PCS Structural Solutions

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STRUCTURAL CALCULATIONS

FOR

MERCER ISLAND MIXED USED
2885 78TH AVE SE
MERCER ISLAND, WA 98040

PREPARED BY
PCS STRUCTURAL *SOLUTIONS*

NOVEMBER 12, 2020
19-028

PCS Structural Solutions

TABLE OF CONTENTS

DESIGN CRITERIA

PROJECT DESCRIPTION

The proposed project is located at 2885 78th Avenue SE Mercer Island, WA. The project consists of approximately 230,000 gross square feet including two below-grade parking levels (lowest level is half the area), ground level of retail, amenity and courtyard, elevated post-tensioned podium slab and 3 stories of Type V wood framing.

The proposed structural systems for the various building components are summarized below:

FOUNDATIONS & BASEMENT WALLS

The building will be supported by a combination of spread footings (at interior columns), linear footings (at basement walls and individual shear walls) and mat foundations (at core shear walls) that will rest on soil. The mat foundations may vary in thickness according to specific loading demands (gravity, overturning, and shear). The site will be permanently drained, therefore, the foundations will not be designed for hydrostatic uplift forces. Basement/retaining walls will consist of poured in place concrete walls.

Soil parameters are provided in the *Geotechnical Engineering Design Report Mercer Island Multi-Family Development* prepared by Hart Crowser and dated November 3, 2020.

Allowable soil bearing pressure for spread and linear footings is 3,000 psf.

Soil improvements are deemed required over portions of the site. Rammed aggregate piers (GeoPiers) are most suitable for the site per the Geotech Report.

TABLE 1. BASEMENT WALL DESIGN PARAMETERS

Parameter	Value	Notes
Lateral Pressure (EFP)	35 pcf 55 pcf	< 2H:1V slope >+ 2H:1V slope
Passive Resistance	300 pcf	Safety Factor of 1.5 for sliding
Traffic Surcharge	200 psf	2 feet of soil
Seismic Surcharge	8H	

Parameter	Value	Notes
Friction Coefficient	0.35	Safety Factor of 1.5 for sliding

CONCRETE FRAMING

The half size below-grade Parking Level, P-2, partially below-grade Parking Level, P-1, the Ground Level 1 and the Level 2 Podium slab will be cast-in-place concrete. The parking is entered from SE 29th Street on the south side at Level 1. See the Schematic Design drawings for preliminary member sizes.

WOOD FRAMING

The building will have 3 stories of wood framing above the concrete Podium slab with floors consisting of I-joists and plywood sheathing with a 1" gypcrete topping slab. Roof framing will consist of I-joists and tapered insulation at certain locations and builder's trusses at others. Wood bearing walls of various thickness, from 2x4 to 2x6 and 2x8 at plumbing walls, will support the joists along with various engineered lumber headers and beams. See the Schematic Design drawings for preliminary member sizes.

LATERAL SYSTEM

The lateral forces (seismic and wind) will be resisted by special concrete shear walls and concrete diaphragms at the concrete portion of the structure and plywood shear walls and plywood diaphragms at the wood-framed portion.

SITE SHORING

It is assumed that the site will be shored directly behind the basement walls where required. The design and installation of this shoring is by others.

BUILDING CODE

- 2015 International Building Code (IBC) with WA State Amendments.
- ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures", American Society of Civil Engineers, 2010.
- ACI 318-14, "Building Code Requirements for Structural Concrete and Commentary", American Concrete Institute, 2014.
- ANSI/AISC 360-10, "Specification for Structural Steel Buildings", American Institute of Steel Construction, 2010.

A summary of the project-specific loading criteria follows. This loading meets or exceeds the requirements of the 2015 IBC and incorporates loading requirements specific to this project.

GRAVITY LOADS

The following loads are in addition to the self-weight of the structure. The minimum live load requirements have been taken from Table 1607.1 of the 2015 IBC. Live loads are reduced where permitted in accordance with Section 1607.10 of the 2015 IBC.

TABLE 2. LIVE LOADS

Use	Uniform Load (psf)	Concentrated Load (lbs)
Assembly	100 psf (not reduced)	2,000 lbs
Courtyard	100 psf (not reduced)	2,000 lbs (Planters and other loadings greater than 2,000 lbs will be shown on plans)
Stairs/Exits/Corridors	100 psf	300 lbs at Stairs
Parking Garage	40 psf	3,000 lbs
Residential	40 psf	N/A
Mechanical/Electrical/Plumbing	125 psf (not reduced)	See Floor Plans for unit weights > 500 lbs
Office/Conference/BOH	80 psf	2,000 lbs
Roof	20 psf	300 lbs
Storage, Light	125 psf (not reduced)	N/A

TABLE 3. SUPERIMPOSED DEAD LOADS

Use	Total Uniform Load (psf)	Materials
Assembly	25 psf	Floor/Ceiling Allowance MEP/Fireproofing/Misc
Courtyard	80 psf	Pedestal Pavers/Waterproofing/etc MEP/Fireproofing/Misc

Use	Total Uniform Load (psf)	Materials
Parking Garage	5 psf	MEP/Fireproofing/Misc
Residential	20 psf	Floor/Ceiling Allowance w/ 1" Gypcrete Partitions MEP/Fireproofing/Misc
Roof	20 psf	Rigid Insulation Ceiling Allowance MEP/Fireproofing/Misc
Green Roof	75 psf	Rigid Insulation Ceiling Allowance Soil (4") MEP/Fireproofing/Misc
Light Planter	190 psf	Soil (1'-6") MEP/Fireproofing/Misc
Heavy Planter	360 psf	Soil (3'-0") MEP/Fireproofing/Misc 2,500 lb Point Load at Trees

SNOW LOADS

Snow loading is in accordance with ASCE 7-10 requirements. Snow drifting, unbalanced loading, and partial loading are considered in the design of the roof/roofdeck framing.

TABLE 4. SNOW DESIGN CRITERIA

Parameter	Value
Ground Snow Load (P_g)	20 psf
Exposure	Terrain Category B
Exposure Factor (C_e)	1.0
Thermal Factor (C_t)	1.0
Importance Factor (I_s)	1.0
Flat Roof Snow Load (p_f) Maximum of: $p_f = 0.7C_eC_tI_sp_g$ $P_f = 20(I_s)$ P_f (Jurisdiction minimum)	 14 psf 20 psf 25 psf (controls)
Warm Roof Slope Factor	1.0

Parameter	Value
Sloped Roof Snow Load = C_s * p_f	25 psf

WIND LOADS

Wind loading is in accordance with ASCE 7-10 requirements.

TABLE 5. WIND DESIGN CRITERIA

Parameter	Value
Basic Wind Speed, 3-second gust (V)	110 mph
Exposure	B
Importance Factor (I_w)	1.00
Enclosure Classification	Enclosed
K_{zt}	1.0
Mean Roof Height (h)	52 feet

SEISMIC LOADS

Seismic design parameters were provided in the Geotechnical Report and in accordance with the 2015 IBC and ASCE 7-10 requirements.

TABLE 6. PRELIMINARY SEISMIC DESIGN CRITERIA

Parameter	Value
Latitude / Longitude	47.58485°N 122.23438°W
Spectral Response Acceleration at Short Periods (S_S)	1.380
Spectral Response Acceleration at 1-Second Periods (S_1)	0.531
Occupancy Category	II
Seismic Importance Factor	1.0
Site Class	D
Seismic Parameters	F_a = 1.0 F_v = 1.5

Parameter	Value
Latitude / Longitude	47.58485°N 122.23438°W
Seismic Design Category (SDC)	D
Building Height (Seismic Base to Main Roof)	H = 52 feet
Structural System	Special Reinforced Concrete Shear Wall System; R = 5.0 Plywood Shear Walls; R = 6.5
Seismic Force Amplification Factor	Ω_0 = 2.5
Seismic Deflection Amplification Factor	C_d = 5.0

The material properties used for the design of various structural elements include the following:

TABLE 7. CONCRETE PROPERTIES

Member	Strength
Slab on Grade, Sidewalks, Curbs, Mechanical Pads	f'c = 5.0 ksi at 28 days
Basement Walls, Shotcrete (Pilasters to be Cast-in-Place)	f'c = 5.0 ksi at 28 days
Mat Foundation	f'c = 5.0 ksi at 56 days
Mild Reinforced Beams and Slabs	f'c = 5.0 ksi at 28 days
Post-Tensioned Floors	f'ci = 3.0 ksi at 3 days (at stressing) f'c = 5.5 ksi at 28 days
Columns	f'c = 5.0 ksi at 28 days
Shear Walls and Coupling Beams	f'c = 5.0 ksi at 28 days

TABLE 8. REINFORCEMENT PROPERTIES

Standard	Strength
ASTM A615 Grade 60	60 ksi (Typical)
ASTM A706 Grade 60	60 ksi (Shear Walls)
ASTM A615 Grade 75 with special ductile requirements	75 ksi (Coupling Beams, Column Ties, and Wall Tie Sets)
ASTM A615 Grade 75	75 ksi (Mat Foundation)
½"ϕ ASTM A416 Grade 270, low relaxation strands	Post-Tensioned Reinforcing

STRUCTURAL DESIGN CRITERIA

MERCER ISLAND MIXED USE
2885 78TH AVE SE
MERCER ISLAND, WA 98040

JOB NUMBER: 19-028

ASSEMBLY WEIGHTS

ROOF LOADS	**GRAVITY:**		**SEISMIC:**		**COMMENTS**
MEMBRANE ROOFING	2.2	PSF	2.2	PSF	
½" PLYWOOD SHEATHING	1.5	PSF	1.5	PSF	
ROOF JOISTS @ 16" O.C.	2.3	PSF	2.3	PSF	
R30 INSULATION	1.0	PSF	1.0	PSF	
5/8" GWB – 2 LAYERS	5.2	PSF	5.2	PSF	
SPRINKLERS	3.0	PSF	3.0	PSF	
LIGHTS, DUCTS	1.0	PSF	1.0	PSF	
MECH., ELEC.	1.1	PSF	0.7	PSF	
MISCELLANEOUS	0.7	PSF	1.6	PSF	
WALL SELF WEIGHT	-		4.5	PSF	
ROOF DL	18.0	PSF	23.0	PSF	SL = 25 PSF

WOOD FLOOR LOADS	**GRAVITY:**		**SEISMIC:**		**COMMENTS**
FLOORING	2.5	PSF	2.5	PSF	
1" GYPCRETE	9.0	PSF	9.0	PSF	
¾" PLYWOOD SHEATHING	2.3	PSF	2.3	PSF	
FLOOR JOISTS @ 16" O.C.	2.3	PSF	2.3	PSF	
5/8" GWB – 2 LAYERS	5.2	PSF	5.2	PSF	
SPRINKLERS	2.0	PSF	0.3	PSF	
LIGHTS, DUCTS	1.0	PSF	0.2	PSF	
MISCELLANEOUS	0.7	PSF	0.2	PSF	
WALL SELF WEIGHT	-		8.0	PSF	
FLOOR DL	25.0	PSF	30.0	PSF	LL = 40/100 PSF

EXTERIOR WALL LOADS	**GRAVITY & SEISMIC:**	
SIDING	2.5	PSF
½" PLYWOOD SHEATHING	1.5	PSF
FRAMING – 2X6 @ 16" O.C.	1.7	PSF
INSULATION	0.5	PSF
½" GWB	2.2	PSF
MISCELLANEOUS MECHANICAL/ELEC.	0.6	PSF
	9.0	PSF

PCS Structural Solutions

Project: MERCER ISLAND | Job Number: 19-028

Sheet: _____ of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

DESIGN CRITERIA CHECKLIST

CODE: IBC 2015, ASCE 7-10 | LOCATION: SEATTLE, WA

VERTICAL DESIGN CRITERIA

	DEAD	LIVE
ROOF:	18 PSF	25 PSF
RESIDENTIAL:	25 PSF	40 PSF
STAIRS:	10 PSF	100 PSF
RESIDENTIAL BALCONY:	15 PSF	60 PSF
MECHANICAL ROOM:	20 PSF	40 PSF

WIND DESIGN CRITERIA

BASIC WIND SPEED (V) =	110 MPH	(Per ASCE 7-10 Sec. 26.5.1, Fig. 26.5-1A; 1B & 1C, or as required by Bld'g Dept.)
RISK CATEGORY:	II	(Per ASCE 7-10 Table 1.5-1 & IBC Table 1604.5)
EXPOSURE CATEGORY:	B	(Per ACSE 7-10 Section 26.7.3)
TOPOGRAPHIC FACTOR (K_{zt}):	1.30	(Per ASCE 7-10 Section 26.8.2)
MEAN ROOF HEIGHT:	55 FT	(See ASCE 7-10 Section 26.2 - Definitions)
ROOF SLOPE (__:12):	1.50:12	(Enter vertical rise in 12 horizontal units)
θ (degrees):	7.13	

SEISMIC DESIGN CRITERIA

RISK CATEGORY:	I & II	(Per ASCE 7-10 Table 1.5-1 & IBC Table 1604.5)
SITE CLASS:	D	(Per IBC Section 1613.3.2, Assumed as "D" or per Geotech.)
IMPORTANCE FACTOR (I_E):	1	(Per ASCE 7-10 Table 1.5-2)
STRUCTURAL SYSTEM (R):	6.5	(Per ASCE 7-10 Table 12.2-1)
OVERSTRENGTH FACTOR (Ω_o):	3.0	(Per ASCE 7-10 Table 12.2-1)

INFORMATION BELOW FROM "EARTHQUAKE SPECTRAL RESPONSE ACCELERATION MAPS" PER USGS

LATITUDE:	47.585	S_S =	1.380	F_a =	1.000
LONGITUDE:	-122.234	S_1 =	0.531	F_v =	1.500

DEFLECTION CRITERIA

FLOOR (LIVE):	L/ 480	ROOF (LIVE):	L/ 360
FLOOR (TOTAL):	L/ 360	ROOF (TOTAL):	L/ 240
WALLS:	L/ 360	SPECIAL:	L/

SOIL DESIGN CRITERIA

REPORT: YES

SEE SOILS REPORT FOR ACTIVE, PASSIVE PRESSURES AND FRICTION COEFFICIENT

BEARING:
ACTIVE: 35 PCF
PASSIVE: 300 PCF
COEFFICIENT OF FRICTION: 0.35
PILE TYPE: NONE

MINIMUM FOOTING DIMENSIONS:

CONTINUOUS:	1'-4"
SPREAD:	1'-6"
FROST DEPTH:	1'-6"

VERTICAL CAPACITY =	N/A	LATERAL CAPACITY =	N/A
UPLIFT CAPACITY =	N/A	SIZE =	N/A

MATERIALS

GLULAM BEAMS

	Simple Spans		Cantilevers
	24F-V4	Grade =	24F-V8
	1.80E+06 PSI	E =	1.80E+06 PSI
	2400 PSI	$F_{b\ (BOTTOM)}$ =	2400 PSI
	1850 PSI	$F_{b\ (TOP)}$ =	2400 PSI
	240 PSI	F_v =	240 PSI

SCL PRODUCTS

	2x SCL	1¾" SCL	3½, 5¼ SCL
E =	1.30E+06 PSI	1.80E+06 PSI	2.00E+06 PSI
F_b =	1700 PSI	2600 PSI	2900 PSI
F_v =	285 PSI	285 PSI	285 PSI
F_c =	1400 PSI	2400 PSI	2600 PSI

FRAMING LUMBER

Joists & Studs	2x DF #2	2x HF #1	-
E =	1.60E+06 PSI	1.50E+06 PSI	-
F_b =	900 PSI	975 PSI	-
F_v =	180 PSI	150 PSI	-
F_c =	1350 PSI	1350 PSI	-
Beams & Headers	4x DF #2	4x HF #1	6x DF #1
E =	1.60E+06 PSI	1.50E+06 PSI	1.60E+06 PSI
F_b =	900 PSI	975 PSI	1350 PSI
F_v =	180 PSI	150 PSI	170 PSI
Posts & Timbers	6x DF #1	-	-
E =	1.60E+06 PSI	-	-
F_c =	1000 PSI	-	-

DESIGN CRITERIA - WIND

BASIC WIND SPEED (V):	110 MPH	MEAN ROOF HEIGHT:	55 FT
RISK CATEGORY:	II	ROOF SLOPE (__:12):	1.5:12
EXPOSURE CATEGORY:	B	θ (degrees):	7.13
TOPOGRAPHIC FACTOR (K_{zt}):	1.30		

ASCE 7-10 CHAPTER 28.5 PART 2: ENCLOSED SIMPLE DIAPHRAGM LOW RISE BUILDINGS W/ H<60 FT
ASCE 7-10 FIG. 28.6-1 - MAIN WIND FORCE RESISTING SYSTEM - DESIGN WIND PRESSURES - METHOD 2

HORIZONTAL PRESSURES

ZONE:	A	B	C	D	-	-
CASE 1:	31.28	-14.81	20.76	-8.67	-	-
CASE 2:	N/A	N/A	N/A	N/A	-	-

VERTICAL PRESSURES

ZONE:	E	F	G	H	E_{OH}	G_{OH}
CASE 1:	-35.74	-20.92	-24.75	-16.08	-49.97	-39.14
CASE 2:	N/A	N/A	N/A	N/A	N/A	N/A

ASCE 7-10 CH 30 PART 2: LOW RISE BUILDINGS (SIMPLIFIED) W/ H<60 FT
ASCE 7-10 FIGURE 30.5-1 - COMPONENTS AND CLADDING - DESIGN WIND PRESSURES - METHOD 1

ROOF SURFACES

Effective Wind Area	POSITIVE PRESSURES			NEGATIVE PRESSURES		
	ZONE					
	1	2	3	1	2	3
10 SF	19.3	19.3	19.3	-30.8	-53.7	-79.4
20 SF	17.6	17.6	17.6	-30.0	-49.3	-74.1
50 SF	16.0	16.0	16.0	-28.8	-43.6	-67.3
100 SF	16.0	16.0	16.0	-28.0	-39.4	-62.2

WALL SURFACES & ROOF OVERHANGS

Effective Wind Area	POSITIVE PRESSURES		NEGATIVE PRESSURES		ROOF OVERHANGS	
	ZONE					
	4	5	4	5	2	3
10 SF	33.7	33.7	-36.5	-45.0	-62.8	-105.7
20 SF	32.2	32.2	-35.0	-42.1	-62.8	-95.3
50 SF	30.2	30.2	-33.0	-38.1	-62.8	-81.7
100 SF	28.6	28.6	-31.6	-35.0	-62.8	-71.3
500 SF	25.1	25.1	-28.0	-28.0	NA	NA

ASCE 7-10 SECTION 28.6.4 & SECTION 30.2.2 - MINIMUM PRESSURES

MAIN WIND FORCE RESISTING SYSTEM - MINIMUM PRESSURES (ENVELOPE PROCEDURE)

ASCE 7-10 28.6.4	The load effects of the design wind pressures from ASCE 7-10 Section 28.6.3 shall not be less than the minimum load defined by assuming the pressures, p, for Zones A and C equal to +16.0 psf, Zones B and D equal to +8 psf, while assuming Zones E, F, G, and H all equal to 0 psf.

