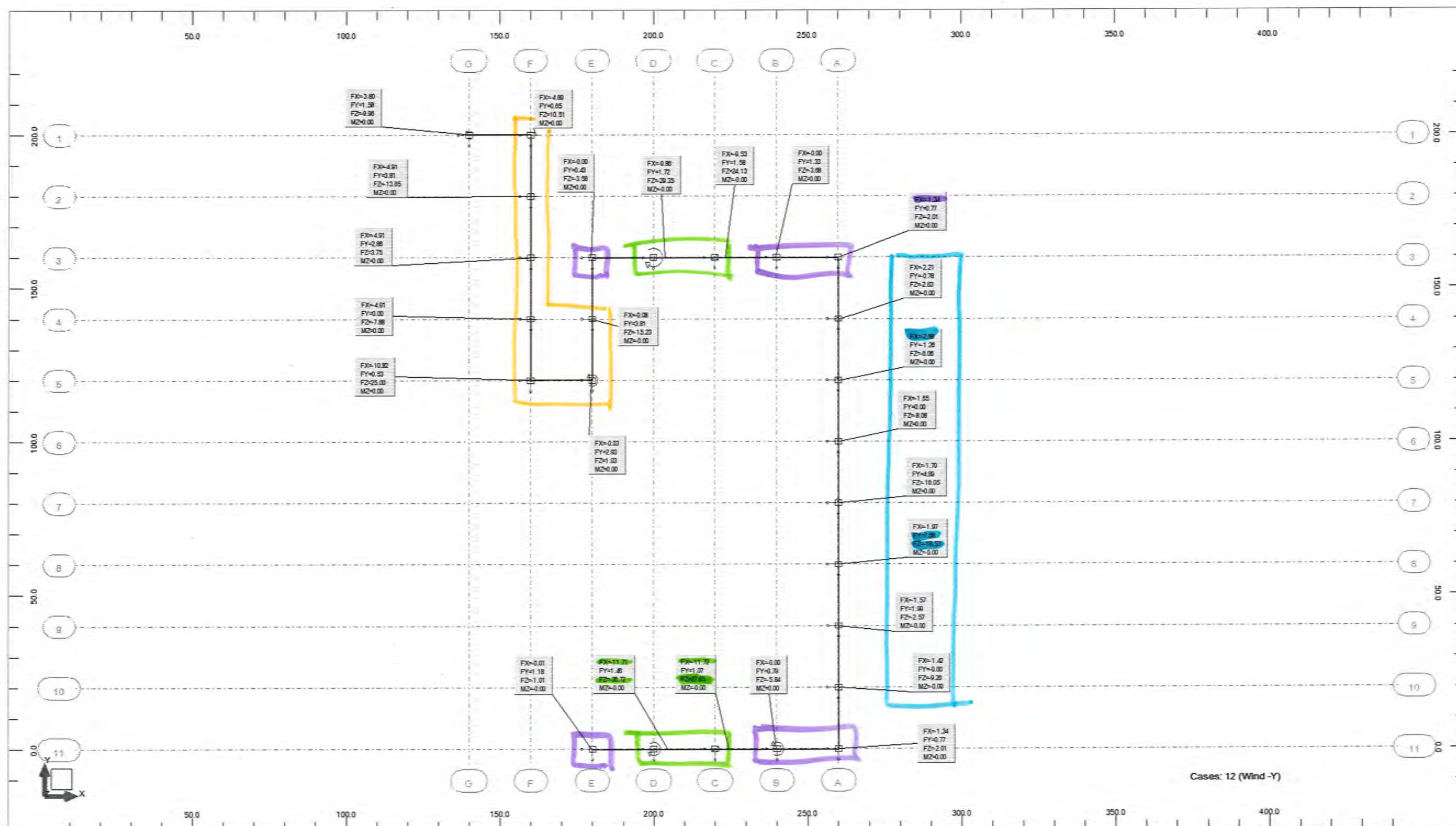
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 10 (Wind -X)



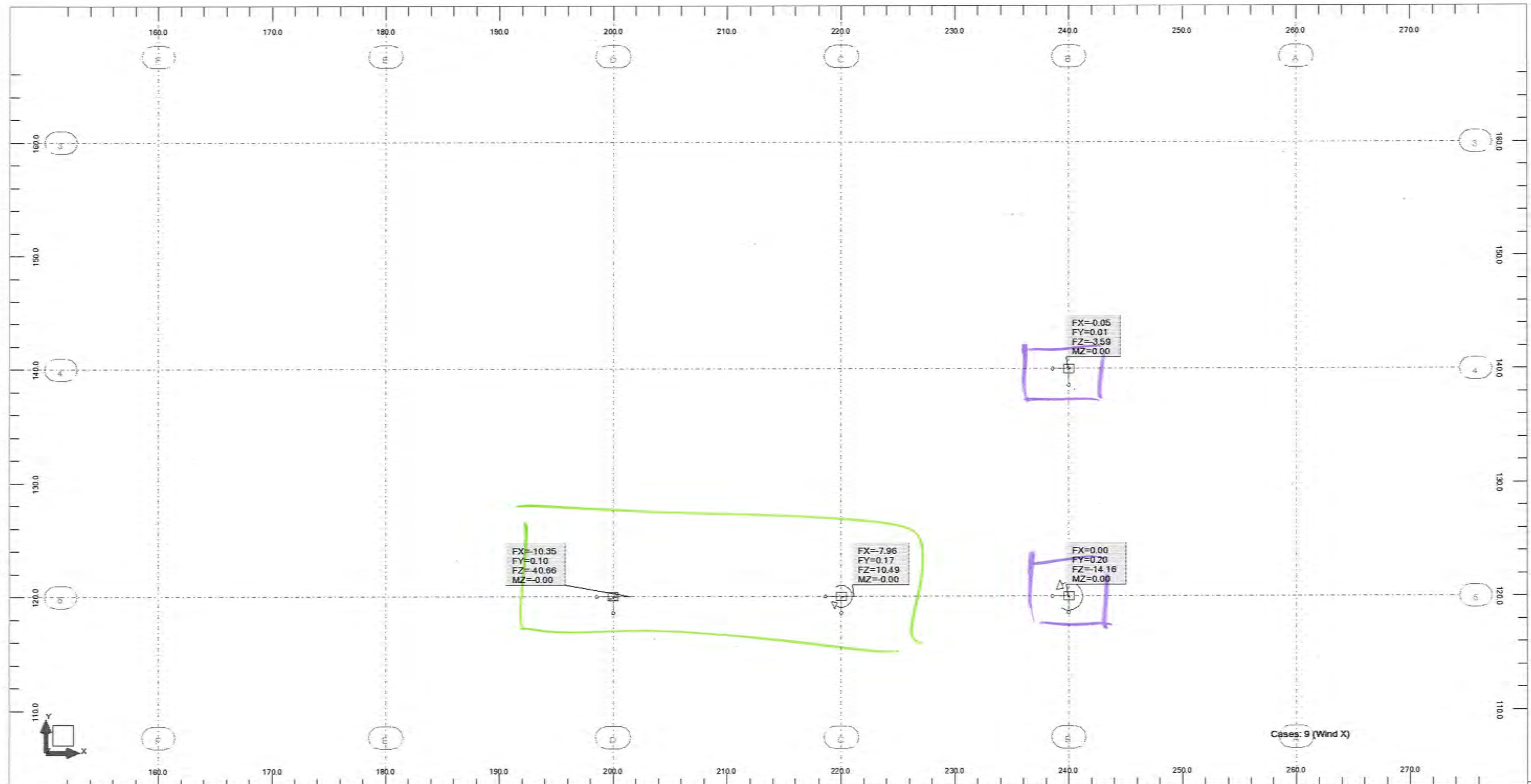
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 11 (Wind Y)



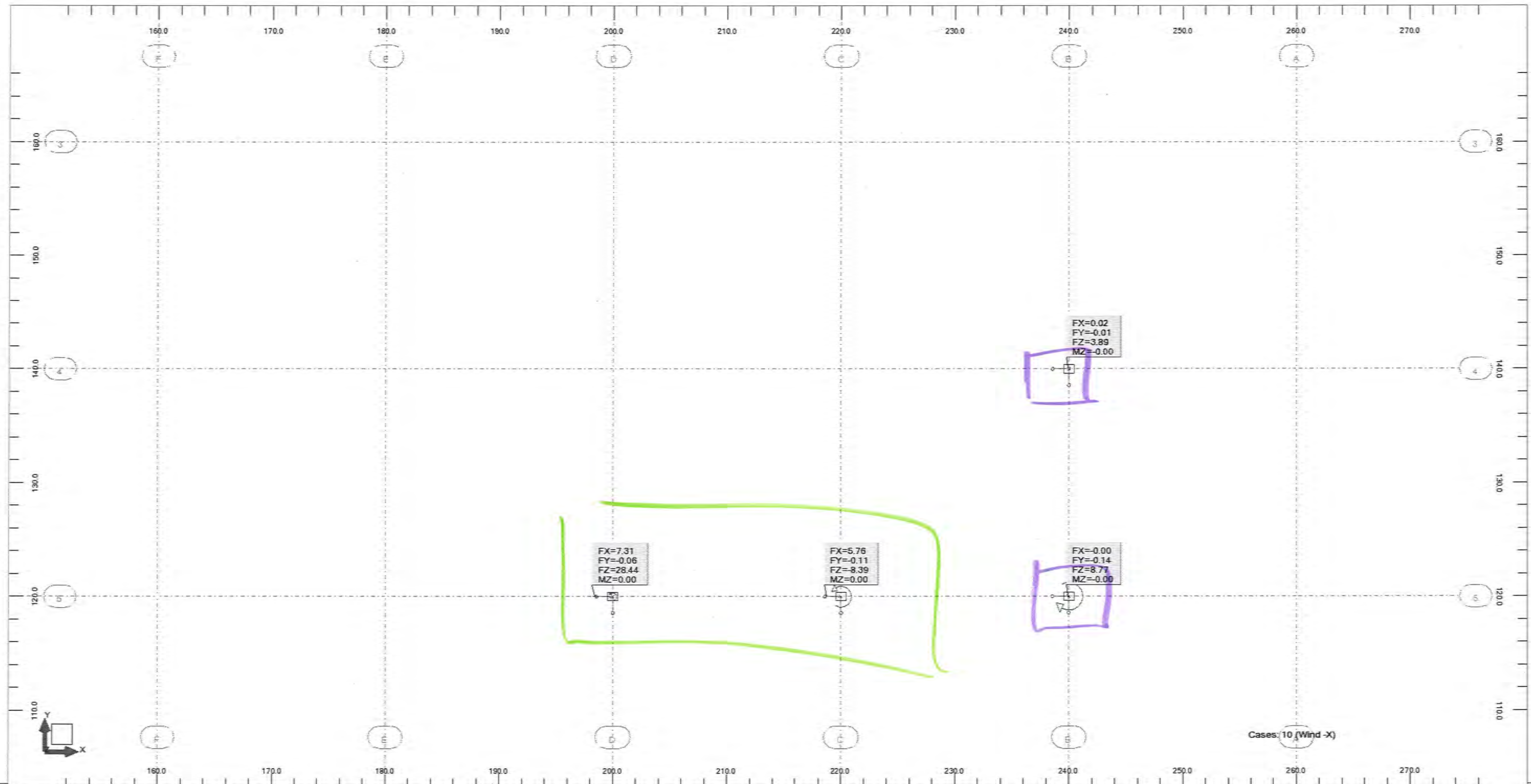
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 12 (Wind -Y)



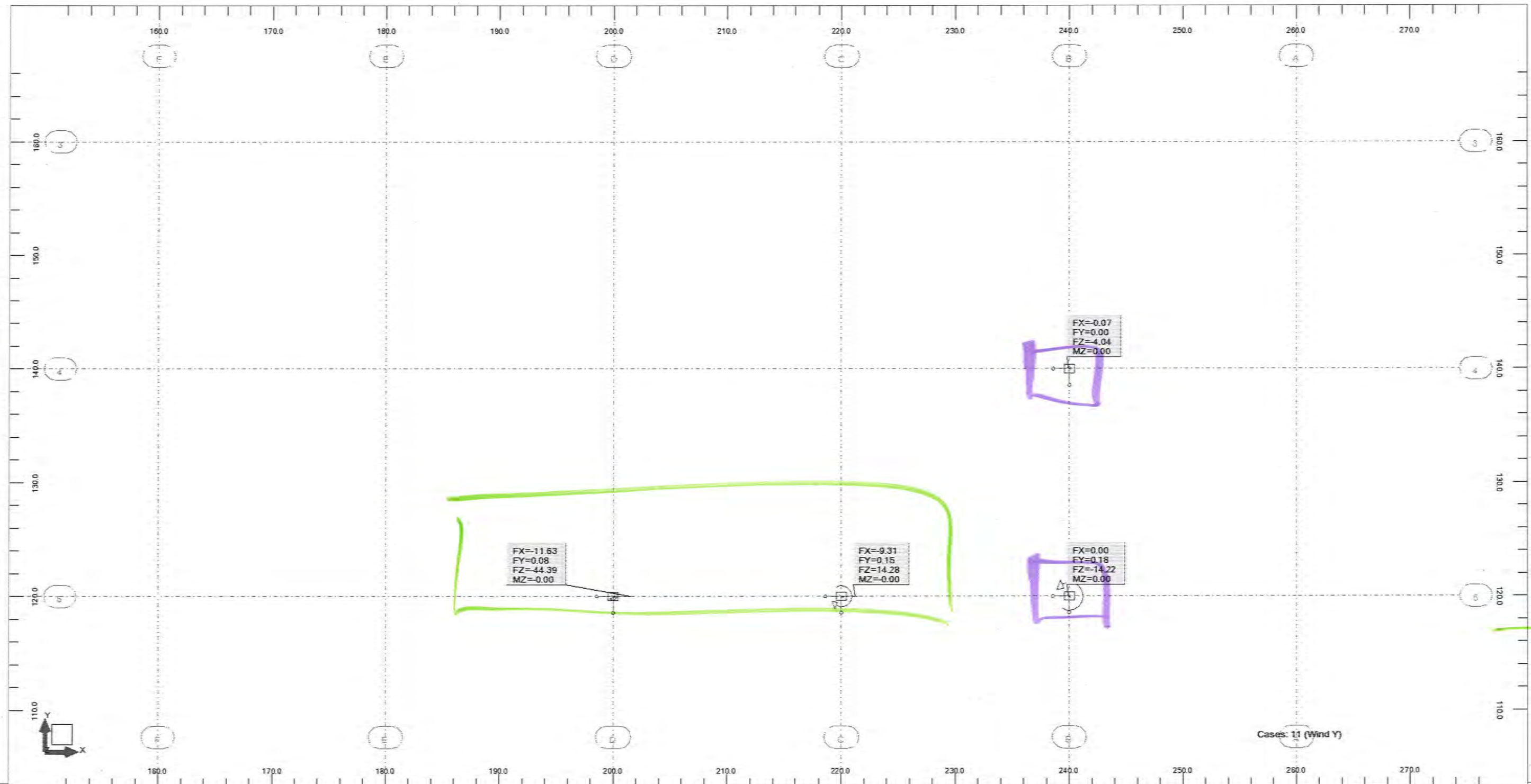
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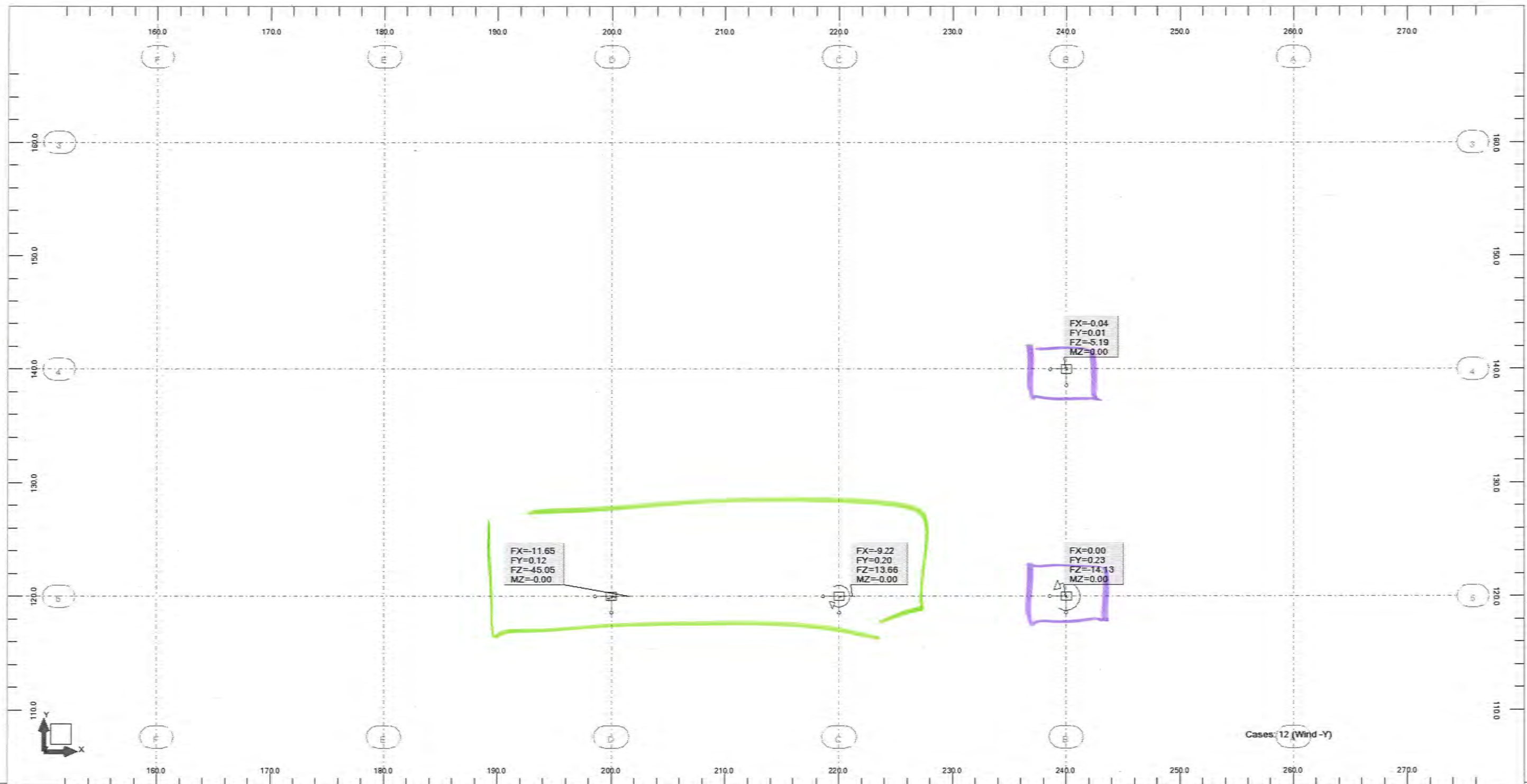
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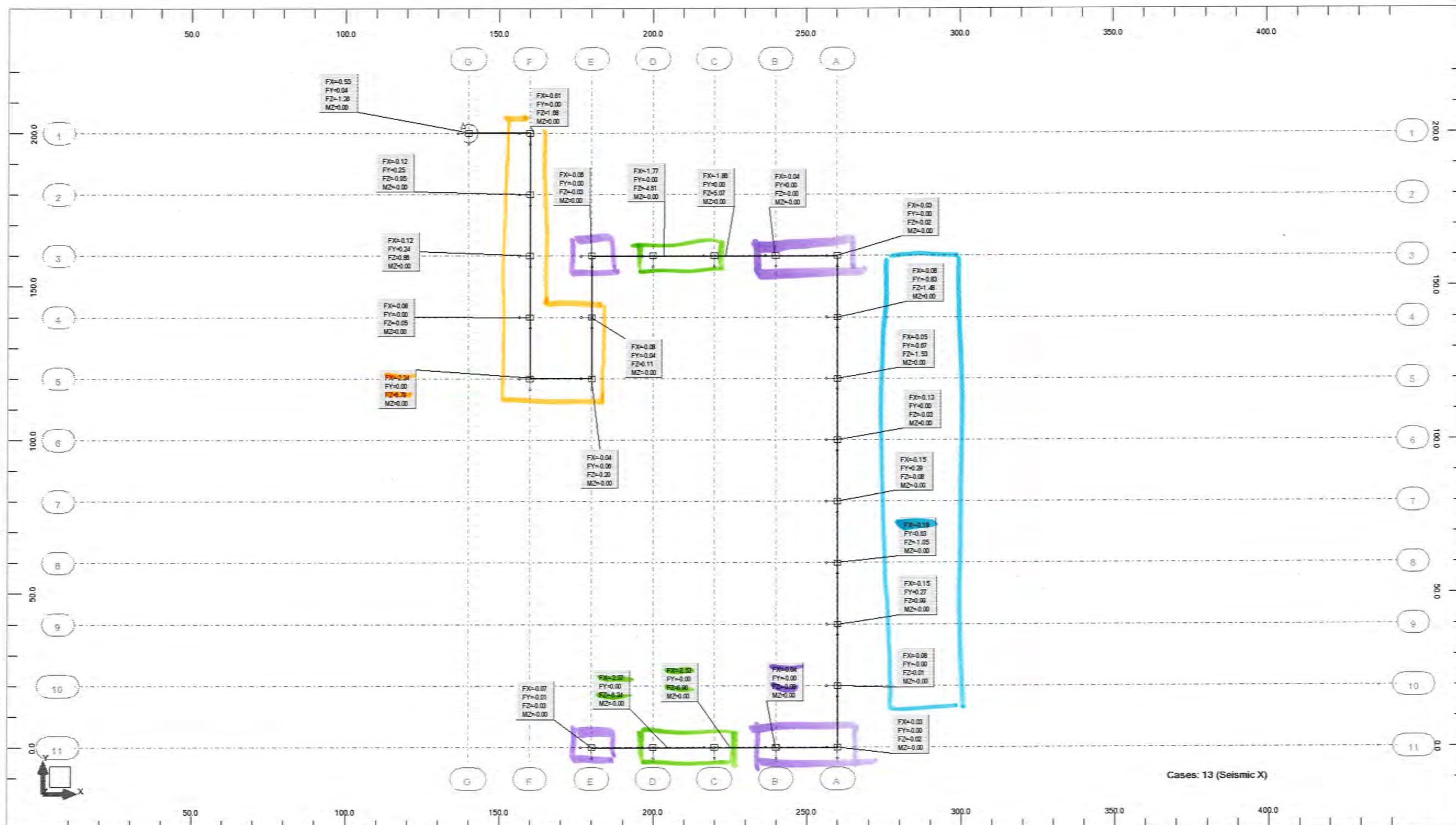
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 11 (Wind Y)



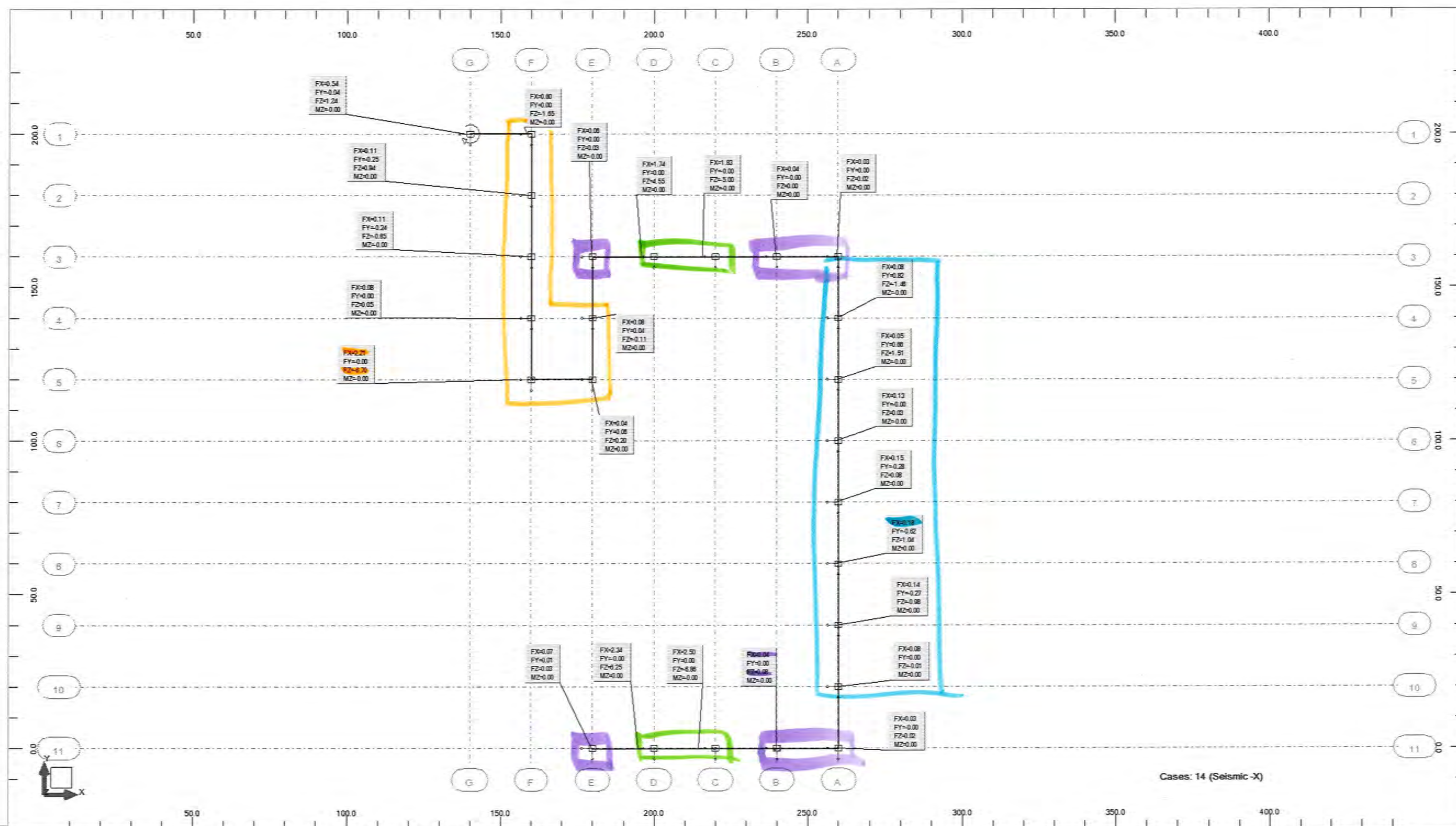
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 12 (Wind -Y)



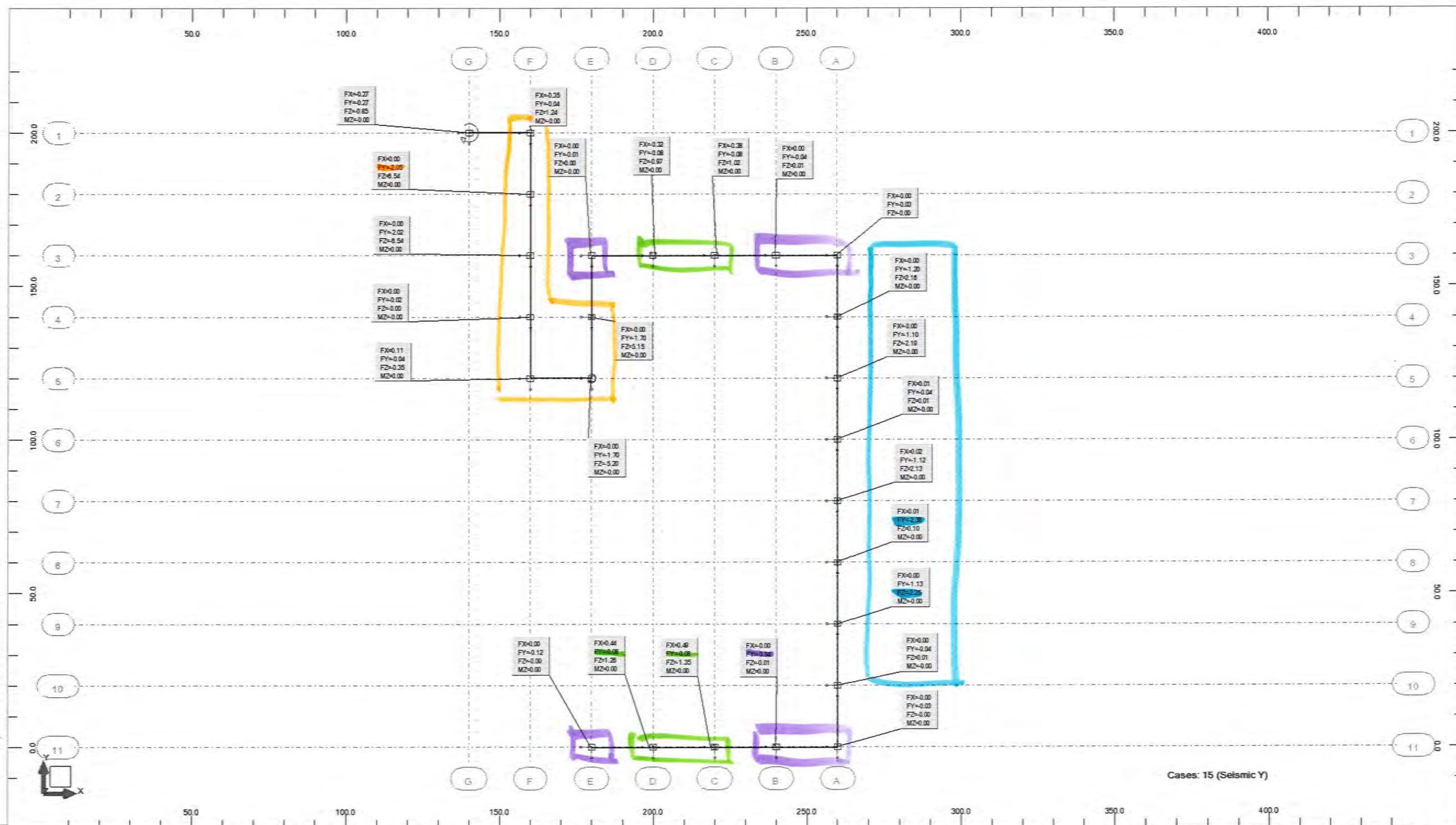
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 13 (Seismic X)



