ARCHITECTS
ENGINEERS

CLH Innovative Cost Effective Design and Engineering Solutions

Reconfigure M1 Room
ZLA Los Angeles
Air Route Traffic Control Center
Palmdale, California

Design Analysis

100% Submittal

AUGUST 2021

Prepared By

E-Corp

CLH ARCHITECTS ENGINEERS

Case, Lowe & Hart, Inc. • 2484 Washington Blvd
Suite 510 • Ogden, Utah • 84401
801.399.5821 • www.clhae.com

Design Analysis

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Structural Information

ARW ENGINEERS
structural consultants

Structural Calculations

For

FAA ENGR Reconfigure M1 Room

Project Number: 19521

November 19, 2021

REGISTERED PROFESSIONAL ENGINEER
DAVID L. PIERSON
No. S 4219
Exp. 12/2023
STRUCTURAL
STATE OF CALIFORNIA
11-19-2021

Prepared by
ARW Engineers
1594 West Park Circle
Ogden, Utah 84404

ARW ENGINEERS
structural consultants

STRUCTURAL CALCULATIONS

FOR

FAA ENGR Reconfigure M1 Room

Client: Case, Lowe & Hart, Inc.

Project Number: 19521

DESIGN CRITERIA

GOVERNING CODE: CBC 2019

GENERAL: Risk Category = IV

SEISMIC: Seismic Design Category = D
$I_E = 1.5$
$S_{DS} = 1.468$
$S_{D1} = 0.866$

DESIGN LOADS

SUSPENDED FLOOR: DL = 12 psf LL = 20 psf

ARW ENGINEERS
structural consultants

CALCULATIONS INDEX

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Floor Framing	26 to 316
Lateral Analysis	317 to 354
Walls	355 to 380

ROOF FRAMING

DESIGN LOADING:

JOIST LOADING:

LL = 20 PSF (APPLIED TO RAM MODEL AS A ROOF LIVE LOAD)

DL =

METAL STUDS	=	3.81 PLF/16" = 2.9 PSF
DECKING	=	2.3 PSF
INSULATION	=	1.0 PSF
MECH/ELECT/CLG	=	2.5 PSF
MISC	=	0.9 PSF
ADD'L GYP LAYER	=	2.4 PSF
		12.0 PSF

WALL DL:

METAL STUDS	=	1.44 PLF = 1.1 PSF (STUDS @ 16" O.C)
SHEATHING	=	2.0 PSF
INSULATION	=	1.5 PSF
GYP BOARD	=	2.8 PSF
MISC	=	2.6 PSF (CONSERVATIVE)
		10.0 PSF

USE 12 PSF @ SHEAR WALLS

$$F_p = \frac{0.4 a_p S_{DS} W_p}{(R_p/I_p)}(1+2z/h) = \frac{0.4(1.0)(1.468)(10\ PSF)(1+2)}{(2.5/1.5)} = 10.6\ PSF \rightarrow 7.42\ PSF\ (LRFD)$$

EXISTING LOADING:

* SEE "NEW LOADS ON (E) STRUCTURE FOUND IN FLOOR FRAMING CALCULATIONS

JOIST DESIGN:

1) WORST CASE SPAN (SIMPLY SUPPORTED):

SPAN = 25'-7", BLOCKED @ 1/3 SPAN. DL = 12 PSF

SPACING = @ 16" O.C. LL = 20 PSF

→ 1200S162-54 @ 16" O.C. — 16" O.C. TO MATCH WALL STUD FRAMING

→ SEE STEELSMART PRINTOUT

2) SMALLER SPAN:

SPAN = 17'-1", BLOCKING @ 1/2 SPAN

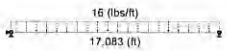
→ 1200S162-54 @ 16" O.C.

→ SEE STEELSMART PRINTOUT

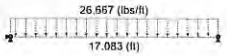
Company:	ARW Engineers	Date:	Thu, Apr 30 20
Address:	1594 W Park Circle		
Country:	United States		
State:	Utah		
Zip Code:	84404		

Joist Design #1

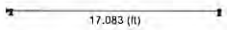
Simple Supported Rafter



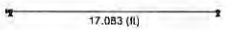
Dead Load



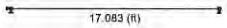
Roof Live Load



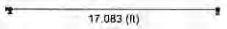
Wind Load(+)



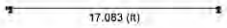
Wind Load(-)



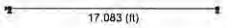
Snow Load



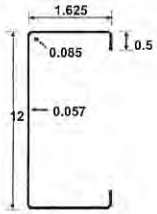
Other Load 1



Other Load 2



Other Load 3



1200S162-54, 50 ksi

Gross Section Properties

Ix (major) (in4)	15.735
Sx (major) (in3)	2.623
rx (major) (in)	4.191
Iy (minor) (in4)	0.212
Sy (minor) (in3)	0.156
ry (minor) (in)	0.486
Area (in²)	0.896
Xo (in)	-0.732
J x 1000 (in4)	0.957
Cw (in6)	6.34
Ro (in)	4.282
Weight (lbs/ft)	3.049

Material Properties:

Fy (ksi)	50
Fu (ksi)	65
E (ksi)	29500
G (ksi)	11300

Roof Information:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD
Roof Horizontal Length (ft)	17.083
Rafter Spacing (in)	16
Lr/SL Allowable Deflection L /	360

Sections Effective Properties

Member		Value
1	Ae(Comp.) (in²)	0.312
	Sxe (in3)	1.914
	Ixe(in4)	14.138
	Fy Design (ksi)	50

Company:	ARW Engineers	Date:	Thu, Apr 30 20
Address:	1594 W Park Circle		
Country:	United States		
State:	Utah		
Zip Code:	84404		

Joist Design #1

Simple Supported Rafter

TL Allowable Deflection L /	240
Absolute Deflection (in)	4
Rafter Slope (X/12)	0.000

Bracing Data:

Axial Compression Lateral Bracing (in)	None
Axial Compression Torsional Bracing (in)	None
Top Flange Lateral Bracing (in)	Full
Top Flange Torsional Bracing (in)	Full
Bottom Flange Lateral Bracing (in)	None
Bottom Flange Torsional Bracing (in)	None
K_{φ} Distortional Buckling Rotational Stiffness (lbf-in./in.)	50

Maximum Positive Reactions:

Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	0	0.364	0
2	0	0.364	0

Maximum Negative Reactions:

Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	0	0	0
2	0	0	0

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0	0.137	0
Dead Load	2	0	0.137	0
Roof Live Load	1	0	0.228	0
Roof Live Load	2	0	0.228	0
Wind Load (+)	1	0	0	0
Wind Load (+)	2	0	0	0
Wind Load (-)	1	0	0	0
Wind Load (-)	2	0	0	0
Snow Load	1	0	0	0
Snow Load	2	0	0	0
Other Load 1	1	0	0	0
Other Load 1	2	0	0	0
Other Load 2	1	0	0	0
Other Load 2	2	0	0	0
Other Load 3	1	0	0	0
Other Load 3	2	0	0	0

Load Combination Factors:

#	Dead	Roof Live	Wind(+)	Wind(-)	Snow	Other Ld.1	Other Ld.2	Other Ld.3	Used For
1	1	0.75	0.45	0	0	0	0	0	Strength
2	1	1	0	0	0	0	0	0	Strength
3	1	0	0	0	1	0	0	0	Strength
4	1	0	0.6	0	0	0	0	0	Strength
5	1	0	0.45	0	0.75	0	0	0	Strength
6	0.6	0	0	0.6	0	0	0	0	Strength
7	1	1	0	0	0	0	0	0	Total Load Deflection
8	1	0	0	0	1	0	0	0	Total Load Deflection
9	1	0	0.6	0	0	0	0	0	Total Load Deflection
10	1	0.75	0.45	0	0	0	0	0	Total Load Deflection
11	1	0	0.45	0	0.75	0	0	0	Total Load Deflection
12	0.6	0	0	0.6	0	0	0	0	Total Load Deflection

Span Loads (psf): (Wind Loads are Ultimate)

Span	Dead	Roof Live	Wind(+)	Wind(-)	Snow	Other Ld.1	Other Ld.2	Other Ld.3
1	12	20	0.000	0.000	0.000	0.000	0.000	0.000

Design Options:

° Section Layout	Single
° Fastener Spacing (in)	N/A
° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1
° Shear Coeff. Kv	5.34
° X (in)	4

Capacity Check:

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Lr/SL Deflection (in)	TL Deflection (in)	Crippling (kips)
1	Actual	18.674	0.364	N/A	N/A	0.123	0.196	N/A
	Allowable	47.999	1.377	26.358	0.543	0.569	0.854	N/A
	Act./All.	0.389 *	0.265	N/A	N/A	0.215	0.229	N/A
	X/L	0.500	0.000	N/A	N/A	N/A	N/A	N/A

Design for Web Crippling is Disabled

*** Forces are calculated for punched-out section**

Interaction Check (kips.in, kips):

Member	Combined (M,V)		Combined (M,Pcr)		Combined (M,T)		Combined (M,P)	
1	Moment(Mx)	17.927	Moment(Mx)	N/A	Moment(Mx)	N/A	Moment(Mx)	N/A
	Shear(Vy)	-0.073	Pcr (Crippling)	N/A	Tension (T)	N/A	Comp. (P)	N/A
	Act./All.	0.317	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A
	X/L	0.400	X/L	N/A	X/L	N/A	X/L	N/A

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

Joist Design #1

Date: Thu, Apr 30 20

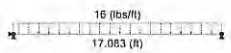
Simple Supported Rafter

Connection Data:

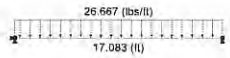
1	Clip Data	Clip Position	Clip @ joint 1	
		Clip Type	StiffClip® RT650-33	
		Screws	2/2 (#12)	
	Clip Allowable Loads	F1 (kips)	0.175	
		F2 (kips)	0.128	
		F3 (kips)	0.453	
		M1 (kips.in)	N/A	
	Clip Actual Loads	F1 (kips)	0.000	
		F2 (kips)	0.000	
		F3 (kips)	0.364	
		M1 (kips.in)	N/A	
	Clip Interaction	Linear Interaction ratio	0.804	
	Clip Long Leg Screws Actual Loads	Shear (kips)	0.218	
		Tension (kips)	0.000	
	Clip Short Leg Screws Actual Loads	Shear (kips)	0.346	
		Tension (kips)	0.000	
	Clip Screws Allowable Loads	Shear (kips)	0.437	
		Tension (kips)	0.225	
	Screw Interaction	Linear Interaction ratio	N/A	
2	Clip Data	Clip Position	Clip @ joint 2	
		Clip Type	StiffClip® HC1000-68	
		Screws	4 (#12)	
	Clip Allowable Loads	F1 (kips)	N/A	
		F2 (kips)	N/A	
		F3 (kips)	2.238	
		M1 (kips.in)	N/A	
	Clip Actual Loads	F1 (kips)	N/A	
		F2 (kips)	N/A	
		F3 (kips)	0.364	
		M1 (kips.in)	N/A	
	Clip Interaction	Linear Interaction ratio	0.163	
	Clip Screws Actual Loads	Shear (kips)	N/A	
		Tension (kips)	N/A	
		Shear (kips)	N/A	
		Tension (kips)	N/A	
	Clip Screws Allowable Loads	Shear (kips)	N/A	
		Tension (kips)	N/A	
	Screw Interaction	Linear Interaction ratio	N/A	

- When more than one load affect a connection, simple linear relationship is used to check the interaction of multiple loads acting on the connection.

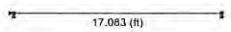
Company:	ARW Engineers	Date:	Thu, Apr 30 20
Address:	1594 W Park Circle		
Country:	United States	Joist Design #2	
State:	Utah		
Zip Code:	84404	**Simple Supported Rafter**	



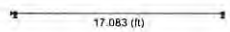
Dead Load



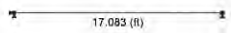
Roof Live Load



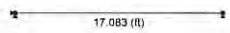
Wind Load(+)



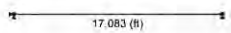
Wind Load(-)



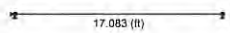
Snow Load



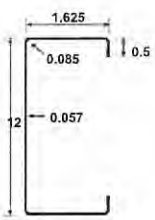
Other Load 1



Other Load 2



Other Load 3



1200S162-54, 50 ksi

Gross Section Properties

Ix (major) (in4)	15.735
Sx (major) (in3)	2.623
rx (major) (in)	4.191
Iy (minor) (in4)	0.212
Sy (minor) (in3)	0.156
ry (minor) (in)	0.486
Area (in²)	0.896
Xo (in)	-0.732
J x 1000 (in4)	0.957
Cw (in6)	6.34
Ro (in)	4.282
Weight (lbs/ft)	3.049

Material Properties:

Fy (ksi)	50
Fu (ksi)	65
E (ksi)	29500
G (ksi)	11300

Roof Information:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD
Roof Horizontal Length (ft)	17.083
Rafter Spacing (in)	16
Lr/SL Allowable Deflection L /	360

Sections Effective Properties

Member		Value
1	Ae(Comp.) (in²)	0.312
	Sxe (in3)	1.914
	Ixe(in4)	14.138
	Fy Design (ksi)	50

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Country:	United States	Joist Design #2	
State:	Utah		
Zip Code:	84404	**Simple Supported Rafter**	

TL Allowable Deflection L /	240
Absolute Deflection (in)	4
Rafter Slope (X/12)	0.000

Bracing Data:

Axial Compression Lateral Bracing (in)	None
Axial Compression Torsional Bracing (in)	None
Top Flange Lateral Bracing (in)	Full
Top Flange Torsional Bracing (in)	Full
Bottom Flange Lateral Bracing (in)	None
Bottom Flange Torsional Bracing (in)	None
K_φ Distortional Buckling Rotational Stiffness (lbf-in./in.)	50

Maximum Positive Reactions:

Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	0	0.364	0
2	0	0.364	0

Maximum Negative Reactions:

Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	0	0	0
2	0	0	0

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0	0.137	0
Dead Load	2	0	0.137	0
Roof Live Load	1	0	0.228	0
Roof Live Load	2	0	0.228	0
Wind Load (+)	1	0	0	0
Wind Load (+)	2	0	0	0
Wind Load (-)	1	0	0	0
Wind Load (-)	2	0	0	0
Snow Load	1	0	0	0
Snow Load	2	0	0	0
Other Load 1	1	0	0	0
Other Load 1	2	0	0	0
Other Load 2	1	0	0	0
Other Load 2	2	0	0	0
Other Load 3	1	0	0	0
Other Load 3	2	0	0	0

Load Combination Factors:

#	Dead	Roof Live	Wind(+)	Wind(-)	Snow	Other Ld.1	Other Ld.2	Other Ld.3	Used For
1	1	0.75	0.45	0	0	0	0	0	Strength
2	1	1	0	0	0	0	0	0	Strength
3	1	0	0	0	1	0	0	0	Strength
4	1	0	0.6	0	0	0	0	0	Strength
5	1	0	0.45	0	0.75	0	0	0	Strength
6	0.6	0	0	0.6	0	0	0	0	Strength
7	1	1	0	0	0	0	0	0	Total Load Deflection
8	1	0	0	0	1	0	0	0	Total Load Deflection
9	1	0	0.6	0	0	0	0	0	Total Load Deflection
10	1	0.75	0.45	0	0	0	0	0	Total Load Deflection
11	1	0	0.45	0	0.75	0	0	0	Total Load Deflection
12	0.6	0	0	0.6	0	0	0	0	Total Load Deflection

Span Loads (psf): (Wind Loads are Ultimate)

Span	Dead	Roof Live	Wind(+)	Wind(-)	Snow	Other Ld.1	Other Ld.2	Other Ld.3
1	12	20	0.000	0.000	0.000	0.000	0.000	0.000

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

Joist Design #2

Date: Thu, Apr 30 20

Simple Supported Rafter

Design Options:

° Section Layout	Single
° Fastener Spacing (in)	N/A
° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1
° Shear Coeff. Kv	5.34
° X (in)	4

Capacity Check:

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Lr/SL Deflection (in)	TL Deflection (in)	Crippling (kips)
1	Actual	18.674	0.364	N/A	N/A	0.123	0.196	N/A
	Allowable	47.999	1.377	26.358	0.543	0.569	0.854	N/A
	Act./All.	0.389 *	0.265	N/A	N/A	0.215	0.229	N/A
	X/L	0.500	0.000	N/A	N/A	N/A	N/A	N/A

Design for Web Crippling is Disabled

*** Forces are calculated for punched-out section**

Interaction Check (kips.in, kips):

Member	Combined (M,V)		Combined (M,Pcr)		Combined (M,T)		Combined (M,P)	
1	Moment(Mx)	17.927	Moment(Mx)	N/A	Moment(Mx)	N/A	Moment(Mx)	N/A
	Shear(Vy)	-0.073	Pcr (Crippling)	N/A	Tension (T)	N/A	Comp. (P)	N/A
	Act./All.	0.317	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A
	X/L	0.400	X/L	N/A	X/L	N/A	X/L	N/A

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

Joist Design #2

Date: Thu, Apr 30 20

Simple Supported Rafter

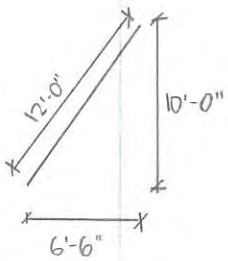
Connection Data:

1	Clip Data	Clip Position	Clip @ joint 1	
		Clip Type	StiffClip® RT650-33	
		Screws	2/2 (#12)	
	Clip Allowable Loads	F1 (kips)	0.175	
		F2 (kips)	0.128	
		F3 (kips)	0.453	
		M1 (kips.in)	N/A	
	Clip Actual Loads	F1 (kips)	0.000	
		F2 (kips)	0.000	
		F3 (kips)	0.364	
		M1 (kips.in)	N/A	
	Clip Interaction	Linear Interaction ratio	0.804	
	Clip Long Leg Screws Actual Loads	Shear (kips)	0.218	
		Tension (kips)	0.000	
	Clip Short Leg Screws Actual Loads	Shear (kips)	0.346	
		Tension (kips)	0.000	
	Clip Screws Allowable Loads	Shear (kips)	0.437	
		Tension (kips)	0.225	
	Screw Interaction	Linear Interaction ratio	N/A	
2	Clip Data	Clip Position	Clip @ joint 2	
		Clip Type	StiffClip® HC1000-68	
		Screws	4 (#12)	
	Clip Allowable Loads	F1 (kips)	N/A	
		F2 (kips)	N/A	
		F3 (kips)	2.238	
		M1 (kips.in)	N/A	
	Clip Actual Loads	F1 (kips)	N/A	
		F2 (kips)	N/A	
		F3 (kips)	0.364	
		M1 (kips.in)	N/A	
	Clip Interaction	Linear Interaction ratio	0.163	
	Clip Screws Actual Loads	Shear (kips)	N/A	
		Tension (kips)	N/A	
		Shear (kips)	N/A	
		Tension (kips)	N/A	
	Clip Screws Allowable Loads	Shear (kips)	N/A	
		Tension (kips)	N/A	
	Screw Interaction	Linear Interaction ratio	N/A	

- When more than one load affect a connection, simple linear relationship is used to check the interaction of multiple loads acting on the connection.

7

SHIPS LADDER:



WIDTH = 2'-4"

TOTAL DL:

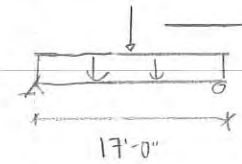
HANDRAIL = 5PLF (12'-0")(2) = 120 #
LADDER = 15PSF (12'-0")(2'-4") = 420 #
] = 440 #

TOTAL LL = 60 PSF (12'-0")(2'-2") = 1560 #

TOTAL = 1560 # + 440 # = 2000 #

EACH SIDE see APPROXIMATELY 1000 #.

JOIST DESIGN:



→ DL = 220 # LL = 780 #

→ DL = 12 PSF, LL = 20 PSF, TRIB = 16"

CHECK (3)12005162 - 54.

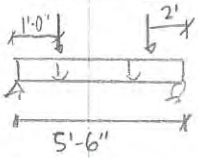
EACH JOIST: LOADING: DL = 74 #, LL = 260 #

DL = 6 PLF

LL = 9 PLF

(3) 12005162 - 54 OK., SR = 0.521

HEADER @ SHIPS LADDER:



→ DL = 12 PSF, LL = 20 PSF, TRIB = 17'/2 + 8" = 9'-2"

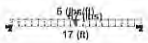
EA. PT LOAD: DL = 220 #

LL = 780 #

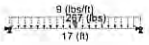
(2) 3625162 - 54 JAMBS OK.

HEADER OK - same as everywhere else.

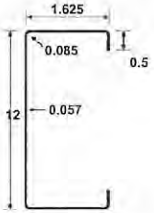
Company:	ARW Engineers		Date: Tue, Aug 04 20
Address:	1594 W Park Circle	Joist Design at ships ladder	
Country:	United States		
State:	Utah		
Zip Code:	84404	**User-Defined Joist**	



Dead Load



Live Load



1200S162-54, 50 ksi

Gross Section Properties

Ix (major) (in4)	15.735
Sx (major) (in3)	2.623
rx (major) (in)	4.191
Iy (minor) (in4)	0.212
Sy (minor) (in3)	0.156
ry (minor) (in)	0.486
Area (in²)	0.896
Xo (in)	-0.732
J x 1000 (in4)	0.957
Cw (in6)	6.34
Ro (in)	4.282
Weight (lbs/ft)	3.049

Floor Information:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD
Joist Length (ft)	17
Number of Spans	1
LL Allowable Deflection, L /	360
TL Allowable Deflection, L /	240
Absolute Deflection (in)	1
Deflection calculation method at parapet free end	Relative value considered

Material Properties:

Fy (ksi)	50
Fu (ksi)	65
E (ksi)	29500
G (ksi)	11300

Bracing Data:

Top Flange Lateral Bracing (in)	Full
Top Flange Torsional Bracing (in)	Full
Bottom Flange Lateral Bracing (in)	60
Bottom Flange Torsional Bracing (in)	60
K_{ϕ} Distortional Buckling Rotational Stiffness (lbf-in./in.)	0.000

Design Options

° Section Layout	Single
° Fastener Spacing (in)	N/A
° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1

Company:	ARW Engineers		Date: Tue, Aug 04 20
Address:	1594 W Park Circle	Joist Design at ships ladder	
Country:	United States		
State:	Utah		
Zip Code:	84404	**User-Defined Joist**	

° Shear Coeff. Kv	5.34
° X (in)	4

Joint Supports and Reactions:

#	Support Type	Rx (kips)	Ry (kips)	Rm (kips.in)
1	Hinged	0.000	0.295	0.000
2	Hinged	0.000	0.295	0.000

Joint Loads:

Joint	Load Case	Vertical (lbs)	M (lbs.ft)

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0.000	0.085	0.000
Dead Load	2	0.000	0.085	0.000
Live Load	1	0.000	0.21	0.000
Live Load	2	0.000	0.21	0.000

Span Uniform Loads:

#	Dead Load (lbs/ft)	Live Load (lbs/ft)
1	6	9

Span Non-Uniform Loads:

#	Load Case	Start pt.	Load (lbs/ft)	End pt.	Load (lbs/ft)

Span Concentrated Loads:

#	Load Case	Vertical (lbs)	Moment (lbs.ft)	X/L
1	Dead Load	67	0.000	0.5
1	Live Load	267	0.000	0.5

Load Combination Factors:

#	Dead	Live	Used For
1	1	1	Strength
2	1	1	Total Load Deflection

Capacity Check:

Member		Moment (kips.in)	Shear (kips)	LL Deflection (in)	TL Deflection (in)	Crippling (kips)
1	Actual	23.536	0.294	0.154	0.209	N/A
	Allowable	45.21	1.377	0.567	0.85	N/A
	Act./All.	0.521 *	0.214	0.271	0.246	N/A
	X/L	0.500	0.000	N/A	N/A	N/A

Design for Web Crippling is Disabled

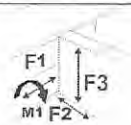
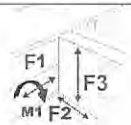
*** Forces are calculated for punched-out section**

Interaction Check:

Member	Combined (M,V) (kips.in, kips)		Combined (M,Pcr) (kips.in, kips)	
1	Moment(Mx)	23.536	Moment(Mx)	N/A
	Shear(Vy)	-0.167	P (Crippling)	N/A
	Act./All.	0.428	Act./All.	N/A
	X/L	0.500	X/L	N/A

Company:	ARW Engineers		Date: Tue, Aug 04 20
Address:	1594 W Park Circle	Joist Design at ships ladder	
Country:	United States		
State:	Utah		
Zip Code:	84404	**User-Defined Joist**	

Connection Data:

1	Clip Data	Clip Position	Clip @ joint 1	
		Clip Type	None	
		Screws	N/A	
	Clip Allowable Loads	F1 (kips)	N/A	
		F2 (kips)	N/A	
		F3 (kips)	N/A	
		M1 (kips.in)	N/A	
	Clip Actual Loads	F1 (kips)	0.000	
		F2 (kips)	0.000	
		F3 (kips)	0.295	
		M1 (kips.in)	0.000	
	Clip Interaction	Linear Interaction ratio	N/A	
	Screws Allowable Loads	Screw All Shear (kips)	N/A	
		Screw All Tension (kips)	N/A	
	Screws Actual Loads	Screw Act Shear (kips)	N/A	
		Screw Act Tension (kips)	N/A	
	Screws Interaction	Linear Interaction ratio	N/A	
2	Clip Data	Clip Position	Clip @ joint 2	
		Clip Type	None	
		Screws	N/A	
	Clip Allowable Loads	F1 (kips)	N/A	
		F2 (kips)	N/A	
		F3 (kips)	N/A	
		M1 (kips.in)	N/A	
	Clip Actual Loads	F1 (kips)	0.000	
		F2 (kips)	0.000	
		F3 (kips)	0.295	
		M1 (kips.in)	0.000	
	Clip Interaction	Linear Interaction ratio	N/A	
	Screws Allowable Loads	Screw All Shear (kips)	N/A	
		Screw All Tension (kips)	N/A	
	Screws Actual Loads	Screw Act Shear (kips)	N/A	
		Screw Act Tension (kips)	N/A	
	Screws Interaction	Linear Interaction ratio	N/A	

- When more than one load affect a connection, simple linear relationship is used to check the interaction of multiple loads acting on the connection.

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

Header @ ships ladder

Date: Tue, Aug 04 20

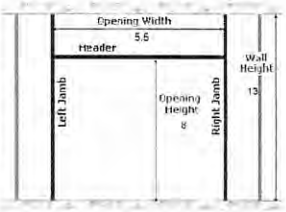
Load Bearing User Defined Door

Design Data:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD

Wall Data:

Wall Height (ft)	13
Horizontal Deflection L /	360
Header Vertical Deflection L /	480
Absolute Deflection (in)	1
Max. Bridging Spacing (ft)	5
Stud Spacing (in)	16
Opening Type/Wind Load Distribution	Glazed / Four Ways Distribution
Ultimate Wind Load (psf)	12.4
Dead Load (lbs/ft)	130
Live Load (lbs/ft)	185



Bracing Data:

Jamb Lateral Bracing (in)	Full
Jamb Torsional Bracing (in)	Full
Header Lateral Bracing-Lateral Ld (in)	Full
Header Torsional Bracing-Lateral Ld (in)	Full
Header Lateral Bracing-Gravity Ld (in)	None
Header Torsional Bracing-Gravity Ld (in)	None
K_{tp} Distortional Buckling Rotational Stiffness (lbf-in./in.)	0.000

Design Options:

° Section Layout	Built Up Section
° Fastener Spacing (in)	24
° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1
° Shear Coeff. Kv	5.34
° X (in)	4

Dimensions (ft):

Jamb Height	Door Height	Door Width
13	8	5.5

Uniform Dead Load:

#	Load Value (lbs/ft)
3	130

Note:Applied Joint and Member Loads are calculated from Opening Loads

Joint Loads: (Wind Loads are Ultimate)

Joint #	Load Case	Vertical (lbs)	Lateral (lbs)	Moment (lbs.ft)
3	Dead Load	0.000	0.000	0.000
4	Dead Load	0.000	0.000	0.000
3	Live Load	0.000	0.000	0.000
4	Live Load	0.000	0.000	0.000
3	Snow/Roof Live Load	0.000	0.000	0.000
4	Snow/Roof Live Load	0.000	0.000	0.000

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

Header @ ships ladder

Date: Tue, Aug 04 20

Load Bearing User Defined Door

Member Loads: (Wind Loads are Ultimate)

#	Load Case	Vertical	Lateral	Moment	X/L
1	Dead Load	220 (lbs)	0.000 (lbs)	0.000 (lbs.ft)	0.18
1	Dead Load	220 (lbs)	0.000 (lbs)	0.000 (lbs.ft)	0.64
1	Live Load	0.78 (lbs)	0.000 (lbs)	0.000 (lbs.ft)	0.18
1	Live Load	0.78 (lbs)	0.000 (lbs)	0.000 (lbs.ft)	0.64
3	Live Load	185 (lbs/ft)	0.000 (lbs/ft)	0.0 (lbs.ft)	Uniform
1	Wind Load	0.000 (lbs/ft)	-8.267 (lbs/ft)	0.0 (lbs.ft)	Uniform
2	Wind Load	0.000 (lbs/ft)	-8.267 (lbs/ft)	0.0 (lbs.ft)	Uniform
3	Wind Load	0.000 (lbs/ft)	-48.050 (lbs/ft)	0.0 (lbs.ft)	Uniform
4	Wind Load	0.000 (lbs/ft)	-30.645 (lbs/ft)	0.0 (lbs.ft)	Uniform
5	Wind Load	0.000 (lbs/ft)	-30.645 (lbs/ft)	0.0 (lbs.ft)	Uniform
3	Snow/Roof Live Load	0.000 (lbs/ft)	N/A	N/A	Uniform

Load Combination Factors:

#	Dead	Live	Wind	Snow/Roof Live Load	Used For
1	1	0.75	0.45	0.75	Strength
2	1	0	0	1	Strength
3	1	0	0.6	0	Strength
4	1	1	0	0	Strength
5	1	1	0	0	Deflection
6	1	0	0.6	0	Deflection
7	1	0	0	1	Deflection
8	1	0.75	0.45	0.75	Deflection

Reactions:

Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	0.114	0	0
2	0.114	0	0
5	0.137	1.308	0
6	0.137	0.866	0

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0	0	0
Dead Load	2	0	0	0
Dead Load	5	0	0.797	0
Dead Load	6	0	0.357	0
Live Load	1	0	0	0
Live Load	2	0	0	0
Live Load	5	0	0.51	0
Live Load	6	0	0.509	0
Wind Load	1	0.19	0	0
Wind Load	2	0.19	0	0
Wind Load	5	0.229	0	0
Wind Load	6	0.229	0	0
Snow/Roof Live Load	1	0	0	0
Snow/Roof Live Load	2	0	0	0
Snow/Roof Live Load	5	0	0	0
Snow/Roof Live Load	6	0	0	0

Company:	ARW Engineers	Date:	Tue, Aug 04 20
Address:	1594 W Park Circle	Header @ ships ladder	
Country:	United States		
State:	Utah		
Zip Code:	84404	**Load Bearing User Defined Door**	

Sections Data:

Jamb	Stud Section	2 x 362S162-54, 50 ksi	
	Track Section	N/A	
Header	Horizontal Stud	N/A	
	Horizontal Track	N/A	
	Horizontal Closure	2 x 362T125-54, 50 ksi	
	Vertical Stud	2 x 600S162-54, 50 ksi	
	Vertical Track	N/A	

Member Check:

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Hz. Deflection (in)	V.Deflection (in)	Crippling (kips)
Jamb	Actual	6.126	0.122	N/A	1.308	0.288	N/A	N/A
	Allowable	25.87	2.033	21.904	7.98	0.433	N/A	N/A
	Act./All.	0.237 *	0.060 *	N/A	0.164 *	0.666	N/A	N/A
Header Lateral Elements	Actual	1.308	0.079	N/A	N/A	0.015	N/A	N/A
	Allowable	18.723	6.745	N/A	N/A	0.183	N/A	N/A
	Act./All.	0.070	0.012	N/A	N/A	0.082	N/A	N/A
Header Gravity Elements	Actual	14.293	0.866	N/A	N/A	N/A	0.038	N/A
	Allowable	39.984	5.645	N/A	N/A	N/A	0.138	N/A
	Act./All.	0.357 *	0.153	N/A	N/A	N/A	0.279	N/A

Design For Web Crippling Is Disabled

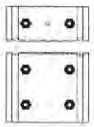
* Forces are calculated For punched-out section

Interaction Check (kips.in, kips):

Member	Moment, Shear		Moment, Crippling		Moment, Tension		Moment, Compression	
Jamb	Mx	-6.101	Mx	N/A	Mx	N/A	Mx, My	-6.126, 0.046
	Vy	0.089	Pcr	N/A	T	N/A	P	-0.797
	Act./All.	0.234	Act./All.	N/A	Act./All.	N/A	Act./All.	0.342
Header Lateral Elements	Mx	-1.256	Mx	N/A	Mx	N/A	Mx	N/A
	Vy	0.016	Pcr1	N/A	T	N/A	P	N/A
	Act./All.	0.067	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A
Header Gravity Elements	My	13.721	My	N/A	My	N/A	My	N/A
	Vx	-0.173	Pcr2	N/A	T	N/A	P	N/A
	Act./All.	0.228	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A

Company:	ARW Engineers	Date:	Tue, Aug 04 20
Address:	1594 W Park Circle	Header @ ships ladder	
Country:	United States		
State:	Utah		
Zip Code:	84404	**Load Bearing User Defined Door**	

Allowable Screw Loads:

Span		Attachment of Header to Jamb	
1	Clip Type	2 x StiffClip® AL362	
	Allowable F1 (kips)	0.9	
	Allowable F2 (kips)	2.94	
	Allowable F3 (kips)	3.086	
	Actual F1 (kips)	0.000	
	Actual F2 (kips)	0.866	
	Actual F3 (kips)	0.079	
	Linear Interaction Ratio	0.320	
	Attachment to Jamb		
	All. Screw Shear (kips)	0.569	
	All. Screw tension (kips)	0.225	
	Act. Screw Shear (kips)	0.152	
	Act. Screw Tension (kips)	0.105	
	Linear Interaction Ratio	0.732	
	F2 Screws Qty.	4 (#12)	
	Attachment to Header		
	All. Screw Shear (kips)	0.569	
	All. Screw tension (kips)	0.225	
	Act. Screw Shear (kips)	0.02	
	Act. Screw Tension (kips)	0.13	
	Linear Interaction Ratio	0.612	
	F3 Screws Qty.	2 (#12)	

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

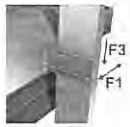
Header @ ships ladder

Date: Tue, Aug 04 20

Load Bearing User Defined Door

Connection Data:

1	Clip Data	Clip Position	Head Connection @ Jamb
		Clip Type	StiffClip® LB362
		Screws	2 (#12)
	Allowable Loads	F1 (kips)	N/A
		F2 (kips)	1.139
		F3 (kips)	0.712
		M1 (kips.in)	N/A
		Screw Shear (kips)	0.569
		Screw Tension (kips)	0.225
	Actual Loads	F1 (kips)	0.000
		F2 (kips)	0.114
		F3 (kips)	0.000
		M1 (kips.in)	N/A
		Screw Shear (kips)	0.057
		Screw Tension (kips)	0.000
	Interaction	Clip Linear Interaction ratio	0.100
		Screws Linear Interaction ratio	N/A
	Base Material	Material	Steel with fy >= 36 ksi
		Concrete Compressive Strength (psi)	N/A
	Attachment to Structure	Fastener Designation	X-U, 0.157(in)
		Quantity	2
		Min. Penetration (in)	0.188
		Min. Edge Distance for Shear (in)	0.5
		Min. Edge Distance for Tension (in)	0.5
		Min. Fastener Spacing for Shear (in)	1
		Min. Fastener Spacing for Tension (in)	1
		Allowable Shear (kips)	0.72
		Allowable Tension (kips)	0.535
	Fastener Design Load	Actual Shear (kips)	0.000
		Actual Tension (kips)	0.094
		Interaction Ratio	N/A
		Tensile Strength Reduction Factor	1.000
		Shear Strength Reduction Factor	1.000



Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

Header @ ships ladder

Date: Tue, Aug 04 20

Load Bearing User Defined Door

2	Clip Data	Clip Position	Base Connection @ Jamb
		Clip Type	StiffClip® AL362
		Screws	2 (#12)
	Allowable Loads	F1 (kips)	0.225
		F2 (kips)	1.139
		F3 (kips)	0.775
		M1 (kips.in)	N/A
		Screw Shear (kips)	0.569
		Screw Tension (kips)	0.225
	Actual Loads	F1 (kips)	0.001
		F2 (kips)	0.000
		F3 (kips)	0.137
		M1 (kips.in)	N/A
		Screw Shear (kips)	0.101
		Screw Tension (kips)	0.001
	Interaction	Clip Linear Interaction ratio	0.183
		Screws Linear Interaction ratio	0.180
	Base Material	Material	NW Concrete, fc = 4000 psi
		Concrete Compressive Strength (psi)	N/A
	Attachment to Structure	Fastener Designation	X-U, 0.157(in)
		Quantity	2
		Min. Penetration (in)	0.75
		Min. Edge Distance for Shear (in)	2.75
		Min. Edge Distance for Tension (in)	2.75
		Min. Fastener Spacing for Shear (in)	2.75
		Min. Fastener Spacing for Tension (in)	2.75
		Allowable Shear (kips)	0.125
		Allowable Tension (kips)	0.1
	Fastener Design Load	Actual Shear (kips)	0.069
		Actual Tension (kips)	0.041
		Interaction Ratio	0.959
		Tensile Strength Reduction Factor	1.000
		Shear Strength Reduction Factor	1.000

- When more than one load affect a connection, simple linear relationship is used to check the interaction of multiple loads acting on the connection.
- Fastener attachment of connectors to the primary structure should be reviewed by a design professional.
- Displayed actual & allowable are for one fastener.
- Fastener spacing for attachment to the primary structure (1.875(in)) is less than the minimum spacing recommended by fastener manufacturer (Ratio = 0.68).

HANGING UNIT:

DIMENSIONS: WIDTH = 62"
LENGTH = 120"
HEIGHT = 20"

WEIGHT = 2000#

EXISTING ROOF LOADING:

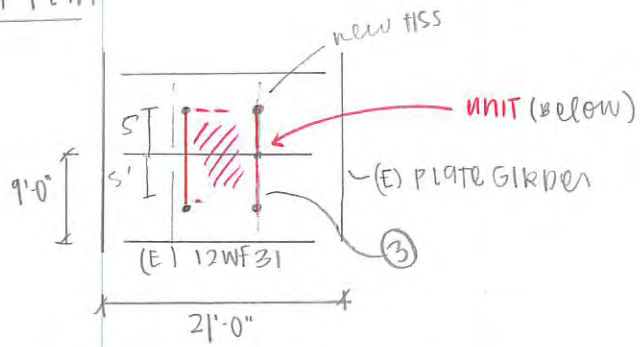
DL=	18 GA DECK	=	3 PSF
	INSULATION	=	1.0 PSF
	DENS DECK	=	1.2 PSF
	TPO ROOF	=	0.4 PSF
	FIREPROOFING	=	2 PSF
	MECH/ELECT	=	4 PSF
	MISC	=	1.4 PSF
			13 PSF (DOESN'T INCLUDE BEAM SW)

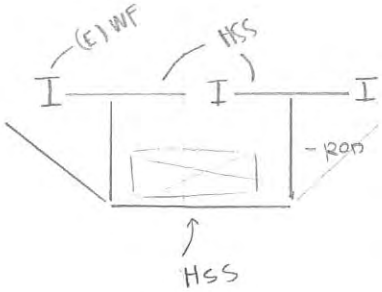
$LL_R = 20$ PSF

SL = 1.0(20 PSF) = 20 PSF (MIN. SNOW LOAD)

BEAM SW = 31 PLF/9' = 3.4 PSF

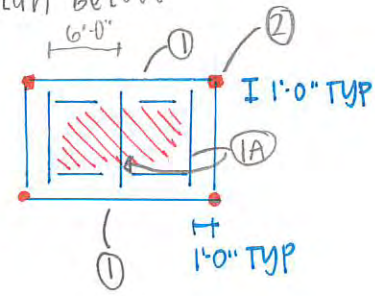
ROOF PLAN:





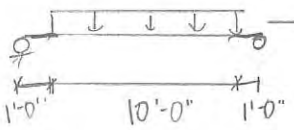
$$\text{UNIT} = \frac{1.3(2000\#)}{(62")\ (120")} = 51 \text{ PSF}$$

PLAN BELOW



HANGING UNIT (CONT'D):

1) HSS BELOW UNIT (WORST CASE - USE SAME SIZE AT ALL HSS)



→ W = 51 PSF (5'-2"/2) = 131.8 PLF

$R_A = 0.73K$

↳ HSS 4x4x1/4, SR = 0.216 ∴ OK.

~~Check bending:~~

~~$M_a = 132\#(5") = 660\#\cdot in$~~

~~$M_n = F_y Z \le 1.6 F_y S_x$~~ ~~$Z = bd^2/4 = 12"(5/16")^2/4 = 0.29\ in^3$~~

~~$S = bd^2/6 = 0.195\ in^3$~~

~~$M_n/\Omega = \frac{36\ ksi(0.29\ in^3)}{1.67} = 6.2\ k\cdot in > M_a$ ∴ OK~~

2) ROD:

LOAD = 0.73K

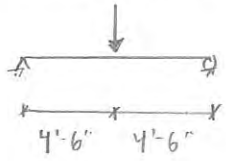
$P_n/\Omega = F_y A_g$

1/2" ROD CAPACITY

$P_n/\Omega = \frac{36ksi(0.20\ in^2)}{1.67} = 4.3\ K > 0.73K$ ∴ OK

1/2" THREADED ROD

3) HSS SUPPORTING HANGING ROD:



(PUT PT LOAD IN MIDDLE, WORST CASE)

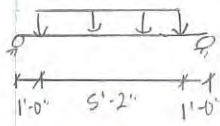
PT LOAD = 0.73K + 0.1K (WT OF ROD)

= 0.83K

↳ HSS 3x3x1/4, SR = 0.316

REACTION = 0.59K (IF NOT CENTERED)

1A) HSS IN BETWEEN (WORST CASE)



→ W = 51 PSF (6')

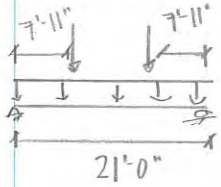
= 306 PLF

→ HSS 3x3x1/4, SR = 0.79 < 1.0 ∴ OK.

HANGING UNIT - EXISTING BEAMS

12WF31:

PART A) SW = 31 PLF



SL = 20 PSF (9'-0") = 180 PLF

DL = 13 PSF (9'-0") + 31 PLF = 148 PLF

LL_R = 20 PSF (9'-0") = 180 PLF

PT LOAD = 0.53 K (2) = 1.06 K

M_{max} = 26.473 K·FT = 317.7 K·in

12WF31, S = 39.4 in³ (HISTORICAL data)

Max stress in beam:

$\sigma = M/S = \frac{317.7 \text{ K·in}}{39.4 \text{ in}^3} = 8.06 \text{ KSI} < 36 \text{ KSI} \therefore$ OK.

SEISMIC:

$F_p = \frac{0.4 a_p S_{DS} W_p}{(R_p/I_p)} (1 + 2z/h)$

$a_p = 2.5$

$R_p = 6$

$I_p = 1.5$

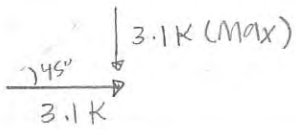
$S_{DS} = 1.468$

$W_p = 1.3(2000\#) + 200\#$ (MISC)

$= 2800\#$

$= \frac{0.4(2.5)(1.468)(2800\#)}{(6/1.5)} (1+2)$

$= 3.1$ K



Max Tension in Brace = $\sqrt{2}$ (3.1 K) = 4.4K → 3.1 K (ASD)

THERE ARE (2) BRACES EA SIDE.

LOAD PER BRACE = 1.55 K = 0.8 TONS

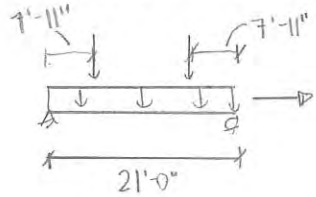
↳ 3/8" Φ WIRE ROPE

HANGING UNIT - EXISTING BEAMS (CONT'D):

12WF31 (CONT'D):

CHECK (E) WITH SEISMIC LOADING:

PART B)



DL & SL SAME AS PART A.

PT LOAD = DL = 1.06 K (MIDDLE BEAM... WC)

EQ = 2.2 K (LRFD)

M_{max} = 33.137 K·FT = 397.64 K·in

MAX STRESS: $\sigma = M/S = \frac{397.6 \text{ K·in}}{39.4 \text{ in}^3} = 10.1 \text{ KSI} < 36 \text{ KSI} \therefore$ OK

PLATE GIRDER:

TRIBUTARY AREA = 21'-0"(63'-0") = 1323 SF

EXISTING LOAD = DL = (13 PSF + 3.4 PSF (BEAM SW) + 4 PSF (GIRDER SW))(1323) = 26.99 K

LL_R = SL = 20 PSF (1323 SF) = 26.46 K

TOTAL = 53.45 K

NEW LOAD:

UNIT = 2000 #

NEW STRUCTURE = 8.81 PLF(7'-2")(5) + 12.21 PLF(12')(2) + 40# (ROD)

= 648.8#

TOTAL = 2648.8 # < 53.45 K(0.05) = 2672 #

∴ OK TO ADD NEW LOAD. LESS THAN 5% OF (E)

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

File: 19521.ec6
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Lic. # : KW-06002489 ARW ENGINEERS

DESCRIPTION: HSS below unit (#1)

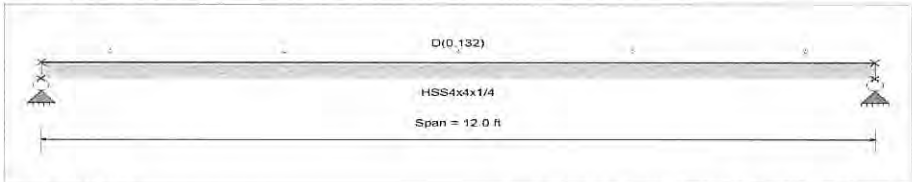
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.1320 k/ft, Extent = 1.0 -->> 11.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.216 : 1	Maximum Shear Stress Ratio =	0.027 : 1
Section used for this span	HSS4x4x1/4	Section used for this span	HSS4x4x1/4
Ma : Applied	2.530 k-ft	Va : Applied	0.7333 k
Mn / Omega : Allowable	11.702 k-ft	Vn/Omega : Allowable	27.634 k
Load Combination	+D+H	Load Combination	+D+H
Location of maximum on span	6.000 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.000 in	Ratio =	0 <360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.290 in	Ratio =	497 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+L+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+Lr+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+S+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+0.750Lr+0.750L+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+0.750L+0.750S+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+0.60W+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+0.70E+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 12.00 ft	1	0.216	0.027	2.53		2.53	19.54	11.70	1.14	1.00	0.73	46.15	27.63
+0.60D+0.60W+0.60H													

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

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DESCRIPTION: HSS below unit (#1)

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+0.60H													
Dsgn. L = 12.00 ft	1	0.130	0.016	1.52		1.52	19.54	11.70	1.14	1.00	0.44	46.15	27.63

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.2897	6.034		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.733	0.733
Overall MINimum	0.440	0.440
+D+H	0.733	0.733
+D+L+H	0.733	0.733
+D+Lr+H	0.733	0.733
+D+S+H	0.733	0.733
+D+0.750Lr+0.750L+H	0.733	0.733
+D+0.750L+0.750S+H	0.733	0.733
+D+0.60W+H	0.733	0.733
+D+0.70E+H	0.733	0.733
+D+0.750Lr+0.750L+0.450W+H	0.733	0.733
+D+0.750L+0.750S+0.450W+H	0.733	0.733
+D+0.750L+0.750S+0.5250E+H	0.733	0.733
+0.60D+0.60W+0.60H	0.440	0.440
+0.60D+0.70E+0.60H	0.440	0.440
D Only	0.733	0.733
H Only		

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Steel Beam

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DESCRIPTION: HSS support at mechanical unit (above)

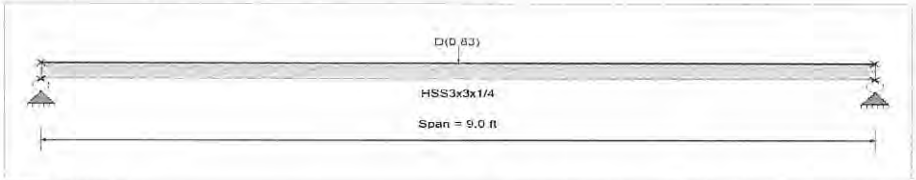
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Completely Unbraced
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load(s) for Span Number 1
Point Load : D = 0.830 k @ 4.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.316 : 1	Maximum Shear Stress Ratio =	0.024 : 1
Section used for this span	HSS3x3x1/4	Section used for this span	HSS3x3x1/4
Ma : Applied	1.957 k-ft	Va : Applied	0.4546 k
Mn / Omega : Allowable	6.188 k-ft	Vn/Omega : Allowable	19.262 k
Load Combination	+D+H	Load Combination	+D+H
Location of maximum on span	4.500ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.000 in	Ratio =	0 <360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.265 in	Ratio =	408 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+L+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+Lr+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+S+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+0.750Lr+0.750L+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+0.750L+0.750S+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+0.60W+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+0.70E+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 9.00 ft	1	0.316	0.024	1.96		1.96	10.33	6.19	1.31	1.00	0.45	32.17	19.26
+0.60D+0.60W+0.60H													

ARW Engineers
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Steel Beam

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DESCRIPTION: HSS support at mechanical unit (above)

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+0.60H													
Dsgn. L = 9.00 ft	1	0.190	0.014	1.17		1.17	10.33	6.19	1.31	1.00	0.27	32.17	19.26

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.2647	4.526		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.455	0.455
Overall MINimum	0.273	0.273
+D+H	0.455	0.455
+D+L+H	0.455	0.455
+D+Lr+H	0.455	0.455
+D+S+H	0.455	0.455
+D+0.750Lr+0.750L+H	0.455	0.455
+D+0.750L+0.750S+H	0.455	0.455
+D+0.60W+H	0.455	0.455
+D+0.70E+H	0.455	0.455
+D+0.750Lr+0.750L+0.450W+H	0.455	0.455
+D+0.750L+0.750S+0.450W+H	0.455	0.455
+D+0.750L+0.750S+0.5250E+H	0.455	0.455
+0.60D+0.60W+0.60H	0.273	0.273
+0.60D+0.70E+0.60H	0.273	0.273
D Only	0.455	0.455
H Only		

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

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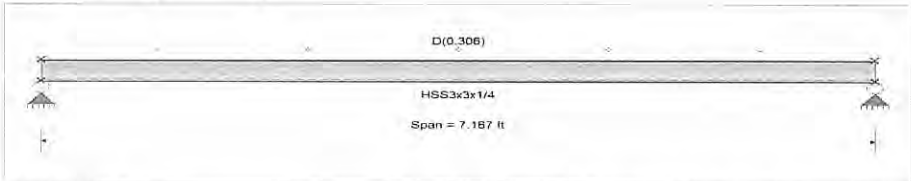
DESCRIPTION: Hanging unit support (1A HSS)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load for Span Number 1
Uniform Load : D = 0.3060 k/ft, Extent = 1.0 -->> 6.167 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.293 : 1	Maximum Shear Stress Ratio =	0.041 : 1
Section used for this span	**HSS3x3x1/4**	Section used for this span	**HSS3x3x1/4**
Ma : Applied	1.812 k-ft	Va : Applied	0.7906 k
Mn / Omega : Allowable	6.188 k-ft	Vn/Omega : Allowable	19.262 k
Load Combination	+D+H	Load Combination	+D+H
Location of maximum on span	3.584 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.000 in	Ratio =	0 <360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.189 in	Ratio =	455 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+L+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+Lr+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+S+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+0.750Lr+0.750L+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+0.750L+0.750S+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+0.60W+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+0.70E+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 7.17 ft	1	0.293	0.041	1.81		1.81	10.33	6.19	1.15	1.00	0.79	32.17	19.26
+0.60D+0.60W+0.60H													

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

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DESCRIPTION: Hanging unit support (1A HSS)

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+0.60H													
Dsgn. L = 7.17 ft	1	0.176	0.025	1.09		1.09	10.33	6.19	1.15	1.00	0.47	32.17	19.26

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
D Only	1	0.1891	3.604		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	0.791	0.791
Overall MINimum	0.474	0.474
+D+H	0.791	0.791
+D+L+H	0.791	0.791
+D+Lr+H	0.791	0.791
+D+S+H	0.791	0.791
+D+0.750Lr+0.750L+H	0.791	0.791
+D+0.750L+0.750S+H	0.791	0.791
+D+0.60W+H	0.791	0.791
+D+0.70E+H	0.791	0.791
+D+0.750Lr+0.750L+0.450W+H	0.791	0.791
+D+0.750L+0.750S+0.450W+H	0.791	0.791
+D+0.750L+0.750S+0.5250E+H	0.791	0.791
+0.60D+0.60W+0.60H	0.474	0.474
+0.60D+0.70E+0.60H	0.474	0.474
D Only	0.791	0.791
H Only		

ARW Engineers
1594 Park Circle
Ogden, UT
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Engineer:
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Steel Beam

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ARW ENGINEERS

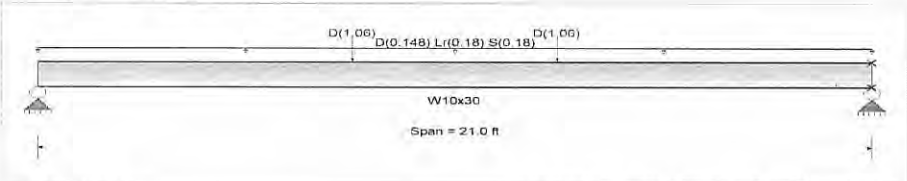
DESCRIPTION: (E) 12WF31

CODE REFERENCES (used only to get max moment)

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2006

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	36.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : D = 1.060 k @ 7.917 ft

Point Load : D = 1.060 k @ 13.083 ft

Uniform Load : D = 0.1480, Lr = 0.180, S = 0.180 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.403 : 1	Maximum Shear Stress Ratio =	0.099 : 1
Section used for this span	W10x30	Section used for this span	W10x30
Ma : Applied	26.473 k-ft	Va : Applied	4.504 k
Mn / Omega : Allowable	65.749 k-ft	Vn/Omega : Allowable	45.360 k
Load Combination	+D+Lr+H	Load Combination	+D+Lr+H
Location of maximum on span	10.500ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.160 in	Ratio =	1,570 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.424 in	Ratio =	594 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 21.00 ft	1	0.252	0.058	16.55		16.55	109.80	65.75	1.00	1.00	2.61	68.04	45.36
+D+L+H													
Dsgn. L = 21.00 ft	1	0.252	0.058	16.55		16.55	109.80	65.75	1.00	1.00	2.61	68.04	45.36
+D+Lr+H													
Dsgn. L = 21.00 ft	1	0.403	0.099	26.47		26.47	109.80	65.75	1.00	1.00	4.50	68.04	45.36
+D+S+H													
Dsgn. L = 21.00 ft	1	0.403	0.099	26.47		26.47	109.80	65.75	1.00	1.00	4.50	68.04	45.36
+D+0.750Lr+0.750L+H													
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+0.750L+0.750S+H													
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+W+H													
Dsgn. L = 21.00 ft	1	0.252	0.058	16.55		16.55	109.80	65.75	1.00	1.00	2.61	68.04	45.36
+D+0.70E+H													
Dsgn. L = 21.00 ft	1	0.252	0.058	16.55		16.55	109.80	65.75	1.00	1.00	2.61	68.04	45.36
+D+0.750Lr+0.750L+0.750W+H													

ARW Engineers
1594 Park Circle
Ogden, UT
84404

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Engineer:
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Steel Beam

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ARW ENGINEERS

DESCRIPTION: (E) 12WF31

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+0.750Lr+0.750L+0.5250E+H													
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+0.750L+0.750S+0.750W+H													
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+0.60D+W+H													
Dsgn. L = 21.00 ft	1	0.151	0.035	9.93		9.93	109.80	65.75	1.00	1.00	1.57	68.04	45.36
+0.60D+0.70E+H													
Dsgn. L = 21.00 ft	1	0.151	0.035	9.93		9.93	109.80	65.75	1.00	1.00	1.57	68.04	45.36

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4245	10.560		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	4.504	4.504
Overall MINimum	1.568	1.568
D Only	2.614	2.614
+D+L+H	2.614	2.614
+D+Lr+H	4.504	4.504
+D+S+H	4.504	4.504
+D+0.750Lr+0.750L+H	4.032	4.032
+D+0.750L+0.750S+H	4.032	4.032
+D+W+H	2.614	2.614
+D+0.70E+H	2.614	2.614
+D+0.750Lr+0.750L+0.750W+H	4.032	4.032
+D+0.750Lr+0.750L+0.5250E+H	4.032	4.032
+D+0.750L+0.750S+0.750W+H	4.032	4.032
+D+0.750L+0.750S+0.5250E+H	4.032	4.032
+0.60D+W+H	1.568	1.568
+0.60D+0.70E+H	1.568	1.568
D Only	2.614	2.614
Lr Only	1.890	1.890
S Only	1.890	1.890
H Only		

ARW Engineers
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Steel Beam

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ARW ENGINEERS

DESCRIPTION: (E) 12WF31 with seismic loads (just getting moment)

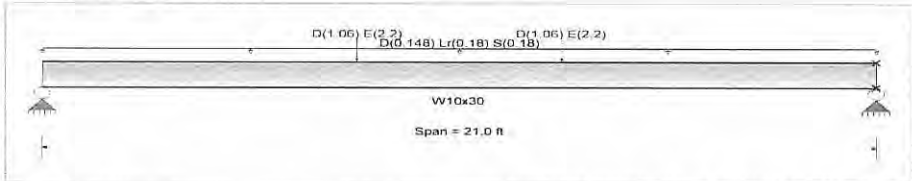
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 36.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : D = 1.060, E = 2.20 k @ 7.917 ft

Uniform Load : D = 0.1480, Lr = 0.180, S = 0.180 k/ft, Tributary Width = 1.0 ft

Point Load : D = 1.060, E = 2.20 k @ 13.083 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.504 : 1	Maximum Shear Stress Ratio =	0.114 : 1
Section used for this span	W10x30	Section used for this span	W10x30
Ma : Applied	33.137 k-ft	Va : Applied	5.187 k
Mn / Omega : Allowable	65.749 k-ft	Vn/Omega : Allowable	45.360 k
Load Combination	+D+0.750L+0.750S+0.5250E+H	Load Combination	+D+0.750L+0.750S+0.5250E+H
Location of maximum on span	10.500 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.274 in	Ratio =	919 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.528 in	Ratio =	477 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 21.00 ft	1	0.252	0.058	16.55		16.55	109.80	65.75	1.00	1.00	2.61	68.04	45.36
+D+L+H													
Dsgn. L = 21.00 ft	1	0.252	0.058	16.55		16.55	109.80	65.75	1.00	1.00	2.61	68.04	45.36
+D+Lr+H													
Dsgn. L = 21.00 ft	1	0.403	0.099	26.47		26.47	109.80	65.75	1.00	1.00	4.50	68.04	45.36
+D+S+H													
Dsgn. L = 21.00 ft	1	0.403	0.099	26.47		26.47	109.80	65.75	1.00	1.00	4.50	68.04	45.36
+D+0.750Lr+0.750L+H													
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+0.750L+0.750S+H													
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+0.60W+H													
Dsgn. L = 21.00 ft	1	0.252	0.058	16.55		16.55	109.80	65.75	1.00	1.00	2.61	68.04	45.36
+D+0.70E+H													
Dsgn. L = 21.00 ft	1	0.437	0.092	28.74		28.74	109.80	65.75	1.00	1.00	4.15	68.04	45.36
+D+0.750Lr+0.750L+0.450W+H													

ARW Engineers
1594 Park Circle
Ogden, UT
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Project Title:
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Steel Beam

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ARW ENGINEERS

DESCRIPTION: (E) 12WF31 with seismic loads (just getting moment)

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 21.00 ft	1	0.365	0.089	23.99		23.99	109.80	65.75	1.00	1.00	4.03	68.04	45.36
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 21.00 ft	1	0.504	0.114	33.14		33.14	109.80	65.75	1.00	1.00	5.19	68.04	45.36
+0.60D+0.60W+0.60H													
Dsgn. L = 21.00 ft	1	0.151	0.035	9.93		9.93	109.80	65.75	1.00	1.00	1.57	68.04	45.36
+0.60D+0.70E+0.60H													
Dsgn. L = 21.00 ft	1	0.336	0.069	22.12		22.12	109.80	65.75	1.00	1.00	3.11	68.04	45.36

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.5250E+H	1	0.5282	10.560		0.0000	0.000

Vertical Reactions

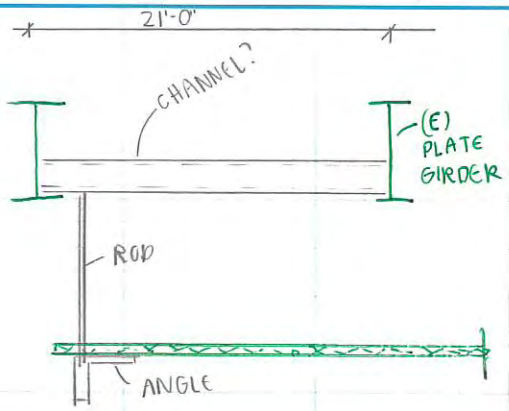
Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	5.187	5.187
Overall MINimum	1.568	1.568
+D+H	2.614	2.614
+D+L+H	2.614	2.614
+D+Lr+H	4.504	4.504
+D+S+H	4.504	4.504
+D+0.750Lr+0.750L+H	4.032	4.032
+D+0.750L+0.750S+H	4.032	4.032
+D+0.60W+H	2.614	2.614
+D+0.70E+H	4.154	4.154
+D+0.750Lr+0.750L+0.450W+H	4.032	4.032
+D+0.750L+0.750S+0.450W+H	4.032	4.032
+D+0.750L+0.750S+0.5250E+H	5.187	5.187
+0.60D+0.60W+0.60H	1.568	1.568
+0.60D+0.70E+0.60H	3.108	3.108
D Only	2.614	2.614
Lr Only	1.890	1.890
S Only	1.890	1.890
E Only	2.200	2.200
H Only		

GRATING SUPPORT @ FIRE WALL:

DL = 10 PSF

LL = 60 PSF

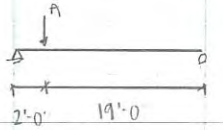


1) CHANNEL:

DL = 10 PSF (21'-0" / 2) = 105 PLF

LL = 60 PSF (21'-0" / 2) = 630 PLF

→ C6x8.2 ADEQUATE FOR TRIB = 4'-0"

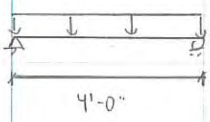


PT LOAD A: DL = 105 PLF (4'-0") = 420 #

LL = 630 PLF (4'-0") = 2.52K

SR = 0.590

2) ANGLE



DL = 105 PLF

LL = 630 PLF

→ L3x3x5/16, SR = 0.728

3) ROD:

TOTAL LOAD = (105 PLF + 630 PLF)(4'-0") = 2.94 K (ASD)

$P_n/\Omega = F_y A_g$

$A_{REQ'D} = \frac{3K(1.67)}{36\ KSI} = 0.14\ in^2$

→ 1/2" ϕ THREADED ROD (MIN)

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

File: 19521.ec6
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Lic. # : KW-06002489
ARW ENGINEERS

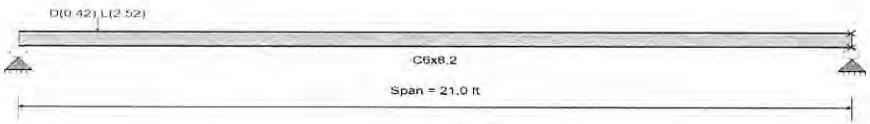
DESCRIPTION: Channel @ existing grating

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	36.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load(s) for Span Number 1
Point Load : D = 0.420, L = 2.520 k @ 2.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.590 : 1	Maximum Shear Stress Ratio =	0.177 : 1
Section used for this span	C6x8.2	Section used for this span	C6x8.2
Ma : Applied	5.467 k-ft	Va : Applied	2.746 k
Mn / Omega : Allowable	9.269 k-ft	Vn/Omega : Allowable	15.521 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	2.040 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.643 in	Ratio =	391 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.844 in	Ratio =	299 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 21.00 ft	1	0.105	0.030	0.97		0.97	15.48	9.27	1.00	1.00	0.47	25.92	15.52
+D+L+H													
Dsgn. L = 21.00 ft	1	0.590	0.177	5.47		5.47	15.48	9.27	1.00	1.00	2.75	25.92	15.52
+D+Lr+H													
Dsgn. L = 21.00 ft	1	0.105	0.030	0.97		0.97	15.48	9.27	1.00	1.00	0.47	25.92	15.52
+D+S+H													
Dsgn. L = 21.00 ft	1	0.105	0.030	0.97		0.97	15.48	9.27	1.00	1.00	0.47	25.92	15.52
+D+0.750Lr+0.750L+H													
Dsgn. L = 21.00 ft	1	0.467	0.140	4.33		4.33	15.48	9.27	1.00	1.00	2.18	25.92	15.52
+D+0.750L+0.750S+H													
Dsgn. L = 21.00 ft	1	0.467	0.140	4.33		4.33	15.48	9.27	1.00	1.00	2.18	25.92	15.52
+D+0.60W+H													
Dsgn. L = 21.00 ft	1	0.105	0.030	0.97		0.97	15.48	9.27	1.00	1.00	0.47	25.92	15.52
+D+0.70E+H													
Dsgn. L = 21.00 ft	1	0.105	0.030	0.97		0.97	15.48	9.27	1.00	1.00	0.47	25.92	15.52
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 21.00 ft	1	0.467	0.140	4.33		4.33	15.48	9.27	1.00	1.00	2.18	25.92	15.52
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 21.00 ft	1	0.467	0.140	4.33		4.33	15.48	9.27	1.00	1.00	2.18	25.92	15.52
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 21.00 ft	1	0.467	0.140	4.33		4.33	15.48	9.27	1.00	1.00	2.18	25.92	15.52
+0.60D+0.60W+0.60H													

ARW Engineers
1594 Park Circle
Ogden, UT
84404

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Project Descr:

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Steel Beam

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ARW ENGINEERS

DESCRIPTION: Channel @ existing grating

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+0.60H													
Dsgn. L = 21.00 ft	1	0.063	0.018	0.58		0.58	15.48	9.27	1.00	1.00	0.28	25.92	15.52

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.8439	9.120		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.746	0.366
Overall MINimum	0.280	0.076
+D+H	0.466	0.126
+D+L+H	2.746	0.366
+D+Lr+H	0.466	0.126
+D+S+H	0.466	0.126
+D+0.750Lr+0.750L+H	2.176	0.306
+D+0.750L+0.750S+H	2.176	0.306
+D+0.60W+H	0.466	0.126
+D+0.70E+H	0.466	0.126
+D+0.750Lr+0.750L+0.450W+H	2.176	0.306
+D+0.750L+0.750S+0.450W+H	2.176	0.306
+D+0.750L+0.750S+0.5250E+H	2.176	0.306
+0.60D+0.60W+0.60H	0.280	0.076
+0.60D+0.70E+0.60H	0.280	0.076
D Only	0.466	0.126
L Only	2.280	0.240
H Only		

ARW Engineers
1594 Park Circle
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Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

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Lic. # : KW-06002489 ARW ENGINEERS

DESCRIPTION: Angle @ existing grating support

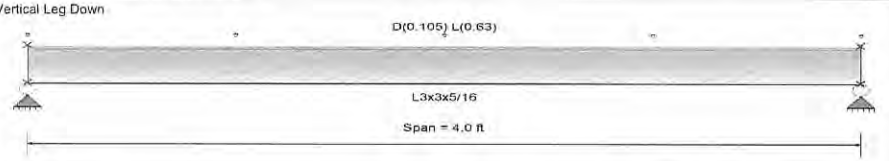
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : IBC 2018

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		

Vertical Leg Down



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.1050, L = 0.630 k/ft, Tribulary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.728 : 1	Maximum Shear Stress Ratio =	0.088 : 1
Section used for this span	**L3x3x5/16**	Section used for this span	**L3x3x5/16**
Ma : Applied	1.482 k-ft	Va : Applied	1.482 k
Mn / Omega : Allowable	2.036 k-ft	Vn/Omega : Allowable	16.868 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	2.000 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.084 in	Ratio =	572 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360
Max Downward Total Deflection	0.099 in	Ratio =	487 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 4.00 ft	1	0.109	0.013	0.22		0.22	3.40	2.04	1.14	1.00	0.22	28.17	16.87
+D+L+H													
Dsgn. L = 4.00 ft	1	0.728	0.088	1.48		1.48	3.40	2.04	1.14	1.00	1.48	28.17	16.87
+D+Lr+H													
Dsgn. L = 4.00 ft	1	0.109	0.013	0.22		0.22	3.40	2.04	1.14	1.00	0.22	28.17	16.87
+D+S+H													
Dsgn. L = 4.00 ft	1	0.109	0.013	0.22		0.22	3.40	2.04	1.14	1.00	0.22	28.17	16.87
+D+0.750Lr+0.750L+H													
Dsgn. L = 4.00 ft	1	0.573	0.069	1.17		1.17	3.40	2.04	1.14	1.00	1.17	28.17	16.87
+D+0.750L+0.750S+H													
Dsgn. L = 4.00 ft	1	0.573	0.069	1.17		1.17	3.40	2.04	1.14	1.00	1.17	28.17	16.87
+D+0.60W+H													
Dsgn. L = 4.00 ft	1	0.109	0.013	0.22		0.22	3.40	2.04	1.14	1.00	0.22	28.17	16.87
+D+0.70E+H													
Dsgn. L = 4.00 ft	1	0.109	0.013	0.22		0.22	3.40	2.04	1.14	1.00	0.22	28.17	16.87
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 4.00 ft	1	0.573	0.069	1.17		1.17	3.40	2.04	1.14	1.00	1.17	28.17	16.87
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 4.00 ft	1	0.573	0.069	1.17		1.17	3.40	2.04	1.14	1.00	1.17	28.17	16.87
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 4.00 ft	1	0.573	0.069	1.17		1.17	3.40	2.04	1.14	1.00	1.17	28.17	16.87
+0.60D+0.60W+0.60H													
Dsgn. L = 4.00 ft	1	0.065	0.008	0.13		0.13	3.40	2.04	1.14	1.00	0.13	28.17	16.87

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

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Lic. # : KW-06002489 ARW ENGINEERS

DESCRIPTION: Angle @ existing grating support

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+0.60H													
Dsgn. L = 4.00 ft	1	0.065	0.008	0.13		0.13	3.40	2.04	1.14	1.00	0.13	28.17	16.87

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0986	2.011		0.0000	0.000

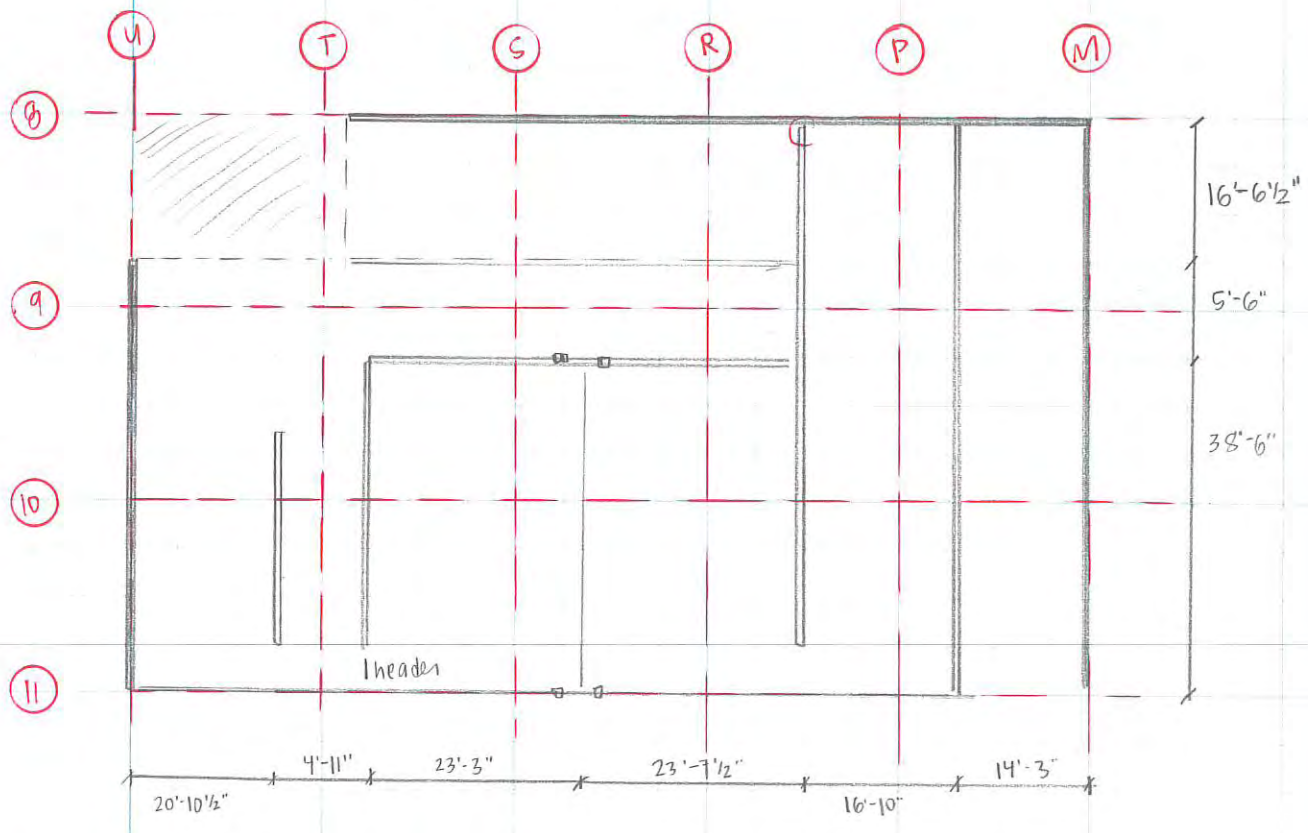
Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	1.482	1.482
Overall MINimum	0.133	0.133
+D+H	0.222	0.222
+D+L+H	1.482	1.482
+D+Lr+H	0.222	0.222
+D+S+H	0.222	0.222
+D+0.750Lr+0.750L+H	1.167	1.167
+D+0.750L+0.750S+H	1.167	1.167
+D+0.60W+H	0.222	0.222
+D+0.70E+H	0.222	0.222
+D+0.750Lr+0.750L+0.450W+H	1.167	1.167
+D+0.750L+0.750S+0.450W+H	1.167	1.167
+D+0.750L+0.750S+0.5250E+H	1.167	1.167
+0.60D+0.60W+0.60H	0.133	0.133
+0.60D+0.70E+0.60H	0.133	0.133
D Only	0.222	0.222
L Only	1.260	1.260
H Only		

FLOOR FRAMING

NEW LOADS ON (E) STRUCTURE: - LOADS FROM METAL STUDS



DL = 12.0 PSF

ROOF$_{LL}$ = 20 PSF

WALL SW = 12 PSF (@ SHEAR WALLS)

= 10 PSF (@ OTHER WALLS)

1) GRID 8 WALL - BETWEEN R.5 AND M.

TRIB = 8"

wall SW

DL = 12 PSF (8") + 12 PSF (13') = 164 PLF

LL = 20 PSF (8") = 13.33 PLF

2) GRID 8 WALL - BETWEEN T.1 & R.5

TRIB = 7'-4" (BASED ON A CANTILEVER BEAM)

DL = 12 PSF (7'-4") + 12 PSF (13') = 244 PLF

LL = 20 PSF (7'-4") = 146.7 PLF

NEW LOADS ON (E) STRUCTURE (CONT'D):

3) GRID 8.8 - BETWEEN T.1 & R.5:

TRIB = 14'-8" (BASED ON A CANTILEVER BEAM

DL = 12 PSF (14'-8") + 10PSF (13') = 306 PLF

LL = 20 PSF (14'-8") = 294 PLF

4) - GRID U (LONGER SPAN):

TRIB = 25'-9 3/8" /2 = 12.89'

DL = 12 PSF (12.89') + 156 PLF = 310.7 PLF

LL = 20PSF (12.89') = 257.8 PLF

- GRID U (SHORTER SPAN):

TRIB = 8.3' (FROM DOUBLE SPAN BEAM IN EnerCalc)

DL = 12 PSF (8.3') + 156 PLF = 255.6 PLF

LL = 20 PSF (8.3') = 166 PLF

5) GRID U.8

TRIB = 24.12' (FROM DOUBLE SPAN BEAM IN EnerCalc)

DL = 12 PSF (24.12') + 156 PLF = 445.4 PLF

LL = 20 PSF (24.12') = 482.4 PLF

6) - GRID T.2 (LONGER TRIB)

TRIB = 25'-9 3/8" /2 + 23'-3"/2 = 24.52'

DL = 12 PSF (24.52') + 156 PLF = 450.24 PLF

LL = 20PSF (24.52') = 490.4 PLF

- GRID T.2 (SHORTER TRIB)

TRIB = 23'-3"/2 + 4'-11"/2 = 14'-1"

DL = 12 PSF (14'-1") + 156 PLF = 325 PLF

LL = 20 PSF (14'-1") = 281.6 PLF

7) GRID R.5 (SHORTER TRIB)

TRIB = 16'-10"/2 + 16"/2 = 9'-1"

DL = 12 PSF (9'-1") + 156 PLF = 266 PLF

LL = 20 PSF (9'-1") = 181.7 PLF

GRID R.5 (LONGER TRIB)

TRIB = 16'-10"/2 + 23'-7 1/2"/2 = 20.23'

DL = 12 PSF (20.23') + 156 PLF = 398.8 PLF

LL = 20PSF (20.23') = 404.6 PLF

NEW LOADS ON (E) STRUCTURE (CONT'D):

8) GRID P.2:

TRIB = 16'-10"/2 + 14'-3"/2 = 15.5'

DL = 12 PSF (15.5') + 12PSF (13') = 342 PLF → DL = 12PSF(15.5') + 10PSF(13')

LL = 20 PSF (15.5') = 310.8 PLF = 316 PLF

(@ nonshear wall)

9) GRID M:

TRIB = 14'-3"/2 = 7.125'

DL = 12 PSF (7.125') + 10 PSF (13') = 216 PLF

LL = 20PSF (7.125') = 142.5 PLF

10) OUTSIDE WALLS W/ 6" TRIB:

DL = 8 PLF

LL = 13.2 PLF

11) SELF WEIGHT OF WALLS:

SHEAR WALLS = 12 PSF (13') = 156 PLF

12) NON-BEARING WALLS:

SELF WT = 10 PSF (12') = 120 PLF

13) FROM PREVIOUS CALCS - POST LOAD:

WORST CASE LOAD: (BEAM REACTION) DL = 6.9 K, LL = 12.9 K] TOTAL

↳ SEE FOLLOWING PAGES FOR POST REACTIONS ON SLAB THAT WILL BE APPLIED TO MODEL. * SHEET "PARTITION BEAM SUPPORT"

* WORST CASE LOAD ONLY OCCURS AT ONE END WHEN PARTITION WALL IS FOLDED. USE WORST CASE LOAD CONSERVATIVELY AT BOTH ENDS

NEW LOADS ON (E) STRUCTURE: (LOADING PROVIDED BY THE FAA - see next page)

14) AREA LOADS ON SLAB:

DL: HANGING MEP LOAD 15 PSF
MISC 5 PSF
20 PSF + SELF WEIGHT } BELOW OFFICE LID (METAL STUD FRAMING)

DL: AT EXTENDED CONTROL ROOM, NO RAISED FLOOR
HANGING MEP LOAD 15 PSF
MISC 5 PSF
20 PSF + SELF WEIGHT SLAB

DL: AT EXTENDED CONTROL ROOM, RAISED FLOOR, FUTURE EQUIP
HANGING MEP LOAD 15 PSF
RAISED FLOOR 12 PSF
FUTURE EQUIPMENT 25 PSF
MISC 5 PSF
57 PSF + SELF WEIGHT SLAB

DL: AT EXTENDED CONTROL ROOM, RAISED FLOOR, EXISTING EQUIPMENT
HANGING MEP LOAD 15 PSF
RAISED FLOOR 12 PSF
EXISTING EQUIPMENT 25 PSF
MISC 5 PSF
57 PSF + SELF WEIGHT SLAB

↳ ALSO ADD VERTICAL SEISMIC LOAD = $0.2(S_{DS})(D_L)$
$= 0.2(1.468)(DL)$
$= 0.2936\,(DL)$

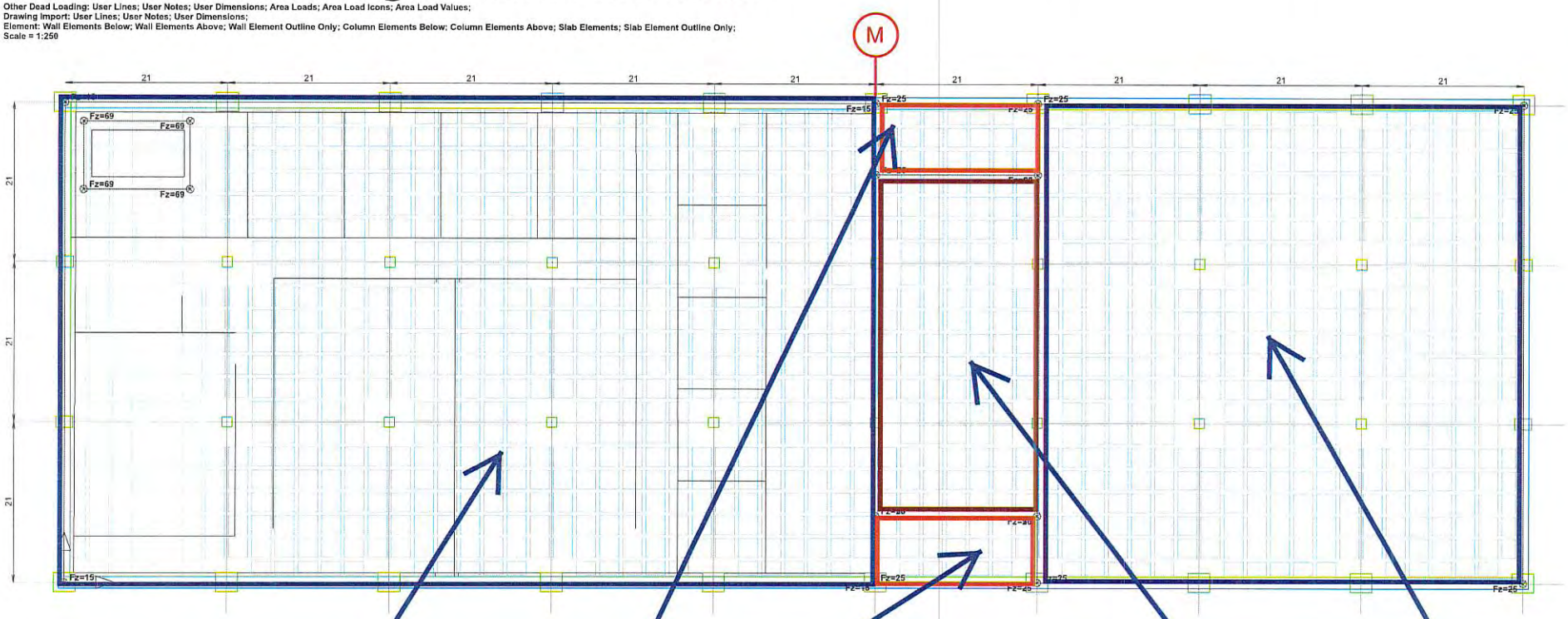
LL = 50 PSF

AT 20 PSF DL, VERT SEISMIC = 0.2936(20 PSF)
= 5.87 PSF

AT 57 PSF DL, VERT SEISMIC = 0.2(57 PSF)
= 16.74 PSF

Other Dead Loading: Area Loads Plan

Other Dead Loading: User Lines; User Notes; User Dimensions; Area Loads; Area Load Icons; Area Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



LOADING PROVIDED BY THE FAA

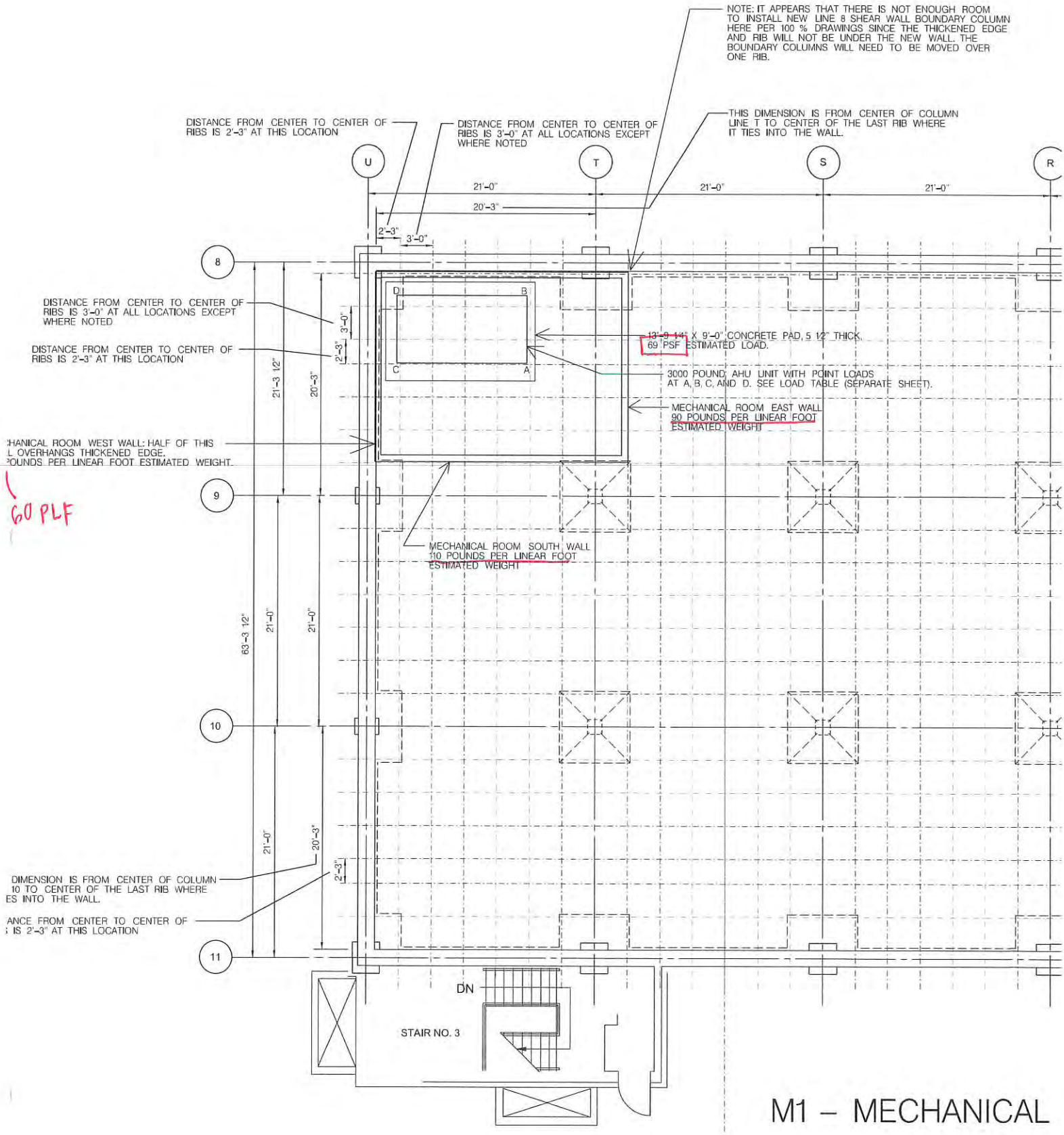
NEW M1: MECH/ELECT/ PLUMBING UNDER THE SLAB OF 15 PSF PER FAA ESTIMATE. PLUS MISCELLANEOUS LOAD PER ARW'S SHEET 78.

EXTENDED CONTROL ROOM WITH NO RAISED FLOOR: MECH/ELECT/ PLUMBING UNDER THE SLAB OF 15 PSF PER FAA ESTIMATE. PLUS MISCELLANEOUS LOAD PER ARW'S SHEET 78.

EXTENDED CONTROL ROOM WITH RAISED FLOOR PER DRAWINGS FOR THIS PROJECT: MECH/ELECT/PLUMBING UNDER THE SLAB OF 15 PSF PER FAA ESTIMATE. 12 PSF RAISED FLOOR ESTIMATE. FUTURE EQUIPMENT WEIGHT IS UNKNOWN, BUT 25 PSF IS PROBABLE.

EXISTING CONTROL ROOM WITH RAISED FLOOR. MECH/ELECT/ PLUMBING UNDER THE SLAB COMBINED WITH CABLES UNDER THE FLOOR IS ESTIMATED AT 15 PSF BY FAA. RAISED FLOOR IS ESTIMATED AT 12 PSF. EXISTING EQUIPMENT WEIGHT IS ESTIMATED AT 25 PSF.

LOADING PROVIDED BY THE FAA



M1 – MECHANICAL

LOADING PROVIDED BY THE FAA

TABLES OF FORCES FOR AHU-700 APPLIED TO SLAB WITH NEGATIVE SEISMIC GRAVITY LOAD

.9D – Ev + Emh

NOTE: FOR GRAVITY ONLY, IT IS ASSUMED THAT THE LOADS ARE EVENLY DISTRIBUTED. THE UNIT IS SUPPORTED BY 4 VIBRATION ISOLATOR SUPPORTS. THE UNIT IS ESTIMATED AT 3000 POUNDS, AND THEREFORE THE GRAVITY FORCES ARE 750 POUNDS AT EACH CORNER. THE FOLLOWING TABLES ARE THE TABULATION OF THE SEISMIC FORCES AT THE SUPPORT POINTS FOR THE FORCES IN FOUR DIFFERENT DIRECTIONS. THE MOMENT FORCES AT THE POINTS ARE THE RESULT OF THE ECCENTRICITY OF THE SHEAR FORCES APPLIED AT THE TOP OF THE VIBRATION ISOLATORS. THESE FORCES INCLUDE OVERSTRENGTH FACTOR APPLIED TO SEISMIC FORCES BEFORE OVERTURNING CALCULATION. THESE FORCES ARE STRENGTH DESIGN.

SIGN CONVENTION: POSITIVE VERTICAL FORCES ARE DOWNWARD FORCES ON THE CONCRETE SLAB, AND NEGATIVE VERTICAL FORCES ARE UPLIFT (TENSION) FORCES ON THE CONCRETE SLAB. FOR MOMENT, Mx IS COUNTER-CLOCKWISE (POSITIVE) LOOKING AT A LINE GOING EAST, AND My IS COUNTER-CLOCKWISE (POSITIVE) LOOKING AT A LINE GOING NORTH.

TABLE 1: SEISMIC FORCE FROM SOUTH TO NORTH

POINT	VERTICAL FORCE	MOMENT Mx
A	-509 POUNDS	1067 FOOT POUNDS
B	1469 POUNDS	1067 FOOT POUNDS
C	-509 POUNDS	1067 FOOT POUNDS
D	1469 POUNDS	1067 FOOT POUNDS

TABLE 2: SEISMIC FORCE FROM NORTH TO SOUTH

POINT	VERTICAL FORCE	MOMENT Mx
A	1469 POUNDS	-1067 FOOT POUNDS
B	-509 POUNDS	-1067 FOOT POUNDS
C	1469 POUNDS	-1067 FOOT POUNDS
D	-509 POUNDS	-1067 FOOT POUNDS

TABLE 3: SEISMIC FORCE FROM WEST TO EAST

POINT	VERTICAL FORCE	MOMENT Mx
A	978 POUNDS	-1067 FOOT POUNDS
B	978 POUNDS	-1067 FOOT POUNDS
C	-18 POUNDS	-1067 FOOT POUNDS
D	-18 POUNDS	-1067 FOOT POUNDS

TABLE 4: SEISMIC FORCE FROM EAST TO WEST

POINT	VERTICAL FORCE	MOMENT Mx
A	-18 POUNDS	1067 FOOT POUNDS
B	-18 POUNDS	1067 FOOT POUNDS
C	978 POUNDS	1067 FOOT POUNDS
D	978 POUNDS	1067 FOOT POUNDS

SEE SHEET 2 FOR POSITIVE SEISMIC GRAVITY LOAD AND DIAGRAM

LOADING PROVIDED BY THE FAA

TABLES OF FORCES FOR AHU-700 APPLIED TO SLAB WITH POSITIVE SEISMIC GRAVITY LOAD

1.2D + Ev + Emh

SEE NOTES ON SHEET 1

TABLE 1A: SEISMIC FORCE FROM SOUTH TO NORTH

POINT	VERTICAL FORCE	MOMENT Mx
A	106 POUNDS	1067 FOOT POUNDS
B	2084 POUNDS	1067 FOOT POUNDS
C	106 POUNDS	1067 FOOT POUNDS
D	2084 POUNDS	1067 FOOT POUNDS

TABLE 2A: SEISMIC FORCE FROM NORTH TO SOUTH

POINT	VERTICAL FORCE	MOMENT Mx
A	2084 POUNDS	-1067 FOOT POUNDS
B	106 POUNDS	-1067 FOOT POUNDS
C	2084 POUNDS	-1067 FOOT POUNDS
D	106 POUNDS	-1067 FOOT POUNDS

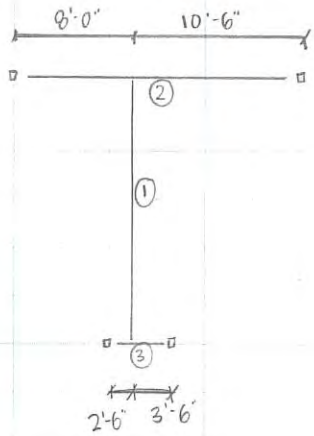
TABLE 3A: SEISMIC FORCE FROM WEST TO EAST

POINT	VERTICAL FORCE	MOMENT Mx
A	1593 POUNDS	-1067 FOOT POUNDS
B	1593 POUNDS	-1067 FOOT POUNDS
C	597 POUNDS	-1067 FOOT POUNDS
D	597 POUNDS	-1067 FOOT POUNDS

TABLE 4A: SEISMIC FORCE FROM EAST TO WEST

POINT	VERTICAL FORCE	MOMENT Mx
A	597 POUNDS	1067 FOOT POUNDS
B	597 POUNDS	1067 FOOT POUNDS
C	1593 POUNDS	1067 FOOT POUNDS
D	1593 POUNDS	1067 FOOT POUNDS

PARTITION BEAM SUPPORT



BEAM 1: SEE PREVIOUS CALCS

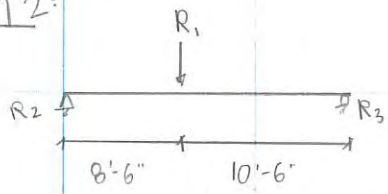
MAX REACTION (R_1):

DL = 6.9K

LL = 12.9K

↳ SEE CALCS IN "WALLS" SECTION OF CALCULATIONS

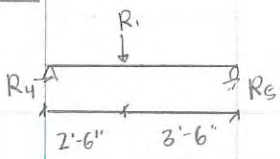
BEAM 2:



R_2: DL = 3.81K, LL = 7.13K
R_3: DL = 3.1K, LL = 5.8K
} APPLY TO RAM MODEL

↳ W16x40 OK, SR = 0.797

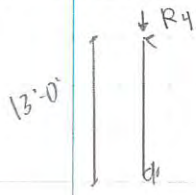
BEAM 3:



R_4: DL = 4.03K, LL = 7.53K
R_5: DL = 2.88K, LL = 5.4K
} APPLY TO RAM MODEL

↳ W16x26, OK, SR = 0.262

COLUMN CHECK:



↳ HSS 5x3x1/4 OK, SR = 0.624

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Steel Beam

File: 19521.ec6
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Lic. # : KW-06002489
ARW ENGINEERS

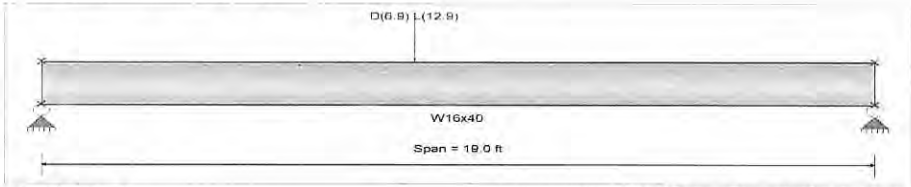
DESCRIPTION: Beam #2 (longer with partition beam reaction)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : D = 6.90, L = 12.90 k @ 8.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.797 : 1	Maximum Shear Stress Ratio =	0.112 : 1
Section used for this span	**W16x40**	Section used for this span	**W16x40**
Ma : Applied	92.805 k-ft	Va : Applied	10.942 k
Mn / Omega : Allowable	116.388 k-ft	Vn/Omega : Allowable	97.60 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	8.523ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.210 in	Ratio =	1,086 >=360.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Max Downward Total Deflection	0.322 in	Ratio =	708 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 19.00 ft	1	0.278	0.039	32.34		32.34	194.37	116.39	1.36	1.00	3.81	146.40	97.60
+D+L+H													
Dsgn. L = 19.00 ft	1	0.797	0.112	92.81		92.81	194.37	116.39	1.36	1.00	10.94	146.40	97.60
+D+Lr+H													
Dsgn. L = 19.00 ft	1	0.278	0.039	32.34		32.34	194.37	116.39	1.36	1.00	3.81	146.40	97.60
+D+S+H													
Dsgn. L = 19.00 ft	1	0.278	0.039	32.34		32.34	194.37	116.39	1.36	1.00	3.81	146.40	97.60
+D+0.750Lr+0.750L+H													
Dsgn. L = 19.00 ft	1	0.668	0.094	77.69		77.69	194.37	116.39	1.36	1.00	9.16	146.40	97.60
+D+0.750L+0.750S+H													
Dsgn. L = 19.00 ft	1	0.668	0.094	77.69		77.69	194.37	116.39	1.36	1.00	9.16	146.40	97.60
+D+0.60W+H													
Dsgn. L = 19.00 ft	1	0.278	0.039	32.34		32.34	194.37	116.39	1.36	1.00	3.81	146.40	97.60
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 19.00 ft	1	0.668	0.094	77.69		77.69	194.37	116.39	1.36	1.00	9.16	146.40	97.60
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 19.00 ft	1	0.668	0.094	77.69		77.69	194.37	116.39	1.36	1.00	9.16	146.40	97.60
+0.60D+0.60W+0.60H													
Dsgn. L = 19.00 ft	1	0.167	0.023	19.40		19.40	194.37	116.39	1.36	1.00	2.29	146.40	97.60
+D+0.70E+0.60H													
Dsgn. L = 19.00 ft	1	0.278	0.039	32.34		32.34	194.37	116.39	1.36	1.00	3.81	146.40	97.60
+D+0.750L+0.750S+0.5250E+H													

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Steel Beam

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ARW ENGINEERS

DESCRIPTION: Beam #2 (longer with partition beam reaction)

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+H													
Dsgn. L = 19.00 ft	1	0.668	0.094	77.69		77.69	194.37	116.39	1.36	1.00	9.16	146.40	97.60
Dsgn. L = 19.00 ft	1	0.167	0.023	19.40		19.40	194.37	116.39	1.36	1.00	2.29	146.40	97.60

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.3221	9.229		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	10.942	8.858
Overall MINimum	2.288	1.852
+D+H	3.813	3.087
+D+L+H	10.942	8.858
+D+Lr+H	3.813	3.087
+D+S+H	3.813	3.087
+D+0.750Lr+0.750L+H	9.160	7.415
+D+0.750L+0.750S+H	9.160	7.415
+D+0.60W+H	3.813	3.087
+D+0.750Lr+0.750L+0.450W+H	9.160	7.415
+D+0.750L+0.750S+0.450W+H	9.160	7.415
+0.60D+0.60W+0.60H	2.288	1.852
+D+0.70E+0.60H	3.813	3.087
+D+0.750L+0.750S+0.5250E+H	9.160	7.415
+0.60D+0.70E+H	2.288	1.852
D Only	3.813	3.087
L Only	7.129	5.771
H Only		

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Steel Beam

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ARW ENGINEERS

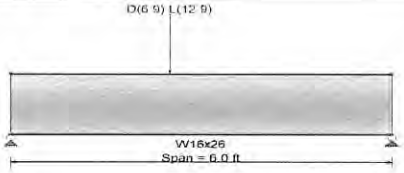
DESCRIPTION: Beam #3 (shorter with partition beam reaction)

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Load(s) for Span Number 1
Point Load : D = 6.90, L = 12.90 k @ 2.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.262 : 1	Maximum Shear Stress Ratio =	0.164 : 1
Section used for this span	W16x26	Section used for this span	W16x26
Ma : Applied	28.851 k-ft	Va : Applied	11.550 k
Mn / Omega : Allowable	110.279 k-ft	Vn/Omega : Allowable	70.509 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	2.503ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.011 in	Ratio =	6,470 >=360.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Max Downward Total Deflection	0.017 in	Ratio =	4216 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 6.00 ft	1	0.091	0.057	10.05		10.05	184.17	110.28	1.39	1.00	4.03	117.75	70.51
+D+L+H													
Dsgn. L = 6.00 ft	1	0.262	0.164	28.85		28.85	184.17	110.28	1.39	1.00	11.55	117.75	70.51
+D+Lr+H													
Dsgn. L = 6.00 ft	1	0.091	0.057	10.05		10.05	184.17	110.28	1.39	1.00	4.03	117.75	70.51
+D+S+H													
Dsgn. L = 6.00 ft	1	0.091	0.057	10.05		10.05	184.17	110.28	1.39	1.00	4.03	117.75	70.51
+D+0.750Lr+0.750L+H													
Dsgn. L = 6.00 ft	1	0.219	0.137	24.15		24.15	184.17	110.28	1.39	1.00	9.67	117.75	70.51
+D+0.750L+0.750S+H													
Dsgn. L = 6.00 ft	1	0.219	0.137	24.15		24.15	184.17	110.28	1.39	1.00	9.67	117.75	70.51
+D+0.60W+H													
Dsgn. L = 6.00 ft	1	0.091	0.057	10.05		10.05	184.17	110.28	1.39	1.00	4.03	117.75	70.51
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 6.00 ft	1	0.219	0.137	24.15		24.15	184.17	110.28	1.39	1.00	9.67	117.75	70.51
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 6.00 ft	1	0.219	0.137	24.15		24.15	184.17	110.28	1.39	1.00	9.67	117.75	70.51
+0.60D+0.60W+0.60H													
Dsgn. L = 6.00 ft	1	0.055	0.034	6.03		6.03	184.17	110.28	1.39	1.00	2.42	117.75	70.51
+D+0.70E+0.60H													
Dsgn. L = 6.00 ft	1	0.091	0.057	10.05		10.05	184.17	110.28	1.39	1.00	4.03	117.75	70.51
+D+0.750L+0.750S+0.5250E+H													

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Steel Beam

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ARW ENGINEERS

DESCRIPTION: Beam #3 (shorter with partition beam reaction)

Load Combination		Max Stress Ratios		Summary of Moment Values							Summary of Shear Values		
Segment Length	Span #	M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+H													
Dsgn. L = 6.00 ft	1	0.055	0.034	6.03		6.03	184.17	110.28	1.39	1.00	2.42	117.75	70.51

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.0171	2.863		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	11.550	8.250
Overall MINimum	2.415	1.725
+D+H	4.025	2.875
+D+L+H	11.550	8.250
+D+Lr+H	4.025	2.875
+D+S+H	4.025	2.875
+D+0.750Lr+0.750L+H	9.669	6.906
+D+0.750L+0.750S+H	9.669	6.906
+D+0.60W+H	4.025	2.875
+D+0.750Lr+0.750L+0.450W+H	9.669	6.906
+D+0.750L+0.750S+0.450W+H	9.669	6.906
+0.60D+0.60W+0.60H	2.415	1.725
+D+0.70E+0.60H	4.025	2.875
+D+0.750L+0.750S+0.5250E+H	9.669	6.906
+0.60D+0.70E+H	2.415	1.725
D Only	4.025	2.875
L Only	7.525	5.375
H Only		

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Steel Column

File: 19521.ec6
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ARW ENGINEERS

DESCRIPTION: Post @ w-beam

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name : **HSS5x3x1/4**
Analysis Method : Allowable Strength
Steel Stress Grade
Fy : Steel Yield 50.0 ksi
E : Elastic Bending Modulus 29,000.0 ksi

Overall Column Height 13.0 ft
Top & Bottom Fixity Top & Bottom Pinned
Brace condition for deflection (buckling) along columns :
X-X (width) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 13.0 ft, K = 1.0
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT X-X Axis = 13.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 158.730 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 13.0 ft, Xecc = 2.50 in, D = 4.030, L = 7.530 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = 0.6236 : 1
Load Combination +D+L+H
Location of max.above base 12.913 ft
At maximum location values are . . .
Pa : Axial 11.719 k
Pn / Omega : Allowable 29.475 k
Ma-x : Applied 0.0 k-ft
Mn-x / Omega : Allowable 13.423 k-ft
Ma-y : Applied -2.392 k-ft
Mn-y / Omega : Allowable 9.406 k-ft

Maximum Load Reactions . .
Top along X-X 0.1853 k
Bottom along X-X 0.1853 k
Top along Y-Y 0.0 k
Bottom along Y-Y 0.0 k

Maximum Load Deflections . . .
Along Y-Y 0.0 in at 0.0 ft above base
for load combination :
Along X-X -0.3263 in at 7.591 ft above base
for load combination : +D+L+H

PASS Maximum Shear Stress Ratio = 0.009618 : 1
Load Combination +D+L+H
Location of max.above base 0.0 ft
At maximum location values are . .
Va : Applied 0.1853 k
Vn / Omega : Allowable 19.262 k

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.160	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.003	PASS	0.00 ft
+D+L+H	0.624	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.010	PASS	0.00 ft
+D+Lr+H	0.160	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.003	PASS	0.00 ft
+D+S+H	0.160	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.003	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.523	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.008	PASS	0.00 ft
+D+0.750L+0.750S+H	0.523	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.008	PASS	0.00 ft
+D+0.60W+H	0.160	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.003	PASS	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.523	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.008	PASS	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.523	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.008	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.096	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.002	PASS	0.00 ft
+D+0.70E+0.60H	0.160	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.003	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.523	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.008	PASS	0.00 ft
+0.60D+0.70E+H	0.096	PASS	12.91 ft	1.00	1.66	87.64	131.09	0.002	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	@ Top	k-ft	My - End Moments @ Base	@ Top
+D+H	4.189	0.065	0.065								
+D+L+H	11.719	0.185	0.185								

Title Block Line 1
You can change this area using the "Settings" menu item and then using the "Printing & Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 19 JUL 2021, 8:44AM

Steel Column

File: 19521.ec6
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Lic. # : KW-06002489
ARW ENGINEERS

DESCRIPTION: Post @ w-beam

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	@ Top	k-ft	My - End Moments @ Base	@ Top
+D+Lr+H	4.189	0.065	0.065								
+D+S+H	4.189	0.065	0.065								
+D+0.750Lr+0.750L+H	9.836	0.155	0.155								
+D+0.750L+0.750S+H	9.836	0.155	0.155								
+D+0.60W+H	4.189	0.065	0.065								
+D+0.750Lr+0.750L+0.450W+H	9.836	0.155	0.155								
+D+0.750L+0.750S+0.450W+H	9.836	0.155	0.155								
+0.60D+0.60W+0.60H	2.513	0.039	0.039								
+D+0.70E+0.60H	4.189	0.065	0.065								
+D+0.750L+0.750S+0.5250E+H	9.836	0.155	0.155								
+0.60D+0.70E+H	2.513	0.039	0.039								
D Only	4.189	0.065	0.065								
Lr Only											
L Only	7.530	0.121	0.121								
S Only											
W Only											
E Only											
H Only											

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	@ Top	k	Y-Y Axis Reaction @ Base	@ Top	Mx - End Moments @ Base	@ Top	k-ft	My - End Moments @ Base	@ Top
Axial @ Base	Maximum	11.719	0.185	0.185								
"	Minimum											
Reaction, X-X Axis Base	Maximum	11.719	0.185	0.185								
"	Minimum											
Reaction, Y-Y Axis Base	Maximum	4.189	0.065	0.065								
"	Minimum	4.189	0.065	0.065								
Reaction, X-X Axis Top	Maximum	11.719	0.185	0.185								
"	Minimum											
Reaction, Y-Y Axis Top	Maximum	7.530	0.121	0.121								
"	Minimum	4.189	0.065	0.065								
Moment, X-X Axis Base	Maximum	4.189		0.065								
"	Minimum	4.189		0.065								
Moment, Y-Y Axis Base	Maximum	4.189	0.065	0.065								
"	Minimum	4.189	0.065	0.065								
Moment, X-X Axis Top	Maximum	4.189	0.065	0.065								
"	Minimum	4.189	0.065	0.065								
Moment, Y-Y Axis Top	Maximum	4.189	0.065	0.065								
"	Minimum	4.189	0.065	0.065								

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	-0.1137	in	7.591	ft	0.000	in	0.000	ft
+D+L+H	-0.3263	in	7.591	ft	0.000	in	0.000	ft
+D+Lr+H	-0.1137	in	7.591	ft	0.000	in	0.000	ft
+D+S+H	-0.1137	in	7.591	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+H	-0.2731	in	7.591	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+H	-0.2731	in	7.591	ft	0.000	in	0.000	ft
+D+0.60W+H	-0.1137	in	7.591	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+0.450W+H	-0.2731	in	7.591	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+0.450W+H	-0.2731	in	7.591	ft	0.000	in	0.000	ft
+0.60D+0.60W+0.60H	-0.0682	in	7.591	ft	0.000	in	0.000	ft
+D+0.70E+0.60H	-0.1137	in	7.591	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+0.5250E+H	-0.2731	in	7.591	ft	0.000	in	0.000	ft
+0.60D+0.70E+H	-0.0682	in	7.591	ft	0.000	in	0.000	ft
D Only	-0.1137	in	7.591	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	-0.2125	in	7.591	ft	0.000	in	0.000	ft

Title Block Line 1
You can change this area
using the "Settings" menu item
and then using the "Printing &
Title Block" selection.
Title Block Line 6

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 19 JUL 2021, 8:44AM

Steel Column

File: 19521.ec6

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ARW ENGINEERS

DESCRIPTION: Post @ w-beam

Maximum Deflections for Load Combinations

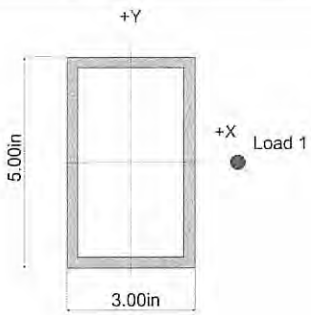
Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
E Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Steel Section Properties : HSS5x3x1/4

Depth	=	5.000 in	I xx	=	10.70 in^4		J	=	11.000 in^4
Design Thick	=	0.233 in	S xx	=	4.29 in^3		Cw	=	6.10 in^6
Width	=	3.000 in	R xx	=	1.780 in				
Wall Thick	=	0.250 in	Zx	=	5.380 in^3				
Area	=	3.370 in^2	I yy	=	4.810 in^4		C	=	6.100 in^3
Weight	=	12.210 plf	S yy	=	3.210 in^3				
			R yy	=	1.190 in				
			Zy	=	3.770 in^3				

Ycg = 0.000 in

Sketches



SEISMIC LOADING:

* OVERTURNING LOADS SHOWN BELOW CAN BE FOUND IN THE LATERAL PORTION OF THESE CALCULATIONS.

X-DIRECTION:

OVERTURNING LOADS (LOADS INCLUDE Ω)

- GRID 8 (T.1 TO R.6) TOTAL COMPRESSION LOAD = 8K
  DIVIDE BETWEEN (2) POSTS. LOAD @ EA POST = 4K
- GRID 8 (R.7 TO M) TOTAL COMPRESSION LOAD = 8K
  DIVIDE BETWEEN (2) POSTS, LOAD @ EA POST = 4K
- GRID 11 TOTAL COMPRESSION LOAD = 6.3K
  DIVIDE LOAD BETWEEN (2) POSTS, LOAD @ EA POST = 3.15K

Y-DIRECTION:

OVERTURNING LOADS (LOADS INCLUDE Ω)

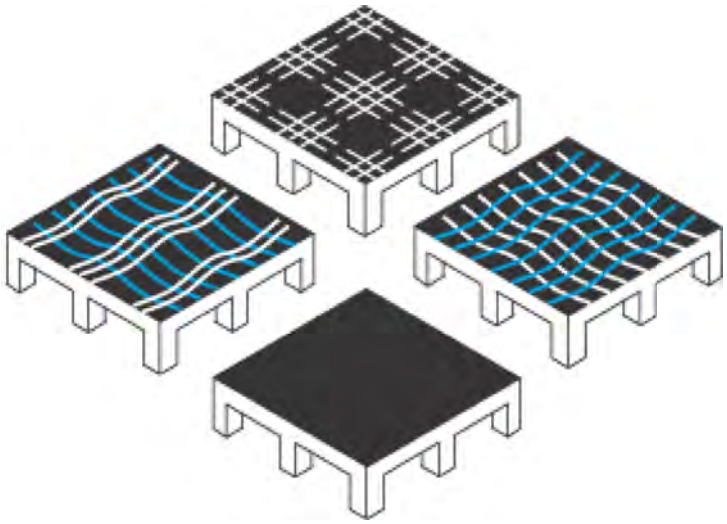
- GRID U TOTAL COMPRESSION LOAD = 3.0K
- GRID T TOTAL COMPRESSION LOAD = 7.4K
  DIVIDE BETWEEN (2) POSTS, LOAD @ EA POST = 3.7K
- GRID T.2 TOTAL COMPRESSION LOAD = 9.9K
  DIVIDE BETWEEN (2) POSTS, LOAD @ EA POST = 4.95K
- GRID R.6 (9.1 TO 10.6) TOTAL COMPRESSION LOAD = 5.6K
- GRID R.6 (8 TO 8.8) TOTAL COMPRESSION LOAD = 5.6K
- GRID P.3 TOTAL COMPRESSION LOAD = 4.9K

* LOAD COMBINATIONS WILL BE IN THE RAM CONCEPT MODEL. THEY WILL ACCOUNT FOR LOADS IN THE POSITIVE AND NEGATIVE X & Y DIRECTION.

FAA Reconfigured M1 Room

FAA M1 Room Existing Waffle Slab Analysis

Future Loading



Existing Slab Model_ANB_20210505_future loading.cpt
7/19/2021

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Units

Geometry Units

Plan Dimensions: feet
Angles: degrees

Slab Thickness: inches
Elevations: inches

Support Dimensions: inches
Support Height: feet

Loading and Reaction Units

Point Force: Kips
- Report As Zero: 0 Kips

Point Moment: kip-ft
- Report As Zero: 0 kip-ft

Line Force: kips/ft
- Report As Zero: 0 kips/ft

Line Moment: Kips
- Report As Zero: 0 Kips

Area Force: psf
- Report As Zero: 0 psf

Area Moment: #/foot
- Report As Zero: 0 #/foot

Spring and Stiffness Units

Point Force Spring: kips/in
Point Moment Spring: k-ft/°

Line Force Spring: ksi
Line Moment Spring: k/°

Area Force Spring: pci
Area Moment Spring: k/ft°

Slab Analysis Units

Force: Kips
- Report As Zero: 0 Kips

Force Per Width: kips/ft
- Report As Zero: 0 kips/ft

Moment: kip-ft
- Report As Zero: 0 kip-ft

Moment Per Width: Kips
- Report As Zero: 0 Kips

Concrete Stress: psi
- Report As Zero: 0 psi

Deflection: inches
- Report As Zero: 0 inches

Materials Units

Concrete Volume: yd^3
Tendon Force: Kips
Reinforcing Stress: ksi

Reinforcing Area: in^2
Tendon Force Per Width: kips/ft
PT Weight: pounds

Reinforcement Weight: tons
Tendon Profile: inches
Cover: inches

Miscellaneous Units

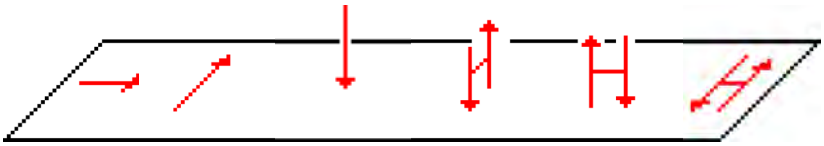
Floor Area: ft^2
Tendon Angles (for friction): radians

Density: pcf
Temperature Change: °F

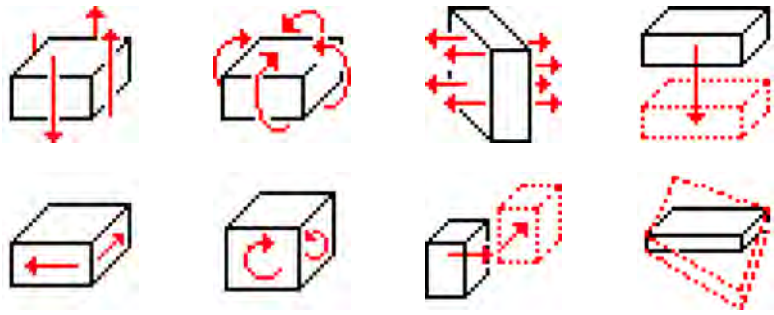
Elongations: inches

Signs

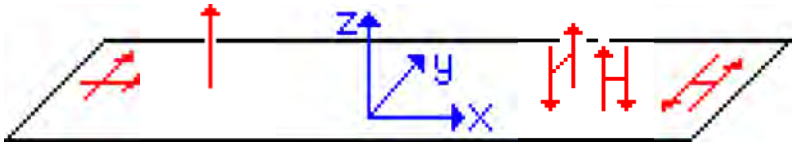
Positive Loads



Positive Analysis



Positive Reactions



Materials

Concrete Mix

Mix Name	Density (pcf)	Density For Loads (pcf)	f'ci (psi)	f'c (psi)	fcui (psi)	fcu (psi)	Poissons Ratio	Thermal Exp. Coeff	Ec Calc	User Eci (psi)	User Ec (psi)
3000 psi	145	145	3000	3000	3725	3725	0.2	5.556e-6	Code	2500000	3000000
4000 psi	150	150	3000	4000	3725	4975	0.2	5.556e-6	Code	2500000	3000000
6000 psi	150	150	3000	6000	3725	7450	0.2	5.556e-6	Code	2500000	3000000
3300 psi	150	150	3000	3300	3725	4025	0.2	5.556e-6	Code	2500000	3000000

PT Systems

System Name	Type	Aps (in²)	Eps (ksi)	fse (ksi)	fpy (ksi)	fpu (ksi)	Duct Width (inches)	Strands Per Duct	Min Radius (feet)
½" Unbonded	unbonded	0.153	28000	175	243	270	0.5	1	6

PT Stressing Parameters

System Name	Jacking Stress (ksi)	Seating Loss (inches)	Anchor Friction	Wobble Friction (1/feet)	Angular Friction (1/radians)	Long-Term Losses (ksi)
½" Unbonded	216	0.25	0	0.0014	0.07	22

Reinforcing Bars

Bar Name	As (in²)	Es (ksi)	Fy (ksi)	Coating	Straight Ld/Db	90 Hook Ld/Db	180 Hook Ld/Db
#3	0.11	29000	40	None	Code	Code	Code
#4	0.2	29000	40	None	Code	Code	Code
#5	0.31	29000	40	None	Code	Code	Code
#6	0.44	29000	40	None	Code	Code	Code
#7	0.6	29000	40	None	Code	Code	Code
#8	0.79	29000	40	None	Code	Code	Code
#9	1	29000	40	None	Code	Code	Code
#10	1.27	29000	40	None	Code	Code	Code
#11	1.56	29000	40	None	Code	Code	Code

SSR Systems

SSR System Name	Stud Area (in²)	Head Area (in²)	Min Clear Head Spacing (inches)	Specified Stud Spacing (inches)	Fy (ksi)	Stud Spacing Increment	Rounding (inches)	Min Studs Per Rail	System Type
3/8" SSR	0.11	1.11	0.5	None	50	0.25		2	Rail
1/2" SSR	0.196	1.96	0.5	None	50	0.25		2	Rail
5/8" SSR	0.307	3.07	0.5	None	50	0.25		2	Rail
3/4" SSR	0.442	4.42	0.5	None	50	0.25		2	Rail
Ancon Shearfix Auto-Size	0.1217	1.096	0.5906	None	72.52	0.03937		2	Rail
Ancon Shearfix 10 mm	0.1217	1.096	0.5906	None	72.52	0.03937		2	Rail
Ancon Shearfix 12 mm	0.1753	1.578	0.5906	None	72.52	0.03937		2	Rail
Ancon Shearfix 14 mm	0.2386	2.147	0.5906	None	72.52	0.03937		2	Rail
Ancon Shearfix 16 mm	0.3116	2.805	0.5906	None	72.52	0.03937		2	Rail
Ancon Shearfix 20 mm	0.4869	4.383	0.5906	None	72.52	0.03937		2	Rail
Ancon Shearfix 24 mm	0.7012	6.311	0.5906	None	72.52	0.03937		2	Rail

Loadings

Loading Name	*Type*	*Analysis*	*On-Pattern Factor*	*Off-Pattern Factor*
Self-Dead Loading	Self-Weight	Normal	1	1
Balance Loading	Balance	Normal	1	1
Hyperstatic Loading	Hyperstatic	Hyperstatic	1	1
Other Dead Loading	Dead	Normal	1	1
Live (Reducible) Loading	Live (Reducible)	Normal	1	0
Live (Unreducible) Loading	Live (Unreducible)	Normal	1	0
Live (Roof) Loading	Live (Roof)	Normal	1	0
Seismic X (positive) Loading	Ultimate Seismic 1	Normal	1	1
Seismic Y (positive) Loading	Ultimate Seismic 2	Normal	1	1
Seismic X (negative) loading	Ultimate Seismic 3	Normal	1	1
Seismic Y (negative) loading	Ultimate Seismic 4	Normal	1	1

Load Combinations

All Dead LC

Active Design Criteria: <none>
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Other Dead Loading	1	1

Dead + Balance LC

Active Design Criteria: <none>
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1

Service LC: D + L

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1
Live (Reducible) Loading	1	0
Live (Unreducible) Loading	1	0

Service LC: D + Lr

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1
Live (Roof) Loading	1	0

Service LC: D + 0.75L + 0.75Lr

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1
Live (Reducible) Loading	0.75	0
Live (Unreducible) Loading	0.75	0
Live (Roof) Loading	0.75	0

Load Combinations (2)

Sustained Service LC

Active Design Criteria: Sustained Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1
Live (Reducible) Loading	0.5	0.5
Live (Unreducible) Loading	0.5	0.5
Live (Roof) Loading	0.5	0.5

Factored LC: 1.4D

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1.4	0.9
Hyperstatic Loading	1	1
Other Dead Loading	1.4	0.9

Factored LC: 1.2D + 1.6L + 0.5Lr

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1.2	0.9
Hyperstatic Loading	1	1
Other Dead Loading	1.2	0.9
Live (Reducible) Loading	1.6	0
Live (Unreducible) Loading	1.6	0
Live (Roof) Loading	0.5	0

Factored LC: 1.2D + f1L + 1.6Lr

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1.2	0.9
Hyperstatic Loading	1	1
Other Dead Loading	1.2	0.9
Live (Reducible) Loading	0.5	0
Live (Unreducible) Loading	1	0
Live (Roof) Loading	1.6	0

Load Combinations (3)

Factored LC: 1.2D + 1.6L

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1.2	0.9
Hyperstatic Loading	1	1
Other Dead Loading	1.2	0.9
Live (Reducible) Loading	1.6	0
Live (Unreducible) Loading	1.6	0

Service LC: D + 0.7E (Positive X)

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1
Seismic X (positive) Loading	0.7	0.7

Service LC: D + 0.7E (Positive Y)

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1
Seismic Y (positive) Loading	0.7	0.7

Service LC: D + 0.7E (Negative X)

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1
Seismic X (negative) loading	0.7	0.7

Service LC: D + 0.7E (Negative Y)

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1	1
Other Dead Loading	1	1
Seismic Y (negative) loading	0.7	0.7

Load Combinations (4)

Service LC: 0.6D + 0.7E (Positive X)

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	0.6	0.6
Balance Loading	1	1
Other Dead Loading	0.6	0.6
Seismic X (positive) Loading	0.7	0.7

Service LC: 0.6D + 0.7E (Positive Y)

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	0.6	0.6
Balance Loading	1	1
Other Dead Loading	0.6	0.6
Seismic Y (positive) Loading	0.7	0.7

Service LC: 0.6D + 0.7E (Negative X)

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	0.6	0.6
Balance Loading	1	1
Other Dead Loading	0.6	0.6
Seismic X (negative) loading	0.7	0.7

Service LC: 0.6D + 0.7E (Negative Y)

Active Design Criteria: User Minimum Design, Code Minimum Design, Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	0.6	0.6
Balance Loading	1	1
Other Dead Loading	0.6	0.6
Seismic Y (negative) loading	0.7	0.7

Factored LC: 0.9D + E (Positive X)

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	0.9	0.9
Hyperstatic Loading	1	1
Other Dead Loading	0.9	0.9
Seismic X (positive) Loading	1	1

Load Combinations (5)

Factored LC: 0.9D + E (Positive Y)

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	0.9	0.9
Hyperstatic Loading	1	1
Other Dead Loading	0.9	0.9
Seismic Y (positive) Loading	1	1

Factored LC: 0.9D + E (Negative X)

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	0.9	0.9
Hyperstatic Loading	1	1
Other Dead Loading	0.9	0.9
Seismic X (negative) loading	1	1

Factored LC: 0.9D + E (Negative Y)

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	0.9	0.9
Hyperstatic Loading	1	1
Other Dead Loading	0.9	0.9
Seismic Y (negative) loading	1	1

Factored LC: 1.2D + f1L + E (Positive X)

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1.2	0.9
Hyperstatic Loading	1	1
Other Dead Loading	1.2	0.9
Live (Reducible) Loading	0.5	0
Live (Unreducible) Loading	0.5	0
Seismic X (positive) Loading	1	1

Load Combinations (6)

Factored LC: 1.2D + f1L + E (Positive Y)

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1.2	0.9
Hyperstatic Loading	1	1
Other Dead Loading	1.2	0.9
Live (Reducible) Loading	0.5	0
Live (Unreducible) Loading	0.5	0
Seismic Y (positive) Loading	1	1

Factored LC: 1.2D + f1L + E (Negative X)

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1.2	0.9
Hyperstatic Loading	1	1
Other Dead Loading	1.2	0.9
Live (Reducible) Loading	0.5	0
Live (Unreducible) Loading	0.5	0
Seismic X (negative) loading	1	1

Factored LC: 1.2D + f1L + E (Negative Y)

Active Design Criteria: User Minimum Design, Code Minimum Design, Strength Design, Ductility Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1.2	0.9
Hyperstatic Loading	1	1
Other Dead Loading	1.2	0.9
Live (Reducible) Loading	0.5	0
Live (Unreducible) Loading	0.5	0
Seismic Y (negative) loading	1	1

Design Rules

Code Minimum Design

318-14 Min. Reinforcement

User Minimum Design

Specified Min. Reinforcement

Initial Service Design

318-14 Initial Service Design

Service Design

318-14 Service Design

Include detailed section analysis

Sustained Service Design

318-14 Sustained Service Design

Strength Design

318-14 Strength Design

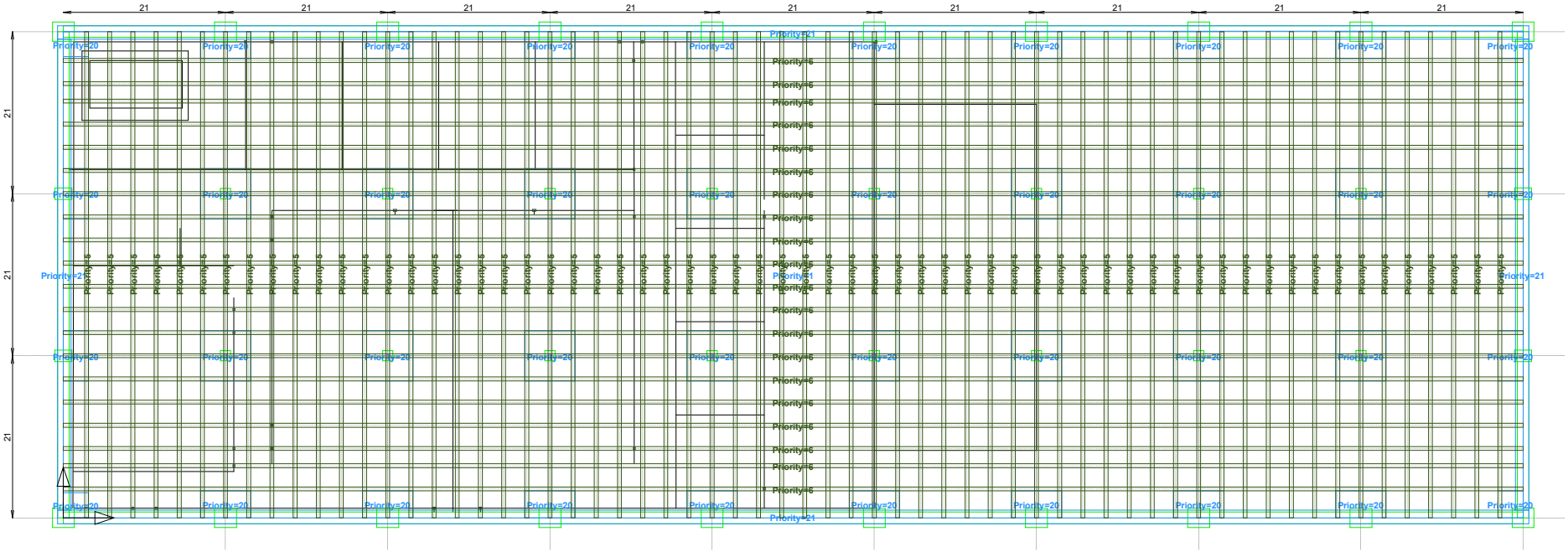
Punching Shear Design

Ductility Design

318-14 Ductility Design

Mesh Input: Standard Plan

Mesh Input: Beams; Beam Priorities; Slab Areas; Slab Area Priorities; Slab Openings; Slab Opening Priorities; Point Supports; Point Support Icons; Line Supports; Line Support Icons; Walls Above; Walls Below; Columns Above; Columns Below; Point Springs; Point Spring Icons; Point Spring Values; Line Springs; Line Spring Icons; Line Spring Values; Area Springs; Area Spring Icons; A
Drawing Import: User Notes; User Lines; User Dimensions;
Scale = 1:250



Other Dead Loading: All Loads Plan

Other Dead Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values; Line Loads; Line Load Icons; Line Load Values; Area Loads; Area Load Icons; Area Load Values;
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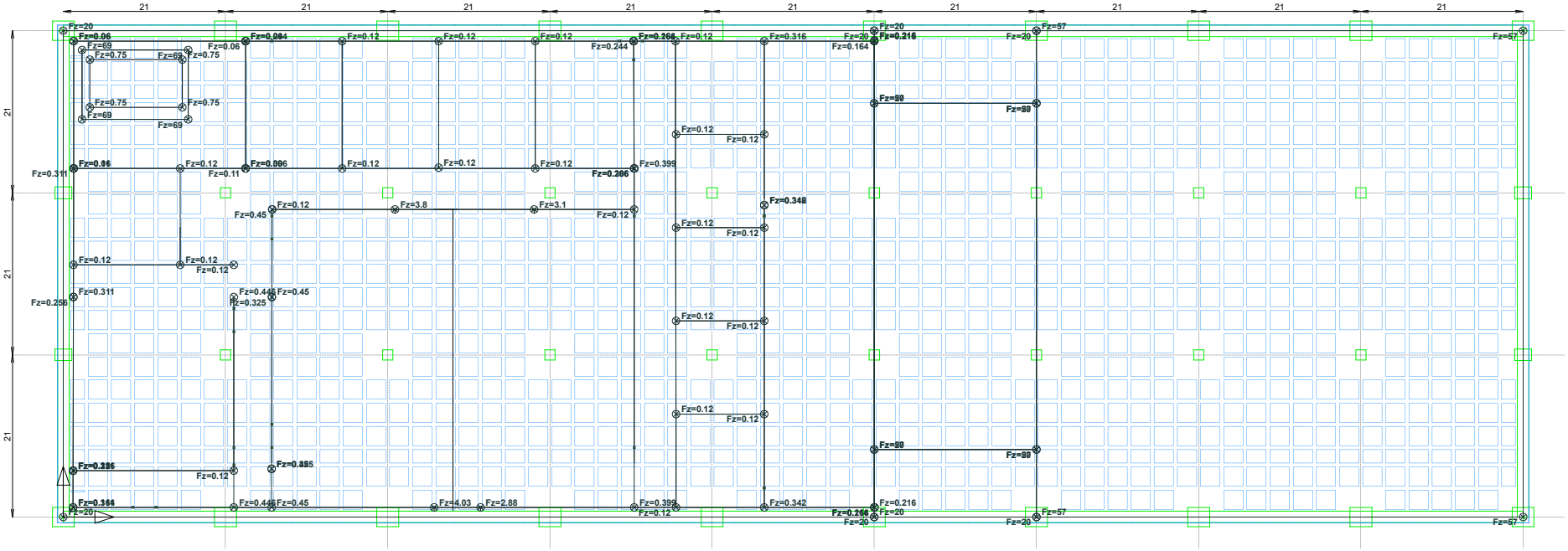

Other Dead Loading: Point Loads Plan

Other Dead Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values;
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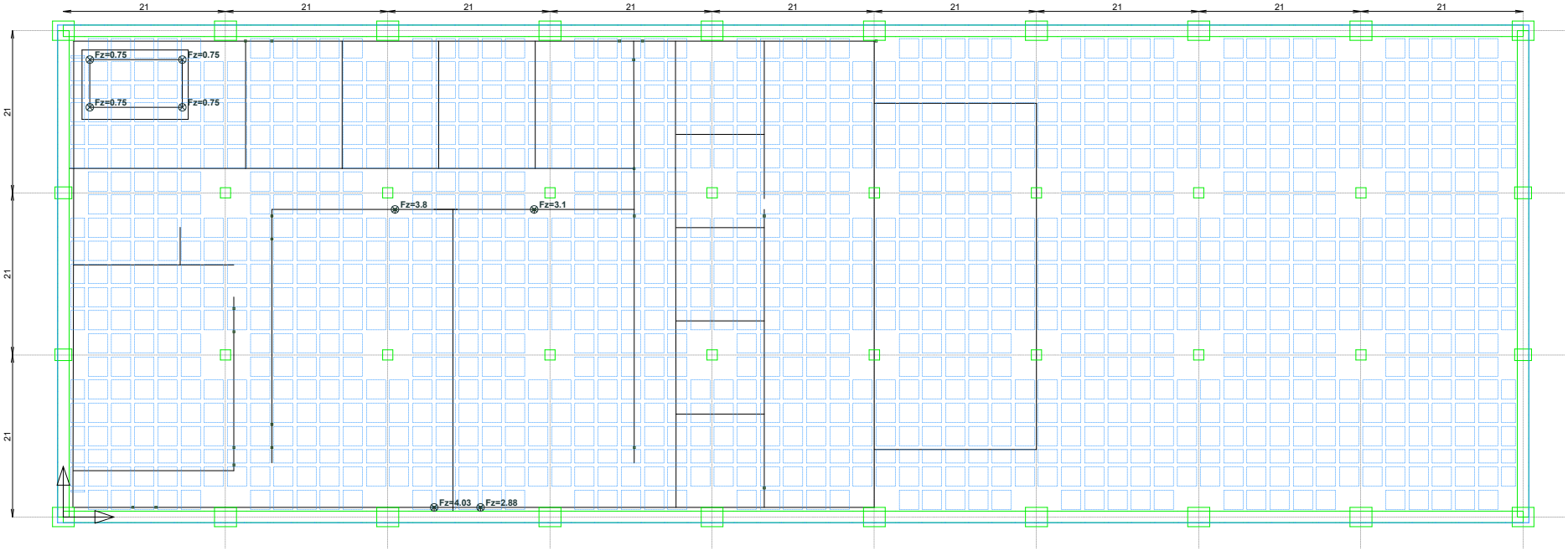
Scale = 1:250



Other Dead Loading: Line Loads Plan

Other Dead Loading: User Lines; User Notes; User Dimensions; Line Loads; Line Load Icons; Line Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
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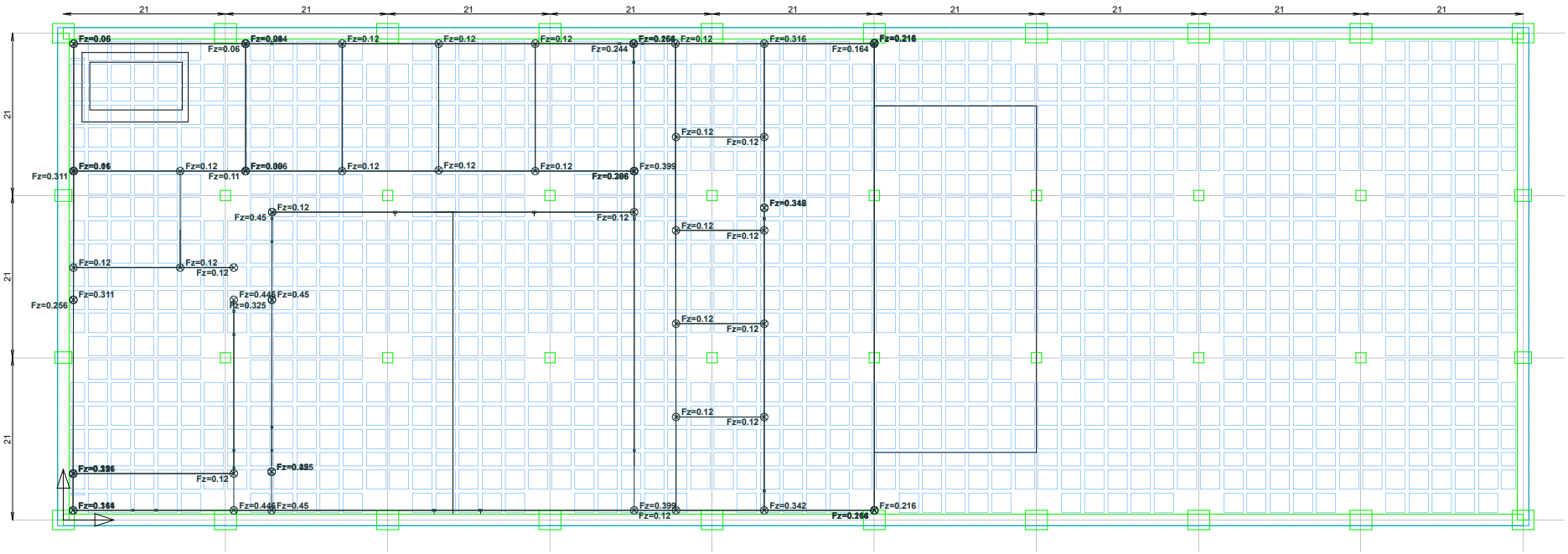
Scale = 1:250



Other Dead Loading: Area Loads Plan

Other Dead Loading: User Lines; User Notes; User Dimensions; Area Loads; Area Load Icons; Area Load Values;
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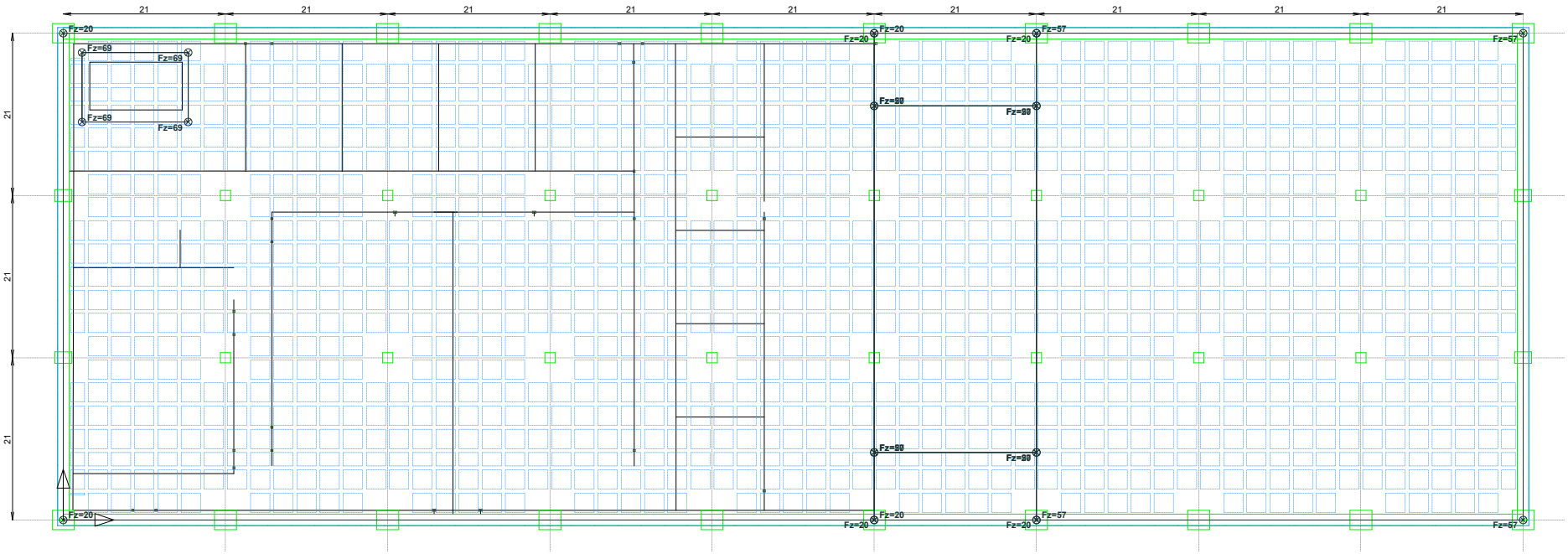
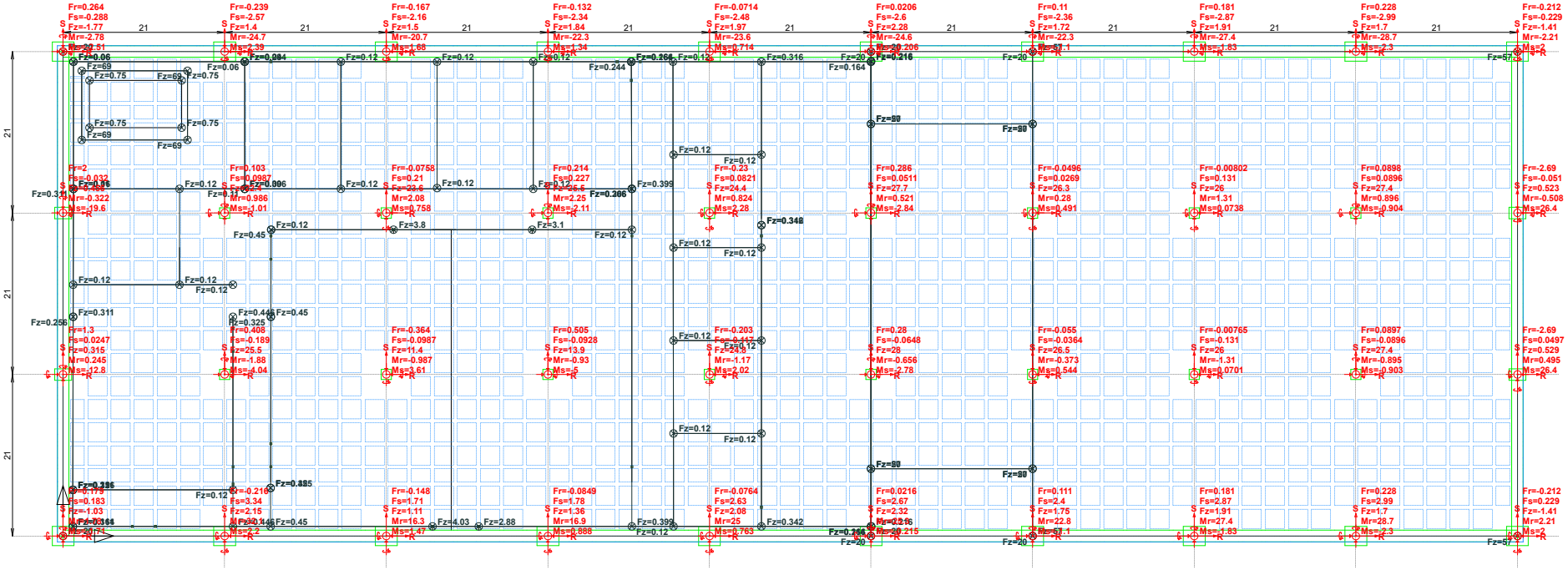
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



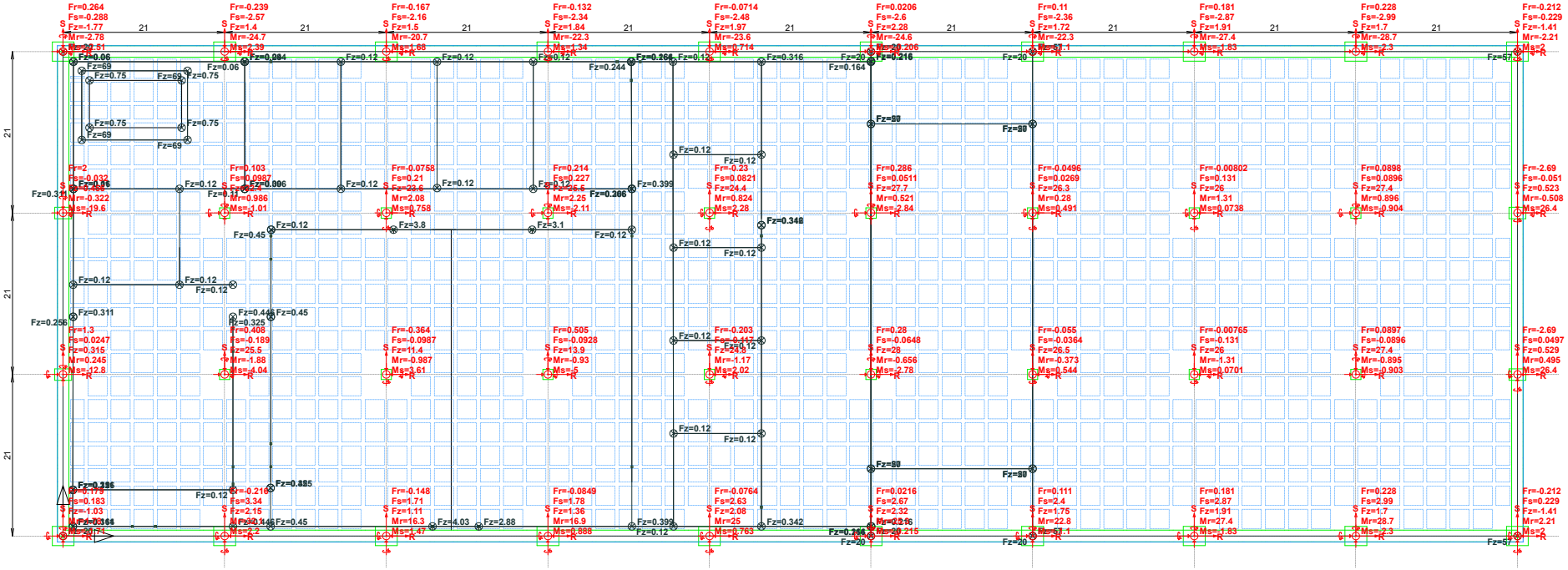
Other Dead Loading: Max Reactions Plan

Other Dead Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Values; Point Load Icons; Line Loads; Line Load Values; Line Load Icons; Area Loads; Area Load Values; Area Load Icons;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Other Dead Loading - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



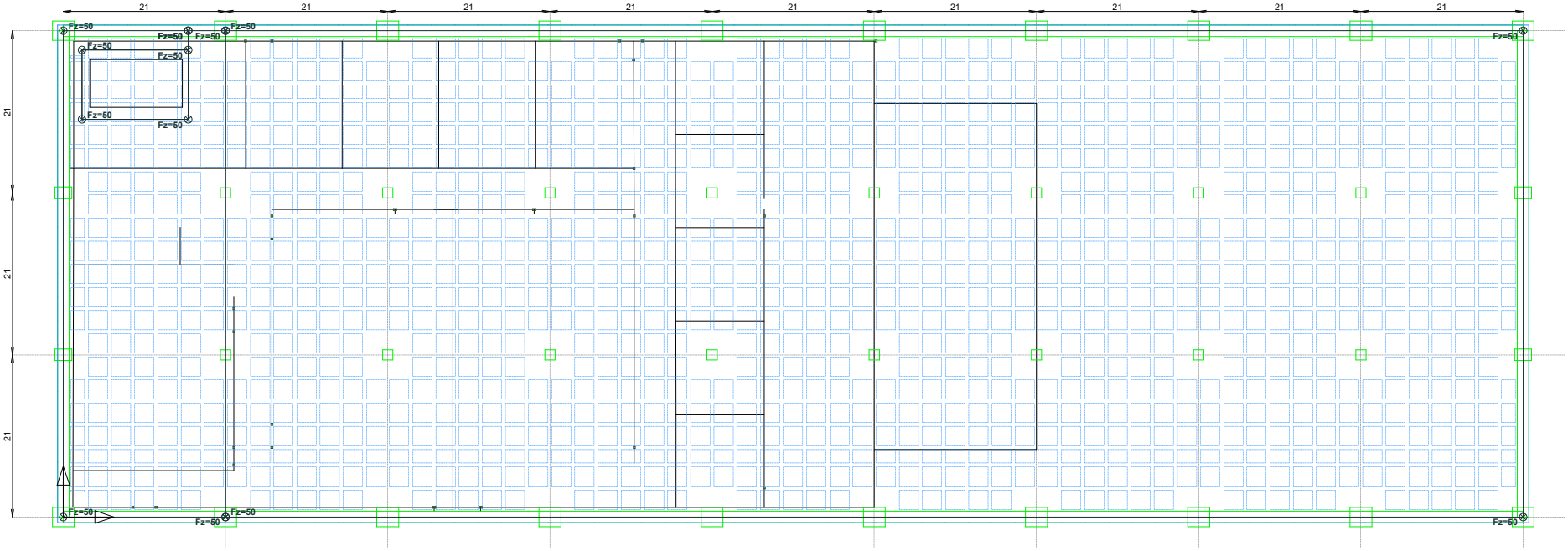
Other Dead Loading: Min Reactions Plan

Other Dead Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Values; Point Load Icons; Line Loads; Line Load Values; Line Load Icons; Area Loads; Area Load Values; Area Load Icons;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Other Dead Loading - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



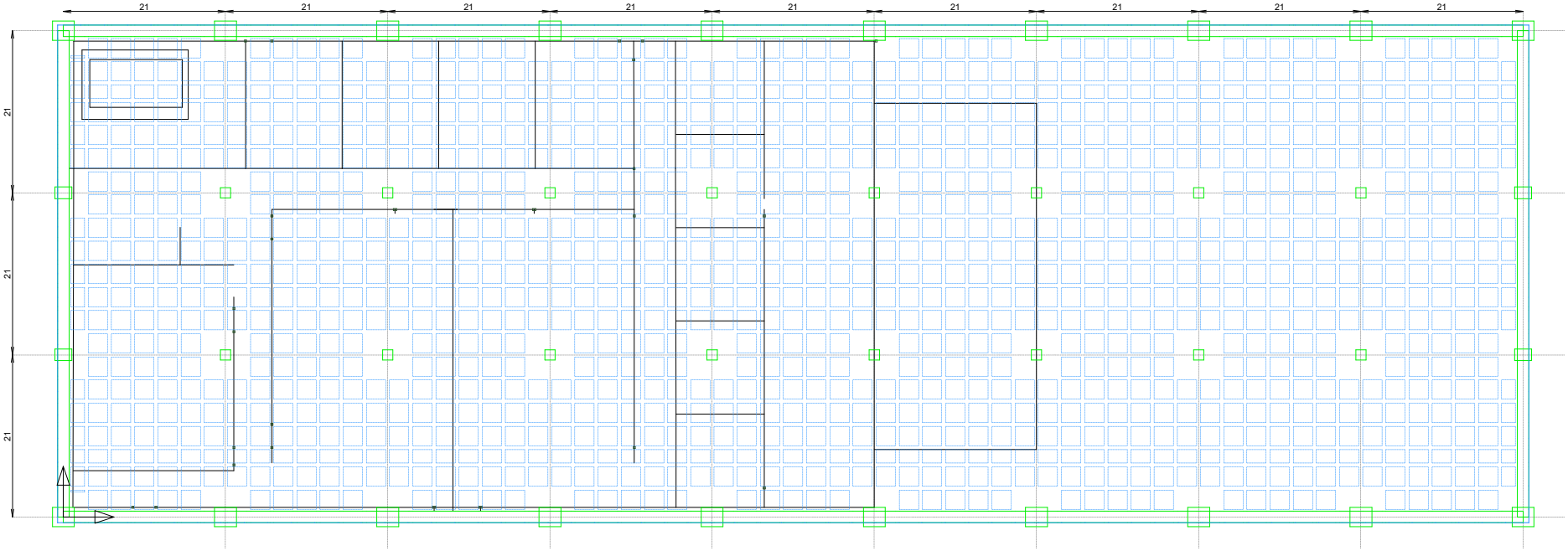
Live (Reducible) Loading: All Loads Plan

Live (Reducible) Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values; Line Loads; Line Load Icons; Line Load Values; Area Loads; Area Load Icons; Area Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



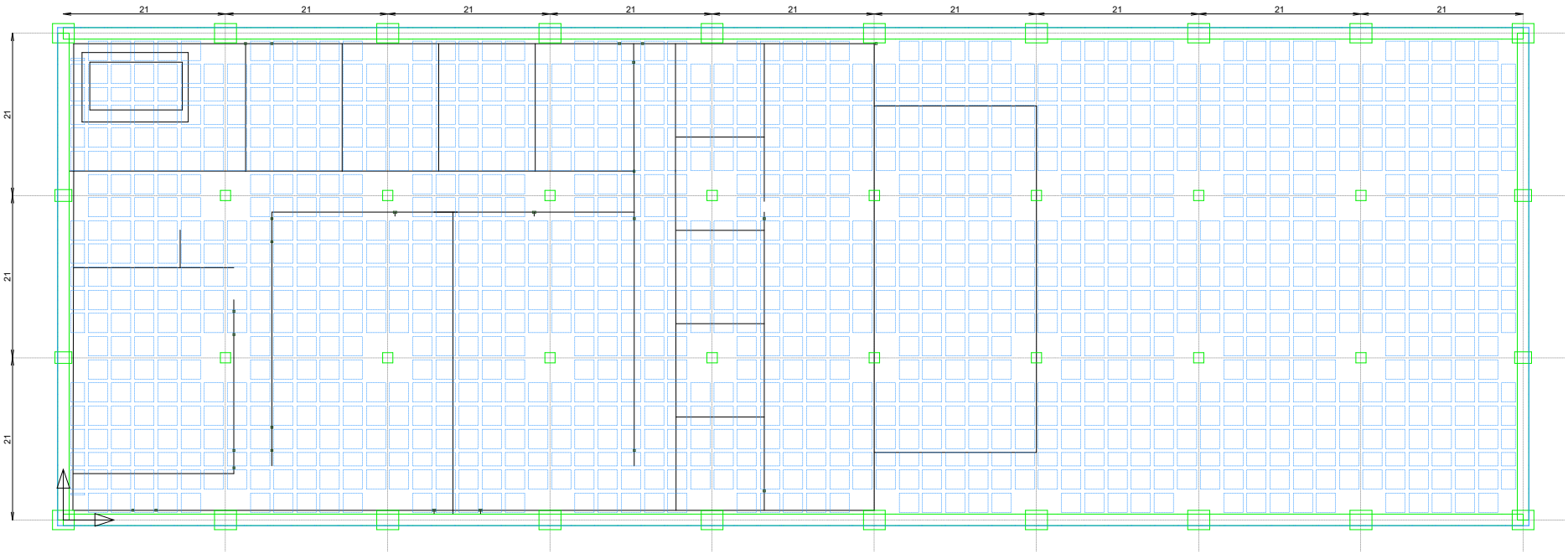
Live (Reducible) Loading: Point Loads Plan

Live (Reducible) Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



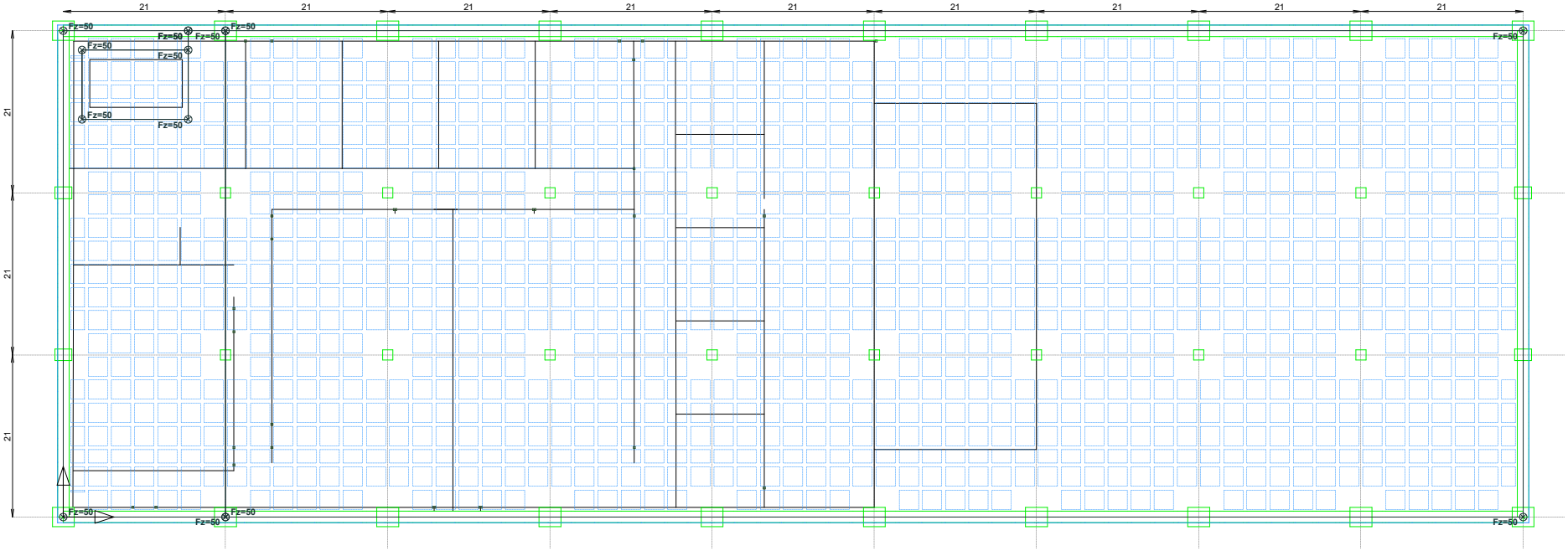
Live (Reducible) Loading: Line Loads Plan