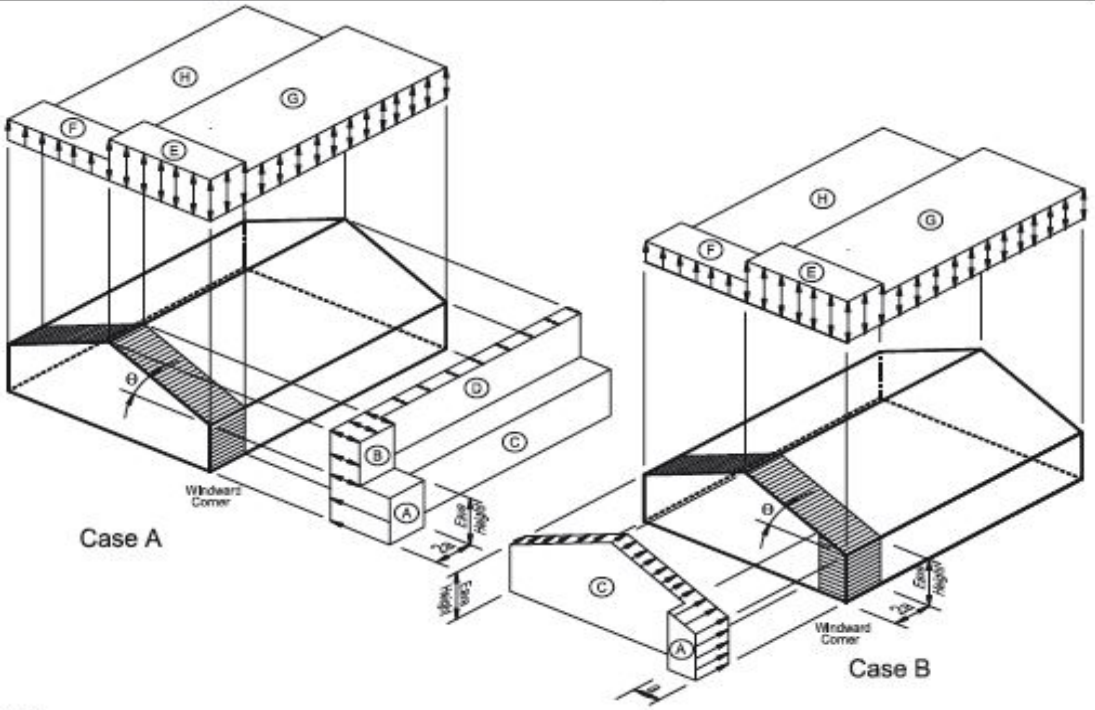
COMPONENTS AND CLADDING - MINIMUM PRESSURES

ASCE 7-10 30.2.2	The design wind pressure for components and cladding of buildings shall not be less than a net pressure of 16 psf acting in either direction normal ot the surface.

DESIGN CRITERIA - WIND

FIGURE 28.6-1, ASCE 7-10 3rd Printing

Main Wind Force Resisting System – Method 2		h ≤ 60 ft.
Figure 28.6-1	Design Wind Pressures	Walls & Roofs
Enclosed Buildings		

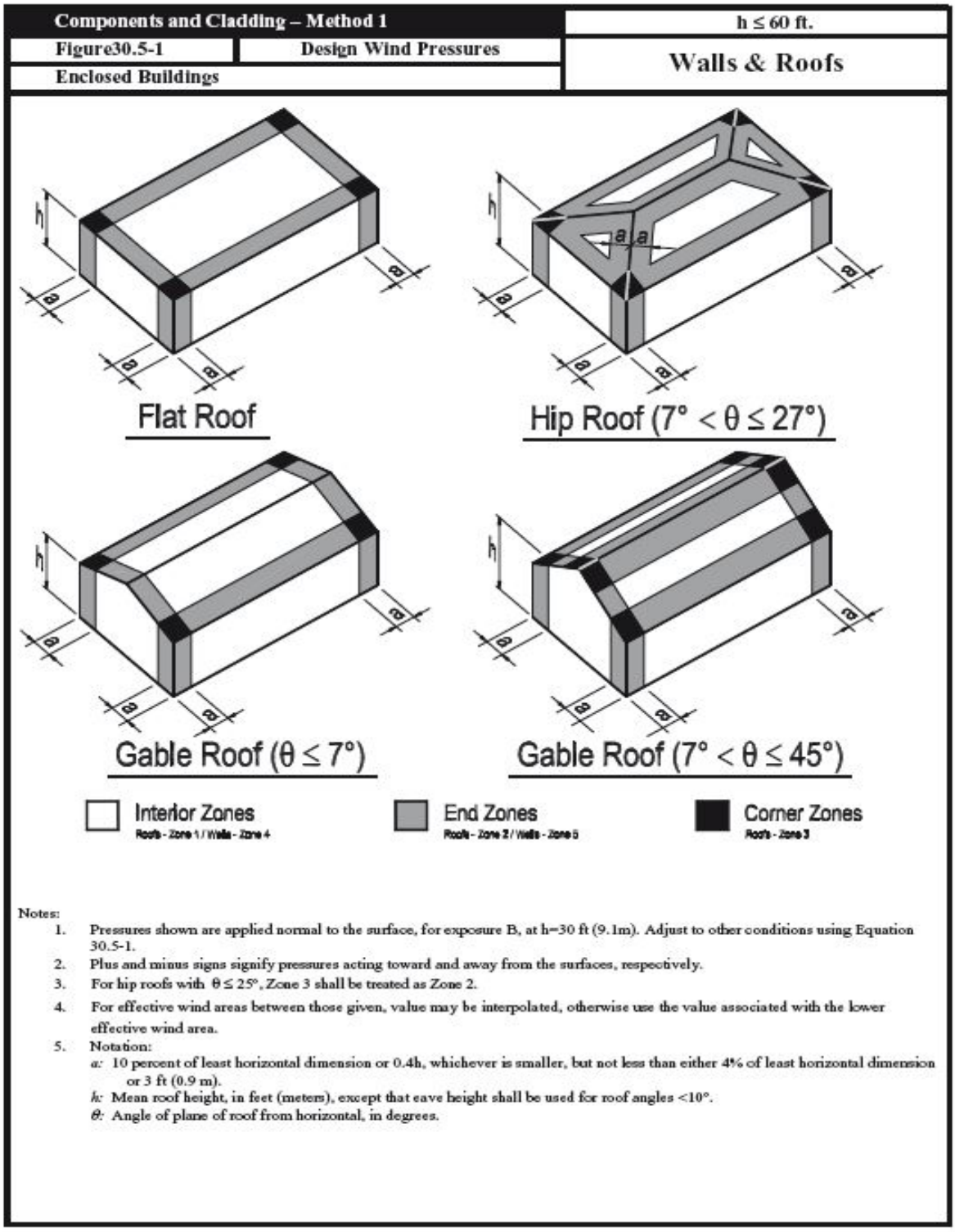


Notes:

1. Pressures shown are applied to the horizontal and vertical projections, for exposure B, at h=30 ft (9.1m). Adjust to other exposures and heights with adjustment factor λ.
2. The load patterns shown shall be applied to each corner of the building in turn as the reference corner. (See Figure 28.4-1)
3. For Case B use $\theta = 0°$.
4. Load cases 1 and 2 must be checked for $25° < \theta \leq 45°$. Load case 2 at 25° is provided only for interpolation between 25° and 30°.
5. Plus and minus signs signify pressures acting toward and away from the projected surfaces, respectively.
6. For roof slopes other than those shown, linear interpolation is permitted.
7. The total horizontal load shall not be less than that determined by assuming $p_s = 0$ in zones B & D.
8. Where zone E or G falls on a roof overhang on the windward side of the building, use E_{OH} and G_{OH} for the pressure on the horizontal projection of the overhang. Overhangs on the leeward and side edges shall have the basic zone pressure applied.
9. Notation:
   - *a:* 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).
   - *h:* Mean roof height, in feet (meters), except that eave height shall be used for roof angles <10°.
   - *θ:* Angle of plane of roof from horizontal, in degrees.
10. For Load Case A, the roof pressure coefficient (GC_p), when negative in Zone 2 and 2E, shall be applied in Zone 2/2E for a distance from the edge of roof equal to 0.5 times the horizontal dimension of the building measured perpendicular to the ridge line or 2.5 times the eave height at the windward wall, whichever is less; the remainder of Zone 2/2E extending to the ridge line shall use the pressure coefficient (GC_p) for Zone 3/3E.

DESIGN CRITERIA - WIND

FIGURE 30.5-1, ASCE 7-10 3rd Printing



Notes:

1. Pressures shown are applied normal to the surface, for exposure B, at h=30 ft (9.1m). Adjust to other conditions using Equation 30.5-1.
2. Plus and minus signs signify pressures acting toward and away from the surfaces, respectively.
3. For hip roofs with $\theta \leq 25°$, Zone 3 shall be treated as Zone 2.
4. For effective wind areas between those given, value may be interpolated, otherwise use the value associated with the lower effective wind area.
5. Notation:
   a: 10 percent of least horizontal dimension or 0.4h, whichever is smaller, but not less than either 4% of least horizontal dimension or 3 ft (0.9 m).
   h: Mean roof height, in feet (meters), except that eave height shall be used for roof angles <10°.
   θ: Angle of plane of roof from horizontal, in degrees.

DESIGN CRITERIA - SEISMIC

ASCE 7-10 SECTION 12.8 - EQUIVALENT LATERAL FORCE PROCEDURE

OCCUPANCY CATEGORY:	I & II	LATITUDE:	47.585
SITE CLASS:	D	LONGITUDE:	-122.234
IMPORTANCE FACTOR (I_E):	1	S_S =	1.380
STRUCTURAL SYSTEM (R):	6.5	S_1 =	0.531
OVERSTRENGTH FACTOR (Ω_o):	3	F_a =	1.000
		F_v =	1.500

ASCE 7-10 SECTION 11.4 SEISMIC GROUND MOTION VALUES

Section 11.4.3 - Adjusted Maximum Considered Earthquake Spectral Response Acceleration Parameters

$S_{MS} = F_a*S_S$ = 1.380 $S_{M1} = F_v*S_1$ = 0.797

Section 11.4.4 - Design Spectral Response Acceleration Parameters

$S_{DS} = 2/3*S_{MS}$ = 0.920 $S_{D1} = 2/3*S_{M1}$ = 0.531

ASCE 7-10 SECTION 11.6 - SEISMIC DESIGN CATEGORY - SECTION 12.8.2 - PERIOD DETERMINATION

ASCE 7-10 TABLE 11.6-1

SEISMIC DESIGN CATEGORY BASED ON S_{DS}

	RISK CATEGORY:		
	I & II	III	IV
< 0.167g	A	A	A
< 0.33g	B	B	C
< 0.50g	C	C	D
>= 0.50g	D	D	D
	D		

ASCE 7-10 TABLE 11.6-2

SEISMIC DESIGN CATEGORY BASED ON S_{D1}

	RISK CATEGORY:		
	I & II	III	IV
< 0.067g	A	A	A
< 0.133g	B	B	C
< 0.20g	C	C	D
>= 0.20g	D	D	D
	D		

Each building and structure shall be assigned to the most severe Seismic Design Category in accordance with Table 11.6-1 or Table 11.6-2, irrespective of the fundamental period of vibration of the structure.

PERIOD DETERMINATION:	
C_t =	0.02
h_n =	34 FT
x =	0.75
$T_a = C_t*h_n^x$ =	0.278

ASCE 7-10 SECTION 12.8.1.1 - SEISMIC RESPONSE COEFFICIENT

GENERAL EQUATION:	$C_S = S_{DS}/(R/I)$ =	0.142	<--CONTROLS	EQ. 12.8-2
MAXIMUM:	$C_S = S_{D1}/(T*(R/I))$ =	0.293		EQ. 12.8-3
MINIMUM:	$C_S = 0.044*S_{DS}*I > 0.01$ =	0.040		EQ. 12.8-5
	For structures located where S1 > 0.6g			
	$C_S = 0.5*S_1/(R/I)$ =	0.000		EQ. 12.8-6

ASCE 7-10 SECTION 12.8.1 - SEISMIC BASE SHEAR

$V = C_S*W$ = **0.142*W**

W = the total dead load and applicable portion of other loads as indicated in Section 12.7.2

Hazards by Location

Search Information

Address: 2885 78th Ave SE, Mercer Island, WA 98040, USA

Coordinates: 47.5846341, -122.234227

Elevation: 81 ft

Timestamp: 2020-10-08T22:39:03.889Z

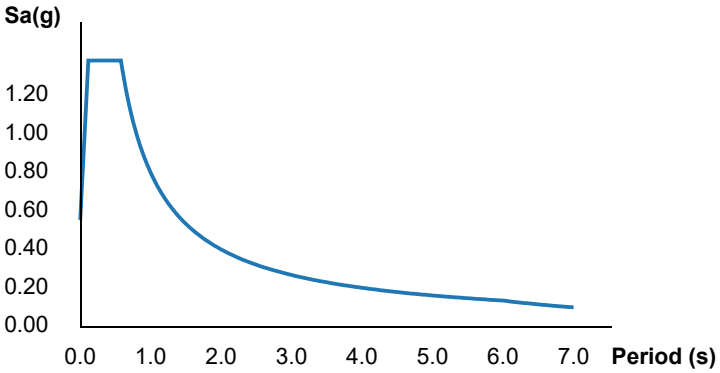
Hazard Type: Seismic

Reference Document: ASCE7-10

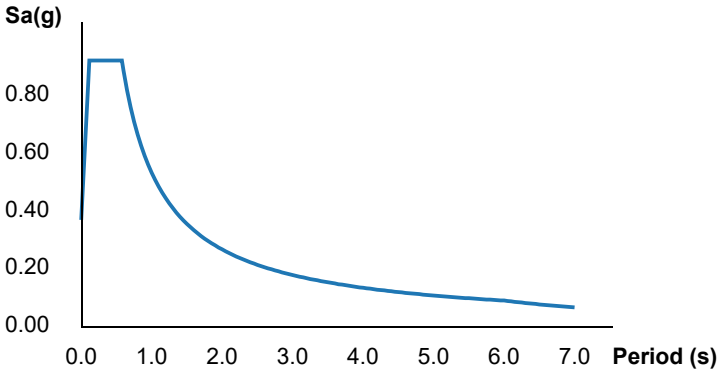
Risk Category: II

Site Class: D

MCER Horizontal Response Spectrum



Design Horizontal Response Spectrum



Basic Parameters

Name	Value	Description
S_S	1.38	MCE_R ground motion (period=0.2s)
S_1	0.531	MCE_R ground motion (period=1.0s)
S_{MS}	1.38	Site-modified spectral acceleration value
S_{M1}	0.797	Site-modified spectral acceleration value
S_{DS}	0.92	Numeric seismic design value at 0.2s SA
S_{D1}	0.531	Numeric seismic design value at 1.0s SA

Additional Information

Name	Value	Description
SDC	D	Seismic design category
F_a	1	Site amplification factor at 0.2s
F_v	1.5	Site amplification factor at 1.0s

CR_S	0.962	Coefficient of risk (0.2s)
CR_1	0.936	Coefficient of risk (1.0s)
PGA	0.568	MCE_G peak ground acceleration
F_{PGA}	1	Site amplification factor at PGA
PGA_M	0.568	Site modified peak ground acceleration
T_L	6	Long-period transition period (s)
SsRT	1.38	Probabilistic risk-targeted ground motion (0.2s)
SsUH	1.435	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
SsD	2.663	Factored deterministic acceleration value (0.2s)
S1RT	0.531	Probabilistic risk-targeted ground motion (1.0s)
S1UH	0.568	Factored uniform-hazard spectral acceleration (2% probability of exceedance in 50 years)
S1D	1.101	Factored deterministic acceleration value (1.0s)
PGAd	1.019	Factored deterministic acceleration value (PGA)

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.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

Hazards by Location

Search Information

Address: 2885 78th Ave SE, Mercer Island, WA 98040, USA

Coordinates: 47.5846341, -122.234227

Elevation: 81 ft

Timestamp: 2020-10-08T22:36:32.107Z

Hazard Type: Wind

ASCE 7-16

MRI 10-Year	67 mph
MRI 25-Year	73 mph
MRI 50-Year	78 mph
MRI 100-Year	83 mph
Risk Category I	92 mph
Risk Category II	97 mph
Risk Category III	104 mph
Risk Category IV	108 mph

ASCE 7-10

MRI 10-Year	72 mph
MRI 25-Year	79 mph
MRI 50-Year	85 mph
MRI 100-Year	91 mph
Risk Category I	100 mph
Risk Category II	110 mph
Risk Category III-IV	115 mph

ASCE 7-05

ASCE 7-05 Wind Speed	85 mph

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 interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

While the information presented on this website is believed to be correct, ATC and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in the report should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. ATC does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the report provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the

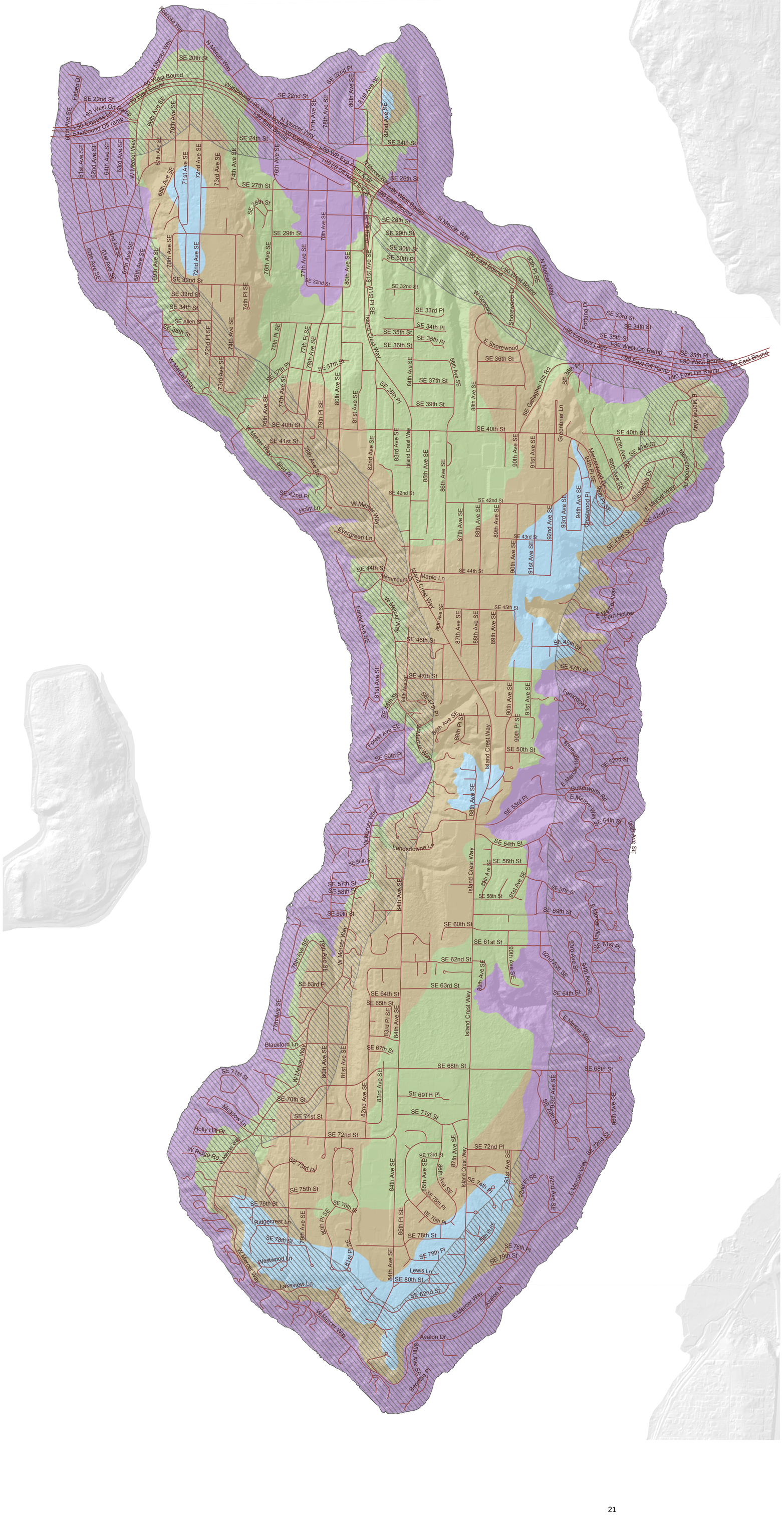
this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the report.