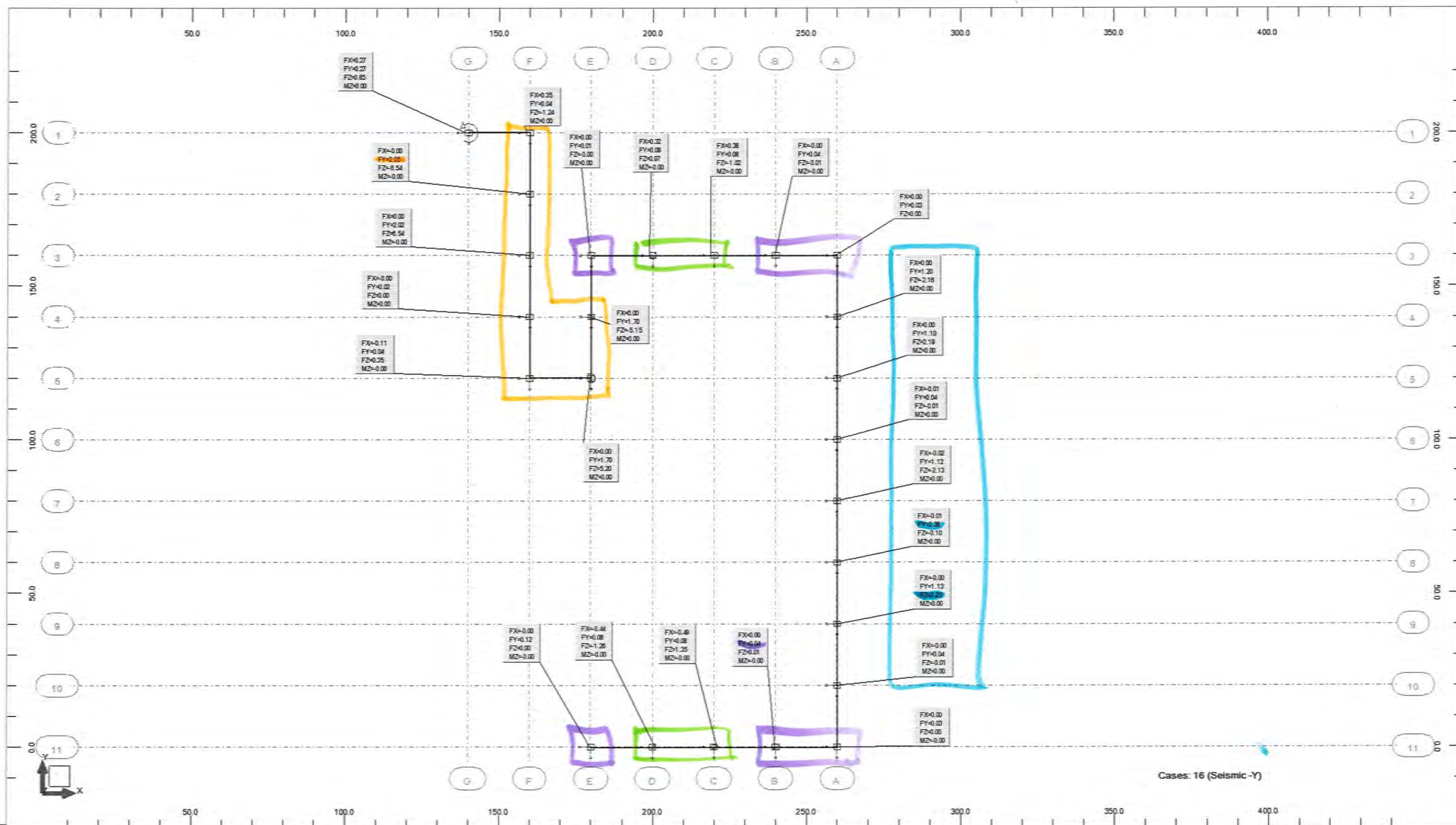
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 14 (Seismic -X)



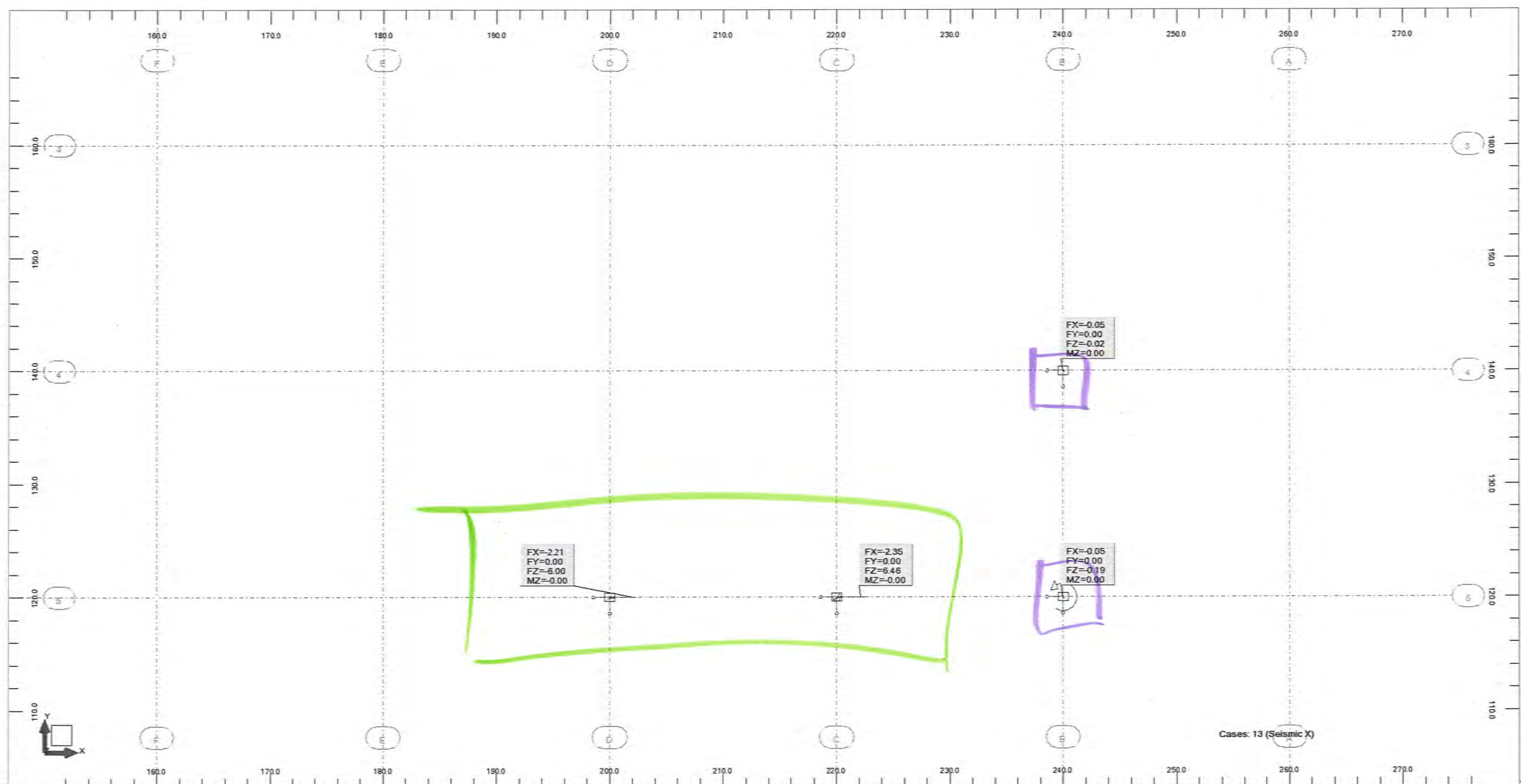
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 15 (Seismic Y)



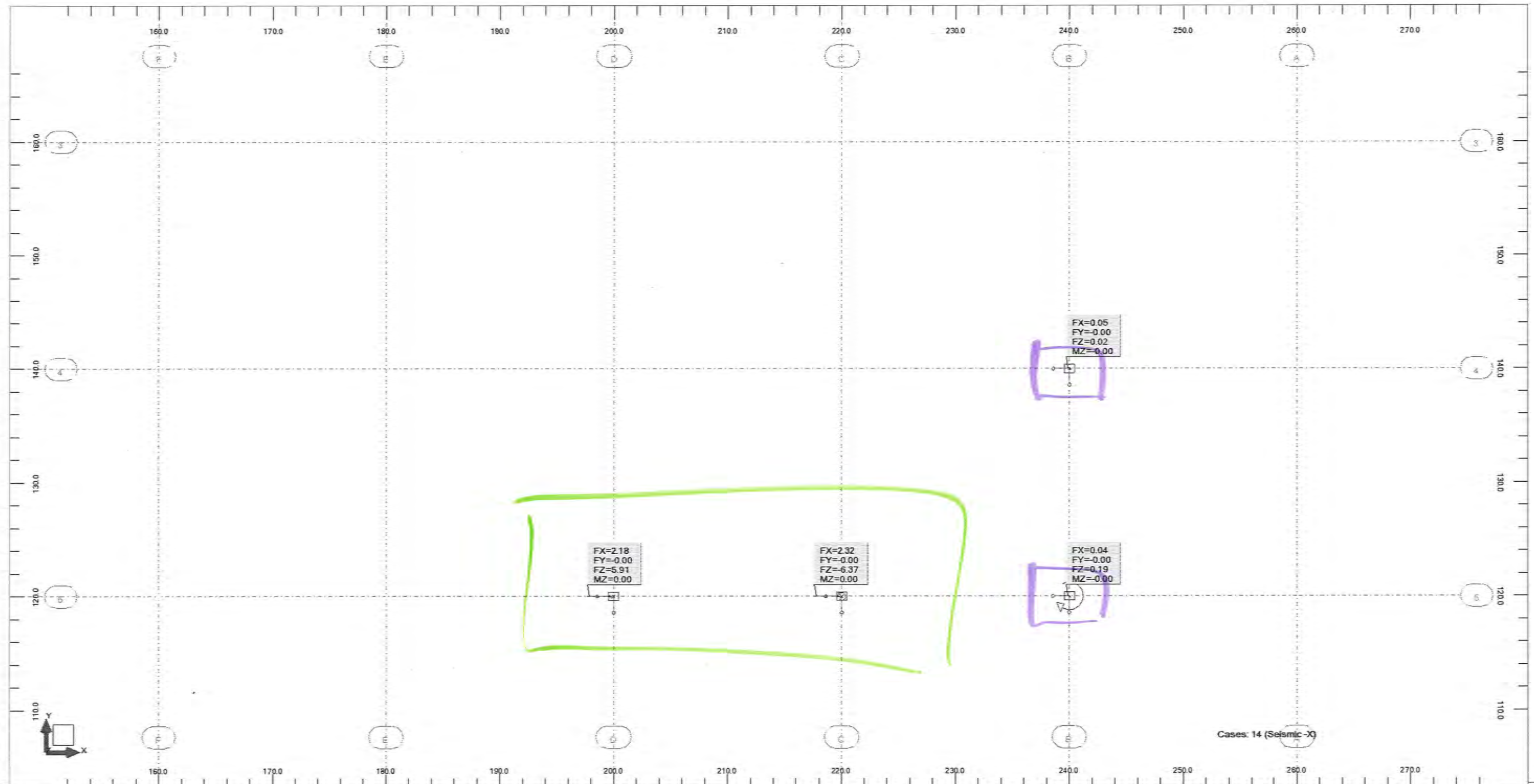
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 16 (Seismic -Y)



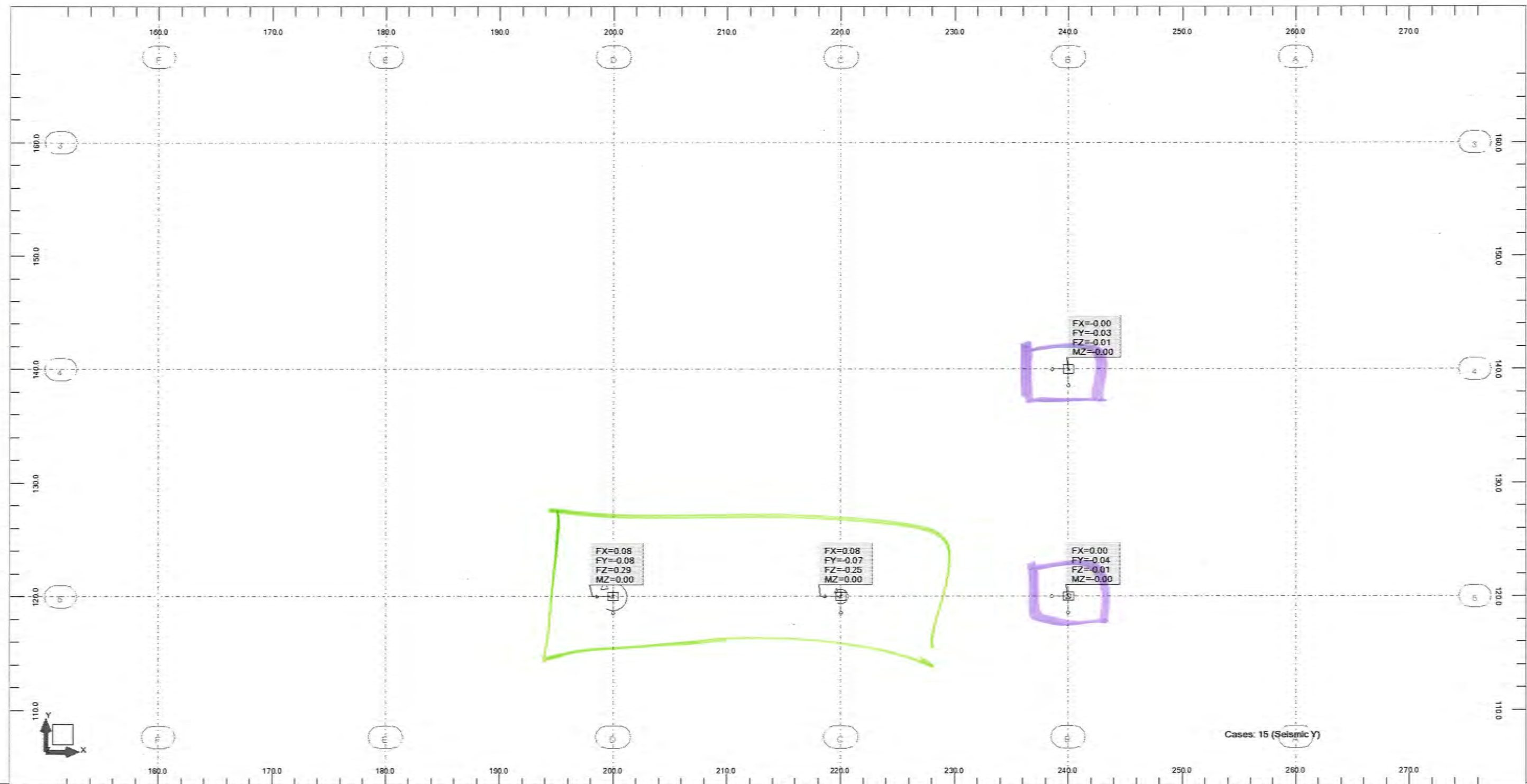
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 13 (Seismic X)



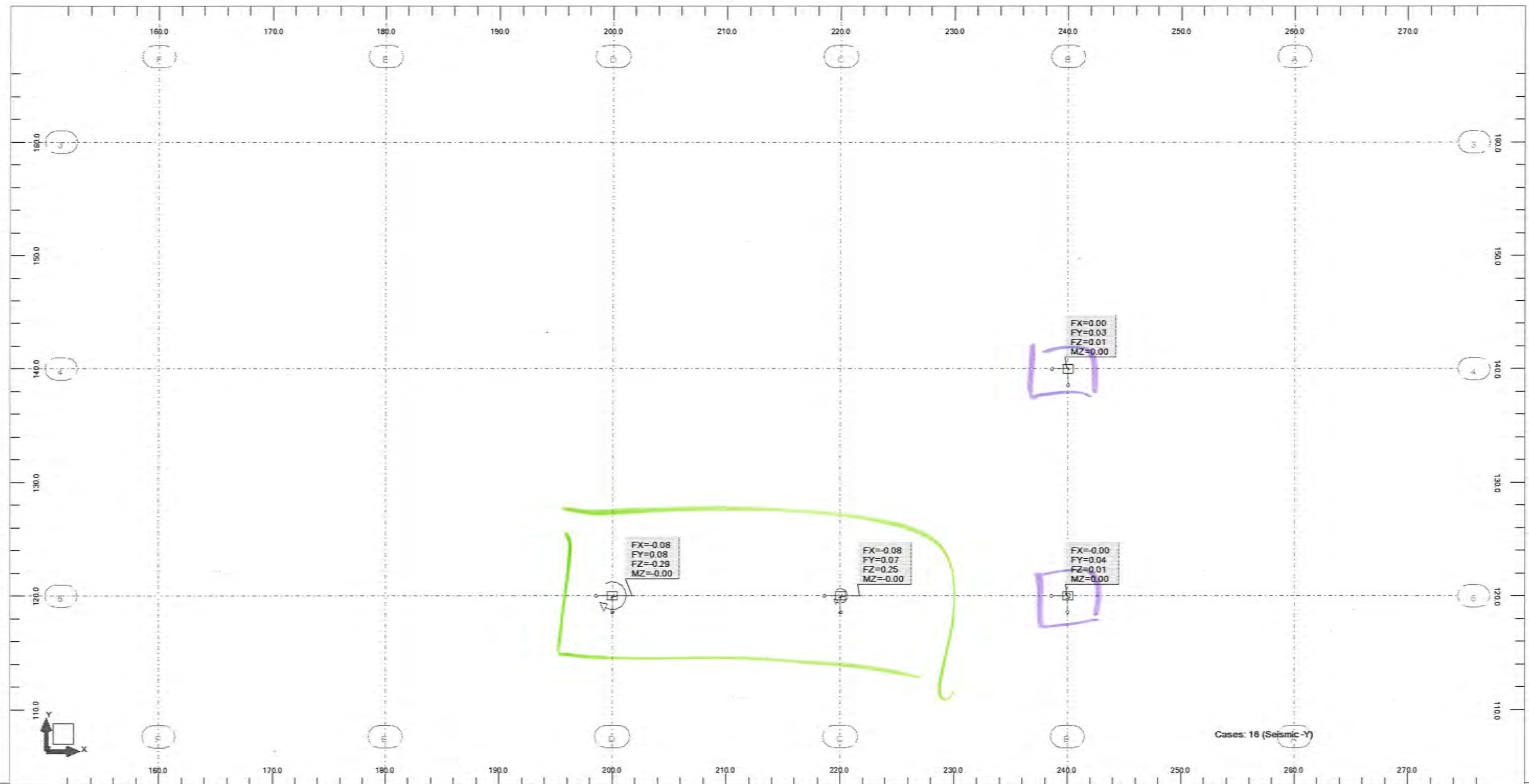
View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 14 (Seismic -X)



View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 15 (Seismic Y)

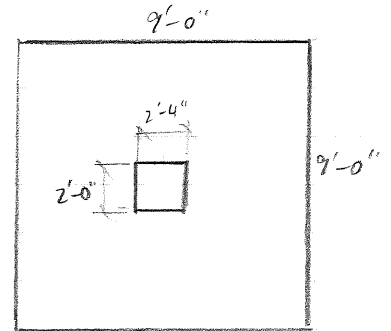


View - Reaction forces(kip),Reaction moments(kip*ft), Cases: 16 (Seismic -Y)

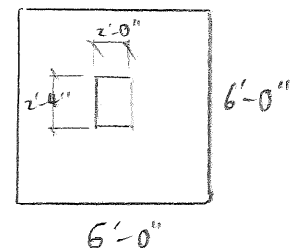


FLSMIDTH	PROJECT	PROJ NO. 11021
	CC & V	CALC NO. C-003
	SUBJECT	BY Wchan DATE 11/3/2011
	Load input for foundation	CHK DATE
		SHEET OF REV

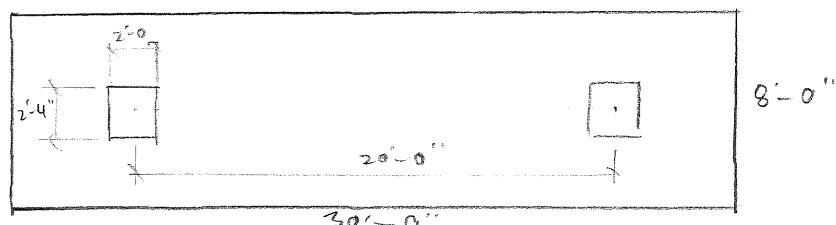
F.1.	Z	X	Y
D.L. =	19.65	-1.37	-2.46
S.L. =	36.08	-2.96	-4.74
W.L. =	11.14	1.54	-5.43
Cuplift)	-18.53	-2.68	7.68
Seis L. =	2.25	0.18	2.38
Cuplift)	-2.25	-0.18	-2.38



F.2.	Z	X	Y
D.L. =	7.42	0	0.59
S.L. =	14.21	0	1.25
W.L. =	3.07	0.77	1.89
	-6.10	-1.34	-2.05
Seis L. =	0.08	0.04	0.04
	-0.08	-0.04	-0.04

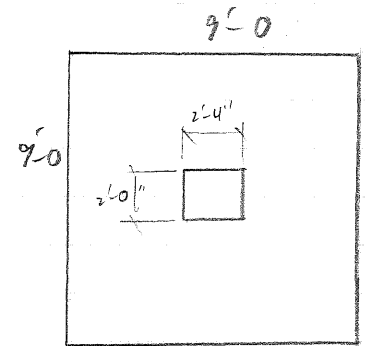


F.3.	Z	X	Y
	Pier 1 / Pier 2	Pier 1 / Pier 2	Pier 1 / Pier 2
D.L. =	11.68 / 8.64	1.79 / 0.48	0.29 / 0.57
S.L. =	25.44 / 12.94	3.40 / 1.53	0.68 / 1.27
W.L. =	20.43 / -16.36	6.72 / 6.80	2.66 / 2.13
	-36.72 / 27.85	-11.71 / -11.72	-2.91 / -2.63
Seis L. =	6.25 / -6.86	2.34 / 2.50	-0.08 / -0.08
	-6.34 / 6.96	-2.37 / -2.53	0.08 / 0.08

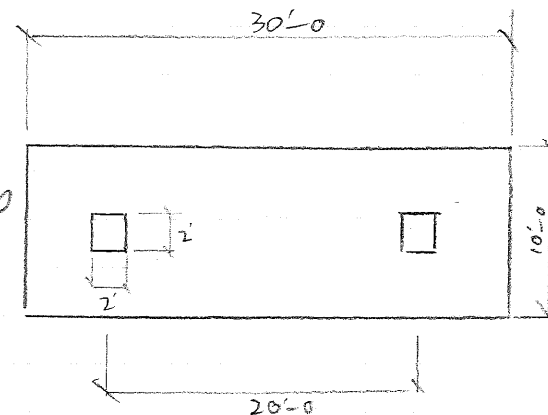


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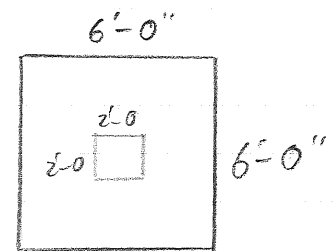
F.4.	Z	X	Y
D.L =	11.84	-0.88	-1.21
S.L =	26.91	-1.52	-2.35
			2.97
W.L =	25.20	-10.88	-4.08
	-15.41	6.61	3.81
Seis.L =	6.79	-2.24	-2.05
	-6.70	2.21	2.05



F.5.	Z	X	Y
	Pier 1 / Pier 2	Pier 1 / Pier 2	Pier 1 / Pier 2
D.L =	22.21 / 23.21	2.22 / -1.85	-0.12 / -0.20
S.L =	40.35 / 44.78	3.97 / -3.78	-0.26 / -0.43
W.L =	28.55 / -7.93	7.36 / 5.75	-0.06 / -0.10
	-45.24 / 13.94	-11.71 / -9.34	0.11 / 0.18
Seis.L =	5.93 / -6.38	2.19 / 2.32	0 / 0
	-6.01 / 6.47	-2.22 / -2.36	0.08 / 0.07



F.6.	Z	X	Y
D.L =	19.34	0	-0.2
S.L =	38.88	-0.43	0.0
W.L =	10.43	0	-0.1
	-16.39	0	0.18
Seis.L =	0.20	0.04	0
	-0.20	-0.05	0.04



Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.1		Time	8:26:51 AM
Designed By:	CC&V	Engineer	WChan	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\			
Filename:	Warehouse Spread Footing F1 (uplift).mcs			

DETAIL REPORT FOR F.1**PROJECT INFORMATION**

Project Name: Grassy Valley Pipeline Water Tank Ring Wall
Project Number: 11021
Client: CC&V
Project Location: Grassy Valley Pipeline
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 5000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.85
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 0 Earthquake 0 Test 0
 Erection Stability Ratio 1.5
 Operation Stability Ratio 1.5
 Test Stability Ratio 1.5
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 2
 Grade Elevation (ft) 9928

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 9
 Min Long Bar Size 5
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.1		Time	8:26:51 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\IC-003 Warehouse Area\ Warehouse Spread Footing F1 (uplift).mcs			

DETAIL REPORT FOR F.1**APPLIED LOADS**

P1

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	19.65	-1.37	0.00	-2.46	0.00
2 - Live	36.08	-2.96	0.00	-4.74	0.00
3 - Wind	-18.53	-2.65	0.00	7.68	0.00
4 - Earthquake	-2.25	-0.18	0.00	-2.38	0.00

UNFACTORED (ALLOWABLE) LOAD COMBINATIONS

P1

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	19.65	-1.37	0.00	-2.46	0.00
2 - Dead + Live	55.73	-4.33	0.00	-7.20	0.00
3 - Dead + 0.75Live	46.71	-3.59	0.00	-6.02	0.00
4 - Dead + 0.75Live + 0.75Wind	32.81	-5.58	0.00	-0.26	0.00
5 - Dead + Wind	1.12	-4.02	0.00	5.22	0.00
6 - 0.6Dead + Wind	-6.74	-3.47	0.00	6.20	0.00
7 - Dead + 0.75Live + 0.525Earthquake	45.53	-3.68	0.00	-7.26	0.00
8 - Dead + 0.7Earthquake	18.08	-1.50	0.00	-4.13	0.00
9 - 0.6Dead + 0.7Earthquake	10.22	-0.95	0.00	-3.14	0.00

FACTORED (ULTIMATE) LOAD COMBINATIONS

P1

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	27.51	-1.92	0.00	-3.44	0.00
2 - 1.2Dead + 1.6Live	81.31	-6.38	0.00	-10.54	0.00
3 - 1.2Dead + Live	59.66	-4.60	0.00	-7.69	0.00
4 - 1.2Dead + 0.8Wind	8.76	-3.76	0.00	3.19	0.00
5 - 1.2Dead + Live + 1.6Wind	30.01	-8.84	0.00	4.60	0.00
6 - 0.9Dead + 1.6Wind	-11.96	-5.47	0.00	10.07	0.00
7 - 1.2Dead + Live + Earthquake	57.41	-4.78	0.00	-10.07	0.00
8 - 0.9Dead + Earthquake	15.44	-1.41	0.00	-4.59	0.00

Dimensional Solutions FOUNDATION3D	Version 5.8.2	Date 11/10/2011
Foundation Name F.1		Time 8:26:51 AM
Designed By: CC&V	Engineer WChan	Checker
Filename: P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\ Warehouse Spread Footing F1 (uplift).mcs		