Live (Reducible) Loading: User Lines; User Notes; User Dimensions; Line Loads; Line Load Icons; Line Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



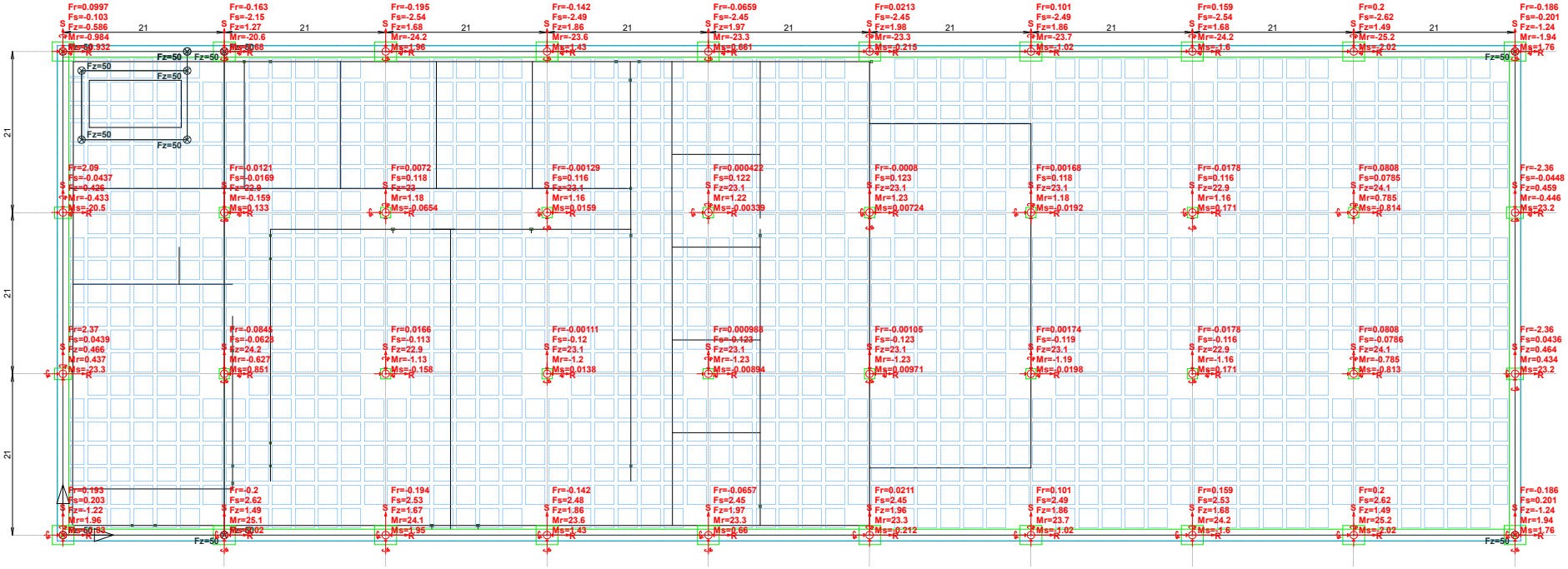
Live (Reducible) Loading: Area Loads Plan

Live (Reducible) Loading: User Lines; User Notes; User Dimensions; Area Loads; Area Load Icons; Area Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



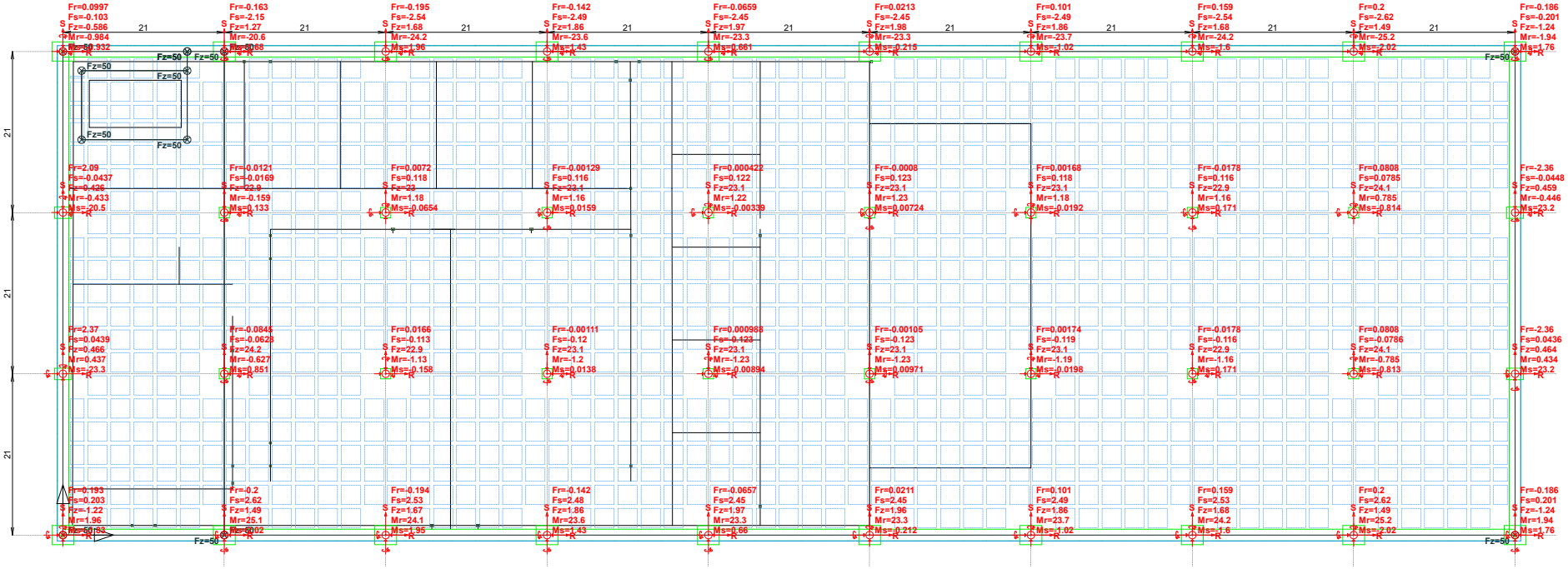
Live (Reducible) Loading: Max Reactions Plan

Live (Reducible) Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Values; Point Load Icons; Line Loads; Line Load Values; Line Load Icons; Area Loads; Area Load Values; Area Load Icons;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Live (Reducible) Loading - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



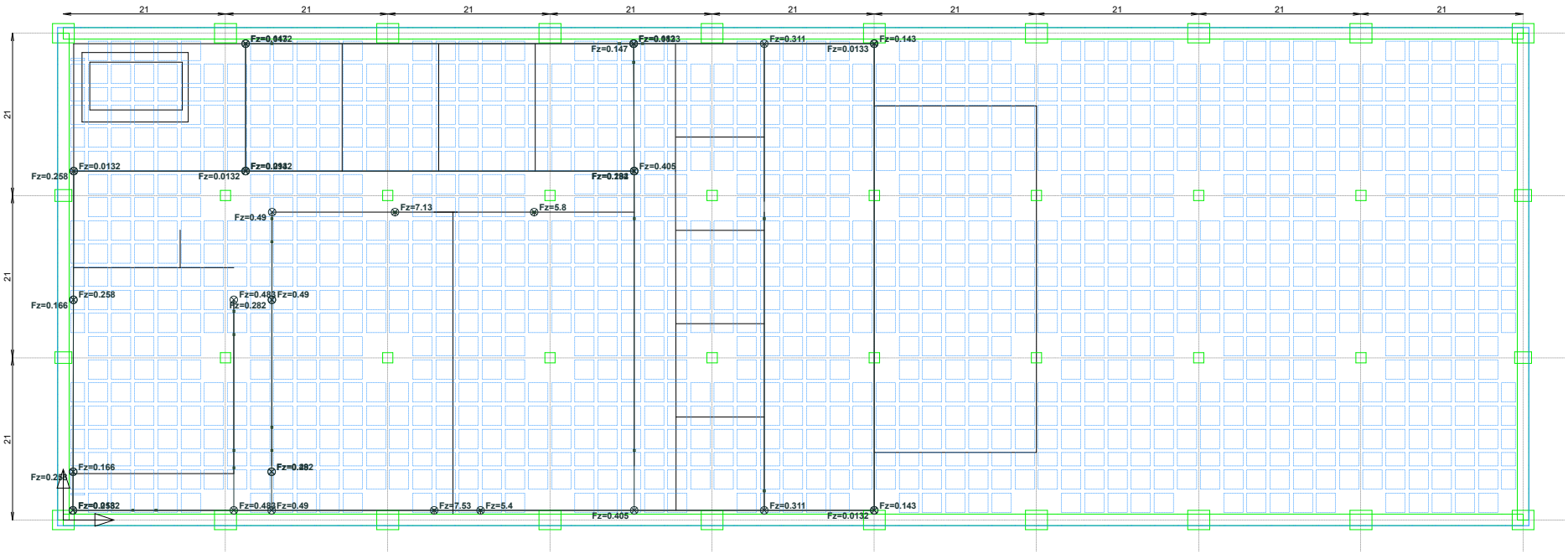
Live (Reducible) Loading: Min Reactions Plan

Live (Reducible) Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Values; Point Load Icons; Line Loads; Line Load Values; Line Load Icons; Area Loads; Area Load Values; Area Load Icons;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Live (Reducible) Loading - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



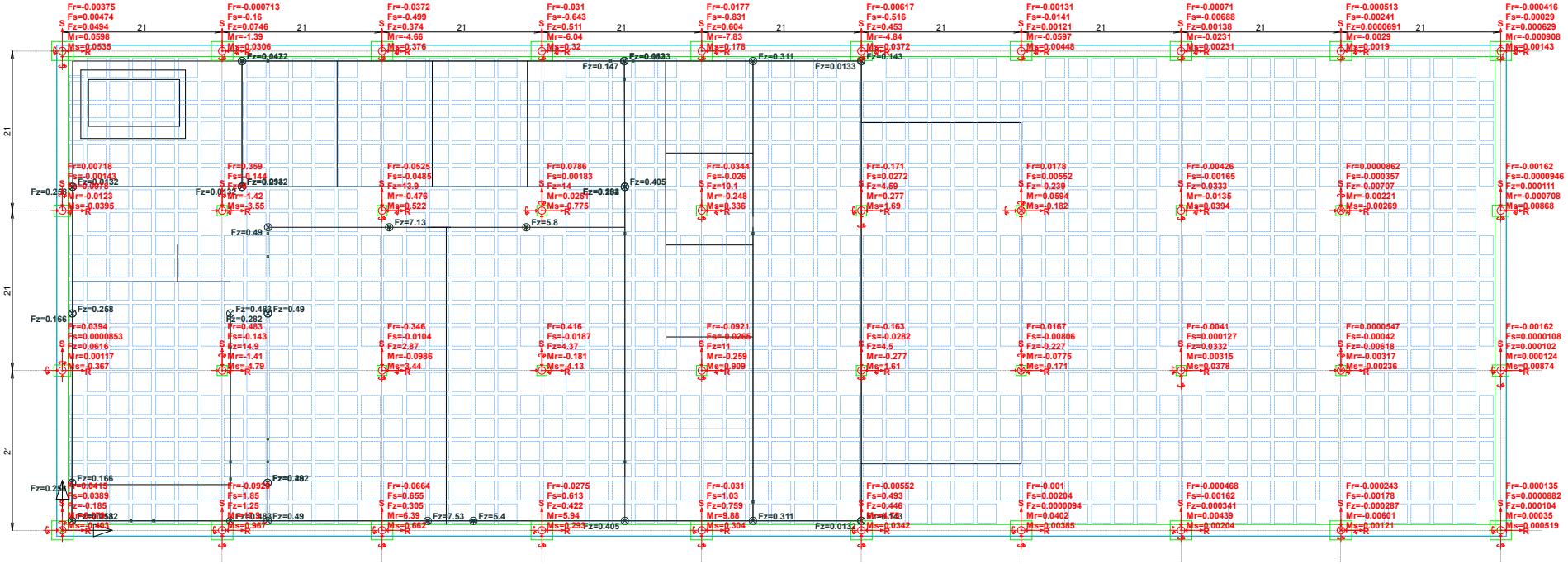
Live (Roof) Loading: All Loads Plan

Live (Roof) Loading: Point Loads; Point Load Icons; Point Load Values; Line Loads; Line Load Icons; Line Load Values; Area Loads; Area Load Icons; Area Load Values; User Notes; User Lines; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



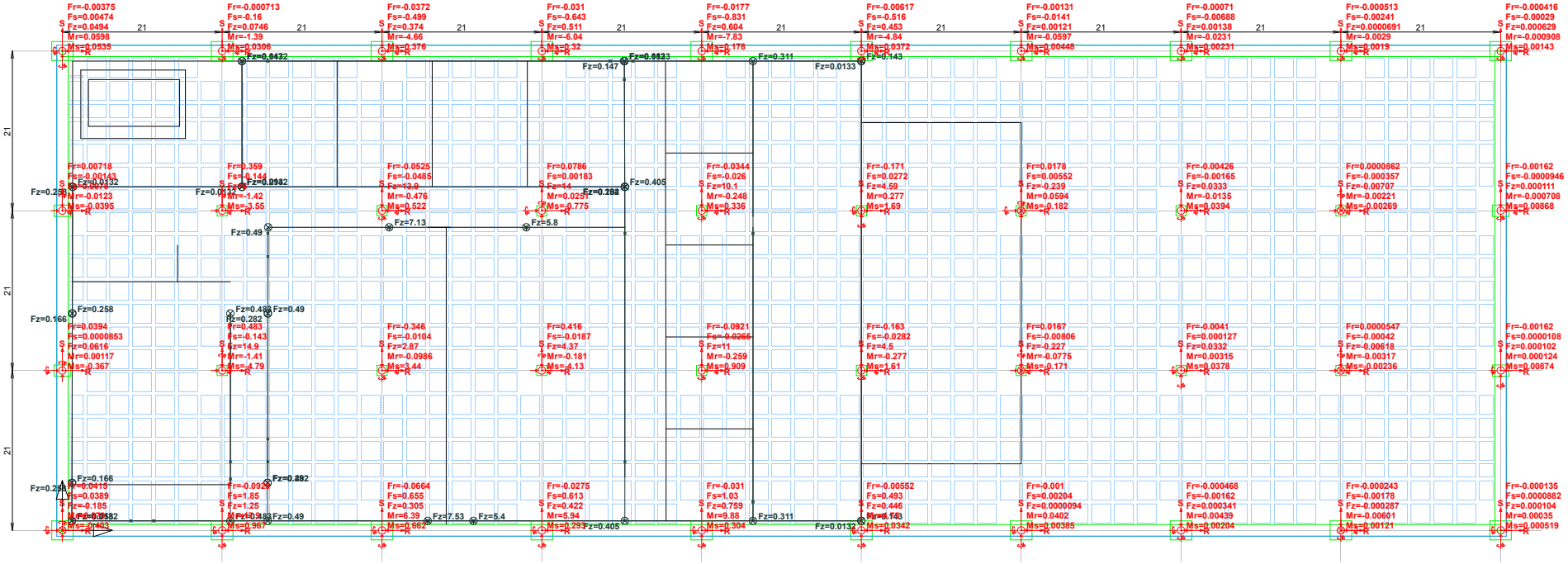
Live (Roof) Loading: Max Reactions Plan

Live (Roof) Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Values; Point Load Icons; Line Loads; Line Load Values; Line Load Icons; Area Loads; Area Load Values; Area Load Icons;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Live (Roof) Loading - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



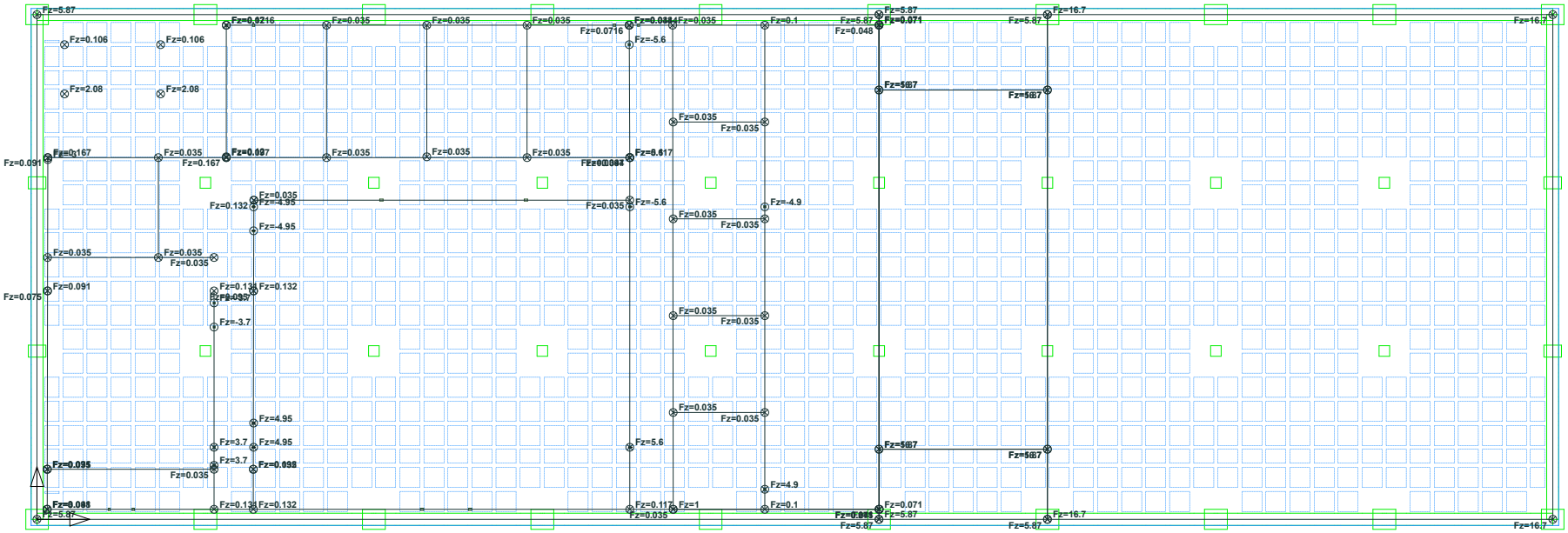
Live (Roof) Loading: Min Reactions Plan

Live (Roof) Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Values; Point Load Icons; Line Loads; Line Load Values; Line Load Icons; Area Loads; Area Load Values; Area Load Icons;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Live (Roof) Loading - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



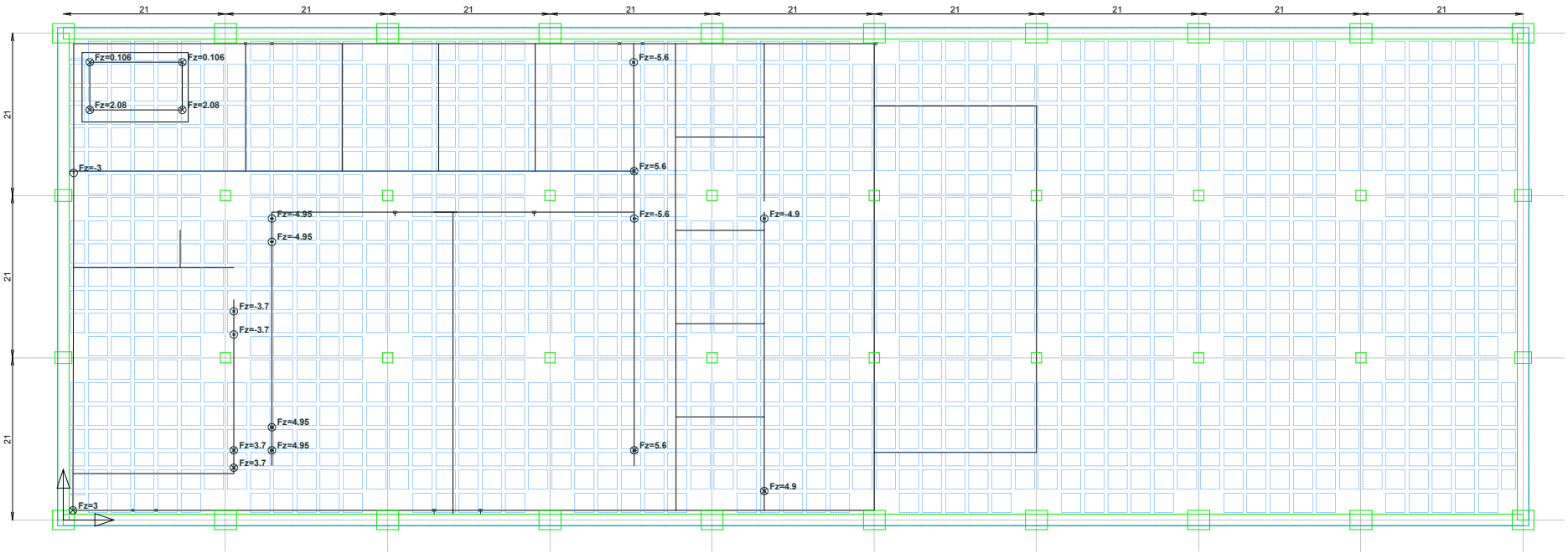
Seismic Y (negative) loading: All Loads Plan

Seismic Y (negative) loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values; Line Loads; Line Load Icons; Line Load Values; Area Loads; Area Load Icons; Area Load Values; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



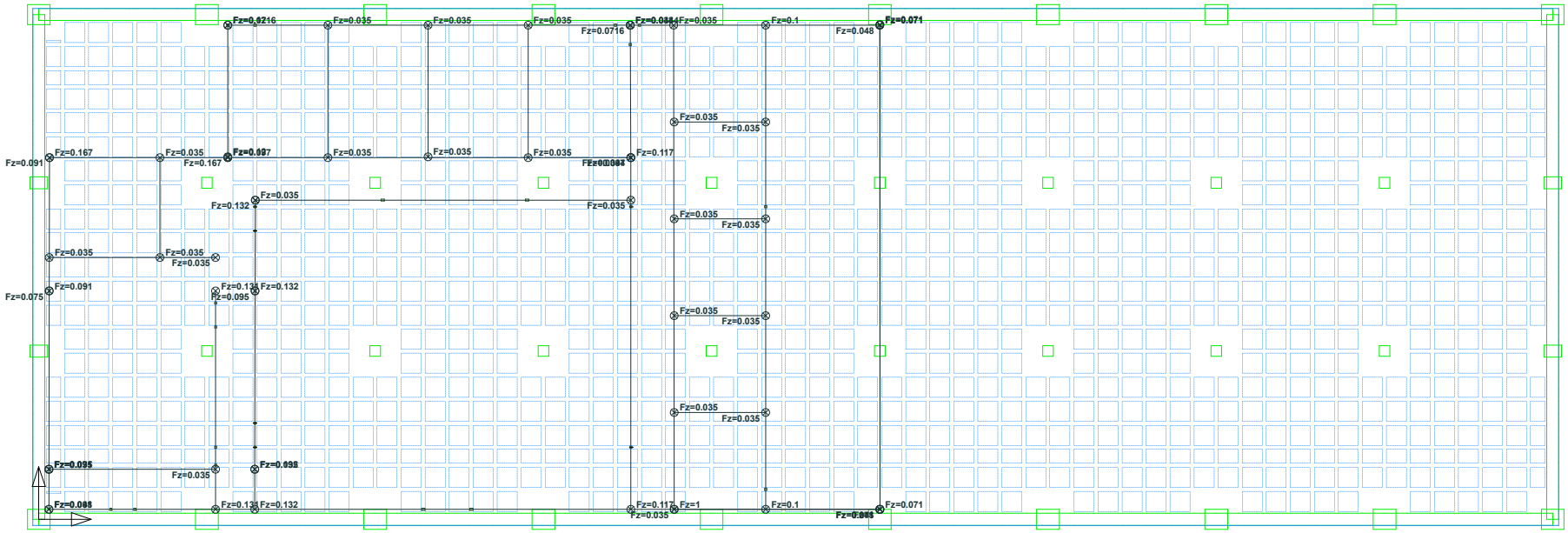
Seismic Y (negative) loading: Point Loads Plan

Seismic Y (negative) loading: Point Loads; Point Load Icons; Point Load Values; User Notes; User Lines; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



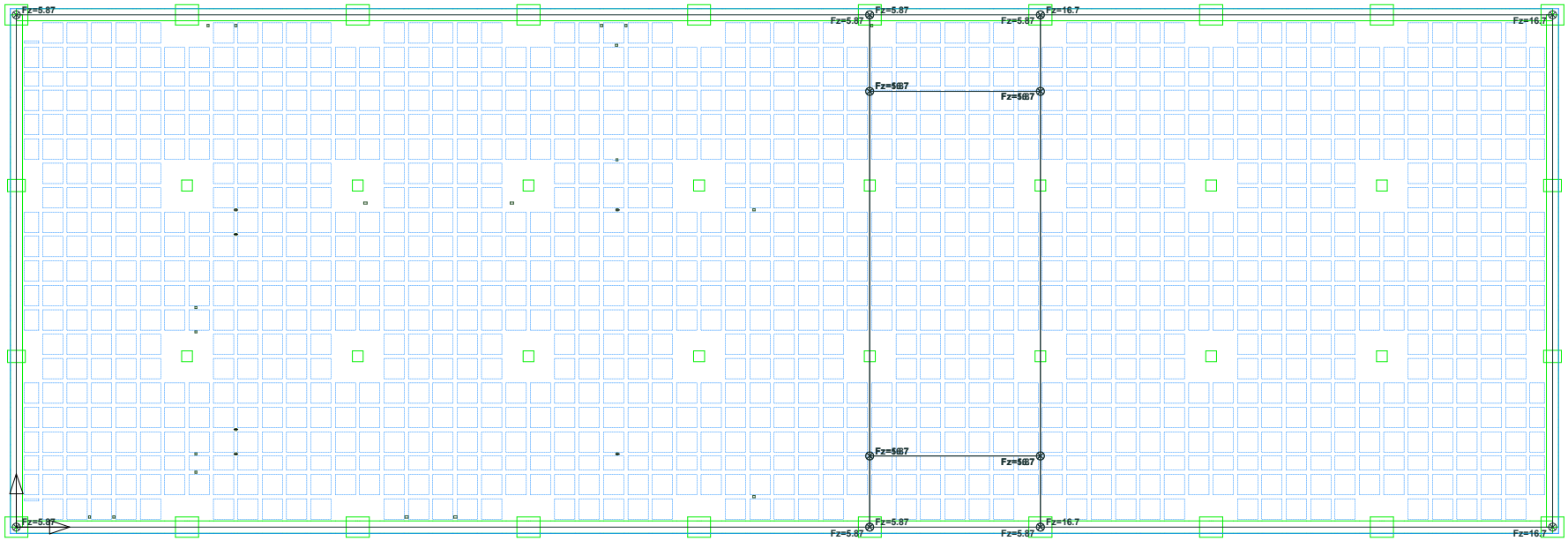
Seismic Y (negative) loading: Line Loads Plan

Seismic Y (negative) loading: User Lines; User Notes; User Dimensions; Line Loads; Line Load Icons; Line Load Values;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



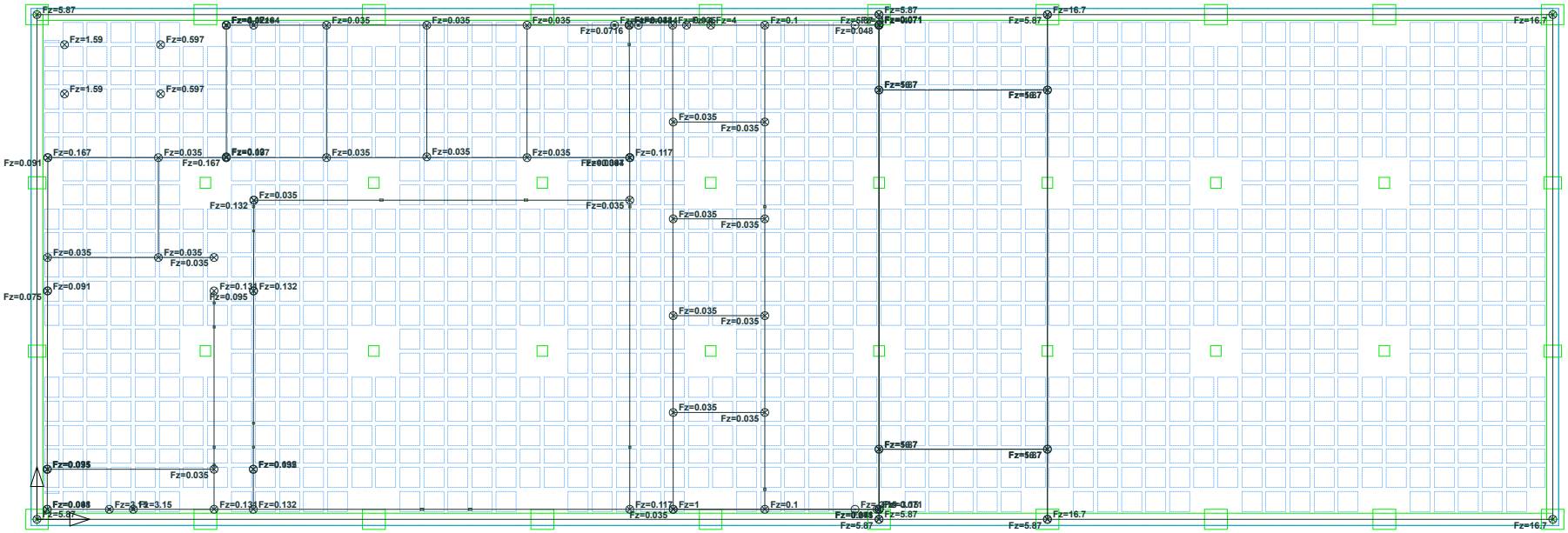
Seismic Y (negative) loading: Area Loads Plan

Seismic Y (negative) loading: User Lines; User Notes; User Dimensions; Area Loads; Area Load Icons; Area Load Values;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



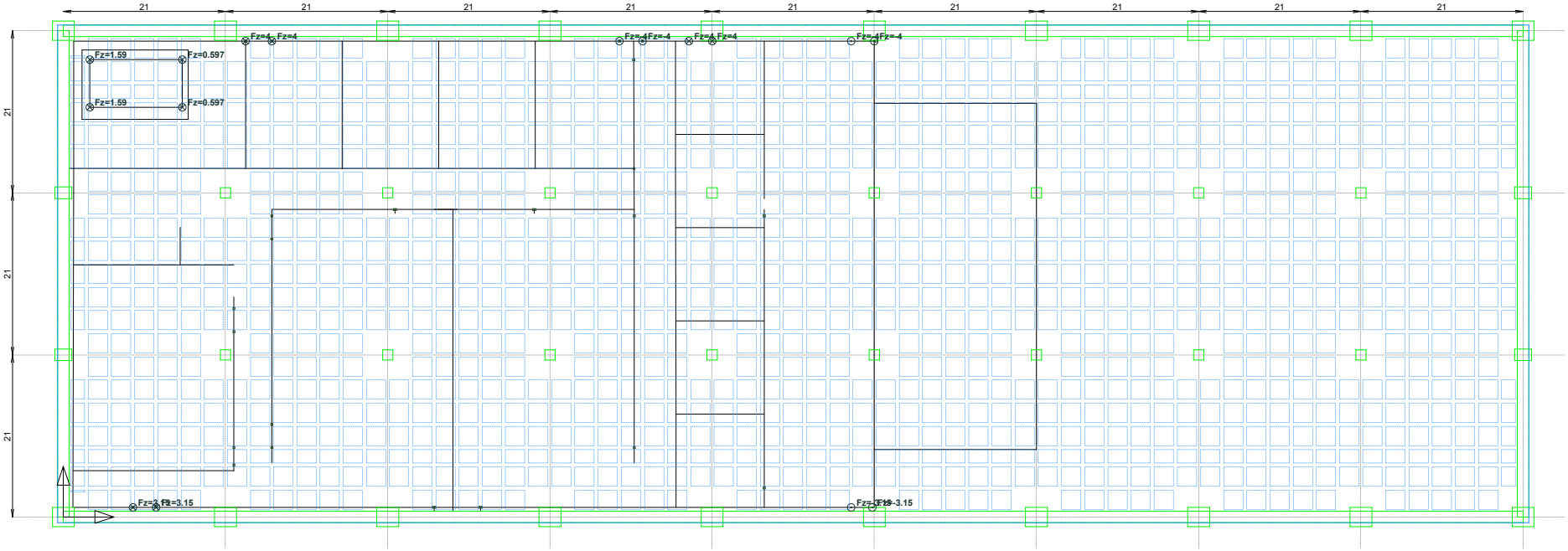
Seismic X (negative) loading: All Loads Plan

Seismic X (negative) loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values; Line Loads; Line Load Icons; Line Load Values; Area Loads; Area Load Icons; Area Load Values; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



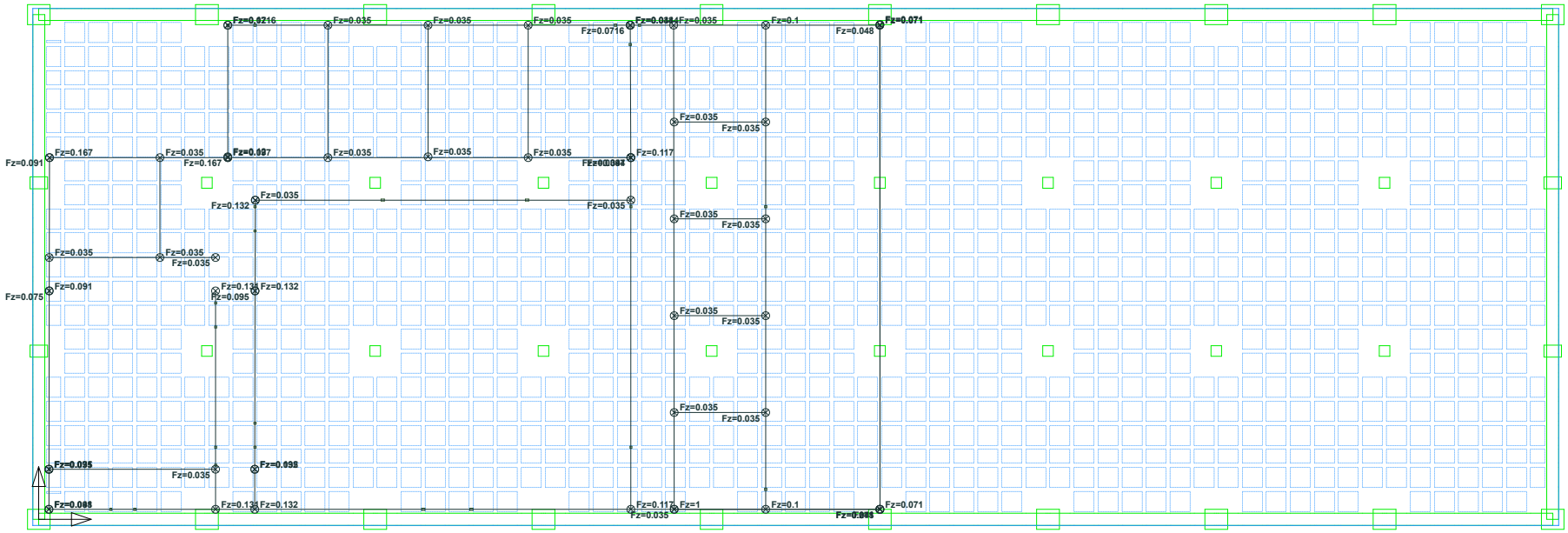
Seismic X (negative) loading: Point Loads Plan

Seismic X (negative) loading: Point Loads; Point Load Icons; Point Load Values; User Notes; User Lines; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



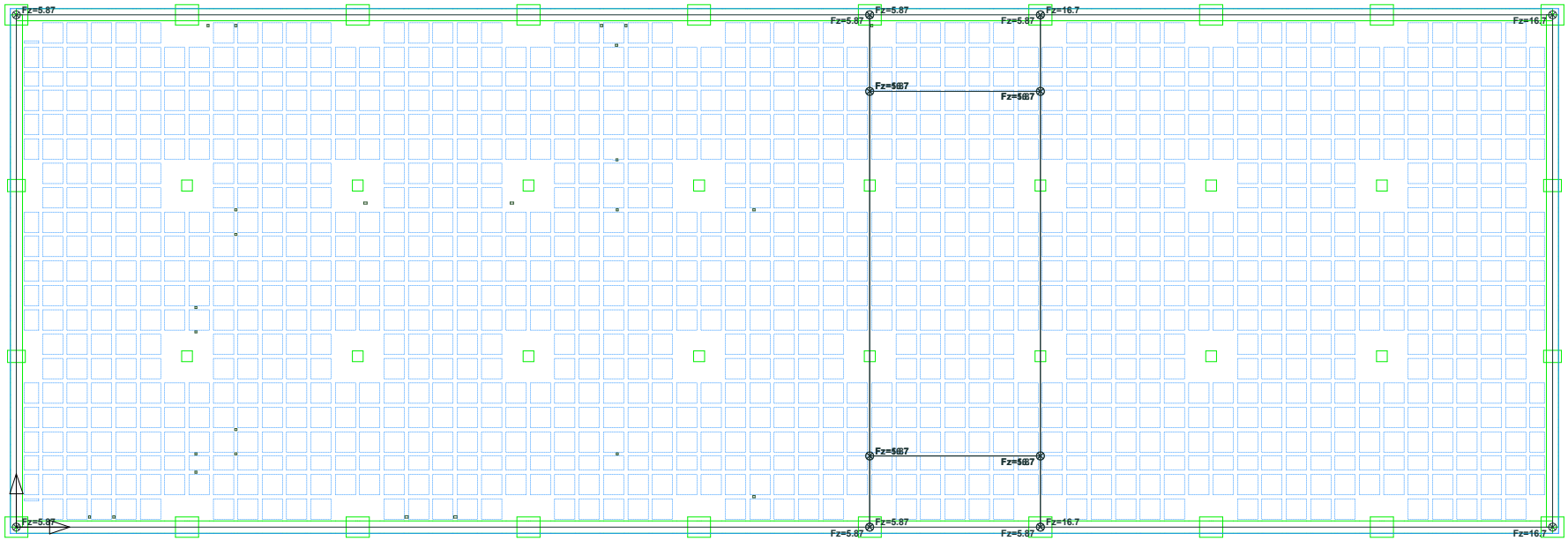
Seismic X (negative) loading: Line Loads Plan

Seismic X (negative) loading: User Lines; User Notes; User Dimensions; Line Loads; Line Load Icons; Line Load Values;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



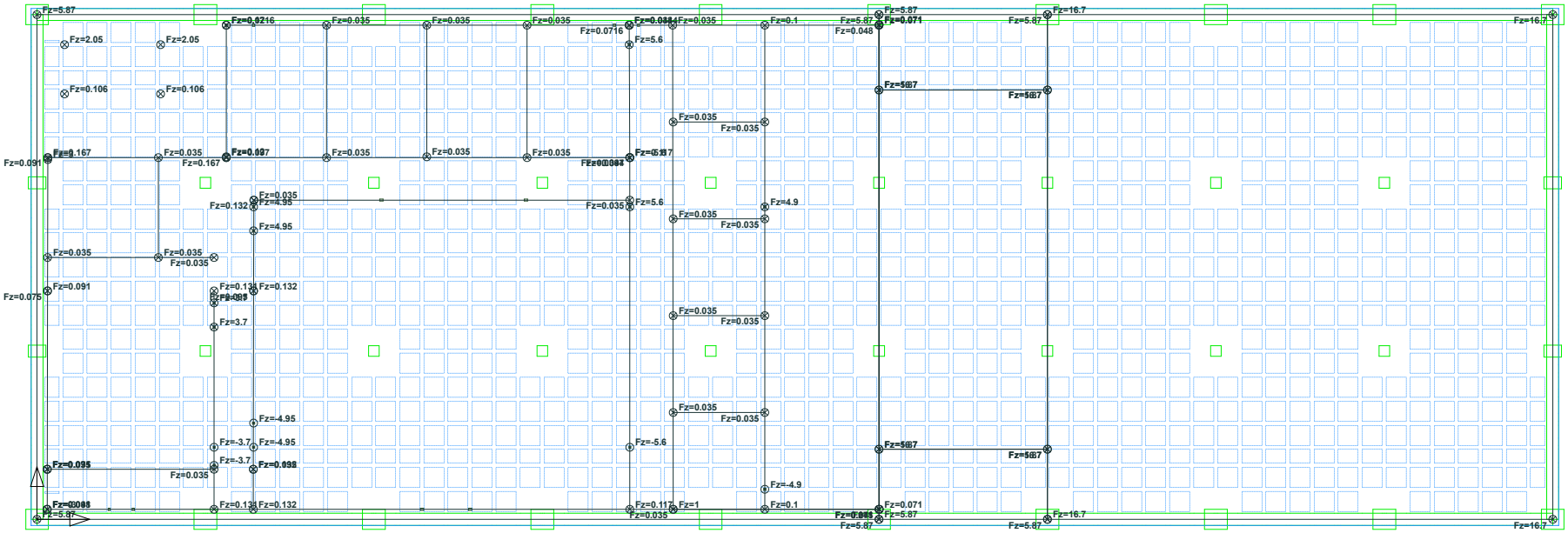
Seismic X (negative) loading: Area Loads Plan

Seismic X (negative) loading: User Lines; User Notes; User Dimensions; Area Loads; Area Load Icons; Area Load Values;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



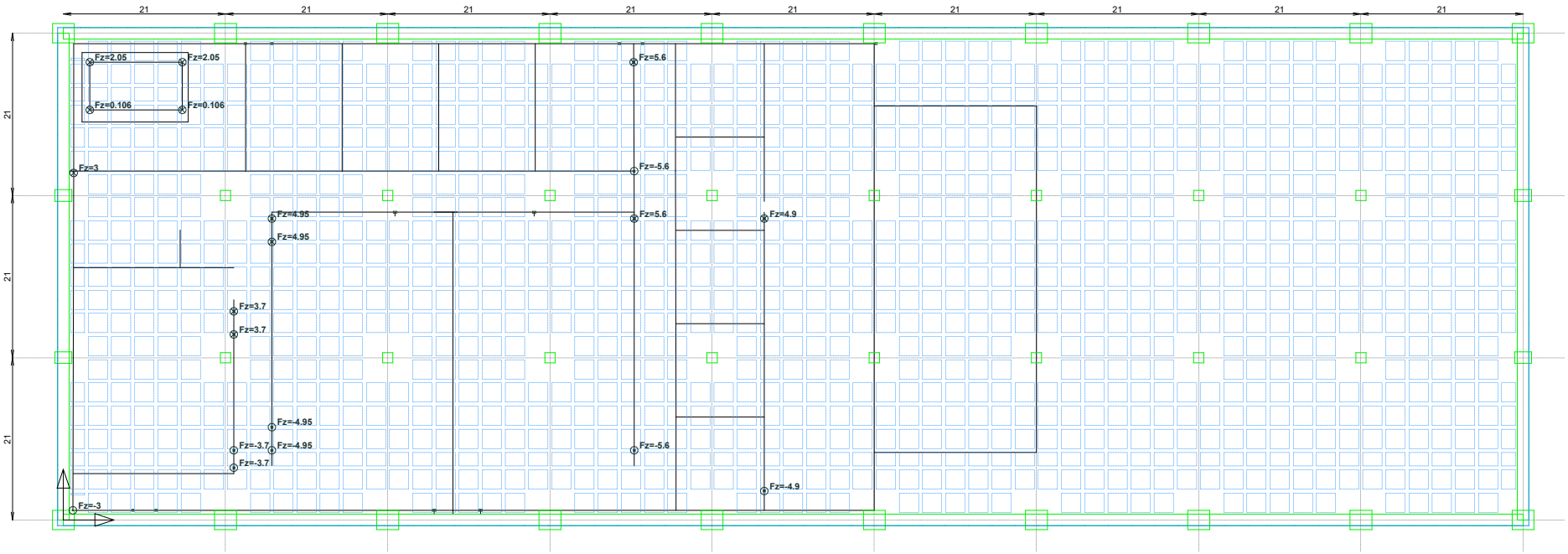
Seismic Y (positive) Loading: All Loads Plan

Seismic Y (positive) Loading: User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values; Line Loads; Line Load Icons; Line Load Values; Area Loads; Area Load Icons; Area Load Values; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



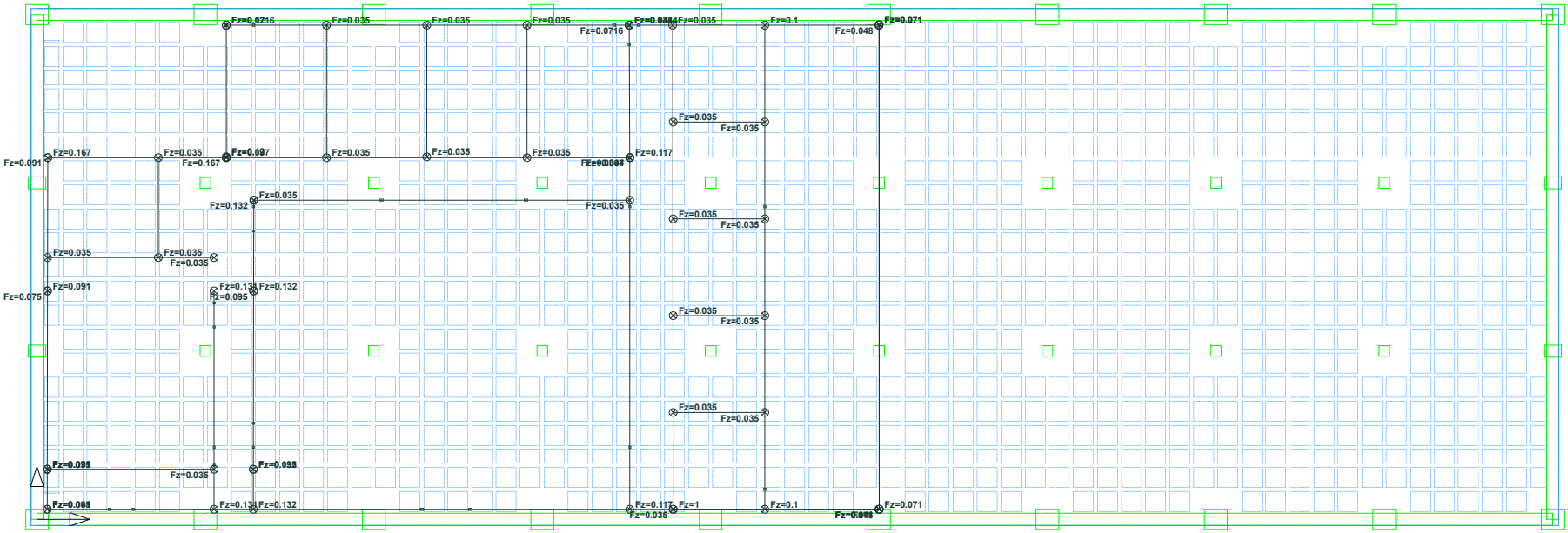
Seismic Y (positive) Loading: Point Loads Plan

Seismic Y (positive) Loading: Point Loads; Point Load Icons; Point Load Values; User Notes; User Lines; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



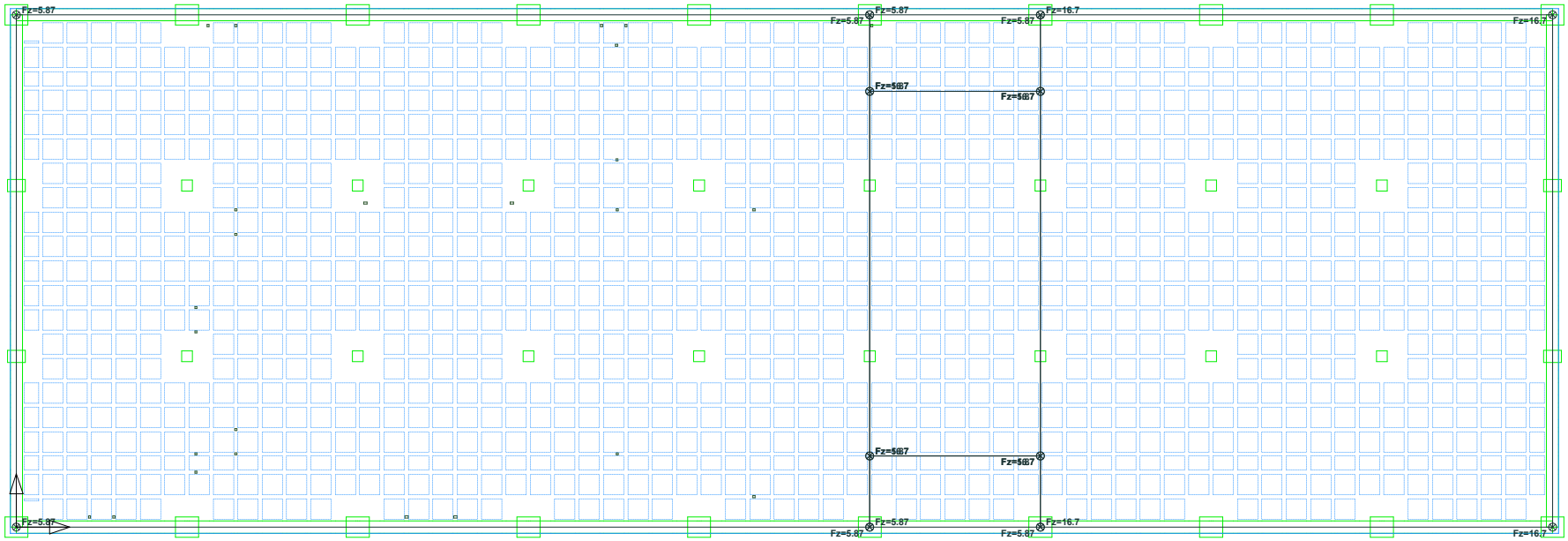
Seismic Y (positive) Loading: Line Loads Plan

Seismic Y (positive) Loading: User Lines; User Notes; User Dimensions; Line Loads; Line Load Icons; Line Load Values;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



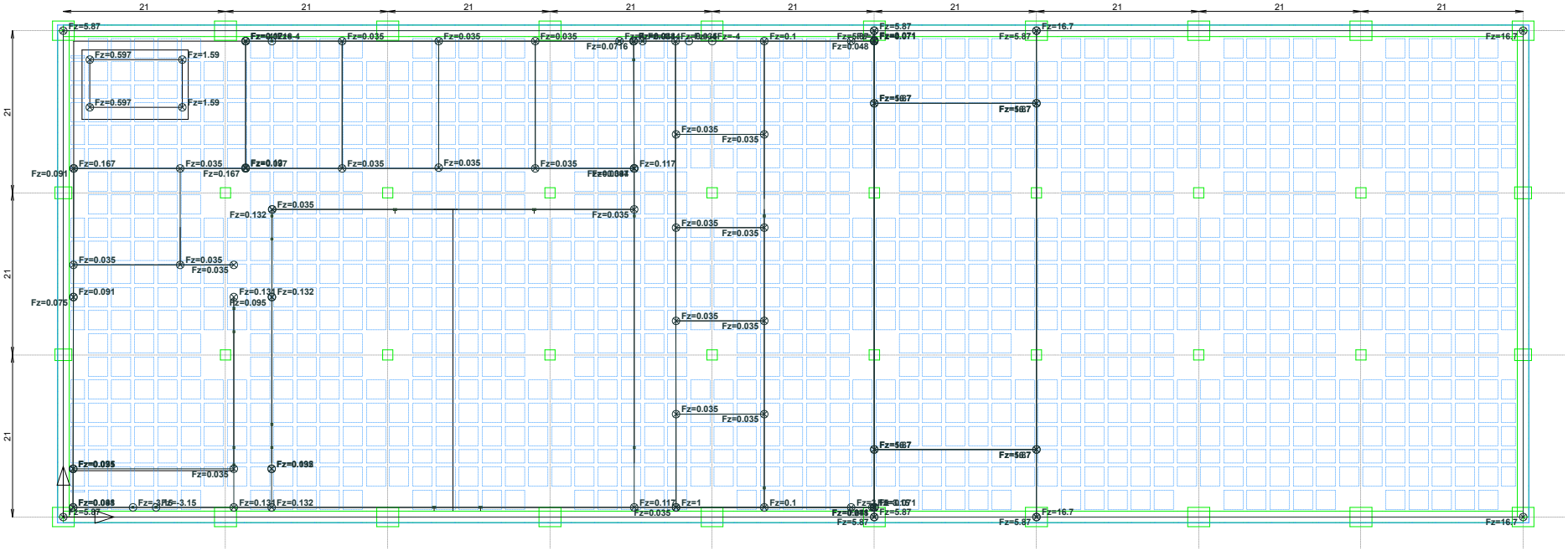
Seismic Y (positive) Loading: Area Loads Plan

Seismic Y (positive) Loading: User Lines; User Notes; User Dimensions; Area Loads; Area Load Icons; Area Load Values;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



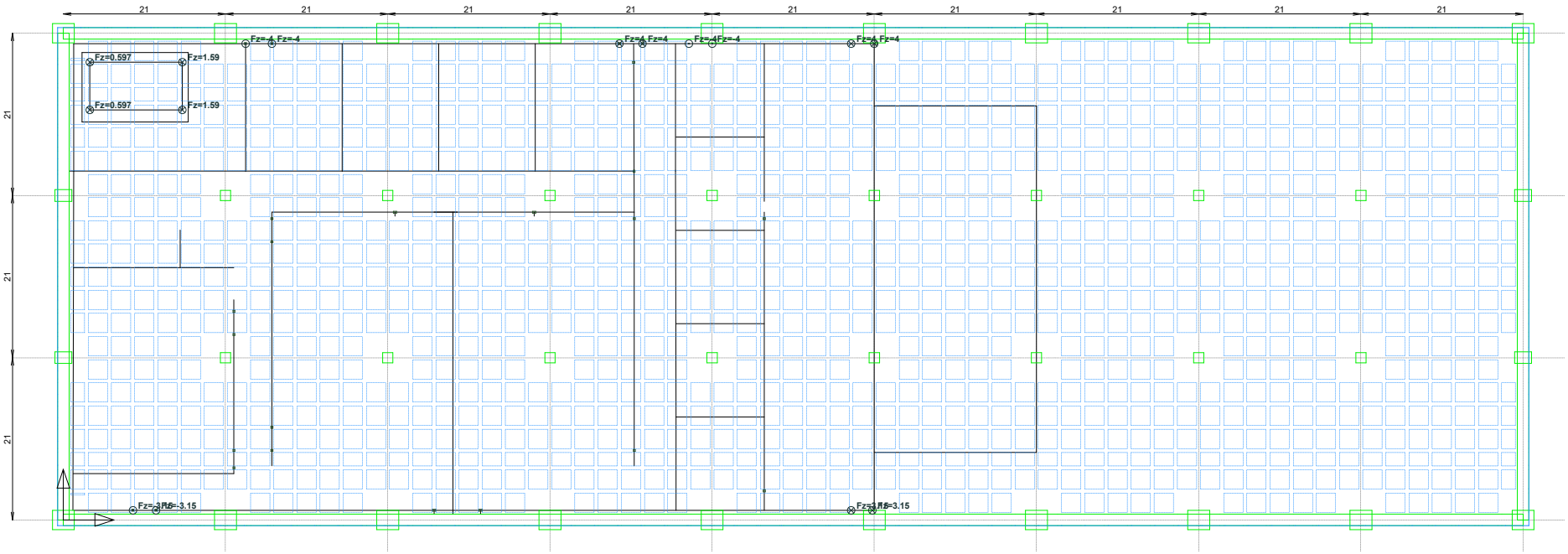
Seismic X (positive) Loading : All Loads Plan

Seismic X (positive) Loading : User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values; Line Loads; Line Load Icons; Line Load Values; Area Loads; Area Load Icons; Area Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



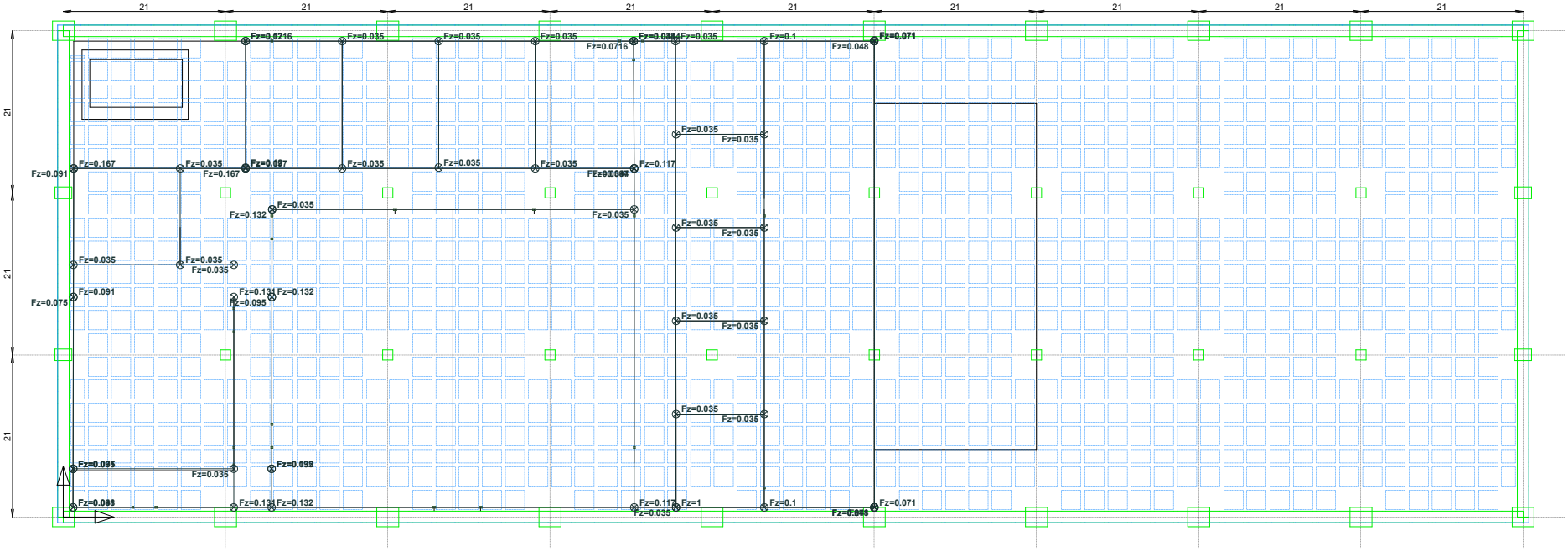
Seismic X (positive) Loading : Point Loads Plan

Seismic X (positive) Loading : User Lines; User Notes; User Dimensions; Point Loads; Point Load Icons; Point Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



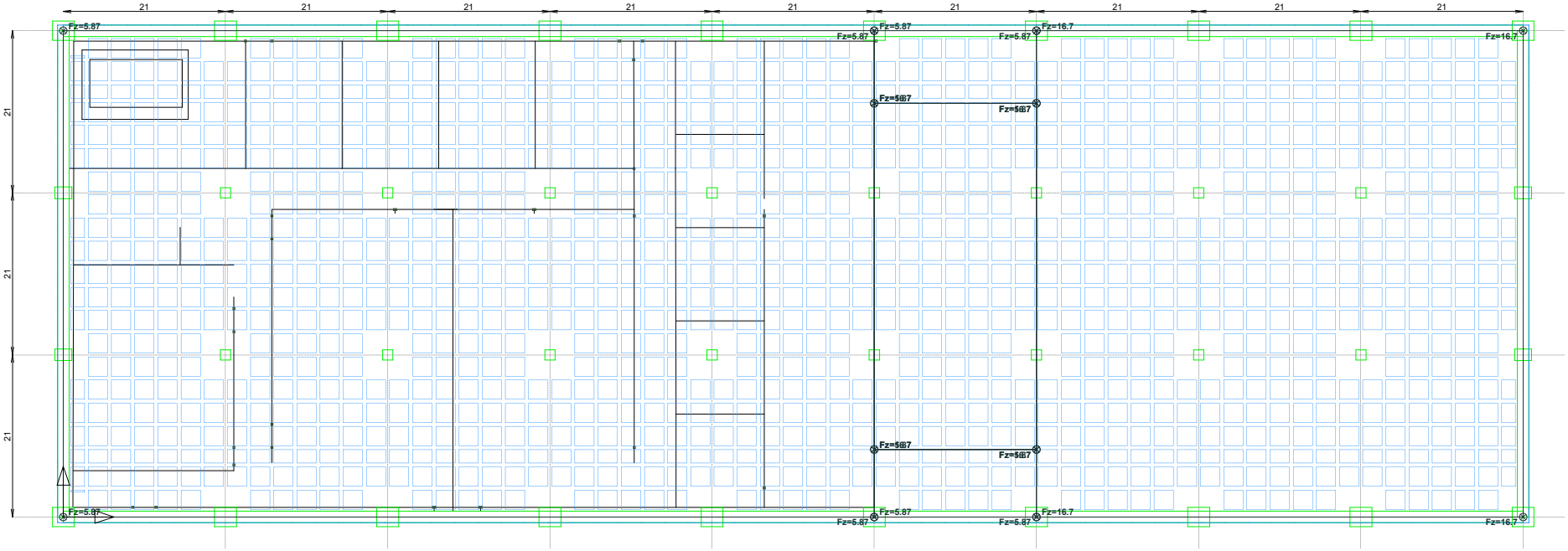
Seismic X (positive) Loading : Line Loads Plan

Seismic X (positive) Loading : Line Loads; Line Load Icons; Line Load Values; User Notes; User Lines; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Line Supports; Slab Elements; Slab Element Outline Only;
Scale = 1:250



Seismic X (positive) Loading : Area Loads Plan

Seismic X (positive) Loading : User Lines; User Notes; User Dimensions; Area Loads; Area Load Icons; Area Load Values;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250

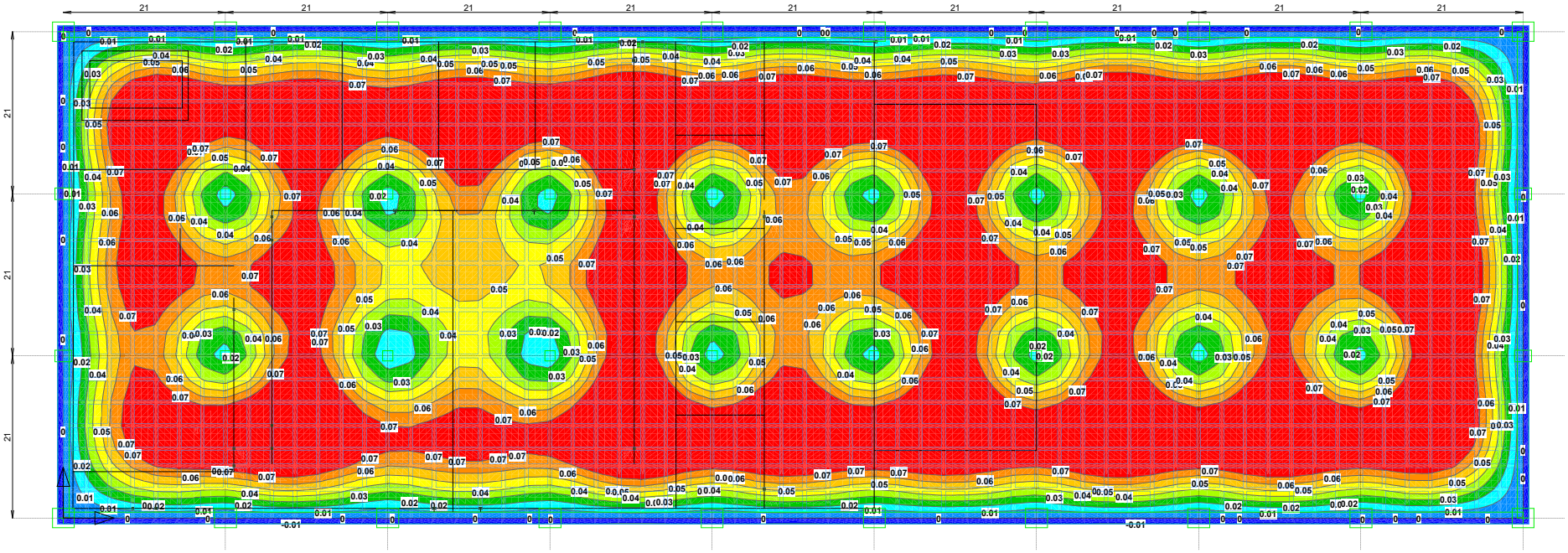


All Dead LC: Max Deflection Plan

All Dead LC: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
All Dead LC - Vertical Deflection Plot (Maximum Values)

-0.01 0 0.01 0.02 0.03 0.04 0.05 0.06 0.07

Min Value = -0.01092 inches @ (74.85,-0.75) Max Value = 0.1113 inches @ (74.75,11.75)

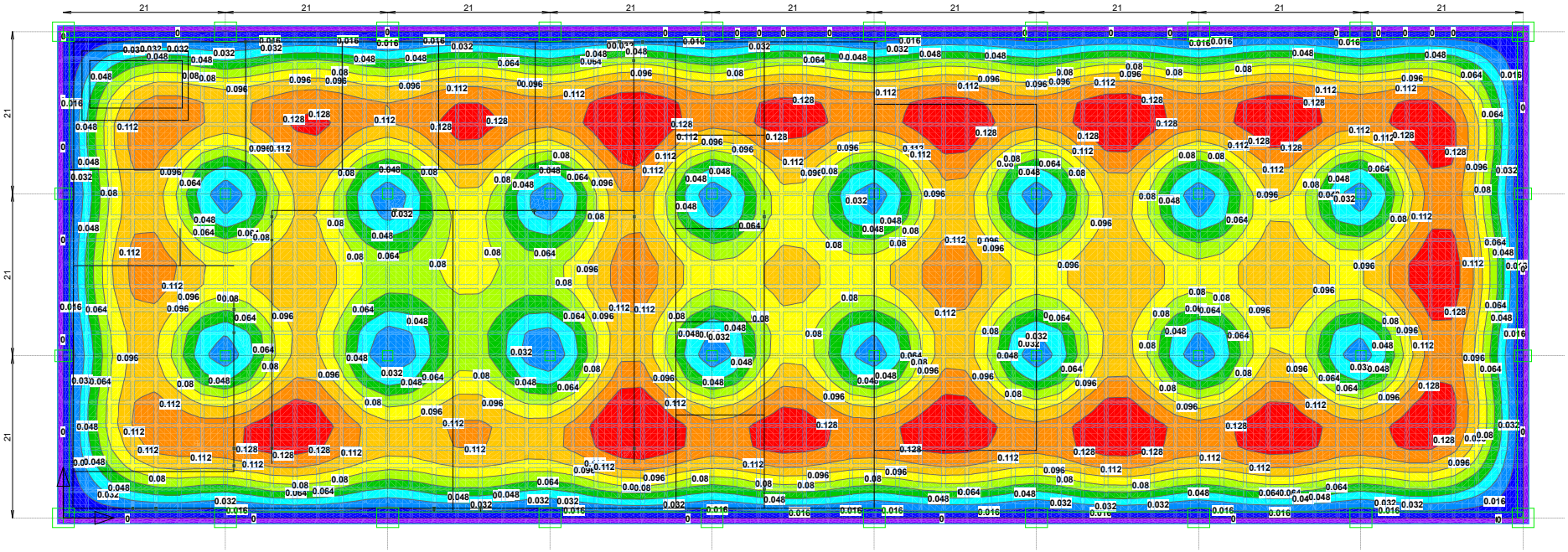


Service LC: D + L: Max Deflection Plan

Service LC: D + L: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + L - Vertical Deflection Plot (Maximum Values)

0 0.016 0.032 0.048 0.064 0.08 0.096 0.112 0.128

Min Value = -0.01092 inches @ (74.85,-0.75) Max Value = 0.1488 inches @ (74.75,11.75)

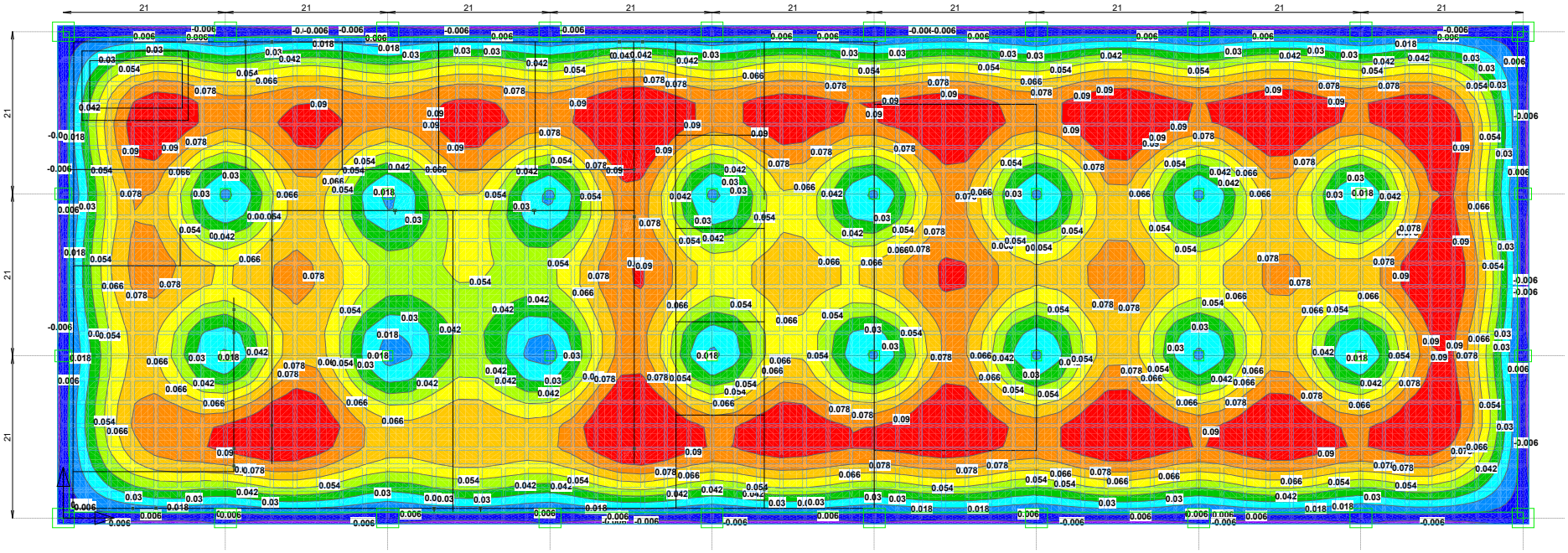


Service LC: D + L: Min Deflection Plan

Service LC: D + L: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + L - Vertical Deflection Plot (Minimum Values)

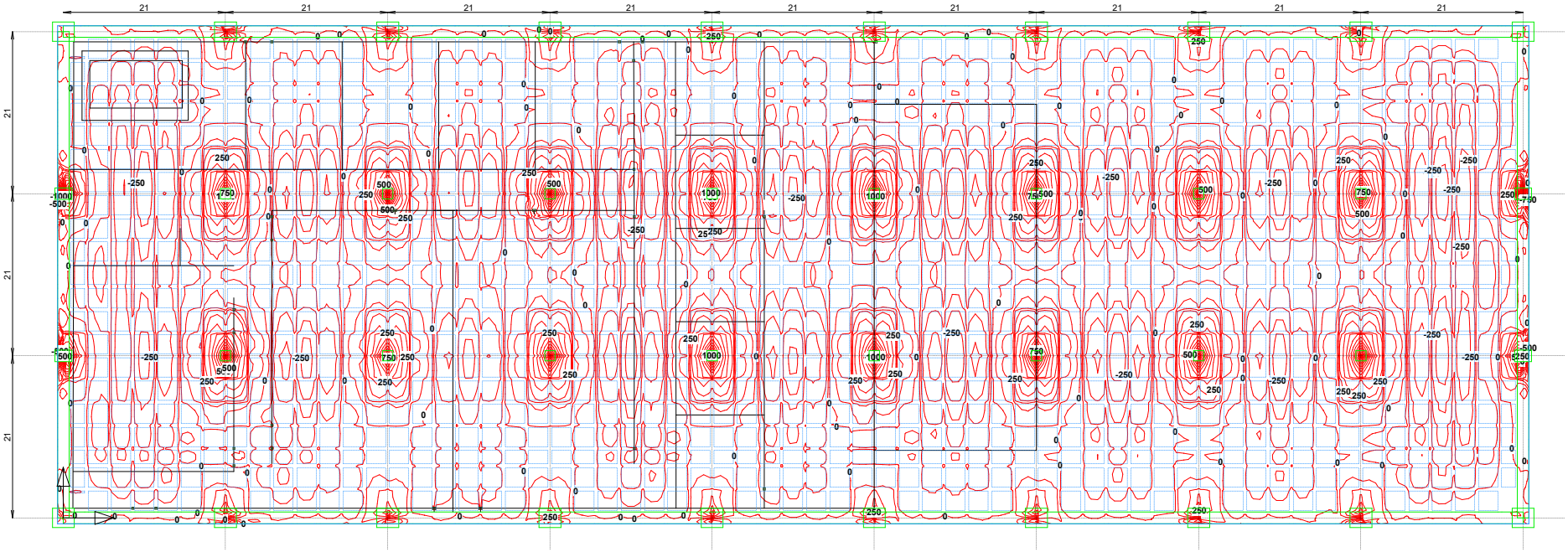
-0.006 0.006 0.018 0.03 0.042 0.054 0.066 0.078 0.09

Min Value = -0.01472 inches @ (74.85,-0.75) Max Value = 0.1113 inches @ (74.75,11.75)



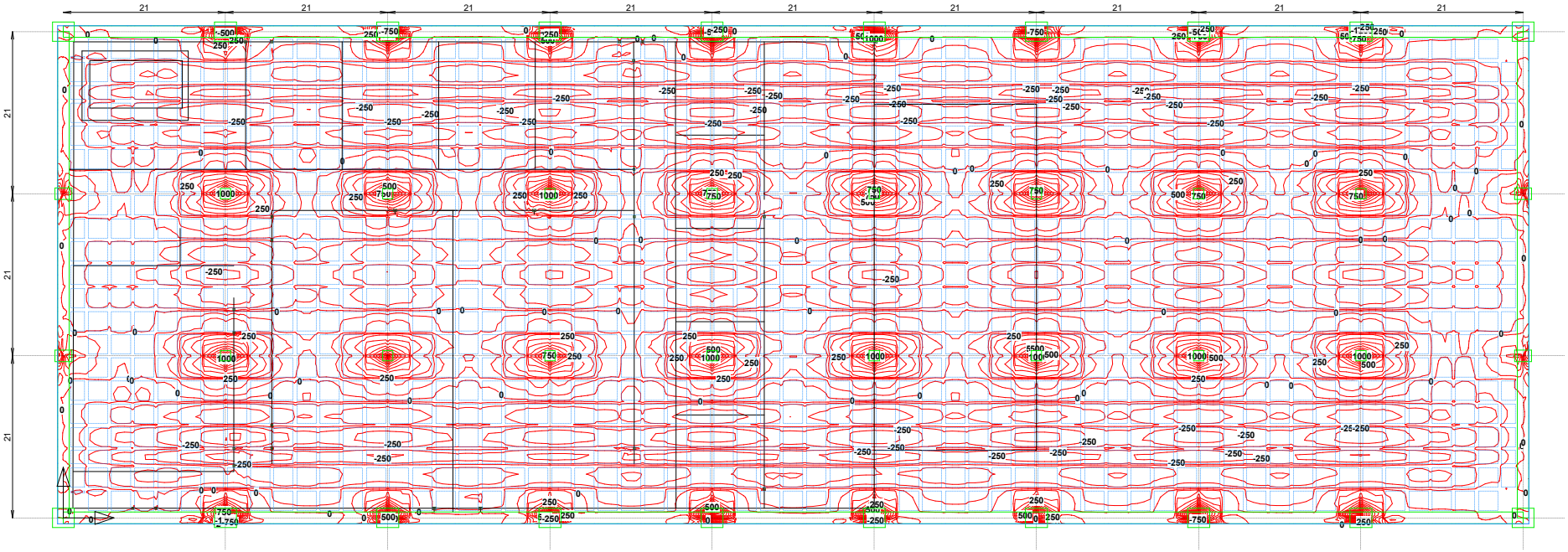
Service LC: D + L: Top X Stress Plan

Service LC: D + L: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + L - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1318 psi @ (189.4,21.55) Max Value = 1213 psi @ (168.1,42.13)



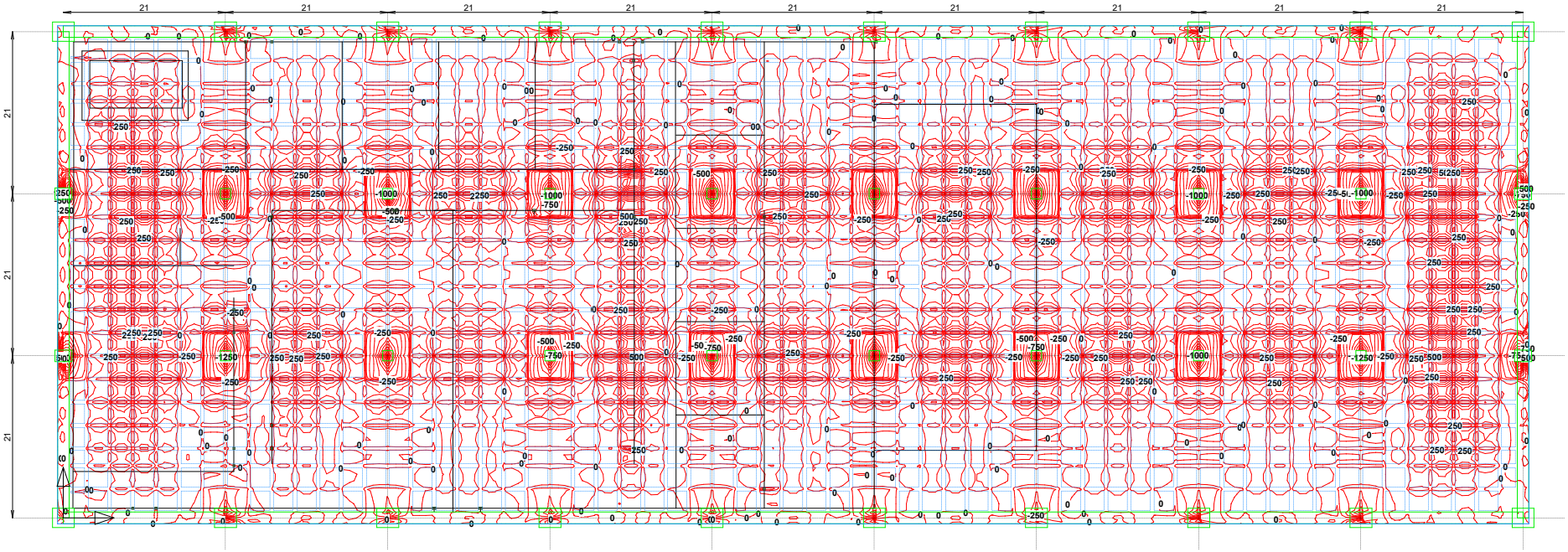
Service LC: D + L: Top Y Stress Plan

Service LC: D + L: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + L - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1498 psi @ (20.83,-0.375) Max Value = 1211 psi @ (168.1,42.13)



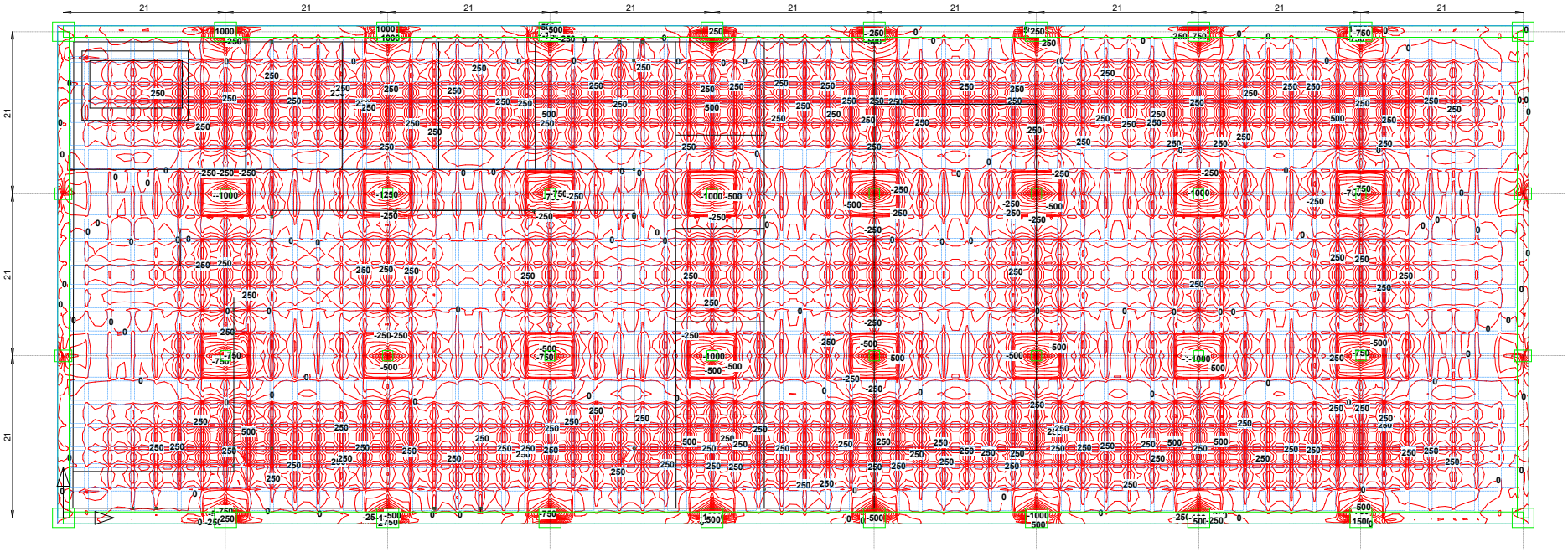
Service LC: D + L: Bottom X Stress Plan

Service LC: D + L: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + L - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1324 psi @ (168.1,42.13) Max Value = 1372 psi @ (189.4,21.55)



Service LC: D + L: Bottom Y Stress Plan

Service LC: D + L: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + L - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1321 psi @ (168.1,42.13) Max Value = 1564 psi @ (20.83,-0.375)

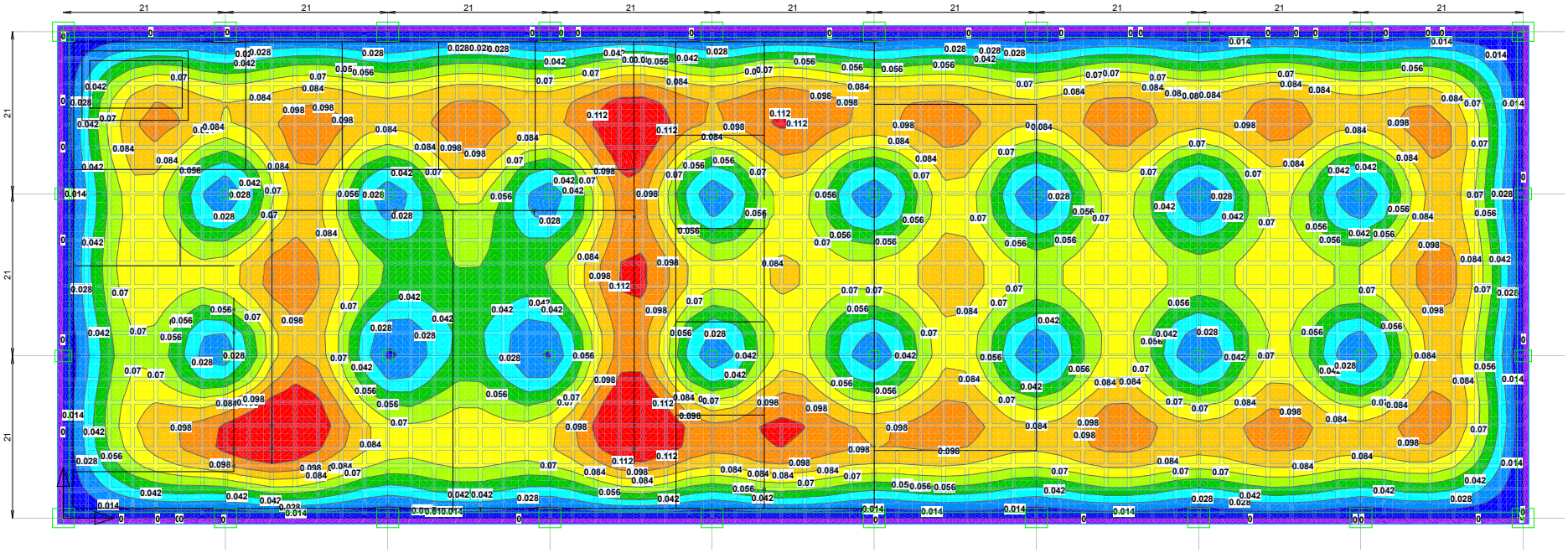


Service LC: D + Lr: Max Deflection Plan

Service LC: D + Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + Lr - Vertical Deflection Plot (Maximum Values)

0 0.014 0.028 0.042 0.056 0.07 0.084 0.098 0.112

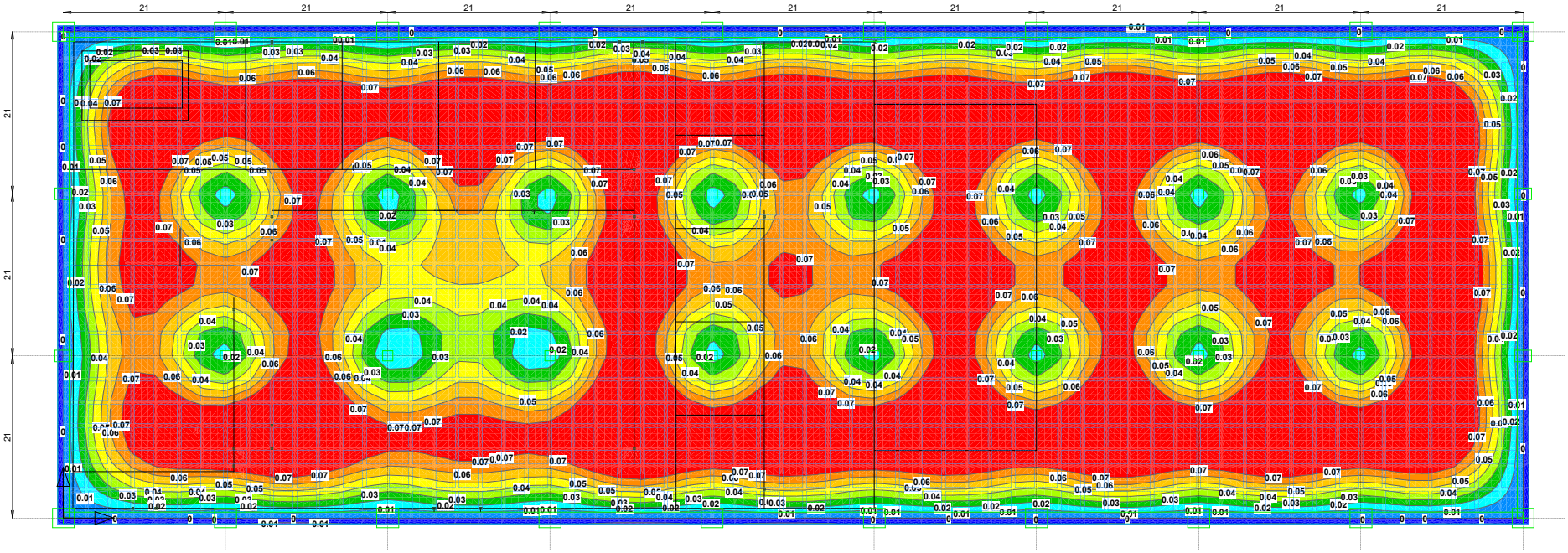
Min Value = -0.01092 inches @ (74.85,-0.75) Max Value = 0.1352 inches @ (74.75,11.75)



Service LC: D + Lr: Min Deflection Plan

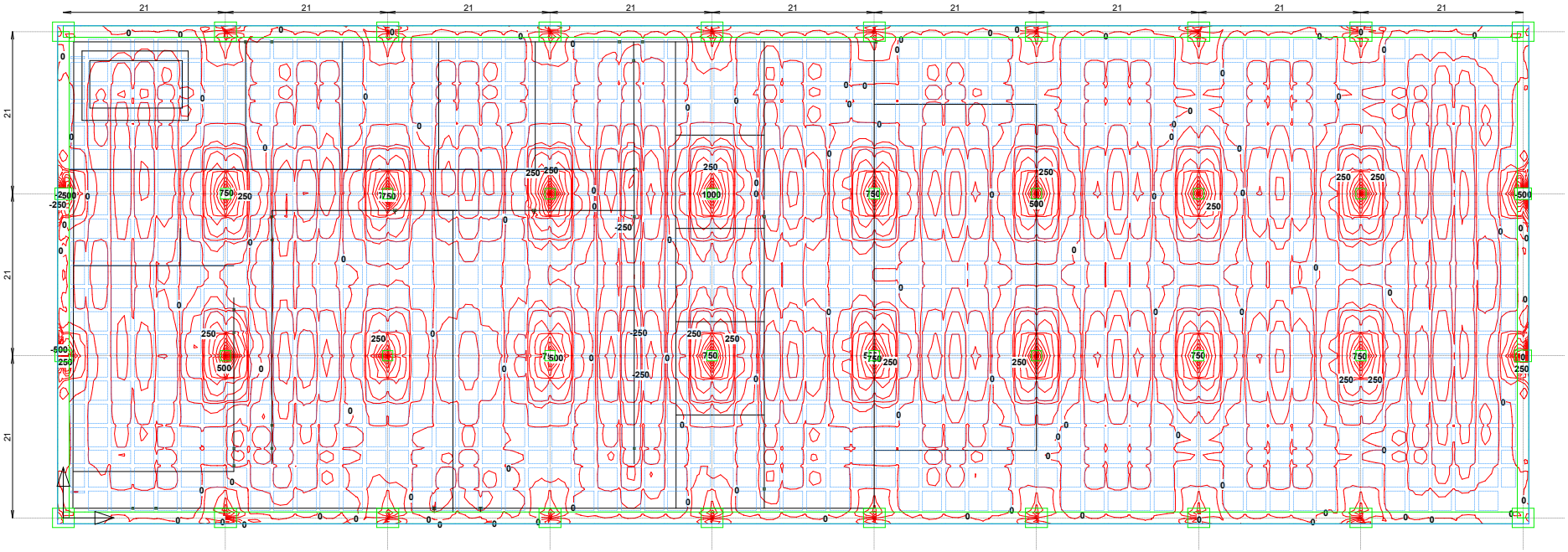
Service LC: D + Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + Lr - Vertical Deflection Plot (Minimum Values)

Min Value = -0.01295 inches @ (74.85,-0.75) Max Value = 0.1113 inches @ (74.75,11.75)



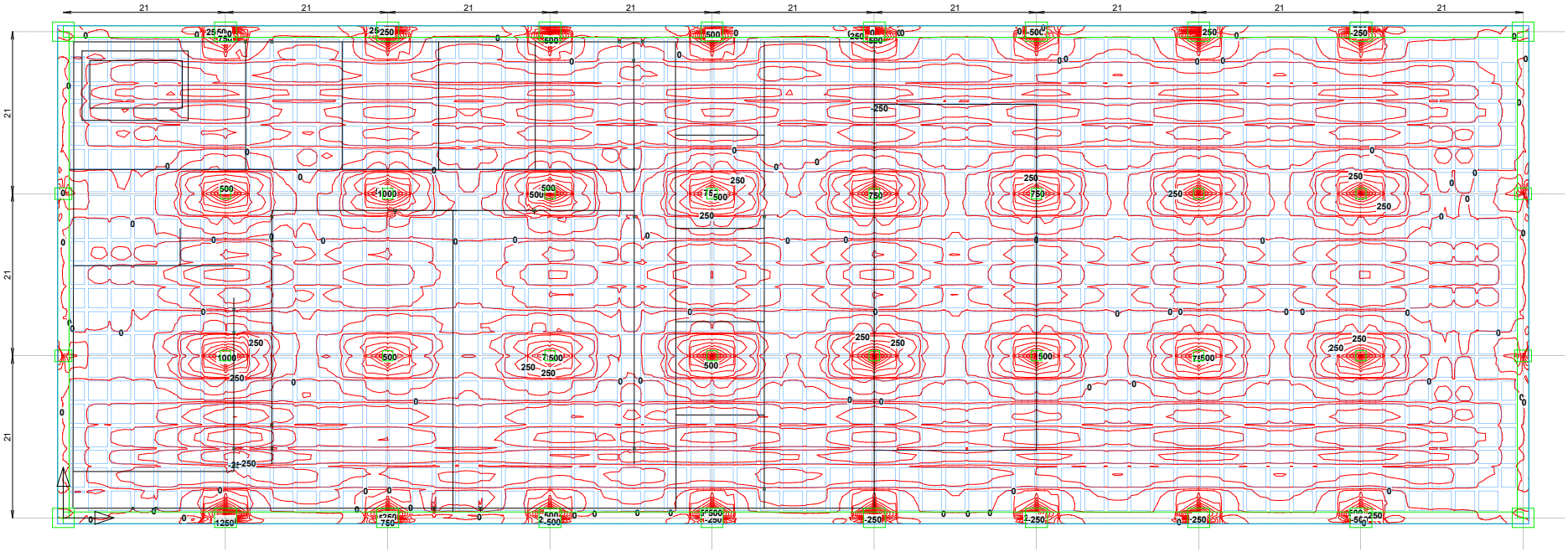
Service LC: D + Lr: Top X Stress Plan

Service LC: D + Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + Lr - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -976 psi @ (189.4,21.55) Max Value = 1141 psi @ (21.13,20.88)



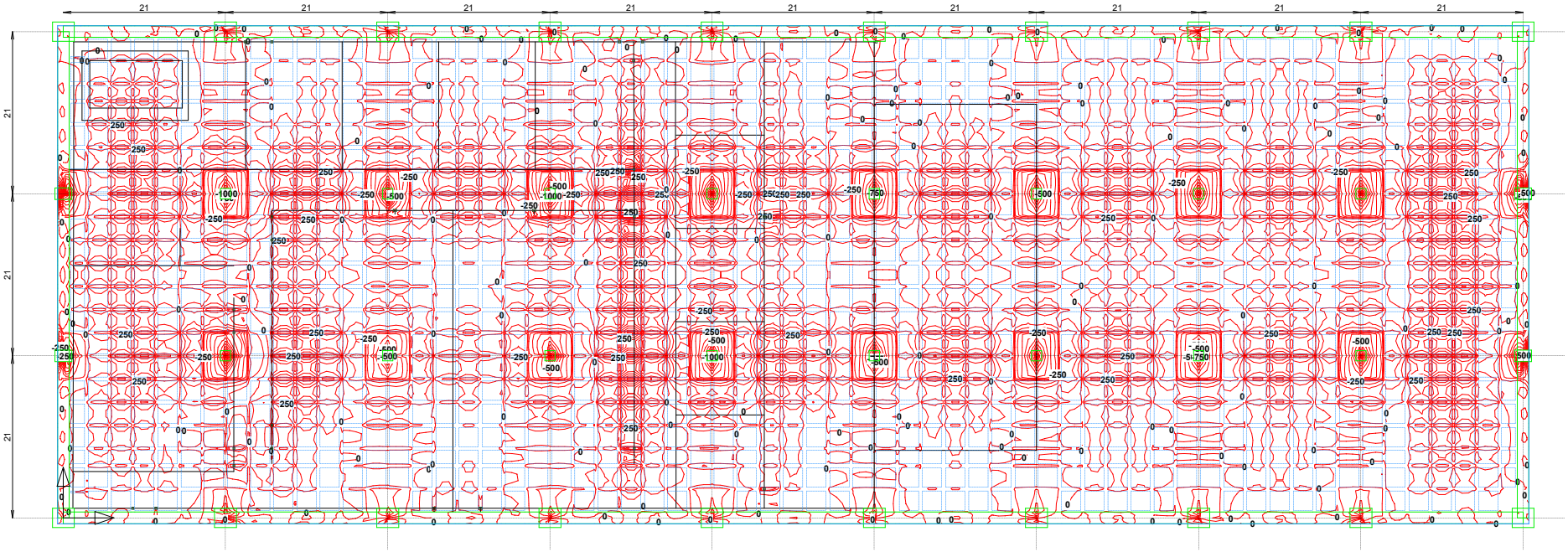
Service LC: D + Lr: Top Y Stress Plan

Service LC: D + Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + Lr - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1387 psi @ (20.83,-0.375) Max Value = 1137 psi @ (21.13,20.88)



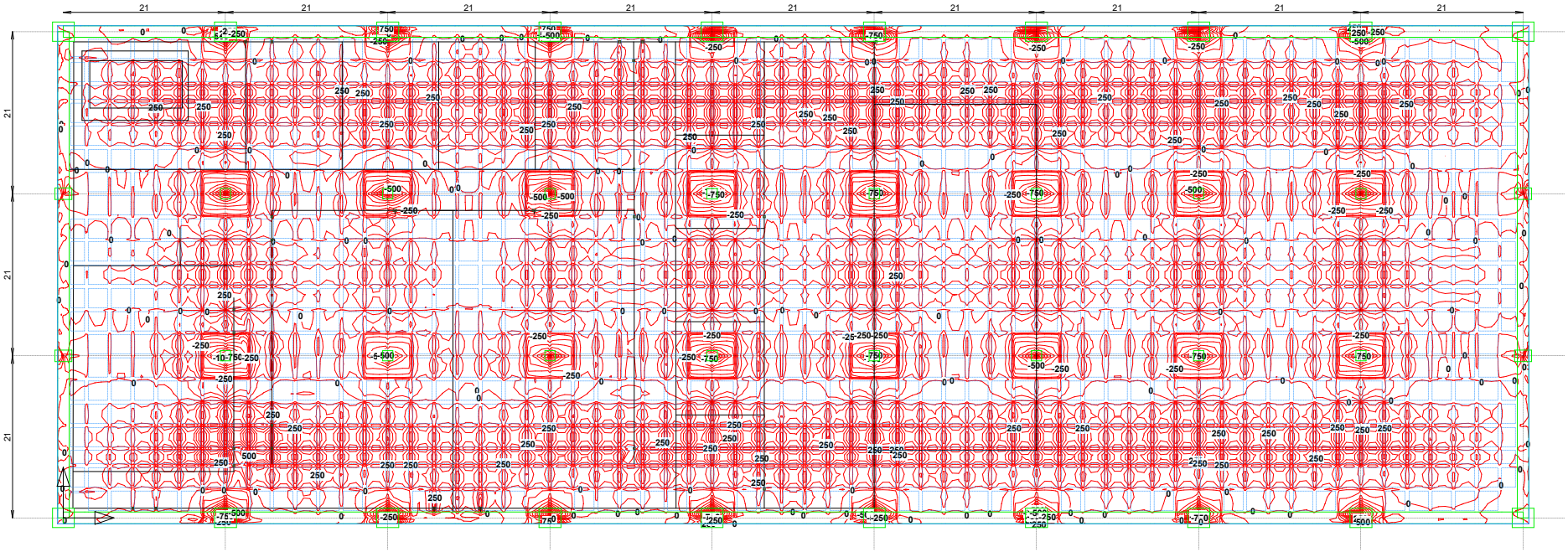
Service LC: D + Lr: Bottom X Stress Plan

Service LC: D + Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + Lr - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1233 psi @ (21.13,20.88) Max Value = 1016 psi @ (189.4,21.55)



Service LC: D + Lr: Bottom Y Stress Plan

Service LC: D + Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + Lr - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1229 psi @ (21.13,20.88) Max Value = 1448 psi @ (20.83,-0.375)

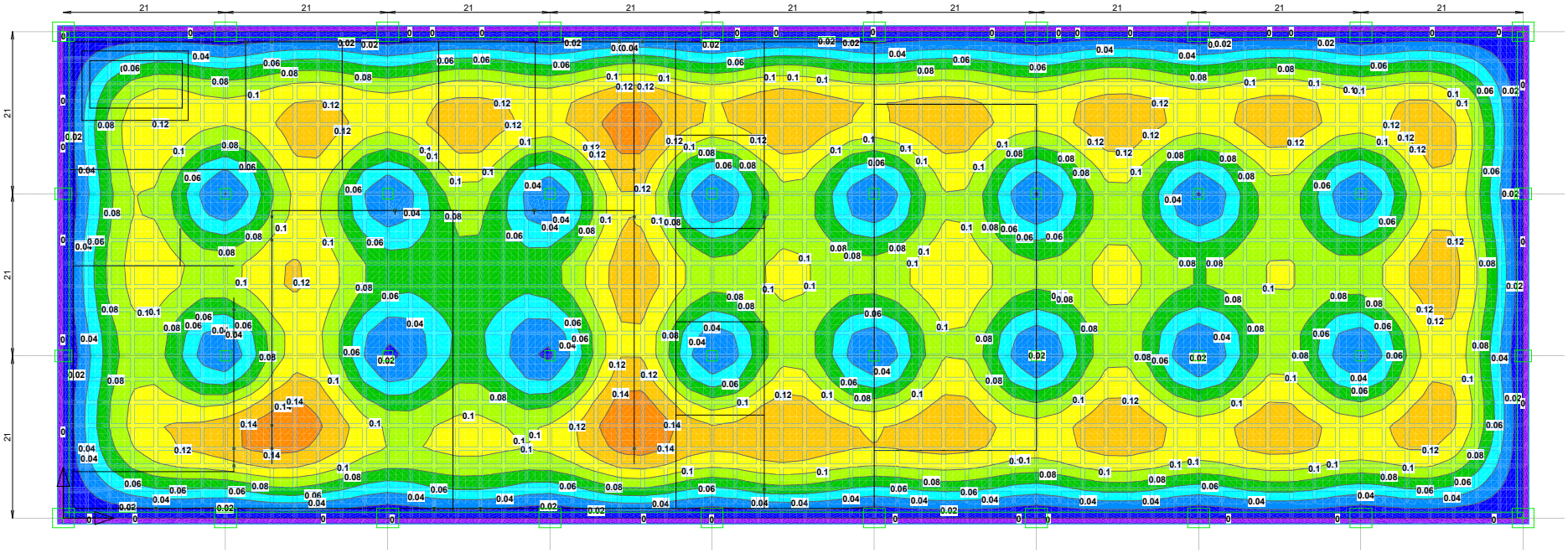


Service LC: D + 0.75L + 0.75Lr: Max Deflection Plan

Service LC: D + 0.75L + 0.75Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.75L + 0.75Lr - Vertical Deflection Plot (Maximum Values)

0 0.02 0.04 0.06 0.08 0.1 0.12 0.14 0.16

Min Value = -0.01092 inches @ (74.85,-0.75) Max Value = 0.1573 inches @ (74.75,11.75)

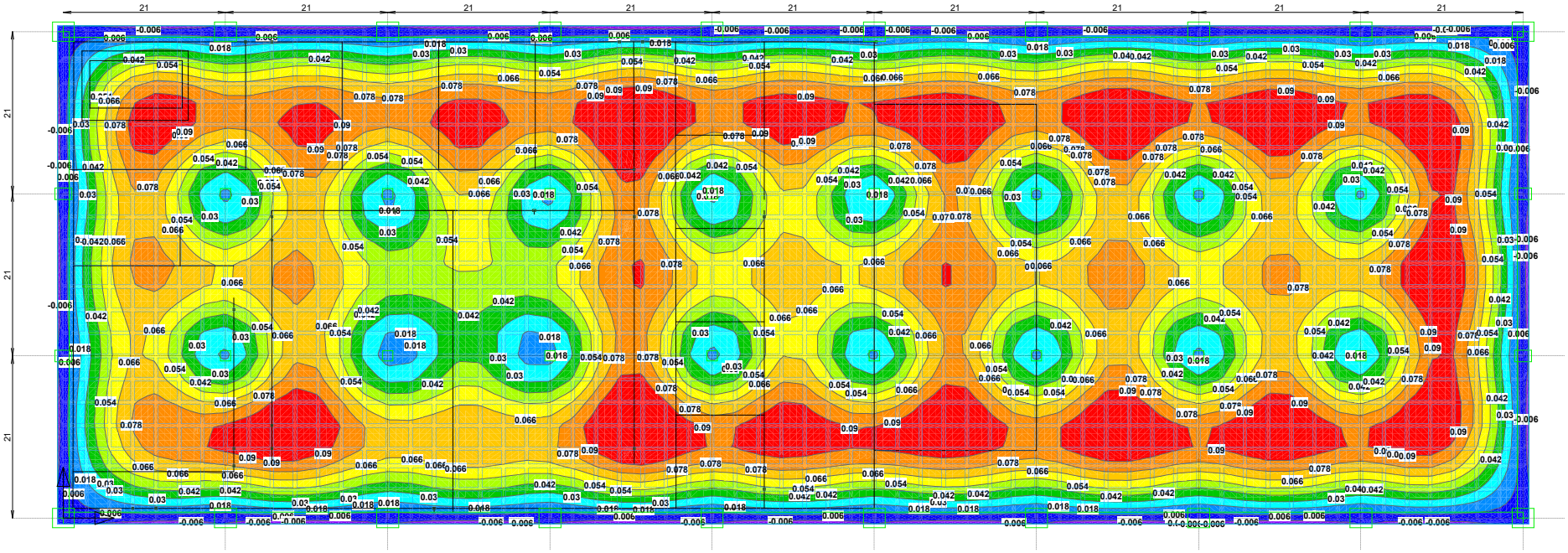


Service LC: D + 0.75L + 0.75Lr: Min Deflection Plan

Service LC: D + 0.75L + 0.75Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.75L + 0.75Lr - Vertical Deflection Plot (Minimum Values)

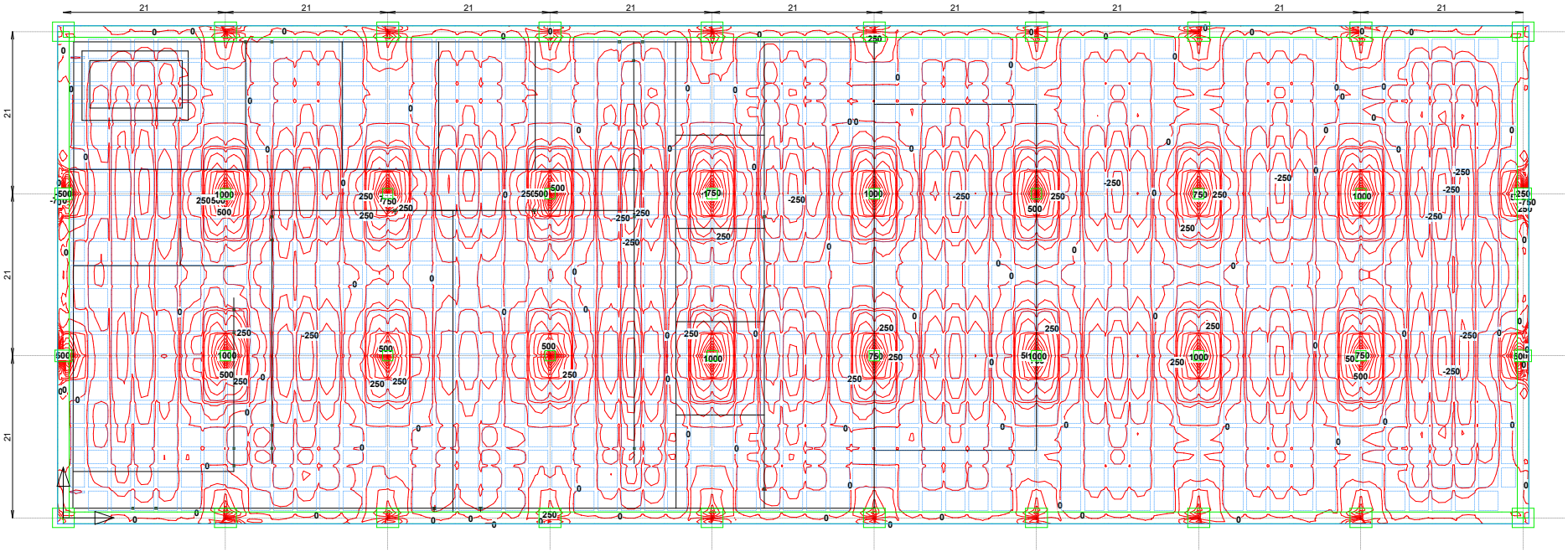
-0.006 0.006 0.018 0.03 0.042 0.054 0.066 0.078 0.09

Min Value = -0.01529 inches @ (74.85,-0.75) Max Value = 0.1113 inches @ (74.75,11.75)



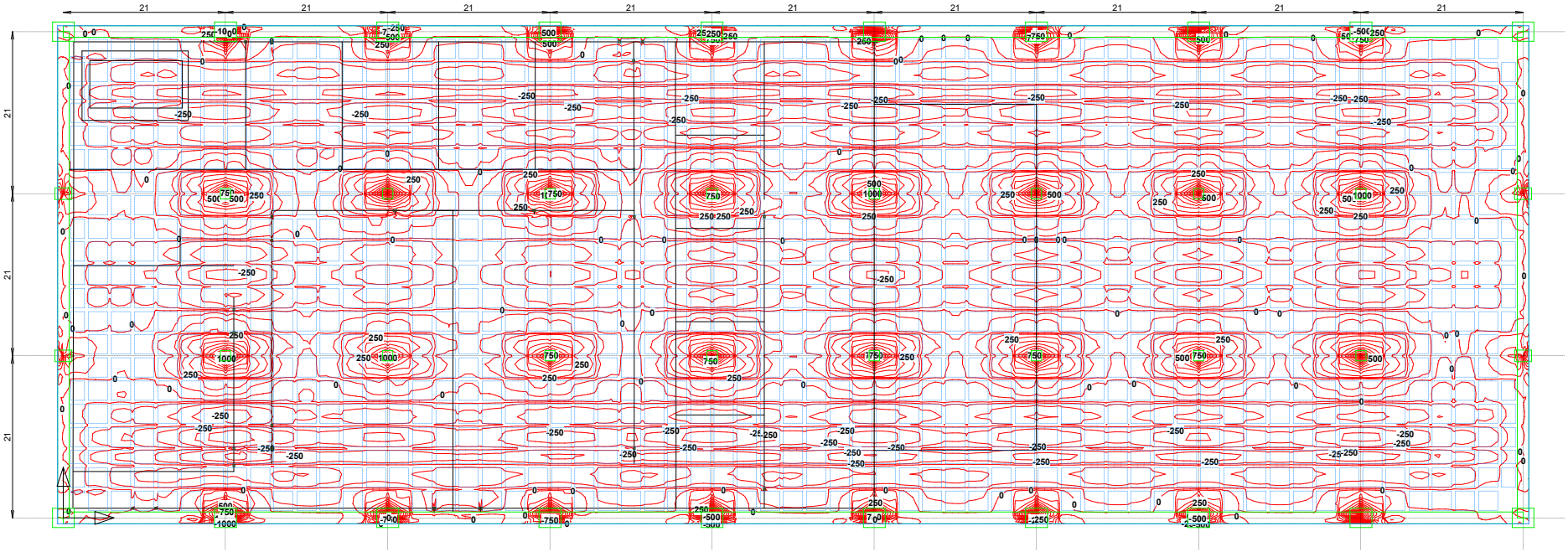
Service LC: D + 0.75L + 0.75Lr: Top X Stress Plan

Service LC: D + 0.75L + 0.75Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.75L + 0.75Lr - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1232 psi @ (189.4,21.55) Max Value = 1275 psi @ (21.13,20.88)



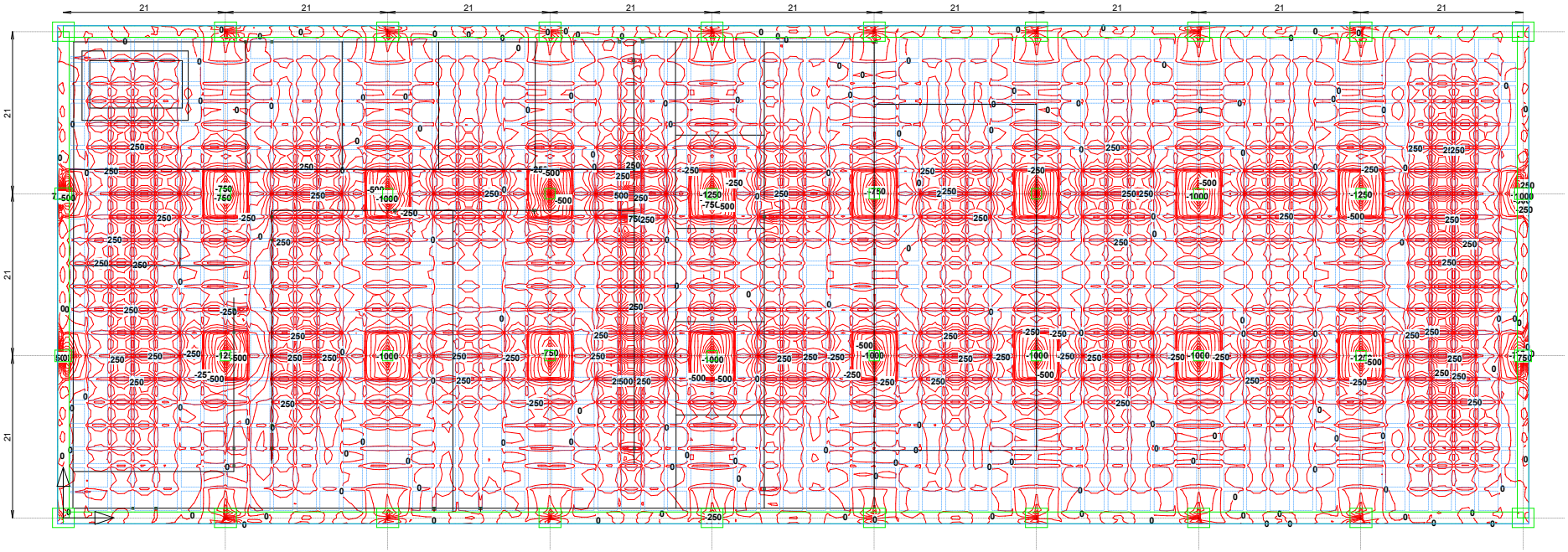
Service LC: D + 0.75L + 0.75Lr: Top Y Stress Plan

Service LC: D + 0.75L + 0.75Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.75L + 0.75Lr - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1601 psi @ (20.83,-0.375) Max Value = 1305 psi @ (21.13,20.88)



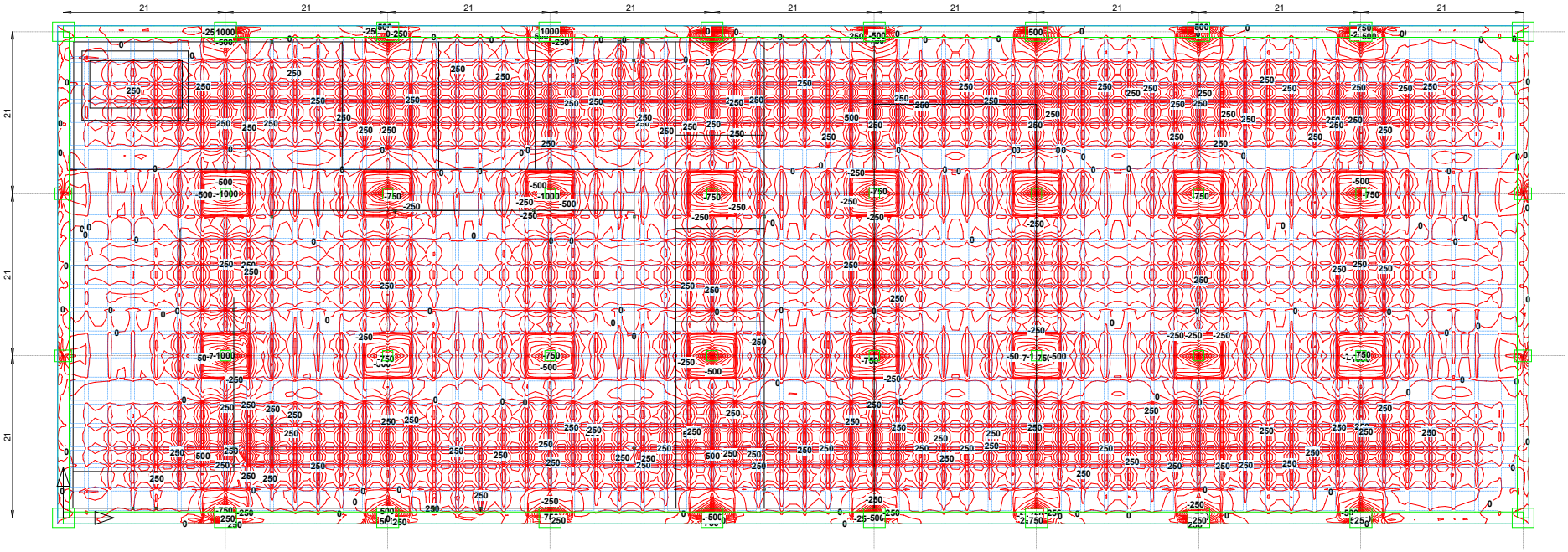
Service LC: D + 0.75L + 0.75Lr: Bottom X Stress Plan

Service LC: D + 0.75L + 0.75Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.75L + 0.75Lr - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1384 psi @ (21.13,20.88) Max Value = 1283 psi @ (189.4,21.55)



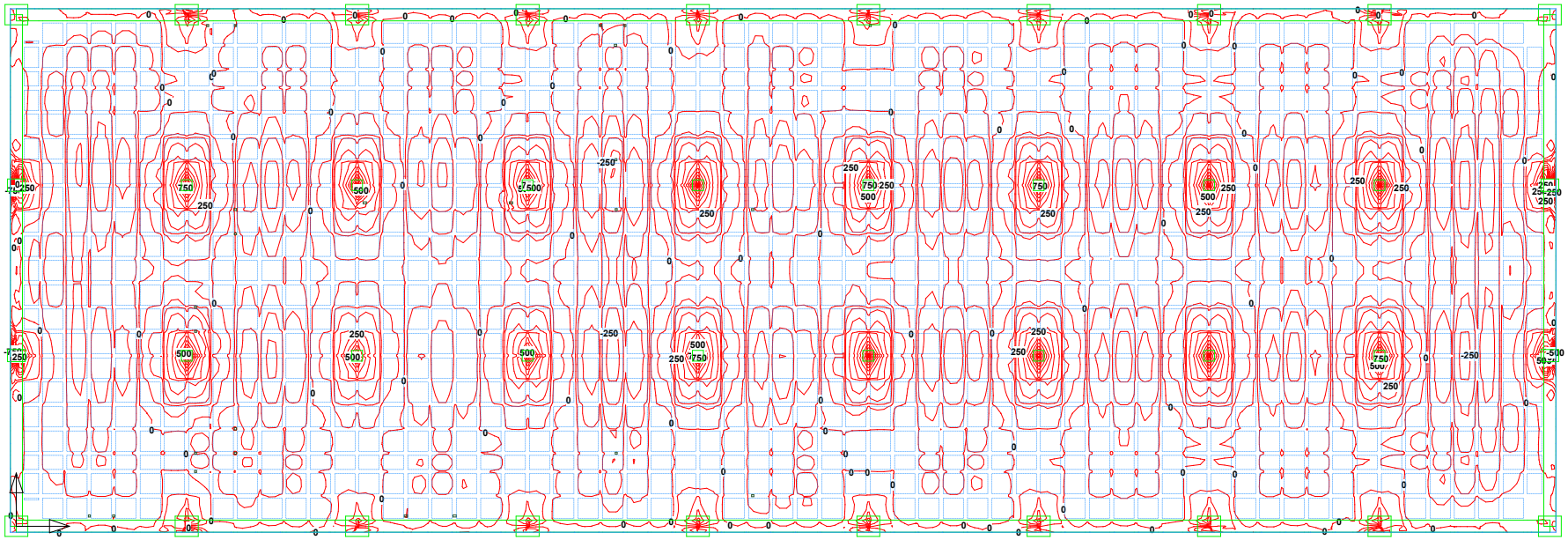
Service LC: D + 0.75L + 0.75Lr: Bottom Y Stress Plan

Service LC: D + 0.75L + 0.75Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.75L + 0.75Lr - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1413 psi @ (21.13,20.88) Max Value = 1672 psi @ (20.83,-0.375)



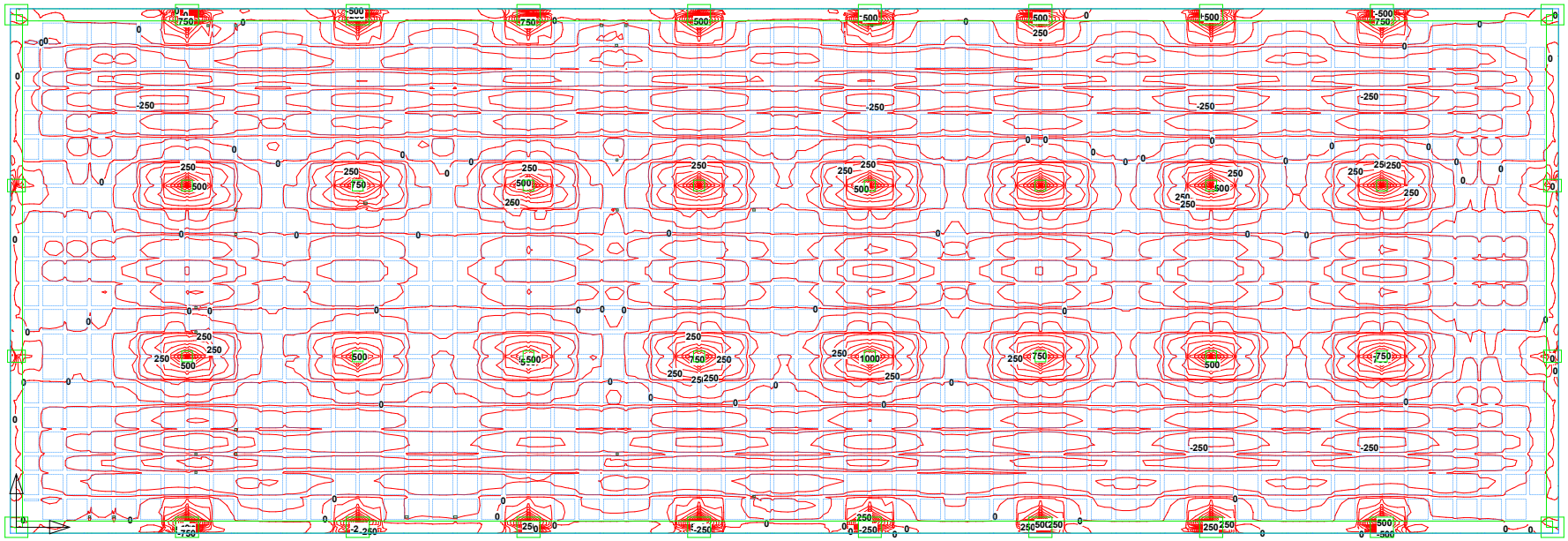
Service LC: D + 0.7E (Positive X): Top X Stress Plan

Service LC: D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive X) - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1056 psi @ (189.4,21.55) Max Value = 973.2 psi @ (168.1,42.13)



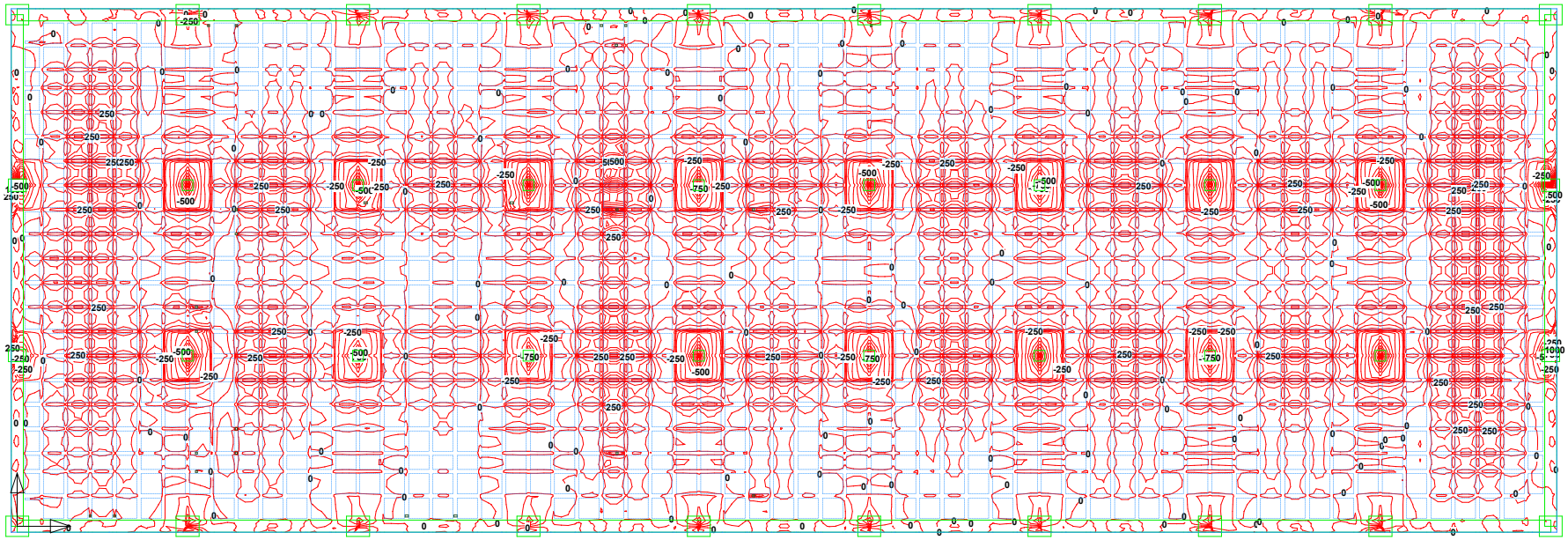
Service LC: D + 0.7E (Positive X): Top Y Stress Plan

Service LC: D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive X) - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1206 psi @ (20.83,-0.375) Max Value = 1003 psi @ (105.1,20.88)



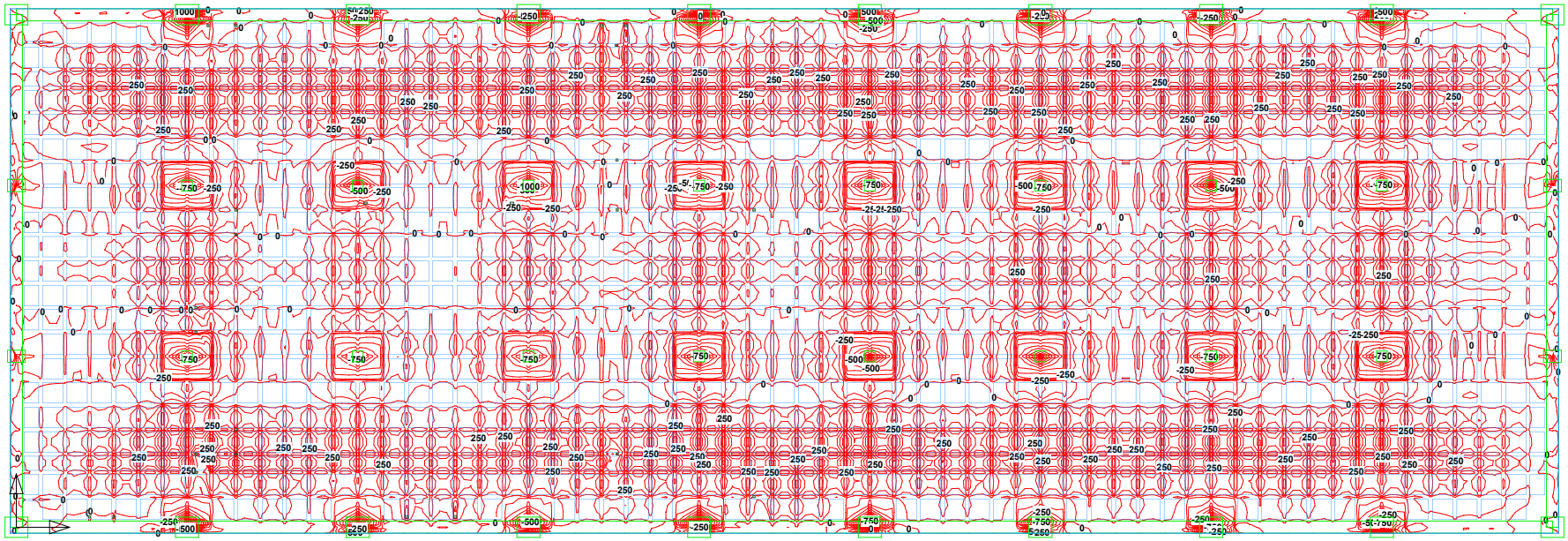
Service LC: D + 0.7E (Positive X): Bottom X Stress Plan

Service LC: D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive X) - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1063 psi @ (168.1,42.13) Max Value = 1099 psi @ (189.4,21.55)



Service LC: D + 0.7E (Positive X): Bottom Y Stress Plan

Service LC: D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive X) - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1086 psi @ (105.1,20.88) Max Value = 1260 psi @ (20.83,-0.375)

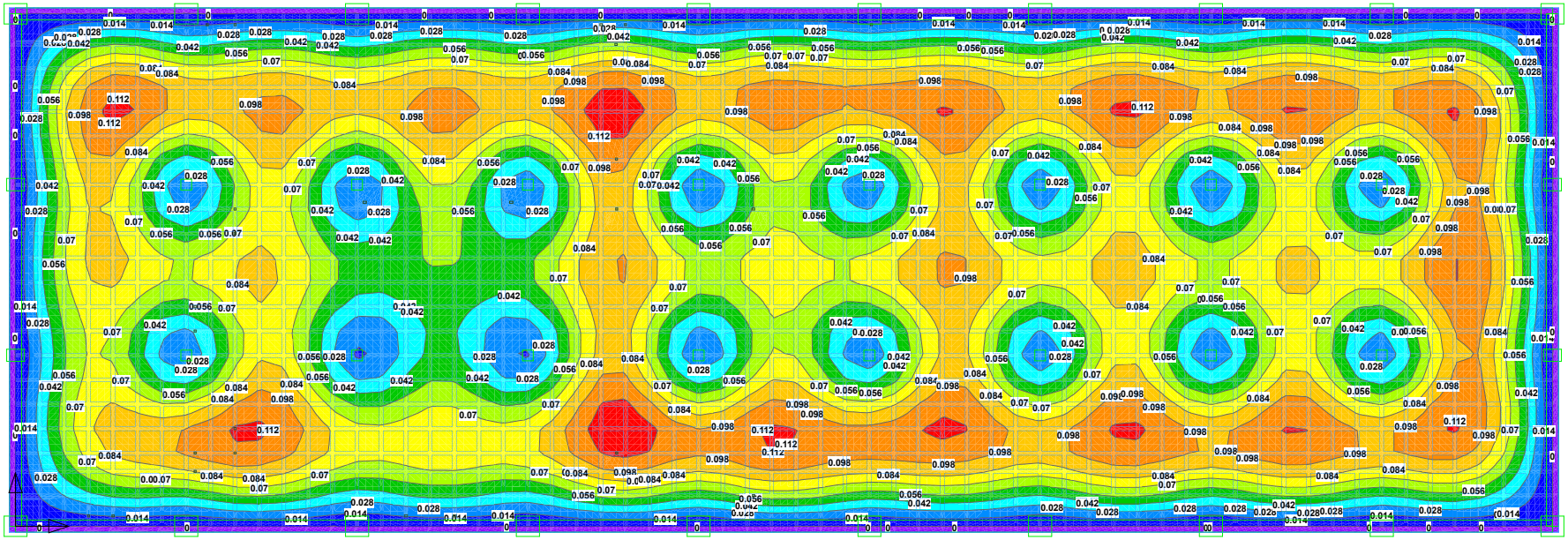


Service LC: D + 0.7E (Positive X): Max Deflection Plan

Service LC: D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive X) - Vertical Deflection Plot (Maximum Values)

0 0.014 0.028 0.042 0.056 0.07 0.084 0.098 0.112

Min Value = -0.01292 inches @ (92.99,-0.75) Max Value = 0.1224 inches @ (74.75,11.75)

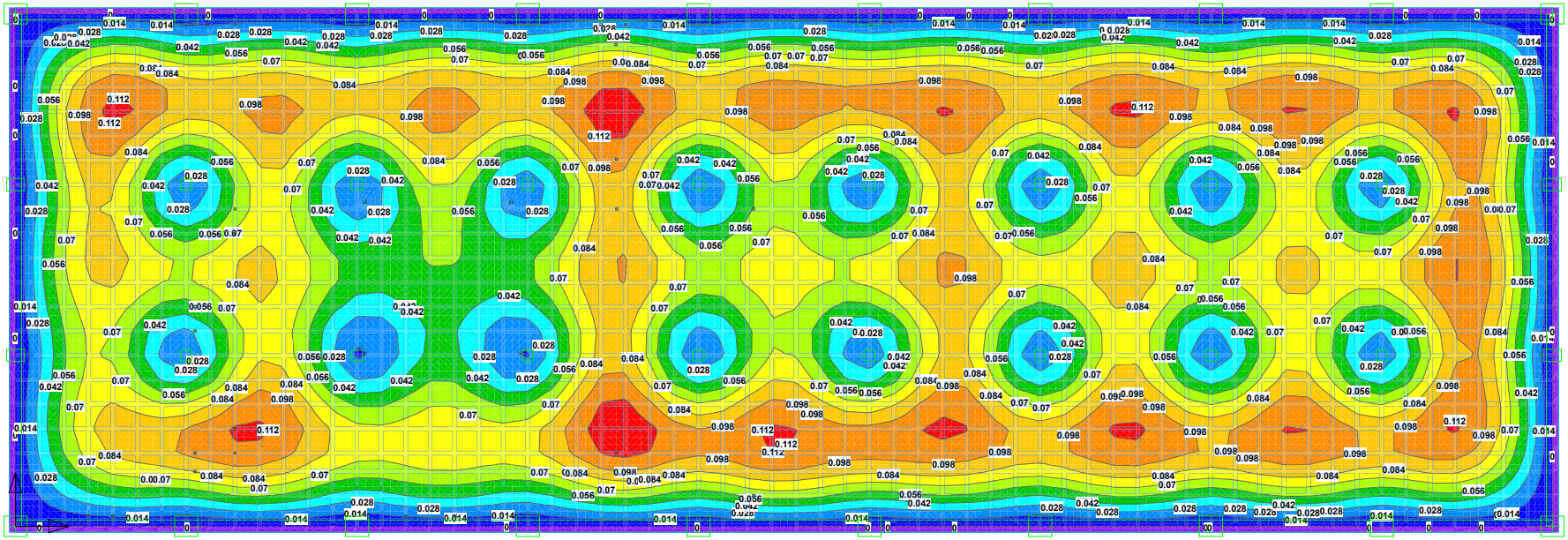


Service LC: D + 0.7E (Positive X): Min Deflection Plan

Service LC: D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive X) - Vertical Deflection Plot (Minimum Values)

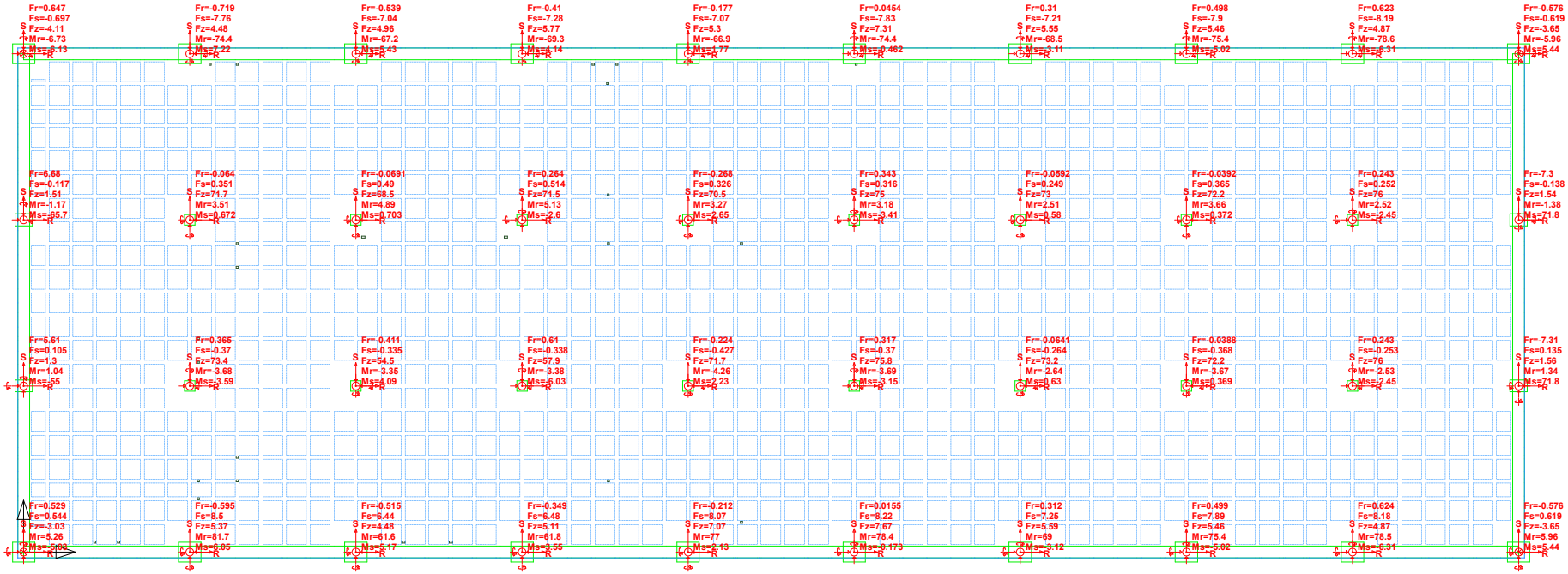
0 0.014 0.028 0.042 0.056 0.07 0.084 0.098 0.112

Min Value = -0.01292 inches @ (92.99,-0.75) Max Value = 0.1224 inches @ (74.75,11.75)



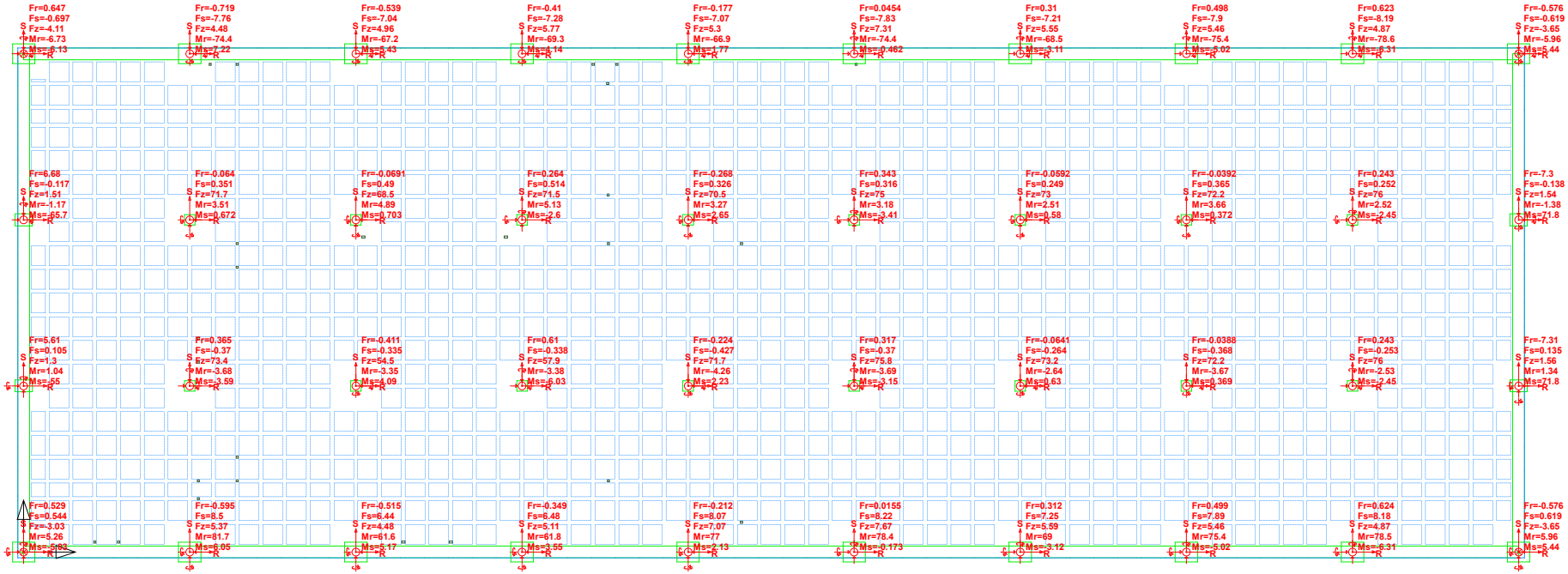
Service LC: D + 0.7E (Positive X): Max Reactions Plan

Service LC: D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



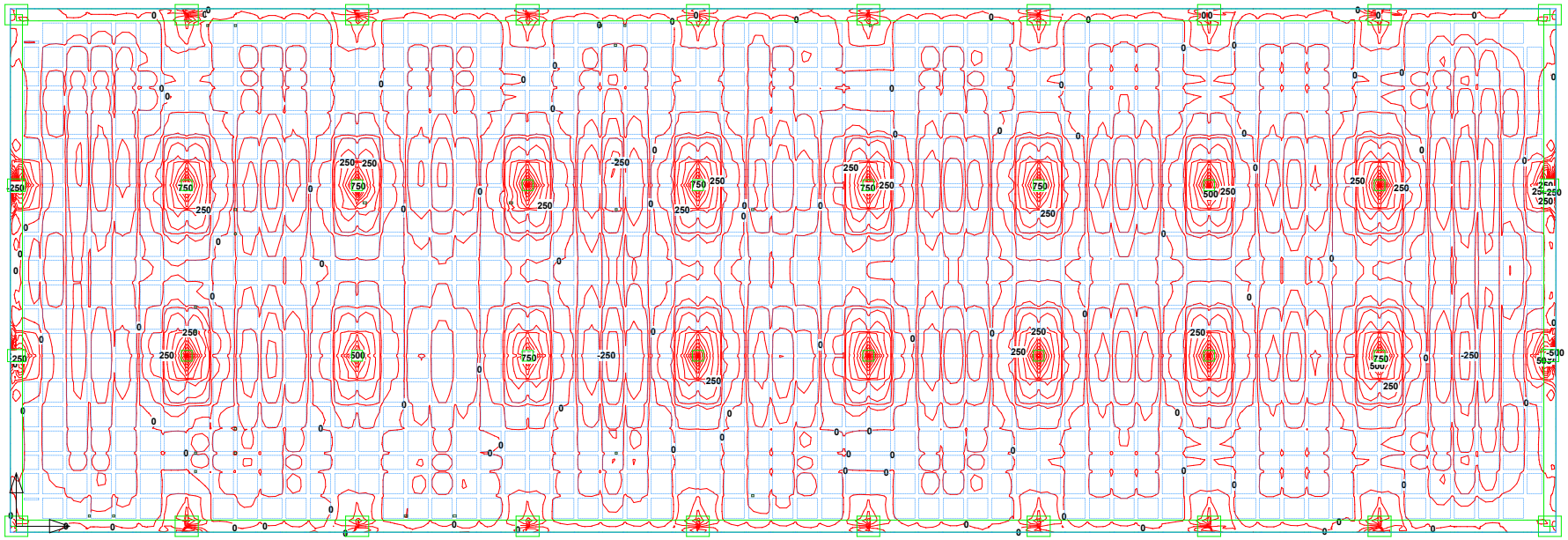
Service LC: D + 0.7E (Positive X): Min Reactions Plan

Service LC: D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



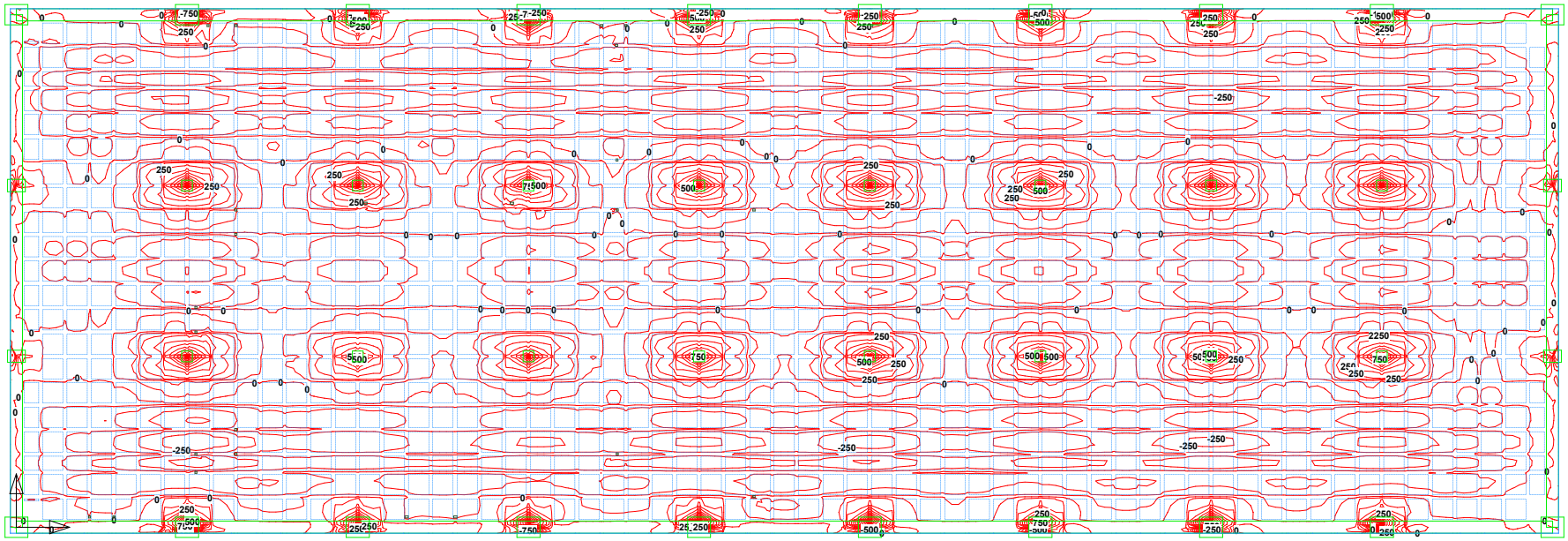
Service LC: D + 0.7E (Negative X): Top X Stress Plan

Service LC: D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative X) - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1056 psi @ (189.4,21.55) Max Value = 973.3 psi @ (168.1,42.13)



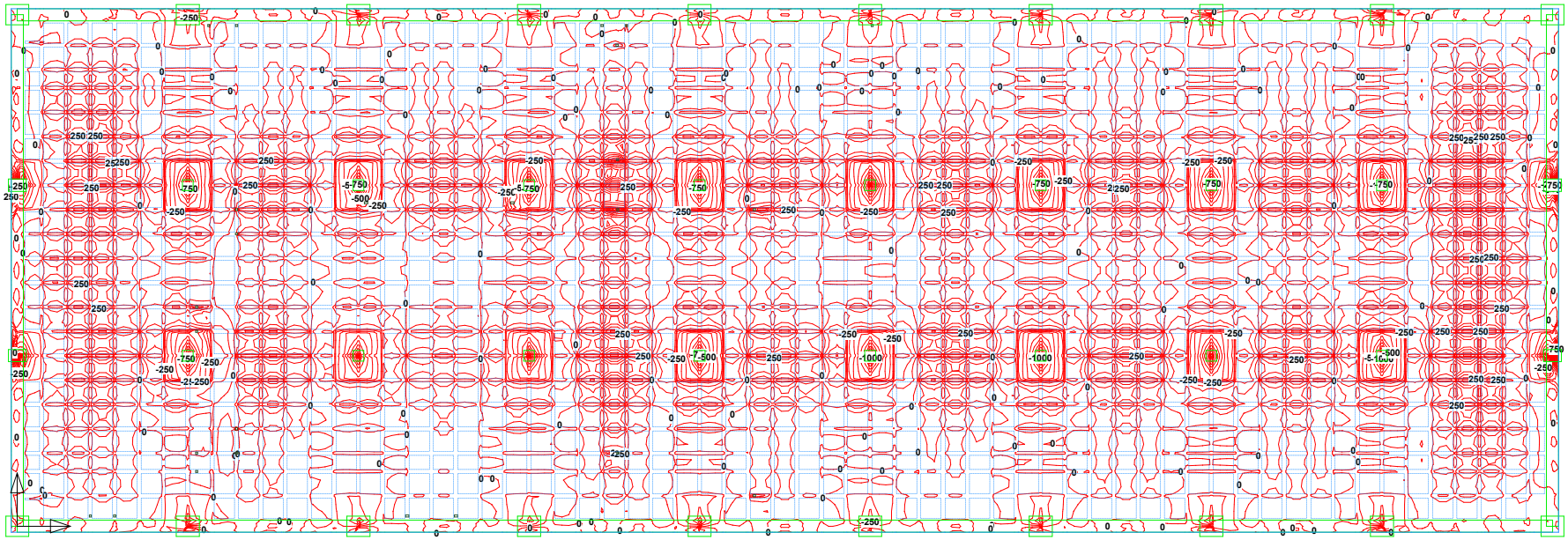
Service LC: D + 0.7E (Negative X): Top Y Stress Plan

Service LC: D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative X) - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1240 psi @ (20.83,-0.375) Max Value = 988.3 psi @ (105.1,20.88)



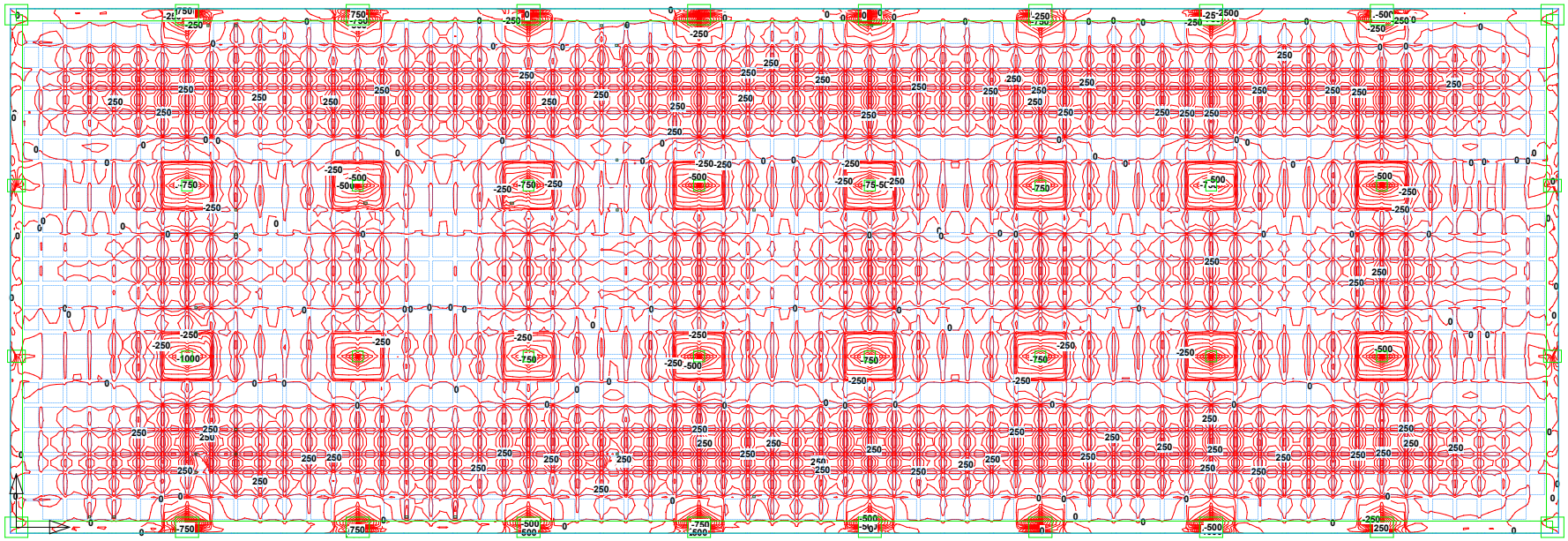
Service LC: D + 0.7E (Negative X): Bottom X Stress Plan

Service LC: D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative X) - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1063 psi @ (168.1,42.13) Max Value = 1099 psi @ (189.4,21.55)



Service LC: D + 0.7E (Negative X): Bottom Y Stress Plan

Service LC: D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative X) - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1070 psi @ (105.1,20.88) Max Value = 1295 psi @ (20.83,-0.375)

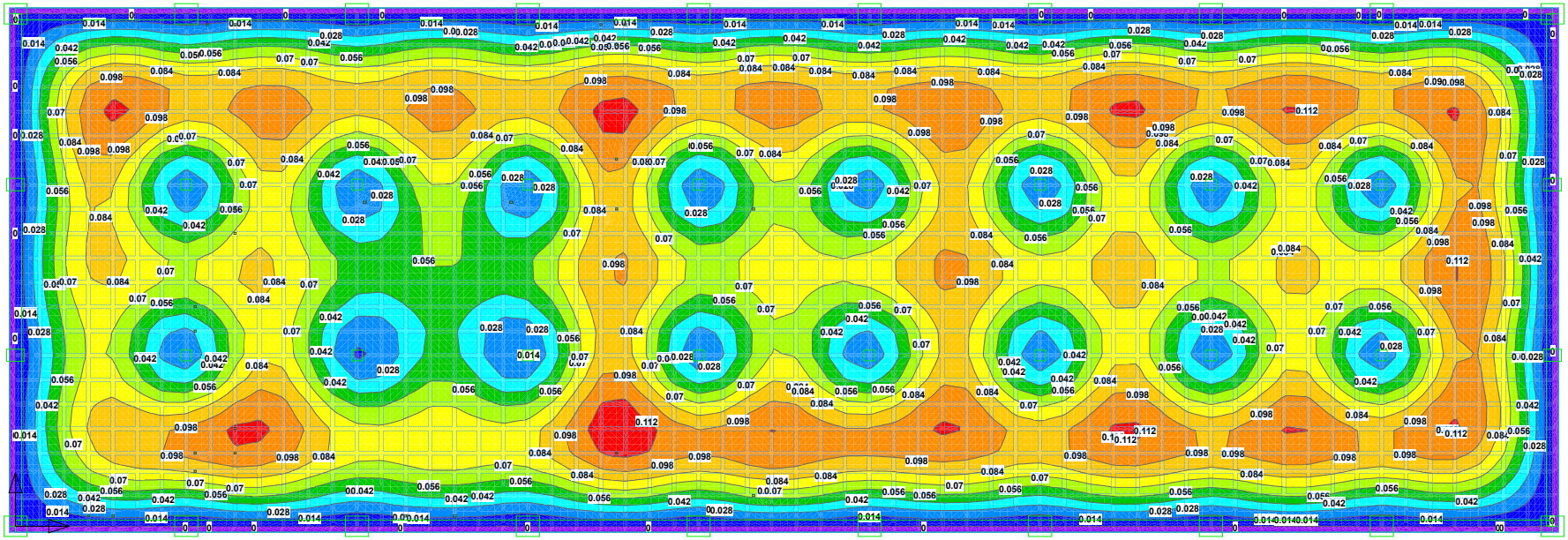


Service LC: D + 0.7E (Negative X): Max Deflection Plan

Service LC: D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative X) - Vertical Deflection Plot (Maximum Values)

0 0.014 0.028 0.042 0.056 0.07 0.084 0.098 0.112

Min Value = -0.01265 inches @ (92.99,-0.75) Max Value = 0.1224 inches @ (74.75,11.75)

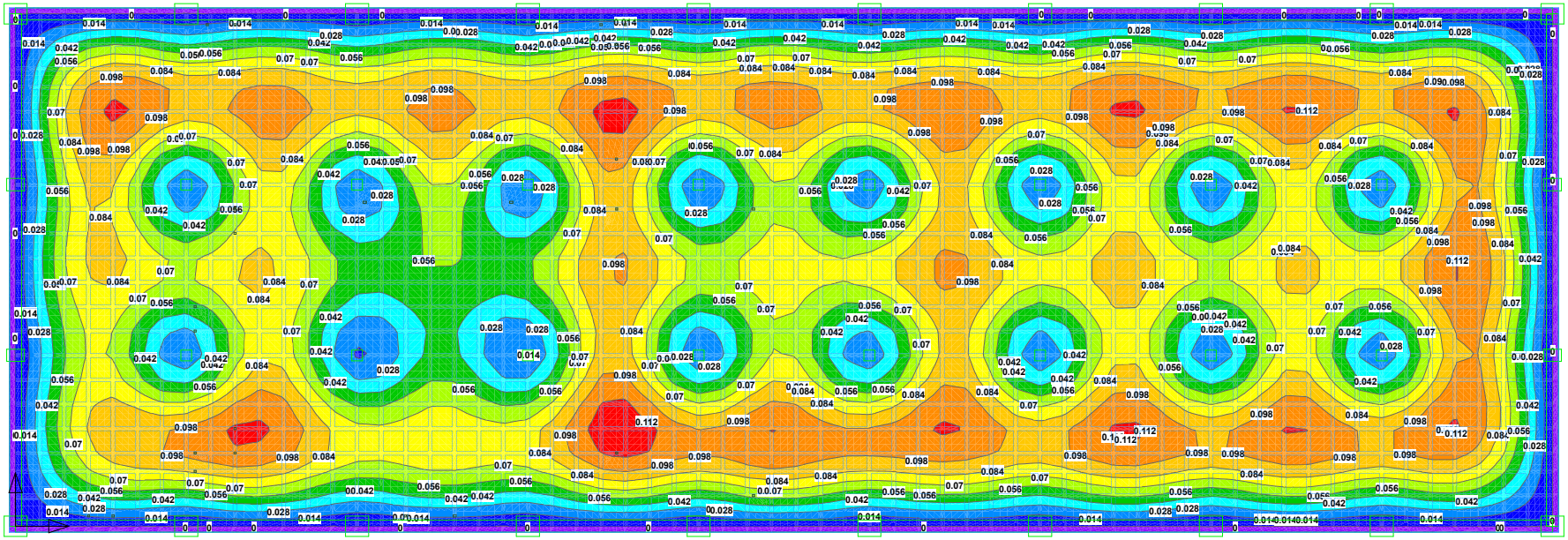


Service LC: D + 0.7E (Negative X): Min Deflection Plan

Service LC: D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative X) - Vertical Deflection Plot (Minimum Values)