Mercer Island Wind Exposure and Wind Speed-Up (Topographic Effect)

by Development Services Group (DSG), City of Mercer Island
April 2009

0 0.5 1 Kilometers 1:12,000
0 0.5 1 Miles

T N



WIND EXPOSURE CATEGORIES & WIND SPEED-UP FACTORS
(ICC Section 1609 & ASCE 7-05 Chapter 6)

It is the responsibility of the Owner (or their Design Professional) to review site conditions and determine the Kzt factor to be utilized for each specific project. The Kzt factors and wind exposure categories indicated on this map are the minimum values accepted by the City of Mercer Island without requiring the design professional to submit additional calculations and supporting topographic documentation (to verify the values utilized in their wind load determination).

Please note – The Kzt values indicated on this map are approximations based upon periodic calculations of representative samplings around Mercer Island. These values are intended for City of Mercer Island's plan review purposes only.

WIND EXPOSURE CATEGORIES:

Wind Exposure Category	
	Exposure 'C' (1500 feet from Lake)
	Exposure 'B' (all other areas)

WIND SPEED-UP (TOPOGRAPHIC EFFECT) - K_zt Factor :

K_zt Factor	
	$K_zt = 1.0$
	$K_zt = 1.3$
	$K_zt = 1.6$
	$K_zt = 1.9$

GENERAL NOTES FOR WIND EXPOSURE AND WIND SPEED-UP MAP

This map is the Wind Exposure Category and Wind Speed-up (Topographic Effects) Map for the City of Mercer island. This map shows the minimum wind exposure category and the minimum wind speed-up, "K_zt" factor, which will be accepted without site specific documentation and calculation.

Other wind speed phenomena may occur on Mercer Island that is not specifically indentified on this map. It is the responsibility of the Owner (or their Design Professional) to review site conditions and determine the appropriate design wind speed and exposure category for their specific project and location.

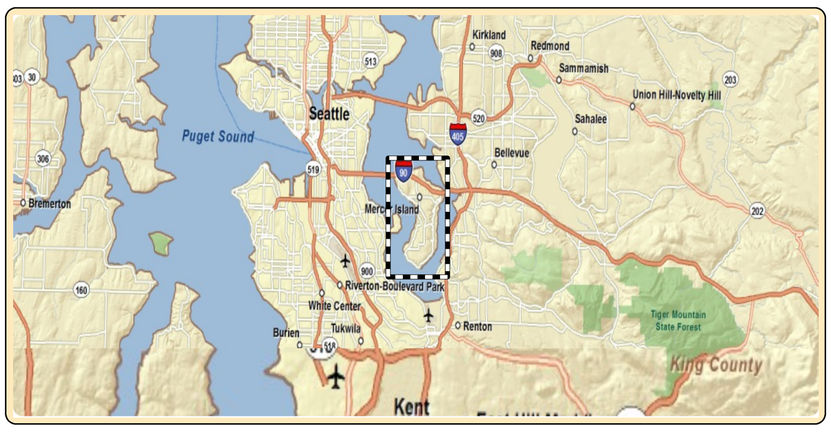
This map is for the sole use of the staff of the City of Mercer Island's Development Services Group (DSG) for the purposes of permit application evaluation. This map provides DSG staff a general assessment of Wind Exposure Category and Wind Speed-up (Topographic Effects). All areas have not been specifically evaluated and there may be locations that are not correctly represented on this map. It is the responsibility of individual property owners and map users to evaluate risk associated with their proposed development. No site-specific assessment of risk is implied or otherwise indicated by the City of Mercer Island with this map.

Information about data used for the map, references, and data limitation are all described the associated "Read Me" document. The digital version of this map is accompanied by a meta data file containing pertinent information about map construction. This data map is available on the City of Mercer Island website.

The City of Mercer Island is using guidance provided within ICC Section 1609 & ASCE 7-05 Chapter 6 regarding definitions used when creating this map.

DEFINITIONS:

K_zt factor:	The topographic effect of wind speed-up at isolated hills, ridges, and escarpments constituting abrupt changes in the general topography, located in any exposure category, that meet all of the conditions noted in ASCE 7-05 Minimum Design Loads for Buildings and Other Structures, Section 6.5.7.
Exposure B:	The wind exposure category that applies where the site in question is located a minimum of 1500 feet from the shoreline and the mean roof height is less than or equal to 30 feet per IBC 2006 section 1609.4.3.
Exposure C:	The wind exposure category that applies where the site in question is located within 1500 feet from the shoreline per IBC 2006 section 1609.4.3.
Wind Speed:	Minimum 85 mph 3-second gust per IRC Figure R301.2(4)



	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

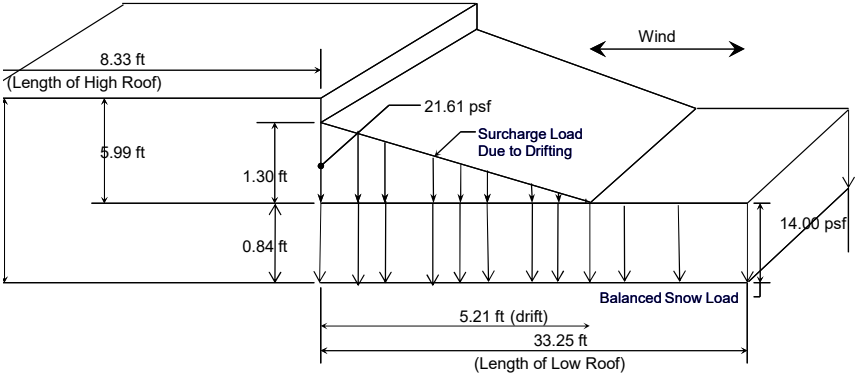
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	8.33 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	33.25 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	6.83 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

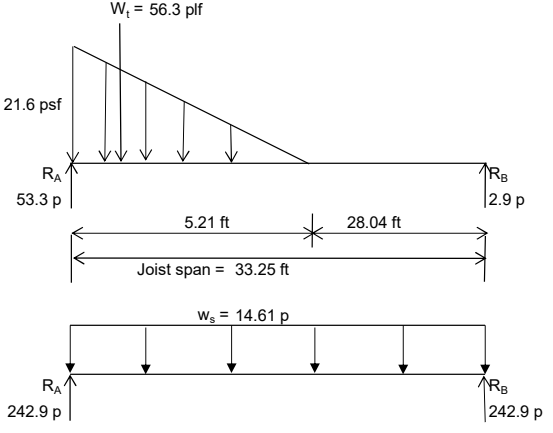
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	5.99 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.23 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	1.30 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	1.30 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	7.10	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	5.21 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	33.25 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	5.21 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	21.61 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	35.61 psf	$p_{(total)}$ = pf(use)+pd

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_i =	4.02 ft
Maximum moment, M_{max} =	84.74 pft
ent uniform load due to drift, w_e =	0.61 psf
Total snow load on joist, w_s =	14.61 psf

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

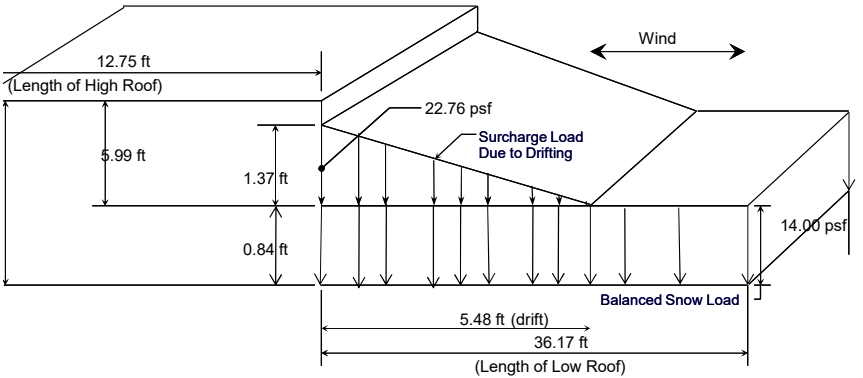
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	12.75 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	36.17 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	6.83 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

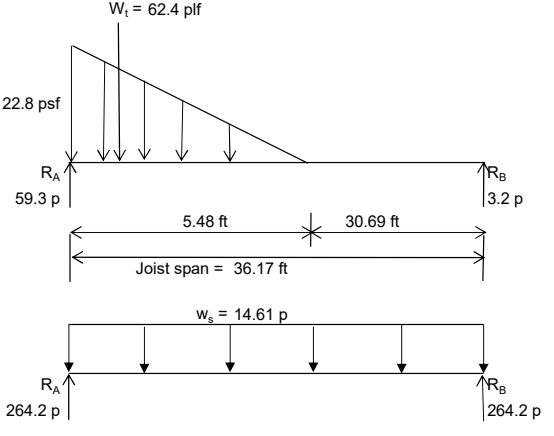
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	5.99 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.23 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	1.37 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	1.37 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	7.10	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	5.48 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	36.17 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	5.48 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	22.76 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	36.76 psf	$p_{(total)}$ = pf(use)+pd

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_i =	4.25 ft
Maximum moment, M_{max} =	99.39 pft
ent uniform load due to drift, w_e =	0.61 psf
Total snow load on joist, w_s =	14.61 psf

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

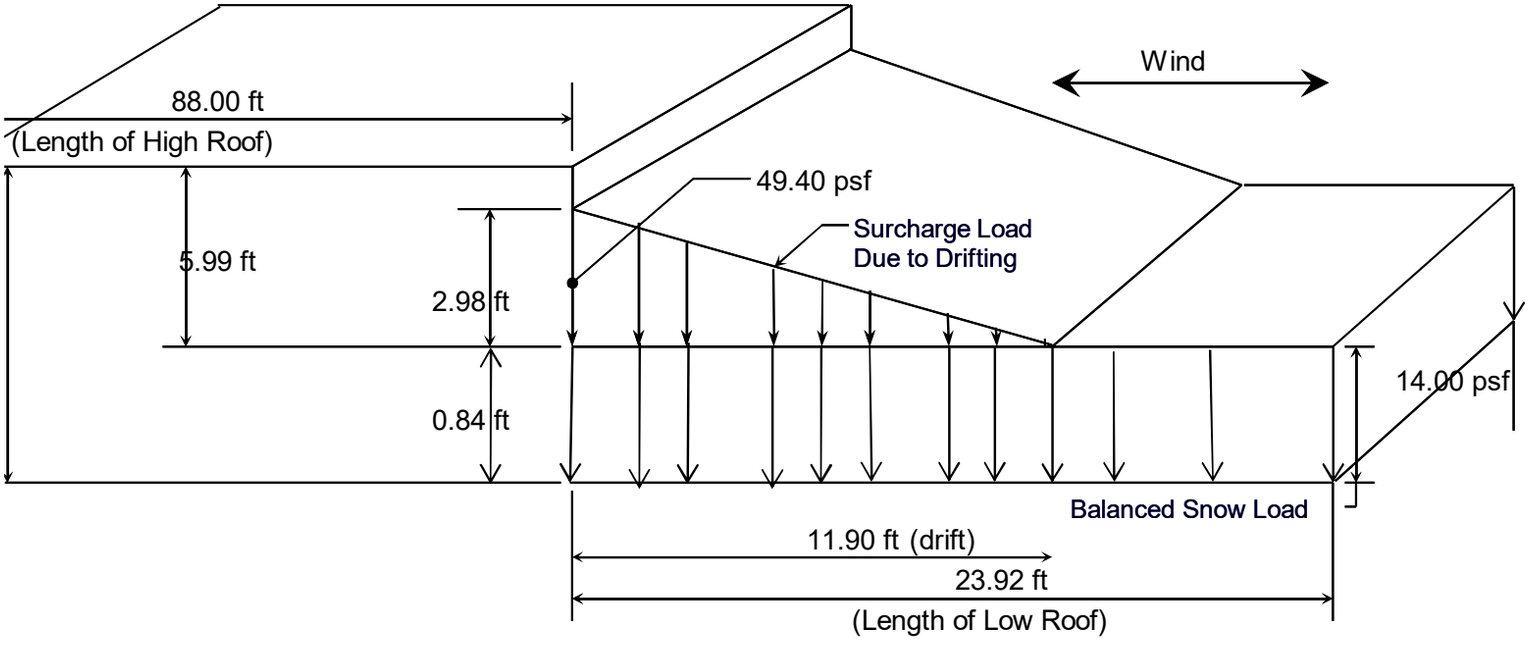
Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	88.00 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	23.92 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	6.83 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

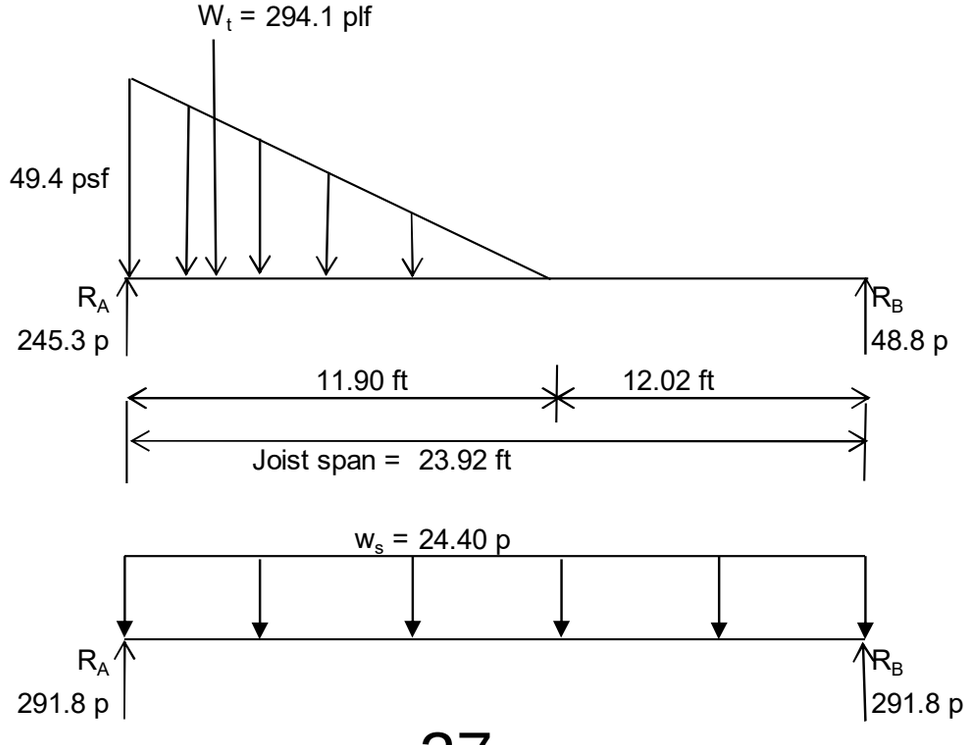
Results:

Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	5.99 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	2.98 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	1.05 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	2.98 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	7.10	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	11.90 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	23.92 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	11.90 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	49.40 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	63.40 psf	$p_{(total)}$ = pf(use)+pd



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_i =	7.06 ft
Maximum moment, M_{max} =	743.89 pft
alent uniform load due to drift, w_e =	10.40 psf
Total snow load on joist, w_s =	24.40 psf

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

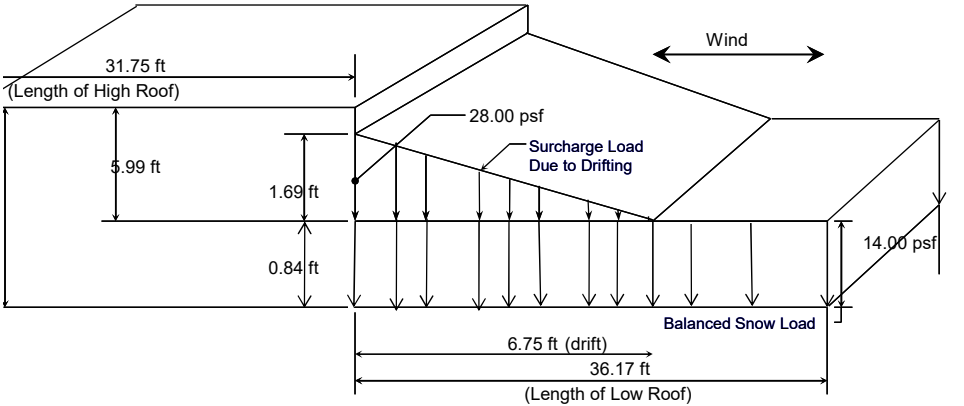
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	31.75 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	36.17 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	6.83 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

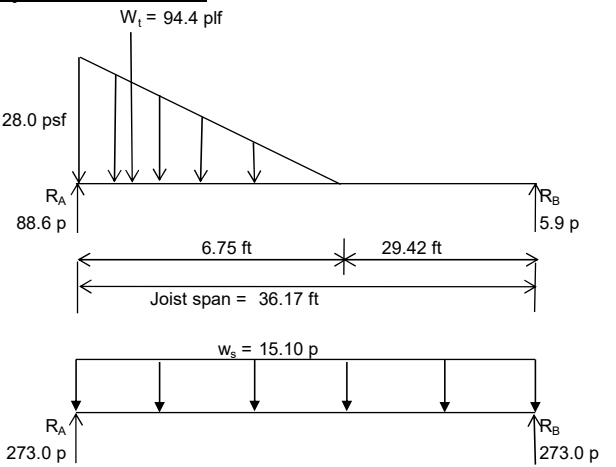
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	5.99 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.69 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	1.37 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	1.69 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	7.10	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	6.75 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	36.17 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	6.75 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	28.00 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	42.00 psf	$p_{(total)}$ = pf(use)+pd

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_i =	5.06 ft
Maximum moment, M_{max} =	179.36 pft
nt uniform load due to drift, w_e =	1.10 psf
Total snow load on joist, w_s =	15.10 psf