DETAIL REPORT FOR F.1**BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD**

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	0.97	5.48	0.26	0.03	1.95	17.22	
2 - Dead + Live	1.76	5.48	0.49	0.11	10.77	50.40	
3 - Dead + 0.75Live	1.56	5.48	0.45	0.09	8.56	42.11	
4 - Dead + 0.75Live + 0.75Wind	1.21	5.48	0.02	0.34	27.06	1.79	
5 - Dead + Wind	1.10	5.48	0.77	0.56	26.62	36.54	
6 - 0.6Dead + Wind	0.97	5.48	2.07	1.23	25.84	43.43	
7 - Dead + 0.75Live + 0.525Earthquake	1.63	5.48	0.55	0.10	9.61	50.85	
8 - Dead + 0.7Earthquake	1.06	5.48	0.45	0.05	3.35	28.88	
9 - 0.6Dead + 0.7Earthquake	0.67	5.48	0.58	0.07	2.57	21.99	

STABILITY RATIO / SLIDING SAFETY FACTOR

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead	17.19	31.62	1.50	23.51	42.21	1.50	
2 - Dead + Live	9.09	15.75	1.50	10.54	17.52	1.50	
3 - Dead + 0.75Live	9.92	17.27	1.50	11.86	19.88	1.50	
4 - Dead + 0.75Live + 0.75Wind	100.00	9.39	1.50	100.00	11.55	1.50	
5 - Dead + Wind	5.82	7.59	1.50	9.30	12.08	1.50	
6 - 0.6Dead + Wind	1.69	2.20	1.50	5.71	10.20	1.50	
7 - Dead + 0.75Live + 0.525Earthquake	8.11	16.60	1.50	9.74	19.21	1.50	
8 - Dead + 0.7Earthquake	10.00	28.23	1.50	13.83	38.13	1.50	
9 - 0.6Dead + 0.7Earthquake	7.75	26.27	1.50	13.97	46.30	1.50	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.1		Time	8:26:51 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F1 (uplift).mcs			

DETAIL REPORT FOR F.1**FOOTING DESIGN INFORMATION**

E-W Dim (ft)	9.00
N-S Dim (ft)	9.00
Thickness (ft)	2.00

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
6. 0.9Dead + 1.6Wind	9	7	12	0.6	0.02	-1.68	E-W
6. 0.9Dead + 1.6Wind	9	7	12	0.6	0.04	-2.88	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	9	7	12	0.6	0.52	7.75	E-W
2. 1.2Dead + 1.6Live	9	7	12	0.6	0.52	9.22	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	69.08	18.78	189.74	

MAXIMUM SHEAR - E-W DIRECTION

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	2.00	7.51	3.48	94.87	
2 - 1.2Dead + 1.6Live	2.00	20.88	9.67	94.87	
3 - 1.2Dead + Live	2.00	15.46	7.16	94.87	
4 - 1.2Dead + 0.8Wind	2.00	5.42	2.51	94.87	
5 - 1.2Dead + Live + 1.6Wind	2.00	13.42	6.22	94.87	
6 - 0.9Dead + 1.6Wind	7.66	4.79	2.22	94.87	
7 - 1.2Dead + Live + Earthquake	2.00	15.19	7.03	94.87	
8 - 0.9Dead + Earthquake	2.00	4.56	2.11	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.1		Time	8:26:51 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\003 Warehouse Area\Warehouse Spread Footing F.1 (uplift).mcs			

DETAIL REPORT FOR F.1**MAXIMUM SHEAR - N-S DIRECTION**

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	1.83	9.21	4.26	94.87	
2 - 1.2Dead + 1.6Live	1.83	25.39	11.76	94.87	
3 - 1.2Dead + Live	1.83	18.83	8.72	94.87	
4 - 1.2Dead + 0.8Wind	7.17	-5.05	2.34	94.87	
5 - 1.2Dead + Live + 1.6Wind	7.17	-10.45	4.84	94.87	
6 - 0.9Dead + 1.6Wind	1.83	-8.33	3.85	94.87	
7 - 1.2Dead + Live + Earthquake	1.83	20.17	9.34	94.87	
8 - 0.9Dead + Earthquake	1.83	7.26	3.36	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.1		Time	8:26:51 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\ Warehouse Spread Footing F1 (uplift).mcs			

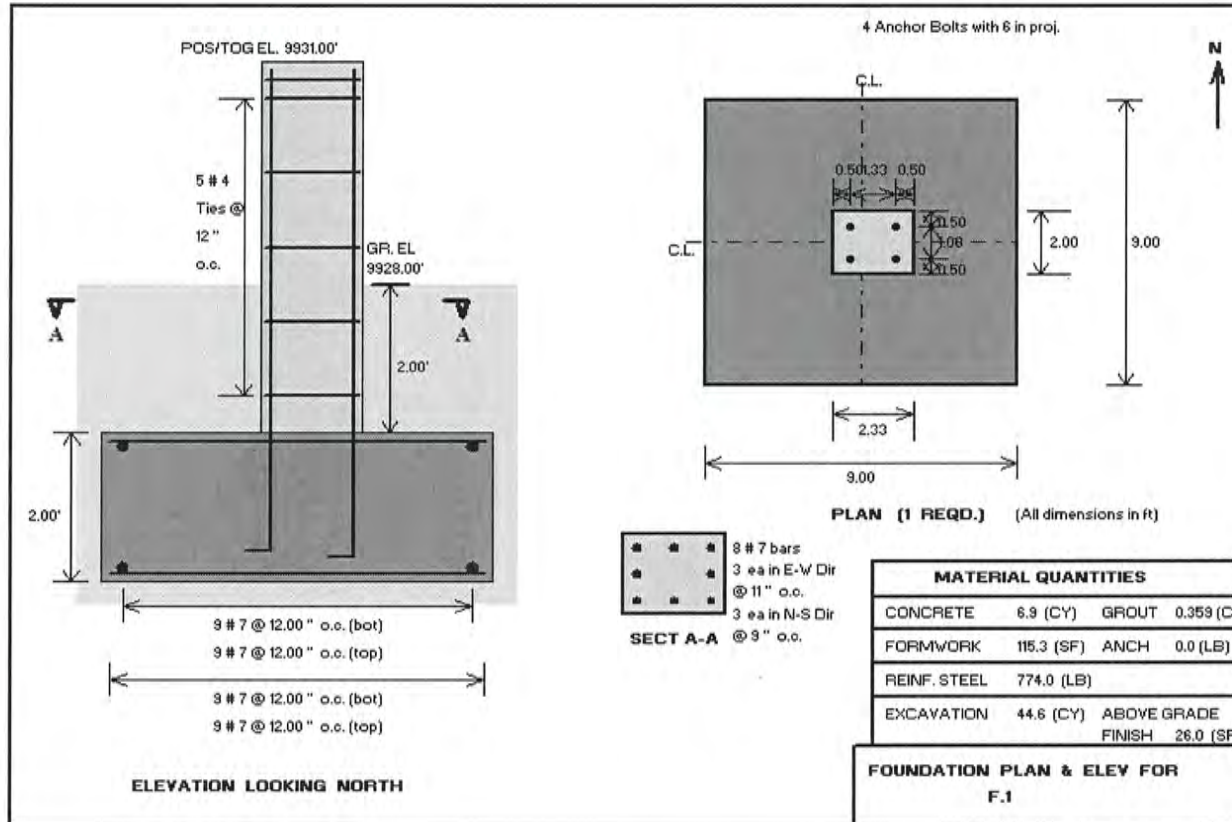
DETAIL REPORT FOR F.1**PIER/BASE PLATE DESIGN INFORMATION**

	P1
E-W Dim (ft)	2.33
N-S Dim (ft)	2.00
Height above grade (ft)	3.00
E-W Offset (ft)	0.33
N-S Offset (ft)	0.00
Requested Reinf. Ratio	0.0050
Provided Reinf. Ratio	0.0072
Long Bar Size	7
Bars in E-W Dir	3
Bars in N-S Dir	3
Total Long Bars	8
Tie Bar Size	4
Total No. of Ties	6
Major Tie Spacing (in)	12

PIER ULTIMATE LOAD CAPACITIES

	P1						
Load	Axial	Axial	Mom N-S	Mom N-S	Mom E-W	Mom E-W	Rem
Comb	Load	Capa.		Capa		Capa	
	(kips)	(kips)	(kip ft)	(kip ft)	(kip ft)	(kip ft)	
1 - 1.4Dead	32.40	720.67	9.59	212.75	17.22	378.40	
2 - 1.2Dead + 1.6Live	85.50	612.15	31.90	227.08	52.68	369.20	
3 - 1.2Dead + Live	63.85	627.84	23.02	225.70	38.46	371.26	
4 - 1.2Dead + 0.8Wind	12.95	195.38	18.82	283.89	15.96	240.74	
5 - 1.2Dead + Live + 1.6Wind	34.21	260.59	44.22	336.88	22.98	175.06	
6 - 0.9Dead + 1.6Wind	-8.82	-33.45	27.36	103.88	50.37	191.20	
7 - 1.2Dead + Live + Earthquake	61.60	456.38	23.92	177.10	50.36	372.42	
8 - 0.9Dead + Earthquake	18.58	266.99	7.07	101.49	22.97	329.99	

Dimensional Solutions FOUNDATION3D	Version 5.8.2	Date 11/10/2011
Foundation Name F.1		Time 8:26:51 AM
Designed By: CC&V	Engineer WChan	Checker
P:\11021\116 - Calculations\116.d - Arch_Civil_StructC-003 Warehouse Area\		
Filename:	Warehouse Spread Footing F1 (uplift).mcs	

DETAIL REPORT FOR F.1

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.2		Time	9:25:15 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\IC-003 Warehouse Area\Warehouse Spread Footing F2 (uplift).mcs			

DETAIL REPORT FOR F.2**PROJECT INFORMATION**

Project Name: Grassy Valley Pipeline Water Tank Ring Wall
Project Number: 11021
Client: CC&V
Project Location: Grassy Valley Pipeline
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 5000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.85
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 0 Earthquake 0 Test 0
 Erection Stability Ratio 1.5
 Operation Stability Ratio 1.5
 Test Stability Ratio 1.5
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 2
 Grade Elevation (ft) 9928

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 9
 Min Long Bar Size 5
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.2		Time	9:25:15 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\ Warehouse Spread Footing F2 (uplift).mcs			

DETAIL REPORT FOR F.2**APPLIED LOADS**

P1

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	7.42	0.00	0.00	0.59	0.00
2 - Live	14.21	0.00	0.00	1.25	0.00
3 - Wind	-6.10	-1.34	0.00	-2.05	0.00
4 - Earthquake	-0.08	-0.04	0.00	-0.04	0.00

UNFACTORED (ALLOWABLE) LOAD COMBINATIONS

P1

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	7.42	0.00	0.00	0.59	0.00
2 - Dead + Live	21.63	0.00	0.00	1.84	0.00
3 - Dead + 0.75Live	18.08	0.00	0.00	1.53	0.00
4 - Dead + 0.75Live + 0.75Wind	13.50	-1.01	0.00	-0.01	0.00
5 - Dead + Wind	1.32	-1.34	0.00	-1.46	0.00
6 - 0.6Dead + Wind	-1.65	-1.34	0.00	-1.70	0.00
7 - Dead + 0.75Live + 0.525Earthquake	18.04	-0.02	0.00	1.51	0.00
8 - Dead + 0.7Earthquake	7.36	-0.03	0.00	0.56	0.00
9 - 0.6Dead + 0.7Earthquake	4.40	-0.03	0.00	0.33	0.00

FACTORED (ULTIMATE) LOAD COMBINATIONS

P1

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	10.39	0.00	0.00	0.83	0.00
2 - 1.2Dead + 1.6Live	31.64	0.00	0.00	2.71	0.00
3 - 1.2Dead + Live	23.11	0.00	0.00	1.96	0.00
4 - 1.2Dead + 0.8Wind	4.02	-1.07	0.00	-0.93	0.00
5 - 1.2Dead + Live + 1.6Wind	13.35	-2.14	0.00	-1.32	0.00
6 - 0.9Dead + 1.6Wind	-3.08	-2.14	0.00	-2.75	0.00
7 - 1.2Dead + Live + Earthquake	23.03	-0.04	0.00	1.92	0.00
8 - 0.9Dead + Earthquake	6.60	-0.04	0.00	0.49	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.2		Time	9:25:15 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\Warehouse Spread Footing F2 (uplift).mcs			

DETAIL REPORT FOR F.2**BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD**

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	1.03	5.48	0.26	0.00	0.00	7.73	
2 - Dead + Live	1.79	5.48	0.49	0.00	0.00	21.17	
3 - Dead + 0.75Live	1.60	5.48	0.45	0.00	0.00	17.81	
4 - Dead + 0.75Live + 0.75Wind	1.33	5.48	0.16	0.20	7.04	5.54	
5 - Dead + Wind	1.14	5.48	0.37	0.41	9.38	8.63	
6 - 0.6Dead + Wind	0.97	5.48	1.02	0.82	9.38	11.72	
7 - Dead + 0.75Live + 0.525Earthquake	1.60	5.48	0.44	0.00	0.15	17.65	
8 - Dead + 0.7Earthquake	1.02	5.48	0.26	0.01	0.20	7.52	
9 - 0.6Dead + 0.7Earthquake	0.61	5.48	0.25	0.01	0.20	4.42	

STABILITY RATIO / SLIDING SAFETY FACTOR

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead	20.45	100.00	1.50	52.97	100.00	1.50	
2 - Dead + Live	9.50	100.00	1.50	20.85	100.00	1.50	
3 - Dead + 0.75Live	10.56	100.00	1.50	23.95	100.00	1.50	
4 - Dead + 0.75Live + 0.75Wind	100.00	15.06	1.50	100.00	34.12	1.50	
5 - Dead + Wind	6.91	7.40	1.50	19.32	21.05	1.50	
6 - 0.6Dead + Wind	2.29	2.74	1.50	13.18	16.68	1.50	
7 - Dead + 0.75Live + 0.525Earthquake	10.70	100.00	1.50	24.27	100.00	1.50	
8 - Dead + 0.7Earthquake	21.44	100.00	1.50	55.56	100.00	1.50	
9 - 0.6Dead + 0.7Earthquake	22.15	100.00	1.50	77.84	100.00	1.50	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.2		Time	9:25:15 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\003 Warehouse Area\ Warehouse Spread Footing F2 (uplift).mcs			

DETAIL REPORT FOR F.2**FOOTING DESIGN INFORMATION**

E-W Dim (ft)	6.00
N-S Dim (ft)	6.00
Thickness (ft)	2.00

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
6. 0.9Dead + 1.6Wind	6	7	12	0.6	0.01	-0.64	E-W
6. 0.9Dead + 1.6Wind	6	7	12	0.6	0.01	-0.49	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	6	7	12	0.6	0.52	1.99	E-W
2. 1.2Dead + 1.6Live	6	7	12	0.6	0.52	1.93	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	20.45	5.56	189.74	

MAXIMUM SHEAR - E-W DIRECTION

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	5.67	-0.85	0.59	94.87	
2 - 1.2Dead + 1.6Live	5.67	-1.99	1.38	94.87	
3 - 1.2Dead + Live	5.67	-1.52	1.05	94.87	
4 - 1.2Dead + 0.8Wind	0.33	0.85	0.59	94.87	
5 - 1.2Dead + Live + 1.6Wind	0.33	1.76	1.22	94.87	
6 - 0.9Dead + 1.6Wind	0.33	0.79	0.55	94.87	
7 - 1.2Dead + Live + Earthquake	0.33	1.53	1.06	94.87	
8 - 0.9Dead + Earthquake	0.33	0.56	0.39	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.2		Time	9:25:15 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\Warehouse Spread Footing F2 (uplift).mcs			

DETAIL REPORT FOR F.2**MAXIMUM SHEAR - N-S DIRECTION**

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	4.50	-5.87	4.07	94.87	
2 - 1.2Dead + 1.6Live	4.50	-14.77	10.26	94.87	
3 - 1.2Dead + Live	4.50	-11.12	7.72	94.87	
4 - 1.2Dead + 0.8Wind	4.50	-1.35	0.93	94.87	
5 - 1.2Dead + Live + 1.6Wind	4.50	-3.75	2.61	94.87	
6 - 0.9Dead + 1.6Wind	4.50	3.57	2.48	94.87	
7 - 1.2Dead + Live + Earthquake	4.50	-11.04	7.67	94.87	
8 - 0.9Dead + Earthquake	4.50	-3.69	2.57	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.2		Time	9:25:15 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_StructC-003 Warehouse Area\Warehouse Spread Footing F2 (uplift).mcs			

DETAIL REPORT FOR F.2**PIER/BASE PLATE DESIGN INFORMATION**

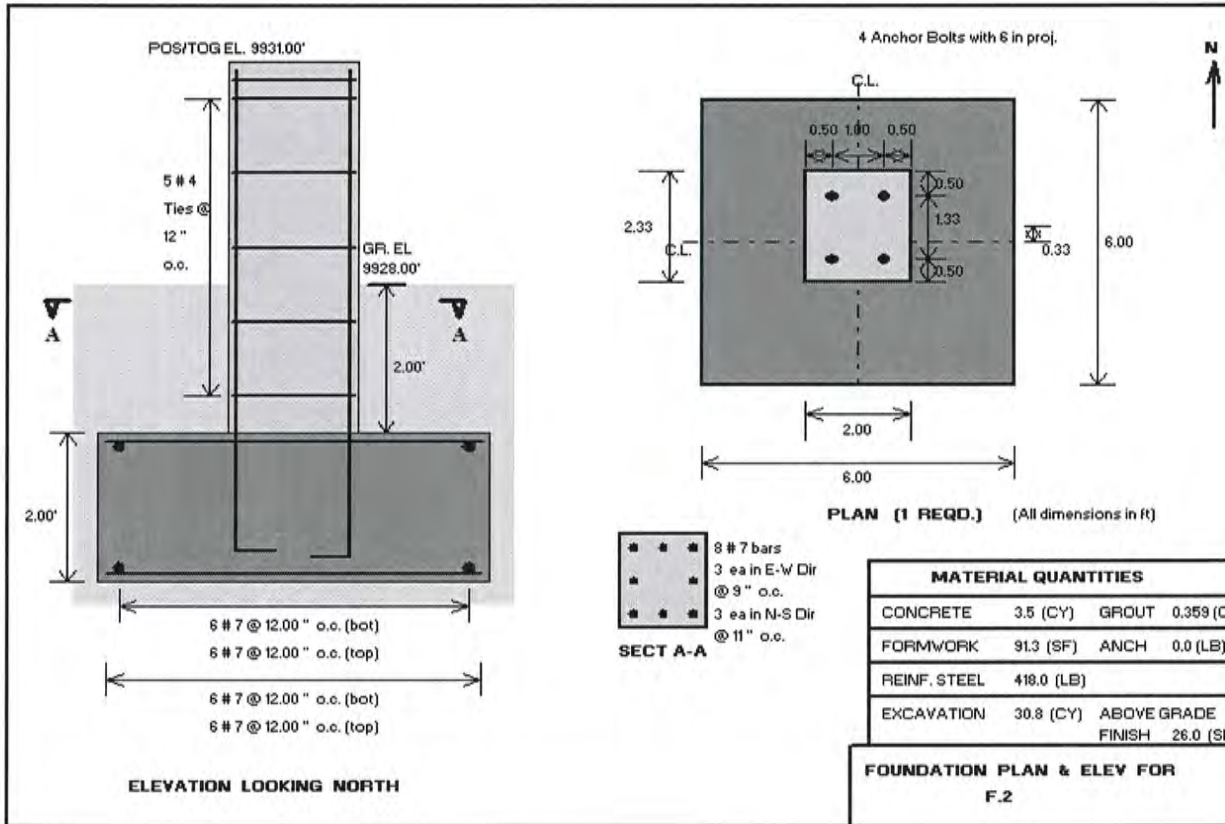
	P1
E-W Dim (ft)	2.00
N-S Dim (ft)	2.33
Height above grade (ft)	3.00
E-W Offset (ft)	0.00
N-S Offset (ft)	0.33
Requested Reinf. Ratio	0.0050
Provided Reinf. Ratio	0.0072
Long Bar Size	7
Bars in E-W Dir	3
Bars in N-S Dir	3
Total Long Bars	8
Tie Bar Size	4
Total No. of Ties	6
Major Tie Spacing (in)	12

PIER ULTIMATE LOAD CAPACITIES

	P1						
Load	Axial	Axial	Mom N-S	Mom N-S	Mom E-W	Mom E-W	Rem
Comb	Load	Capa.		Capa		Capa	
	(kips)	(kips)	(kip ft)	(kip ft)	(kip ft)	(kip ft)	
1 - 1.4Dead	15.28	1206.97	1.68	133.37	4.13	325.71	
2 - 1.2Dead + 1.6Live	35.83	1075.06	3.94	118.13	13.54	404.93	
3 - 1.2Dead + Live	27.31	1098.13	3.00	120.77	9.79	392.65	
4 - 1.2Dead + 0.8Wind	8.22	485.34	5.36	316.25	4.66	275.17	
5 - 1.2Dead + Live + 1.6Wind	17.55	614.22	10.72	367.48	6.61	230.20	
6 - 0.9Dead + 1.6Wind	0.06	0.06	10.72	137.28	13.75	175.39	
7 - 1.2Dead + Live + Earthquake	27.23	1105.70	3.00	121.65	9.59	388.46	
8 - 0.9Dead + Earthquake	9.74	1233.70	1.07	135.25	2.46	307.72	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.2		Time	9:25:15 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\Warehouse Spread Footing F2 (uplift).mcs			

DETAIL REPORT FOR F.2



Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.3		Time	9:28:55 AM
Designed By:	CC&V	Engineer	WChan	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\			
Filename:	Warehouse Spread Footing F3 (uplife).mcs			

DETAIL REPORT FOR F.3**PROJECT INFORMATION**

Project Name: Grassy Valley Pipeline Water Tank Ring Wall
Project Number: 11021
Client: CC&V
Project Location: Grassy Valley Pipeline
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 5000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.85
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 0 Earthquake 0 Test 0
 Erection Stability Ratio 1.5
 Operation Stability Ratio 1.5
 Test Stability Ratio 1.5
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 2
 Grade Elevation (ft) 9928

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 9
 Min Long Bar Size 5
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.3		Time	9:28:55 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F3 (uplife).mcs			

DETAIL REPORT FOR F.3**APPLIED LOADS****P1**

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	11.68	1.79	0.00	0.29	0.00
2 - Live	25.44	3.40	0.00	0.68	0.00
3 - Wind	-36.72	-11.71	0.00	-2.91	0.00
4 - Earthquake	-6.34	-2.37	0.00	0.08	0.00

p2

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	8.64	0.48	0.00	0.57	0.00
2 - Live	12.94	1.53	0.00	1.27	0.00
3 - Wind	27.85	-11.72	0.00	-2.63	0.00
4 - Earthquake	6.96	-2.53	0.00	0.08	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.3		Time	9:28:55 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F3 (uplife).mcs			

DETAIL REPORT FOR F.3**UNFACTORED (ALLOWABLE) LOAD COMBINATIONS****P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	11.68	1.79	0.00	0.29	0.00
2 - Dead + Live	37.12	5.19	0.00	0.97	0.00
3 - Dead + 0.75Live	30.76	4.34	0.00	0.80	0.00
4 - Dead + 0.75Live + 0.75Wind	3.22	-4.44	0.00	-1.38	0.00
5 - Dead + Wind	-25.04	-9.92	0.00	-2.62	0.00
6 - 0.6Dead + Wind	-29.71	-10.64	0.00	-2.74	0.00
7 - Dead + 0.75Live + 0.525Earthquake	27.43	3.10	0.00	0.84	0.00
8 - Dead + 0.7Earthquake	7.24	0.13	0.00	0.35	0.00
9 - 0.6Dead + 0.7Earthquake	2.57	-0.58	0.00	0.23	0.00

p2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	8.64	0.48	0.00	0.57	0.00
2 - Dead + Live	21.58	2.01	0.00	1.84	0.00
3 - Dead + 0.75Live	18.35	1.63	0.00	1.52	0.00
4 - Dead + 0.75Live + 0.75Wind	39.23	-7.16	0.00	-0.45	0.00
5 - Dead + Wind	36.49	-11.24	0.00	-2.06	0.00
6 - 0.6Dead + Wind	33.03	-11.43	0.00	-2.29	0.00
7 - Dead + 0.75Live + 0.525Earthquake	22.00	0.30	0.00	1.56	0.00
8 - Dead + 0.7Earthquake	13.51	-1.29	0.00	0.63	0.00
9 - 0.6Dead + 0.7Earthquake	10.06	-1.48	0.00	0.40	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.3		Time	9:28:55 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F3 (uplife).mcs			

DETAIL REPORT FOR F.3**FACTORED (ULTIMATE) LOAD COMBINATIONS****P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	16.35	2.51	0.00	0.41	0.00
2 - 1.2Dead + 1.6Live	54.72	7.59	0.00	1.44	0.00
3 - 1.2Dead + Live	39.46	5.55	0.00	1.03	0.00
4 - 1.2Dead + 0.8Wind	-15.36	-7.22	0.00	-1.98	0.00
5 - 1.2Dead + Live + 1.6Wind	-19.30	-13.19	0.00	-3.63	0.00
6 - 0.9Dead + 1.6Wind	-48.24	-17.13	0.00	-4.40	0.00
7 - 1.2Dead + Live + Earthquake	33.12	3.18	0.00	1.11	0.00
8 - 0.9Dead + Earthquake	4.17	-0.76	0.00	0.34	0.00

p2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	12.10	0.67	0.00	0.80	0.00
2 - 1.2Dead + 1.6Live	31.07	3.02	0.00	2.72	0.00
3 - 1.2Dead + Live	23.31	2.11	0.00	1.95	0.00
4 - 1.2Dead + 0.8Wind	32.65	-8.80	0.00	-1.42	0.00
5 - 1.2Dead + Live + 1.6Wind	67.87	-16.65	0.00	-2.25	0.00
6 - 0.9Dead + 1.6Wind	52.34	-18.32	0.00	-3.70	0.00
7 - 1.2Dead + Live + Earthquake	30.27	-0.42	0.00	2.03	0.00
8 - 0.9Dead + Earthquake	14.74	-2.10	0.00	0.59	0.00

BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	0.73	5.48	0.10	0.30	46.29	15.03	
2 - Dead + Live	1.11	5.48	0.21	1.07	205.80	41.35	
3 - Dead + 0.75Live	1.01	5.48	0.19	0.90	165.92	34.77	
4 - Dead + 0.75Live + 0.75Wind	1.12	5.48	0.02	2.50	441.36	3.49	
5 - Dead + Wind	1.33	5.48	0.18	5.24	763.42	26.67	
6 - 0.6Dead + Wind	1.42	5.48	0.39	9.32	781.94	32.69	
7 - Dead + 0.75Live + 0.525Earthquake	0.94	5.48	0.19	0.42	78.09	35.46	
8 - Dead + 0.7Earthquake	0.76	5.48	0.10	0.46	70.82	15.96	
9 - 0.6Dead + 0.7Earthquake	0.49	5.48	0.11	0.96	89.34	9.95	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
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Designed By:	CC&V	Engineer	WChan	Checker
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DETAIL REPORT FOR F.3**STABILITY RATIO / SLIDING SAFETY FACTOR**

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead	100.00	100.00	1.50	100.00	43.84	1.50	
2 - Dead + Live	38.19	54.37	1.50	63.95	16.49	1.50	
3 - Dead + 0.75Live	44.04	62.91	1.50	75.30	19.09	1.50	
4 - Dead + 0.75Live + 0.75Wind	56.35	28.21	1.50	93.62	9.53	1.50	
5 - Dead + Wind	4.94	2.84	1.50	33.35	4.49	1.50	
6 - 0.6Dead + Wind	2.85	1.53	1.50	24.91	2.91	1.50	
7 - Dead + 0.75Live + 0.525Earthquake	42.58	100.00	1.50	72.74	33.60	1.50	
8 - Dead + 0.7Earthquake	89.95	100.00	1.50	100.00	85.97	1.50	
9 - 0.6Dead + 0.7Earthquake	83.68	91.44	1.50	100.00	33.27	1.50	

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DETAIL REPORT FOR F.3**FOOTING DESIGN INFORMATION**

E-W Dim (ft)	30.00
N-S Dim (ft)	8.00
Thickness (ft)	2.00

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	8	7	12	0.6	0.23	-16.98	E-W
6. 0.9Dead + 1.6Wind	30	7	12	0.6	0	-0.28	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
6. 0.9Dead + 1.6Wind	8	7	12	0.6	0.52	19.88	E-W
2. 1.2Dead + 1.6Live	30	7	12	0.6	0.52	1.7	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	51.76	14.07	189.74	

p2

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
5. 1.2Dead + Live + 1.6Wind	67.49	18.35	189.74	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
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DETAIL REPORT FOR F.3**MAXIMUM SHEAR - E-W DIRECTION**

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	7.67	-9.68	5.04	94.87	
2 - 1.2Dead + 1.6Live	7.67	-23.02	11.99	94.87	
3 - 1.2Dead + Live	7.67	-17.50	9.12	94.87	
4 - 1.2Dead + 0.8Wind	2.33	10.49	5.47	94.87	
5 - 1.2Dead + Live + 1.6Wind	2.33	19.94	10.38	94.87	
6 - 0.9Dead + 1.6Wind	2.33	27.15	14.14	94.87	
7 - 1.2Dead + Live + Earthquake	7.67	-17.94	9.34	94.87	
8 - 0.9Dead + Earthquake	7.67	-6.66	3.47	94.87	