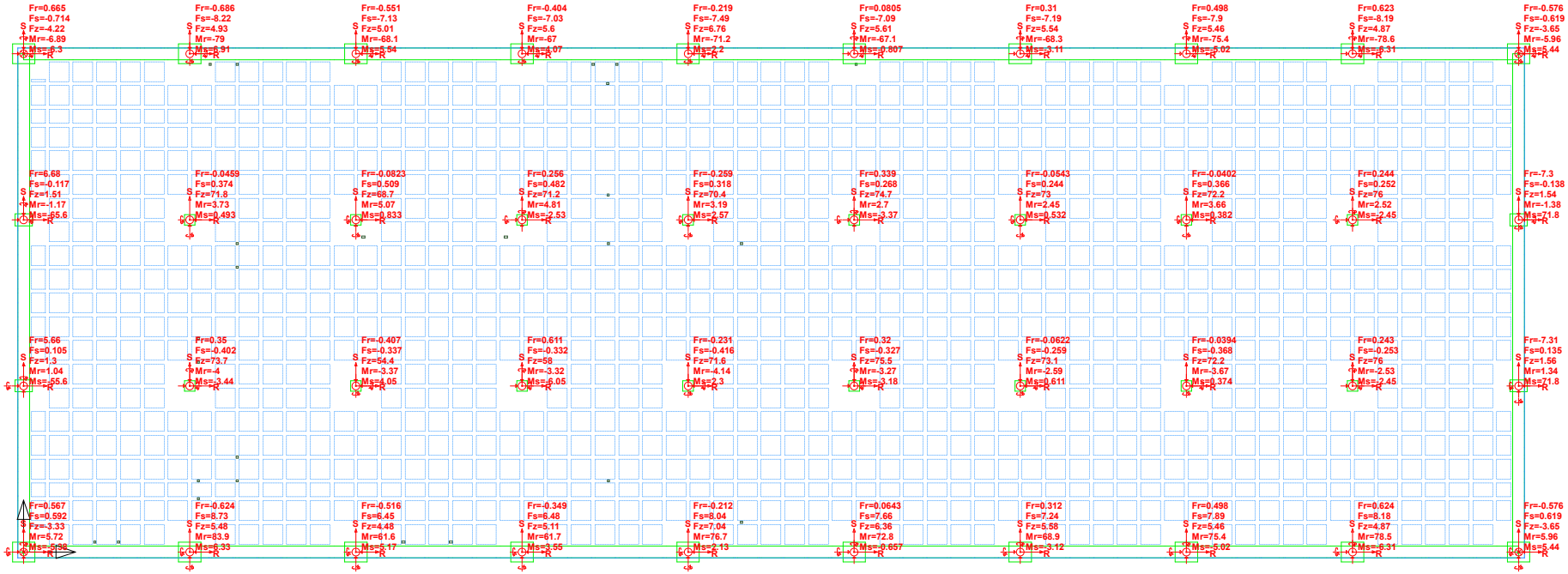
0 0.014 0.028 0.042 0.056 0.07 0.084 0.098 0.112

Min Value = -0.01265 inches @ (92.99,-0.75) Max Value = 0.1224 inches @ (74.75,11.75)



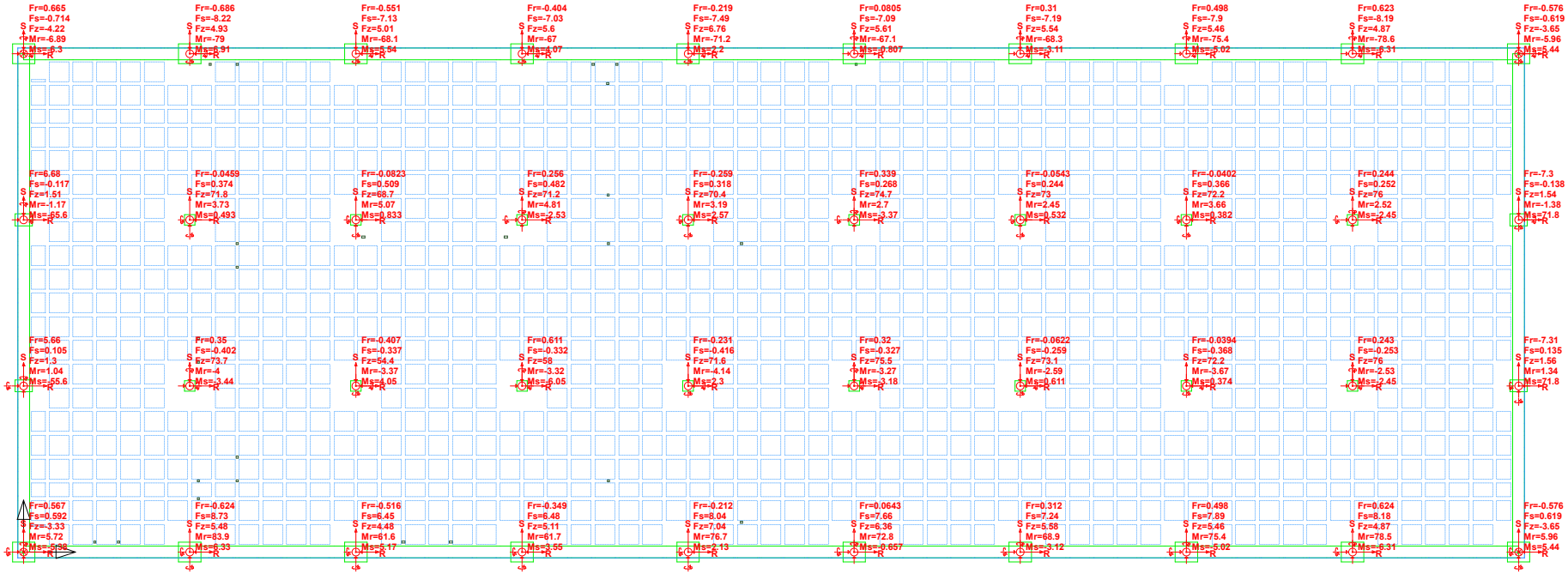
Service LC: D + 0.7E (Negative X): Max Reactions Plan

Service LC: D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



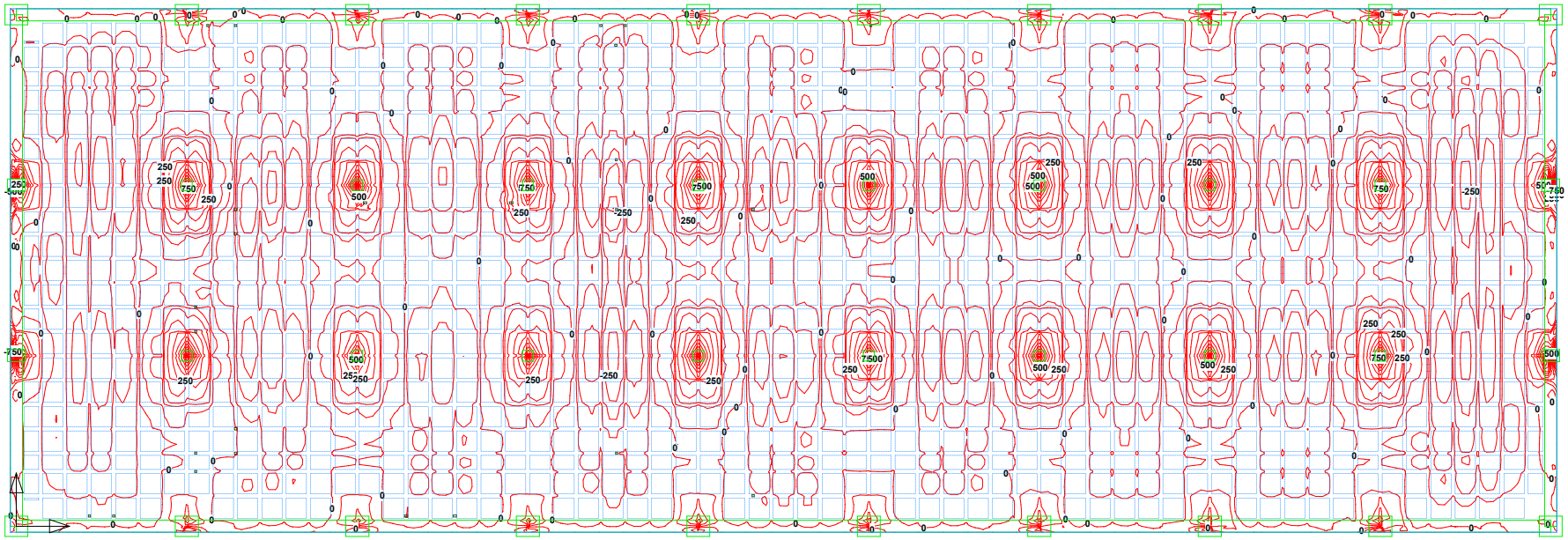
Service LC: D + 0.7E (Negative X): Min Reactions Plan

Service LC: D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



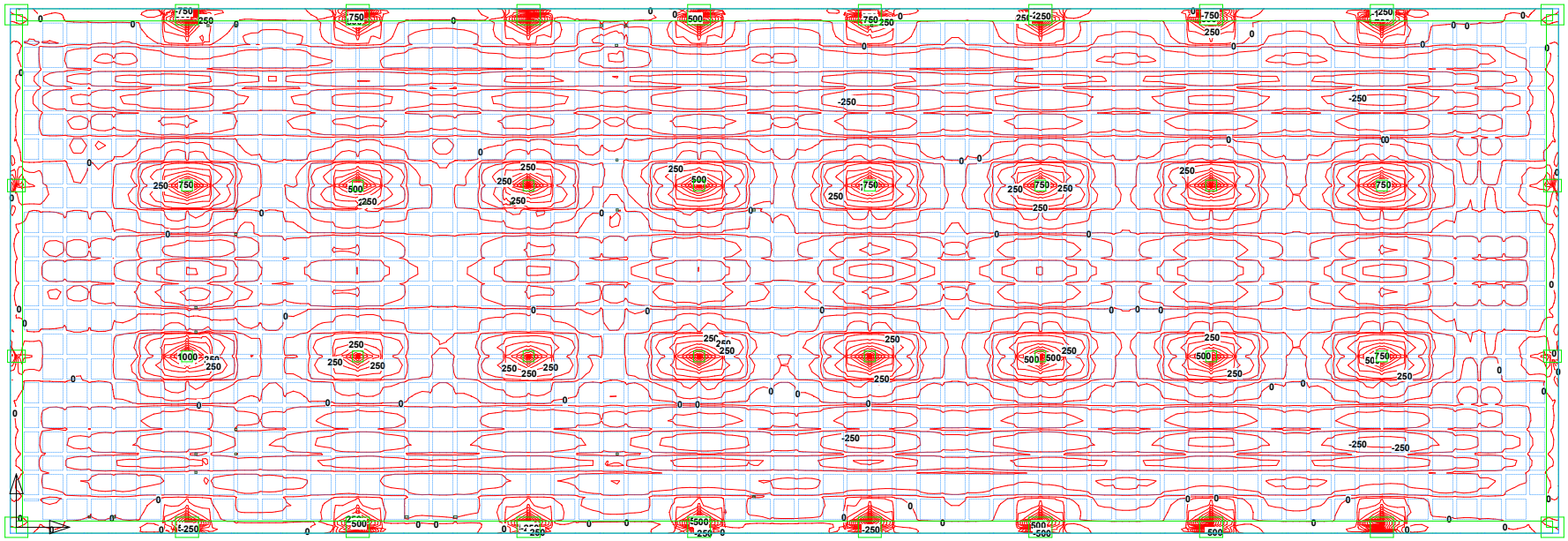
Service LC: D + 0.7E (Positive Y): Top X Stress Plan

Service LC: D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive Y) - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1056 psi @ (189.4,21.55) Max Value = 1016 psi @ (21.13,41.88)



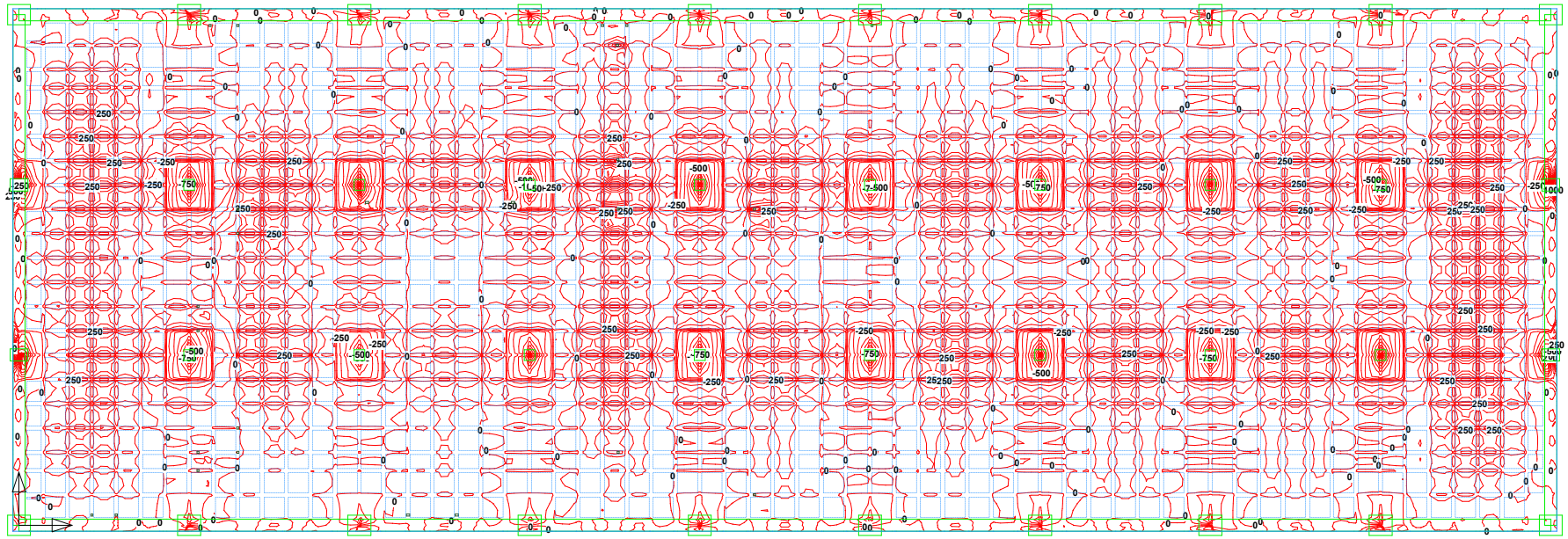
Service LC: D + 0.7E (Positive Y): Top Y Stress Plan

Service LC: D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive Y) - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1165 psi @ (168.2,-0.375) Max Value = 1004 psi @ (21.13,21.13)



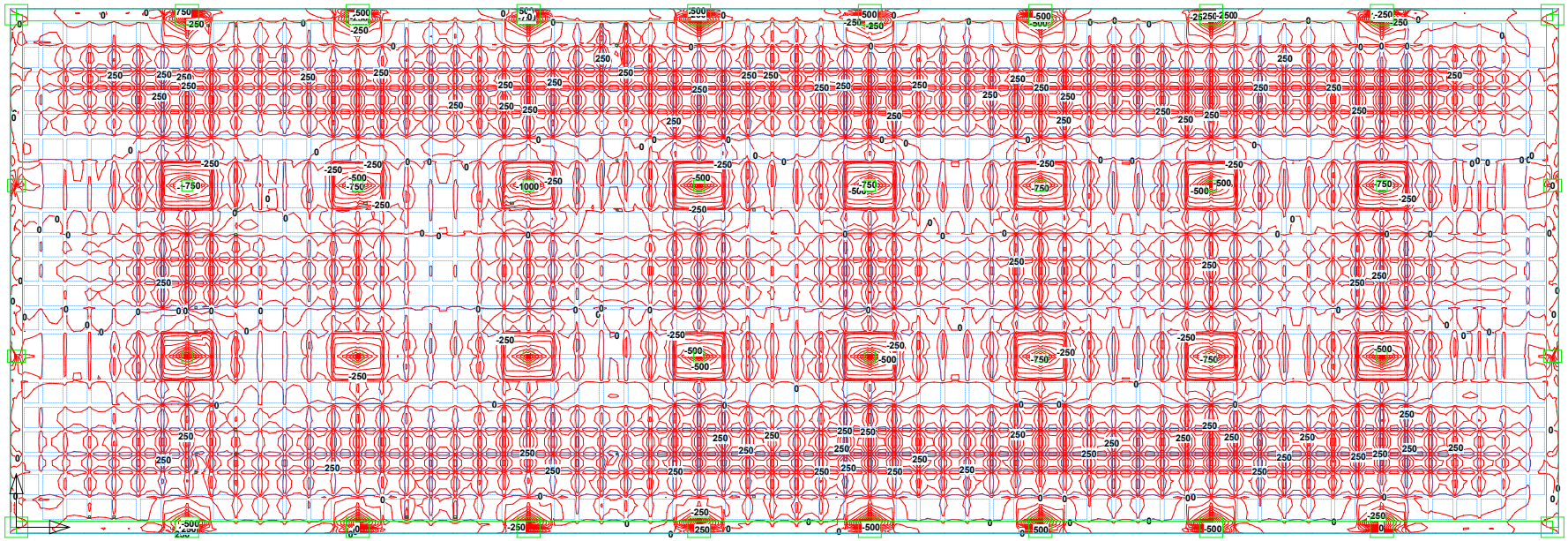
Service LC: D + 0.7E (Positive Y): Bottom X Stress Plan

Service LC: D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive Y) - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1110 psi @ (21.13,41.88) Max Value = 1099 psi @ (189.4,21.55)



Service LC: D + 0.7E (Positive Y): Bottom Y Stress Plan

Service LC: D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive Y) - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1084 psi @ (21.13,21.13) Max Value = 1215 psi @ (168.2,-0.375)

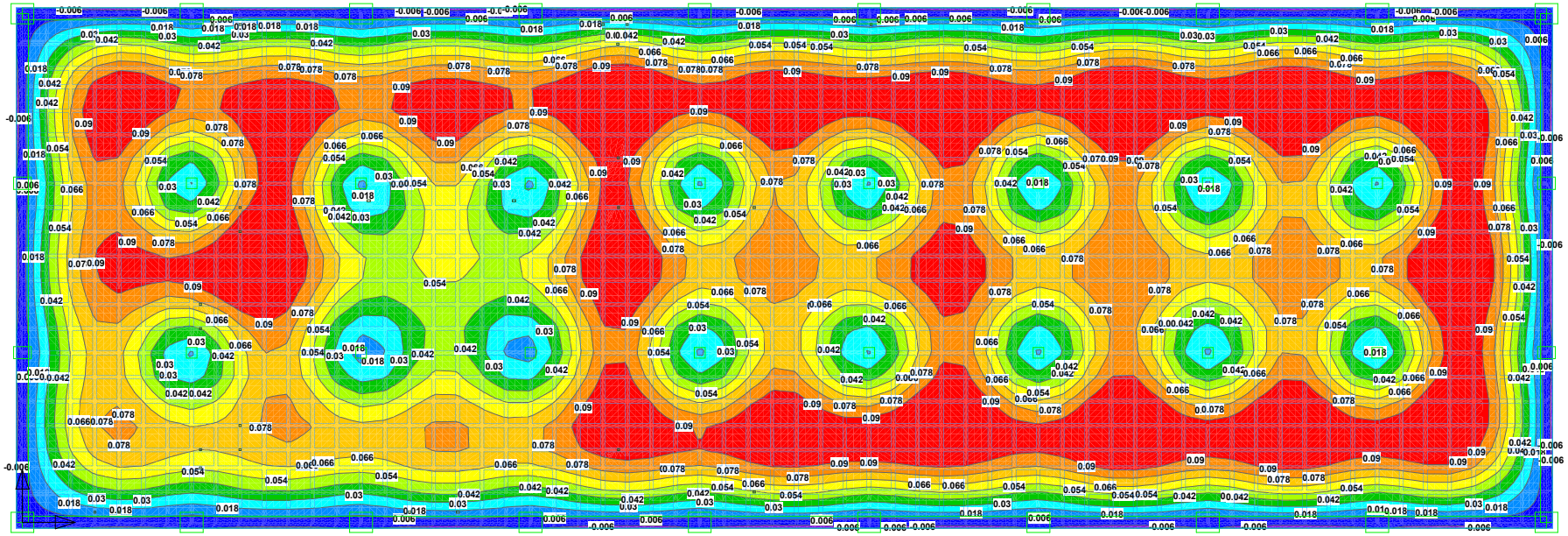


Service LC: D + 0.7E (Positive Y): Max Deflection Plan

Service LC: D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive Y) - Vertical Deflection Plot (Maximum Values)

-0.006 0.006 0.018 0.03 0.042 0.054 0.066 0.078 0.09

Min Value = -0.01234 inches @ (74.85,63.75) Max Value = 0.1155 inches @ (29.75,32.75)

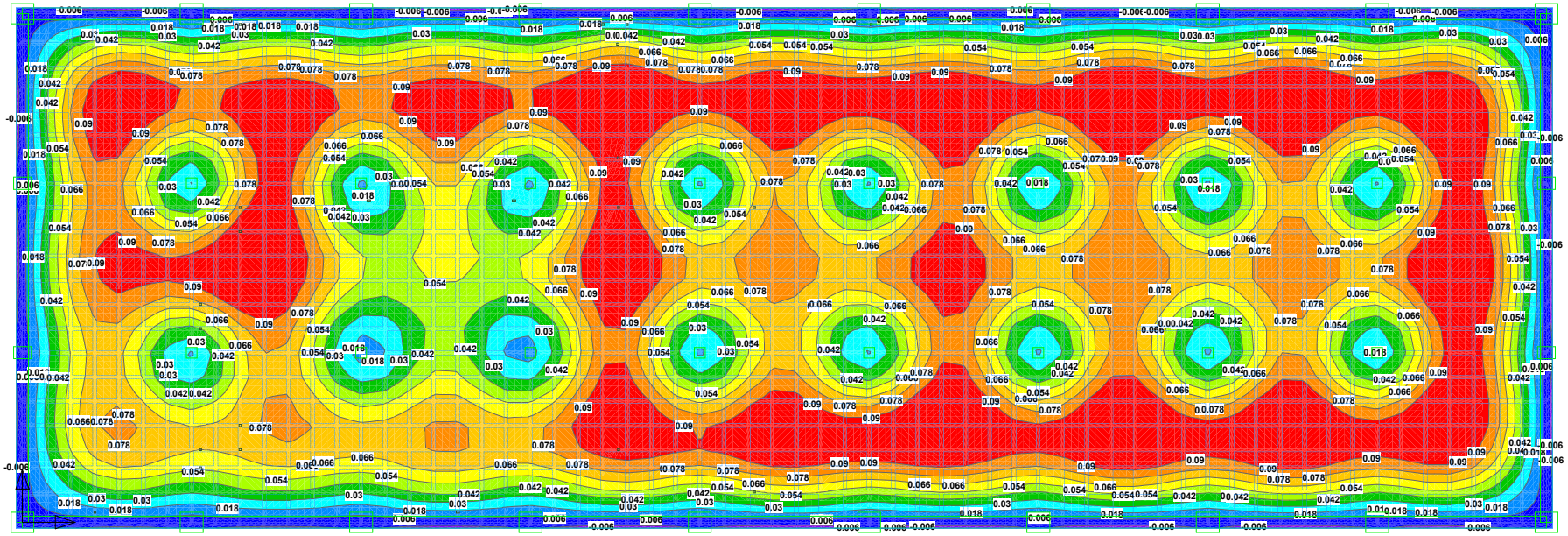


Service LC: D + 0.7E (Positive Y): Min Deflection Plan

Service LC: D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive Y) - Vertical Deflection Plot (Minimum Values)

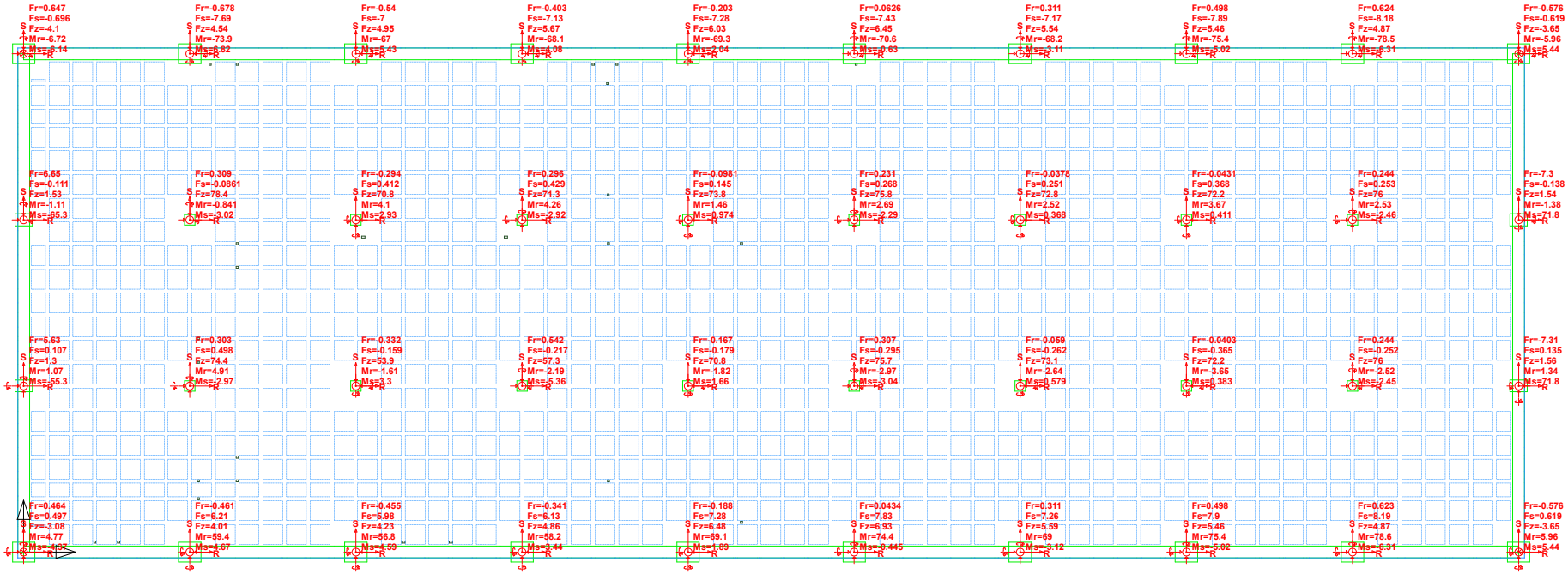
-0.006 0.006 0.018 0.03 0.042 0.054 0.066 0.078 0.09

Min Value = -0.01234 inches @ (74.85,63.75) Max Value = 0.1155 inches @ (29.75,32.75)



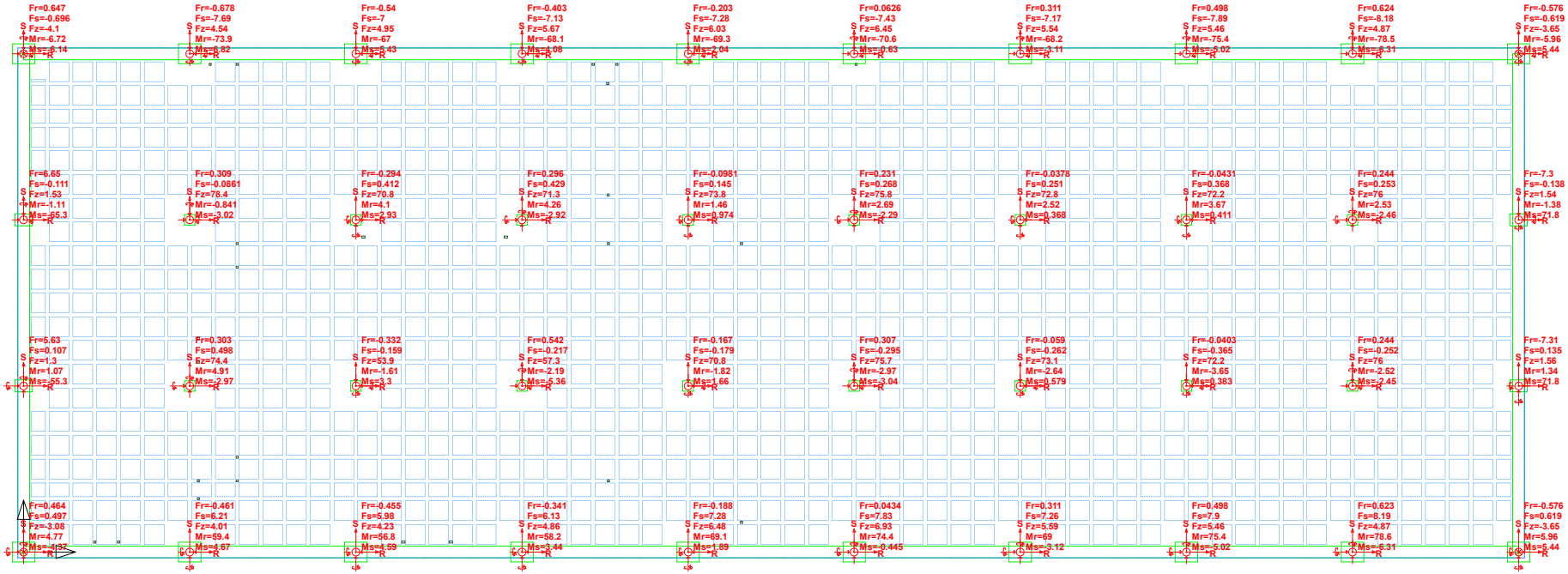
Service LC: D + 0.7E (Positive Y): Max Reactions Plan

Service LC: D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



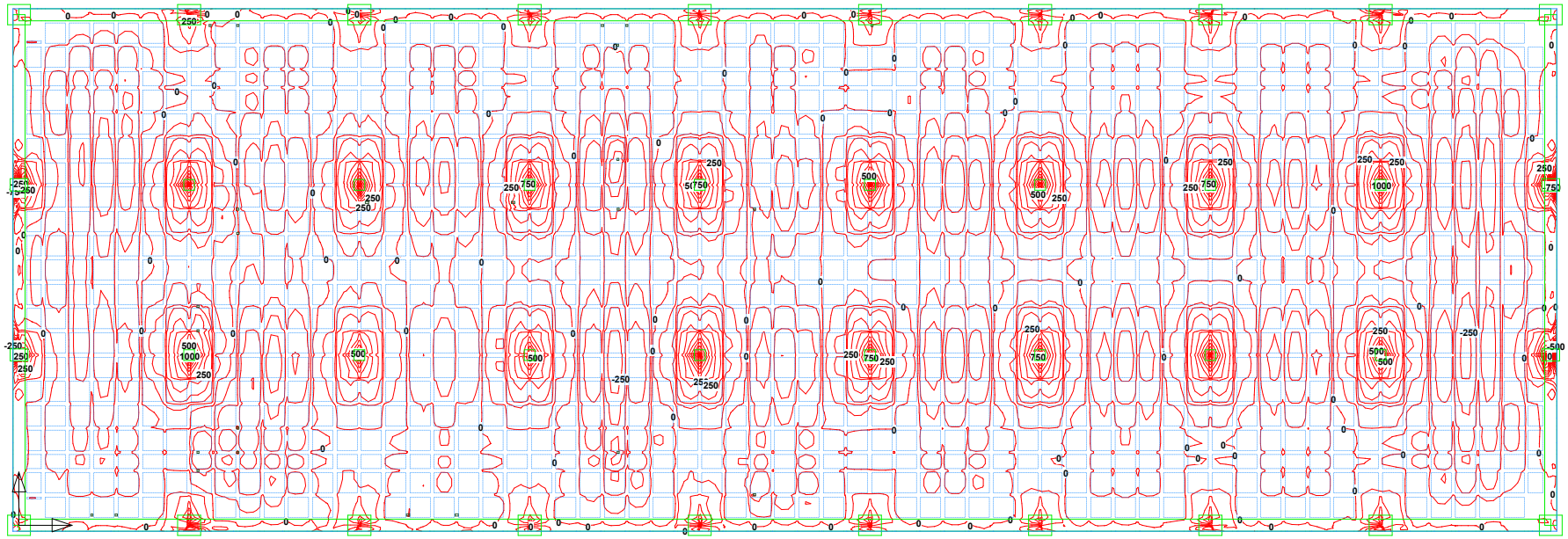
Service LC: D + 0.7E (Positive Y): Min Reactions Plan

Service LC: D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Positive Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



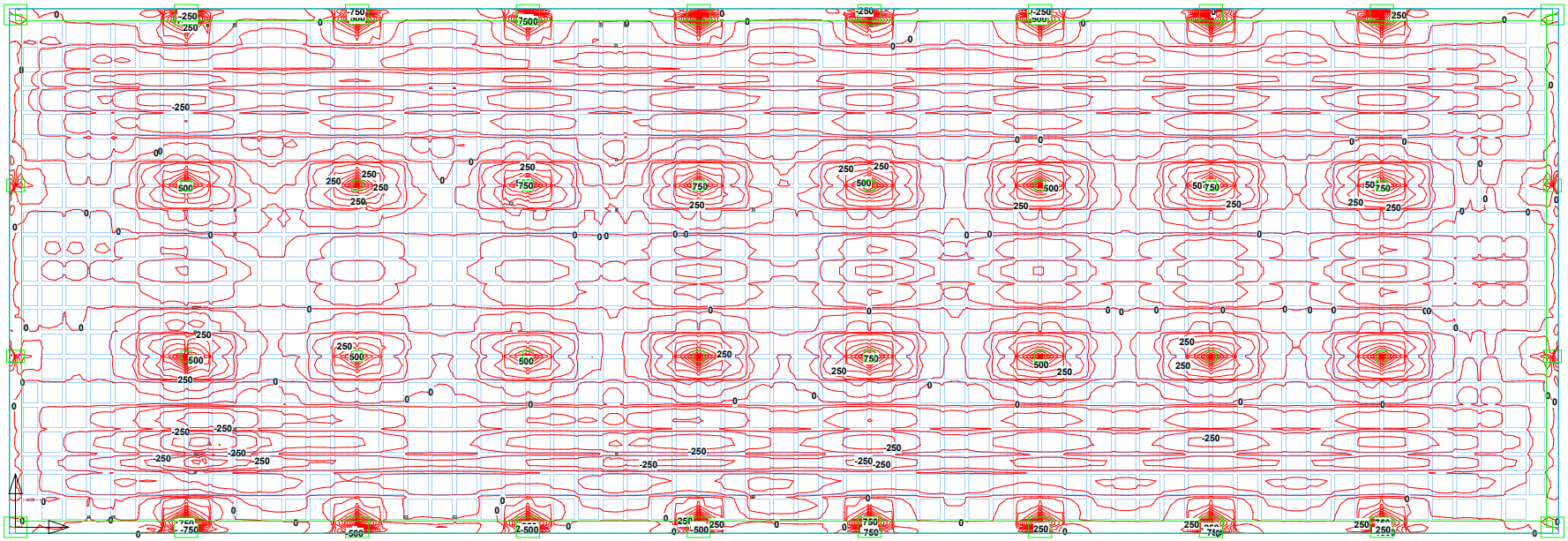
Service LC: D + 0.7E (Negative Y): Top X Stress Plan

Service LC: D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative Y) - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1056 psi @ (189.4,21.55) Max Value = 1004 psi @ (21.13,20.88)



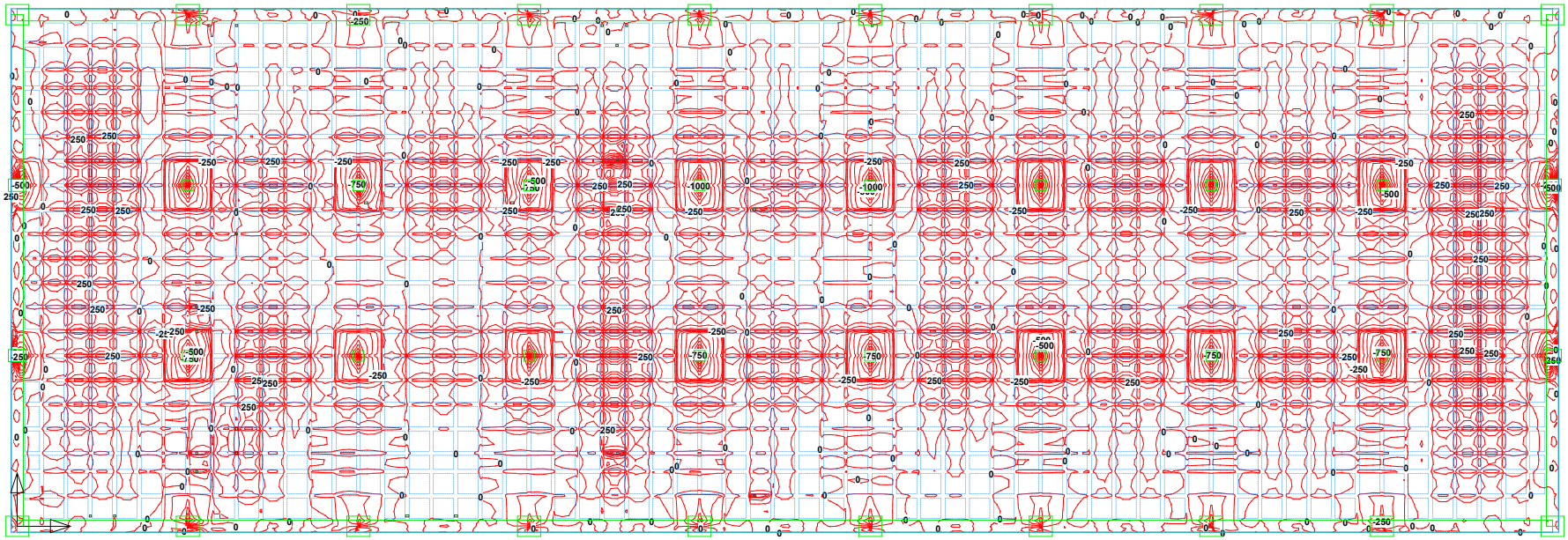
Service LC: D + 0.7E (Negative Y): Top Y Stress Plan

Service LC: D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative Y) - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1566 psi @ (20.83,-0.375) Max Value = 1205 psi @ (21.13,20.88)



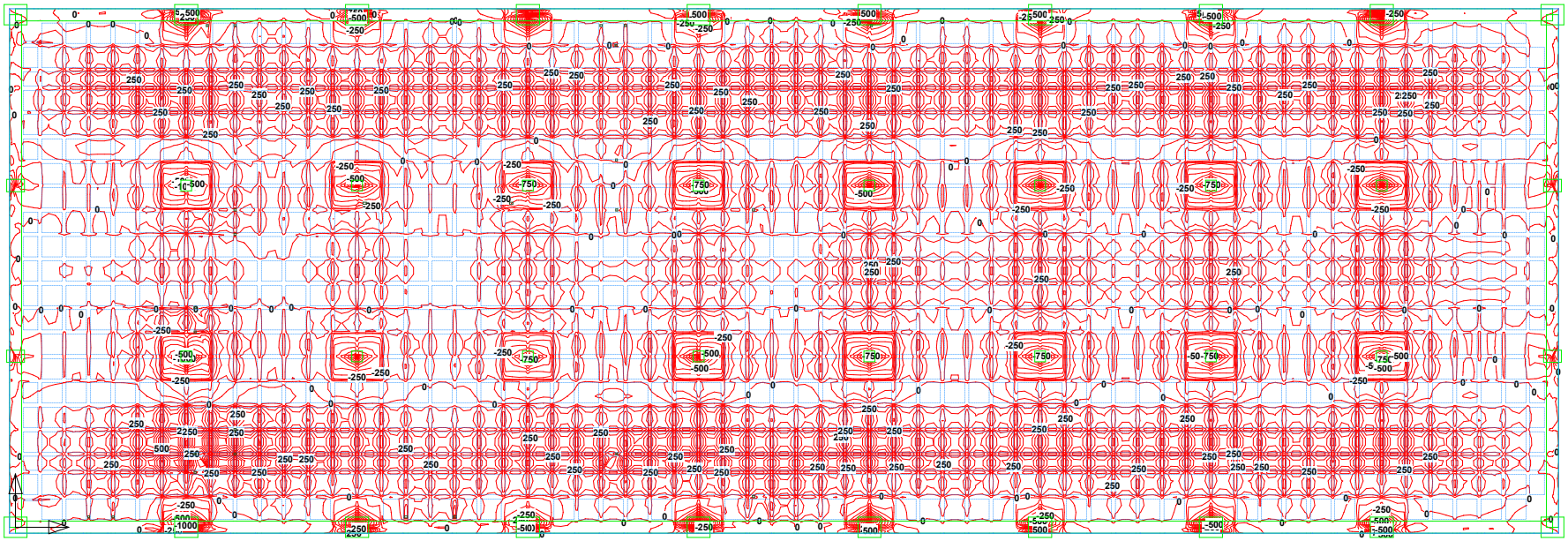
Service LC: D + 0.7E (Negative Y): Bottom X Stress Plan

Service LC: D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative Y) - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 50 psi
Min Value = -1089 psi @ (21.13,20.88) Max Value = 1099 psi @ (189.4,21.55)



Service LC: D + 0.7E (Negative Y): Bottom Y Stress Plan

Service LC: D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative Y) - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1300 psi @ (21.13,20.88) Max Value = 1635 psi @ (20.83,-0.375)

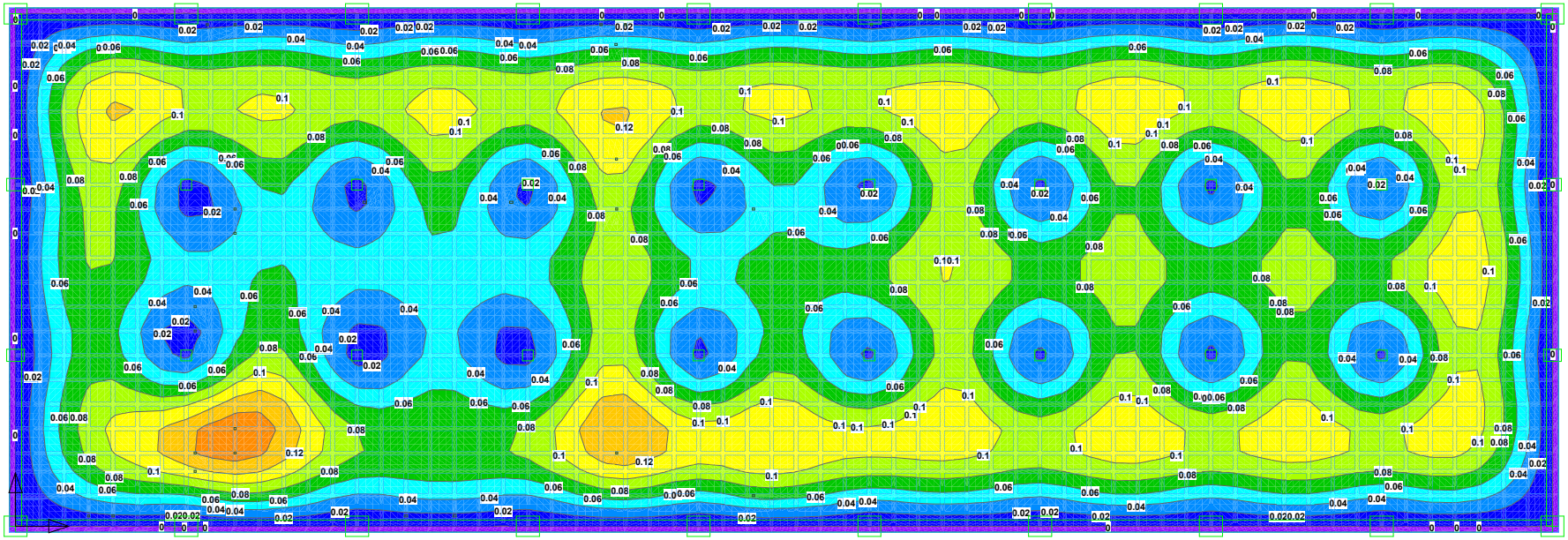


Service LC: D + 0.7E (Negative Y): Max Deflection Plan

Service LC: D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative Y) - Vertical Deflection Plot (Maximum Values)

0 0.02 0.04 0.06 0.08 0.1 0.12 0.14 0.16

Min Value = -0.01447 inches @ (29.49,-0.75) Max Value = 0.1554 inches @ (27.25,11.75)

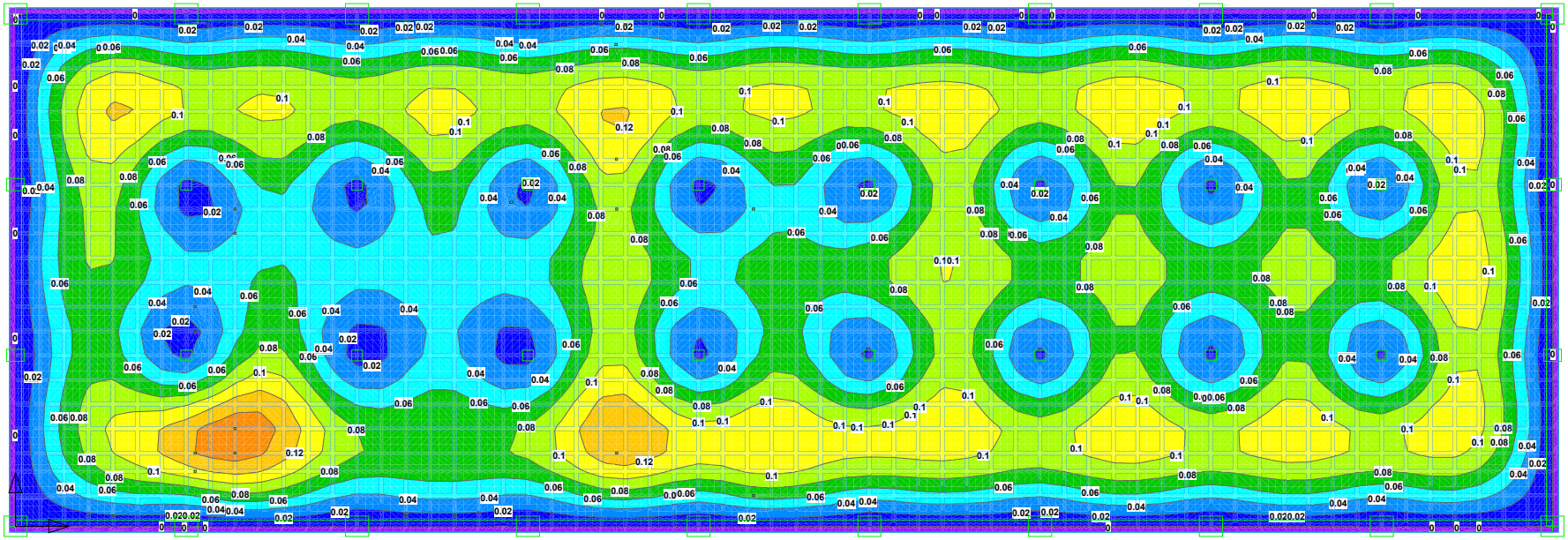


Service LC: D + 0.7E (Negative Y): Min Deflection Plan

Service LC: D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative Y) - Vertical Deflection Plot (Minimum Values)

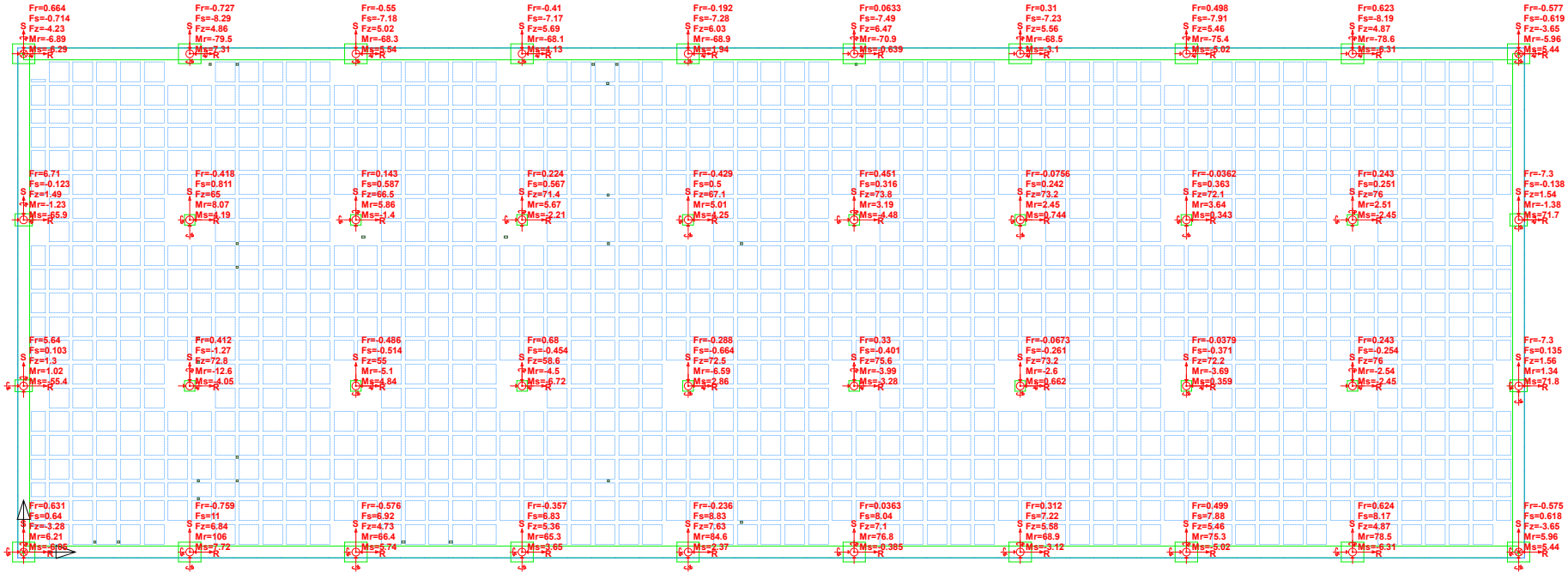
0 0.02 0.04 0.06 0.08 0.1 0.12 0.14 0.16

Min Value = -0.01447 inches @ (29.49,-0.75) Max Value = 0.1554 inches @ (27.25,11.75)



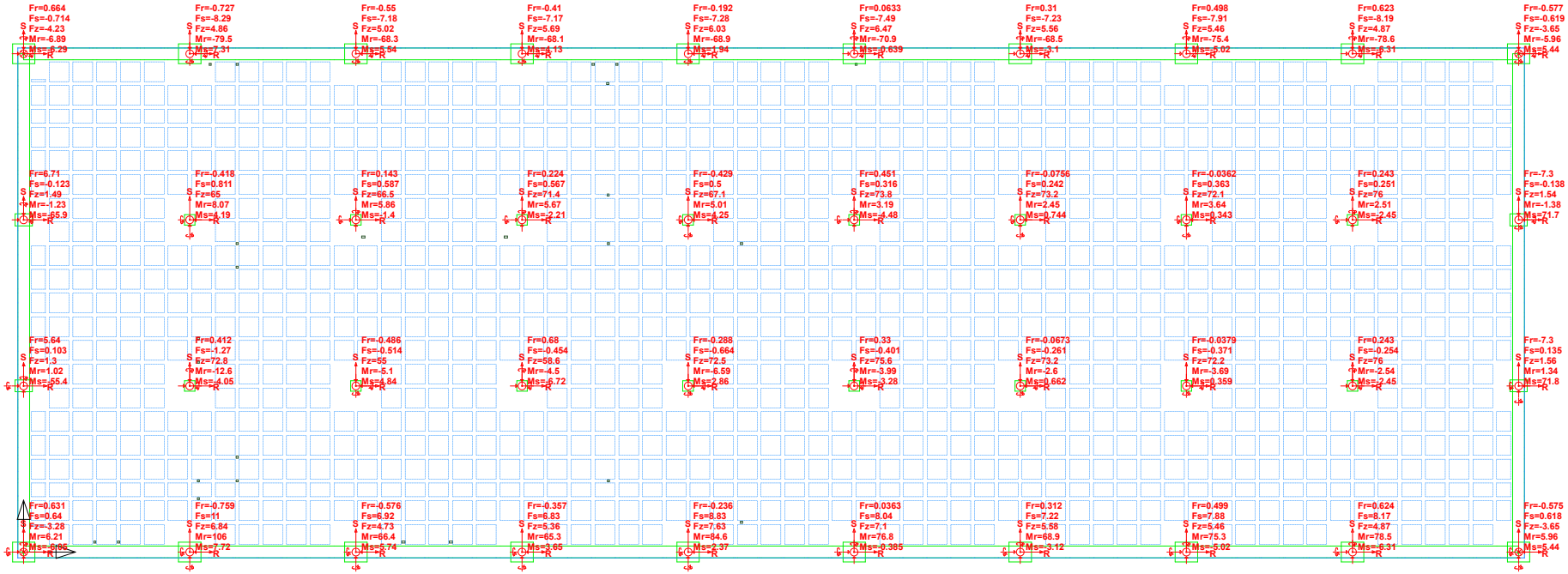
Service LC: D + 0.7E (Negative Y): Max Reactions Plan

Service LC: D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



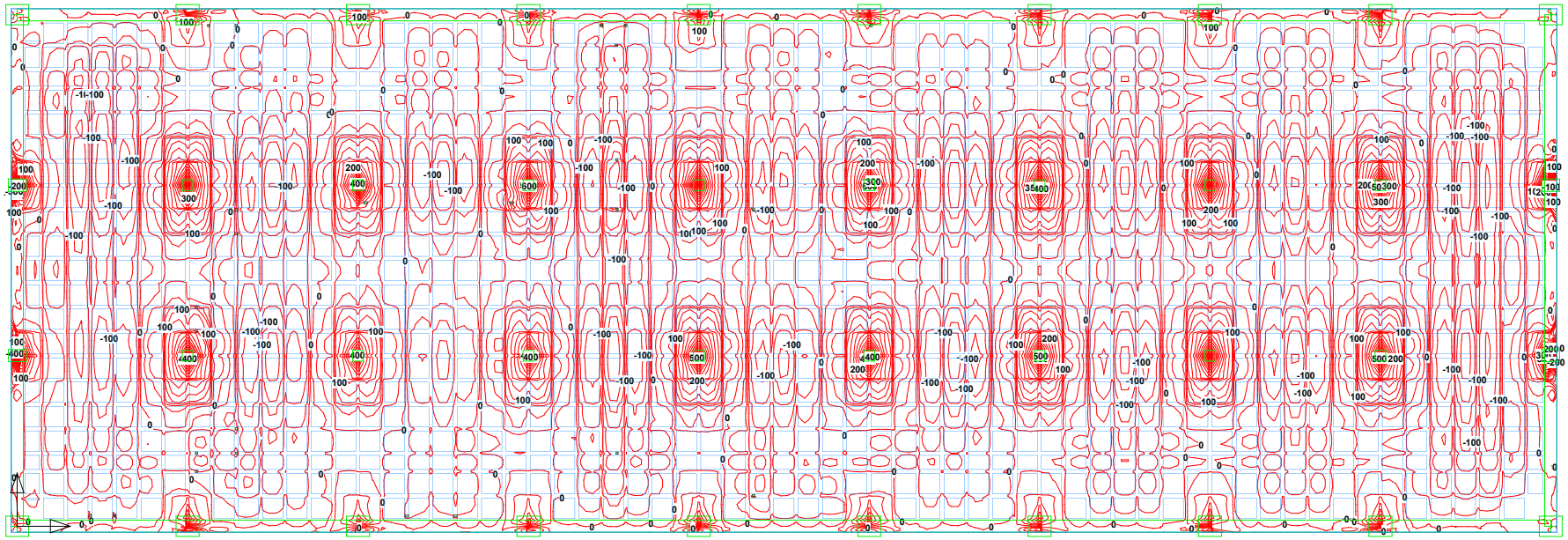
Service LC: D + 0.7E (Negative Y): Min Reactions Plan

Service LC: D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: D + 0.7E (Negative Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



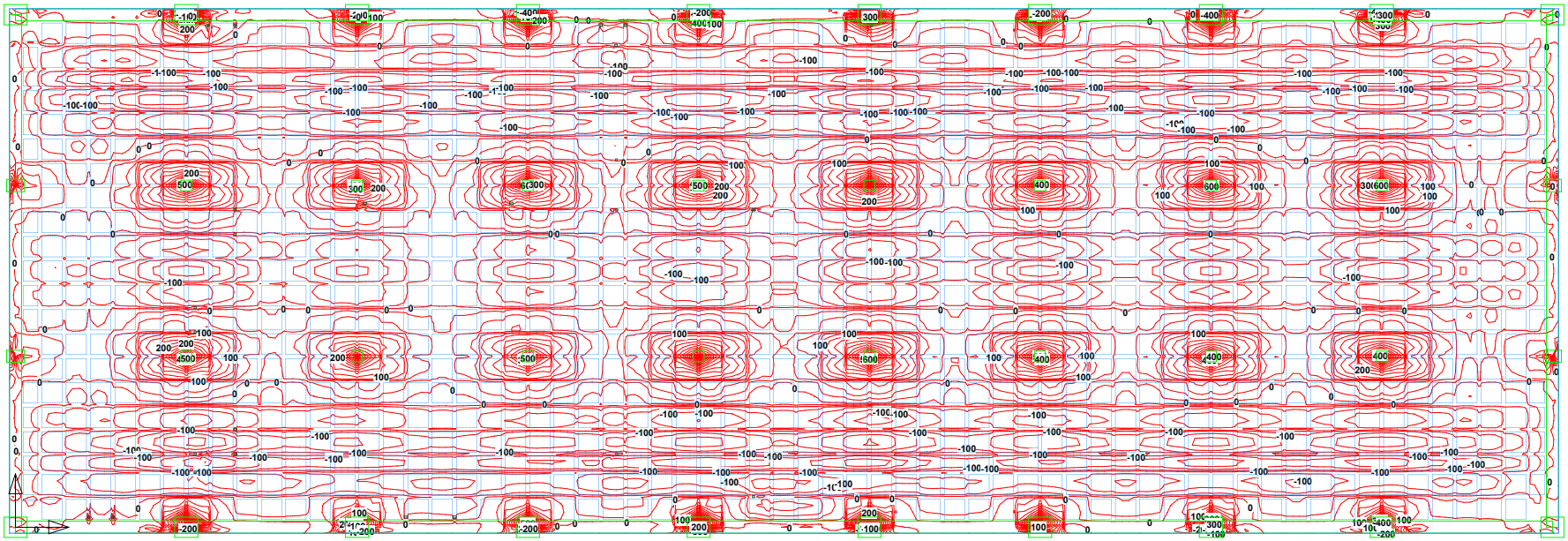
Service LC: 0.6D + 0.7E (Positive X): Top X Stress Plan

Service LC: 0.6D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive X) - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 20 psi
Min Value = -665.6 psi @ (189.4,21.55) Max Value = 613.2 psi @ (168.1,20.88)



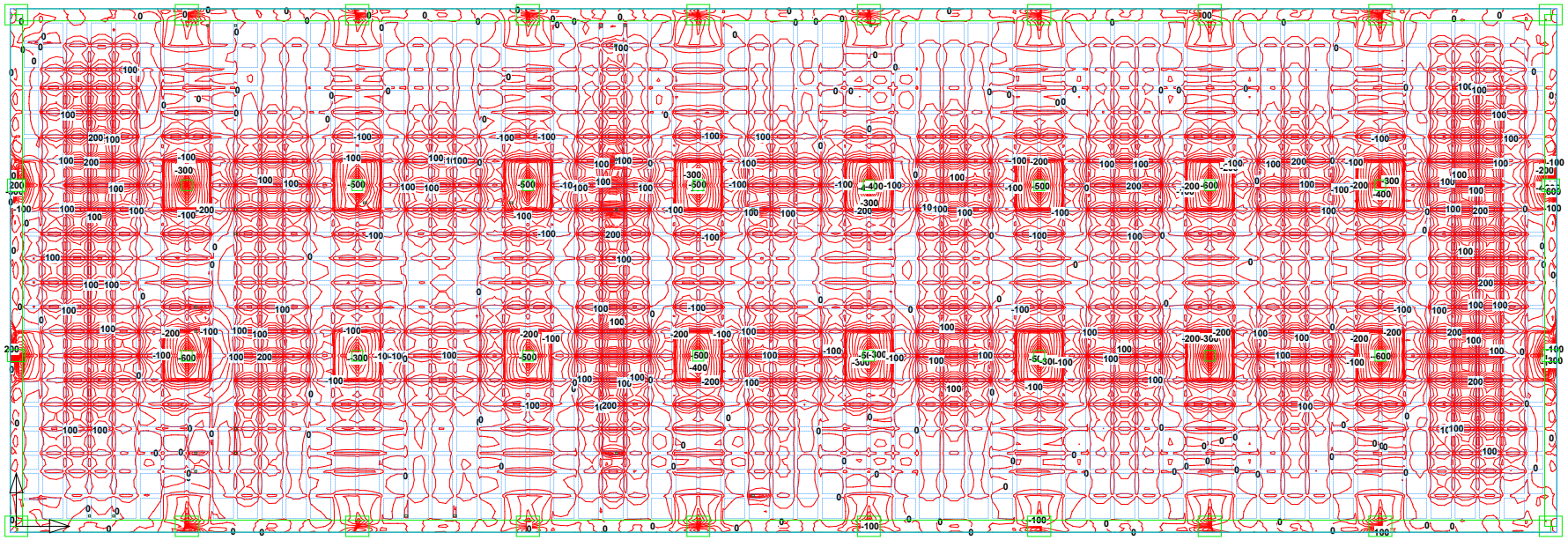
Service LC: 0.6D + 0.7E (Positive X): Top Y Stress Plan

Service LC: 0.6D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive X) - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 20 psi
Min Value = -756.5 psi @ (20.83,-0.375) Max Value = 642.2 psi @ (105.1,20.88)



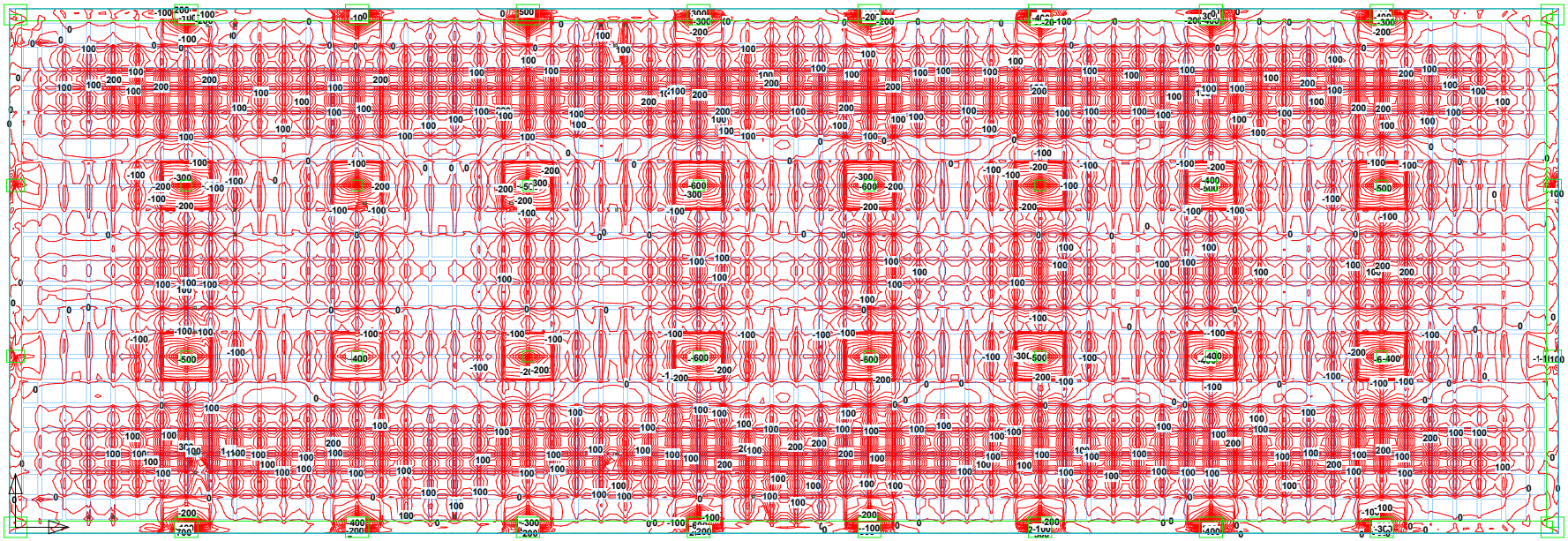
Service LC: 0.6D + 0.7E (Positive X): Bottom X Stress Plan

Service LC: 0.6D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive X) - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 20 psi
Min Value = -669.6 psi @ (168.1,20.88) Max Value = 692.7 psi @ (189.4,21.55)



Service LC: 0.6D + 0.7E (Positive X): Bottom Y Stress Plan

Service LC: 0.6D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive X) - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 20 psi
Min Value = -695.4 psi @ (105.1,20.88) Max Value = 790 psi @ (20.83,-0.375)

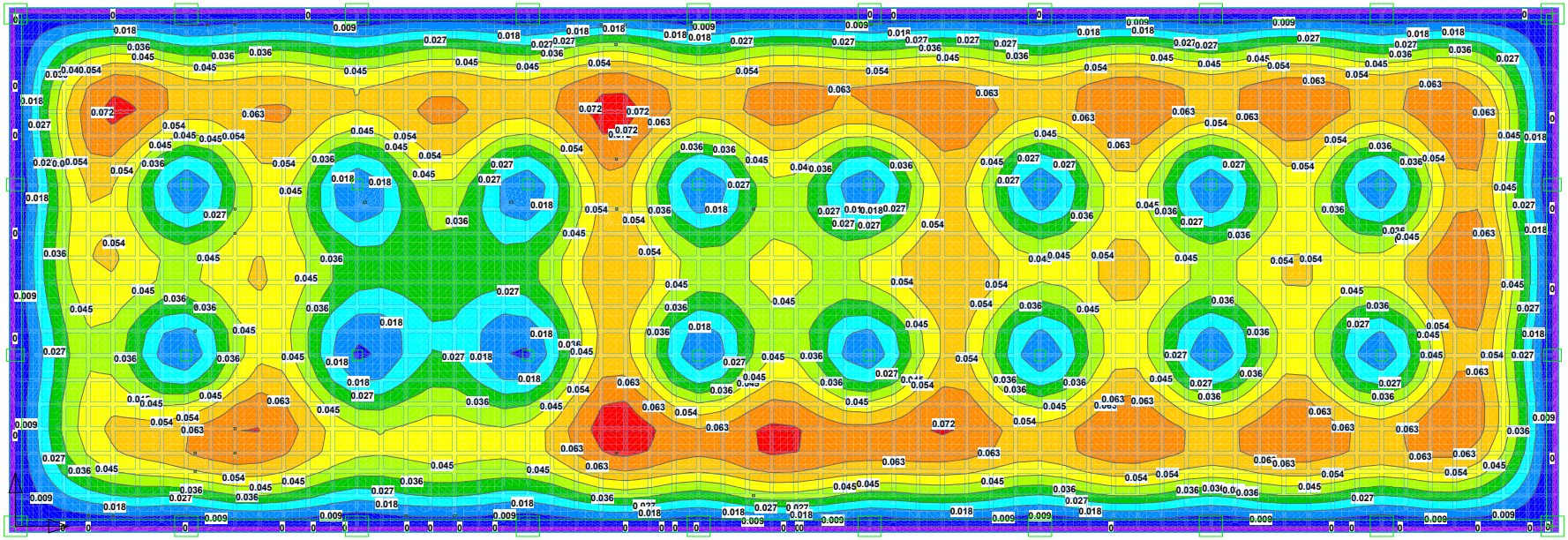


Service LC: 0.6D + 0.7E (Positive X): Max Deflection Plan

Service LC: 0.6D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive X) - Vertical Deflection Plot (Maximum Values)

0 0.009 0.018 0.027 0.036 0.045 0.054 0.063 0.072

Min Value = -0.008707 inches @ (92.99,-0.75) Max Value = 0.07793 inches @ (74.75,11.75)

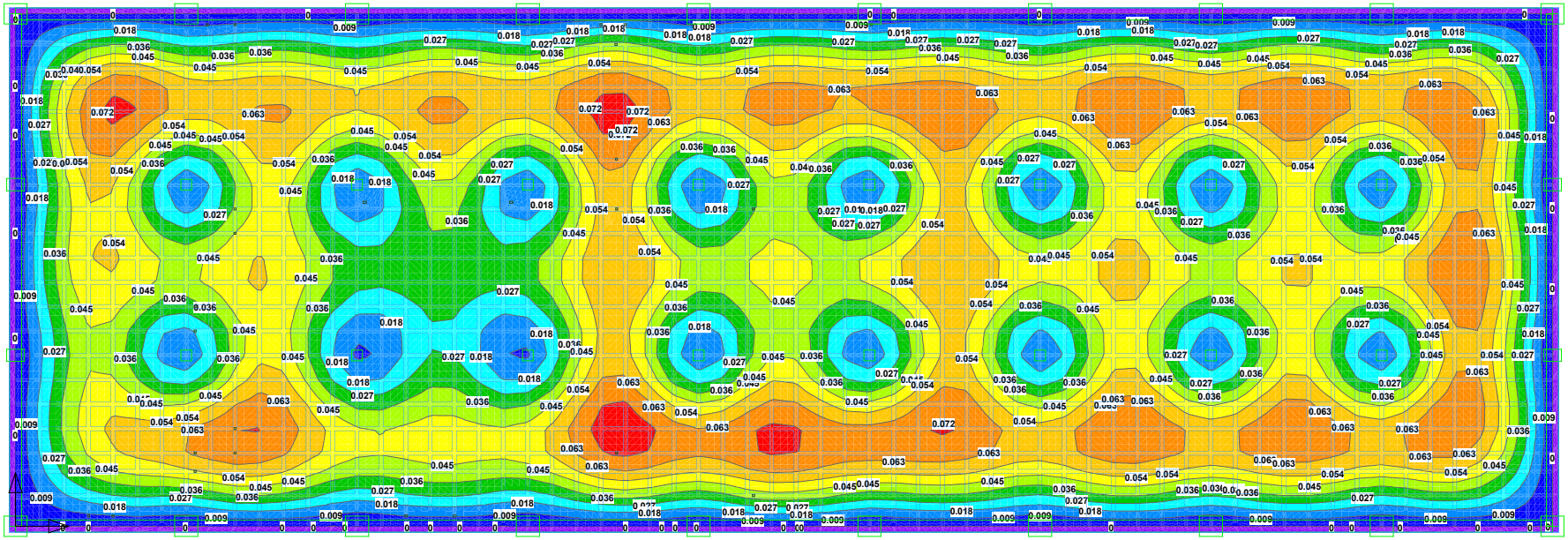


Service LC: 0.6D + 0.7E (Positive X): Min Deflection Plan

Service LC: 0.6D + 0.7E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive X) - Vertical Deflection Plot (Minimum Values)

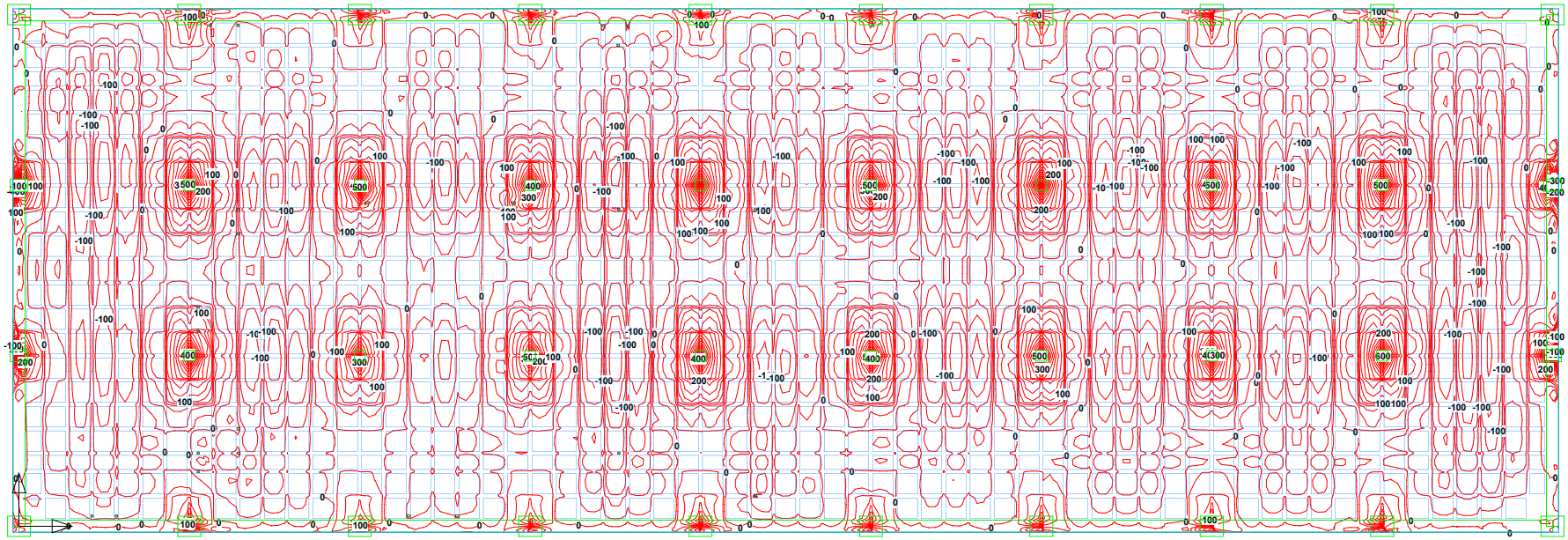
0 0.009 0.018 0.027 0.036 0.045 0.054 0.063 0.072

Min Value = -0.008707 inches @ (92.99,-0.75) Max Value = 0.07793 inches @ (74.75,11.75)



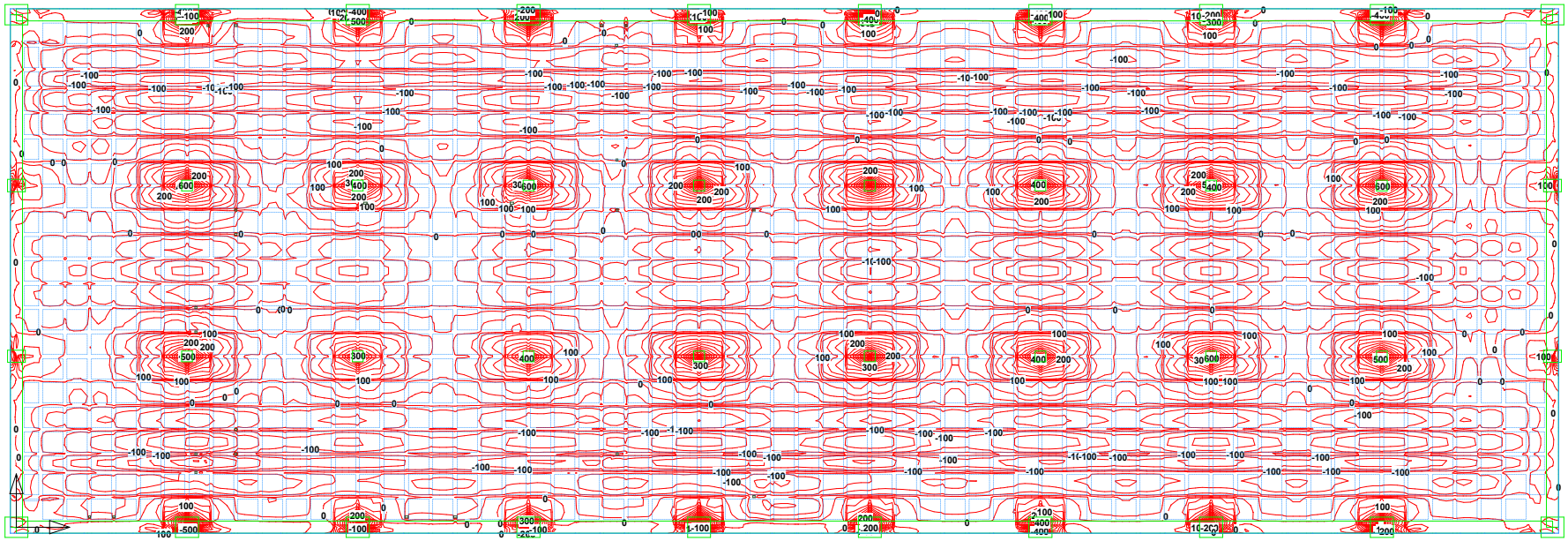
Service LC: 0.6D + 0.7E (Negative X): Top X Stress Plan

Service LC: 0.6D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative X) - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 20 psi
Min Value = -665.6 psi @ (189.4,21.55) Max Value = 613.2 psi @ (168.1,20.88)



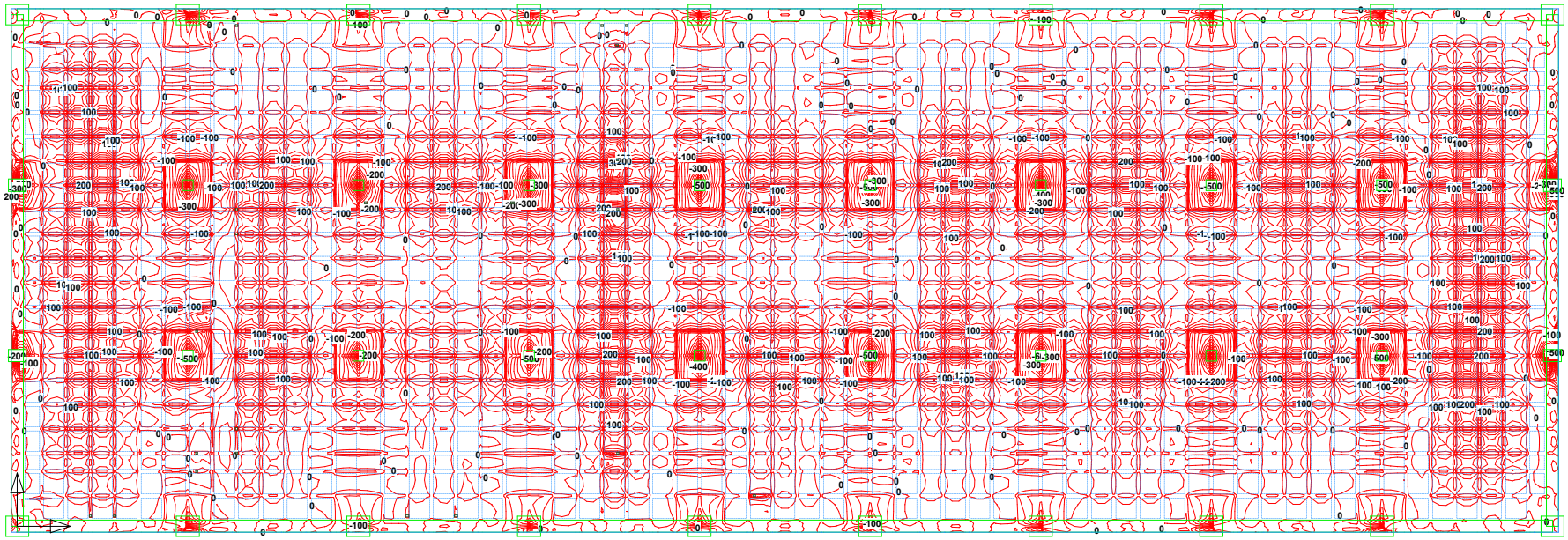
Service LC: 0.6D + 0.7E (Negative X): Top Y Stress Plan

Service LC: 0.6D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative X) - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 20 psi
Min Value = -790.1 psi @ (20.83,-0.375) Max Value = 628 psi @ (105.1,20.88)



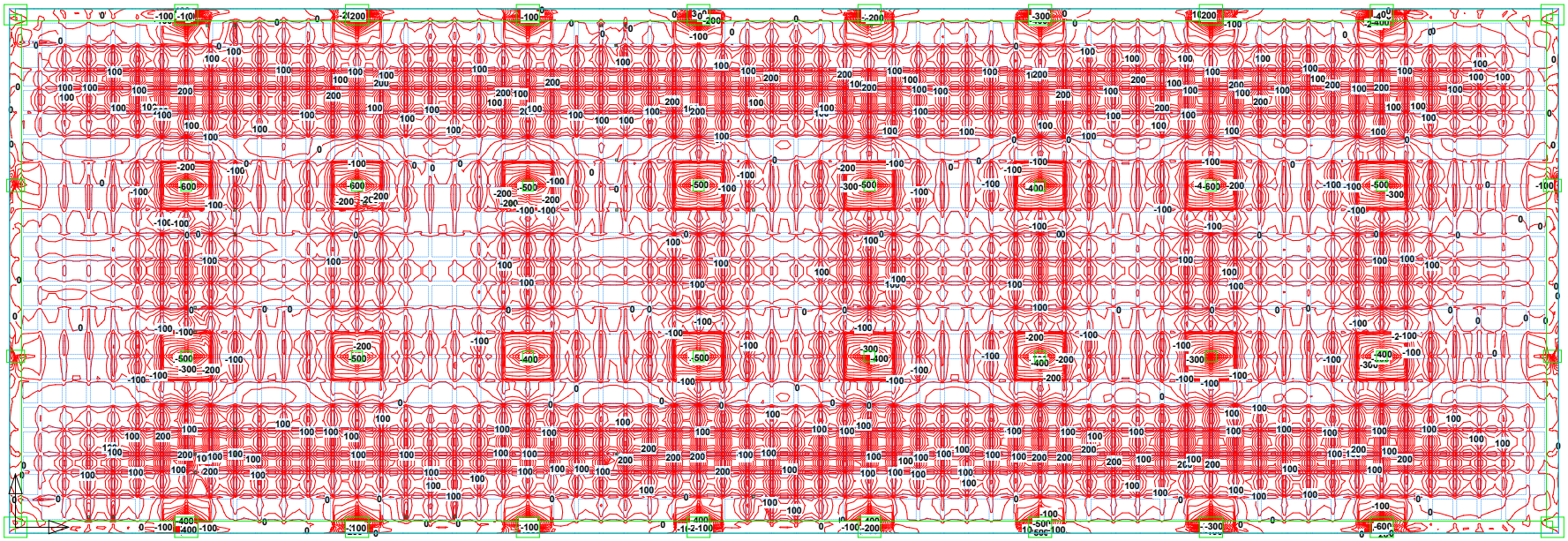
Service LC: 0.6D + 0.7E (Negative X): Bottom X Stress Plan

Service LC: 0.6D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative X) - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 20 psi
Min Value = -669.6 psi @ (168.1,42.13) Max Value = 692.7 psi @ (189.4,21.55)



Service LC: 0.6D + 0.7E (Negative X): Bottom Y Stress Plan

Service LC: 0.6D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative X) - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 20 psi
Min Value = -680 psi @ (105.1,20.88) Max Value = 825.2 psi @ (20.83,-0.375)

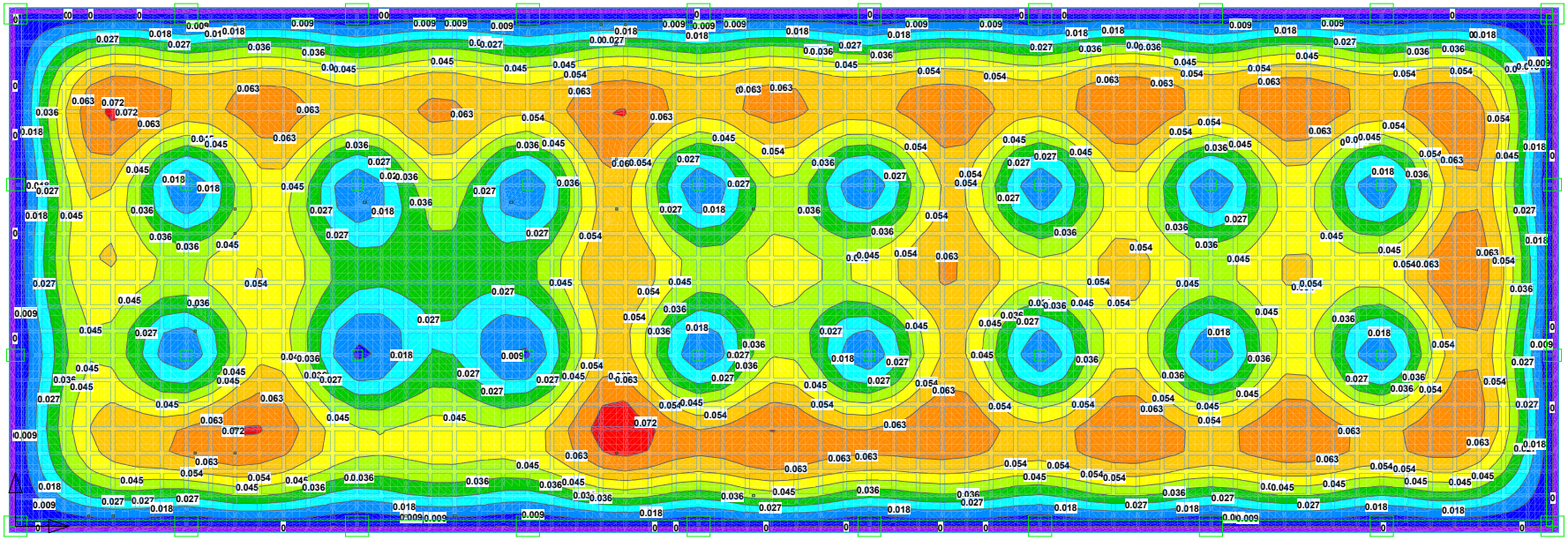


Service LC: 0.6D + 0.7E (Negative X): Max Deflection Plan

Service LC: 0.6D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative X) - Vertical Deflection Plot (Maximum Values)

0 0.009 0.018 0.027 0.036 0.045 0.054 0.063 0.072

Min Value = -0.008436 inches @ (92.99,-0.75) Max Value = 0.0779 inches @ (74.75,11.75)

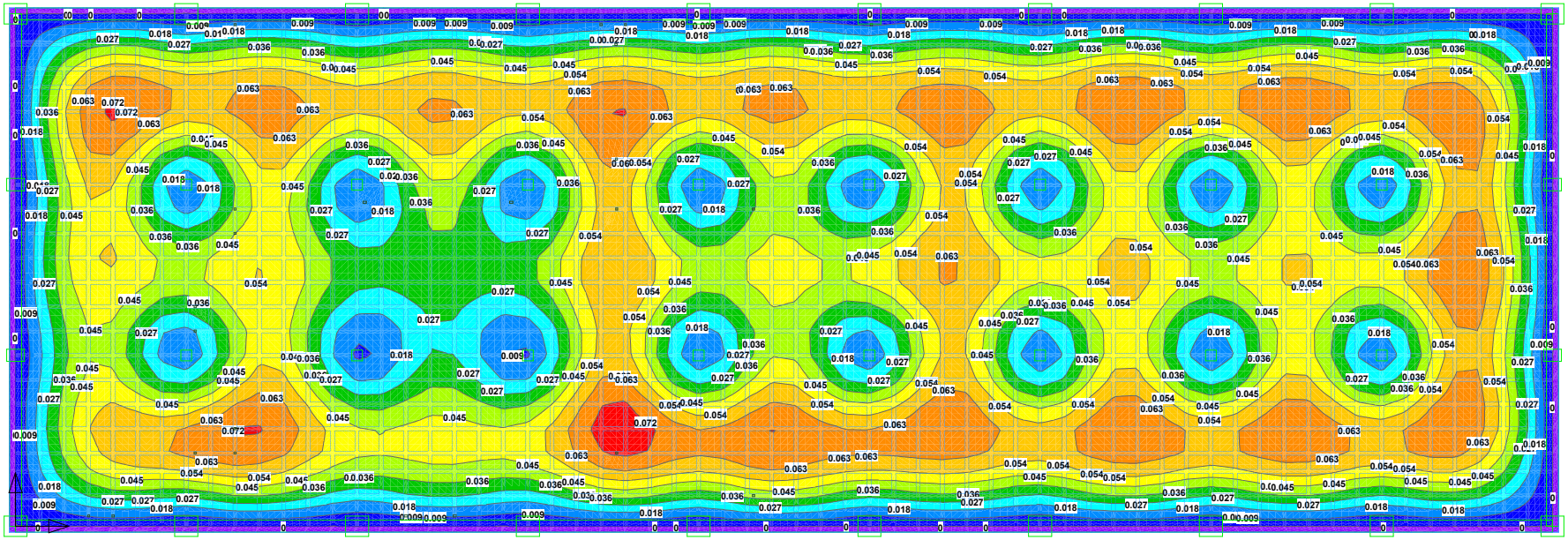


Service LC: 0.6D + 0.7E (Negative X): Min Deflection Plan

Service LC: 0.6D + 0.7E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative X) - Vertical Deflection Plot (Minimum Values)

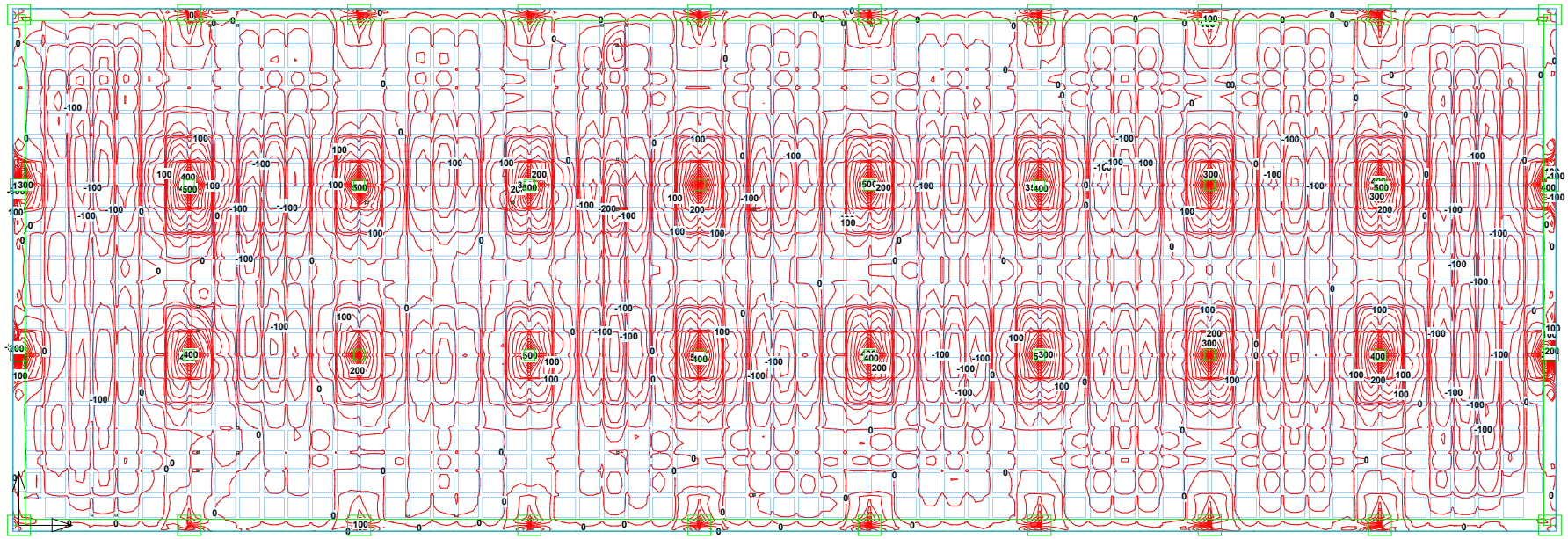
0 0.009 0.018 0.027 0.036 0.045 0.054 0.063 0.072

Min Value = -0.008436 inches @ (92.99,-0.75) Max Value = 0.0779 inches @ (74.75,11.75)



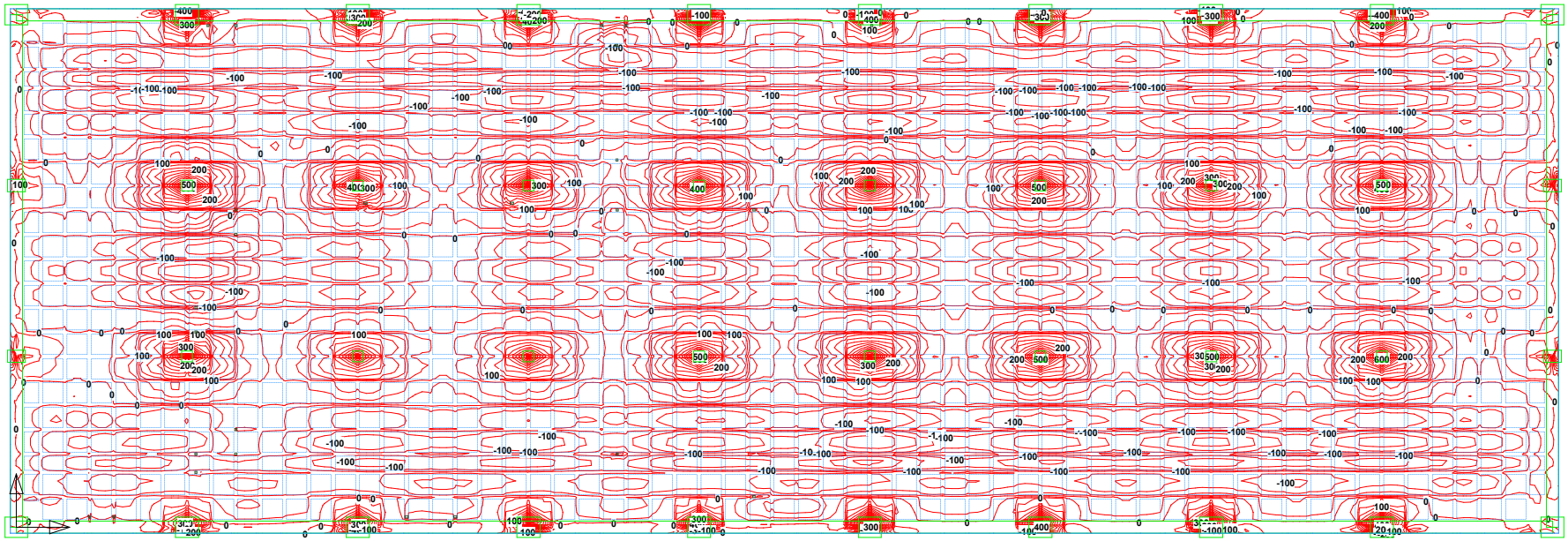
Service LC: 0.6D + 0.7E (Positive Y): Top X Stress Plan

Service LC: 0.6D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive Y) - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 20 psi
Min Value = -665.6 psi @ (189.4,21.55) Max Value = 714.1 psi @ (21.13,41.88)



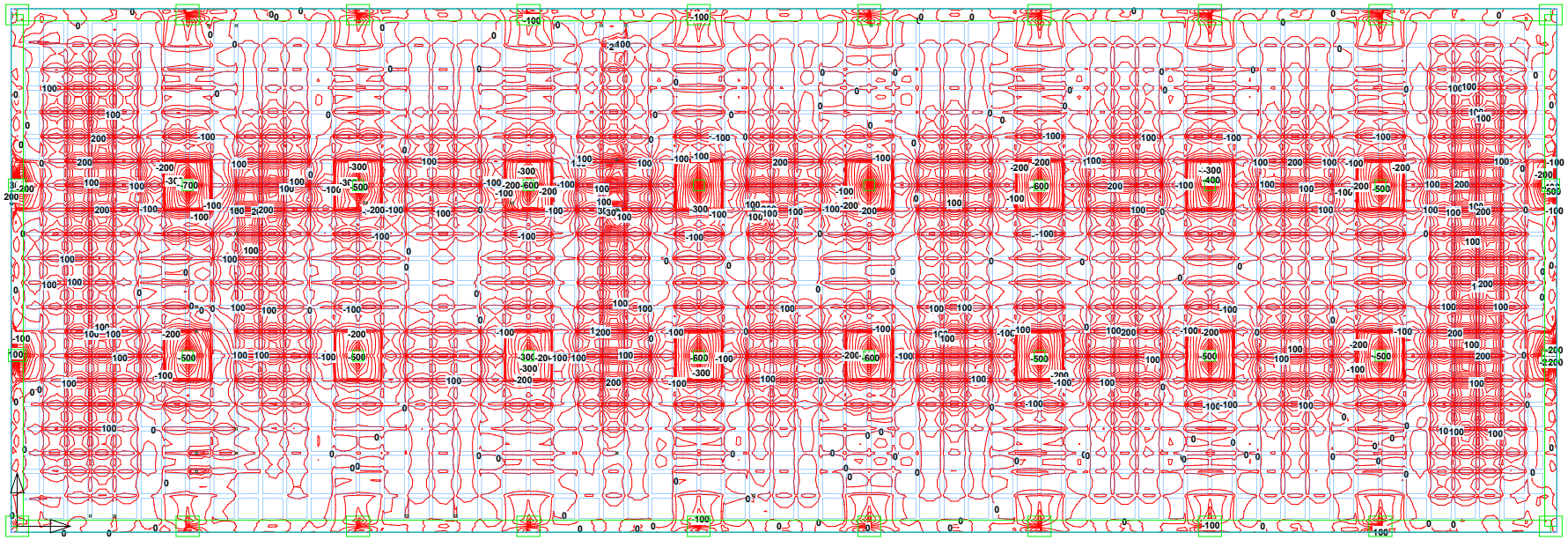
Service LC: 0.6D + 0.7E (Positive Y): Top Y Stress Plan

Service LC: 0.6D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive Y) - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 20 psi
Min Value = -734 psi @ (168.2,-0.375) Max Value = 711.3 psi @ (21.13,21.13)



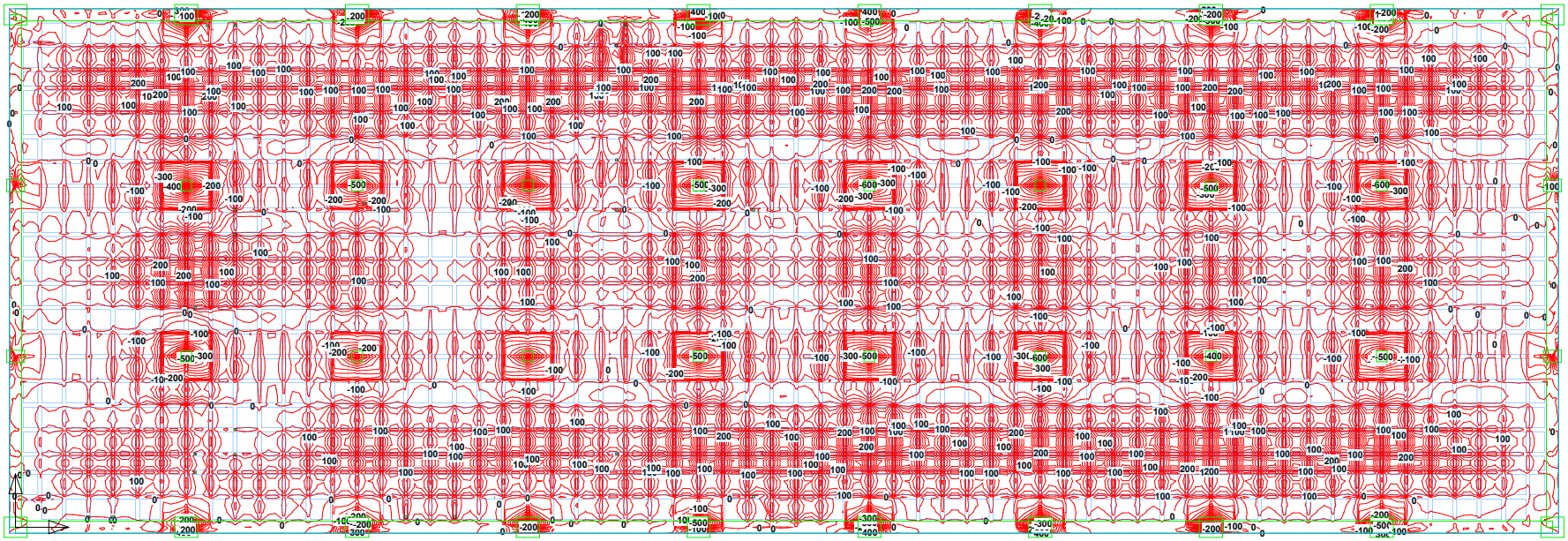
Service LC: 0.6D + 0.7E (Positive Y): Bottom X Stress Plan

Service LC: 0.6D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive Y) - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 20 psi
Min Value = -777.9 psi @ (21.13,41.88) Max Value = 692.8 psi @ (189.4,21.55)



Service LC: 0.6D + 0.7E (Positive Y): Bottom Y Stress Plan

Service LC: 0.6D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive Y) - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 20 psi
Min Value = -763.2 psi @ (21.13,21.13) Max Value = 765.7 psi @ (168.2,-0.375)

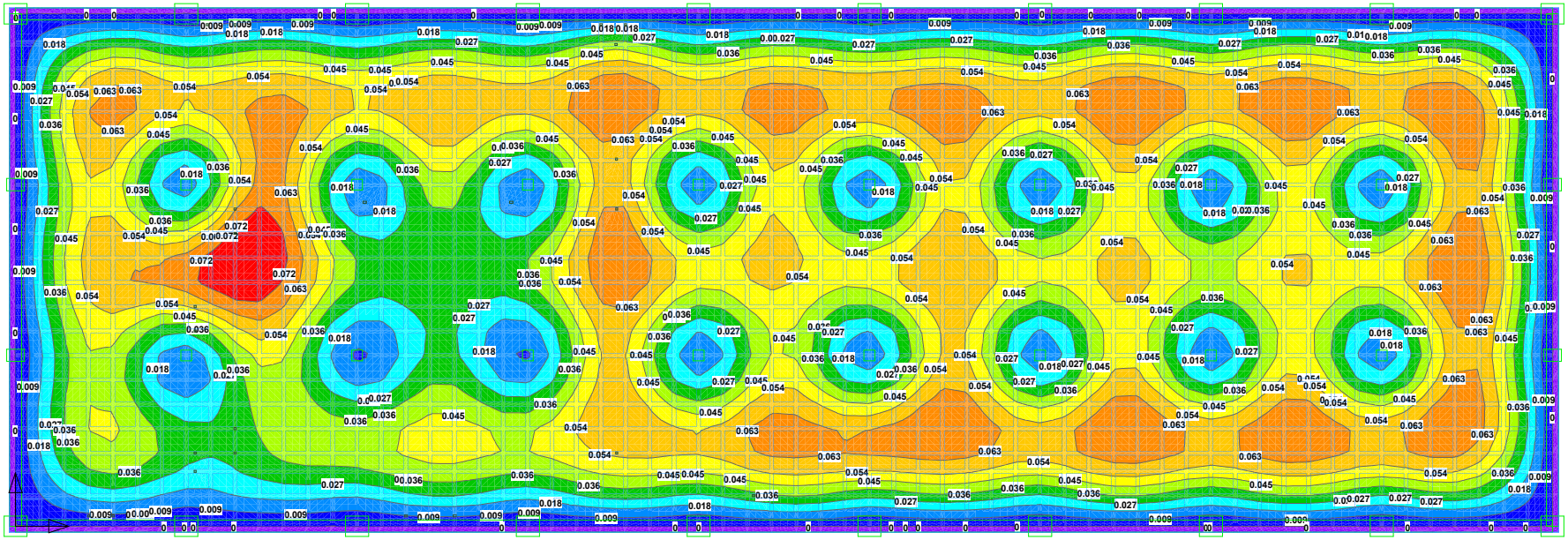


Service LC: 0.6D + 0.7E (Positive Y): Max Deflection Plan

Service LC: 0.6D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive Y) - Vertical Deflection Plot (Maximum Values)

0 0.009 0.018 0.027 0.036 0.045 0.054 0.063 0.072

Min Value = -0.008019 inches @ (74.85,63.75) Max Value = 0.08365 inches @ (27.25,32.75)

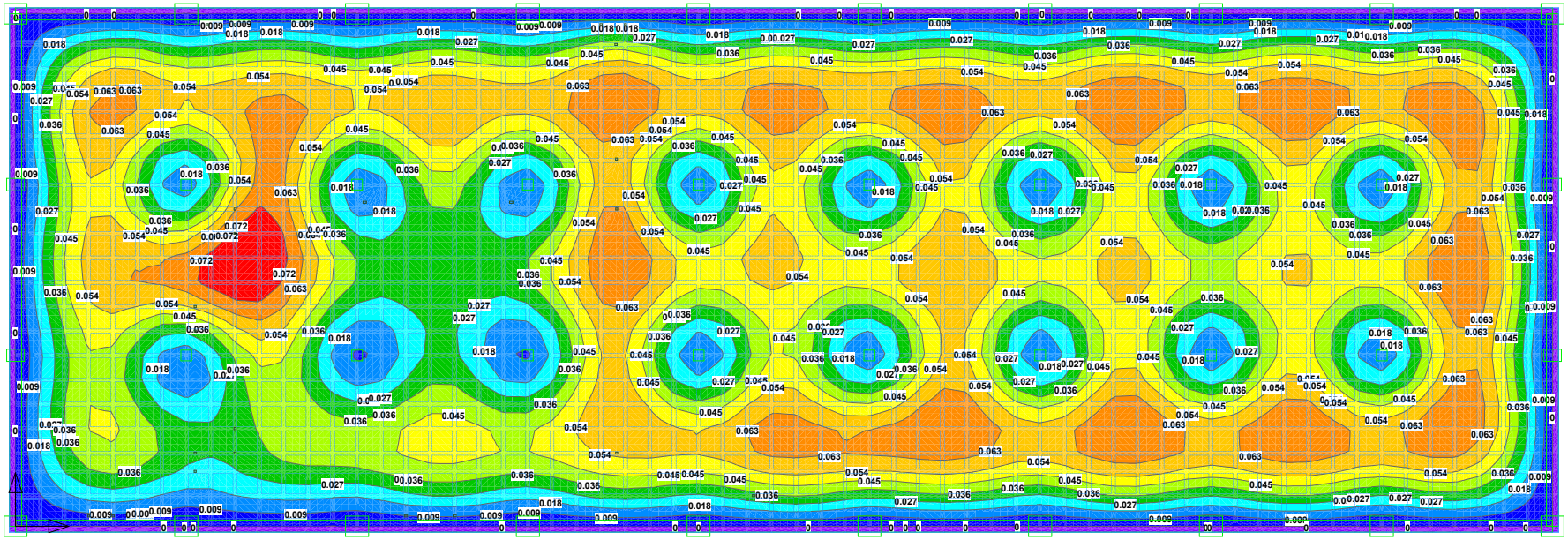


Service LC: 0.6D + 0.7E (Positive Y): Min Deflection Plan

Service LC: 0.6D + 0.7E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Positive Y) - Vertical Deflection Plot (Minimum Values)

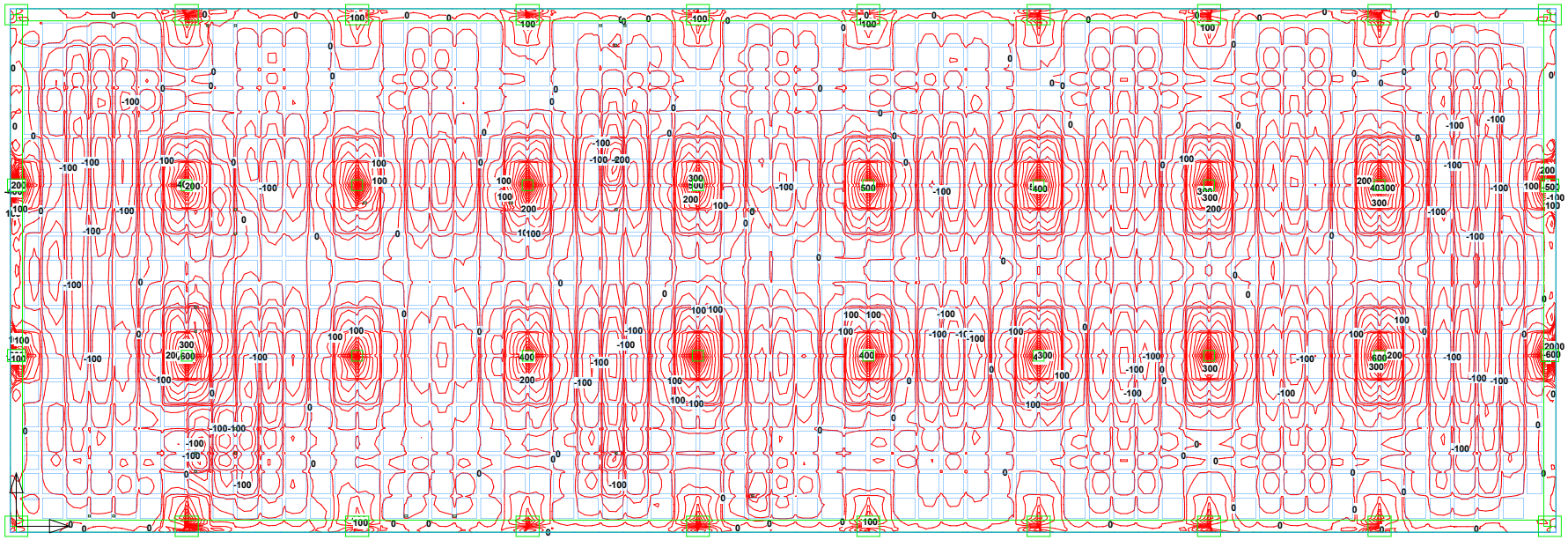
0 0.009 0.018 0.027 0.036 0.045 0.054 0.063 0.072

Min Value = -0.008019 inches @ (74.85,63.75) Max Value = 0.08365 inches @ (27.25,32.75)



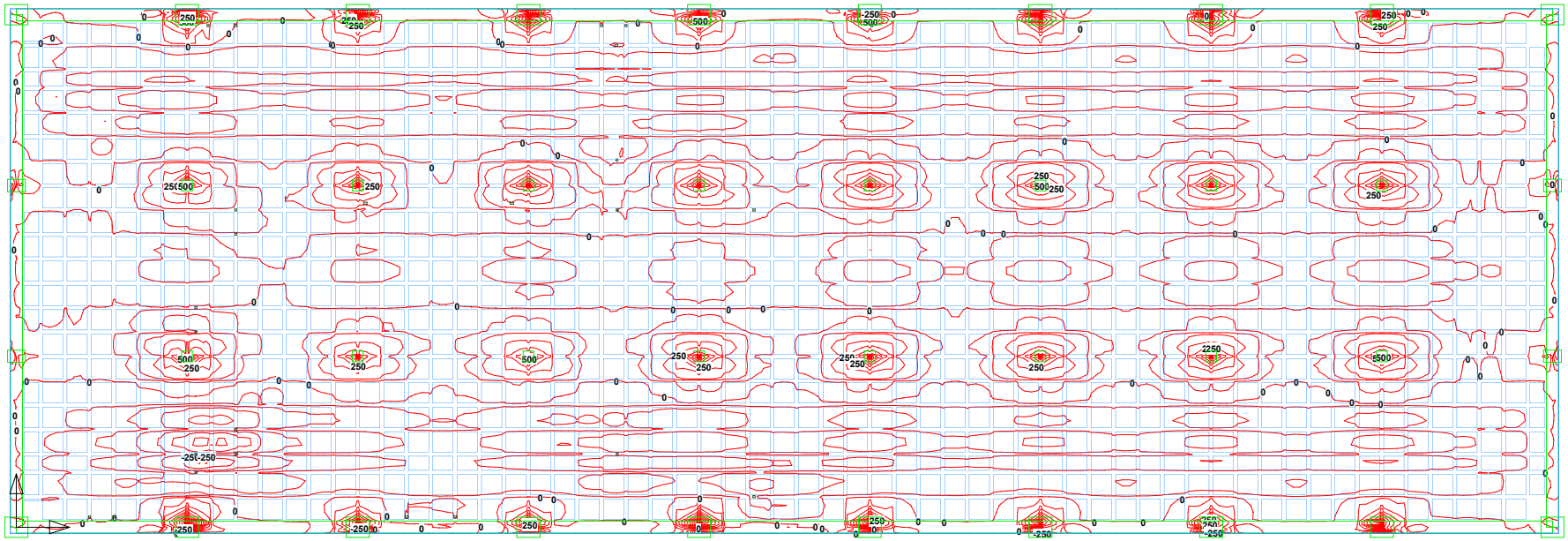
Service LC: 0.6D + 0.7E (Negative Y): Top X Stress Plan

Service LC: 0.6D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative Y) - Axial Stress Plot (@Top of Slab) (X-Axis Direction)
One Contour = 20 psi
Min Value = -665.4 psi @ (189.4,21.55) Max Value = 658.3 psi @ (21.13,20.88)



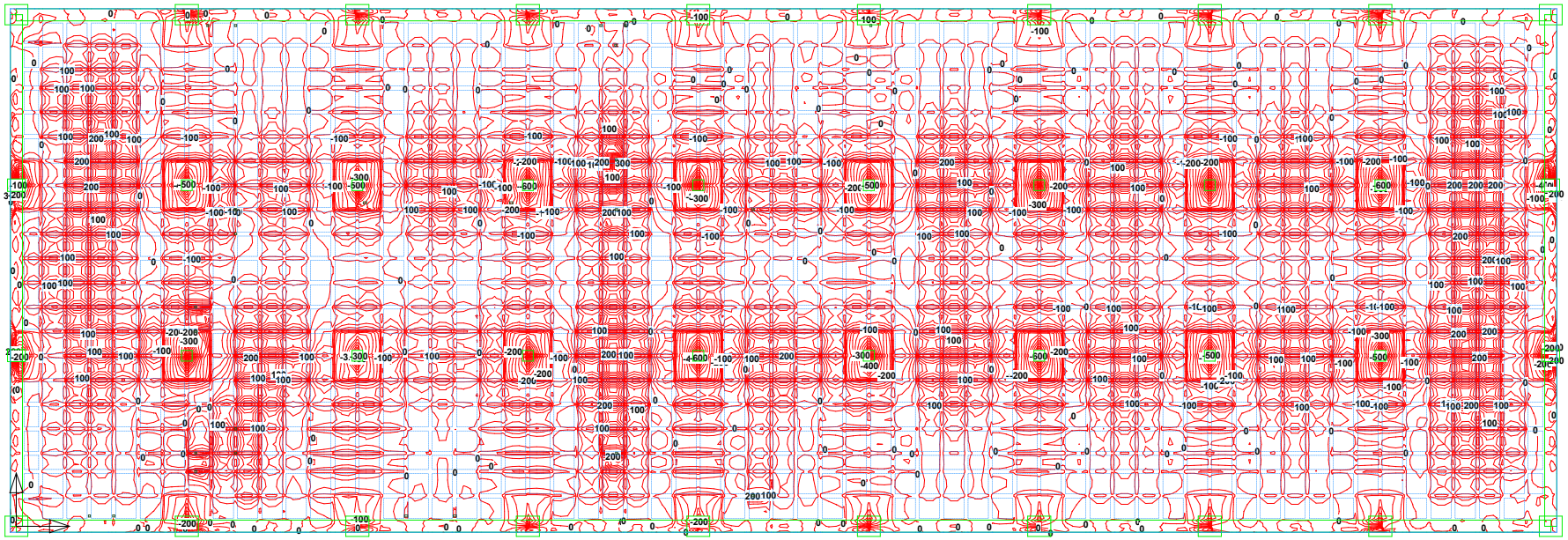
Service LC: 0.6D + 0.7E (Negative Y): Top Y Stress Plan

Service LC: 0.6D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative Y) - Axial Stress Plot (@Top of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -1116 psi @ (20.83,-0.375) Max Value = 844.2 psi @ (21.13,20.88)



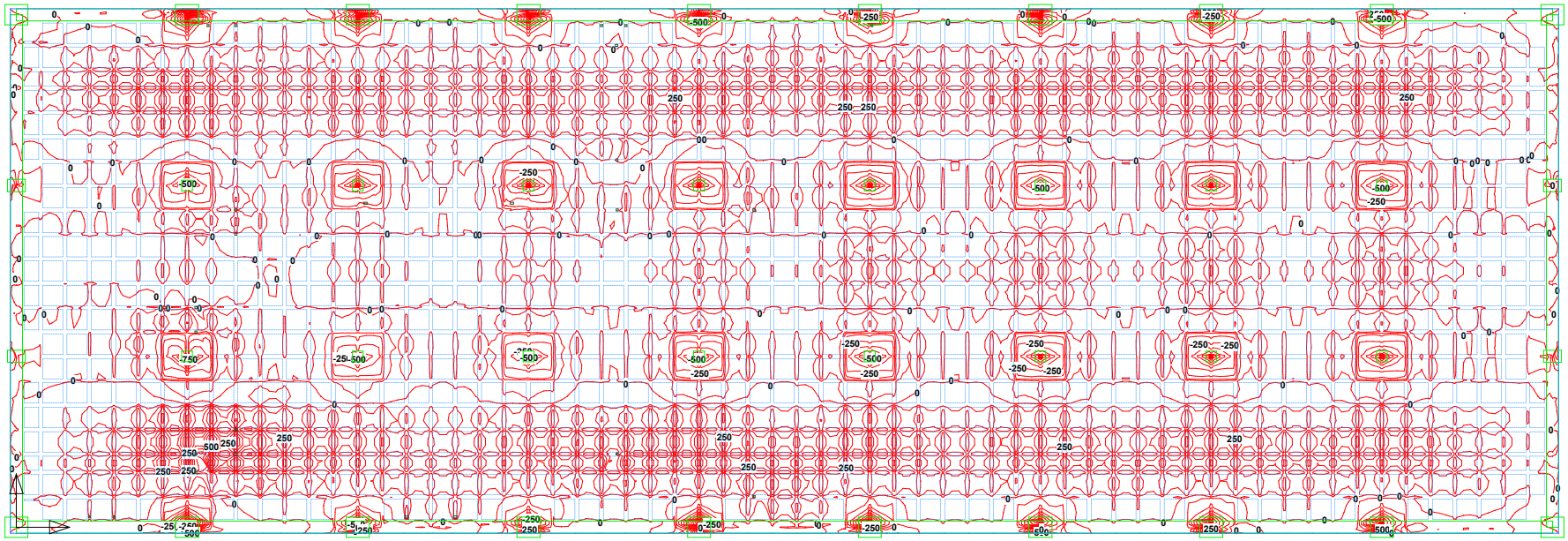
Service LC: 0.6D + 0.7E (Negative Y): Bottom X Stress Plan

Service LC: 0.6D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative Y) - Axial Stress Plot (@Bottom of Slab) (X-Axis Direction)
One Contour = 20 psi
Min Value = -713.1 psi @ (21.13,20.88) Max Value = 692.5 psi @ (189.4,21.55)



Service LC: 0.6D + 0.7E (Negative Y): Bottom Y Stress Plan

Service LC: 0.6D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative Y) - Axial Stress Plot (@Bottom of Slab) (Y-Axis Direction)
One Contour = 50 psi
Min Value = -908.3 psi @ (21.13,20.88) Max Value = 1165 psi @ (20.83,-0.375)

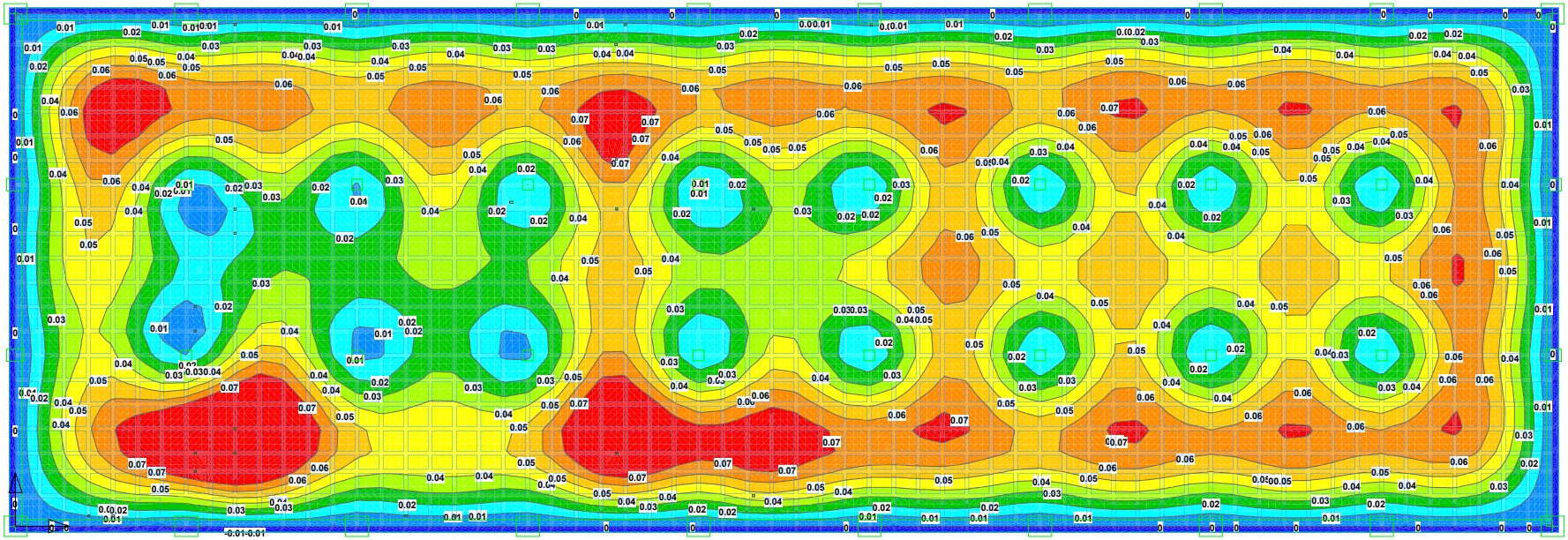


Service LC: 0.6D + 0.7E (Negative Y): Max Deflection Plan

Service LC: 0.6D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative Y) - Vertical Deflection Plot (Maximum Values)

-0.01 0 0.01 0.02 0.03 0.04 0.05 0.06 0.07

Min Value = -0.01028 inches @ (29.49,-0.75) Max Value = 0.1136 inches @ (27.25,11.75)

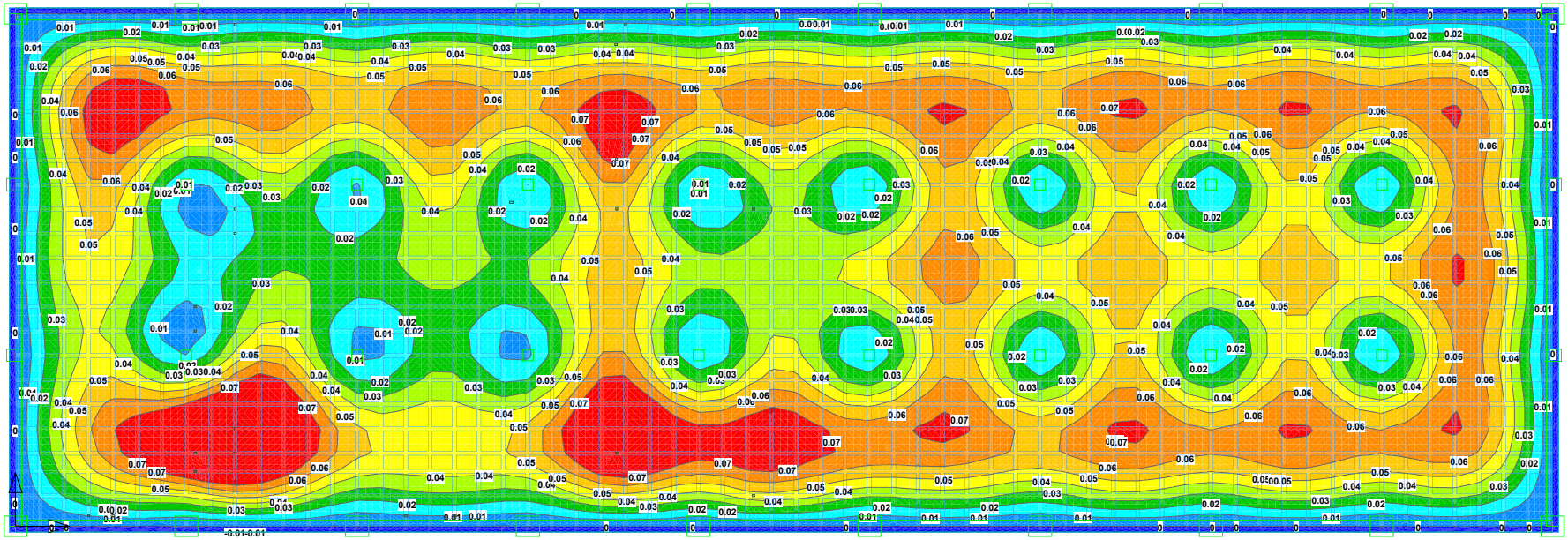


Service LC: 0.6D + 0.7E (Negative Y): Min Deflection Plan

Service LC: 0.6D + 0.7E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service LC: 0.6D + 0.7E (Negative Y) - Vertical Deflection Plot (Minimum Values)

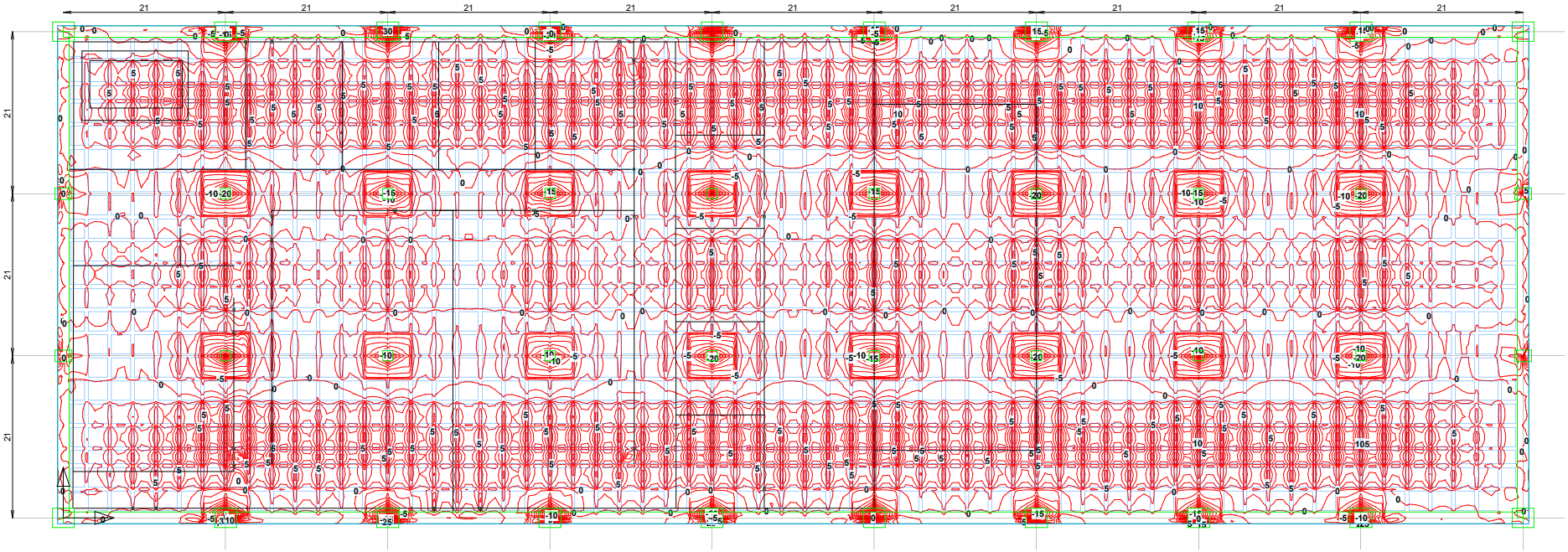
-0.01 0 0.01 0.02 0.03 0.04 0.05 0.06 0.07

Min Value = -0.01028 inches @ (29.49,-0.75) Max Value = 0.1136 inches @ (27.25,11.75)



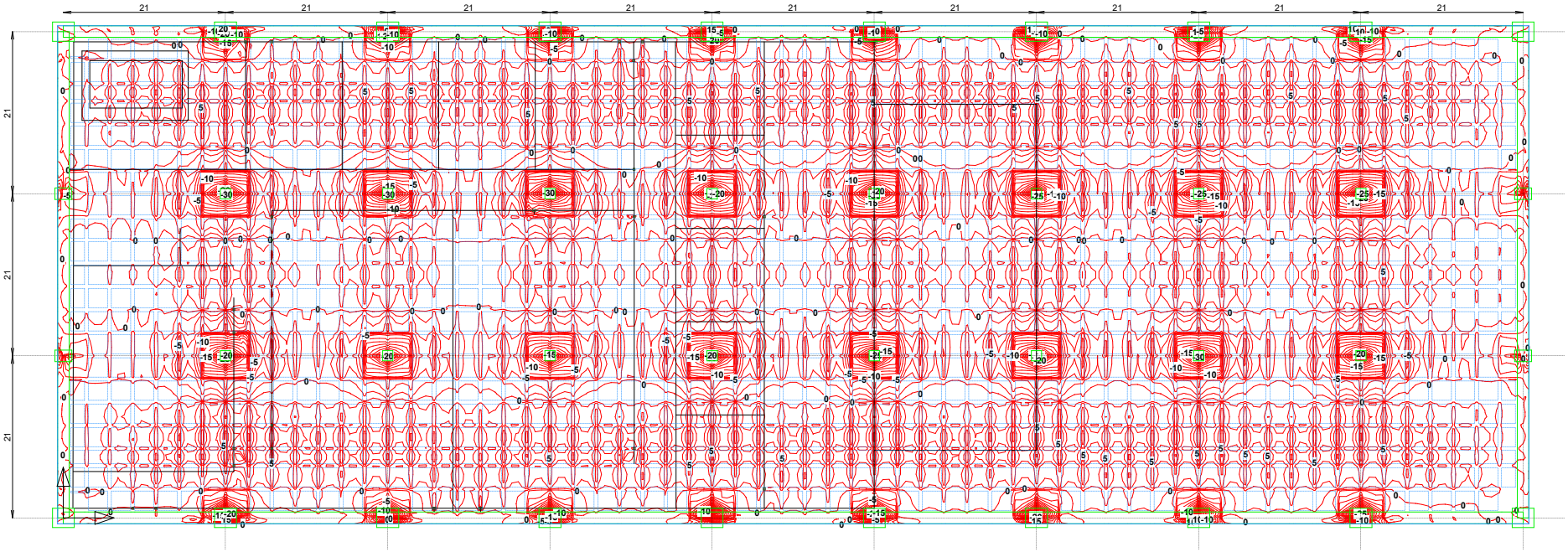
Factored LC: 1.4D: Max Mx Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -22.04 Kips @ (21.13,20.88) Max Value = 41.92 Kips @ (20.83,-0.375)



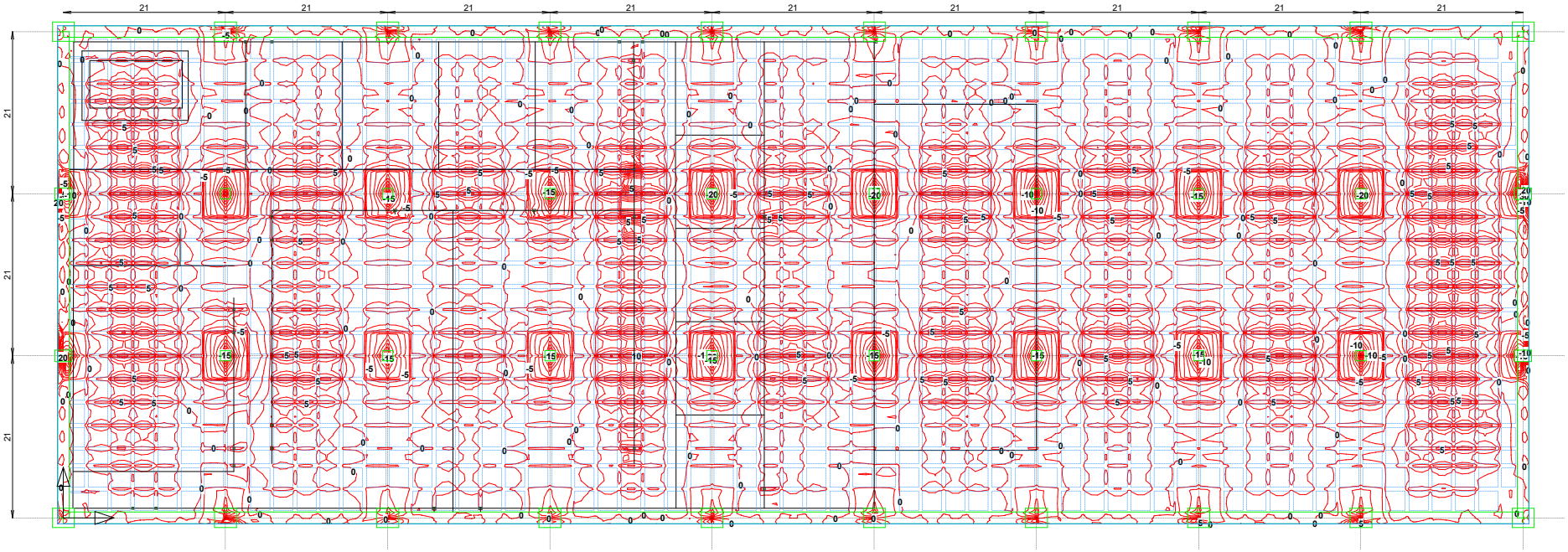
Factored LC: 1.4D: Min Mx Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -34.29 Kips @ (21.13,20.88) Max Value = 26.95 Kips @ (20.83,-0.375)



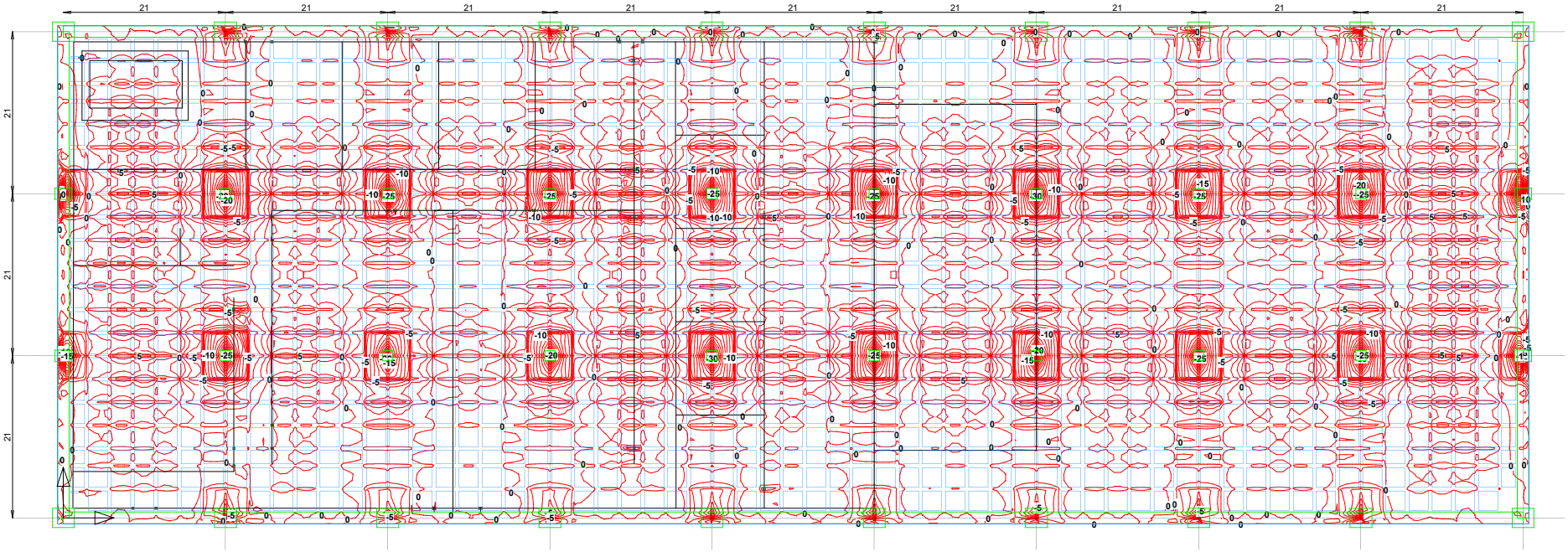
Factored LC: 1.4D: Max My Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -22.06 Kips @ (168.1,42.13) Max Value = 36.3 Kips @ (189.4,21.55)



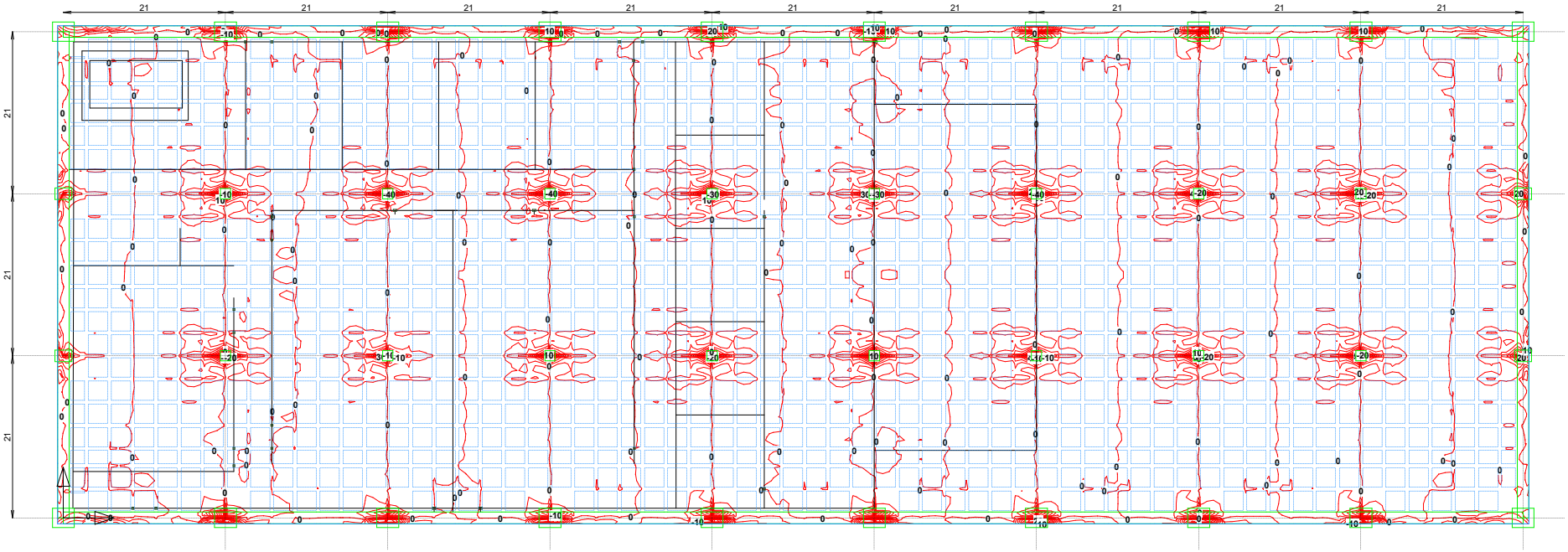
Factored LC: 1.4D: Min My Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -34.32 Kips @ (168.1,42.13) Max Value = 23.34 Kips @ (189.4,21.55)



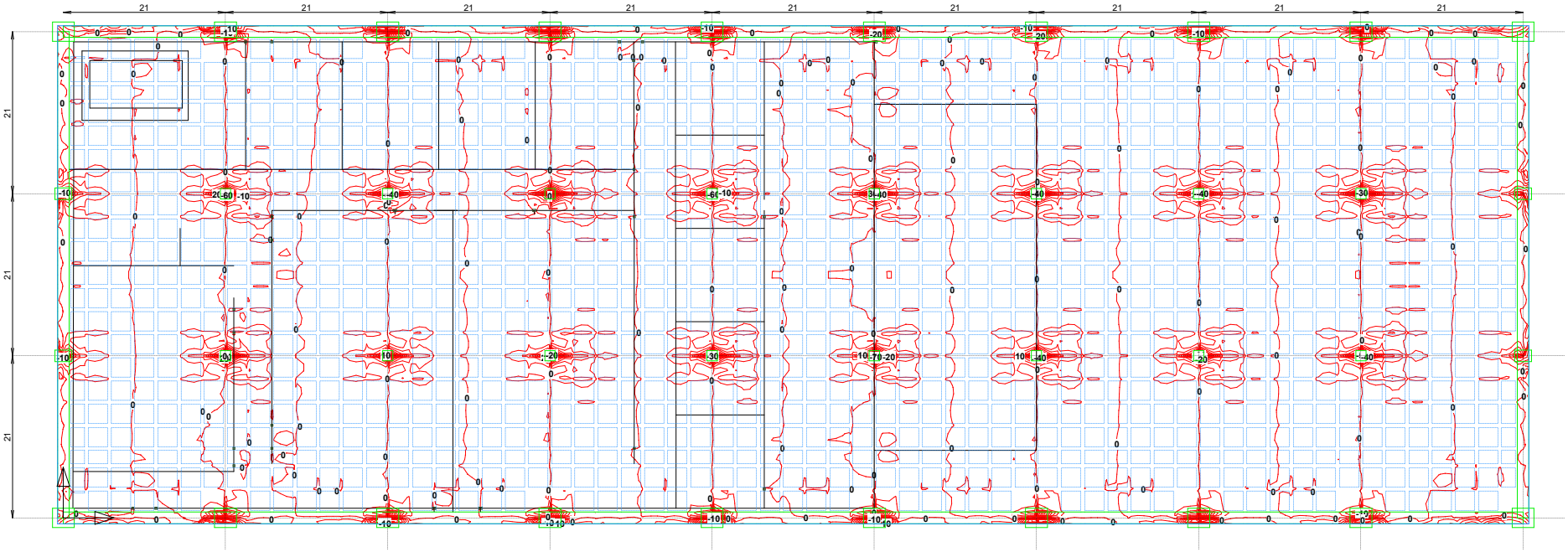
Factored LC: 1.4D: Max Vx Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -37.23 kips/ft @ (168.3,42) Max Value = 55.32 kips/ft @ (167.8,42)



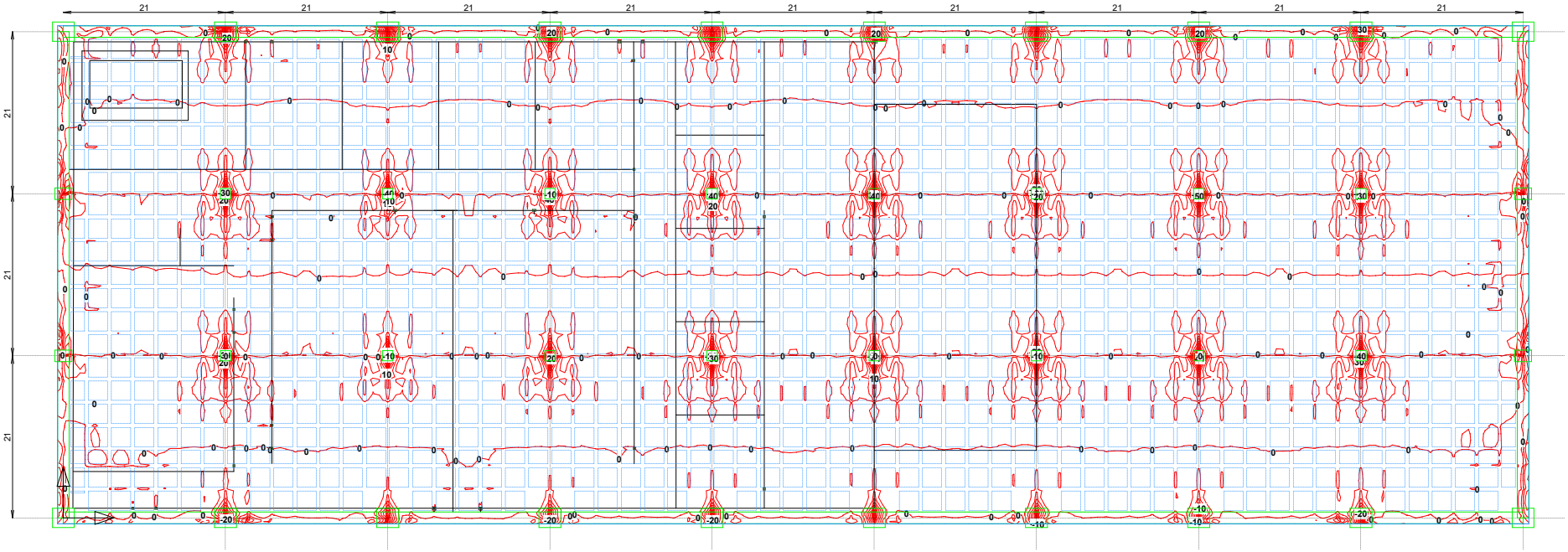
Factored LC: 1.4D: Min Vx Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -57.91 kips/ft @ (168.3,42) Max Value = 35.56 kips/ft @ (167.8,42)



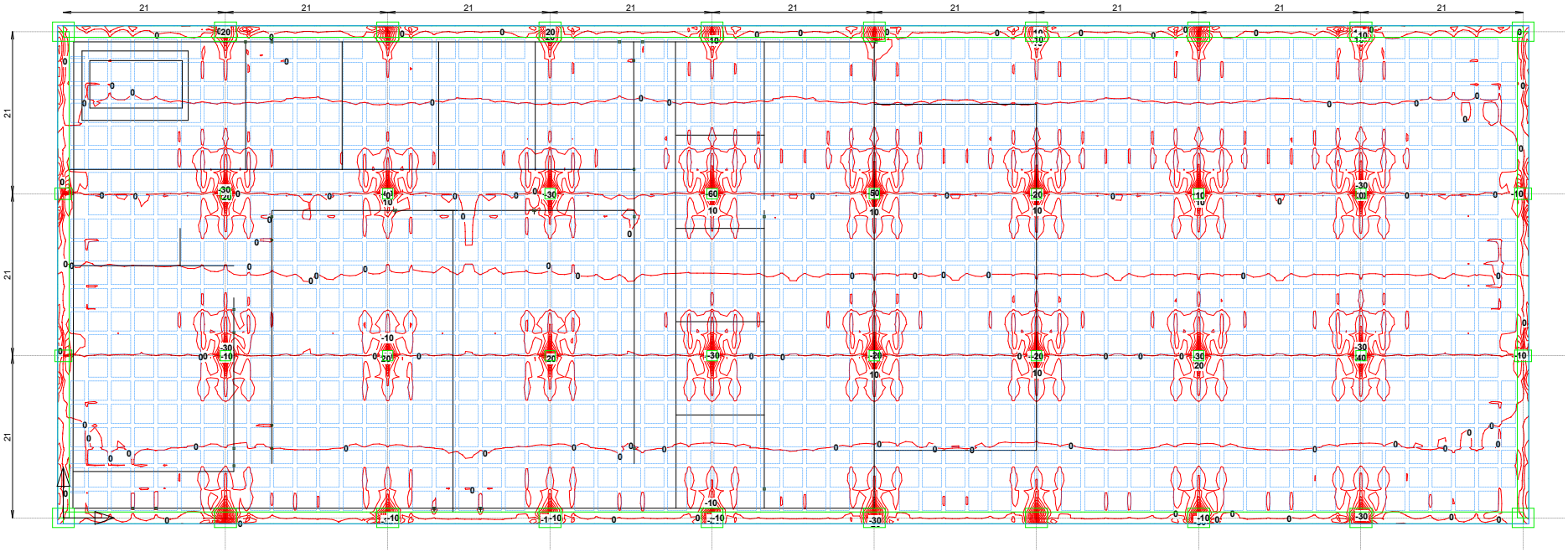
Factored LC: 1.4D: Max Vy Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -37.25 kips/ft @ (168,42.25) Max Value = 57.94 kips/ft @ (168,20.75)



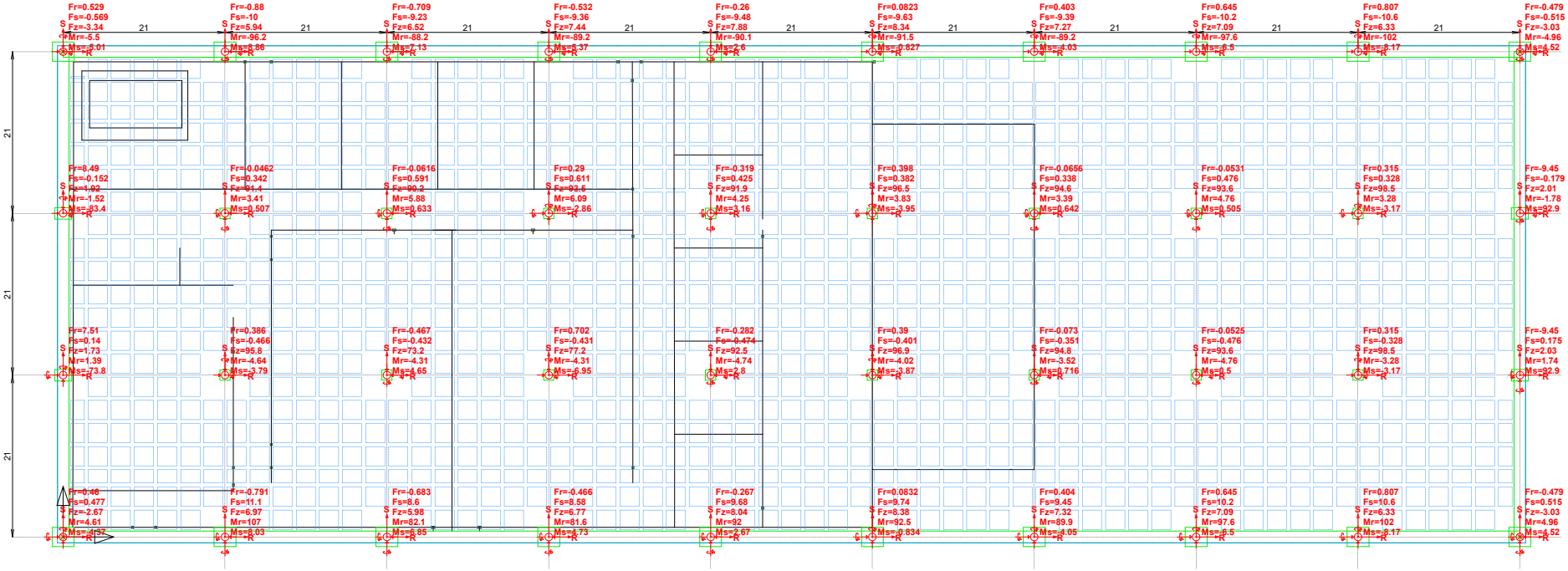
Factored LC: 1.4D: Min Vy Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -57.94 kips/ft @ (168,42.25) Max Value = 37.25 kips/ft @ (168,20.75)



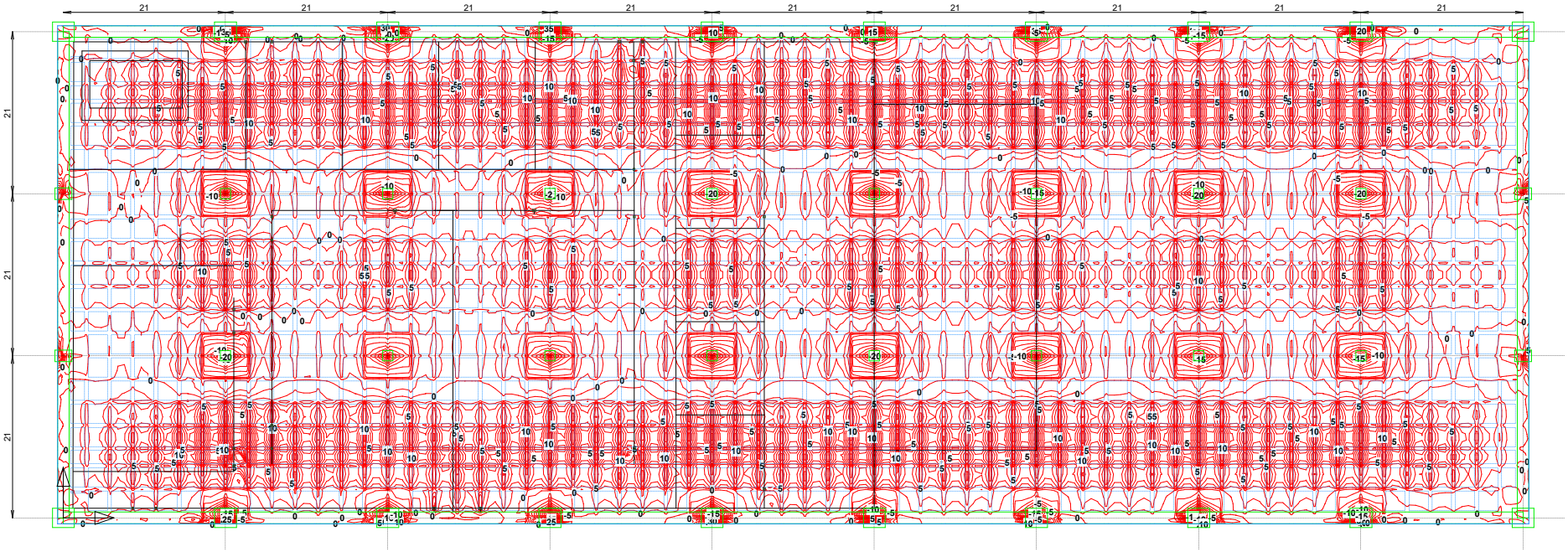
Factored LC: 1.4D: Max Reactions Plan

Factored LC: 1.4D: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.4D - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



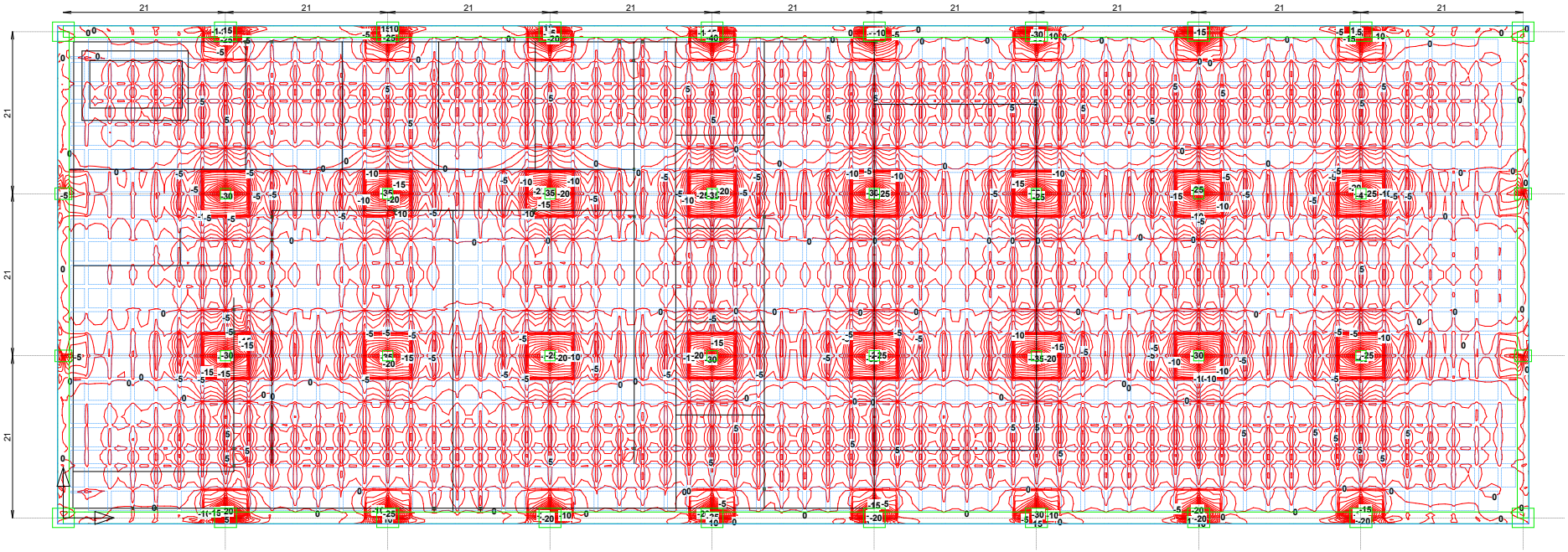
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Mx Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -22.04 Kips @ (21.13,20.88) Max Value = 55.3 Kips @ (20.83,-0.375)