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

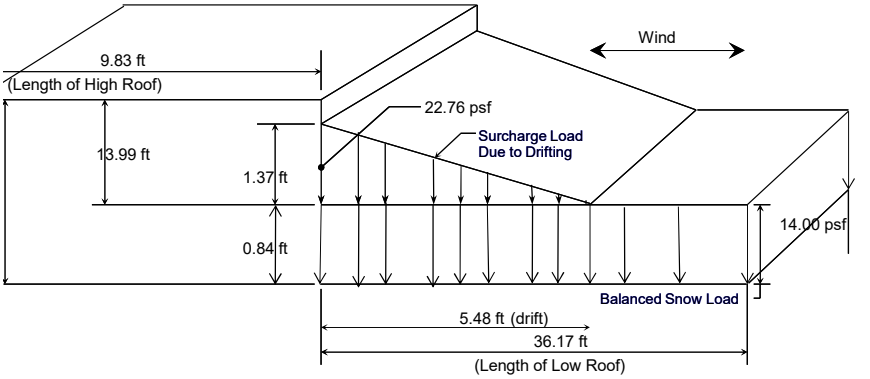
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	9.83 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	36.17 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	14.83 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

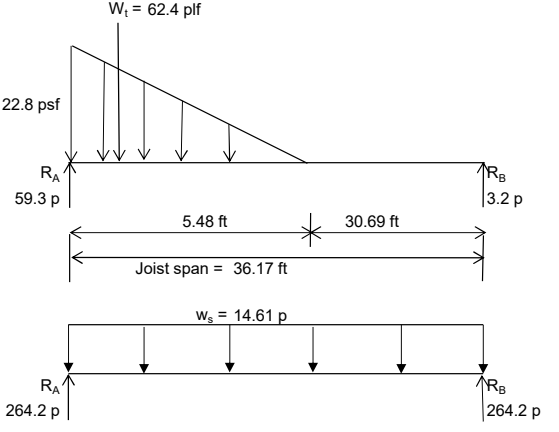
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	13.99 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.23 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	1.37 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	1.37 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	16.58	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	5.48 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	36.17 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	5.48 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	22.76 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	36.76 psf	$p_{(total)}$ = pf(use)+pd

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_l =	4.25 ft
Maximum moment, M_{max} =	99.39 pft
ent uniform load due to drift, w_e =	0.61 psf
Total snow load on joist, w_s =	14.61 psf

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

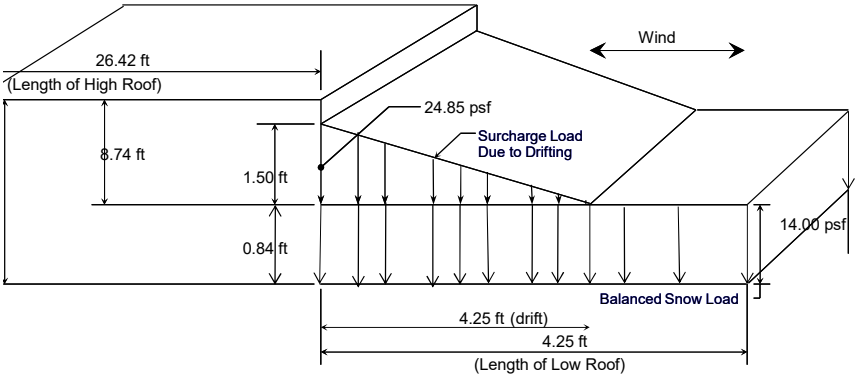
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	26.42 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	4.25 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	9.58 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

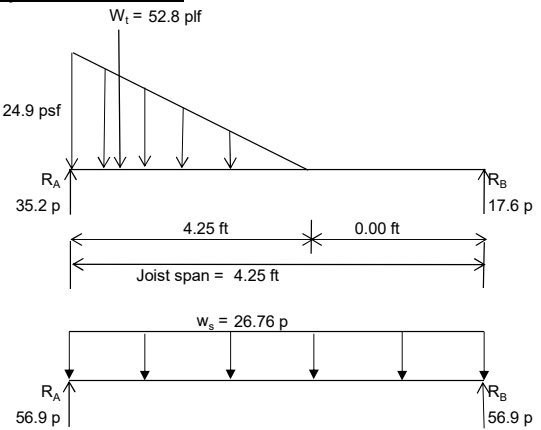
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	8.74 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.50 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	0.92 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	1.50 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	10.36	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	5.99 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	4.25 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	4.25 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	24.85 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	38.85 psf	$p_{(total)}$ = pf(use)+pd

Job No.:	19-028		
Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_i =	1.80 ft
Maximum moment, M_{max} =	28.80 pft
ent uniform load due to drift, w_e =	12.76 psf
Total snow load on joist, w_s =	26.76 psf

PSM Engineers
2200 6th Ave., #601, Seattle, WA 98121

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

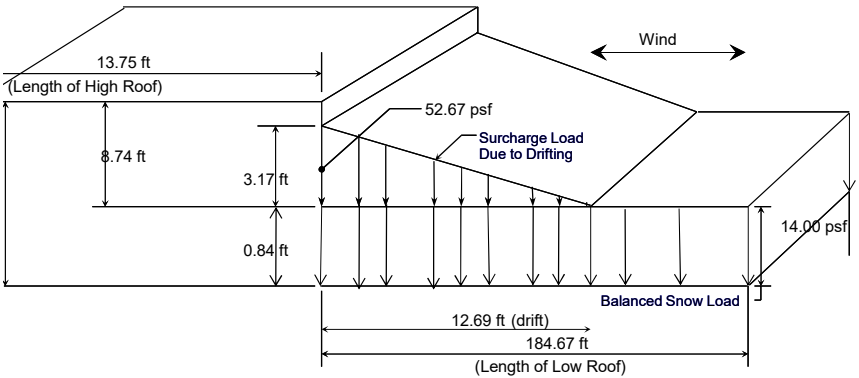
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	13.75 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	184.67 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	9.58 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

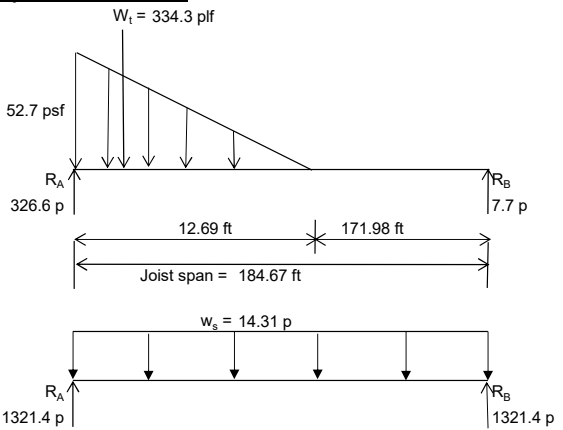
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	8.74 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.23 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	3.17 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	3.17 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	10.36	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	12.69 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	69.89 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	12.69 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	52.67 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	66.67 psf	$p_{(total)}$ = pf(use)+pd

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_i =	10.77 ft
Maximum moment, M_{max} =	1326.85 pft
ent uniform load due to drift, w_e =	0.31 psf
Total snow load on joist, w_s =	14.31 psf

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

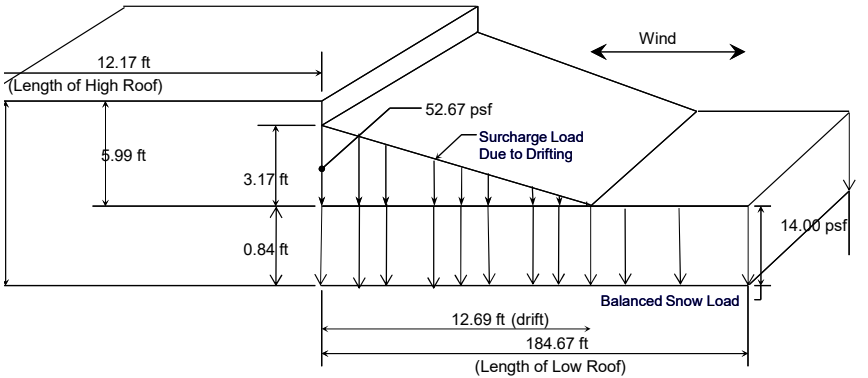
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	12.17 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	184.67 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	6.83 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

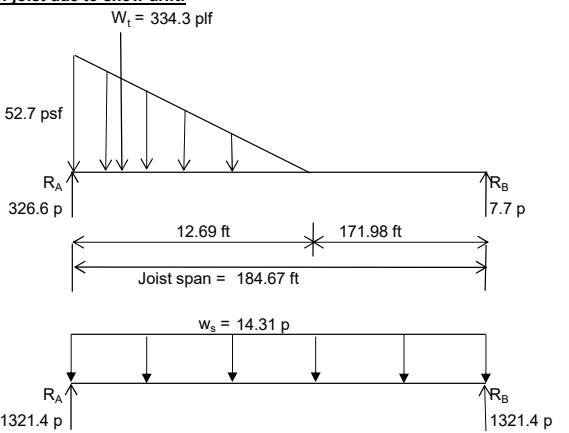
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	5.99 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.23 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	3.17 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	3.17 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	7.10	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	12.69 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	47.89 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	12.69 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	52.67 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	66.67 psf	$p_{(total)}$ = pf(use)+pd

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_i =	10.77 ft
Maximum moment, M_{max} =	1326.85 pft
ent uniform load due to drift, w_e =	0.31 psf
Total snow load on joist, w_s =	14.31 psf

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

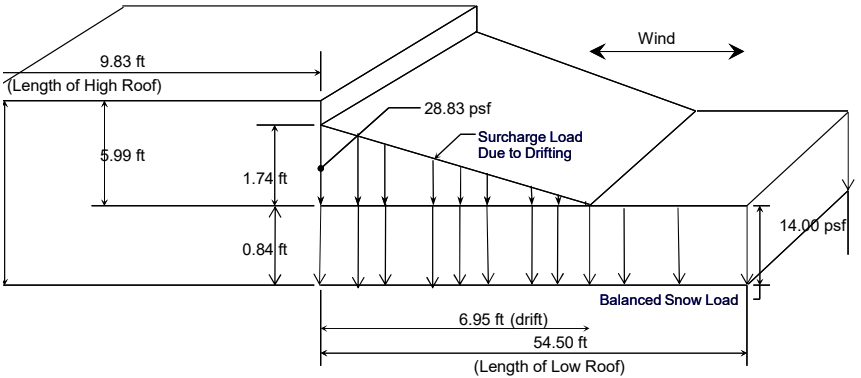
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	9.83 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	54.50 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	6.83 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

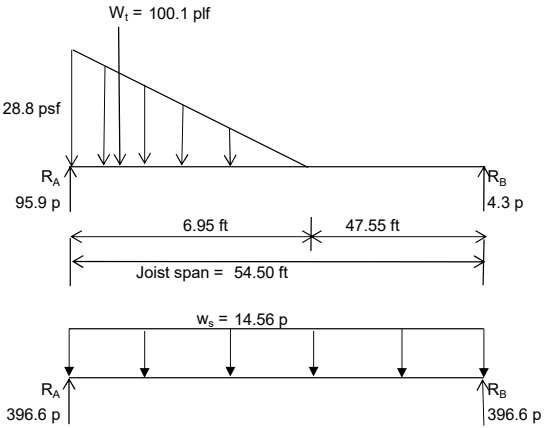
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	5.99 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.23 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	1.74 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	1.74 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	7.10	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	6.95 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	47.89 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	6.95 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	28.83 psf	p_d =hd*g (maximum value)
*Total Snow Load, $p_{(total)}$ =	42.83 psf	$p_{(total)}$ = pf(use)+pd

	Job No.:	19-028		
	Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

Equivalent uniform load on low roof joist due to snow drift:



Location of max. moment, L_i =	5.51 ft
Maximum moment, M_{max} =	206.35 pft
ent uniform load due to drift, w_e =	0.56 psf
Total snow load on joist, w_s =	14.56 psf

Job:		Job No.:	19-028		
Subject:		Date:	9/15/2020	By:	M.K.

Per ASCE 7-10-Code for Buildings with Flat or Low Slope Roofs (<= 5 deg. or 1 in./ft.)
for Balanced Snow, Drift, and Rain-on-Snow Surcharge Loadings

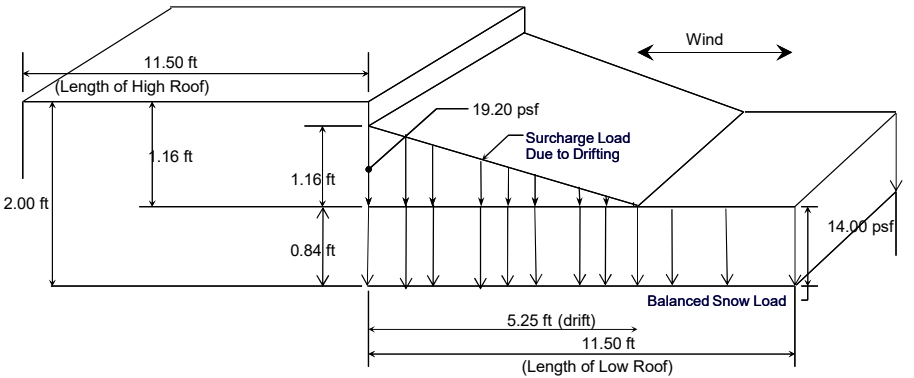
Input Data:

Building Risk Category =	II	Table 1.5-1, page 2
Ground Snow Load, p_g =	20.00 psf	Figure 7-1, page 32 and Table 7-1, page 30,(Verify w/ local juridiction)
Roof Snow P_{fj}=	14.00 psf	As per local juridiction
Length of High Roof, L_u =	11.50 ft	Length of Roof Upwind of the Snow Drift
Length of Low Roof, L_L =	11.50 ft	Length of Roof Downwind of the Snow Drift
Obstruction Height, h_o =	2.00 ft	High Roof - Low Roof Elevations
Exposure Factor, C_e =	1	Table 7-2, page 30
Thermal Factor, C_t =	1	Table 7-3, page 30

Results:

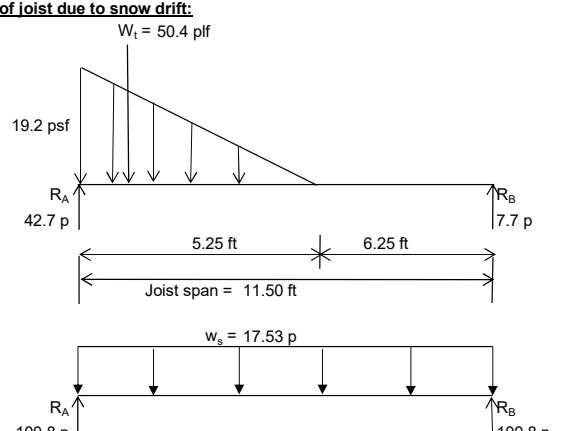
Importance Factor, I_s =	1.00	Table 1.5-2, page 5
Snow Density, g =	16.60 pcf	g = 0.13*pg+14 <= 30 (Eqn. 7.7-1, page 33)
Flat Roof Snow Load, p_f =	14.00 psf	p_f = 0.7*Ce*Ct*I_s*pg (Eqn. 7.3-1, page 29)
$p_{f(use)}$ =	14.00 psf	$p_{f(use)}$ = maximum of: pf or pfj
Balanced Snow Load Ht., h_b =	0.84 ft	h_b = pf(use)/g (Section 7.1, page 29)
Clear Height, h_c =	1.16 ft	h_c = ho-hb >= 0 (Section 7.1, page 29)
Leeward Drift Height, h_{dL} =	1.23 ft	h_{dL} = 0.43*Lu^1/3*(pg+10)^1/4-1.5, with Lu>=20' (Figure 7-9)
Windward Drift Height, h_{dw} =	0.92 ft	h_{dw} = 0.75*(0.43*LL^1/3*(pg+10)^1/4-1.5), with LL>=20'
Design Drift Height, h_d =	1.16 ft	h_d = minimum of: (maximum of: (hdL or hdw)) or hc
Ratio, h_c/h_b =	1.37	If hc/hb >= 0.2 , then snow drifts are required to be applied
Drift Length, w =	5.25 ft	If hd <= hc: w = 4*hd , if hd> hc: w = 4*hd^2/hc (Sect. 7.7.1)
Drift Length, $w_{(max)}$ =	9.25 ft	$w_{(max)}$ = minimum of: 8*hc or LL
Drift Length, $w_{(use)}$ =	5.25 ft	$w_{(use)}$ = minimum of: w or w(max)
Wt. of Drift at High End, p_d =	19.20 psf	p_d =hd*g (Maximum value)
*Total Snow Load, $p_{(total)}$ =	33.20 psf	$p_{(total)}$ = pf(use)+pd

Job:		Job No.:	19-028		
Subject:		Date:	9/15/2020	By:	M.K.



Configuration of Snow Drift on Lower Roof

➡ **Equivalent uniform load on low roof joist due to snow drift:**



Location of max. moment, L_l =	3.20 ft
Maximum moment, M_{max} =	58.34 pft
Equivalent uniform load due to drift, w_e =	3.53 psf
Total snow load on joist, w_s =	17.53 psf

CONCRETE GRAVITY

FOUNDATIONS

Foundation Design Criteria

Code

ACI 318-14

Materials

Concrete f'c = 4,000 psi, Typical
Concrete f'c = 5,000 psi, Mats
Reinforcing Steel fy = 60,000 psi

Analysis

The foundation support was designed in accordance with the recommendations and values within the geotechnical report labelled "Multi-Family Development Mercer Island, Washington" dated November 3, 2020, Project 19413-00, and prepared by Hart Crowser.

Footing sizes were determined using service loads and reinforcing was designed using ultimate loads in accordance with ACI 318-14 and the allowable soil bearing values in the geotechnical report. Calculations were performed using Excel spreadsheets, one to track vertical gravity loads and another to determine footing size for allowable bearing pressures and reinforcing requirements in accordance with ACI 318-14.

COLUMN SPREAD FOOTING DESIGN:

PROJECT Hycroft Mercer Island
DATE: 11-13-20
ENGINEER: KR

ASSUPTIONS:

1. Footings are designed for maximum bearing pressure using global load factor.
2. Pedestal base width is assumed for each footing. Footing calculations are based on this pedestal width.
3. Distance d equals footing depth - 4 inches.
4. Factored one-way shear is determined at a distance d from face of pedestal.
5. Nominal one-way shear strength of concrete is determined using ACI 318-14, Sect. 22.5.
6. Factored two-way shear is determined at a distance d/2 from face of pedestal.
7. Nominal two-way shear strength of concrete is determined using ACI 318-14, Sect. 22.6.
8. Factored moment is determined at face of pedestal.
9. Nominal flexural strength of footing is determined according to ACI 318-14, Sect. 14.4.3.
10. 5% under for footing flexural strength is considered adequate since load factor is conservative and footing will never see full design load.
11. All footing reinforcing shall be developed at pedestal. Therefore end 180 degree hooks not required.