MAXIMUM SHEAR - N-S DIRECTION

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	7.16	-5.49	0.76	94.87	
2 - 1.2Dead + 1.6Live	7.16	-14.10	1.96	94.87	
3 - 1.2Dead + Live	7.16	-10.58	1.47	94.87	
4 - 1.2Dead + 0.8Wind	1.50	6.56	0.91	94.87	
5 - 1.2Dead + Live + 1.6Wind	1.50	13.22	1.84	94.87	
6 - 0.9Dead + 1.6Wind	1.50	8.02	1.11	94.87	
7 - 1.2Dead + Live + Earthquake	7.16	-10.74	1.49	94.87	
8 - 0.9Dead + Earthquake	7.16	-3.69	0.51	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
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DETAIL REPORT FOR F.3**PIER/BASE PLATE DESIGN INFORMATION**

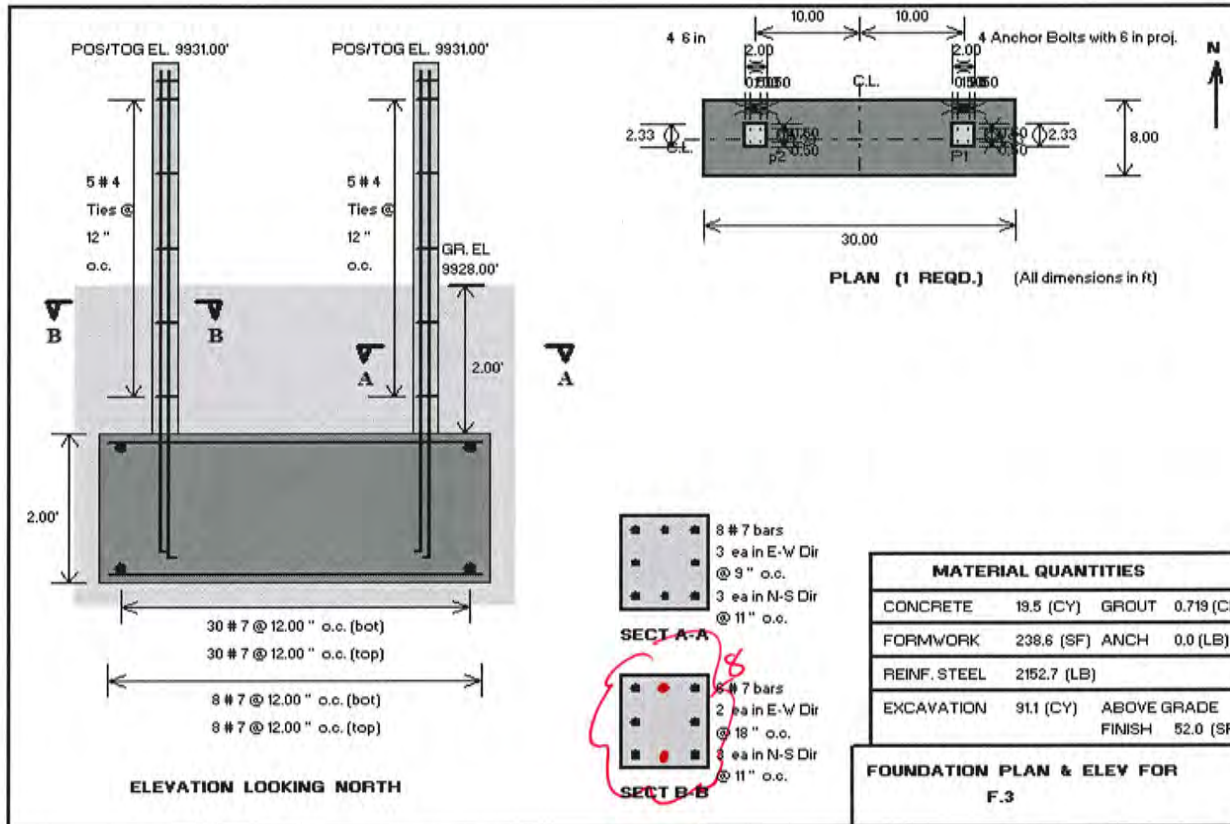
	P1	p2
E-W Dim (ft)	2.00	2.00
N-S Dim (ft)	2.33	2.33
Height above grade (ft)	3.00	3.00
E-W Offset (ft)	10.00	-10.00
N-S Offset (ft)	0.33	0.33
Requested Reinf. Ratio	0.0050	0.0050
Provided Reinf. Ratio	0.0072	0.0054
Long Bar Size	7	7
Bars in E-W Dir	3	2
Bars in N-S Dir	3	3
Total Long Bars	8	6
Tie Bar Size	4	4
Total No. of Ties	6	6
Major Tie Spacing (in)	12	12

PIER ULTIMATE LOAD CAPACITIES

P1							
Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	Rem
1 - 1.4Dead	21.24	744.49	12.53	434.58	2.55	89.12	
2 - 1.2Dead + 1.6Live	58.91	691.25	37.94	439.74	7.18	84.15	
3 - 1.2Dead + Live	43.65	699.77	27.74	439.43	5.24	83.86	
4 - 1.2Dead + 0.8Wind	-11.17	-55.38	36.10	178.80	9.90	49.00	
5 - 1.2Dead + Live + 1.6Wind	-15.10	-43.16	65.94	188.54	18.14	51.89	
6 - 0.9Dead + 1.6Wind	-45.09	-82.28	85.62	157.43	21.98	40.59	
7 - 1.2Dead + Live + Earthquake	37.31	921.19	15.89	389.86	5.54	136.60	
8 - 0.9Dead + Earthquake	7.32	767.69	3.79	394.00	1.70	178.67	

p2							
Load Comb	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	Rem
1 - 1.4Dead	16.99	1129.96	3.36	223.76	3.99	264.70	
2 - 1.2Dead + 1.6Live	35.27	742.74	15.12	315.51	13.58	284.15	
3 - 1.2Dead + Live	27.50	809.13	10.53	307.83	9.77	285.79	
4 - 1.2Dead + 0.8Wind	36.84	1.49	44.00	168.62	7.10	65.71	Cap Exc.
5 - 1.2Dead + Live + 1.6Wind	72.06	1.34	83.23	168.36	11.27	68.21	Cap Exc.
6 - 0.9Dead + 1.6Wind	55.48	-37.80	91.60	140.16	18.48	48.59	Cap Exc.
7 - 1.2Dead + Live + Earthquake	34.46	275.27	3.79	305.94	10.17	124.98	
8 - 0.9Dead + Earthquake	17.88	52.91	10.49	190.81	2.96	28.20	

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DETAIL REPORT FOR F.3

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Filename:	Warehouse Spread Footing F4 (uplift).mcs			

DETAIL REPORT FOR F.4**PROJECT INFORMATION**

Project Name: Grassy Valley Pipeline Water Tank Ring Wall
Project Number: 11021
Client: CC&V
Project Location: Grassy Valley Pipeline
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 5000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.85
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 0 Earthquake 0 Test 0
 Erection Stability Ratio 1.5
 Operation Stability Ratio 1.5
 Test Stability Ratio 1.5
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 2
 Grade Elevation (ft) 9928

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 9
 Min Long Bar Size 5
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

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DETAIL REPORT FOR F.4**APPLIED LOADS**

P1

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	11.84	-0.88	0.00	-1.21	0.00
2 - Live	26.91	-1.52	0.00	2.97	0.00
3 - Wind	-15.41	6.61	0.00	3.81	0.00
4 - Earthquake	-6.70	2.21	0.00	2.05	0.00

UNFACTORED (ALLOWABLE) LOAD COMBINATIONS

P1

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	11.84	-0.88	0.00	-1.21	0.00
2 - Dead + Live	38.75	-2.40	0.00	1.76	0.00
3 - Dead + 0.75Live	32.02	-2.02	0.00	1.02	0.00
4 - Dead + 0.75Live + 0.75Wind	20.47	2.94	0.00	3.88	0.00
5 - Dead + Wind	-3.57	5.73	0.00	2.60	0.00
6 - 0.6Dead + Wind	-8.31	6.08	0.00	3.08	0.00
7 - Dead + 0.75Live + 0.525Earthquake	28.51	-0.86	0.00	2.09	0.00
8 - Dead + 0.7Earthquake	7.15	0.67	0.00	0.22	0.00
9 - 0.6Dead + 0.7Earthquake	2.41	1.02	0.00	0.71	0.00

FACTORED (ULTIMATE) LOAD COMBINATIONS

P1

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	16.58	-1.23	0.00	-1.69	0.00
2 - 1.2Dead + 1.6Live	57.26	-3.49	0.00	3.30	0.00
3 - 1.2Dead + Live	41.12	-2.58	0.00	1.52	0.00
4 - 1.2Dead + 0.8Wind	1.88	4.23	0.00	1.60	0.00
5 - 1.2Dead + Live + 1.6Wind	16.46	8.00	0.00	7.61	0.00
6 - 0.9Dead + 1.6Wind	-14.00	9.78	0.00	5.01	0.00
7 - 1.2Dead + Live + Earthquake	34.42	-0.37	0.00	3.57	0.00
8 - 0.9Dead + Earthquake	3.96	1.42	0.00	0.96	0.00

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DETAIL REPORT FOR F.4**BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD**

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	0.79	5.48	0.15	0.02	1.10	8.47	
2 - Dead + Live	1.17	5.48	0.15	0.03	2.86	12.32	
3 - Dead + 0.75Live	1.04	5.48	0.09	0.03	2.42	7.12	
4 - Dead + 0.75Live + 0.75Wind	1.28	5.48	0.41	0.43	28.47	27.13	
5 - Dead + Wind	1.00	5.48	0.43	0.94	40.09	18.20	
6 - 0.6Dead + Wind	0.86	5.48	1.11	2.09	40.53	21.59	
7 - Dead + 0.75Live + 0.525Earthquake	1.08	5.48	0.20	0.06	4.54	14.66	
8 - Dead + 0.7Earthquake	0.74	5.48	0.03	0.15	8.18	1.57	
9 - 0.6Dead + 0.7Earthquake	0.48	5.48	0.16	0.29	8.62	4.96	

STABILITY RATIO / SLIDING SAFETY FACTOR

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead	30.79	43.10	1.50	44.57	61.28	1.50	
2 - Dead + Live	31.00	23.54	1.50	38.28	28.08	1.50	
3 - Dead + 0.75Live	49.37	25.67	1.50	62.92	31.69	1.50	
4 - Dead + 0.75Live + 0.75Wind	11.05	14.20	1.50	15.03	19.83	1.50	
5 - Dead + Wind	6.06	3.76	1.50	17.78	8.07	1.50	
6 - 0.6Dead + Wind	2.11	1.61	1.50	11.23	5.69	1.50	
7 - Dead + 0.75Live + 0.525Earthquake	22.91	57.49	1.50	29.74	72.42	1.50	
8 - Dead + 0.7Earthquake	100.00	50.67	1.50	100.00	77.33	1.50	
9 - 0.6Dead + 0.7Earthquake	27.28	18.80	1.50	56.40	39.24	1.50	

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Filename: Warehouse Spread Footing F4 (uplift).mcs		

DETAIL REPORT FOR F.4**FOOTING DESIGN INFORMATION**

E-W Dim (ft)	9.00
N-S Dim (ft)	9.00
Thickness (ft)	2.00

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
6. 0.9Dead + 1.6Wind	9	7	12	0.6	0.04	-3.15	E-W
6. 0.9Dead + 1.6Wind	9	7	12	0.6	0.03	-2.13	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	9	7	12	0.6	0.52	5.26	E-W
2. 1.2Dead + 1.6Live	9	7	12	0.6	0.52	5.51	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	49.28	13.40	189.74	

MAXIMUM SHEAR - E-W DIRECTION

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	2.00	4.94	2.29	94.87	
2 - 1.2Dead + 1.6Live	2.00	14.12	6.54	94.87	
3 - 1.2Dead + Live	2.00	10.42	4.82	94.87	
4 - 1.2Dead + 0.8Wind	7.66	-3.57	1.65	94.87	
5 - 1.2Dead + Live + 1.6Wind	7.66	-8.37	3.88	94.87	
6 - 0.9Dead + 1.6Wind	2.00	-8.94	4.14	94.87	
7 - 1.2Dead + Live + Earthquake	2.00	7.40	3.43	94.87	
8 - 0.9Dead + Earthquake	7.66	-2.09	0.97	94.87	

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DETAIL REPORT FOR F.4

MAXIMUM SHEAR - N-S DIRECTION

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	1.83	5.66	2.62	94.87	
2 - 1.2Dead + 1.6Live	7.17	-15.02	6.95	94.87	
3 - 1.2Dead + Live	7.17	-10.38	4.81	94.87	
4 - 1.2Dead + 0.8Wind	7.17	-2.45	1.13	94.87	
5 - 1.2Dead + Live + 1.6Wind	7.17	-9.97	4.62	94.87	
6 - 0.9Dead + 1.6Wind	1.83	-6.00	2.78	94.87	
7 - 1.2Dead + Live + Earthquake	7.17	-10.57	4.89	94.87	
8 - 0.9Dead + Earthquake	7.17	-2.17	1.01	94.87	

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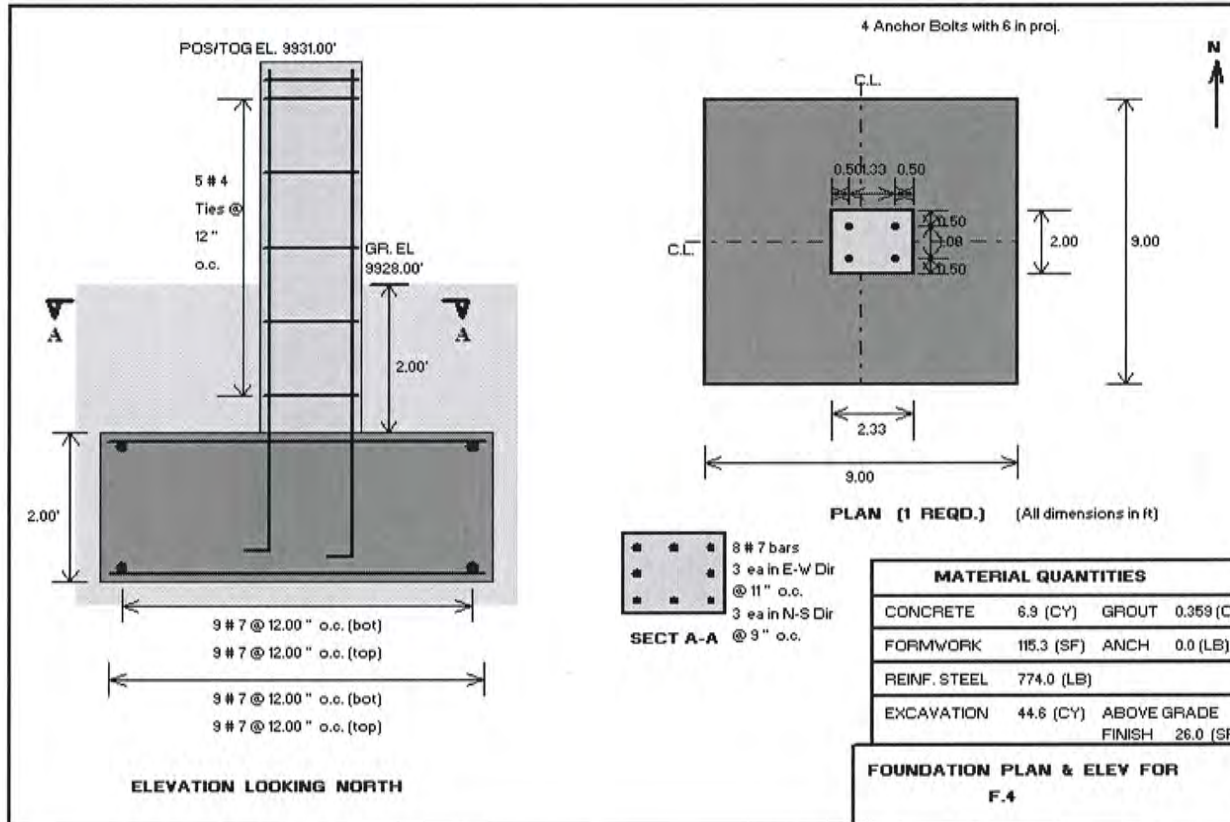
DETAIL REPORT FOR F.4**PIER/BASE PLATE DESIGN INFORMATION**

	P1
E-W Dim (ft)	2.33
N-S Dim (ft)	2.00
Height above grade (ft)	3.00
E-W Offset (ft)	0.33
N-S Offset (ft)	0.00
Requested Reinf. Ratio	0.0050
Provided Reinf. Ratio	0.0072
Long Bar Size	7
Bars in E-W Dir	3
Bars in N-S Dir	3
Total Long Bars	8
Tie Bar Size	4
Total No. of Ties	6
Major Tie Spacing (in)	12

PIER ULTIMATE LOAD CAPACITIES

	P1						
Load	Axial	Axial	Mom N-S	Mom N-S	Mom E-W	Mom E-W	Rem
Comb	Load	Capa.		Capa		Capa	
	(kips)	(kips)	(kip ft)	(kip ft)	(kip ft)	(kip ft)	
1 - 1.4Dead	21.47	867.50	6.16	248.03	8.47	340.34	
2 - 1.2Dead + 1.6Live	61.46	1018.61	17.44	288.66	16.50	272.61	
3 - 1.2Dead + Live	45.31	1133.72	12.88	321.50	7.59	190.37	
4 - 1.2Dead + 0.8Wind	6.07	83.31	21.16	289.45	7.98	109.08	
5 - 1.2Dead + Live + 1.6Wind	20.66	122.21	40.00	236.43	38.07	224.97	
6 - 0.9Dead + 1.6Wind	-10.85	-46.32	48.92	209.26	25.03	107.11	
7 - 1.2Dead + Live + Earthquake	38.61	890.50	4.63	106.96	17.84	408.17	
8 - 0.9Dead + Earthquake	7.10	334.38	7.09	329.79	4.80	224.75	

Dimensional Solutions FOUNDATION3D	Version 5.8.2	Date 11/10/2011
Foundation Name F.4	Engineer WChan	Time 10:07:48 AM
Designed By: CC&V	Checker	
P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\		
Filename:	Warehouse Spread Footing F4 (uplift).mcs	

DETAIL REPORT FOR F.4

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\			
Filename:	Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5**PROJECT INFORMATION**

Project Name: Grassy Valley Pipeline Water Tank Ring Wall
Project Number: 11021
Client: CC&V
Project Location: Grassy Valley Pipeline
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 5000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.85
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 0 Earthquake 0 Test 0
 Erection Stability Ratio 1.5
 Operation Stability Ratio 1.5
 Test Stability Ratio 1.5
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 1
 Grade Elevation (ft) 9928

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 9
 Min Long Bar Size 5
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\			
Filename:	Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5**APPLIED LOADS****P1**

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	22.21	2.22	0.00	-0.12	0.00
2 - Live	40.35	3.97	0.00	-0.26	0.00
3 - Wind	-45.24	-11.71	0.00	0.11	0.00
4 - Earthquake	-6.01	-2.22	0.00	0.08	0.00

p2

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	23.21	-1.85	0.00	-0.20	0.00
2 - Live	44.78	-3.78	0.00	-0.43	0.00
3 - Wind	13.94	-9.34	0.00	0.18	0.00
4 - Earthquake	6.47	-2.36	0.00	0.07	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5**UNFACTORED (ALLOWABLE) LOAD COMBINATIONS****P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	22.21	2.22	0.00	-0.12	0.00
2 - Dead + Live	62.56	6.19	0.00	-0.38	0.00
3 - Dead + 0.75Live	52.47	5.20	0.00	-0.32	0.00
4 - Dead + 0.75Live + 0.75Wind	18.54	-3.59	0.00	-0.23	0.00
5 - Dead + Wind	-23.03	-9.49	0.00	-0.01	0.00
6 - 0.6Dead + Wind	-31.91	-10.38	0.00	0.04	0.00
7 - Dead + 0.75Live + 0.525Earthquake	49.32	4.03	0.00	-0.27	0.00
8 - Dead + 0.7Earthquake	18.00	0.67	0.00	-0.06	0.00
9 - 0.6Dead + 0.7Earthquake	9.12	-0.22	0.00	-0.02	0.00

p2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	23.21	-1.85	0.00	-0.20	0.00
2 - Dead + Live	67.99	-5.63	0.00	-0.63	0.00
3 - Dead + 0.75Live	56.80	-4.69	0.00	-0.52	0.00
4 - Dead + 0.75Live + 0.75Wind	67.25	-11.69	0.00	-0.39	0.00
5 - Dead + Wind	37.15	-11.19	0.00	-0.02	0.00
6 - 0.6Dead + Wind	27.87	-10.45	0.00	0.06	0.00
7 - Dead + 0.75Live + 0.525Earthquake	60.19	-5.92	0.00	-0.49	0.00
8 - Dead + 0.7Earthquake	27.74	-3.50	0.00	-0.15	0.00
9 - 0.6Dead + 0.7Earthquake	18.46	-2.76	0.00	-0.07	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5**FACTORED (ULTIMATE) LOAD COMBINATIONS****P1**

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	31.09	3.11	0.00	-0.17	0.00
2 - 1.2Dead + 1.6Live	91.21	9.02	0.00	-0.56	0.00
3 - 1.2Dead + Live	67.00	6.63	0.00	-0.40	0.00
4 - 1.2Dead + 0.8Wind	-9.54	-6.70	0.00	-0.06	0.00
5 - 1.2Dead + Live + 1.6Wind	-5.38	-12.10	0.00	-0.23	0.00
6 - 0.9Dead + 1.6Wind	-52.40	-16.74	0.00	0.07	0.00
7 - 1.2Dead + Live + Earthquake	60.99	4.41	0.00	-0.32	0.00
8 - 0.9Dead + Earthquake	13.98	-0.22	0.00	-0.03	0.00

p2

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	32.49	-2.59	0.00	-0.28	0.00
2 - 1.2Dead + 1.6Live	99.50	-8.27	0.00	-0.93	0.00
3 - 1.2Dead + Live	72.63	-6.00	0.00	-0.67	0.00
4 - 1.2Dead + 0.8Wind	39.00	-9.69	0.00	-0.10	0.00
5 - 1.2Dead + Live + 1.6Wind	94.94	-20.94	0.00	-0.38	0.00
6 - 0.9Dead + 1.6Wind	43.19	-16.61	0.00	0.11	0.00
7 - 1.2Dead + Live + Earthquake	79.10	-8.36	0.00	-0.60	0.00
8 - 0.9Dead + Earthquake	27.36	-4.03	0.00	-0.11	0.00

BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	0.71	5.48	0.01	0.04	7.41	2.24	
2 - Dead + Live	1.04	5.48	0.02	0.17	50.38	7.07	
3 - Dead + 0.75Live	0.96	5.48	0.02	0.14	39.64	5.86	
4 - Dead + 0.75Live + 0.75Wind	1.24	5.48	0.02	2.36	594.00	4.34	
5 - Dead + Wind	1.10	5.48	0.00	4.14	746.56	0.21	
6 - 0.6Dead + Wind	0.88	5.48	0.01	7.78	743.60	0.69	
7 - Dead + 0.75Live + 0.525Earthquake	1.01	5.48	0.02	0.44	121.99	5.31	
8 - Dead + 0.7Earthquake	0.78	5.48	0.01	0.55	117.21	1.51	
9 - 0.6Dead + 0.7Earthquake	0.50	5.48	0.00	0.90	114.25	0.61	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5**STABILITY RATIO / SLIDING SAFETY FACTOR**

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead	100.00	100.00	1.50	100.00	100.00	1.50	
2 - Dead + Live	100.00	100.00	1.50	100.00	100.00	1.50	
3 - Dead + 0.75Live	100.00	100.00	1.50	100.00	100.00	1.50	
4 - Dead + 0.75Live + 0.75Wind	100.00	30.78	1.50	100.00	10.06	1.50	
5 - Dead + Wind	8.81	3.72	1.50	100.00	5.70	1.50	
6 - 0.6Dead + Wind	3.98	1.73	1.50	100.00	3.63	1.50	
7 - Dead + 0.75Live + 0.525Earthquake	100.00	97.75	1.50	100.00	87.48	1.50	
8 - Dead + 0.7Earthquake	100.00	100.00	1.50	100.00	47.12	1.50	
9 - 0.6Dead + 0.7Earthquake	100.00	86.89	1.50	100.00	30.61	1.50	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5**FOOTING DESIGN INFORMATION**

E-W Dim (ft) 30.00
 N-S Dim (ft) 10.00
 Thickness (ft) 2.00

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	10	7	12	0.6	0.43	-30.79	E-W
6. 0.9Dead + 1.6Wind	30	7	12	0.6	0	-0.12	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
6. 0.9Dead + 1.6Wind	10	7	12	0.6	0.52	12.58	E-W
2. 1.2Dead + 1.6Live	30	7	12	0.6	0.52	5.4	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	85.36	24.25	189.74	

p2

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	93.18	26.47	189.74	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5**MAXIMUM SHEAR - E-W DIRECTION**

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	7.67	-17.90	7.46	94.87	
2 - 1.2Dead + 1.6Live	7.67	-49.57	20.65	94.87	
3 - 1.2Dead + Live	7.67	-36.73	15.31	94.87	
4 - 1.2Dead + 0.8Wind	2.33	11.46	4.78	94.87	
5 - 1.2Dead + Live + 1.6Wind	7.67	-26.84	11.18	94.87	
6 - 0.9Dead + 1.6Wind	2.33	20.26	8.44	94.87	
7 - 1.2Dead + Live + Earthquake	7.67	-37.12	15.47	94.87	
8 - 0.9Dead + Earthquake	7.67	-11.89	4.96	94.87	

MAXIMUM SHEAR - N-S DIRECTION

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	2.33	17.13	2.38	94.87	
2 - 1.2Dead + 1.6Live	2.33	47.30	6.57	94.87	
3 - 1.2Dead + Live	2.33	35.07	4.87	94.87	
4 - 1.2Dead + 0.8Wind	2.33	8.67	1.20	94.87	
5 - 1.2Dead + Live + 1.6Wind	2.33	23.03	3.20	94.87	
6 - 0.9Dead + 1.6Wind	2.33	-1.02	0.14	94.87	
7 - 1.2Dead + Live + Earthquake	2.33	35.06	4.87	94.87	
8 - 0.9Dead + Earthquake	2.33	11.01	1.53	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5**PIER/BASE PLATE DESIGN INFORMATION**

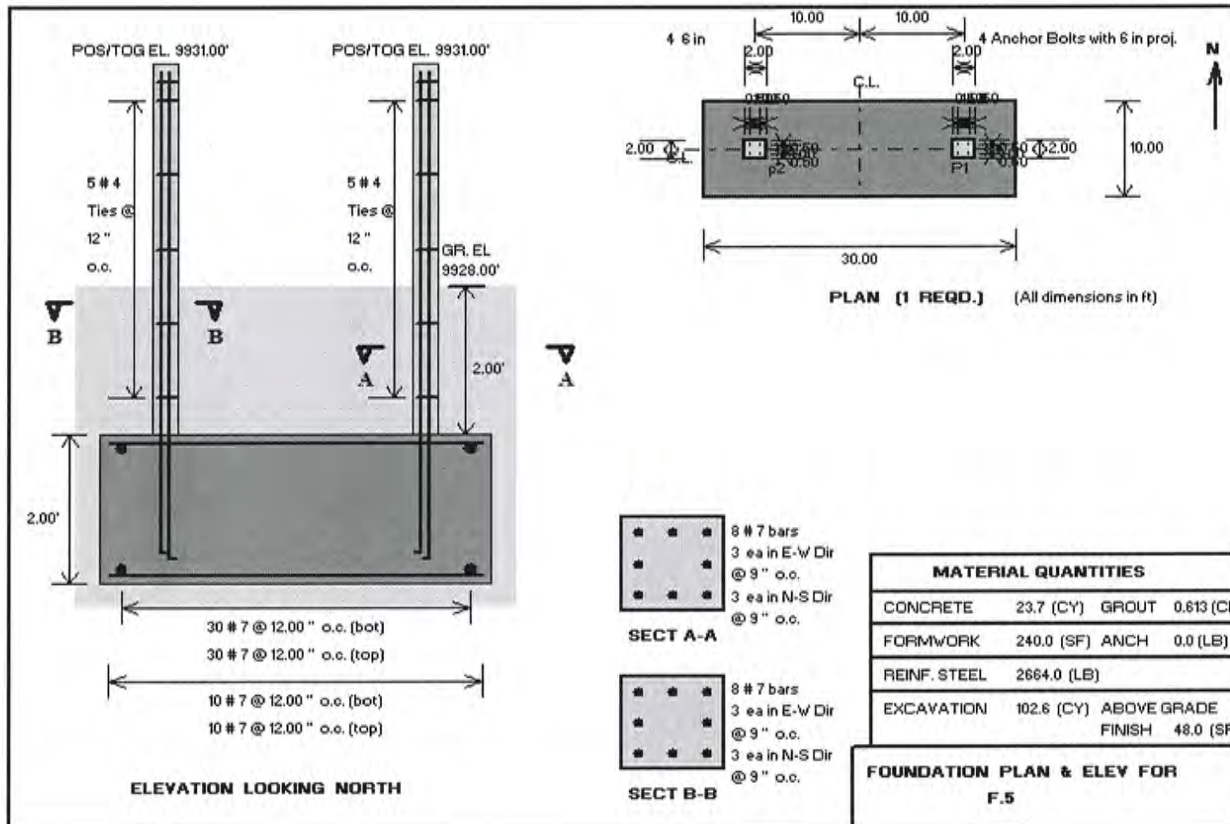
	P1	p2
E-W Dim (ft)	2.00	2.00
N-S Dim (ft)	2.00	2.00
Height above grade (ft)	3.00	3.00
E-W Offset (ft)	10.00	-10.00
N-S Offset (ft)	0.00	0.00
Requested Reinf. Ratio	0.0050	0.0050
Provided Reinf. Ratio	0.0084	0.0084
Long Bar Size	7	7
Bars in E-W Dir	3	3
Bars in N-S Dir	3	3
Total Long Bars	8	8
Tie Bar Size	4	4
Total No. of Ties	6	6
Major Tie Spacing (in)	12	12