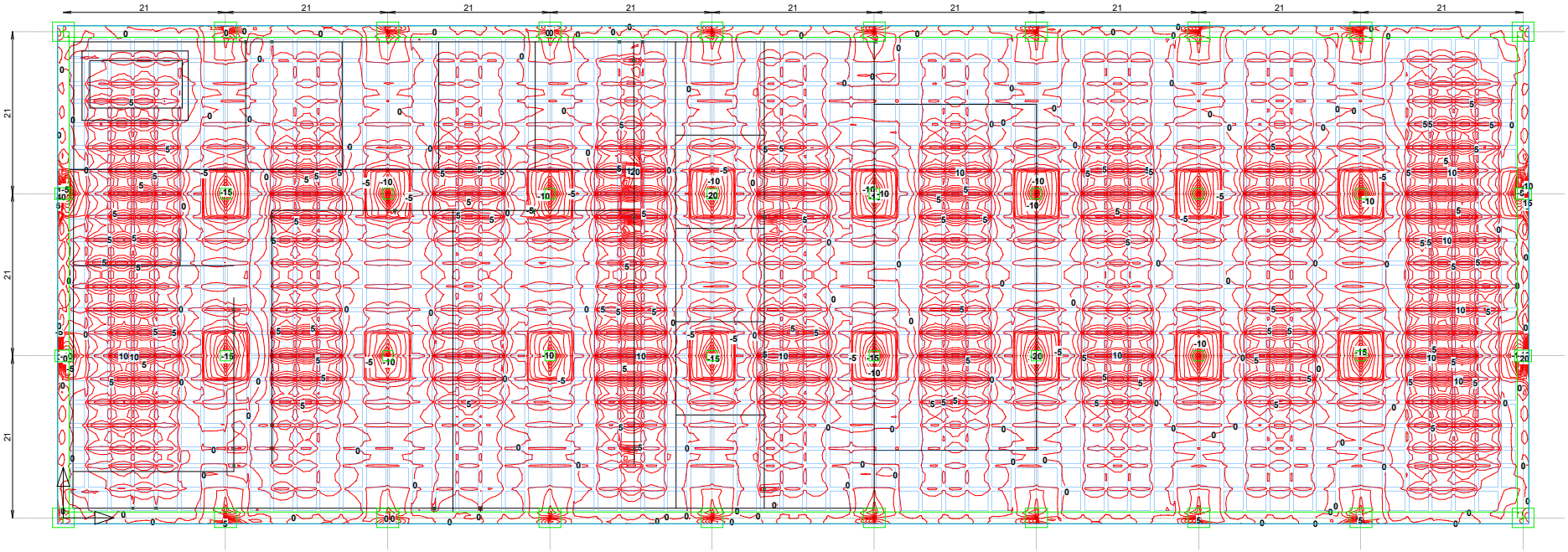
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Mx Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -45.69 Kips @ (21.13,20.88) Max Value = 26.95 Kips @ (20.83,-0.375)



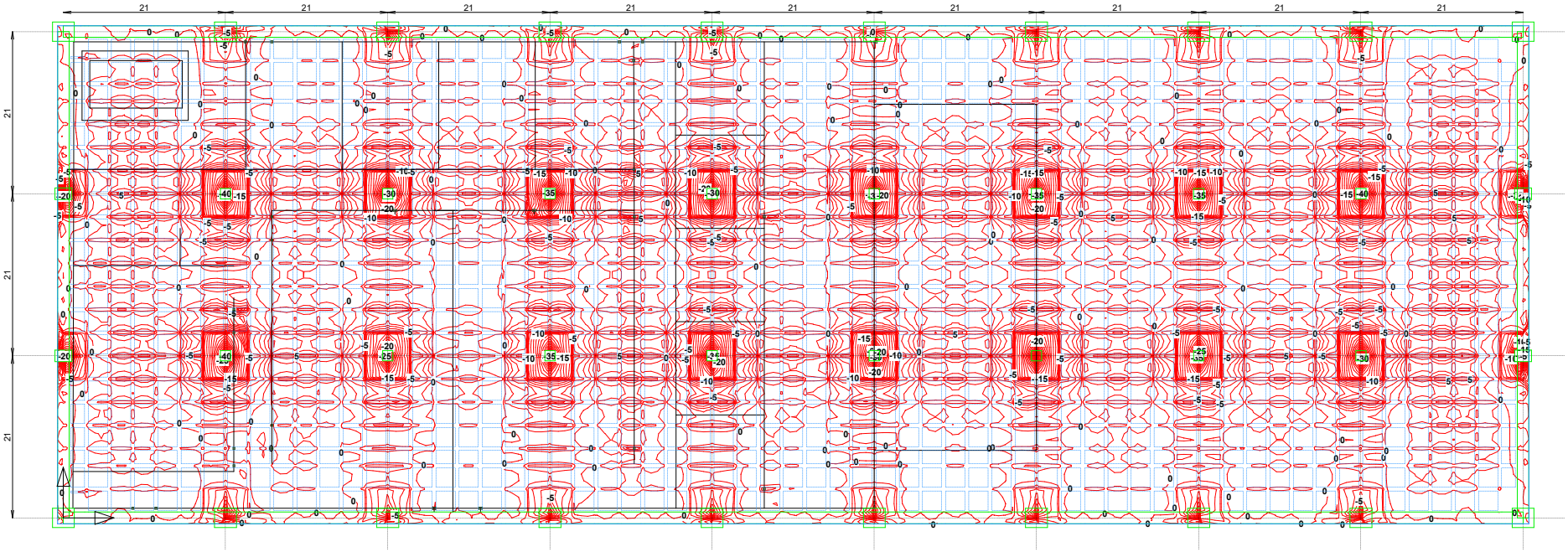
Factored LC: 1.2D + 1.6L + 0.5Lr: Max My Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -22.06 Kips @ (168.1,42.13) Max Value = 45.66 Kips @ (189.4,21.55)



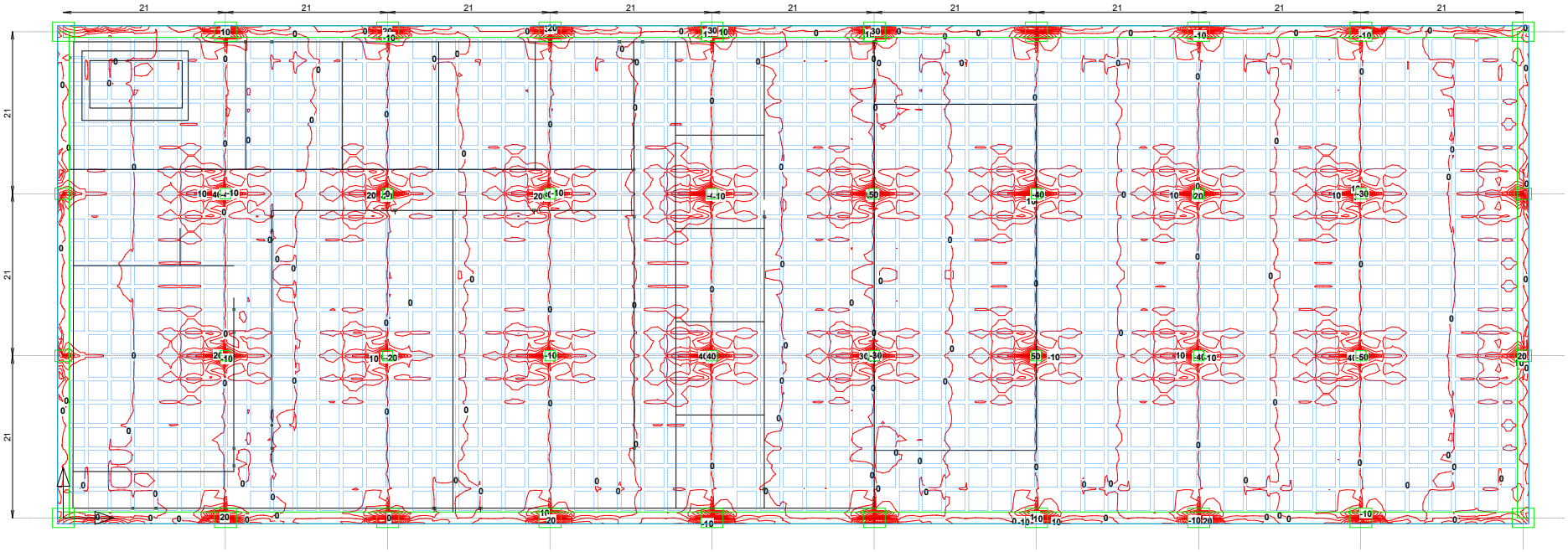
Factored LC: 1.2D + 1.6L + 0.5Lr: Min My Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -43.77 Kips @ (21.13,20.88) Max Value = 23.34 Kips @ (189.4,21.55)



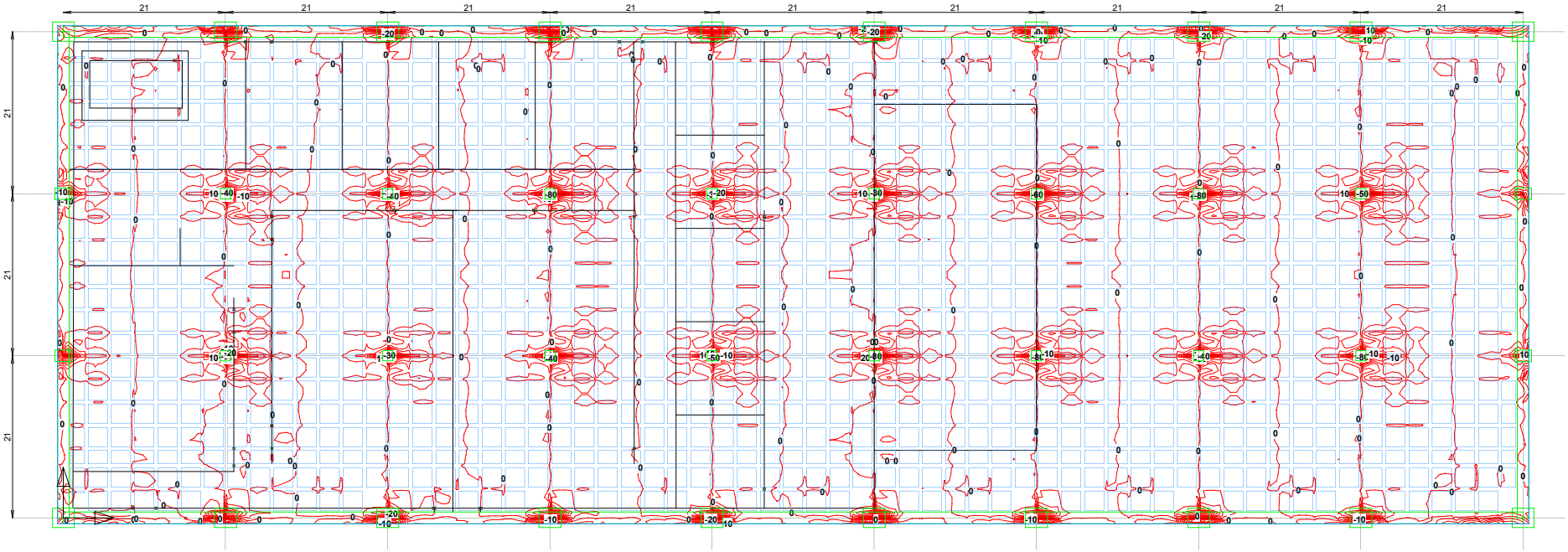
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Vx Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -37.22 kips/ft @ (168.3,42) Max Value = 71.3 kips/ft @ (20.75,21)



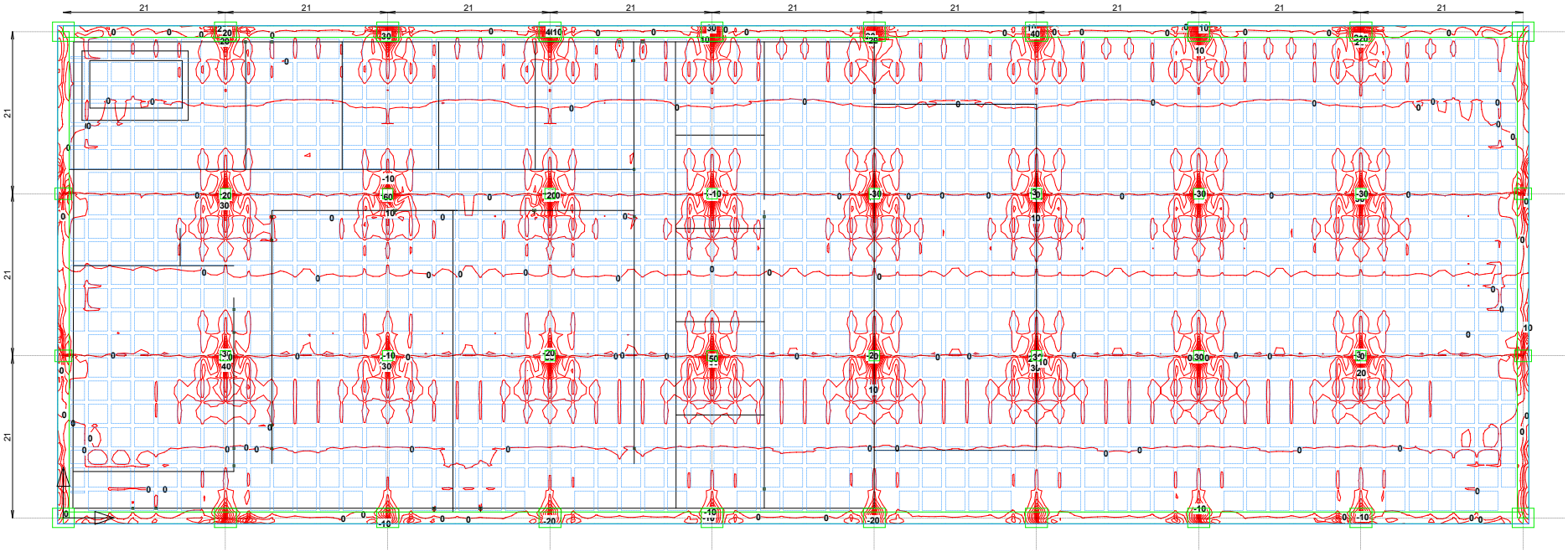
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Vx Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -75.49 kips/ft @ (21.25,21) Max Value = 35.56 kips/ft @ (167.8,21)



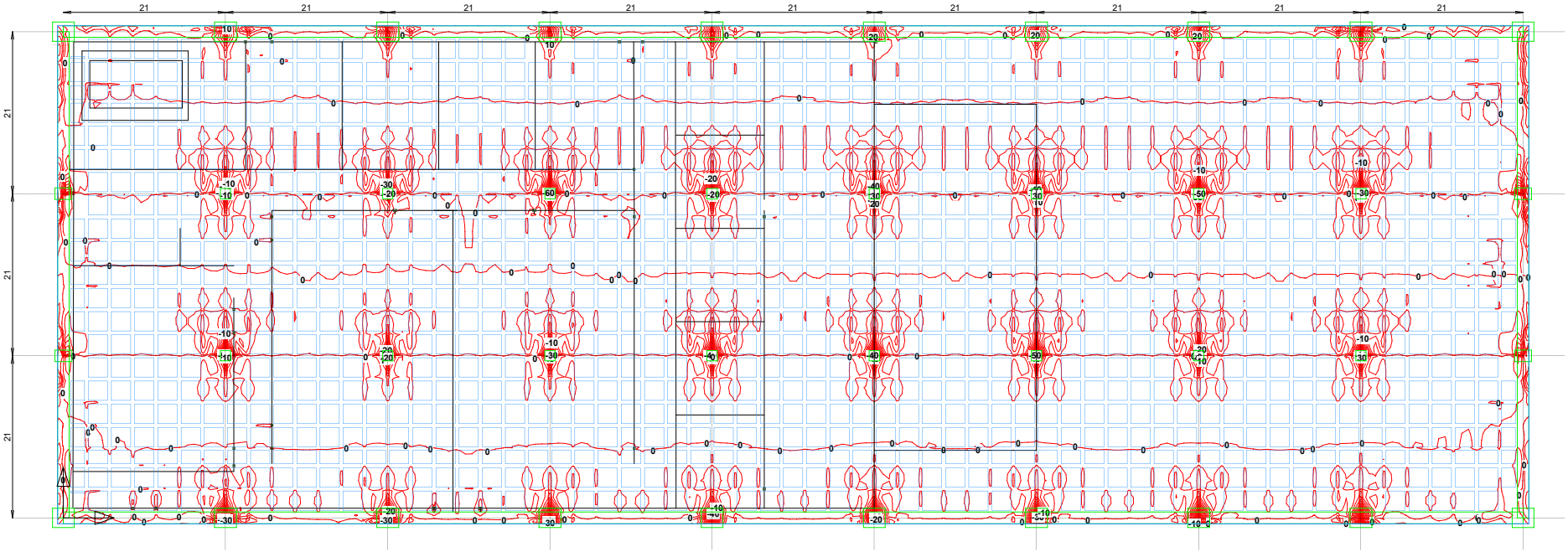
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Vy Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -37.25 kips/ft @ (168,42.25) Max Value = 75.9 kips/ft @ (21,20.75)



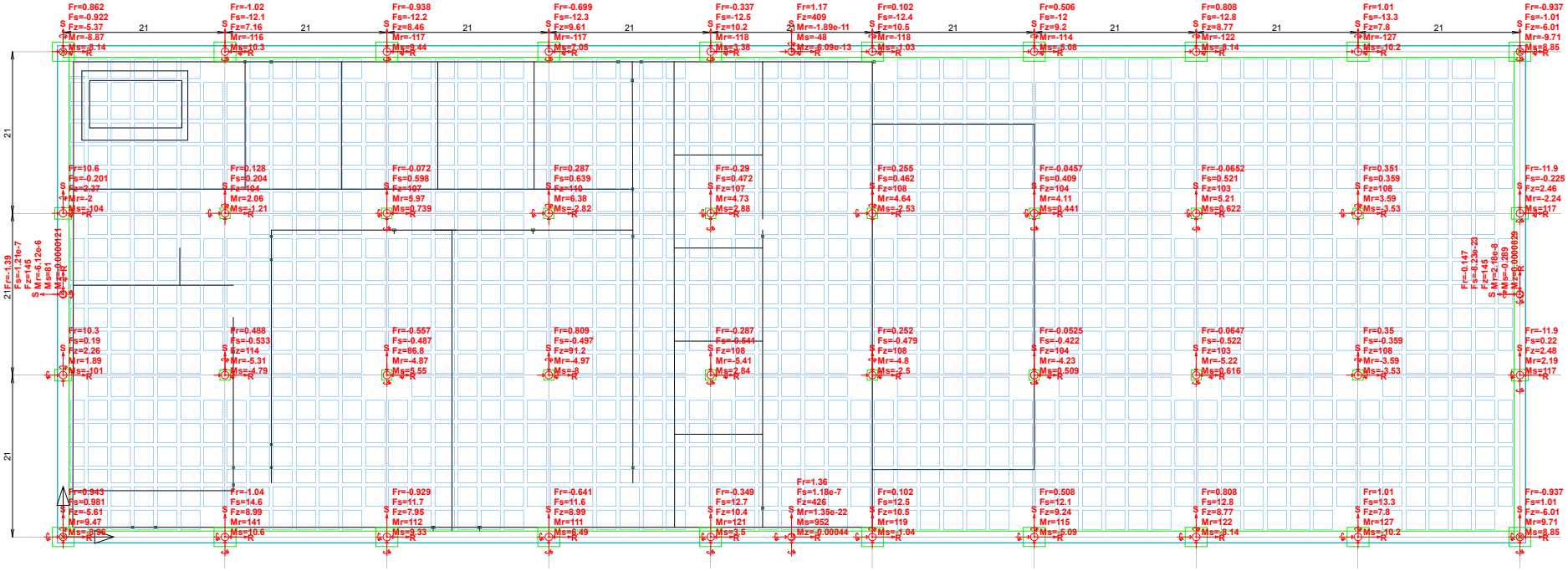
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Vy Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -74.43 kips/ft @ (63,42.25) Max Value = 37.25 kips/ft @ (168,20.75)



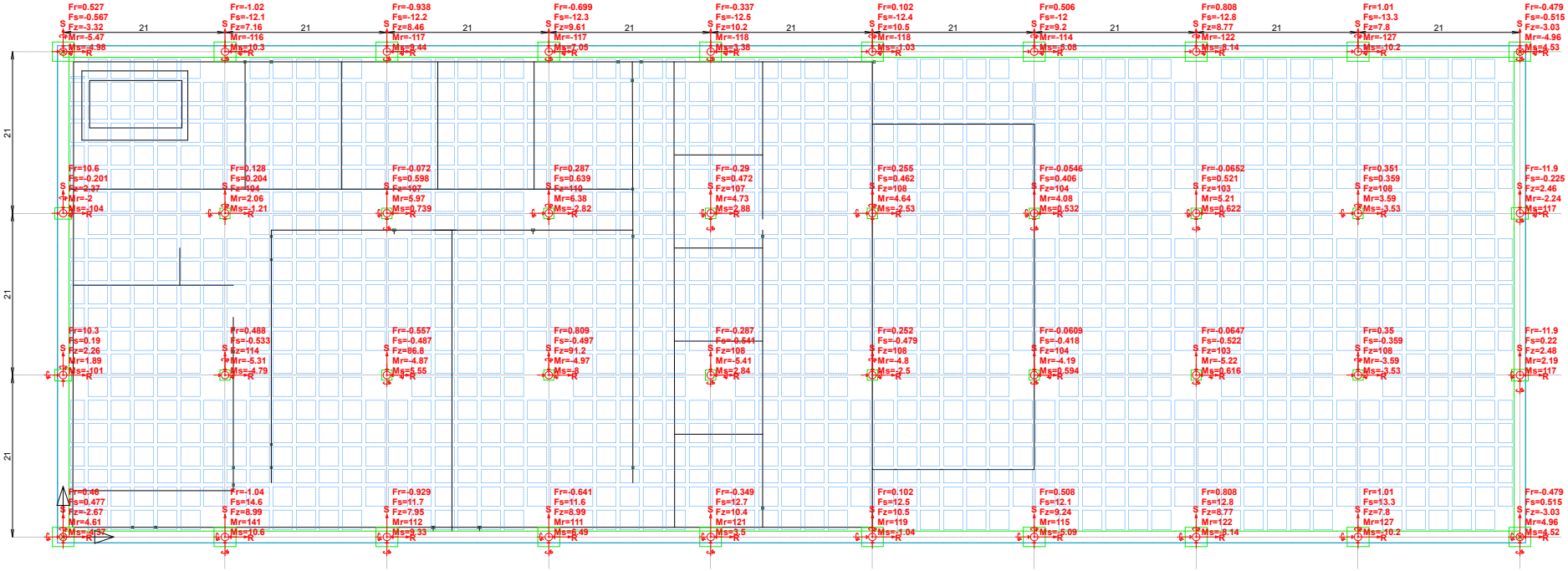
Factored LC: 1.2D + 1.6L + 0.5Lr: Std Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fr,Fs,Fz,Mr,Ms,Mz)(Standard Context)



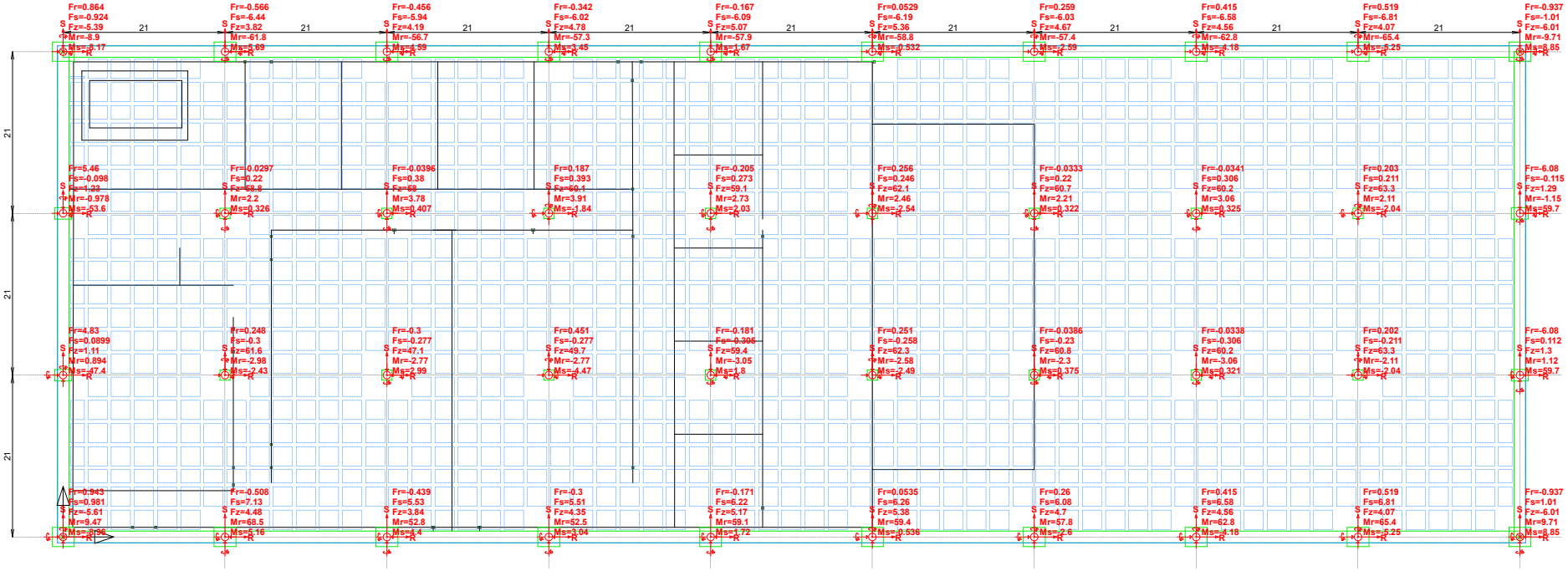
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



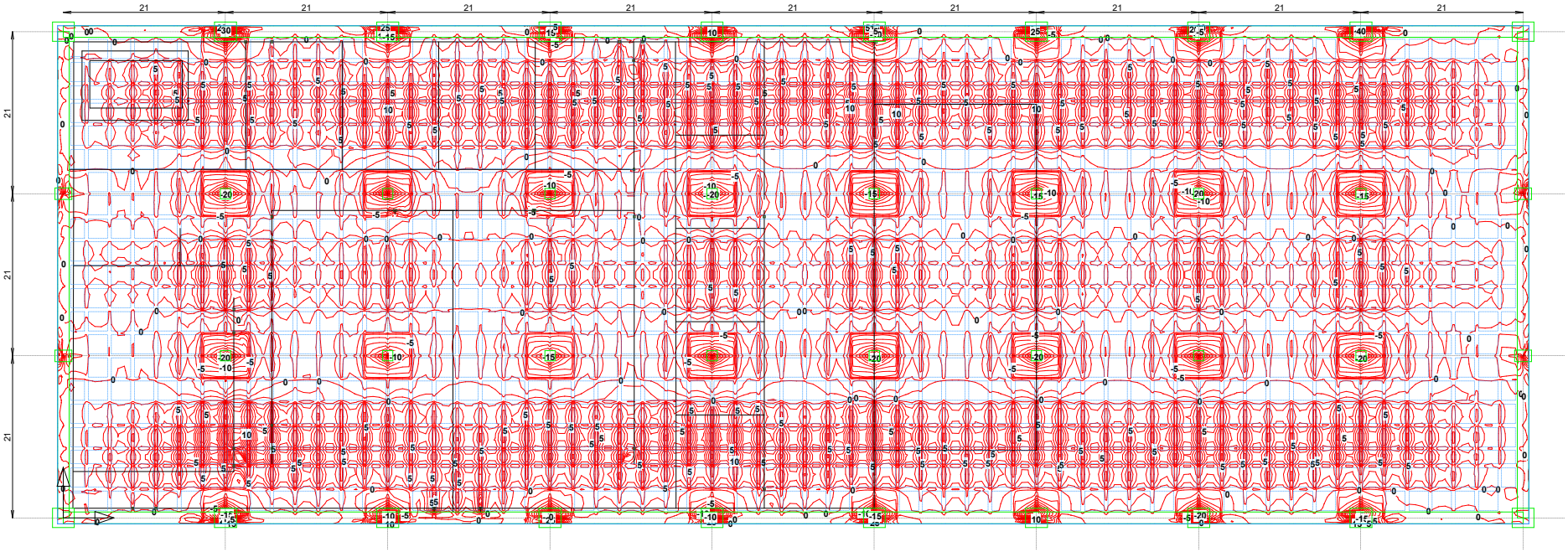
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



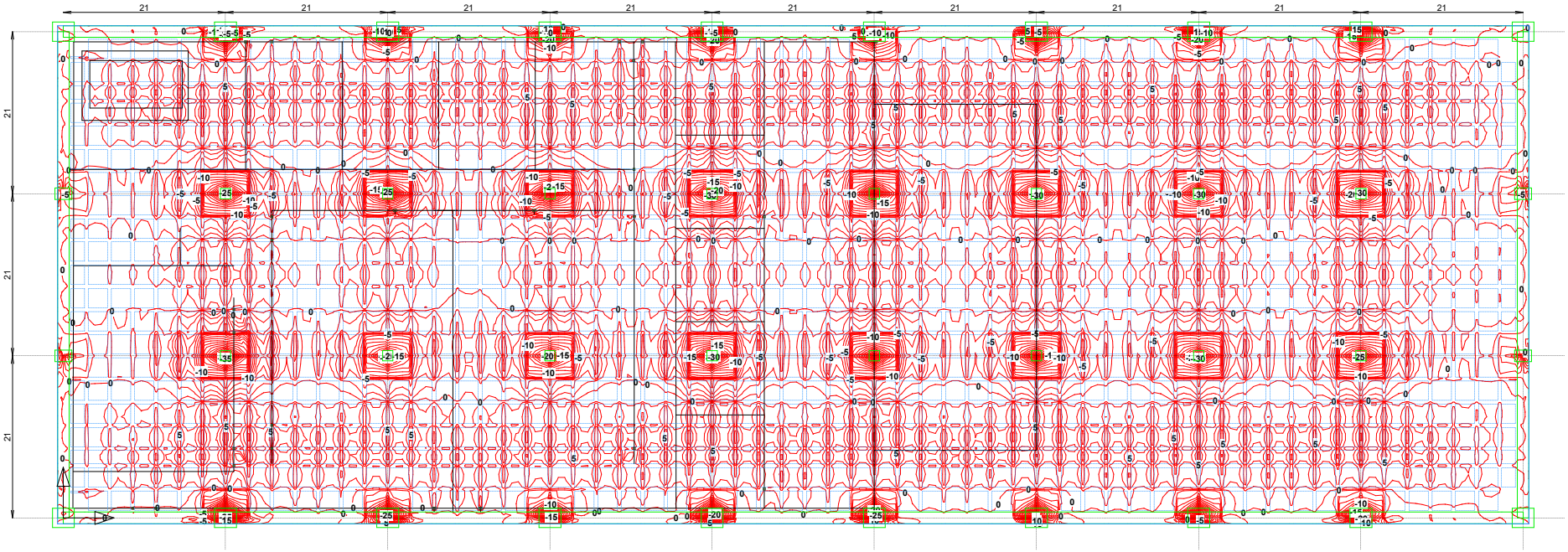
Factored LC: 1.2D + f1L + 1.6Lr: Max Mx Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -22.04 Kips @ (21.13,20.88) Max Value = 52.05 Kips @ (20.83,-0.375)



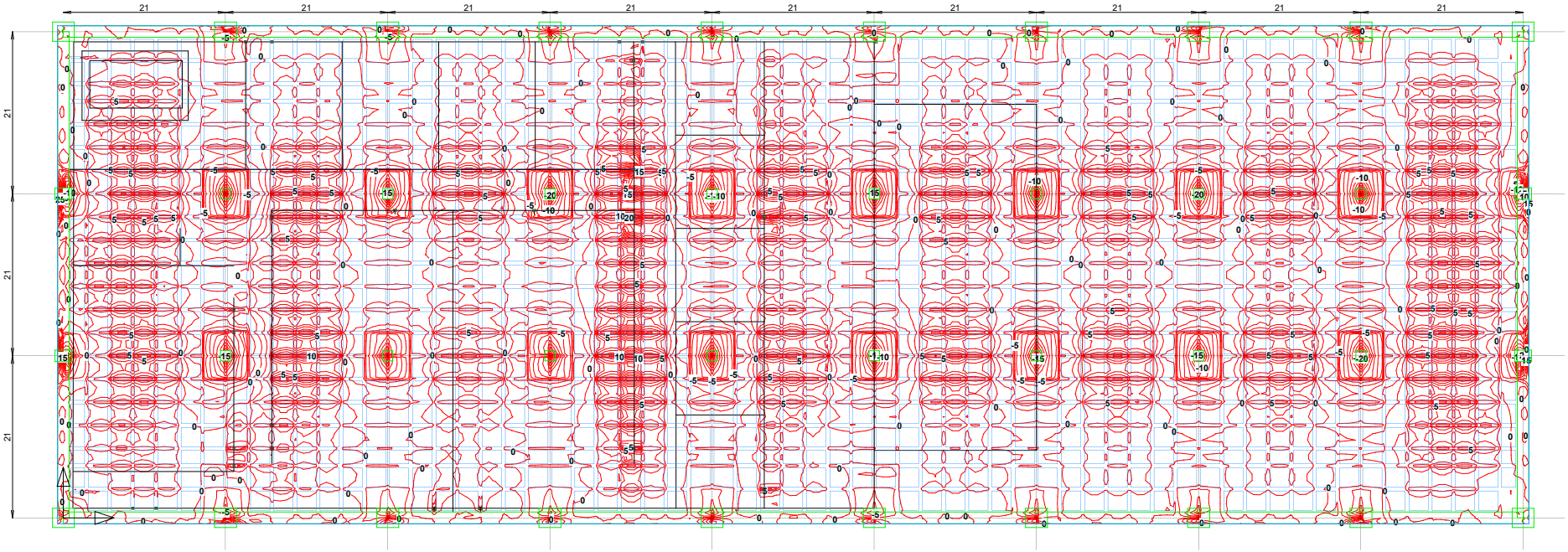
Factored LC: 1.2D + f1L + 1.6Lr: Min Mx Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -43.59 Kips @ (21.13,20.88) Max Value = 26.95 Kips @ (20.83,-0.375)



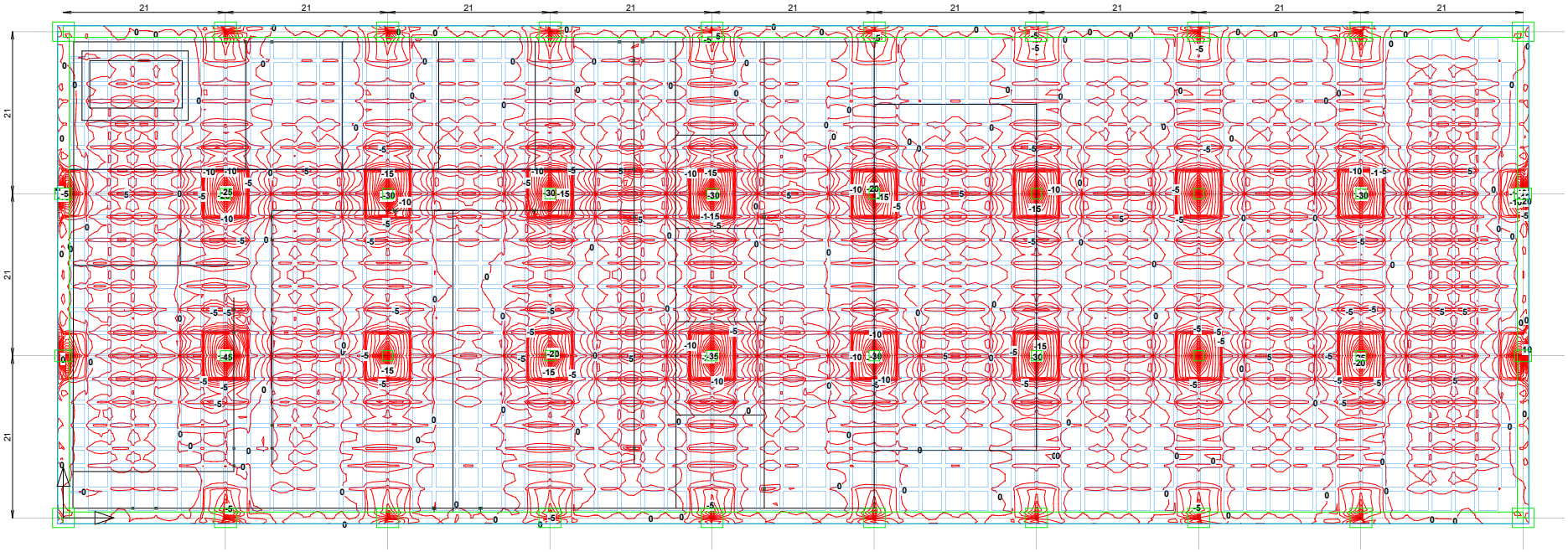
Factored LC: 1.2D + f1L + 1.6Lr: Max My Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -22.06 Kips @ (168.1,42.13) Max Value = 35.67 Kips @ (189.4,21.55)



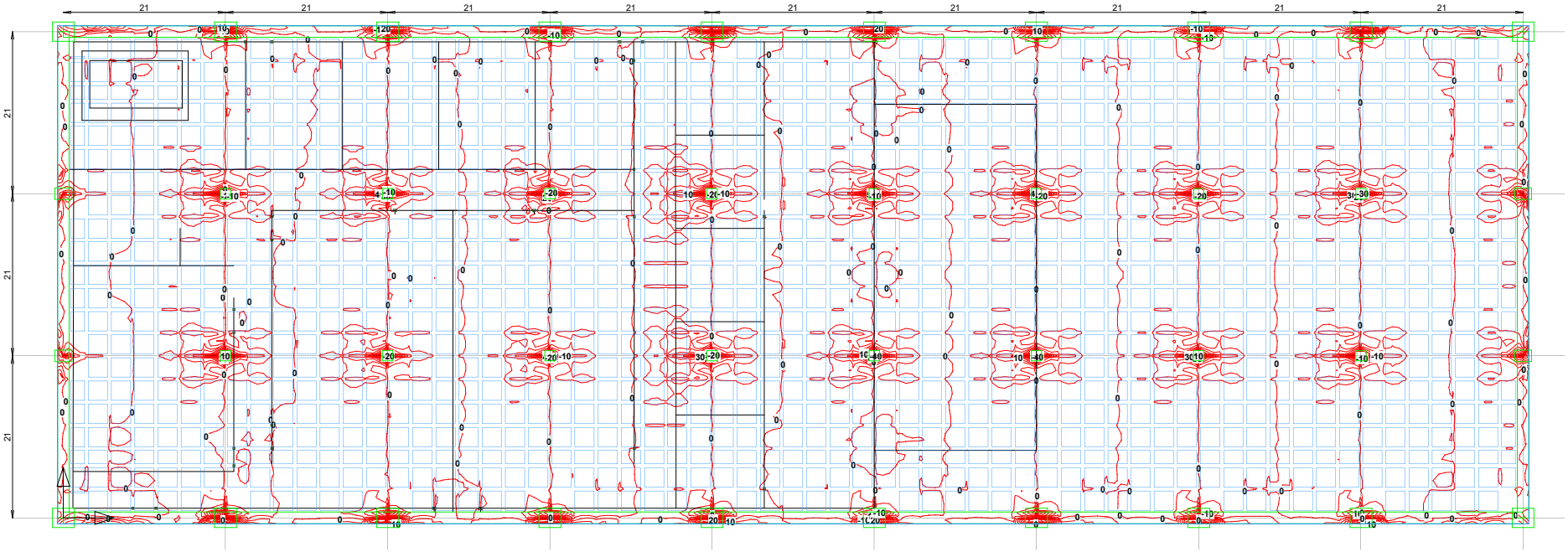
Factored LC: 1.2D + f1L + 1.6Lr: Min My Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -43.76 Kips @ (21.13,20.88) Max Value = 23.34 Kips @ (189.4,21.55)



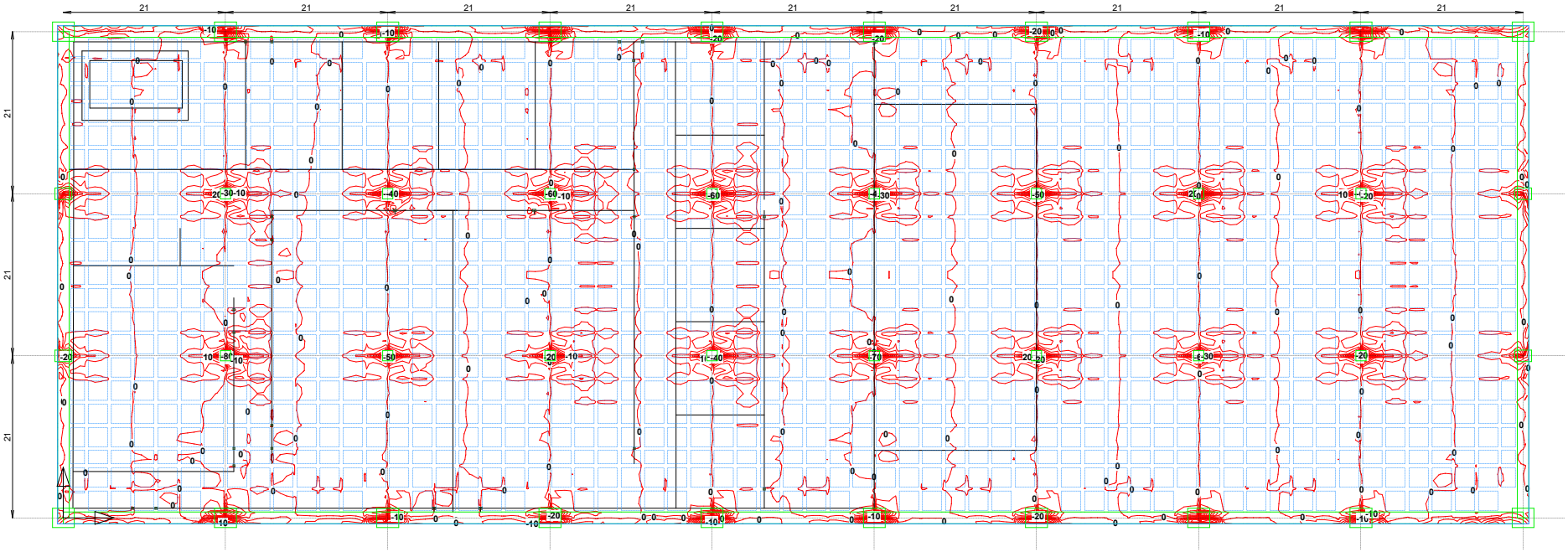
Factored LC: 1.2D + f1L + 1.6Lr: Max Vx Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -37.22 kips/ft @ (168.3,42) Max Value = 64.33 kips/ft @ (41.75,42)



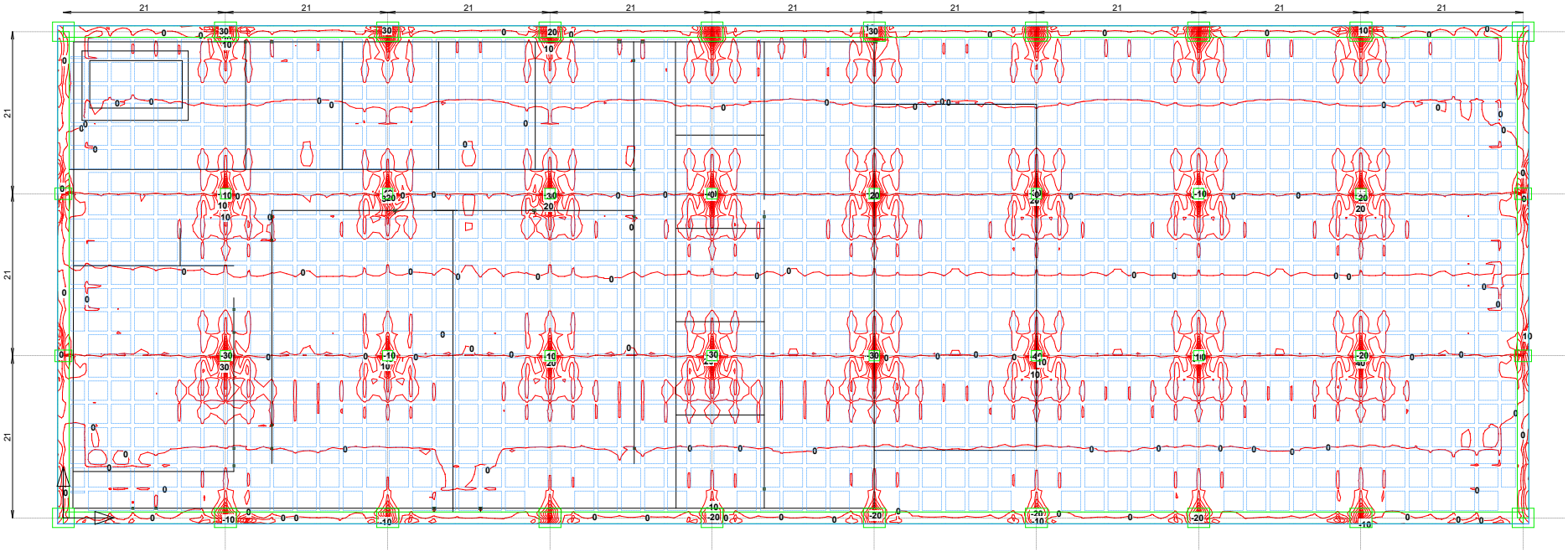
Factored LC: 1.2D + f1L + 1.6Lr: Min Vx Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -72.26 kips/ft @ (21.25,21) Max Value = 35.56 kips/ft @ (167.8,21)



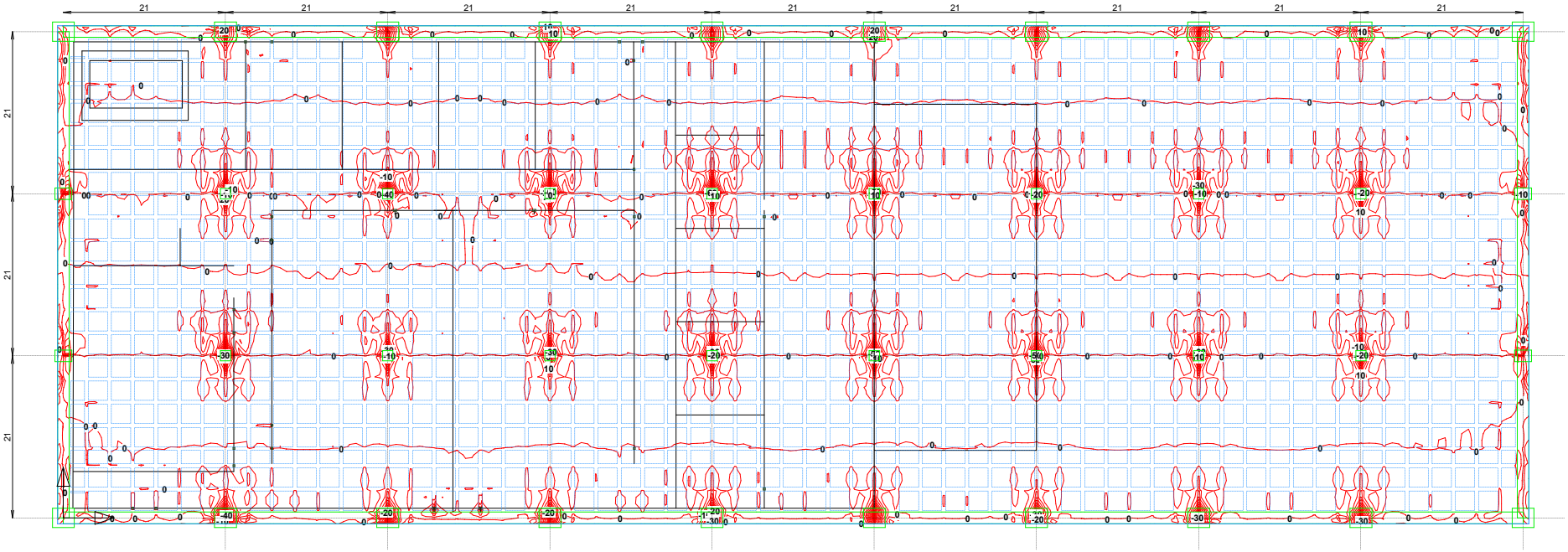
Factored LC: 1.2D + f1L + 1.6Lr: Max Vy Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -37.24 kips/ft @ (168,42.25) Max Value = 70.31 kips/ft @ (21,20.75)



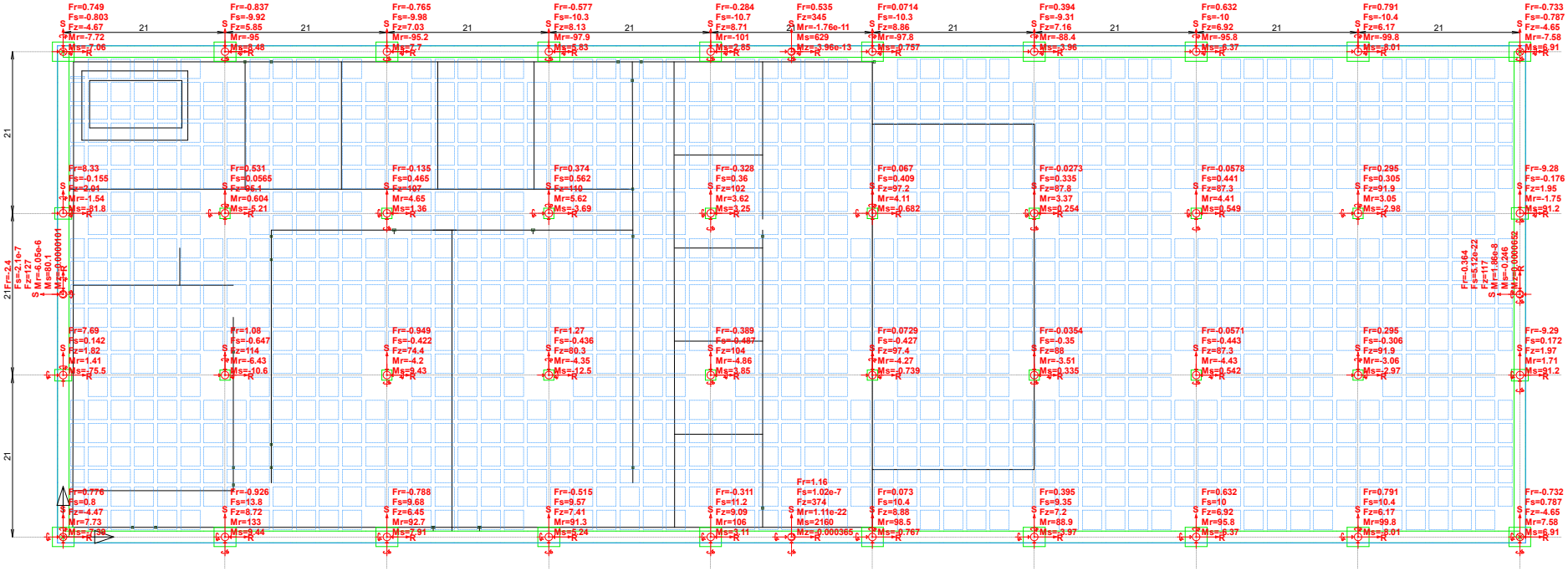
Factored LC: 1.2D + f1L + 1.6Lr: Min Vy Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -68.1 kips/ft @ (63,42.25) Max Value = 37.24 kips/ft @ (168,20.75)



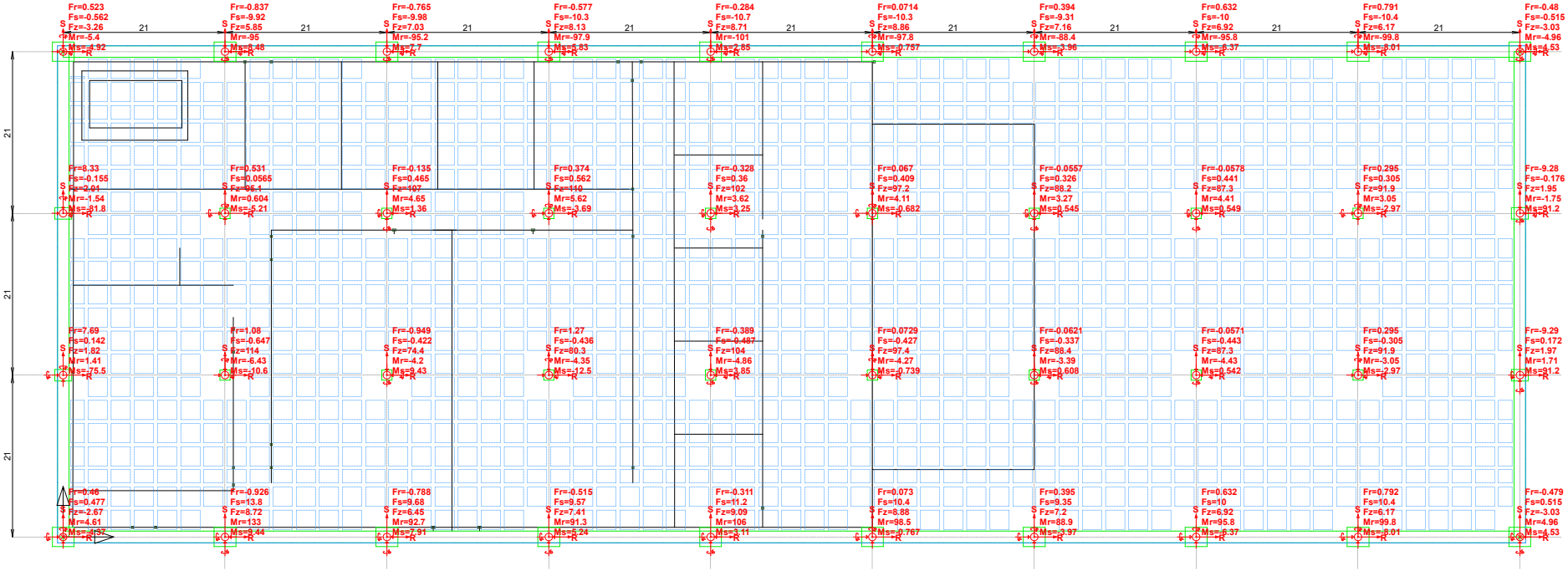
Factored LC: 1.2D + f1L + 1.6Lr: Std Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fr,Fs,Fz,Mr,Ms,Mz)(Standard Context)



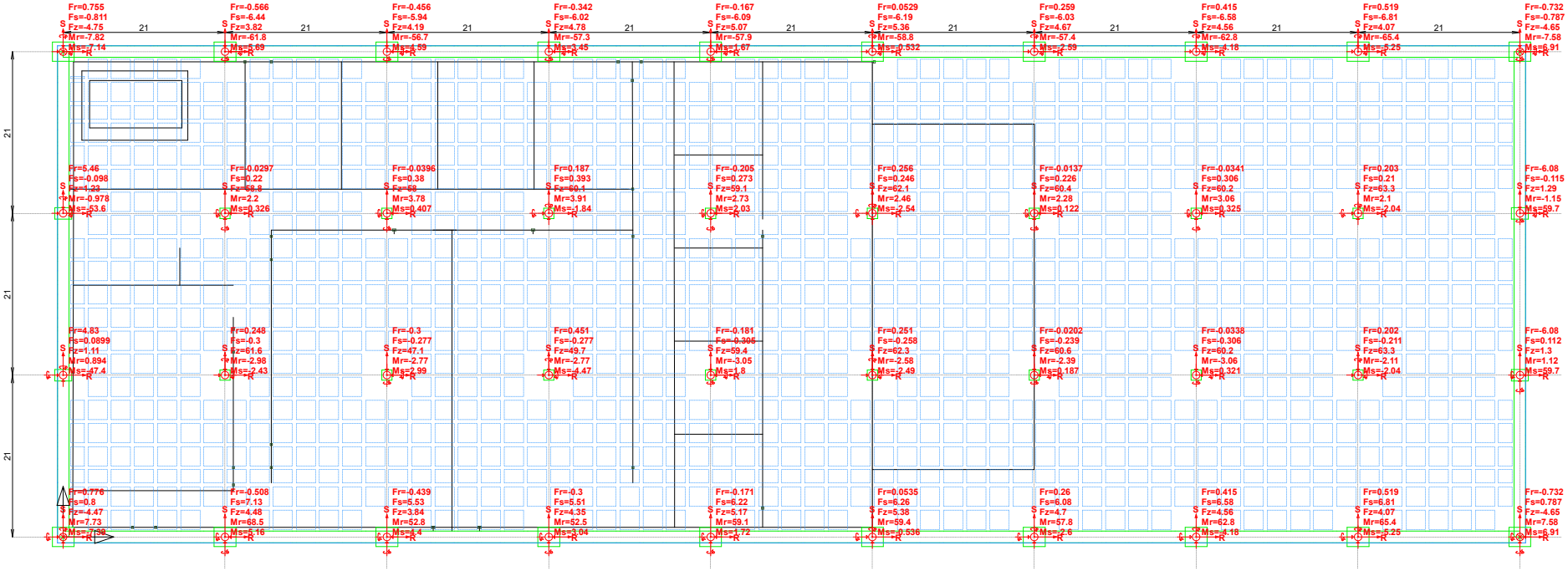
Factored LC: 1.2D + f1L + 1.6Lr: Max Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



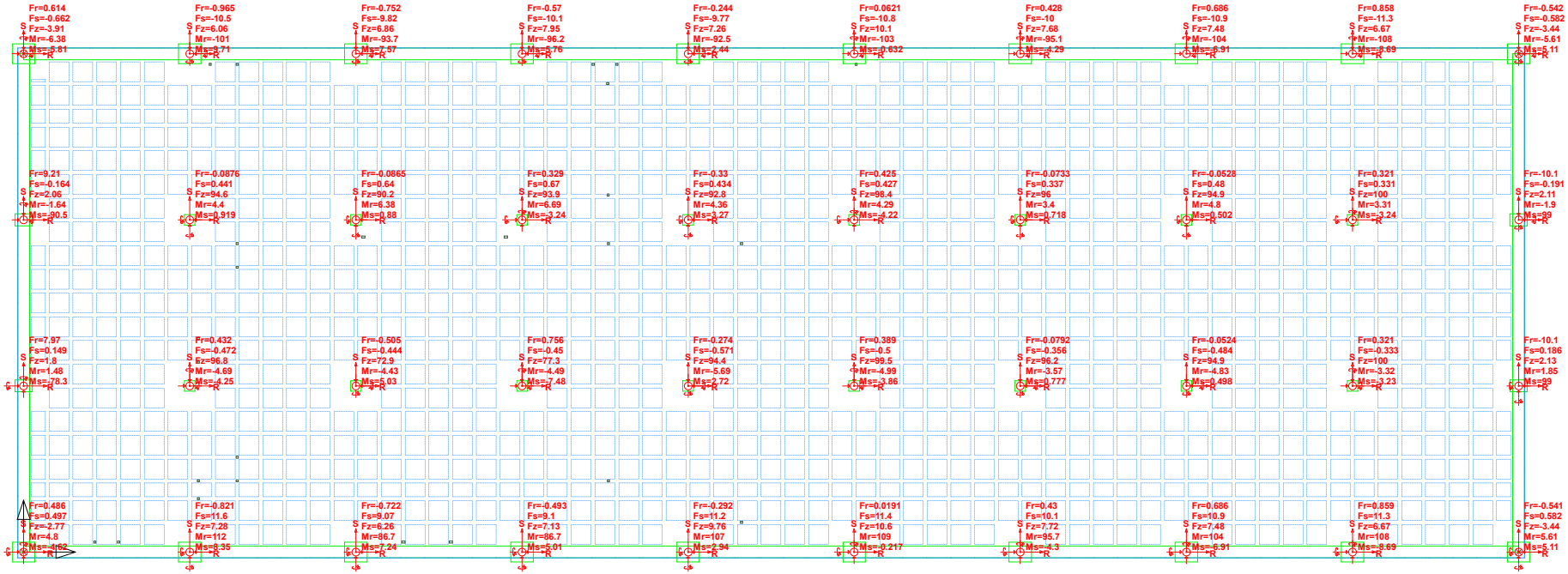
Factored LC: 1.2D + f1L + 1.6Lr: Min Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



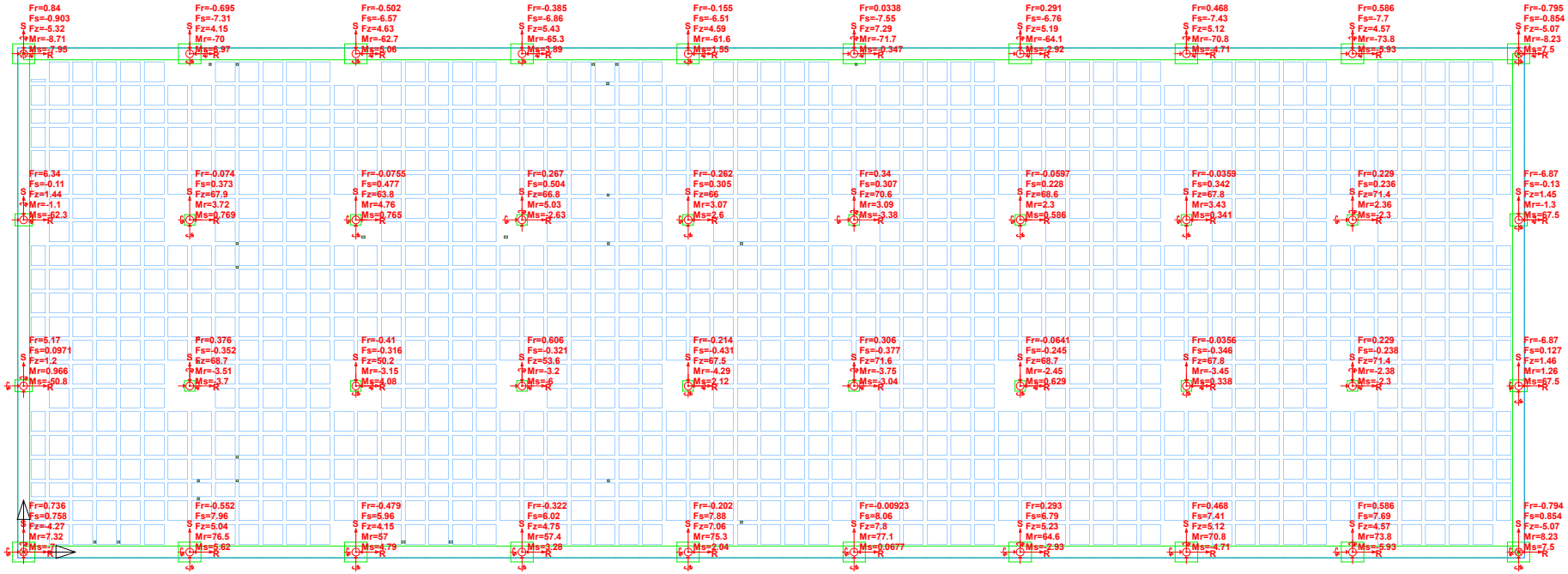
Factored LC: 1.2D + f1L + E (Positive X): Max Reactions Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



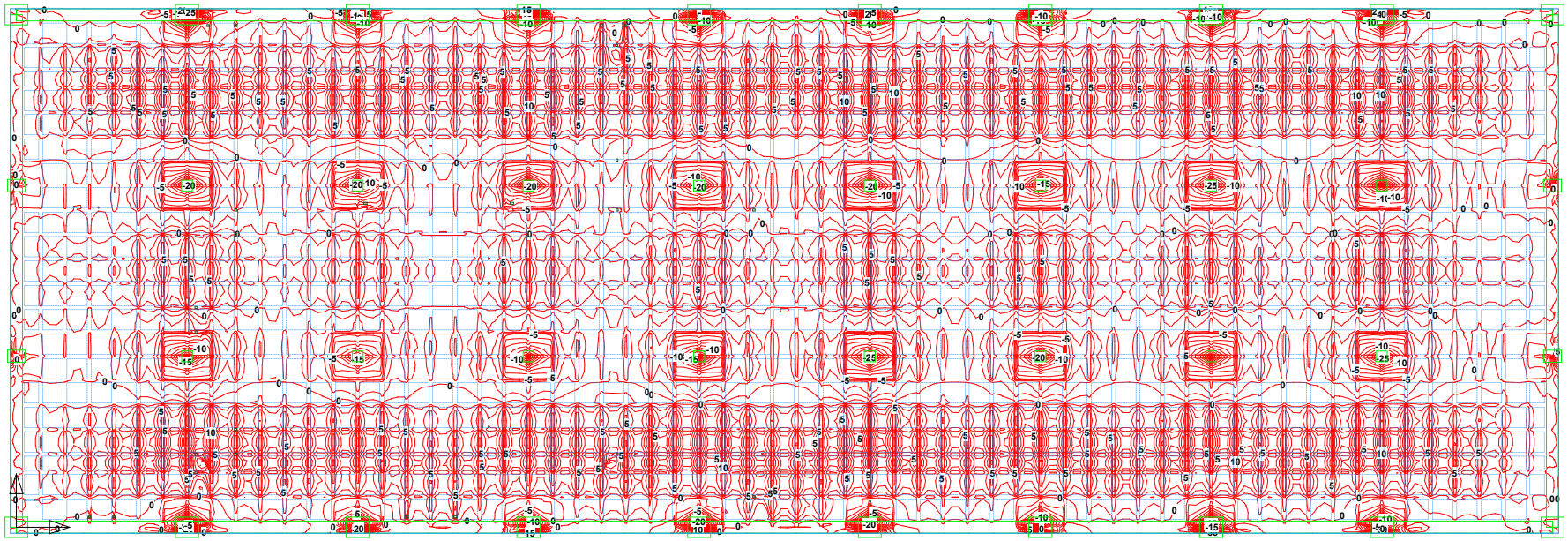
Factored LC: 1.2D + f1L + E (Positive X): Min Reactions Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



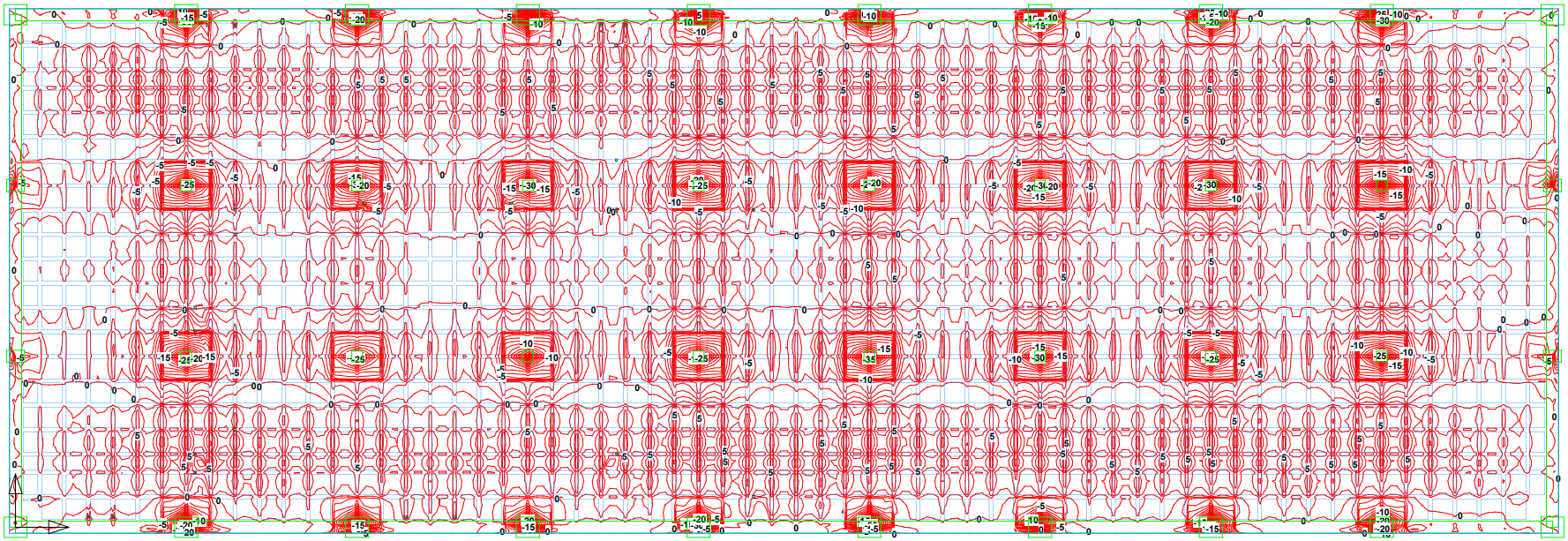
Factored LC: 1.2D + f1L + E (Positive X): Max Mx Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -25.93 Kips @ (105.1,20.88) Max Value = 44 Kips @ (20.83,-0.375)



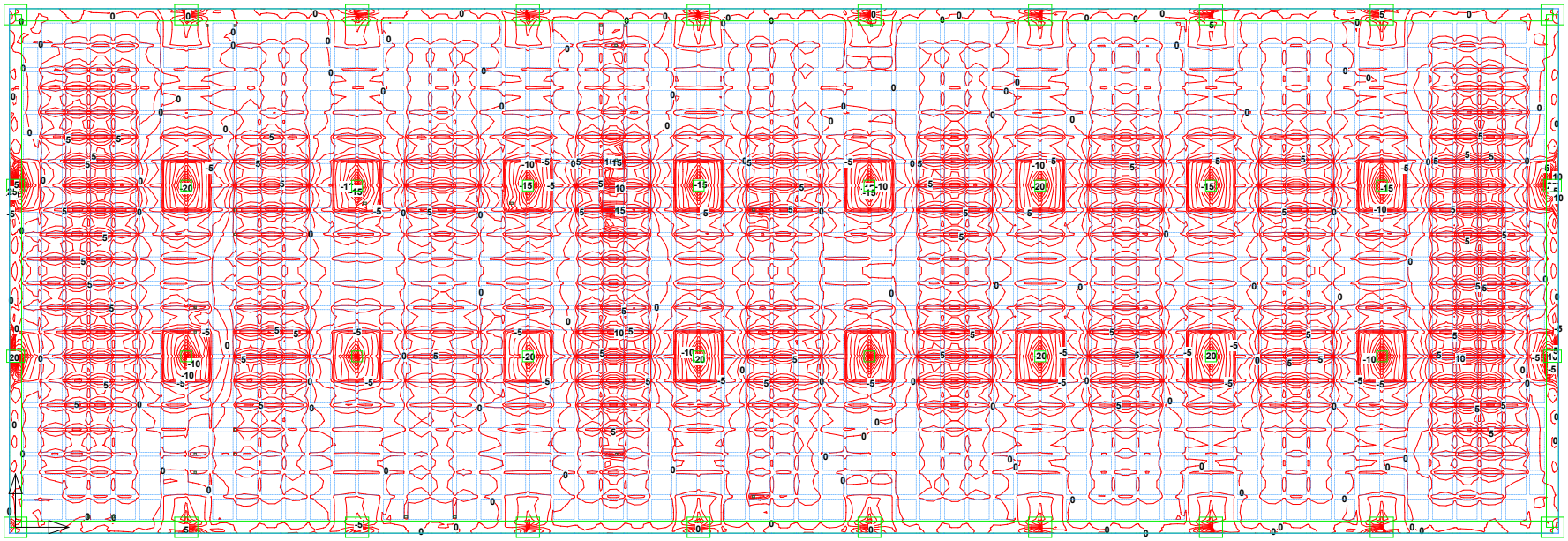
Factored LC: 1.2D + f1L + E (Positive X): Min Mx Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -37.44 Kips @ (105.1,20.88) Max Value = 30.05 Kips @ (20.83,-0.375)



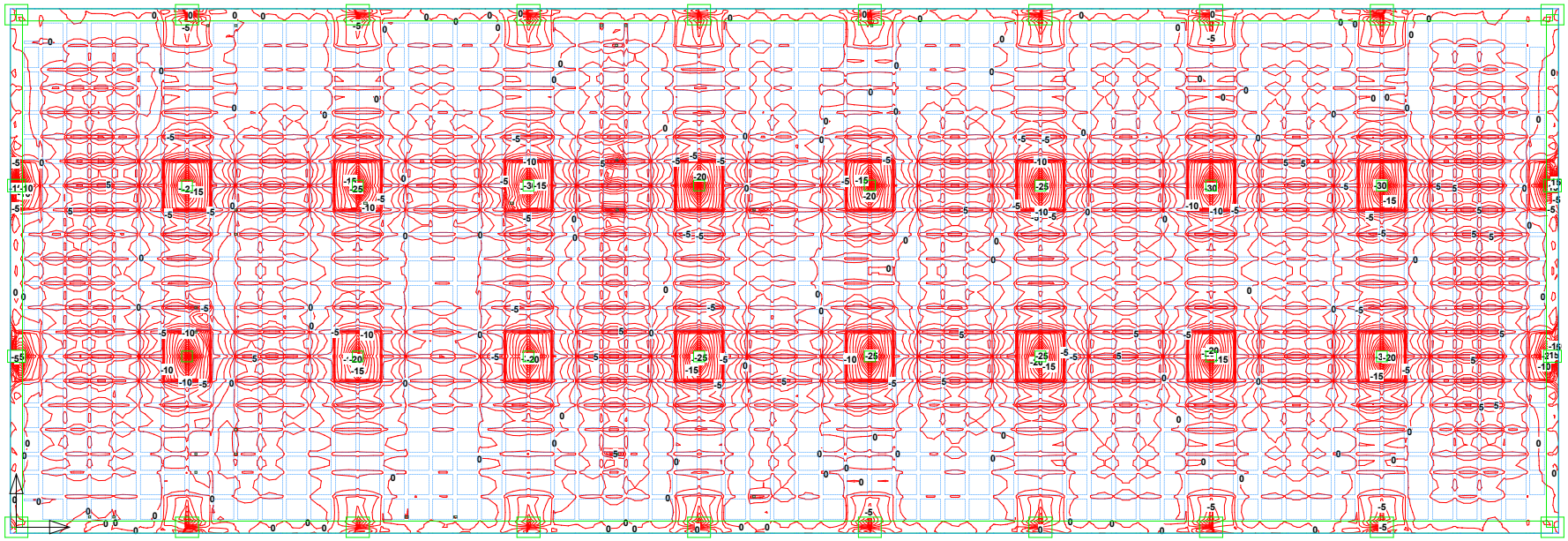
Factored LC: 1.2D + f1L + E (Positive X): Max My Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -24.91 Kips @ (168.1,20.88) Max Value = 38.7 Kips @ (189.4,21.55)



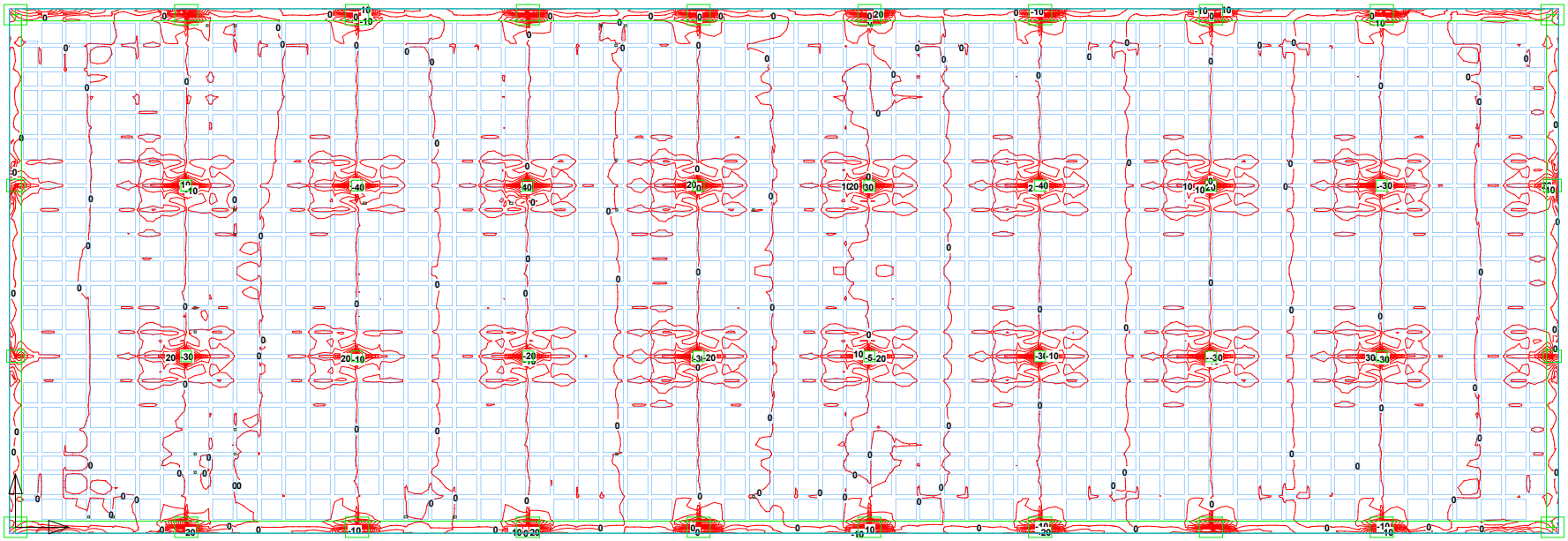
Factored LC: 1.2D + f1L + E (Positive X): Min My Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -36.53 Kips @ (168.1,42.13) Max Value = 26.38 Kips @ (189.4,21.55)



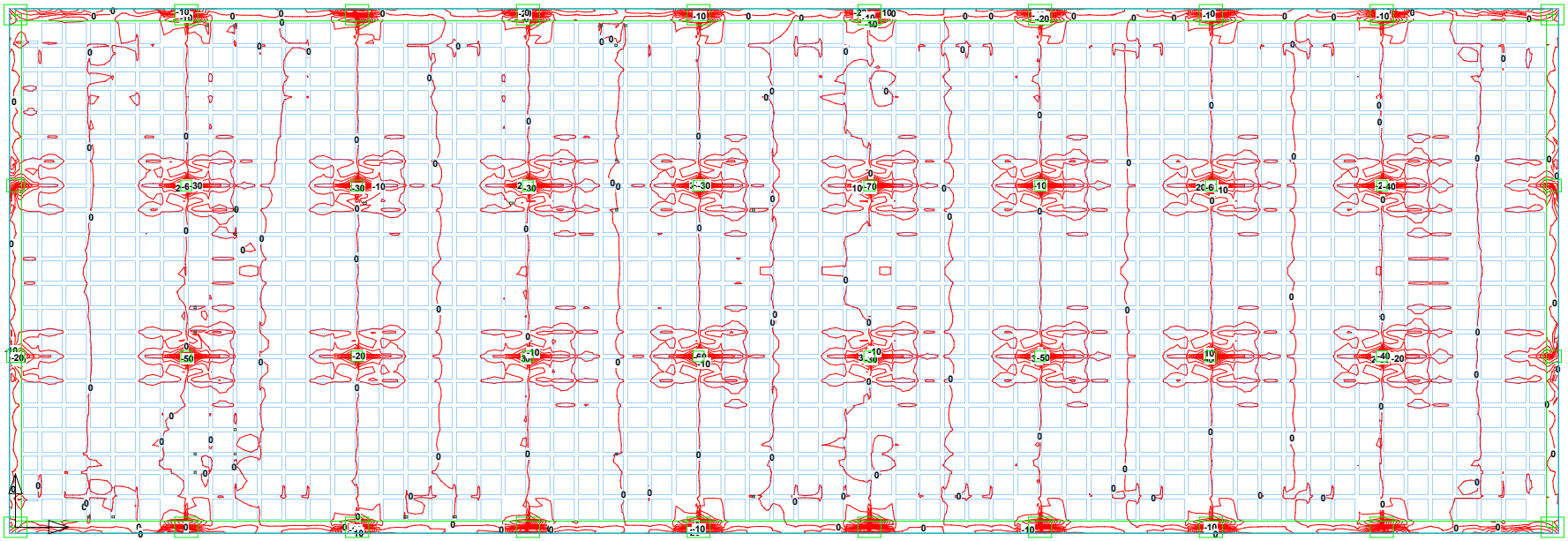
Factored LC: 1.2D + f1L + E (Positive X): Max Vx Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.21 kips/ft @ (105.3,21) Max Value = 58.71 kips/ft @ (167.8,21)



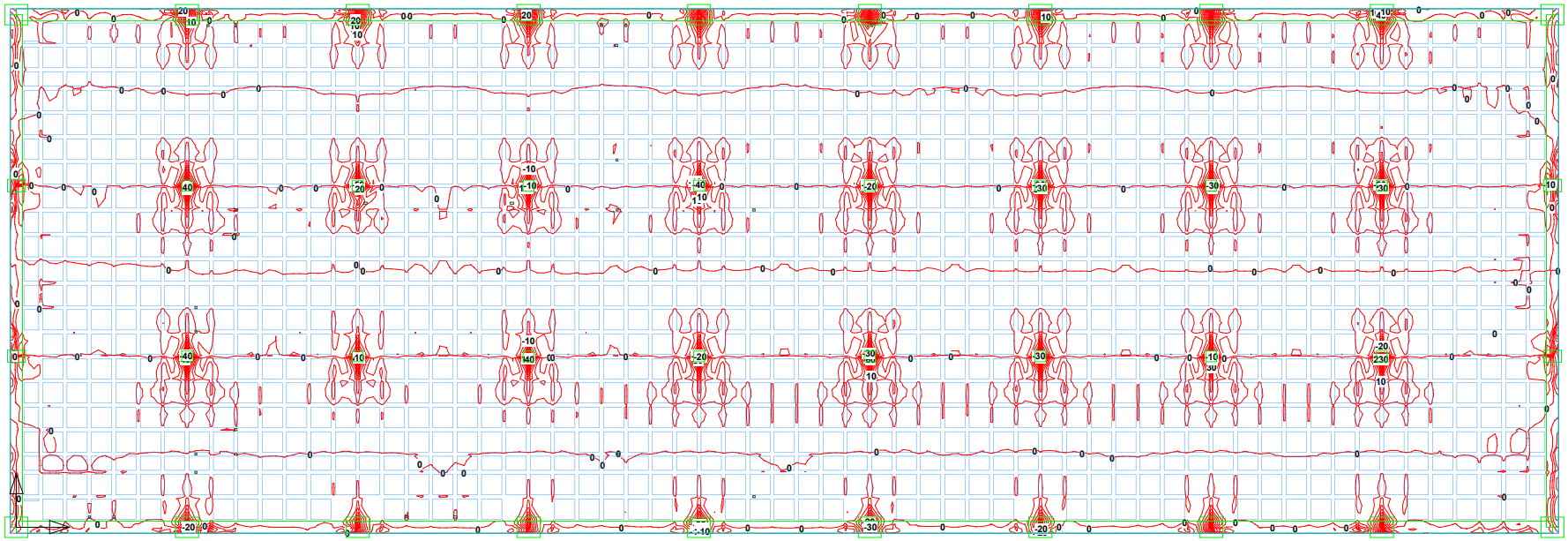
Factored LC: 1.2D + f1L + E (Positive X): Min Vx Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -61.47 kips/ft @ (168.3,42) Max Value = 40.1 kips/ft @ (167.8,21)



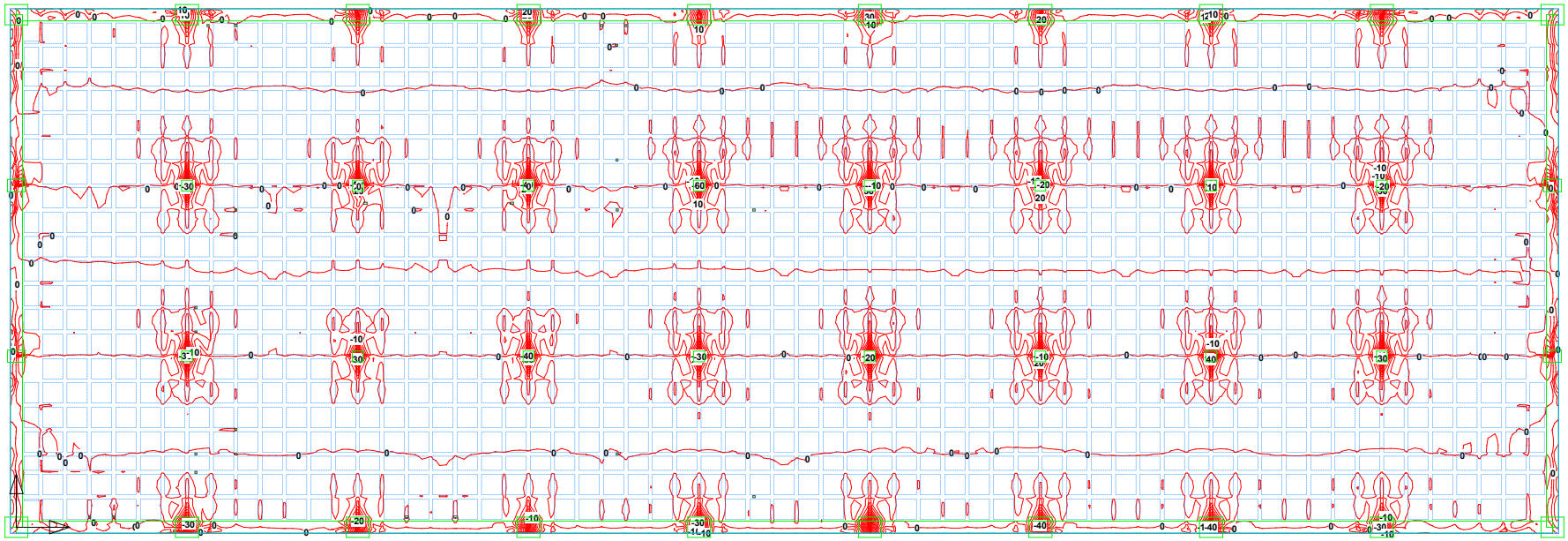
Factored LC: 1.2D + f1L + E (Positive X): Max Vy Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.99 kips/ft @ (168,42.25) Max Value = 61.77 kips/ft @ (105,20.75)



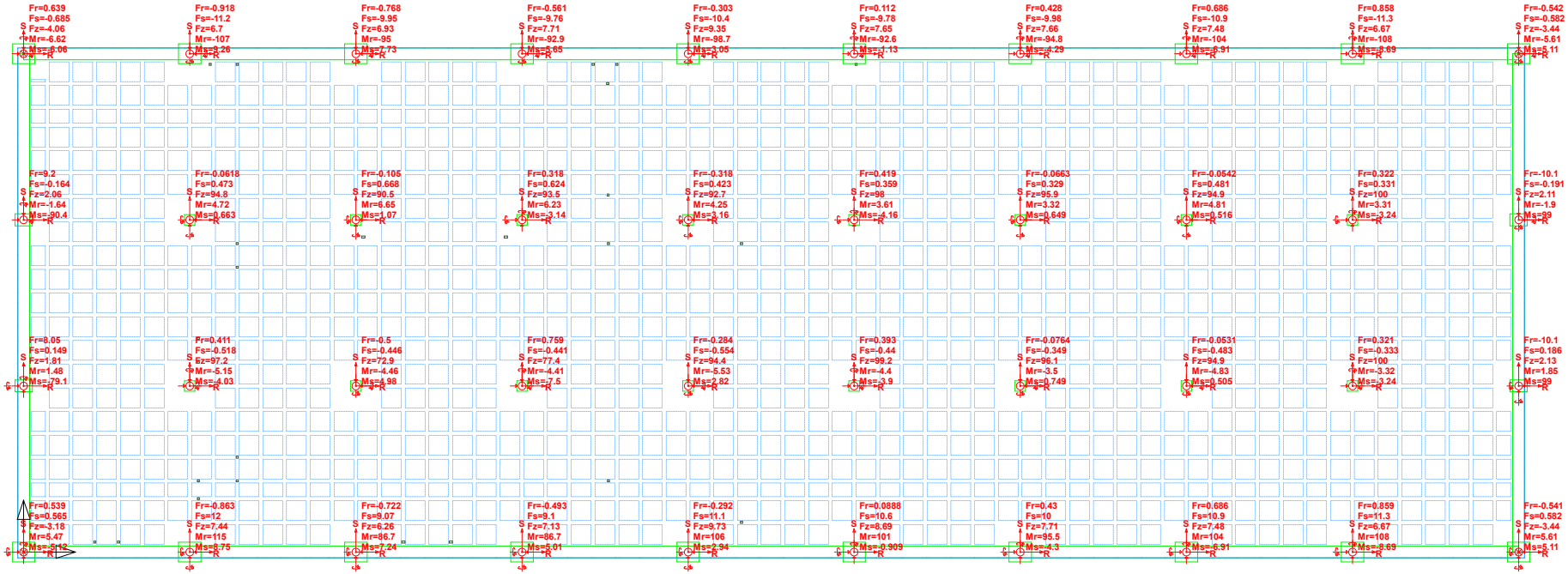
Factored LC: 1.2D + f1L + E (Positive X): Min Vy Plan

Factored LC: 1.2D + f1L + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive X) - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -61.49 kips/ft @ (168,42.25) Max Value = 42.61 kips/ft @ (105,20.75)



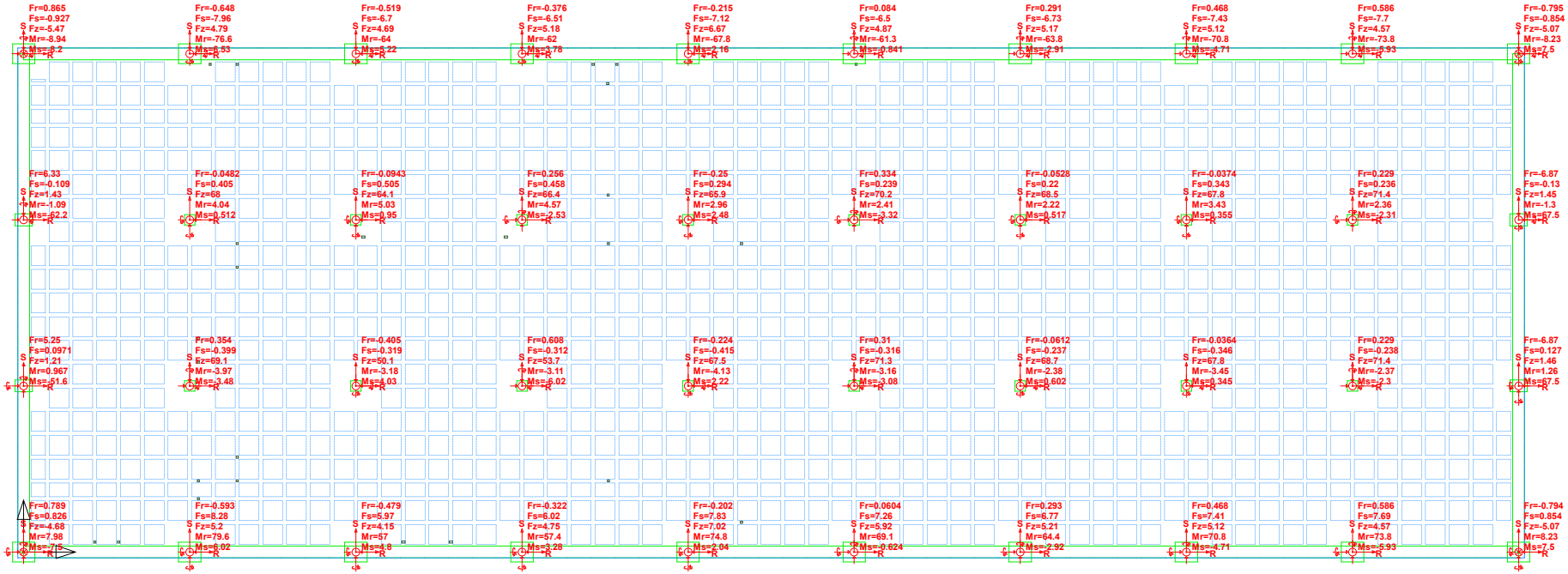
Factored LC: 1.2D + f1L + E (Negative X): Max Reactions Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



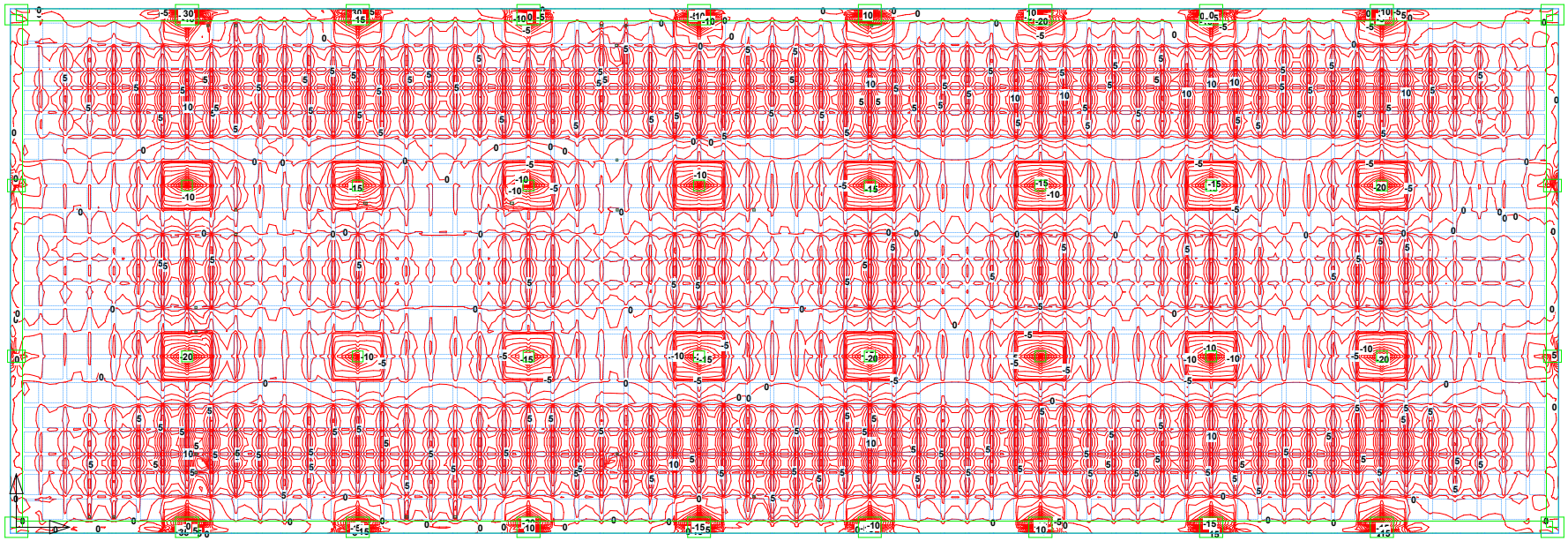
Factored LC: 1.2D + f1L + E (Negative X): Min Reactions Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



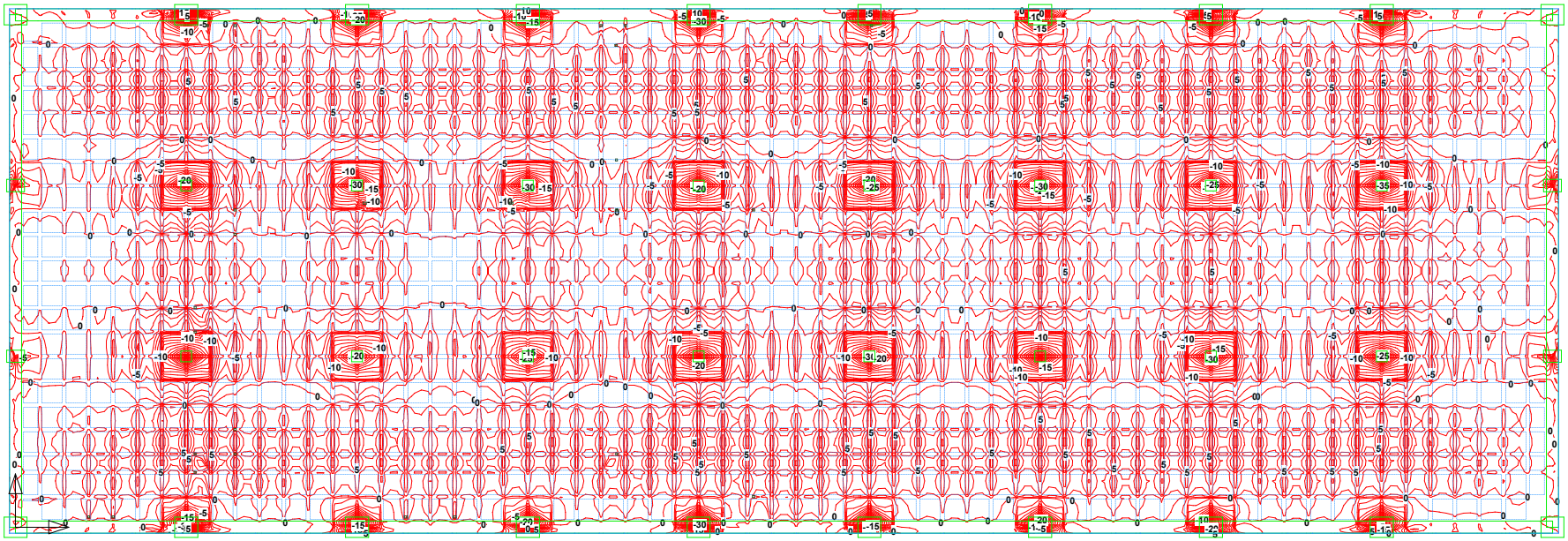
Factored LC: 1.2D + f1L + E (Negative X): Max Mx Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -25.38 Kips @ (105.1,20.88) Max Value = 45.27 Kips @ (20.83,-0.375)



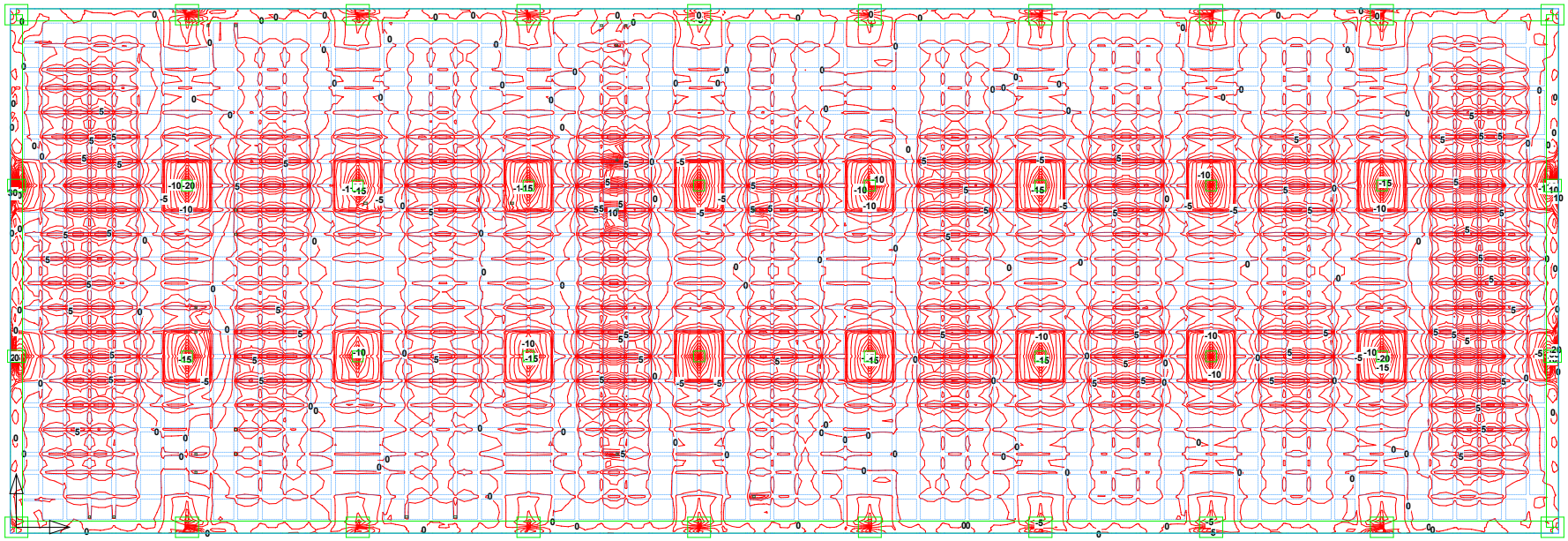
Factored LC: 1.2D + f1L + E (Negative X): Min Mx Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -36.89 Kips @ (105.1,20.88) Max Value = 31.33 Kips @ (20.83,-0.375)



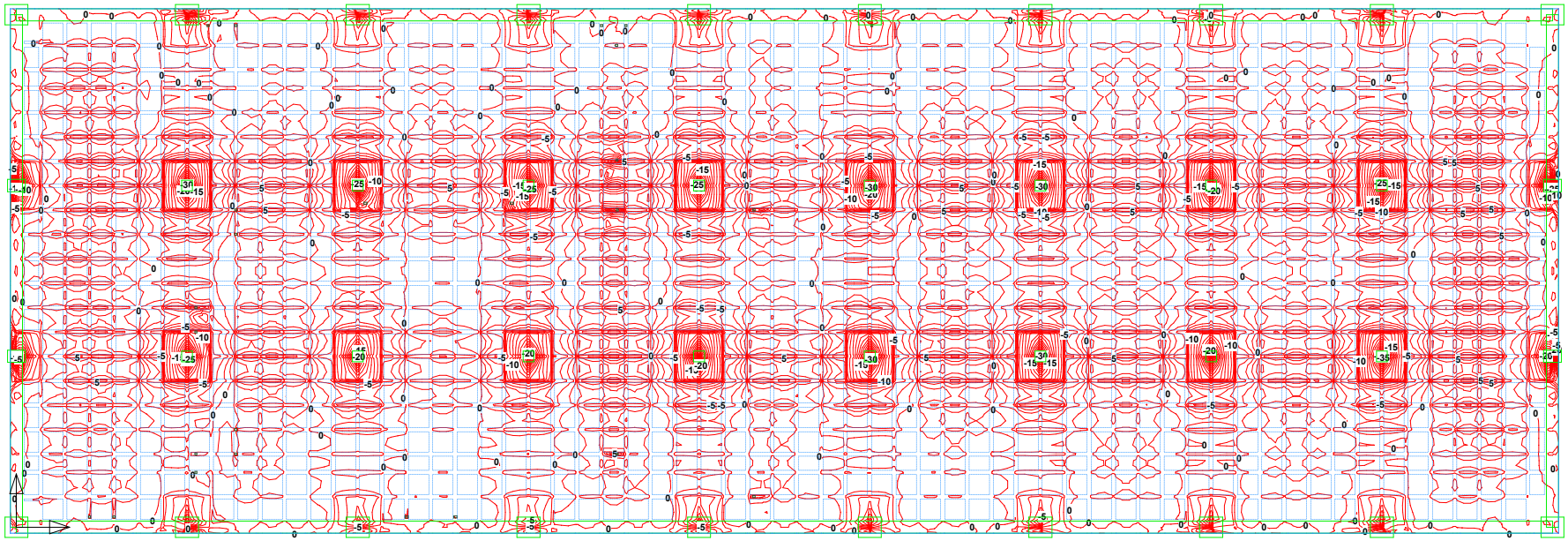
Factored LC: 1.2D + f1L + E (Negative X): Max My Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -24.91 Kips @ (168.1,42.13) Max Value = 38.7 Kips @ (189.4,21.55)



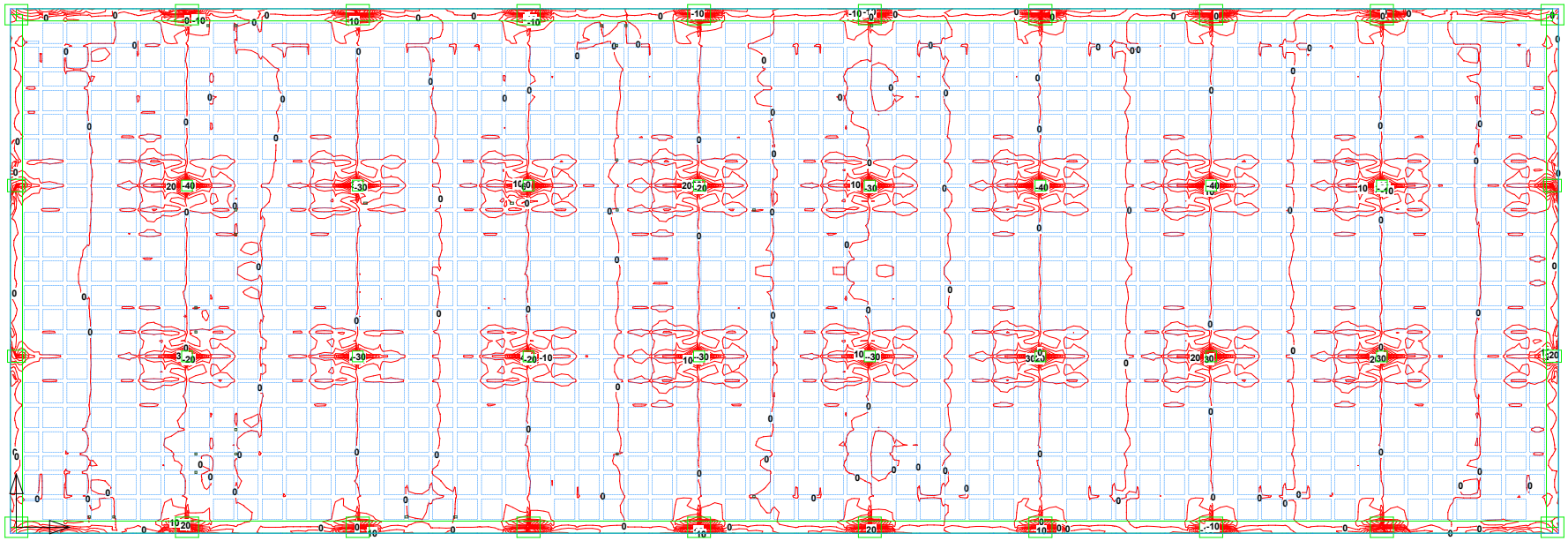
Factored LC: 1.2D + f1L + E (Negative X): Min My Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -36.53 Kips @ (168.1,42.13) Max Value = 26.38 Kips @ (189.4,21.55)



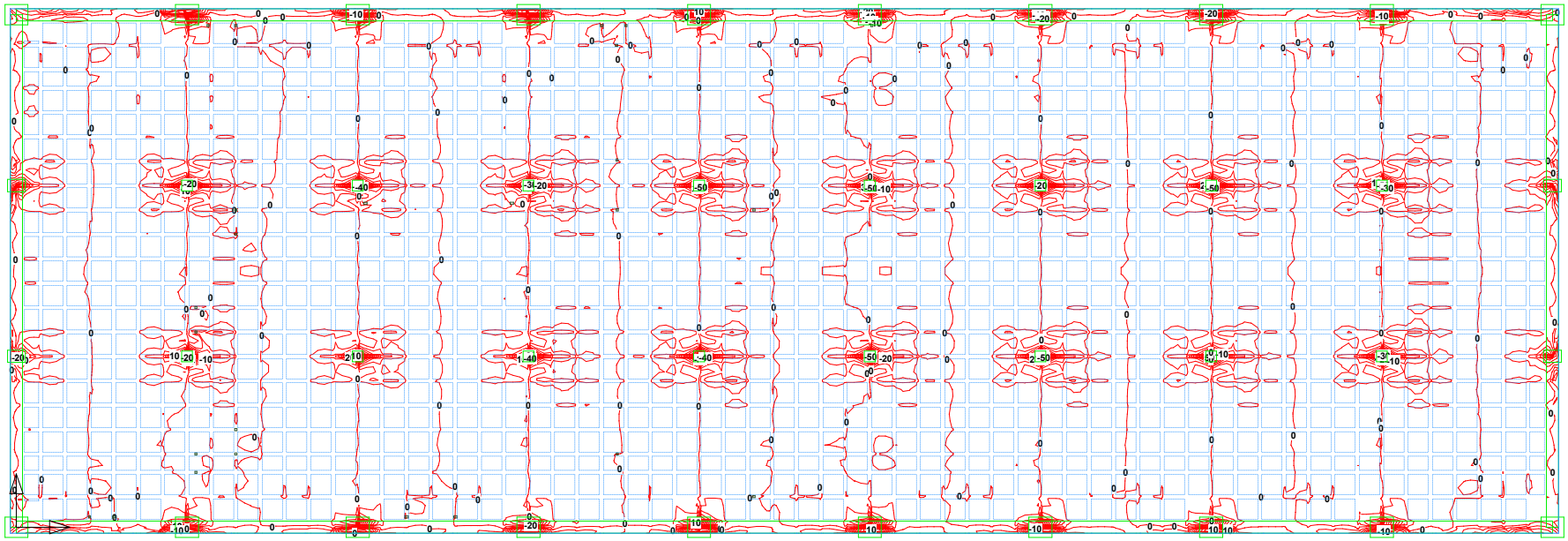
Factored LC: 1.2D + f1L + E (Negative X): Max Vx Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.04 kips/ft @ (105.3,21) Max Value = 58.7 kips/ft @ (167.8,21)



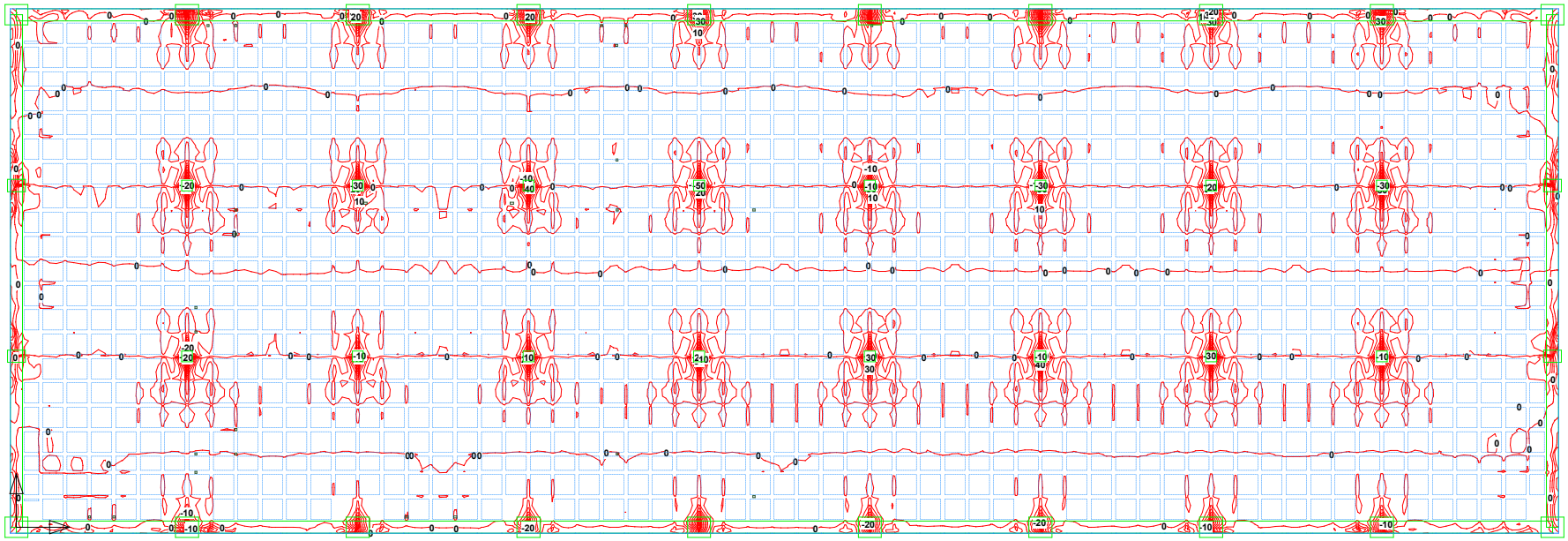
Factored LC: 1.2D + f1L + E (Negative X): Min Vx Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -61.46 kips/ft @ (168.3,42) Max Value = 40.09 kips/ft @ (167.8,21)



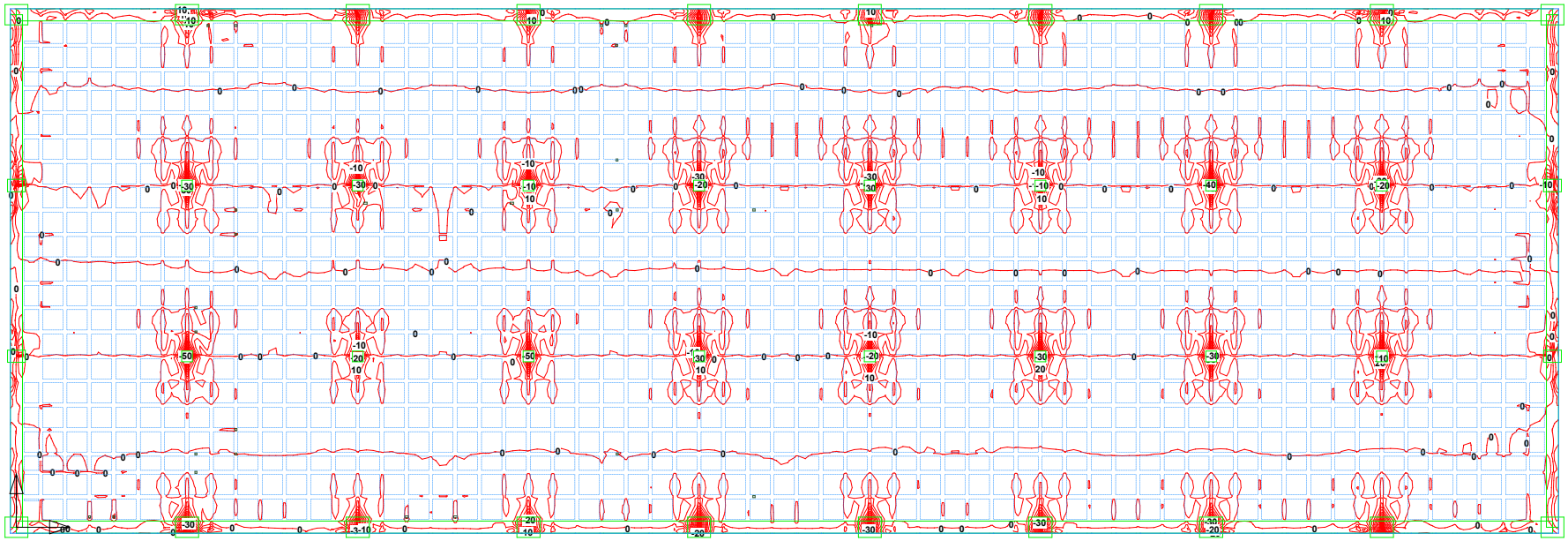
Factored LC: 1.2D + f1L + E (Negative X): Max Vy Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.99 kips/ft @ (168,42.25) Max Value = 61.49 kips/ft @ (168,20.75)



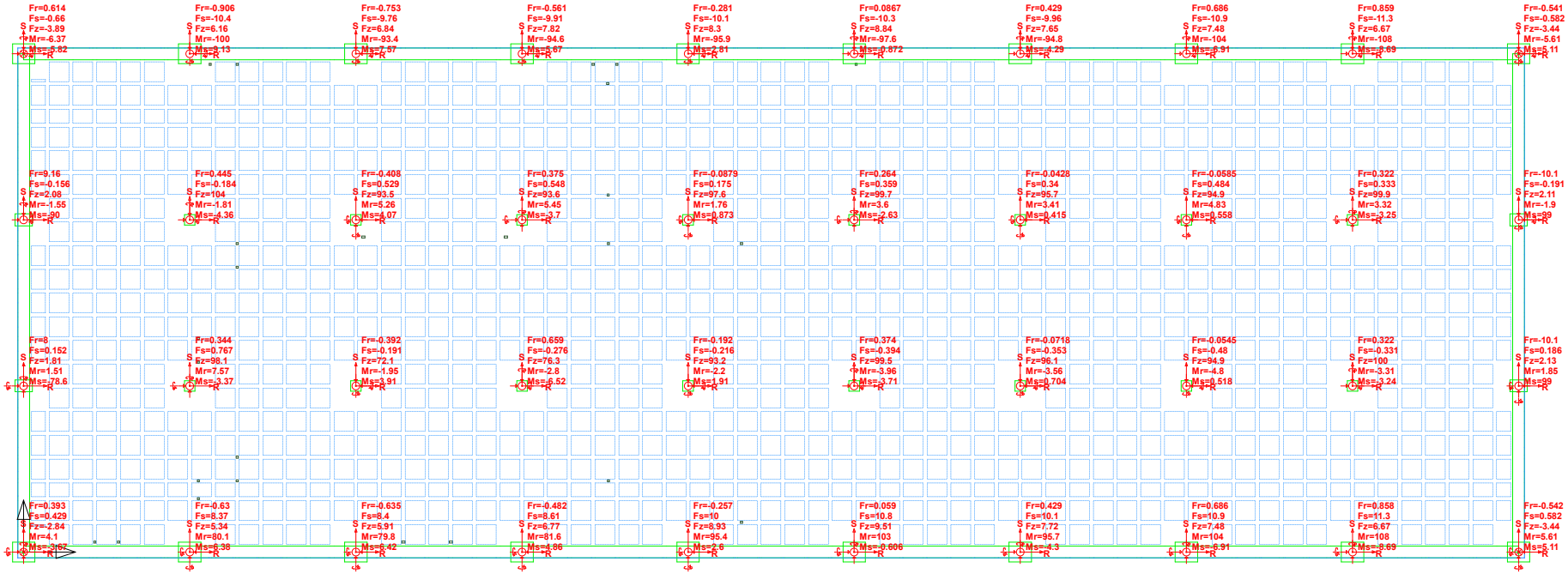
Factored LC: 1.2D + f1L + E (Negative X): Min Vy Plan

Factored LC: 1.2D + f1L + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative X) - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -61.49 kips/ft @ (168,42.25) Max Value = 42.18 kips/ft @ (105,20.75)



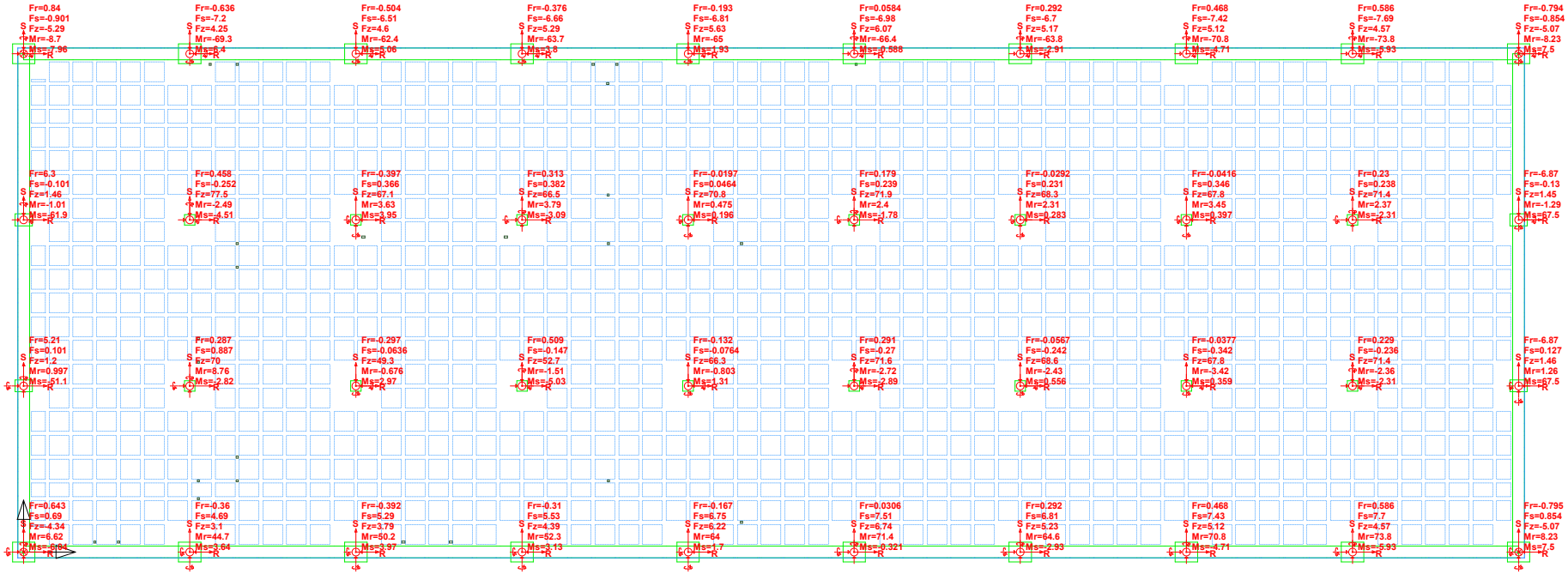
Factored LC: 1.2D + f1L + E (Positive Y): Max Reactions Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



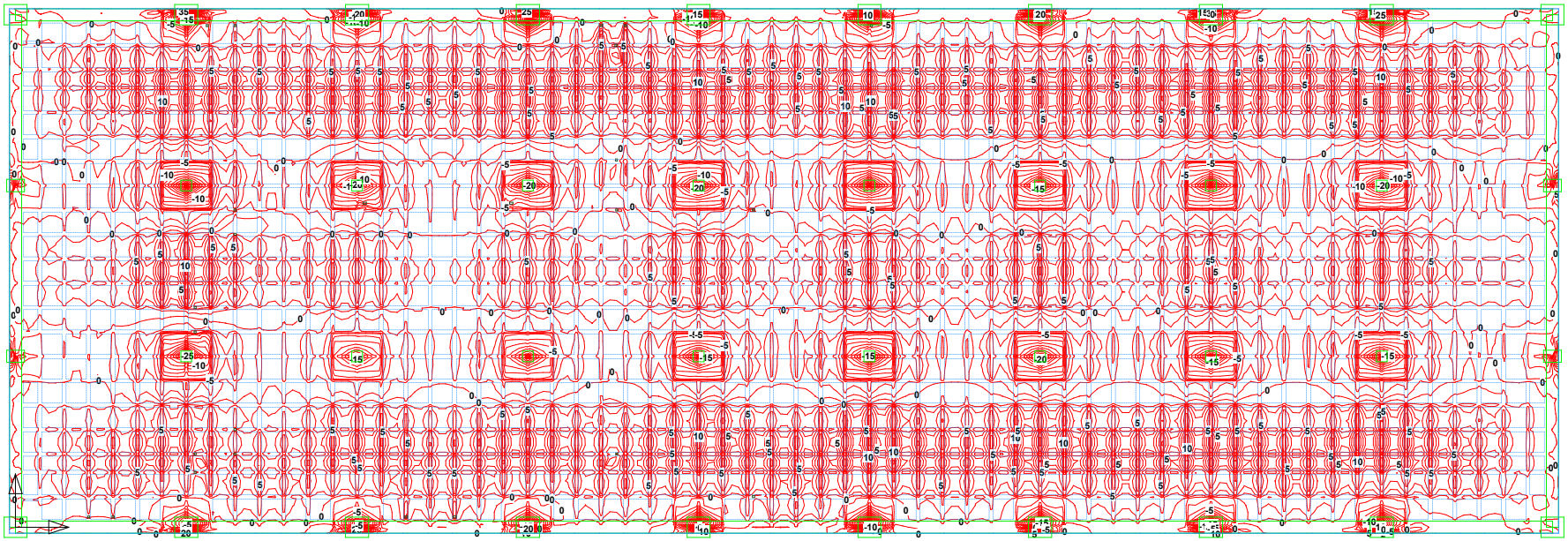
Factored LC: 1.2D + f1L + E (Positive Y): Min Reactions Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



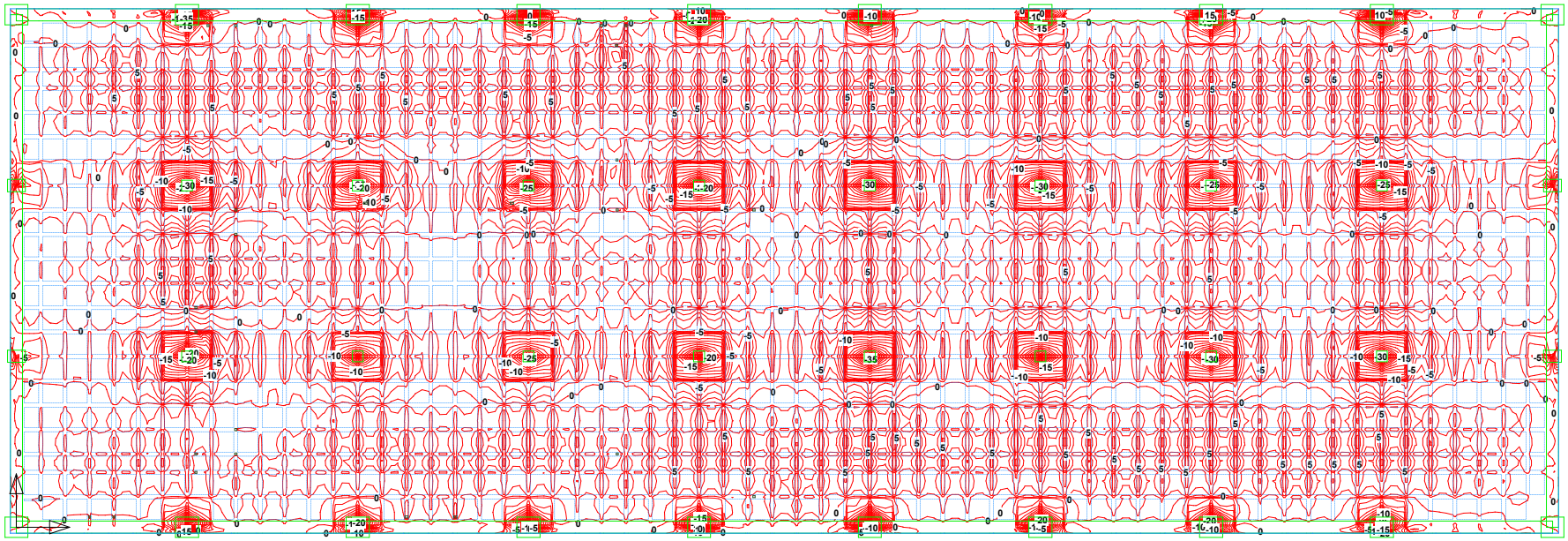
Factored LC: 1.2D + f1L + E (Positive Y): Max Mx Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -28.28 Kips @ (21.13,21.13) Max Value = 42.69 Kips @ (168.2,-0.375)



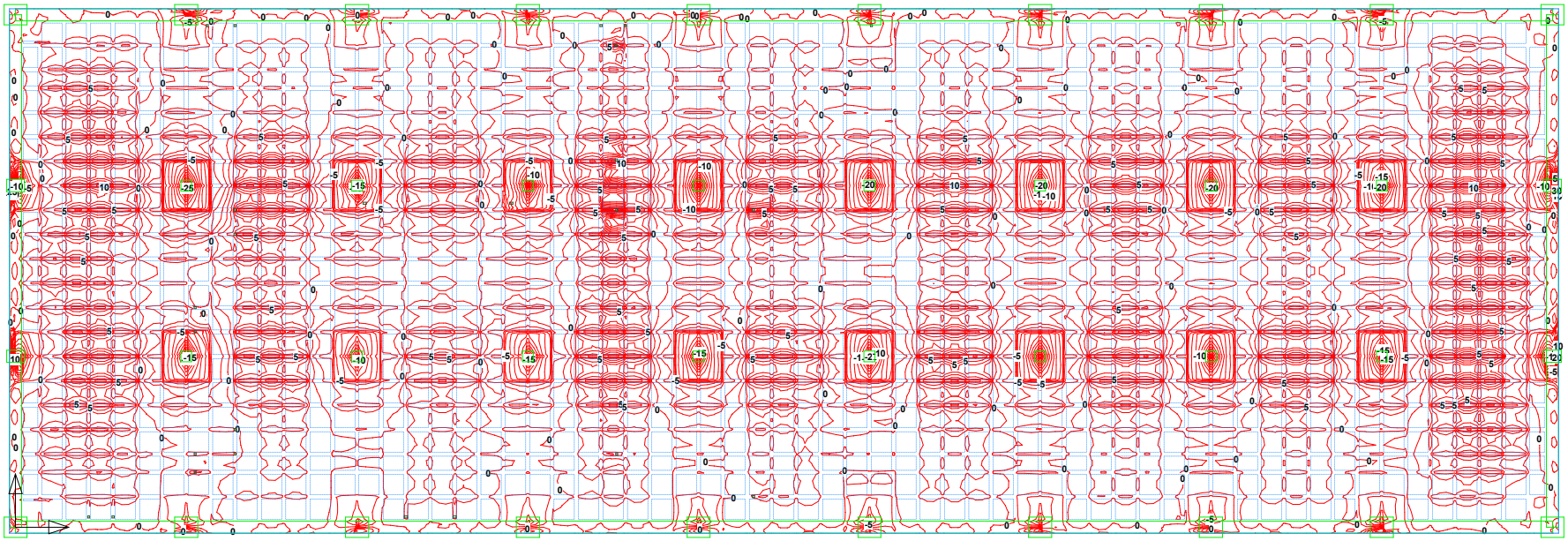
Factored LC: 1.2D + f1L + E (Positive Y): Min Mx Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -37.95 Kips @ (21.13,21.13) Max Value = 29.12 Kips @ (168.2,-0.375)



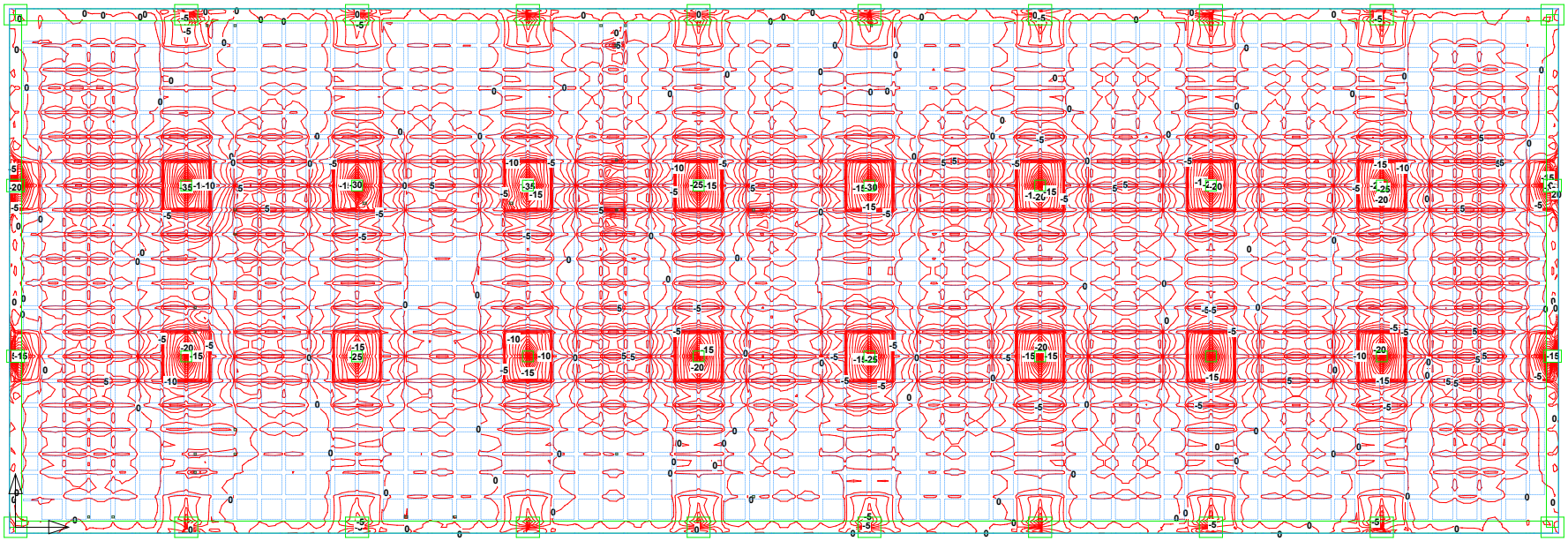
Factored LC: 1.2D + f1L + E (Positive Y): Max My Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -28.64 Kips @ (21.13,41.88) Max Value = 38.7 Kips @ (189.4,21.55)



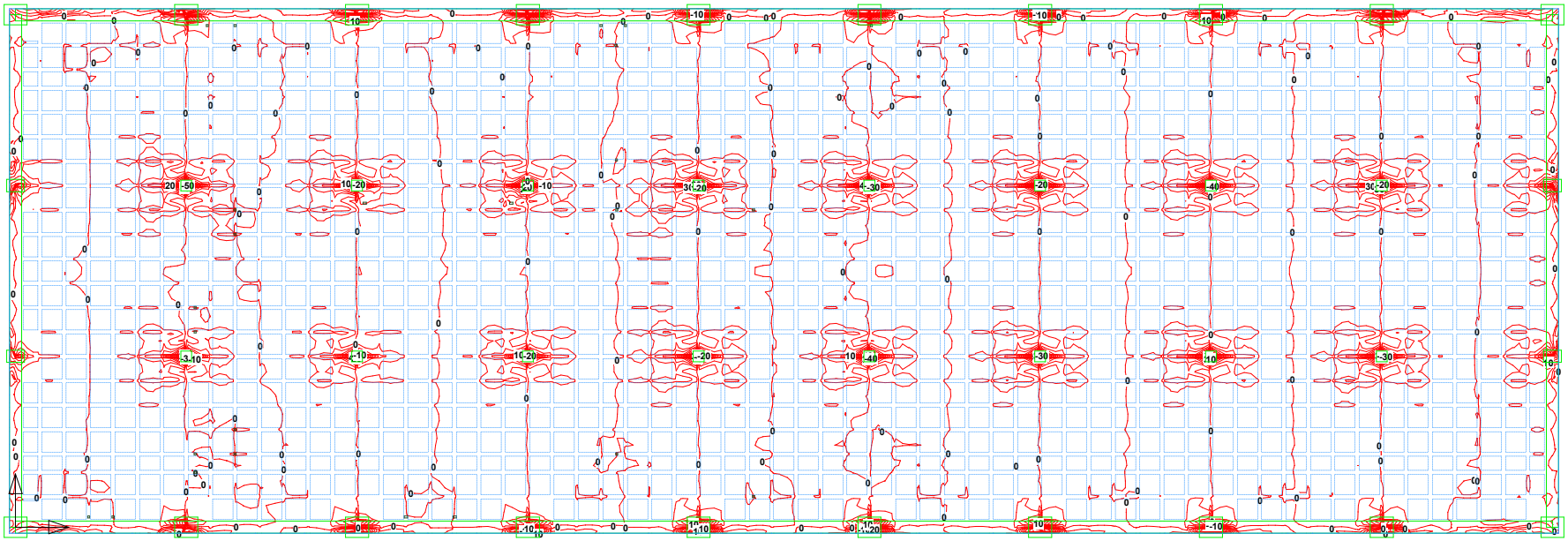
Factored LC: 1.2D + f1L + E (Positive Y): Min My Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -38.54 Kips @ (21.13,41.88) Max Value = 26.38 Kips @ (189.4,21.55)



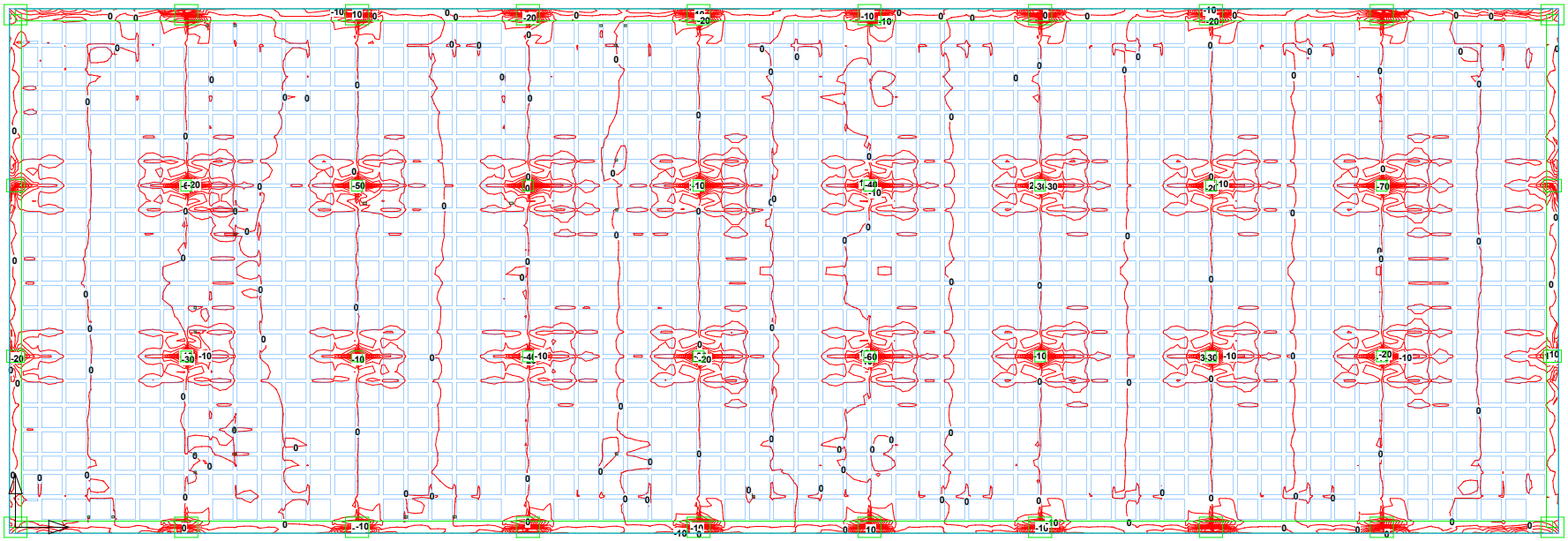
Factored LC: 1.2D + f1L + E (Positive Y): Max Vx Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -46.63 kips/ft @ (21.25,42) Max Value = 60.58 kips/ft @ (20.75,42)



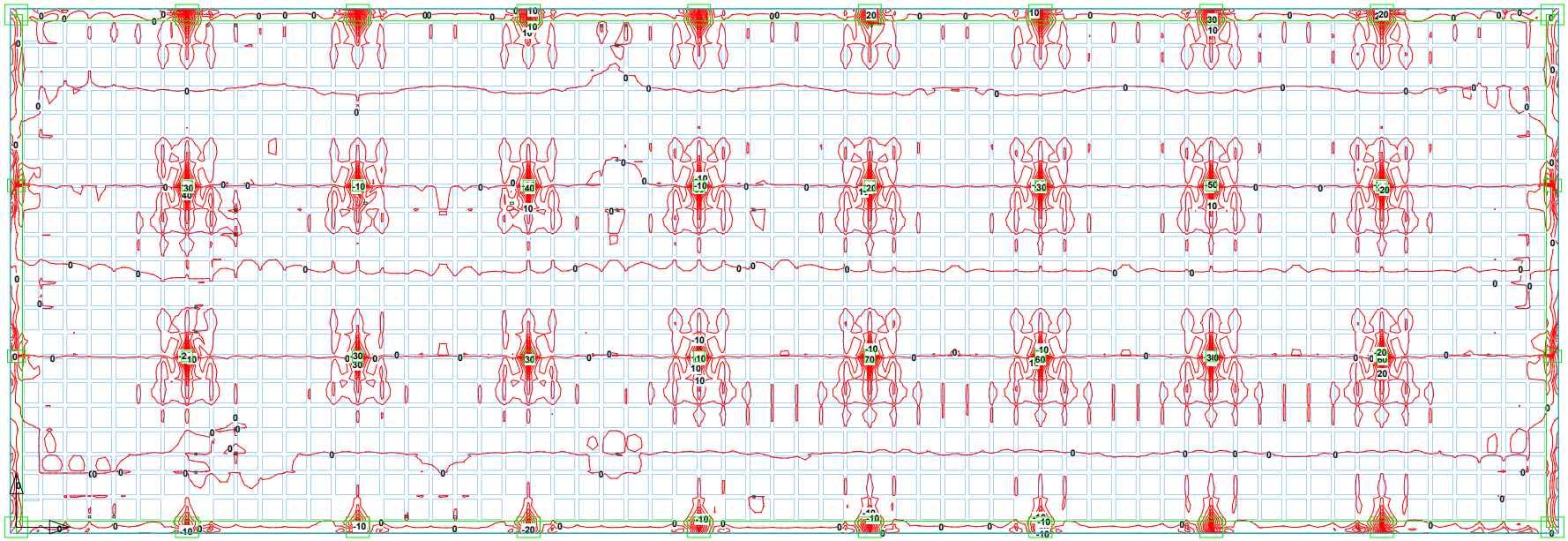
Factored LC: 1.2D + f1L + E (Positive Y): Min Vx Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -64.44 kips/ft @ (21.25,42) Max Value = 42.66 kips/ft @ (20.75,42)



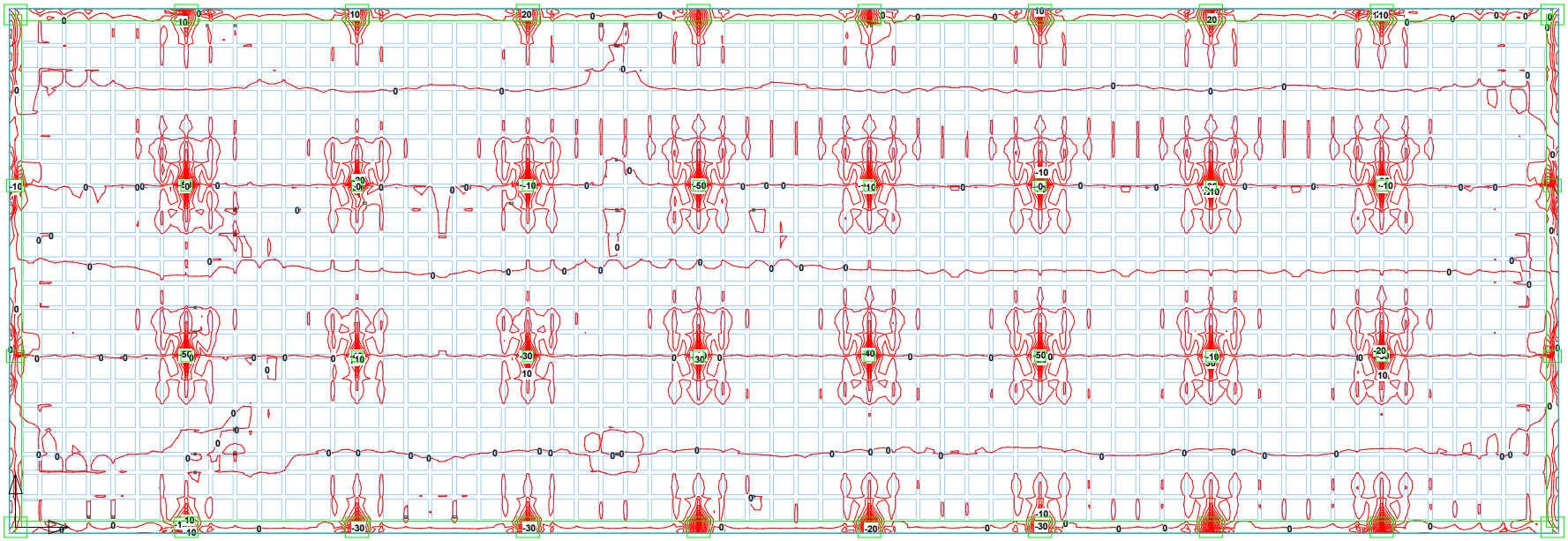
Factored LC: 1.2D + f1L + E (Positive Y): Max Vy Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -43.9 kips/ft @ (21,21.25) Max Value = 63.21 kips/ft @ (21,41.75)



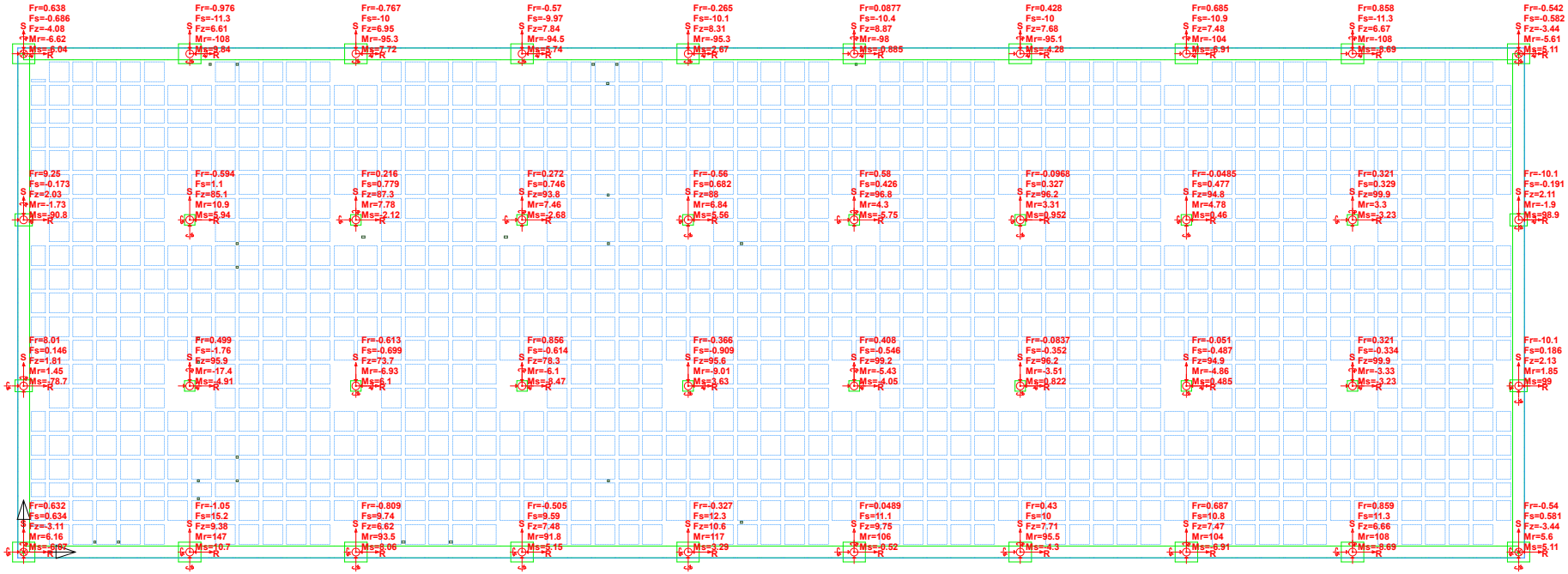
Factored LC: 1.2D + f1L + E (Positive Y): Min Vy Plan

Factored LC: 1.2D + f1L + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Positive Y) - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -62.11 kips/ft @ (21,21.25) Max Value = 45.62 kips/ft @ (21,41.75)



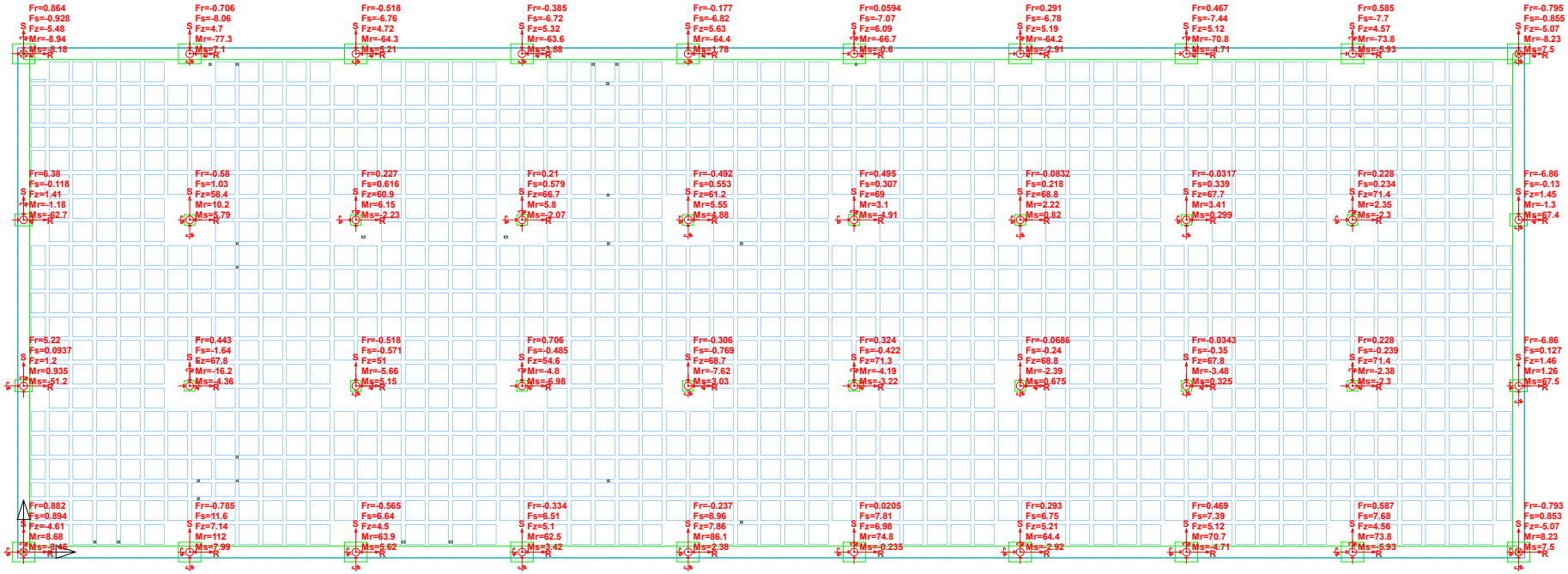
Factored LC: 1.2D + f1L + E (Negative Y): Max Reactions Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



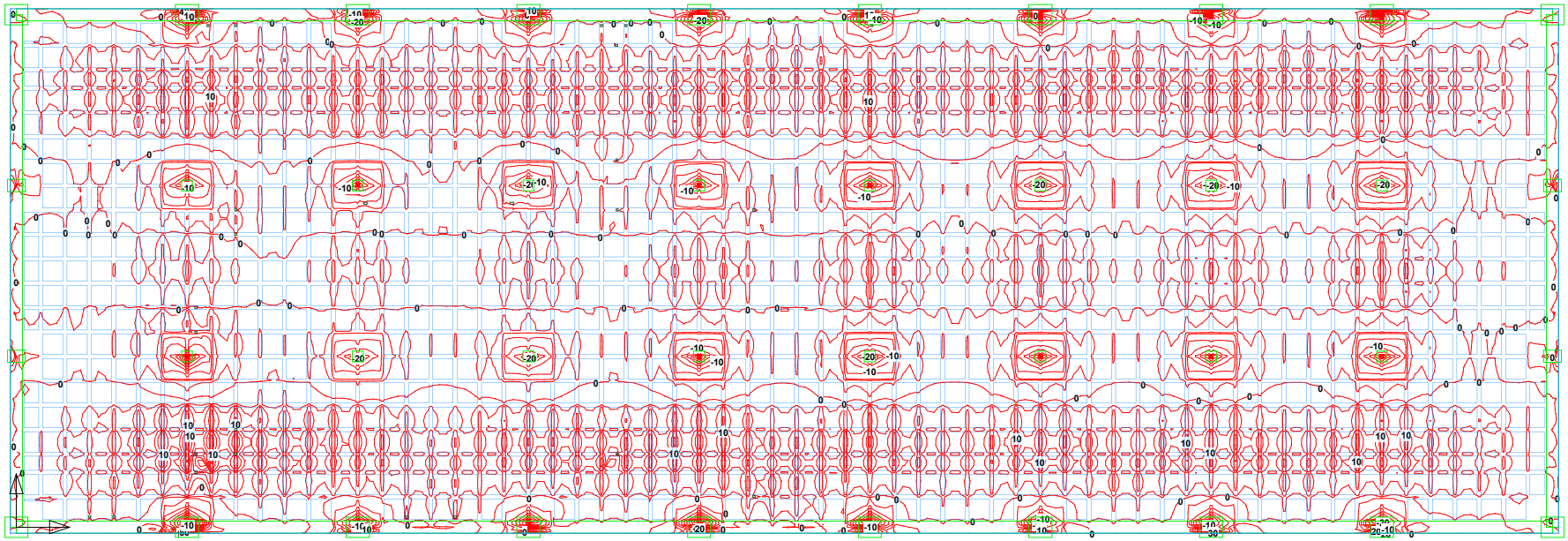
Factored LC: 1.2D + f1L + E (Negative Y): Min Reactions Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



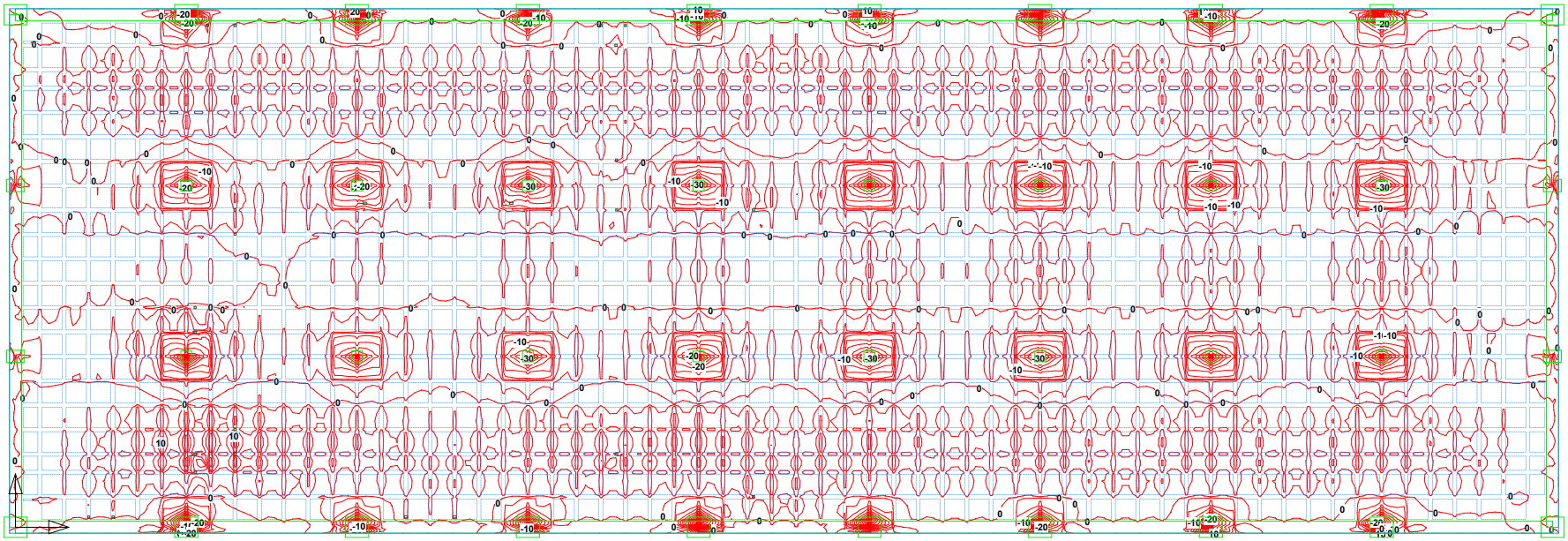
Factored LC: 1.2D + f1L + E (Negative Y): Max Mx Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 Kips
Min Value = -33.65 Kips @ (21.13,20.88) Max Value = 57.66 Kips @ (20.83,-0.375)



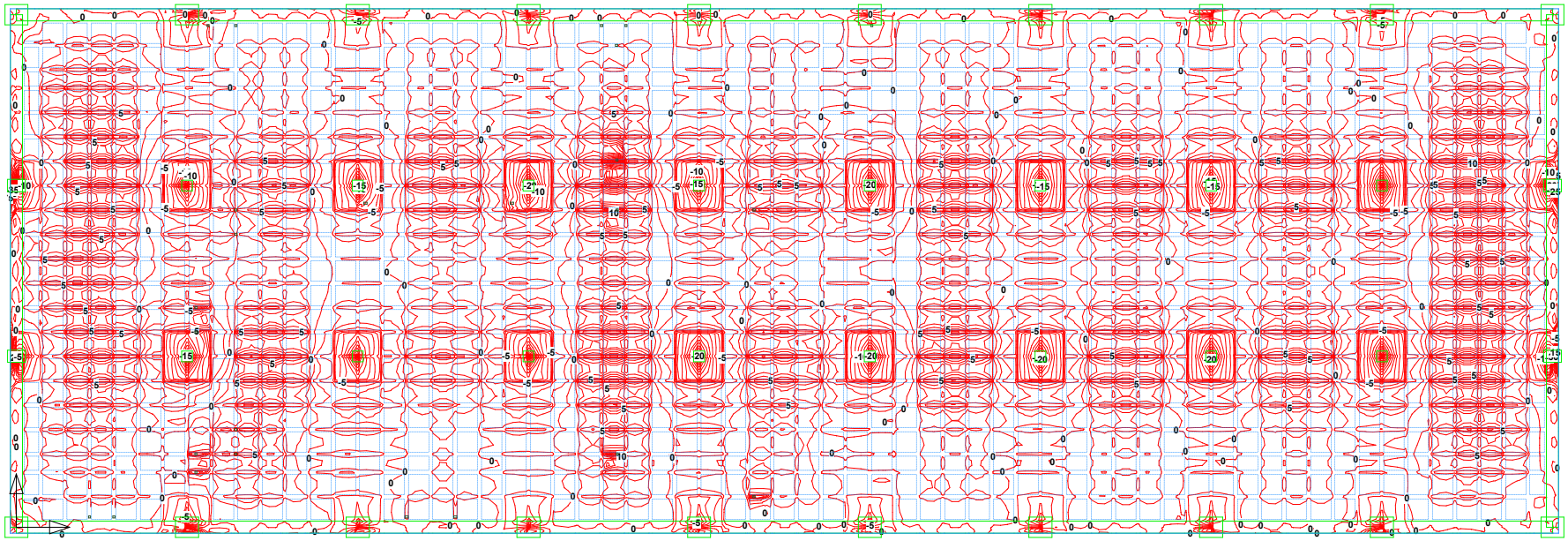
Factored LC: 1.2D + f1L + E (Negative Y): Min Mx Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 Kips
Min Value = -45.1 Kips @ (21.13,20.88) Max Value = 43.71 Kips @ (20.83,-0.375)