INPUT		
Fy	60	ksi
F'c	4	ksi
Allowable Bearing	3000	psf
Load Factor	1.4	

COLUMN FOOTING SIZE					SECT. PROP.				DESIGN	ONE-WAY SHEAR		TWO-WAY SHEAR		FLEXURE						ALLOW.
FTG MARK	LENGTH (ft)	WIDTH (ft)	THICK (in)	FTG WT (kips)	Pedestal Width (in)	d (in)	b (in)	bo (in)	LOAD Wu (psf)	Vu (kips)	0.75Vc (kips)	Vu (kips)	0.75Vc (kips)	Mu (k-ft)	BARS	As (in^2)	0.9Mn (k-ft)	As(min) (in^2)	COMMENTS	LOAD (kips)
F6	6.0	6.0	16.0	7.2	16.0	12.0	72.0	112.0	4200	33.6	82.0	128.3	255.0	68.6	(6) #6	2.64	138.7	2.07		100.8
F8	8.0	8.0	18.0	14.4	16.0	14.0	96.0	120.0	4200	72.8	127.5	242.6	318.8	186.7	(8) #7	4.48	273.9	3.11		177.6
F9	9.0	9.0	20.0	20.3	16.0	16.0	108.0	128.0	4200	94.5	163.9	310.3	388.6	277.7	(8) #8	6.32	440.4	3.89		222.75
F10	10.0	10.0	22.0	27.5	16.0	18.0	120.0	136.0	4200	119.0	204.9	386.3	464.5	394.3	(10) #8	7.90	619.2	4.75		272.5
F11	11.0	11.0	24.0	36.3	16.0	20.0	132.0	144.0	4200	146.3	250.5	470.4	546.4	539.6	(10) #9	10.00	869.9	5.70		326.7
F12	12.0	12.0	26.0	46.8	16.0	22.0	144.0	152.0	4200	176.4	300.5	562.7	634.5	716.8	(12) #9	12.00	1148.3	6.74		385.2
F13	13.0	13.0	28.0	59.2	16.0	24.0	156.0	160.0	4200	209.3	355.2	663.1	728.6	929.0	(12) #10	15.24	1586.8	7.86		447.85
F14	14.0	14.0	30.0	73.5	16.0	26.0	168.0	168.0	4200	245.0	414.4	771.8	828.8	1179.3	(14) #10	17.78	2005.5	9.07		514.5
F15	15.0	15.0	32.0	90.0	16.0	28.0	180.0	176.0	4200	283.5	478.1	888.5	935.0	1470.9	(12) #11	18.72	2281.4	10.37		585
F16	16.0	16.0	36.0	115.2	16.0	32.0	192.0	192.0	4200	313.6	582.9	1008.0	1165.7	1806.9	(14) #11	21.84	3046.3	12.44		652.8
F18	18.0	18.0	40.0	162.0	18.0	36.0	216.0	216.0	4200	396.9	737.7	1275.8	1475.4	2572.8	(16) #11	24.96	3929.0	15.55		810

Basement Wall Design Criteria

Code

ACI 318-14

Materials

Concrete f'c = 5,000 psi at 28 days
Reinforcing Steel fy = 60,000 psi

Analysis

The basement walls were designed to resist the horizontal loads applied via the soil as provided in the geotechnical report labelled "Multi-Family Development Mercer Island, Washington" dated November 3, 2020, Project 19413-00, and prepared by Hart Crowser and vertical loads due to the self weight of the building, superimposed dead loads and live loads (including any appropriate surcharge).

Calculations were performed using the computer software analysis program Enercalc & RetainPRo.

BASEMENT WALLS

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: Mercer Island P-1 Basement Wall
Engineer: KAR/AK
Project ID: 19028
Project Descr:

Printed: 13 NOV 2020, 2:23PM
File: 19028 P-2 Basement Wall.ec6

Concrete Beam

Lic. # : KW-06002327 PCS STRUCTURAL SOLUTIONS

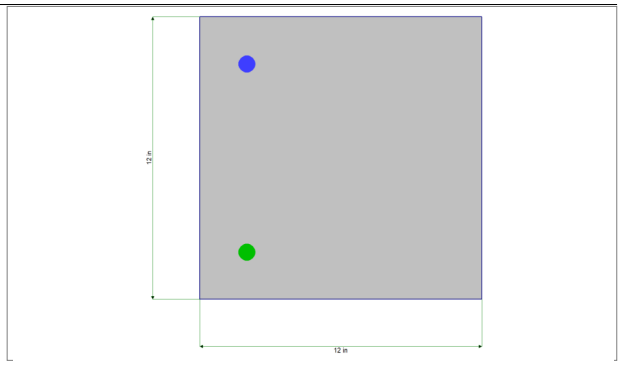
DESCRIPTION: P-1 Basement Wall (#6@12"O.C.)

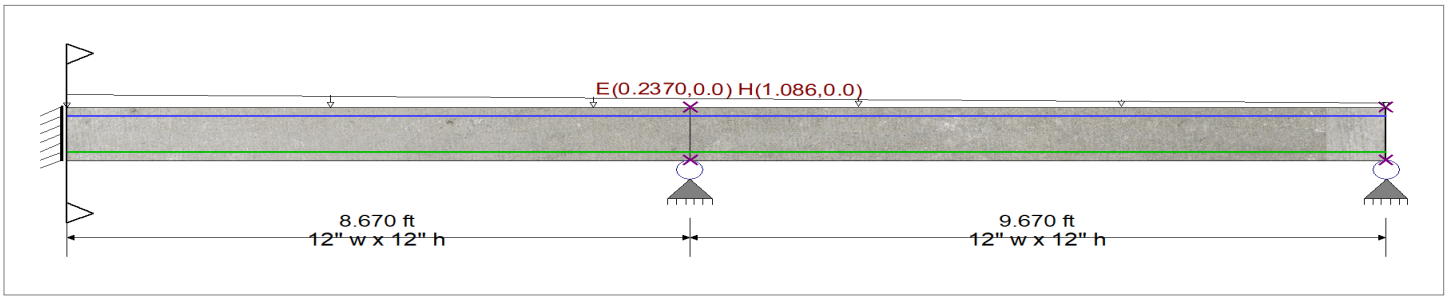
CODE REFERENCES

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

f'c	=	6.0 ksi	ϕ Phi Values	Flexure :	0.90
fr = f'c $^{1/2}$ * 7.50	=	580.95 psi		Shear :	0.750
Ψ Density	=	145.0 pcf	β_1	=	0.750
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups		40.0 ksi
fy - Main Rebar	=	60.0 ksi	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #		3
			Number of Resisting Legs Per Stirrup =		2





Cross Section & Reinforcing Details

Rectangular Section, Width = 12.0 in, Height = 12.0 in
Span #1 Reinforcing....
1-#6 at 2.0 in from Top, from 0.0 to 8.670 ft in this span
1-#6 at 2.0 in from Bottom, from 0.0 to 8.670 ft in this span
Span #2 Reinforcing....
1-#6 at 2.0 in from Top, from 0.0 to 9.670 ft in this span
1-#6 at 2.0 in from Bottom, from 0.0 to 9.670 ft in this span

Beam self weight calculated and added to loads
Loads on all spans...
Varying Uniform Load : E= 0.2370->0.0, H= 1.086->0.0 k/ft, Extent = 0.0 -->> 19.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	**0.519** : 1		Maximum Deflection			
Section used for this span	**Typical Section**		Max Downward Transient Deflection	0.004 in	Ratio =	23952 >=360
Mu : Applied	-11.434	k-ft	Max Upward Transient Deflection	0.000 in	Ratio =	0 <360.0
Mn * Phi : Allowable	22.052	k-ft	Max Downward Total Deflection	0.007 in	Ratio =	15719 >=180
Location of maximum on span	0.000	ft	Max Upward Total Deflection	0.000 in	Ratio =	0 <180.0
Span # where maximum occurs	Span # 1					

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
Overall MAXimum	5.194	7.949	1.408
Overall MINimum	0.547	1.252	0.166
+D+H	4.717	7.291	1.321
+D+L+H, LL Comb Run (*L)	4.717	7.291	1.321
+D+L+H, LL Comb Run (L*)	4.717	7.291	1.321
+D+L+H, LL Comb Run (LL)	4.717	7.291	1.321
+D+Lr+H, LL Comb Run (*L)	4.717	7.291	1.321
+D+Lr+H, LL Comb Run (L*)	4.717	7.291	1.321
+D+Lr+H, LL Comb Run (LL)	4.717	7.291	1.321
+D+S+H	4.717	7.291	1.321
+D+0.750Lr+0.750L+H, LL Comb Run (	4.717	7.291	1.321

Concrete Beam

DESCRIPTION: P-1 Basement Wall (#6@12"O.C.)

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
+D+0.750Lr+0.750L+H, LL Comb Run (	4.717	7.291	1.321
+D+0.750Lr+0.750L+H, LL Comb Run (	4.717	7.291	1.321
+D+0.750L+0.750S+H, LL Comb Run (*	4.717	7.291	1.321
+D+0.750L+0.750S+H, LL Comb Run (L	4.717	7.291	1.321
+D+0.750L+0.750S+H, LL Comb Run (L	4.717	7.291	1.321
+D+0.60W+H	4.717	7.291	1.321
+D+0.750Lr+0.750L+0.450W+H, LL Com	4.717	7.291	1.321
+D+0.750Lr+0.750L+0.450W+H, LL Com	4.717	7.291	1.321
+D+0.750Lr+0.750L+0.450W+H, LL Com	4.717	7.291	1.321
+D+0.750L+0.750S+0.450W+H, LL Comb	4.717	7.291	1.321
+D+0.750L+0.750S+0.450W+H, LL Comb	4.717	7.291	1.321
+D+0.750L+0.750S+0.450W+H, LL Comb	4.717	7.291	1.321
+0.60D+0.60W+0.60H	2.830	4.375	0.793
+D+0.70E+0.60H	3.686	5.873	1.132
+D+0.750L+0.750S+0.5250E+H, LL Com	5.194	7.949	1.408
+D+0.750L+0.750S+0.5250E+H, LL Com	5.194	7.949	1.408
+D+0.750L+0.750S+0.5250E+H, LL Com	5.194	7.949	1.408
+0.60D+0.70E+H	5.135	7.546	1.214
D Only	0.547	1.554	0.559
E Only	0.910	1.252	0.166
H Only	4.170	5.738	0.762

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	0.00	10.00	8.24	8.24	11.43	0.60	13.74	PhiVc/2 < Vu <=	Min 9.6.3.1	26.9	5.0	5.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	0.21	10.00	7.78	7.78	9.73	0.67	13.80	PhiVc/2 < Vu <=	Min 9.6.3.1	27.0	5.0	5.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	0.42	10.00	7.33	7.33	8.13	0.75	13.87	PhiVc/2 < Vu <=	Min 9.6.3.1	27.1	5.0	5.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	0.64	10.00	6.89	6.89	6.62	0.87	13.96	Vu < PhiVc/2	lot Reqd 9.6.	14.0	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	0.85	10.00	6.45	6.45	5.20	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	1.06	10.00	6.01	6.01	3.88	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	1.27	10.00	5.58	5.58	2.65	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	1.49	10.00	5.15	5.15	1.51	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	1.70	10.00	4.73	4.73	0.46	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	1.91	10.00	4.31	4.31	0.50	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	2.12	10.00	3.90	3.90	1.37	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	2.34	10.00	3.49	3.49	2.16	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	2.55	10.00	3.09	3.09	2.86	0.90	13.99	Vu < PhiVc/2	lot Reqd 9.6.	14.0	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	2.76	10.00	2.69	2.69	3.47	0.65	13.78	Vu < PhiVc/2	lot Reqd 9.6.	13.8	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	2.97	10.00	2.29	2.29	4.00	0.48	13.64	Vu < PhiVc/2	lot Reqd 9.6.	13.6	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	3.18	10.00	1.90	1.90	4.44	0.36	13.54	Vu < PhiVc/2	lot Reqd 9.6.	13.5	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	3.40	10.00	1.52	1.52	4.81	0.26	13.46	Vu < PhiVc/2	lot Reqd 9.6.	13.5	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	3.61	10.00	1.13	1.13	5.09	0.19	13.40	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	3.82	10.00	0.76	0.76	5.29	0.12	13.34	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	4.03	10.00	0.38	0.38	5.41	0.06	13.29	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+0.90D+W+1.60H	1	4.25	10.00	0.02	0.02	4.74	0.00	13.25	Vu < PhiVc/2	lot Reqd 9.6.	13.2	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	4.46	10.00	-0.35	0.35	5.42	0.05	13.29	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	4.67	10.00	-0.71	0.71	5.30	0.11	13.34	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	4.88	10.00	-1.06	1.06	5.12	0.17	13.39	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	5.10	10.00	-1.41	1.41	4.85	0.24	13.45	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	5.31	10.00	-1.76	1.76	4.52	0.32	13.51	Vu < PhiVc/2	lot Reqd 9.6.	13.5	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	5.52	10.00	-2.10	2.10	4.11	0.43	13.60	Vu < PhiVc/2	lot Reqd 9.6.	13.6	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	5.73	10.00	-2.44	2.44	3.62	0.56	13.71	Vu < PhiVc/2	lot Reqd 9.6.	13.7	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	5.95	10.00	-2.77	2.77	3.07	0.75	13.87	Vu < PhiVc/2	lot Reqd 9.6.	13.9	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	6.16	10.00	-3.10	3.10	2.45	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	6.37	10.00	-3.42	3.42	1.76	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	6.58	10.00	-3.74	3.74	1.00	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0

Concrete Beam

DESCRIPTION: P-1 Basement Wall (#6@12"O.C.)

Detailed Shear Information

Load Combination	Span Number	Distance (ft)	'd' (in)	Vu (k) Actual	Vu (k) Design	Mu (k-ft)	d*Vu/Mu	Phi*Vc (k)	Comment	Phi*Vs (k)	Phi*Vn (k)	Spacing (in) Req'd	Spacing (in) Suggest
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	6.79	10.00	-4.05	4.05	0.17	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	7.01	10.00	-4.36	4.36	0.72	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	7.22	10.00	-4.67	4.67	1.68	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	7.43	10.00	-4.97	4.97	2.71	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	7.64	10.00	-5.26	5.26	3.79	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	7.86	10.00	-5.56	5.56	4.94	0.94	14.02	Vu < PhiVc/2	lot Reqd 9.6.	14.0	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	8.07	10.00	-5.84	5.84	6.15	0.79	13.90	Vu < PhiVc/2	lot Reqd 9.6.	13.9	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	8.28	10.00	-6.13	6.13	7.42	0.69	13.81	Vu < PhiVc/2	lot Reqd 9.6.	13.8	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	1	8.49	10.00	-6.40	6.40	8.75	0.61	13.75	Vu < PhiVc/2	lot Reqd 9.6.	13.7	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	8.71	10.00	5.61	5.61	9.68	0.48	13.64	Vu < PhiVc/2	lot Reqd 9.6.	13.6	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	8.95	10.00	5.31	5.31	8.39	0.53	13.68	Vu < PhiVc/2	lot Reqd 9.6.	13.7	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	9.18	10.00	5.02	5.02	7.17	0.58	13.73	Vu < PhiVc/2	lot Reqd 9.6.	13.7	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	9.42	10.00	4.73	4.73	6.01	0.66	13.79	Vu < PhiVc/2	lot Reqd 9.6.	13.8	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	9.66	10.00	4.45	4.45	4.93	0.75	13.87	Vu < PhiVc/2	lot Reqd 9.6.	13.9	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	9.89	10.00	4.17	4.17	3.91	0.89	13.98	Vu < PhiVc/2	lot Reqd 9.6.	14.0	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	10.13	10.00	3.90	3.90	2.95	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	10.37	10.00	3.63	3.63	2.06	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	10.60	10.00	3.37	3.37	1.23	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	10.84	10.00	3.12	3.12	0.46	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	11.08	10.00	2.87	2.87	0.25	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	11.31	10.00	2.62	2.62	0.90	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	11.55	10.00	2.39	2.39	1.49	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	11.79	10.00	2.15	2.15	2.03	0.88	13.98	Vu < PhiVc/2	lot Reqd 9.6.	14.0	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	12.02	10.00	1.93	1.93	2.51	0.64	13.77	Vu < PhiVc/2	lot Reqd 9.6.	13.8	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	12.26	10.00	1.70	1.70	2.94	0.48	13.64	Vu < PhiVc/2	lot Reqd 9.6.	13.6	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	12.50	10.00	1.49	1.49	3.32	0.37	13.55	Vu < PhiVc/2	lot Reqd 9.6.	13.6	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	12.74	10.00	1.28	1.28	3.65	0.29	13.49	Vu < PhiVc/2	lot Reqd 9.6.	13.5	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	12.97	10.00	1.07	1.07	3.92	0.23	13.43	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	13.21	10.00	0.88	0.88	4.16	0.18	13.39	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	13.45	10.00	0.68	0.68	4.34	0.13	13.35	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	13.68	10.00	0.49	0.49	4.48	0.09	13.32	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	13.92	10.00	0.31	0.31	4.57	0.06	13.29	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.40D+1.60H	2	14.16	10.00	0.14	0.14	4.44	0.03	13.27	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	14.39	10.00	-0.03	0.03	4.64	0.01	13.25	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	14.63	10.00	-0.20	0.20	4.61	0.04	13.28	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	14.87	10.00	-0.36	0.36	4.55	0.07	13.30	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	15.10	10.00	-0.51	0.51	4.44	0.10	13.33	Vu < PhiVc/2	lot Reqd 9.6.	13.3	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	15.34	10.00	-0.66	0.66	4.30	0.13	13.35	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	15.58	10.00	-0.80	0.80	4.13	0.16	13.38	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	15.81	10.00	-0.94	0.94	3.92	0.20	13.41	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	16.05	10.00	-1.07	1.07	3.68	0.24	13.45	Vu < PhiVc/2	lot Reqd 9.6.	13.4	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	16.29	10.00	-1.20	1.20	3.41	0.29	13.49	Vu < PhiVc/2	lot Reqd 9.6.	13.5	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	16.52	10.00	-1.32	1.32	3.12	0.35	13.54	Vu < PhiVc/2	lot Reqd 9.6.	13.5	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	16.76	10.00	-1.43	1.43	2.79	0.43	13.60	Vu < PhiVc/2	lot Reqd 9.6.	13.6	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	17.00	10.00	-1.54	1.54	2.44	0.53	13.68	Vu < PhiVc/2	lot Reqd 9.6.	13.7	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	17.23	10.00	-1.65	1.65	2.06	0.67	13.80	Vu < PhiVc/2	lot Reqd 9.6.	13.8	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	17.47	10.00	-1.75	1.75	1.66	0.88	13.97	Vu < PhiVc/2	lot Reqd 9.6.	14.0	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	17.71	10.00	-1.84	1.84	1.23	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	17.95	10.00	-1.92	1.92	0.79	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0
+1.20D+L+0.20S+E+1.60H, LL Comb Ru	2	18.18	10.00	-2.01	2.01	0.32	1.00	14.07	Vu < PhiVc/2	lot Reqd 9.6.	14.1	0.0	0.0

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
MAXimum BENDING Envelope					

Concrete Beam

DESCRIPTION: P-1 Basement Wall (#6@12"O.C.)

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	8.670	-11.43	22.05	0.52
Span # 2	2	9.670	-9.91	22.05	0.45
+1.40D+1.60H					
Span # 1	1	8.670	-10.29	22.05	0.47
Span # 2	2	9.670	-9.19	22.05	0.42
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (*L)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (L*)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+0.50Lr+1.60L+1.60H, LL Comb Run (LL)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (*L)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (L*)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60L+0.50S+1.60H, LL Comb Run (LL)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60Lr+L+1.60H, LL Comb Run (*L)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60Lr+L+1.60H, LL Comb Run (L*)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60Lr+L+1.60H, LL Comb Run (LL)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (*L)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (L*)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60Lr+0.50W+1.60H, LL Comb Run (LL)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+L+1.60S+1.60H, LL Comb Run (*L)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+L+1.60S+1.60H, LL Comb Run (L*)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+L+1.60S+1.60H, LL Comb Run (LL)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+1.60S+0.50W+1.60H					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (*L)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (L*)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+0.50Lr+L+W+1.60H, LL Comb Run (LL)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+L+0.50S+W+1.60H, LL Comb Run (*L)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+L+0.50S+W+1.60H, LL Comb Run (L*)					
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+1.20D+L+0.50S+W+1.60H, LL Comb Run (LL)					

Concrete Beam

DESCRIPTION: P-1 Basement Wall (#6@12"O.C.)