PIER ULTIMATE LOAD CAPACITIES

Load Comb	P1						Rem
	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	
1 - 1.4Dead	35.29	798.87	15.54	349.78	3.88	87.81	
2 - 1.2Dead + 1.6Live	94.81	761.05	45.08	359.76	10.43	83.63	
3 - 1.2Dead + Live	70.60	767.00	33.17	358.29	7.77	84.29	
4 - 1.2Dead + 0.8Wind	-5.94	-34.50	33.52	194.73	-0.65	-3.80	
5 - 1.2Dead + Live + 1.6Wind	-1.78	-1.80	60.51	222.07	1.14	4.19	
6 - 0.9Dead + 1.6Wind	-49.70	-89.31	83.69	150.69	-5.47	-9.84	
7 - 1.2Dead + Live + Earthquake	64.59	914.61	22.07	311.43	7.11	100.47	
8 - 0.9Dead + Earthquake	16.68	1159.96	1.83	137.37	1.83	137.37	

Load Comb	p2						Rem
	Axial Load (kips)	Axial Capa. (kips)	Mom N-S (kip ft)	Mom N-S Capa (kip ft)	Mom E-W (kip ft)	Mom E-W Capa (kip ft)	
1 - 1.4Dead	36.69	978.38	12.95	282.20	4.04	107.77	
2 - 1.2Dead + 1.6Live	103.10	936.90	41.34	301.80	11.34	102.96	
3 - 1.2Dead + Live	76.23	943.19	30.00	298.97	8.39	103.68	
4 - 1.2Dead + 0.8Wind	42.60	855.76	48.46	331.81	4.69	94.24	
5 - 1.2Dead + Live + 1.6Wind	98.54	1096.00	104.72	216.77	10.84	118.42	
6 - 0.9Dead + 1.6Wind	45.89	89.21	83.05	259.51	5.05	11.71	
7 - 1.2Dead + Live + Earthquake	82.70	1079.42	41.80	226.56	9.10	117.87	
8 - 0.9Dead + Earthquake	30.06	1146.39	20.13	180.25	3.31	123.03	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.5		Time	10:13:26 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\ Warehouse Spread Footing F5 (uplift).mcs			

DETAIL REPORT FOR F.5

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.6		Time	10:18:56 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_StructC-003 Warehouse Area\Warehouse Spread Footing F6 (uplift).mcs			

DETAIL REPORT FOR F.6**PROJECT INFORMATION**

Project Name: Grassy Valley Pipeline Water Tank Ring Wall
Project Number: 11021
Client: CC&V
Project Location: Grassy Valley Pipeline
Foundation Description: FOUNDATION

DESIGN CODE ACI 318 - 2008 **INPUT UNITS** English **OUTPUT UNITS** English

CONCRETE PARAMETERS:

Compressive Strength (psi) 4000
 Unit Weight (pcf) 150
 Pier Concrete Cover - E-W Dir (in) 2
 Pier Concrete Cover - N-S Dir (in) 2
 Footing Side Concrete Cover - E-W Dir (in) 3
 Footing Side Concrete Cover - N-S Dir (in) 3
 Footing Top Concrete Cover (in) 2
 Footing Bottom Concrete Cover - X Dir (in) 3

SOIL PARAMETERS:

Unit Weight (pcf) 120
 Allowable Net Bearing Capacity (psf) 5000
 Bearing Capacity Method Linear Soil Pressure
 Soil Type Granular
 Passive Pressure Coefficient Kp 3.85
 Soil To Concrete Friction f 0.5
 Allowable Increase in Soil Pressure due to Short Term Loads (%)
 Wind 0 Earthquake 0 Test 0
 Erection Stability Ratio 1.5
 Operation Stability Ratio 1.5
 Test Stability Ratio 1.5
 Safety Factor against Lateral Forces 1.5

MINIMUM FOUNDATION CRITERIA:

Depth of Footing Below Grade (ft) 4
 Minimum Soil Cover (ft) 2
 Grade Elevation (ft) 9928

REINFORCING STEEL PARAMETERS:

Yield Strength (ksi) 60
 Unit Weight (pcf) 490
 Modulus of Elasticity (ksi) 29000
 Pier Min Rebar Spacing (in) 3
 Footing Min Rebar Spacing (in) 6
 Footing Max Rebar Spacing (in) 18

REBAR PARAMETERS:

Max Long Bar Size 9
 Min Long Bar Size 5
 Max Tie Bar Size 4
 Min Tie Bar Size 3
 Max Ftg Bar Size 18
 Temp & Shrinkage Steel Ratio 0.0018

BUOYANCY CRITERIA:

Consider Buoyancy: No
 Consider soil for buoyancy: No
 Water table below grade (ft) 0

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.6		Time	10:18:56 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\ Warehouse Spread Footing F6 (uplift).mcs			

DETAIL REPORT FOR F.6**APPLIED LOADS**

P1

Load Case	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	19.34	0.00	0.00	-0.20	0.00
2 - Live	38.88	-0.43	0.00	0.00	0.00
3 - Wind	-16.39	0.00	0.00	0.18	0.00
4 - Earthquake	-0.20	-0.05	0.00	0.04	0.00

UNFACTORED (ALLOWABLE) LOAD COMBINATIONS

P1

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - Dead	19.34	0.00	0.00	-0.20	0.00
2 - Dead + Live	58.22	-0.43	0.00	-0.20	0.00
3 - Dead + 0.75Live	48.50	-0.32	0.00	-0.20	0.00
4 - Dead + 0.75Live + 0.75Wind	36.21	-0.32	0.00	-0.07	0.00
5 - Dead + Wind	2.95	0.00	0.00	-0.02	0.00
6 - 0.6Dead + Wind	-4.79	0.00	0.00	0.06	0.00
7 - Dead + 0.75Live + 0.525Earthquake	48.40	-0.35	0.00	-0.18	0.00
8 - Dead + 0.7Earthquake	19.20	-0.04	0.00	-0.17	0.00
9 - 0.6Dead + 0.7Earthquake	11.46	-0.04	0.00	-0.09	0.00

FACTORED (ULTIMATE) LOAD COMBINATIONS

P1

Load Comb	Axial (kips)	Shear E-W (kips)	Mom N-S (kip ft)	Shear N-S (kips)	Mom E-W (kip ft)
1 - 1.4Dead	27.08	0.00	0.00	-0.28	0.00
2 - 1.2Dead + 1.6Live	85.42	-0.69	0.00	-0.24	0.00
3 - 1.2Dead + Live	62.09	-0.43	0.00	-0.24	0.00
4 - 1.2Dead + 0.8Wind	10.10	0.00	0.00	-0.10	0.00
5 - 1.2Dead + Live + 1.6Wind	35.86	-0.43	0.00	0.05	0.00
6 - 0.9Dead + 1.6Wind	-8.82	0.00	0.00	0.11	0.00
7 - 1.2Dead + Live + Earthquake	61.89	-0.48	0.00	-0.20	0.00
8 - 0.9Dead + Earthquake	17.21	-0.05	0.00	-0.14	0.00

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.6		Time	10:18:56 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\Warehouse Spread Footing F6 (uplift).mcs			

DETAIL REPORT FOR F.6**BEARING CAPACITY - LINEAR SOIL PRESSURE METHOD**

Load Comb	Max Pressure (ksf)	All Pressure (ksf)	Ecc N/S Dir (ft)	Ecc E/W Dir (ft)	Moment N/S axis (kip-ft)	Moment E/W axis (kip-ft)	Rem
1 - Dead	1.43	5.48	0.04	0.00	0.00	1.20	
2 - Dead + Live	3.11	5.48	0.02	0.04	2.58	1.20	
3 - Dead + 0.75Live	2.69	5.48	0.02	0.03	1.94	1.20	
4 - Dead + 0.75Live + 0.75Wind	2.16	5.48	0.01	0.04	1.94	0.39	
5 - Dead + Wind	0.72	5.48	0.01	0.00	0.00	0.12	
6 - 0.6Dead + Wind	0.18	5.48	0.09	0.00	0.00	0.36	
7 - Dead + 0.75Live + 0.525Earthquake	2.69	5.48	0.02	0.03	2.09	1.07	
8 - Dead + 0.7Earthquake	1.43	5.48	0.03	0.01	0.21	1.03	
9 - 0.6Dead + 0.7Earthquake	0.85	5.48	0.03	0.01	0.21	0.55	

STABILITY RATIO / SLIDING SAFETY FACTOR

Load Comb	S.R. N/S Dir	S.R. E/W Dir	All S.R.	Sliding FS - N/S	Sliding FS - E/W	All FS	Remarks
1 - Dead	71.42	100.00	1.50	100.00	100.00	1.50	
2 - Dead + Live	100.00	70.89	1.50	100.00	100.00	1.50	
3 - Dead + 0.75Live	100.00	81.96	1.50	100.00	100.00	1.50	
4 - Dead + 0.75Live + 0.75Wind	100.00	66.08	1.50	100.00	100.00	1.50	
5 - Dead + Wind	100.00	100.00	1.50	100.00	100.00	1.50	
6 - 0.6Dead + Wind	1.82	100.00	1.50	100.00	100.00	1.50	
7 - Dead + 0.75Live + 0.525Earthquake	100.00	75.67	1.50	100.00	100.00	1.50	
8 - Dead + 0.7Earthquake	82.70	100.00	1.50	100.00	100.00	1.50	
9 - 0.6Dead + 0.7Earthquake	92.52	100.00	1.50	100.00	100.00	1.50	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.6		Time	10:18:56 AM
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Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\Warehouse Spread Footing F6 (uplift).mcs			

DETAIL REPORT FOR F.6**FOOTING DESIGN INFORMATION**

E-W Dim (ft)	5.00
N-S Dim (ft)	5.00
Thickness (ft)	2.00

Top Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
6. 0.9Dead + 1.6Wind	5	7	12	0.6	0	-0.3	E-W
6. 0.9Dead + 1.6Wind	5	7	12	0.6	0	-0.33	N-S

Bottom Steel

Governing Combination	No of Bars	Bar Size	Bar Spac (in)	Area Prov (sq in/ft)	Area Req (sq in/ft)	Moment (kip ft/ft)	Direction
2. 1.2Dead + 1.6Live	5	7	12	0.6	0.52	4.15	E-W
2. 1.2Dead + 1.6Live	5	7	12	0.6	0.52	4.04	N-S

PUNCHING SHEAR**P1**

Control Comb	Net Ult Load (kips)	Punch. Stress (psi)	All Stress (psi)	Rem
2. 1.2Dead + 1.6Live	40.28	11.44	189.74	

MAXIMUM SHEAR - E-W DIRECTION

Load Comb	Left Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	3.50	-9.13	7.61	94.87	
2 - 1.2Dead + 1.6Live	1.50	27.53	22.94	94.87	
3 - 1.2Dead + Live	1.50	20.14	16.78	94.87	
4 - 1.2Dead + 0.8Wind	3.50	-3.89	3.24	94.87	
5 - 1.2Dead + Live + 1.6Wind	1.50	12.27	10.23	94.87	
6 - 0.9Dead + 1.6Wind	1.50	-2.00	1.67	94.87	
7 - 1.2Dead + Live + Earthquake	1.50	20.16	16.80	94.87	
8 - 0.9Dead + Earthquake	1.50	5.89	4.91	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.6		Time	10:18:56 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\Warehouse Spread Footing F6 (uplift).mcs			

DETAIL REPORT FOR F.6**MAXIMUM SHEAR - N-S DIRECTION**

Load Comb	Bottom Dist (ft)	Max Shear (kips)	Shear Stress (psi)	All Stress (psi)	Rem
1 - 1.4Dead	1.50	9.55	7.96	94.87	
2 - 1.2Dead + 1.6Live	1.50	26.85	22.38	94.87	
3 - 1.2Dead + Live	1.50	19.85	16.54	94.87	
4 - 1.2Dead + 0.8Wind	1.50	4.04	3.37	94.87	
5 - 1.2Dead + Live + 1.6Wind	3.50	-11.70	9.75	94.87	
6 - 0.9Dead + 1.6Wind	1.50	-2.16	1.80	94.87	
7 - 1.2Dead + Live + Earthquake	1.50	19.73	16.44	94.87	
8 - 0.9Dead + Earthquake	1.50	6.02	5.02	94.87	

Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.6		Time	10:18:56 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struct\C-003 Warehouse Area\ Warehouse Spread Footing F6 (uplift).mcs			

DETAIL REPORT FOR F.6**PIER/BASE PLATE DESIGN INFORMATION**

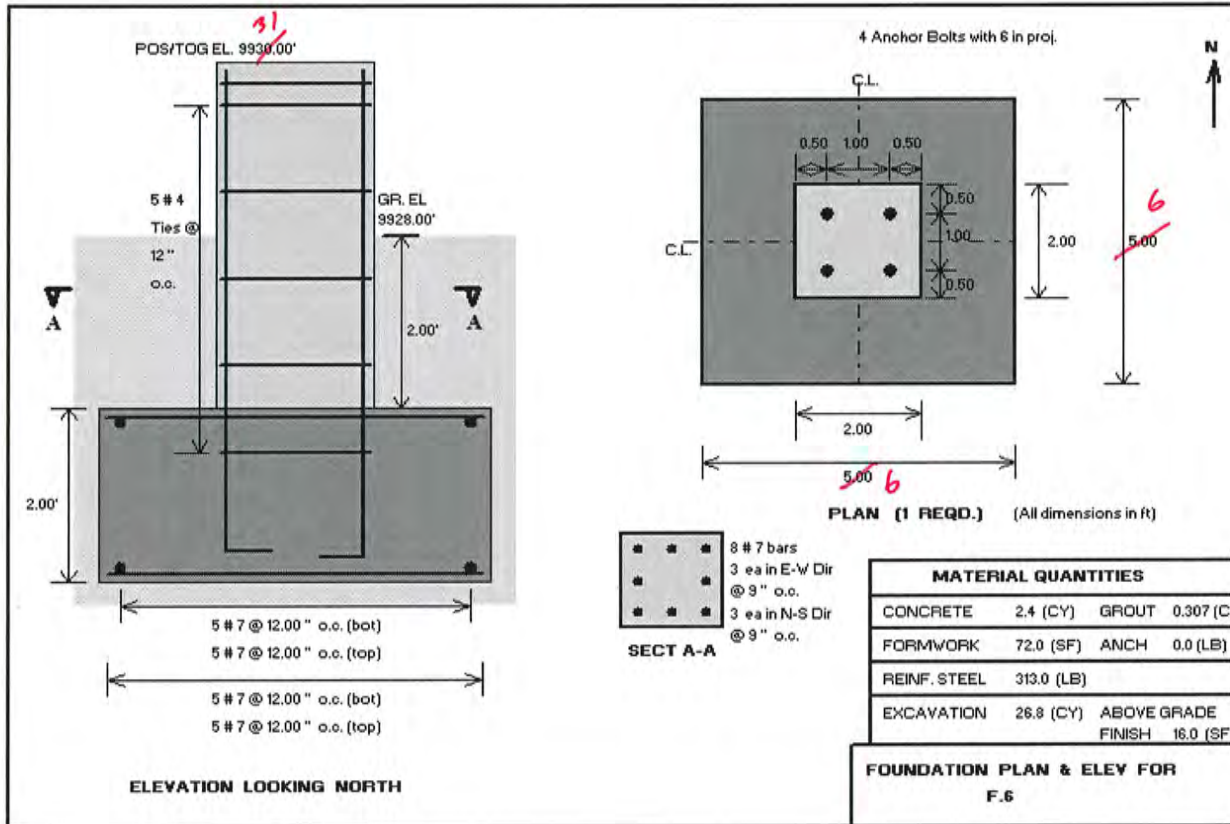
	P1
E-W Dim (ft)	2.00
N-S Dim (ft)	2.00
Height above grade (ft)	2.00
E-W Offset (ft)	0.00
N-S Offset (ft)	0.00
Requested Reinf. Ratio	0.0050
Provided Reinf. Ratio	0.0084
Long Bar Size	7
Bars in E-W Dir	3
Bars in N-S Dir	3
Total Long Bars	8
Tie Bar Size	4
Total No. of Ties	6
Major Tie Spacing (in)	12

PIER ULTIMATE LOAD CAPACITIES

	P1						
Load	Axial	Axial	Mom N-S	Mom N-S	Mom E-W	Mom E-W	Rem
Comb	Load	Capa.		Capa		Capa	
	(kips)	(kips)	(kip ft)	(kip ft)	(kip ft)	(kip ft)	
1 - 1.4Dead	30.44	1159.96	3.35	137.37	3.35	137.37	
2 - 1.2Dead + 1.6Live	88.30	1159.96	9.71	137.37	9.71	137.37	
3 - 1.2Dead + Live	64.97	1159.96	7.15	137.37	7.15	137.37	
4 - 1.2Dead + 0.8Wind	12.98	1159.96	1.43	137.37	1.43	137.37	
5 - 1.2Dead + Live + 1.6Wind	38.74	1159.96	4.26	137.37	4.26	137.37	
6 - 0.9Dead + 1.6Wind	-6.66	-228.27	-0.73	-26.60	-0.73	-26.60	
7 - 1.2Dead + Live + Earthquake	64.77	1159.96	7.12	137.37	7.12	137.37	
8 - 0.9Dead + Earthquake	19.37	1159.96	2.13	137.37	2.13	137.37	

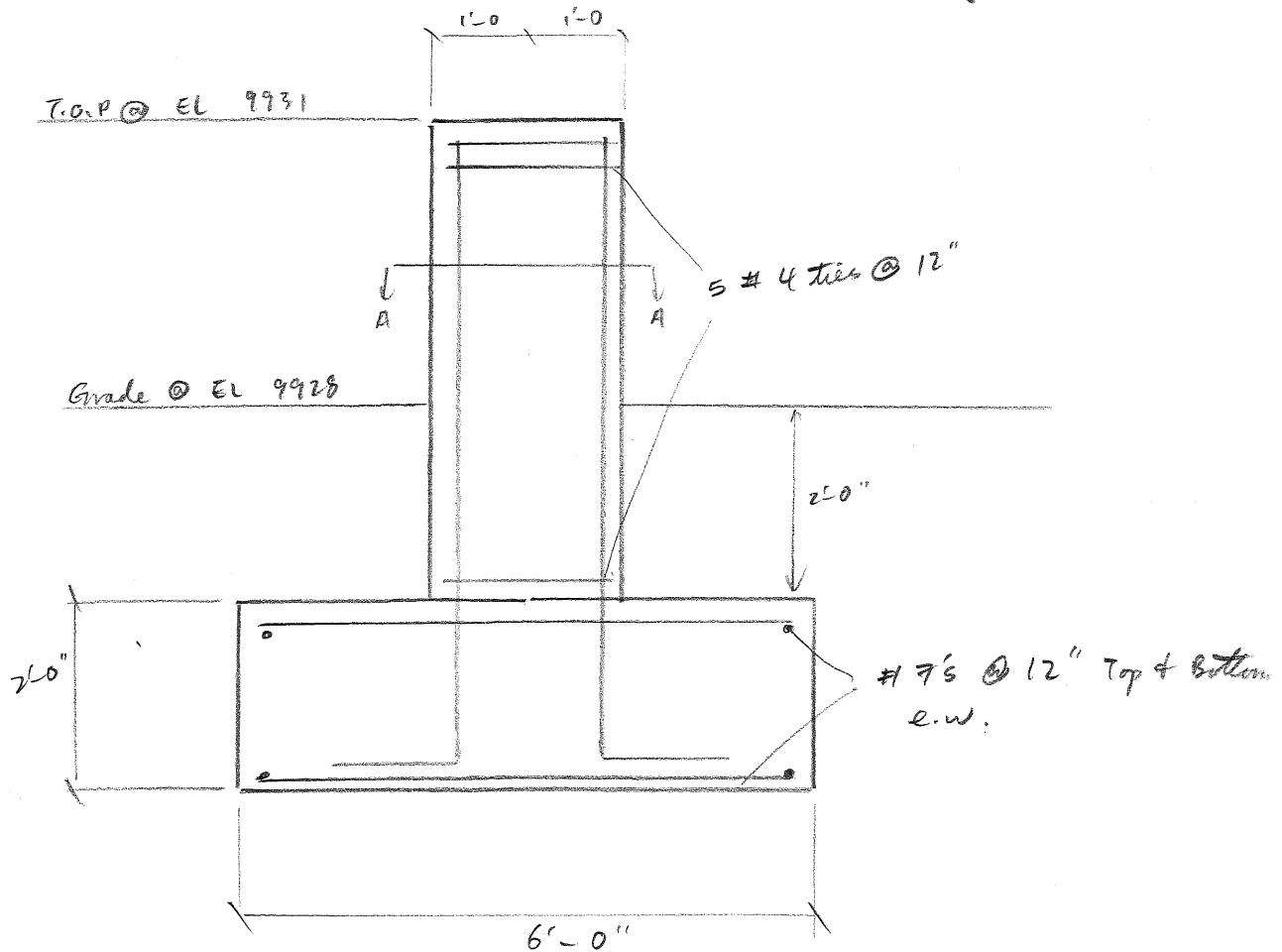
Dimensional Solutions FOUNDATION3D	Version	5.8.2	Date	11/10/2011
Foundation Name	F.6		Time	10:18:56 AM
Designed By:	CC&V	Engineer	WChan	Checker
Filename:	P:\11021\116 - Calculations\116.d - Arch_Civil_Struc\C-003 Warehouse Area\ Warehouse Spread Footing F6 (uplift).mcs			

DETAIL REPORT FOR F.6

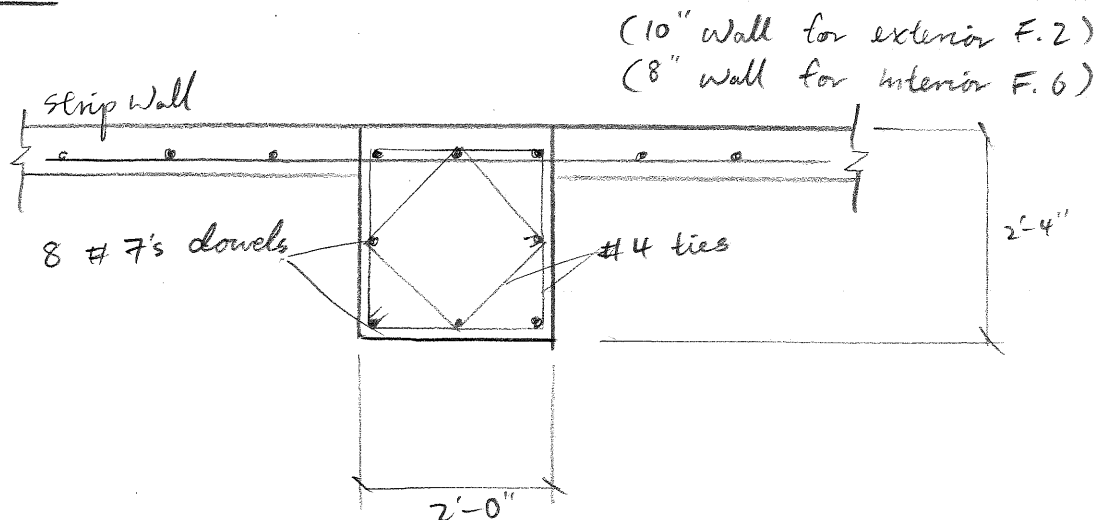


	PROJECT	PROJ NO. 11021
	SUBJECT	CALC NO. C-003
		BY Wchen DATE
		CHK DATE
		SHEET OF REV

Foundation 2 & 6 (6'-0" x 6'-0" Spread footing)



View A-A

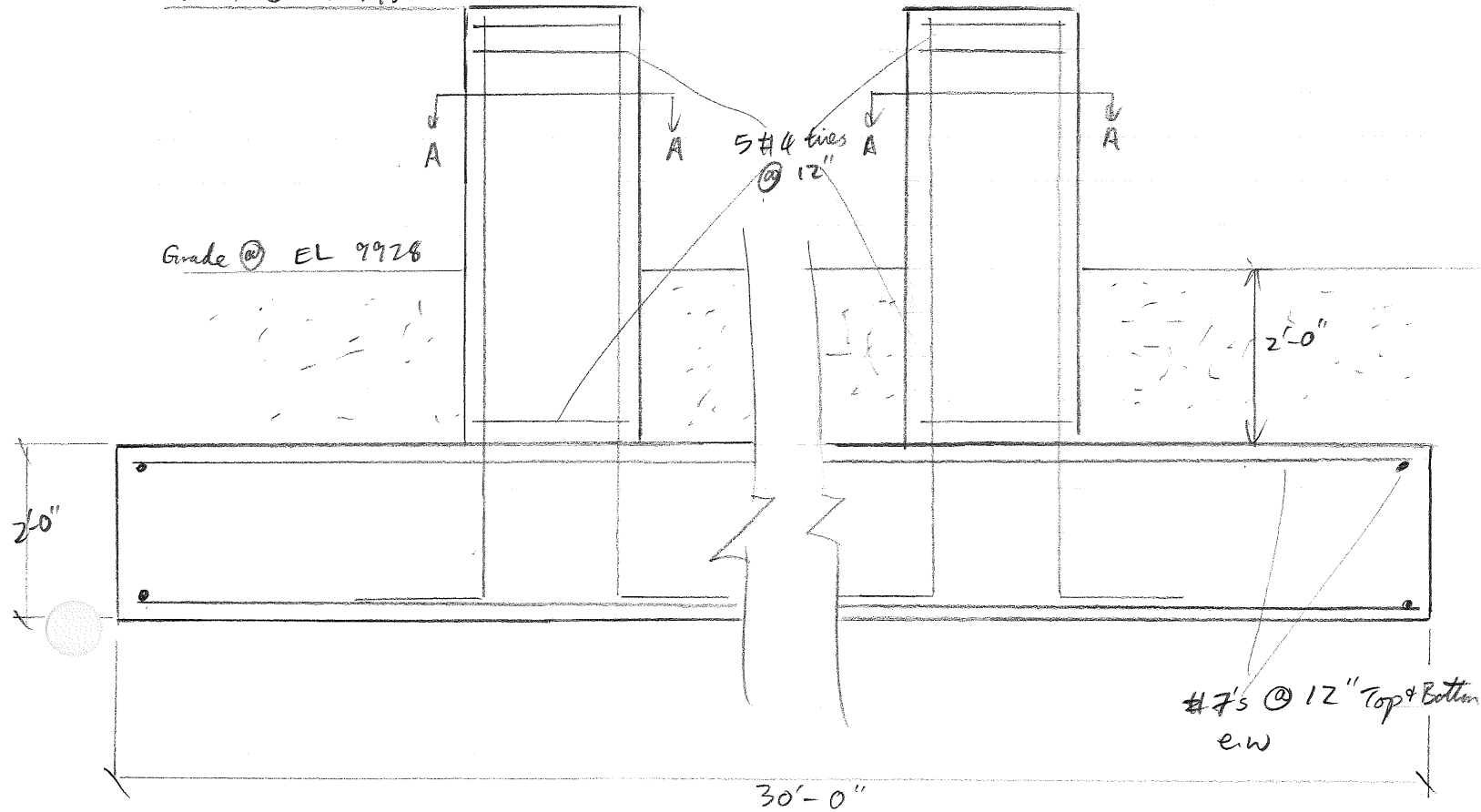


	PROJECT	PROJ NO. 11021
		CALC NO. C-003
	SUBJECT	BY wchan DATE
		CHK DATE
		SHEET OF REV

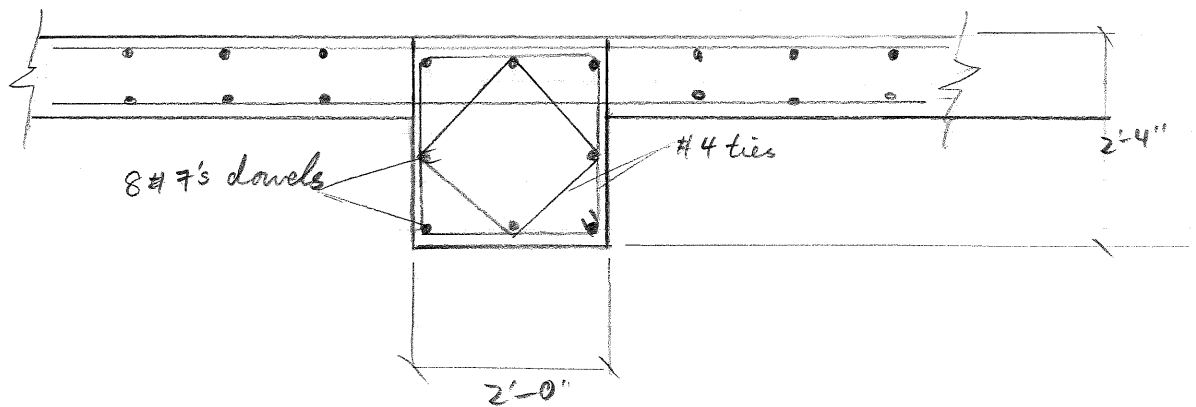
Foundation 3 (30' X 8' combine footing)

T.O.P. @ EL 9931

Grade @ EL 9928



View A-A.