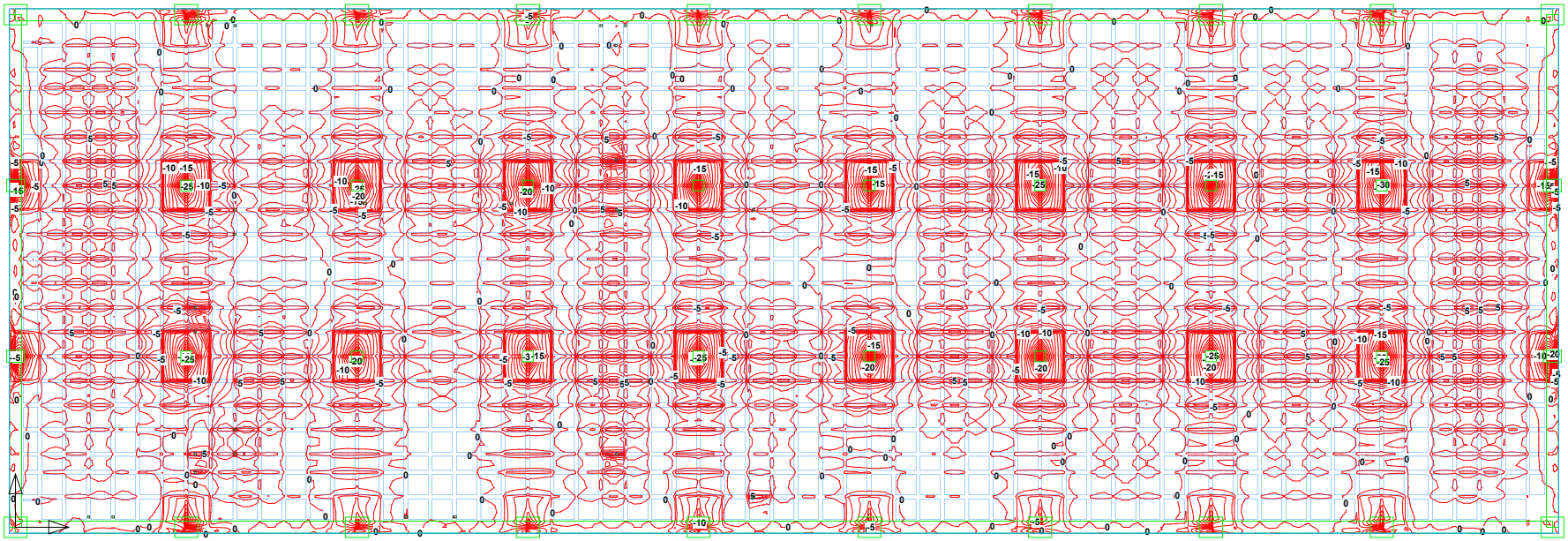
Factored LC: 1.2D + f1L + E (Negative Y): Max My Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -26.52 Kips @ (21.13,20.88) Max Value = 38.69 Kips @ (189.4,21.55)



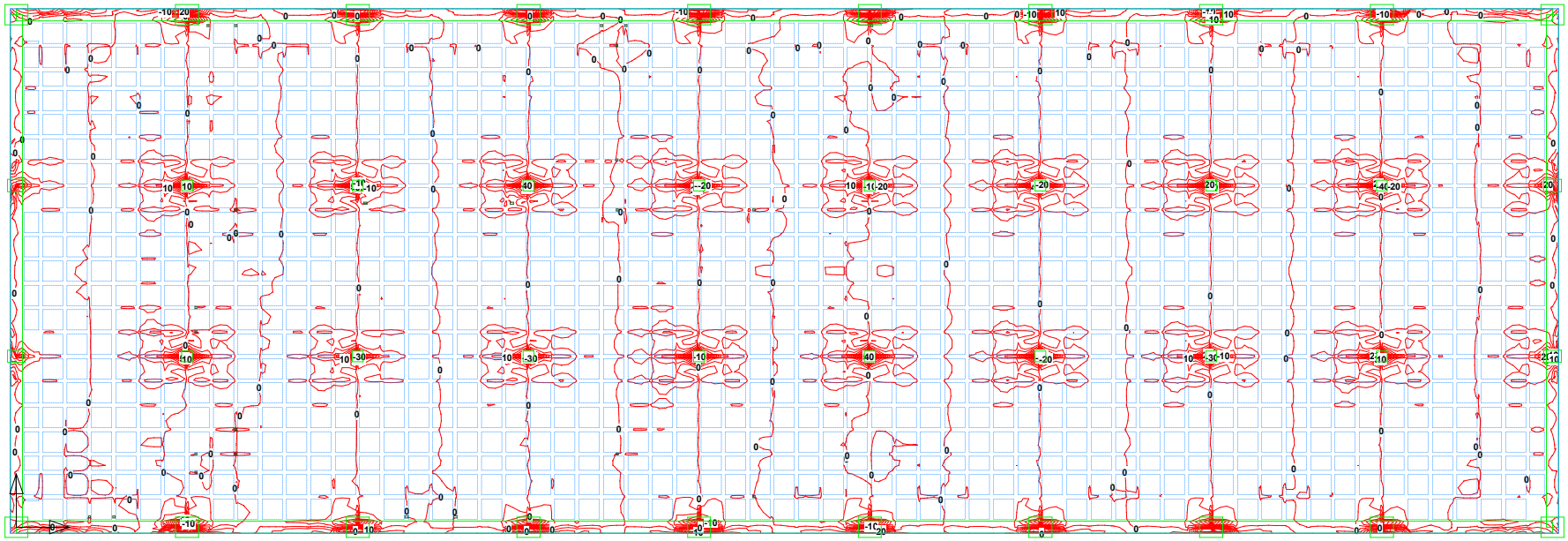
Factored LC: 1.2D + f1L + E (Negative Y): Min My Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -37.27 Kips @ (21.13,20.88) Max Value = 26.37 Kips @ (189.4,21.55)



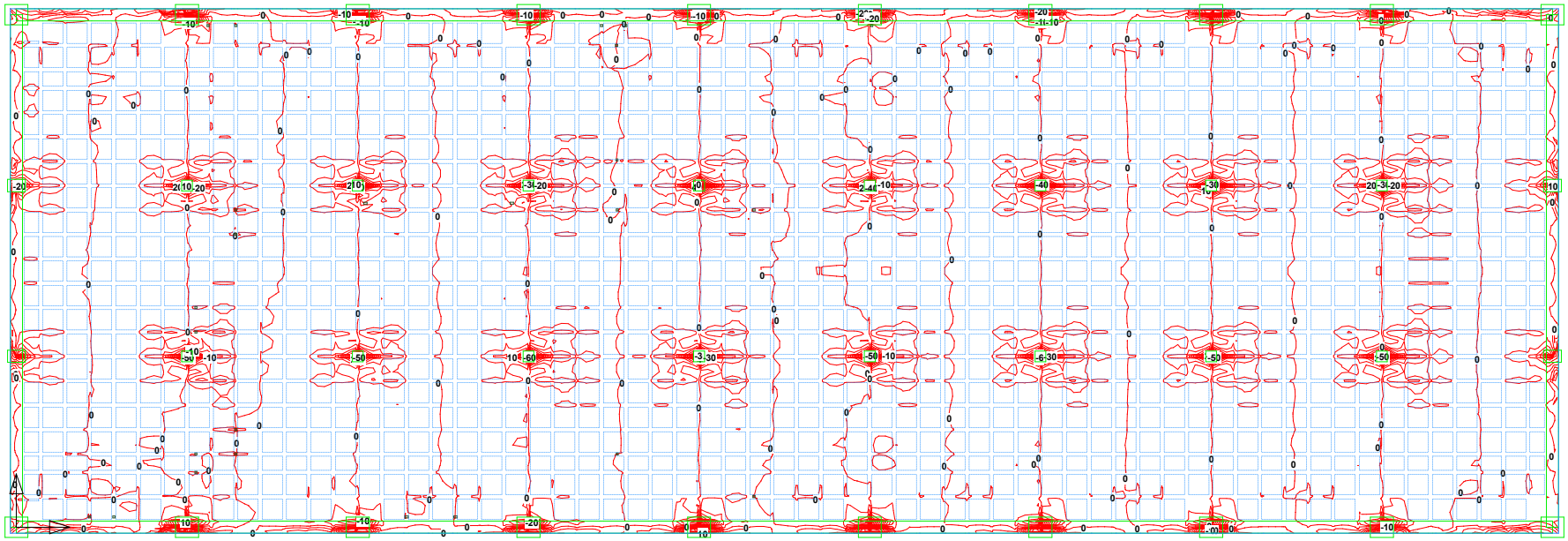
Factored LC: 1.2D + f1L + E (Negative Y): Max Vx Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.13 kips/ft @ (105.3,21) Max Value = 59.04 kips/ft @ (83.75,21)



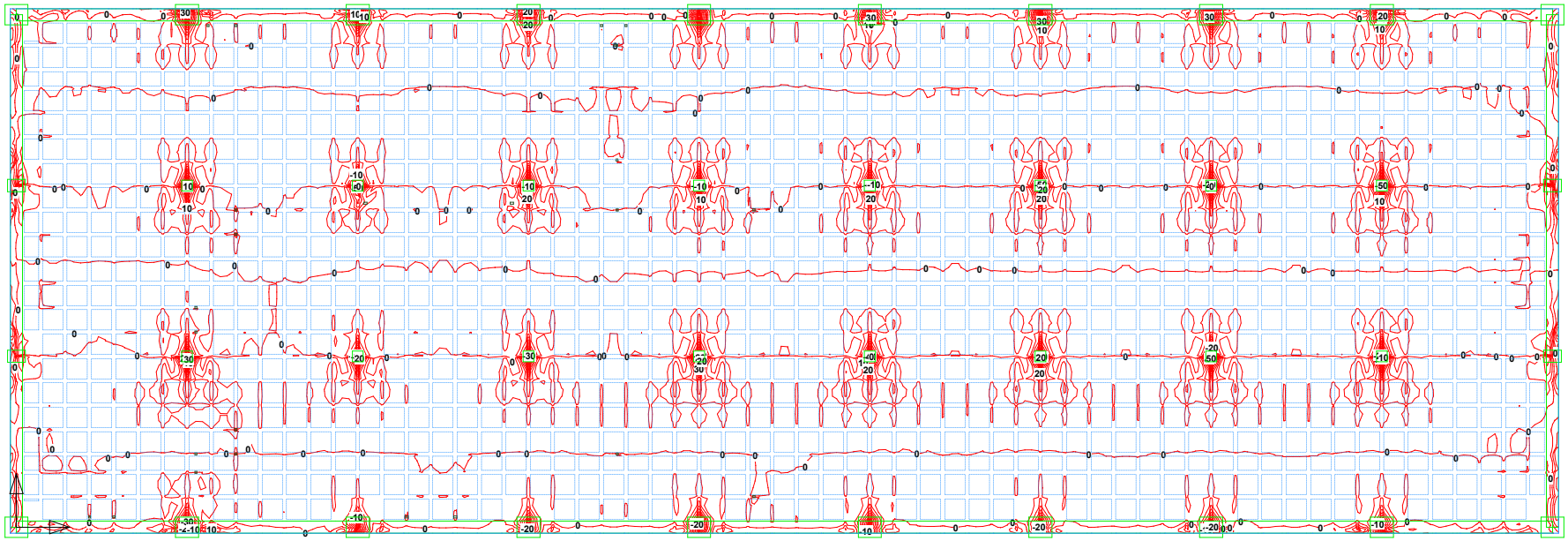
Factored LC: 1.2D + f1L + E (Negative Y): Min Vx Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -61.46 kips/ft @ (168.3,42) Max Value = 40.76 kips/ft @ (83.75,21)



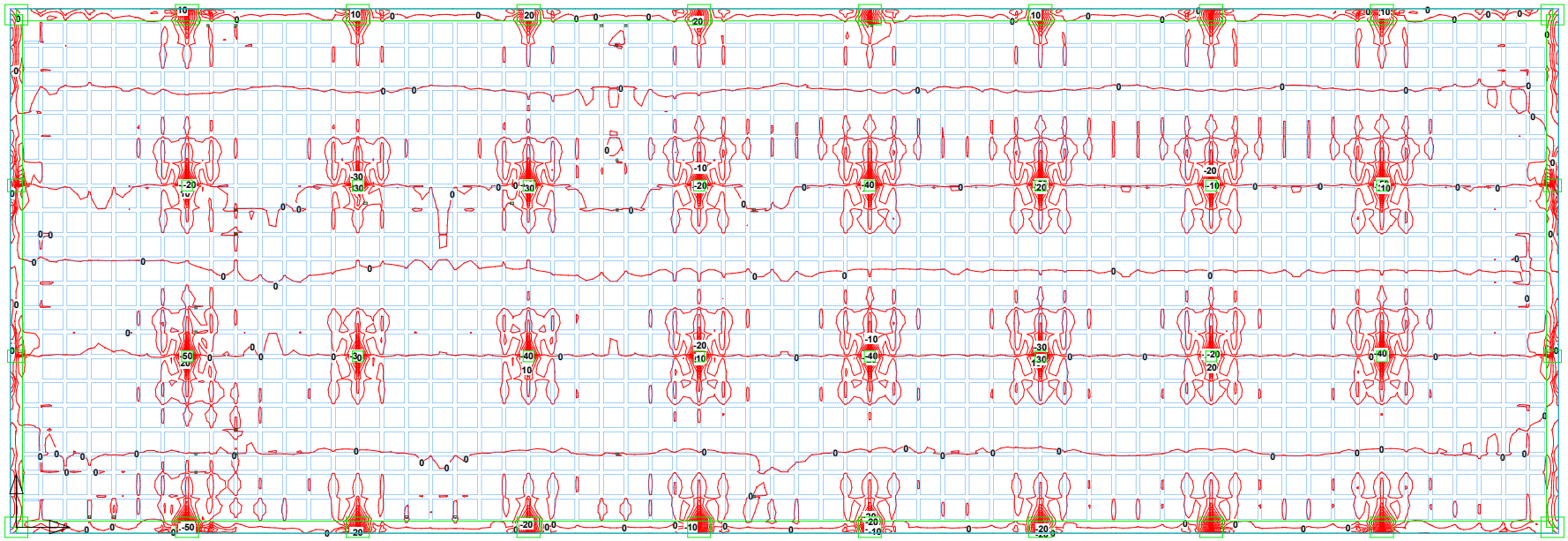
Factored LC: 1.2D + f1L + E (Negative Y): Max Vy Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.98 kips/ft @ (168,42.25) Max Value = 64.81 kips/ft @ (21,20.75)



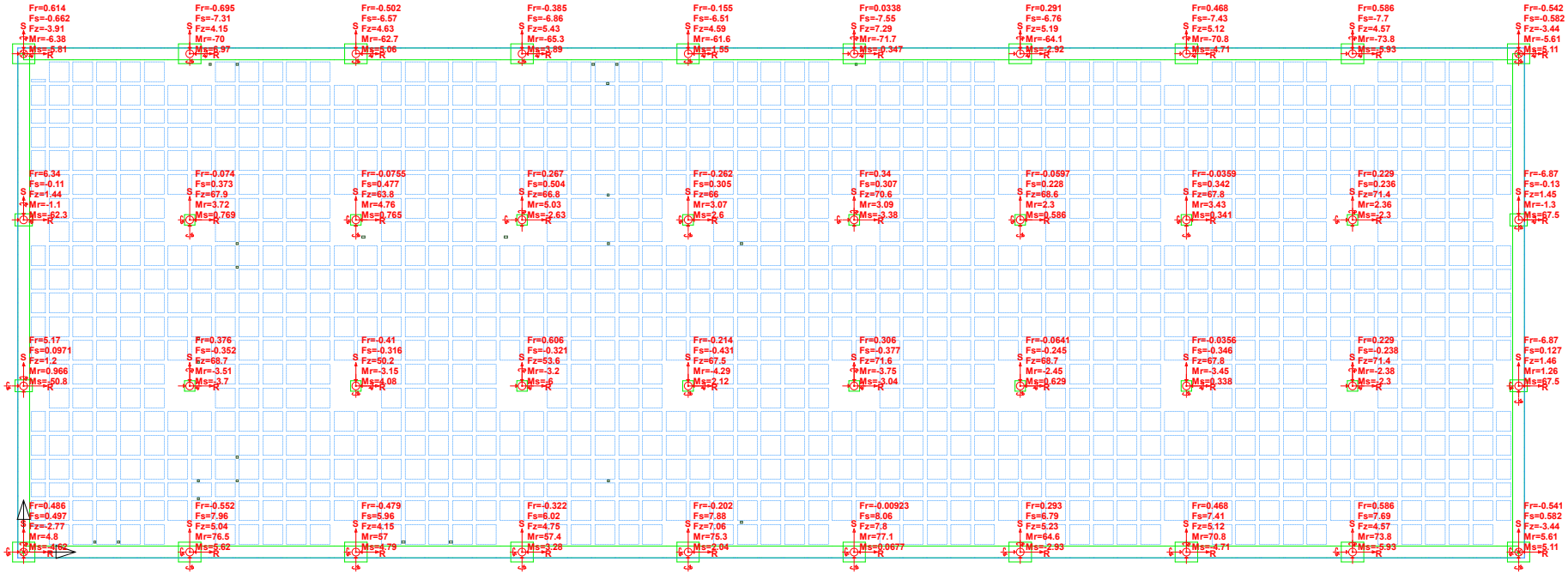
Factored LC: 1.2D + f1L + E (Negative Y): Min Vy Plan

Factored LC: 1.2D + f1L + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 1.2D + f1L + E (Negative Y) - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -61.48 kips/ft @ (168,42.25) Max Value = 45.55 kips/ft @ (21,20.75)



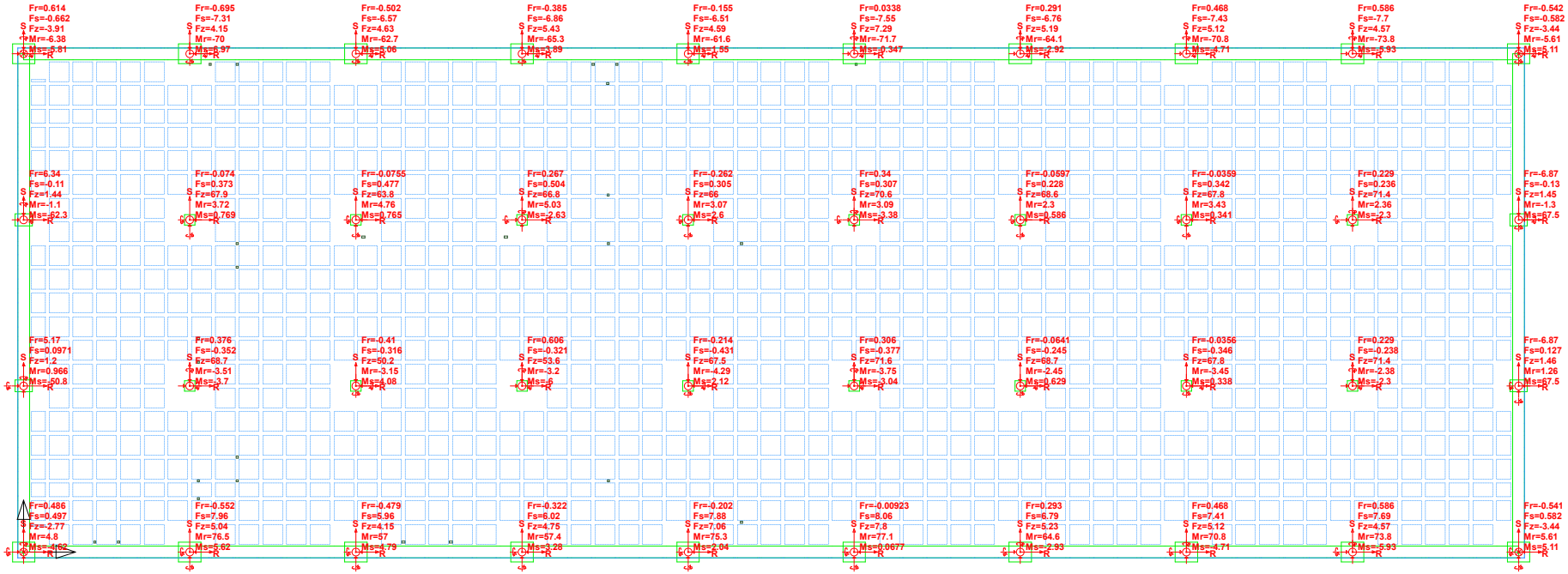
Factored LC: 0.9D + E (Positive X): Max Reactions Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



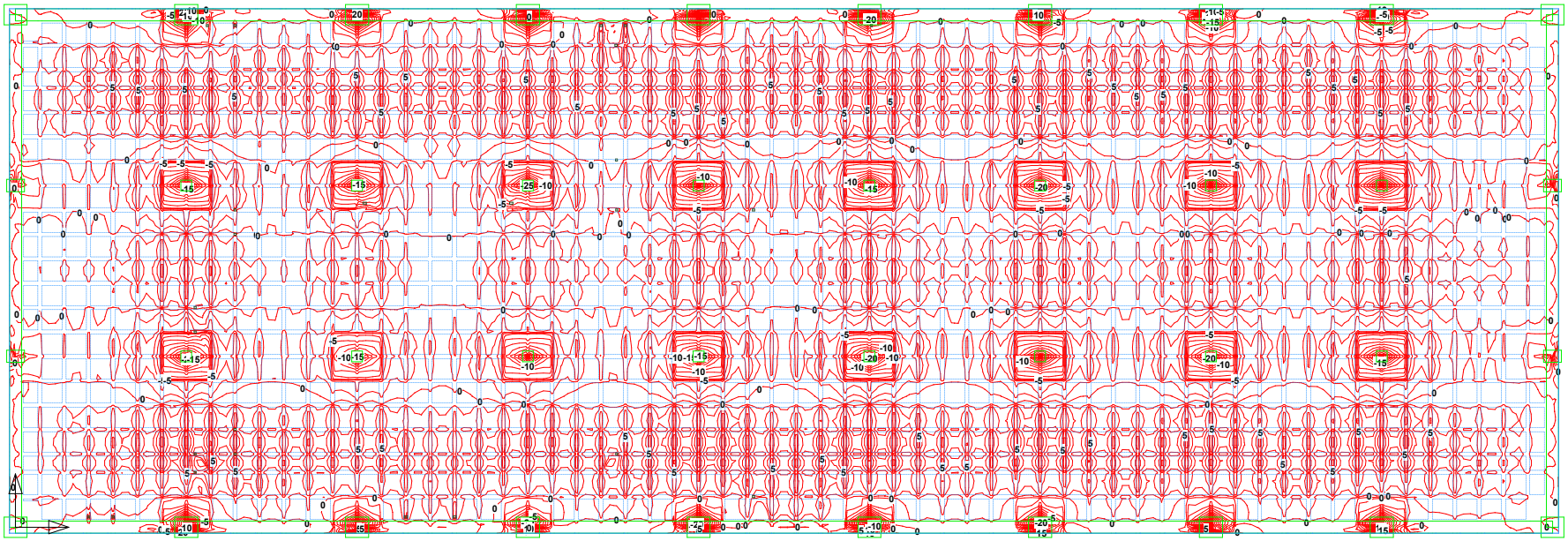
Factored LC: 0.9D + E (Positive X): Min Reactions Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



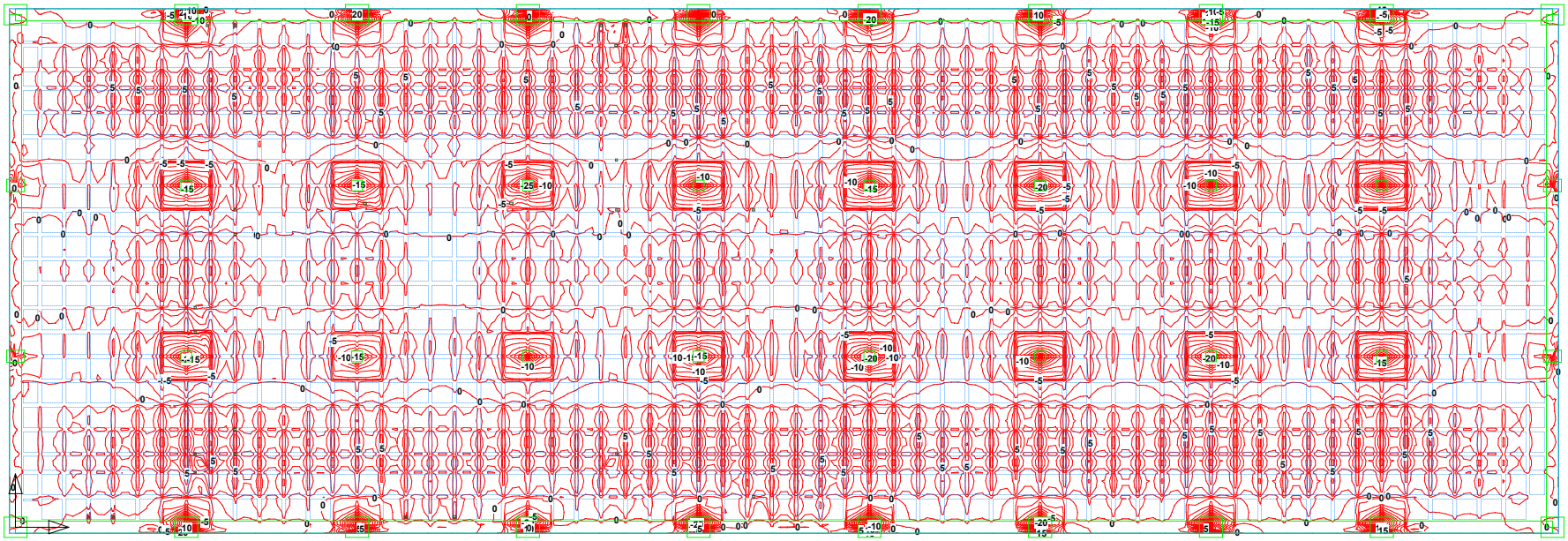
Factored LC: 0.9D + E (Positive X): Max Mx Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -25.93 Kips @ (105.1,20.88) Max Value = 30.05 Kips @ (20.83,-0.375)



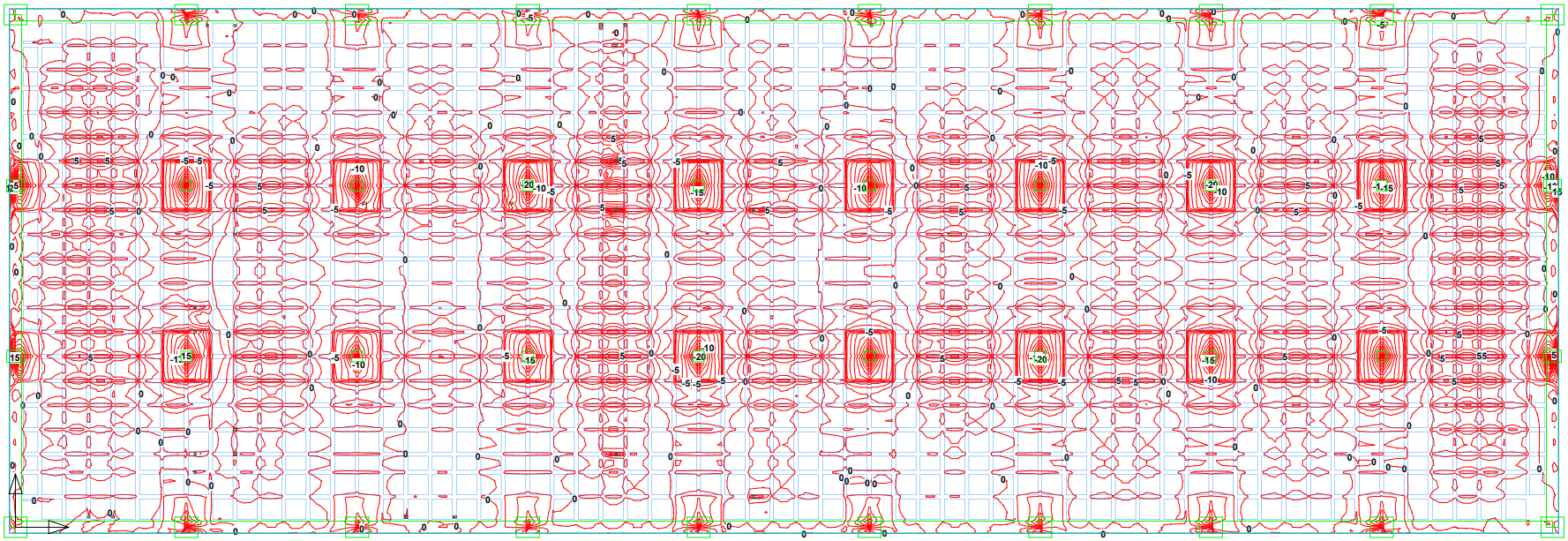
Factored LC: 0.9D + E (Positive X): Min Mx Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -25.93 Kips @ (105.1,20.88) Max Value = 30.05 Kips @ (20.83,-0.375)



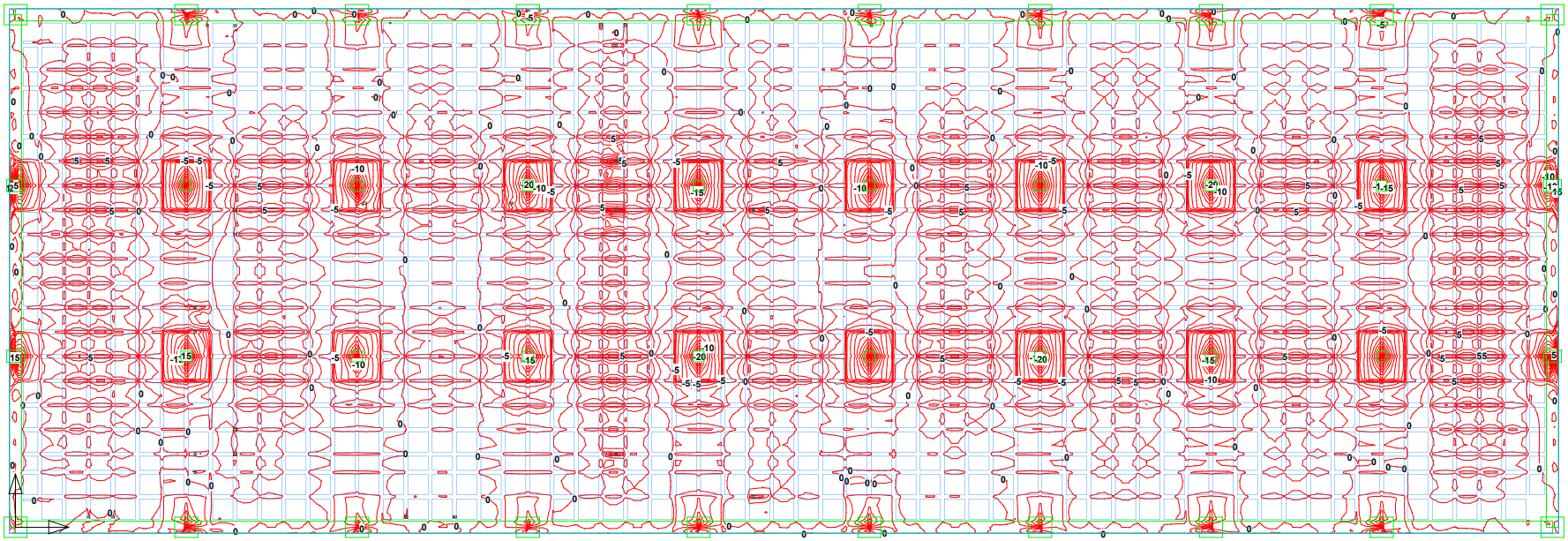
Factored LC: 0.9D + E (Positive X): Max My Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -24.91 Kips @ (168.1,20.88) Max Value = 26.38 Kips @ (189.4,21.55)



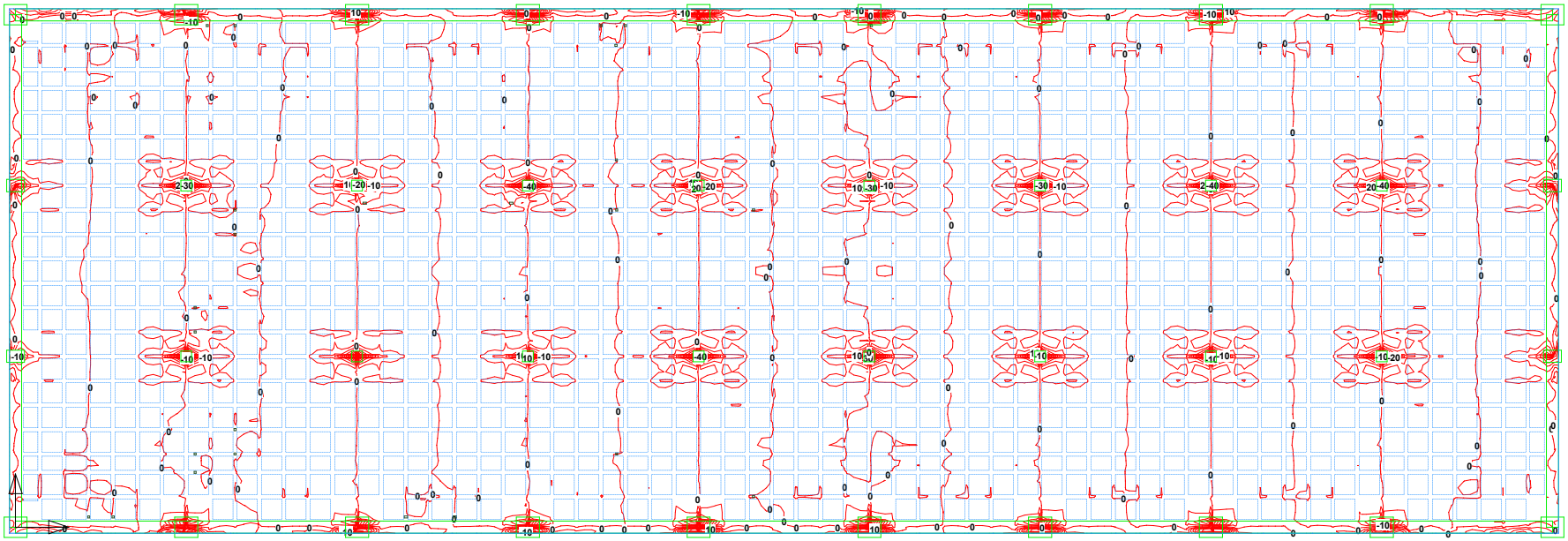
Factored LC: 0.9D + E (Positive X): Min My Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -24.91 Kips @ (168.1,20.88) Max Value = 26.38 Kips @ (189.4,21.55)



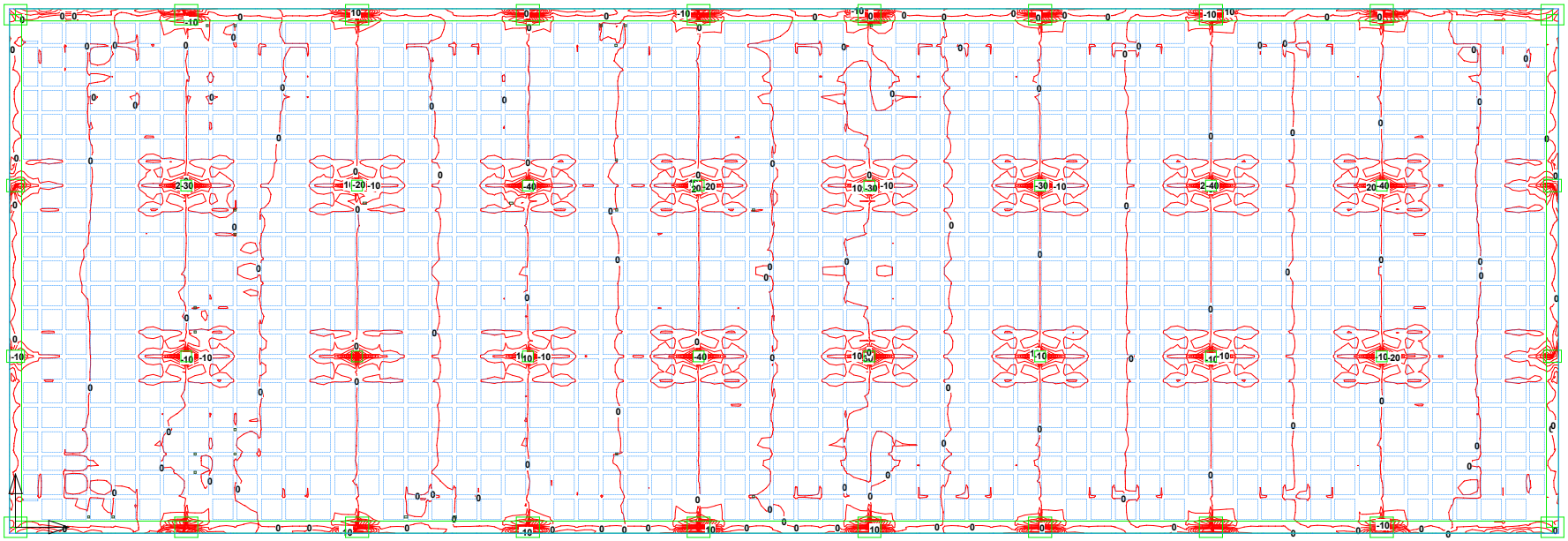
Factored LC: 0.9D + E (Positive X): Max Vx Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.21 kips/ft @ (105.3,21) Max Value = 40.1 kips/ft @ (167.8,21)



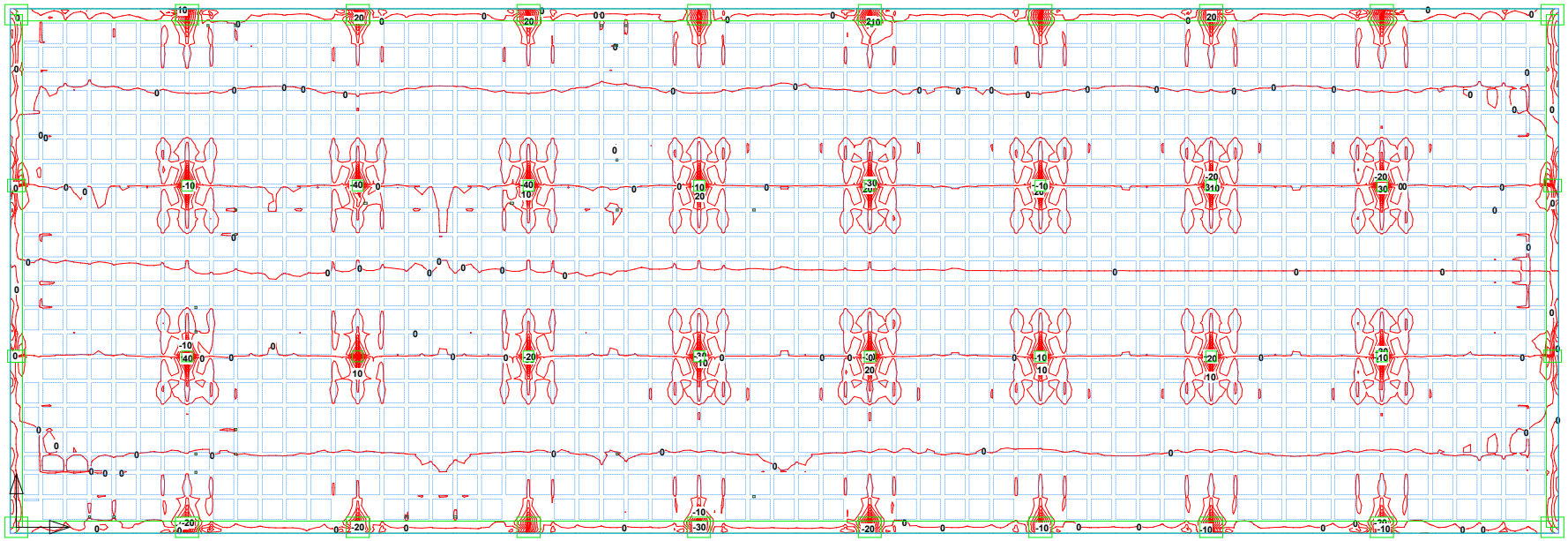
Factored LC: 0.9D + E (Positive X): Min Vx Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.21 kips/ft @ (105.3,21) Max Value = 40.1 kips/ft @ (167.8,21)



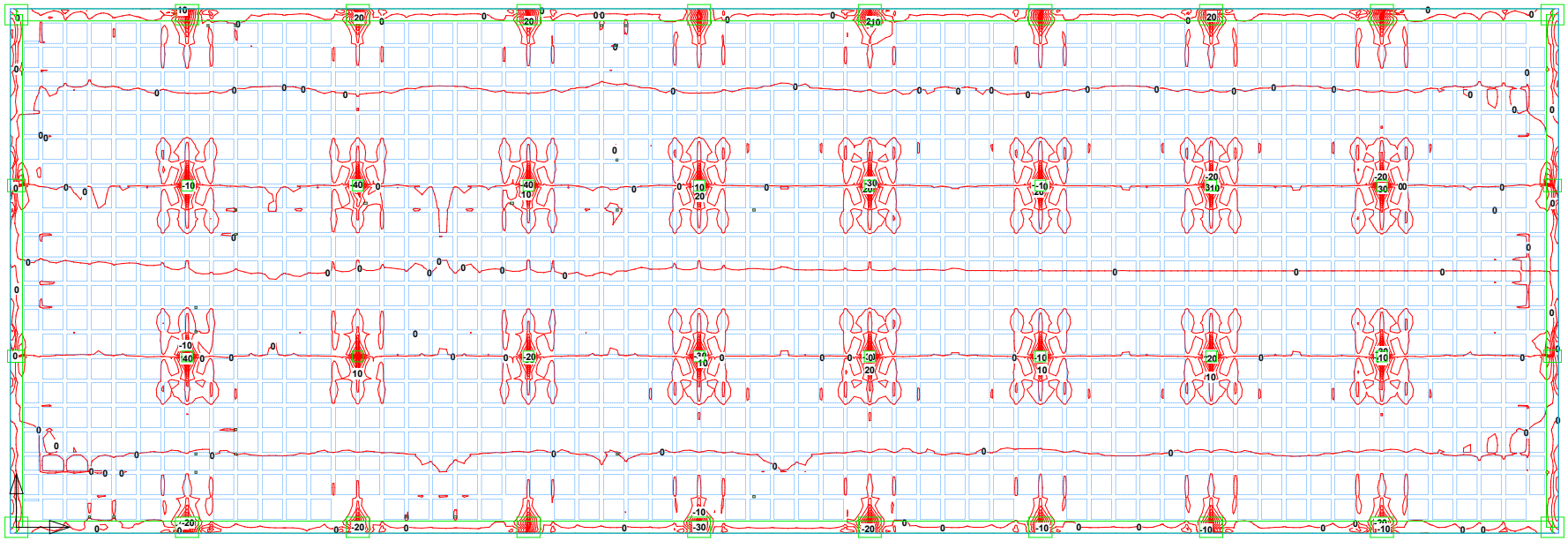
Factored LC: 0.9D + E (Positive X): Max Vy Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.99 kips/ft @ (168,42.25) Max Value = 42.61 kips/ft @ (105,20.75)



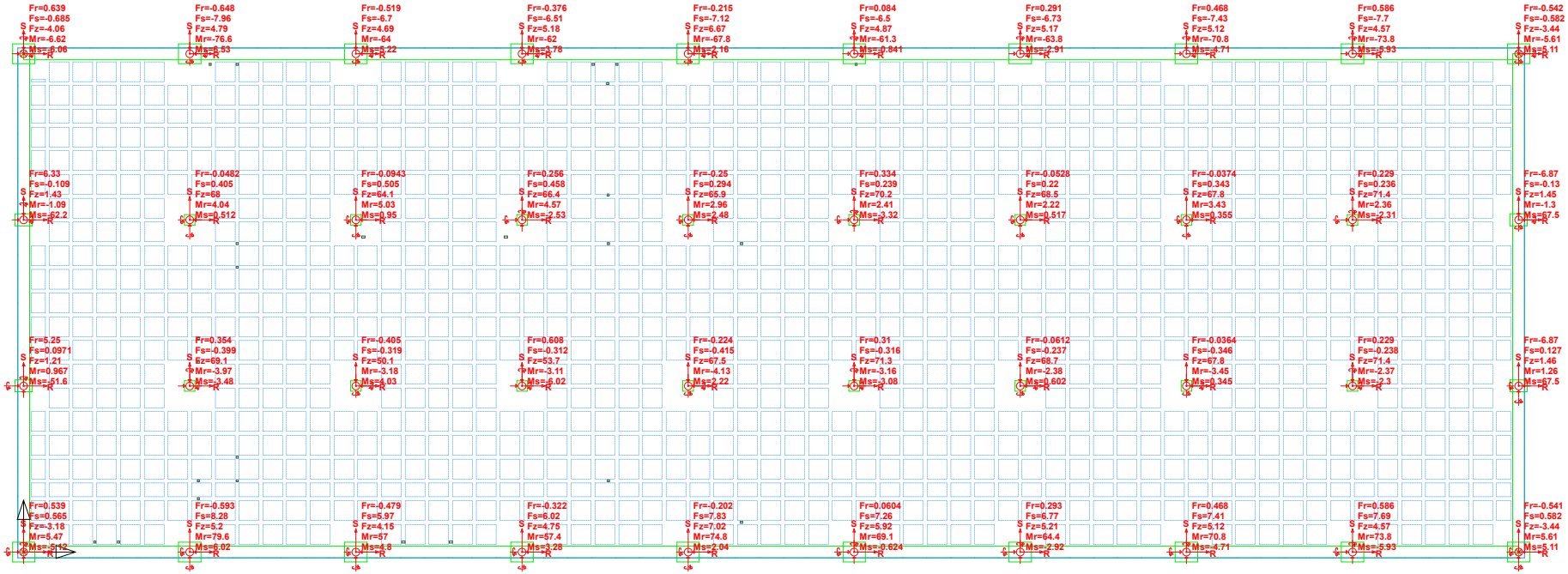
Factored LC: 0.9D + E (Positive X): Min Vy Plan

Factored LC: 0.9D + E (Positive X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive X) - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.99 kips/ft @ (168,42.25) Max Value = 42.61 kips/ft @ (105,20.75)



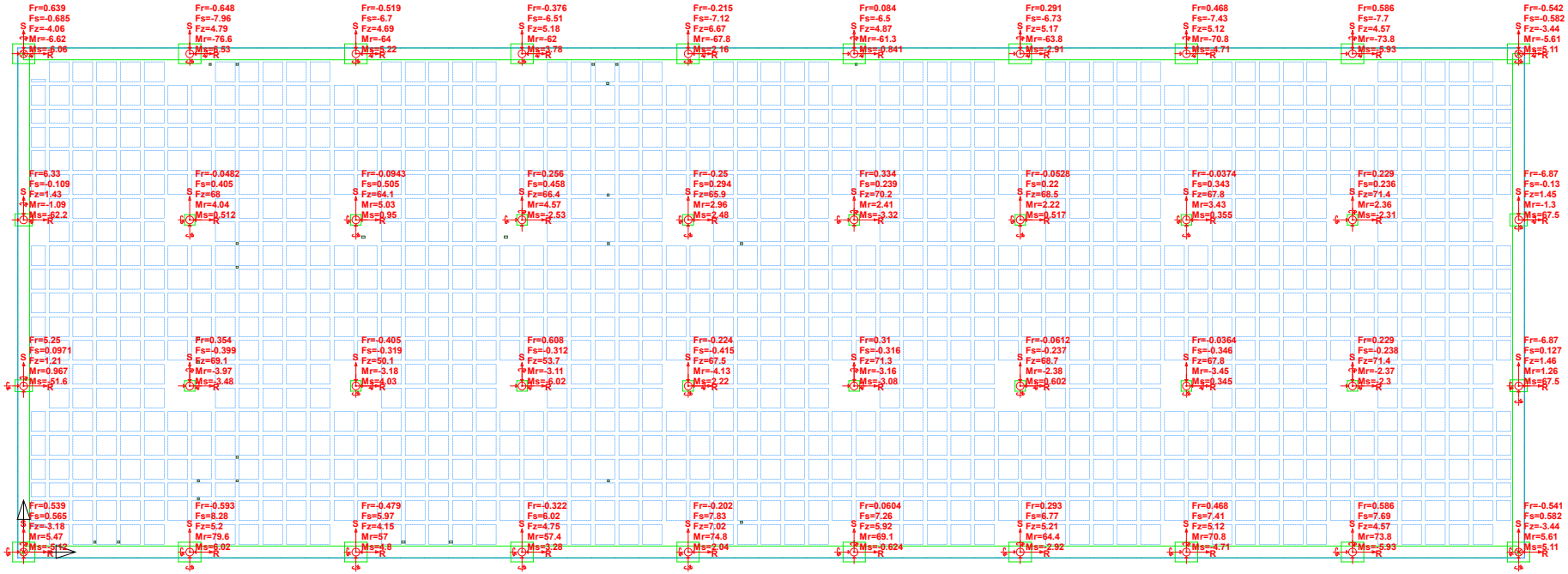
Factored LC: 0.9D + E (Negative X): Max Reactions Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



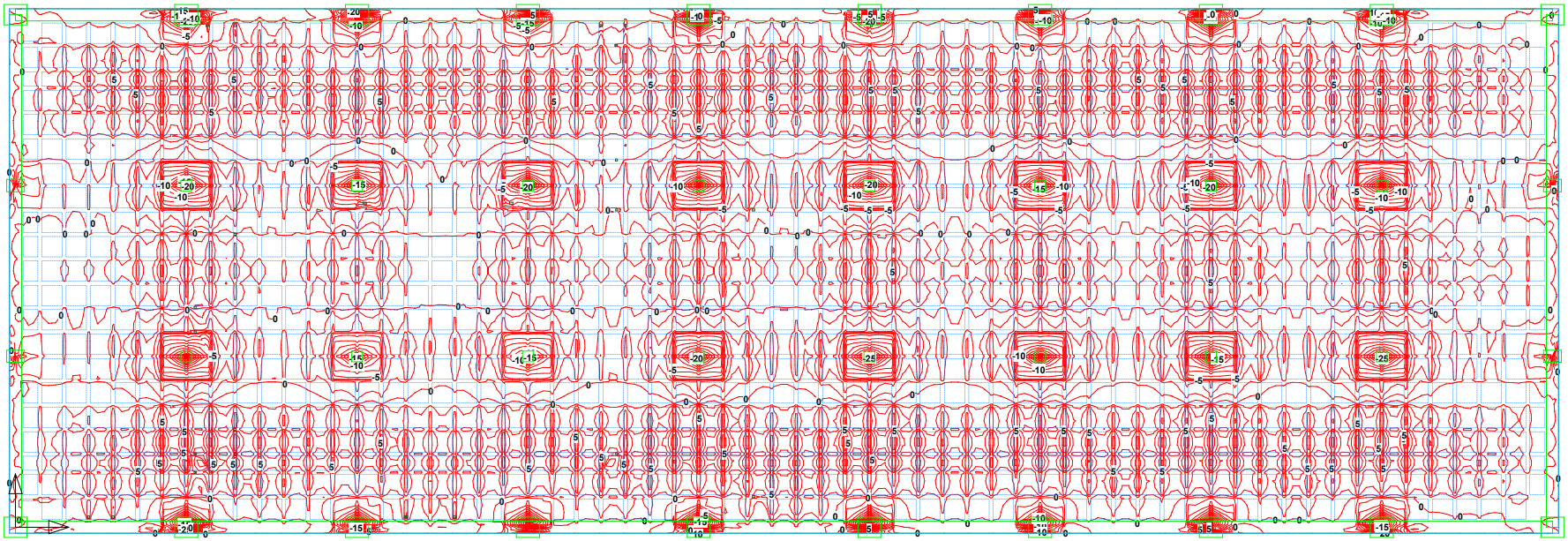
Factored LC: 0.9D + E (Negative X): Min Reactions Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



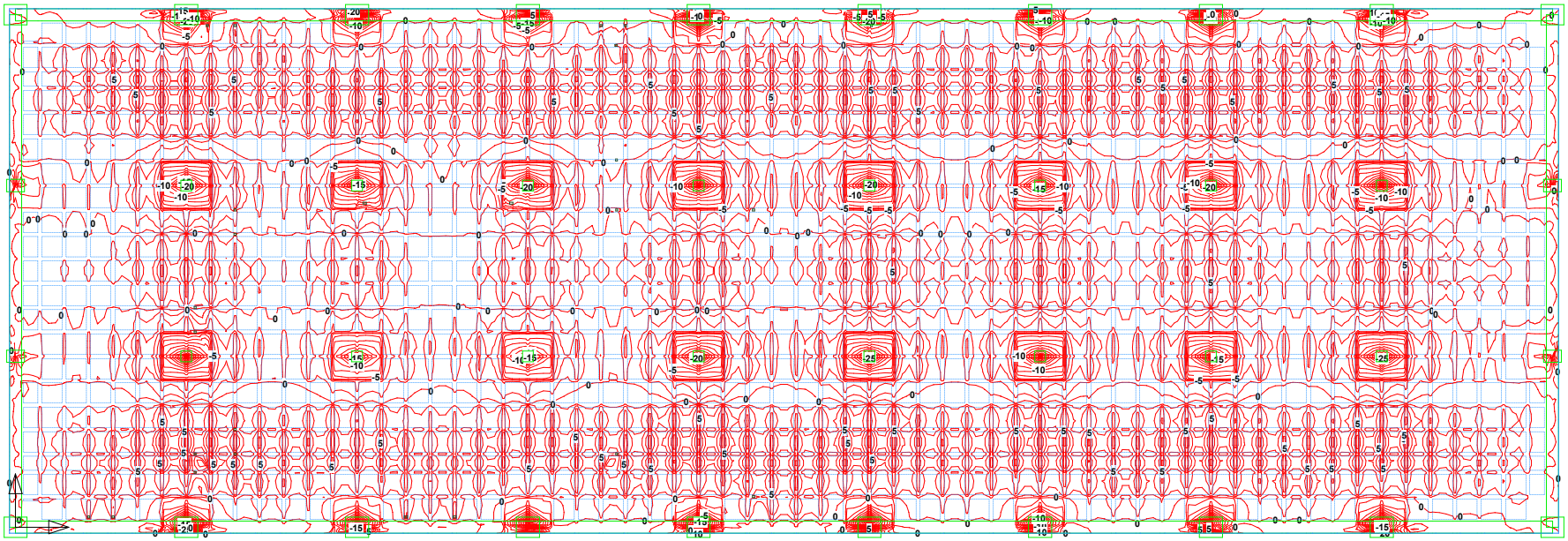
Factored LC: 0.9D + E (Negative X): Max Mx Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -25.38 Kips @ (105.1,20.88) Max Value = 31.33 Kips @ (20.83,-0.375)



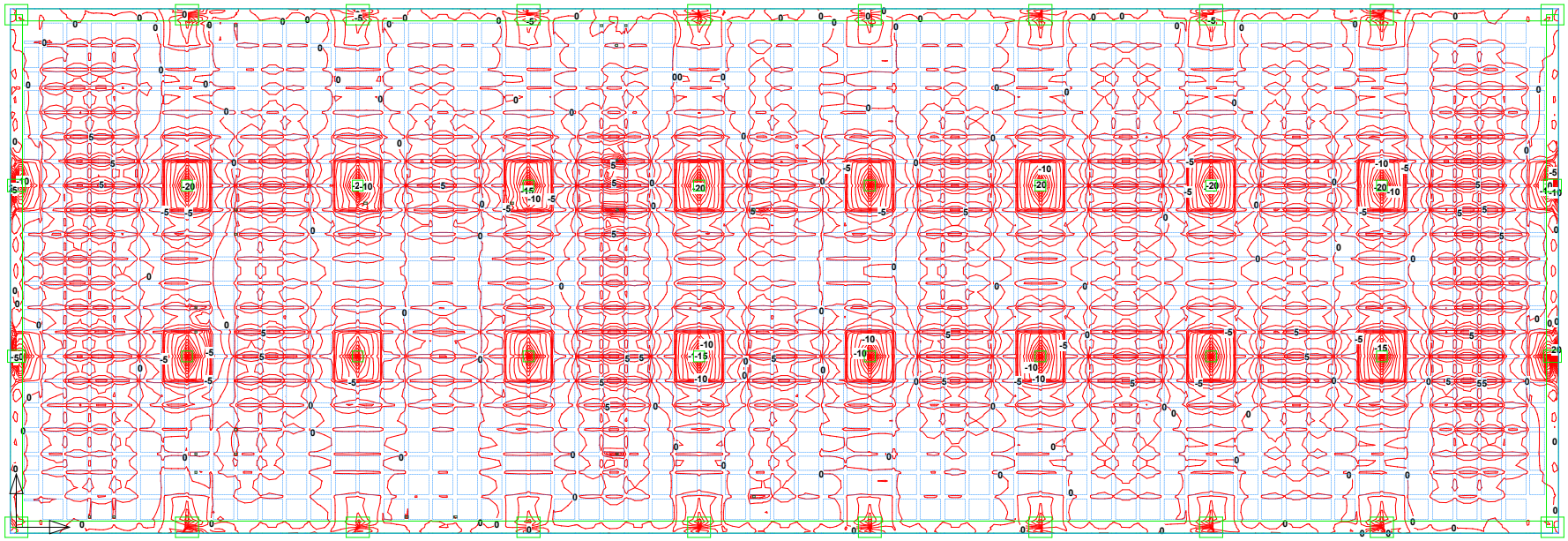
Factored LC: 0.9D + E (Negative X): Min Mx Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -25.38 Kips @ (105.1,20.88) Max Value = 31.33 Kips @ (20.83,-0.375)



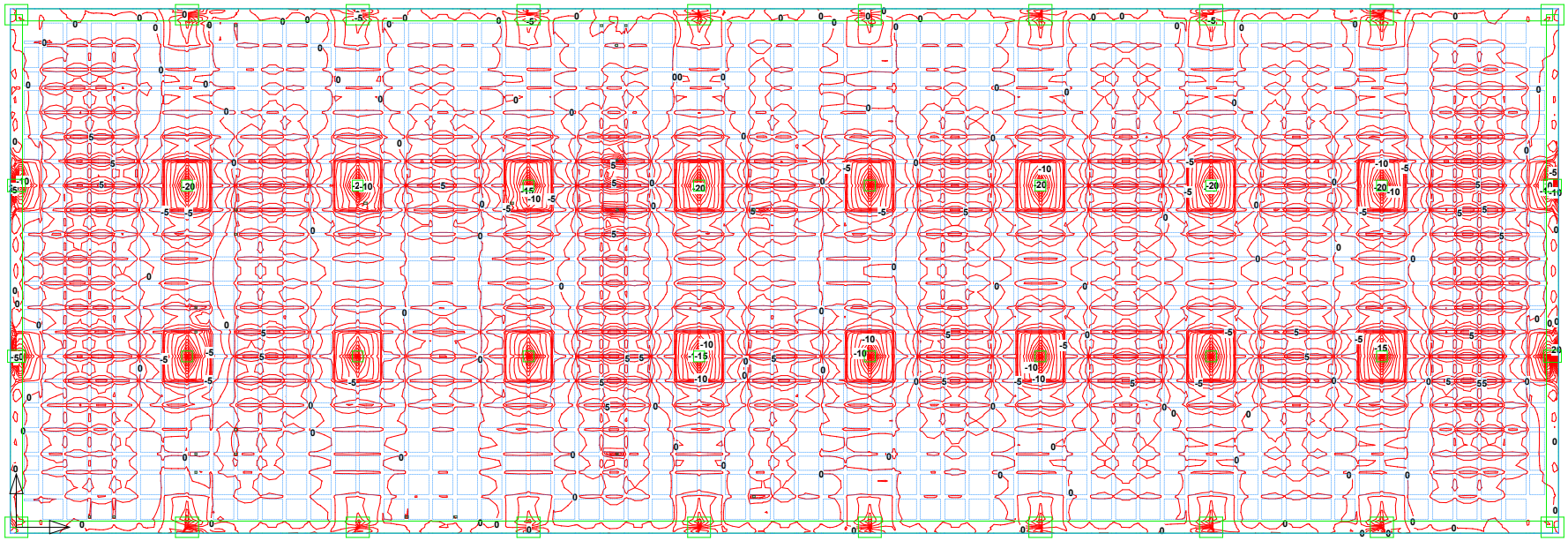
Factored LC: 0.9D + E (Negative X): Max My Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -24.91 Kips @ (168.1,42.13) Max Value = 26.38 Kips @ (189.4,21.55)



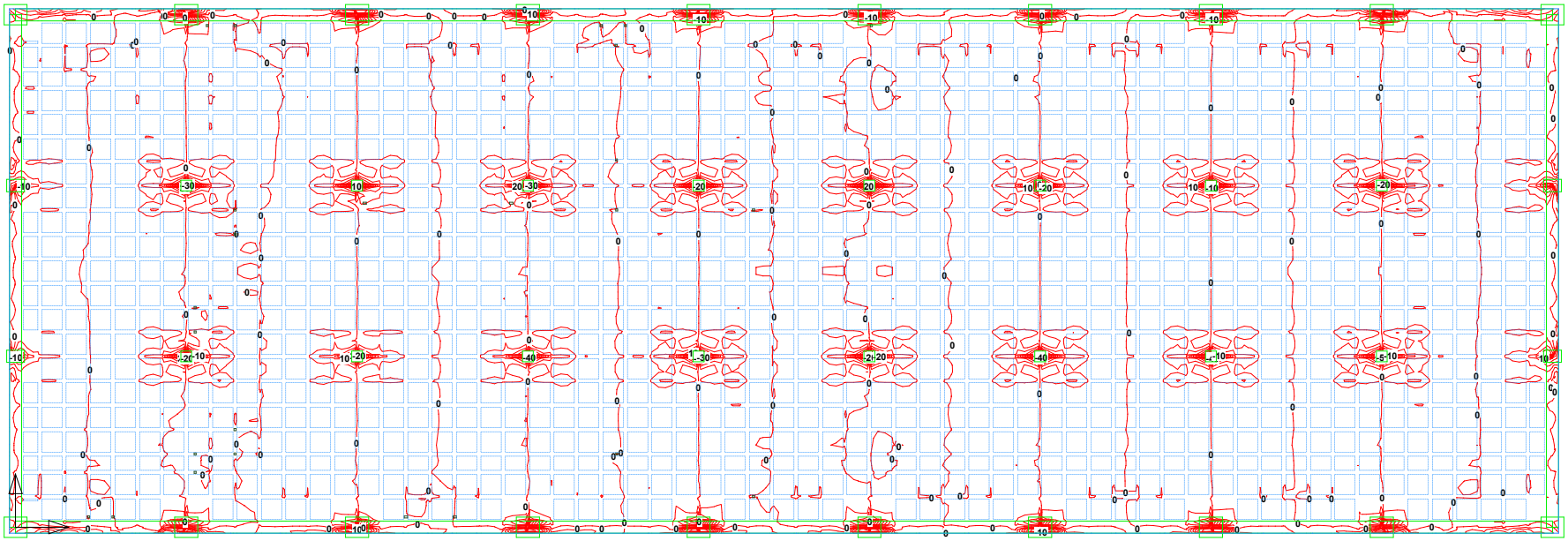
Factored LC: 0.9D + E (Negative X): Min My Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -24.91 Kips @ (168.1,42.13) Max Value = 26.38 Kips @ (189.4,21.55)



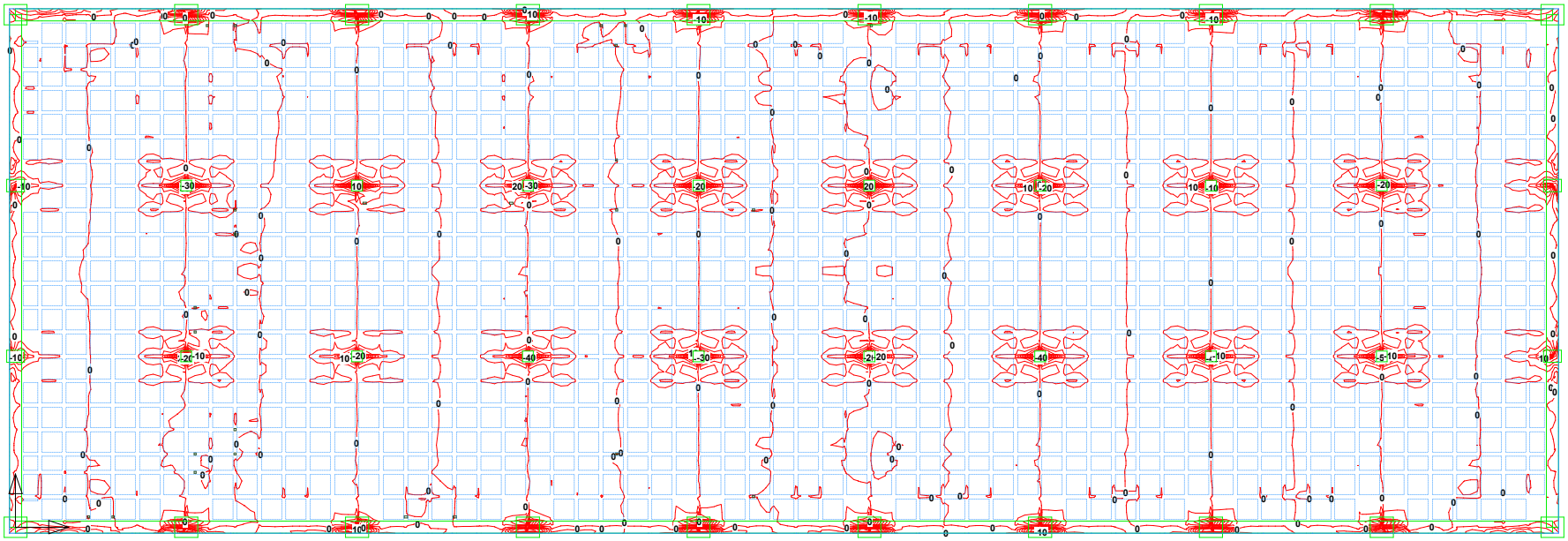
Factored LC: 0.9D + E (Negative X): Max Vx Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.04 kips/ft @ (105.3,21) Max Value = 40.09 kips/ft @ (167.8,21)



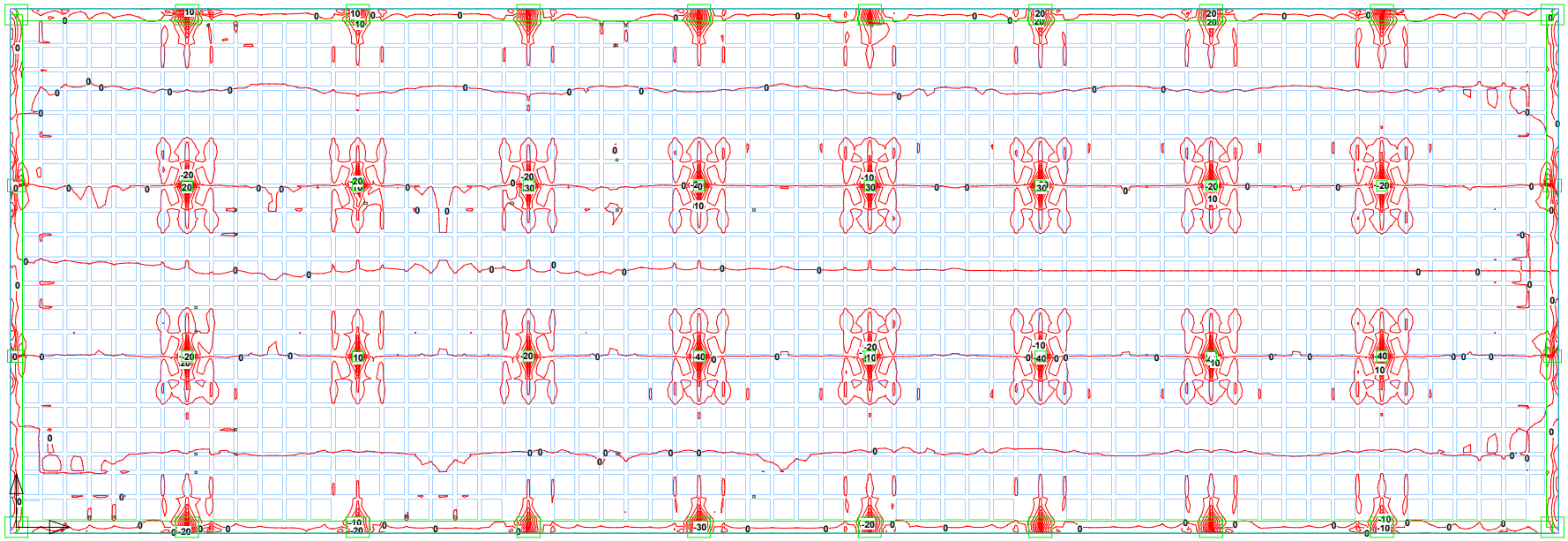
Factored LC: 0.9D + E (Negative X): Min Vx Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.04 kips/ft @ (105.3,21) Max Value = 40.09 kips/ft @ (167.8,21)



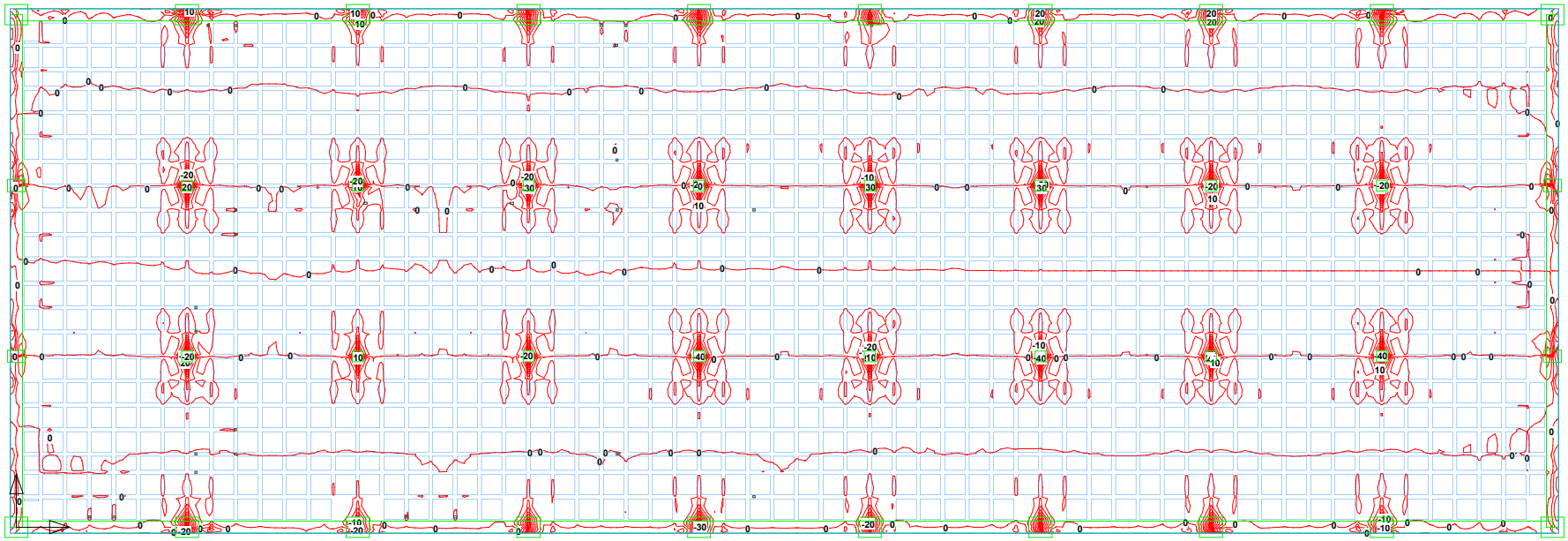
Factored LC: 0.9D + E (Negative X): Max Vy Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.99 kips/ft @ (168,42.25) Max Value = 42.18 kips/ft @ (105,20.75)



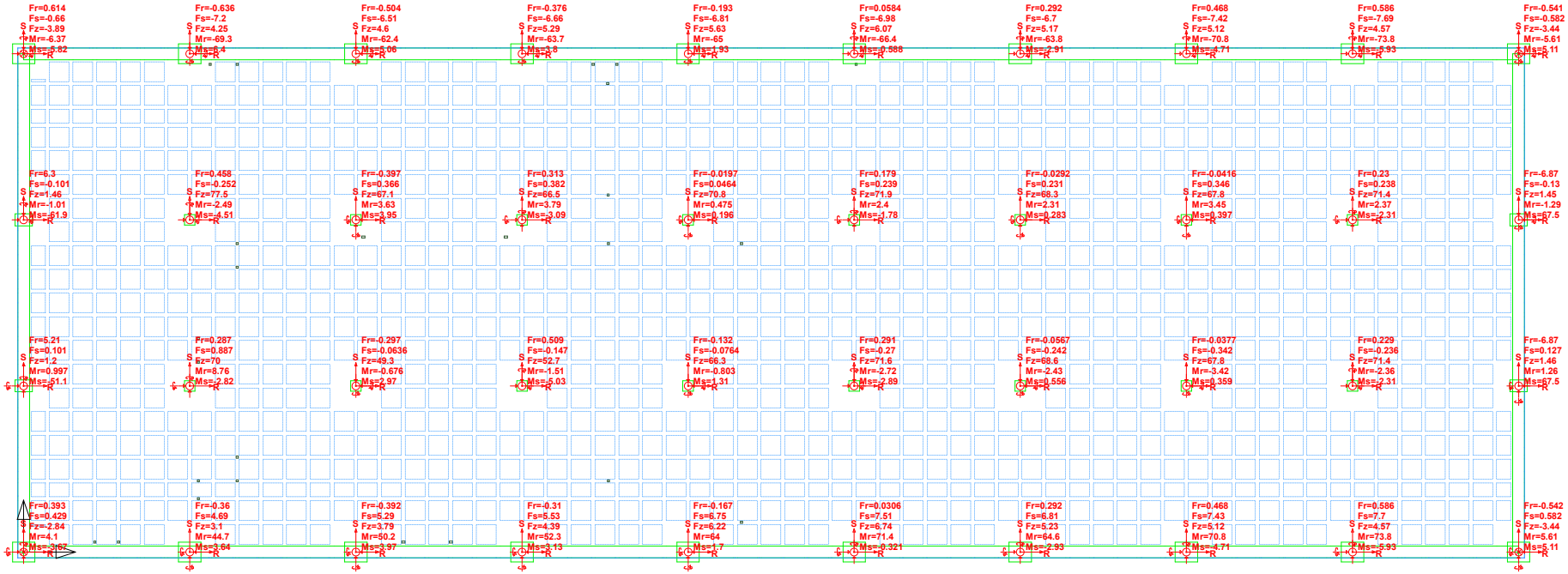
Factored LC: 0.9D + E (Negative X): Min Vy Plan

Factored LC: 0.9D + E (Negative X): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative X) - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.99 kips/ft @ (168,42.25) Max Value = 42.18 kips/ft @ (105,20.75)



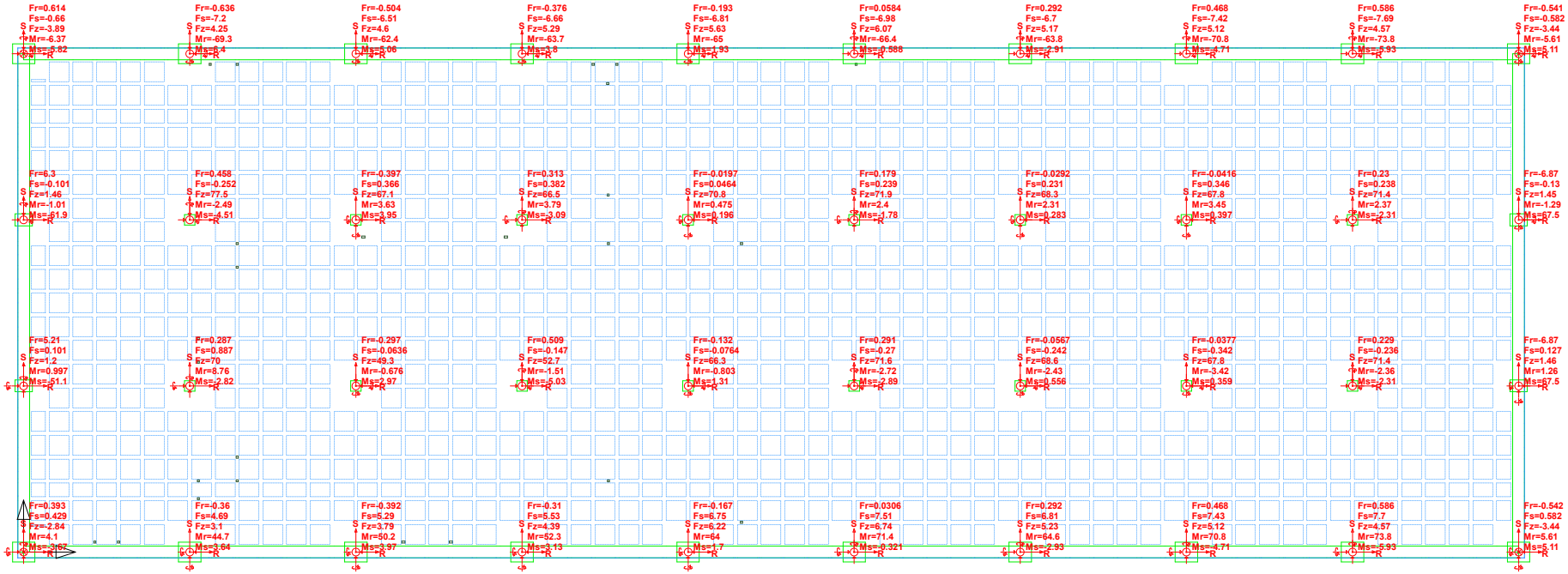
Factored LC: 0.9D + E (Positive Y): Max Reactions Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



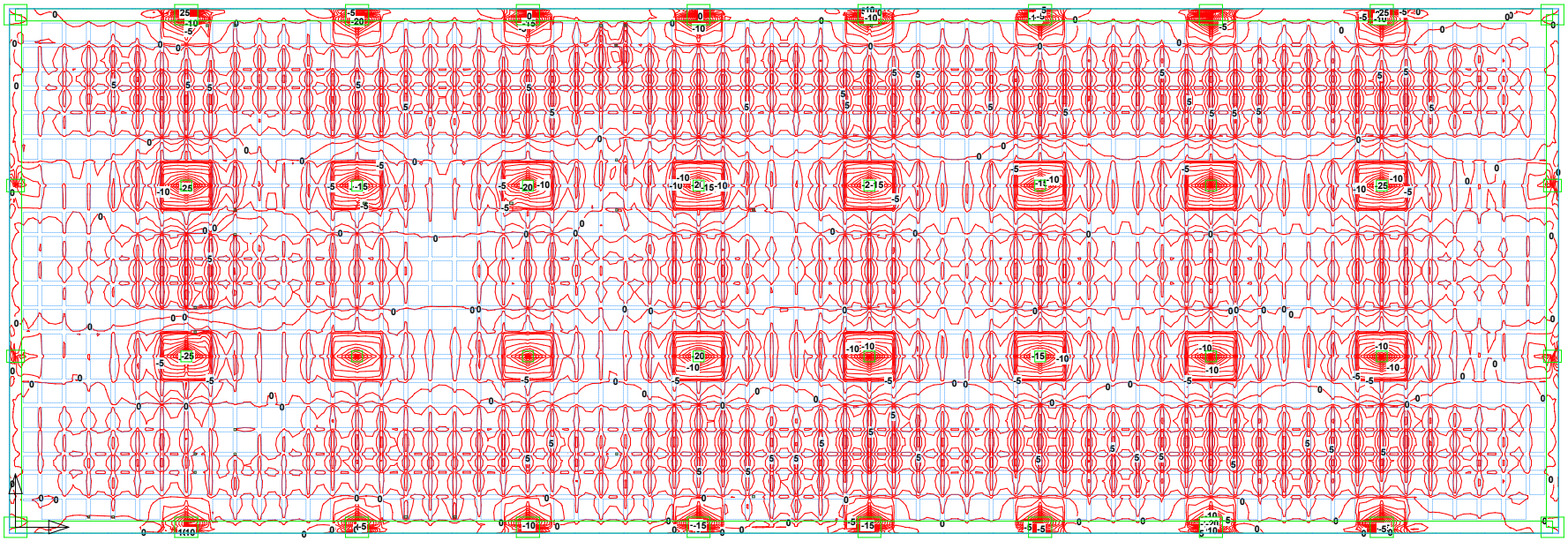
Factored LC: 0.9D + E (Positive Y): Min Reactions Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



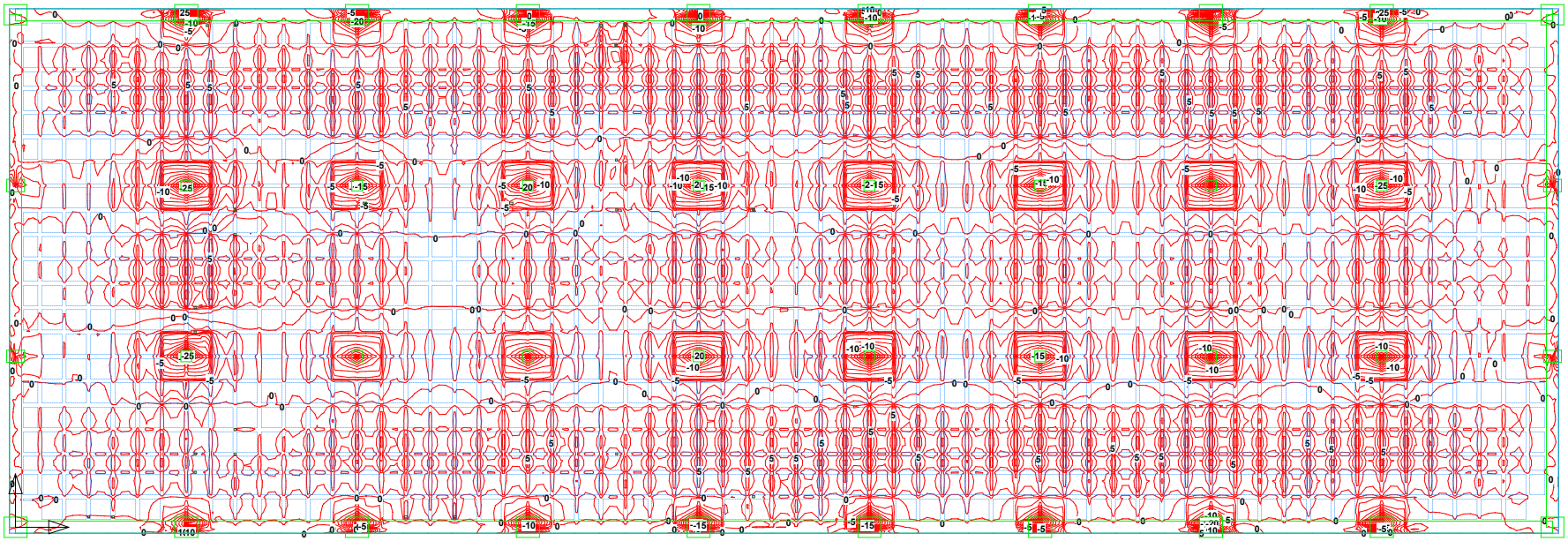
Factored LC: 0.9D + E (Positive Y): Max Mx Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -28.28 Kips @ (21.13,21.13) Max Value = 29.12 Kips @ (168.2,-0.375)



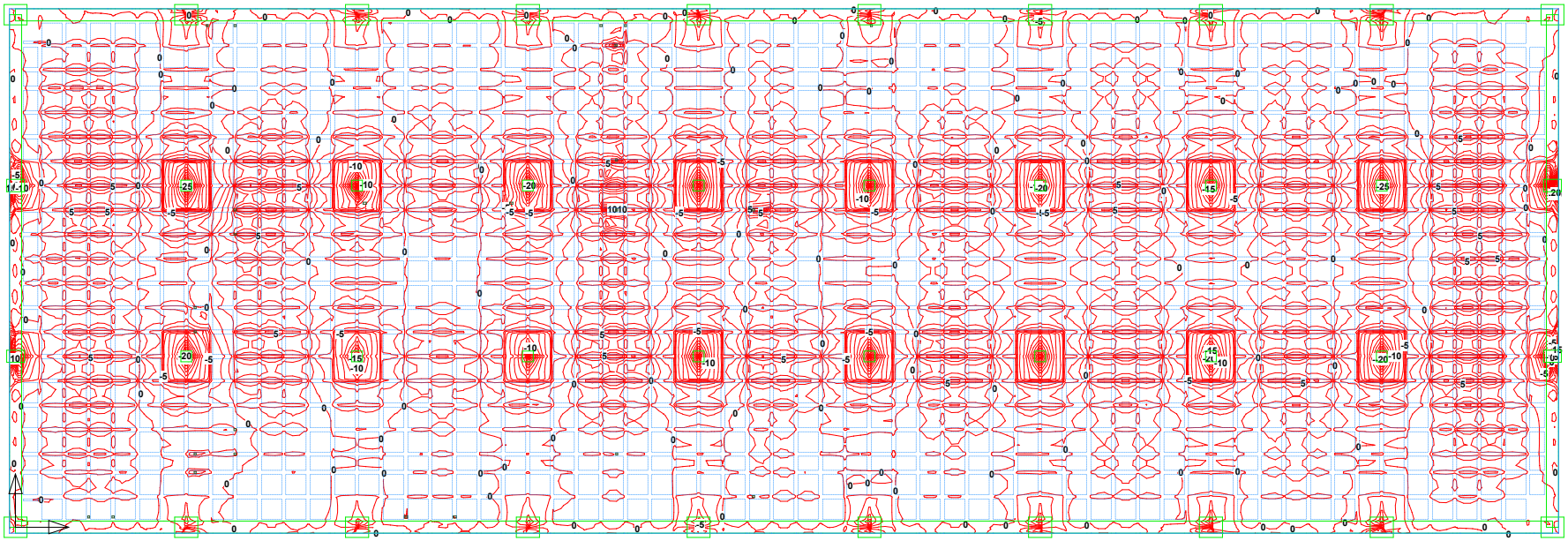
Factored LC: 0.9D + E (Positive Y): Min Mx Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -28.28 Kips @ (21.13,21.13) Max Value = 29.12 Kips @ (168.2,-0.375)



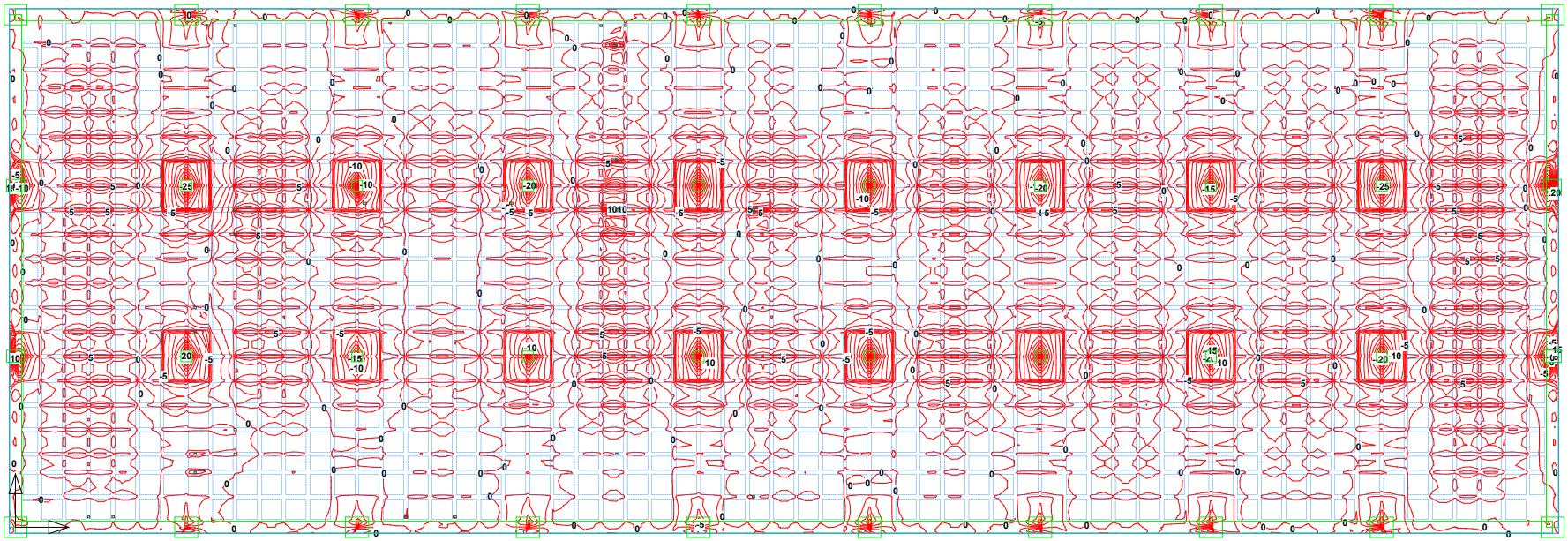
Factored LC: 0.9D + E (Positive Y): Max My Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -28.64 Kips @ (21.13,41.88) Max Value = 26.38 Kips @ (189.4,21.55)



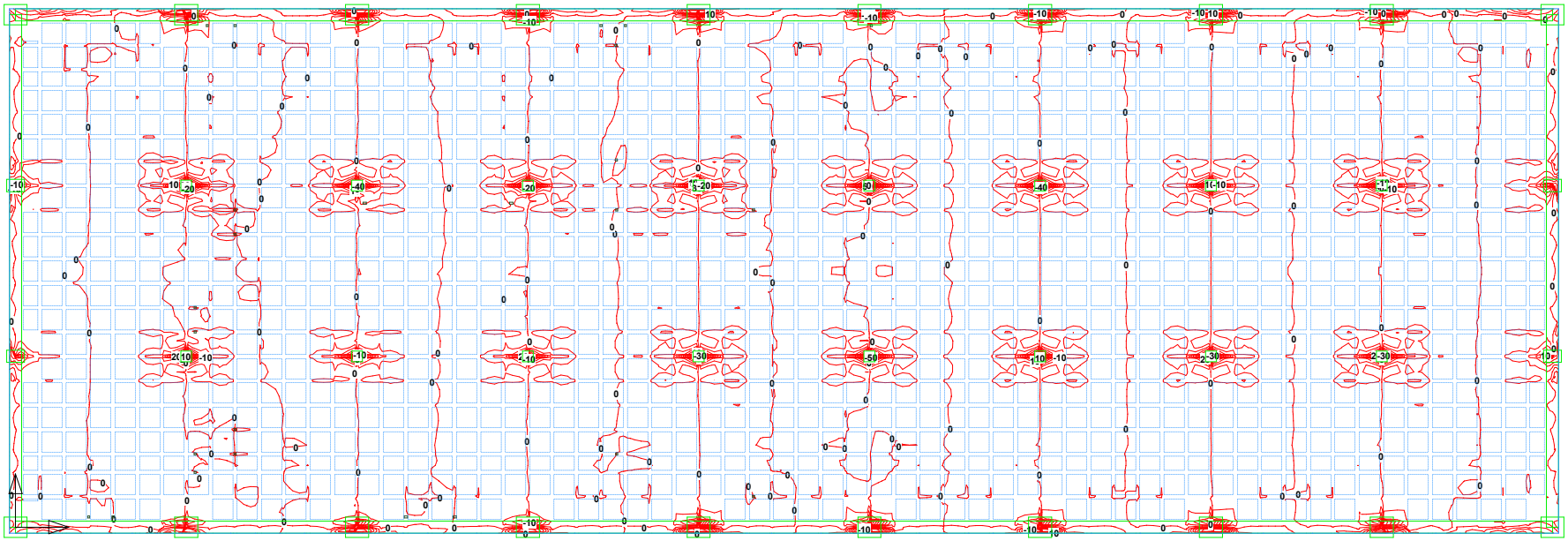
Factored LC: 0.9D + E (Positive Y): Min My Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -28.64 Kips @ (21.13,41.88) Max Value = 26.38 Kips @ (189.4,21.55)



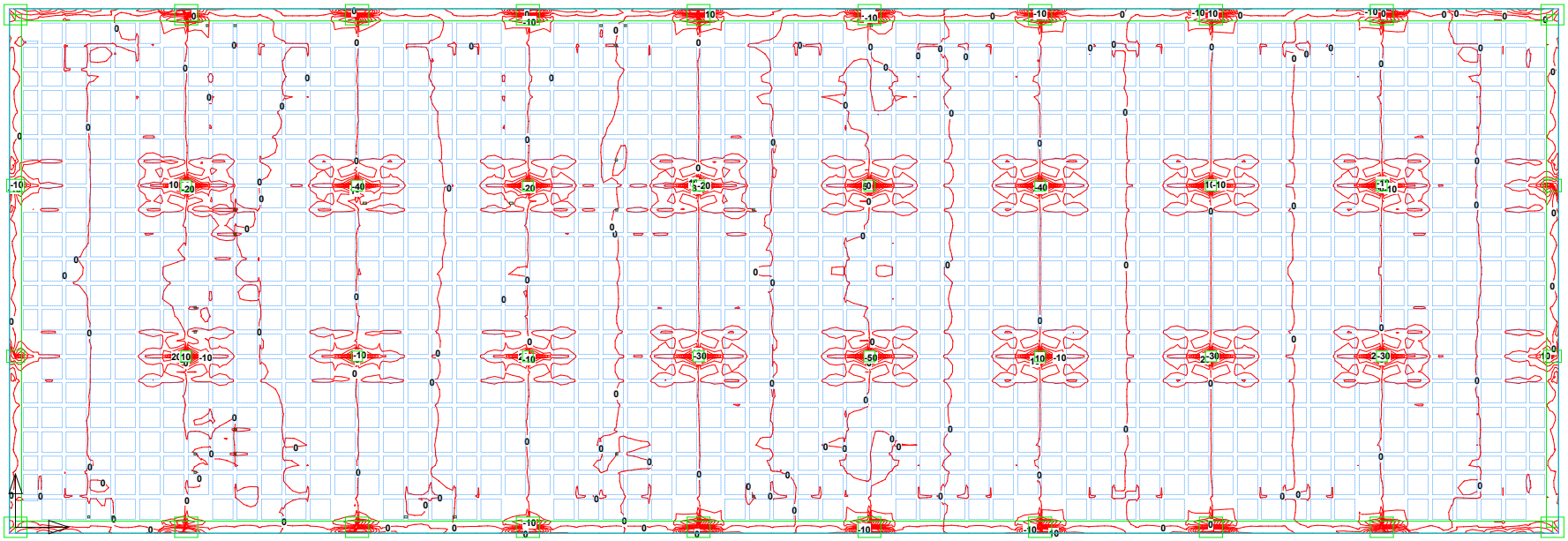
Factored LC: 0.9D + E (Positive Y): Max Vx Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -46.63 kips/ft @ (21.25,42) Max Value = 42.66 kips/ft @ (20.75,42)



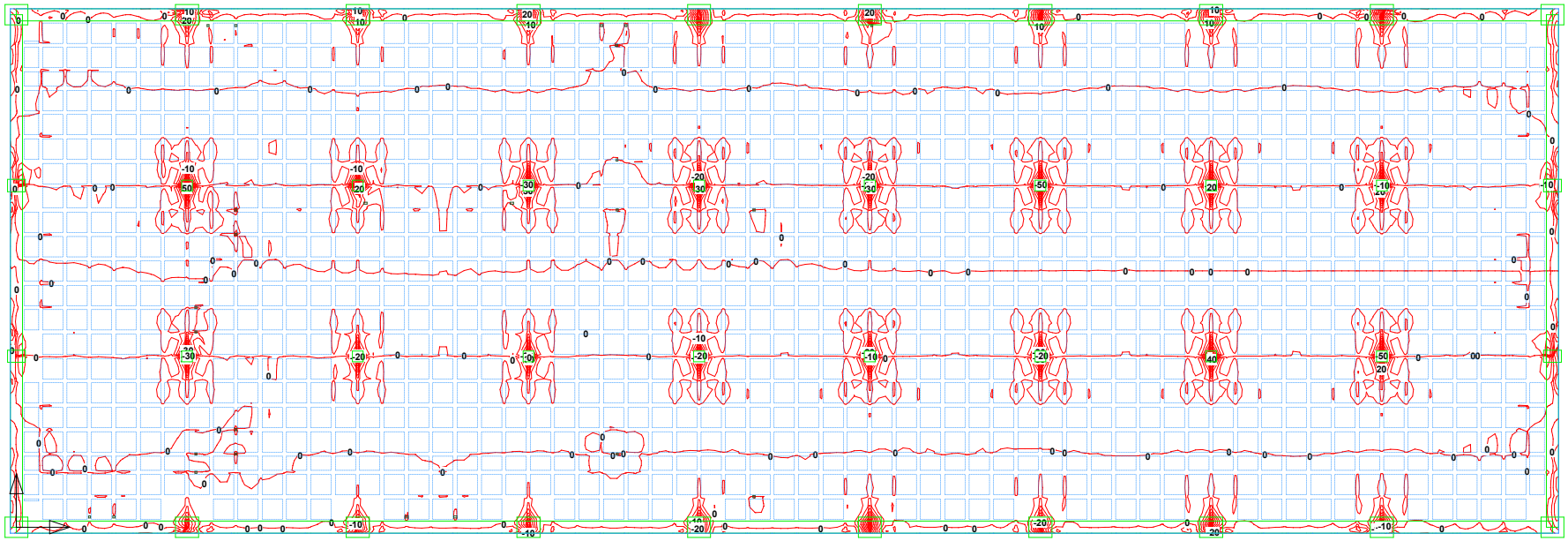
Factored LC: 0.9D + E (Positive Y): Min Vx Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -46.63 kips/ft @ (21.25,42) Max Value = 42.66 kips/ft @ (20.75,42)



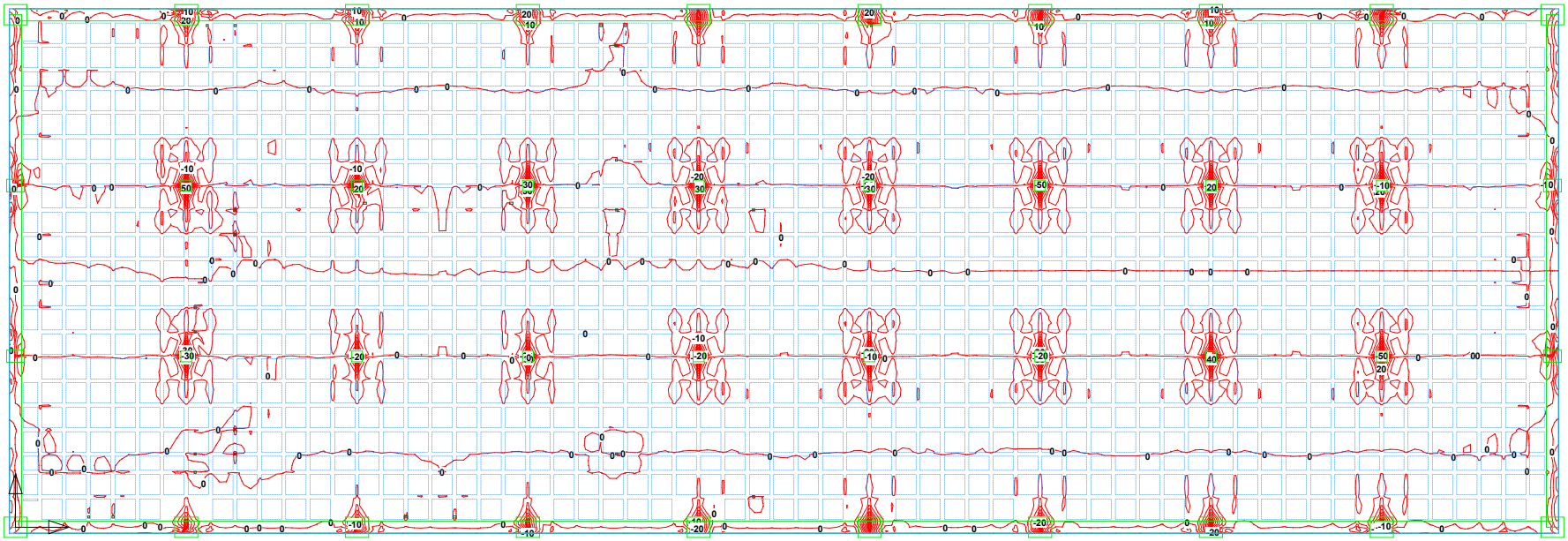
Factored LC: 0.9D + E (Positive Y): Max Vy Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -43.9 kips/ft @ (21,21.25) Max Value = 45.62 kips/ft @ (21,41.75)



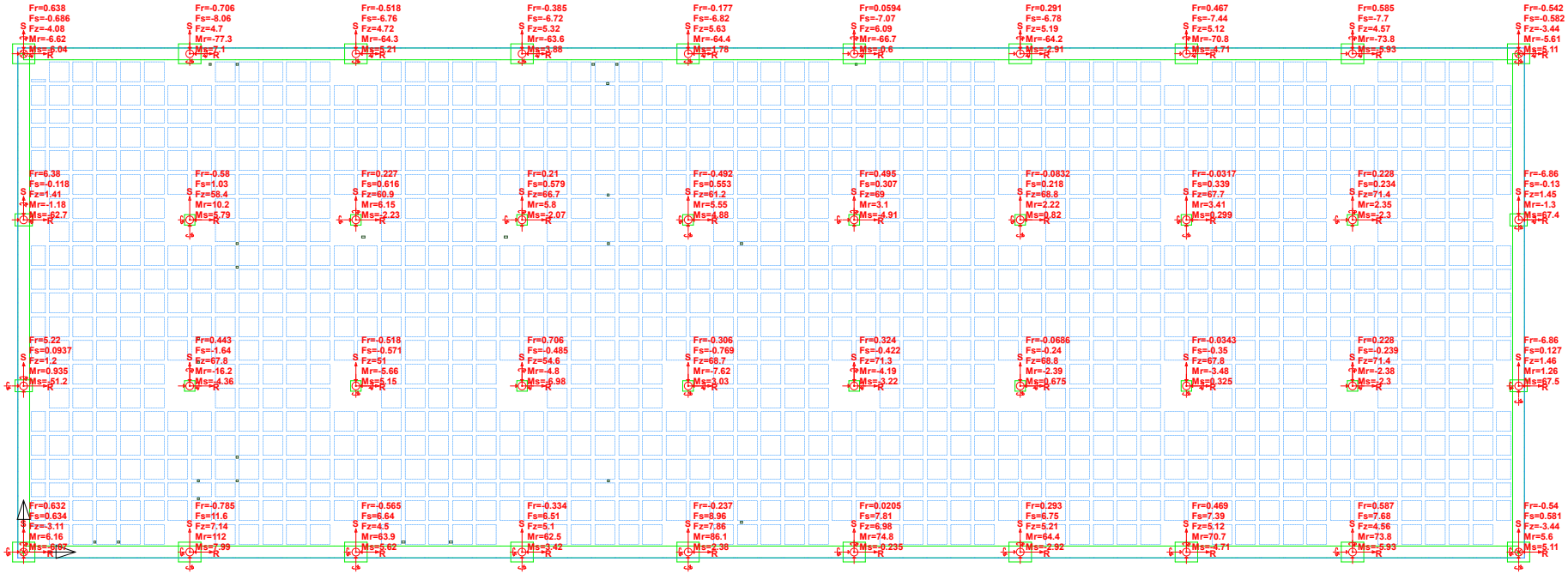
Factored LC: 0.9D + E (Positive Y): Min Vy Plan

Factored LC: 0.9D + E (Positive Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Positive Y) - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -43.9 kips/ft @ (21,21.25) Max Value = 45.62 kips/ft @ (21,41.75)



Factored LC: 0.9D + E (Negative Y): Max Reactions Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Max Fz Context)



Factored LC: 0.9D + E (Negative Y): Min Reactions Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
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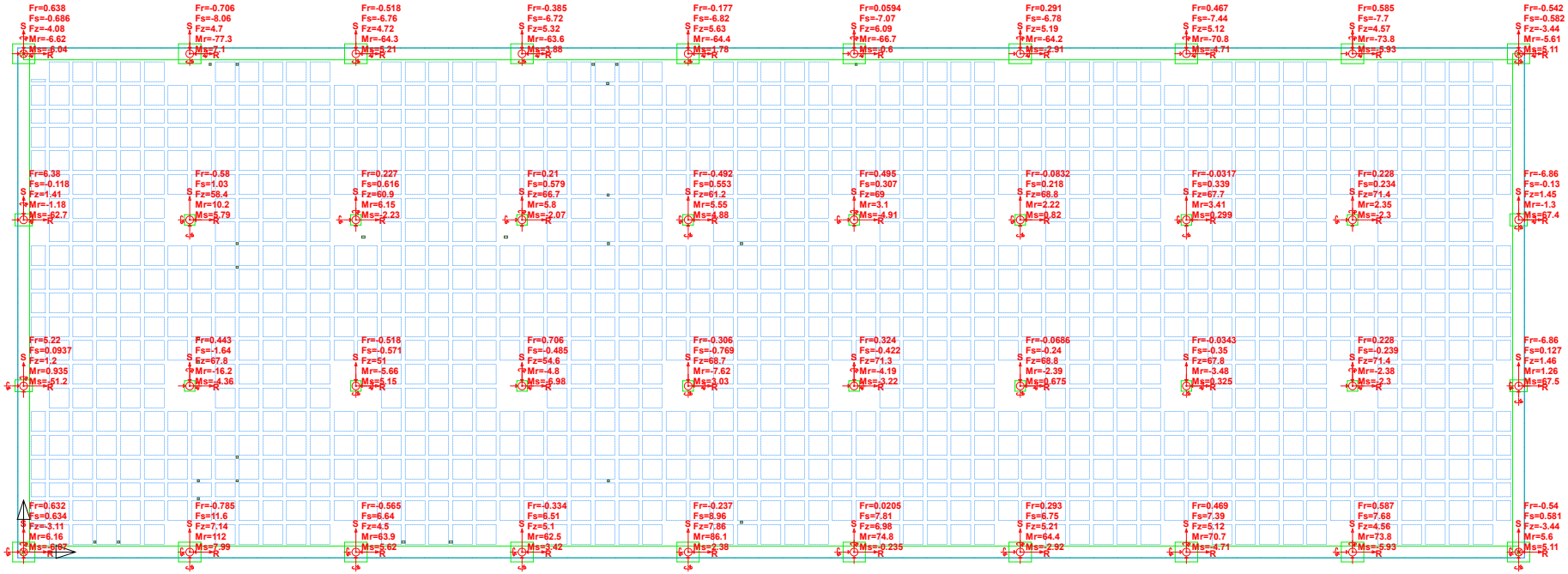
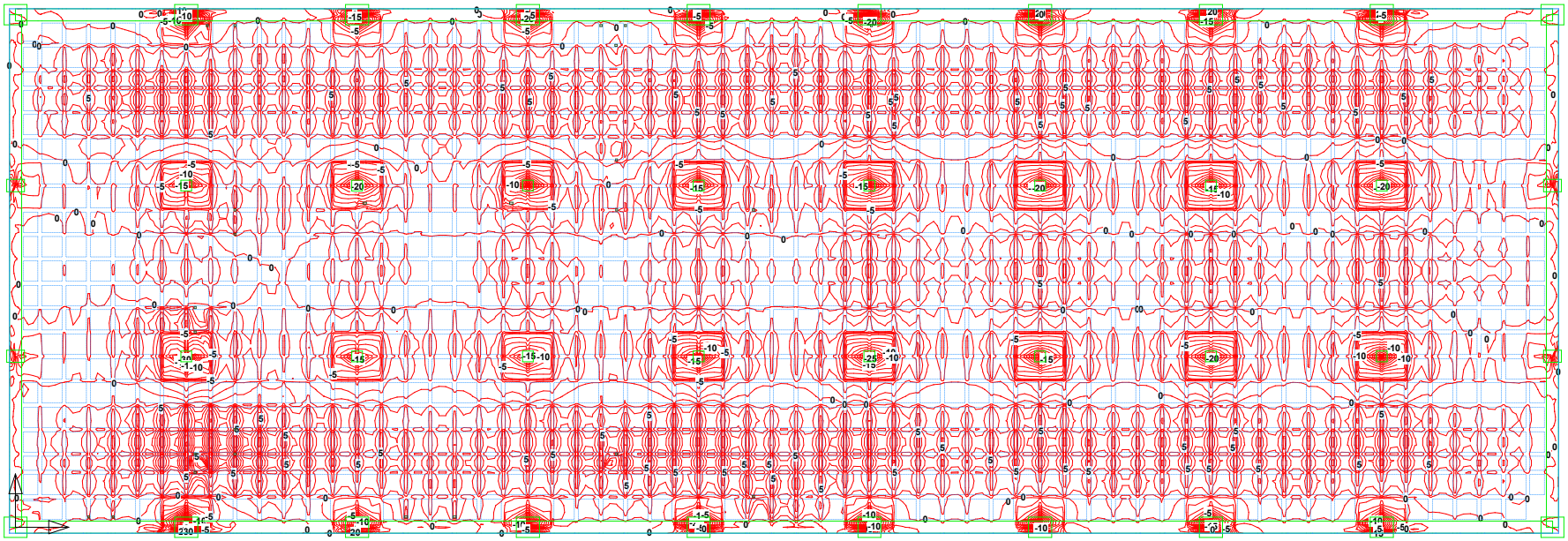
Factored LC: 0.9D + E (Negative Y) - Reaction Plot: (Column Below)(Fr,Fs,Fz,Mr,Ms,Mz)(Min Fz Context)



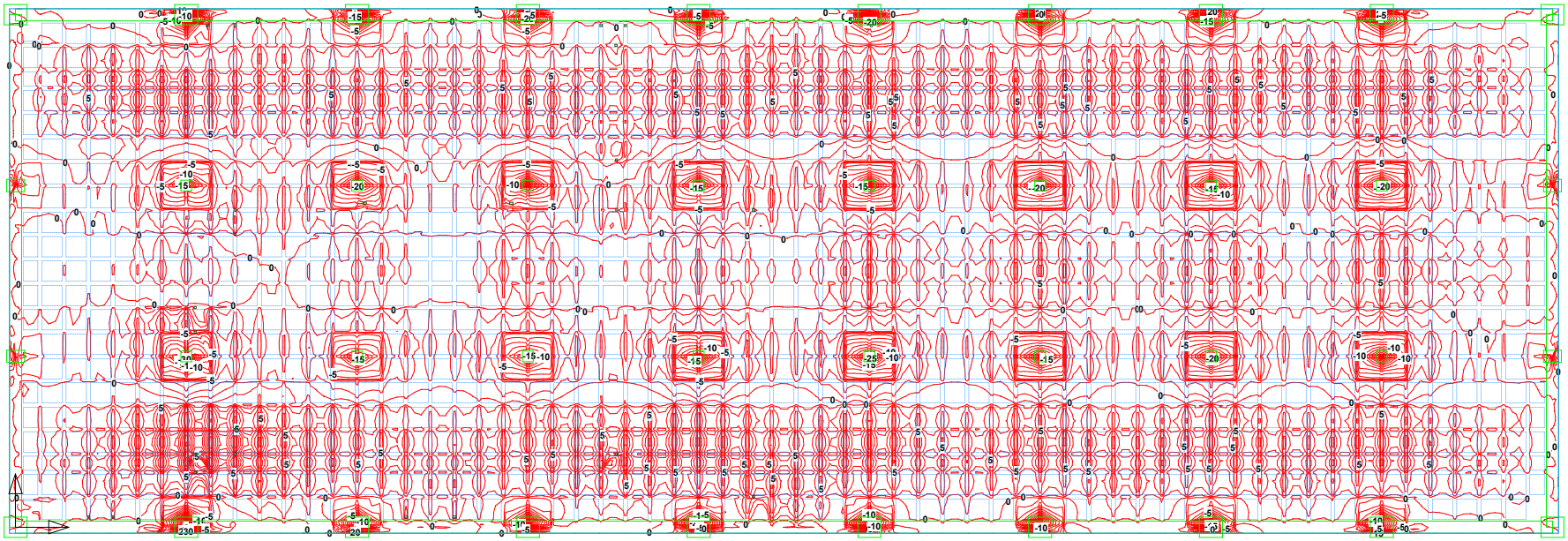
Factored LC: 0.9D + E (Negative Y): Max Mx Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -33.65 Kips @ (21.13,20.88) Max Value = 43.71 Kips @ (20.83,-0.375)



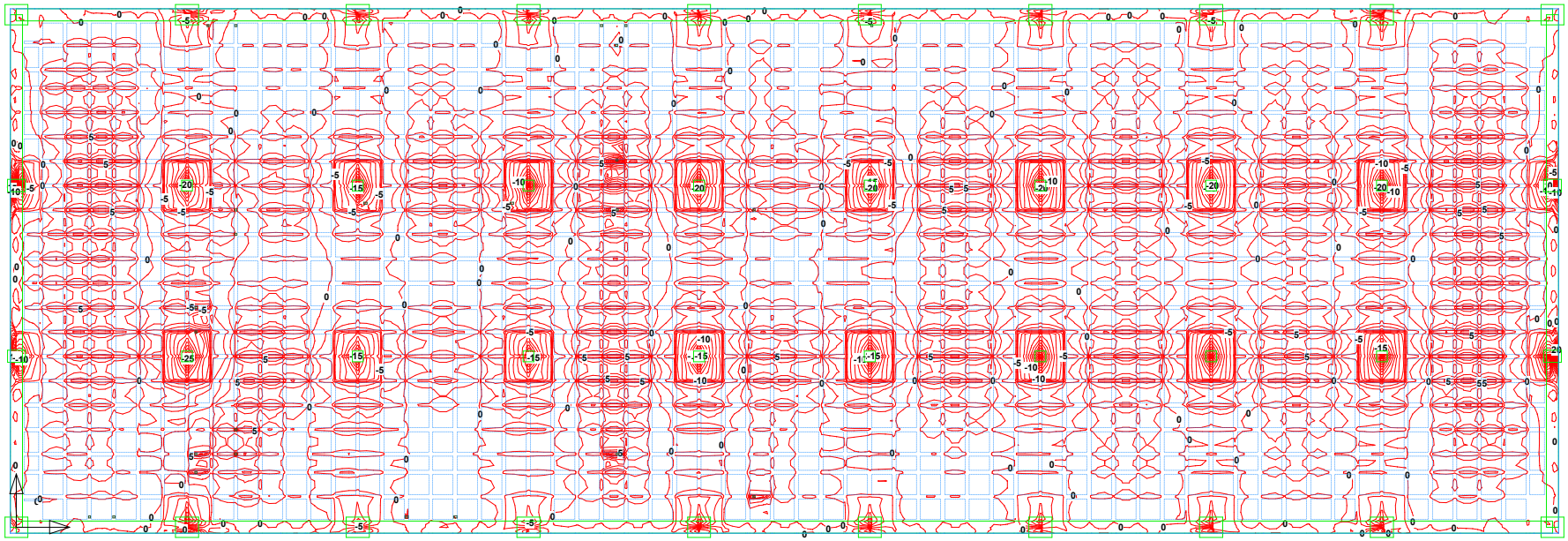
Factored LC: 0.9D + E (Negative Y): Min Mx Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -33.65 Kips @ (21.13,20.88) Max Value = 43.71 Kips @ (20.83,-0.375)



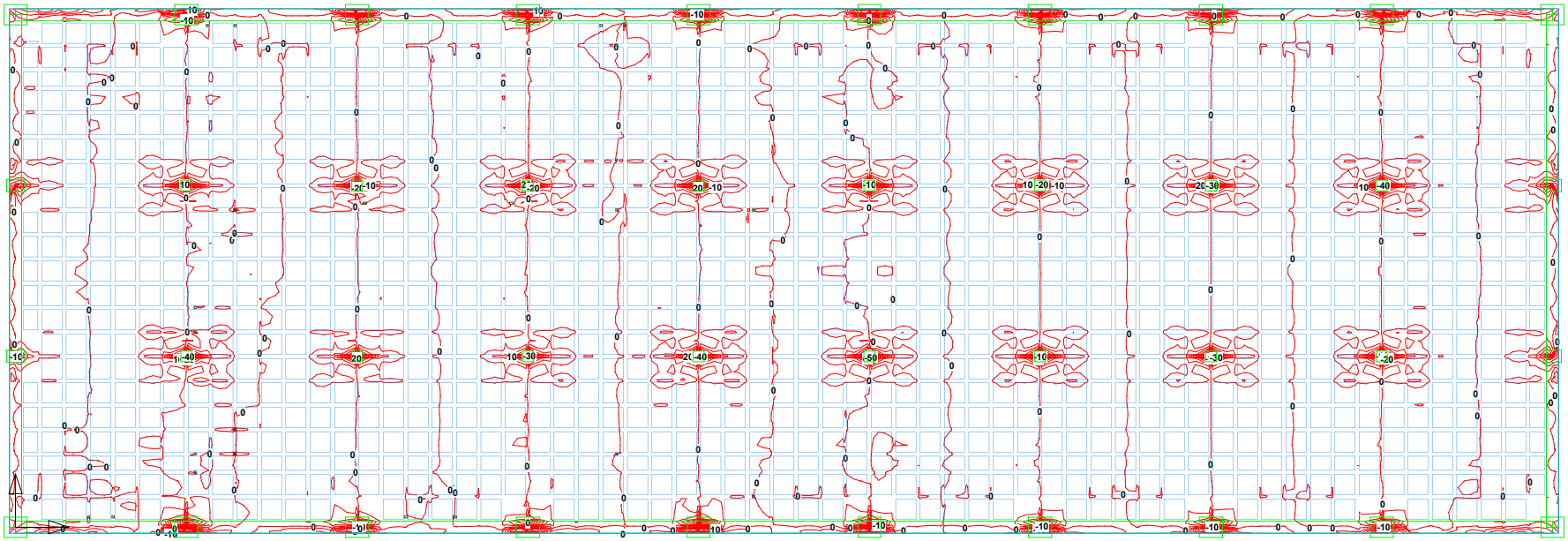
Factored LC: 0.9D + E (Negative Y): Max My Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -26.52 Kips @ (21.13,20.88) Max Value = 26.37 Kips @ (189.4,21.55)



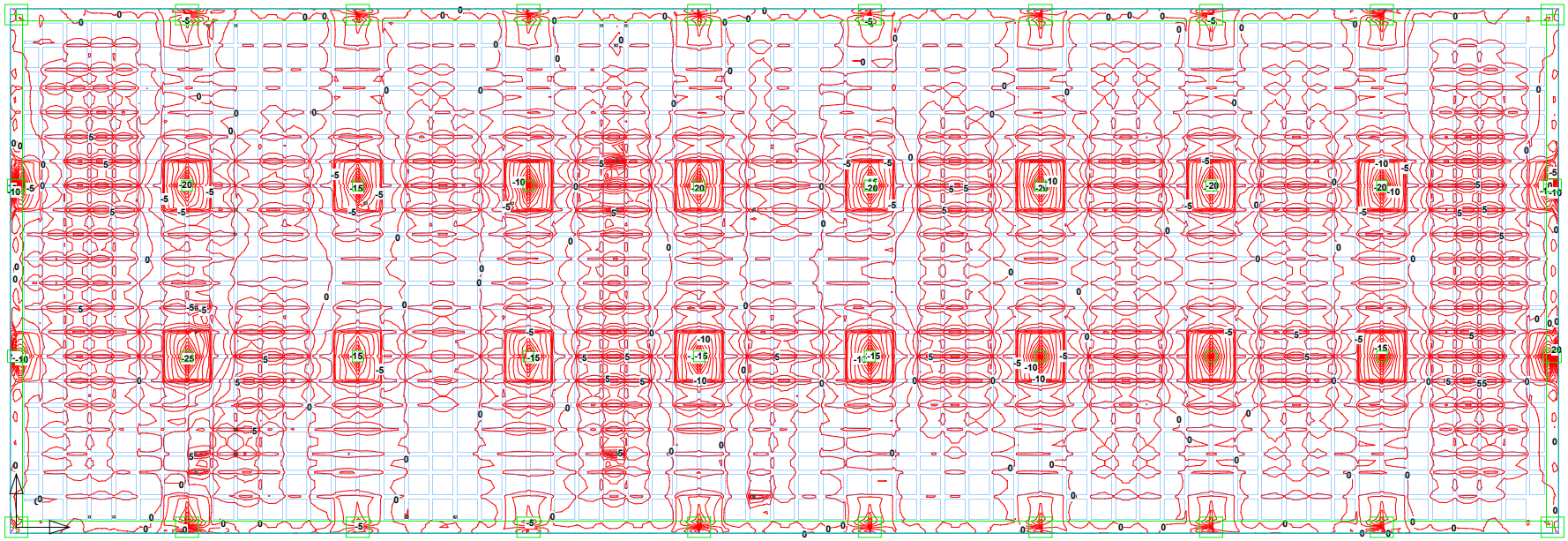
Factored LC: 0.9D + E (Negative Y): Max Vx Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Vertical Shear Plot (Maximum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.13 kips/ft @ (105.3,21) Max Value = 40.76 kips/ft @ (83.75,21)



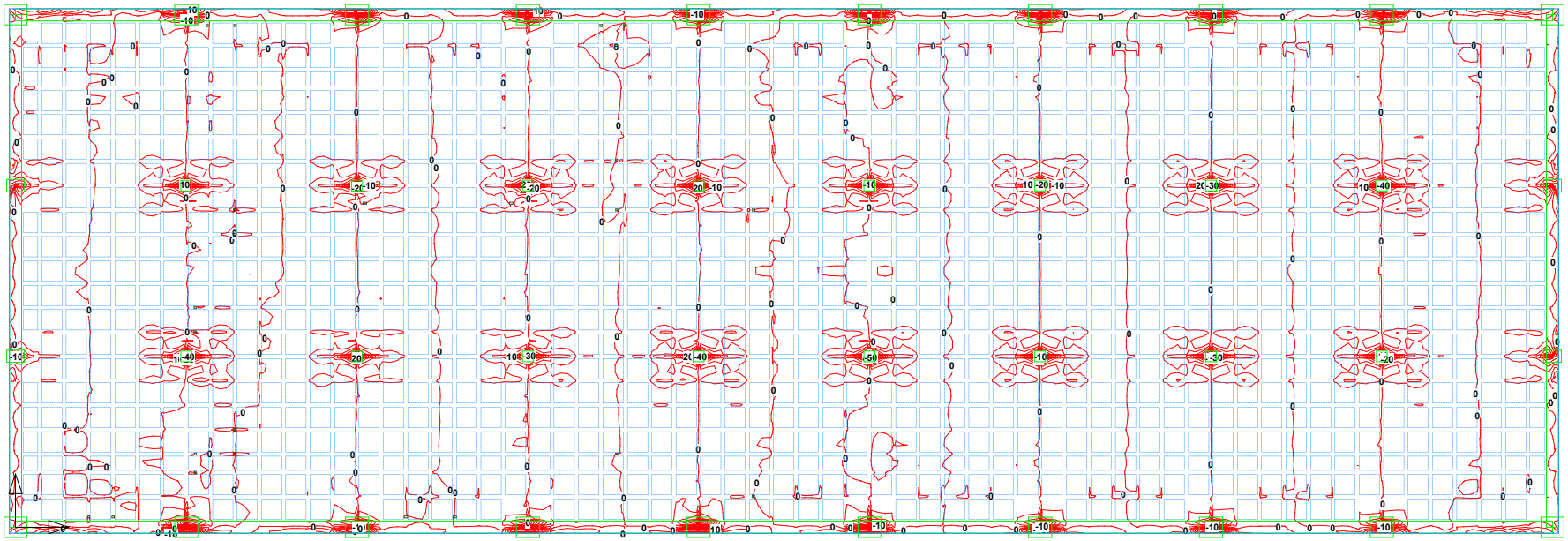
Factored LC: 0.9D + E (Negative Y): Min My Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -26.52 Kips @ (21.13,20.88) Max Value = 26.37 Kips @ (189.4,21.55)



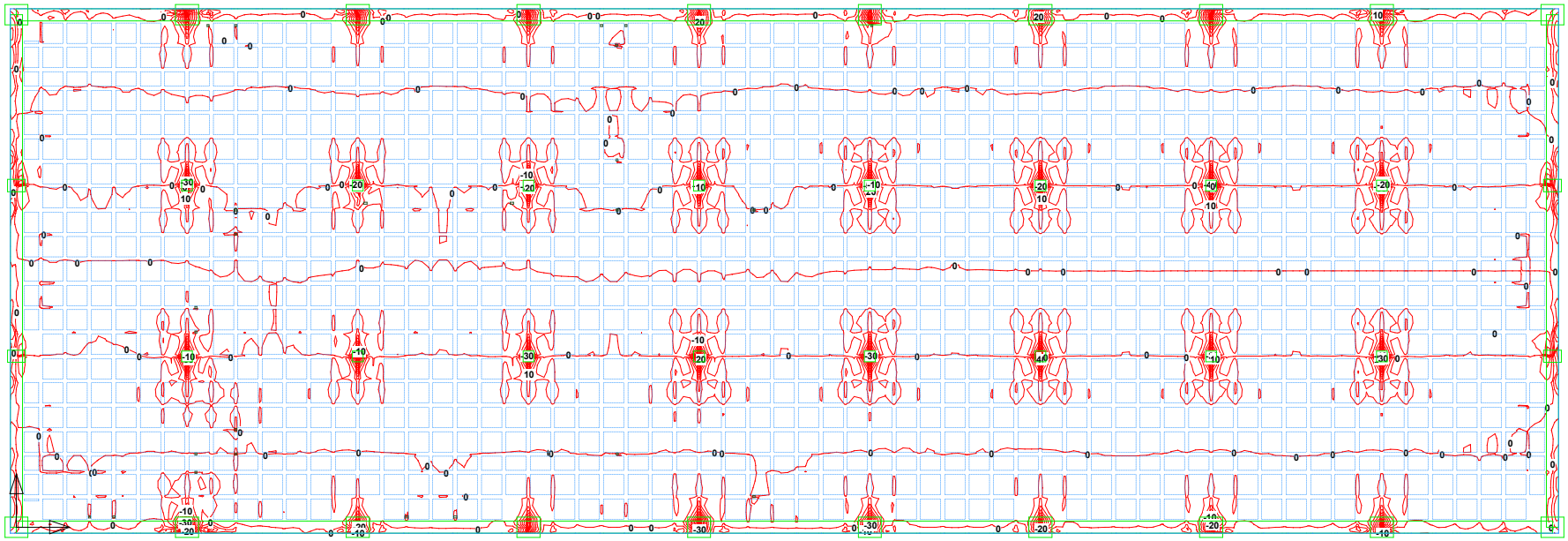
Factored LC: 0.9D + E (Negative Y): Min Vx Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Vertical Shear Plot (Minimum Values) (X-Axis Direction)
One Contour = 2 kips/ft
Min Value = -42.13 kips/ft @ (105.3,21) Max Value = 40.76 kips/ft @ (83.75,21)



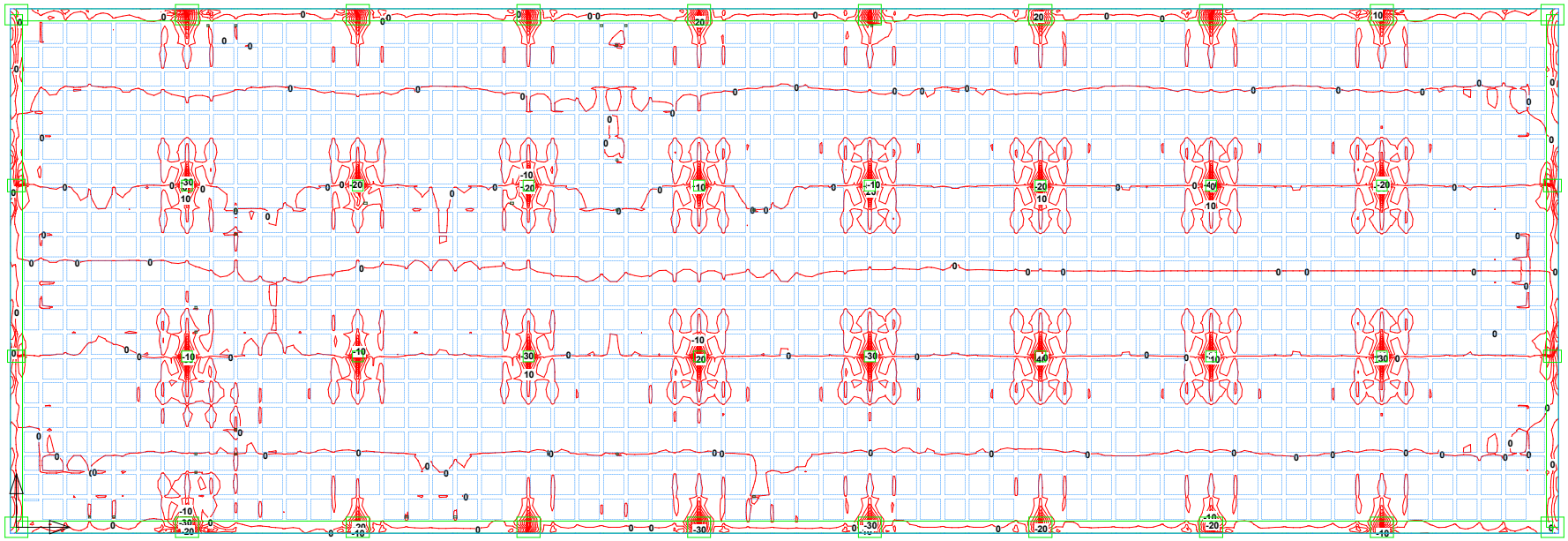
Factored LC: 0.9D + E (Negative Y): Max Vy Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Vertical Shear Plot (Maximum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.98 kips/ft @ (168,42.25) Max Value = 45.55 kips/ft @ (21,20.75)



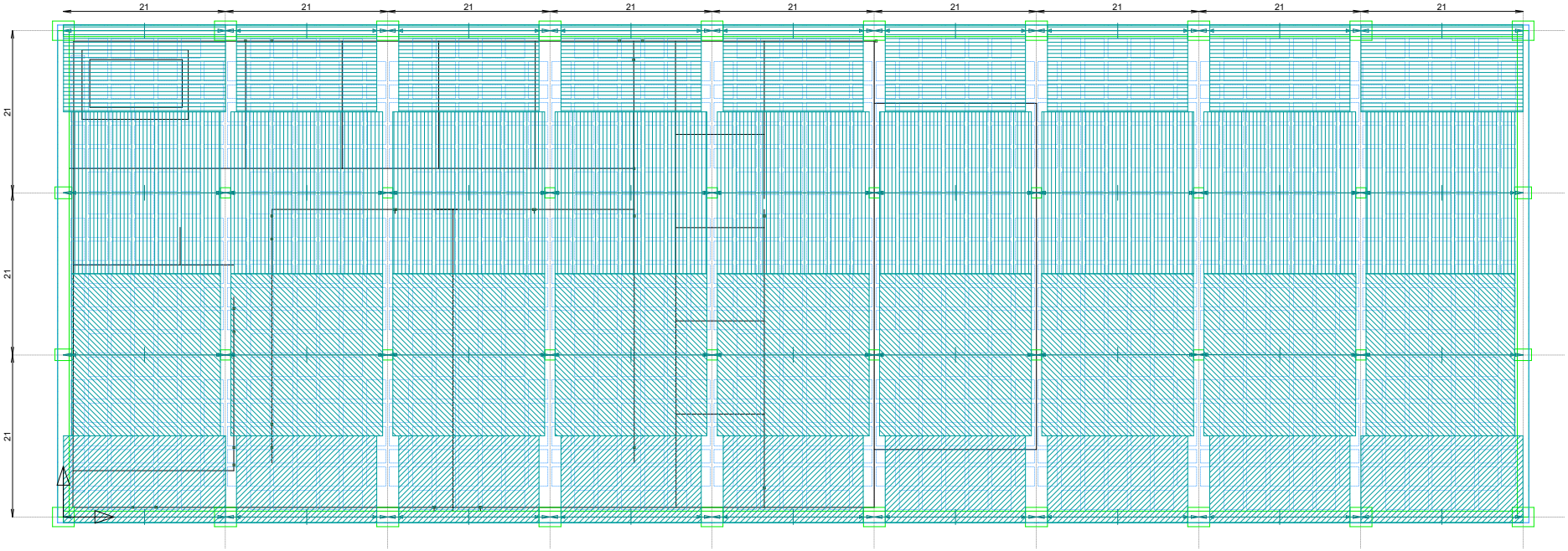
Factored LC: 0.9D + E (Negative Y): Min Vy Plan

Factored LC: 0.9D + E (Negative Y): User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Factored LC: 0.9D + E (Negative Y) - Vertical Shear Plot (Minimum Values) (Y-Axis Direction)
One Contour = 2 kips/ft
Min Value = -41.98 kips/ft @ (168,42.25) Max Value = 45.55 kips/ft @ (21,20.75)



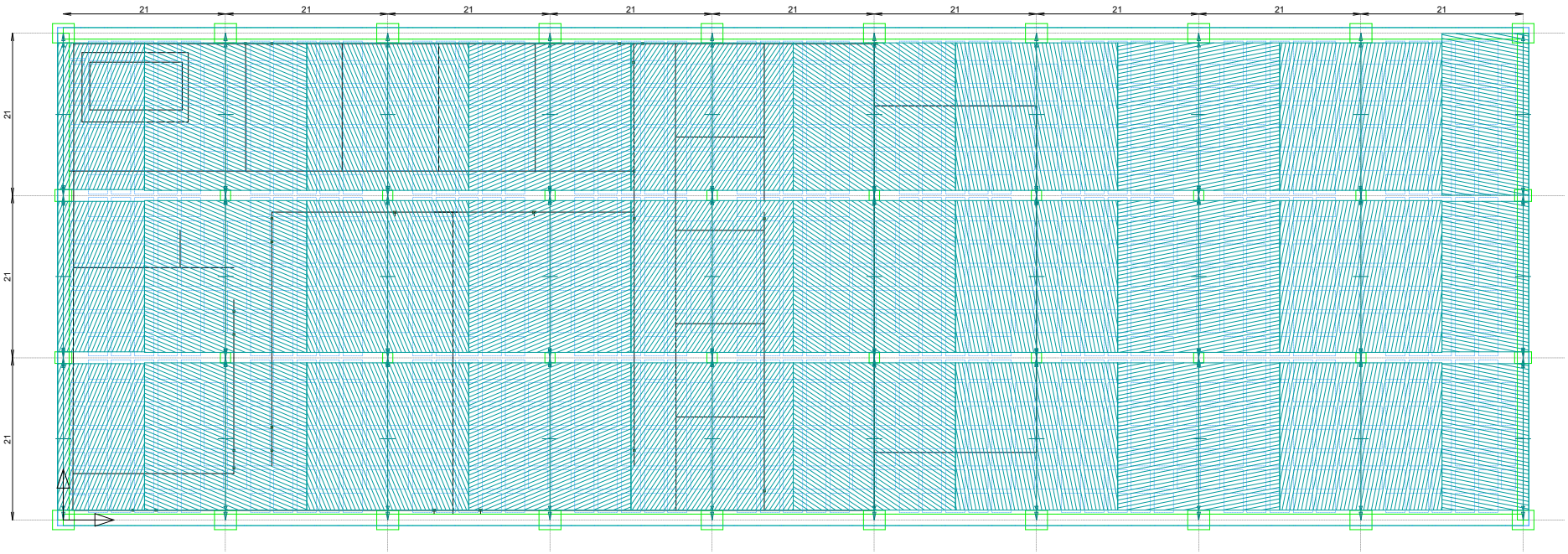
Design Strip: Latitude Design Spans Plan

Design Strip: Latitude Span Boundaries; Latitude SSs; Latitude DSs; Latitude Strip Boundaries; Latitude SSSs; SSS Hatching; User Notes; User Lines; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



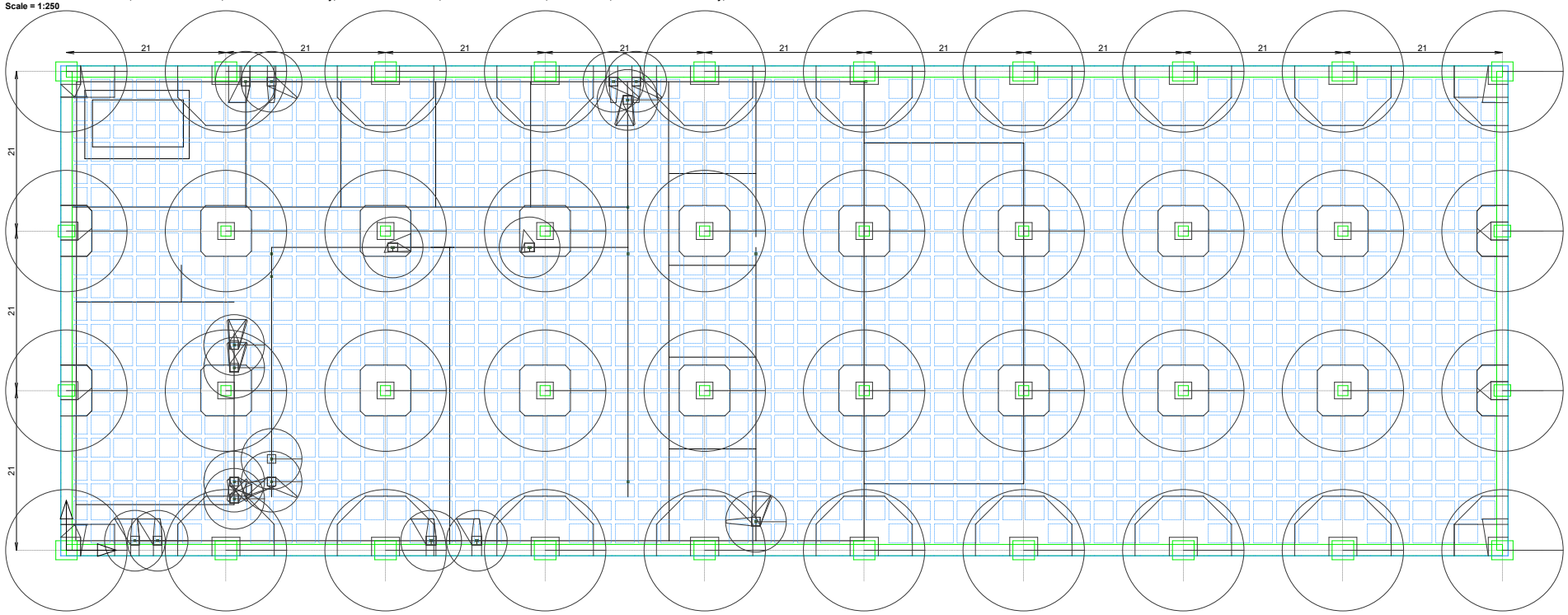
Design Strip: Longitude Design Spans Plan

Design Strip: User Lines; User Notes; User Dimensions; Longitude SSs; Longitude SSSs; SSS Hatching; Longitude DSs; Longitude Span Boundaries; Longitude Strip Boundaries;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



Design Strip: Punching Checks Plan

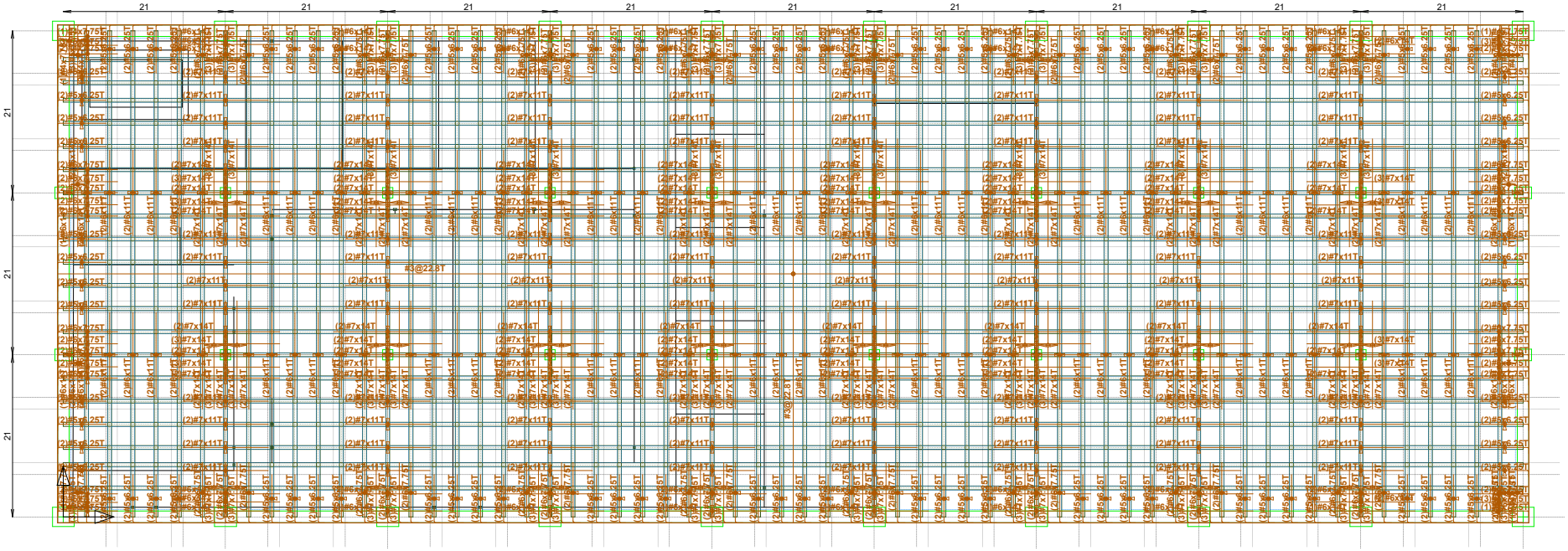
Design Strip: User Lines; User Notes; User Dimensions; Punching Checks; Punching Check Sections;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



FAA Reconfigured M1 Room - Existing Slab Model_ANB_20210505_future loading.cpt - 7/19/2021

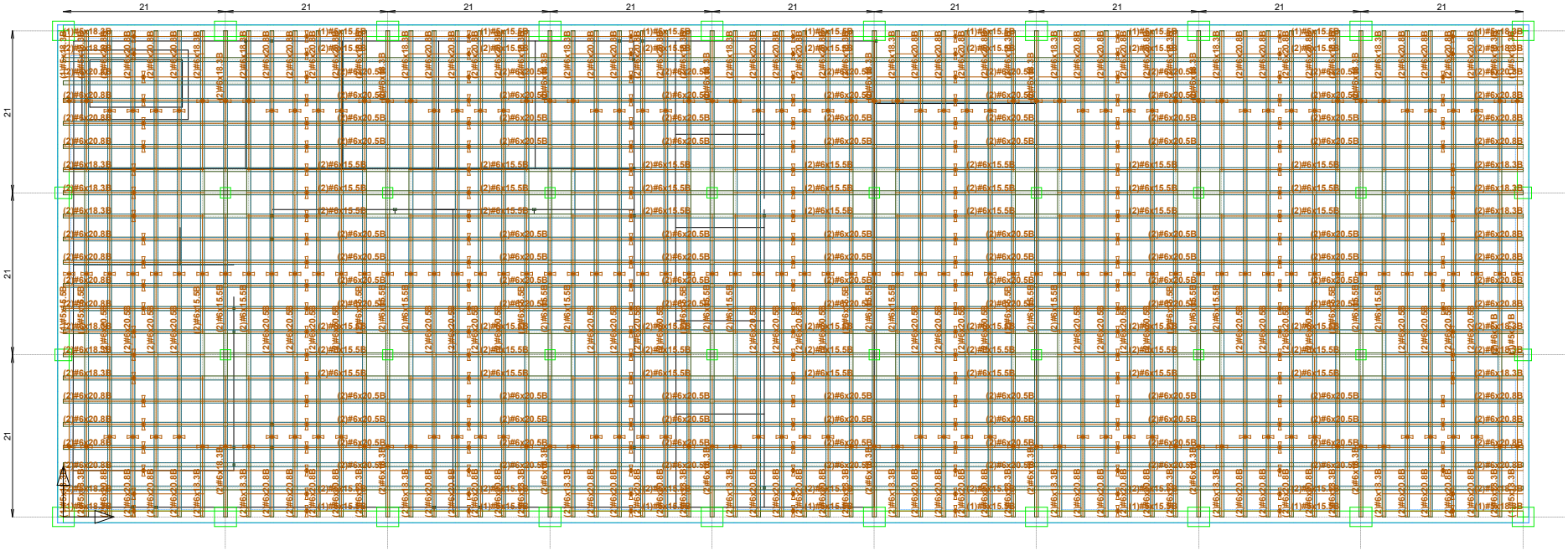
Reinforcement: Top Bars Plan

Reinforcement: Latitude User Concentrated Reinf.; Longitude User Concentrated Reinf.; Latitude Program Concentrated Reinf.; Longitude Program Concentrated Reinf.; Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Concentrated Reinf. Descriptions; Concentrated Reinf. Extent; Latitude User Distributed Reinf.; Longitude User Distributed Reinf.; Top Face Distributed Rei
Drawing Import: User Notes; User Lines; User Dimensions;
Mesh Input: Beams;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



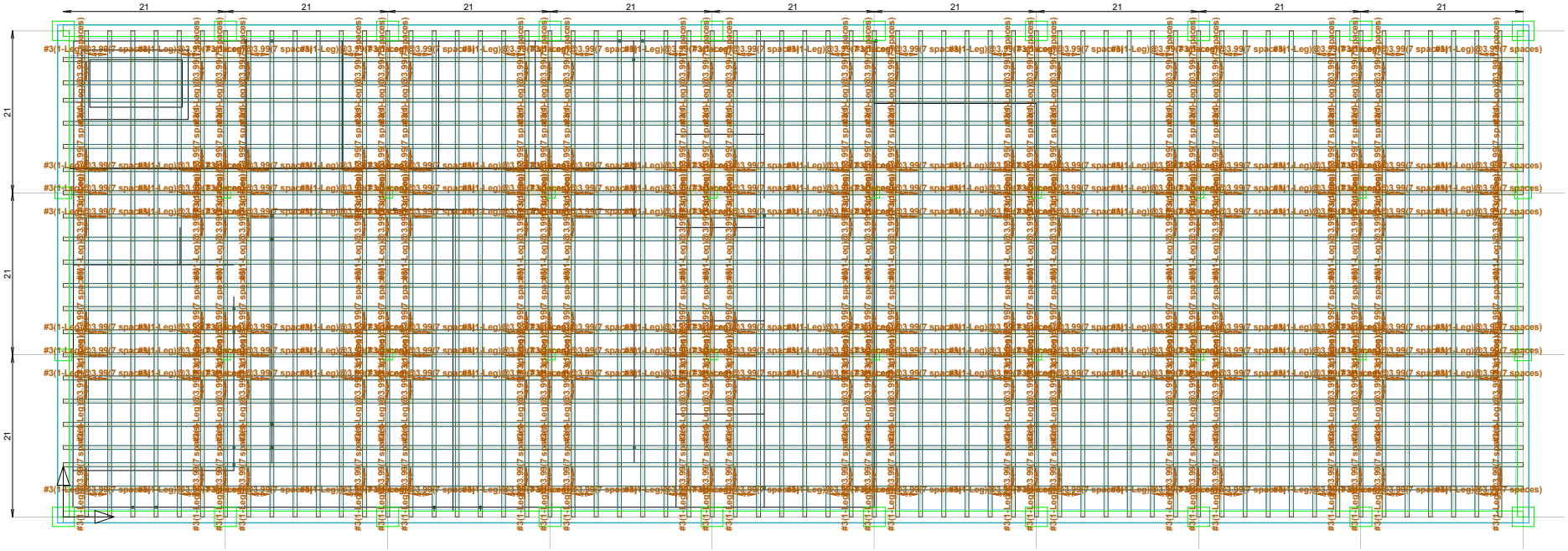
Reinforcement: Bottom Bars Plan

Reinforcement: Latitude User Concentrated Reinf.; Longitude User Concentrated Reinf.; Latitude Program Concentrated Reinf.; Longitude Program Concentrated Reinf.; Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Concentrated Reinf. Descriptions; Concentrated Reinf. Extent; Latitude User Distributed Reinf.; Longitude User Distributed Reinf.; Bottom Face Distribu
Drawing Import: User Notes; User Lines; User Dimensions;
Mesh Input: Beams;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



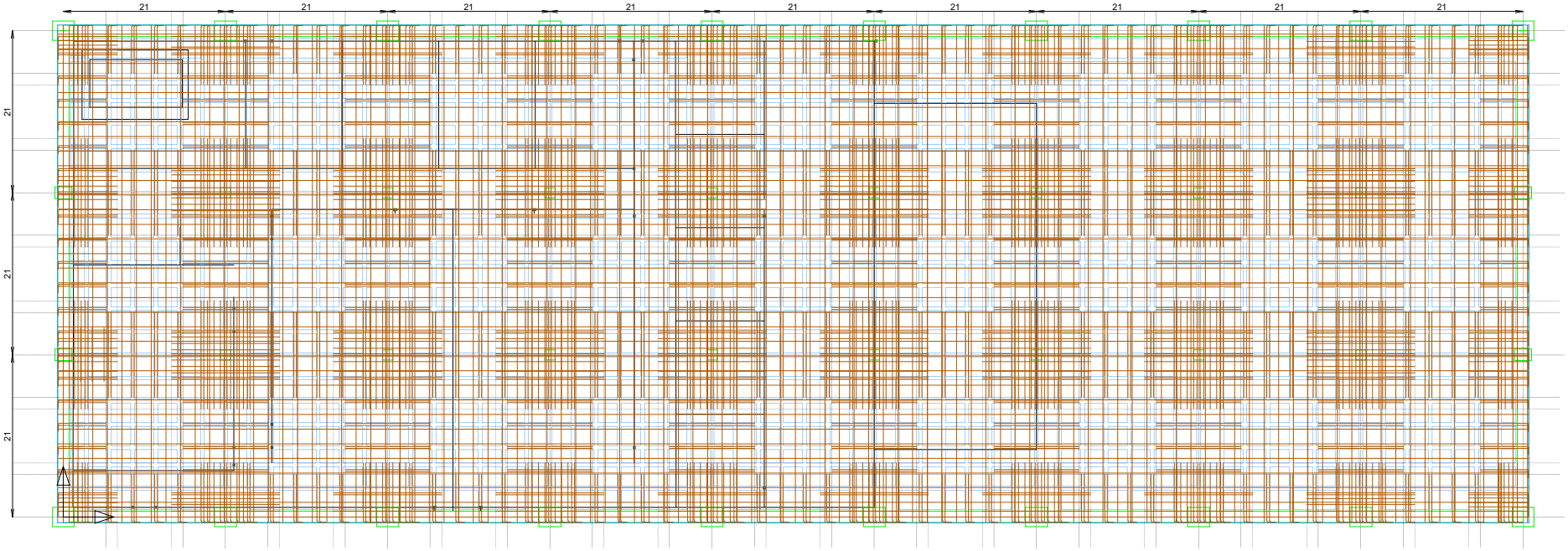
Reinforcement: Shear Bars Plan

Reinforcement: Latitude User Transverse Reinf.; Longitude User Transverse Reinf.; Latitude Program Transverse Reinf.; Longitude Program Transverse Reinf.; Transverse Reinf. Descriptions; Transverse Reinf. Extent; Latitude User Individual Transverse Bars; Longitude User Individual Transverse Bars; Latitude Program Individual Transverse Bars; Longitude Program Individual Transve
Drawing Import: User Notes; User Lines; User Dimensions;
Mesh Input: Beams;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



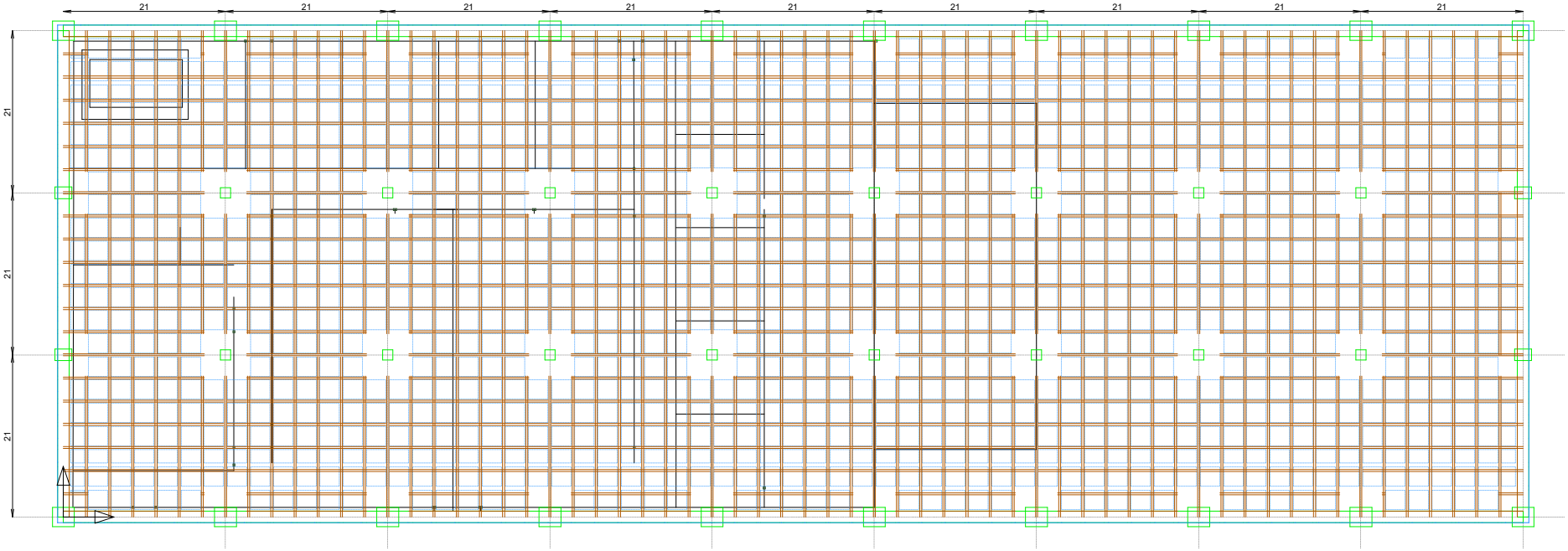
Reinforcement: Individual Top Bars Plan

Reinforcement: Latitude User Individual Bars; Longitude User Individual Bars; Latitude Program Individual Bars; Longitude Program Individual Bars; Top Face Individual Bars; Both Faces Individual Bars; User Notes; User Lines; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



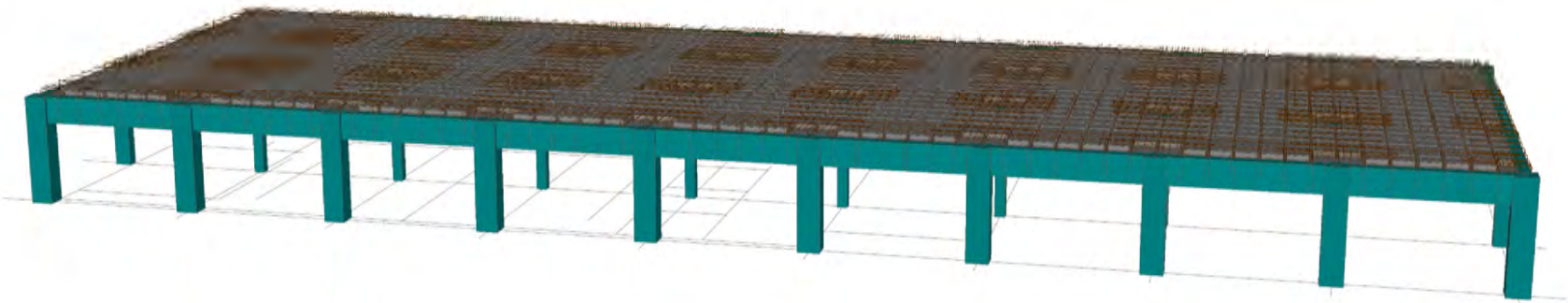
Reinforcement: Individual Bottom Bars Plan

Reinforcement: Latitude User Individual Bars; Longitude User Individual Bars; Latitude Program Individual Bars; Longitude Program Individual Bars; Bottom Face Individual Bars; Both Faces Individual Bars; User Notes; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:250



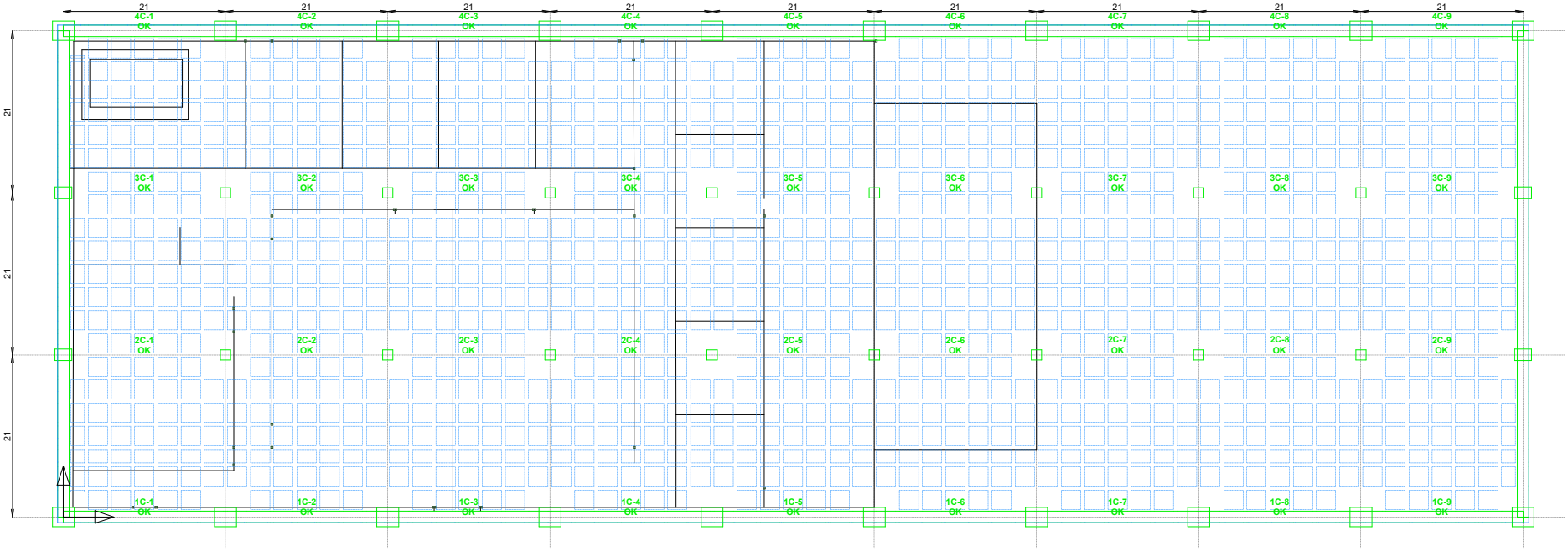
Reinforcement: Detailed Bars & SSR Perspective