Load Combination / Segment	Span #	Location (ft) along Beam	Bending Stress Results (k-ft) Mu : Max	Phi*Mnx	Stress Ratio
Span # 1	1	8.670	-10.16	22.05	0.46
Span # 2	2	9.670	-8.92	22.05	0.40
+0.90D+W+1.60H					
Span # 1	1	8.670	-9.96	22.05	0.45
Span # 2	2	9.670	-8.50	22.05	0.39
+1.20D+L+0.20S+E+1.60H, LL Comb Run (*L)					
Span # 1	1	8.670	-11.43	22.05	0.52
Span # 2	2	9.670	-9.91	22.05	0.45
+1.20D+L+0.20S+E+1.60H, LL Comb Run (L*)					
Span # 1	1	8.670	-11.43	22.05	0.52
Span # 2	2	9.670	-9.91	22.05	0.45
+1.20D+L+0.20S+E+1.60H, LL Comb Run (LL)					
Span # 1	1	8.670	-11.43	22.05	0.52
Span # 2	2	9.670	-9.91	22.05	0.45
+0.90D+E+0.90H					
Span # 1	1	8.670	-7.14	22.05	0.32
Span # 2	2	9.670	-6.32	22.05	0.29

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl (in)	Location in Span (ft)	Load Combination	Max. "+" Defl (in)	Location in Span (ft)
+0.60D+0.70E+H	1	0.0052	4.335		0.0000	0.000
+D+0.750L+0.750S+0.5250E+H, LL C	2	0.0074	5.388		0.0000	0.000

Wall Footing

DESCRIPTION: Basement Wall Footing (Northside Wall)

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-16

General Information

Material Properties

f'c : Concrete 28 day strength	=	5.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,605.0 ksi
Concrete Density	=	150.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL	:	Yes

Soil Design Values

Allowable Soil Bearing	=	3.0 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	300.0 pcf
Soil/Concrete Friction Coeff.	=	0.350

Increases based on footing Depth

Reference Depth below Surface	=	1.50 ft
Allow. Pressure Increase per foot of depth	=	0.60 ksf
when base footing is below	=	1.50 ft

Increases based on footing Width

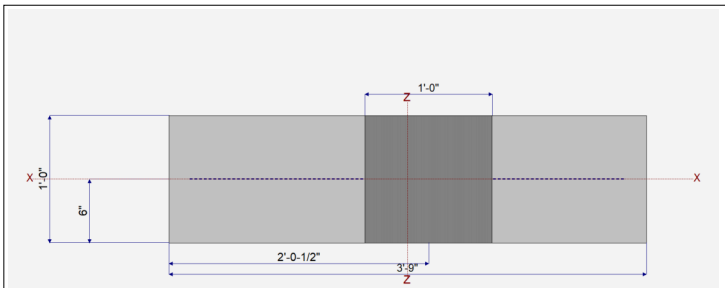
Allow. Pressure Increase per foot of width	=	0.20 ksf
when footing is wider than	=	1.0 ft

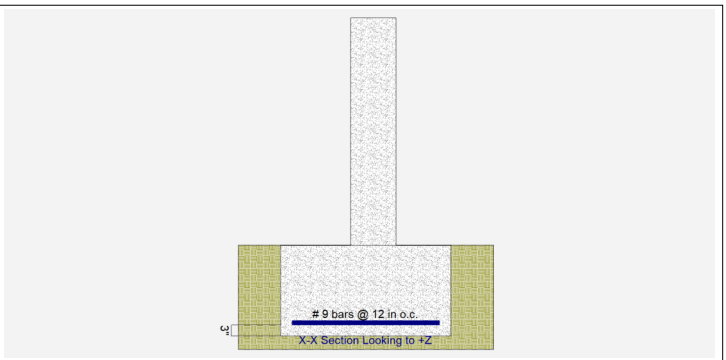
Adjusted Allowable Bearing Pressure = 0.0 ksf

Dimensions

Footing Width	=	3.750 ft	Footing Thickness	=	24.0 in	Bars along X-X Axis	
Wall Thickness	=	12.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset from center of footing	=	2 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 9

Reinforcing





Applied Loads

		D	Lr	L	S	W	E	H	
P : Column Load	=								k
OB : Overburden	=								ksf
V-x	=						0.90	0.470	k
M-zz	=								k-ft

Vx applied = 0.50 in above top of footing

Wall Footing

DESCRIPTION: Basement Wall Footing (Northside Wall)

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.0	Soil Bearing	0.0 ksf	0.0 ksf	0.0
PASS	0.0	Z Flexure (+X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	0.0	Z Flexure (-X)	0.0 k-ft	0.0 k-ft	No Moment
PASS	n/a	1-way Shear (+X)	0.0 psi	0.0 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	9.67 ft
Wall height above soil	=	0.00 ft
Total Wall Height	=	9.67 ft
Top Support Height	=	9.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in

Soil Data

Allow Soil Bearing	=	3,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	55.0 psf/ft
	=	
Passive Pressure	=	300.0 psf/ft
Soil Density	=	110.00 pcf
Footing||Soil Frictior	=	0.350
Soil height to ignore for passive pressure	=	12.00 in

Thumbnail

Surcharge Loads

Surcharge Over Heel = 0.0 psf
>>>Used To Resist Sliding & Overturning
Surcharge Over Toe = 125.0 psf
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	425.0 lbs
Axial Live Load	=	665.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	112.0 #/ft
...Height to Top	=	9.67 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Service Level)
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

K_h Soil Density Multiplier = 0.020 g Added seismic per unit area = 14.9 psf

Design Summary

Total Bearing Load	=	3,401	lbs
...resultant ecc.	=	7.88	in
Soil Pressure @ Toe	=	0 psf	OK
Soil Pressure @ Heel	=	2,689 psf	OK
Allowable	=	3,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	0 psf	
ACI Factored @ Heel	=	3,437 psf	
Footing Shear @ Toe	=	1.7 psi	OK
Footing Shear @ Heel	=	1.6 psi	OK
Allowable	=	94.9 psi	
Reaction at Top	=	1,306.7	lbs
Reaction at Bottom	=	3,025.2	lbs

Sliding Calcs
Lateral Sliding Force = 3,025.2 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Concrete Stem Construction

Thickness = 10.00 in Fy = 60,000 psi
Wall Weight = 125.0 psf f'c = 5,000 psi
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	9.67 ft	4.27 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	12.00 in	12.00 in	12.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	7.50 in	8.00 in	7.50 in
Design Data				
fb/FB + fa/Fa	=	0.000	0.607	0.000
Mu....Actual	=	0.0 ft-#	6,615.2 ft-#	0.0 ft-#
Mn * Phi.....Allowable	=	10,207.4 ft-#	10,904.9 ft-#	10,207.4 ft-#
Shear Force @ this height	=	2,020.4 lbs		3,387.5 lbs
Shear.....Actual	=	22.45 psi		37.64 psi
Shear.....Allowable	=	106.07 psi		106.07 psi

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

Top Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0 in2/ft		
(4/3) * As :	0 in2/ft	Min Stem T&S Reinf Area 2.321 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(7.5)/60000 :	0.3182 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.216 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.31 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.9125 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Mmax Between Ends	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1909 in2/ft		
(4/3) * As :	0.2546 in2/ft	Min Stem T&S Reinf Area 1.296 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(8)/60000 :	0.3394 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2546 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.31 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	2.04 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Base Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0 in2/ft		
(4/3) * As :	0 in2/ft	Min Stem T&S Reinf Area 1.025 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(7.5)/60000 :	0.3182 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.216 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.31 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.9125 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Footing Strengths & Dimensions

Toe Width	=	2.00 ft
Heel Width	=	1.00
Total Footing Width	=	3.00
Footing Thickness	=	18.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	0	3,437	psf
Mu' : Upward	=	811	47	ft-#
Mu' : Downward	=	940	21	ft-#
Mu: Design	=	-129	-25	ft-#
Actual 1-Way Shear	=	1.73	1.59	psi
Allow 1-Way Shear	=	94.87	94.87	psi

Other Acceptable Sizes & Spacings:

Toe: # 6 @ 16.00 in	-or-	Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: # 6 @ 16.00 in	-or-	Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined	-or-	No key defined

Min footing T&S reinf Area 1.17 in2
Min footing T&S reinf Area per foot 0.39 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Summary of Forces on Footing : Slab RESISTS sliding, stem is PINNED at footing

Forces acting on footing soil pressure

(taking moments about front of footing to find eccentricity)

Surcharge Over Heel	=	lbs	ft		ft-#
Axial Dead Load on Stem	=	1,090.0	lbs	2.42 ft	2,634.2	ft-#
Soil Over Toe	=	lbs	ft		ft-#
Adjacent Footing Load	=	lbs	ft		ft-#
Surcharge Over Toe	=	250.0	lbs	1.00 ft	250.0	ft-#
Stem Weight	=	1,208.8	lbs	2.42 ft	2,921.1	ft-#
Soil Over Heel	=	177.3	lbs	2.92 ft	517.1	ft-#
Footing Weight	=	675.0	lbs	1.50 ft	1,012.5	ft-#
Total Vertical Force	=	3,401.0	lbs	Moment =	7,334.9	ft-#

Net Mom. at Stem/Ftg Interface = -2,233.3 ft-#

Allow. Mom. @ Stem/Ftg Interface = 6,379.6 ft-#

Allow. Mom. Exceeds Applied Mom.? Yes

Therefore Uniform Soil Pressure = 1,133.7 psf

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	9.67 ft
Wall height above soil	=	0.00 ft
Total Wall Height	=	9.67 ft
Top Support Height	=	9.67 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in

Soil Data

Allow Soil Bearing	=	3,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	55.0 psf/ft
	=	
Passive Pressure	=	300.0 psf/ft
Soil Density	=	110.00 pcf
Footing||Soil Frictior	=	0.350
Soil height to ignore for passive pressure	=	12.00 in

Thumbnail

Surcharge Loads

Surcharge Over Heel = 0.0 psf
>>>Used To Resist Sliding & Overturning
Surcharge Over Toe = 125.0 psf
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	145.0 lbs
Axial Live Load	=	225.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	112.0 #/ft
...Height to Top	=	9.67 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Service Level)
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

K_h Soil Density Multiplier = 0.020 g Added seismic per unit area = 14.9 psf

Design Summary

Total Bearing Load	=	2,504	lbs
...resultant ecc.	=	9.86	in
Soil Pressure @ Toe	=	0 psf	OK
Soil Pressure @ Heel	=	2,462 psf	OK
Allowable	=	3,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	0 psf	
ACI Factored @ Heel	=	3,043 psf	
Footing Shear @ Toe	=	2.1 psi	OK
Footing Shear @ Heel	=	0.0 psi	OK
Allowable	=	94.9 psi	
Reaction at Top	=	1,306.7	lbs
Reaction at Bottom	=	3,025.2	lbs

Sliding Calcs
Lateral Sliding Force = 3,025.2 lbs

Concrete Stem Construction

Thickness = 12.00 in Fy = 60,000 psi
Wall Weight = 150.0 psf f'c = 5,000 psi
Stem is FREE to rotate at top of footing

	@ Top Support	Mmax Between Top & Base	@ Base of Wall
	Stem OK	Stem OK	Stem OK
Design Height Above Ftg =	9.67 ft	4.27 ft	0.00 ft
Rebar Size =	# 7	# 7	# 7
Rebar Spacing =	12.00 in	12.00 in	12.00 in
Rebar Placed at =	Edge	Edge	Edge
Rebar Depth 'd' =	9.50 in	10.00 in	9.50 in
Design Data			
fb/FB + fa/Fa =	0.000	0.254	0.000
Mu....Actual =	0.0 ft-#	6,615.2 ft-#	0.0 ft-#
Mn * Phi.....Allowable =	24,694.2 ft-#	26,044.2 ft-#	24,694.2 ft-#
Shear Force @ this height =	2,020.4 lbs		3,387.5 lbs
Shear.....Actual =	17.72 psi		29.71 psi
Shear.....Allowable =	106.07 psi		106.07 psi

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

Top Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0 in2/ft		
(4/3) * As :	0 in2/ft	Min Stem T&S Reinf Area 2.785 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(9.5)/60000 :	0.4031 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.6 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.4225 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Mmax Between Ends	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1516 in2/ft		
(4/3) * As :	0.2021 in2/ft	Min Stem T&S Reinf Area 1.555 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(10)/60000 :	0.4243 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.6 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.55 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Base Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0 in2/ft		
(4/3) * As :	0 in2/ft	Min Stem T&S Reinf Area 1.230 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(9.5)/60000 :	0.4031 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.6 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.4225 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Footing Strengths & Dimensions

Toe Width	=	2.00 ft
Heel Width	=	1.00
Total Footing Width	=	3.00
Footing Thickness	=	18.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	0	3,043	psf
Mu' : Upward	=	276	0	ft-#
Mu' : Downward	=	940	0	ft-#
Mu: Design	=	-664	0	ft-#
Actual 1-Way Shear	=	2.14	0.00	psi
Allow 1-Way Shear	=	94.87	0.00	psi

Other Acceptable Sizes & Spacings:

Toe: # 6 @ 16.00 in	-or-	Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: # 6 @ 16.00 in	-or-	Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined	-or-	No key defined

Min footing T&S reinf Area 1.17 in2
Min footing T&S reinf Area per foot 0.39 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Summary of Forces on Footing : Slab RESISTS sliding, stem is PINNED at footing

Forces acting on footing soil pressure

(taking moments about front of footing to find eccentricity)

Surcharge Over Heel	=		lbs		ft	ft-#
Axial Dead Load on Stem	=	370.0	lbs	2.50	ft	925.0 ft-#
Soil Over Toe	=		lbs		ft	ft-#
Adjacent Footing Load	=		lbs		ft	ft-#
Surcharge Over Toe	=	250.0	lbs	1.00	ft	250.0 ft-#
Stem Weight	=	1,450.5	lbs	2.50	ft	3,626.3 ft-#
Soil Over Heel	=		lbs	3.00	ft	ft-#
Footing Weight	=	675.0	lbs	1.50	ft	1,012.5 ft-#
Total Vertical Force	=	2,503.8	lbs	Moment =		5,813.8 ft-#

Net Mom. at Stem/Ftg Interface = -2,058.1 ft-#

Allow. Mom. @ Stem/Ftg Interface = 15,433.9 ft-#

Allow. Mom. Exceeds Applied Mom.? Yes

Therefore Uniform Soil Pressure = 834.6 psf

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	8.75 ft
Wall height above soil	=	0.00 ft
Total Wall Height	=	8.75 ft
Top Support Height	=	8.75 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in

Soil Data

Allow Soil Bearing	=	3,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	55.0 psf/ft
	=	
Passive Pressure	=	300.0 psf/ft
Soil Density	=	110.00 pcf
Footing||Soil Frictior	=	0.350
Soil height to ignore for passive pressure	=	12.00 in

Thumbnail

Surcharge Loads

Surcharge Over Heel = 0.0 psf
>>>Used To Resist Sliding & Overturning
Surcharge Over Toe = 125.0 psf
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	140.0 lbs
Axial Live Load	=	225.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	112.0 #/ft
...Height to Top	=	9.67 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Service Level)
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

K_h Soil Density Multiplier = 0.020 g Added seismic per unit area = 13.5 psf

Design Summary

Total Bearing Load	=	2,741 lbs	
...resultant ecc.	=	5.89 in	
Soil Pressure @ Toe	=	16 psf	OK
Soil Pressure @ Heel	=	1,811 psf	OK
Allowable	=	3,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	20 psf	
ACI Factored @ Heel	=	2,232 psf	
Footing Shear @ Toe	=	0.7 psi	OK
Footing Shear @ Heel	=	0.0 psi	OK
Allowable	=	94.9 psi	
Reaction at Top	=	1,210.9 lbs	
Reaction at Bottom	=	2,584.1 lbs	

Sliding Calcs
Lateral Sliding Force = 2,584.1 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

Concrete Stem Construction

Thickness = 12.00 in Fy = 60,000 psi
Wall Weight = 150.0 psf f'c = 5,000 psi
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	8.75 ft	3.87 ft	0.00 ft
Rebar Size	=	# 7	# 7	# 7
Rebar Spacing	=	12.00 in	12.00 in	12.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	9.50 in	10.00 in	9.50 in
Design Data				
fb/FB + fa/Fa	=	0.002	0.191	0.000
Mu....Actual	=	47.4 ft-#	4,979.3 ft-#	0.0 ft-#
Mn * Phi.....Allowable	=	24,694.2 ft-#	26,044.2 ft-#	24,694.2 ft-#
Shear Force @ this height	=	1,706.7 lbs		2,814.8 lbs
Shear.....Actual	=	14.97 psi		24.69 psi
Shear.....Allowable	=	106.07 psi		106.07 psi

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

Top Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0011 in2/ft		
(4/3) * As :	0.0015 in2/ft	Min Stem T&S Reinf Area 2.520 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(9.5)/60000 :	0.4031 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.6 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.4225 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Mmax Between Ends	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1141 in2/ft		
(4/3) * As :	0.1521 in2/ft	Min Stem T&S Reinf Area 1.407 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(10)/60000 :	0.4243 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.6 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.55 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Base Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0 in2/ft		
(4/3) * As :	0 in2/ft	Min Stem T&S Reinf Area 1.113 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(9.5)/60000 :	0.4031 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.6 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.4225 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Footing Strengths & Dimensions

Toe Width	=	2.00 ft
Heel Width	=	1.00
Total Footing Width	=	3.00
Footing Thickness	=	18.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	20	2,232	psf
Mu' : Upward	=	1,024	0	ft-#
Mu' : Downward	=	940	0	ft-#
Mu: Design	=	84	0	ft-#
Actual 1-Way Shear	=	0.72	0.00	psi
Allow 1-Way Shear	=	94.87	0.00	psi

Other Acceptable Sizes & Spacings:

Toe: # 6 @ 16.00 in	-or-	Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: # 6 @ 16.00 in	-or-	Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined	-or-	No key defined

Min footing T&S reinf Area 1.17 in2
Min footing T&S reinf Area per foot 0.39 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Summary of Forces on Footing : Slab RESISTS sliding, stem is PINNED at footing

Forces acting on footing soil pressure

(taking moments about front of footing to find eccentricity)

Surcharge Over Heel	=	lbs	ft		ft-#
Axial Dead Load on Stem	=	365.0 lbs	2.50 ft		912.5 ft-#
Soil Over Toe	=	lbs	ft		ft-#
Adjacent Footing Load	=	lbs	ft		ft-#
Surcharge Over Toe	=	250.0 lbs	1.00 ft		250.0 ft-#
Stem Weight	=	1,312.5 lbs	2.50 ft		3,281.3 ft-#
Soil Over Heel	=	lbs	3.00 ft		ft-#
Footing Weight	=	675.0 lbs	1.50 ft		1,012.5 ft-#
Total Vertical Force	=	2,740.5 lbs	Moment	=	5,456.3 ft-#