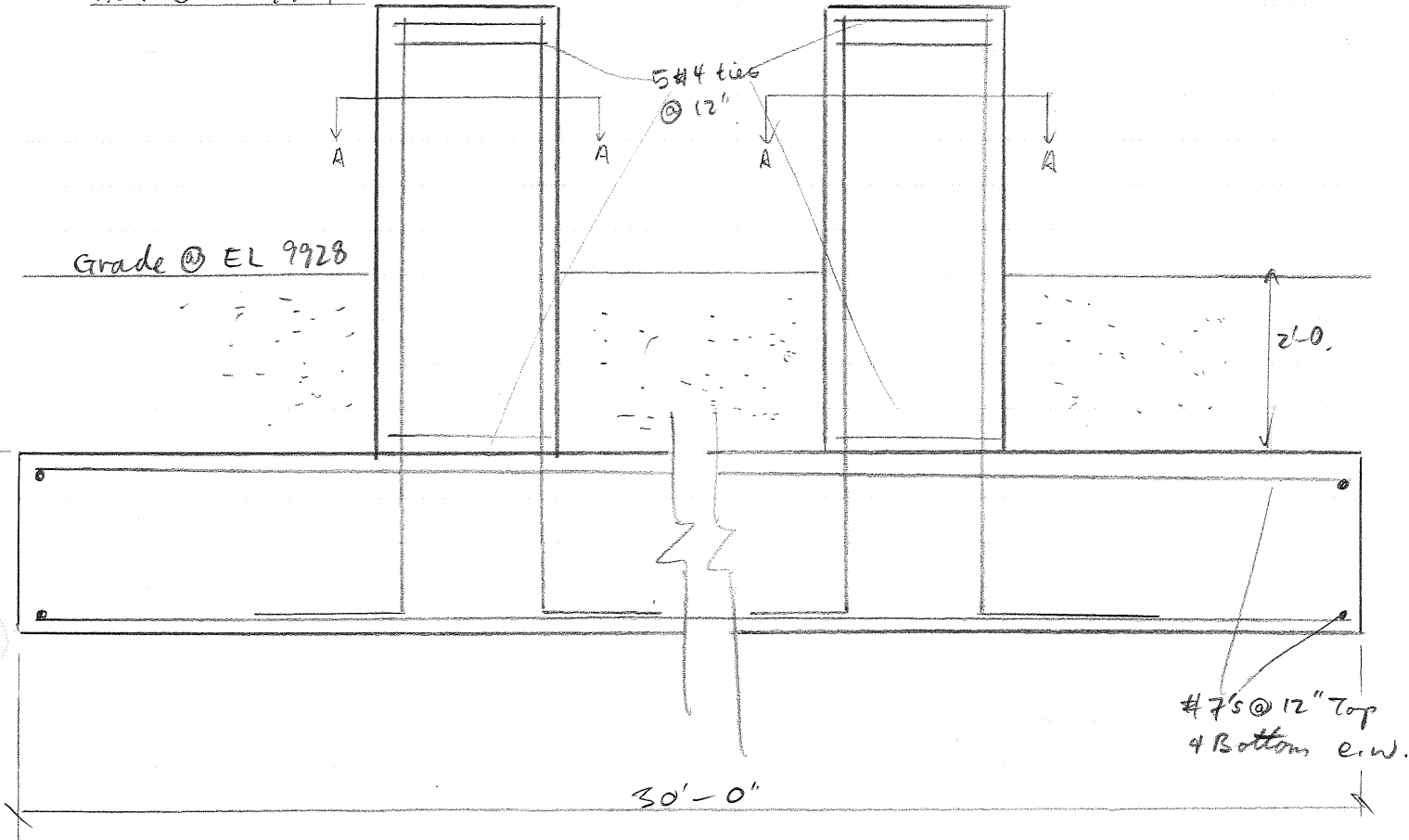


	PROJECT	PROJ NO. 11021
	SUBJECT	CALC NO. C-003
		BY W Chan DATE
		CHK DATE
		SHEET OF REV

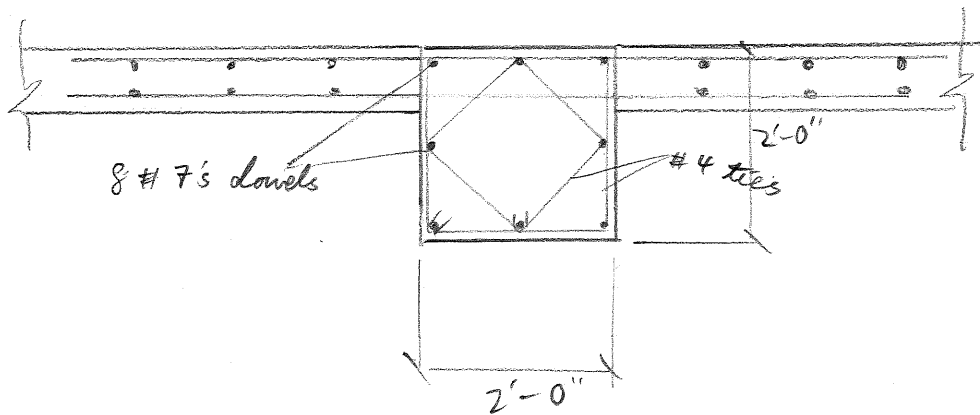
Foundation 5. (30' X 10' combine footing)

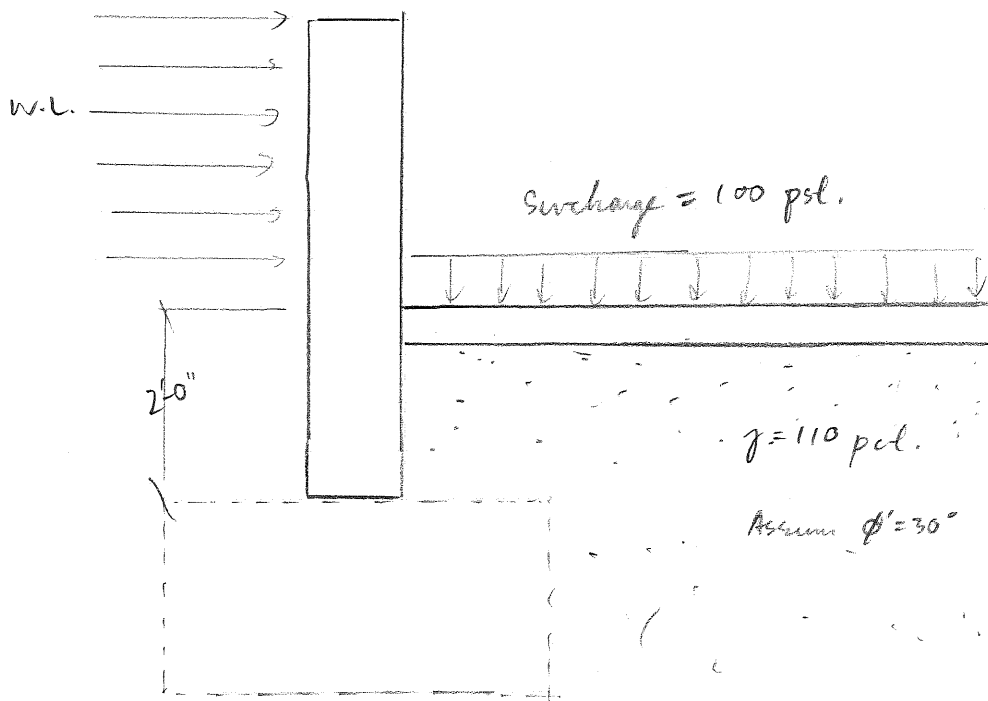
T.O.P @ EL 9931

Grade @ EL 9928



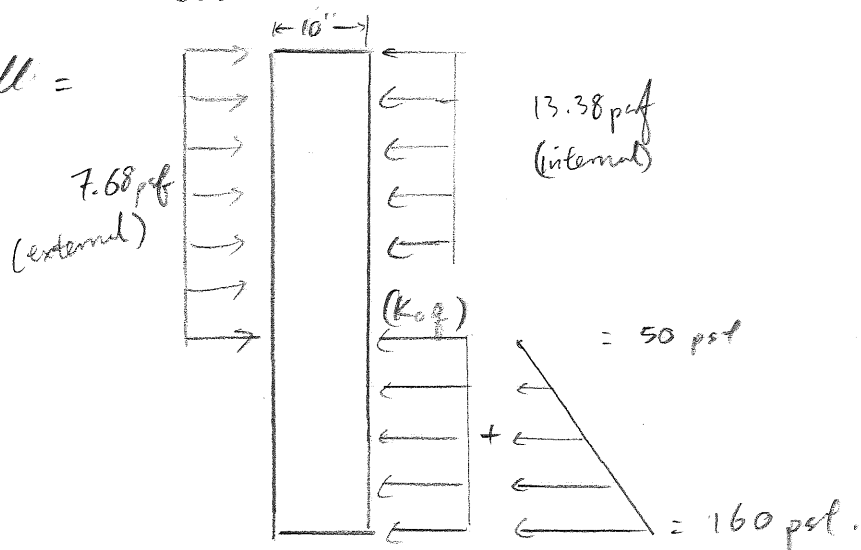
View A-A





$$K_o = 1 - \sin \phi' = 1 - \sin 30^\circ = 0.5$$

Load acting on wall =



$$\begin{aligned}
 &= 0.5 (100 \text{ psl}) + 110 \text{ pcf} (2 \text{ ft}) (0.5) \\
 &= 160 \text{ pcf.}
 \end{aligned}$$

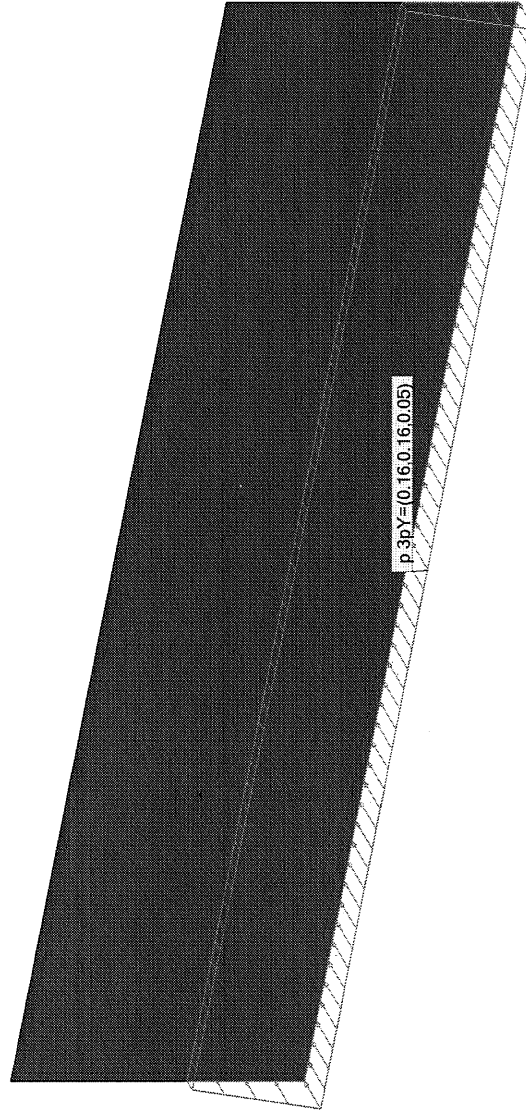




7158 S. FLSmidth Drive
Midvale, Utah 84047-5559

Engineer: Wallace Chan
Calc No.: C-003/Rev. A Job.: 11021
Project: Strip Wall-Warehouse Concrete Foundation
Client: CC&V

View - Cases: 14 (Total LL)



 kip/ft2
Cases: 14 (Total LL)

Date : 11/11/11

File: Strip Wall.rtd

Page : 1

Robot 2012 © AutoDesk



7158 S. FLSmidth Drive
Midvale, Utah 84047-5559

Engineer: **Wallace Chan**
Calc No.: **C-003/Rev. A Job.:11021**
Project: **Strip Wall-Warehouse Concrete Foundation**
Client: **CC&V**

View - Cases: 10 (WIND Y)

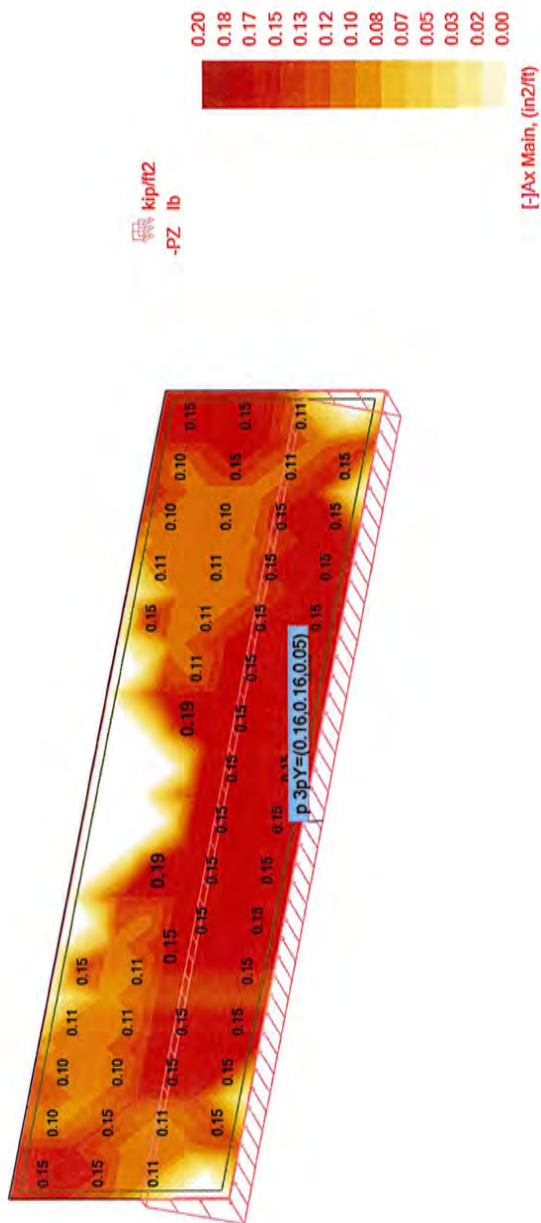


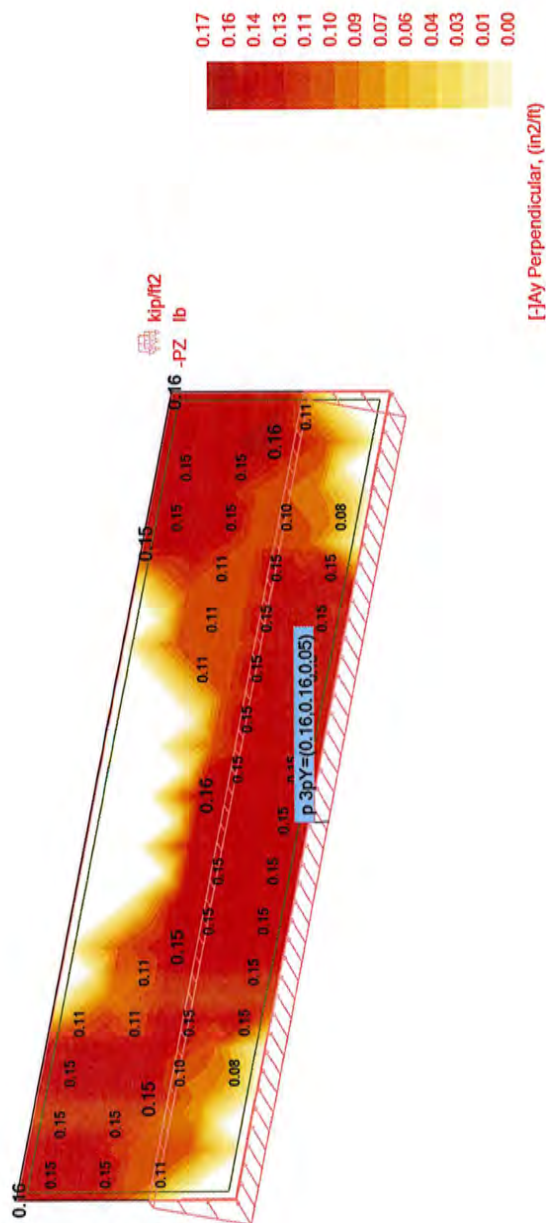
Date : 11/11/11

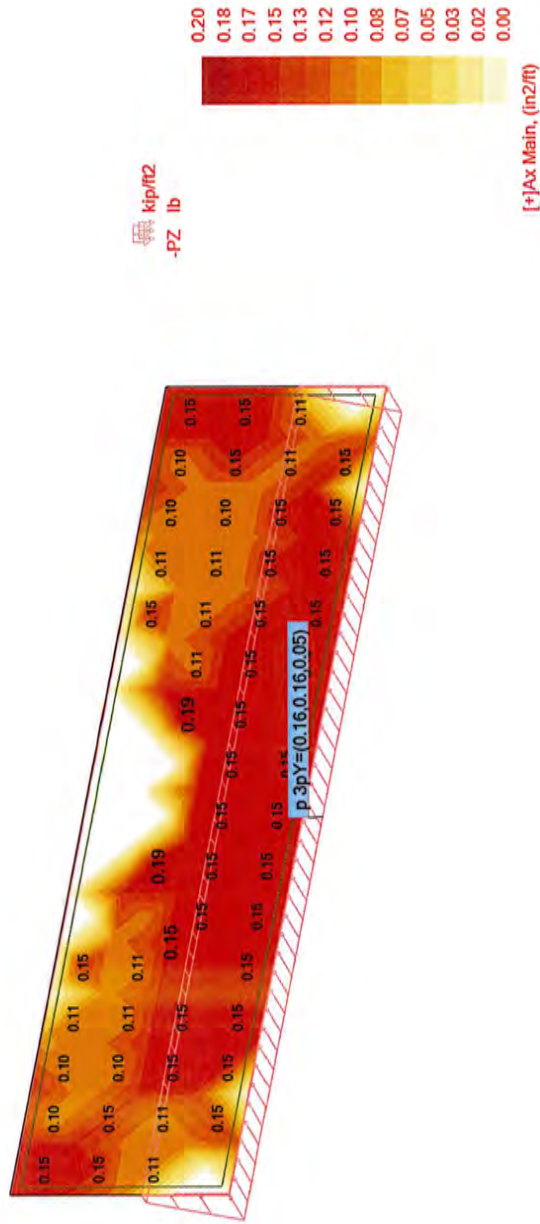
File: **Strip Wall.rtd**

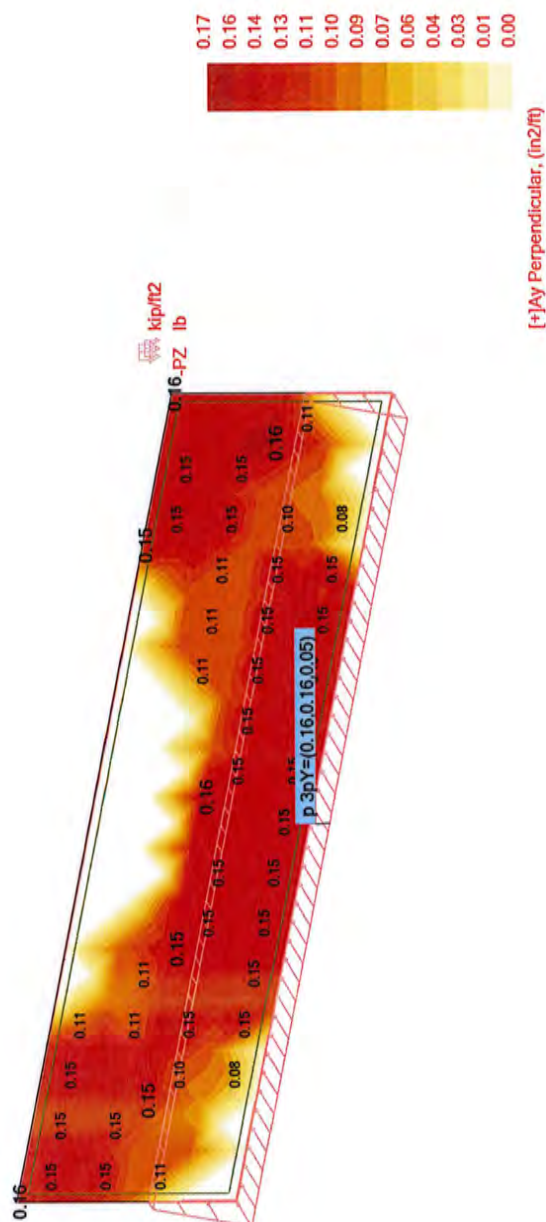
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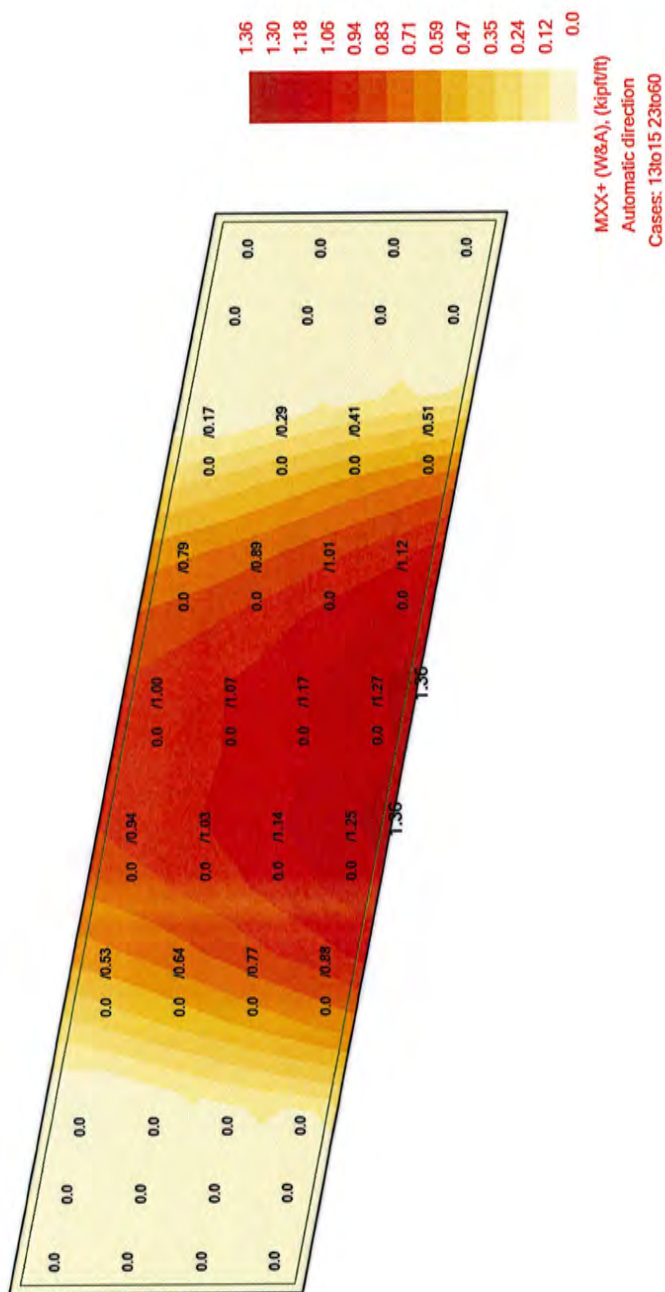
Robot 2012 © AutoDesk