Latitude User Individual Bars; Longitude User Individual Bars; I
Wall Elements Below; Column Elements Below; Slab Elements;
Tendons; Jacks;
Tendons; Jacks;
Tendons; Jacks;
Tendons; Jacks;



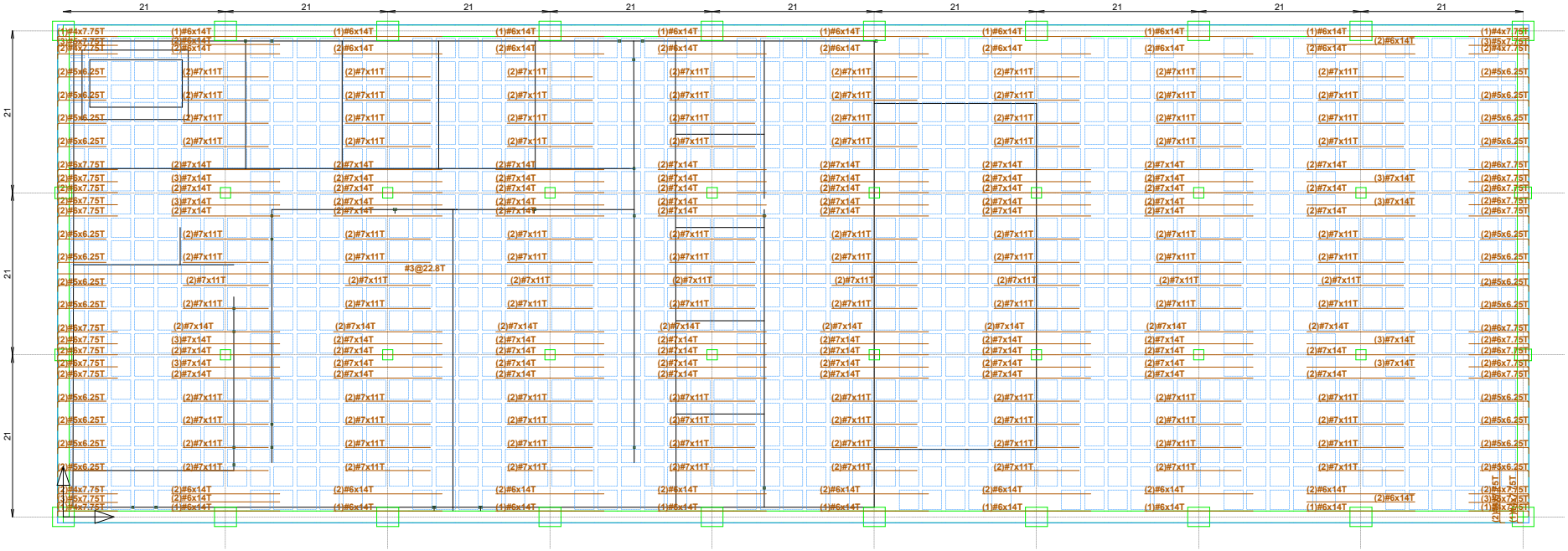
Service Design: Latitude Status Plan

Service Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Numbers; Span Design Status; Latitude DS Designs; DS Design Numbers; DS Design Status;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



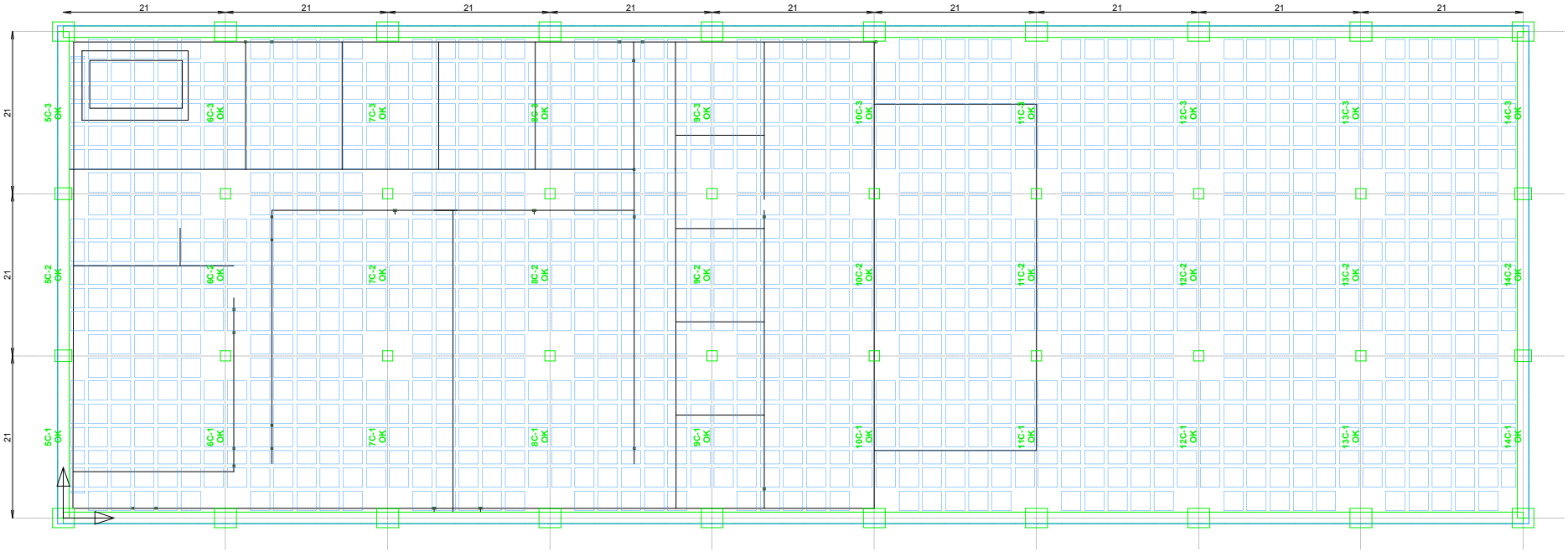
Service Design: Latitude Top Reinforcement Plan

Service Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Top Bars; Span Design Bar Descriptions; Latitude DS Designs; DS Design Top Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Top Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Latitude User Concentrated Reinf.; Latitude User Distributed Reinf.;
Scale = 1:250



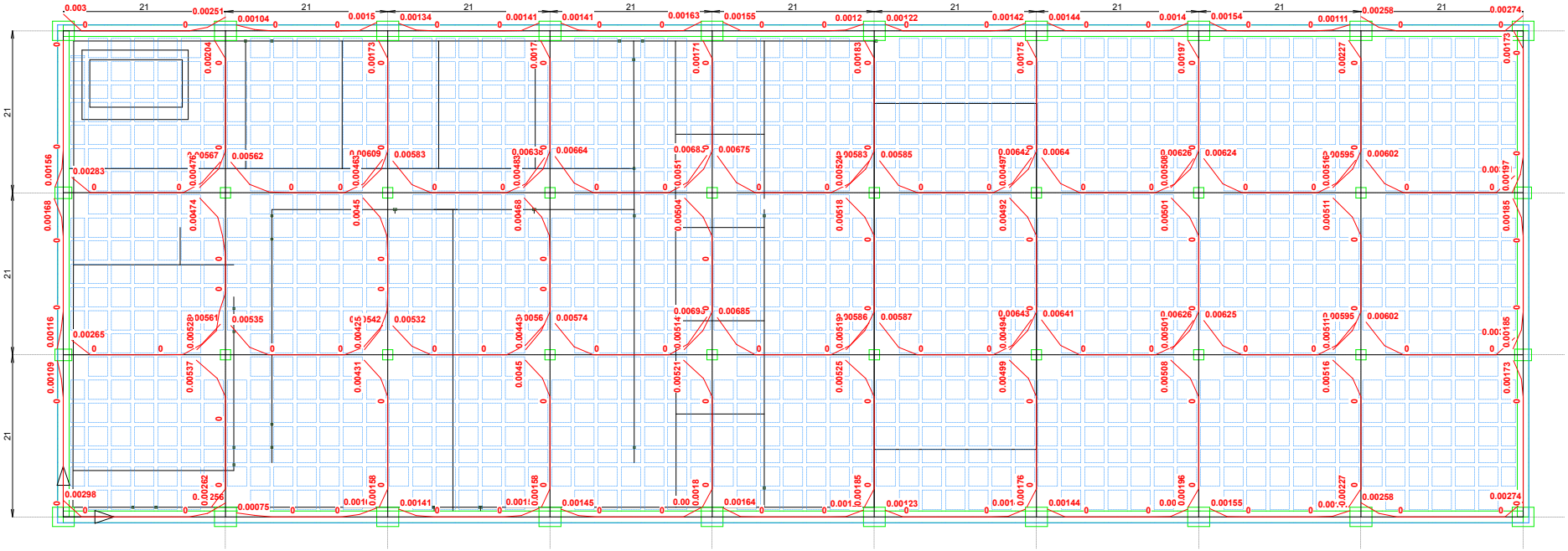
Service Design: Longitude Status Plan

Service Design: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Numbers; Span Design Status; Longitude DS Designs; DS Design Numbers; DS Design Status;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



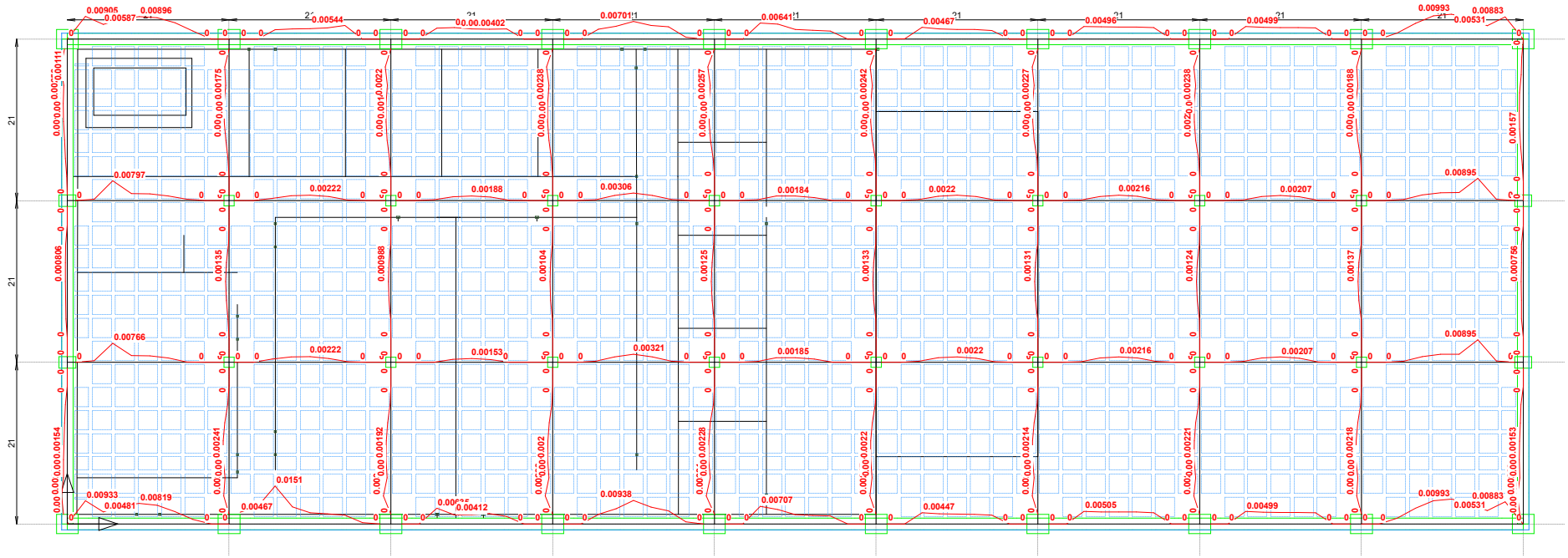
Service Design: Top Crack Width Plan

Service Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Latitude DS Designs; Longitude DS Designs;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service Design - Section Analysis Plot: (Top Crack Width)(Context: Max Capacity,Max Demand)



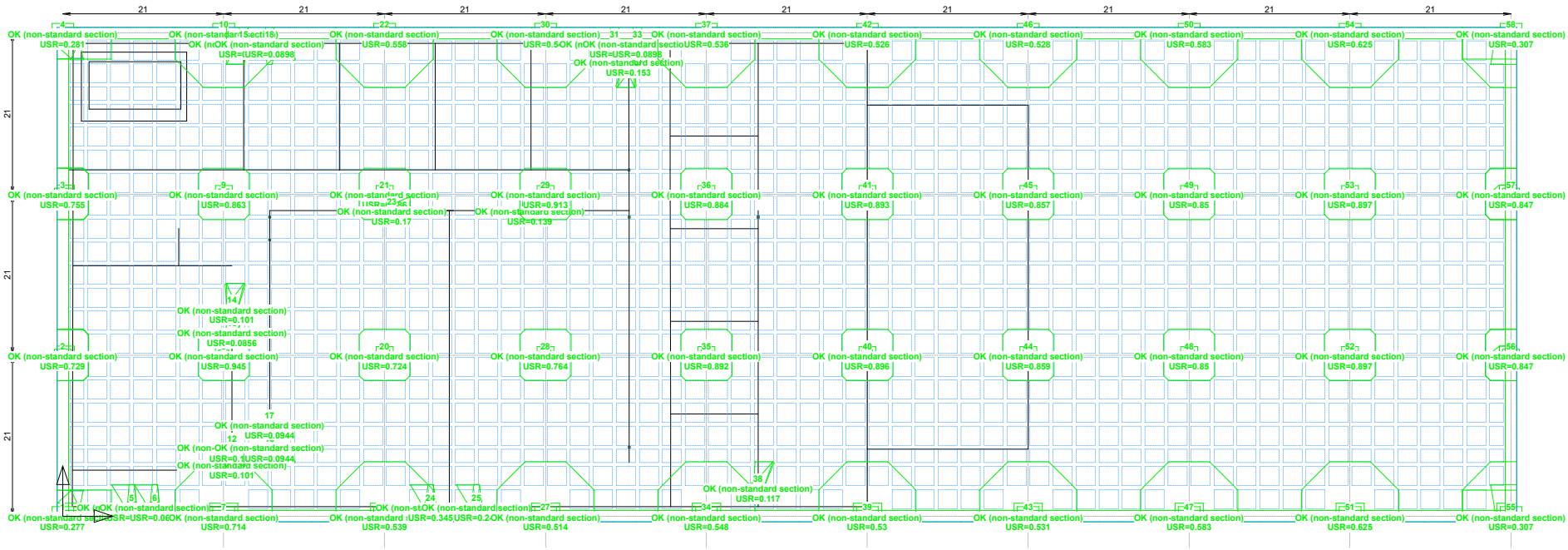
Service Design: Bottom Crack Width Plan

Service Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Latitude DS Designs; Longitude DS Designs;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service Design - Section Analysis Plot: (Bottom Crack Width)(Context: Max Capacity,Max Demand)



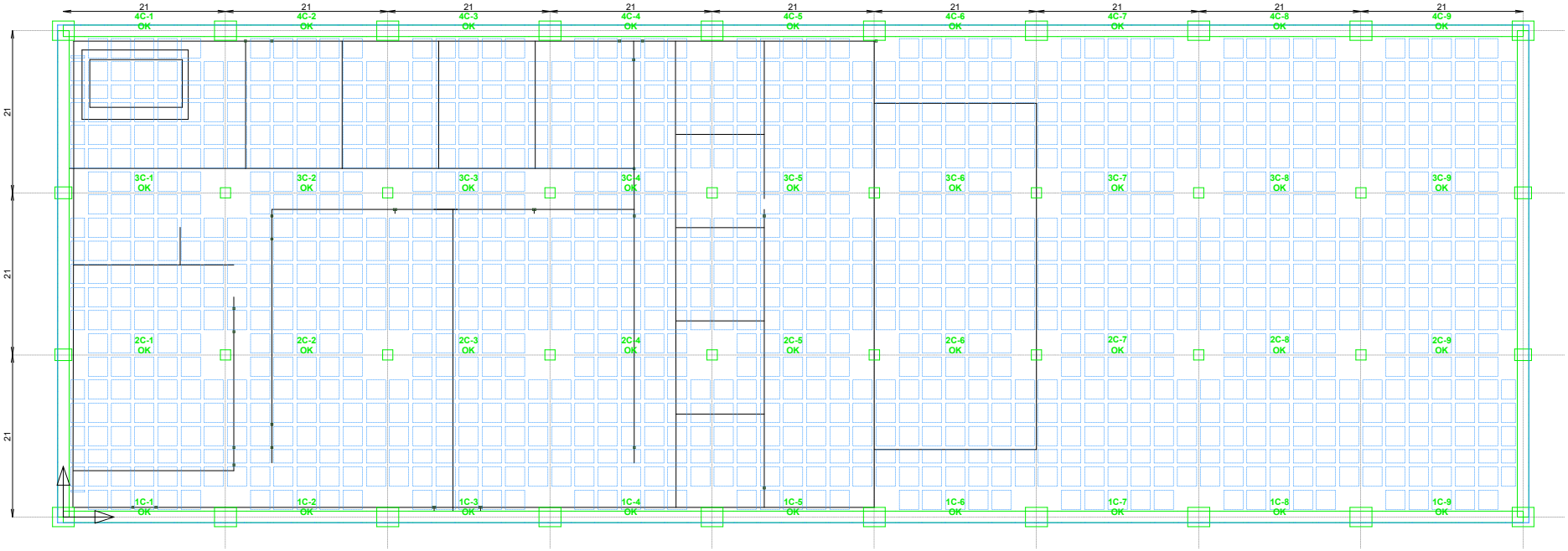
Strength Design: Punching Shear Status Plan

Strength Design: User Lines; User Notes; User Dimensions; PC Designs; PC Design Numbers; PC Design Status; PC Design Stress Ratios; PC Design Sections;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



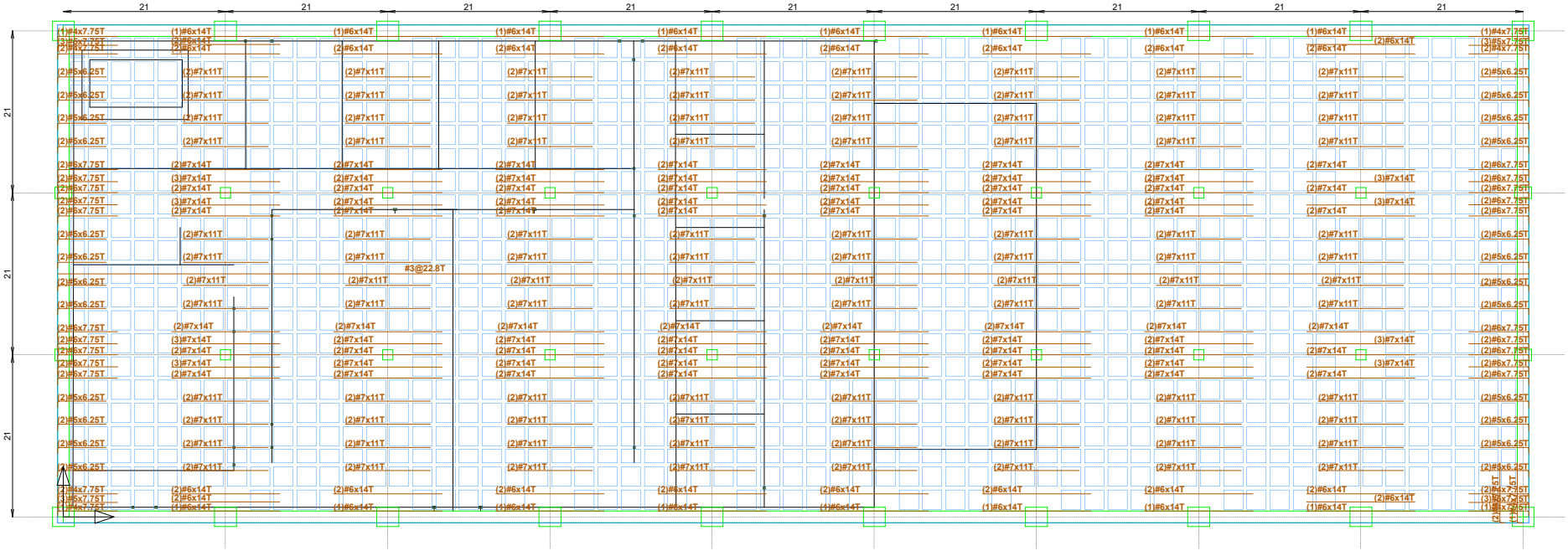
Strength Design: Latitude Status Plan

Strength Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Numbers; Span Design Status; Latitude DS Designs; DS Design Numbers; DS Design Status;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



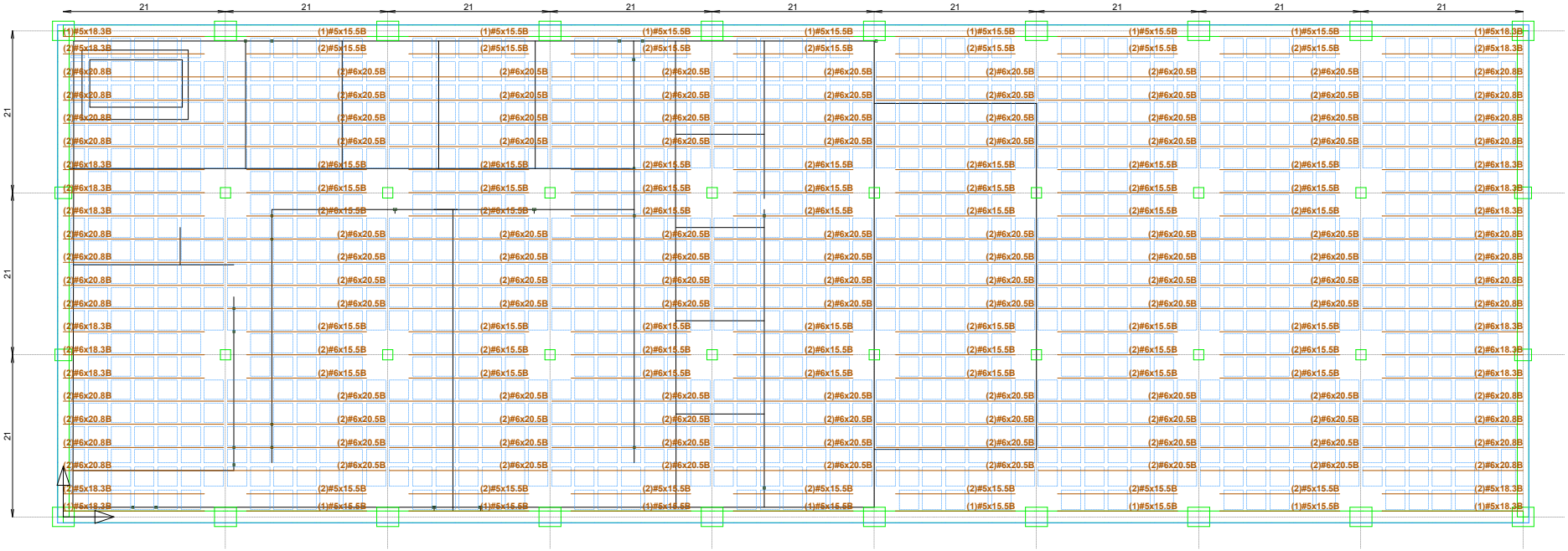
Strength Design: Latitude Top Reinforcement Plan

Strength Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Top Bars; Span Design Bar Descriptions; Latitude DS Designs; DS Design Top Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Top Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Latitude User Concentrated Reinf.; Latitude User Distributed Reinf.;
Scale = 1:250



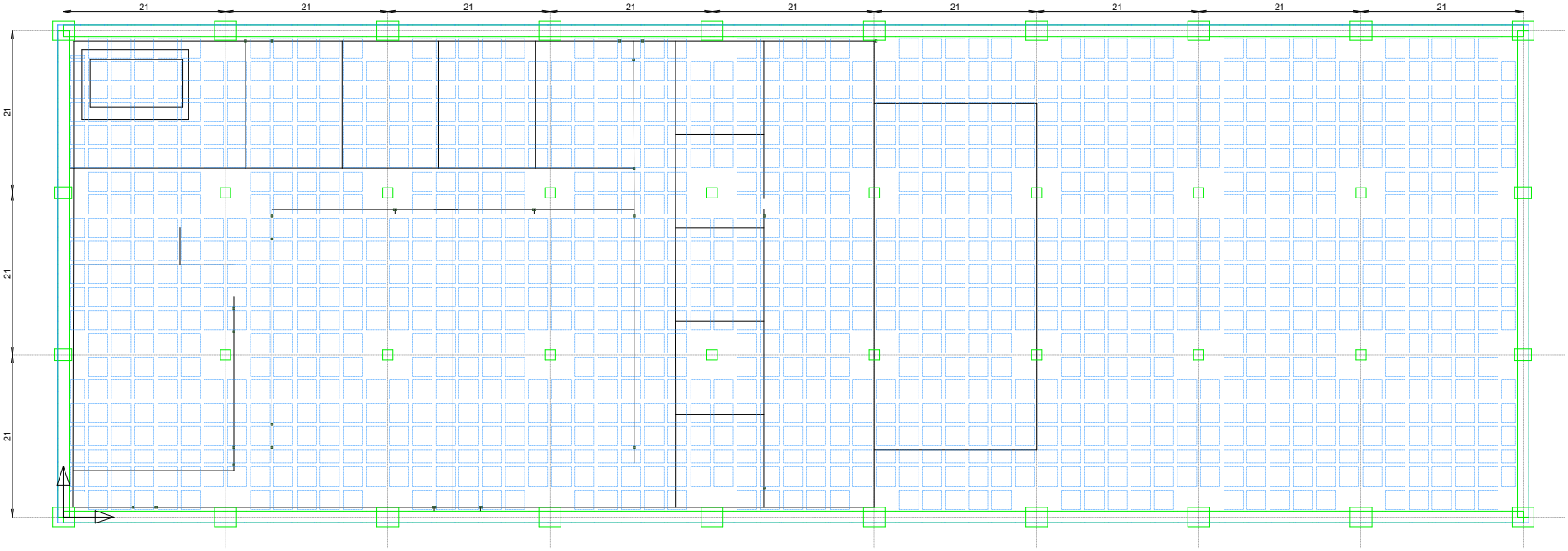
Strength Design: Latitude Bottom Reinforcement Plan

Strength Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Bottom Bars; Span Design Bar Descriptions; Latitude DS Designs; DS Design Bottom Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Bottom Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Latitude User Concentrated Reinf.; Latitude User Distributed Reinf.;
Scale = 1:250



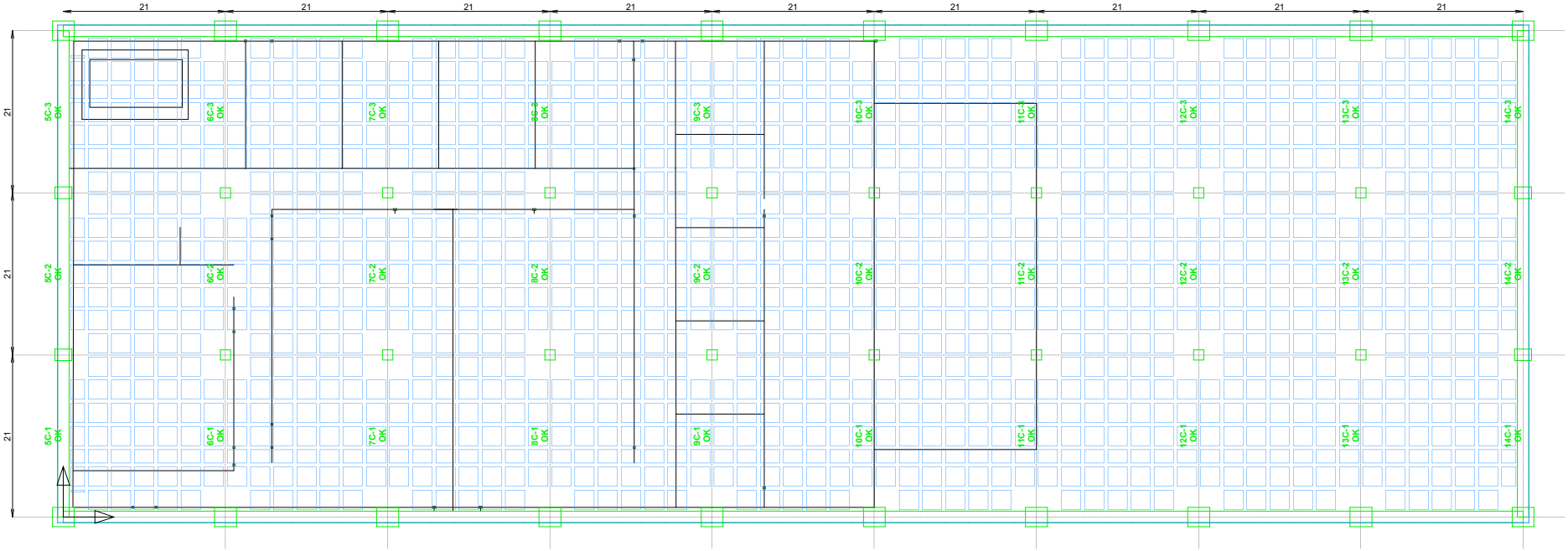
Strength Design: Latitude Shear Reinforcement Plan

Strength Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Shear Bars; Span Design Bar Descriptions; Latitude DS Designs; DS Design Numbers; DS Design Shear Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



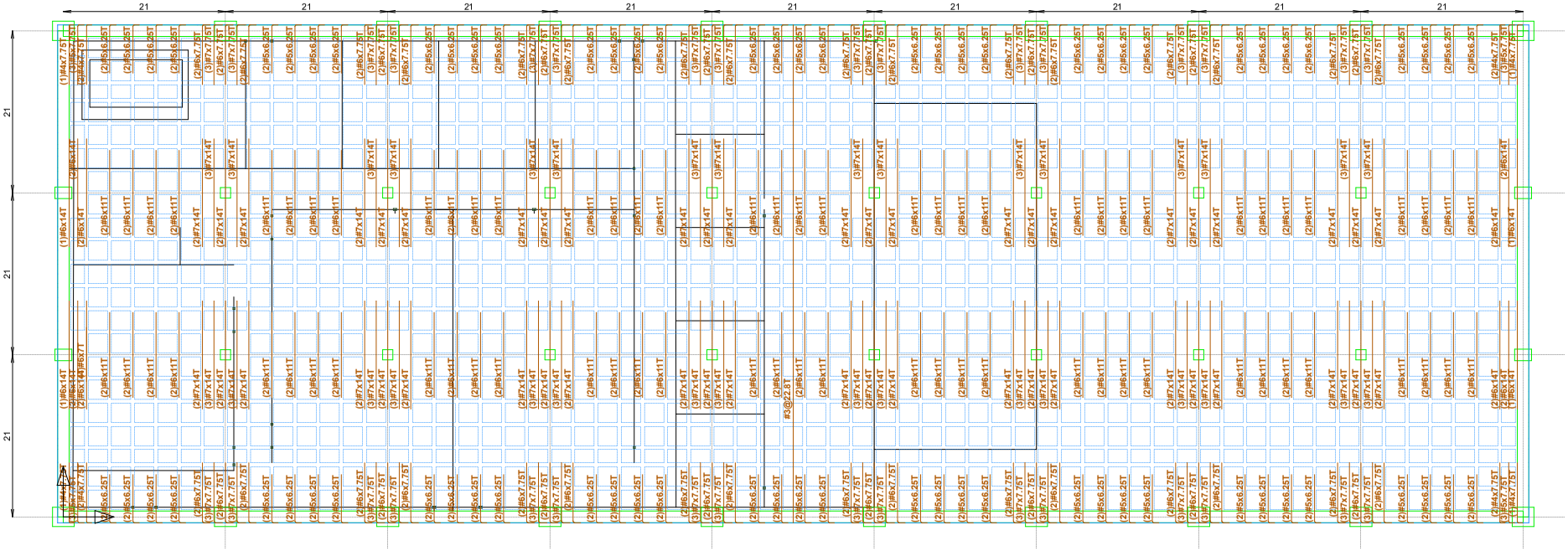
Strength Design: Longitude Status Plan

Strength Design: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Numbers; Span Design Status; Longitude DS Designs; DS Design Numbers; DS Design Status;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



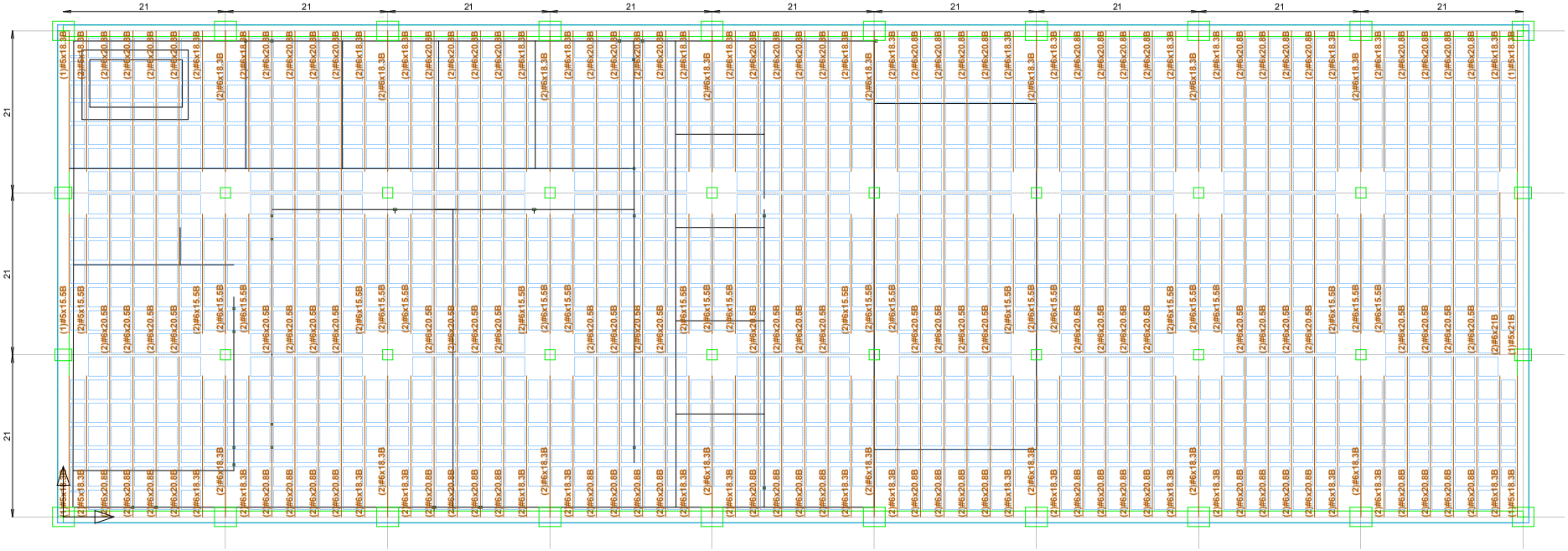
Strength Design: Longitude Top Reinforcement Plan

Strength Design: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Top Bars; Span Design Bar Descriptions; Longitude DS Designs; DS Design Top Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Top Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Longitude User Concentrated Reinf.; Longitude User Distributed Reinf.;
Scale = 1:250



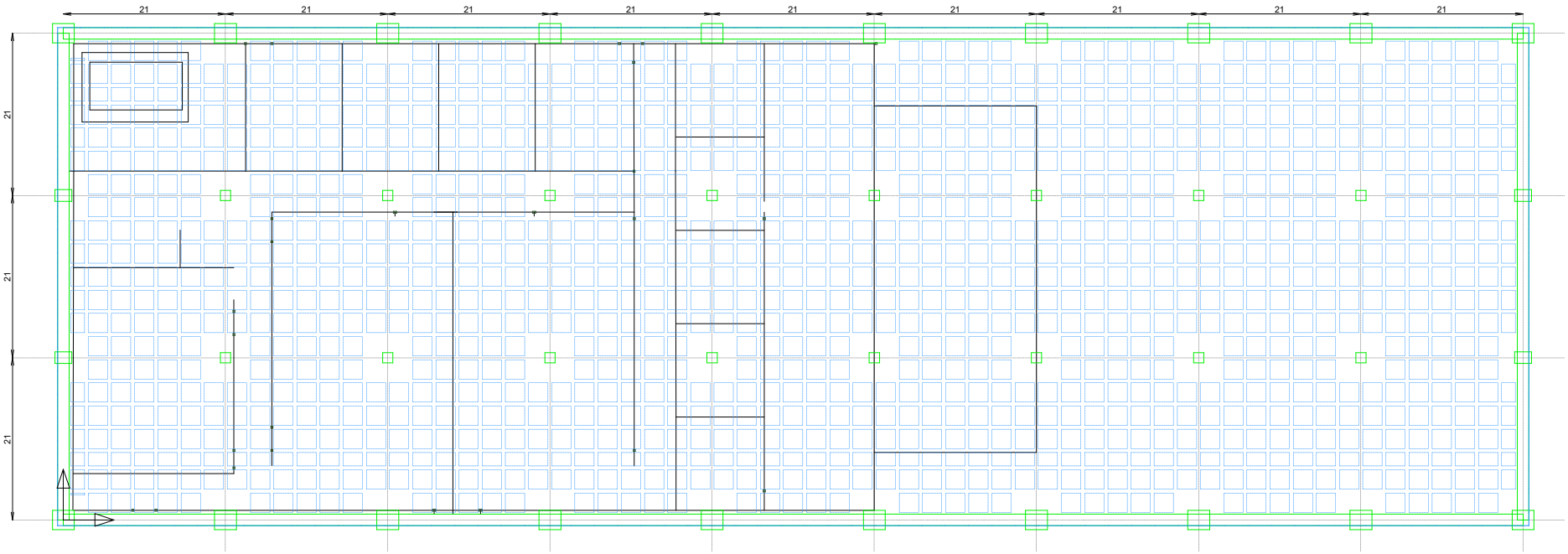
Strength Design: Longitude Bottom Reinforcement Plan

Strength Design: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Bottom Bars; Span Design Bar Descriptions; Longitude DS Designs; DS Design Bottom Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Bottom Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Longitude User Concentrated Reinf.; Longitude User Distributed Reinf.;
Scale = 1:250



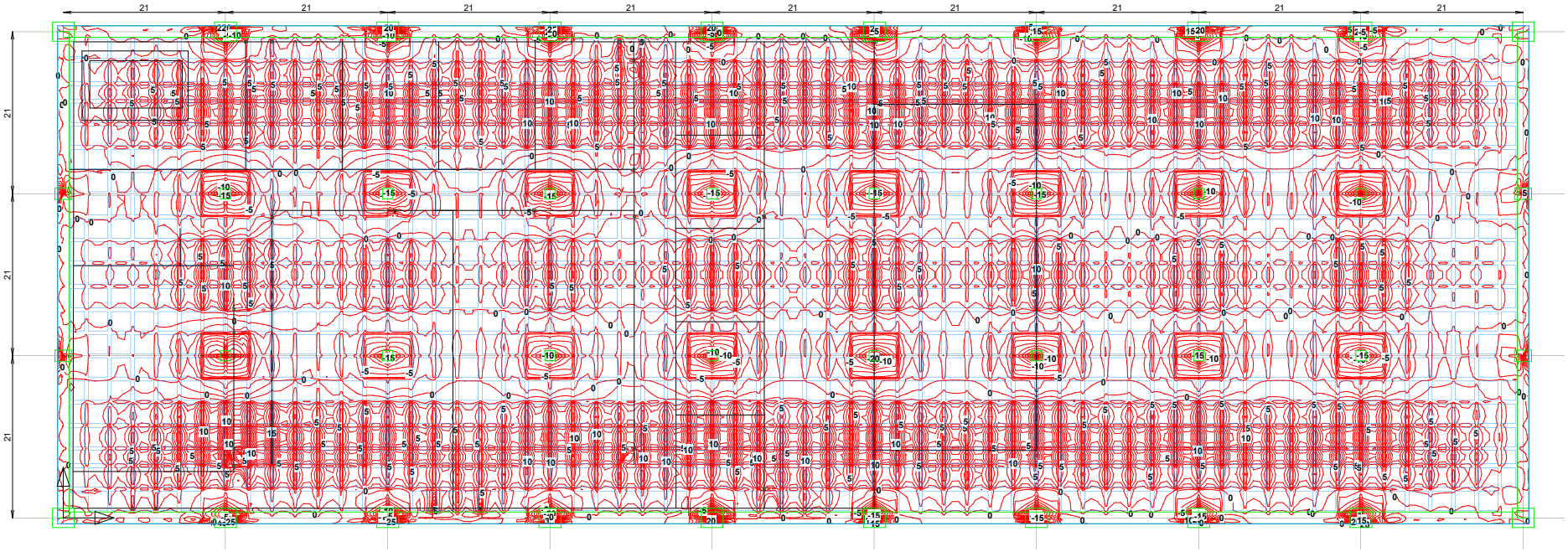
Strength Design: Longitude Shear Reinforcement Plan

Strength Design: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Shear Bars; Span Design Bar Descriptions; Longitude DS Designs; DS Design Shear Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



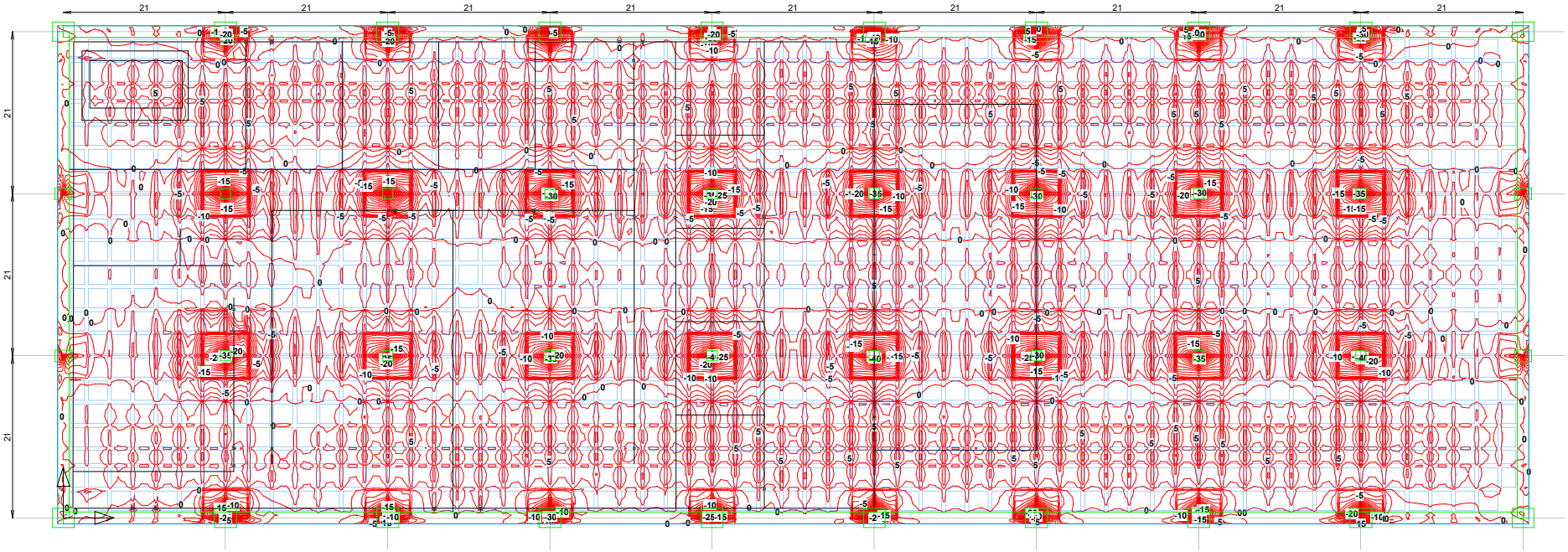
Strength Design: Max Mx Plan

Strength Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Latitude DS Designs; Longitude DS Designs; PC Designs;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Strength Design - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -22.04 Kips @ (168.1,20.88) Max Value = 57.66 Kips @ (20.83,-0.375)



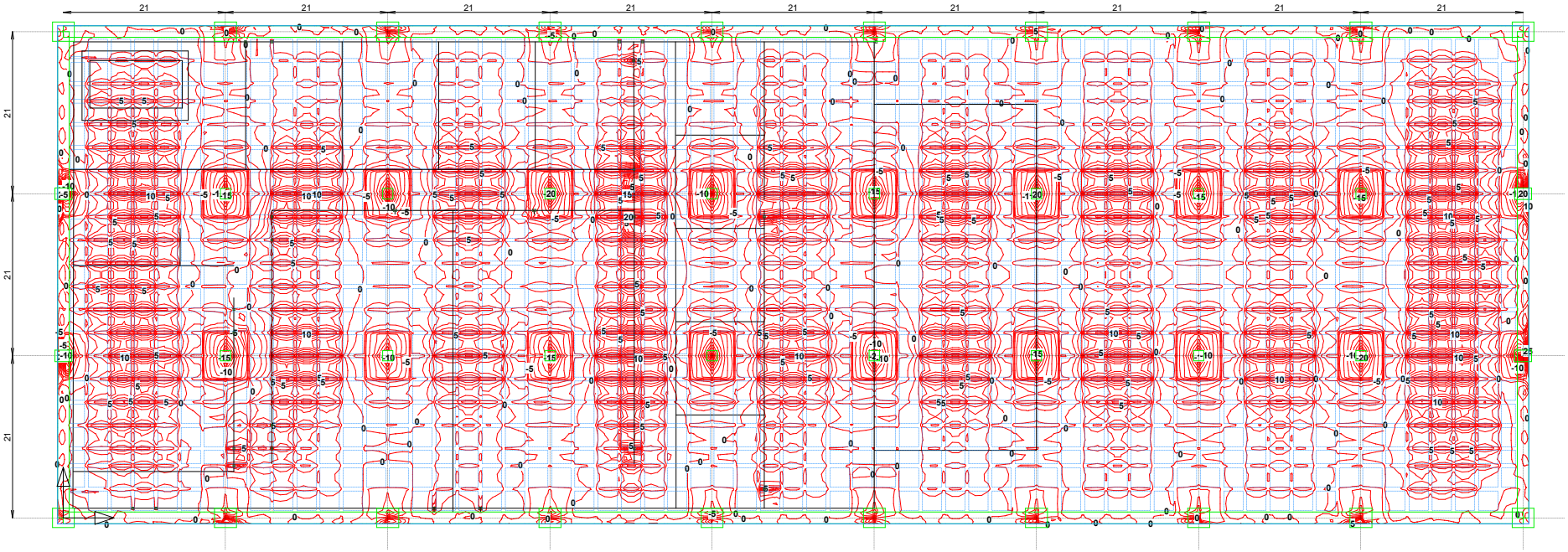
Strength Design: Min Mx Plan

Strength Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Latitude DS Designs; Longitude DS Designs; PC Designs;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Strength Design - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 1 Kips
Min Value = -49.38 Kips @ (21.13,20.88) Max Value = 25.79 Kips @ (168.2,63.38)



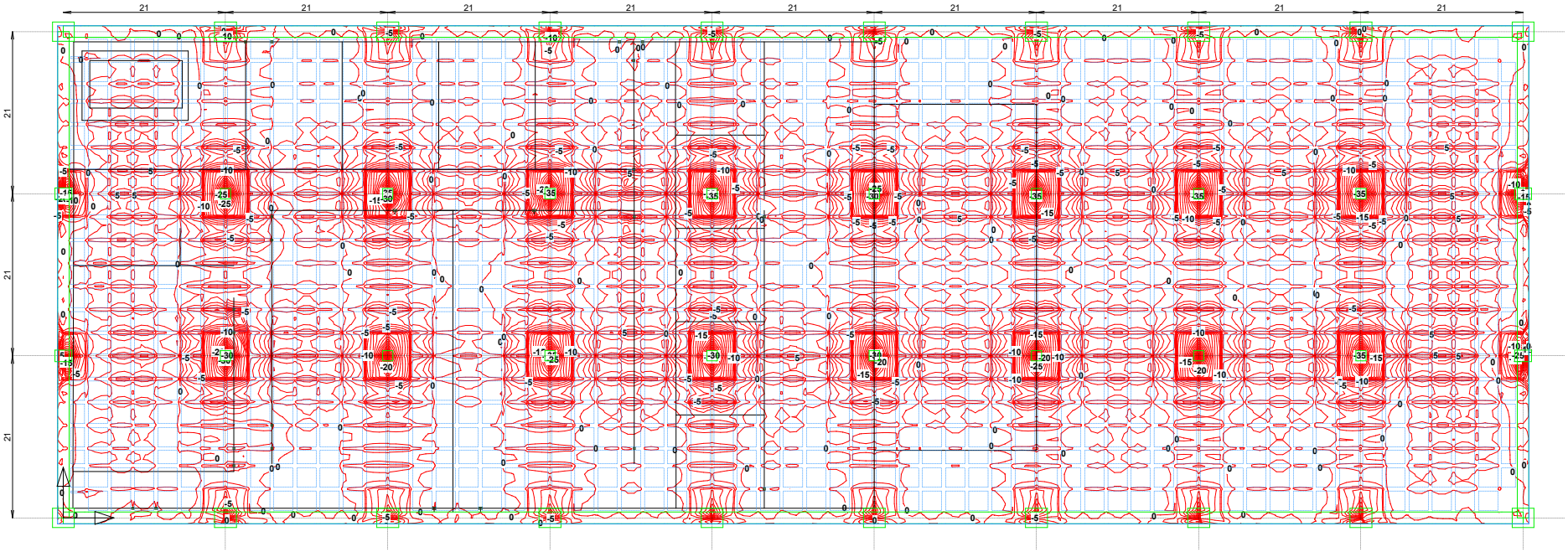
Strength Design: Max My Plan

Strength Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Latitude DS Designs; Longitude DS Designs; PC Designs;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Strength Design - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -22.06 Kips @ (168.1,42.13) Max Value = 45.66 Kips @ (189.4,21.55)



Strength Design: Min My Plan

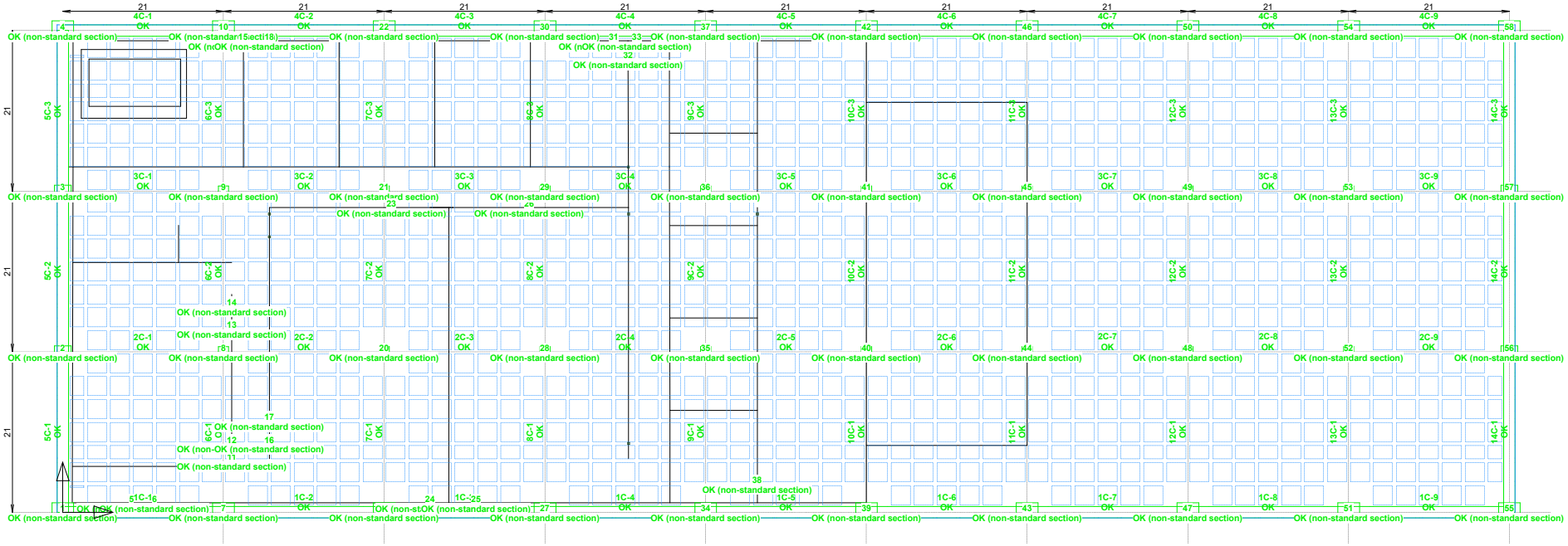
Strength Design: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Latitude DS Designs; Longitude DS Designs; PC Designs;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Strength Design - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 1 Kips
Min Value = -45.8 Kips @ (21.13,20.88) Max Value = 23.34 Kips @ (189.4,21.55)



FAA Reconfigured M1 Room - Existing Slab Model_ANB_20210505_future loading.cpt - 7/19/2021

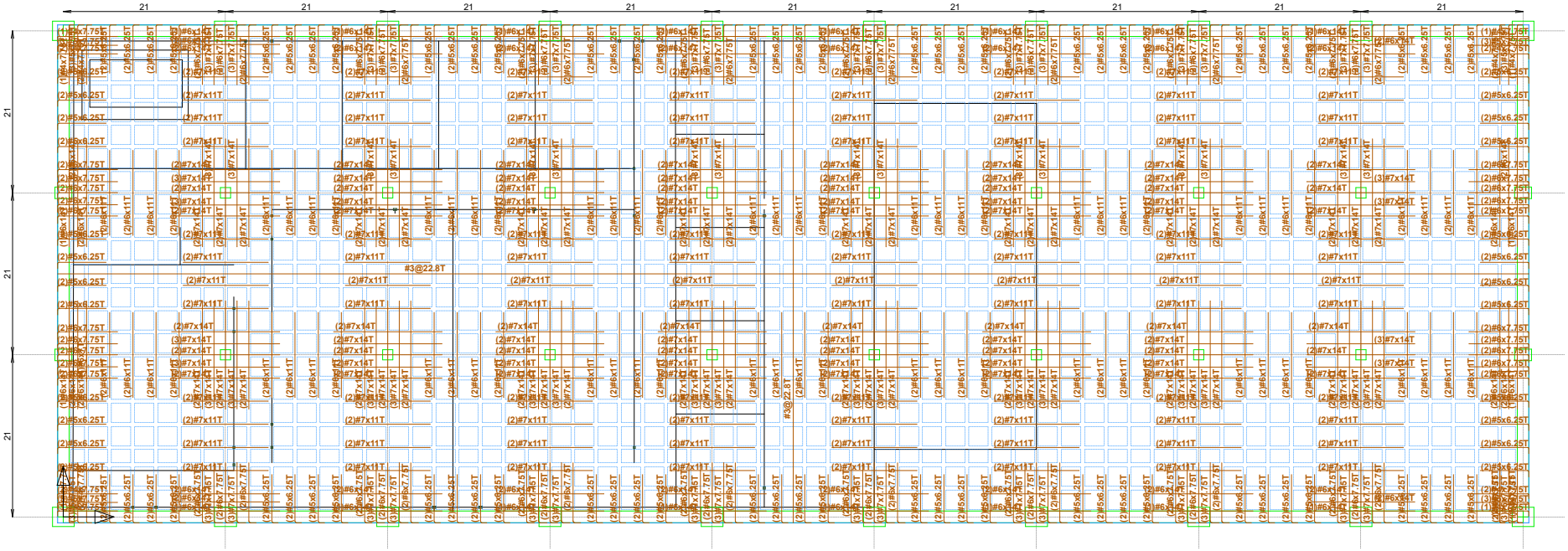
Design Status: Status Plan

Design Status: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Span Design Numbers; Span Design Status; Latitude DS Designs; Longitude DS Designs; DS Design Numbers; DS Design Status; PC Designs; PC Design Numbers; PC Design Status;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



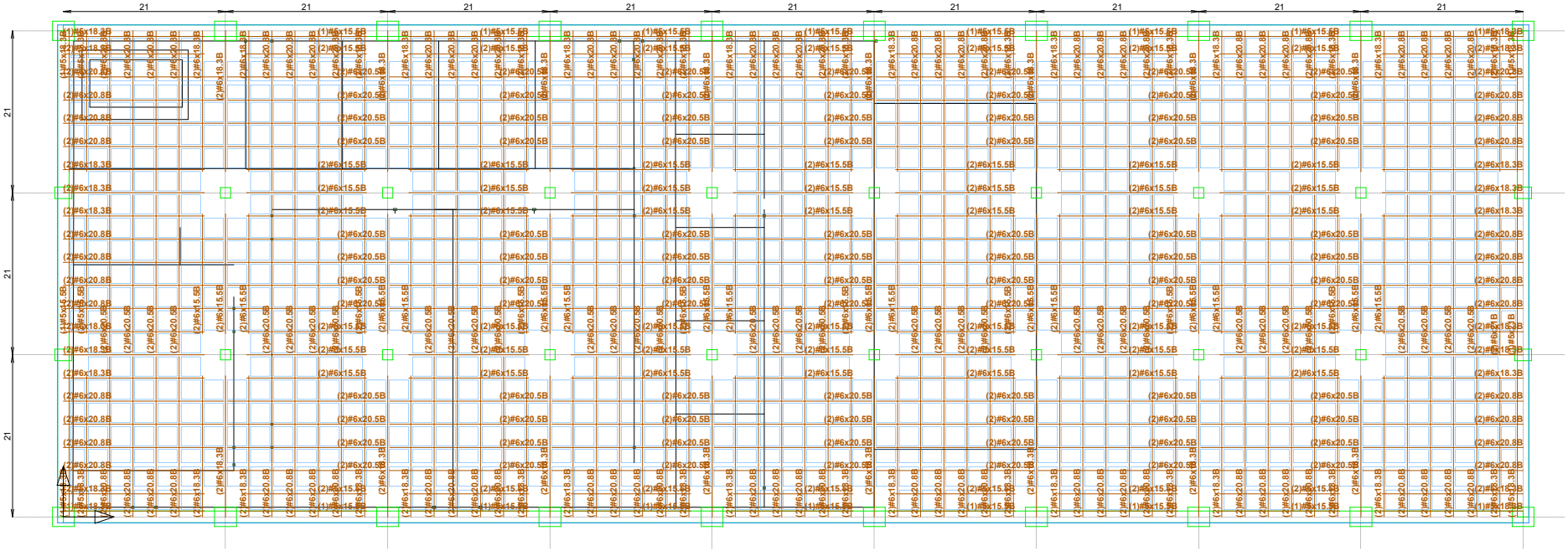
Design Status: Top Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Span Design Top Bars; Span Design Bar Descriptions; Latitude DS Designs; Longitude DS Designs; DS Design Top Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Top Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Latitude User Concentrated Reinf.; Longitude User Concentrated Reinf.; Latitude User Distributed Reinf.; Longitude User
Scale = 1:250



Design Status: Bottom Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Latitude Span Designs; Longitude Span Designs; Span Design Bottom Bars; Span Design Bar Descriptions; Latitude DS Designs; Longitude DS Designs; DS Design Bottom Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Bottom Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Latitude User Concentrated Reinf.; Longitude User Concentrated Reinf.; Latitude User Distributed Reinf.; Longitud
Scale = 1:250



Design Status: Shear Reinforcement Plan

Design Status: Latitude Span Designs; Longitude Span Designs; Span Design Shear Bars; Span Design Bar Descriptions; Latitude DS Designs; Longitude DS Designs; DS Design Numbers; DS Design Shear Bars; User Notes; User Lines; User Dimensions;
Drawing Import: User Notes; User Lines; User Dimensions;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Reinforcement: Latitude User Transverse Reinf.; Longitude User Transverse Reinf.;
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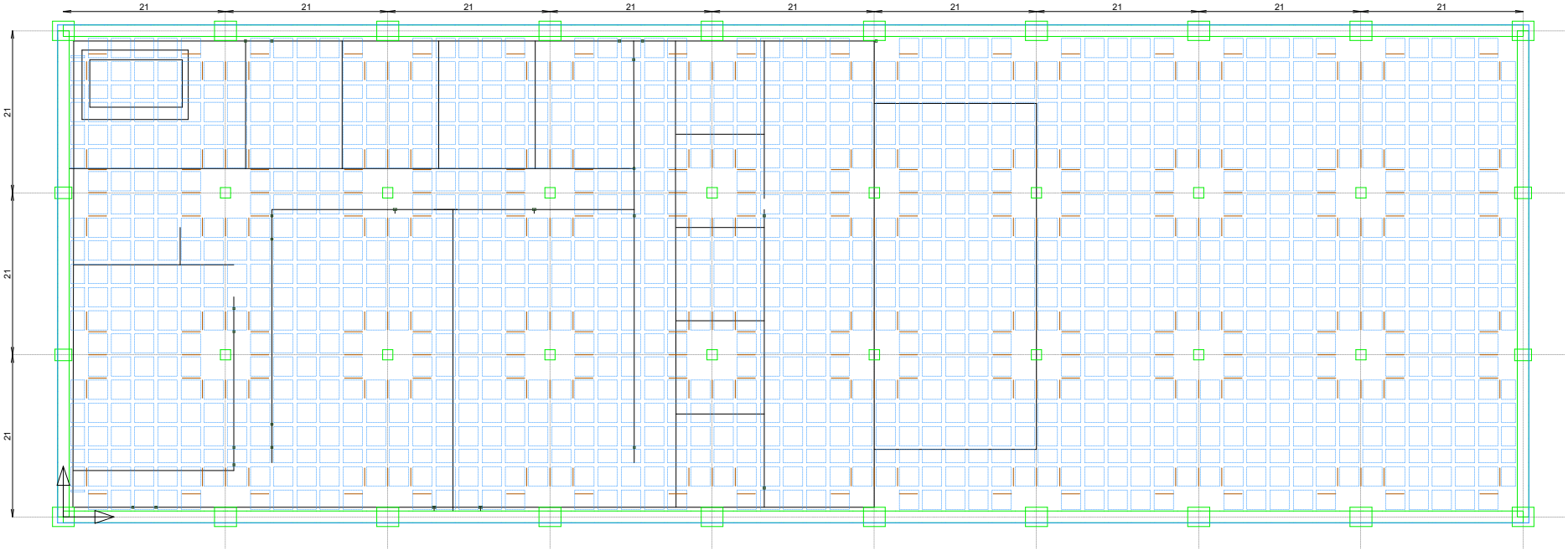
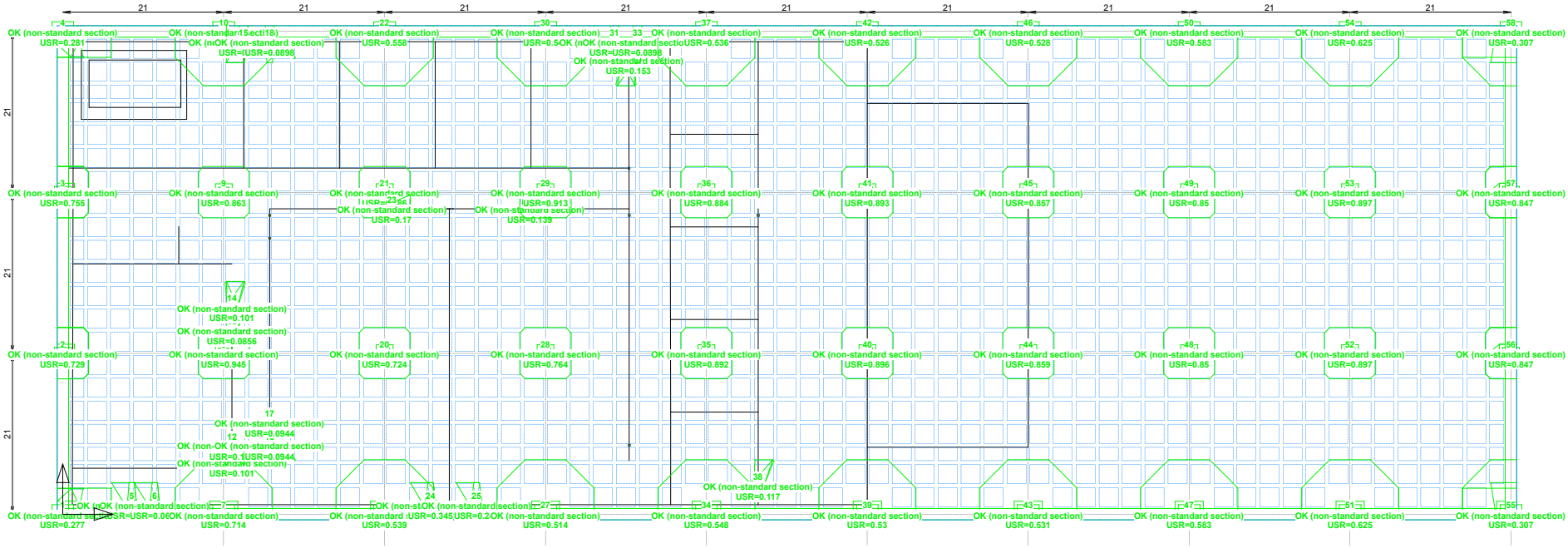


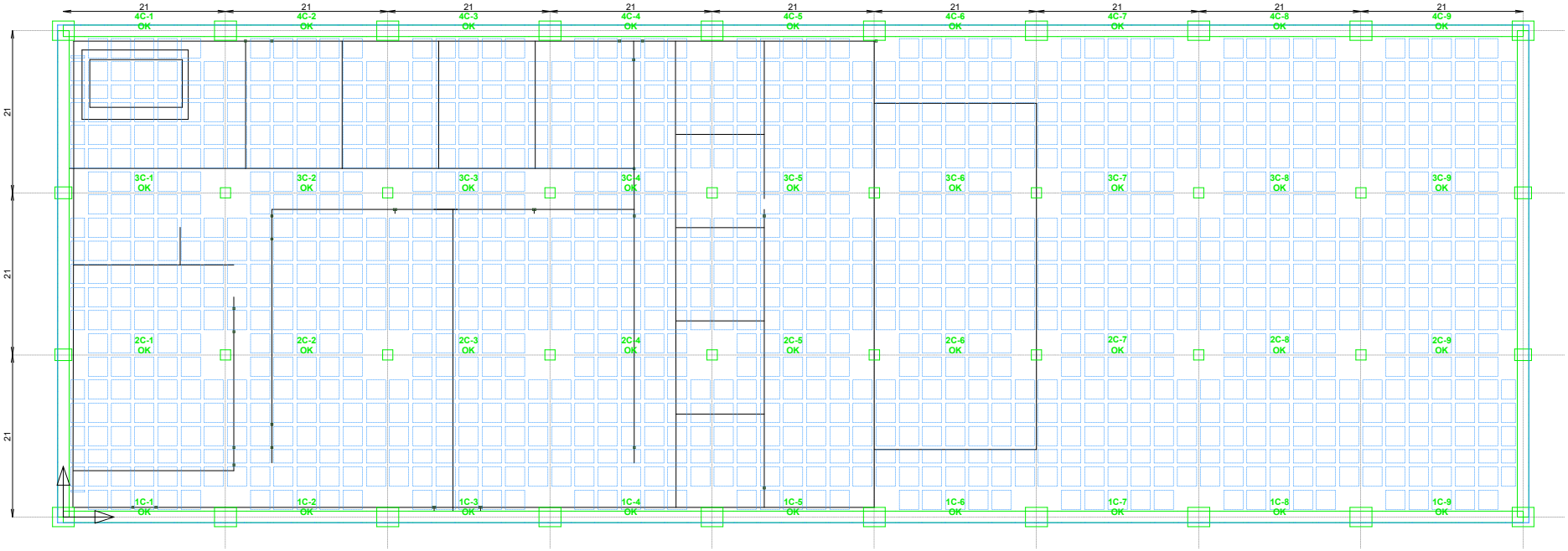
Design Status: Punching Shear Status Plan

Design Status: User Lines; User Notes; User Dimensions; PC Designs; PC Design Numbers; PC Design Status; PC Design Stress Ratios; PC Design Sections;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



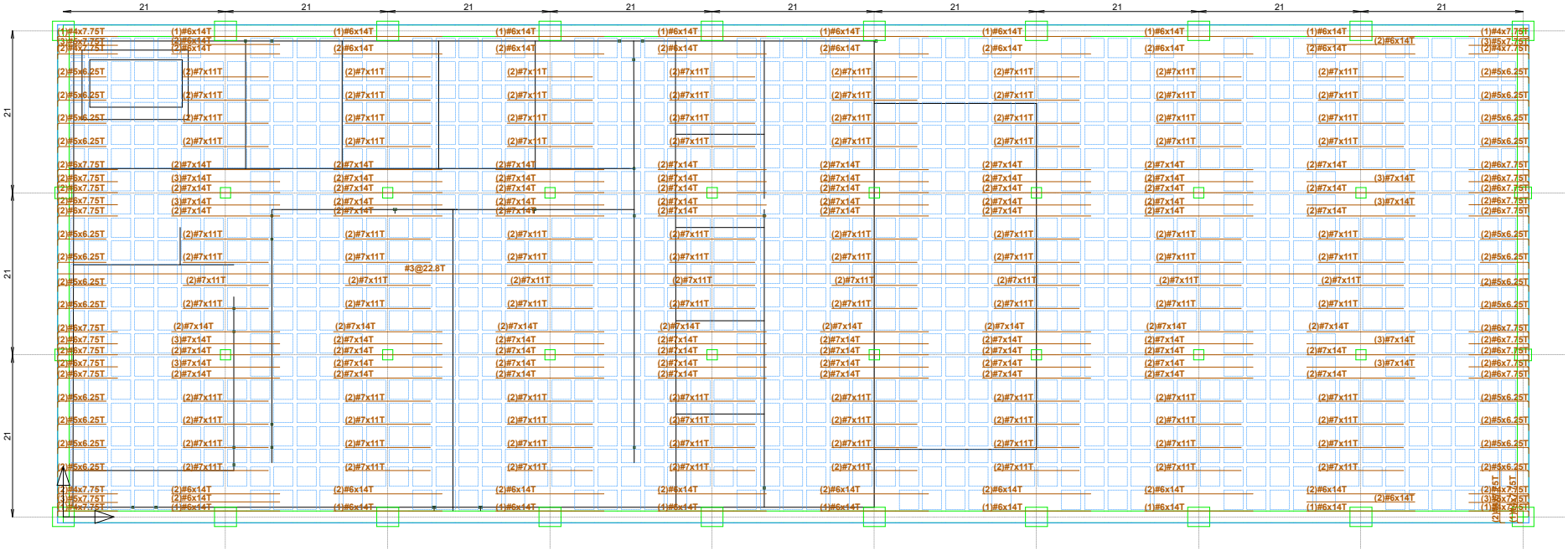
Design Status: Latitude Status Plan

Design Status: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Numbers; Span Design Status; Latitude DS Designs; DS Design Numbers; DS Design Status;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



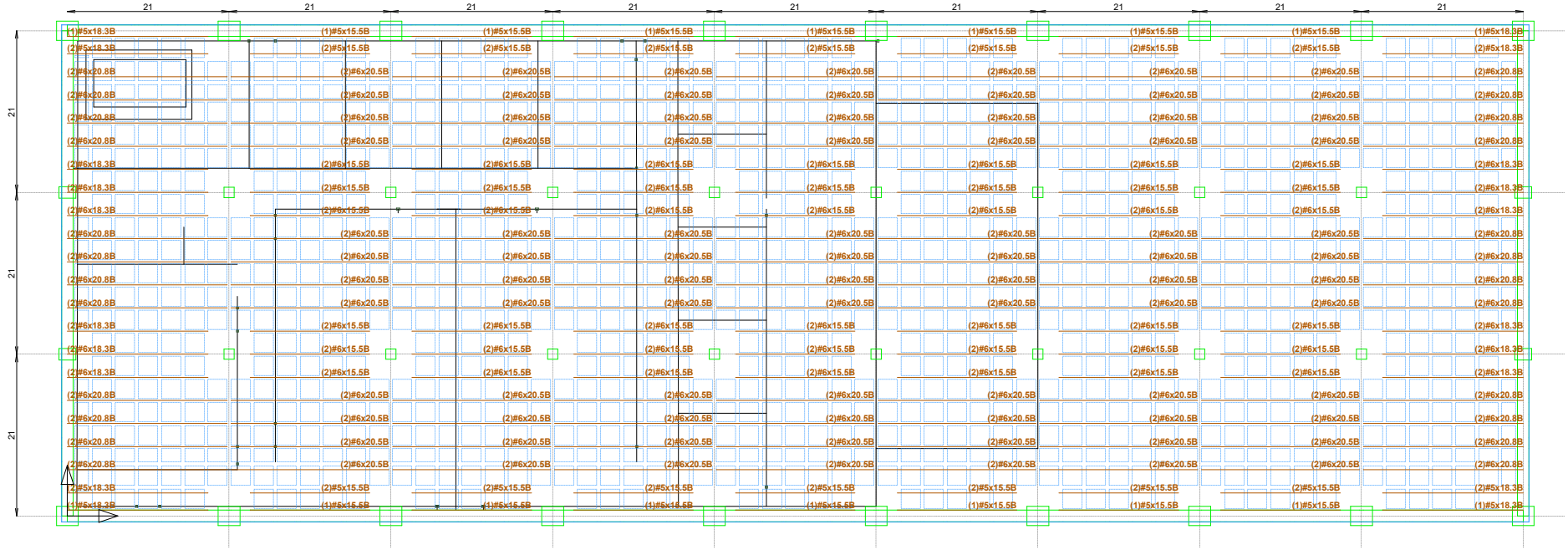
Design Status: Latitude Top Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Top Bars; Span Design Bar Descriptions; Latitude DS Designs; DS Design Top Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Top Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Latitude User Concentrated Reinf.; Latitude User Distributed Reinf.;
Scale = 1:250



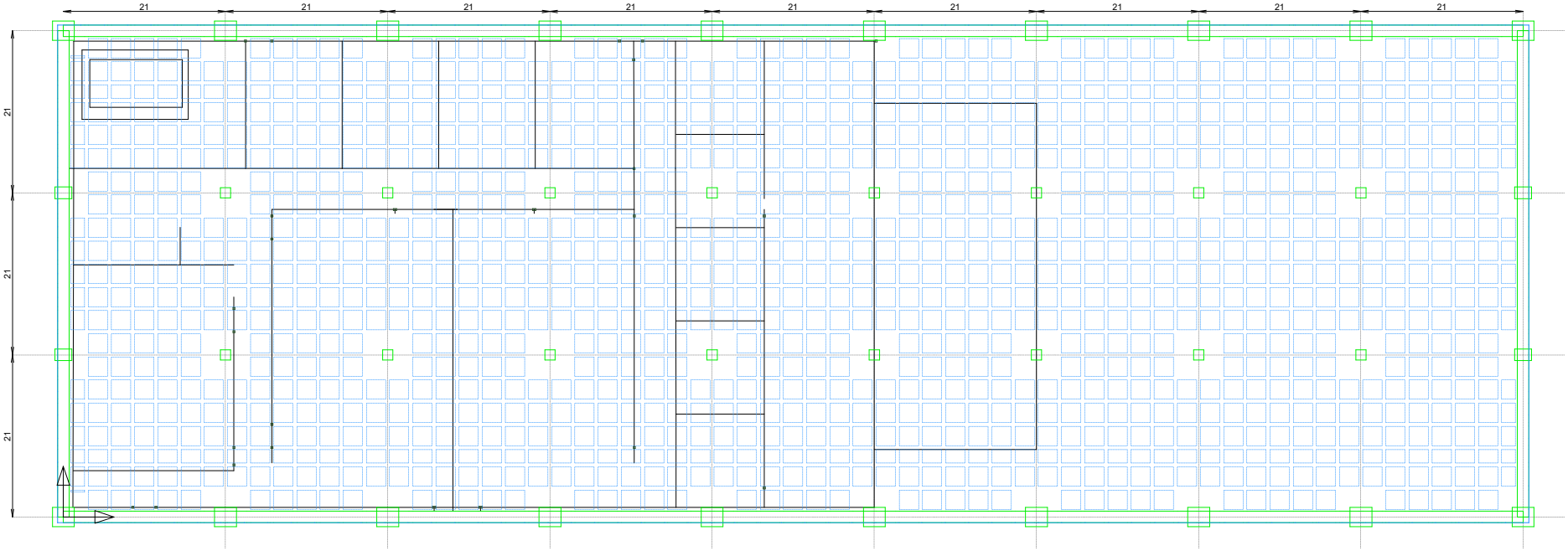
Design Status: Latitude Bottom Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Bottom Bars; Span Design Bar Descriptions; Latitude DS Designs; DS Design Bottom Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Bottom Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Latitude User Concentrated Reinf.; Latitude User Distributed Reinf.;
Scale = 1:250



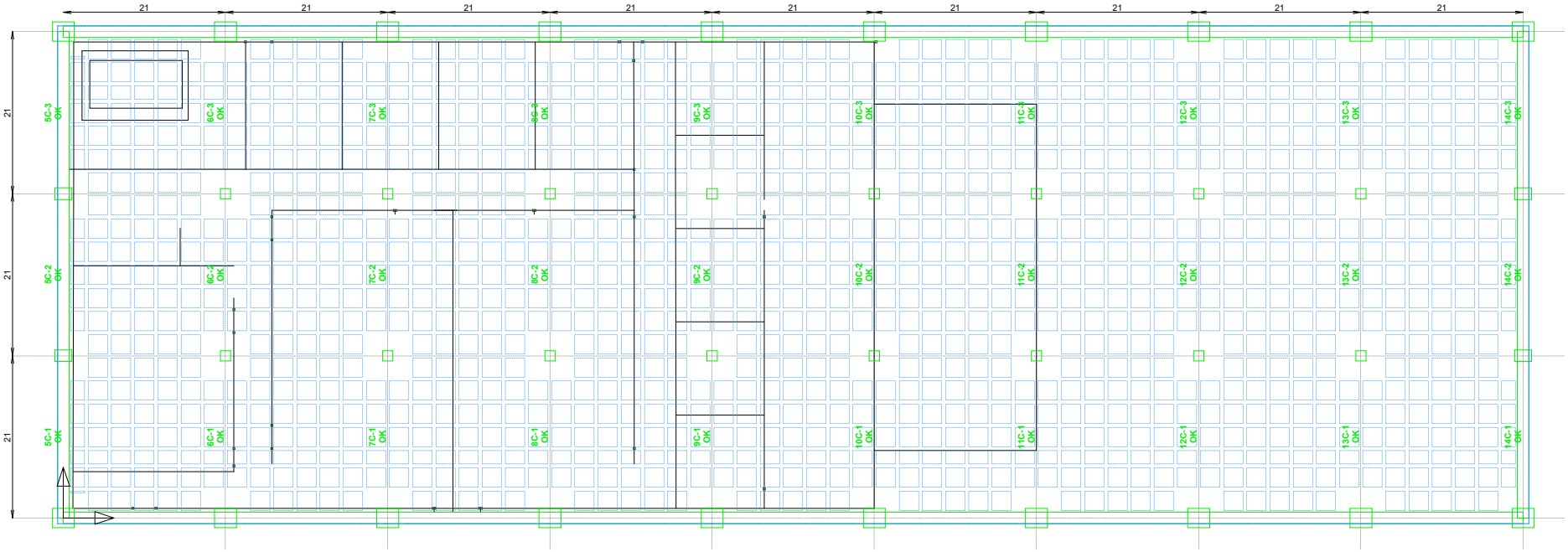
Design Status: Latitude Shear Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Latitude Span Designs; Span Design Shear Bars; Span Design Bar Descriptions; Latitude DS Designs; DS Design Numbers; DS Design Shear Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



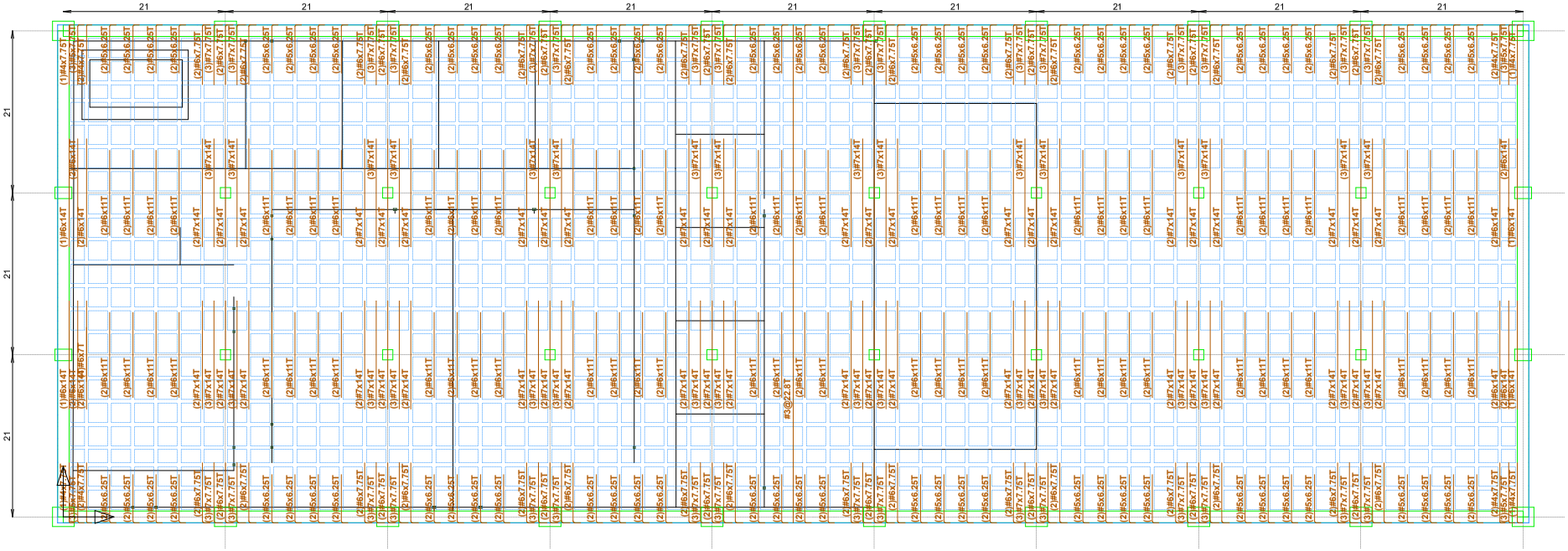
Design Status: Longitude Status Plan

Design Status: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Numbers; Span Design Status; Longitude DS Designs; DS Design Numbers; DS Design Status;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



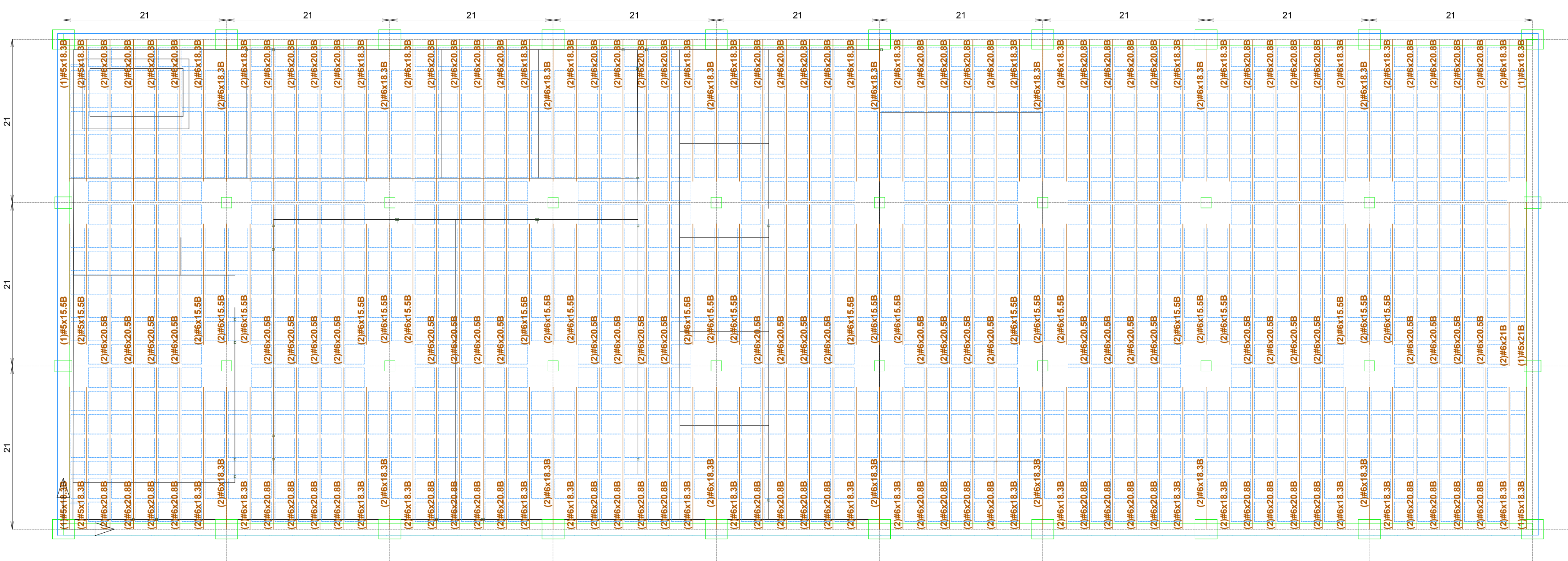
Design Status: Longitude Top Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Top Bars; Span Design Bar Descriptions; Longitude DS Designs; DS Design Top Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Top Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Longitude User Concentrated Reinf.; Longitude User Distributed Reinf.;
Scale = 1:250



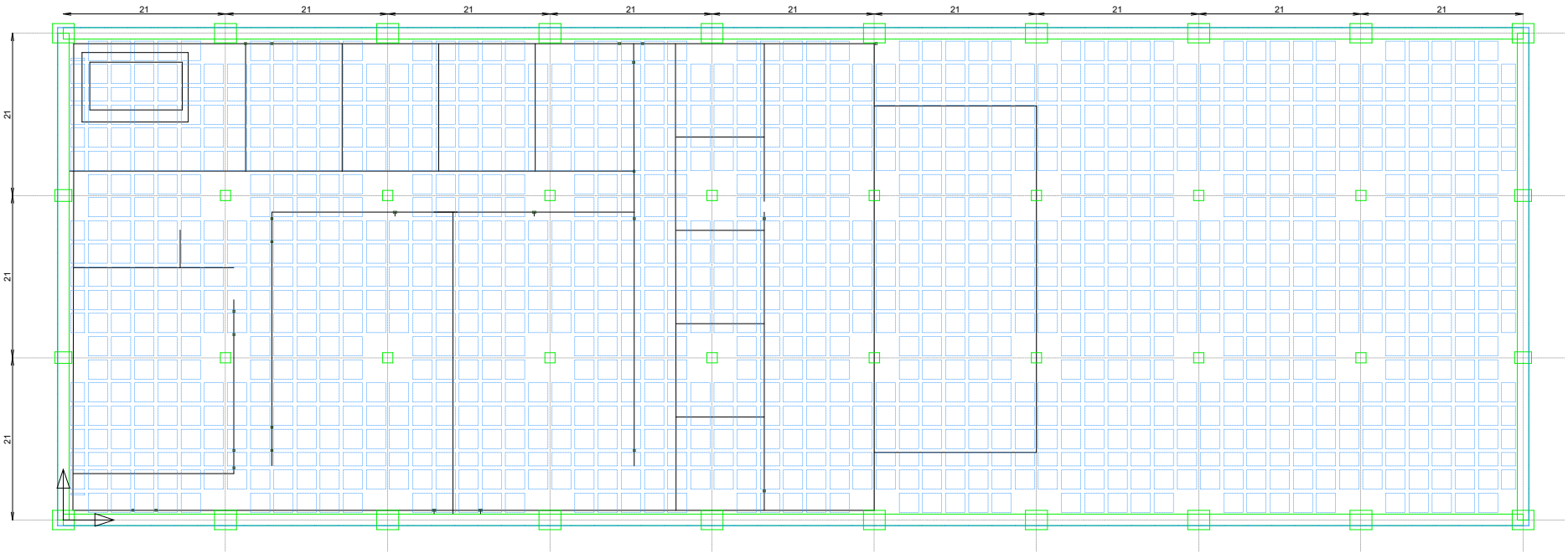
Design Status: Longitude Bottom Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Bottom Bars; Span Design Bar Descriptions; Longitude DS Designs; DS Design Bottom Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Reinforcement: Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Auto Face Concentrated Reinf.; Concentrated Reinf. Descriptions; Bottom Face Distributed Reinf.; Both Faces Distributed Reinf.; Auto Face Distributed Reinf.; Distributed Reinf. Descriptions; Longitude User Concentrated Reinf.; Longitude User Distributed Reinf.;
Scale = 1:250



Design Status: Longitude Shear Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Shear Bars; Span Design Bar Descriptions; Longitude DS Designs; DS Design Shear Bars;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250



LATERAL ANALYSIS

ATC Hazards by Location

Search Information

Coordinates:	34.602799, -118.084971
Elevation:	2563 ft
Timestamp:	2020-02-10T23:00:03.531Z
Hazard Type:	Seismic
Reference Document:	ASCE7-16
Risk Category:	IV
Site Class:	D-default

Basic Parameters

Name	Value	Description
S_S	1.835	MCE_R ground motion (period=0.2s)
S_1	0.764	MCE_R ground motion (period=1.0s)
S_{MS}	2.202	Site-modified spectral acceleration value
S_{M1}	* null	Site-modified spectral acceleration value
S_{DS}	1.468	Numeric seismic design value at 0.2s SA
S_{D1}	* null	Numeric seismic design value at 1.0s SA

$S_{M1} = F_v S_1$
$= 1.7(0.764) = 1.30$

$S_{D1} = 2/3(1.30) = 0.866$

* See Section 11.4.8

Additional Information

Name	Value	Description
SDC	* null	Seismic design category
F_a	1.2	Site amplification factor at 0.2s
F_v	* null	Site amplification factor at 1.0s
CR_S	0.883	Coefficient of risk (0.2s)
CR_1	0.876	Coefficient of risk (1.0s)
PGA	0.796	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.955	Site modified peak ground acceleration
T_L	12	Long-period transition period (s)

SsRT	2.247	Probabilistic risk-targeted ground motion (0.2s)
SsUH	2.544	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	1.835	Factored deterministic acceleration value (0.2s)
S1RT	0.953	Probabilistic risk-targeted ground motion (1.0s)
S1UH	1.088	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	0.764	Factored deterministic acceleration value (1.0s)
PGAd	0.796	Factored deterministic acceleration value (PGA)

* See Section 11.4.8

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are provided by the U.S. Geological Survey Seismic Design Web Services.

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WALL WEIGHTS - FOR LATERAL ANALYSIS:

SHEAR WALLS:

LENGTH (N/S): 44'-0" + 27'-3" + 33'-3"(2) + 61'-0"(2) = 259'-9"

LENGTH (E/W) = 81'-3" + 104'-0" = 185'-3"

height = 13'-0"

NON-BEARING WALLS:

LENGTH (N/S) = 12'-7" + 5'-6"(2) + 17'-0"(4) + 3'-0"(6) + 81'-0" = 190'-7"

LENGTH (E/W) = 20'-9"(2) + 46'-10" + 50'-0" + 11'-6"(4) + 3'-0"(2) = 190'-4"

height = 12'-0"

LATERAL LOAD:

PARTITION WALL WEIGHT = 110 PLF (38'-5") = 4.23 K

INT. PARTITION WALLS = 10 PSF (190'-7" + 190'-4")(6'-0") = 22.86 K

N/S = 12 PSF (259'-9")(13'-0"/2) = 20.26 K

E/W = 12 PSF (185'-3")(13'-0"/2) = 14.45 K

DIAPHRAGM = 12 PSF [103'-8"(44'-0") + 16'-6"(81'-5")] = 70.9 K

TOTAL N/S WEIGHT = 4.23 K + 22.86 K + 20.26 K + 70.9 K
= 118.3 K

TOTAL E/W WEIGHT = 4.23 K + 22.86 K + 14.45 K + 70.9 K
= 112.4 K

LATERAL ANALYSIS:

$V = C_S W$

$S_{DS} = 1.468$

$R = 6.5$

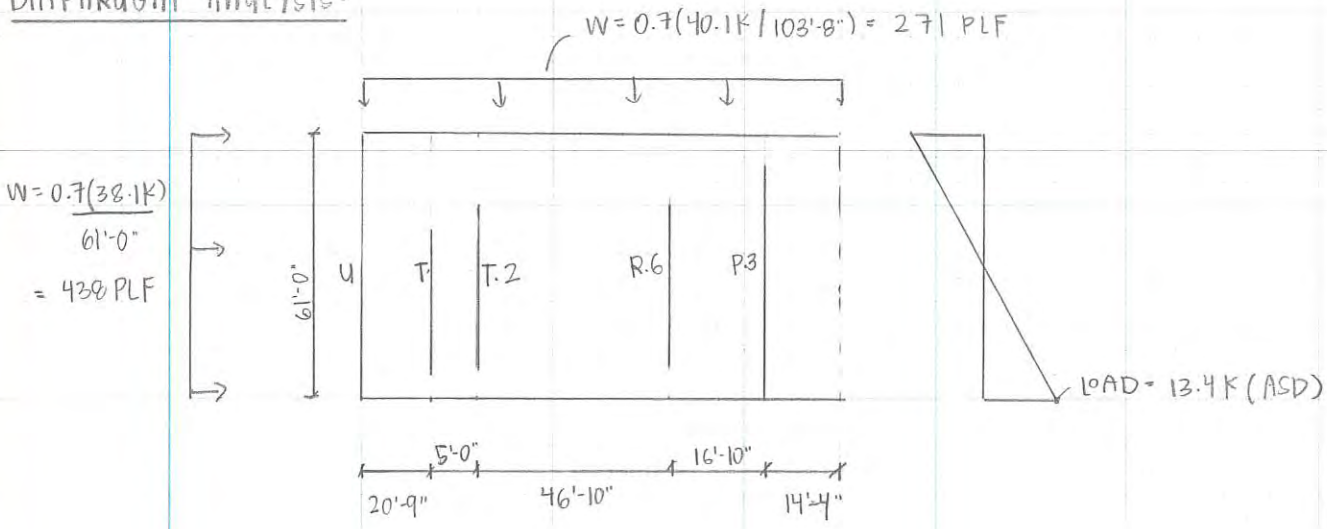
$I_E = 1.50$

$C_S = 1.468 / (6.5/1.5) = 0.339$

N/S: $V = 0.339(118.3K) = 40.1K$

E/W: $V = 0.339(112.4K) = 38.1K$

DIAPHRAGM ANALYSIS:



GRID U = 271 PLF (20'-9"/2) = 2.81 K → 4.02 K (LRFD)

GRID T = 271 PLF (20'-9"/2 + 5'-0"/2) = 3.49K → 4.98 K (LRFD)

GRID T.2 = 271 PLF (5'-0"/2 + 46'-10"/2) = 7.03 K → 10.03 K (LRFD)

GRID R.6 = 271 PLF (46'-10"/2 + 16'-10"/2) = 8.63 K → 12.3 K (LRFD)

GRID P.3 = 271 PLF (16'-10"/2 + 14'-4") = 6.16 K → 8.8 K (LRFD)

DIAPHRAGM:

WORST CASE LOADING = 8.63K / 33' = 261 PLF (ASD)
(GRID R.6)

FROM VERCO DECK Manual

20 GA. B DECK W/ 36/4 SCREW PATTERN (#12 SCREWS)

SIDELAPS W/ #10 SCREWS @ 24" O.C.

CAPACITY = 481 PLF > 261 PLF ∴ OK

ARW ENGINEERS
ASD SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
Version: April 17, 2017 Author: Wayne Young, E.I.T. Reviewed By: Troy M. Dye, S.E. 08-May-18

JOB TITLE: FAA Engineering Center JOB #: 19521
DESCRIPTION: Grid 8 DESIGNER: ANB

INPUT :

Weight of wall =	12.0	psf		Wind (W)	Seismic (E)		
Weight of roof =	12.0	psf	Shear at wall line (V_u) =	0	19050	lbs	Strength level
Roof Tributary length (bearing & uplift) =	8.0	ft	Shear at wall line (V_{ASD}) =	0	13335	lbs	ASD level
Height of wall =	13.0	ft					
Wind roof uplift (W) =	0	psf					
Blocked shear wall?	YES						
Field screws (in)	12	in					
Stud spacing	16	in					

Shear Panel	L		d		H/L		E & W Red.	0.6W v (plf)	0.7E v (plf)	Shear wall Type
#1	50.3	ft	47.3	ft	0.3	..OK	1.00	0	173	**Type 'A'**
#2	26.7	ft	23.7	ft	0.5	..OK	1.00	0	173	**Type 'A'**
#3		ft		ft						
#4		ft		ft						
#5		ft		ft						
#6		ft		ft						
#7		ft		ft						

OUTPUT :

LOAD COMBINATIONS AUTOMATICALLY USED IN Mr CALCULATION
0.6D + 0.7E 0.6D + 0.6W

L =	50.3	ft	Mr =	190.9	kips		W	EQ	
d =	47.3	ft				Mo =	0.0	283.2	kips
			E_v (ASD) =	2.6	kips	HDF =	-4.0	2.0	kips
						Rmax =	0.0	5.6	kips

(2) 362S162-54 Compression Posts @ end of wall

USE S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" S See attached CFS Designer

L =	26.7	ft	Mr =	53.8	kips		W	EQ	
d =	23.7	ft				Mo =	0.0	150.3	kips
			E_v (ASD)=	1.4	kips	HDF =	-2.3	4.1	kips
						Rmax =	0.0	5.6	kips

(2) 362S162-54 Studs POST ..OK

USE S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 26")

ARW ENGINEERS
SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
11-Aug-21
8:39 AM

JOB TITLE: FAA Engineering Center JOB #: 19521
DESCRIPTION: Grid 8 DESIGNER: ANB

Shear wall types

Nominal* W	Nominal* E	Allowable W	Allowable E	
1065	890	533	356	Type 'A' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 6 in. o.c. 16 gauge studs @ panel edge
1065	1330	533	532	Type 'B' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 4 in. o.c. 16 gauge studs @ panel edge
1065	1775	533	710	Type 'C' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 3 in. o.c. 16 gauge studs @ panel edge
1065	2190	533	876	Type 'D' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 2 in. o.c. 16 gauge studs @ panel edge

*Values from AISI S213 Table C2.1-1

Holdown types

Holdown	EQ A.B.	W A.B.	EQ Cap.	W Cap.	
3.97	3.61	2.55	2.55	3.61	S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" SSTB16 anchor (foundation wall height min 14")
6.13	4.04	2.96	2.96	4.04	S/HDU6-(12) #14 screws w/ (2) 16 ga.and 5/8" SSTB20 anchor (foundation wall height min 18")
9.99	4.47	3.33	3.325	4.47	S/HDU9-(18) #14 screws w/ (2) 16 ga.and 7/8" SSTB24 anchor (foundation wall height min 22")
9.68	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 2(
12.18	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor and heavy hex nut (foundatio

*NOTE: A.B. capacities are based on worst case scenario of A.B. at end wall. If holdown is located at corner or midwall revise A.B. capacities based on Simpson Manual C-CFS-15 page 109.

Compression Member Size

Max load = 6.35 kips (2) 362S162-54 Studs
(from Simpson CFS Designer Calc w/ cont. bracing from sheathing, 13'-0" max wall height)

ARW ENGINEERS
ASD SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
Version: April 17, 2017 Author: Wayne Young, E.I.T. 08-May-18
Reviewed By: Troy M. Dye, S.E.
JOB TITLE: FAA Engineering Center JOB #: 19521
DESCRIPTION: Grid 11 DESIGNER: ANB

INPUT :

Weight of wall =	12.0	psf		Wind (W)	Seismic (E)		
Weight of roof =	12.0	psf	Shear at wall line (V_u) =	0	19050	lbs	Strength level
Roof Tributary length (bearing & uplift) =	0.7	ft	Shear at wall line (V_{ASD}) =	0	13335	lbs	ASD level
Height of wall =	13.0	ft					
Wind roof uplift (W) =	0	psf					
Blocked shear wall?	YES						
Field screws (in)	12	in					
Stud spacing	16	in					

Shear Panel	L		d		H/L		E & W Red.	0.6W v (plf)	0.7E v (plf)	Shear wall Type
#1	98.0	ft	95.0	ft	0.1	..OK	1.00	0	136	**Type 'A'**
#2		ft		ft						
#3		ft		ft						
#4		ft		ft						
#5		ft		ft						
#6		ft		ft						
#7		ft		ft						

OUTPUT :

LOAD COMBINATIONS AUTOMATICALLY USED IN Mr CALCULATION
0.6D + 0.7E 0.6D + 0.6W

L = 98.0 ft Mr = 472.5 kips
d = 95.0 ft E_v (ASD) = 3.3 kips

	W	EQ	
Mo =	0.0	433.5	kips
HDF =	-5.0	-0.4	kips
Rmax =	0.0	4.4	kips

USE NO HOLDOWN REQUIRED

(2) 362S162-54 Compression Posts @ end of wall
See attached CFS Designer

ARW ENGINEERS
SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
11-Aug-21
8:39 AM
JOB TITLE: FAA Engineering Center JOB #: 19521
DESCRIPTION: Grid 11 DESIGNER: ANB

Shear wall types

Nominal* W	Nominal* E	Allowable W	Allowable E	
1065	890	533	356	Type 'A' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 6 in. o.c. 16 gauge studs @ panel edge
1065	1330	533	532	Type 'B' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 4 in. o.c. 16 gauge studs @ panel edge
1065	1775	533	710	Type 'C' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 3 in. o.c. 16 gauge studs @ panel edge
1065	2190	533	876	Type 'D' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 2 in. o.c. 16 gauge studs @ panel edge

*Values from AISI S213 Table C2.1-1

Holdown types

Holdown	EQ A.B.	W A.B.	EQ Cap.	W Cap.	
3.97	3.61	2.55	2.55	3.61	S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" SSTB16 anchor (foundation wall height min 14")
6.13	4.04	2.96	2.96	4.04	S/HDU6-(12) #14 screws w/ (2) 16 ga.and 5/8" SSTB20 anchor (foundation wall height min 18")
9.99	4.47	3.33	3.325	4.47	S/HDU9-(18) #14 screws w/ (2) 16 ga.and 7/8" SSTB24 anchor (foundation wall height min 22")
9.68	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 2E
12.18	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor and heavy hex nut (foundatio

*NOTE: A.B. capacities are based on worst case scenario of A.B. at end wall. If holdown is located at corner or midwall revise A.B. capacities based on Simpson Manual C-CFS-15 page 109.

Compression Member Size

Max load = 6.35 kips (2) 362S162-54 Studs
(from Simpson CFS Designer Calc w/ cont. bracing from sheathing, 13'-0" max wall height)

ARW ENGINEERS
ASD SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
Version: April 17, 2017 Author: Wayne Young, E.I.T.
JOB TITLE: FAA Engineering Center
DESCRIPTION: Grid U

08-May-18
Reviewed By: Troy M. Dye, S.E.
JOB #: 19521
DESIGNER: ANB

INPUT :

Weight of wall =	12.0	psf
Weight of roof =	12.0	psf
Roof Tributary length (bearing & uplift) =	10.5	ft
Height of wall =	13.0	ft
Wind roof uplift (W) =	0	psf
Blocked shear wall?	YES	
Field screws (in)	12	in
Stud spacing	16	in

	Wind (W)	Seismic (E)		
Shear at wall line (V_u) =	0	4020	lbs	Strength level
Shear at wall line (V_{ASD}) =	0	2814	lbs	ASD level

Shear Panel	L		d		H/L		E & W Red.	0.6W v (plf)	0.7E v (plf)	Shear wall Type
#1	44.0	ft	41.0	ft	0.3	..OK	1.00	0	64	**Type 'A'**
#2		ft		ft						
#3		ft		ft						
#4		ft		ft						
#5		ft		ft						
#6		ft		ft						
#7		ft		ft						

OUTPUT :

LOAD COMBINATIONS AUTOMATICALLY USED IN Mr CALCULATION
0.6D + 0.7E 0.6D + 0.6W

L = 44.0 ft
d = 41.0 ft

Mr = 163.8 kips

E_v (ASD) = 2.6 kips

	W	EQ	
Mo =	0.0	91.5	kips
HDF =	-4.0	-1.8	kips
Rmax =	0.0	2.1	kips

USE NO HOLDOWN REQUIRED

(2) 362S162-54 Compression Posts @ end of wall
See attached CFS Designer

ARW ENGINEERS
SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
JOB TITLE: FAA Engineering Center
DESCRIPTION: Grid U

11-Aug-21
8:39 AM
JOB #: 19521
DESIGNER: ANB

Shear wall types

Nominal* W	Nominal* E	Allowable W	Allowable E	
1065	890	533	356	Type 'A' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 6 in. o.c. 16 gauge studs @ panel edge
1065	1330	533	532	Type 'B' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 4 in. o.c. 16 gauge studs @ panel edge
1065	1775	533	710	Type 'C' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 3 in. o.c. 16 gauge studs @ panel edge
1065	2190	533	876	Type 'D' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 2 in. o.c. 16 gauge studs @ panel edge

*Values from AISI S213 Table C2.1-1

Holdown types

Holdown	EQ A.B.	W A.B.	EQ Cap.	W Cap.	
3.97	3.61	2.55	2.55	3.61	S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" SSTB16 anchor (foundation wall height min 14")
6.13	4.04	2.96	2.96	4.04	S/HDU6-(12) #14 screws w/ (2) 16 ga.and 5/8" SSTB20 anchor (foundation wall height min 18")
9.99	4.47	3.33	3.325	4.47	S/HDU9-(18) #14 screws w/ (2) 16 ga.and 7/8" SSTB24 anchor (foundation wall height min 22")
9.68	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 2
12.18	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor and heavy hex nut (foundatio

*NOTE: A.B. capacities are based on worst case scenario of A.B. at end wall. If holdown is located at corner or midwall revise A.B. capacities based on Simpson Manual C-CFS-15 page 109.

Compression Member Size

Max load = 6.35 kips (2) 362S162-54 Studs
(from Simpson CFS Designer Calc w/ cont. bracing from sheathing, 13'-0" max wall height)

ARW ENGINEERS
ASD SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
Version: April 17, 2017 Author: Wayne Young, E.I.T. Reviewed By: Troy M. Dye, S.E. 08-May-18

JOB TITLE: FAA Engineering Center JOB #: 19521
DESCRIPTION: Grid T DESIGNER: ANB

INPUT :

				Wind (W)	Seismic (E)		
Weight of wall =	12.0	psf					
Weight of roof =	12.0	psf	Shear at wall line (V_u) =	0	4980	lbs	Strength level
Roof Tributary length (bearing & uplift) =	13.0	ft	Shear at wall line (V_{ASD}) =	0	3486	lbs	ASD level
Height of wall =	13.0	ft					
Wind roof uplift (W) =	0	psf					
Blocked shear wall?	YES						
Field screws (in)	12	in					
Stud spacing	16	in					

Shear Panel	L		d		H/L		E & W Red.	0.6W v (plf)	0.7E v (plf)	Shear wall Type
#1	22.0	ft	19.0	ft	0.6	..OK	1.00	0	158	**Type 'A'**
#2		ft		ft						
#3		ft		ft						
#4		ft		ft						
#5		ft		ft						
#6		ft		ft						
#7		ft		ft						

OUTPUT :

LOAD COMBINATIONS AUTOMATICALLY USED IN Mr CALCULATION
0.6D + 0.7E 0.6D + 0.6W

L =	22.0	ft	Mr =	45.3	kips		W	EQ	
d =	19.0	ft				Mo =	0.0	113.3	kips
			E_v (ASD) =	1.4	kips	HDF =	-2.4	3.579	kips
						Rmax =	0.0	5.15	kips

(2) 362S162-54 Compression Posts @ end of wall see CFS designer

USE S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 26")

ARW ENGINEERS
SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015 11-Aug-21 8:39 AM

JOB TITLE: FAA Engineering Center JOB #: 19521
DESCRIPTION: Grid T DESIGNER: ANB

Shear wall types

Nominal* W	Nominal* E	Allowable W	Allowable E	
1065	890	533	356	Type 'A' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 6 in. o.c. 16 gauge studs @ panel edge
1065	1330	533	532	Type 'B' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 4 in. o.c. 16 gauge studs @ panel edge
1065	1775	533	710	Type 'C' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 3 in. o.c. 16 gauge studs @ panel edge
1065	2190	533	876	Type 'D' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 2 in. o.c. 16 gauge studs @ panel edge

*Values from AISI S213 Table C2.1-1

Holdown types

Holdown	EQ A.B.	W A.B.	EQ Cap.	W Cap.	
3.97	3.61	2.55	2.55	3.61	S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" SSTB16 anchor (foundation wall height min 14")
6.13	4.04	2.96	2.96	4.04	S/HDU6-(12) #14 screws w/ (2) 16 ga.and 5/8" SSTB20 anchor (foundation wall height min 18")
9.99	4.47	3.33	3.325	4.47	S/HDU9-(18) #14 screws w/ (2) 16 ga.and 7/8" SSTB24 anchor (foundation wall height min 22")
9.68	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 2(
12.18	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor and heavy hex nut (foundatio

*NOTE: A.B. capacities are based on worst case scenario of A.B. at end wall. If holdown is located at corner or midwall revise A.B. capacities based on Simpson Manual C-CFS-15 page 109.

Compression Member Size

Max load = 6.35 kips (2) 362S162-54 Studs
(from Simpson CFS Designer Calc w/ cont. bracing from sheathing, 13'-0" max wall height)

ARW ENGINEERS 08-May-18

ASD SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015

Version: April 17, 2017 Author: Wayne Young, E.I.T. Reviewed By: Troy M. Dye, S.E.

JOB TITLE: FAA Engineering Center JOB #: 19521

DESCRIPTION: Grid T.2 DESIGNER: ANB

INPUT :

Weight of wall =	12.0	psf		Wind (W)	Seismic (E)		
Weight of roof =	12.0	psf	Shear at wall line (V_u) =	0	10030	lbs	Strength level
Roof Tributary length (bearing & uplift) =	14.3	ft	Shear at wall line (V_{ASD}) =	0	7021	lbs	ASD level
Height of wall =	13.0	ft					
Wind roof uplift (W) =	0	psf					
Blocked shear wall?	YES						
Field screws (in)	12	in					
Stud spacing	16	in					

Shear Panel	L		d		H/L		E & W Red.	0.6W v (plf)	0.7E v (plf)	Shear wall Type
#1	33.3	ft	30.3	ft	0.4	..OK	1.00	0	211	**Type 'A'**
#2		ft		ft						
#3		ft		ft						
#4		ft		ft						
#5		ft		ft						
#6		ft		ft						
#7		ft		ft						

OUTPUT :

LOAD COMBINATIONS AUTOMATICALLY USED IN Mr CALCULATION

0.6D + 0.7E 0.6D + 0.6W

L =	33.3	ft	Mr =	108.5	kips		W	EQ	
d =	30.3	ft				Mo =	0.0	228.2	kips
			E_v (ASD) =	2.2	kips	HDF =	-3.6	3.959	kips
						Rmax =	0.0	6.9	kips

(3) 362S162-54 Compression Posts @ end of wall See attached CFS designer

USE S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 26")

ARW ENGINEERS 11-Aug-21 8:39 AM

SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015

JOB TITLE: FAA Engineering Center JOB #: 19521

DESCRIPTION: Grid T.2 DESIGNER: ANB

Shear wall types

Nominal* W	Nominal* E	Allowable W	Allowable E	
1065	890	533	356	Type 'A' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 6 in. o.c. 16 gauge studs @ panel edge
1065	1330	533	532	Type 'B' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 4 in. o.c. 16 gauge studs @ panel edge
1065	1775	533	710	Type 'C' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 3 in. o.c. 16 gauge studs @ panel edge
1065	2190	533	876	Type 'D' shear wall 15/32 in. plywood sheathing w/ #8 screws @ 2 in. o.c. 16 gauge studs @ panel edge

*Values from AISI S213 Table C2.1-1

Holdown types

Holdown	EQ A.B.	W A.B.	EQ Cap.	W Cap.	
3.97	3.61	2.55	2.55	3.61	S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" SSTB16 anchor (foundation wall height min 14")
6.13	4.04	2.96	2.96	4.04	S/HDU6-(12) #14 screws w/ (2) 16 ga.and 5/8" SSTB20 anchor (foundation wall height min 18")
9.99	4.47	3.33	3.325	4.47	S/HDU9-(18) #14 screws w/ (2) 16 ga.and 7/8" SSTB24 anchor (foundation wall height min 22")
9.68	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 2E
12.18	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor and heavy hex nut (foundatio

*NOTE: A.B. capacities are based on worst case scenario of A.B. at end wall. If holdown is located at corner or midwall revise A.B. capacities based on Simpson Manual C-CFS-15 page 109.

Compression Member Size

Max load = 9.90 kips (3) 362S162-54 Studs

(from Simpson CFS Designer Calc w/ cont. bracing from sheathing, 13'-0" max wall height)

ARW ENGINEERS
ASD SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
Version: April 17, 2017 Author: Wayne Young, E.I.T.
JOB TITLE: FAA Engineering Center
DESCRIPTION: Grid R.6

08-May-18
Reviewed By: Troy M. Dye, S.E.
JOB #: 19521
DESIGNER: ANB

INPUT :

Weight of wall =	12.0	psf		Wind (W)	Seismic (E)		
Weight of roof =	12.0	psf	Shear at wall line (V_u) =	0	12300	lbs	Strength level
Roof Tributary length (bearing & uplift) =	20.17	ft	Shear at wall line (V_{ASD}) =	0	8610	lbs	ASD level
Height of wall =	13.0	ft					
Wind roof uplift (W) =	0	psf					
Blocked shear wall?	YES						
Field screws (in)	12	in					
Stud spacing	16	in					

Shear Panel	L		d		H/L		E & W Red.	0.6W v (plf)	0.7E v (plf)	Shear wall Type
#1	33.3	ft	30.3	ft	0.4	..OK	1.00	0	178	**Type 'A'**
#2	15.0	ft	12.0	ft	0.9	..OK	1.00	0	178	**Type 'A'**
#3		ft		ft						
#4		ft		ft						
#5		ft		ft						
#6		ft		ft						
#7		ft		ft						

OUTPUT :

LOAD COMBINATIONS AUTOMATICALLY USED IN Mr CALCULATION
0.6D + 0.7E 0.6D + 0.6W

L = 33.3 ft Mr = 132.0 kips
d = 30.3 ft

	W	EQ	
Mo =	0.0	192.9	kips
HDF =	-4.4	2.0	kips
Rmax =	0.0	5.8	kips

E_v (ASD) = 2.7 kips

(2) 362S162-54 Compression Posts @ end of wall See attached CFS designer

USE S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" SSTB16 anchor (foundation wall height min 14")

L = 15.0 ft Mr = 26.9 kips
d = 12.0 ft

	W	EQ	
Mo =	0.0	87.0	kips
HDF =	-2.2	5.0	kips
Rmax =	0.0	5.8	kips

E_v (ASD)= 1.2 kips

(2) 362S162-54 Studs POST ..OK

USE S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 26")

ARW ENGINEERS
SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015
JOB TITLE: FAA Engineering Center
DESCRIPTION: Grid R.6

09-Feb-22
4:57 PM
JOB #: 19521
DESIGNER: ANB

Shear wall types

Nominal* W	Nominal* E	Allowable W	Allowable E		
1065	890	533	356	Type 'A'	shear wall 15/32 in. plywood sheathing w/ #8 screws @ 6 in. o.c. 16 gauge studs @ panel edge
1065	1330	533	532	Type 'B'	shear wall 15/32 in. plywood sheathing w/ #8 screws @ 4 in. o.c. 16 gauge studs @ panel edge
1065	1775	533	710	Type 'C'	shear wall 15/32 in. plywood sheathing w/ #8 screws @ 3 in. o.c. 16 gauge studs @ panel edge
1065	2190	533	876	Type 'D'	shear wall 15/32 in. plywood sheathing w/ #8 screws @ 2 in. o.c. 16 gauge studs @ panel edge

*Values from AISI S213 Table C2.1-1

Holdown types

Holdown	EQ A.B.	W A.B.	EQ Cap.	W Cap.	
3.97	3.61	2.55	2.55	3.61	S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" SSTB16 anchor (foundation wall height min 14")
6.13	4.04	2.96	2.96	4.04	S/HDU6-(12) #14 screws w/ (2) 16 ga.and 5/8" SSTB20 anchor (foundation wall height min 18")
9.99	4.47	3.33	3.325	4.47	S/HDU9-(18) #14 screws w/ (2) 16 ga.and 7/8" SSTB24 anchor (foundation wall height min 22")
9.68	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 26
12.18	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor and heavy hex nut (foundatio

*NOTE: A.B. capacities are based on worst case scenario of A.B. at end wall. If holdown is located at corner or midwall revise A.B. capacities based on Simpson Manual C-CFS-15 page 109.

Compression Member Size

Max load = 6.35 kips (2) 362S162-54 Studs
(from Simpson CFS Designer Calc w/ cont. bracing from sheathing, 13'-0" max wall height)

ARW ENGINEERS

ASD SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015

Version: April 17, 2017 Author: Wayne Young, E.I.T. Reviewed By: Troy M. Dye, S.E 08-May-18

JOB TITLE: FAA Engineering Center JOB #: 19521

DESCRIPTION: Grid P.3 DESIGNER: ANB

INPUT :

				Wind (W)	Seismic (E)		
Weight of wall =	12.0	psf					
Weight of roof =	12.0	psf	Shear at wall line (V_u) =	0	8800	lbs	Strength level
Roof Tributary length (bearing & uplift) =	15.5	ft	Shear at wall line (V_{ASD}) =	0	6160	lbs	ASD level
Height of wall =	13.0	ft					
Wind roof uplift (W) =	0	psf					
Blocked shear wall?	YES						
Field screws (in)	12	in					
Stud spacing	16	in					

Shear Panel	L		d		H/L		E & W Red.	0.6W v (plf)	0.7E v (plf)	Shear wall Type
#1	39.2	ft	36.2	ft	0.3	..OK	1.00	0	157	**Type 'A'**
#2		ft		ft						
#3		ft		ft						
#4		ft		ft						
#5		ft		ft						
#6		ft		ft						
#7		ft		ft						

OUTPUT :

LOAD COMBINATIONS AUTOMATICALLY USED IN Mr CALCULATION

0.6D + 0.7E 0.6D + 0.6W

L =	39.2	ft	Mr =	157.6	kips		W	EQ	
d =	36.2	ft				Mo =	0.0	200.3	kips
			E_v (ASD) =	2.8	kips	HDF =	-4.4	1.2	kips
						Rmax =	0.0	5.1	kips

(2) 362S162-54 Compression Posts @ end of wall

USE S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" S See attached CFS Designer

ARW ENGINEERS

SEGMENTED SHEAR WALL CALCULATIONS PER IBC 2015 10-Feb-22 8:37 AM

JOB TITLE: FAA Engineering Center JOB #: 19521

DESCRIPTION: Grid P.3 DESIGNER: ANB

Shear wall types

Nominal* W	Nominal* E	Allowable W	Allowable E		
1065	890	533	356	Type 'A'	shear wall 15/32 in. plywood sheathing w/ #8 screws @ 6 in. o.c. 16 gauge studs @ panel edge
1065	1330	533	532	Type 'B'	shear wall 15/32 in. plywood sheathing w/ #8 screws @ 4 in. o.c. 16 gauge studs @ panel edge
1065	1775	533	710	Type 'C'	shear wall 15/32 in. plywood sheathing w/ #8 screws @ 3 in. o.c. 16 gauge studs @ panel edge
1065	2190	533	876	Type 'D'	shear wall 15/32 in. plywood sheathing w/ #8 screws @ 2 in. o.c. 16 gauge studs @ panel edge

*Values from AISI S213 Table C2.1-1

Holdown types

Holdown	EQ A.B.	W A.B.	EQ Cap.	W Cap.	
3.97	3.61	2.55	2.55	3.61	S/HDU4-(6) #14 screws w/ (2) 16 ga and 5/8" SSTB16 anchor (foundation wall height min 14")
6.13	4.04	2.96	2.96	4.04	S/HDU6-(12) #14 screws w/ (2) 16 ga.and 5/8" SSTB20 anchor (foundation wall height min 18")
9.99	4.47	3.33	3.325	4.47	S/HDU9-(18) #14 screws w/ (2) 16 ga.and 7/8" SSTB24 anchor (foundation wall height min 22")
9.68	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor (foundation wall height min 2(
12.18	7.62	6.4	7.315	7.615	S/HDU11-(27) #14 screws w/ (2) 16 ga. and 7/8" SSTB28 anchor and heavy hex nut (foundatio

*NOTE: A.B. capacities are based on worst case scenario of A.B. at end wall. If holdown is located at corner or midwall revise A.B. capacities based on Simpson Manual C-CFS-15 page 109.

Compression Member Size

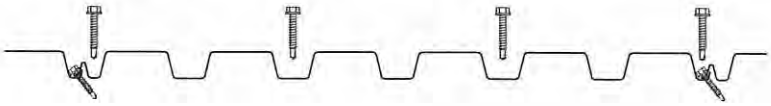
Max load = 6.35 kips (2) 362S162-54 Studs

(from Simpson CFS Designer Calc w/ cont. bracing from sheathing, 13'-0" max wall height)

Type HSB®-36-SS

FOR REFERENCE ONLY 5329

- **36/4 Screw Pattern at Supports**
  #12 or #14 SDI Recognized Screws
  at Supports 0.0385" and thicker
- **Sidelaps Connected with #10 Screws**



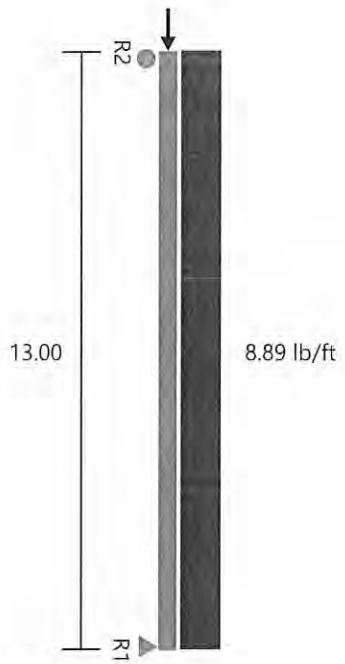
Allowable Diaphragm Shear Strength, q (plf) and Flexibility Factors, F ((in./lb)x10^6)

DECK GAGE	SIDELAP ATTACHMENT		SPAN (ft-in.) 2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"
22	#10 @ 24"	q	394	355	290	277	235	233	203	206	185
		F	-24.9+542R	-13.3+361R	-6.2+270R	-2.9+216R	0.5+179R	1.8+154R	4.1+134R	4.6+119R	6.2+107R
	#10 @ 18"	q	458	355	334	314	269	263	258	232	231
		F	-26.1+543R	-13.3+361R	-7.5+271R	-4.1+216R	-0.8+180R	0.7+154R	1.9+135R	3.6+120R	4.2+108R
	#10 @ 12"	q	458	405	374	348	329	315	305	296	289
		F	-26.1+543R	-14.4+361R	-8.4+271R	-4.9+217R	-2.4+180R	-0.7+155R	0.6+135R	1.6+120R	2.4+108R
	#10 @ 8"	q	510	485	443	434	406	405	386	387	373
		F	-26.8+543R	-15.5+362R	-9.5+271R	-6.2+217R	-3.7+181R	-2.2+155R	-0.8+136R	0+120R	0.9+108R
	#10 @ 6"	q	551	517	498	481	468	459	452	447	442
		F	-27.2+543R	-15.9+362R	-10.2+271R	-6.8+217R	-4.5+181R	-2.8+155R	-1.6+136R	-0.7+121R	0.1+109R
	#10 @ 4"	q	609	588	575	565	557	552	547	544	541
		F	-27.8+543R	-16.5+362R	-10.9+272R	-7.5+217R	-5.3+181R	-3.6+155R	-2.4+136R	-1.5+121R	-0.7+109R
20	#10 @ 24"	q	481	438	359	346	295	295	258	262	236
		F	-13.7+343R	-6.3+228R	-1.3+170R	0.7+136R	3.3+113R	4+97R	5.7+84R	6+75R	7.2+67R
	#10 @ 18"	q	563	438	415	393	337	331	326	294	294
		F	-14.8+343R	-6.3+228R	-2.5+171R	-0.3+137R	2.1+114R	3+97R	3.7+85R	5+75R	5.4+68R
	#10 @ 12"	q	563	502	466	436	414	398	386	376	368
		F	-14.8+343R	-7.2+229R	-3.4+171R	-1+137R	0.6+114R	1.7+98R	2.6+85R	3.2+76R	3.8+68R
	#10 @ 8"	q	628	602	552	544	511	511	488	491	474
		F	-15.4+344R	-8.3+229R	-4.4+172R	-2.3+137R	-0.6+114R	0.3+98R	1.2+86R	1.8+76R	2.4+69R
	#10 @ 6"	q	677	640	619	600	587	577	569	563	558
		F	-15.8+344R	-8.6+229R	-4.9+172R	-2.8+137R	-1.3+114R	-0.2+98R	0.5+86R	1.1+76R	1.6+69R
	#10 @ 4"	q	746	724	711	699	691	685	681	677	674
		F	-16.3+344R	-9.2+229R	-5.6+172R	-3.4+138R	-2+115R	-1+98R	-0.2+86R	0.4+76R	0.9+69R
18	#10 @ 24"	q	659	611	502	490	419	422	375	383	346
		F	-4.3+167R	-0.5+111R	2.5+83R	3.4+66R	5.1+55R	5.4+47R	6.5+41R	6.5+36R	7.5+32R
	#10 @ 18"	q	779	611	585	559	482	476	472	427	428
		F	-5.2+167R	-0.5+111R	1.4+83R	2.5+66R	4+55R	4.5+47R	4.8+41R	5.7+36R	5.8+33R
	#10 @ 12"	q	779	703	659	621	594	574	559	547	537
		F	-5.2+167R	-1.3+111R	0.7+83R	1.9+67R	2.8+55R	3.4+48R	3.8+42R	4.2+37R	4.5+33R
	#10 @ 8"	q	868	842	779	772	730	732	703	708	686
		F	-5.8+168R	-2.2+112R	-0.2+84R	0.8+67R	1.7+56R	2.2+48R	2.7+42R	2.9+37R	3.3+33R
	#10 @ 6"	q	935	893	869	847	832	821	812	805	799
		F	-6.1+168R	-2.5+112R	-0.7+84R	0.4+67R	1.1+56R	1.7+48R	2.1+42R	2.4+37R	2.6+34R
	#10 @ 4"	q	1023	999	985	973	965	958	953	949	946
		F	-6.6+168R	-3+112R	-1.3+84R	-0.2+67R	0.5+56R	1+48R	1.4+42R	1.7+37R	1.9+34R
16	#10 @ 24"	q	844	793	654	644	553	561	499	511	466
		F	-0.7+95R	1.5+63R	3.6+47R	4.2+37R	5.4+31R	5.5+26R	6.4+23R	6.3+20R	7.1+18R
	#10 @ 18"	q	1004	793	766	737	638	634	630	571	575
		F	-1.6+95R	1.5+63R	2.7+47R	3.4+38R	4.5+31R	4.7+27R	4.9+23R	5.6+21R	5.7+19R
	#10 @ 12"	q	1004	915	864	819	788	764	746	732	720
		F	-1.6+95R	0.8+63R	2+47R	2.8+38R	3.3+31R	3.7+27R	4+24R	4.2+21R	4.4+19R
	#10 @ 8"	q	1119	1092	1018	1013	963	967	933	940	913
		F	-2.1+96R	0+64R	1.3+48R	1.8+38R	2.4+32R	2.6+27R	3+24R	3.1+21R	3.3+19R
	#10 @ 6"	q	1201	1156	1129	1106	1090	1077	1068	1060	1054
		F	-2.4+96R	-0.3+64R	0.8+48R	1.5+38R	1.9+32R	2.2+27R	2.4+24R	2.6+21R	2.8+19R
	#10 @ 4"	q	1306	1281	1267	1255	1246	1240	1235	1231	1227
		F	-2.8+96R	-0.7+64R	0.3+48R	0.9+38R	1.3+32R	1.6+27R	1.9+24R	2+21R	2.2+19R

See footnotes on page 28.

Project Name: Posts @ wall end
Model: Shear Wall End Posts
Code: 2012 NASPEC [AISI S100-2012]

Date: 08/04/2020
Simpson Strong-Tie® CFS Designer™ 3.2.0.0



Section : (2) 362S162-54 (50 ksi) @ 16" o.c. Back-To-Back C Stud
Maxo = 2213.3 Ft-Lb **Va =** 6743.1 lb **I =** 1.75 in^4

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Bridging Connectors - Design Method =AISI S100

Span	Axial KyLy, KtLt	Flexual, Distortional	Connector	Stress Ratio
Span	48.0", 48.0"	48.0", 156.0"	N/A	-

Web Crippling

Support	Load (lb)	Bearing (in)	Pa (lb)	M (ft-lbs)	Max Int.	Stiffener?
R2	57.8	--Shear Connection			w/ clip--	NO
R1	57.8	--Shear Connection			w/ clip--	NO

Gravity Load

Type	Load (lb)
Uniform	~~0.00plf~~
P1y	6350lb @ 13ft

MAX POST CAPACITY

	Code Check	Required	Allowed	Interaction	Notes
Span	Max. Axial, lbs	6350.0(c)	7978.7(c)	80%	KΦ=0.00 lb-in/in
	Max. Shear, lbs	57.8	2031.9	3%	Shear (Punched)
	Max. Moment (MaFy, Ma-dist), ft-lbs	187.9	2213.3	8%	MaFy (control),KΦ=0.00 lb-in/in
	Moment Stability, ft-lbs	187.9	2204.2	9%	
	Shear/Moment	0.08	1.00	8%	Shear 0.0, Moment 187.9
	Axial/Moment	0.98	1.00	98%	Axial 6350.0(c), Moment 187.9
	Deflection Span, in	0.078	--meets L/2008--		

Support	Rx(lb)	Ry(lb)	Simpson Strong-Tie Connector	Connector Interaction	Anchor Interaction
R2	57.8	0.0	SCB45.5(2) & (2) #12 SST X to A36 Steel	7.61 %	7.27 %
R1	57.8	6350.0	362T125-33 (33) & (1) .157" SST PDPA/PDPAT-62KP to steel (3/16" to 1/2" thickness)	4.20 %	26.25 %

* Reference catalog for connector and anchor requirement notes as well as screw placement requirements

SHEAR WALL – HAND CALC:

SHEAR WALLS ARE DESIGNED IN SPREADSHEET. HERE IS GRID 8 SHEAR WALL HAND CALC. ALL OTHER SHEAR WALLS ARE DESIGNED SIMILARLY IN SPREADSHEET.

GRID 11:

V = 19.1 K (LRFD) = 13.4 K (ASD)

WALL length = 98'-0"

WALL WEIGHT = ROOF WEIGHT = 12 PSF

TRIB FROM JOICIS = 8"

H/L = 13'/98' = 0.13 < 2.0 ∴ OK. NO REDUCTION TO SW CAPACITY.

0.7E = 13.44 K/98' = 137 PLF

FROM AISI S213 TABLE C2.1-1

CAPACITY OF 15/32" PLYWOOD SHEATHED WALL W/ 8" SCREWS @ 6" O.C.

CAP = 890 PLF (NOMINAL) ÷ 890/2.5 = 356 PLF (ASD)

394 PLF > 137 PLF ∴ OK TO USE SCREWS @ 6" O.C.

OVERTURNING?

M_O = 137 PLF (98')(13')/1000 = 174.5 K·FT (OTM)

M_R = 0.6 [12PSF (98')(13')(98'/2) + 12PSF (8")(98')(98'/2)] /1000
= 472.5 K·FT

OVERTURNING? $\frac{M_O - M_R}{d}$ = $\frac{174.1 \text{ K·FT} - 472.5 \text{ K·FT}}{95'\text{-}0"}$ = −170.1 K

NO OVERTURNING IN WALL ∴ NO HOLDOWN REQ'D.

CHECK COMP. POST MEMBER:

PER CFS CHECK, (2) 3625162-54 POSTS GOOD FOR 7.0 K

R_{max} = [137 PLF (98')(13'/98')/1000] Ω = 4.4 K < 7.0 K ∴ OK.

(2) 3625162-54 POSTS ADEQUATE.

CHORDS/COLLECTORS:

CHORDS: GRID U/P.2 AND GRID 8.8/11

WORST CASE: $M = 271\ PLF(63'-8")^2/8 = 137.3\ K\cdot FT$ (ASD)

$T=C = M/d = 137.3K\cdot FT / 48'-10" = 2812\#$

CHECK SPLICE: # OF REQ'D SCREWS @ SPLICE.

#10 SHEAR CAPACITY = 534# (54 MIL)

SCREWS = 2812#/534# = 5.3 SCREWS → 6 SCREWS

DETAIL SHOWS (4) #10 EA SIDE OF TRACK, SO (8) TOTAL EA. SIDE OF SPLICE

↳ THE RIM TRACK WILL ALSO BE SPLICED W/ (4) #10 EA. SIDE.

DRAG?

CHECK GRID 8 → DOES DECK HAVE CAPACITY TO TRANSFER?

TOTAL V = 13.4K ASD

DECK DIAPHRAGM = 481 PLF (CAPACITY) - SEE PREVIOUS CALCULATION

$V_W = 13.4K/51' = 263\ PLF$

DECK CAN TRANSFER LOAD INTO SHEAR WALL.

NO DRAG REQ'D.

CHORDS - CONT'D:

- FOR CHORD ON 8.8, USE SIMPSON STRAP
  - LOAD = 1433#

    SIMPSON CS16 STRAP CAP = 1550 # ∴ OK.
  - CHECK 1200S162-54 IN COMPRESSION.

    ↳ STUD OK IN COMPRESSION. NO GRAVITY ON STUD., USE (2) STUDS @ THIS LOCATION.

    ↳ SEE CFS PRINTOUT

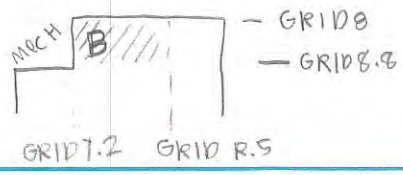
- FOR CHORD ON U, USE STRAP FOR CHORD AROUND MECH.

SEISMIC LOAD PER SF = 38.4K/[(44'(103'-8") + 81'-5"(16'-6")]

= 6.5 PSF

LOAD FROM HALF OF AREA B = 0.7(6.5 PSF)(51'-0"/2)(16'-6") = 1.92K

LENGTH OF STRAP BEYOND GRID 8.8 = 1.92K/481 PLF = 4'-0" → USE 10'-0"



→ CS14 STRAP, CAPACITY = 2.31 K > 1.92K ∴ OK.

(CAPACITY FROM SIMPSON)

Project Name: FAA ENGINEERING
Model: Chords in compression
Code: 2012 NASPEC [AISI S100-2012]

Date: 04/30/2020
Simpson Strong-Tie® CFS Designer™ 3.2.0.0

Section : 1200S162-54 (50 ksi) Single C Stud (punched)
Maxo = 4776.1 Ft-Lb **Va =** 1377.4 lb **I =** 14.30 in^4

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Bridging Connectors - Design Method =AISI S100

Span	Axial KyLy, KtLt	Flexual, Distortional	Connector	Stress Ratio
Span	Third-Pt, Third-Pt	Third-Pt, 312.0"	N/A	-

Web Crippling

Support	Load (lb)	Bearing (in)	Pa (lb)	M (ft-lbs)	Max Int.	Stiffener?
R2	0.0	--Shear Connection			w/ clip--	NO
R1	0.0	--Shear Connection			w/ clip--	NO

Gravity Load

Type	Load (lb)
Uniform	0plf
P1y	1433lb @ 26ft

	Code Check	Required	Allowed	Interaction	Notes
Span	Max. Axial, lbs	1433.0(c)	1522.2(c)	94%	KΦ=0.00 lb-in/in
	Max. Shear, lbs	0.0	1377.4	0%	Shear (Punched)
	Max. Moment (MaFy, Ma-dist), ft-lbs	0.0	3896.4	0%	Ma-dist (control),KΦ=0.00 lb-in/in
	Moment Stability, ft-lbs	0.0	1495.8	0%	
	Shear/Moment	0.00	1.00	0%	Shear 0.0, Moment 4250.0
	Axial/Moment	0.94	1.00	94%	Axial 1433.0(c), Moment 0.0
	Deflection Span, in	0.000	--meets L/0--		

Support	Rx(lb)	Ry(lb)	Simpson Strong-Tie Connector	Connector Interaction	Anchor Interaction
R2	0.0	0.0	SCB47.5(2) & (2) #12 SST X to A36 Steel	0.00 %	0.00 %
R1	0.0	1433.0	1200T125-33 (33) & (3) .157" SST PDPA/PDPAT-62KP to steel (3/16" to 1/2" thickness)	0.00 %	0.00 %

* Reference catalog for connector and anchor requirement notes as well as screw placement requirements

LATERAL ANALYSIS - SEISMIC JOINT REQ'D:

JOINT BETWEEN NEW & EXISTING:

FROM FAA:

max SEISMIC DEFLECTION = 1.25"

NEW STRUCTURE:

$$\delta_M = 0.015h = 0.015(13') = 2.34" \quad \text{(TABLE 12.12-1)}$$

$$\delta_M = \frac{C_d \delta_{max}}{I_e} \Rightarrow \frac{1.5(2.34")}{4} = 0.88"$$

$$\text{COMBINED GAP} = \sqrt{(1.25")^2 + (2.34")^2} = 2.7"$$

→ USE A 2.7" GAP BETWEEN THE (2) STRUCTURES

Actual Mezzanine DRIFT:

Shear wall Deflection (AISI C2.1.1)

$$\delta = \frac{2vh^3}{3E_s A_c b} + \omega_1\omega_2 \frac{vh}{\rho G t_{sheat}} + \omega_1^{5/4}\omega_2\omega_3\omega_4 (v/\beta)^2 + \frac{h}{b}\delta_v$$

$A_c = 0.339\ in^2$

$b = 33'\text{-}3" = 399"$

$E_s = 29{,}500{,}000$ psi

$G = 165{,}245$ psi

$h = 13'\text{-}0" = 156"$

$s = 6"$

$t_{sheath} = 15/32"$

$t_{STUD} = 0.0566"$

$v = 11.5K/399" = 28.82$ #/in (GRIDT)

$V = 11500$#

$\beta = 67.5$

$\delta_v = 0.25"$

$\rho = 1.85$

$\omega_1 = s/6 = 6"/6 = 1"$

$\omega_2 = 0.033/0.0566 = 0.583"$

$\omega_3 = \sqrt{\frac{h/b}{2}} = \sqrt{\frac{(156/399)}{2}} = 0.442$

$\omega_4 = 1.0$

G: $G_v t_v = 25000$ lb/in

$t = 0.469"$

$C_G = 3.1$

$G_{(approx)} = C_G(G_v t_v)/t = 3.1(25000\ lb/in)/0.469" = 165245$ psi

THUS $C_G G_v t_v = 77{,}500$ lb/in & $G_t = 77{,}500$ lb/in SO G_{approx} IS OK.

$$\delta = \frac{2(28.82)(156)^3}{3(29500000)(0.339)(399)} + 1(0.583)\left[\frac{28.82(156")}{1.85(165245)(15/32)}\right] + 0.583(0.442)\left(\frac{28.82}{67.5}\right)^2 + \frac{156}{399}(0.25")$$

$= \underline{0.181"}$

DIAPHRAGM DEFLECTION

↳ see spreadsheet on following pg

Deflection is conservative. only looks @ one span.

$\delta_{diaph} = 0.325"$ (worst case)

Allowable deflection $= 0.88"$ (see previous calc)

Total deflection $= 0.181" + 0.325" = \underline{0.506"} < 0.88"$ ∴ OK.

ENGINEERS

Simply Supported Steel Diaphragm Deflection

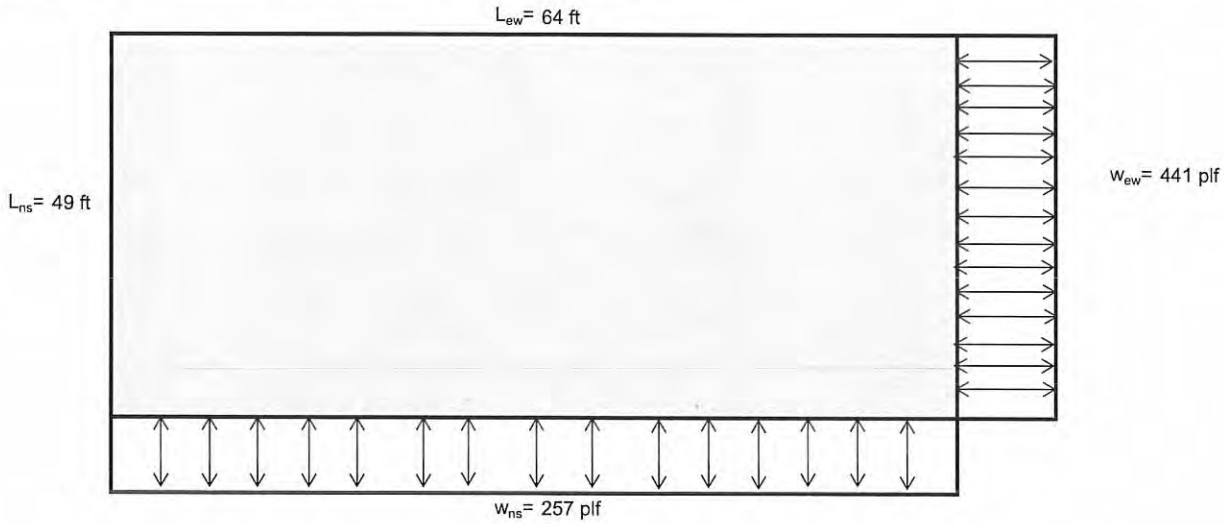
Version Date: September 3, 2015 Author: SDP Reviewed By:

JOB TITLE: FAA ENGR

Diaphragm Location Worst Case Diaphragm Span

Date: 30-Apr-20

JOB #: 19521



Deck Properties

Gage	20	
Type	PLB	
Attachments	36/4 Screw Patterns w/ #10 @ 24" o.c.	
Span Factor, R=	0.33	
Flexibility Factor, F=	100.60	μ-in/lbs

Chord Properties

Chord Member	362T125-54	
Area=	0.339	in^2
Modulus of Elasticity, E=	29,000	ksi
Diaphragm Moment of Inertia, I_{ns}=	58,205	in^4
Diaphragm Moment of Inertia, I_{ew}=	98,938	in^4

Deflections

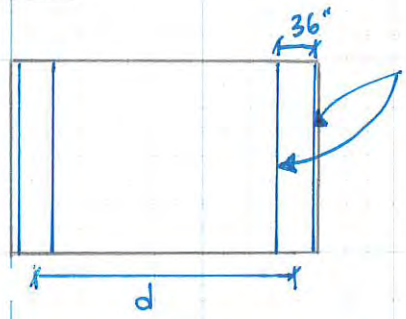
$$\Delta_W = \frac{wL^2F}{8b*10^6} \qquad \Delta_f = \frac{5}{384}\frac{wL^4}{EI}$$

		E-W
Shear Deflection, Δ_w=	0.268 in	0.208 in
Flexural Deflection, Δ_f=	0.056 in	0.020 in
Total Deflection, Δ_t=	**0.325 in**	**0.227 in**

COMPRESSION & TENSION LOADS @ SW ENDS:

WHERE REQ'D:

SHEAR WALL SPREADSHEETS PROVIDE ASD LOADS. TABLE BELOW CONVERTS LOADS TO LRFD.



BOUNDARY POST

(2) POSTS & (2) HOLDOWNS @ END OF EA. WALL

MAX HOLDOWN CAPACITY = 3.63 K (LRFD)

(SPREADSHEETS NOW INCLUDE $E_m = 0.25 S_{DS} D$)

GRID	M_R (ASD)	M_o (ASD) (INCLUDES Ω)	M_R (LRFD)	M_o (LRFD)	HOLDOWN FORCE (LRFD)	COMPRESSION FORCE (LRFD)
* 8_A	190.9	283.3	286.4	404.7	2.5 K	8 K
* 8_B	53.8	150.3	80.7	214.7	K	8 K
* 11	-	-	-	-	-	6.3 K
4	-	-	-	-	-	3.0 K
* T	45.3	113.3	67.95	161.9	4.94 K	7.4 K
* T.2	108.5	228.3	162.8	326.1	5.4 K	9.9 K
$R.6_A$	132K	192.9 K	197.9K	275.5	2.6K	8.3K
* $R.6_B$	26.9	87 K	40.3K	124.3K	7 K	8.3K
P.3	157.6K	200.3K	236.3K	286.1K	1.4K	7.3K

AT LOCATIONS WHERE HOLDOWN FORCE > 3.63K, USE (2) BOUNDARY POSTS AS SHOWN ABOVE.

→ HOLDOWN CAPACITY = 3.63K (SEE HILTI PRINTOUT)

AT LOCATIONS WHERE COMPRESSION FORCE > 6.0K, USE (2) BOUNDARY POSTS

↳ PUNCHING SHEAR CAPACITY = 6.0 K (CONSERVATIVE)
SEE CALC ON FOLLOWING PAGE.

→ HDU4: LRFD CAPACITY = 6.35K, SO OK.

(E) SLAB PUNCHING SHEAR CHECK:

BEAM SHEAR CHECK:

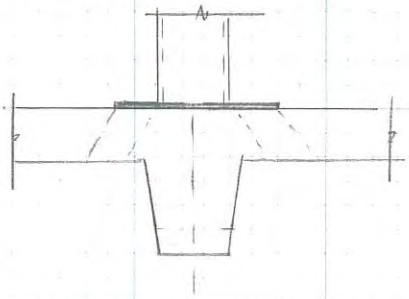
$\phi V_c = \phi [2 b_w d \sqrt{f'c}]$

$= 0.75(2)(6")(12.5" - 0.75" - 7/16")\sqrt{3000}$

$= \underline{6.0\ K}$

- LOOKED AT SHEAR CAPACITY OF INDIVIDUAL RIB. CHECK IS CONSERVATIVE BECAUSE POINT LOAD FROM BOUNDARY POSTS WILL BE DISTRIBUTED TO MULTIPLE RIBS.
- POINT LOADS WILL ALL BE LESS THAN 6.0K, SO SLAB IS OK FOR PUNCHING SHEAR.

↳ AT HSS COLUMN LOCATION, VERT LOAD > 6.0K,
LOOK @ CAPACITY OF RIB + SOME OF THE TOPPING SLAB



↳ RAMCONCEPT ACCOUNTS FOR SLAB ENTIRETY.

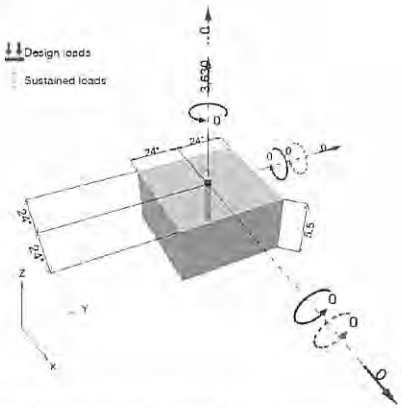
Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Holdown anchorage	Date:	8/11/2021
Fastening point:			

Specifier's comments:

1 Input data

Anchor type and diameter:	**HIT-HY 200 + HAS-V-36 (ASTM F1554 Gr.36) 5/8**
Item number:	2198024 HAS-V-36 5/8"x6" (element) / 2022793 HIT-HY 200-R (adhesive)
Effective embedment depth:	$h_{of,act}$ = 4.000 in. ($h_{of,limit}$ = - in.)
Material:	ASTM A 1554 Grade 36
Evaluation Service Report:	ESR-3187
Issued I Valid:	4/1/2020 | 3/1/2022
Proof:	Design Method ACI 318-14 / Chem
Stand-off installation:	
Profile:	
Base material:	cracked concrete, 3000, f_c' = 3,000 psi; h = 5.500 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

Geometry [in.] & Loading [lb, in.lb]



Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	Holdown anchorage	Date:	8/11/2021
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 3,630; V_x = 0; V_y = 0; M_x = 0; M_y = 0; M_z = 0; N_{sus} = 0; $M_{x,sus}$ = 0; $M_{y,sus}$ = 0;	yes	100

2 Load case/Resulting anchor forces

Anchor reactions [lb]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	3,630	0	0	0

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 0 [lb]
resulting compression force in (x/y)=(0.000/0.000): 0 [lb]

3 Tension load

	Load N_{ua} [lb]	Capacity ϕ N_n [lb]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	3,630	9,833	37	OK
Bond Strength**	3,630	4,517	81	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	3,630	3,631	100	OK

* highest loaded anchor **anchor group (anchors in tension)

3.1 Steel Strength

N_{sa} = ESR value — refer to ICC-ES ESR-3187

$\phi\ N_{sa} \geq N_{ua}$ — ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.23	58,000

Calculations

N_{sa} [lb]
13,110

Results

N_{sa} [lb]	ϕ_{steel}	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
13,110	0.750	9,833	3,630

3.2 Bond Strength

$N_a = \left(\frac{A_{Na}}{A_{Na0}}\right) \psi_{ed,Na}\ \psi_{cp,Na}\ N_{ba}$ — ACI 318-14 Eq. (17.4.5.1a)

$\phi\ N_a \geq N_{ua}$ — ACI 318-14 Table 17.3.1.1

A_{Na} see ACI 318-14, Section 17.4.5.1, Fig. R 17.4.5.1(b)

$A_{Na0} = (2\ c_{Na})^2$ — ACI 318-14 Eq. (17.4.5.1c)

$c_{Na} = 10\ d_a \sqrt{\frac{\tau_{uncr}}{1100}}$ — ACI 318-14 Eq. (17.4.5.1d)

$\psi_{ed,Na} = 0.7 + 0.3 \left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.4.5.4b)

$\psi_{cp,Na} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{c_{Na}}{c_{ac}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.4.5.5b)

$N_{ba} = \lambda_a \cdot \tau_{k,c} \cdot \alpha_{N,seis} \cdot \pi \cdot d_a \cdot h_{ef}$ — ACI 318-14 Eq. (17.4.5.2)

Variables

$\tau_{k,c,uncr}$ [psi]	d_a [in.]	h_{ef} [in.]	$c_{a,min}$ [in.]	$\alpha_{overhead}$	$\tau_{k,c}$ [psi]
2,261	0.625	4.000	24.000	1.000	1,192

c_{ac} [in.]	λ_a	$\alpha_{N,seis}$
9.055	1.000	0.990

Calculations

c_{Na} [in.]	A_{Na} [in.^{2}]	A_{Na0} [in.^{2}]	$\psi_{ed,Na}$
8.920	318.25	318.25	1.000

$\psi_{cp,Na}$	N_{ba} [lb]
1.000	9,265

Results

N_a [lb]	ϕ_{bond}	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_a$ [lb]	N_{ua} [lb]
9,265	0.650	0.750	1.000	4,517	3,630

3.3 Concrete Breakout Failure

$N_{cb} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ — ACI 318-14 Eq. (17.4.2.1a)

$\phi\ N_{cb} \geq N_{ua}$ — ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ — ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{1.5}$ — ACI 318-14 Eq. (17.4.2.2a)

Variables

h_{ef} [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
4.000	24.000	1.000	9.055	17	1.000	3,000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
144.00	144.00	1.000	1.000	7,449

Results

N_{cb} [lb]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{cb}$ [lb]	N_{ua} [lb]
7,449	0.650	0.750	1.000	3,631	3,630

4 Shear load

	Load V_{ua} [lb]	Capacity $\phi\ V_n$ [lb]	Utilization $\beta_V = V_{ua}/\phi\ V_n$	Status
Steel Strength*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Bond Strength controls)*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* highest loaded anchor **anchor group (relevant anchors)

5 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2018, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-14, Section 17.8.1.

Fastening meets the design criteria!

6 Installation data

Profile: -

Hole diameter in the fixture: -

Plate thickness (input): -

Drilling method: Hammer drilled
Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

5/8 Hilti HAS Carbon steel threaded rod with Hilti HIT-HY 200 Safe Set System

Anchor type and diameter: HIT-HY 200 + HAS-V-36 (ASTM F1554 Gr.36) 5/8
Item number: 2198024 HAS-V-36 5/8"x6" (element) / 2022793 HIT-HY 200-R (adhesive)

Maximum installation torque: 720 in.lb

Hole diameter in the base material: 0.750 in.

Hole depth in the base material: 4.000 in.

Minimum thickness of the base material: 5.500 in.

6.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Compressed air with required accessories to blow from the bottom of the hole • Proper diameter wire brush	• Dispenser including cassette and mixer • Torque wrench

Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.000	0.000	24.000	24.000	24.000	24.000

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COMPRESSION / TENSION @ SW ENDS (CONT'D):

WALLS THAT WILL HAVE (2) BOUNDARY POSTS @ EA END: (ALL LOADS LRFD)

GRID $@_A$: HOLDOWN FORCE = 3.2K/2 = 1.6K
COMPRESSION FORCE = 8.7K/2 = 4.4K

GRID $@_B$: HOLDOWN FORCE = 7.4K/2 = 3.7K
COMPRESSION FORCE = 8.7K/2 = 4.4K

GRID 11: COMPRESSION FORCE = 6.3K/2 = 3.2K

GRID T.2: HOLDOWN FORCE = 5.4K/2 = 2.7K
COMPRESSION FORCE = 9.9K/2 = 4.95K

ALL OTHER WALLS have adequate tension/compression capacity.

ALL WALLS THAT REQUIRE HOLDOWNS, USE HDU14.

WITH 54 MIL, TENSION CAPACITY = 6.3K > HOLDOWN FORCES

COMBINED JAMBS/ BOUNDARY POSTS:

VERIFY THAT (2) STUDS IS ADEQUATE FOR JAMB LOAD + BOUNDARY POST.

CAPACITY OF (2) STUDS = 6.35 K (BACK TO BACK)
(ACD)
↳ see CFS PRINTOUT

FROM BOUNDARY POST DESIGN:

WORST CASE COMPRESSION FORCE = 5.6K (LRFD - GRID R.6)

HEADER VERTICAL REACTION = DL = 12 PSF (6'-4"/2)(31'-1"/2) = 591 #

LL = 20 PSF (6'-4"/2)(31'-1"/2) = 984 #

TOTAL = DL + 0.7E

= 0.591 K + 0.7(5.6K) = 4.5 K < 6.35 K

(2) STUDS @ WALL END ARE ADEQUATE.

PARTITION WALL - BEAM BRACING:

BEAM LENGTH = 38'-5"

PART. WALL WEIGHT = 110 PLF (11 PSF)

BEAM : W16X77 → SW = 77 PLF

$F_p = \frac{0.4 a_p S_{DS} W_p}{(R_p/I_p)}(1+2z/h)$ $a_p = 1.0$, $R_p = 2.5$, $\Omega = 2$

$S_{DS} = 1.468$, $I_p = 1.5$

$F_p = 0.4\frac{(1.0)(1.468)(11\ PSF)}{(2.5/1.5)}(1+2) = 11.63\ PSF$ → $F_p = 8.2\ PSF$ (ASD) > 5 PSF

use 8.2 PSF

BEAM FORCES: $F_p = 0.4\frac{(1.0)(1.468)(77\ PLF)}{(2.5/1.5)}(1+2) = 81.4\ PLF$ → $F_p = 57\ PLF$ (BEAM) (ASD)

CHECK 12 GA. WIRE FOR PARTITION FORCES:

LOAD INTO CABLE = $\sqrt{2}$ (8.2 PSF)(10') = 116 PLF

TIGHT 3 WRAP TIE CAPACITY = 358 #, 12 GA

MAX SPACING = 358 #/116 PLF = 3.08' → @ 36" O.C. → 32" O.C.

↳ OR use 5/16" ϕ WIRE ROPE w/ 500# WORKING CAPACITY @ 48" O.C. L = 359#

CHECK CFS KICKER FOR BEAM BRACING:

TENSION LOAD = $\sqrt{2}$ (57 PLF) = 80.6 PLF BEAM LENGTH = 38'-5"

@ 1/4 PTS : LOAD = 80.6 PLF (38'-5"/4) = 775 #

$P_n/\Omega = F_y A_g$

$A_{REQD} = 775\#(1.67)/50000\ psi = 0.025\ in^2$

→ TRY 362 S 162-54, $A_{act} = 0.422\ in^2$

CONNECTION TO JOIST:

SHEAR CAPACITY OF #10 SCREWS = 534 #

# of SCREWS = 775 #/534 # = 1.5 SCREWS

↳ (4) #10 SCREWS OK.

PARTITION WALL - BEAM BRACING (CONT'D):

BRACING WHEN WALL IS BUNCHED UP:

$$F_p = \frac{0.4(1.0)(1.468)(W)(1+2)}{(2.5/1.5)} = 1.06\,W_p$$

$$W_p = 110\,\text{PLF}\,\frac{(38'\text{-}5")}{6'\text{-}0"} = 704.3\,\text{PLF}$$

$F_p = 1.06(704.3\,\text{PLF}) = 746.6\,\text{PLF} \rightarrow 522.6\,\text{PLF (ACD)}$ — PARTITION WALL

1) CHECK 12 GA. WIRE:

LOAD INTO CABLE $= \sqrt{2}\,(522.6\,\text{PLF}) = 739\,\text{PLF}$

a) TIGHT 3 WRAP CAP = 358 #, 12 GA

MAX SPACING = $358\#/739\,\text{PLF} = 0.48' \rightarrow 5"$ O.C.

2) TRY ELKO WIRE ROPE:

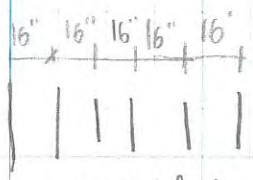
TOTAL LOAD $= [(1.06(110\,\text{PLF})(38'\text{-}5") + 6'(91.4\,\text{PLF})]\,0.7\sqrt{2} = 4571\,\#$

↳ USE (6) WIRE ROPE (EA SIDE)

LOAD = 762# → 0.38 TONS

↳ 5/16" ϕ WIRE ROPE W/

MIN WORKING CAPACITY = 800#



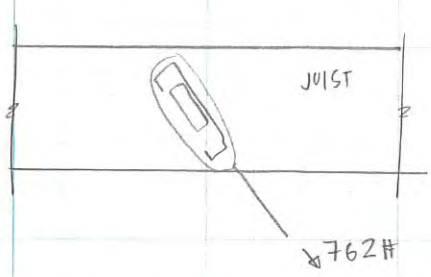
(6) TOTAL WIRES

PARTITION WALL - BEAM BRACING (CONT'D).