Net Mom. at Stem/Ftg Interface = -1,345.5 ft-#

Allow. Mom. @ Stem/Ftg Interface = 15,433.9 ft-#

Allow. Mom. Exceeds Applied Mom.? Yes

Therefore Uniform Soil Pressure = 913.5 psf

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	11.00 ft
Wall height above soil	=	0.00 ft
Total Wall Height	=	11.00 ft
Top Support Height	=	9.25 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in

Soil Data

Allow Soil Bearing	=	3,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	55.0 psf/ft
	=	
Passive Pressure	=	300.0 psf/ft
Soil Density	=	110.00 pcf
Footing||Soil Frictior	=	0.350
Soil height to ignore for passive pressure	=	12.00 in

Thumbnail

Surcharge Loads

Surcharge Over Heel = 0.0 psf
>>>Used To Resist Sliding & Overturning
Surcharge Over Toe = 125.0 psf
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	140.0 lbs
Axial Live Load	=	157.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	112.0 #/ft
...Height to Top	=	9.67 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Service Level)
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

K_h Soil Density Multiplier = 0.020 g Added seismic per unit area = 16.9 psf

Design Summary

Total Bearing Load	=	3,734 lbs	
...resultant ecc.	=	3.91 in	
Soil Pressure @ Toe	=	434 psf	OK
Soil Pressure @ Heel	=	2,056 psf	OK
Allowable	=	3,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	528 psf	
ACI Factored @ Heel	=	2,501 psf	
Footing Shear @ Toe	=	0.3 psi	OK
Footing Shear @ Heel	=	2.5 psi	OK
Allowable	=	94.9 psi	
Reaction at Top	=	1,835.4 lbs	
Reaction at Bottom	=	3,415.1 lbs	

Sliding Calcs
Lateral Sliding Force = 3,415.1 lbs

Concrete Stem Construction

Thickness = 10.00 in Fy = 60,000 psi
Wall Weight = 125.0 psf f'c = 5,000 psi
Stem is FREE to rotate at top of footing

	@ Top Support	Mmax Between Top & Base	@ Base of Wall
	Stem OK	Stem OK	Stem OK
Design Height Above Ftg =	9.25 ft	4.20 ft	0.00 ft
Rebar Size =	# 7	# 7	# 7
Rebar Spacing =	12.00 in	12.00 in	12.00 in
Rebar Placed at =	Edge	Edge	Edge
Rebar Depth 'd' =	7.50 in	8.00 in	7.50 in
Design Data			
fb/FB + fa/Fa =	0.007	0.361	0.000
Mu....Actual =	125.5 ft-#	7,452.6 ft-#	0.0 ft-#
Mn * Phi.....Allowable =	19,294.2 ft-#	20,644.2 ft-#	19,294.2 ft-#
Shear Force @ this height =	2,615.0 lbs		3,838.6 lbs
Shear.....Actual =	29.06 psi		42.65 psi
Shear.....Allowable =	106.07 psi		106.07 psi

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

Top Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0039 in2/ft		
(4/3) * As :	0.0052 in2/ft	Min Stem T&S Reinf Area 2.220 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(7.5)/60000 :	0.3182 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.216 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.6 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.9125 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Mmax Between Ends	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.2151 in2/ft		
(4/3) * As :	0.2868 in2/ft	Min Stem T&S Reinf Area 1.213 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(8)/60000 :	0.3394 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2868 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.6 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	2.04 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Base Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0 in2/ft		
(4/3) * As :	0 in2/ft	Min Stem T&S Reinf Area 1.007 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(7.5)/60000 :	0.3182 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.240 in2/ft	
0.0018bh : 0.0018(12)(10) :	0.216 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.216 in2/ft	#4@ 10.00 in	#4@ 20.00 in
Provided Area :	0.6 in2/ft	#5@ 15.50 in	#5@ 31.00 in
Maximum Area :	1.9125 in2/ft	#6@ 22.00 in	#6@ 44.00 in

Footing Strengths & Dimensions

Toe Width	=	1.08 ft
Heel Width	=	1.92
Total Footing Width	=	3.00
Footing Thickness	=	18.00 in
Key Width	=	0.00 in
Key Depth	=	10.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	528	2,501	psf
Mu' : Upward	=	446	1,335	ft-#
Mu' : Downward	=	274	1,017	ft-#
Mu: Design	=	172	-318	ft-#
Actual 1-Way Shear	=	0.35	2.47	psi
Allow 1-Way Shear	=	94.87	94.87	psi

Other Acceptable Sizes & Spacings:

Toe: # 6 @ 16.00 in -or- Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: # 6 @ 16.00 in -or- Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: Slab Resists Sliding -or- Slab Resists Sliding - No Force on

Min footing T&S reinf Area 1.17 in2
Min footing T&S reinf Area per foot 0.39 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Summary of Forces on Footing : Slab RESISTS sliding, stem is PINNED at footing

Forces acting on footing soil pressure

(taking moments about front of footing to find eccentricity)

Surcharge Over Heel	=	lbs	ft		ft-#
Axial Dead Load on Stem	=	297.0 lbs	1.50 ft	444.5	ft-#
Soil Over Toe	=	lbs	ft		ft-#
Adjacent Footing Load	=	lbs	ft		ft-#
Surcharge Over Toe	=	135.0 lbs	0.54 ft	72.9	ft-#
Stem Weight	=	1,375.0 lbs	1.50 ft	2,057.9	ft-#
Soil Over Heel	=	1,314.9 lbs	2.46 ft	3,230.2	ft-#
Footing Weight	=	675.0 lbs	1.50 ft	1,012.5	ft-#
Total Vertical Force	=	3,734.4 lbs	Moment =	6,818.0	ft-#

Net Mom. at Stem/Ftg Interface = -1,216.5 ft-#

Allow. Mom. @ Stem/Ftg Interface = 12,058.9 ft-#

Allow. Mom. Exceeds Applied Mom.? Yes

Therefore Uniform Soil Pressure = 1,244.8 psf

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Criteria

Retained Height	=	10.75 ft
Wall height above soil	=	0.00 ft
Total Wall Height	=	10.75 ft
Top Support Height	=	10.25 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	0.00 in

Soil Data

Allow Soil Bearing	=	3,000.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	55.0 psf/ft
	=	
Passive Pressure	=	300.0 psf/ft
Soil Density	=	110.00 pcf
Footing||Soil Frictior	=	0.350
Soil height to ignore for passive pressure	=	12.00 in

Thumbnail

Surcharge Loads

Surcharge Over Heel = 0.0 psf
>>>Used To Resist Sliding & Overturning
Surcharge Over Toe = 125.0 psf
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	140.0 lbs
Axial Live Load	=	157.0 lbs
Axial Load Eccentricity	=	0.0 in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	112.0 #/ft
...Height to Top	=	9.67 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Seismic (E) (Service Level)
Wind on Exposed Stem	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

K_h Soil Density Multiplier = 0.020 g Added seismic per unit area = 16.6 psf

Design Summary

Total Bearing Load	=	2,822	lbs
...resultant ecc.	=	9.10	in
Soil Pressure @ Toe	=	0 psf	OK
Soil Pressure @ Heel	=	2,538 psf	OK
Allowable	=	3,000 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	0 psf	
ACI Factored @ Heel	=	3,101 psf	
Footing Shear @ Toe	=	0.7 psi	OK
Footing Shear @ Heel	=	0.0 psi	OK
Allowable	=	94.9 psi	
Reaction at Top	=	1,559.2	lbs
Reaction at Bottom	=	3,844.8	lbs

Sliding Calcs
Lateral Sliding Force = 3,844.8 lbs

Concrete Stem Construction

Thickness = 12.00 in Fy = 60,000 psi
Wall Weight = 150.0 psf f'c = 5,000 psi
Stem is FREE to rotate at top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	10.25 ft	4.57 ft	0.00 ft
Rebar Size	=	# 7	# 7	# 7
Rebar Spacing	=	12.00 in	12.00 in	11.25 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	9.50 in	10.00 in	9.50 in
Design Data				
fb/FB + fa/Fa	=	0.000	0.322	0.000
Mu....Actual	=	4.8 ft-#	8,386.8 ft-#	0.0 ft-#
Mn * Phi.....Allowable	=	24,694.2 ft-#	26,044.2 ft-#	26,272.5 ft-#
Shear Force @ this height	=	2,399.2 lbs		4,000.4 lbs
Shear.....Actual	=	21.05 psi		35.09 psi
Shear.....Allowable	=	106.07 psi		106.07 psi

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	IBC 2015,ACI
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.000
Seismic, E	1.000

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Concrete Stem Rebar Area Details

Top Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.0001 in2/ft		
(4/3) * As :	0.0002 in2/ft	Min Stem T&S Reinf Area 2.952 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(9.5)/60000 :	0.4031 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.6 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.4225 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Mmax Between Ends	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0.1921 in2/ft		
(4/3) * As :	0.2562 in2/ft	Min Stem T&S Reinf Area 1.636 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(10)/60000 :	0.4243 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.6 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.55 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Base Support	Vertical Reinforcing	Horizontal Reinforcing	
As (based on applied moment) :	0 in2/ft		
(4/3) * As :	0 in2/ft	Min Stem T&S Reinf Area 1.316 in2	
3sqrt(f'c)bd/fy : 3sqrt(5000)(12)(9.5)/60000 :	0.4031 in2/ft	Min Stem T&S Reinf Area per ft of stem Height : 0.288 in2/ft	
0.0018bh : 0.0018(12)(12) :	0.2592 in2/ft	Horizontal Reinforcing Options :	
	==========	One layer of :	Two layers of :
Required Area :	0.2592 in2/ft	#4@ 8.33 in	#4@ 16.67 in
Provided Area :	0.64 in2/ft	#5@ 12.92 in	#5@ 25.83 in
Maximum Area :	2.4225 in2/ft	#6@ 18.33 in	#6@ 36.67 in

Footing Strengths & Dimensions

Toe Width	=	2.00 ft
Heel Width	=	1.00
Total Footing Width	=	3.00
Footing Thickness	=	24.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 4,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top = 2.00 in @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	0	3,101	psf
Mu' : Upward	=	426	0	ft-#
Mu' : Downward	=	1,120	0	ft-#
Mu: Design	=	-694	0	ft-#
Actual 1-Way Shear	=	0.66	0.00	psi
Allow 1-Way Shear	=	94.87	0.00	psi

Other Acceptable Sizes & Spacings:

Toe: # 6 @ 16.00 in	-or-	Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Heel: # 6 @ 16.00 in	-or-	Not req'd: Mu < phi*5*lambda*sqrt(f'c)*Sm
Key: No key defined	-or-	No key defined

Min footing T&S reinf Area 1.56 in2
Min footing T&S reinf Area per foot 0.52 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 4.63 in	#4@ 9.26 in
#5@ 7.18 in	#5@ 14.35 in
#6@ 10.19 in	#6@ 20.37 in

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Restrained Retaining Wall

Code: IBC 2015,ACI 318-14,ACI 530-13

Summary of Forces on Footing : Slab RESISTS sliding, stem is PINNED at footing

Forces acting on footing soil pressure

(taking moments about front of footing to find eccentricity)

Surcharge Over Heel	=	lbs		ft		ft-#
Axial Dead Load on Stem	=	297.0	lbs	2.50	ft	742.5 ft-#
Soil Over Toe	=	lbs		ft		ft-#
Adjacent Footing Load	=	lbs		ft		ft-#
Surcharge Over Toe	=	250.0	lbs	1.00	ft	250.0 ft-#
Stem Weight	=	1,612.5	lbs	2.50	ft	4,031.3 ft-#
Soil Over Heel	=	lbs		3.00	ft	ft-#
Footing Weight	=	900.0	lbs	1.50	ft	1,350.0 ft-#
Total Vertical Force	=	2,822.0	lbs	Moment =		6,373.8 ft-#

Net Mom. at Stem/Ftg Interface = -2,140.8 ft-#

Allow. Mom. @ Stem/Ftg Interface = 16,420.3 ft-#

Allow. Mom. Exceeds Applied Mom.? Yes

Therefore Uniform Soil Pressure = 940.7 psf

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

COLUMNS

Gravity Column Design Criteria

Code

ACI 318-14

Materials

Concrete f'c = 5,000 psi at 28 days
Reinforcing Steel fy = 60,000 psi

Analysis:

Column gravity design loads were calculated based on the tributary area multiplied by the corresponding dead load (self weight of structure plus superimposed load) and live load. The Finite Element software program RAM Concept was used to check tributary areas and to verify vertical loads for each level. Final column loads were tabulated in Excel and column sizes and reinforcing were calculated.
For columns with unbalanced moment and for slender columns the program *SPCol* was used to calculate the interaction diagram and size vertical reinforcing.

1. General Information

File Name	g:\2019 jobs\19028 mercer isl apa...\7.1-d_p1.col
Project	Mercer Island
Column	7.1-D-L1
Engineer	AK
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Y - axis
Slenderness	Considered
Column Type	Structural
Capacity Method	Moment capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	5	ksi
E_c	4030.51	ksi
f_c	4.25	ksi
ε_u	0.003	in/in
β_1	0.8	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{yt}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	16	in
Depth	22	in
A_g	352	in^2
I_x	14197.3	in^4
I_y	7509.33	in^4
r_x	6.35085	in
r_y	4.6188	in
X_o	0	in
Y_o	0	in

3.2. Section Figure

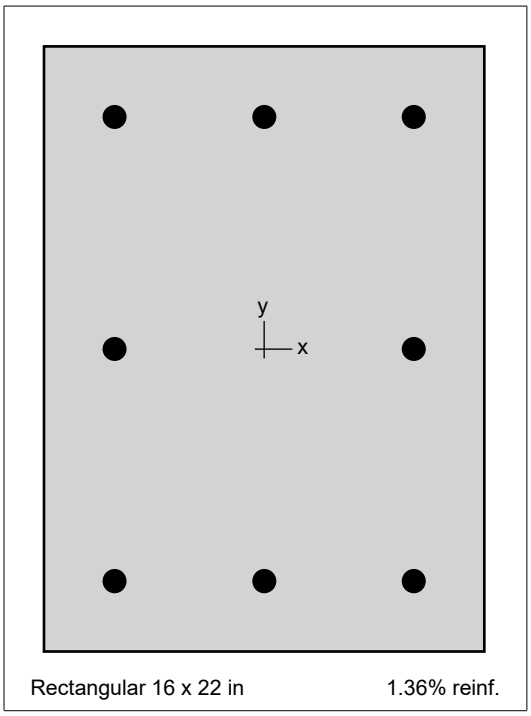


Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#5 ties
For larger bars	#5 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Equal spacing
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	1.5 in
Bars	8 #7

Total steel area, A_s	4.80 in^2
Rho	1.36 %
Minimum clear spacing	4.56 in

5. Loading

5.1. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.800	0.000	1.600
U5	1.200	1.000	1.600	0.000	0.500
U6	0.900	0.000	1.600	0.000	0.000
U7	1.200	0.000	-0.800	0.000	1.600
U8	1.200	1.000	-1.600	0.000	0.500
U9	0.900	0.000	-1.600	0.000	0.000
U10	1.200	1.000	0.000	1.000	0.200
U11	0.900	0.000	0.000	1.000	0.000
U12	1.200	1.000	0.000	-1.000	0.200
U13	0.900	0.000	0.000	-1.000	0.000

5.2. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	326.00	0.00	0.00	1.00	0.00
1	Live	148.00	0.00	0.00	0.00	0.00
1	Wind	0.00	0.00	0.00	0.00	0.00
1	EQ	0.00	0.00	0.00	0.00	0.00
1	Snow	0.00	0.00	0.00	0.00	0.00

5.3. Sustained Load Factors

Load Case	Factor
	%
Dead	60
Live	0
Wind	0
EQ	0
Snow	0

6. Slenderness

6.1. Sway Criteria

Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	Y	10	16	22	7509.33	5	4030.51
Above	Y	8.333	12	28	4032	5	4030.51
Below	Y	(no column specified...)					

6.3. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
0.2 $E_c I_g + E_s I_{se}$ (Y-axis)	9.14e+006 kip-in^2
Minimum eccentricity, $e_{y\,min}$	1.08 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
Y	999.000	999.000	1.000	(N/A)	25.97

7.3. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	456.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	628.00	(N/A)	4563.80	0.374	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	4368.08	0.435	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	391.20	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	4368.08	0.435	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	293.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	391.20	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	4368.08	0.435	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	293.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	4368.08	0.435	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	293.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	4368.08	0.435	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	293.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. Y - axis

Load Combo			1st Order				2nd Order			Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	1.40	(N/A)	1.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

9. Factored Loads and Moments with Corresponding Capacity Ratios

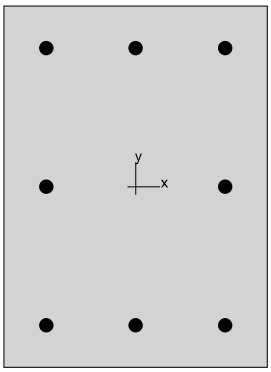
NOTE: Calculations are based on "Moment Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u kip	M_{uy} k-ft	Capacity ϕP_n kip	ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	ε_t	ϕ	Capacity Ratio
1	1	U1	Top	456.40	1.40	456.40	212.97	8.95	0.00151	0.650	0.01
2	1	U1	Bot	456.40	0.00	456.40	212.97	8.95	0.00151	0.650	0.00
3	1	U2	Top	628.00	1.20	628.00	195.22	11.55	0.00049	0.650	0.01
4	1	U2	Bot	628.00	0.00	628.00	195.22	11.55	0.00049	0.650	0.00
5	1	U3	Top	539.20	1.20	539.20	206.29	10.19	0.00096	0.650	0.01
6	1	U3	Bot	539.20	0.00	539.20	206.29	10.19	0.00096	0.650	0.00
7	1	U4	Top	391.20	1.20	391.20	215.91	8.09	0.00198	0.650	0.01
8	1	U4	Bot	391.20	0.00	391.20	215.91	8.09	0.00198	0.650	0.00
9	1	U5	Top	539.20	1.20	539.20	206.29	10.19	0.00096	0.650	0.01
10	1	U5	Bot	539.20	0.00	539.20	206.29	10.19	0.00096	0.650	0.00
11	1	U6	Top	293.40	0.90	293.40	235.88	5.74	0.00402	0.817	0.00
12	1	U6	Bot	293.40	0.00	293.40	235.88	5.74	0.00402	0.817	0.00
13	1	U7	Top	391.20	1.20	391.20	215.91	8.09	0.00198	0.650	0.01
14	1	U7	Bot	391.20	0.00	391.20	215.91	8.09	0.00198	0.650	0.00
15	1	U8	Top	539.20	1.20	539.20	206.29	10.19	0.00096	0.650	0.01
16	1	U8	Bot	539.20	0.00	539.20	206.29	10.19	0.00096	0.650	0.00
17	1	U9	Top	293.40	0.90	293.40	235.88	5.74	0.00402	0.817	0.00
18	1	U9	Bot	293.40	0.00	293.40	235.88	5.74	0.00402	0.817	0.00
19	1	U10	Top	539.20	1.20	539.20	206.29	10.19	0.00096	0.650	0.01
20	1	U10	Bot	539.20	0.00	539.20	206.29	10.19	0.00096	0.650	0.00
21	1	U11	Top	293.40	0.90	293.40	235.88	5.74	0.00402	0.817	0.00