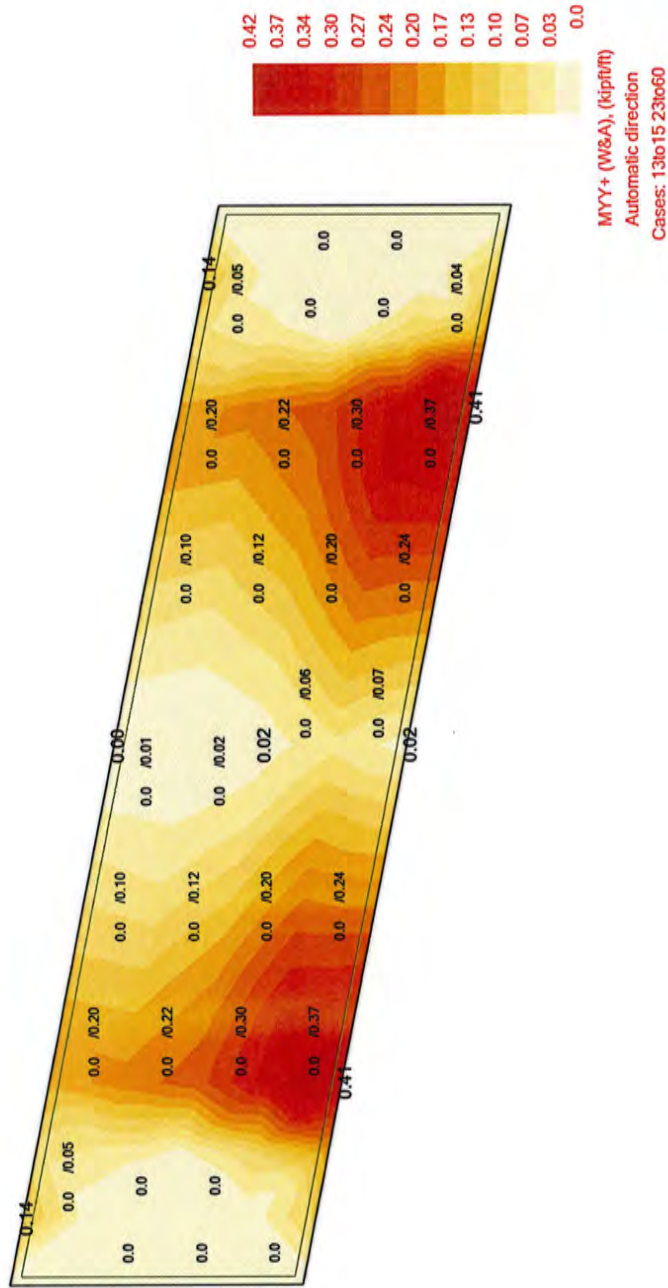


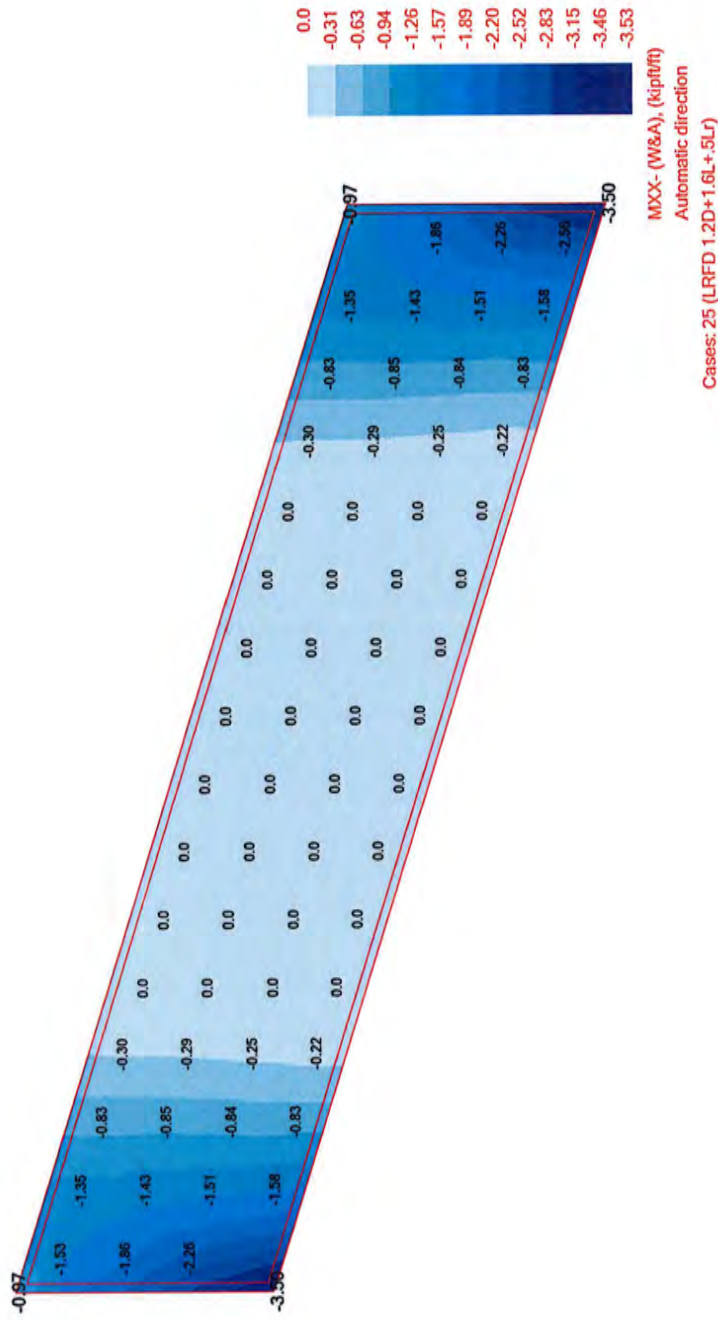


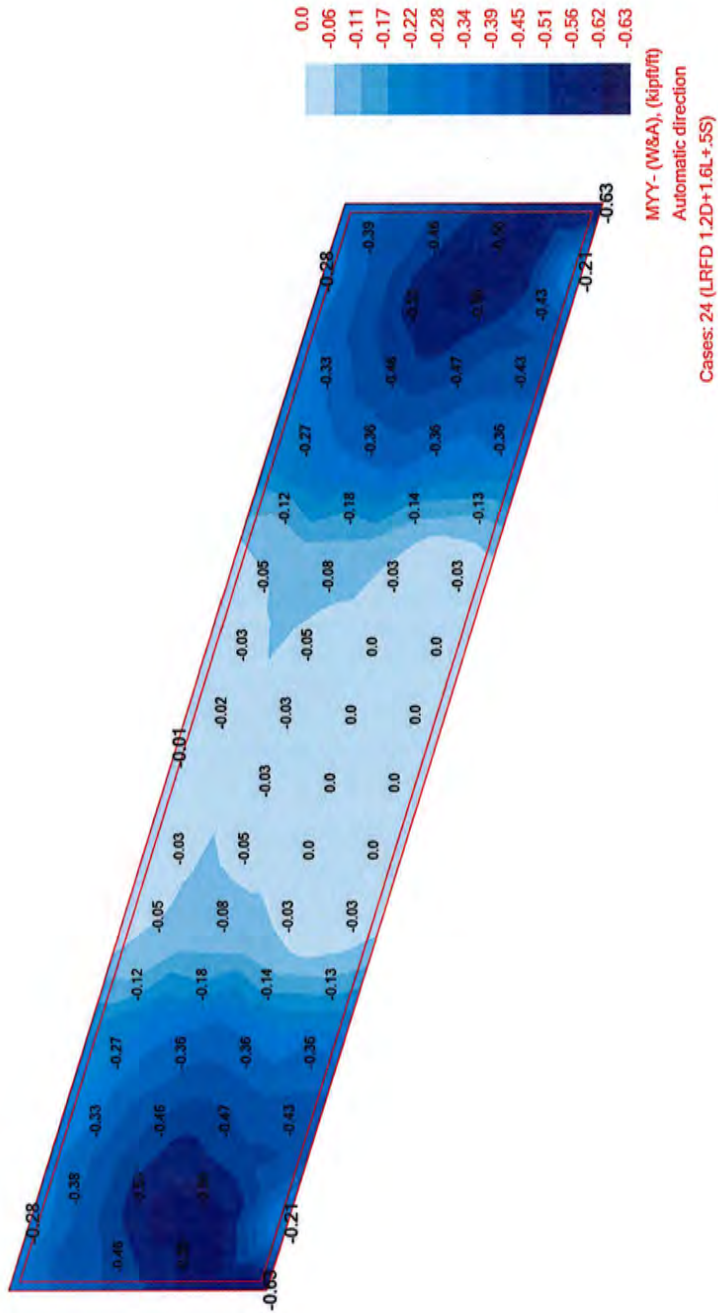












FLSMIDTH	PROJECT	PROJ NO.
		CALC NO.
	SUBJECT	BY DATE
		CHK DATE
		SHEET OF REV

Rebar for strip wall to pedestal connection

$$\text{Max moment} = 3.53 \text{ k-ft/ft}$$

$$\therefore A_s = \frac{M_u}{\phi f_y j d} = \frac{3.53 \times 12}{0.9(60)(0.875)7} = 0.128 \text{ in}^2/\text{ft.} \quad \text{j d assumed to be } 0.875d$$

$$d = 10" - 3" = 7"$$

$$A_{s(\min)} = \frac{3\sqrt{f_c}}{f_y} b_w d \geq 200 b_w d / f_y$$

$$\frac{3\sqrt{f_c}}{f_y} b_w d = \frac{3\sqrt{4000}}{60000} (12)(7) = 0.26$$

$$200 b_w d / f_y = \frac{200 (12)(7)}{60000} = 0.28$$

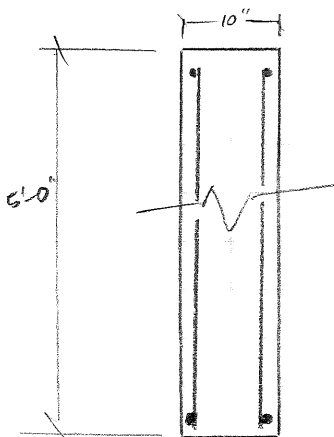
$$A_s = 0.128 \text{ in}^2/\text{ft} < A_{s \min}$$

$\therefore$ USE $A_{s \min} = 0.28$ (#5's @ 12") for connection between pedestal and strip wall.

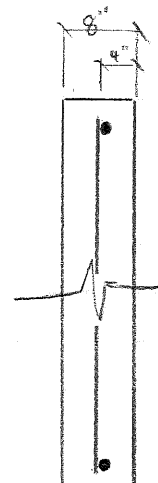
Rebar for strip wall

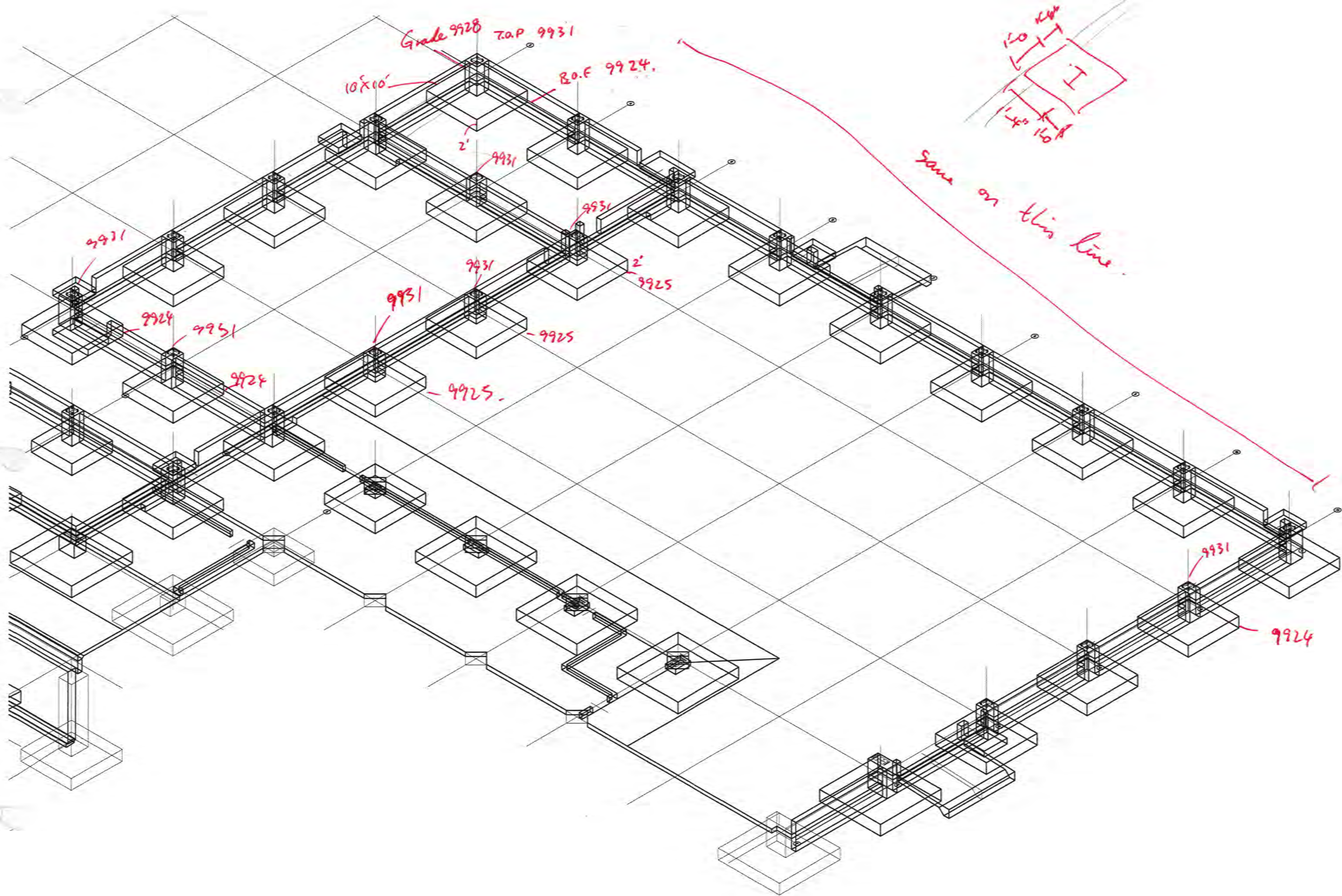
By Robot analysis, Reinforcement needed = $A_s = 0.20 \text{ in}^2/\text{ft}$ (max)

$\therefore$ Use #5's @ 12", two layers



For 8" Wall
Single layer of #5's @ 12"





	PROJECT	CC&V	PROJ NO. 11021
	SUBJECT	Warehouse Slab Design	CALC NO. C-003
			BY WChan DATE 11/19/2011
			CHK DATE
			SHEET 5 OF REV

Concrete Slab for Warehouse Area:

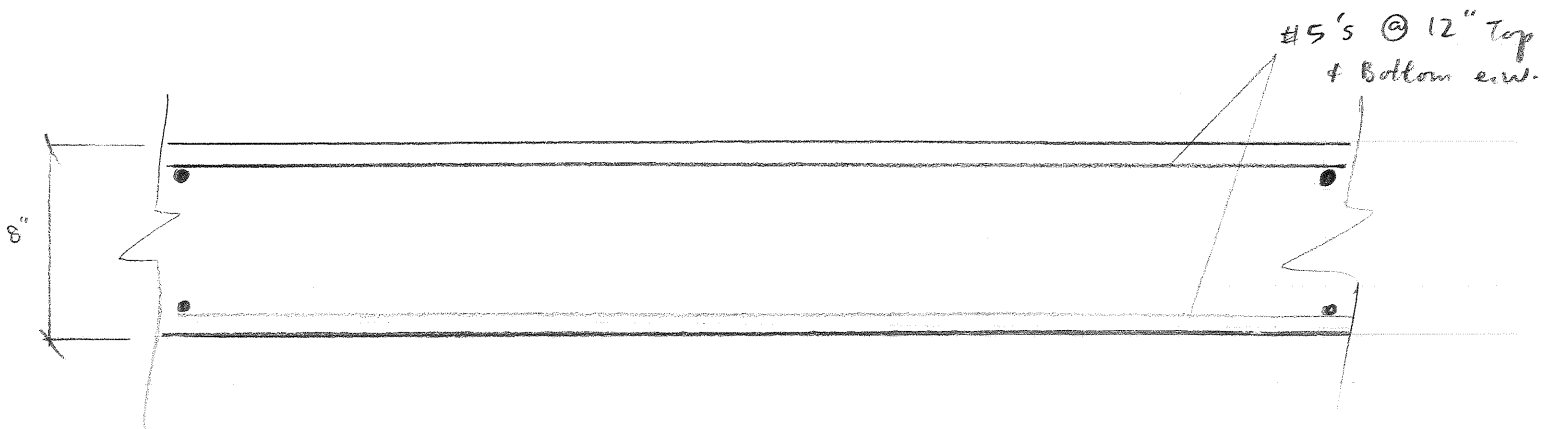
Preliminary Design = 8" Slab, 2 layers of Rebar.

Assumed Load = Floor LL = 100 psf.
Fork Lift = 10 tons capacity

From CAT Lift Trucks: Front Wheel load = $45.452/2 = 22.73$ kip/wheel
Catalog Rear wheel load = $4.95/2 = 2.475$ kip/wheel

Front tire area = $9" \times 20"$ $\therefore$ Load = 18.18 ksf
Rear tire area = $9" \times 20"$ Load = 1.98 ksf.

Use Elastic Foundation Coefficient, $K_z = 200.00$ ksf for robot model. By robot analysis, $A_s \text{ req} = 0.30 \text{ in}^2/\text{ft}$, use #5's @ 12" Top & Bottom each way.



Diesel Pneumatic Tire Lift Trucks

Capacity: 17,500-36,000 lb



CAT® Lift
Trucks

P17500-P36000 Series

Cat® lift trucks set the standard for the ultimate lifting experience. These internal combustion pneumatic tire lift trucks follow in that tradition, with a wide range of standard features and application options to meet your specific needs. Exceptional comfort, durable construction and industry-leading customer service make the P17500-P36000 Series the only choice for your material handling needs.

Function. This lift truck thrives in lumber, cement, pipe and heavy-duty applications where its strength can effectively be put to the test. The spacious operator compartment combined with powerful performance results in an operator who is comfortable and productive during long shifts.

Air Quality. These rugged trucks provide excellent horsepower and torque while meeting EPA and CARB requirements for carbon monoxide (CO), hydrocarbons (HC) and nitrogen oxide (NOx) emissions.

Added Protection. The dependable Presence Detection System (PDS) and excellent visibility help protect your operator and equipment.



Comfortable Operation

Operators of varying sizes can work long shifts comfortably in the standard full-suspension seat.

Model	Capacity (lbs)										
	16,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000	32,000	34,000	36,000
P17500											
P20000											
P22000											
P26500											
P30000											
P33000											
P36000											



Adjustable seating for increased comfort

Up for a Challenge

With load capacities of up to 36,000 pounds, these diesel pneumatic tire lift trucks offer unmatched performance and many features to tackle the most demanding applications.



Easy Lifting

Fingertip controls are a standard feature on the P17500 – P36000 series of lift trucks. This premium feature allows operators to lift the heaviest of loads with ease.

Reduced Noise And Vibration

The operator module is securely mounted to the chassis, which helps to significantly reduce the noise and vibration levels of the truck.



Control at your fingertips



Maximum comfort, reduced vibration

RELIABILITY

Legendary Performance

With a high-performing engine, enhanced transmission system and minimized downtime, these diesel pneumatic tire lift trucks will get the job done.

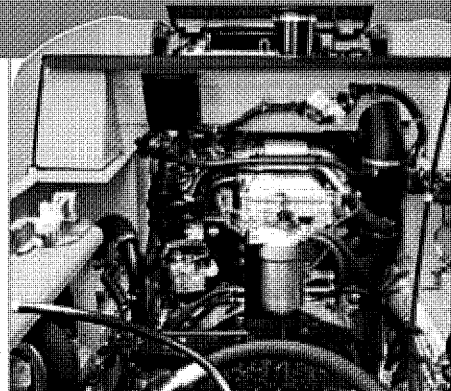


Turbo-charged Diesel Engine

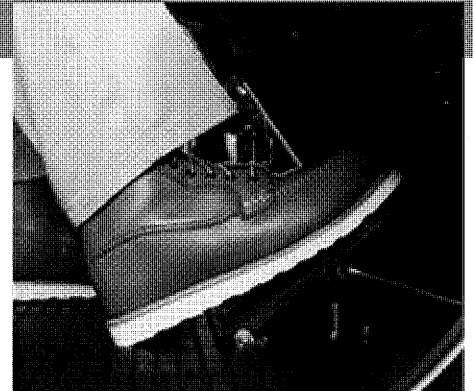
This strong, EPA-compliant engine provides swift acceleration and low noise and vibration. The fuel injected 6-cylinder diesel engine combines power and efficiency to boost performance in your application.

Total Control

The air-over-hydraulic brakes provide dependable braking with little effort. Oil-cooled wet disc brakes are standard on the P36000 model, providing additional control in extreme environments.



Low noise, high performance



Low-effort braking



Optimized Visibility

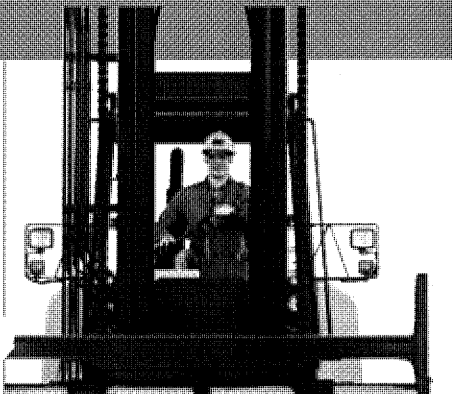
Narrow mast channels and an open overhead guard help improve operator visibility to the load and work area. Standard work lights illuminate your surroundings.

Application Options

Optional attachments, foundry and brick protection, operator cabins and specialty tires can help customize the truck for your specific needs, helping to extend equipment service life and minimize product damage.

Serviceability

With 500 hour service intervals, display-based indicators and reminders and easy access to service components, you can count on maximizing uptime and lowering maintenance costs with your Cat lift truck.



Optimum visibility



Solutions for your application

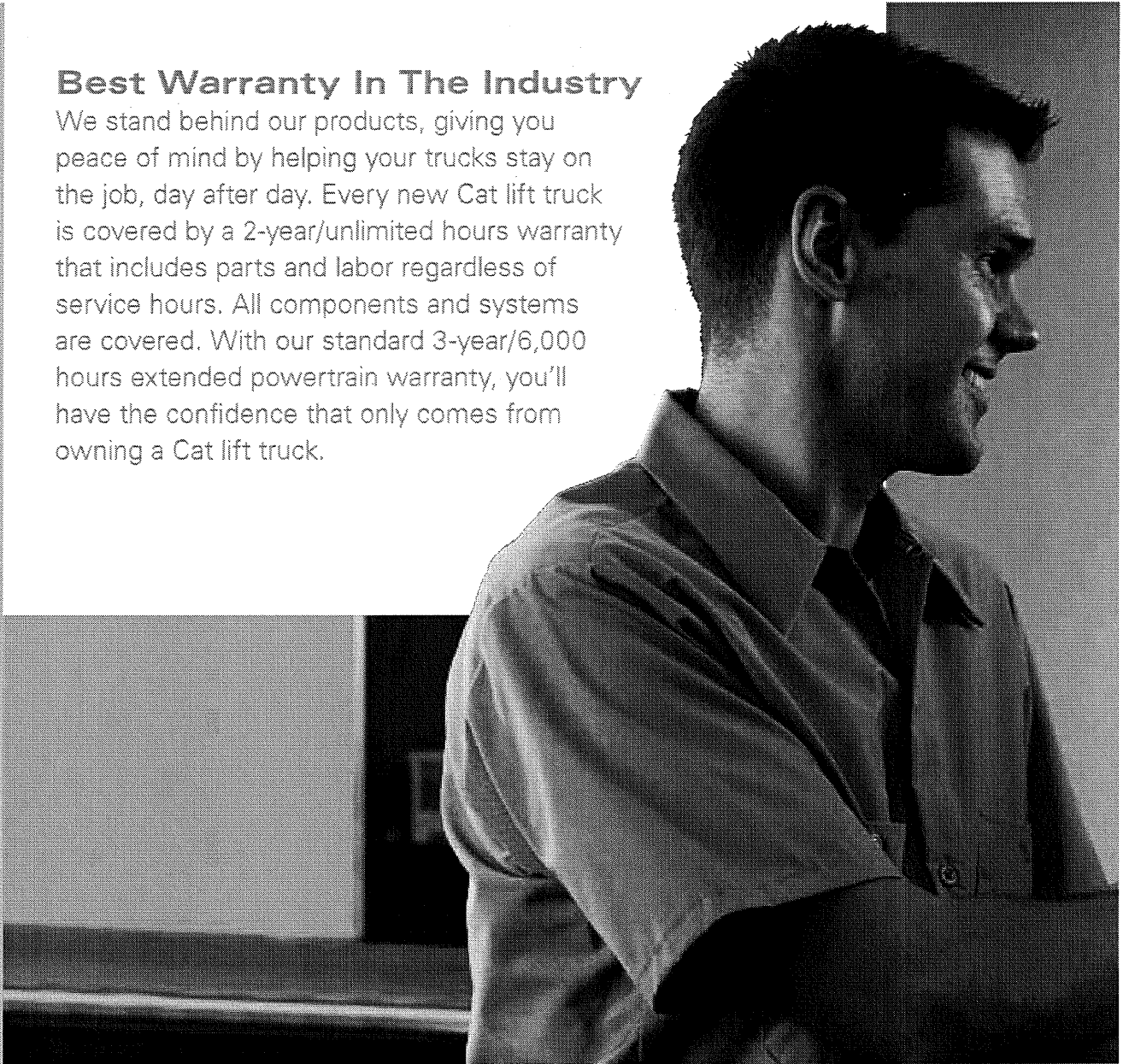


Service time minimized

CUSTOMER SERVICE

Best Warranty In The Industry

We stand behind our products, giving you peace of mind by helping your trucks stay on the job, day after day. Every new Cat lift truck is covered by a 2-year/unlimited hours warranty that includes parts and labor regardless of service hours. All components and systems are covered. With our standard 3-year/6,000 hours extended powertrain warranty, you'll have the confidence that only comes from owning a Cat lift truck.



Free Loaner Service Guarantee*

If your lift truck is not repaired right the first time or within the quoted time, you will receive a free loaner truck while the repair is completed.

Parts Fast Or Parts Free*

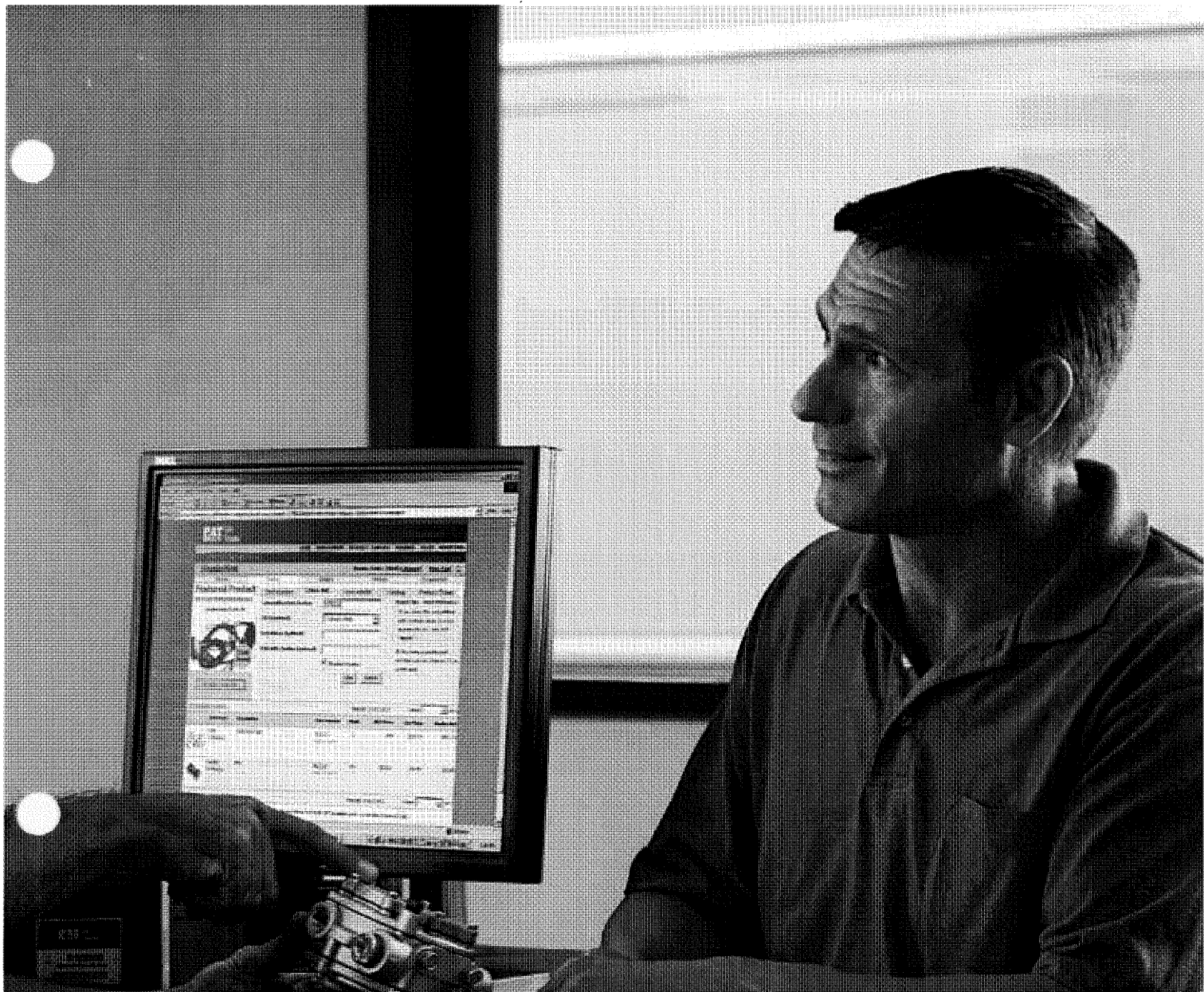
The Parts Fast Or Parts Free Guarantee ensures next-business-day delivery of parts for all brands of lift trucks, or they're free, including freight. If your part doesn't come in by the next business day, we pay for it.



Guaranteed to keep you moving



Parts for all brands of lift trucks



Flexible Financing Options*

Financing your next Cat lift truck is easy with our wide range of flexible leasing and purchasing options. Whether you want to finance or lease, your local Cat lift truck dealer can help customize a package tailored to your specific needs.

Dealers You Can Depend On

With hundreds of dealer locations throughout North and South America, Cat lift truck dealers provide more than lift trucks. From flexible financing options, parts, service and product support, our dealers are unsurpassed.

Free Planned Maintenance*

Proper maintenance of your truck helps assure top performance over the long haul. That's why every new Cat lift truck gets its first planned maintenance completed by your local Cat lift truck dealer at no cost to you.



Custom financing packages



Professionals you can depend on



Quality service at the right price

* Programs may be subject to change without notice and may vary by region. Please ask your local Cat® lift truck dealer for complete terms and conditions.