BRACE CONNECTION TO STRUCTURE:

AXIAL LOAD = 762 # (WORST CASE) → ↓

SO VERT = HORIZ = 539 #



CONNECT TO JOIST WITH:

↳ F_1 = 762#

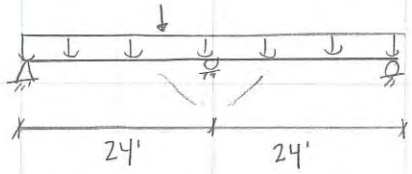
USE LTO, CAPACITY (54 MIL) = 1100 # ∴ OK

WITH (8) #10 SCREWS

CHECK JOIST FOR AXIAL LOAD:

AXIAL = 539# (ASD)

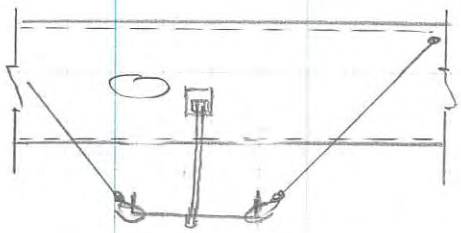
VERT. PT LOAD = 539# (ASD)



JOIST WILL ONLY SEE LOAD FROM ONE BRACE @ A TIME

↳ (2) 1200S162-54 REQ'D.

ELECTRICAL CABLE TRAY BRACING



W = 9.2 PLF HANGERS @ 10'-0" MAX SPACING

MAX LOAD @ HANGERS IS 92#

* SEISMIC FORCE FOR TRAY

$$F_p = \frac{0.4 a_p S_{DS} W}{\frac{R_p}{I_p}}\left(1+2\frac{z}{h}\right) = \frac{0.4(2.5)(1.468)(9.2\,PLF)}{\frac{6}{1.5}}\left(1+2\left(\frac{1}{1}\right)\right) = 10.1\,PLF$$

LATERAL BRACING @ 10'-0" O.C. = 10.1 PLF (10'-0") = 101# $\left(\frac{1}{\cos 45}\right)$ = 143#

LONGITUDINAL BRACING @ 20'-0" O.C. = 10.1 PLF (20'-0") = 202# $\left(\frac{1}{\cos 45}\right)$ = 286#

USE 12 GA WIRE W/ (3) WRAPS.

* VERTICAL SUPPORT

USE 1/4" ROD G.F. $0.6(36000\,\#/IN^2)(0.049\,IN^2)$ = 1,060#

USE WALL MOUNT SCREW BRACKET INTO WEB OF STUD.

FOR REFERENCE ONLY

Hanger Wire Attachment

Code Requirements[1]

The International Building Code (IBC) defines the requirement for hanger wire and their supports and attachment methods. However, there are exceptions and the application of hanger wires in a seismic design category can meet code requirements in different ways.

USG® recommends that the design team, consulting engineers and code officials work together to analyze these factors and determine the appropriate construction and application of hanger wire attachment. Because codes continue to evolve, check with local officials prior to designing and installing a suspension system.

Guidelines

- 12-gauge, galvanized, soft-annealed steel wire
- Manufactured in accordance with ASTM A641
- Meets or Exceeds Federal Specification QQ-W-461H

Note: 12-gauge hanger wire produced by USG meets these requirements.

Performance Data

12-Gauge Wire	Wire Tie Failure / Pullout Load
Typical 3 wrap tie[1]	270 lbs.
Tight 3 wrap tie	358 lbs.
Yields	424 lbs.
Ultimate load	+550 lbs.
Tensile Strength (Ksi)	80 max.

[1] Per ASTM C636

Note: Tight wrap typically consists of three complete wraps within 1 in. Some jurisdictions may require four complete wraps for bracing wires. These requirements may vary by jurisdiction.

Splice Options

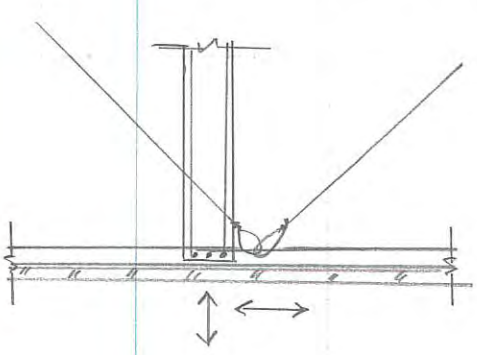
Hanger wire splices are typical when the ceiling drop is greater than the length of the wire available and are allowed in seismic ceiling construction. The industry standard is to loop and tie the wire ends with three tight turns, or use a square knot. The square knot is the stronger of the two options at 550 lbs. versus 350 lbs. for the loop and tie option.

12-Gauge Wire Splice	Wire Tie Failure
Loop and Tie	350 lbs.
Square Knot	550 lbs.

Note: Accessories by others for securing hanger wire splices should be evaluated for pullout and strength.

[1] See last page for Seismic Code Reference Standards

CEILING BRACING



$W = 1.8$ psf ⟶ PER ASCE 7-16 USE 4 psf MIN TO ACCOUNT FOR VERTICAL SEISMIC COMPONANT

$$F_p = \frac{0.4 a_p S_{DS} W}{\frac{R_p}{I_p}} \left(1 + 2\frac{z}{h}\right)$$

$$= \frac{0.4(1)(1.468)(1.8\text{psf})}{\frac{2\frac{1}{2}}{1.5}} \left(1 + 2\left(\frac{1}{1}\right)\right)$$

$$= 1.9 \text{ psf}$$

* SEISMIC BRACING

$12'\text{-}0'' \times 12'\text{-}0'' \times 1.9$ psf $= 273.6\# \left(\frac{1}{\cos 45}\right) = 387\#$

USE 12 GA WIRE W/ (3) TIGHT WRAPS

* VERTICAL SEISMIC STRUT

$12'\text{-}0'' \times 12'\text{-}0'' \times 4$ psf $= 576\#$ TENSION

$12'\text{-}0'' \times 12'\text{-}0'' \times (1.8\text{psf})(1.468)(0.2) = 76.1\#$ COMPRESSION

USE 362S162-33 STUD AS HANGER W/(2) #10 SCREWS MIN.

* HANGER WIRES

$4'\text{-}0'' \times 4'\text{-}0'' \times 4$ psf $= 64\#$

USE 12GA WIRE W/ (3) WRAPS.

FOR REFERENCE ONLY

Hanger Wire Attachment

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Guidelines

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Note: 12-gauge hanger wire produced by USG meets these requirements.

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[1] Per ASTM C636

Note: Tight wrap typically consists of three complete wraps within 1 in. Some jurisdictions may require four complete wraps for bracing wires. These requirements may vary by jurisdiction.

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Hanger wire splices are typical when the ceiling drop is greater than the length of the wire available and are allowed in seismic ceiling construction. The industry standard is to loop and tie the wire ends with three tight turns, or use a square knot. The square knot is the stronger of the two options at 550 lbs. versus 350 lbs. for the loop and tie option.

12-Gauge Wire Splice	Wire Tie Failure
Loop and Tie	350 lbs.
Square Knot	550 lbs.

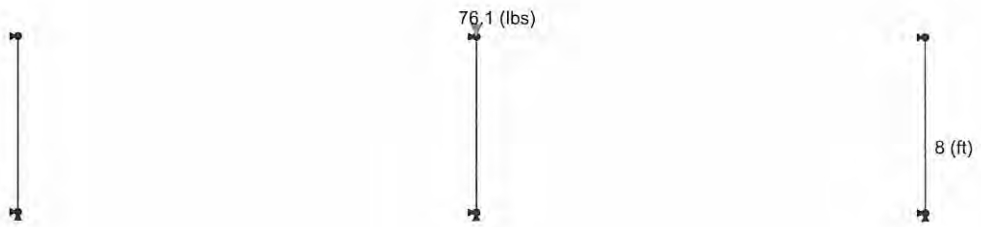
Note: Accessories by others for securing hanger wire splices should be evaluated for pullout and strength.

[1] See last page for Seismic Code Reference Standards

Company:	ARW Engineers	Date:	Tue, Apr 28 20
Address:	1594 W Park Circle		
Country:	United States		
State:	Utah		
Zip Code:	84404		

Post 1

Multi-Span Post



Dead Load **Live Load** **Snow/Roof Live Load**

Wall Information:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD
No. of Spans	1
Lateral and Torsional Bracing (ft)	Unbraced
K_φ Distortional Buckling Rotational Stiffness (lbf-in./in.)	0.000

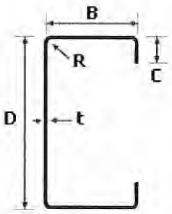
Reactions:

Joint	Ry (kips)
1	0.076
2	0.000

Design Options:

° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1
° Shear Coeff. Kv	5.34
° X (in)	4

Span Sections:



Profile (1)

Company:	ARW Engineers		Date: Tue, Apr 28 20
Address:	1594 W Park Circle	Post 1	
Country:	United States		
State:	Utah		
Zip Code:	84404		

Multi-Span Post

Span	Section Name:	362S162-33, 33 ksi			Span Height (ft):	8
	Section Layout:	Single	Section Count:	1	Fastener Spacing (in):	N/A
	Dimensions (in):	Profile (1)				
	D:	3.625	B:	1.625	t:	0.035
	R:	0.077	C:	0.5		
	Gross Section Properties:					
1	Ix (major) (in4)	0.551	Sx (major) (in3)	0.304	rx (major) (in)	1.45
	Iy (minor) (in4)	0.099	Sy (minor) (in3)	0.091	ry (minor) (in)	0.616
	Area (in²)	0.262	Xo (in)	-1.308	J × 1000 (in4)	0.105
	Cw(in6)	0.297	Ro (in)	2.048	Weight (lbs/ft)	0.892
	Material Properties:					
	Fy (ksi)	33	Fu (ksi)	45	E (ksi)	29500
	G (ksi)	11300				

Span Loads:

Span	Tributary Length (ft)	Tributary Width (ft)	Dead Load (psf)	Live Load (psf)	Snow/Roof Live (psf)
1	1	1	0.000	76.1	0.000

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0	0	0
Dead Load	2	0	0	0
Live Load	1	0	0.076	0
Live Load	2	0	0	0
Snow/Roof Live Load	1	0	0	0
Snow/Roof Live Load	2	0	0	0

Load Combination Factors:

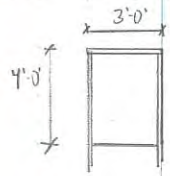
#	Dead	Live	Snow/Roof Live Load	Used For
1	1	1	0	Strength
2	1	0	1	Strength
3	1	0.75	0.75	Strength

Capacity Check:

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)
1	Actual	N/A	N/A	N/A	0.076
	Allowable	3.27	0.521	4.73	0.914
	Act./All.	N/A	N/A	N/A	0.083 *
	X/L	N/A	N/A	N/A	0.200

* Forces are calculated for punched-out section

FRAMING AT DUCT:



h=15'-0"

WALL WEIGHT: METAL STUD = 3.0 PSF
SHEATHING = 2.0 PSF
MISC = 5.0 PSF
10.0 PSF

SHORT WALL (LAT. LOAD):

$W = 10\ PSF(3'\text{-}0" + 2'\text{-}0" + 2'\text{-}0")(15'\text{-}0"/2) = 525\ \#$

$F_p = \frac{0.4\, a_p S_{DS} W_p}{(R_p/I_p)}(1+2z/h)$

$= \frac{0.4(1.0)(1.466)(525\#)}{(2.5/1.5)}(1+2) = 555\ \#$

SO IN SHEAR WALL: $v = \frac{555\#(0.7)}{3'\text{-}0"} = 130\ PLF$

SHEAR WALL CAPACITY = 780PLF (2(3'-0"/15'-0")) = 312 PLF > 130 PLF ∴ OK.
↳ 15/32" PLYWOOD SHEATHING W/ #8 SCREWS AT 6" O.C.

LONG WALL (LAT LOAD):

W = 10 PSF(4'-0" + 3'-0"/2)(15'-0"/2) = 412 # < SHORT WALL use same wall.

OVERTURNING?

$M_{OTM} = (555\#)(15'\text{-}0") = 8.33\ K\text{-}FT$

$M_R = 0.9[(10\ PSF)(15'\text{-}0")(6'\text{-}0")](3'\text{-}0"/2) = 1215\ \#\text{-}FT$

(COUNT ON PORTION OF RETURN WALLS)

$T = C = \frac{1215\ \#\text{-}FT - 8333\ \#\text{-}FT}{3'\text{-}0"} = 2372\ \#$ (LRFD)

$\Omega = 2$, LOAD = 4744 #

5/8" ϕ A.B W/ 4" MIN HILTI HIT HY200 EPOXY embedment
(see ANCHORAGE CALC @ SW)

HOLDOWN: CL362-116(H) W/ (9) #12 SCREWS
OR
SIMPSON HDU4.

WALLS

WALLS/ HEADERS/JAMBS:

WALL DESIGN:

TRIB(MAX) = 24.5'

DL = 12 PSF, LL = 20 PSF

→ 362S162-43 @ 16" o.c. OK.

HEADERS:

OPENING WIDTH = 6'-0"

MAX TRIB = 14'-6"

→ DL = 12PSF(14'-6") = 174 PLF
LL = 20 PSF(14'-6") = 290 PLF] @ 6'-0" OPENING

OPENING WIDTH = 7'-4"

MAX TRIB = 9'-2"

→ DL = 12 PSF(9'-2") = 110 PLF
LL = 20 PSF(9'-2") = 183 PLF] @ 7'-4" OPENING

→ SEE PRINTOUT FOR HEADERS & JAMBS

OPENING WIDTH = 3'-4"

TRIB = 24'-6"

DL = 12PSF(24'-6") = 294 PLF

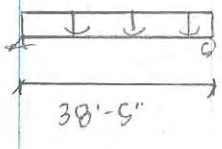
LL = 20 PSF(24'-6") = 490 PLF

→ SEE PRINTOUT FOR HEADERS & JAMBS

→ SEE SPREADSHEET FOR HEADER CONNECTION.

W-BEAM:

CASE 1:

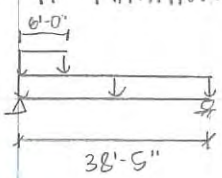


→ W_{DL} = 12 PSF *
W_{LL} = 20 PSF
TRIB = 23'-4"
110 PLF (PARTITION WALL)

W16X67 SR = 0.540
(DEFLECTION GOVERNS)

CASE 2/3:

IF PARTITION WALL IS FOLDED UP @ ONE END OF BEAM, OR IN MIDDLE



→ W_{PART} = 110PLF(38'-5")/6'-0" = 705 PLF

W_{DL} & W_{LL} CAME AS CASE 1.

CASE 3 GOVERNS.

SR = 0.506 → W16X77

POST:

h = 13'-0"

LOAD = 6.67K (DL)
= 12.9K (LL) (WORST CASE)

→ HSS 5X3X5/16, SR = 0.89 ∴ OK

walls/headers (CONT'D):

JAMBS:

WORST CASE JAMB REACTION = 7.4 PSF(7'-4"/2 + 0.667')(12'-0"/2) = 193#

→ CHECK DEFLECTION TRACK FOR LOAD.

→ SEE DEFLECTION TRACK SPREADSHEET.

STUD REACTION = 193#

CONNECTION IS OK, TRACK & DEFLECTION ARE OK.

CHECK TRACK CONNECTION TO JOISTS/BLOCKING

- SHEAR = 192#
- TENSION = 164#

(ACTUAL FROM SPREADSHEET)

#10 SCREW CAP:

SHEAR = 634#

TENSION = 198#

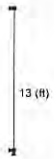
(1) SCREW SHEAR, (1) SCREW TENSION OK TO USE (2) #10 SCREWS INTO JOIST/BLOCKING.

Company:	ARW Engineers	Date:	Thu, Apr 30 20
Address:	1594 W Park Circle		
Country:	United States	SSW -1	
State:	Utah		
Zip Code:	84404	**Multi-Span Simple Stud Interior**	

Dead Load

Live Load

Transverse Load



Snow/Roof Live Load

Wall Information:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD
No. of Spans	1
Absolute Deflection (in)	2

Bracing Data:

Lateral Bracing (in)	48
Torsional Bracing (in)	Full
K_{φ} Distortional Buckling Rotational Stiffness (lbf-in./in.)	50

Design Options:

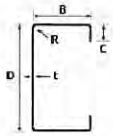
° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1
° Shear Coeff. Kv	5.34
° X (in)	4

Company:	ARW Engineers	Date:	Thu, Apr 30 20
Address:	1594 W Park Circle		
Country:	United States	SSW -1	
State:	Utah		
Zip Code:	84404	**Multi-Span Simple Stud Interior**	

Span Information:

Span	Height (in)	Stud Spacing (in)	Allowable Hl. Deflection L /	Max. Bridging Spacing (ft)
1	13	16	360	6

Span Sections:



Profile (1)

Span						
	Section Name:	362S162-43, 33 ksi				
	Section Layout:	Single		**Fastener Spacing (in):**		N/A
	Dimensions (in):	Profile (1)				
	D:	3.625	B:	1.625	t:	0.045
	R:	0.071	C:	0.5		
	Gross Section Properties:					
1	Ix (major) (in4)	0.71	Sx (major) (in3)	0.392	rx (major) (in)	1.445
	Iy (minor) (in4)	0.127	Sy (minor) (in3)	0.117	ry (minor) (in)	0.611
	Area (in²)	0.34	Xo (in)	-1.297	J × 1000 (in4)	0.23
	Cw(in6)	0.376	Ro (in)	2.036	Weight (lbs/ft)	1.156
	Material Properties:					
	Fy (ksi)	33	Fu (ksi)	45	E (ksi)	29500
	G (ksi)	11300				

Span Loads:

Span	Tributary Width (ft)	Load Distribution Factor	Dead Load (psf)	Live Load (psf)	Snow/Roof Load (psf)	Transverse Load (psf)
1	24.5	1	12	20	0.000	9

Reactions:

Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	-0.078	1.045	0
2	-0.078	0	0

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0	0.392	0
Dead Load	2	0	0	0
Live Load	1	0	0.653	0
Live Load	2	0	0	0
Transverse Load	1	-0.078	0	0
Transverse Load	2	-0.078	0	0
Snow/Roof Live Load	1	0	0	0
Snow/Roof Live Load	2	0	0	0

Load Combination Factors:

#	Dead	Live	Transverse	Snow/Roof Live Load	Used For
1	1	1	1	0	Strength
2	1	0	0	1	Strength
3	1	0.75	0.75	0.75	Strength
4	0	0	1	0	Deflection

Effective Section Properties:

Member	Value
Ae(Comp.) (in²)	0.248

Company:	ARW Engineers		
Address:	1594 W Park Circle	SSW -1	Date: Thu, Apr 30 20
Country:	United States		
State:	Utah		
Zip Code:	84404	**Multi-Span Simple Stud Interior**	

Capacity Check:

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Hz. Deflection (in)	Crippling (kips)
1	Actual	3.042	0.068	N/A	1.045	0.368	N/A
	Allowable	7.344	0.676	6.122	2.753	0.433	N/A
	Act./All.	0.414 *	0.101 *	N/A	0.380 *	0.850	N/A
	X/L	0.500	0.936	N/A	0.100	N/A	N/A

Member		Value
1	Sxe (in3)	0.372
	Ixe (in4)	0.710
	Fy Design (ksi)	33.000

Design for Web Crippling is Disabled

*** Forces are calculated for punched-out section**

Interaction Check (kips.in, kips):

Member	Combined (M,V)		Combined (M,Pcr)		Combined (M,T)		Combined (M,P)	
1	Moment(Mx)	-2.920	Moment(Mx)	N/A	Moment(Mx)	N/A	Moment(Mx)	-3.042
	Shear(Vy)	-0.016	Pcr (Crippling)	N/A	Tension (T)	N/A	Comp. (P)	-1.045
	Act./All.	0.398	Act./All.	N/A	Act./All.	N/A	Act./All.	0.794
	X/L	0.600	X/L	N/A	X/L	N/A	X/L	0.500

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

3'-4" opening

Date: Thu, Apr 30 20

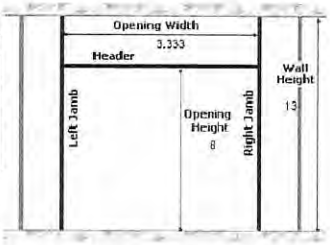
Load Bearing Interior Door

Design Data:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD

Wall Data:

Wall Height (ft)	13
Horizontal Deflection L /	360
Header Vertical Deflection L /	360
Absolute Deflection (in)	1
Max. Bridging Spacing (ft)	4
Stud Spacing (in)	16
Door Type/Wind Load Distribution	Glazed / Four Ways Distribution



Bracing Data:

Jamb Lateral Bracing (in)	Full
Jamb Torsional Bracing (in)	Full
Header Lateral Bracing-Lateral Ld (in)	@ Stud Spacing
Header Torsional Bracing-Lateral Ld (in)	@ Stud Spacing
Header Lateral Bracing-Gravity Ld (in)	None
Header Torsional Bracing-Gravity Ld (in)	None
K^{ϕ} Distortional Buckling Rotational Stiffness (lbf-in./in.)	50

Design Options:

° Section Layout	Built Up Section
° Fastener Spacing (in)	24
° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1
° Shear Coeff. Kv	5.34
° X (in)	4

Dimensions (ft):

Jamb Height	Door Height	Door Width
13	8	3.333

Load Combination Factors:

#	Dead	Live	Transverse	Snow/Roof Live Load	Used For
1	1	1	1	1	Strength
2	1	0	0	1	Strength
3	1	0.75	0.75	1	Strength
4	1	1	1	1	Deflection
5	1	0	0	1	Deflection
6	1	0.75	0.75	1	Deflection

Loads Data:

Loads	Value
Dead Load(lbs/ft)	294
Live Load(lbs/ft)	490
Transverse Load(psf)	8

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

3'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Loads	Value
Snow/Roof Live Load(lbs/ft)	0.000
Jamb Additional Dead Load (lbs)	0.000
Jamb Additional Live Load (lbs)	0.000
Jamb Additional Snow/Roof Load (lbs)	0.000

Reactions:

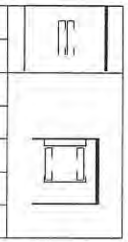
Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	0.088	0	0
2	0.088	0	0
5	0.121	1.307	0
6	0.121	1.307	0

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0	0	0
Dead Load	2	0	0	0
Dead Load	5	0	0.49	0
Dead Load	6	0	0.49	0
Live Load	1	0	0	0
Live Load	2	0	0	0
Live Load	5	0	0.817	0
Live Load	6	0	0.817	0
Transverse Load	1	0.088	0	0
Transverse Load	2	0.088	0	0
Transverse Load	5	0.121	0	0
Transverse Load	6	0.121	0	0
Snow/Roof Live Load	1	0	0	0
Snow/Roof Live Load	2	0	0	0
Snow/Roof Live Load	5	0	0	0
Snow/Roof Live Load	6	0	0	0

Sections Data:

Jamb	Stud Section	2 x 362S162-54, 50 ksi
	Track Section	N/A
Header	Horizontal Stud	N/A
	Horizontal Track	N/A
	Closure Track	2 x 362T125-54, 50 ksi
	Vertical Stud	2 x 600S162-54, 50 ksi
	Vertical Track	N/A



Member Check:

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Hz. Deflection (in)	V.Deflection (in)	Crippling (kips)
Jamb	Actual	4.729	0.106	N/A	1.307	0.227	N/A	N/A
	Allowable	26.364	2.033	21.904	7.98	0.433	N/A	N/A
	Act./All.	0.179 *	0.052 *	N/A	0.164 *	0.524	N/A	N/A
Header	Actual	0.333	0.033	N/A	N/A	0.001	N/A	N/A
Lateral	Allowable	18.723	6.745	N/A	N/A	0.111	N/A	N/A
Elements	Act./All.	0.018	0.005	N/A	N/A	0.013	N/A	N/A

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

3'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Hz. Deflection (in)	V.Deflection (in)	Crippling (kips)
Header	Actual	13.064	1.307	N/A	N/A	N/A	0.013	N/A
Gravity	Allowable	53.214	5.645	N/A	N/A	N/A	0.111	N/A
Elements	Act./All.	0.245 *	0.231	N/A	N/A	N/A	0.116	N/A

Design For Web Crippling Is Disabled

*** Forces are calculated For punched-out section**

Interaction Check (kips.in, kips):

Member	Moment, Shear		Moment, Crippling		Moment, Tension		Moment, Compression	
Jamb	Mx	-4.729	Mx	N/A	Mx	N/A	Mx, My	-4.729, 0.000
	Vy	-0.002	Pcr	N/A	T	N/A	P	-1.307
	Act./All.	0.178	Act./All.	N/A	Act./All.	N/A	Act./All.	0.343
Header	Mx	-0.320	Mx	N/A	Mx	N/A	Mx	N/A
Lateral	Vy	0.007	Pcr1	N/A	T	N/A	P	N/A
Elements	Act./All.	0.017	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A
Header	My	0.001	My	N/A	My	N/A	My	N/A
Gravity	Vx	-1.307	Pcr2	N/A	T	N/A	P	N/A
Elements	Act./All.	0.231	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

3'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Allowable Screws Loads:

Span		Attachment of Header to Jamb	
	Clip Type	None	
1	Allowable F1 (kips)	N/A	[None]
	Allowable F2 (kips)	N/A	
	Allowable F3 (kips)	N/A	
	Actual F1 (kips)	0.000	
	Actual F2 (kips)	0.033	
	Actual F3 (kips)	1.307	
	Linear Interaction Ratio	N/A	
	Attachment to Jamb		
	All. Screw Shear (kips)	N/A	
	All. Screw tension (kips)	N/A	
	Act. Screw Shear (kips)	N/A	
	Act. Screw Tension (kips)	N/A	
	Linear Interaction Ratio	N/A	
	F2 Screws Qty.	N/A	
	Attachment to Header		
	All. Screw Shear (kips)	N/A	
	All. Screw tension (kips)	N/A	
	Act. Screw Shear (kips)	N/A	
	Act. Screw Tension (kips)	N/A	
	Linear Interaction Ratio	N/A	
	F3 Screws Qty.	N/A	

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

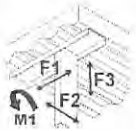
3'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Connection Data:

1	Clip Data	Clip Position	Head Connection @ Jamb
		Clip Type	None
		Screws	N/A
	Allowable Loads	F1 (kips)	N/A
		F2 (kips)	N/A
		F3 (kips)	N/A
		M1 (kips.in)	N/A
		Screw Shear (kips)	N/A
		Screw Tension (kips)	N/A
	Actual Loads	F1 (kips)	0.000
		F2 (kips)	-0.088
		F3 (kips)	0.000
		M1 (kips.in)	0.000
		Screw Shear (kips)	N/A
		Screw Tension (kips)	N/A
	Interaction	Clip Linear Interaction ratio	N/A
		Screws Linear Interaction ratio	N/A
	Base Material	Material	N/A
		Concrete Compressive Strength (psi)	N/A
	Attachment to Structure	Fastener Designation	N/A
		Quantity	N/A
		Min. Penetration (in)	N/A
		Min. Edge Distance for Shear (in)	N/A
		Min. Edge Distance for Tension (in)	N/A
		Min. Fastener Spacing for Shear (in)	N/A
		Min. Fastener Spacing for Tension (in)	N/A
		Allowable Shear (kips)	N/A
		Allowable Tension (kips)	N/A
	Fastener Design Load	Actual Shear (kips)	N/A
		Actual Tension (kips)	N/A
		Interaction Ratio	N/A
		Tensile Strength Reduction Factor	N/A
		Shear Strength Reduction Factor	N/A



Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

3'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

2	Clip Data	Clip Position	Base Connection @ Jamb
		Clip Type	None
		Screws	N/A
	Allowable Loads	F1 (kips)	N/A
		F2 (kips)	N/A
		F3 (kips)	N/A
		M1 (kips.in)	N/A
		Screw Shear (kips)	N/A
		Screw Tension (kips)	N/A
	Actual Loads	F1 (kips)	0.000
		F2 (kips)	-0.121
		F3 (kips)	1.307
		M1 (kips.in)	0.000
		Screw Shear (kips)	N/A
		Screw Tension (kips)	N/A
	Interaction	Clip Linear Interaction ratio	N/A
		Screws Linear Interaction ratio	N/A
	Base Material	Material	N/A
		Concrete Compressive Strength (psi)	N/A
	Attachment to Structure	Fastener Designation	N/A
		Quantity	N/A
		Min. Penetration (in)	N/A
		Min. Edge Distance for Shear (in)	N/A
		Min. Edge Distance for Tension (in)	N/A
		Min. Fastener Spacing for Shear (in)	N/A
		Min. Fastener Spacing for Tension (in)	N/A
		Allowable Shear (kips)	N/A
		Allowable Tension (kips)	N/A
	Fastener Design Load	Actual Shear (kips)	N/A
		Actual Tension (kips)	N/A
		Interaction Ratio	N/A
		Tensile Strength Reduction Factor	N/A
		Shear Strength Reduction Factor	N/A

- When more than one load affect a connection, simple linear relationship is used to check the interaction of multiple loads acting on the connection.
- Fastener attachment of connectors to the primary structure should be reviewed by a design professional.
- Displayed actual & allowable are for one fastener.

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

6' opening

Date: Thu, Apr 30 20

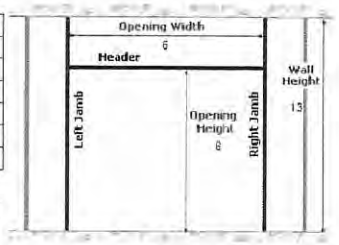
Load Bearing Interior Door

Design Data:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD

Wall Data:

Wall Height (ft)	13
Horizontal Deflection L /	360
Header Vertical Deflection L /	360
Absolute Deflection (in)	1
Max. Bridging Spacing (ft)	4
Stud Spacing (in)	16
Door Type/Wind Load Distribution	Glazed / Four Ways Distribution



Bracing Data:

Jamb Lateral Bracing (in)	Full
Jamb Torsional Bracing (in)	Full
Header Lateral Bracing-Lateral Ld (in)	@ Stud Spacing
Header Torsional Bracing-Lateral Ld (in)	@ Stud Spacing
Header Lateral Bracing-Gravity Ld (in)	None
Header Torsional Bracing-Gravity Ld (in)	None
K φ Distortional Buckling Rotational Stiffness (lbf-in./in.)	50

Design Options:

° Section Layout	Built Up Section
° Fastener Spacing (in)	24
° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1
° Shear Coeff. Kv	5.34
° X (in)	4

Dimensions (ft):

Jamb Height	Door Height	Door Width
13	8	6

Load Combination Factors:

#	Dead	Live	Transverse	Snow/Roof Live Load	Used For
1	1	1	1	1	Strength
2	1	0	0	1	Strength
3	1	0.75	0.75	1	Strength
4	1	1	1	1	Deflection
5	1	0	0	1	Deflection
6	1	0.75	0.75	1	Deflection

Loads Data:

Loads	Value
Dead Load(lbs/ft)	174
Live Load(lbs/ft)	290
Transverse Load(psf)	8

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

6' opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Loads	Value
Snow/Roof Live Load(lbs/ft)	0.000
Jamb Additional Dead Load (lbs)	0.000
Jamb Additional Live Load (lbs)	0.000
Jamb Additional Snow/Roof Load (lbs)	0.000

Reactions:

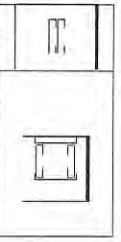
Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	0.131	0	0
2	0.131	0	0
5	0.155	1.392	0
6	0.155	1.392	0

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0	0	0
Dead Load	2	0	0	0
Dead Load	5	0	0.522	0
Dead Load	6	0	0.522	0
Live Load	1	0	0	0
Live Load	2	0	0	0
Live Load	5	0	0.87	0
Live Load	6	0	0.87	0
Transverse Load	1	0.131	0	0
Transverse Load	2	0.131	0	0
Transverse Load	5	0.155	0	0
Transverse Load	6	0.155	0	0
Snow/Roof Live Load	1	0	0	0
Snow/Roof Live Load	2	0	0	0
Snow/Roof Live Load	5	0	0	0
Snow/Roof Live Load	6	0	0	0

Sections Data:

Jamb	Stud Section	2 x 362S162-68, 50 ksi
	Track Section	N/A
Header	Horizontal Stud	N/A
	Horizontal Track	N/A
	Closure Track	2 x 362T125-68, 50 ksi
	Vertical Stud	2 x 600S162-68, 50 ksi
	Vertical Track	N/A



Member Check:

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Hz. Deflection (in)	V.Deflection (in)	Crippling (kips)
Jamb	Actual	7.039	0.138	N/A	1.392	0.27	N/A	N/A
	Allowable	33.982	2.007	27.086	9.826	0.433	N/A	N/A
	Act./All.	0.207 *	0.069 *	N/A	0.142 *	0.622	N/A	N/A
Header Lateral Elements	Actual	1.728	0.096	N/A	N/A	0.018	N/A	N/A
	Allowable	25.626	9.408	N/A	N/A	0.2	N/A	N/A
	Act./All.	0.067	0.010	N/A	N/A	0.088	N/A	N/A

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

6' opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Hz. Deflection (in)	V.Deflection (in)	Crippling (kips)
Header	Actual	25.056	1.392	N/A	N/A	N/A	0.065	N/A
Gravity	Allowable	42.835	10.704	N/A	N/A	N/A	0.2	N/A
Elements	Act./All.	0.585 *	0.130	N/A	N/A	N/A	0.325	N/A

Design For Web Crippling Is Disabled

*** Forces are calculated For punched-out section**

Interaction Check (kips.in, kips):

Member	Moment, Shear		Moment, Crippling		Moment, Tension		Moment, Compression	
Jamb	Mx	-7.039	Mx	N/A	Mx	N/A	Mx, My	-7.039, 0.201
	Vy	0.104	Pcr	N/A	T	N/A	P	-1.392
	Act./All.	0.211	Act./All.	N/A	Act./All.	N/A	Act./All.	0.368
Header	Mx	-1.659	Mx	N/A	Mx	N/A	Mx	N/A
Lateral	Vy	0.019	Pcr1	N/A	T	N/A	P	N/A
Elements	Act./All.	0.065	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A
Header	My	24.054	My	N/A	My	N/A	My	N/A
Gravity	Vx	0.278	Pcr2	N/A	T	N/A	P	N/A
Elements	Act./All.	0.306	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

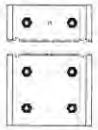
6' opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Allowable Screws Loads:

Span		Attachment of Header to Jamb
	Clip Type	2 x StiffClip® AL362
1	Allowable F1 (kips)	1.134
	Allowable F2 (kips)	2.94
	Allowable F3 (kips)	4.364
	Actual F1 (kips)	0.000
	Actual F2 (kips)	1.392
	Actual F3 (kips)	0.096
	Linear Interaction Ratio	0.495
	Attachment to Jamb	
	All. Screw Shear (kips)	0.777
	All. Screw tension (kips)	0.284
	Act. Screw Shear (kips)	0.244
	Act. Screw Tension (kips)	0.166
	Linear Interaction Ratio	0.900
	F2 Screws Qty.	4 (#12)
	Attachment to Header	
	All. Screw Shear (kips)	0.777
	All. Screw tension (kips)	0.284
	Act. Screw Shear (kips)	0.024
	Act. Screw Tension (kips)	0.209
	Linear Interaction Ratio	0.767
	F3 Screws Qty.	2 (#12)



Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

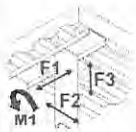
6' opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Connection Data:

1	Clip Data	Clip Position	Head Connection @ Jamb
		Clip Type	None
		Screws	N/A
	Allowable Loads	F1 (kips)	N/A
		F2 (kips)	N/A
		F3 (kips)	N/A
		M1 (kips.in)	N/A
		Screw Shear (kips)	N/A
		Screw Tension (kips)	N/A
	Actual Loads	F1 (kips)	0.000
		F2 (kips)	-0.131
		F3 (kips)	0.000
		M1 (kips.in)	0.000
		Screw Shear (kips)	N/A
		Screw Tension (kips)	N/A
	Interaction	Clip Linear Interaction ratio	N/A
		Screws Linear Interaction ratio	N/A
	Base Material	Material	N/A
		Concrete Compressive Strength (psi)	N/A
	Attachment to Structure	Fastener Designation	N/A
		Quantity	N/A
		Min. Penetration (in)	N/A
		Min. Edge Distance for Shear (in)	N/A
		Min. Edge Distance for Tension (in)	N/A
		Min. Fastener Spacing for Shear (in)	N/A
		Min. Fastener Spacing for Tension (in)	N/A
		Allowable Shear (kips)	N/A
		Allowable Tension (kips)	N/A
	Fastener Design Load	Actual Shear (kips)	N/A
		Actual Tension (kips)	N/A
		Interaction Ratio	N/A
		Tensile Strength Reduction Factor	N/A
		Shear Strength Reduction Factor	N/A



Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

6' opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

2	Clip Data	Clip Position	Base Connection @ Jamb
		Clip Type	StiffClip® AL362
		Screws	2 (#12)
	Allowable Loads	F1 (kips)	0.284
		F2 (kips)	1.47
		F3 (kips)	1.095
		M1 (kips.in)	N/A
		Screw Shear (kips)	0.777
		Screw Tension (kips)	0.284
	Actual Loads	F1 (kips)	0.002
		F2 (kips)	0.000
		F3 (kips)	0.155
		M1 (kips.in)	N/A
		Screw Shear (kips)	0.114
		Screw Tension (kips)	0.001
	Interaction	Clip Linear Interaction ratio	0.149
		Screws Linear Interaction ratio	0.150
	Base Material	Material	NW Concrete, fc = 4000 psi
		Concrete Compressive Strength (psi)	N/A
	Attachment to Structure	Fastener Designation	X-U, 0.157(in)
		Quantity	2
		Min. Penetration (in)	1
		Min. Edge Distance for Shear (in)	2.75
		Min. Edge Distance for Tension (in)	2.75
		Min. Fastener Spacing for Shear (in)	2.75
		Min. Fastener Spacing for Tension (in)	2.75
		Allowable Shear (kips)	0.225
		Allowable Tension (kips)	0.17
	Fastener Design Load	Actual Shear (kips)	0.077
		Actual Tension (kips)	0.046
		Interaction Ratio	0.616
		Tensile Strength Reduction Factor	1.000
		Shear Strength Reduction Factor	1.000

- When more than one load affect a connection, simple linear relationship is used to check the interaction of multiple loads acting on the connection.
- Fastener attachment of connectors to the primary structure should be reviewed by a design professional.
- Displayed actual & allowable are for one fastener.
- Fastener spacing for attachment to the primary structure (1.875(in)) is less than the minimum spacing recommended by fastener manufacturer (Ratio = 0.68).

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

7'-4" opening

Load Bearing Interior Door

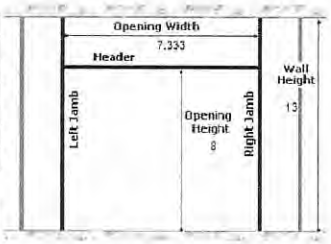
Date: Thu, Apr 30 20

Design Data:

Design Code	2018 IBC/AISI S100-16/ASCE 7-16
Design Method	ASD

Wall Data:

Wall Height (ft)	13
Horizontal Deflection L /	360
Header Vertical Deflection L /	360
Absolute Deflection (in)	1
Max. Bridging Spacing (ft)	4
Stud Spacing (in)	16
Door Type/Wind Load Distribution	Glazed / Four Ways Distribution



Bracing Data:

Jamb Lateral Bracing (in)	Full
Jamb Torsional Bracing (in)	Full
Header Lateral Bracing-Lateral Ld (in)	@ Stud Spacing
Header Torsional Bracing-Lateral Ld (in)	@ Stud Spacing
Header Lateral Bracing-Gravity Ld (in)	None
Header Torsional Bracing-Gravity Ld (in)	None
K_{φ} Distortional Buckling Rotational Stiffness (lbf-in./in.)	50

Design Options:

° Section Layout	Built Up Section
° Fastener Spacing (in)	24
° Standard Punchout	Considered
° Strength Increase from Cold Work of Forming (AISI, Sec. A7.2)	Considered
° CMx	1
° Cb	1
° Shear Coeff. Kv	5.34
° X (in)	4

Dimensions (ft):

Jamb Height	Door Height	Door Width
13	8	7.333

Load Combination Factors:

#	Dead	Live	Transverse	Snow/Roof Live Load	Used For
1	1	1	1	1	Strength
2	1	0	0	1	Strength
3	1	0.75	0.75	1	Strength
4	1	1	1	1	Deflection
5	1	0	0	1	Deflection
6	1	0.75	0.75	1	Deflection

Loads Data:

Loads	Value
Dead Load(lbs/ft)	110
Live Load(lbs/ft)	183
Transverse Load(psf)	8

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

7'-4" opening

Load Bearing Interior Door

Date: Thu, Apr 30 20

Loads	Value
Snow/Roof Live Load(lbs/ft)	0.000
Jamb Additional Dead Load (lbs)	0.000
Jamb Additional Live Load (lbs)	0.000
Jamb Additional Snow/Roof Load (lbs)	0.000

Reactions:

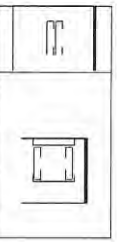
Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
1	0.152	0	0
2	0.152	0	0
5	0.172	1.074	0
6	0.172	1.074	0

Unfactored Reactions:

Load Case	Joint	Rx (kips)	Ry (kips)	Rm (kips.in)
Dead Load	1	0	0	0
Dead Load	2	0	0	0
Dead Load	5	0	0.403	0
Dead Load	6	0	0.403	0
Live Load	1	0	0	0
Live Load	2	0	0	0
Live Load	5	0	0.671	0
Live Load	6	0	0.671	0
Transverse Load	1	0.152	0	0
Transverse Load	2	0.152	0	0
Transverse Load	5	0.172	0	0
Transverse Load	6	0.172	0	0
Snow/Roof Live Load	1	0	0	0
Snow/Roof Live Load	2	0	0	0
Snow/Roof Live Load	5	0	0	0
Snow/Roof Live Load	6	0	0	0

Sections Data:

Jamb	Stud Section	2 x 362S162-68, 50 ksi
	Track Section	N/A
Header	Horizontal Stud	N/A
	Horizontal Track	N/A
	Closure Track	2 x 362T125-68, 50 ksi
	Vertical Stud	2 x 1200S162-68, 50 ksi
	Vertical Track	N/A



Member Check:

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Hz. Deflection (in)	V.Deflection (in)	Crippling (kips)
Jamb	Actual	8.32	0.154	N/A	1.074	0.312	N/A	N/A
	Allowable	33.982	2.007	27.086	9.826	0.433	N/A	N/A
	Act./All.	0.245 *	0.077 *	N/A	0.109 *	0.720	N/A	N/A
Header Lateral Elements	Actual	2.796	0.127	N/A	N/A	0.042	N/A	N/A
	Allowable	25.626	9.408	N/A	N/A	0.244	N/A	N/A
	Act./All.	0.109	0.014	N/A	N/A	0.173	N/A	N/A

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

7'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Member		Moment (kips.in)	Shear (kips)	Tension (kips)	Compression (kips)	Hz. Deflection (in)	V.Deflection (in)	Crippling (kips)
Header Gravity Elements	Actual	23.633	1.074	N/A	N/A	N/A	0.018	N/A
	Allowable	62.503	5.54	N/A	N/A	N/A	0.244	N/A
	Act./All.	0.378 *	0.194	N/A	N/A	N/A	0.072	N/A

Design For Web Crippling Is Disabled

*** Forces are calculated For punched-out section**

Interaction Check (kips.in, kips):

Member	Moment, Shear		Moment, Crippling		Moment, Tension		Moment, Compression	
Jamb	Mx	-8.320	Mx	N/A	Mx	N/A	Mx, My	-8.320, 0.155
	Vy	0.125	Pcr	N/A	T	N/A	P	-1.074
	Act./All.	0.250	Act./All.	N/A	Act./All.	N/A	Act./All.	0.369
Header Lateral Elements	Mx	-2.684	Mx	N/A	Mx	N/A	Mx	N/A
	Vy	0.025	Pcr1	N/A	T	N/A	P	N/A
	Act./All.	0.105	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A
Header Gravity Elements	My	0.001	My	N/A	My	N/A	My	N/A
	Vx	-1.074	Pcr2	N/A	T	N/A	P	N/A
	Act./All.	0.194	Act./All.	N/A	Act./All.	N/A	Act./All.	N/A

Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

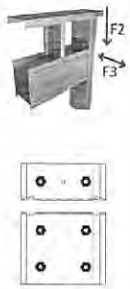
7'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Allowable Screws Loads:

Span		Attachment of Header to Jamb
1	Clip Type	2 x StiffClip® AL362
	Allowable F1 (kips)	1.134
	Allowable F2 (kips)	2.94
	Allowable F3 (kips)	4.364
	Actual F1 (kips)	0.000
	Actual F2 (kips)	1.074
	Actual F3 (kips)	0.127
	Linear Interaction Ratio	0.395
	Attachment to Jamb	
	All. Screw Shear (kips)	0.777
	All. Screw tension (kips)	0.284
	Act. Screw Shear (kips)	0.189
	Act. Screw Tension (kips)	0.132
	Linear Interaction Ratio	0.708
	F2 Screws Qty.	4 (#12)
	Attachment to Header	
	All. Screw Shear (kips)	0.777
	All. Screw tension (kips)	0.284
	Act. Screw Shear (kips)	0.032
	Act. Screw Tension (kips)	0.161
	Linear Interaction Ratio	0.609
	F3 Screws Qty.	2 (#12)



Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

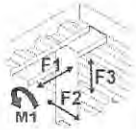
7'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

Connection Data:

1	Clip Data	Clip Position	Head Connection @ Jamb
		Clip Type	None
		Screws	N/A
	Allowable Loads	F1 (kips)	N/A
		F2 (kips)	N/A
		F3 (kips)	N/A
		M1 (kips.in)	N/A
		Screw Shear (kips)	N/A
		Screw Tension (kips)	N/A
	Actual Loads	F1 (kips)	0.000
		F2 (kips)	-0.152
		F3 (kips)	0.000
		M1 (kips.in)	0.000
		Screw Shear (kips)	N/A
		Screw Tension (kips)	N/A
	Interaction	Clip Linear Interaction ratio	N/A
		Screws Linear Interaction ratio	N/A
	Base Material	Material	N/A
		Concrete Compressive Strength (psi)	N/A
	Attachment to Structure	Fastener Designation	N/A
		Quantity	N/A
		Min. Penetration (in)	N/A
		Min. Edge Distance for Shear (in)	N/A
		Min. Edge Distance for Tension (in)	N/A
		Min. Fastener Spacing for Shear (in)	N/A
		Min. Fastener Spacing for Tension (in)	N/A
		Allowable Shear (kips)	N/A
		Allowable Tension (kips)	N/A
	Fastener Design Load	Actual Shear (kips)	N/A
		Actual Tension (kips)	N/A
		Interaction Ratio	N/A
		Tensile Strength Reduction Factor	N/A
		Shear Strength Reduction Factor	N/A



Company: ARW Engineers
Address: 1594 W Park Circle
Country: United States
State: Utah
Zip Code: 84404

7'-4" opening

Date: Thu, Apr 30 20

Load Bearing Interior Door

2	Clip Data	Clip Position	Base Connection @ Jamb
		Clip Type	StiffClip® AL362
		Screws	2 (#12)
	Allowable Loads	F1 (kips)	0.284
		F2 (kips)	1.47
		F3 (kips)	1.095
		M1 (kips.in)	N/A
		Screw Shear (kips)	0.777
		Screw Tension (kips)	0.284
	Actual Loads	F1 (kips)	0.002
		F2 (kips)	0.000
		F3 (kips)	0.172
		M1 (kips.in)	N/A
		Screw Shear (kips)	0.126
		Screw Tension (kips)	0.001
	Interaction	Clip Linear Interaction ratio	0.162
		Screws Linear Interaction ratio	0.166
	Base Material	Material	NW Concrete, fc = 4000 psi
		Concrete Compressive Strength (psi)	N/A
	Attachment to Structure	Fastener Designation	X-U, 0.157(in)
		Quantity	2
		Min. Penetration (in)	1
		Min. Edge Distance for Shear (in)	2.75
		Min. Edge Distance for Tension (in)	2.75
		Min. Fastener Spacing for Shear (in)	2.75
		Min. Fastener Spacing for Tension (in)	2.75
		Allowable Shear (kips)	0.225
		Allowable Tension (kips)	0.17
	Fastener Design Load	Actual Shear (kips)	0.086
		Actual Tension (kips)	0.051
		Interaction Ratio	0.684
		Tensile Strength Reduction Factor	1.000
		Shear Strength Reduction Factor	1.000

- When more than one load affect a connection, simple linear relationship is used to check the interaction of multiple loads acting on the connection.
- Fastener attachment of connectors to the primary structure should be reviewed by a design professional.
- Displayed actual & allowable are for one fastener.
- Fastener spacing for attachment to the primary structure (1.875(in)) is less than the minimum spacing recommended by fastener manufacturer (Ratio = 0.68).

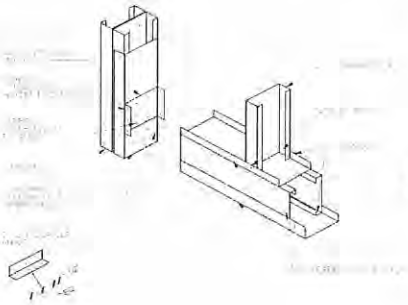
ENGINEERS

AISI S100-2007 METAL BOX HEADER CONNECTION DESIGN
Version Date: May 9, 2016 Author: Steven L. Ericksen SE
JOB TITLE: FAA
DESCRIPTION: Typ Box Header

April 30, 2020
8:58 AM
JOB #: 19521

Metal Stud Wall Box Header Connection Design

Based on AISI S100-2007 (ASD Level Forces)



HEADER REACTIONS

Vertical Reaction 1392 lbs

Lateral Reaction 168 lbs
This reaction is based on the Ch. 13 connection Fp force for seismic loads

CONNECTION INFORMATION

Header Information
Header Studs 600S162-68
Fy_{stud}= 50000 psi
# of Header Vert. Webs 2
(No. of studs in header w/ vert webs)
Header Tracks 362T125-68
Fy_{track}= 50000

Header to Track Screws
Screws Ea. Side 3
Screw Size #10

Jamb Information
Jamb Thickness (mils) 68
Fy_{jamb}= 50000 psi

Header Track Connector Piece
Header Track Connector 362T125-68
Fy_{track}= 50000 psi
Length of Track = 5.5 in
Track Thickness = 0.0713 in
Track to Jamb Screws 6
Screw Size #10

Lateral Angle Connectors
Angle Thickness (mils) 68
Fy_{clip}= 50000 psi
# of Screws into Header 3
Screw Size #10
# of Screws into Jamb. 3
Screw Size #10

HEADER CONNECTION TO CONNECTOR CLIP

Shear in screws

Track Properties: t1= 0.0451, Fu1= 60000
Header Properties: t2= 0.0713, Fu2= 60000
Screw Dia. d = 0.19
t_2/t_1 = 1.5809313
Pns= 1388 lbs/screw

Applied Load (ea. Side) 696 lbs
Connection Capacity 1388 lbs

Screws are Sufficient

CONNECTION TRACK ATTACHMENT TO JAMB

Shear in screws

Track Properties: t1= 0.0713, Fu1= 60000
Jamb Properties: t2= 0.0713, Fu2= 60000
Screw Dia. d = 0.19
t_2/t_1 = 1.000
Pns= 2091 lbs/screw

Tension : Pull-Out
Pnot= 230 lbs/screw

Tension : Pull-Over
Pnov= 406 lbs/screw

Applied Shear Load 1392 lbs
Reslutant Tension Load 232 lbs
(Due to eccentricity)

Combined Shear and Tension
Interaction Eqn. 0.42

Connection is Sufficient

ENGINEERS

AISI S100-2007 METAL BOX HEADER CONNECTION DESIGN
Version Date: August 28, 2012 Author: Steven L. Ericksen SE Reviewed by: ????
JOB TITLE: FAA
DESCRIPTION: Typ Box Header

April 30, 2020
8:58 AM
JOB #: 19521

Metal Stud Wall Box Header Connection Design

Based on AISI S100-2007 (ASD Level Forces)

HEADER TRACK CONNECTION TO LATERAL CLIPS

Shear in screws

Clip Properties: t1= 0.0713, Fu1= 60000
Header Properties: t2= 0.0713, Fu2= 60000
Screw Dia. d = 0.19
t_2/t_1 = 1
Pns= 2091 lbs/screw

Applied Load (ea. Side) 168 lbs
Conneciton Capacity 2091 lbs

Screws are Sufficient

LATERAL CLIP CONNECTION TO JAMB

Shear in screws

Clip Properties: t1= 0.0713, Fu1= 60000
Jamb Properties: t2= 0.0713, Fu2= 60000
Screw Dia. d = 0.19
t_2/t_1 = 1.000
Pns= 2091 lbs/screw

Tension : Pull-Out
Pnot= 230 lbs/screw

Tension : Pull-Over
Pnov= 406 lbs/screw

Applied Shear Load 168 lbs
Reslutant Tension Load 71 lbs
(Due to eccentricity)

Combined Shear and Tension
Interaction Eqn. 0.42

Connection is Sufficient

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

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Lic. # : KW-06002489 ARW ENGINEERS

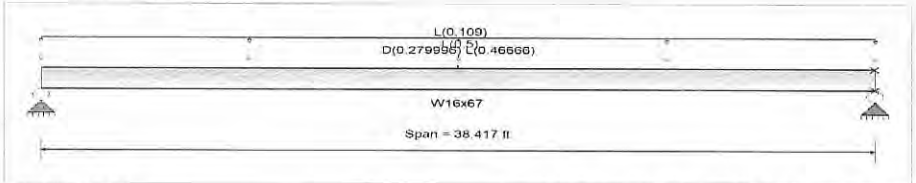
DESCRIPTION: W-beam - case 1 BEAM DESIGN

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.0120, L = 0.020 ksf, Tributary Width = 23.333 ft

Uniform Load : L = 0.1090 k/ft, Tributary Width = 1.0 ft

Point Load : L = 0.50 k @ 19.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.540 : 1	Maximum Shear Stress Ratio =	0.140 : 1
Section used for this span	W16x67	Section used for this span	W16x67
Ma : Applied	175.015 k-ft	Va : Applied	17.973 k
Mn / Omega : Allowable	324.351 k-ft	Vn/Omega : Allowable	128.770 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	19.209 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	1.060 in	Ratio =	434 >=360.
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Max Downward Total Deflection	1.679 in	Ratio =	275 >=240.
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+L+H													
Dsgn. L = 38.42 ft	1	0.540	0.140	175.01		175.01	541.67	324.35	1.00	1.00	17.97	193.16	128.77
+D+Lr+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+S+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+0.750Lr+0.750L+H													
Dsgn. L = 38.42 ft	1	0.454	0.118	147.26		147.26	541.67	324.35	1.00	1.00	15.15	193.16	128.77
+D+0.750L+0.750S+H													
Dsgn. L = 38.42 ft	1	0.454	0.118	147.26		147.26	541.67	324.35	1.00	1.00	15.15	193.16	128.77
+D+0.60W+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 38.42 ft	1	0.454	0.118	147.26		147.26	541.67	324.35	1.00	1.00	15.15	193.16	128.77
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 38.42 ft	1	0.454	0.118	147.26		147.26	541.67	324.35	1.00	1.00	15.15	193.16	128.77

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
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DESCRIPTION: W-beam - case 1

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+0.60D+0.60W+0.60H													
Dsgn. L = 38.42 ft	1	0.118	0.031	38.41		38.41	541.67	324.35	1.00	1.00	4.00	193.16	128.77
+D+0.70E+0.60H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 38.42 ft	1	0.454	0.118	147.26		147.26	541.67	324.35	1.00	1.00	15.15	193.16	128.77
+0.60D+0.70E+H													
Dsgn. L = 38.42 ft	1	0.118	0.031	38.41		38.41	541.67	324.35	1.00	1.00	4.00	193.16	128.77

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	1.6790	19.318		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	17.973	17.973
Overall MINimum	3.999	3.999
+D+H	6.665	6.665
+D+L+H	17.973	17.973
+D+Lr+H	6.665	6.665
+D+S+H	6.665	6.665
+D+0.750Lr+0.750L+H	15.146	15.146
+D+0.750L+0.750S+H	15.146	15.146
+D+0.60W+H	6.665	6.665
+D+0.750Lr+0.750L+0.450W+H	15.146	15.146
+D+0.750L+0.750S+0.450W+H	15.146	15.146
+0.60D+0.60W+0.60H	3.999	3.999
+D+0.70E+0.60H	6.665	6.665
+D+0.750L+0.750S+0.5250E+H	15.146	15.146
+0.60D+0.70E+H	3.999	3.999
D Only	6.665	6.665
Lr Only		
L Only	11.308	11.307
S Only		
W Only		
E Only		
H Only		

ARW Engineers
1594 Park Circle
Ogden, UT
84404

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Project ID:
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DESCRIPTION: W-beam - case 2

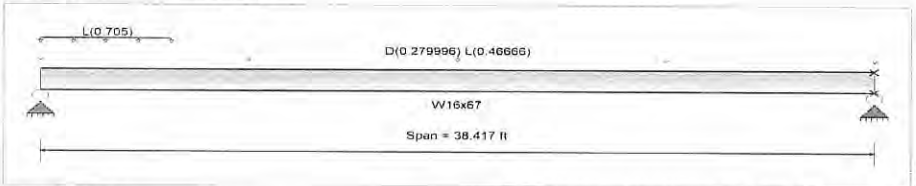
CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.0120, L = 0.020 ksf, Tributary Width = 23.333 ft

Uniform Load : L = 0.7050 k/ft, Extent = 0.0 –>> 6.0 ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.483 : 1	Maximum Shear Stress Ratio =	0.152 : 1
Section used for this span	W16x67	Section used for this span	W16x67
Ma : Applied	156.517 k-ft	Va : Applied	19.529 k
Mn / Omega : Allowable	324.351 k-ft	Vn/Omega : Allowable	128.770 k
Load Combination	+D+L+H	Load Combination	+D+L+H
Location of maximum on span	18.769 ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.902 in	Ratio =	510 >=360
Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Max Downward Total Deflection	1.520 in	Ratio =	303 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+L+H													
Dsgn. L = 38.42 ft	1	0.483	0.152	156.52		156.52	541.67	324.35	1.00	1.00	19.53	193.16	128.77
+D+Lr+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+S+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+0.750Lr+0.750L+H													
Dsgn. L = 38.42 ft	1	0.411	0.127	133.39		133.39	541.67	324.35	1.00	1.00	16.31	193.16	128.77
+D+0.750L+0.750S+H													
Dsgn. L = 38.42 ft	1	0.411	0.127	133.39		133.39	541.67	324.35	1.00	1.00	16.31	193.16	128.77
+D+0.60W+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 38.42 ft	1	0.411	0.127	133.39		133.39	541.67	324.35	1.00	1.00	16.31	193.16	128.77
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 38.42 ft	1	0.411	0.127	133.39		133.39	541.67	324.35	1.00	1.00	16.31	193.16	128.77
+0.60D+0.60W+0.60H													
Dsgn. L = 38.42 ft	1	0.118	0.031	38.41		38.41	541.67	324.35	1.00	1.00	4.00	193.16	128.77
+D+0.70E+0.60H													

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

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Steel Beam

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DESCRIPTION: W-beam - case 2

Load Combination / Segment Length	Span #	Max Stress Ratios M	Max Stress Ratios V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 38.42 ft	1	0.197	0.052	64.01		64.01	541.67	324.35	1.00	1.00	6.67	193.16	128.77
+0.60D+0.70E+H													
Dsgn. L = 38.42 ft	1	0.411	0.127	133.39		133.39	541.67	324.35	1.00	1.00	16.31	193.16	128.77
Dsgn. L = 38.42 ft	1	0.118	0.031	38.41		38.41	541.67	324.35	1.00	1.00	4.00	193.16	128.77

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	1.5204	19.099		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 — Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	19.529	15.959
Overall MINimum	3.999	3.999
+D+H	6.665	6.665
+D+L+H	19.529	15.959
+D+Lr+H	6.665	6.665
+D+S+H	6.665	6.665
+D+0.750Lr+0.750L+H	16.313	13.636
+D+0.750L+0.750S+H	16.313	13.636
+D+0.60W+H	6.665	6.665
+D+0.750Lr+0.750L+0.450W+H	16.313	13.636
+D+0.750L+0.750S+0.450W+H	16.313	13.636
+0.60D+0.60W+0.60H	3.999	3.999
+D+0.70E+0.60H	6.665	6.665
+D+0.750L+0.750S+0.5250E+H	16.313	13.636
+0.60D+0.70E+H	3.999	3.999
D Only	6.665	6.665
Lr Only		
L Only	12.864	9.294
S Only		
W Only		
E Only		
H Only		

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
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Steel Column

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DESCRIPTION: Post @ w-beam

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Steel Section Name :	**HSS5x3x5/16**	Overall Column Height	13.0 ft
Analysis Method :	Allowable Strength	Top & Bottom Fixity	Top & Bottom Pinned
Steel Stress Grade		Brace condition for deflection (buckling) along columns :	
Fy : Steel Yield	50.0 ksi	X-X (width) axis :	
E : Elastic Bending Modulus	29,000.0 ksi	Unbraced Length for buckling ABOUT Y-Y Axis = 13.0 ft, K = 1.0	
		Y-Y (depth) axis :	
		Unbraced Length for buckling ABOUT X-X Axis = 13.0 ft, K = 1.0	

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 192.790 lbs * Dead Load Factor
AXIAL LOADS . .
Axial Load at 13.0 ft, Xecc = 2.50 in, D = 6.670, L = 12.90 k

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = 0.8922 : 1
Load Combination +D+L+H
Location of max.above base 12.913 ft
At maximum location values are . . .
Pa : Axial 19.763 k
Pn / Omega : Allowable 34.665 k
Ma-x : Applied 0.0 k-ft
Mn-x / Omega : Allowable 16.018 k-ft
Ma-y : Applied -4.050 k-ft
Mn-y / Omega : Allowable 11.178 k-ft

Maximum Load Reactions . .
Top along X-X 0.3136 k
Bottom along X-X 0.3136 k
Top along Y-Y 0.0 k
Bottom along Y-Y 0.0 k

Maximum Load Deflections . . .
Along Y-Y 0.0 in at 0.0 ft above base
for load combination :
Along X-X -0.4744 in at 7.591 ft above base
for load combination :+D+L+H

PASS Maximum Shear Stress Ratio = 0.01410 : 1
Load Combination +D+L+H
Location of max.above base 0.0 ft
At maximum location values are . . .
Va : Applied 0.3136 k
Vn / Omega : Allowable 22.238 k

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios: Stress Ratio	Status	Location
+D+H	0.222	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.005	PASS	0.00 ft
+D+L+H	0.892	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.014	PASS	0.00 ft
+D+Lr+H	0.222	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.005	PASS	0.00 ft
+D+S+H	0.222	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.005	PASS	0.00 ft
+D+0.750Lr+0.750L+H	0.746	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.012	PASS	0.00 ft
+D+0.750L+0.750S+H	0.746	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.012	PASS	0.00 ft
+D+0.60W+H	0.222	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.005	PASS	0.00 ft
+D+0.750Lr+0.750L+0.450W+H	0.746	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.012	PASS	0.00 ft
+D+0.750L+0.750S+0.450W+H	0.746	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.012	PASS	0.00 ft
+0.60D+0.60W+0.60H	0.133	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.003	PASS	0.00 ft
+D+0.70E+0.60H	0.222	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.005	PASS	0.00 ft
+D+0.750L+0.750S+0.5250E+H	0.746	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.012	PASS	0.00 ft
+0.60D+0.70E+H	0.133	PASS	12.91 ft	1.00	1.66	89.14	133.33	0.003	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	k	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top	k-ft	My - End Moments @ Base	My - End Moments @ Top
+D+H	6.863	0.107	0.107								
+D+L+H	19.763	0.314	0.314								

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 27 APR 2020, 2:55PM

Steel Column

File = Y:\Projects 2019\19521 - FAA En Route Engineering Center\Engineering\Calculations\Other\19521.ec6 ;
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Lic. # : KW-06002489 ARW ENGINEERS

DESCRIPTION: Post @ w-beam

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	k	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top	k-ft	My - End Moments @ Base	My - End Moments @ Top
+D+Lr+H	6.863	0.107	0.107								
+D+S+H	6.863	0.107	0.107								
+D+0.750Lr+0.750L+H	16.538	0.262	0.262								
+D+0.750L+0.750S+H	16.538	0.262	0.262								
+D+0.60W+H	6.863	0.107	0.107								
+D+0.750Lr+0.750L+0.450W+H	16.538	0.262	0.262								
+D+0.750L+0.750S+0.450W+H	16.538	0.262	0.262								
+0.60D+0.60W+0.60H	4.118	0.064	0.064								
+D+0.70E+0.60H	6.863	0.107	0.107								
+D+0.750L+0.750S+0.5250E+H	16.538	0.262	0.262								
+0.60D+0.70E+H	4.118	0.064	0.064								
D Only	6.863	0.107	0.107								
Lr Only											
L Only	12.900	0.207	0.207								
S Only											
W Only											
E Only											
H Only											

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	k	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top	k-ft	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	19.763	0.314	0.314								
"	Minimum											
Reaction, X-X Axis Base	Maximum	19.763	0.314	0.314								
"	Minimum											
Reaction, Y-Y Axis Base	Maximum	6.863	0.107	0.107								
"	Minimum	6.863	0.107	0.107								
Reaction, X-X Axis Top	Maximum	19.763	0.314	0.314								
"	Minimum											
Reaction, Y-Y Axis Top	Maximum	12.900	0.207	0.207								
"	Minimum	6.863	0.107	0.107								
Moment, X-X Axis Base	Maximum	6.863		0.107								
"	Minimum	6.863		0.107								
Moment, Y-Y Axis Base	Maximum	6.863	0.107	0.107								
"	Minimum	6.863	0.107	0.107								
Moment, X-X Axis Top	Maximum	6.863	0.107	0.107								
"	Minimum	6.863	0.107	0.107								
Moment, Y-Y Axis Top	Maximum	6.863	0.107	0.107								
"	Minimum	6.863	0.107	0.107								

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
+D+H	-0.1617	in	7.591	ft	0.000	in	0.000	ft
+D+L+H	-0.4744	in	7.591	ft	0.000	in	0.000	ft
+D+Lr+H	-0.1617	in	7.591	ft	0.000	in	0.000	ft
+D+S+H	-0.1617	in	7.591	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+H	-0.3962	in	7.591	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+H	-0.3962	in	7.591	ft	0.000	in	0.000	ft
+D+0.60W+H	-0.1617	in	7.591	ft	0.000	in	0.000	ft
+D+0.750Lr+0.750L+0.450W+H	-0.3962	in	7.591	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+0.450W+H	-0.3962	in	7.591	ft	0.000	in	0.000	ft
+0.60D+0.60W+0.60H	-0.0970	in	7.591	ft	0.000	in	0.000	ft
+D+0.70E+0.60H	-0.1617	in	7.591	ft	0.000	in	0.000	ft
+D+0.750L+0.750S+0.5250E+H	-0.3962	in	7.591	ft	0.000	in	0.000	ft
+0.60D+0.70E+H	-0.0970	in	7.591	ft	0.000	in	0.000	ft
D Only	-0.1617	in	7.591	ft	0.000	in	0.000	ft
Lr Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
L Only	-0.3127	in	7.591	ft	0.000	in	0.000	ft

ARW Engineers
1594 Park Circle
Ogden, UT
84404

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 27 APR 2020, 2:55PM

Steel Column

File = Y:\Projects 2019\19521 - FAA En Route Engineering Center\Engineering\Calculations\Other\19521.ec6 .
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Lic. #: KW-06002489 ARW ENGINEERS

DESCRIPTION: Post @ w-beam

Maximum Deflections for Load Combinations

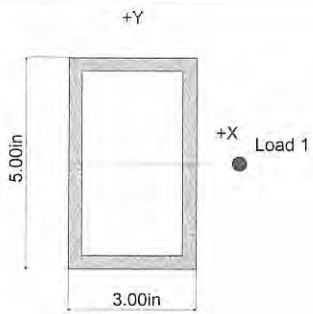
Load Combination	Max. X-X Deflection		Distance		Max. Y-Y Deflection		Distance	
S Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
W Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
E Only	0.0000	in	0.000	ft	0.000	in	0.000	ft
H Only	0.0000	in	0.000	ft	0.000	in	0.000	ft

Steel Section Properties : HSS5x3x5/16

Depth	=	5.000 in	I xx	=	12.60 in^4		J	=	13.100 in^4
Design Thick	=	0.291 in	S xx	=	5.03 in^3		Cw	=	7.33 in^6
Width	=	3.000 in	R xx	=	1.750 in				
Wall Thick	=	0.313 in	Zx	=	6.420 in^3				
Area	=	4.100 in^2	I yy	=	5.600 in^4		C	=	7.330 in^3
Weight	=	14.830 plf	S yy	=	3.730 in^3				
			R yy	=	1.170 in				
			Zy	=	4.480 in^3				

Ycg = 0.000 in

Sketches



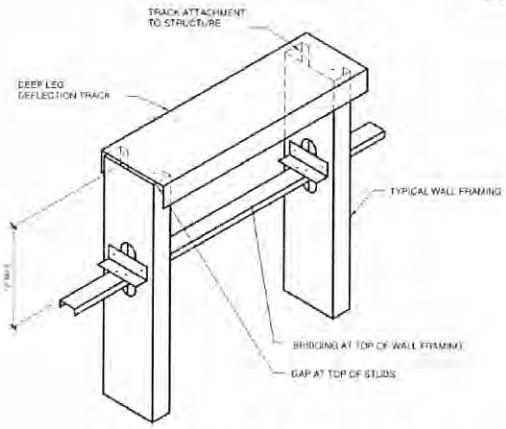
ARW ENGINEERS

AISI S100-2007 METAL STUD WALL DEFLECTION TRACK CONNECTION
Version Date: August 28, 2012 Author: Steven L. Ericksen SE Reviewed by: ????
JOB TITLE: FAA Mezzanine
DESCRIPTION: Deflection Track @ jamb

August 4, 2020
10:09 AM
JOB #: 19521

Metal Stud Wall Connection at Top Deflection Track

Based on AISI S100-2007 (ASD Level Forces)



WALL LOADING

Wind Wall Pressure	0	psf	Seismic Wall Weight	10	psf
Wall Height	12	ft	Sds	1.468	
			Ip	1.5	
			Track Design Force (ap=1.0, Rp = 2.5)	34.361	psf
			Track Connection Force (ap=1.0, Rp = 2.5)	34.361	psf

WALL FRAMING INFORMATION

Stud Spacing	16	in	Track Designation	362T250-54	
			Thickness	0.0566	in
Stud Designation	362S162-54		Ix	1.224538	in^4
Thickness	0.0566	in	Sx	0.64061627	in^3
Depth	3.625	in	Flange	2.5	in
Flange	1.625	in	Depth	3.823	in
Fy	50000	psi	Fy	50000	psi
			Track Anchor Spacing	16	in
			Track Anchor Diameter	0.19	in

STUD ATTACHMENT TO TRACK (STUD WEB CRIPPLING)

C =	4	CN =	0.6	R =	0.0849	h =	3.625
CR =	0.4	Ch =	0.03	N =	1	t =	0.0566

Transverse wall stud capacity, Pnst, is based on the following assumptions.
- #8 Screws attaching studs to track
- 1/8" Max gap at bottom of stud.
- Track is same or greater thickness than stud.

Pnst/Ω = **486** lbs AISI S211-07 Eq. B2.2-1

Stud Reaction = 192 lbs ***Pnst > Reaction, Connection OK***

STUD ATTACHMENT TO TRACK (TRACK FLANGE BENDING)

Deflection Gap	0.75	in	
Minimum Track leg size	2.25	in	Track leg is adequate

Effective Track Length 12.6 in

Transverse wall track capacity, Pndt, is based on the following assumptions.
- Stud spacing is between 12" and 24" on center
- Track is connected to its support at a fastener spacing not greater than the stud spacing.
- Track is same or greater thickness than stud.

Pndt/Ω = **671** lbs AISI S211-07 Eq. B2.3-1

Stud Reaction = **193** lbs ***Pnst > Reaction, Connection OK***

TRACK BENDING BETWEEN ANCHORS

Flexure Check

Moment in Track = **4618** lb-in

Mn/Ω = **9401** lb-in AISI S100-07 Eq. E3.3.1-1

Track is Sufficient

Shear Check

Shear Force At Connector **96** lbs

Shear Yielding Pn/Ω = **2794** lbs AISI S100-07 Eq. E3.1-1

Shear Yielding Pn/Ω = 5107 lbs AISI S100-07 Eq. E3.2-8

Track is Sufficient

TRACK WEB BEARING ON ANCHORS

Are Washers Being Used? NO

Pn/Ω = 581 lbs AISI S100-07 Eq. E3.3.1-1

Pn/Ω = **521** lbs AISI S100-07 Eq. E3.3.2-1

Force at Track Connectors = **192** lbs

Track Bearing is Sufficient

ANCHOR CONNECTION FORCE

Shear= **192** lbs
Tension = **164** lbs

Interior non-bearing walls:

height = 13'-0" (MAX)

Check deflection track connection for 7.42PSF (MIN)

PLF LOAD = 7.42PSF (13'-0"/2) = 49 PLF

#10 SCREW CAPACITY (54 MIL) = 534 # SHEAR.

JOISTS ARE SPACED @ 16" o.c. . ATTACH TO EA. JOIST.

FROM DEFLECTION TRACK SPST: SHEAR = 186 #

TENC = 157 #

#10 SCREW CAP = TENS = 198 #

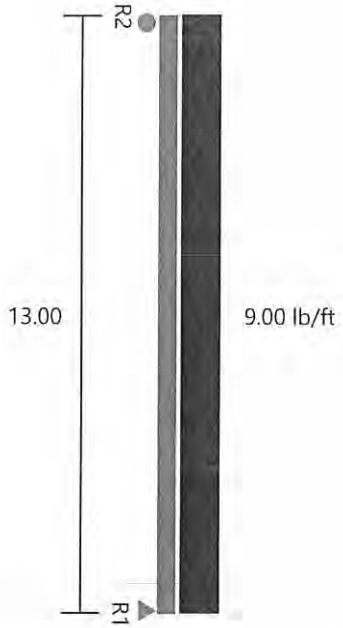
SHEAR = 534 #

(54 MIL)

(2) #10 SCREWS OK.

Project Name: FAA
Model: Non bearing wall
Code: 2012 NASPEC [AISI S100-2012]

Date: 08/04/2020
Simpson Strong-Tie® CFS Designer™ 3.2.0.0



Section : 362S162-54 (50 ksi) Single C Stud (punched)
Maxo = 1106.7 Ft-Lb **Va =** 3371.6 lb **I =** 0.87 in^4

Loads have not been modified for strength checks
Loads have been multiplied by 0.70 for deflection calculations

Bridging Connectors - Design Method =AISI S100

Span	Axial KyLy, KtLt	Flexual, Distortional	Connector	Stress Ratio
Span	NA	None, 156.0"	N/A	-

Web Crippling

Support	Load (lb)	Bearing (in)	Pa (lb)	M (ft-lbs)	Max Int.	Stiffener?
R2	58.5	--Shear Connection w/ clip--				NO
R1	58.5	--Shear Connection w/ clip--				NO

Gravity Load

Type	Load (lb)
Uniform	0plf

	Code Check	Required	Allowed	Interaction	Notes
Span	Max. Axial, lbs	0.0(t)	-	0%	KΦ=0.00 lb-in/in
	Max. Shear, lbs	58.5	1016	6%	Shear (Punched)
	Max. Moment (MaFy, Ma-dist), ft-lbs	190.1	1106.7	17%	MaFy (control),KΦ=0.00 lb-in/in
	Moment Stability, ft-lbs	190.1	245.6	77%	
	Shear/Moment	0.17	1.00	17%	Shear 0.0, Moment 190.1
	Axial/Moment	0.17	1.00	17%	Axial 0.0(c), Moment 190.1
	Deflection Span, in	0.157	--meets L/992--		

Support	Rx(lb)	Ry(lb)	Simpson Strong-Tie Connector	Connector Interaction	Anchor Interaction
R2	58.5	0.0	SCB45.5(2) & (2) #12 SST X to A36 Steel	7.70 %	7.36 %
R1	58.5	0.0	FCB43.5 Min(4#12-14) & (2) #12 SST X to A36 Steel	6.00 %	7.36 %

* Reference catalog for connector and anchor requirement notes as well as screw placement requirements

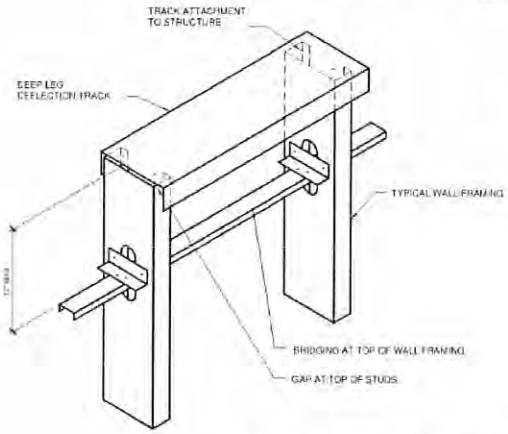
ENGINEERS

AISI S100-2007 METAL STUD WALL DEFLECTION TRACK CONNECTION
Version Date: August 28, 2012 Author: Steven L. Ericksen SE Reviewed by: ????
JOB TITLE: FAA Mezzanine
DESCRIPTION: Deflection Track

April 30, 2020
8:58 AM
JOB #: 19521

Metal Stud Wall Connection at Top Deflection Track

Based on AISI S100-2007 (ASD Level Forces)



WALL LOADING

Wind Wall Pressure	0	psf	Seismic Wall Weight	10	psf
Wall Height	12	ft	Sds	1.468	
			Ip	1.5	
			Track Design Force (ap=1.0, Rp = 2.5)	10.5696	psf
			Track Connection Force (ap=1.0, Rp = 2.5)	10.5696	psf

WALL FRAMING INFORMATION

Stud Spacing	16	in	Track Designation	362T250-54	
			Thickness	0.0566	in
Stud Designation	362S162-54		Ix	1.224538	in^4
Thickness	0.0566	in	Sx	0.64061627	in^3
Depth	3.625	in	Flange	2.5	in
Flange	1.625	in	Depth	3.823	in
Fy	50000	psi	Fy	50000	psi
			Track Anchor Spacing	16	in
			Track Anchor Diameter	0.19	in

STUD ATTACHMENT TO TRACK (STUD WEB CRIPPLING

C =	4	CN =	0.6	R =	0.0849	h =	3.625
CR =	0.4	Ch =	0.03	N =	1	t =	0.0566

Transverse wall stud capacity, Pnst, is based on the following assumptions.
- #8 Screws attaching studs to track
- 1/8" Max gap at bottom of stud.
- Track is same or greater thickness than stud.

Pnst/Ω = **486** lbs AISI S211-07 Eq. B2.2-1

Stud Reaction = 59 lbs ***Pnst > Reaction, Connection OK***

STUD ATTACHMENT TO TRACK (TRACK FLANGE BENDING

Deflection Gap	0.75	in	
Minimum Track leg size	2.25	in	Track leg is adequate

Effective Track Length 12.6 in

Transverse wall track capacity, Pndt, is based on the following assumptions.
- Stud spacing is between 12" and 24" on center
- Track is connected to its support at a fastener spacing not greater than the stud spacing.
- Track is same or greater thickness than stud.

Pndt/Ω = **671** lbs AISI S211-07 Eq. B2.3-1

Stud Reaction = **59** lbs ***Pnst > Reaction, Connection OK***

TRACK BENDING BETWEEN ANCHORS

Flexure Check

Moment in Track = **1421** lb-in

Mn/Ω = **9401** lb-in AISI S100-07 Eq. E3.3.1-1

Track is Sufficient

Shear Check

Shear Force At Connector **30** lbs

Shear Yielding Pn/Ω = **2794** lbs AISI S100-07 Eq. E3.1-1

Shear Yielding Pn/Ω = 5107 lbs AISI S100-07 Eq. E3.2-8

Track is Sufficient

TRACK WEB BEARING ON ANCHORS

Are Washers Being Used? NO

Pn/Ω = 581 lbs AISI S100-07 Eq. E3.3.1-1

Pn/Ω = **521** lbs AISI S100-07 Eq. E3.3.2-1

Force at Track Connectors = **59** lbs

Track Bearing is Sufficient

ANCHOR CONNECTION FORCE

Shear= **59** lbs
Tension = **50** lbs

WALL TRACK ANCHORAGE:

LOAD = 12.7PSF (13'-0"/2) = 83 PLF

LATERAL LOAD = 16.4K/33'-3" + 0.339 (SW OF WALL) (12PSF)(13') = 546 PLF (GRIDT) (LRFD)

@ 32" O.C. LOAD = [546PLF(32/12)] Ω = 3640#

Ω = 2.5

@ 12" O.C. LRFD LOAD = 546PLF(12/12)(2.5) = 1365 #

SR = 0.83

3/8" Φ HILTI KWIK HUS EZ W/ 2"1/2" MIN EMBEDMENT.

LATERAL LOAD IS BASED ON HIGHEST LOADED WALL. SO OK.

Hilti PROFIS Engineering 3.0.58

www.hilti.com

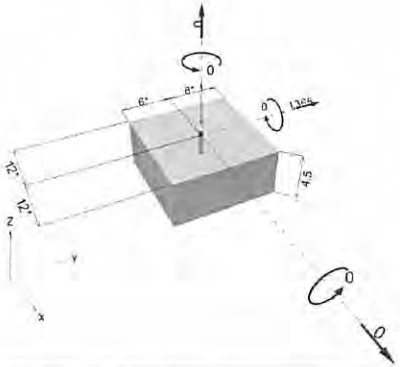
Company:		Page:	1
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	FAA Mezzanine	Date:	4/30/2020
Fastening point:			

Specifier's comments:

1 Input data

Anchor type and diameter:	**KWIK HUS-EZ (KH-EZ) 3/8 (2 1/2)**
Item number:	418057 KH-EZ 3/8"x3"
Effective embedment depth:	$h_{ef,act}$ = 1.860 in., h_{nom} = 2.500 in.
Material:	Carbon Steel
Evaluation Service Report:	ESR-3027
Issued I Valid:	6/1/2019 | 12/1/2019
Proof:	Design Method ACI 318-14 / Mech
Stand-off installation:	
Profile:	
Base material:	cracked concrete, 3000, f_c' = 3,000 psi; h = 4.500 in.
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (d)) Shear load: yes (17.2.3.5.3 (c))

Geometry [in.] & Loading [lb, in.lb]



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Company:		Page:	2
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	FAA Mezzanine	Date:	4/30/2020
Fastening point:			

1.1 Design results

Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V_x = 0; V_y = 1,365; M_x = 0; M_y = 0; M_z = 0;	yes	83

Hilti PROFIS Engineering 3.0.58

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Company:		Page:	3
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	FAA Mezzanine	Date:	4/30/2020
Fastening point:			

2 Proof I Utilization (Governing Cases)

Loading	Proof	Design values [lb] Load	Capacity	Utilization β_N / β_V [%]	Status
Tension	-	-	-	- / -	N/A
Shear	Pryout Strength	1,365	1,653	- / 83	OK

Loading	β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
Combined tension and shear loads	-	-	-	-	N/A

3 Warnings

- Please consider all details and hints/warnings given in the detailed report!

Fastening meets the design criteria!

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Hilti PROFIS Engineering 3.0.58

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Company:		Page:	4
Address:		Specifier:	
Phone I Fax:	|	E-Mail:	
Design:	FAA Mezzanine	Date:	4/30/2020
Fastening point:			

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Mechanical Information

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Air System Sizing Summary for AHU-700

Project Name: FAA-Reconfigure M1 — 08/17/2021
Prepared by: Case, Lowe & Hart — 11:36AM

Air System Information

Air System Name	**AHU-700**		Number of zones	**1**	
Equipment Class	**CW AHU**		Floor Area	**5645.4**	ft²
Air System Type	**VAV**		Location	**Palmdale, California**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone CFM Sizing	**Peak zone sensible load**
Sizing Data	**User-Modified**	Space CFM Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**6.1**	Tons	Load occurs at	**Aug 1500**	
Total coil load	**73.6**	MBH	OA DB / WB	**100.7 / 65.3**	°F
Sensible coil load	**73.6**	MBH	Entering DB / WB	**95.2 / 64.6**	°F
Coil CFM at Aug 1500	**1861**	CFM	Leaving DB / WB	**55.0 / 50.1**	°F
Max block CFM	**2113**	CFM	Coil ADP	**50.5**	°F
Sum of peak zone CFM	**2113**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**49**	%
CFM/Ton	**303.6**		Design supply temp.	**55.0**	°F
ft²/Ton	**920.9**		Zone T-stat Check	**1 of 1**	OK
BTU/(hr·ft²)	**13.0**		Max zone temperature deviation	**0.0**	°F
Water flow @ 10.0 °F rise	**14.72**	gpm			

Preheat Coil Sizing Data

Max coil load	**32.8**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**1803**	CFM	Ent. DB / Lvg DB	**36.5 / 55.0**	°F
Max coil CFM	**2113**	CFM			
Water flow @ 20.0 °F drop	**3.28**	gpm			

Supply Fan Sizing Data

Actual max CFM	**2113**	CFM	Fan motor BHP	**0.00**	BHP
Standard CFM	**1925**	CFM	Fan motor kW	**0.00**	kW
Actual max CFM/ft²	**0.37**	CFM/ft²	Fan static	**0.00**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**1654**	CFM	CFM/person	**15.65**	CFM/person
CFM/ft²	**0.29**	CFM/ft²			

Zone Sizing Summary for AHU-700

Project Name: FAA-Reconfigure M1 — 08/17/2021
Prepared by: Case, Lowe & Hart — 11:36AM

Air System Information

Air System Name **AHU-700**
Equipment Class ..... **CW AHU**
Air System Type ..... **VAV**

Number of zones **1**
Floor Area ..... **5645.4** ft²
Location ..... **Palmdale, California**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **User-Modified**

Zone CFM Sizing ..... **Peak zone sensible load**
Space CFM Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	2113	1803	0.37	70.9	7.10	0.0	0.00	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 1	41.6	Aug 1600	44.3	5645.4

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
1051A SUP BRK RM	1	3.2	Jul 1700	162	4.5	538.3	0.30
1051B SAIC	1	0.9	Jul 1700	43	1.4	163.0	0.27
1051D AREA A SUP	1	1.0	Jul 1600	48	1.6	204.8	0.24
1051E AREA B SUP	1	0.9	Jul 1600	47	1.6	206.9	0.23
1051F AREA C SUP	1	0.9	Jul 1600	46	1.5	203.9	0.23
1051G AREA D SUP	1	0.9	Jul 1600	46	1.5	204.3	0.23
1051H TECH OPS OFF	1	0.7	Jul 1600	34	1.1	150.8	0.23
1051I OFFICE	1	0.5	Jul 1600	25	0.8	108.6	0.23
1051J AREA E SUP	1	0.5	Jul 1600	28	0.9	122.8	0.23
1051K AREA F SUP	1	0.5	Jul 1600	28	0.9	122.8	0.23
1051L STMC	1	1.1	Aug 1600	54	1.7	193.4	0.28
1051M CONF RM	1	11.9	Aug 1700	604	6.9	877.0	0.69
1051N CONF RM	1	11.9	Aug 1700	604	6.9	877.0	0.69
1051O CORRIDOR	1	1.3	Jul 1600	68	2.9	381.0	0.18
1051Q CORRIDOR	1	1.7	Jul 1600	84	3.5	457.7	0.18
1051 CBI LAB	1	3.9	Aug 1600	198	6.5	833.1	0.24

Air System Design Load Summary for AHU-700

Project Name: FAA-Reconfigure M1 08/17/2021
Prepared by: Case, Lowe & Hart 11:36AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1500 COOLING OA DB / WB 100.7 °F / 65.3 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 27.6 °F / 23.4 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	0 ft²	0	-	0 ft²	-	-
Wall Transmission	1116 ft²	1163	-	1116 ft²	2000	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	0 ft²	0	-	0 ft²	0	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	5645 ft²	4038	-	5645 ft²	42341	-
Overhead Lighting	5645 W	15773	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	106	20029	21659	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**41003**	**21659**	**-**	**44340**	**0**
Zone Conditioning	-	37112	21659	-	40276	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	1861 CFM	0	-	1803 CFM	0	-
Ventilation Load	1457 CFM	36453	-21671	1411 CFM	56969	0
Supply Fan Load	1861 CFM	0	-	1803 CFM	0	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**73565**	**-12**	**-**	**97245**	**0**
Central Cooling Coil	-	73565	0	-	0	0
Preheat Coil	-	0	-	-	32782	-
Terminal Reheat Coils	-	0	-	-	64463	-
>> Total Conditioning	**-**	**73565**	**0**	**-**	**97245**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

System Psychrometrics for AHU-700

Project Name: FAA-Reconfigure M1 08/17/2021
Prepared by: Case, Lowe & Hart 11:36AM

August DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	100.7	0.00655	1457	400	36453	-21671
Vent - Return Mixing	Outlet	95.2	0.00729	1861	591	-	-
Preheat Coil	Outlet	95.2	0.00729	1861	591	0	-
Central Cooling Coil	Outlet	55.0	0.00729	1861	591	73565	0
Supply Fan	Outlet	55.0	0.00729	1861	591	0	-
Cold Supply Duct	Outlet	55.0	0.00729	1861	591	-	-
Zone Air	-	75.3	0.00999	1861	1280	37112	21659
Return Plenum	Outlet	75.3	0.00999	1861	1280	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4323.6 BTU/(hr-CFM)
Site Altitude = 2560.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	41003	Cooling	37112	75.3	1861	1280	0	0

System Psychrometrics for AHU-700

Project Name: FAA-Reconfigure M1 08/17/2021
Prepared by: Case, Lowe & Hart 11:36AM

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

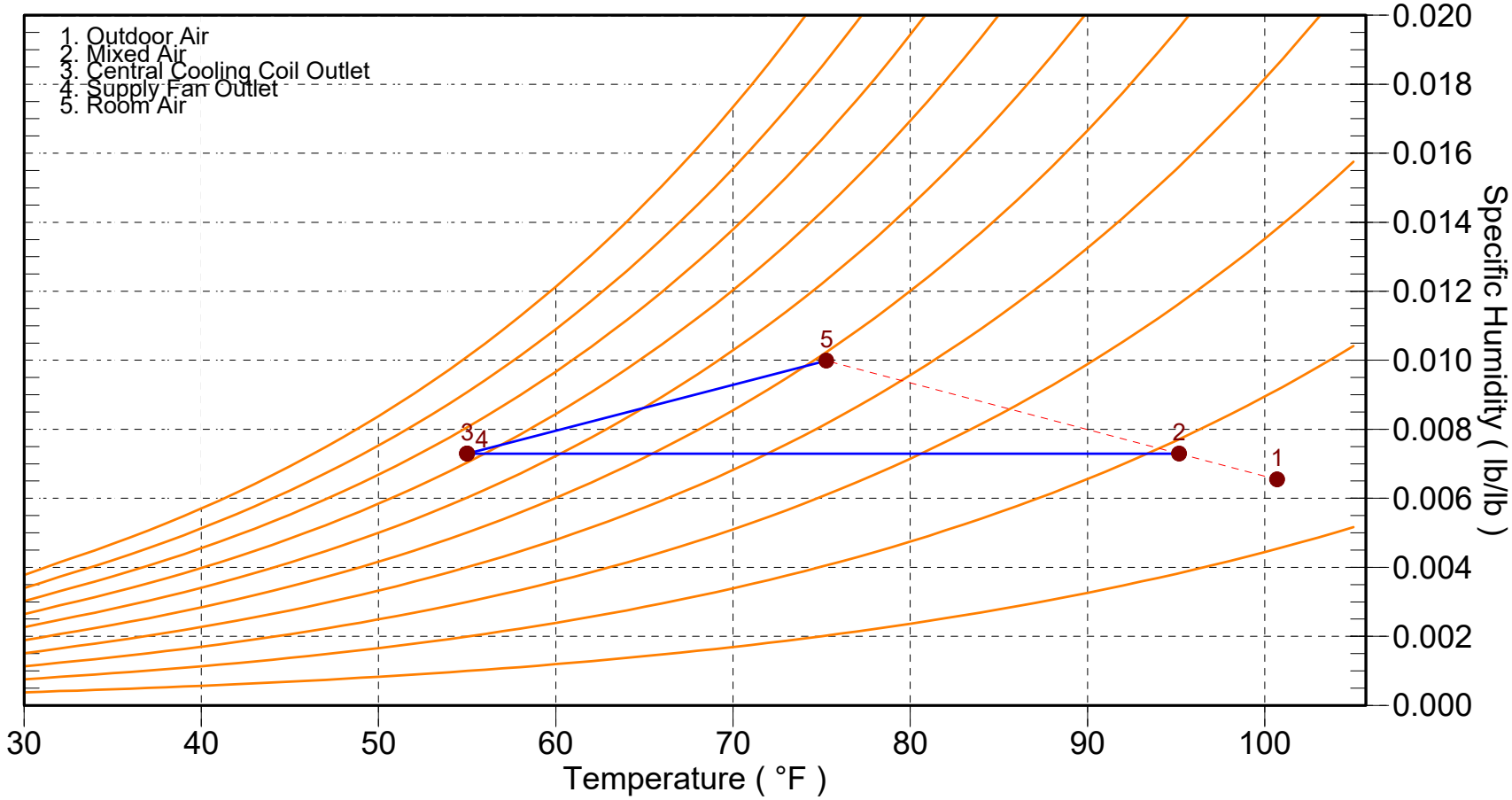
Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	27.6	0.00184	1411	400	-56969	0
Vent - Return Mixing	Outlet	36.5	0.00184	1803	401	-	-
Preheat Coil	Outlet	55.0	0.00184	1803	401	32782	-
Central Cooling Coil	Outlet	55.0	0.00184	1803	401	0	0
Supply Fan	Outlet	55.0	0.00184	1803	401	0	-
Cold Supply Duct	Outlet	55.0	0.00184	1803	401	-	-
Zone Air	-	68.6	0.00184	1803	404	-40276	0
Return Plenum	Outlet	68.6	0.00184	1803	404	0	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4323.6 BTU/(hr-CFM)
Site Altitude = 2560.0 ft

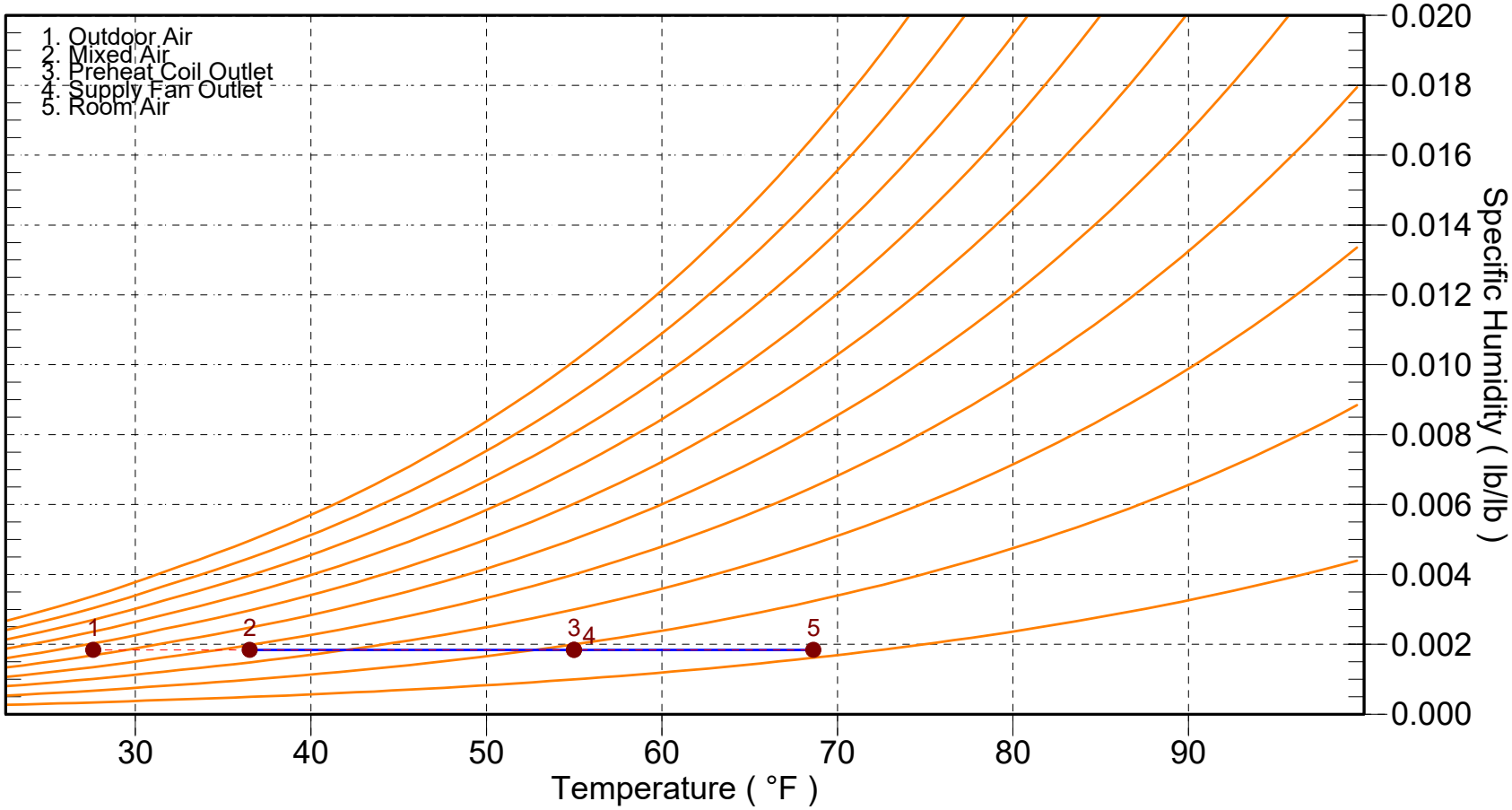
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-44340	Heating	-40276	68.6	1803	404	64463	0

Location: Palmdale, California
Altitude: 2560.0 ft.
Data for: August DESIGN COOLING DAY, 1500



Location: Palmdale, California
Altitude: 2560.0 ft.
Data for: WINTER DESIGN HEATING



Air System Sizing Summary for AHU-206

Project Name: FAA-Reconfigure M1 — 09/08/2020
Prepared by: Case, Lowe & Hart — 06:51PM

Air System Information

Air System Name	**AHU-206**		Number of zones	**1**	
Equipment Class	**CW AHU**		Floor Area	**833.1**	ft²
Air System Type	**VAV**		Location	**Palmdale, California**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**	Zone CFM Sizing	**Peak zone sensible load**
Sizing Data	**Calculated**	Space CFM Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**0.9**	Tons	Load occurs at	**Aug 1500**	
Total coil load	**11.0**	MBH	OA DB / WB	**100.7 / 65.3**	°F
Sensible coil load	**11.0**	MBH	Entering DB / WB	**93.3 / 63.4**	°F
Coil CFM at Aug 1500	**277**	CFM	Leaving DB / WB	**52.9 / 48.3**	°F
Max block CFM at Jan 0000	**277**	CFM	Coil ADP	**48.4**	°F
Sum of peak zone CFM	**277**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**42**	%
CFM/Ton	**301.9**		Design supply temp.	**55.0**	°F
ft²/Ton	**908.4**		Zone T-stat Check	**1 of 1**	OK
BTU/(hr·ft²)	**13.2**		Max zone temperature deviation	**0.0**	°F
Water flow @ 10.0 °F rise	**2.20**	gpm			

Supply Fan Sizing Data

Actual max CFM at Jan 0000	**277**	CFM	Fan motor BHP	**0.15**	BHP
Standard CFM	**252**	CFM	Fan motor kW	**0.12**	kW
Actual max CFM/ft²	**0.33**	CFM/ft²	Fan static	**2.00**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**200**	CFM	CFM/person	**48.01**	CFM/person
CFM/ft²	**0.24**	CFM/ft²			

Zone Sizing Summary for AHU-206

Project Name: FAA-Reconfigure M1 09/08/2020
Prepared by: Case, Lowe & Hart 06:51PM

Air System Information

Air System Name **AHU-206**
Equipment Class ..... **CW AHU**
Air System Type ..... **VAV**

Number of zones **1**
Floor Area ..... **833.1** ft²
Location ..... **Palmdale, California**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Peak zone sensible load**
Space CFM Sizing ..... **Individual peak space loads**

Zone Terminal Sizing Data

Zone Name	Design Supply Airflow (CFM)	Minimum Supply Airflow (CFM)	Zone CFM/ft²	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Unit Coil Load (MBH)	Zone Htg Unit Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	263	263	0.32	10.3	1.04	0.0	0.00	0

Zone Peak Sensible Loads

Zone Name	Zone Cooling Sensible (MBH)	Time of Peak Sensible Cooling Load	Zone Heating Load (MBH)	Zone Floor Area (ft²)
Zone 1	3.2	Aug 1600	6.5	833.1

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Peak Sensible Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
1051 CBI LAB	1	3.2	Aug 1600	263	6.5	833.1	0.32

Air System Design Load Summary for AHU-206

Project Name: FAA-Reconfigure M1 09/08/2020
Prepared by: Case, Lowe & Hart 06:51PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1500 COOLING OA DB / WB 100.7 °F / 65.3 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 27.6 °F / 23.4 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	0 ft²	0	-	0 ft²	-	-
Wall Transmission	123 ft²	144	-	123 ft²	220	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	0 ft²	0	-	0 ft²	0	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	833 ft²	596	-	833 ft²	6248	-
Overhead Lighting	833 W	1629	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	0 W	0	-	0	0	-
People	4	790	854	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**3158**	**854**	**-**	**6469**	**0**
Zone Conditioning	-	4330	854	-	3604	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	70%	0	-	0	0	-
Plenum Lighting Load	30%	853	-	0	0	-
Return Fan Load	277 CFM	0	-	277 CFM	0	-
Ventilation Load	200 CFM	5253	-854	200 CFM	6842	0
Supply Fan Load	277 CFM	410	-	277 CFM	-410	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	5%	158	-	5%	323	-
>> Total System Loads	**-**	**11005**	**0**	**-**	**10359**	**0**
Central Cooling Coil	-	11005	0	-	0	0
Terminal Reheat Coils	-	0	-	-	10350	-
>> Total Conditioning	**-**	**11005**	**0**	**-**	**10350**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

System Psychrometrics for AHU-206

Project Name: FAA-Reconfigure M1 09/08/2020
Prepared by: Case, Lowe & Hart 06:51PM

August DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	100.7	0.00655	200	400	5253	-854
Vent - Return Mixing	Outlet	93.3	0.00682	277	471	-	-
Central Cooling Coil	Outlet	52.9	0.00682	277	471	11005	0
Supply Fan	Outlet	54.4	0.00682	277	471	410	-
Cold Supply Duct	Outlet	55.0	0.00682	263	471	-	-
Zone Air	-	71.7	0.00757	263	666	4330	854
Return Plenum	Outlet	75.0	0.00757	263	666	853	-
Duct Leakage Air	Outlet	54.4	0.00682	14	471	-	-
Return Duct	Outlet	74.0	0.00753	277	657	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4323.6 BTU/(hr-CFM)
Site Altitude = 2560.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	3158	Deadband	4330	71.7	263	666	0	0

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	27.6	0.00184	200	400	-6842	0
Vent - Return Mixing	Outlet	37.3	0.00184	277	402	-	-
Central Cooling Coil	Outlet	37.3	0.00184	277	402	0	0
Supply Fan	Outlet	38.8	0.00184	277	402	410	-
Cold Supply Duct	Outlet	37.5	0.00184	263	402	-	-
Zone Air	-	63.6	0.00184	263	409	-3604	0
Return Plenum	Outlet	63.6	0.00184	263	409	0	-
Duct Leakage Air	Outlet	38.8	0.00184	14	402	-	-
Return Duct	Outlet	62.4	0.00184	277	409	-	-

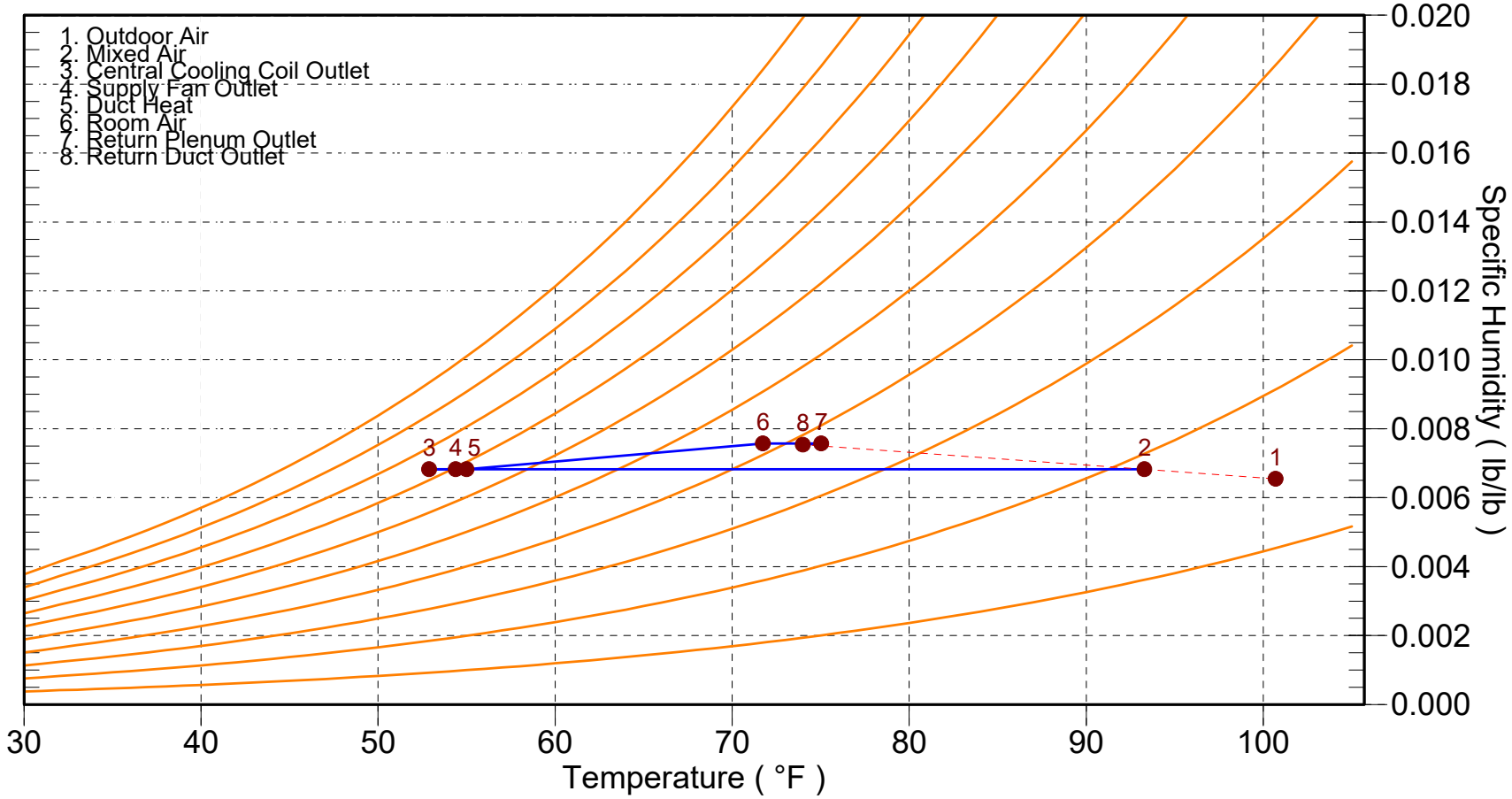
Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4323.6 BTU/(hr-CFM)
Site Altitude = 2560.0 ft

TABLE 2: ZONE DATA

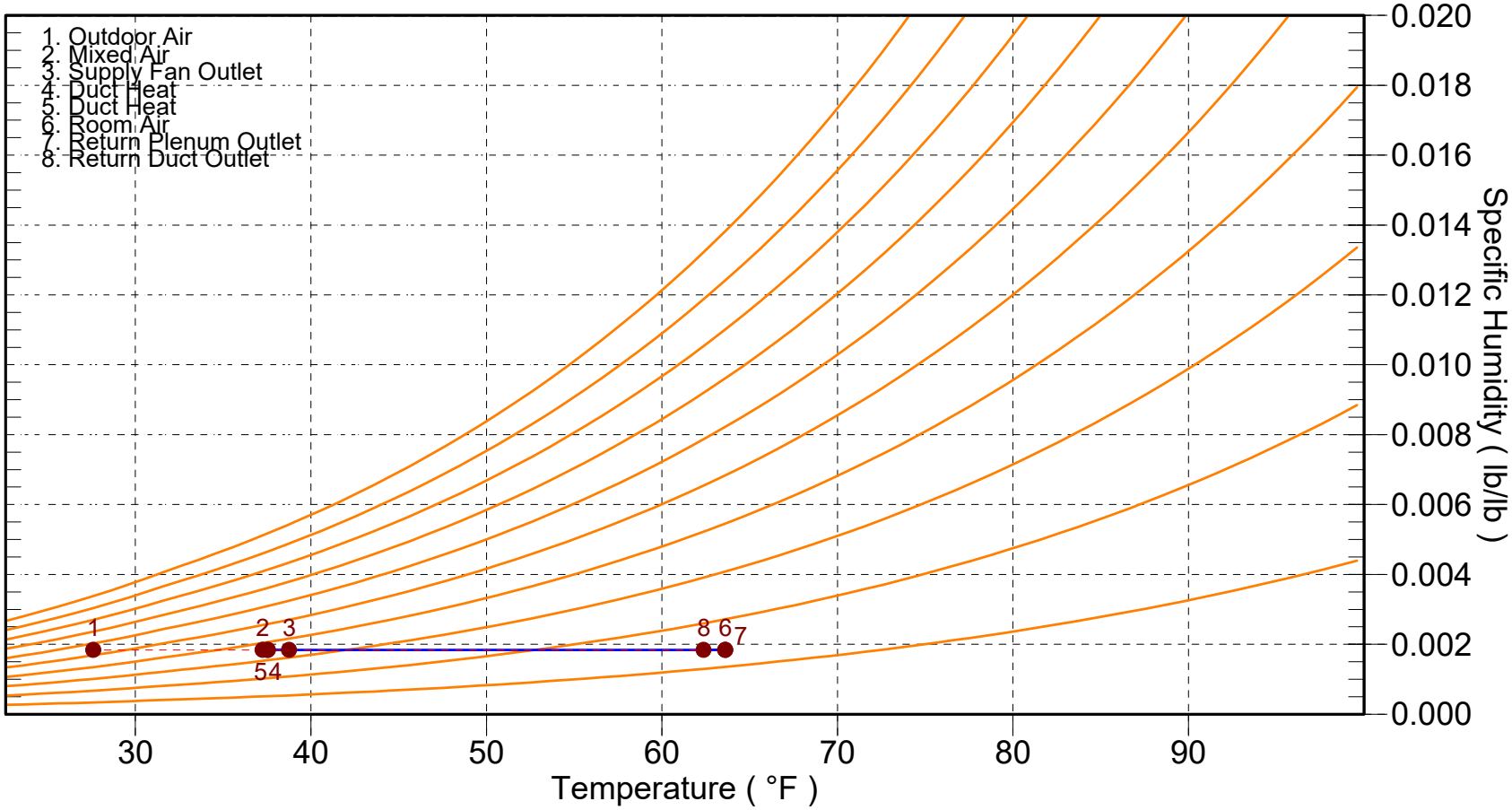
Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-6469	Heating	-3604	63.6	263	409	10350	0

System Psychrometrics for AHU-206

Location: Palmdale, California
Altitude: 2560.0 ft.
Data for: August DESIGN COOLING DAY, 1500



Location: Palmdale, California
Altitude: 2560.0 ft.
Data for: WINTER DESIGN HEATING



Job Name: CSP-A390 Cut Sheet
Tag: MK-1
Quantity: 1
Printed Date: February 6, 2020

Model: CSP-A390

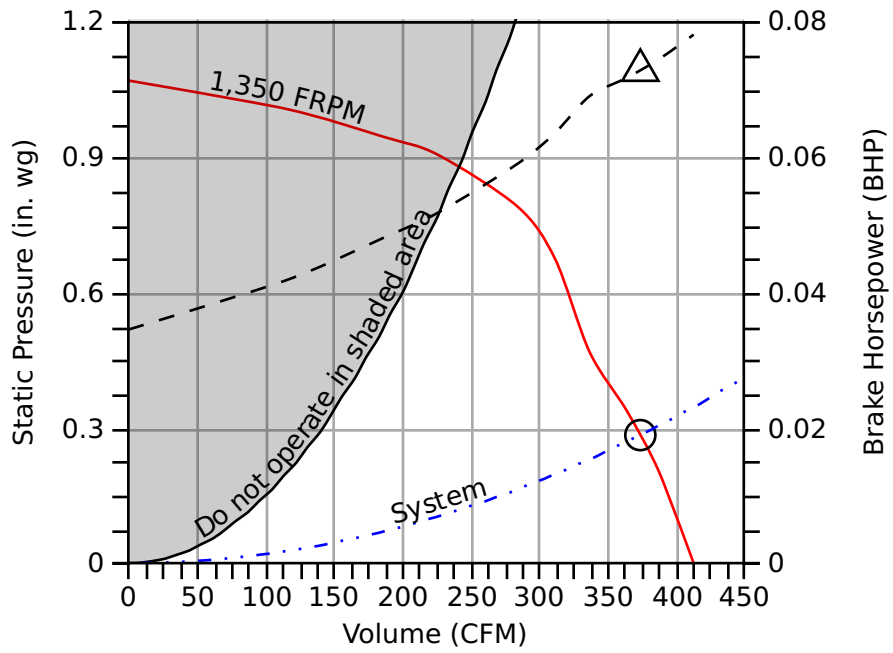
Direct Drive Cabinet Fan

Standard Construction Features: Galvanized steel housing with duct collars. Centrifugal forward curved wheel. Direct driven motor in the air stream.

Fan Configuration	
Drive type	Direct

Performance	
Requested Volume (CFM)	350
Actual Volume (CFM)	373
Total External SP (in. wg)	0.28
Fan RPM	1,350
Operating Power (bhp)	0.07
Startup Power (bhp)	0.07
Air Stream Temp (F)	70
Start-up Temp (F)	70
Air Density (lbs/ft^3)	0.068
Elevation (ft)	2600
Watts (W)	136
Static Efficiency (%)	23
Outlet Velocity (ft/min)	848

Motor	
Enclosure	ODP
V/C/P	115/60/1
NEC FLA (Amps)	1.33



- Fan curve
- Brake horsepower curve
- Operating Point SP
- Operating Bhp point
- Max system curve
- System curve

Static Pressure Calculations	
External SP	0.25 in. wg
Direct Drive RPM Adjustment	0.03 in. wg
Total External SP	0.28 in. wg

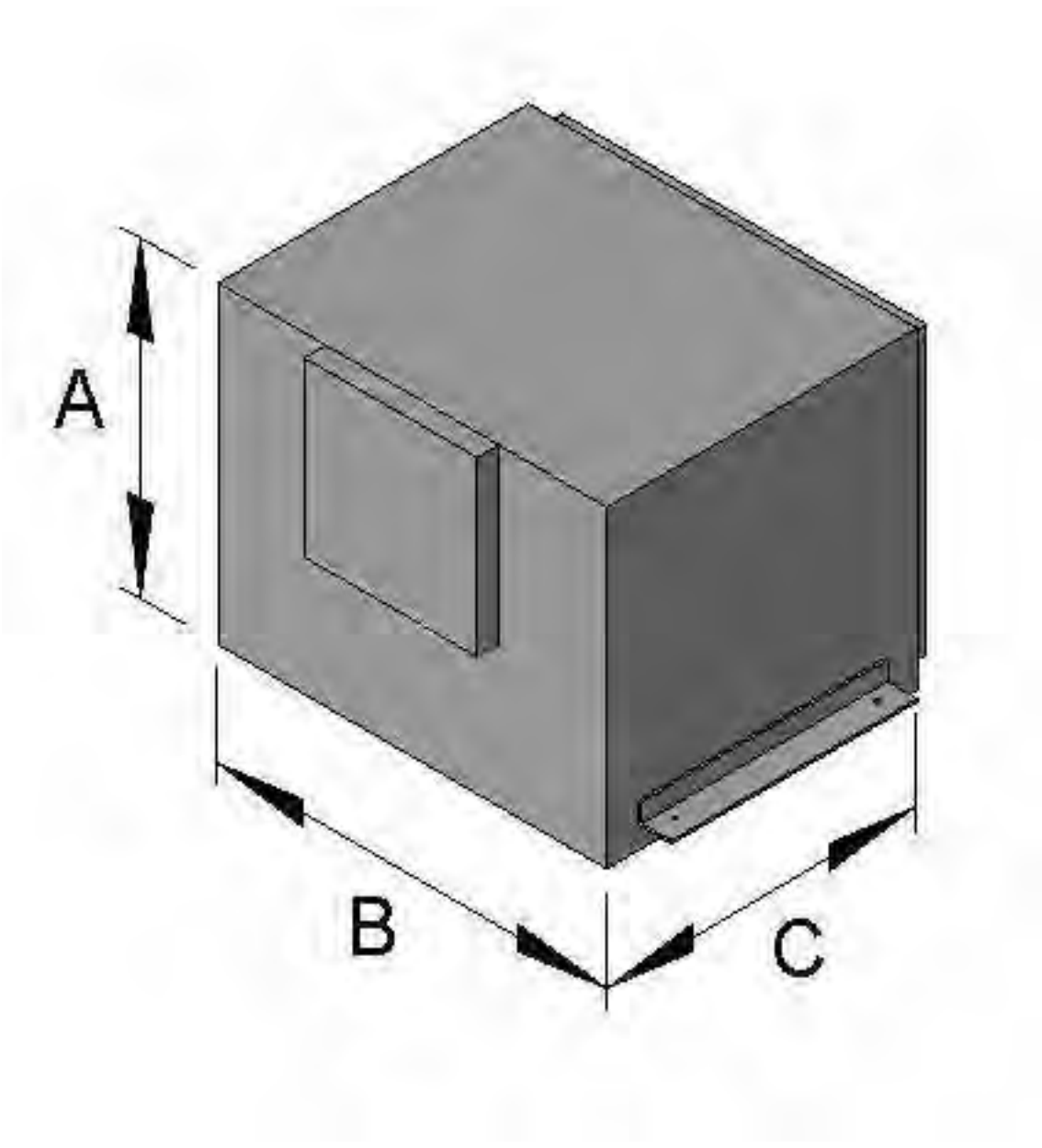
Sound

	Octave Bands (hz)								LwA	dBA	Sones
	62.5	125	250	500	1000	2000	4000	8000			
Inlet	68	62	56	52	50	37	35	32	55	41	3.4

Greenheck Fan Corporation certifies that the model shown herein is licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and comply with the requirements of the AMCA Certified Ratings ProgramThe AMCA certified ratings seal applies to air performance ratings only.Performance certified is for installation type D: Ducted inlet, ducted outlet.Power rating does not include transmission losses.Performance ratings include the effects of a backdraft damper.Speed (RPM) shown is nominal. Performance is based on actual speed of test.The sound ratings shown are loudness values in spherical sones at 1.5 m (5 ft) in a spherical free field calculated per ANSI/AMCA 301.Values shown are for installation Type D: ducted inlet spherical sone levels. Ratings do not include the effects of duct end correction. Ratings are based on 10 ft. of insulated duct.

Wattage is shown at free air. Wattage is approximate and may vary between motors. Fan shaft input power (bhp) is not certified.FLA - based on tables 150 or 148 of National Electric Code 2002. Actual motor FLA may vary, for sizing thermal overload, consult factory.

Dimensions and Weights		
Label	**Value**	**Description**
-	23	Weight w/o accessories (lbs)
A	11	Overall Height (in)
B	14	Overall Width (in)
C	12	Overall Length (in)
-	12.875	Inlet Width (in)
-	10	Inlet Height (in)
-	8	Outlet Width (in)
-	8	Outlet Height (in)



*All dimensions are in inches.

TMS / SQUARE CEILING / ROUND NECK / HIGH PERFORMANCE

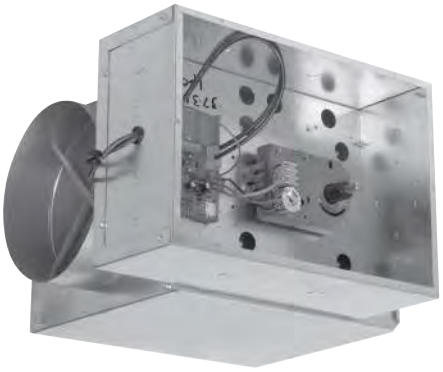
		Neck Velocity	400	500	600	700	800	1000	1200	1400	1600
		Velocity Pressure	0.010	0.016	0.022	0.031	0.040	0.062	0.090	0.122	0.160
12" x 12" Module Size	4" Dia.	Airflow, cfm	35	44	52	61	70	87	105	122	140
		Total Pressure	0.012	0.018	0.026	0.035	0.046	0.072	0.104	0.141	0.184
		NC (Noise Criteria)	-	-	-	-	12	20	26	31	36
		Throw feet	1-1-3	1-2-4	1-2-4	2-3-5	2-3-6	2-4-7	3-4-7	3-5-8	4-6-8
	5" Dia.	Airflow, cfm	55	68	82	95	109	136	164	191	218
		Total Pressure	0.015	0.023	0.033	0.044	0.058	0.091	0.131	0.178	0.232
		NC (Noise Criteria)	-	-	-	-	15	23	29	34	39
		Throw feet	1-2-4	2-2-5	2-3-6	2-3-7	2-4-7	3-5-8	4-6-9	4-7-10	5-7-10
	6" Dia.	Airflow, cfm	79	98	118	137	157	196	236	275	314
		Total Pressure	0.018	0.028	0.041	0.056	0.073	0.114	0.164	0.223	0.291
		NC (Noise Criteria)	-	-	-	13	18	25	32	37	42
		Throw feet	2-2-5	2-3-6	2-3-7	3-4-8	3-5-9	4-6-10	5-7-11	5-8-12	6-9-13
	7" Dia.	Airflow, cfm	107	134	160	187	214	267	321	374	428
		Total Pressure	0.020	0.031	0.045	0.062	0.081	0.126	0.181	0.247	0.322
		NC (Noise Criteria)	-	-	-	15	20	28	34	39	44
		Throw feet	2-3-5	2-3-7	3-4-8	3-5-9	4-5-10	4-7-12	5-8-13	6-9-14	7-10-15
	8" Dia.	Airflow, cfm	140	175	209	244	279	349	419	489	559
		Total Pressure	0.022	0.035	0.050	0.069	0.090	0.140	0.202	0.275	0.359
		NC (Noise Criteria)	-	-	12	17	22	29	36	41	46
		Throw feet	2-3-6	3-4-8	3-5-9	4-5-11	4-6-12	5-8-13	6-9-14	7-11-16	8-12-17
20" x 20" Module Size	6" Dia.	Airflow, cfm	79	98	118	137	157	196	236	275	
		Total Pressure	0.016	0.025	0.035	0.048	0.063	0.099	0.142	0.193	
		NC (Noise Criteria)	-	-	-	14	18	24	30	34	
		Throw feet	1-1-4	1-2-4	2-3-5	2-3-6	2-4-7	3-4-9	4-5-10	4-6-12	
	8" Dia.	Airflow, cfm	140	175	209	244	279	349	419	489	
		Total Pressure	0.017	0.027	0.038	0.057	0.067	0.105	0.152	0.207	
		NC (Noise Criteria)	-	-	-	13	19	23	29	34	
		Throw feet	2-4-5	2-4-6	3-4-8	4-6-9	5-7-12	5-8-13	5-9-15	5-10-17	
	10" Dia.	Airflow, cfm	218	273	327	382	436	545	654	764	
		Total Pressure	0.020	0.032	0.045	0.062	0.081	0.126	0.180	0.240	
		NC (Noise Criteria)	-	-	17	20	24	31	36	41	
		Throw feet	2-5-7	3-6-10	4-7-11	4-8-14	5-9-15	6-9-18	7-11-19	8-12-21	
24" x 24" Module Size	6" Dia.	Airflow, cfm	79	98	118	137	157	196	236	275	314
		Total Pressure	0.016	0.025	0.035	0.048	0.063	0.099	0.142	0.193	0.252
		NC (Noise Criteria)	-	-	-	12	16	22	28	32	36
		Throw feet	1-2-4	1-2-4	2-3-5	2-3-6	2-4-7	3-4-9	4-5-11	4-6-12	5-7-13
	8" Dia.	Airflow, cfm	140	175	209	244	279	349	419	489	559
		Total Pressure	0.016	0.025	0.036	0.049	0.064	0.101	0.145	0.197	0.257
		NC (Noise Criteria)	-	-	11	15	19	26	31	36	40
		Throw feet	2-3-5	2-3-7	3-4-8	3-5-9	4-5-11	4-7-13	5-8-14	6-9-16	7-11-17
	10" Dia.	Airflow, cfm	218	273	327	382	436	545	654	764	873
		Total Pressure	0.017	0.026	0.037	0.051	0.066	0.103	0.149	0.202	0.264
		NC (Noise Criteria)	-	-	14	18	22	29	34	39	43
		Throw feet	2-4-7	3-5-9	4-5-11	4-6-13	5-7-14	6-9-17	7-11-18	8-13-20	10-14-21
	12" Dia.	Airflow, cfm	314	393	471	550	628	785	942	1100	1257
		Total Pressure	0.017	0.027	0.038	0.052	0.068	0.106	0.153	0.208	0.272
		NC (Noise Criteria)	-	11	16	21	24	31	36	41	45
		Throw feet	3-5-9	4-6-11	5-7-14	5-8-16	6-9-18	8-11-20	9-14-22	11-16-23	12-18-25
	14" Dia.	Airflow, cfm	428	535	641	748	855	1069	1283	1497	1710
		Total Pressure	0.018	0.028	0.040	0.054	0.071	0.110	0.159	0.216	0.282
		NC (Noise Criteria)	-	13	18	22	26	33	38	43	47
		Throw feet	4-5-11	5-7-14	5-8-16	6-10-19	7-11-21	9-14-23	11-16-25	13-19-27	14-21-29
	15" Dia.	Airflow, cfm	491	614	736	859	982	1227	1473	1718	1963
		Total Pressure	0.018	0.028	0.040	0.055	0.072	0.112	0.162	0.220	0.287
		NC (Noise Criteria)	-	13	19	23	27	34	39	44	48
		Throw feet	4-6-12	5-7-15	6-9-18	7-10-21	8-12-22	10-15-25	12-18-27	14-21-29	16-22-31

Performance notes appear at end of performance data

- Data obtained from tests conducted in accordance with ANSI/ASHRAE Standard 70-2006. Actual performance, with flexible duct inlet, may vary in the field. See the Engineering Guidelines section of this catalog for additional information.
- If the diffuser is mounted on an exposed duct, the throw values are 70% of those listed in the table
- Throw values given are for terminal velocities of 150, 100 and 50 fpm and for isothermal conditions. See the section, Engineering Guidelines, for an explanation of catalog throw data.
- NC values based on octave band 2 to 7 sound power levels minus a room absorption of 10 dB
- Each NC value represents the noise criteria curve which will not be exceeded by the sound pressure in any of the octave bands, 2nd through 7th, with a room absorption of 10 dB, re 10-12 watts
- Dash (-) in space denotes an NC value of less than 10
- All pressures are given in inches of water
- To obtain static pressure, subtract the velocity pressure from the total pressure

RECOMMENDED PRIMARY AIR CFM RANGES / ALL TERMINALS

Control Types:
- PESV / Pneumatic
- AESV / Analog Electronic
- DESV / Digital Electronic



QUICK SELECTION PROCEDURE

1. Select unit inlet size based upon acoustic parameters and/or maximum pressure drop requirements, using pages M15-M16
2. Check inlet size selection against cfm control limits based on control type shown on this page
3. Select accessories (multi-outlets, attenuators) as required
4. Select reheat coil, if required. Make your selection using the actual heating flow rate, not cooling.

Inlet Size	Total cfm Range	cfm Ranges of Minimum and Maximum Settings							
		PESV - Pneumatic Titus II Controller		PESV - Pneumatic Titus I Controller		AESV - Analog Electronic TA1 Controller		DESV - Digital Typical Controller	
		Minimum	Maximum	Minimum	Maximum	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
4	0-225	50-210	90-225	65-210	90-225	50-225	50-225	30-225	30-225
5	0-350	70-300	125-350	90-300	125-350	70-350	70-350	40-350	40-350
6	0-500	80-345	145-500	100-345	145-500	80-500	80-500	45-500	45-500
7	0-650	120-515	210-650	150-515	210-650	120-650	120-650	70-650	70-650
8	0-900	160-700	285-900	205-700	285-900	160-900	160-900	90-900	90-900
9	0-1050	205-900	370-1050	260-900	370-1050	205-1050	205-1050	120-1050	120-1050
10	0-1400	250-1110	455-1400	325-1110	455-1400	250-1400	250-1400	145-1400	145-1400
12	0-2000	330-1460	600-2000	425-1460	600-2000	330-2000	330-2000	190-2000	190-2000
14	0-3000	525-2335	955-3000	675-2335	955-3000	525-3000	525-3000	300-3000	300-3000
16	0-4000	665-2970	1215-4000	860-2970	1215-4000	665-4000	665-4000	385-4000	385-4000
24 X 16	0-8000	1245-5555	2270-8000	1605-5555	2270-8000	1245-8000	1245-8000	720-8000	720-8000

Note: On controls mounted by Titus but supplied by others (FMA or Factory Mounting Authorization), these values are guidelines only. Controls mounted on an FMA basis are calibrated in the field.

PESV, AESV, DESV / RADIATED SOUND PERFORMANCE

Size	CFM	Min ΔPs	Octave Band Sound Power, Lw																											
			0.5" ΔPs							1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
4	100	0.02	49	45	36	33	31	26	**11**	52	48	39	36	35	31	**15**	53	50	41	37	37	34	**17**	55	51	43	38	39	36	**18**
	125	0.03	52	49	39	36	32	27	**16**	55	52	42	38	36	32	**20**	57	54	44	40	39	36	**22**	58	55	45	41	40	38	**23**
	150	0.04	55	52	41	37	34	28	**20**	58	55	44	40	38	34	**23**	60	57	46	41	40	37	**25**	61	58	47	42	42	39	**27**
	175	0.06	58	55	42	39	35	29	**23**	61	58	46	42	39	34	**27**	63	59	48	43	41	38	**28**	64	61	49	44	43	40	**30**
	200	0.08	60	57	44	40	36	30	**25**	63	60	47	43	40	35	**29**	65	62	49	44	42	38	**31**	66	63	51	45	44	41	**33**
5	150	0.01	49	44	36	32	31	25	**10**	53	49	41	36	35	30	**16**	55	51	43	38	37	33	**18**	57	53	45	39	39	35	**21**
	200	0.02	53	48	39	35	34	27	**15**	56	53	44	38	37	32	**21**	59	55	46	40	40	35	**23**	60	57	48	42	41	37	**25**
	250	0.03	55	52	41	37	35	29	**20**	59	56	46	40	39	34	**24**	62	59	49	42	41	37	**28**	63	61	51	44	43	39	**30**
	300	0.04	58	54	43	39	37	30	**22**	62	59	48	42	41	35	**28**	64	61	50	44	43	38	**30**	65	63	52	45	44	40	**33**
	350	0.06	60	56	45	40	38	31	**24**	63	61	49	43	42	36	**30**	66	63	52	45	44	39	**33**	67	65	54	47	45	41	**35**
6	300	0.07	55	49	40	35	32	28	**16**	59	54	45	39	37	33	**22**	61	57	48	41	39	36	**25**	63	59	50	42	41	38	**28**
	350	0.10	57	52	42	37	34	29	**20**	60	57	47	41	38	34	**25**	62	59	50	43	40	37	**28**	64	62	52	44	42	39	**31**
	400	0.13	58	53	44	39	35	30	**21**	61	58	49	42	39	35	**27**	63	61	52	44	42	38	**30**	65	63	54	46	43	40	**33**
	450	0.16	59	55	45	40	36	31	**23**	62	60	50	44	40	36	**29**	64	63	53	46	43	39	**33**	66	65	55	47	45	41	**35**
	500	0.20	59	56	47	42	37	32	**24**	63	61	51	45	41	37	**30**	65	64	54	47	44	40	**34**	67	67	56	49	46	42	**37**
7	450	0.07	59	48	42	38	33	24	**20**	61	54	48	42	38	30	**23**	62	57	51	45	41	33	**25**	63	59	53	46	43	35	**28**
	500	0.09	60	50	43	39	34	24	**22**	62	55	49	43	39	30	**24**	63	58	52	46	42	34	**27**	64	60	54	48	44	36	**29**
	550	0.10	60	51	44	40	35	25	**22**	63	57	50	45	40	31	**25**	64	59	53	47	43	34	**28**	66	62	55	49	45	37	**31**
	600	0.12	61	53	45	42	35	25	**23**	63	58	51	46	41	31	**27**	65	61	54	48	44	35	**30**	66	63	56	50	46	37	**33**
	650	0.15	62	54	46	43	36	26	**24**	64	59	52	47	41	32	**28**	65	62	55	49	44	35	**31**	66	64	57	51	46	38	**34**
8	600	0.02	59	50	44	40	38	32	**20**	62	55	49	43	43	39	**24**	64	58	52	46	45	44	**27**	65	60	54	47	47	47	**29**
	650	0.02	60	51	44	41	39	32	**22**	63	56	50	44	44	40	**25**	65	59	53	47	46	45	**28**	66	61	55	48	48	48	**30**
	700	0.02	60	52	45	42	40	33	**22**	63	57	50	45	44	41	**25**	65	60	53	47	47	45	**29**	67	62	56	49	49	48	**31**
	750	0.02	61	53	46	43	40	34	**23**	64	58	51	46	45	41	**27**	66	61	54	48	48	46	**30**	67	63	56	50	50	49	**33**
	800	0.03	62	54	47	43	41	34	**24**	65	59	52	47	46	42	**28**	66	62	55	49	48	47	**31**	68	64	57	51	50	50	**34**
9	800	0.04	58	47	43	36	34	30	**19**	61	53	49	42	40	35	**23**	62	57	52	46	44	38	**26**	63	59	55	48	47	40	**29**
	850	0.04	58	48	43	37	34	31	**19**	61	54	49	43	41	35	**23**	63	58	53	46	45	38	**27**	64	60	55	49	47	40	**29**
	900	0.05	59	49	44	37	35	31	**20**	62	55	50	43	41	35	**24**	64	58	53	47	45	38	**27**	65	61	56	49	48	40	**30**
	950	0.06	59	50	44	37	35	31	**20**	62	56	50	43	42	36	**24**	64	59	54	47	45	38	**28**	65	62	56	49	48	40	**31**
	1000	0.06	60	50	44	38	36	31	**22**	63	56	50	44	42	36	**25**	65	60	54	47	46	39	**29**	66	62	57	50	48	40	**31**
10	900	0.01	60	50	47	45	42	29	**22**	63	57	53	50	48	37	**27**	65	60	57	53	52	41	**31**	67	63	59	56	54	44	**34**
	1000	0.01	60	51	48	46	43	30	**22**	64	58	54	51	49	38	**28**	66	61	57	54	53	42	**31**	67	64	59	56	55	45	**34**
	1100	0.01	61	52	48	47	44	32	**23**	65	58	54	52	50	39	**28**	67	62	57	55	54	43	**31**	68	64	60	57	56	46	**35**
	1200	0.01	62	53	48	47	45	32	**24**	65	59	54	53	51	40	**28**	67	63	58	56	55	44	**33**	69	65	60	58	57	47	**35**
	1300	0.01	63	54	49	48	45	33	**25**	66	60	55	53	52	41	**29**	68	63	58	56	55	45	**33**	69	66	61	58	58	48	**36**
12	1200	0.01	58	50	47	41	37	30	**20**	62	56	52	47	43	37	**26**	64	59	56	50	46	41	**30**	66	61	58	53	49	43	**32**
	1400	0.01	60	52	48	42	38	32	**22**	63	57	54	48	45	39	**28**	65	60	57	52	48	42	**31**	67	63	60	54	51	45	**35**
	1600	0.01	61	53	50	43	40	34	**24**	64	59	55	49	46	40	**29**	66	62	59	53	50	44	**34**	68	64	61	55	52	47	**36**
	1800	0.01	61	55	51	44	41	35	**25**	65	60	56	50	48	41	**30**	67	63	60	54	51	45	**35**	69	65	62	56	54	48	**37**
	2000	0.01	62	56	52	45	43	36	**26**	66	61	57	51	49	43	**31**	68	64	61	55	52	47	**36**	69	67	63	57	55	49	**38**
14	1500	0.02	56	51	45	43	40	36	**18**	60	56	50	48	45	41	**24**	62	59	53	51	48	45	**28**	64	61	55	53	50	47	**30**
	1800	0.03	58	53	46	44	41	36	**21**	62	58	51	49	46	42	**27**	64	60	54	52	49	45	**29**	66	63	56	54	51	48	**33**
	2100	0.04	59	54	47	45	42	37	**22**	63	59	52	50	47	43	**28**	66	62	55	53	50	46	**31**	67	64	58	55	52	49	**34**
	2400	0.05	60	55	48	46	43	38	**23**	64	60	53	51	48	43	**29**	67	63	56	54	51	47	**33**	69	65	58	56	53	49	**35**
	2700	0.06	62	56	49	47	44	38	**24**	66	61	54	52	49	44	**30**	68	64	57	55	52	47	**34**	70	66	59	57	54	50	**36**
16	2000	0.02	55	48	43	41	39	31	**36**	59	53	47	45	44	38	**21**	61	56	50	47	47	41	**24**	63	58	52	49	49	44	**27**
	2400	0.02	57	51	45	43	41	33	**18**	61	56	49	47	46	39	**24**	64	59	52	49	49	43	**28**	65	61	54	51	51	46	**30**
	2800	0.03	59	53	46	44	42	34	**21**	63	58	51	48	47	41	**27**	66	61	54	50	50	45	**30**	67	63	55	52	52	48	**33**
	3200	0.04	61	55	48	46	44	36	**23**	65	60	52	50	49	42	**29**	67	62	55	52	52	46	**31**	69	64	57	53	54	49	**34**
	3600	0.05	62	56	49	47	45	37	**24**	66	61	54	51	50	44	**30**	69	64	56	53	53	48	**34**	71	66	58	55	55	50	**36**
40	3900	0.03	70	65	63	59	57	54	**38**	72	68	66	62	61	58	**41**	74	69	67	63	63	61	**42**	75	70	68	64	65	63	**43**
	4600	0.04	73	68	66	62	59	55	**41**	75	71	68	64	63	60	**43**	77	72	70	66	65	63	**46**	78	73	71	67	67	64	**47**
	5300	0.06	75	71	68	64	61	56	**43**	78	73	71	66	65	61	**47**	79	74	72	68	67	64	**48**	80	75	73	69	68	66	**49**
	6000	0.07	77	73	71	66	63	57	**47**	80	75	73	68	66	62	**49**	81	76	74	70	68	65	**50**	82	77	75	71	70	67	**51**
	6700	0.09	79	75	72	67	64	58	**48**	82	77	75	70	68	63	**51**	83	78	76	71	70	66	**52**	84	79	77	72	71	68	**53**

- Radiated sound is the noise transmitted through the unit casing
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI certified. See page M23 for AHRI Certified Performance Listings.

PESV, AESV, DESV / DISCHARGE SOUND PERFORMANCE

Size	CFM	Min ΔPs	Octave Band Sound Power, Lw																												
			0.5" ΔPs							1.0" ΔPs							1.5" ΔPs							2.0" ΔPs						
			2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC	2	3	4	5	6	7	NC
4	100	0.02	70	56	47	42	40	33	**28**	71	59	51	46	47	41	**29**	72	61	54	49	50	46	**30**	73	62	56	51	53	49	**31**
	125	0.03	72	60	50	44	42	35	**30**	73	63	54	49	49	43	**31**	74	64	57	52	52	47	**33**	75	65	59	54	55	51	**34**
	150	0.04	73	63	52	47	44	36	**31**	75	65	57	51	50	44	**34**	76	67	60	54	54	49	**35**	76	68	61	56	57	52	**35**
	175	0.06	75	65	54	48	45	37	**34**	76	68	59	53	51	45	**35**	77	69	62	56	55	50	**36**	78	71	64	58	58	53	**38**
	200	0.08	76	67	56	50	46	38	**35**	77	70	61	55	53	46	**36**	78	72	63	58	56	51	**38**	79	73	65	60	59	54	**39**
5	150	0.01	68	53	47	43	41	34	**25**	70	58	52	47	47	42	**28**	72	60	55	50	51	46	**30**	73	62	58	52	53	49	**31**
	200	0.02	71	57	50	46	43	36	**29**	73	61	56	51	49	44	**31**	75	64	59	53	53	48	**34**	76	66	61	55	55	51	**35**
	250	0.03	73	60	53	49	45	38	**31**	75	65	58	53	51	45	**34**	77	67	61	56	55	50	**36**	78	69	63	58	57	53	**38**
	300	0.04	74	62	55	51	47	39	**29**	77	67	60	55	53	46	**33**	78	70	63	58	56	51	**34**	79	72	66	60	59	54	**35**
	350	0.06	76	64	57	52	48	40	**31**	78	69	62	57	54	47	**34**	80	72	65	60	57	52	**36**	81	74	67	61	60	55	**38**
6	300	0.07	68	60	54	50	45	39	**21**	72	65	59	54	51	46	**26**	75	68	62	57	54	50	**30**	77	70	64	58	56	53	**33**
	350	0.10	69	62	55	52	47	40	**22**	74	67	61	56	52	47	**29**	76	70	64	59	55	51	**31**	78	72	66	60	58	54	**34**
	400	0.13	71	63	57	54	48	41	**25**	75	69	62	58	53	48	**30**	78	72	65	60	57	52	**34**	79	74	67	62	59	55	**35**
	450	0.16	72	65	58	55	49	42	**26**	76	70	64	59	54	49	**31**	79	73	67	62	58	53	**35**	81	76	69	63	60	56	**38**
	500	0.20	73	66	60	56	50	43	**28**	77	72	65	61	55	50	**33**	80	75	68	63	59	54	**36**	82	77	70	65	61	57	**39**
7	450	0.07	71	61	54	51	47	40	**25**	74	66	59	54	51	46	**29**	75	70	61	56	54	49	**30**	77	72	63	58	56	52	**33**
	500	0.09	71	62	55	52	48	40	**25**	74	68	60	56	52	47	**29**	76	71	63	58	55	50	**31**	77	74	64	59	57	53	**34**
	550	0.10	72	64	56	54	49	41	**26**	75	69	61	57	53	48	**30**	76	73	64	59	56	51	**33**	78	75	65	60	58	54	**36**
	600	0.12	72	65	57	55	49	42	**26**	75	70	62	58	54	48	**30**	77	74	64	60	57	52	**34**	78	76	66	61	59	55	**37**
	650	0.15	72	66	58	56	50	43	**26**	75	72	63	59	55	49	**32**	77	75	65	61	58	53	**36**	79	77	67	62	59	55	**38**
8	600	0.02	73	63	56	52	48	40	**28**	76	69	60	55	52	47	**31**	78	72	62	56	55	51	**34**	79	75	64	57	57	54	**36**
	650	0.02	74	64	57	53	48	41	**29**	77	70	61	56	53	47	**33**	78	73	63	57	55	51	**34**	79	76	65	58	57	54	**37**
	700	0.02	74	65	57	54	49	41	**29**	77	71	61	56	53	48	**33**	79	74	64	58	56	52	**35**	80	77	65	59	58	55	**38**
	750	0.02	75	66	58	54	49	42	**28**	77	72	62	57	54	48	**31**	79	75	64	58	56	52	**34**	80	78	66	60	58	55	**38**
	800	0.03	75	67	58	55	50	42	**28**	78	73	63	58	54	49	**32**	79	76	65	59	57	53	**36**	81	78	67	60	59	56	**38**
9	800	0.04	73	61	57	53	49	43	**25**	76	66	61	57	54	49	**29**	77	69	63	59	57	53	**30**	78	71	65	60	59	56	**31**
	850	0.04	74	62	57	53	49	43	**26**	76	67	61	57	54	50	**29**	78	70	63	59	57	54	**31**	79	72	65	61	59	56	**33**
	900	0.05	74	63	58	54	50	43	**26**	77	68	62	57	55	50	**30**	79	70	64	59	57	54	**33**	80	72	66	61	59	57	**34**
	950	0.06	75	63	58	54	50	44	**28**	78	68	62	58	55	50	**31**	79	71	64	60	58	54	**33**	80	73	66	61	60	57	**34**
	1000	0.06	75	64	59	55	50	44	**28**	78	69	62	58	55	50	**31**	80	72	65	60	58	54	**34**	81	74	66	62	60	57	**35**
10	900	0.01	75	62	58	55	50	44	**28**	77	67	62	59	55	50	**30**	78	70	65	61	58	54	**31**	79	73	67	63	61	57	**33**
	1000	0.01	76	63	59	56	50	44	**29**	78	68	63	60	56	51	**31**	79	71	66	62	59	55	**33**	80	74	68	64	61	57	**34**
	1100	0.01	76	63	59	57	51	45	**29**	79	69	64	61	56	51	**33**	80	72	66	63	60	55	**34**	81	74	68	65	62	58	**35**
	1200	0.01	77	64	60	57	52	45	**30**	79	70	64	61	57	52	**33**	81	73	67	64	60	56	**35**	82	75	69	66	63	59	**36**
	1300	0.01	78	65	61	58	52	46	**31**	80	70	65	62	58	53	**34**	81	74	68	65	61	56	**35**	82	76	69	66	63	59	**36**
12	1200	0.01	73	64	60	55	53	46	**25**	76	69	64	59	57	52	**29**	78	72	66	62	60	56	**31**	79	74	68	64	62	59	**33**
	1400	0.01	74	65	62	56	54	47	**26**	77	71	66	61	59	53	**30**	79	74	68	63	61	57	**33**	80	76	70	65	63	60	**36**
	1600	0.01	75	66	63	57	55	48	**28**	78	72	67	62	59	55	**31**	80	75	69	64	62	58	**34**	81	77	71	66	64	61	**37**
	1800	0.01	76	68	64	58	55	49	**29**	79	73	68	63	60	56	**33**	80	76	71	65	63	59	**36**	81	78	72	67	65	62	**38**
	2000	0.01	76	69	65	59	56	50	**29**	79	74	69	64	61	56	**33**	81	77	72	66	64	60	**37**	82	79	73	68	66	63	**39**
14	1500	0.02	69	57	56	53	50	44	**20**	72	63	56	59	57	53	**24**	74	67	56	62	62	59	**26**	76	69	56	65	65	62	**29**
	1800	0.03	70	59	58	53	50	44	**21**	73	65	58	59	58	53	**25**	75	68	58	63	62	59	**28**	77	71	58	65	65	63	**30**
	2100	0.04	71	60	59	54	51	44	**22**	74	66	59	60	58	54	**26**	76	69	59	63	63	59	**29**	78	72	59	66	66	63	**31**
	2400	0.05	72	61	60	54	51	44	**24**	75	67	60	60	59	54	**28**	77	70	60	64	63	59	**30**	78	73	60	66	66	63	**32**
	2700	0.06	72	62	61	54	51	45	**24**	76	68	61	61	59	54	**29**	78	71	61	64	63	60	**31**	79	74	61	67	66	63	**33**
16	2000	0.02	68	59	57	54	52	45	**19**	71	63	57	58	56	51	**22**	73	66	57	61	59	54	**25**	74	68	57	63	61	57	**26**
	2400	0.02	70	62	59	55	53	46	**21**	73	66	59	60	58	52	**25**	75	68	59	62	61	56	**28**	76	70	59	64	62	58	**29**
	2800	0.03	71	64	61	57	55	48	**22**	75	68	61	61	59	54	**28**	77	70	61	64	62	57	**30**	78	72	61	66	64	60	**31**
	3200	0.04	73	65	63	58	56	49	**25**	76	69	63	62	60	55	**29**	78	72	63	65	63	59	**31**	79	73	63	67	65	61	**33**
	3600	0.05	74	67	65	59	57	50	**26**	77	71	65	63	61	56	**30**	79	73	65	66	64	60	**33**	81	75	65	68	66	62	**35**
40	3900	0.03	76	70	66	62	61	56	**29**	81	75	66	67	67	62	**35**	84	78	66	69	70	66	**39**	86	80	66	71	72	68	**42**
	4600	0.04	77	71	67	63	63	58	**30**	82	77	67	68	68	64	**37**	85	80	67	71	71	67	**40**	88	82	67	73	74	70	**44**
	5300	0.06	79	73	69	65	64	60	**33**	84	78	69	69	70	65	**39**	87	81	69	72	73	69	**43**	89	83	69	74	75	71	**45**
	6000	0.07	80	74	70	66	65	61	**34**	85	79	70	71	71	67	**40**	88	82	70	73	74	70	**44**	90	84	70	75	76	73	**47**
	6700	0.09	81	75	71	67	67	62	**35**	86	80	71	72	72	68	**42**	89	83	71	74	75	71	**45**	91	85	71	76	77	74	**48**

- Discharge sound is the noise emitted from the unit discharge into the downstream ductwork
- Min ΔPs is the static pressure drop from the unit inlet to the unit outlet with primary damper full open
- Sound power levels are in dB, ref 10^{-12} watts
- Sound performance based on units lined with standard dual density fiberglass lining
- All performance based on tests conducted in accordance with ASHRAE 130-2008 and AHRI 880-2011
- All NC levels determined using AHRI 885-2008 Appendix E. See Terminal Unit Engineering Guidelines.
- Dash (-) in space denotes NC value less than NC10
- Only highlighted data points are AHRI certified. See page M23 for AHRI Certified Performance Listings.

PESV, AESV, DESV / HOT WATER COIL CAPACITY, MBH / 1- AND 2-ROW

	Rows	gpm	Head Loss	Airflow, cfm								
Sizes 4-5-6				50	100	150	200	250	300	350	400	450
	One-Row	1.0	0.48	3.7	5.6	6.8	7.8	8.6	9.3	9.9	10.4	10.8
		2.0	1.82	3.8	5.9	7.3	8.5	9.5	10.3	11.0	11.6	12.2
		4.0	6.98	3.9	6.1	7.6	8.9	10.0	10.9	11.7	12.4	13.1
		5.0	10.75	3.9	6.1	7.7	9.0	10.1	11.0	11.8	12.6	13.3
		Airside ΔPs		0.01	0.01	0.02	0.04	0.05	0.07	0.10	0.12	0.15
	Two-Row	1.0	0.12	5.0	8.1	10.3	12.0	13.4	14.5	15.5	16.3	17.0
		3.0	1.04	5.4	9.0	11.9	14.2	16.2	17.9	19.4	20.7	22.0
		5.0	2.80	5.4	9.2	12.2	14.7	16.9	18.8	20.5	22.0	23.4
		7.0	5.38	5.5	9.3	12.4	15.0	17.3	19.2	21.0	22.6	24.1
		Airside ΔPs		0.01	0.03	0.05	0.08	0.12	0.16	0.21	0.26	0.32

	Rows	gpm	Head Loss	Airflow, cfm								
Sizes 7-8				100	200	300	400	500	600	700	800	900
	One-Row	1.0	0.64	6.2	8.9	10.7	12.1	13.1	14.0	14.7	15.3	15.9
		2.0	2.46	6.6	9.7	11.8	13.5	14.8	16.0	16.9	17.8	18.5
		3.0	5.38	6.7	10.0	12.3	14.1	15.5	16.8	17.9	18.8	19.7
		4.0	9.39	6.8	10.1	12.5	14.4	15.9	17.2	18.4	19.4	20.3
		Airside ΔPs		0.01	0.02	0.05	0.07	0.11	0.15	0.19	0.24	0.30
	Two-Row	1.0	0.17	8.8	13.4	16.3	18.5	20.2	21.5	22.6	23.6	24.4
		3.0	1.40	9.7	15.6	20.0	23.4	26.3	28.6	30.7	32.5	34.1
		5.0	3.77	9.9	16.2	21.0	24.8	28.0	30.8	33.2	35.3	37.2
		7.0	7.24	10.0	16.5	21.4	25.5	28.8	31.8	34.4	36.7	38.8
		Airside ΔPs		0.02	0.05	0.10	0.16	0.23	0.32	0.41	0.51	0.62

	Rows	gpm	Head Loss	Airflow, cfm								
Sizes 9-10				200	300	400	500	600	700	800	900	1000
	One-Row	2.0	0.41	11.0	13.5	15.4	17.0	18.3	19.5	20.5	21.3	22.1
		3.0	0.90	11.4	14.1	16.3	18.1	19.6	20.9	22.0	23.0	23.9
		5.0	2.41	11.8	14.7	17.1	19.0	20.7	22.2	23.5	24.6	25.7
		6.0	3.43	11.9	14.9	17.3	19.3	21.0	22.5	23.9	25.1	26.2
		Airside ΔPs		0.01	0.02	0.04	0.06	0.08	0.10	0.13	0.15	0.19
	Two-Row	2.0	0.47	16.4	21.0	24.5	27.4	29.8	31.8	33.6	35.1	36.5
		4.0	1.84	17.6	23.0	27.3	31.0	34.2	36.9	39.4	41.5	43.5
		6.0	4.08	18.0	23.8	28.5	32.5	36.0	39.1	41.8	44.3	46.6
		8.0	5.00	18.3	24.2	29.1	33.3	37.0	40.3	43.2	45.9	48.3
		Airside ΔPs		0.03	0.05	0.09	0.12	0.17	0.22	0.27	0.33	0.40

	Rows	gpm	Head Loss	Airflow, cfm								
Size 12				300	500	700	900	1100	1300	1500	1700	1900
	One-Row	2.0	0.54	15.5	19.8	22.9	25.2	27.1	28.7	30.1	31.2	32.3
		3.0	1.19	16.2	21.0	24.5	27.2	29.5	31.4	33.0	34.5	35.7
		5.0	3.18	16.9	22.1	26.0	29.1	31.7	34.0	35.9	37.6	39.2
		6.0	4.52	17.0	22.4	26.5	29.7	32.4	34.7	36.7	38.5	40.1
		Airside ΔPs		0.01	0.03	0.06	0.09	0.13	0.17	0.22	0.27	0.33
	Two-Row	2.0	0.55	23.2	30.8	36.2	40.2	43.5	46.1	48.3	50.2	51.9
		4.0	2.15	25.3	34.8	41.9	47.6	52.3	56.3	59.7	62.7	65.4
		6.0	4.75	26.1	36.4	44.3	50.7	56.1	60.8	64.8	68.4	71.6
		8.0	6.16	26.5	37.2	45.6	52.5	58.3	63.3	67.8	71.7	75.3
		Airside ΔPs		0.03	0.07	0.13	0.20	0.27	0.36	0.46	0.57	0.68

Performance notes appear at end of table

PESV, AESV, DESV / HOT WATER COIL CAPACITY, MBH / 1- AND 2-ROW

	Rows	gpm	Head Loss	Airflow, cfm								
Size 14				400	700	1000	1300	1600	1900	2200	2500	2800
	One-Row	2.0	0.43	20.4	26.3	30.3	33.2	35.5	27.4	39.0	40.4	41.5
		3.0	0.96	21.6	28.4	33.2	36.8	39.7	42.0	44.1	45.9	47.4
		5.0	2.63	22.7	30.5	36.0	40.3	43.8	47.8	49.3	51.6	53.6
		6.0	3.77	23.1	31.0	36.8	41.3	45.0	48.2	50.9	53.3	55.4
		Airside ΔPs		0.01	0.03	0.06	0.09	0.13	0.17	0.22	0.27	0.33
	Two-Row	2.0	0.39	30.1	40.3	47.0	51.8	55.5	58.5	60.9	62.9	64.7
		4.0	1.51	33.5	47.1	56.8	64.3	70.3	75.3	79.6	83.2	86.4
		6.0	3.36	34.9	49.9	61.1	69.9	77.2	83.3	88.6	93.2	97.3
		8.0	3.95	35.6	51.5	63.5	73.1	81.1	88.0	93.9	99.2	103.8
		Airside ΔPs		0.03	0.07	0.12	0.19	0.27	0.36	0.46	0.57	0.69

	Rows	gpm	Head Loss	Airflow, cfm								
Size 16				600	1000	1400	1800	2200	2600	3000	3400	3800
	One-Row	3.0	1.07	29.5	37.4	42.8	47.0	50.4	53.1	55.5	57.5	59.3
		5.0	2.92	31.4	40.6	47.2	52.3	56.5	60.1	63.1	65.8	68.2
		7.0	5.65	32.4	42.1	49.3	55.0	59.7	63.7	67.1	70.2	72.9
		9.0	6.48	32.9	43.1	50.6	56.6	61.6	65.9	69.6	72.9	75.9
		Airside ΔPs		0.02	0.04	0.07	0.10	0.14	0.19	0.24	0.30	0.36
	Two-Row	3.0	0.53	43.1	55.9	64.7	71.1	76.1	80.1	83.4	86.2	88.6
		5.0	1.46	47.0	63.1	74.6	83.5	90.7	96.6	101.6	105.9	109.7
		7.0	2.84	49.0	66.8	80.0	90.3	98.8	106.0	112.1	117.5	122.2
		9.0	2.54	50.2	69.0	83.3	94.6	104.1	112.1	119.0	125.1	130.5
		Airside ΔPs		0.04	0.08	0.14	0.22	0.30	0.40	0.51	0.63	0.76

	Rows	gpm	Head Loss	Airflow, cfm								
Size 24 x 16				600	1200	1800	2400	3000	3600	4200	4800	5400
	One-Row	3.0	1.31	35.3	49.4	58.3	64.7	69.6	73.5	76.8	79.6	82.0
		5.0	3.57	37.6	54.2	65.2	73.4	79.9	85.3	89.9	93.8	97.3
		7.0	6.89	38.7	56.5	68.7	77.9	85.4	91.6	96.9	101.5	105.6
		9.0	8.50	39.3	58.0	70.8	80.7	88.7	95.5	101.3	106.4	110.9
		Airside ΔPs		0.01	0.02	0.05	0.08	0.11	0.15	0.20	0.25	0.30
	Two-Row	3.0	0.59	48.8	70.9	84.3	93.4	100.1	105.3	109.4	112.8	115.7
		5.0	1.63	53.1	81.0	99.4	112.9	123.3	131.6	138.5	144.3	149.3
		7.0	3.17	55.2	86.2	107.6	123.8	136.6	147.1	155.9	163.5	170.0
		9.0	3.06	56.4	89.4	112.8	130.8	145.3	157.3	167.5	176.4	184.2
		Airside ΔPs		0.02	0.05	0.10	0.16	0.24	0.32	0.42	0.52	0.63

- All coil performance in accordance with AHRI 410-2001
- Heating capacities are in MBH
- Data based on 180°F entering water and 55°F entering air
- For temperature differentials other than 125°, multiply MBH by correction factors below
- Head loss is in feet of water
- Always supply water to lowest connection pipe to prevent air entrapment
- Air temperature rise = 927 x MBH/cfm
- Water temperature drop = 2.04 x MBH/gpm
- Connection size is ½" OD male solder for 1-row coil sizes 04-08. All other coils have 7/8" OD male solder.
- Coils are not intended for steam applications and are labeled for a maximum water temperature of 200°F
- Coils are tested for leakage at test pressure of 500 psi
- Water volumes less than those shown may result in laminar flow and reduced heating capacity. If possible reduce the number of coil rows to increase water velocity into turbulent range.

Correction Factors for Other Entering Conditions

ΔT	50	60	70	80	90	100	110	125	140	150
Factor	0.40	0.48	0.56	0.64	0.72	0.80	0.88	1.00	1.12	1.20

Note: Airside ΔPs reflects the air pressure drop of the hot water coil

PESV, AESV, DESV / HOT WATER COIL CAPACITY, MBH / 3- AND 4-ROW

	Rows	gpm	Head Loss	Airflow, cfm								
Sizes 4-5-6				50	100	150	200	250	300	350	400	450
	Three-Row	2.0	0.70	6.1	10.8	14.4	17.5	20.0	22.3	24.2	25.9	27.4
		3.0	1.54	6.1	11.0	14.9	18.2	21.0	23.5	25.7	27.6	29.4
		5.0	4.14	6.2	11.1	15.2	18.8	21.8	24.6	27.0	29.2	31.3
		6.0	5.90	6.2	11.2	15.3	18.9	22.1	24.9	27.4	29.7	31.8
		Airside ΔPs		0.01	0.04	0.08	0.12	0.18	0.24	0.31	0.39	0.47
	Four-Row	3.0	1.11	6.5	11.9	16.5	20.5	23.9	26.8	29.5	34.8	34.0
		4.0	1.95	6.5	12.1	16.8	20.9	24.5	27.7	30.6	33.1	35.5
		6.0	4.33	6.5	12.2	17.1	21.4	25.2	25.6	31.7	34.5	37.1
		8.0	5.42	6.5	12.2	17.2	21.6	25.5	29.1	32.3	35.3	38.0
		Airside ΔPs		0.02	0.05	0.10	0.16	0.24	0.32	0.41	0.52	0.63

	Rows	gpm	Head Loss	Airflow, cfm								
Sizes 7-8				100	200	300	400	500	600	700	800	900
	Three-Row	2.0	0.50	11.2	18.6	23.8	27.9	31.1	33.7	35.9	37.8	39.4
		4.0	1.95	11.6	19.8	26.0	31.1	35.3	38.8	41.9	44.7	47.1
		6.0	4.33	11.7	20.2	26.9	32.3	37.0	41.0	44.5	47.6	50.4
		8.0	5.42	11.7	20.4	27.3	33.0	37.9	42.1	45.9	49.2	52.2
		Airside ΔPs		0.02	0.08	0.15	0.24	0.35	0.47	0.61	0.77	0.93
	Four-Row	4.0	1.40	12.4	22.1	29.6	358.0	40.9	45.3	49.1	52.4	55.3
		6.0	3.12	12.5	22.5	30.6	37.3	43.0	48.0	52.4	56.3	59.7
		8.0	3.53	12.6	22.7	31.1	38.1	44.2	49.5	54.2	58.4	62.2
		10.0	5.46	12.6	22.9	31.4	38.6	44.9	50.4	55.4	59.8	63.8
		Airside ΔPs		0.03	0.10	0.20	0.32	0.47	0.63	0.82	1.02	1.25

	Rows	gpm	Head Loss	Airflow, cfm								
Sizes 9-10				200	300	400	500	600	700	800	900	1000
	Three-Row	3.0	0.80	21.0	27.9	33.4	38.0	41.8	45.2	48.1	50.7	52.9
		5.0	2.19	21.6	29.2	35.5	40.8	45.5	49.6	53.2	56.5	59.4
		7.0	4.26	21.9	29.8	36.5	42.2	47.2	51.7	55.7	59.4	62.7
		9.0	4.49	22.1	30.2	37.0	43.0	48.3	53.0	57.3	61.2	64.7
		Airside ΔPs		0.04	0.08	0.13	0.19	0.25	0.33	0.41	0.50	0.59
	Four-Row	4.0	1.16	23.5	32.2	39.4	45.6	50.9	55.5	59.6	63.2	66.5
		5.0	1.80	23.7	32.7	40.4	46.9	52.6	57.7	62.2	66.2	69.8
		8.0	2.75	24.1	33.6	41.8	49.0	55.4	61.2	66.4	71.1	75.5
		10.0	4.25	24.2	33.9	42.3	49.8	56.4	62.4	67.9	72.9	77.5
		Airside ΔPs		0.05	0.11	0.17	0.25	0.34	0.43	0.54	0.66	0.79

	Rows	gpm	Head Loss	Airflow, cfm								
Size 12				300	500	700	900	1100	1300	1500	1700	1900
	Three-Row	3.0	0.91	30.3	42.2	50.9	57.6	63.0	67.4	71.1	74.3	77.0
		4.0	1.61	31.0	44.0	53.8	61.5	67.8	73.1	77.6	81.5	84.9
		6.0	3.57	31.8	45.9	56.9	65.8	73.3	79.7	85.2	90.1	94.5
		8.0	4.32	32.2	46.9	58.5	68.2	76.3	83.4	89.6	95.1	100.0
		Airside ΔPs		0.05	0.11	0.19	0.29	0.41	0.54	0.69	0.85	1.02
	Four-Row	4.5	1.63	34.6	50.5	62.9	72.7	80.8	87.6	93.4	98.4	102.8
		5.0	2.01	34.8	51.1	63.9	74.2	82.7	89.9	96.0	101.4	106.1
		7.0	2.88	35.1	52.6	66.5	78.0	87.7	96.1	103.4	109.8	115.6
		9.0	4.11	35.6	53.4	68.0	80.3	90.8	99.9	107.9	115.1	121.5
		Airside ΔPs		0.06	0.15	0.26	0.39	0.55	0.72	0.92	1.13	1.36

Performance notes appear at end of table

PESV, AESV, DESV / HOT WATER COIL CAPACITY, MBH / 3- AND 4-ROW

	Rows	gpm	Head Loss	Airflow, cfm								
Size 14				400	700	1000	1300	1600	1900	2200	2500	2800
	Three-Row	4.0	1.30	41.3	59.8	73.0	83.0	90.9	97.3	102.7	107.3	111.1
		5.0	2.01	42.1	61.8	76.3	87.6	96.6	104.1	110.4	115.8	120.5
		6.0	2.88	42.6	63.2	78.6	90.8	100.7	109.0	116.1	122.2	127.6
		8.0	3.27	43.3	65.0	81.7	95.2	106.3	115.8	124.0	131.2	137.5
		Airside ΔPs		0.04	0.10	0.19	0.29	0.41	0.54	0.69	0.86	1.04
	Four-Row	6.0	2.06	46.7	71.1	89.5	104.0	115.7	125.5	133.7	140.8	146.9
		7.0	2.79	47.1	72.2	91.6	107.1	119.8	130.4	139.5	147.4	154.2
		8.0	2.03	47.4	73.1	93.3	109.5	123.0	134.4	144.1	152.7	160.2
		10.0	3.15	47.8	74.4	95.6	113.0	127.7	140.2	151.1	160.7	169.2
		Airside ΔPs		0.05	0.14	0.25	0.38	0.54	0.72	0.93	1.15	1.39
Size 16	Rows	gpm	Head Loss	Airflow, cfm								
				600	1000	1400	1800	2200	2600	3000	3400	3800
	Three-Row	6.0	1.71	58.5	80.9	97.0	109.3	119.2	127.3	134.0	139.9	144.9
		8.0	1.51	60.1	84.4	102.5	116.7	128.3	138.0	146.2	153.4	159.6
		10.0	2.35	61.1	86.7	106.1	121.6	134.4	145.3	154.6	162.7	169.9
		12.0	3.36	61.8	88.2	108.6	125.1	138.8	150.5	160.7	169.6	177.5
		Airside ΔPs		0.06	0.14	0.24	0.37	0.51	0.68	0.86	1.06	1.28
	Four-Row	9.0	1.58	67.4	97.6	120.6	138.8	153.7	166.2	176.8	185.9	193.9
		10.0	1.95	67.9	98.8	122.6	141.6	157.3	170.5	181.8	191.6	200.2
		11.0	2.36	68.3	99.7	124.2	144.0	160.3	174.1	186.0	196.4	205.6
		12.0	2.80	68.6	100.5	125.6	146.0	162.9	177.3	189.8	200.7	210.3
		Airside ΔPs		0.08	0.18	0.32	0.49	0.68	0.90	1.15	1.42	1.71
Size 24 x 16	Rows	gpm	Head Loss	Airflow, cfm								
				600	1200	1800	2400	3000	3600	4200	4800	5400
	Three-Row	6.0	1.86	65.0	103.8	129.6	148.2	162.3	173.5	182.5	190.1	196.5
		8.0	1.76	66.4	108.6	138.0	160.0	177.3	191.2	202.8	212.6	221.1
		10.0	2.74	67.2	111.5	143.4	167.9	187.4	203.4	216.9	228.5	238.6
		12.0	3.92	67.8	113.6	147.2	173.4	194.7	212.3	227.3	240.3	251.6
		Airside ΔPs		0.03	0.09	0.17	0.27	0.40	0.54	0.70	0.88	1.07
	Four-Row	9.0	1.80	72.6	124.0	161.1	189.2	211.2	229.0	243.6	256.0	266.7
		10.0	2.22	73.0	125.5	164.1	193.6	217.1	236.2	252.1	265.6	277.2
		11.0	2.68	73.3	126.7	166.5	197.3	222.0	242.3	259.3	273.9	286.4
		12.0	3.18	73.5	127.7	168.6	200.5	226.3	247.6	265.6	281.1	294.5
		Airside ΔPs		0.04	0.12	0.23	0.37	0.53	0.72	0.93	1.17	1.42

- All coil performance in accordance with AHRI 410-2001
- Heating capacities are in MBH
- Data based on 180°F entering water and 55°F entering air
- For temperature differentials other than 125°, multiply MBH by correction factors below
- Head loss is in feet of water
- Always supply water to lowest connection pipe to prevent air entrapment
- Air temperature rise = 927 x MBH/cfm
- Water temperature drop = 2.04 x MBH/gpm
- Connection size is ½" OD male solder for 1-row coil sizes 04-08. All other coils have 7/8" OD male solder.
- Coils are not intended for steam applications and are labeled for a maximum water temperature of 200°F
- Coils are tested for leakage at test pressure of 500 psi
- Water volumes less than those shown may result in laminar flow and reduced heating capacity. If possible reduce the number of coil rows to increase water velocity into turbulent range.

Correction Factors for Other Entering Conditions

ΔT	50	60	70	80	90	100	110	125	140	150
Factor	0.40	0.48	0.56	0.64	0.72	0.80	0.88	1.00	1.12	1.20

Note: Airside ΔPs reflects the air pressure drop of the hot water coil

SELECTION AND CAPACITIES

Recommended Coil Selection Data

The table at the right describes the maximum recommended kW capacities and number of stages available for Titus single duct terminals.

To make a coil selection:

1. Check the desired kW is available in desired unit size and number of stages. (Required to prevent excessive watt density and current draw, while taking into account unit size limitations.)
2. Check the desired minimum airflow limit is within recommended operating range. (Ensures velocity pressure will be sufficient to close airflow sensing switch.)
3. Multiply desired minimum airflow limit by a factor of 0.0142 and check the result is equal to or greater than desired kW. (Limits temperature rise across the coil to 45°F.)

$$kW \leq cfm \times 0.0142$$

These requirements established to prevent excessive temperature rise caused by low airflow and/or oversized coils. Minimum airflow limits must be within recommended ranges to ensure proper operation and long service life. For optimum diffuser performance and maximum thermal comfort, coil discharge temperatures should not be more than 15°F above desired room temperatures. For proper coil operation it is recommended that coil discharge temperatures do not to exceed 100°F.

Titus electric heating coils are specifically designed for use with VAV terminal units. They include an extended plenum section and diffuser plate to minimize stratification. The heating elements are designed to minimize hot spots and nuisance tripping of the thermal cutouts.

Note: The Titus 480V, 3-phase electric heat configuration is 4-wire wye. 3-wire configuration is available.

PESV, AESV, DESV / APPLICATION DATA (STAGED HEAT)

Inlet Size	Heating cfm Range	Number of Steps Available	120V 1 Phase kW Range		208V 1 Phase kW Range		240V 1 Phase kW Range		277V 1 Phase kW Range		208V 3 Phase kW Range		480V 3 Phase kW Range	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
4	55-225	1	0.5	5.0	0.5	3.0	1.0	3.0	1.0	3.0	1.5	3.0	2.5	3.0
		2	1.0		1.0		1.5		1.5					
		3	1.5		1.5		2.0		2.5					
5	85-350	1	0.5	5.0	0.5	5.0	1.0	5.0	1.0	5.0	1.5	5.0	2.5	5.0
		2	1.0		1.0		1.5		1.5					
		3	1.5		1.5		2.0		2.5					
6	105-500	1	0.5	5.0	0.5	7.5	1.0	7.5	1.0	7.5	1.5	7.5	2.5	7.5
		2	1.0		1.0		1.5		1.5					
		3	1.5		1.5		2.0		2.5					
7	135-650	1	0.5	5.0	0.5	9.5	1.0	9.5	1.0	9.5	1.5	9.5	2.5	9.5
		2	1.0		1.0		1.5		1.5					
		3	1.5		1.5		2.0		2.5					
8	190-900	1	0.5	5.0	0.5	9.5	1.0	11.0	1.0	13.0	1.5	13.0	2.5	13.0
		2	1.0		1.0		1.5		1.5					
		3	1.5		1.5		2.0		2.5					
9	225-1050	1	0.5	5.0	0.5	9.5	1.0	11.0	1.0	13.0	1.5	16.0	2.5	16.0
		2	1.0		1.0		1.5		1.5					
		3	1.5		1.5		2.0		2.5					
10	300-1400	1	0.5	5.0	0.5	9.5	1.0	11.0	1.0	13.0	1.5	16.0	2.5	21.0
		2	1.0		1.0		1.5		1.5					
		3	1.5		1.5		2.0		2.5					
12	425-2000	1	0.5	5.0	0.5	9.5	1.0	11.0	1.0	13.0	1.5	16.0	2.5	30.0
		2	1.0		1.0		1.5		1.5					
		3	1.5		1.5		2.0		2.5					
14	575-3000	1	0.5	5.0	1.0	9.5	1.0	11.0	1.5	13.0	1.5	16.0	3.0	36.0
		2	1.0		2.0		2.0		2.0		2.0			
		3	1.5		3.0		3.0		3.0		3.0			
16	750-4000	1	0.5	5.0	1.0	9.5	1.0	11.0	1.5	13.0	1.5	16.0	3.0	36.0
		2	1.0		2.0		2.0		2.0		2.0			
		3	1.5		3.0		3.0		3.0		3.0			
24x16	1800-8000	1	1.0	5.0	1.0	9.5	1.0	11.0	1.5	13.0	1.5	16.0	4.0	36.0
		2	2.0		2.0		2.0		3.0		2.0			
		3	3.0		3.0		3.0		4.5		3.0			

Useful formulas:

$$kW = \frac{cfm \times \Delta T}{3160} \quad \text{or} \quad \Delta T = \frac{kW \times 3160}{cfm} \quad \text{or} \quad cfm = \frac{kW \times 3160}{\Delta T}$$

Where ΔT = air temperature rise.

PESV, AESV, DESV / APPLICATION DATA (LYNERGY HEAT)

Inlet Size	Heating cfm Range	120V 1 Phase kW Range		208V 1 Phase kW Range		240V 1 Phase kW Range		277V 1 Phase kW Range		208V 3 Phase kW Range		480V 3 Phase kW Range	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
4	55-225	0.5	2.5	0.5	3.0	1.0	3.0	1.0	3.0	1.5	3.0	2.5	3.0
5	85-350	0.5	4.5	0.5	5.0	1.0	5.0	1.0	5.0	1.5	5.0	2.5	5.0
6	105-500	0.5	5.0	0.5	7.5	1.0	7.5	1.0	7.5	1.5	7.5	2.5	7.5
7	135-650	0.5	5.0	0.5	9.5	1.0	9.5	1.0	9.5	1.5	9.5	2.5	9.5
8	190-900	0.5	5.0	0.5	9.5	1.0	11.0	1.0	13.0	1.5	10.5	2.5	13.0
9	225-1050	0.5	5.0	0.5	9.5	1.0	11.0	1.0	13.0	1.5	10.5	2.5	16.0
10	300-1400	0.5	5.0	0.5	9.5	1.0	11.0	1.0	13.0	1.5	10.5	2.5	21.0
12	425-2000	0.5	5.0	0.5	9.5	1.0	11.0	1.0	13.0	1.5	10.5	2.5	25.0
14	575-3000	0.5	5.0	1.0	9.5	1.0	11.0	1.5	13.0	1.5	10.5	3.0	25.0
16	750-4000	0.5	5.0	1.0	9.5	1.0	11.0	1.5	13.0	1.5	10.5	3.0	25.0
24x16	1800-8000	2.0	5.0	1.0	9.5	1.0	11.0	1.5	13.0	1.5	10.5	4.0	25.0

Electrical Information

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LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

QUANTUM®
Thermoplastic Exits

LHQM LED

LED Lamp Head
Nickel-Cadmium Battery

HO RO

FEATURES & SPECIFICATIONS

INTENDED USE — Suitable for applications requiring both exit sign and unit equipment. Attractive, 8" tall, streamlined design is great for above-the-door applications and other tight fits. Optional high-output version with remote lamps are ideal for emergency egress lighting. **Certain airborne contaminants can diminish integrity of acrylic and/or polycarbonate.** **Click here for Acrylic- Polycarbonate Compatibility table for suitable uses.**

CONSTRUCTION — Engineering-grade thermoplastic housing is impact-resistant, scratch-resistant and corrosion-proof. UL94V-0 flame rating. UV-stable resin resists discoloration from natural and man-made light sources.

Rugged unibody housing snaps together with no additional fasteners. Faceplate and back cover are interchangeable on housing. Positive snap-fit tabs hold faceplate securely, yet are easily removable for lamp compartment access. Universal, directional chevron inserts are easily removed and reinserted.

Uniform graphics illumination without shadows or hot spots. Letters are 6" high with 3/4" stroke, with 100 ft. viewing distance rating based upon UL924 standard.

LEDs mounted on primary circuit boards for sign illumination. Low-energy LED lamp in sign operates in normal (AC input) and emergency (DC input) modes.

Low-profile, integrated test switch/pilot light. Easily viewed bright red status indicator.

Unique track-and-swivel arrangement permits full range of direction of lamp head adjustment. Universal J-box mounting pattern. Tool-less access for maintenance. Conduit entry position on top of unit.

U.S. Patent No. 6,848,798; 6,499,866; 6,142,648; 5,797,673; D379,373; 5,526,251; D484,272; D473,672; 5,611,163; 5,646,502.

OPTICS — Twin LED lamp heads operate in emergency (DC input) mode with 12 series-parallel white LEDs in each head. Provides redundant light sources to ensure emergency lighting performance. The typical life of the exit LED lamp is 10 years.

ELECTRICAL — Dual-voltage input capability (120/277V). Edge connector on printed circuit board ensures long-term durability.

Current-limiting charger maximizes battery life and minimizes energy consumption. Provides low operating costs.

Short-circuit protection — current-limiting charger circuitry protects printed circuit board from shorts.

Thermal compensation adjusts charger output to provide optimum charge voltage relative to ambient temperature.

Regulated charge voltage maintains constant-charge voltage over a wide range of line voltages. Prevents over/undercharging that shortens battery life and reduces capacity.

Filtered charger input minimizes charge voltage ripple and extends battery life.

AC/LVD reset allows battery connection before AC power is applied and prevents battery damage from deep discharge.

Single multi-color LED indicator to display two-state charging, test activation and three-state diagnostic test. Test switch provides manual activation of 30-second diagnostic testing for on-demand visual inspection. Self-diagnostic testing for 30 seconds every 30 days, 30 minutes at 180-day interval, and 90 minutes annually. Diagnostic evaluation of LED light source, AC-to-DC transfer, charging and battery condition.

Battery: Sealed, maintenance-free nickel-cadmium battery delivers 90-minute capacity to emergency lamps. Two-state contstant-current charge maximizes battery life and automatically recharges after battery discharge. Low-voltage disconnect prevents excessively deep discharge that can permanently damage the battery. Optional high-output battery to power both local and optional LED remote lamp heads simultaneously.

INSTALLATION — Top, end or back mounting. Housing snaps to canopy with positive-locking tabs. Cam locking pin secures housing to canopy.

Easily removed mounting knockouts. Conduit entry knockout for 1/2" flexible conduit. J-box pattern on back panel.

LISTINGS — UL damp location listed standard 50°-104°F (10°-40°C). Meets UL 924, NFPA 101 (current Life Safety Code), NEC and OSHA illumination standards.

WARRANTY — 5-year limited warranty. (Battery is prorated). Complete warranty terms located at www.AcuityBrands.com/CustomerResources/Terms_and_Conditions.aspx.

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

CS CONTRACTOR SELECT™ Looking for Contractor Select readily available configurations? Click here to visit Contractor Select™ spec sheet or go to www.contractorselect.com

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: LHQM LED G

LHQM		LED									
Family		**Lamp type**		**Housing color**		**Letter color**		**Options**			
LHQM	Stencil face, single face plate with extra face plate	LED	Two 1.5W/9.6V white LED	(blank)	White	R	Red	HO	High-output Ni-cad battery	NOM	Meets Mexican standards[1]
				B	Black	G	Green	HO RO	High-output option, less lamp heads	NOM SALIDA	Salida signage (non-UL)[2]
								SD	Self-diagnostics		

Accessories: *Order as separate catalog number.*

ELA Q L0309 SD	Single, LED indoor remote head, white, self-diagnostics [3,4,5]	ELA WG3	Wireguard, 30"W x 13-1/2"H x 6"D[6]
ELA T Q L0309 SD	Twin, LED indoor remote head, white, self-diagnostics [3,4,5]	ELA WG2M	Wireguard, 21-1/4"W x 15"H x 12"D[6]
ELA QWP L0309 SD	Single, LED weather-proof remote head, gray, self-diagnostics [3,4,5]	ELA LQMUS12	12" white stem kit[7]
ELA T QWP L0309 SD	Twin, LED weather-proof remote head, gray, self-diagnostics [3,4,5]	ERE W SGL SQ M12	Single, LED indoor remote head, square, ivory white, .75W, 3.6V-12V voltage sensing[8,9]
ELA Q L0309	Single, LED indoor remote head, white[4,5]	ERE W T SQ M12	Twin, LED indoor remote head, square, ivory white, 1.5W, 3.6V-12V voltage sensing[8,9]
ELA T Q L0309	Twin, LED indoor remote head, white[4,5]	ERE GY SGL WP SQ M12	Single, LED weather-proof remote head, square, gray, 1W, 3.6V-12V voltage sensing[8,9]
ELA QWP L0309	Single, LED weather-proof remote head, gray[4,5]	ERE GY T WP SQ M12	Twin, LED weather-proof remote head, square, gray, 2W, 3.6V-12V voltage sensing[8,9]
ELA T QWP L0309	Twin, LED weather-proof remote head, gray[4,5]		

Notes

1 Available in black or white. Consult factory for options.
2 Only available in white. NOM standard.
3 Only compatible with self-diagnostic option. (ex: HO SD)
4 Also available in black. Add "B" after ELA to order black finish. Example: ELA B Q L0309.
5 Only compatible with HO option . See spec sheet ELA-Q-LED.
6 See spec sheet ELA-WG.
7 See spec sheet ELA-Stemkits.
8 See spec sheet ERE.
9 Not available with SD. Only compatible with HO option.

SPECIFICATIONS

Electrical Primary Circuit				
	Typical LED life[1]	Supply voltage	Max amps	Max watts
Red and green LED	10 years	120	.05	4.3
		277	.03	4.3

BATTERY

Ni-Cad				
Voltage	Typical Shelf life[2]	Typical life[2]	Maintenance[3]	Temperature range[4]
9.6	3 years	7-9 years	none	50-104°F (10-40°C)

1 Based on continuous operation.

2 At 77°F (25°C).

3 All life safety equipment, including emergency lighting path of egress, must be maintained, serviced and tested in accordance with all National Fire Protection Association and local codes. Failure to perform the required maintenance, service or testing could jeopardize the safety of occupants and will void all warranties.

4 Optimum ambient temperature range where unit will provide capacity for 90 minutes. Higher and lower temperatures affect life and capacity.

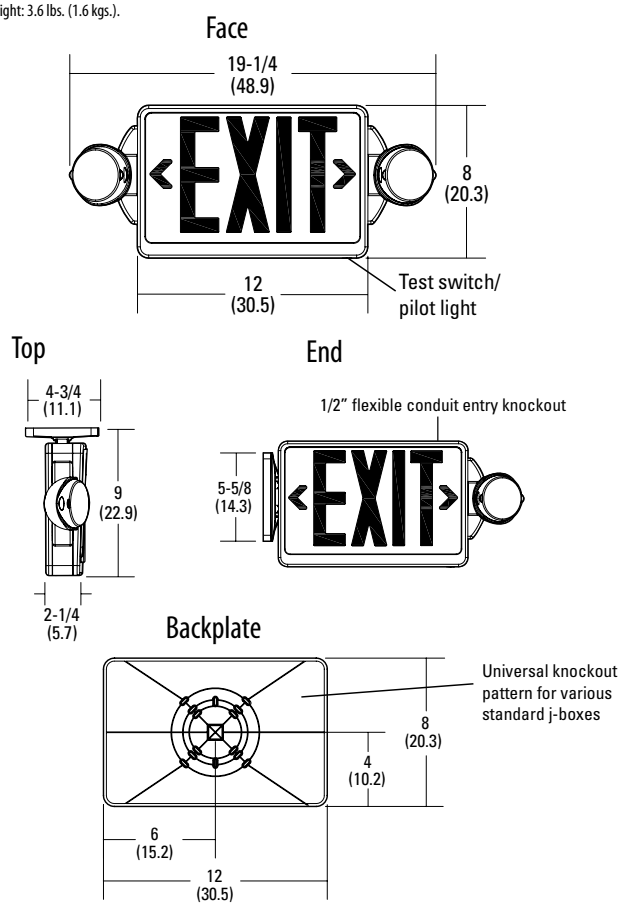
5. Battery life is negatively impacted by many variables including temperature, charging rates, number of cycles and deep discharges due to long periods of time without AC power.

Remote Output Capacity			
Standard unit	Combo	Combo/high-output battery(HO)	Combo/high-output (HO) and no heads (RO)
NA	NA	3W	6W

MOUNTING

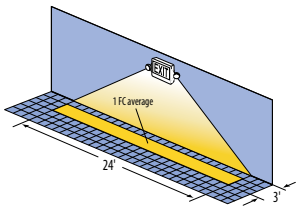
All dimensions are inches (centimeters).

Shipping weight: 3.6 lbs. (1.6 kgs.).

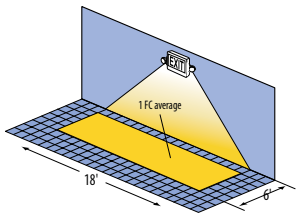


LAMP PHOTOMETRICS

QUANTUM LED SERIES – SINGLE COVERAGE
3W Total White LEDs
Using a single unit at a typical 7.5′ mounting height delivers an average illuminance of 1.0 FC over a distance of 24′ on a 3′ path of egress and 18′ on a 6′ path of egress.

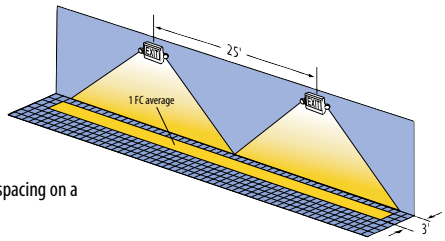


Example of single LHQM LED exit illuminating a 3' path of egress

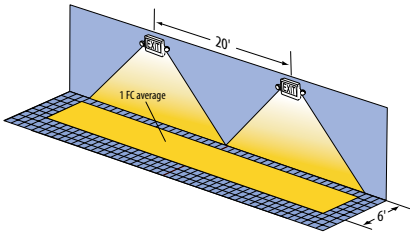


Example of single LHQM LED exit illuminating a 6' path of egress

QUANTUM LED SERIES – MULTIPLE COVERAGE
3W Total White LEDs
Using multiple units at a typical 7.5′ mounting height delivers 25′ center-to-center spacing on a 3′ path of egress and 20′ center-to-center spacing on a 6′ path of egress.



Example of multiple LHQM LED exits illuminating a 3' path of egress



Example of multiple LHQM LED exits illuminating a 6' path of egress

EXTENDED RUN-TIME FOR HIGH-OUTPUT EXITS

Product	Run time
LHQM LED HO (no remotes)	3.8 hours
LHQM LED HO RO (no remotes)	7.5 hours

EMERGENCY: One Lithonia Way Conyers, GA 30012 Phone: 800-705-SERV (7378) www.lithonia.com techsupport-emergency@acuitybrands.com © 2012-2019 Acuity Brands Lighting, Inc. All rights reserved. Rev. 09/04/19

LITHONIA LIGHTING®

DIGITAL NAVIGATION

Ordering Tree nLight Platform Controls Photometrics Performance Data

Catalog Number	
Notes	
Type	T-1

BLT Series LED

2BLT4

2' x 4'
LED

ADP Diffuser Option

Ribbed Reflector Option

eldoLED

FEATURES & SPECIFICATIONS

INTENDED USE —The BLT Best-in-Value Low Profile LED luminaire features a popular center basket design that offers a clean, versatile style and volumetric distribution. High efficacy LED light engines deliver energy savings and low maintenance compared to traditional sources. An extensive selection of configurations and options make the BLT the perfect choice for many lighting applications including schools, offices and other commercial spaces, retail, hospitals and healthcare facilities. The low profile BLT design (2-3/8") also makes it an excellent choice for renovation projects.

CONSTRUCTION — Prior to fabrication, BLT components are coated with a proprietary paint blend and die-formed for dimensional consistency.

The BLT reflector is available in both smooth and ribbed finishes. For a ribbed finish, add RIB to the end of the product description. See the ordering tree below for additional detail.

End plates contain easy-to-position integral T-bar clips for securely attaching the luminaire to the T-grid. For additional T-grid security, optional screw on T-bar clips are available.

Diffusers are extruded from impact modified acrylic for increased durability.

LED boards and drivers are accessible from the plenum.

OPTICS — Volumetric illumination is achieved by creating an optimal mix of light to walls, partitions and vertical and horizontal work surfaces – rendering the interior space, objects and occupants in a more balanced, complimentary luminous environment. High performance extruded acrylic diffusers conceal LEDs and efficiently deliver light in a volumetric distribution. Four diffuser choices available - curved and square designs with ribbed or a smooth frosted finish.

ELECTRICAL — Long-life LEDs, coupled with high-efficiency drivers, provide superior quantity and quality of illumination for extended service life. 80% LED lumen maintenance at 60,000 hours (L80/60,000). Color Variation within 3-step MacAdam ellipse (3SDCM).

Non-Configurable BLT: Generic 0-10 volt dimming driver. Dims to 10%

Configurable BLT: available in High Efficiency (HE) versions for applications where a lower wattage (over the standard product) is required. The High Efficiency versions deliver >130 LPW and can be specified via the Lumen Package designations in the Ordering Information below.

eldoLED driver options deliver choice of dimming range, and choices for control, while assuring flicker-free, low-current inrush, 89% efficiency and low EMI.

Optional integrated nLight®controls make each luminaire addressable - allowing it to digitally communicate with other nLight enabled controls such as dimmers, switches, occupancy sensors and photocontrols. Connection to nLight is simple. It can be accomplished with integrated nLight AIR wireless RIO, RES7 sensors, or through standard Cat-5 cabling. nLight offers unique plug-and-play convenience as devices and luminaires automatically discover each other and self-commission. nLight AIR is commissioned easily through an intutitive mobile app.

Lumen Management: Unique lumen management system (option N80) provides on board intelligence that actively manages the LED light source so that constant lumen output is maintained over the system life, preventing the energy waste created by the traditional practice of over-lighting.

Step-level dimming option allows system to be switched to 50% power for compliance with common energy codes while maintaining fixture appearance.

Driver disconnect provided where required to comply with US and Canadian codes.

SENSOR— Integrated sensor (individual control): Sensor Switch MSD7ADCX ((Passive infrared (PIR)) or MSDPDT7ADCX ((PIR/Microphonics Dual Tech (PDT)) integrated occupancy sensor/automatic dimming photocell allows the luminaire to power off when the space is unoccupied or enough ambient light is entering the space. See page 4 for more details on the integrated sensor.

Integrated Sensor (nLight Wired Networking): This sensor is nLight-enabled, meaning it has the ability to communicate over an nLight network. When wired, using CAT-5 cabling, with other nLight-enabled sensors, power packs, or WallPods, an nLight control zone is created. Once linked to a Gateway, directly or via a Bridge, the zone becomes capable of remote status monitoring and control via SensorView software. See page 4 for the nLight sensor options.

Integrated Smart Sensor (nLight Air Wireless Platform): The RES7 sensor is nLight AIR enabled, meaning it has the ability to communicate over the wireless nLight control platform. It is available with an automatic dimming photocell, and either a digital PIR or a microphonics (PDT) dual technology occupancy sensor. It pairs to other luminairs and wall switches through our mobile app, CL***AIR***ITY, which allows for simple sensor adjustment. See page 4 for more details on the Integrated Smart Sensor.

INSTALLATION — The BLT's low profile design of only 2-3/8" provides increased installation flexibility especially in restrictive plenum applications. The BLT fits into standard 15/16" and narrow 9/16" T-grid ceiling systems.

Suitable for damp location.

For recessed mounting in hard ceiling applications, Drywall Grid Adapters (DGA) are available as an accessory. See Accessories section.

LISTINGS — CSA Certified to meet U.S. and Canadian standards. IC rated.
DesignLights Consortium® (DLC) Premium qualified product. Not all versions of this product may be DLC Premium qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

WARRANTY — 5-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/support/customer-support/terms-and-conditions

NOTE: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

Specifications

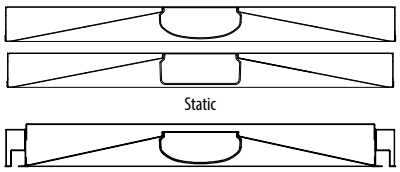
Length: 47-3/4 (121.2)

Width: 23-3/4 (60.3)

Depth: 2-3/8 (6.0)

Depth with Air supply/return: 2-3/4 (6.9)

All dimensions are inches (centimeters) unless otherwise specified.



Static

Air Supply/Return

Embed nLight controls today. Prepare for tomorrow.

Now	Tomorrow
User-friendly install	Scalability
Enhanced energy savings	Space configuration
Code compliance	Future-ready

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded background*
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

2BLT Volumetric Recessed Lighting 2'x4'

A+ Capable options indicated by this color background.

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

Example: 2BLT4 40L ADP EZ1 LP840

2BLT4		60L		ADP		EZ1	LP840
Series	**Air function**	**Lumens**[2]		**Diffuser**	**Voltage**	**Driver**	**Color temperature**
2BLT4 2x4 BLT	(blank) Static A Air supply/ return[1]	**Standard efficiency (>100 LPW)** 30L 3000 40L 4000 48L 4800 60L 6000 72L 7200 85L 8500 100L 10000 120L 12000	**High efficiency**[3,4] **(>130 LPW)** 30LHE 3000 40LHE 4000 48LHE 4800 60LHE 6000 72LHE 7200 85LHE 8500	ADP Curved, ribbed ADSM Curved, smooth SDP Square, ribbed SDSM Square, smooth **Includes trim rings to match sensored version** ADPT Curved, ribbed ADSMT Curved, smooth SDPT Square, ribbed SDSMT Square, smooth	(blank) MVOLT 120 120V 277 277V 347 347V[5]	EZ1 eldoLED dims to 1% (0-10 volt dimming) GZ1 Dims to 1% (0-10V dimming)[6] GZ10 Dims to 10% (0-10V dimming)[6] SLD Step-level dimming[7]	LP830 82CRI, 3000 K LP835 82CRI, 3500 K LP840 82CRI, 4000 K LP850 82CRI, 5000 K LP930 90CRI, 3000K LP935 90CRI, 3500K LP940 90CRI, 4000K LP950 90CRI, 5000K

nLight Interface

nLight Wired

(blank)	no nLight ® interface
N80	nLight with 80% lumen management
N80EMG	nLight with 80% lumen management For use with generator supply EM power[8]
N100	nLight without lumen management
N100EMG	nLight without lumen management For use with generator supply EM power[8]

nLight Wireless

(blank)	no nLight ® interface
NLTAIR2	nLight AIR Generation 2 enabled[9]

Control[10]

nLight Wired

(blank)	No sensor control
NES7	nLight™ nES 7 PIR integral occupancy sensor[11]
NESPDT7	nLight™ nES PDT 7 dual technology integral occupancy control[11]
NES7ADCX	nLight™ nES 7 ADCX PIR integral occupancy sensor with automatic dimming photocell[11]
NESPDT7ADCX	nLight™ nES PDT 7 dual technology integral occupancy sensor with automatic dimming photocell[11]

nLight Wireless

RES7	nLight AIR PIR integral occupancy sensor with automatic dimming photocell for Networking Capabilities
RES7PDT	nLight AIR microphonics dual technology occupancy sensor with automatic dimming photocell
RIO	nLight AIR radio module without sensor
RES7EM	nLight AIR PIR integral occupancy sensor with automatic dimming photocell and UL924 Emergency Operation, via power interrupt detection[23]
RES7PDTEM	nLight AIR microphonics dual technology occupancy sensor with automatic dimming photocell and UL924 Emergency Operation, via power interrupt detection[23]
RIOEM	nLight AIR radio module less sensor, with UL924 Emergency Operation, via power interrupt detection[23]

Individual Control

MSD7ADCX	PIR integral occupancy sensor with automatic dimming control photocell[12]
MSDPDT7ADCX	PDT integral occupancy sensor with automatic dimming control photocell[12]

Standy Mode

NOC	NOC Occupancy sensor disabled[13]

Options

RIB	**Ribbed reflector**
EL7L	700 lumen battery pack (Noncompliant with CA T20)[14]
EL14L	1400 lumen battery pack (Noncompliant with CA T20)[14]
EL14LSD	1400 lumen battery pack with self-diagnostic testing feature (Noncompliant with CA T20)[14,15]
E10WLCP	EM Self-Diagnostic battery pack, 10W Constant Power, Certified in CA Title 20 MAEDBS[14]
CP	Chicago plenum[16]
BGTD	Bodine Generator Transfer Device[17]
PWS1836	6' pre-wire, 3/8" diameter, 18 gauge, 1 circuit
PWS1846	6' pre-wire, 3/8" diameter, 18 gauge, 2 circuit
PWS1846 PWSLV	Two cables: one 6' pre-wire, 3/8" diameter, 18 gauge, 2 circuits; one 6' pre-wire, 3/8" diameter, 18 gauge, purple and gray[18]
PWS1856LV	6' pre-wire, 3/8" diameter, 18 gauge, 1 circuit w/low voltage purple and grey wires[18]
GLR	Fast-blowing fuse[19]
GMF	Slow-blowing fuse[19]
NPLT	Narrow pallet
RRL_	RELOC®-ready luminaire[20]
LATC	Earthquake clip
DWAM	Anti-Microbial paint
JP14	Job packaging[21]
JP18	Job packaging
IP5X	Gasketed diffuser compartment to meet IP5X rating[22]

Notes

1 Consult factory for airflow data.
2 Approximate lumen output.
3 All versions may not achieve 130+ LPW. Refer to photometry on www.acuitybrands.com.
4 Air supply/return option, 90 CRI, and versions with integral sensor trim rings may not achieve 130 LPW.
5 Not available with SLD, EL7L, EL14L, or E10WLCP options.
6 GZ1 and GZ10 not available with any Control or Sensor options
7 Not available with N80, N80EMG, N100, N100EMG, NLTAIR, or occupancy control.
8 nLight EMG option requires a connection to existing nLight network. Power is provided from a separate N80 or N100 enabled fixture.
9 Must order with RES7, RES7PDT, or RIO module. Only available with EZ1 driver. Not available with 85L, 100L, or 120L options.
10 Must specify diffuser with trim rings. See sensor options on page 4.
11 Requires N80, N80EMG, N100, or N100EMG. Only available with EZ1 driver.
12 Only available with EZ1 driver option. 0-10v dimming wires not accessible via access plate.
13 Can only be ordered in conjunction with EZ1, NLTAIR2, RES7/RES7PDT. Occupancy sensor disabled at factory but can be re-enabled upon commissioning.
14 When using pre-wire option, use PWS1846 or PWS1846 PWSLV.
15 For more information, please see the PSSD2 specification sheet.
16 Not available with N80, N80EMG, N100, or N100EMG.
17 Must specify voltage. Requires BSE labeling, voltage specific. Consult factory for options.
18 Not available with nLight wired/wireless network or individual controls.
19 Must specify voltage, 120 or 277, with GLR and GFM fusing.
20 For ordering logic consult RRL_2013.
21 Only available with option: NES7, NESPDT7, NESPDT7ADCX, MSD7ADCX, MSDPDT7ADCX, RES7, RES7PDT, RIO.
22 Not available with air supply/return or Wired Networking (NES_) and Individual Control (MSD_) sensors.
23 See UL924 Sequence of Operation chart on page 3.

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2BLT Volumetric Recessed Lighting 2'x4'

Multiple Diffuser Options

ADP Curved Ribbed

ADSM Curved Smooth

SDP Square Ribbed

SDSM Square Smooth

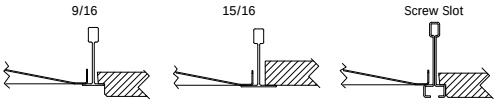
SDSM Diffuser Option

Non-Configurable BLT

Non-Configurable BLT								
Stock/MTO	**Catalog Description ***	**UPC**	**Lumens**	**Wattage**	**LPW**	**Color Temperature**	**Voltage**	**Pallet Qty**
Stock	2BLT4 40L ADP LP835	00190887470789	4000	31	129	3500K/82 CRI	120-277	28
	2BLT4 40L ADP LP840	00190887470765	4063	31	131	4000K/82CRI	120-277	28
	2BLT4 46L ADP LP835	00190887468656	4960	38	131	3500K/82 CRI	120-277	28
	2BLT4 46L ADP LP840	00190887468649	5039	38	133	4000K/82CRI	120-277	28
	2BLT4 40L ADP EL14L LP835	00190887470925	4000	31	129	3500K/82 CRI	120-277	28
	2BLT4 40L ADP EL14L LP840	00190887470918	4063	31	131	4000K/82 CRI	120-277	28
	2BLT4 46L ADP EL14L LP835	00190887468670	4960	38	131	3500K/82 CRI	120-277	28
	2BLT4 46L ADP EL14L LP840	00190887468663	5039	38	133	4000K/82 CRI	120-277	28
MTO	2BLT4 40L ADP 347 LP835	00193047562188	4000	31	129	3500K/82 CRI	347	28
	2BLT4 40L ADP 347 LP840	00193047059183	4063	31	131	4000K/82CRI	347	28
	2BLT4 46L ADP 347 LP835	00193047562225	4960	38	131	3500K/82 CRI	347	28
	2BLT4 46L ADP 347 LP840	00193047686426	5039	38	133	4000K/82CRI	347	28

*Generic 0-10V Dimming to 10%.

MOUNTING DATA	
Ceiling Type	**Appropriate Trim Type**
Exposed grid tee (1' and 9/16")	G
Concealed grid tee	G
Plaster or plasterboard	G*



*DGA accessory available to provide ceiling trim flange and fixture support for plaster or plasterboard ceiling. Recommended rough-in dimensions for DGA installation is 24-3/4" x 24-3/4" (Tolerance is +1/8", -0").

UL924 Sequence of Operation

For 90 minutes following any complete AC power interruption >200 ms:

- Digital dimming is commanded to high end trim level.
- Device ignores wireless lighting control commands.

Accessories & Replacement Parts

Accessories: *Order as separate catalog number.*

DGA24	Drywall grid adapter for 2x4 recessed fixture
2X4SMKSHP PAF	Surface Mount Troffer Kit Post Paint

Replacement Parts: *Order as separate catalog number.*

*249P2N	2DBLT48 ADP LENS ASSEMBLY	4 ft. replacement lens
*249P2T	2DBLT48 SDP LENS ASSEMBLY	4 ft. replacement lens
*249P30	2DBLT48 ADSM LENS ASSEMBLY	4 ft. replacement lens
*249P33	2DBLT48 SDSM LENS ASSEMBLY	4 ft. replacement lens
*237LT2	2DBLT48 ADPT LENS ASSEMBLY	4 ft. replacement lens
*237LT4	2DBLT48 SDPT LENS ASSEMBLY	4 ft. replacement lens
*237LT6	2DBLT48 ADSMT LENS ASSEMBLY	4 ft. replacement lens
*237LT8	2DBLT48 SDSMT LENS ASSEMBLY	4 ft. replacement lens
*237LTA	2DBLT48 ADPT SENSOR LENS ASSEMBLY	4 ft. replacement lens
*237M52	2DBLT48 SDPT SENSOR LENS ASSEMBLY	4 ft. replacement lens
*237M5A	2DBLT48 ADSMT SENSOR LENS ASSEMBLY	4 ft. replacement lens
*237M5L	2DBLT48 SDSMT SENSOR LENS ASSEMBLY	4 ft. replacement lens

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nLight Platform

nLight embedded fixtures offer:	Customers get:
Manual Dimming	Convenience and visual comfort for occupants
Motion Sensing and/or Daylight Harvesting	Energy savings and code compliance
Fixture or Group Level Control	Ability to configure lighting to the space requirements
Flexibility	Ease of fixture moves, adds and changes
Wireless Wall Switch (nLight AIR Only)	Ease and flexibility of placement
Astronomical and Time of Day Scheduling	Energy savings and building security
Scalable Solution	nLight controls to grow with your business
Future-Ready	nLight platform to set foundation for future upgrades and capabilities

nLight Air Wireless

BLT Series

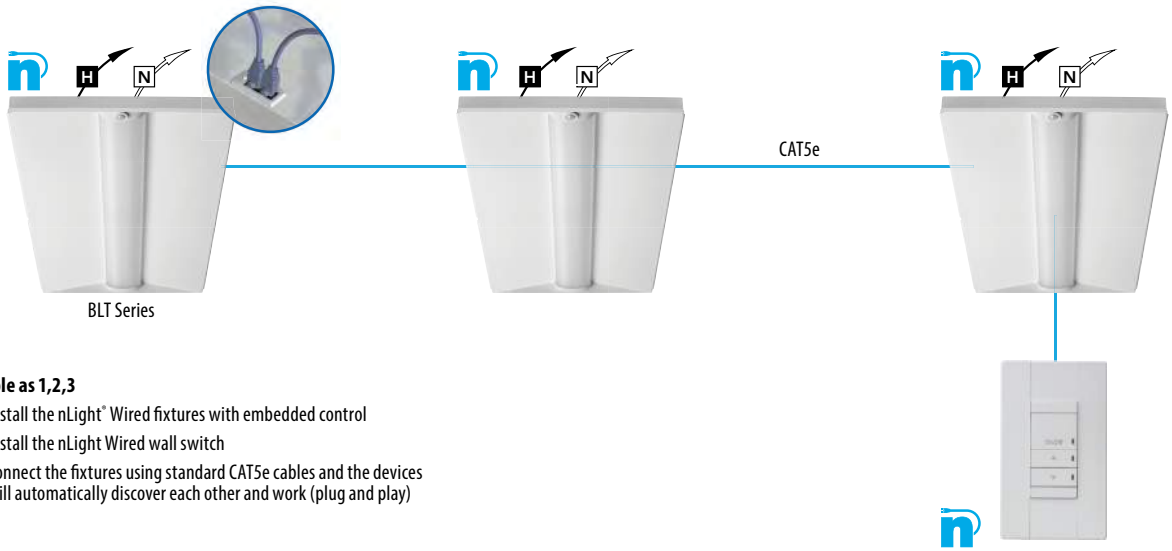
Simple as 1,2,3

1. Install the nLight® AIR fixtures with embedded smart sensor
2. Install the wireless battery-powered wall switch
3. With CL**AIR**ITY app, pair the fixtures with the wall switch and if desired, customize the sensor settings for the desired outcome

nLight AIR rPODBA

Mobile Device

nLight Wired Networking



BLT Series

nLight Wired nPODMA

Simple as 1,2,3

1. Install the nLight® Wired fixtures with embedded control
2. Install the nLight Wired wall switch
3. Connect the fixtures using standard CAT5e cables and the devices will automatically discover each other and work (plug and play)

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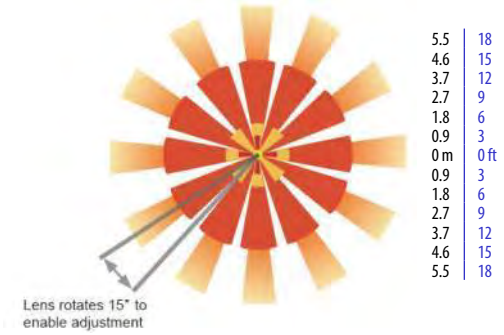
Sensor Options					
Option	Automatic Dimming Photocell	Occupancy Sensing		nLight Wired Networking	nLight AIR Networking
		PIR	PDT		
MSD7ADCX	X	X			
MSDPDT7ADCX	X		X		
NES7		X		X	
NES7ADCX	X	X		X	
NESPDT7			X	X	
NESPDT7ADCX	X		X	X	
RES7	X	X			X
RESPDT7	X	X	X		X

Sensor Coverage Pattern
Mini 360° Lens

- Recommended for walking motion detection from mounting heights between 8 ft (2.44 m) and 20 ft (6.10 m)
- Initial detection of walking motion along sensor axes at distances of 2x the mounting height up to 15 ft (4.57 m) and
- 1.75x up to 20 ft (6.10 m).
- Provides 12 ft (3.66 m) radial detection of small motion when mounted at 9 ft (2.74 m)
- Initial detection will occur earlier when walking across sensor's field of view than when walking directly at sensor

9 FT Mounting



Integrated Sensor with Individual Control

The MSD7ADCX PIR occupancy sensor/automatic dimming photocell is ideal for areas without obstructions and where daylight harvesting may be desired. Suggested applications include, but not limited to, hallways, corridors, storage rooms, and breakrooms or other areas where people are typically moving.

The MSDPDT7ADCX PIR/Microphonics Dual Tech occupancy sensor/automatic dimming photocell is ideal for areas with obstructions and where daylight harvesting is desired. Suggested applications include, but not limited to, open offices, private offices, classrooms, public restrooms, and conference rooms.

nLight AIR Wireless

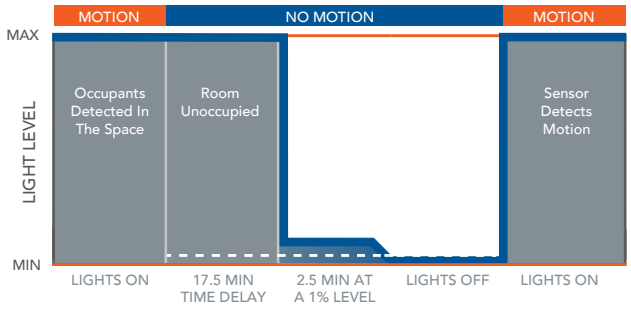
nLight AIR is the ideal solution for retrofit or new construction spaces where adding additional wiring can be labor intensive and nLight AIR is available with or without an integral sensor. The integrated rES7 or rES7PDT smart sensors are part of each luminaire in the nLight AIR network, which can be grouped to control multiple luminaires. The granularity of control with the digital PIR occupancy detection and daylight sensing makes a great solution for any application.

nLight Wired Networking

The nES 7 is ideal for small rooms without obstructions or areas with primarily walking motion. Ideal areas include hallways, corridors, storage rooms, and breakrooms. Additionally, the nES7ADCX includes an integrated photocell, which enables daylight harvesting controls.

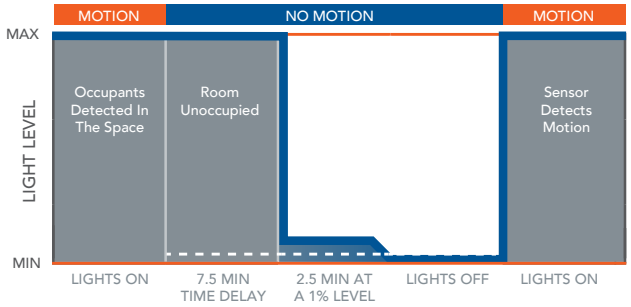
For areas like restrooms, private offices, open offices, conference rooms or any space with obstructions, the nES PDT 7 dual technology sensor is recommended. The nES PDT 7 utilizes both PIR (passive infrared) and Microphonics technologies to detect occupancy. Additionally, the nESPDT7ADCX includes an integrated photocell, which enables daylight harvesting controls which is ideal for areas where windows are present.

Sequence of Operation (MSD7 Sensor)



*The presetting on the automatic dimming photocell is 5fc.

Sequence of Operation (nES7 and rES7 and Sensor)



*The presetting on the automatic dimming photocell is 5fc (NES7) and 10fc (RES7).

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Controls Accessories

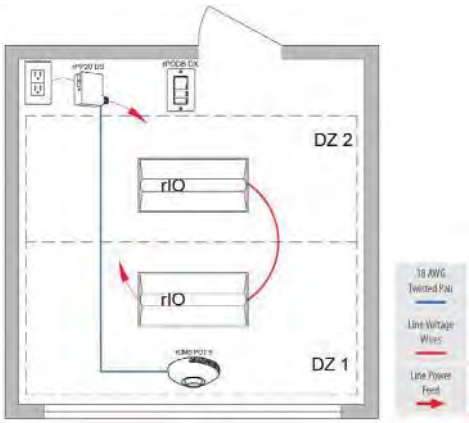
nLight® Wired Control Accessories:
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlight.

WallPod stations	Model number	Occupancy sensors	Model number
On/Off	nPODMA [Color]	Small motion 360°, ceiling (PIR / dual tech)	nCM 9 RJB / nCM PDT 9 RJB
On/Off & raise/lower	nPODMA DX [Color]	Large motion 360°, ceiling (PIR / dual tech)	nCM10 RJB / nCM PDT 10 RJB
Graphic touchscreen	nPOD TOUCH [Color]	Wall switch with raise/lower	nWSX PDT LV DX [color]
Photocell controls	**Model number**	**Cat-5 cable (plenum rated)**	**Model number**
Full range dimming	nCM ADCX RJB	10' cable	CAT5 10FT J1
		30' cable	CAT5 30FT J1

nLight® AIR Control Accessories:
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlightair.

Wall switches	Model number
On/Off single pole	rPODBA [color] G2
On/Off two pole	rPODB A2P [color] G2
On/Off & raise/lower single pole	rPODBA DX [color] G2
On/Off & raise/lower two pole	rPODBA 2P DX [color] G2

BLT fixtures with integrated rIO devices complement any small office space. Pair them with an rCMS occupancy sensor and the space now has wireless occupancy sensing and dimming capability. For additional configuration options please consult with Tech Support.



rCMS[1]					Example: RCMS PDT 10 AR G2
Series / Detection	Power Supply[1]	Occupancy Detection	Lens (Required)	Operating Mode	Generation
RCMS nLight AIR occupancy and daylight sensor	[blank] Power Supply ordered separately PS 150 Standard 150 mA Power Supply	[blank] PIR Detection PDT Dual Tech PIR/ Microphonics	10 Large Motion/ Extended Range 360° 9 Small Motion/ Extended Range 360° 6 High Bay 360° Lens	[BLANK] None AR Auxiliary Relay	G2 Generation 2 compatibility

Notes
1 RCMS requires low voltage power from either RPP20 DS 24V G2 or PS150.

Sensor Switch WSX

nLight WIRED NPOD UNITOUCH

nLight WIRED nPODMA DX

nLight AIR rPODBA

BLT with rIO

rPODBA

RCMS

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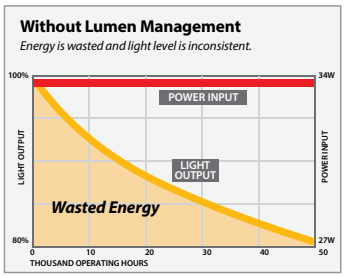
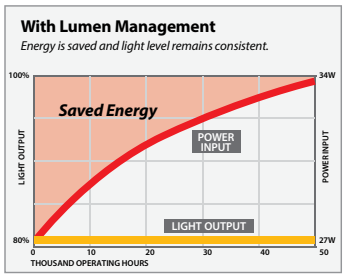
Constant Lumen Management

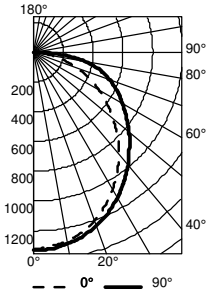
Enabled by the embedded nLight control, the BLT actively tracks its run-time and manages its light source such that constant lumen output is maintained over the system life. Referred to as lumen management, this feature eliminates the energy waste created by the traditional practice of over-lighting.





PHOTOMETRICS

2BLT4 40L ADP LP835, 4000 delivered lumens, test no. ISF36900P109, tested in accordance to IESNA LM-79



CP Summary

	0°	90
0°	1325	1325
5°	1309	1325
15°	1250	1278
25°	1136	1187
35°	981	1058
45°	797	909
55°	601	761
65°	408	621
75°	212	460
85°	48	197
90	1	17

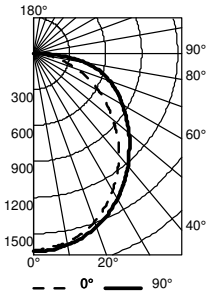
Coefficients of Utilization

RCR (pf / pc / pw)	80% 70%	80% 50%	80% 30%	20% 70% 50%	20% 70% 30%	20% 70% 10%	50% 50% 30%	50% 50% 30%	50% 50% 10%
0	119	119	119	116	116	116	111	111	111
1	108	102	97	100	96	92	96	92	89
2	97	88	81	86	80	74	83	77	72
3	88	77	69	76	68	61	72	66	60
4	81	68	59	67	58	52	64	57	51
5	74	61	51	60	51	44	57	50	44
6	68	55	45	54	45	39	52	44	38
7	63	50	40	49	40	34	47	39	34
8	59	45	36	44	36	30	43	36	30
9	55	41	33	41	33	27	40	32	27
10	52	38	30	38	30	25	37	30	25

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	1024	25.6	25.6
0° - 40°	1669	41.7	41.7
0° - 60°	2960	74.0	74.0
0° - 90°	3998	100.0	100.0
90° - 120°	2	0.0	0.0
90° - 130°	2	0.0	0.0
90° - 150°	2	0.0	0.0
90° - 180°	2	0.0	0.0
0° - 180°	4000	100.0	100.0

2BLT4 48L ADP LP835, 4960 delivered lumens, test no. ISF 36900P117, tested in accordance to IESNA LM-79



CP Summary

	0°	90
0°	1643	1643
5°	1623	1644
15°	1550	1585
25°	1409	1472
35°	1217	1312
45°	988	1127
55°	745	943
65°	505	769
75°	263	571
85°	59	244
90	1	21

Coefficients of Utilization

RCR (pf / pc / pw)	80% 70%	80% 50%	80% 30%	20% 70% 50%	20% 70% 30%	20% 70% 10%	50% 50% 30%	50% 50% 30%	50% 50% 10%
0	119	119	119	116	116	116	111	111	111
1	108	102	97	100	96	92	96	92	89
2	97	88	81	86	80	74	83	77	72
3	88	77	69	76	68	61	72	66	60
4	81	68	59	67	58	52	64	57	51
5	74	61	51	60	51	44	57	50	44
6	68	55	45	54	45	39	52	44	38
7	63	50	40	49	40	34	47	39	34
8	59	45	36	44	36	30	43	36	30
9	55	41	33	41	33	27	40	32	27
10	52	38	30	38	30	25	37	30	25

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	1270	25.6	25.6
0° - 40°	2070	41.7	41.7
0° - 60°	3671	74.0	74.0
0° - 90°	4957	100.0	100.0
90° - 120°	2	0.0	0.0
90° - 130°	2	0.0	0.0
90° - 150°	2	0.0	0.0
90° - 180°	2	0.0	0.0
0° - 180°	4960	100.0	100.0

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2BLT Volumetric Recessed Lighting 2'x4'

Performance Data					
Model Number	**Lumens**	**LPW**	**Watts**	**DLC Listing**	**DLC ID**
2BLT4 30L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	2962	127.31	23.26	Premium	PWJDEMHS
2BLT4 30L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	3009.28	129.34	23.26	Premium	P18J5GLD
2BLT4 30L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	2969.16	127.62	23.26	Premium	P3HB2XSG
2BLT4 40L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	4000	126.22	31.69	Premium	PDWKYXFD
2BLT4 40L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	4063.86	128.23	31.69	Premium	PEYXAZWD
2BLT4 40L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	3946.66	124.53	31.69	Premium	PS63CPK6
2BLT4 40L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	4009.67	126.52	31.69	Premium	PK79UR9W
2BLT4 48L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	4960	130.5	38	Premium	PJ9CK6C1
2BLT4 48L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	5039.18	132.58	38	Premium	P9W2R5AK
2BLT4 48L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	4893.86	128.76	38	Premium	PPFKZU3U
2BLT4 48L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	4971.99	130.82	38	Premium	PC8HMCH9
2BLT4 60L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	6016	126.39	47.59	Premium	PSJ6QERM
2BLT4 60L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	6112.04	128.4	47.59	Premium	PVXQXPUV
2BLT4 60L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	5935.78	124.7	47.59	Premium	PHT84BW4
2BLT4 60L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	6030.55	126.69	47.59	Premium	PXV55BC8
2BLT4 72L ADP EZ1 (GZ10) LP840 [All Options]	7360.66	125.3	58.74	Premium	PSCZ22CB
2BLT4 72L ADP GZ1 LP835 [All Options]	7245	119.07	60.84	standard	PISHTCTS
2BLT4 72L ADP GZ1 LP840 [All Options]	7360.66	120.97	60.84	standard	PBERALG7
2BLT4 72L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	7148.4	117.48	60.84	standard	PDQS3CYK
2BLT4 72L ADPT EZ1 (GZ10) LP840 [All Options]	7262.52	123.63	58.74	Premium	P2KKMMVN
2BLT4 72L ADPT GZ1 LP840 [All Options]	7262.52	119.36	60.84	standard	P10DUPC0
2BLT4 85L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	8567	116.43	73.58	standard	PYD2GO6V
2BLT4 85L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	8703.77	118.28	73.58	standard	P8Z4IV4X
2BLT4 85L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	8452.77	114.87	73.58	standard	PTZEW3QM
2BLT4 85L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	8587.72	116.71	73.58	standard	P01DMEK9
2BLT4 100L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	9837	103.14	95.36	standard	PGDES20R
2BLT4 100L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	9994.04	104.79	95.36	standard	P007CHGX
2BLT4 100L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	9705.84	101.77	95.36	standard	PSZUQY7M
2BLT4 100L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	9860.79	103.39	95.36	standard	P6V6X6HY
2BLT4 120L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	11709	118.18	99.07	standard	PGM4Y7DP
2BLT4 120L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	11895.9	120.07	99.07	standard	P0ODDCG2
2BLT4 120L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	11552.9	116.61	99.07	standard	PXM0FS09
2BLT4 120L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	11737.3	118.47	99.07	standard	PJ4GEBZM

DLC information is subject to change, for the most up-to-date information please refer to www.dlc.org. Above listings do not cover 347v or SLD.

How to Estimate Delivered Lumens in Emergency Mode
Use the formula below to estimate the delivered lumens in emergency mode

Delivered Lumens = 1.25 x P x LPW

P = Ouput power of emergency driver. P = 10W for E10WLCP option. LPW = Lumen per watt rating of the luminaire. This information is available on the ABL luminaire spec sheet. LPW = Lumen per watt rating of the luminaire. LPW information available in Performance Data section.

HE Performance Data					
Model Number	**Lumens**	**LPW**	**Watts**	**DLC Listing**	**DLC ID**
2BLT4 30LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	3107	135.17	22.98	Premium	P7KEICW5
2BLT4 30LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	3156.6	137.33	22.98	Premium	PDOM06BH
2BLT4 30LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	3065.57	133.37	22.98	Premium	P7PZAJDZ
2BLT4 30LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	3114.51	135.5	22.98	Premium	P2N23EBP
2BLT4 40LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	4085	138.56	29.48	Premium	P67P6S5Y
2BLT4 40LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	4150.21	140.77	29.48	Premium	P95UQD66
2BLT4 40LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	4030.53	136.71	29.48	Premium	PC15DQEC
2BLT4 40LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	4094.88	138.89	29.48	Premium	PGRCSJ2T
2BLT4 48LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	4770	138.16	34.52	Premium	PXBJBGN8
2BLT4 48LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	4846.15	140.37	34.52	Premium	P5PQ5RRX
2BLT4 48LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	4706.4	136.32	34.52	Premium	P2NK2H33
2BLT4 48LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	4781.53	138.5	34.52	Premium	PK8C1321
2BLT4 60LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	5894	135.12	43.61	Premium	PQZN176R
2BLT4 60LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	5988.09	137.28	43.61	Premium	PG5CYJUC
2BLT4 60LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	5815.41	133.32	43.61	Premium	PZ72TAWM
2BLT4 60LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	5908.25	135.45	43.61	Premium	PRC4W72B
2BLT4 72LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	7149	135.94	52.58	Premium	PUB38GEQ
2BLT4 72LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	7263.13	138.11	52.58	Premium	P7GDHZTN
2BLT4 72LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	7053.68	134.12	52.58	Premium	P5CC2VKV
2BLT4 72LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	7166.29	136.26	52.58	Premium	P6P1BKDM
2BLT4 85LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	8158	128.96	63.25	Premium	PRTW6BXW
2BLT4 85LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	8288.24	131.02	63.25	Premium	P6H1V2D6
2BLT4 85LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	8049.22	127.24	63.25	Premium	P1VG5TA3
2BLT4 85LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	8177.73	129.27	63.25	Premium	PN5BKJ6E

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LITHONIA LIGHTING®

DIGITAL NAVIGATION

Ordering Tree nLight Platform Controls Photometrics Performance Data

Catalog Number	
Notes	
Type	T-1E

BLT Series LED

2BLT4

2' x 4'
LED

ADP Diffuser Option

Ribbed Reflector Option

eldoLED

FEATURES & SPECIFICATIONS

INTENDED USE —The BLT Best-in-Value Low Profile LED luminaire features a popular center basket design that offers a clean, versatile style and volumetric distribution. High efficacy LED light engines deliver energy savings and low maintenance compared to traditional sources. An extensive selection of configurations and options make the BLT the perfect choice for many lighting applications including schools, offices and other commercial spaces, retail, hospitals and healthcare facilities. The low profile BLT design (2-3/8") also makes it an excellent choice for renovation projects.

CONSTRUCTION — Prior to fabrication, BLT components are coated with a proprietary paint blend and die-formed for dimensional consistency.

The BLT reflector is available in both smooth and ribbed finishes. For a ribbed finish, add RIB to the end of the product description. See the ordering tree below for additional detail.

End plates contain easy-to-position integral T-bar clips for securely attaching the luminaire to the T-grid. For additional T-grid security, optional screw on T-bar clips are available.

Diffusers are extruded from impact modified acrylic for increased durability.

LED boards and drivers are accessible from the plenum.

OPTICS — Volumetric illumination is achieved by creating an optimal mix of light to walls, partitions and vertical and horizontal work surfaces – rendering the interior space, objects and occupants in a more balanced, complimentary luminous environment. High performance extruded acrylic diffusers conceal LEDs and efficiently deliver light in a volumetric distribution. Four diffuser choices available - curved and square designs with ribbed or a smooth frosted finish.

ELECTRICAL — Long-life LEDs, coupled with high-efficiency drivers, provide superior quantity and quality of illumination for extended service life. 80% LED lumen maintenance at 60,000 hours (L80/60,000). Color Variation within 3-step MacAdam ellipse (3SDCM).

Non-Configurable BLT: Generic 0-10 volt dimming driver. Dims to 10%

Configurable BLT: available in High Efficiency (HE) versions for applications where a lower wattage (over the standard product) is required. The High Efficiency versions deliver >130 LPW and can be specified via the Lumen Package designations in the Ordering Information below.

eldoLED driver options deliver choice of dimming range, and choices for control, while assuring flicker-free, low-current inrush, 89% efficiency and low EMI.

Optional integrated nLight®controls make each luminaire addressable - allowing it to digitally communicate with other nLight enabled controls such as dimmers, switches, occupancy sensors and photocontrols. Connection to nLight is simple. It can be accomplished with integrated nLight AIR wireless RIO, RES7 sensors, or through standard Cat-5 cabling. nLight offers unique plug-and-play convenience as devices and luminaires automatically discover each other and self-commission. nLight AIR is commissioned easily through an intutitive mobile app.

Lumen Management: Unique lumen management system (option N80) provides on board intelligence that actively manages the LED light source so that constant lumen output is maintained over the system life, preventing the energy waste created by the traditional practice of over-lighting.

Step-level dimming option allows system to be switched to 50% power for compliance with common energy codes while maintaining fixture appearance.

Driver disconnect provided where required to comply with US and Canadian codes.

SENSOR— Integrated sensor (individual control): Sensor Switch MSD7ADCX ((Passive infrared (PIR)) or MSDPDT7ADCX ((PIR/Microphonics Dual Tech (PDT)) integrated occupancy sensor/automatic dimming photocell allows the luminaire to power off when the space is unoccupied or enough ambient light is entering the space. See page 4 for more details on the integrated sensor.

Integrated Sensor (nLight Wired Networking): This sensor is nLight-enabled, meaning it has the ability to communicate over an nLight network. When wired, using CAT-5 cabling, with other nLight-enabled sensors, power packs, or WallPods, an nLight control zone is created. Once linked to a Gateway, directly or via a Bridge, the zone becomes capable of remote status monitoring and control via SensorView software. See page 4 for the nLight sensor options.

Integrated Smart Sensor (nLight Air Wireless Platform): The RES7 sensor is nLight AIR enabled, meaning it has the ability to communicate over the wireless nLight control platform. It is available with an automatic dimming photocell, and either a digital PIR or a microphonics (PDT) dual technology occupancy sensor. It pairs to other luminairs and wall switches through our mobile app, CL***AIR***ITY, which allows for simple sensor adjustment. See page 4 for more details on the Integrated Smart Sensor.

INSTALLATION — The BLT's low profile design of only 2-3/8" provides increased installation flexibility especially in restrictive plenum applications. The BLT fits into standard 15/16" and narrow 9/16" T-grid ceiling systems.

Suitable for damp location.

For recessed mounting in hard ceiling applications, Drywall Grid Adapters (DGA) are available as an accessory. See Accessories section.

LISTINGS — CSA Certified to meet U.S. and Canadian standards. IC rated.
DesignLights Consortium® (DLC) Premium qualified product. Not all versions of this product may be DLC Premium qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.

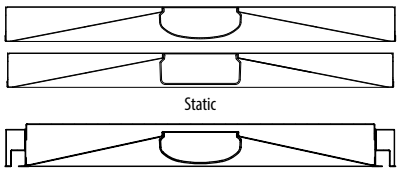
WARRANTY — 5-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/support/customer-support/terms-and-conditions

NOTE: Actual performance may differ as a result of end-user environment and application.
All values are design or typical values, measured under laboratory conditions at 25 °C.
Specifications subject to change without notice.

Specifications

Length: 47-3/4 (121.2)
Width: 23-3/4 (60.3)
Depth: 2-3/8 (6.0)
Depth with Air supply/return: 2-3/4 (6.9)

All dimensions are inches (centimeters) unless otherwise specified.



Static

Air Supply/Return

Embed nLight controls today. Prepare for tomorrow.

Now	Tomorrow
User-friendly install	Scalability
Enhanced energy savings	Space configuration
Code compliance	Future-ready

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded background*
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

2BLT Volumetric Recessed Lighting 2'x4'

A+ Capable options indicated by this color background.

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

Example: 2BLT4 40L ADP EZ1 LP840

2BLT4		60L		ADP		EZ1	LP840
Series	**Air function**	**Lumens[2]**		**Diffuser**	**Voltage**	**Driver**	**Color temperature**
2BLT4 2x4 BLT	(blank) Static A Air supply/ return[1]	**Standard efficiency (>100 LPW)** 30L 3000 40L 4000 48L 4800 60L 6000 72L 7200 85L 8500 100L 10000 120L 12000	**High efficiency[3,4] (>130 LPW)** 30LHE 3000 40LHE 4000 48LHE 4800 60LHE 6000 72LHE 7200 85LHE 8500	ADP Curved, ribbed ADSM Curved, smooth SDP Square, ribbed SDSM Square, smooth **Includes trim rings to match sensored version** ADPT Curved, ribbed ADSMT Curved, smooth SDPT Square, ribbed SDSMT Square, smooth	(blank) MVOLT 120 120V 277 277V 347 347V[5]	EZ1 eldoLED dims to 1% (0-10 volt dimming) GZ1 Dims to 1% (0-10V dimming)[6] GZ10 Dims to 10% (0-10V dimming)[6] SLD Step-level dimming[7]	LP830 82CRI, 3000 K LP835 82CRI, 3500 K LP840 82CRI, 4000 K LP850 82CRI, 5000 K LP930 90CRI, 3000K LP935 90CRI, 3500K LP940 90CRI, 4000K LP950 90CRI, 5000K

nLight Interface

nLight Wired

(blank)	no nLight ® interface
N80	nLight with 80% lumen management
N80EMG	nLight with 80% lumen management For use with generator supply EM power[8]
N100	nLight without lumen management
N100EMG	nLight without lumen management For use with generator supply EM power[8]

nLight Wireless

(blank)	no nLight ® interface
NLTAIR2	nLight AIR Generation 2 enabled[9]

Control[10]

nLight Wired

(blank)	No sensor control
NES7	nLight™ nES 7 PIR integral occupancy sensor[11]
NESPDT7	nLight™ nES PDT 7 dual technology integral occupancy control[11]
NES7ADCX	nLight™ nES 7 ADCX PIR integral occupancy sensor with automatic dimming photocell[11]
NESPDT7ADCX	nLight™ nES PDT 7 dual technology integral occupancy sensor with automatic dimming photocell[11]

nLight Wireless

RES7	nLight AIR PIR integral occupancy sensor with automatic dimming photocell for Networking Capabilities
RES7PDT	nLight AIR microphonics dual technology occupancy sensor with automatic dimming photocell
RIO	nLight AIR radio module without sensor
RES7EM	nLight AIR PIR integral occupancy sensor with automatic dimming photocell and UL924 Emergency Operation, via power interrupt detection[23]
RES7PDTEM	nLight AIR microphonics dual technology occupancy sensor with automatic dimming photocell and UL924 Emergency Operation, via power interrupt detection[23]
RIOEM	nLight AIR radio module less sensor, with UL924 Emergency Operation, via power interrupt detection[23]

Individual Control

MSD7ADCX	PIR integral occupancy sensor with automatic dimming control photocell[12]
MSDPDT7ADCX	PDT integral occupancy sensor with automatic dimming control photocell[12]

	EL7L
Standy Mode	**Options**

Standy Mode

NOC	NOC Occupancy sensor disabled[13]

Options

RIB	**Ribbed reflector**
EL7L	700 lumen battery pack (Noncompliant with CA T20)[14]
EL14L	1400 lumen battery pack (Noncompliant with CA T20)[14]
EL14LSD	1400 lumen battery pack with self-diagnostic testing feature (Noncompliant with CA T20)[14,15]
E10WLCP	EM Self-Diagnostic battery pack, 10W Constant Power, Certified in CA Title 20 MAEDBS[14]
CP	Chicago plenum[16]
BGTD	Bodine Generator Transfer Device[17]
PWS1836	6' pre-wire, 3/8" diameter, 18 gauge, 1 circuit
PWS1846	6' pre-wire, 3/8" diameter, 18 gauge, 2 circuit
PWS1846 PWSLV	Two cables: one 6' pre-wire, 3/8" diameter, 18 gauge, 2 circuits; one 6' pre-wire, 3/8" diameter, 18 gauge, purple and gray[18]
PWS1856LV	6' pre-wire, 3/8" diameter, 18 gauge, 1 circuit w/low voltage purple and grey wires[18]
GLR	Fast-blowing fuse[19]
GMF	Slow-blowing fuse[19]
NPLT	Narrow pallet
RRL_	RELOC®-ready luminaire[20]
LATC	Earthquake clip
DWAM	Anti-Microbial paint
JP14	Job packaging[21]
JP18	Job packaging
IP5X	Gasketed diffuser compartment to meet IP5X rating[22]

Notes

1 Consult factory for airflow data.
2 Approximate lumen output.
3 All versions may not achieve 130+ LPW. Refer to photometry on www.acuitybrands.com.
4 Air supply/return option, 90 CRI, and versions with integral sensor trim rings may not achieve 130 LPW.
5 Not available with SLD, EL7L, EL14L, or E10WLCP options.
6 GZ1 and GZ10 not available with any Control or Sensor options
7 Not available with N80, N80EMG, N100, N100EMG, NLTAIR, or occupancy control.
8 nLight EMG option requires a connection to existing nLight network. Power is provided from a separate N80 or N100 enabled fixture.
9 Must order with RES7, RES7PDT, or RIO module. Only available with EZ1 driver. Not available with 85L, 100L, or 120L options.
10 Must specify diffuser with trim rings. See sensor options on page 4.
11 Requires N80, N80EMG, N100, or N100EMG. Only available with EZ1 driver.
12 Only available with EZ1 driver option. 0-10v dimming wires not accessible via access plate.
13 Can only be ordered in conjunction with EZ1, NLTAIR2, RES7/RES7PDT. Occupancy sensor disabled at factory but can be re-enabled upon commissioning.
14 When using pre-wire option, use PWS1846 or PWS1846 PWSLV.
15 For more information, please see the PSSD2 specification sheet.
16 Not available with N80, N80EMG, N100, or N100EMG.
17 Must specify voltage. Requires BSE labeling, voltage specific. Consult factory for options.
18 Not available with nLight wired/wireless network or individual controls.
19 Must specify voltage, 120 or 277, with GLR and GFM fusing.
20 For ordering logic consult RRL_2013.
21 Only available with option: NES7, NESPDT7, NESPDT7ADCX, MSD7ADCX, MSDPDT7ADCX, RES7, RES7PDT, RIO.
22 Not available with air supply/return or Wired Networking (NES_) and Individual Control (MSD_) sensors.
23 See UL924 Sequence of Operation chart on page 3.

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2BLT Volumetric Recessed Lighting 2'x4'

Multiple Diffuser Options

ADP Curved Ribbed

ADSM Curved Smooth

SDP Square Ribbed

SDSM Square Smooth

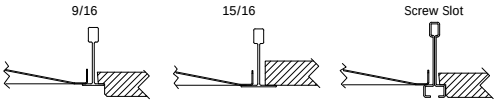
SDSM Diffuser Option

Non-Configurable BLT

Non-Configurable BLT								
Stock/MTO	**Catalog Description ***	**UPC**	**Lumens**	**Wattage**	**LPW**	**Color Temperature**	**Voltage**	**Pallet Qty**
Stock	2BLT4 40L ADP LP835	00190887470789	4000	31	129	3500K/82 CRI	120-277	28
	2BLT4 40L ADP LP840	00190887470765	4063	31	131	4000K/82CRI	120-277	28
	2BLT4 46L ADP LP835	00190887468656	4960	38	131	3500K/82 CRI	120-277	28
	2BLT4 46L ADP LP840	00190887468649	5039	38	133	4000K/82CRI	120-277	28
	2BLT4 40L ADP EL14L LP835	00190887470925	4000	31	129	3500K/82 CRI	120-277	28
	2BLT4 40L ADP EL14L LP840	00190887470918	4063	31	131	4000K/82 CRI	120-277	28
	2BLT4 46L ADP EL14L LP835	00190887468670	4960	38	131	3500K/82 CRI	120-277	28
	2BLT4 46L ADP EL14L LP840	00190887468663	5039	38	133	4000K/82 CRI	120-277	28
MTO	2BLT4 40L ADP 347 LP835	00193047562188	4000	31	129	3500K/82 CRI	347	28
	2BLT4 40L ADP 347 LP840	00193047059183	4063	31	131	4000K/82CRI	347	28
	2BLT4 46L ADP 347 LP835	00193047562225	4960	38	131	3500K/82 CRI	347	28
	2BLT4 46L ADP 347 LP840	00193047686426	5039	38	133	4000K/82CRI	347	28

*Generic 0-10V Dimming to 10%.

MOUNTING DATA	
Ceiling Type	**Appropriate Trim Type**
Exposed grid tee (1' and 9/16")	G
Concealed grid tee	G
Plaster or plasterboard	G*



*DGA accessory available to provide ceiling trim flange and fixture support for plaster or plasterboard ceiling. Recommended rough-in dimensions for DGA installation is 24-3/4" x 24-3/4" (Tolerance is +1/8", -0").

UL924 Sequence of Operation

For 90 minutes following any complete AC power interruption >200 ms:

- Digital dimming is commanded to high end trim level.
- Device ignores wireless lighting control commands.

Accessories & Replacement Parts

Accessories: *Order as separate catalog number.*

DGA24	Drywall grid adapter for 2x4 recessed fixture
2X4SMKSHP PAF	Surface Mount Troffer Kit Post Paint

Replacement Parts: *Order as separate catalog number.*

*249P2N	2DBLT48 ADP LENS ASSEMBLY	4 ft. replacement lens
*249P2T	2DBLT48 SDP LENS ASSEMBLY	4 ft. replacement lens
*249P30	2DBLT48 ADSM LENS ASSEMBLY	4 ft. replacement lens
*249P33	2DBLT48 SDSM LENS ASSEMBLY	4 ft. replacement lens
*237LT2	2DBLT48 ADPT LENS ASSEMBLY	4 ft. replacement lens
*237LT4	2DBLT48 SDPT LENS ASSEMBLY	4 ft. replacement lens
*237LT6	2DBLT48 ADSMT LENS ASSEMBLY	4 ft. replacement lens
*237LT8	2DBLT48 SDSMT LENS ASSEMBLY	4 ft. replacement lens
*237LTA	2DBLT48 ADPT SENSOR LENS ASSEMBLY	4 ft. replacement lens
*237M52	2DBLT48 SDPT SENSOR LENS ASSEMBLY	4 ft. replacement lens
*237M5A	2DBLT48 ADSMT SENSOR LENS ASSEMBLY	4 ft. replacement lens
*237M5L	2DBLT48 SDSMT SENSOR LENS ASSEMBLY	4 ft. replacement lens

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nLight Platform

nLight embedded fixtures offer:	Customers get:
Manual Dimming	Convenience and visual comfort for occupants
Motion Sensing and/or Daylight Harvesting	Energy savings and code compliance
Fixture or Group Level Control	Ability to configure lighting to the space requirements
Flexibility	Ease of fixture moves, adds and changes
Wireless Wall Switch (nLight AIR Only)	Ease and flexibility of placement
Astronomical and Time of Day Scheduling	Energy savings and building security
Scalable Solution	nLight controls to grow with your business
Future-Ready	nLight platform to set foundation for future upgrades and capabilities

nLight Air Wireless

BLT Series

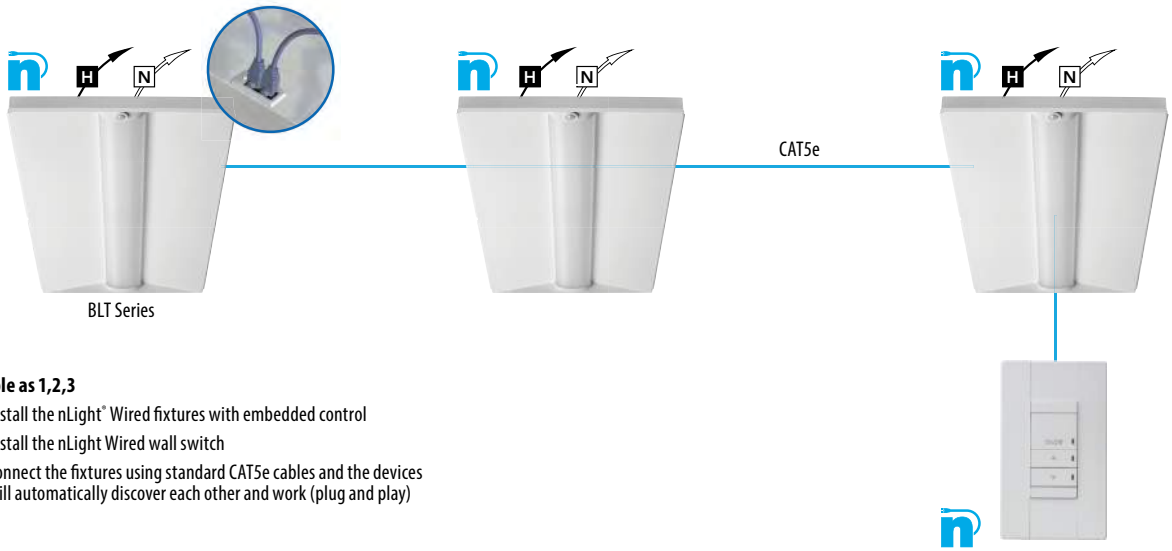
Simple as 1,2,3

1. Install the nLight® AIR fixtures with embedded smart sensor
2. Install the wireless battery-powered wall switch
3. With CL**AIR**ITY app, pair the fixtures with the wall switch and if desired, customize the sensor settings for the desired outcome

nLight AIR rPODBA

Mobile Device

nLight Wired Networking



BLT Series

nLight Wired nPODMA

Simple as 1,2,3

1. Install the nLight® Wired fixtures with embedded control
2. Install the nLight Wired wall switch
3. Connect the fixtures using standard CAT5e cables and the devices will automatically discover each other and work (plug and play)

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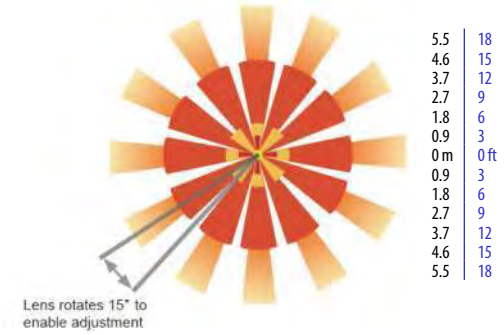
Sensor Options					
Option	Automatic Dimming Photocell	Occupancy Sensing		nLight Wired Networking	nLight AIR Networking
		PIR	PDT		
MSD7ADCX	X	X			
MSDPDT7ADCX	X		X		
NES7		X		X	
NES7ADCX	X	X		X	
NESPDT7			X	X	
NESPDT7ADCX	X		X	X	
RES7	X	X			X
RESPDT7	X	X	X		X

Sensor Coverage Pattern
Mini 360° Lens

- Recommended for walking motion detection from mounting heights between 8 ft (2.44 m) and 20 ft (6.10 m)
- Initial detection of walking motion along sensor axes at distances of 2x the mounting height up to 15 ft (4.57 m) and
- 1.75x up to 20 ft (6.10 m).
- Provides 12 ft (3.66 m) radial detection of small motion when mounted at 9 ft (2.74 m)
- Initial detection will occur earlier when walking across sensor's field of view than when walking directly at sensor

9 FT Mounting



Integrated Sensor with Individual Control

The MSD7ADCX PIR occupancy sensor/automatic dimming photocell is ideal for areas without obstructions and where daylight harvesting may be desired. Suggested applications include, but not limited to, hallways, corridors, storage rooms, and breakrooms or other areas where people are typically moving.

The MSDPDT7ADCX PIR/Microphonics Dual Tech occupancy sensor/automatic dimming photocell is ideal for areas with obstructions and where daylight harvesting is desired. Suggested applications include, but not limited to, open offices, private offices, classrooms, public restrooms, and conference rooms.

nLight AIR Wireless

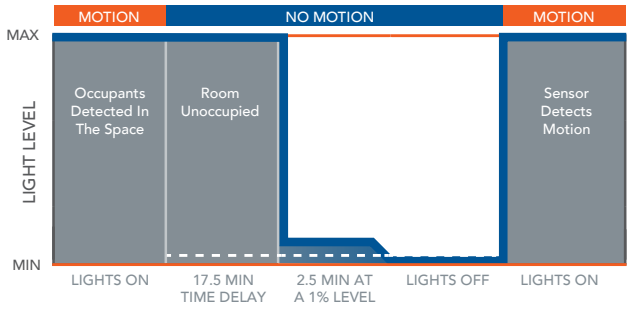
nLight AIR is the ideal solution for retrofit or new construction spaces where adding additional wiring can be labor intensive and nLight AIR is available with or without an integral sensor. The integrated rES7 or rES7PDT smart sensors are part of each luminaire in the nLight AIR network, which can be grouped to control multiple luminaires. The granularity of control with the digital PIR occupancy detection and daylight sensing makes a great solution for any application.

nLight Wired Networking

The nES 7 is ideal for small rooms without obstructions or areas with primarily walking motion. Ideal areas include hallways, corridors, storage rooms, and breakrooms. Additionally, the nES7ADCX includes an integrated photocell, which enables daylight harvesting controls.

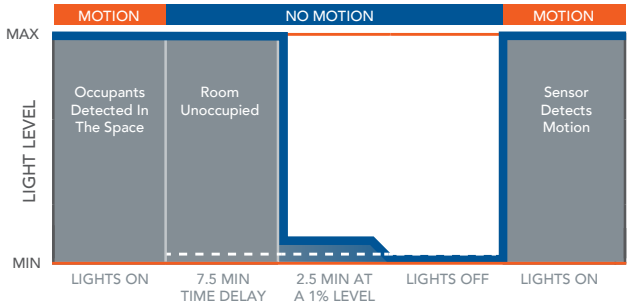
For areas like restrooms, private offices, open offices, conference rooms or any space with obstructions, the nES PDT 7 dual technology sensor is recommended. The nES PDT 7 utilizes both PIR (passive infrared) and Microphonics technologies to detect occupancy. Additionally, the nESPDT7ADCX includes an integrated photocell, which enables daylight harvesting controls which is ideal for areas where windows are present.

Sequence of Operation (MSD7 Sensor)



*The presetting on the automatic dimming photocell is 5fc.

Sequence of Operation (nES7 and rES7 and Sensor)



*The presetting on the automatic dimming photocell is 5fc (NES7) and 10fc (RES7).

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Controls Accessories

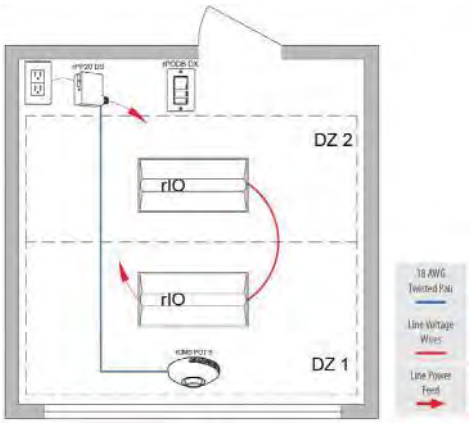
nLight® Wired Control Accessories:
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlight.

WallPod stations	Model number	Occupancy sensors	Model number
On/Off	nPODMA [Color]	Small motion 360°, ceiling (PIR / dual tech)	nCM 9 RJB / nCM PDT 9 RJB
On/Off & raise/lower	nPODMA DX [Color]	Large motion 360°, ceiling (PIR / dual tech)	nCM10 RJB / nCM PDT 10 RJB
Graphic touchscreen	nPOD TOUCH [Color]	Wall switch with raise/lower	nWSX PDT LV DX [color]
Photocell controls	**Model number**	**Cat-5 cable (plenum rated)**	**Model number**
Full range dimming	nCM ADCX RJB	10' cable	CAT5 10FT J1
		30' cable	CAT5 30FT J1

nLight® AIR Control Accessories:
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlightair.

Wall switches	Model number
On/Off single pole	rPODBA [color] G2
On/Off two pole	rPODB A2P [color] G2
On/Off & raise/lower single pole	rPODBA DX [color] G2
On/Off & raise/lower two pole	rPODBA 2P DX [color] G2

BLT fixtures with integrated rIO devices complement any small office space. Pair them with an rCMS occupancy sensor and the space now has wireless occupancy sensing and dimming capability. For additional configuration options please consult with Tech Support.



rCMS[1]					Example: RCMS PDT 10 AR G2
Series / Detection	Power Supply[1]	Occupancy Detection	Lens (Required)	Operating Mode	Generation
RCMS nLight AIR occupancy and daylight sensor	[blank] Power Supply ordered separately PS 150 Standard 150 mA Power Supply	[blank] PIR Detection PDT Dual Tech PIR/ Microphonics	10 Large Motion/ Extended Range 360° 9 Small Motion/ Extended Range 360° 6 High Bay 360° Lens	[BLANK] None AR Auxiliary Relay	G2 Generation 2 compatibility

Notes
1 RCMS requires low voltage power from either RPP20 DS 24V G2 or PS150.

Sensor Switch WSX

nLight WIRED NPOD UNITOUCH

nLight WIRED nPODMA DX

nLight AIR rPODBA

BLT with rIO

rPODBA

RCMS

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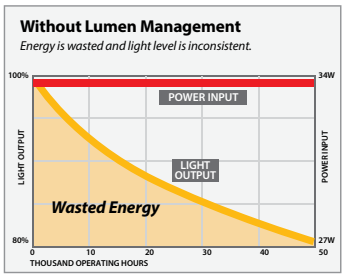
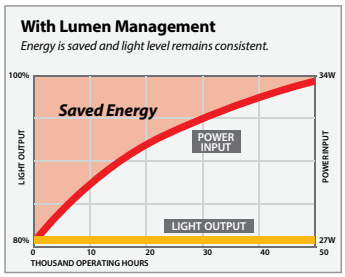
Constant Lumen Management

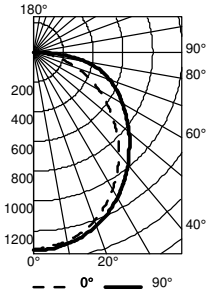
Enabled by the embedded nLight control, the BLT actively tracks its run-time and manages its light source such that constant lumen output is maintained over the system life. Referred to as lumen management, this feature eliminates the energy waste created by the traditional practice of over-lighting.





PHOTOMETRICS

2BLT4 40L ADP LP835, 4000 delivered lumens, test no. ISF36900P109, tested in accordance to IESNA LM-79



CP Summary

	0°	90
0°	1325	1325
5°	1309	1325
15°	1250	1278
25°	1136	1187
35°	981	1058
45°	797	909
55°	601	761
65°	408	621
75°	212	460
85°	48	197
90	1	17

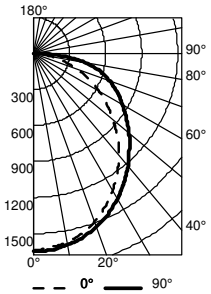
Coefficients of Utilization

RCR (pf / pc / pw)	80% 70%	80% 50%	80% 30%	20% 70% 50%	20% 70% 30%	20% 70% 10%	50% 50% 30%	50% 50% 30%	50% 50% 10%
0	119	119	119	116	116	116	111	111	111
1	108	102	97	100	96	92	96	92	89
2	97	88	81	86	80	74	83	77	72
3	88	77	69	76	68	61	72	66	60
4	81	68	59	67	58	52	64	57	51
5	74	61	51	60	51	44	57	50	44
6	68	55	45	54	45	39	52	44	38
7	63	50	40	49	40	34	47	39	34
8	59	45	36	44	36	30	43	36	30
9	55	41	33	41	33	27	40	32	27
10	52	38	30	38	30	25	37	30	25

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	1024	25.6	25.6
0° - 40°	1669	41.7	41.7
0° - 60°	2960	74.0	74.0
0° - 90°	3998	100.0	100.0
90° - 120°	2	0.0	0.0
90° - 130°	2	0.0	0.0
90° - 150°	2	0.0	0.0
90° - 180°	2	0.0	0.0
0° - 180°	4000	100.0	100.0

2BLT4 48L ADP LP835, 4960 delivered lumens, test no. ISF 36900P117, tested in accordance to IESNA LM-79



CP Summary

	0°	90
0°	1643	1643
5°	1623	1644
15°	1550	1585
25°	1409	1472
35°	1217	1312
45°	988	1127
55°	745	943
65°	505	769
75°	263	571
85°	59	244
90	1	21

Coefficients of Utilization

RCR (pf / pc / pw)	80% 70%	80% 50%	80% 30%	20% 70% 50%	20% 70% 30%	20% 70% 10%	50% 50% 30%	50% 50% 30%	50% 50% 10%
0	119	119	119	116	116	116	111	111	111
1	108	102	97	100	96	92	96	92	89
2	97	88	81	86	80	74	83	77	72
3	88	77	69	76	68	61	72	66	60
4	81	68	59	67	58	52	64	57	51
5	74	61	51	60	51	44	57	50	44
6	68	55	45	54	45	39	52	44	38
7	63	50	40	49	40	34	47	39	34
8	59	45	36	44	36	30	43	36	30
9	55	41	33	41	33	27	40	32	27
10	52	38	30	38	30	25	37	30	25

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixture
0° - 30°	1270	25.6	25.6
0° - 40°	2070	41.7	41.7
0° - 60°	3671	74.0	74.0
0° - 90°	4957	100.0	100.0
90° - 120°	2	0.0	0.0
90° - 130°	2	0.0	0.0
90° - 150°	2	0.0	0.0
90° - 180°	2	0.0	0.0
0° - 180°	4960	100.0	100.0

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2BLT Volumetric Recessed Lighting 2'x4'

Performance Data					
Model Number	**Lumens**	**LPW**	**Watts**	**DLC Listing**	**DLC ID**
2BLT4 30L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	2962	127.31	23.26	Premium	PWJDEMHS
2BLT4 30L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	3009.28	129.34	23.26	Premium	P18J5GLD
2BLT4 30L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	2969.16	127.62	23.26	Premium	P3HB2XSG
2BLT4 40L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	4000	126.22	31.69	Premium	PDWKYXFD
2BLT4 40L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	4063.86	128.23	31.69	Premium	PEYXAZWD
2BLT4 40L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	3946.66	124.53	31.69	Premium	PS63CPK6
2BLT4 40L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	4009.67	126.52	31.69	Premium	PK79UR9W
2BLT4 48L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	4960	130.5	38	Premium	PJ9CK6C1
2BLT4 48L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	5039.18	132.58	38	Premium	P9W2R5AK
2BLT4 48L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	4893.86	128.76	38	Premium	PPFKZU3U
2BLT4 48L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	4971.99	130.82	38	Premium	PC8HMCH9
2BLT4 60L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	6016	126.39	47.59	Premium	PSJ6QERM
2BLT4 60L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	6112.04	128.4	47.59	Premium	PVXQXPUV
2BLT4 60L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	5935.78	124.7	47.59	Premium	PHT84BW4
2BLT4 60L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	6030.55	126.69	47.59	Premium	PXV55BC8
2BLT4 72L ADP EZ1 (GZ10) LP840 [All Options]	7360.66	125.3	58.74	Premium	PSCZ22CB
2BLT4 72L ADP GZ1 LP835 [All Options]	7245	119.07	60.84	standard	PISHTCTS
2BLT4 72L ADP GZ1 LP840 [All Options]	7360.66	120.97	60.84	standard	PBERALG7
2BLT4 72L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	7148.4	117.48	60.84	standard	PDQS3CYK
2BLT4 72L ADPT EZ1 (GZ10) LP840 [All Options]	7262.52	123.63	58.74	Premium	P2KKMMVN
2BLT4 72L ADPT GZ1 LP840 [All Options]	7262.52	119.36	60.84	standard	P10DUPC0
2BLT4 85L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	8567	116.43	73.58	standard	PYD2GO6V
2BLT4 85L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	8703.77	118.28	73.58	standard	P8Z4IV4X
2BLT4 85L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	8452.77	114.87	73.58	standard	PTZEW3QM
2BLT4 85L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	8587.72	116.71	73.58	standard	P01DMEK9
2BLT4 100L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	9837	103.14	95.36	standard	PGDES20R
2BLT4 100L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	9994.04	104.79	95.36	standard	P007CHGX
2BLT4 100L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	9705.84	101.77	95.36	standard	PSZUQY7M
2BLT4 100L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	9860.79	103.39	95.36	standard	P6V6X6HY
2BLT4 120L ADP EZ1 (GZ1, GZ10) LP835 [All Options]	11709	118.18	99.07	standard	PGM4Y7DP
2BLT4 120L ADP EZ1 (GZ1, GZ10) LP840 [All Options]	11895.9	120.07	99.07	standard	P0ODDCG2
2BLT4 120L ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	11552.9	116.61	99.07	standard	PXM0FS09
2BLT4 120L ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	11737.3	118.47	99.07	standard	PJ4GEBZM

DLC information is subject to change, for the most up-to-date information please refer to www.dlc.org. Above listings do not cover 347v or SLD.

How to Estimate Delivered Lumens in Emergency Mode
Use the formula below to estimate the delivered lumens in emergency mode

Delivered Lumens = 1.25 x P x LPW

P = Ouput power of emergency driver. P = 10W for E10WLCP option. LPW = Lumen per watt rating of the luminaire. This information is available on the ABL luminaire spec sheet. LPW = Lumen per watt rating of the luminaire. LPW information available in Performance Data section.

HE Performance Data					
Model Number	**Lumens**	**LPW**	**Watts**	**DLC Listing**	**DLC ID**
2BLT4 30LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	3107	135.17	22.98	Premium	P7KEICW5
2BLT4 30LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	3156.6	137.33	22.98	Premium	PDOM06BH
2BLT4 30LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	3065.57	133.37	22.98	Premium	P7PZAJDZ
2BLT4 30LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	3114.51	135.5	22.98	Premium	P2N23EBP
2BLT4 40LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	4085	138.56	29.48	Premium	P67P6S5Y
2BLT4 40LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	4150.21	140.77	29.48	Premium	P95UQD66
2BLT4 40LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	4030.53	136.71	29.48	Premium	PC15DQEC
2BLT4 40LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	4094.88	138.89	29.48	Premium	PGRCSJ2T
2BLT4 48LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	4770	138.16	34.52	Premium	PXBJBGN8
2BLT4 48LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	4846.15	140.37	34.52	Premium	P5PQ5RRX
2BLT4 48LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	4706.4	136.32	34.52	Premium	P2NK2H33
2BLT4 48LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	4781.53	138.5	34.52	Premium	PK8C1321
2BLT4 60LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	5894	135.12	43.61	Premium	PQZN176R
2BLT4 60LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	5988.09	137.28	43.61	Premium	PG5CYJUC
2BLT4 60LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	5815.41	133.32	43.61	Premium	PZ72TAWM
2BLT4 60LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	5908.25	135.45	43.61	Premium	PRC4W72B
2BLT4 72LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	7149	135.94	52.58	Premium	PUB38GEQ
2BLT4 72LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	7263.13	138.11	52.58	Premium	P7GDHZTN
2BLT4 72LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	7053.68	134.12	52.58	Premium	P5CC2VKV
2BLT4 72LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	7166.29	136.26	52.58	Premium	P6P1BKDM
2BLT4 85LHE ADP EZ1 (GZ1, GZ10) LP835 [All Options]	8158	128.96	63.25	Premium	PRTW6BXW
2BLT4 85LHE ADP EZ1 (GZ1, GZ10) LP840 [All Options]	8288.24	131.02	63.25	Premium	P6H1V2D6
2BLT4 85LHE ADPT EZ1 (GZ1, GZ10) LP835 [All Options]	8049.22	127.24	63.25	Premium	P1VG5TA3
2BLT4 85LHE ADPT EZ1 (GZ1, GZ10) LP840 [All Options]	8177.73	129.27	63.25	Premium	PN5BKJ6E

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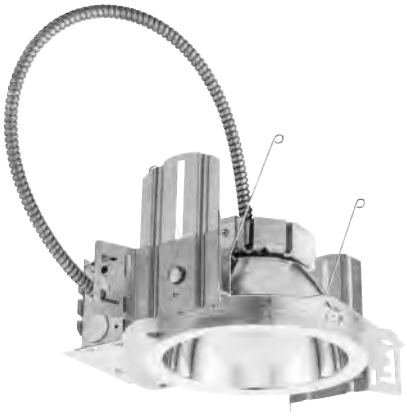
LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	T-2

LDN6



6" OPEN and WALLWASH LED
Non-IC
New Construction Downlight

FEATURES & SPECIFICATIONS

INTENDED USE — Typical applications include corridors, lobbies, conference rooms and private offices.

CONSTRUCTION — Galvanized steel mounting/plaster frame; galvanized steel junction box with bottom-hinged access covers and spring latches. Reflectors are retained by torsion springs.

Vertically adjustable mounting brackets with commercial bar hangers provide 3-3/4" total adjustment.

Two combination ½"-3/4" and four ½" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out). No. 12 AWG conductors, rated for 90°C.

Accommodates 12"-24" joist spacing.

Passive cooling thermal management for 25°C standard; high ambient (40°C) option available. Light engine and drivers are accessible from above or below ceiling.

Max ceiling thickness 1-1/2".

OPTICS — LEDs are binned to a 3-step SDCM; 80 CRI minimum. 90 CRI optional.

LED light source concealed with diffusing optical lens.

General illumination lighting with 1.0 S/MH and 55° cutoff to source and source image.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes. Also available in white and black painted reflectors.

ELECTRICAL — Multi-volt (120-277V, 50/60Hz) 0-10V dimming drivers mounted to junction box, 10% or 1% minimum dimming level available.

0-10V dimming fixture requires two (2) additional low-voltage wires to be pulled.

70% lumen maintenance at 60,000 hours.

LISTINGS — Certified to US and Canadian safety standards. Wet location standard (covered ceiling). IP55 rated. ENERGY STAR® certified product.

WARRANTY — 5-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/support/customer-support/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

A+ Capable options indicated by this color background.

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

Example: LDN6 35/15 LO6AR LSS MVOLT EZ10

LDN6	40/15		LO6 AR		LSS	MVOLT
Series	**Color temperature**	**Lumens**[1]	**Aperture/Trim Color**		**Finish**	**Voltage**
LDN6 6" round	27/ 2700K 30/ 3000K 35/ 3500K 40/ 4000K 50/ 5000K	05 500 lumens 10 1000 lumens 15 1500 lumens 20 2000 lumens 25 2500 lumens 30 3000 lumens 40 4000 lumens 50 5000 lumens	LO6 Downlight LW6 Wallwash	AR Clear WR[2] White BR[2] Black	LSS Semi-specular LD Matte diffuse LS Specular	MVOLT Multi-volt 120 120V 277 277V 347[3] 347V

GZ10	
Driver	**Options**

Driver	
GZ10	0-10V driver dims to 10%
GZ1	0-10V driver dims to 1%
EZ10	0-10V eldoLED driver with smooth and flicker-free deep dimming performance down to 10%
EZ1	0-10V eldoLED driver with smooth and flicker-free deep dimming performance down to 1%

Options	
SF[4]	Single fuse
TRW[5]	White painted flange
TRBL[5]	Black painted flange
EL[6]	Emergency battery pack with integral test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
ELR[6]	Emergency battery pack with remote test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
ELSD[6]	Emergency battery pack with self-diagnostics, integral test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
ELRSD[6]	Emergency battery pack with self-diagnostics, remote test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
E10WCP[6]	Emergency battery pack, 10W Constant Power with integral test switch. Certified in CA Title 20 MAEDB
E10WCPR[6]	Emergency battery pack, 10W Constant Power with remote test switch. Certified in CA Title 20 MAEDB
NPP16D[7]	nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1).
NPP16DER[7]	nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1). ER controls fixtures on emergency circuit.
N80[8]	nLight™ Lumen Compensation
NPS80EZ[7]	nLight® dimming pack controls 0-10V eldoLED drivers (EZ10, EZ1).
NPS80EZER[7]	nLight® dimming pack controls 0-10V eldoLED drivers (EZ10, EZ1). ER controls fixtures on emergency circuit.
HAO[11]	High ambient option
CP[12]	Chicago Plenum
RRL___	RELOC®-ready luminaire connectors enable a simple and consistent factory installed option across all ABL luminaire brands. Refer to RRL for complete nomenclature. Available only in RRLA, RRLB, RRLAE, and RRLC12S.
NLTAIR2[9, 10]	nLight® Air enabled
NLTAIRER2[9, 10]	nLight® AIR Dimming Pack Wireless Controls. Controls fixtures on emergency circuit, not available with battery pack options
USPOM	US point of manufacture
90CRI	High CRI (90+)

Accessories: *Order as separate catalog number.*

PS1055CP	FMC Power Sentry batterypack, T20 compliant, field installable, 10w constant power
EAC ISSM 375	Compact interruptible emergency AC power system
EAC ISSM 125	Compact interruptible emergency AC power system
GRA68 JZ	Oversized trim ring with 8" outside diameter[1]
SCA6	Sloped ceiling adapter. Refer to TECH-SCA for more options.

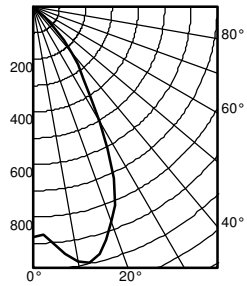
Notes

1 Overall height varies based on lumen package; refer to dimensional chart on page 3.
2 Not available with finishes.
3 Not available with emergency options.
4 Must specify voltage 120V or 277V.
5 Available with clear (AR) reflector only.
6 12.5" of plenum depth or top access required for battery pack maintenance.
7 Specify voltage. ER for use with generator supply EM power. Will require an emergency hot feed and normal hot feed.
8 Fixture begins at 80% light level. Must be specified with NPS80EZ or NPS80EZ ER. Only available with EZ10 and EZ1 drivers.
9 Not available with CP, NPS80EZ, NPS80EZER, NPP16D, NPP16DER or N80 options.
10 NLTAIR2 and NLTAIRER2 not recommended for metal ceiling installations.
11 Fixture height is 6.5" for all lumen packages with HAO.
12 Must specify voltage for 3000lm. 5000lm with marked spacing 24 L x 24 W x 14 H. Not available with emergency battery pack option.

PHOTOMETRY

Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance Data at 30″ Above Floor for a Single Luminaire

LDN6 35/10 LO6AR, input watts: 10.44, delivered lumens: 987.10, LM/W = 94.54, spacing criterion at 0= 1.02, test no. ISF 30716P262.



	Ave	Lumens
0	876	
5	905	89
15	971	269
25	720	322
35	330	214
45	110	87
55	1	4
65	1	1
75	0	0
85	0	0
90	0	

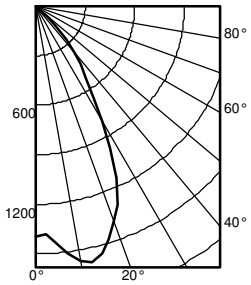
Zone	Lumens	% Lamp
0° - 30°	680.7	69.0
0° - 40°	895.0	90.7
0° - 60°	986.0	99.9
0° - 90°	987.0	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.0	0.0
90° - 180°	0.0	0.0
0° - 180°	987.0	*100.0

*Efficiency

pf	80%			20%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw												
0	119	119	119	116	116	116	111	111	111			
1	111	108	106	109	106	104	104	103	101			
2	103	99	95	101	97	94	98	95	92			
3	96	91	87	94	90	86	92	88	85			
4	89	84	79	88	83	79	86	81	78			
5	83	77	73	82	77	73	81	76	72			
6	78	72	68	77	72	67	76	71	67			
7	73	67	63	73	67	63	71	66	62			
8	69	63	59	68	62	58	67	62	58			
9	65	59	55	64	59	55	63	58	54			
10	61	55	51	61	55	51	60	55	51			

Mounting Height	Inital FC Center Beam	50% beam - 54.5° Diameter	FC	10% beam - 82.2° Diameter	FC
8.0	29.0	5.7	14.5	9.6	2.9
10.0	15.6	7.7	7.8	13.1	1.6
12.0	9.7	9.8	4.9	16.6	1.0
14.0	6.6	11.8	3.3	20.1	0.7
16.0	4.8	13.9	2.4	23.6	0.5

LDN6 35/15 LO6AR, input watts: 17.52, delivered lumens: 1572.9, LM/W = 89.77, spacing criterion at 0= 1.02, test no. ISF 30716P265.



	Ave	Lumens
0	1396	
5	1442	142
15	1547	429
25	1147	514
35	526	342
45	176	139
55	2	6
65	1	1
75	1	1
85	0	0
90	0	

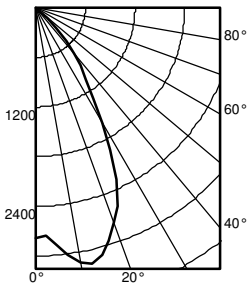
Zone	Lumens	% Lamp
0° - 30°	1084.6	69.0
0° - 40°	1426.2	90.7
0° - 60°	1571.3	99.9
0° - 90°	1572.9	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.0	0.0
90° - 180°	0.0	0.0
0° - 180°	1572.9	*100.0

*Efficiency

pf	80%			20%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw												
0	119	119	119	116	116	116	111	111	111			
1	111	108	106	109	106	104	104	103	101			
2	103	99	95	101	97	94	98	95	92			
3	96	91	87	94	90	86	92	88	85			
4	89	84	79	88	83	79	86	81	78			
5	83	77	73	82	77	73	81	76	72			
6	78	72	68	77	72	67	76	71	67			
7	73	67	63	73	67	63	71	66	62			
8	69	63	59	68	62	58	67	62	58			
9	65	59	55	64	59	55	63	58	54			
10	61	55	51	61	55	51	60	55	51			

Mounting Height	Inital FC Center Beam	50% beam - 54.5° Diameter	FC	10% beam - 82.2° Diameter	FC
8.0	46.2	5.7	23.1	9.6	4.6
10.0	24.8	7.7	12.4	13.1	2.5
12.0	15.5	9.8	7.7	16.6	1.5
14.0	10.6	11.8	5.3	20.1	1.1
16.0	7.7	13.9	3.8	23.6	0.8

LDN6 35/30 LO6AR, input watts: 34.75, delivered lumens: 3138.5, LM/W = 90.31, spacing criterion at 0= 1.02, test no. ISF 30716P274.



	Ave	Lumens
0	2786	
5	2877	284
15	3087	855
25	2289	1025
35	1049	682
45	350	277
55	5	12
65	2	2
75	1	1
85	0	0
90	0	

Zone	Lumens	% Lamp
0° - 30°	2164.3	69.0
0° - 40°	2845.9	90.7
0° - 60°	3135.3	99.9
0° - 90°	3138.5	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.0	0.0
90° - 180°	0.0	0.0
0° - 180°	3138.5	*100.0

*Efficiency

pf	80%			20%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw												
0	119	119	119	116	116	116	111	111	111			
1	111	108	106	109	106	104	104	103	101			
2	103	99	95	101	97	94	98	95	92			
3	96	91	87	94	90	86	92	88	85			
4	89	84	79	88	83	79	86	81	78			
5	83	77	73	82	77	73	81	76	72			
6	78	72	68	77	72	67	76	71	67			
7	73	67	63	73	67	63	71	66	62			
8	69	63	59	68	62	58	67	62	58			
9	65	59	55	64	59	55	63	58	54			
10	61	55	51	61	55	51	60	55	51			

Mounting Height	Inital FC Center Beam	50% beam - 54.5° Diameter	FC	10% beam - 82.2° Diameter	FC
8.0	92.1	5.7	46.1	9.6	9.2
10.0	49.5	7.7	24.8	13.1	5.0
12.0	30.9	9.8	15.4	16.6	3.1
14.0	21.1	11.8	10.5	20.1	2.1
16.0	15.3	13.9	7.6	23.6	1.5

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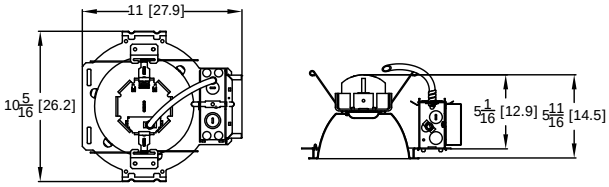
LDN6

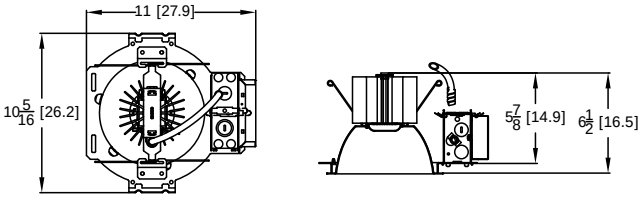
* All dimensions are inches (centimeters) unless otherwise noted.

LDN6 500-1500 LUMEN



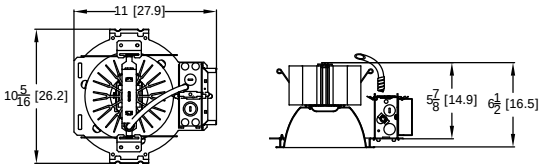
Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap trim: 7-1/2 (19.1)

LDN6 2000-3000 LUMEN



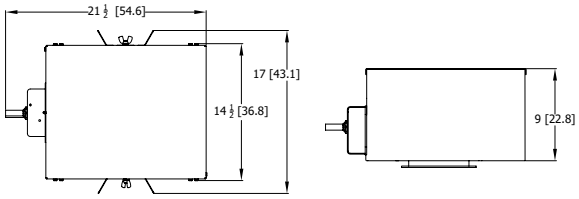
Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap trim: 7-1/2 (19.1)

LDN6 4000-5000 LUMEN



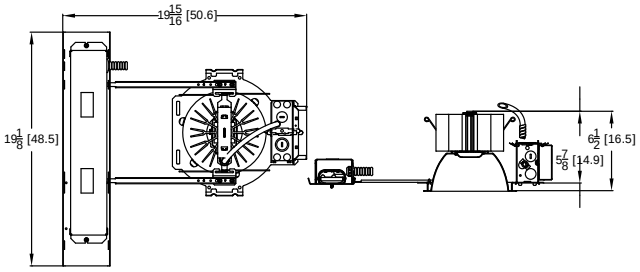
Marked Spacing: 24 x 24 x 10
Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap trim: 7-1/2 (19.1)

LDN6 CP



Aperture: 6-1/4" (15.9)
Ceiling Opening: 7-1/8" (18.1)
Overlap trim: 7-1/2" (19.1)

LDN6 EL-ELR



Marked Spacing above 3000 lumen: 24 x 24 x 10
Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap trim: 7-1/2 (19.1)

LDN6			
Nominal Lumens	**Lumens**	**Wattage**	**Lm/W**
500	527.9	5.8	90.5
750	758.1	8.9	85.1
1000	950.1	10.4	91.0
1500	1514	17.5	86.4
2000	2006	22.5	89.1
2500	2504	28.3	88.6
3000	3021	34.8	86.9
4000	4008	44.3	90.6
5000	4975	57.7	86.3

HOW TO ESTIMATE DELIVERED LUMENS IN EMERGENCY MODE

Use the formula below to estimate the delivered lumens in emergency mode

Delivered Lumens = 1.25 x P x LPW

P = Ouput power of emergency driver. P = 10W for PS1055CP

LPW = Lumen per watt rating of the luminaire. This information is available on the ABL luminaire spec sheet.
The LPW rating is also available at Designlight Consortium.

LUMEN OUTPUT MULTIPLIERS - FINISH			
	Clear (AR)	**White (WR)**	**Black (BR)**
Specular (LS)	1.0	N/A	N/A
Semi-specular (LSS)	0.950	N/A	N/A
Matte diffuse (LD)	0.85	N/A	N/A
Painted	N/A	0.87	0.73

LUMEN OUTPUT MULTIPLIERS - CCT					
	2700K	**3000K**	**3500K**	**4000K**	**5000K**
80CRI	0.950	0.966	1.000	1.025	1.101

Notes

- Tested in accordance with IESNA LM-79-08.
- Tested to current IES and NEMA standards under stabilized laboratory conditions.
- CRI: 80 typical.

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ADDITIONAL DATA

COMPATIBLE 0-10V WALL-MOUNT DIMMERS		
MANUFACTURER	PART NO.	POWER BOOSTER AVAILABLE
Lutron®	Diva® DVTV	
	Diva® DVSCTV	
	Nova T® NTFTV	
	Nova® NFTV	
Leviton®	AWSMT-7DW	CN100
	AWSMG-7DW	PE300
	AMRMG-7DW	
	Leviton Centura Fluorescent Control System	
	IllumaTech® IP7 Series	
Synergy®	ISD BC	RDMFC
	SLD LPCS	
	Digital Equinox (DEQ BC)	
Douglas Lighting Controls	WPC-5721	
Entertainment Technology	Tap Glide TG600FAM120 (120V)	
	Tap Glide Heatsink TGH1500FAM120 (120V)	
	Oasis 0A2000FAMU	
Honeywell	EL7315A1019	EL7305A1010 (optional)
	EL7315A1009	
HUNT Dimming	Preset slide: PS-010-IV and PS-010-WH	
	Preset slide: PS-010-3W-IV and PS-010-3W-WH	
	Preset slide, controls FD-010: PS-IFC-010-IV and PS-IFC-010-WH-120/277V	
	Preset slide, controls FD-010: PS-IFC-010-3W-IV and PS-IFC-010-3W-WH-120/277V	
	Remote mounted unit: FD-010	
Lehigh Electronic Products	Solitaire	PBX
PDM Electrical Products	WPC-5721	
Starfield Controls	TR61 with DALI interface port	RT03 DALInet Router
WattStopper®	LS-4 used with LCD-101 and LCD-103	

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded background*
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

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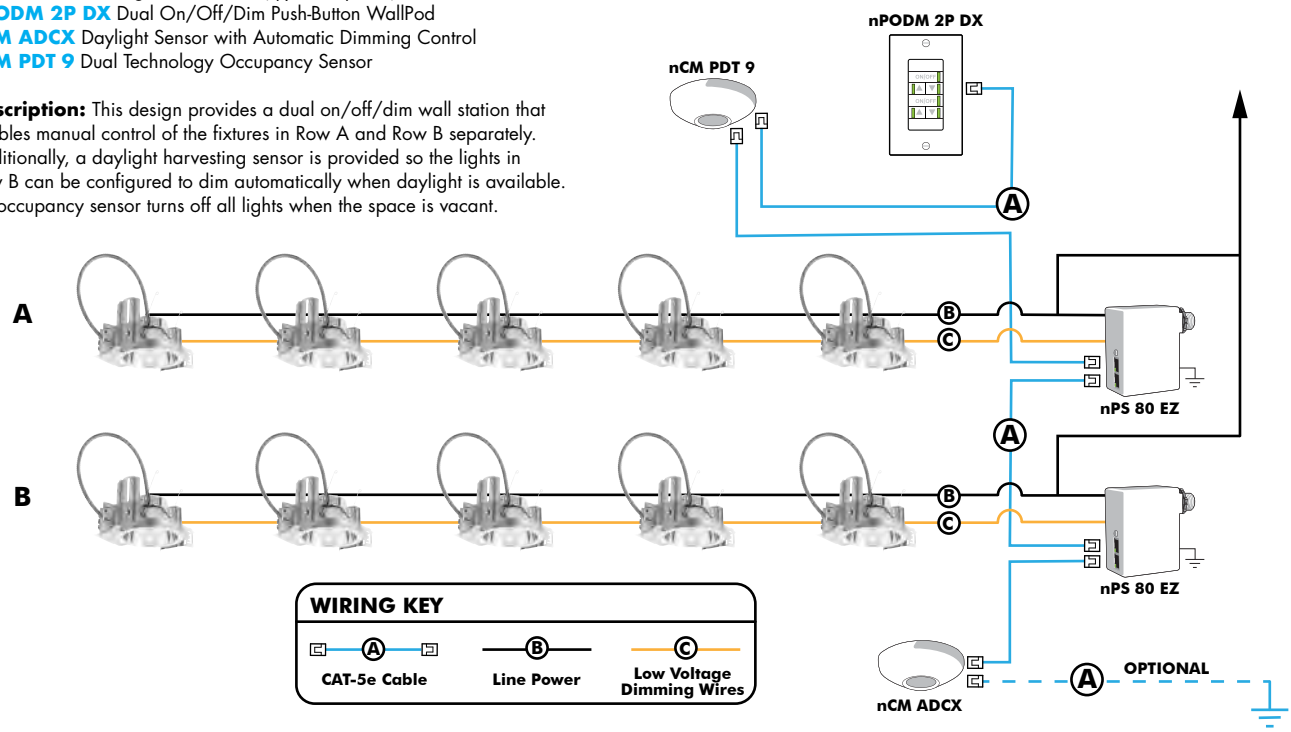
LDN6

EXAMPLE
Group Fixture Control*
*Appiication diagram applies for fixtures with eldoLED drivers only.

nPS 80 EZ Dimming/Control Pack (qty: 2 required)
nPODM 2P DX Dual On/Off/Dim Push-Button WallPod
nCM ADCX Daylight Sensor with Automatic Dimming Control
nCM PDT 9 Dual Technology Occupancy Sensor

Description: This design provides a dual on/off/dim wall station that enables manual control of the fixtures in Row A and Row B separately. Additionally, a daylight harvesting sensor is provided so the lights in Row B can be configured to dim automatically when daylight is available. An occupancy sensor turns off all lights when the space is vacant.



Choose Wall Controls

nLight offers multiple styles of wall controls - each with varying features and user experience.

Push-Button Wallpod
Traditional tactile buttons and LED user feedback

Graphic Wallpod
Full color touch screen provides a sophisticated look and feel

nLight® Wired Controls Accessories:			
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlight for complete listing of nLight controls.			
WallPod Stations	**Model number**	**Occupancy sensors**	**Model Number**
On/Off	nPODM (Color)	Small motion 360°, ceiling (PIR/dual Tech)	nCM 9 / nCM PDT 9
On/Off & Raise/Lower	nPOD DX (Color)	Large motion 360°, ceiling (PIR/dual tech)	nCM 10 / nCM PDT 10
Graphic Touchscreen	nPOD GFX (Color)	Wide View (PIR/dual tech)	nWV 16 / nWV PDT 16
Photocell controls	**Model Number**	Wall Switch w/ Raise/Lower (PIR/dual tech)	nWSX LV DX / nWSX PDT LV DX
Dimming	nCM ADCX	**Cat-5 cables (plenum rated)**	**Model Number**
		10', CAT5 10FT	CAT5 10FT J1
		15, CAT5 15FT	CAT5 15FT J1

nLight® AIR Control Accessories: *Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlightair.*	
Wall switches	**Model number**
On/Off single pole	rPODB [color]
On/Off two pole	rPODB 2P [color]
On/Off & raise/lower single pole	rPODB DX [color]
On/Off & raise/lower two pole	rPODB 2P DX [color]
On/Off & raise/lower single pole	rPODBZ DX WH[1]

Notes
1 Can only be ordered with the RES7Z zone control sensor version.

nLight AIR

nLight AIR is the ideal solution for retrofit or new construction spaces where adding communication is cost prohibitive. The integrated nLight AIR rPP20 Power Pack is part of each Lithonia LDN Luminaire. These individually addressable controls offer the ultimate in flexibility during initial setup and for space repurposing.

Simple as 1,2,3

1. Install the nLight® AIR fixtures with embedded smart sensor
2. Install the wireless battery-powered wall switch
3. With CLAIRITY app, pair the fixtures with the wall switch and if desired, customize the sensor settings for the desired outcome

DOWNLIGHTING: One Lithonia Way Conyers, GA 30012 Phone: 800-705-SERV (7378) www.lithonia.com
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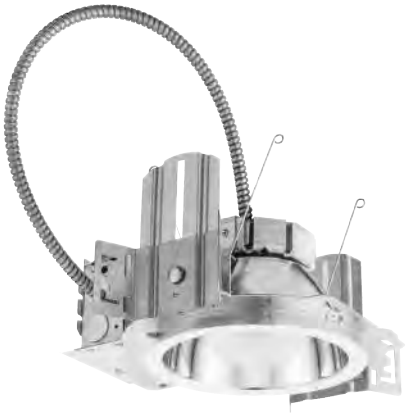
LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	T-2

LDN6



6" OPEN and WALLWASH LED
Non-IC
New Construction Downlight

FEATURES & SPECIFICATIONS

INTENDED USE — Typical applications include corridors, lobbies, conference rooms and private offices.

CONSTRUCTION — Galvanized steel mounting/plaster frame; galvanized steel junction box with bottom-hinged access covers and spring latches. Reflectors are retained by torsion springs.

Vertically adjustable mounting brackets with commercial bar hangers provide 3-3/4" total adjustment.

Two combination ½"-3/4" and four ½" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out). No. 12 AWG conductors, rated for 90°C.

Accommodates 12"-24" joist spacing.

Passive cooling thermal management for 25°C standard; high ambient (40°C) option available. Light engine and drivers are accessible from above or below ceiling.

Max ceiling thickness 1-1/2".

OPTICS — LEDs are binned to a 3-step SDCM; 80 CRI minimum. 90 CRI optional.

LED light source concealed with diffusing optical lens.

General illumination lighting with 1.0 S/MH and 55° cutoff to source and source image.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes. Also available in white and black painted reflectors.

ELECTRICAL — Multi-volt (120-277V, 50/60Hz) 0-10V dimming drivers mounted to junction box, 10% or 1% minimum dimming level available.

0-10V dimming fixture requires two (2) additional low-voltage wires to be pulled.

70% lumen maintenance at 60,000 hours.

LISTINGS — Certified to US and Canadian safety standards. Wet location standard (covered ceiling). IP55 rated. ENERGY STAR® certified product.

WARRANTY — 5-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/support/customer-support/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

A+ Capable options indicated by this color background.

battery pack

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

Example: LDN6 35/15 LO6AR LSS MVOLT EZ10

LDN6	40/15		LO6 AR		LSS	MVOLT
Series	**Color temperature**	**Lumens**[1]	**Aperture/Trim Color**		**Finish**	**Voltage**
LDN6 6" round	27/ 2700K 30/ 3000K 35/ 3500K 40/ 4000K 50/ 5000K	05 500 lumens 10 1000 lumens 15 1500 lumens 20 2000 lumens 25 2500 lumens 30 3000 lumens 40 4000 lumens 50 5000 lumens	LO6 Downlight LW6 Wallwash	AR Clear WR[2] White BR[2] Black	LSS Semi-specular LD Matte diffuse LS Specular	MVOLT Multi-volt 120 120V 277 277V 347[3] 347V

GZ10	POWERED FROM ONE EAC ISSM 375
Driver	**Options**

Driver

- GZ10 0-10V driver dims to 10%
- GZ1 0-10V driver dims to 1%
- EZ10 0-10V eldoLED driver with smooth and flicker-free deep dimming performance down to 10%
- EZ1 0-10V eldoLED driver with smooth and flicker-free deep dimming performance down to 1%

Options

- SF[4] Single fuse
- TRW[5] White painted flange
- TRBL[5] Black painted flange
- EL[6] Emergency battery pack with integral test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
- ELR[6] Emergency battery pack with remote test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
- ELSD[6] Emergency battery pack with self-diagnostics, integral test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
- ELRSD[6] Emergency battery pack with self-diagnostics, remote test switch. 10W Constant Power, Not Certified in CA Title 20 MAEDBS
- E10WCP[6] Emergency battery pack, 10W Constant Power with integral test switch. Certified in CA Title 20 MAEDB
- E10WCPR[6] Emergency battery pack, 10W Constant Power with remote test switch. Certified in CA Title 20 MAEDB
- NPP16D[7] nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1).
- NPP16DER[7] nLight® network power/relay pack with 0-10V dimming for non-eldoLED drivers (GZ10, GZ1). ER controls fixtures on emergency circuit.
- N80[8] nLight™ Lumen Compensation
- NPS80EZ[7] nLight® dimming pack controls 0-10V eldoLED drivers (EZ10, EZ1).
- NPS80EZER[7] nLight® dimming pack controls 0-10V eldoLED drivers (EZ10, EZ1). ER controls fixtures on emergency circuit.
- HAO[11] High ambient option
- CP[12] Chicago Plenum
- RRL___ RELOC®-ready luminaire connectors enable a simple and consistent factory installed option across all ABL luminaire brands. Refer to RRL for complete nomenclature. Available only in RRLA, RRLB, RRLAE, and RRLC12S.
- NLTAIR2[9, 10] nLight® Air enabled
- NLTAIRER2[9, 10] nLight® AIR Dimming Pack Wireless Controls. Controls fixtures on emergency circuit, not available with battery pack options
- USPOM US point of manufacture
- 90CRI High CRI (90+)

Accessories: *Order as separate catalog number.*

PS1055CP	FMC Power Sentry batterypack, T20 compliant, field installable, 10w constant power
EAC ISSM 375	Compact interruptible emergency AC power system
EAC ISSM 125	Compact interruptible emergency AC power system
GRA68 JZ	Oversized trim ring with 8" outside diameter[1]
SCA6	Sloped ceiling adapter. Refer to TECH-SCA for more options.

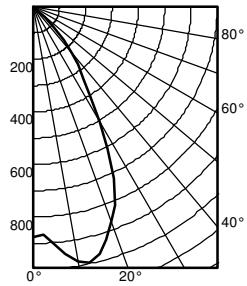
Notes

1. Overall height varies based on lumen package; refer to dimensional chart on page 3.
2. Not available with finishes.
3. Not available with emergency options.
4. Must specify voltage 120V or 277V.
5. Available with clear (AR) reflector only.
6. 12.5" of plenum depth or top access required for battery pack maintenance.
7. Specify voltage. ER for use with generator supply EM power. Will require an emergency hot feed and normal hot feed.
8. Fixture begins at 80% light level. Must be specified with NPS80EZ or NPS80EZ ER. Only available with EZ10 and EZ1 drivers.
9. Not available with CP, NPS80EZ, NPS80EZER, NPP16D, NPP16DER or N80 options.
10. NLTAIR2 and NLTAIRER2 not recommended for metal ceiling installations.
11. Fixture height is 6.5" for all lumen packages with HAO.
12. Must specify voltage for 3000lm. 5000lm with marked spacing 24 L x 24 W x 14 H. Not available with emergency battery pack option.

PHOTOMETRY

Distribution Curve	Distribution Data	Output Data	Coefficient of Utilization	Illuminance Data at 30″ Above Floor for a Single Luminaire

LDN6 35/10 LO6AR, input watts: 10.44, delivered lumens: 987.10, LM/W = 94.54, spacing criterion at 0= 1.02, test no. ISF 30716P262.



	Ave	Lumens
0	876	
5	905	89
15	971	269
25	720	322
35	330	214
45	110	87
55	1	4
65	1	1
75	0	0
85	0	0
90	0	

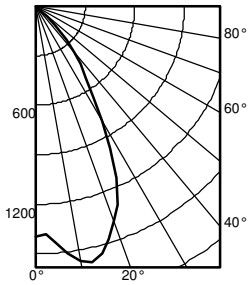
Zone	Lumens	% Lamp
0° - 30°	680.7	69.0
0° - 40°	895.0	90.7
0° - 60°	986.0	99.9
0° - 90°	987.0	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.0	0.0
90° - 180°	0.0	0.0
0° - 180°	987.0	*100.0

*Efficiency

pf	80%			20%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw												
0	119	119	119	116	116	116	111	111	111			
1	111	108	106	109	106	104	104	103	101			
2	103	99	95	101	97	94	98	95	92			
3	96	91	87	94	90	86	92	88	85			
4	89	84	79	88	83	79	86	81	78			
5	83	77	73	82	77	73	81	76	72			
6	78	72	68	77	72	67	76	71	67			
7	73	67	63	73	67	63	71	66	62			
8	69	63	59	68	62	58	67	62	58			
9	65	59	55	64	59	55	63	58	54			
10	61	55	51	61	55	51	60	55	51			

Mounting Height	Inital FC Center Beam	50% beam - 54.5° Diameter	FC	10% beam - 82.2° Diameter	FC
8.0	29.0	5.7	14.5	9.6	2.9
10.0	15.6	7.7	7.8	13.1	1.6
12.0	9.7	9.8	4.9	16.6	1.0
14.0	6.6	11.8	3.3	20.1	0.7
16.0	4.8	13.9	2.4	23.6	0.5

LDN6 35/15 LO6AR, input watts: 17.52, delivered lumens: 1572.9, LM/W = 89.77, spacing criterion at 0= 1.02, test no. ISF 30716P265.



	Ave	Lumens
0	1396	
5	1442	142
15	1547	429
25	1147	514
35	526	342
45	176	139
55	2	6
65	1	1
75	1	1
85	0	0
90	0	

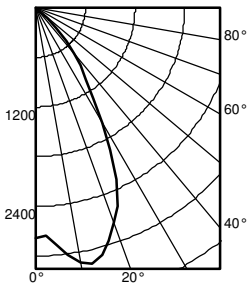
Zone	Lumens	% Lamp
0° - 30°	1084.6	69.0
0° - 40°	1426.2	90.7
0° - 60°	1571.3	99.9
0° - 90°	1572.9	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.0	0.0
90° - 180°	0.0	0.0
0° - 180°	1572.9	*100.0

*Efficiency

pf	80%			20%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw												
0	119	119	119	116	116	116	111	111	111			
1	111	108	106	109	106	104	104	103	101			
2	103	99	95	101	97	94	98	95	92			
3	96	91	87	94	90	86	92	88	85			
4	89	84	79	88	83	79	86	81	78			
5	83	77	73	82	77	73	81	76	72			
6	78	72	68	77	72	67	76	71	67			
7	73	67	63	73	67	63	71	66	62			
8	69	63	59	68	62	58	67	62	58			
9	65	59	55	64	59	55	63	58	54			
10	61	55	51	61	55	51	60	55	51			

Mounting Height	Inital FC Center Beam	50% beam - 54.5° Diameter	FC	10% beam - 82.2° Diameter	FC
8.0	46.2	5.7	23.1	9.6	4.6
10.0	24.8	7.7	12.4	13.1	2.5
12.0	15.5	9.8	7.7	16.6	1.5
14.0	10.6	11.8	5.3	20.1	1.1
16.0	7.7	13.9	3.8	23.6	0.8

LDN6 35/30 LO6AR, input watts: 34.75, delivered lumens: 3138.5, LM/W = 90.31, spacing criterion at 0= 1.02, test no. ISF 30716P274.



	Ave	Lumens
0	2786	
5	2877	284
15	3087	855
25	2289	1025
35	1049	682
45	350	277
55	5	12
65	2	2
75	1	1
85	0	0
90	0	

Zone	Lumens	% Lamp
0° - 30°	2164.3	69.0
0° - 40°	2845.9	90.7
0° - 60°	3135.3	99.9
0° - 90°	3138.5	100.0
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.0	0.0
90° - 180°	0.0	0.0
0° - 180°	3138.5	*100.0

*Efficiency

pf	80%			20%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw												
0	119	119	119	116	116	116	111	111	111			
1	111	108	106	109	106	104	104	103	101			
2	103	99	95	101	97	94	98	95	92			
3	96	91	87	94	90	86	92	88	85			
4	89	84	79	88	83	79	86	81	78			
5	83	77	73	82	77	73	81	76	72			
6	78	72	68	77	72	67	76	71	67			
7	73	67	63	73	67	63	71	66	62			
8	69	63	59	68	62	58	67	62	58			
9	65	59	55	64	59	55	63	58	54			
10	61	55	51	61	55	51	60	55	51			

Mounting Height	Inital FC Center Beam	50% beam - 54.5° Diameter	FC	10% beam - 82.2° Diameter	FC
8.0	92.1	5.7	46.1	9.6	9.2
10.0	49.5	7.7	24.8	13.1	5.0
12.0	30.9	9.8	15.4	16.6	3.1
14.0	21.1	11.8	10.5	20.1	2.1
16.0	15.3	13.9	7.6	23.6	1.5

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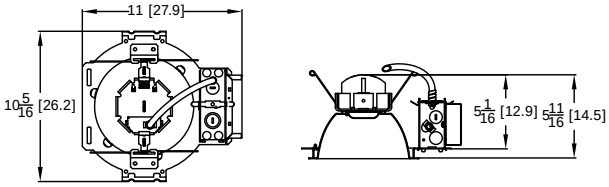
LDN6

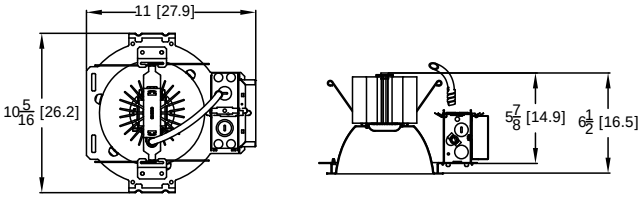
* All dimensions are inches (centimeters) unless otherwise noted.

LDN6 500-1500 LUMEN



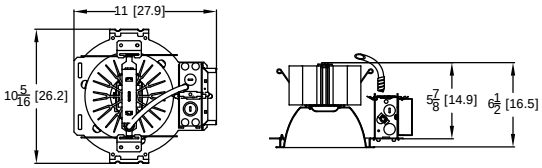
Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap trim: 7-1/2 (19.1)

LDN6 2000-3000 LUMEN



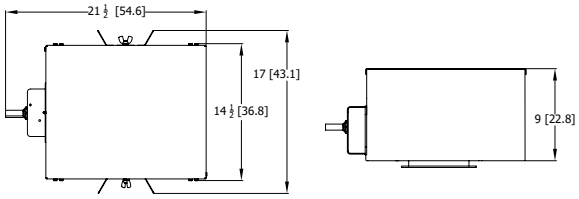
Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap trim: 7-1/2 (19.1)

LDN6 4000-5000 LUMEN



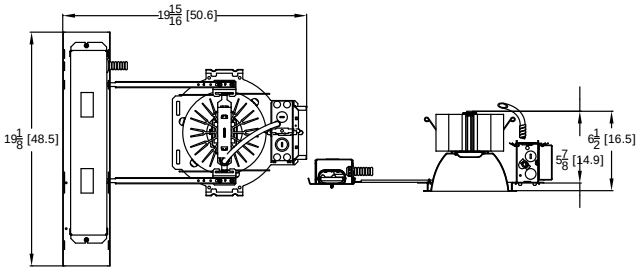
Marked Spacing: 24 x 24 x 10
Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap trim: 7-1/2 (19.1)

LDN6 CP



Aperture: 6-1/4" (15.9)
Ceiling Opening: 7-1/8" (18.1)
Overlap trim: 7-1/2" (19.1)

LDN6 EL-ELR



Marked Spacing above 3000 lumen: 24 x 24 x 10
Aperture: 6-1/4 (15.9)
Ceiling Opening: 7-1/8 (18.1)
Overlap trim: 7-1/2 (19.1)

LDN6			
Nominal Lumens	**Lumens**	**Wattage**	**Lm/W**
500	527.9	5.8	90.5
750	758.1	8.9	85.1
1000	950.1	10.4	91.0
1500	1514	17.5	86.4
2000	2006	22.5	89.1
2500	2504	28.3	88.6
3000	3021	34.8	86.9
4000	4008	44.3	90.6
5000	4975	57.7	86.3

HOW TO ESTIMATE DELIVERED LUMENS IN EMERGENCY MODE

Use the formula below to estimate the delivered lumens in emergency mode

Delivered Lumens = 1.25 x P x LPW

P = Ouput power of emergency driver. P = 10W for PS1055CP

LPW = Lumen per watt rating of the luminaire. This information is available on the ABL luminaire spec sheet.
The LPW rating is also available at Designlight Consortium.

LUMEN OUTPUT MULTIPLIERS - FINISH			
	Clear (AR)	**White (WR)**	**Black (BR)**
Specular (LS)	1.0	N/A	N/A
Semi-specular (LSS)	0.950	N/A	N/A
Matte diffuse (LD)	0.85	N/A	N/A
Painted	N/A	0.87	0.73

LUMEN OUTPUT MULTIPLIERS - CCT					
	2700K	**3000K**	**3500K**	**4000K**	**5000K**
80CRI	0.950	0.966	1.000	1.025	1.101

Notes

- Tested in accordance with IESNA LM-79-08.
- Tested to current IES and NEMA standards under stabilized laboratory conditions.
- CRI: 80 typical.

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ADDITIONAL DATA

COMPATIBLE 0-10V WALL-MOUNT DIMMERS		
MANUFACTURER	PART NO.	POWER BOOSTER AVAILABLE
Lutron®	Diva® DVTV	
	Diva® DVSCTV	
	Nova T® NTFTV	
	Nova® NFTV	
Leviton®	AWSMT-7DW	CN100
	AWSMG-7DW	PE300
	AMRMG-7DW	
	Leviton Centura Fluorescent Control System	
	IllumaTech® IP7 Series	
Synergy®	ISD BC	RDMFC
	SLD LPCS	
	Digital Equinox (DEQ BC)	
Douglas Lighting Controls	WPC-5721	
Entertainment Technology	Tap Glide TG600FAM120 (120V)	
	Tap Glide Heatsink TGH1500FAM120 (120V)	
	Oasis 0A2000FAMU	
Honeywell	EL7315A1019	EL7305A1010 (optional)
	EL7315A1009	
HUNT Dimming	Preset slide: PS-010-IV and PS-010-WH	
	Preset slide: PS-010-3W-IV and PS-010-3W-WH	
	Preset slide, controls FD-010: PS-IFC-010-IV and PS-IFC-010-WH-120/277V	
	Preset slide, controls FD-010: PS-IFC-010-3W-IV and PS-IFC-010-3W-WH-120/277V	
	Remote mounted unit: FD-010	
Lehigh Electronic Products	Solitaire	PBX
PDM Electrical Products	WPC-5721	
Starfield Controls	TR61 with DALI interface port	RT03 DALInet Router
WattStopper®	LS-4 used with LCD-101 and LCD-103	

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded background*
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

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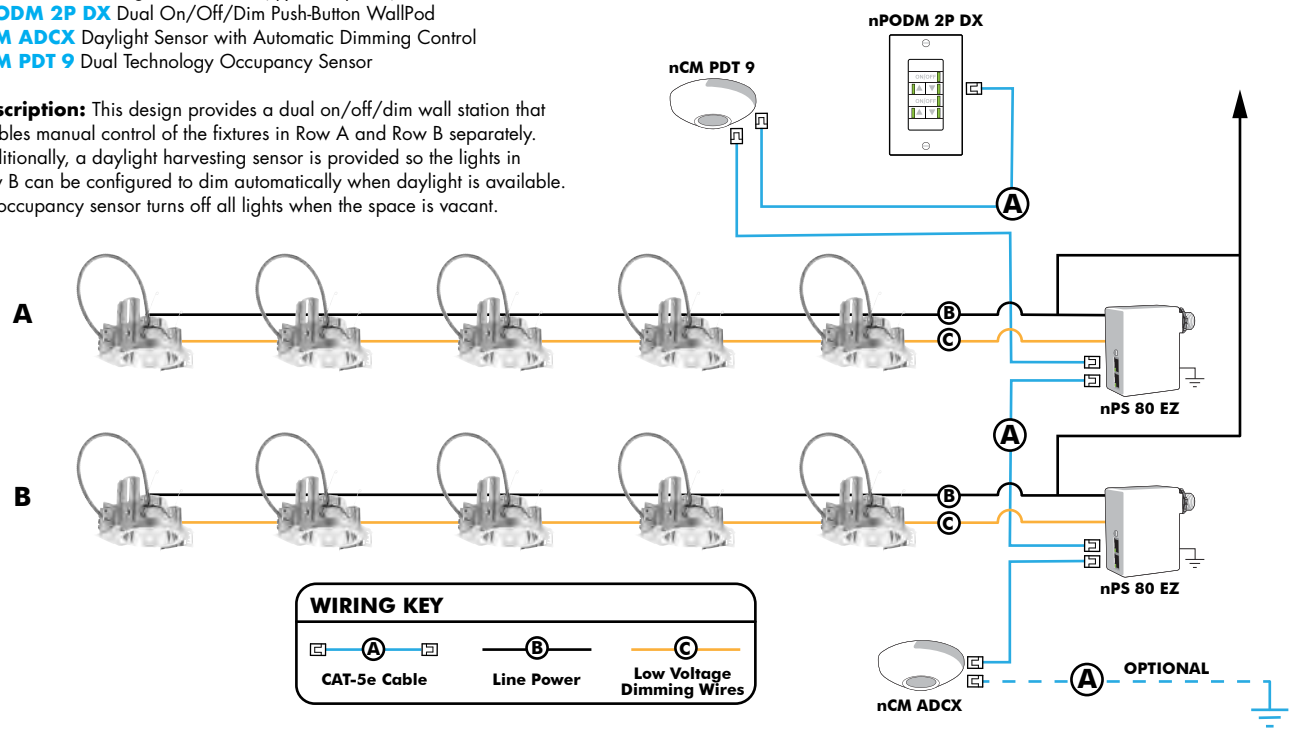
LDN6

EXAMPLE
Group Fixture Control*
*Appiication diagram applies for fixtures with eldoLED drivers only.

nPS 80 EZ Dimming/Control Pack (qty: 2 required)
nPODM 2P DX Dual On/Off/Dim Push-Button WallPod
nCM ADCX Daylight Sensor with Automatic Dimming Control
nCM PDT 9 Dual Technology Occupancy Sensor

Description: This design provides a dual on/off/dim wall station that enables manual control of the fixtures in Row A and Row B separately. Additionally, a daylight harvesting sensor is provided so the lights in Row B can be configured to dim automatically when daylight is available. An occupancy sensor turns off all lights when the space is vacant.



Choose Wall Controls

nLight offers multiple styles of wall controls - each with varying features and user experience.

Push-Button Wallpod
Traditional tactile buttons and LED user feedback

Graphic Wallpod
Full color touch screen provides a sophisticated look and feel

nLight® Wired Controls Accessories:			
Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlight for complete listing of nLight controls.			
WallPod Stations	**Model number**	**Occupancy sensors**	**Model Number**
On/Off	nPODM (Color)	Small motion 360°, ceiling (PIR/dual Tech)	nCM 9 / nCM PDT 9
On/Off & Raise/Lower	nPOD DX (Color)	Large motion 360°, ceiling (PIR/dual tech)	nCM 10 / nCM PDT 10
Graphic Touchscreen	nPOD GFX (Color)	Wide View (PIR/dual tech)	nWV 16 / nWV PDT 16
Photocell controls	**Model Number**	Wall Switch w/ Raise/Lower (PIR/dual tech)	nWSX LV DX / nWSX PDT LV DX
Dimming	nCM ADCX	**Cat-5 cables (plenum rated)**	**Model Number**
		10', CAT5 10FT	CAT5 10FT J1
		15, CAT5 15FT	CAT5 15FT J1

nLight® AIR Control Accessories: *Order as separate catalog number. Visit www.acuitybrands.com/products/controls/nlightair.*	
Wall switches	**Model number**
On/Off single pole	rPODB [color]
On/Off two pole	rPODB 2P [color]
On/Off & raise/lower single pole	rPODB DX [color]
On/Off & raise/lower two pole	rPODB 2P DX [color]
On/Off & raise/lower single pole	rPODBZ DX WH[1]

Notes
1 Can only be ordered with the RES7Z zone control sensor version.

nLight AIR

nLight AIR is the ideal solution for retrofit or new construction spaces where adding communication is cost prohibitive. The integrated nLight AIR rPP20 Power Pack is part of each Lithonia LDN Luminaire. These individually addressable controls offer the ultimate in flexibility during initial setup and for space repurposing.

Simple as 1,2,3

1. Install the nLight® AIR fixtures with embedded smart sensor
2. Install the wireless battery-powered wall switch
3. With CLAIRITY app, pair the fixtures with the wall switch and if desired, customize the sensor settings for the desired outcome

DOWNLIGHTING: One Lithonia Way Conyers, GA 30012 Phone: 800-705-SERV (7378) www.lithonia.com
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Catalog Number	
Notes	
Type	

Contractor Select™

ELM4L

Quantum® Contemporary Commercial LED Emergency Light

The Lithonia Lighting® Quantum® ELM4L Emergency Light is suitable for emergency lighting applications such as stairways and hallways. Its high performance LED lamp heads makes the ELM4L ideal for safely illuminating the path of egress for applications requiring attractive LED unit equipment with quick installation and unparalleled performance for 7.5' to 24' mounting heights. It can be wall or ceiling mounted and will provide 90 minutes of emergency power in the case of power loss.

FEATURES:

- Test switch and status indicator
- UL indoor damp location 50°F to 104°F (10°C to 40°C) listed standard
- For use with dual voltage 120/277VAC

† Small Battery Chargers Certified in the CA Title 20 Appliance Efficiency Database.

Catalog Number	UPC	Description	Supply Voltage	Input Wattage		Input Amps		Pallet Qty
				120	277	120	277	
ELM4L	191723916287	Quantum® LED Adjustable Optics 640 Lumens, 6.6W, Emergency Light, White housing	120/277V, 60hz	3.15	3.15	0.032	0.032	432

Accessories: *Order as separate catalog number.*

ELA WG1	Wireguard 15-1/4" W x 13-3/4" H x 6" D (back mount only). See spec sheet ELA-WG.
WPVS LRG W	Wet protective vandal shield (must be used for wet location applications)

Specifications

INTENDED USE:
Provides a minimum of 90 minutes illumination for the rated wattage upon loss of AC power to meet and exceed code required emergency lighting. Ideal for applications requiring attractive LED unit equipment with quick installation and unparalleled performance for mounting heights from 7.5' TO 30'.

CONSTRUCTION:
The housing is a standard white thermoplastic with a compact and low-profile contemporary design. It is 5VA flame rated, impact-resistant, scratch-resistant and corrosion proof. The UV-stable resin resists discoloration from natural and man-made light sources. The back-plate contains a universal j-box mounting pattern to facilitate ease of installation on a wide variety of j-boxes and the front housing allows tool-less access for ease of maintenance.

OPTICS:
The typical life of the LED is 10 years. Two 3.3W LED Lamps.

ELECTRICAL:
Dual-voltage 120 or 277, 60hz standard. Emergency unit provided with test switch, status indicator and rechargeable battery. Sealed, maintenance-free nickel-cadmium battery provides 90 minutes of emergency power.

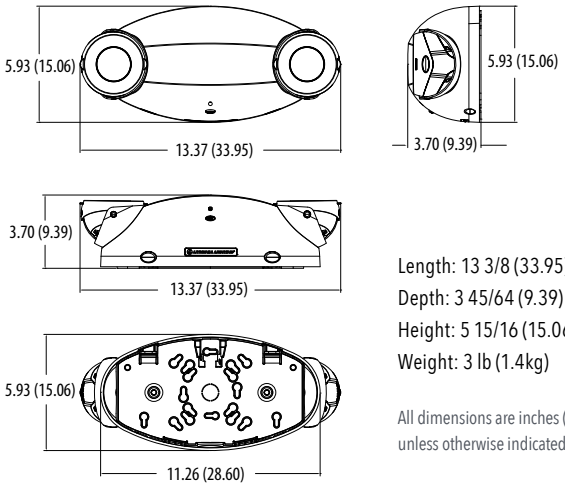
INSTALLATION:
Wall and ceiling mount. Tool-less removal of front cover from back-plate for ease of installation and maintenance.

LISTINGS:
UL damp location listed standard and wet location listed when used with the WPVS accessory, all at 50-104°F (10-40°C). Meets or exceeds all applicable requirements for UL 924, NFPA 101 (current Life Safety Code), NFPA 70 (NEC), NOM (Norma Oficial Mexicana), California Energy Commission Title 20 section 1605.3 (W)(4), FCC Title 47, Part 15, Subpart B and OSHA. List and labeled to comply with Canadian Standards C22.2 No. 141-10.

WARRANTY:
5-year limited warranty. Complete warranty terms located at:
www.acuitybrands.com/support/customer-support/terms-and-conditions

Note: Actual performance may differ as a result of end-user environment and application. All values are design or typical values, measured under laboratory conditions at 25 °C. Specifications subject to change without notice.

Dimensions



Length: 13 3/8 (33.95)
Depth: 3 45/64 (9.39)
Height: 5 15/16 (15.06)
Weight: 3 lb (1.4kg)

All dimensions are inches (centimeters) unless otherwise indicated.

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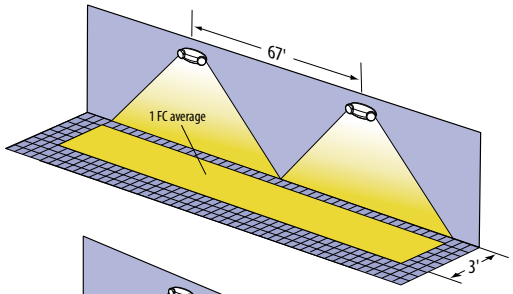
Spacing guidelines

Maximum Spacing Guidelines — ELM4L [1]						
Mounting Height	Illumination Level	Single Luminaire		Multiple Luminaire		Application Notes
		3' Path of Egress	6' Path of Egress	3' Path of Egress	6' Path of Egress	
7.5'	1FC Avg [1]	62'	58'	67'	60'	100'Corridor, 8' wide, and 12' high with 80/50/20 reflectances
10'	1FC Avg [1]	62'	58'	67'	60'	
7.5'	1FC Avg [1]	52'	40'	66'	58'	Retail open area: 200' X 15' X 30' with 80/50/20 reflectances
10'	1FC Avg [1]	52'	48'	64'	60'	
12'	1FC Avg [1]	52'	48'	62'	59'	
16'	1FC Avg [1]	52'	44'	61'	58'	
20'	1FC Avg [1]	44'	42'	60'	58'	
24'	1FC Avg [1]	34'	34'	42'	58'	

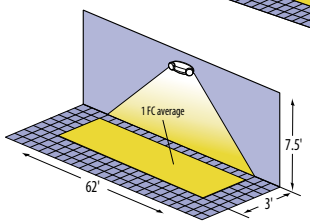
Notes:

1. Also meets the additional illumination requirements of NFPA 101: 1FC minimum and max/min ration of 40:1.

*Note: To see complete photometric report or download the .ies file for this product, visit Lithonia Lighting ELM4L and ELM6L home page.



Example of multiple ELM4L luminaires illuminating a 3' path of egress.



Example of single ELM4L illuminating a 3' path of egress.

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