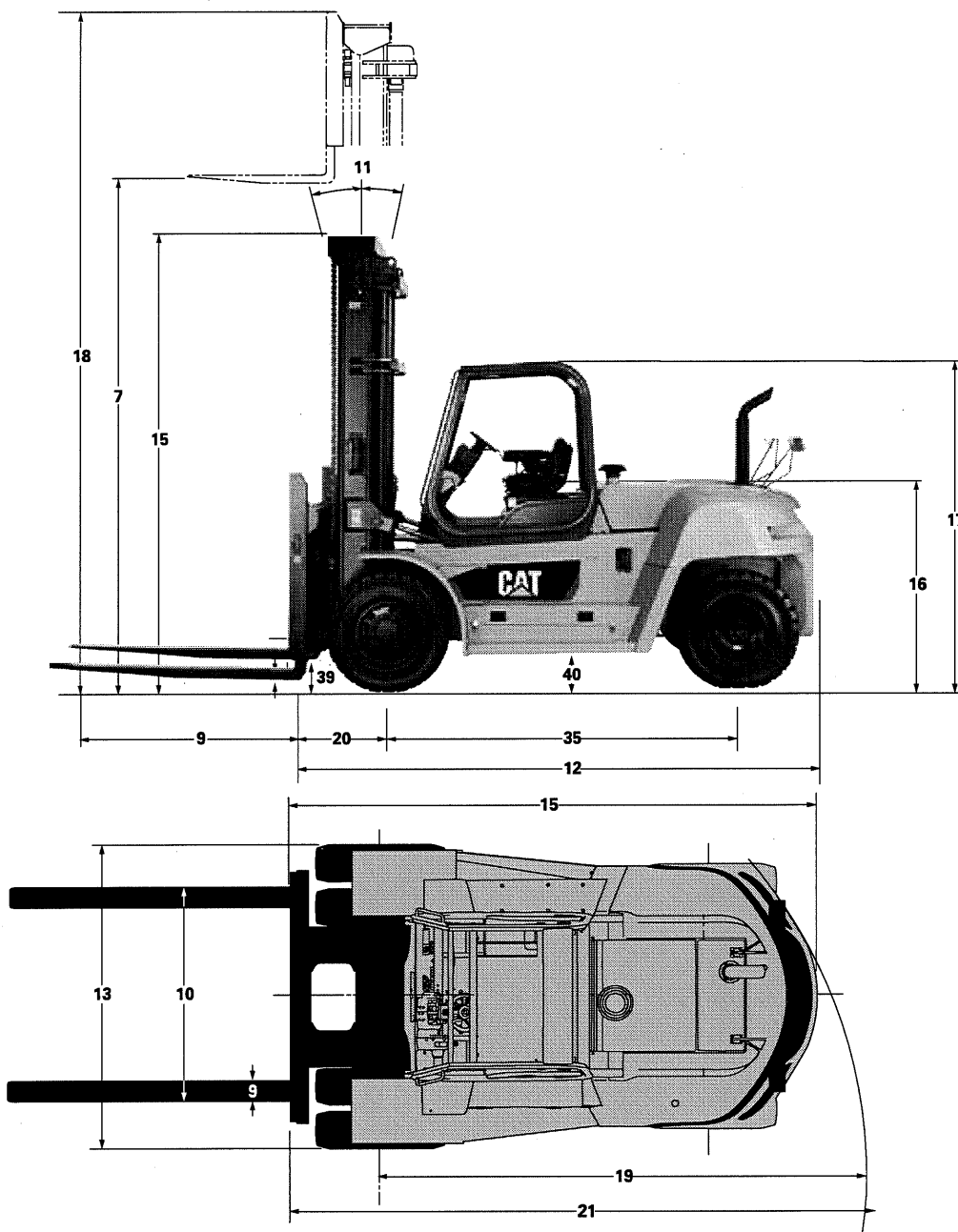
Specifications

Characteristics				P17500		P20000		P22000			
1	Capacity	at rated load center	lb	kg	17,500	8,000	20,000	9,000	22,000	10,000	
2		at load center - distance	in	mm	24	600	24	600	24	600	
3	Power	diesel, gas, LP gas			diesel		diesel		diesel		
4	Tire type	cushion, pneumatic			pneumatic		pneumatic		pneumatic		
5	Wheels (x = driven)	number front / rear			x4 / 2		x4 / 2		x4 / 2		
Dimensions				P17500		P20000		P22000			
7	Lift with standard two-stage mast	maximum fork height	in	mm	132.4	3,364	132.8	3,372	132.8	3,372	
8		free fork height	in	mm	8.8	224	2.8	72.0	2.8	72.0	
9	Forks	thickness x length x width	in	mm	2.5 x 48 x 7.1	64 x 1,220 x 180	2.8 x 48 x 7.1	72 x 1,220 x 180	2.8 x 48 x 7.1	72 x 1,220 x 180	
10	Fork spacing	out-to-out minimum / maximum	in	mm	17.7 / 65.7	450 / 1,670	18.5 / 79.8	470 / 2,026	18.5 / 79.8	470 / 2,026	
11	Tilt	forward / backward	deg		15° / 12°		15° / 12°		15° / 12°		
12	Overall dimensions	length to fork face	in	mm	160.0	4,065	166.9	4,240	168.9	4,290	
13		width	with standard dual drive tires	in	mm	94.1	2,390	94.1	2,390	99.0	2,515
15		height	with lowered mast	in	mm	115.2	2,925	122.8	3,120	127.4	3,235
16			seat height	in	mm	70.9	1,800	70.9	1,800	73.8	1,875
17			to top of overhead guard	in	mm	112.0	2,845	112.0	2,845	114.8	2,915
18			with extended mast	in	mm	181.9	4,620	188.4	4,785	192.3	4,885
19	Minimum outside turning radius	in	mm	150.8	3,830	154.7	3,930	157.5	4,000		
20	Load moment constant	in	mm	26.6	675	29.7	755	29.7	755		
21	Minimum aisle - 90° stack - zero clearance w / out load	in	mm	177.4	4,505	184.4	4,685	187.2	4,755		
Performance				P17500		P20000		P22000			
22	Speeds	travel speed loaded / empty	mph	km/h	17.0 / 20.0	28.0 / 32.0	17.0 / 19.0	27.0 / 31.0	15.0 / 18.0	24.0 / 29.0	
23		lift speed loaded / empty	fpm	m/s	108 / 112	0.55 / 0.57	87.0 / 91.0	0.44 / 0.46	91.0 / 94.0	0.46 / 0.48	
24		lowering speed loaded / empty	fpm	m/s	98 / 108	0.50 / 0.55	79.0 / 87.0	0.40 / 0.44	91.0 / 94.0	0.46 / 0.48	
25	Drawbar pull	loaded at 1 mph (1.6 km)	lb	N	19,243	85,600	19,063	84,800	19,445	86,500	
26		loaded maximum	lb	N	23,335	103,800	21,311	94,800	23,874	106,200	
27	Gradeability	loaded at 1 mph (1.6 km)	%		46		39		38		
28		maximum loaded / empty	%		63 / 31		58 / 28		49 / 30		
Weight				P17500		P20000		P22000			
29	Empty		lb	kg	26,676	12,100	30,402	13,790	34,613	15,700	
30	Axle load	with rated load front / rear	lb	kg	39,638 / 4,538	18,035 / 2,065	45,452 / 4,950	20,552 / 2,238	50,795 / 5,864	23,040 / 2,664	
31		without load front / rear	lb	kg	13,997 / 12,679	6,349 / 5,751	15,774 / 14,628	7,155 / 6,635	18,078 / 16,535	8,200 / 7,500	
Chassis				P17500		P20000		P22000			
32	Tire size	front, standard dual drive tires	in		9.00x20-12PR		9.00x20-14PR		10.00x20-14PR		
34		rear	in		9.00x20-12PR		9.00x20-14PR		10.00x20-14PR		
35	Wheelbase		in	mm	104.3	2,650	104.3	2,650	110.2	2,800	
36	Tread width	front, standard dual drive tires	in	mm	71.7	1,820	71.7	1,820	74.8	1,900	
38		rear tires	in	mm	69.1	1,755	69.1	1,755	77.4	1,965	
39	Ground clearance	at lowest point at mast	in	mm	8.5	215	8.1	205	8.7	220	
40		at center of wheelbase	in	mm	9.1	230	9.1	230	10.8	275	
41	Brakes	service				air over hydraulic-foot		air over hydraulic-foot		air over hydraulic-foot	
42		parking				mechanical-hand		mechanical-hand		mechanical-hand	
Powertrain				P17500		P20000		P22000			
43	Engine	manufacturer and model		Mitsubishi 6M60-TL		Mitsubishi 6M60-TL		Mitsubishi 6M60-TL			
44		continuous output S.A.E. gross	HP	kW	148	110	148	110	148	110	
45			at r.p.m.		2,100		2,100		2,100		
46		maximum torque S.A.E gross	lb-ft	N-m	450	610	450	610	450	610	
47			at r.p.m.		1,600		1,600		1,600		
48		cylinder / displacement	cu in	cm3	6 / 460	6 / 7,545	6 / 460	6 / 7,545	6 / 460	6 / 7,545	
49	Transmission	type			Automatic Powershift		Automatic Powershift		Automatic Powershift		
50		number of speeds forward / reverse			3 / 3		3 / 3		3 / 3		
51	Relief pressure	for attachments	psi	bar	2,625	181	2,625	181	2,987	206	

NOTE: These specifications assume the use of drive axles, tires and tilt angles specified. Any modification to specifications, or any other combination of specifications made after the shipment of the truck, requires prior written approval from Mitsubishi Caterpillar Forklift America Inc. ("MCFA"). (See ANSI/ITSDF B56.1). Also be advised that overall operating visibility may be affected by the mast configuration and mast options of your truck. Therefore, you may need to add ancillary (auxiliary) devices or modify your operating practices. Consult your dealer for further information.

P26500		P30000		P33000		P36000	
26,500	12,000	30,000	13,500	33,000	15,000	36,000	16,000
24	600	24	600	24	600	24	600
diesel		diesel		diesel		diesel	
pneumatic		pneumatic		pneumatic		pneumatic	
x4 / 2		x4 / 2		x4 / 2		x4 / 2	
P26500		P30000		P33000		P36000	
133.0	3,379	133.4	3,388	133.4	3,388	133.5	3,392
3.1	79.0	3.5	88.0	3.5	88.0	0.0	0.0
3.1 x 48 x 7.1	79 x 1,220 x 180	3.5 x 48 x 7.1	88 x 1,220 x 180	3.5 x 48 x 7.1	88 x 1,220 x 180	3.6 x 48 x 7.1	92 x 1,220 x 180
18.5 / 79.8	470 / 2,026	18.5 / 79.5	470 / 2,020	18.5 / 79.5	470 / 2,020	18.5 / 79.5	470 / 2,020
15° / 12°		15° / 12°		15° / 12°		15° / 12°	
172.2	4,375	178.1	4,525	190.2	4,830	198.6	5,045
99.0	2,515	102.4	2,600	102.4	2,600	103.7	2,635
127.4	3,235	137.0	3,480	137.0	3,480	144.9	3,680
73.8	1,875	75.4	1,915	75.4	1,915	75.4	1,915
114.8	2,915	116.5	2,960	116.5	2,960	116.5	2,960
192.3	4,885	205.7	5,225	205.7	5,225	209.8	5,330
159.8	4,060	163.8	4,160	179.1	4,550	189.6	4,815
30.1	765	31.3	795	31.3	795	31.7	805
190.0	4,825	195.1	4,965	210.4	5,345	221.3	5,620
P26500		P30000		P33000		P36000	
14.0 / 18.0	23.0 / 29.0	14.0 / 19.0	23.0 / 30.0	14.0 / 19.0	23.0 / 30.0	14.0 / 19.0	22.0 / 30.0
91.0 / 94.0	0.46 / 0.48	75.0 / 79.0	0.38 / 0.40	75.0 / 79.0	0.38 / 0.40	69.0 / 73.0	0.35 / 0.37
91.0 / 94.0	0.46 / 0.48	94.0 / 79.0	0.48 / 0.40	94.0 / 79.0	0.48 / 0.51	87.0 / 73.0	0.44 / 0.37
19,266	85,700	17,714	78,800	17,625	78,400	17,512	77,900
23,717	105,500	21,356	95,000	21,289	94,700	21,154	94,100
33		27		25		23	
42 / 27		33 / 26		31 / 27		29 / 29	
P26500		P30000		P33000		P36000	
57,412	16,970	41,293	18,730	40,411	18,330	42,395	19,230
57,276 / 6,592	25,980 / 2,990	63,978 / 7,077	29,020 / 3,210	66,579 / 6,832	30,228 / 3,102	71,276 / 7,119	32,031 / 3,199
17,946 / 19,467	8,140 / 8,830	19,445 / 21,848	8,820 / 9,910	19,499 / 20,912	8,845 / 9,485	21,304 / 21,091	9,577 / 9,653
P26500		P30000		P33000		P36000	
10.00x20-16PR		12.00x20-18PR		12.00x20-18PR		12.00x20-20PR	
10.00x20-16PR		12.00x20-18PR		12.00x20-18PR		12.00x20-20PR	
110.2	2,800	110.2	2,800	122.0	3,100	129.9	3,300
74.8	1,900	75.0	1,905	75.0	1,905	75.0	1,905
77.4	1,965	75.8	1,925	75.8	1,925	74.4	1,890
8.7	220	10.2	260	10.2	260	10.2	260
10.8	275	12.6	320	12.6	320	12.6	320
air over hydraulic-foot		air over hydraulic-foot		air over hydraulic-foot		oil cooled disc brake	
mechanical-hand		mechanical-hand		mechanical-hand		mechanical-hand	
P26500		P30000		P33000		P36000	
Mitsubishi 6M60-TL		Mitsubishi 6M60-TL		Mitsubishi 6M60-TL		Mitsubishi 6M60-TL	
148	110	148	110	148	110	148	110
2,100		2,100		2,100		2,100	
450	610	450	610	450	610	450	610
1,600		1,600		1,600		1,600	
6 / 460	6 / 7,545	6 / 460	6 / 7,545	6 / 460	6 / 7,545	6 / 460	6 / 7,545
Automatic Powershift		Automatic Powershift		Automatic Powershift		Automatic Powershift	
3 / 3		3 / 3		3 / 3		3 / 3	
2,987	206	2,987	206	2,987	206	2,987	206

Call-out numbers shown in diagram correspond to the first column of the specifications chart.



Safety Standards

These trucks meet American National Standards Institute/ Industrial Truck Standards Development Foundation, ANSI/ITSDF B56.1. UL-Classified by Underwriters Laboratories, Inc., as to fire and electric shock hazard only; Type D (standard). Type DS available. Users should be aware of, and adhere to, applicable codes and regulations regarding operator training, use, operation and maintenance of powered industrial trucks, including:

- ANSI/ITSDF B56.1.
- NFPA 505, fire safety standard for powered industrial trucks - type designations, areas of use, maintenance, and operation.
- Occupational Safety and Health Administration (OSHA) regulations that may apply.

Specifications, equipment, technical data, photos and illustrations based on information at time of printing and subject to change without notice. Some products may be shown with optional equipment.

Enhance Your Experience

Your local Cat lift truck dealer can help you choose an option package that best suits your specific application and material handling requirements.

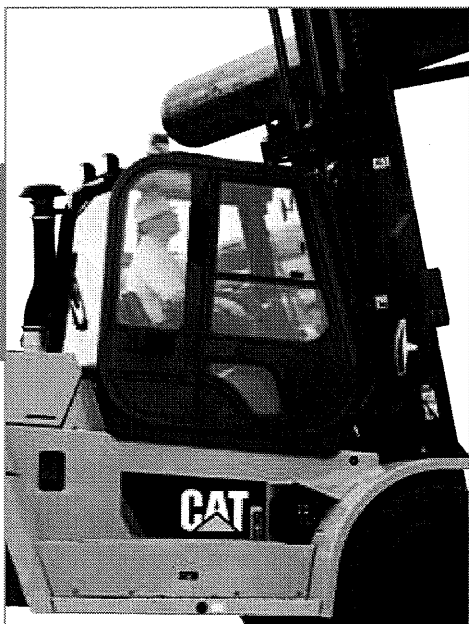


Application Awareness

- Air horn
- Rotating lights
- Mirrors
- Ground speed control

Foundry/Dust Protection Options

- Radiator coolant level warning kit
- Boot kits - 15° forward /12° back tilt cylinder
- Dust proof breather kit – front axle
- Elevated air intake – operator module mounted
- Air cleaner service indicator



Cabs

- Factory-installed cabs help protect the operator from falling objects as well as inclement weather

Lights

- 2 forward working lights
 - Operator module or cab mounted
- 2 rear working lights
 - Operator module or cab mounted
- 2 rear working lights
 - Rear deck mounted



Service Brake

- Oil-cooled disc brakes (standard on P36000)

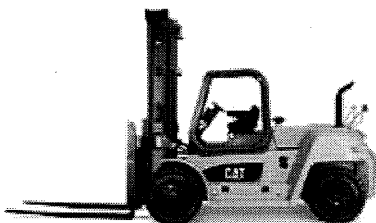


Quality

Reliability

Customer Service

Experienced professionals at our dealerships and on our National Accounts Team can assist you with your lift truck purchase or lease. Your Cat lift truck dealer can provide options and additional visual and audible warning devices geared toward your specific requirements. Operator training programs are also available to boost productivity and to help reduce the potential for product damage and personal injury.



Diesel Pneumatic Tire Lift Trucks

Capacity: 17,500-36,000 lb

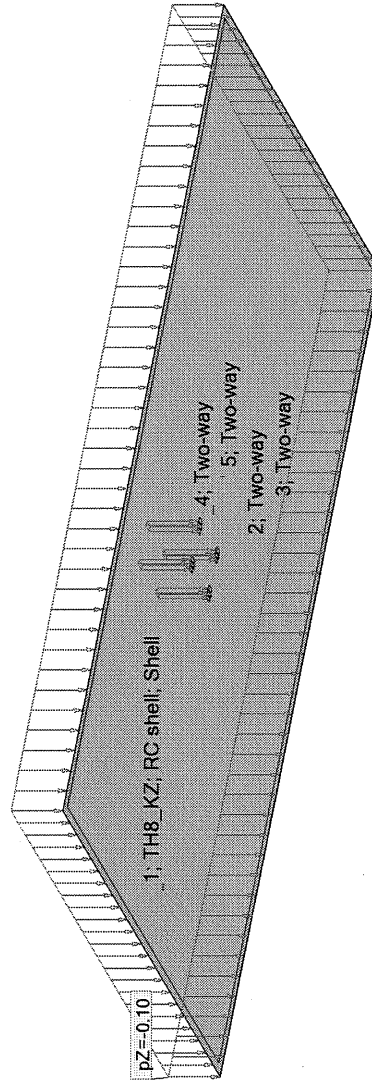
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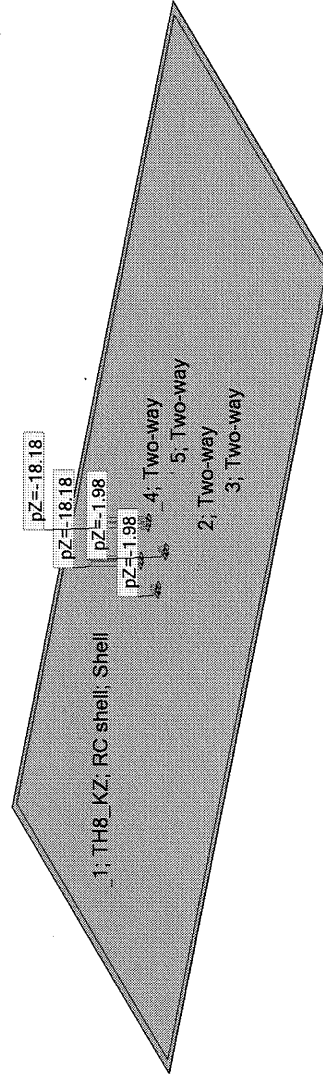
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CAT[®] Lift Trucks



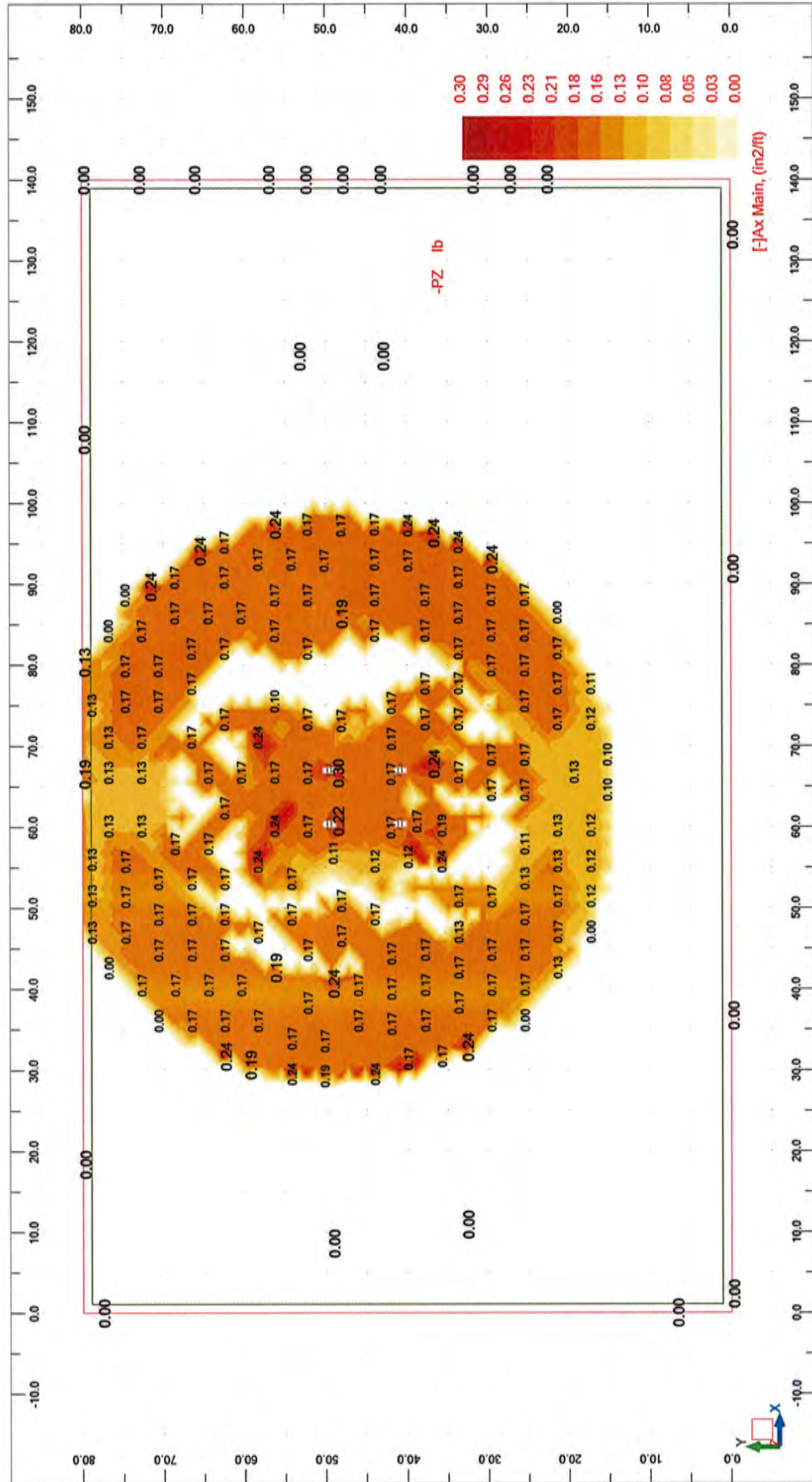
Cases: 4 (Applied LL)
kip/ft2

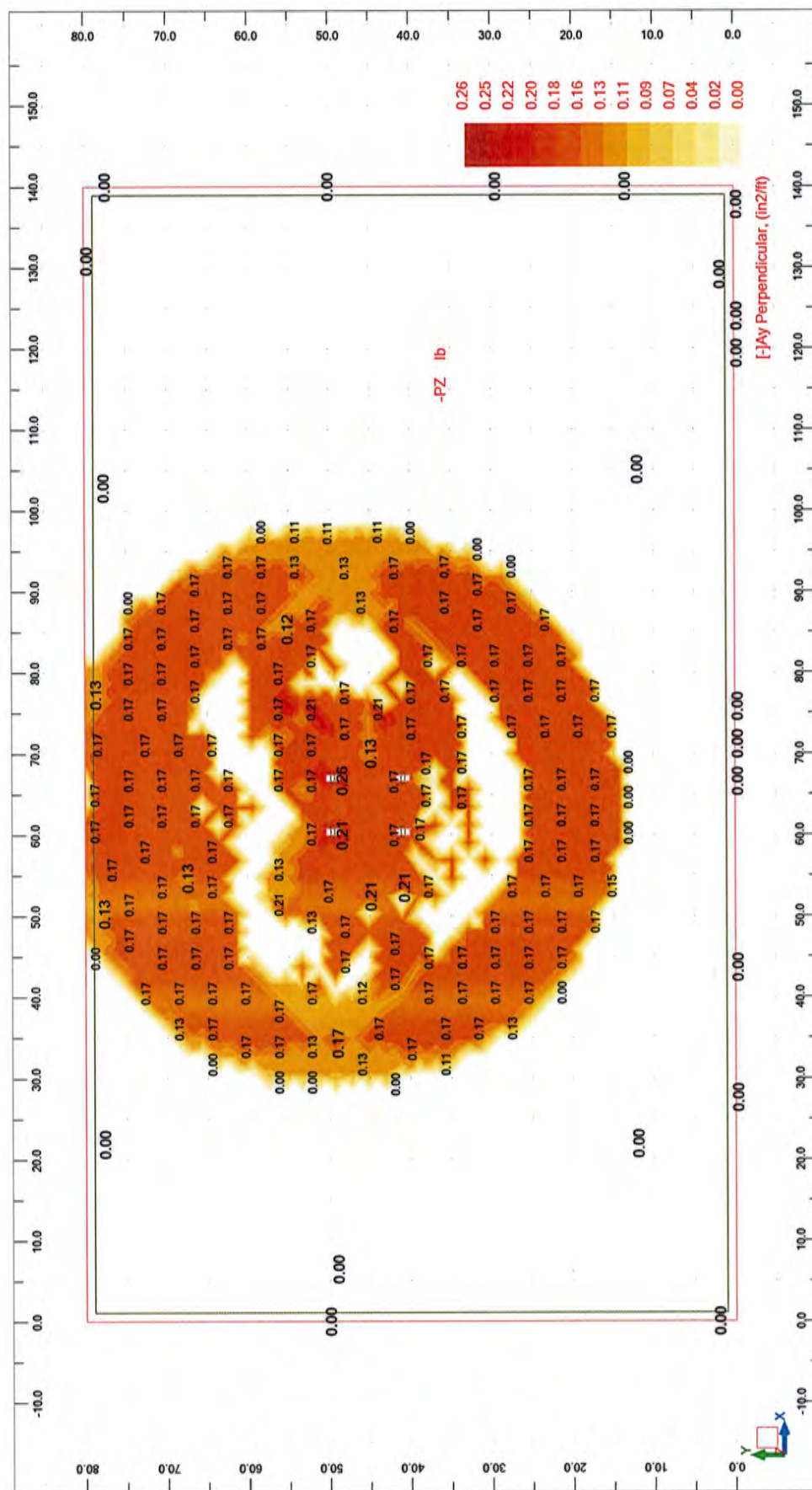
View -



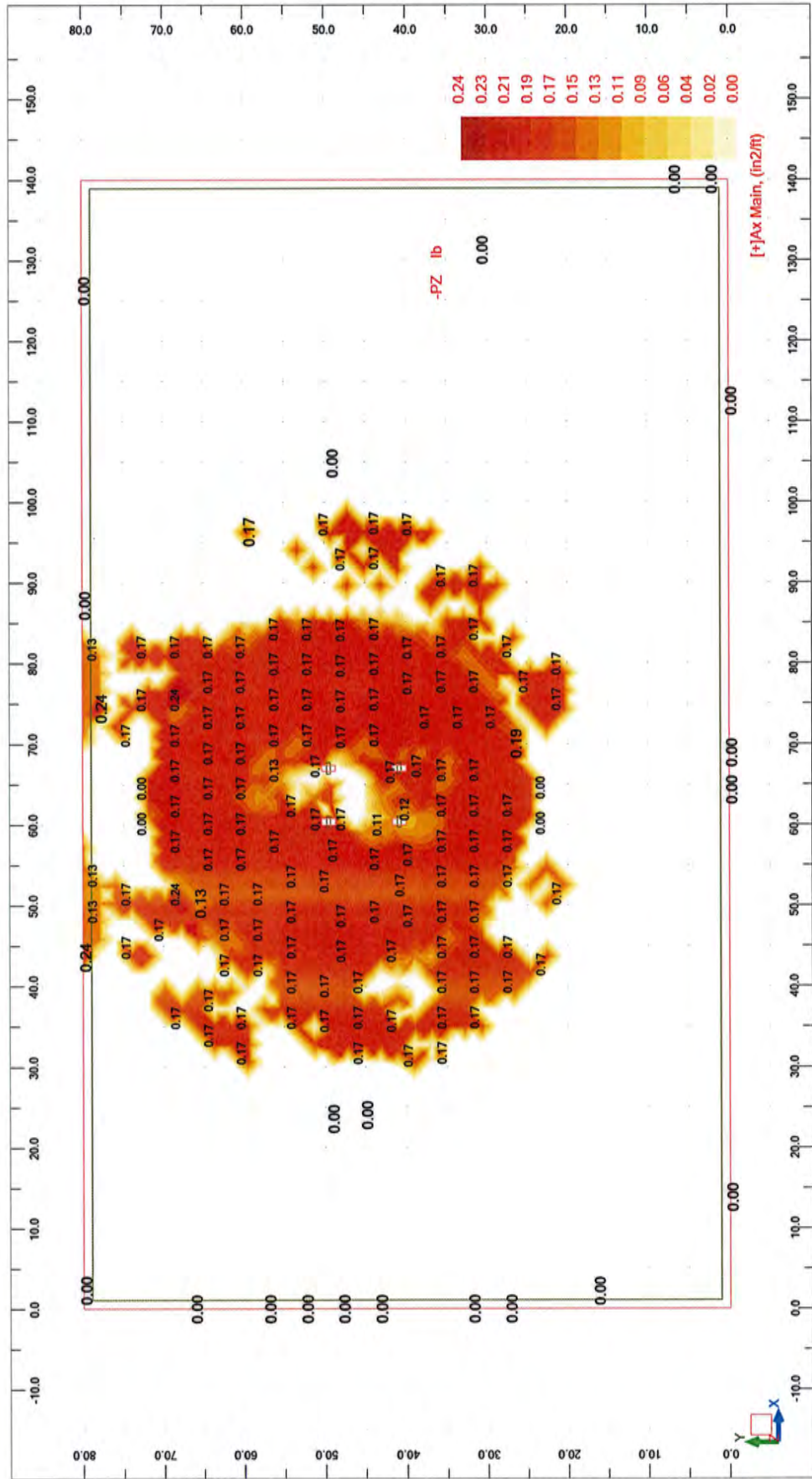
kip/ft2
Cases: 5 (Equip LL)

View - [-]JAx Main (in2/ft)





View - [x]Ax Main (in2/ft)



View - [+Y] Perpendicular (in2/ft)