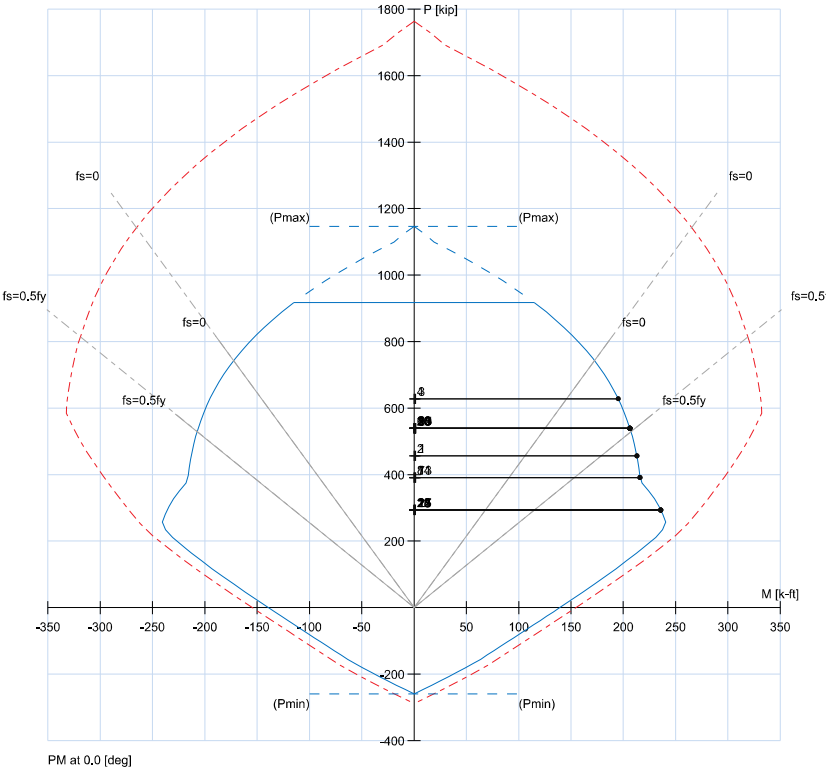
No.	Load Combo			Demand		Capacity		Parameters at Capacity			Capacity Ratio
				P_u	M_{uy}	ϕP_n	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	kip	k-ft	in			
22	1	U11	Bot	293.40	0.00	293.40	235.88	5.74	0.00402	0.817	0.00
23	1	U12	Top	539.20	1.20	539.20	206.29	10.19	0.00096	0.650	0.01
24	1	U12	Bot	539.20	0.00	539.20	206.29	10.19	0.00096	0.650	0.00
25	1	U13	Top	293.40	0.90	293.40	235.88	5.74	0.00402	0.817	0.00
26	1	U13	Bot	293.40	0.00	293.40	235.88	5.74	0.00402	0.817	0.00

10. Diagrams

10.1. PM at θ=0 [deg]



16 x 22 in



PM at 0.0 [deg]

General Information	
Project	Mercer Island
Column	7.1-D-L1
Engineer	AK
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Y - axis
Slenderness	Considered
Column Type	Structural
Capacity Method	Moment capacity

Materials	
f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	16 in
Depth	22 in
A_g	352 in²
I_x	14197.3 in⁴
I_y	7509.33 in⁴

Reinforcement	
Pattern	Equal spacing
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	1.5 in
Bars	8 #7
Confinement type	Tied
Total steel area, A_s	4.80 in²
Rho	1.36 %
Min. clear spacing	4.56 in

No.	Load Combo			P_u	M_{uy}	ϕP_n	ϕM_{ny}	Capacity
				kip	k-ft	kip	k-ft	Ratio
1	1	U1	Top	456.4	1.4	456.40	212.97	0.01
3	1	U2	Top	628.0	1.2	628.00	195.22	0.01
5	1	U3	Top	539.2	1.2	539.20	206.29	0.01
7	1	U4	Top	391.2	1.2	391.20	215.91	0.01
9	1	U5	Top	539.2	1.2	539.20	206.29	0.01
13	1	U7	Top	391.2	1.2	391.20	215.91	0.01
15	1	U8	Top	539.2	1.2	539.20	206.29	0.01
19	1	U10	Top	539.2	1.2	539.20	206.29	0.01
23	1	U12	Top	539.2	1.2	539.20	206.29	0.01
2	1	U1	Bot	456.4	0.0	456.40	212.97	0.00
4	1	U2	Bot	628.0	0.0	628.00	195.22	0.00
6	1	U3	Bot	539.2	0.0	539.20	206.29	0.00
8	1	U4	Bot	391.2	0.0	391.20	215.91	0.00
10	1	U5	Bot	539.2	0.0	539.20	206.29	0.00
11	1	U6	Top	293.4	0.9	293.40	235.88	0.00

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.01

1. General Information

File Name	g:\2019 jobs\19028 mercer isl apa...\h-9.2_p1.col
Project	Mercer Island
Column	H-9.2-P1
Engineer	AK
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Y - axis
Slenderness	Considered
Column Type	Structural
Capacity Method	Moment capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	5	ksi
E_c	4030.51	ksi
f_c	4.25	ksi
ε_u	0.003	in/in
β_1	0.8	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{yt}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	16	in
Depth	22	in
A_g	352	in^2
I_x	14197.3	in^4
I_y	7509.33	in^4
r_x	6.35085	in
r_y	4.6188	in
X_o	0	in
Y_o	0	in

3.2. Section Figure

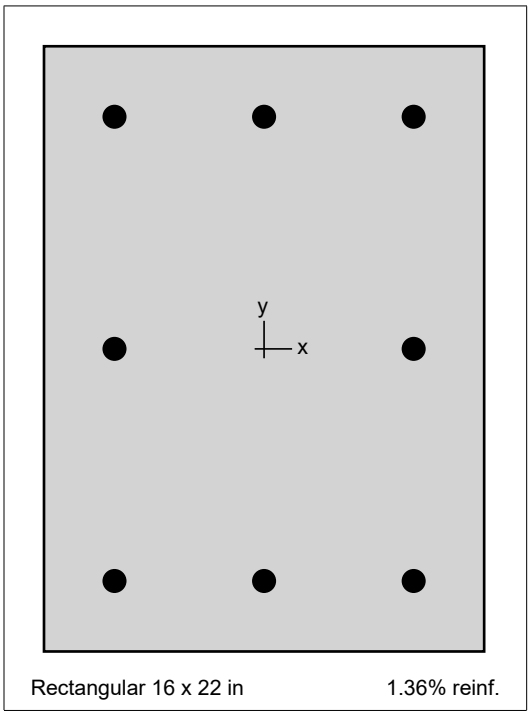


Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#5 ties
For larger bars	#5 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Equal spacing
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	1.5 in
Bars	8 #7

Total steel area, A_s	4.80 in^2
Rho	1.36 %
Minimum clear spacing	4.56 in

5. Loading

5.1. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.800	0.000	1.600
U5	1.200	1.000	1.600	0.000	0.500
U6	0.900	0.000	1.600	0.000	0.000
U7	1.200	0.000	-0.800	0.000	1.600
U8	1.200	1.000	-1.600	0.000	0.500
U9	0.900	0.000	-1.600	0.000	0.000
U10	1.200	1.000	0.000	1.000	0.200
U11	0.900	0.000	0.000	1.000	0.000
U12	1.200	1.000	0.000	-1.000	0.200
U13	0.900	0.000	0.000	-1.000	0.000

5.2. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	366.00	0.00	0.00	1.00	0.00
1	Live	140.00	0.00	0.00	0.00	0.00
1	Wind	0.00	0.00	0.00	0.00	0.00
1	EQ	0.00	0.00	0.00	0.00	0.00
1	Snow	0.00	0.00	0.00	0.00	0.00

5.3. Sustained Load Factors

Load Case	Factor
	%
Dead	60
Live	0
Wind	0
EQ	0
Snow	0

6. Slenderness

6.1. Sway Criteria

Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	Y	10	16	22	7509.33	5	4030.51
Above	Y	8.333	12	28	4032	5	4030.51
Below	Y	(no column specified...)					

6.3. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
0.2 $E_c I_g + E_s I_{se}$ (Y-axis)	9.14e+006 kip-in^2
Minimum eccentricity, $e_{y\,min}$	1.08 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
Y	999.000	999.000	1.000	(N/A)	25.97

7.3. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	512.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	663.20	(N/A)	4486.76	0.397	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	579.20	(N/A)	4309.05	0.455	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	439.20	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	579.20	(N/A)	4309.05	0.455	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	329.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	439.20	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	579.20	(N/A)	4309.05	0.455	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	329.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	579.20	(N/A)	4309.05	0.455	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	329.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	579.20	(N/A)	4309.05	0.455	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	329.40	(N/A)	3918.47	0.600	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. Y - axis

Load Combo			1st Order				2nd Order			Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	1.40	(N/A)	1.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

Load Combo			1st Order M_{ns} k-ft	M_s k-ft	M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	M_c k-ft	Ratio 2nd/1st
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

9. Factored Loads and Moments with Corresponding Capacity Ratios

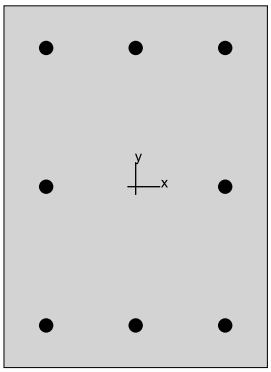
NOTE: Calculations are based on "Moment Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u kip	M_{uy} k-ft	Capacity ϕP_n kip	ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	ε_t	ϕ	Capacity Ratio
1	1	U1	Top	512.40	1.40	512.40	209.01	9.74	0.00114	0.650	0.01
2	1	U1	Bot	512.40	0.00	512.40	209.01	9.74	0.00114	0.650	0.00
3	1	U2	Top	663.20	1.20	663.20	189.34	12.12	0.00033	0.650	0.01
4	1	U2	Bot	663.20	0.00	663.20	189.34	12.12	0.00033	0.650	0.00
5	1	U3	Top	579.20	1.20	579.20	201.92	10.79	0.00074	0.650	0.01
6	1	U3	Bot	579.20	0.00	579.20	201.92	10.79	0.00074	0.650	0.00
7	1	U4	Top	439.20	1.20	439.20	213.95	8.71	0.00163	0.650	0.01
8	1	U4	Bot	439.20	0.00	439.20	213.95	8.71	0.00163	0.650	0.00
9	1	U5	Top	579.20	1.20	579.20	201.92	10.79	0.00074	0.650	0.01
10	1	U5	Bot	579.20	0.00	579.20	201.92	10.79	0.00074	0.650	0.00
11	1	U6	Top	329.40	0.90	329.40	229.42	6.50	0.00320	0.747	0.00
12	1	U6	Bot	329.40	0.00	329.40	229.42	6.50	0.00320	0.747	0.00
13	1	U7	Top	439.20	1.20	439.20	213.95	8.71	0.00163	0.650	0.01
14	1	U7	Bot	439.20	0.00	439.20	213.95	8.71	0.00163	0.650	0.00
15	1	U8	Top	579.20	1.20	579.20	201.92	10.79	0.00074	0.650	0.01
16	1	U8	Bot	579.20	0.00	579.20	201.92	10.79	0.00074	0.650	0.00
17	1	U9	Top	329.40	0.90	329.40	229.42	6.50	0.00320	0.747	0.00
18	1	U9	Bot	329.40	0.00	329.40	229.42	6.50	0.00320	0.747	0.00
19	1	U10	Top	579.20	1.20	579.20	201.92	10.79	0.00074	0.650	0.01
20	1	U10	Bot	579.20	0.00	579.20	201.92	10.79	0.00074	0.650	0.00
21	1	U11	Top	329.40	0.90	329.40	229.42	6.50	0.00320	0.747	0.00

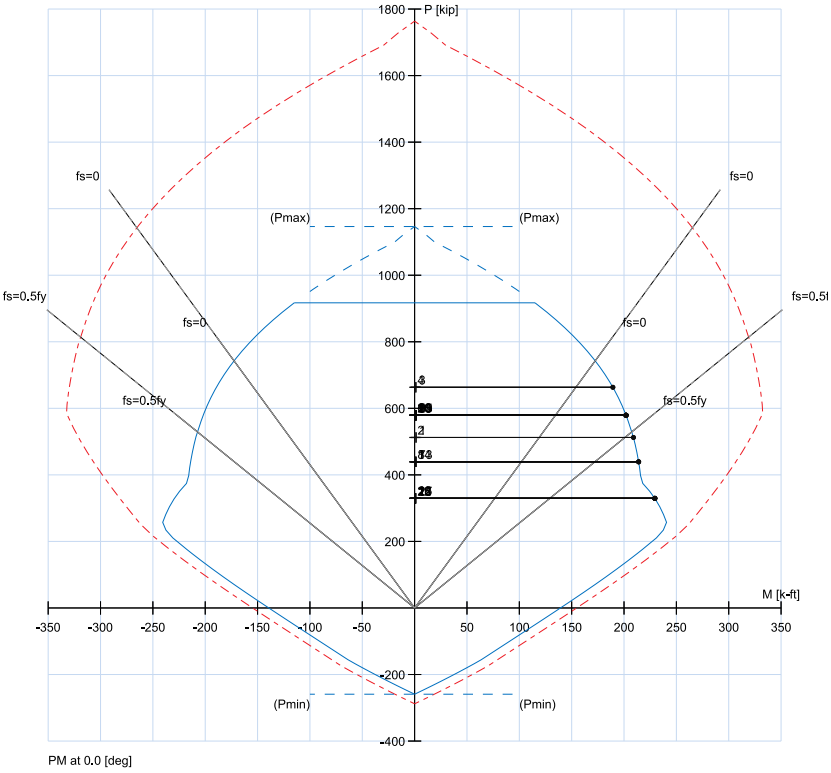
No.	Load Combo			Demand P_u kip	Demand M_{uy} k-ft	Capacity ϕP_n kip	Capacity ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	Parameters at Capacity ε_t	Parameters at Capacity ϕ	Capacity Ratio
22	1	U11	Bot	329.40	0.00	329.40	229.42	6.50	0.00320	0.747	0.00
23	1	U12	Top	579.20	1.20	579.20	201.92	10.79	0.00074	0.650	0.01
24	1	U12	Bot	579.20	0.00	579.20	201.92	10.79	0.00074	0.650	0.00
25	1	U13	Top	329.40	0.90	329.40	229.42	6.50	0.00320	0.747	0.00
26	1	U13	Bot	329.40	0.00	329.40	229.42	6.50	0.00320	0.747	0.00

10. Diagrams

10.1. PM at θ=0 [deg]



16 x 22 in



PM at 0.0 [deg]

General Information	
Project	Mercer Island
Column	H-9.2-P1
Engineer	AK
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Y - axis
Slenderness	Considered
Column Type	Structural
Capacity Method	Moment capacity

Materials	
f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	16 in
Depth	22 in
A_g	352 in^2
I_x	14197.3 in^4
I_y	7509.33 in^4

Reinforcement	
Pattern	Equal spacing
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	1.5 in
Bars	8 #7
Confinement type	Tied
Total steel area, A_s	4.80 in^2
Rho	1.36 %
Min. clear spacing	4.56 in

No.	Load Combo			P_u	M_{uy}	ϕP_n	ϕM_{ny}	Capacity
				kip	k-ft	kip	k-ft	Ratio
1	1	U1	Top	512.4	1.4	512.40	209.01	0.01
3	1	U2	Top	663.2	1.2	663.20	189.34	0.01
5	1	U3	Top	579.2	1.2	579.20	201.92	0.01
7	1	U4	Top	439.2	1.2	439.20	213.95	0.01
9	1	U5	Top	579.2	1.2	579.20	201.92	0.01
13	1	U7	Top	439.2	1.2	439.20	213.95	0.01
15	1	U8	Top	579.2	1.2	579.20	201.92	0.01
19	1	U10	Top	579.2	1.2	579.20	201.92	0.01
23	1	U12	Top	579.2	1.2	579.20	201.92	0.01
2	1	U1	Bot	512.4	0.0	512.40	209.01	0.00
4	1	U2	Bot	663.2	0.0	663.20	189.34	0.00
6	1	U3	Bot	579.2	0.0	579.20	201.92	0.00
8	1	U4	Bot	439.2	0.0	439.20	213.95	0.00
10	1	U5	Bot	579.2	0.0	579.20	201.92	0.00
11	1	U6	Top	329.4	0.9	329.40	229.42	0.00

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.01

1. General Information

File Name	g:\2019 jobs\19028 mercer isl apartmen...\e-1.col
Project	Mercer Island
Column	**E-1**
Engineer	AK
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Y - axis
Slenderness	Considered
Column Type	Structural
Capacity Method	Moment capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	5	ksi
E_c	4030.51	ksi
f_c	4.25	ksi
ε_u	0.003	in/in
β_1	0.8	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{yt}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Circular	
Diameter	16	in
A_g	201.062	in^2
I_x	3216.99	in^4
I_y	3216.99	in^4
r_x	4	in
r_y	4	in
X_o	0	in
Y_o	0	in

3.2. Section Figure

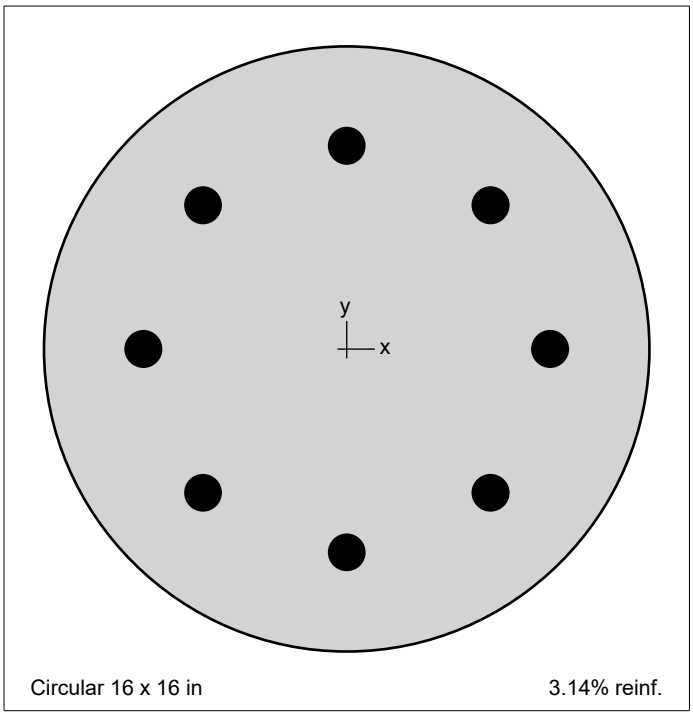


Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#5 ties
For larger bars	#5 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	All sides equal
Bar layout	Circular
Cover to	Transverse bars
Clear cover	1.5 in
Bars	8 #8

Total steel area, A_s	6.32 in^2
Rho	3.14 %
Minimum clear spacing	3.11 in

5. Loading

5.1. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.800	0.000	1.600
U5	1.200	1.000	1.600	0.000	0.500
U6	0.900	0.000	1.600	0.000	0.000
U7	1.200	0.000	-0.800	0.000	1.600
U8	1.200	1.000	-1.600	0.000	0.500
U9	0.900	0.000	-1.600	0.000	0.000
U10	1.200	1.000	0.000	1.000	0.200
U11	0.900	0.000	0.000	1.000	0.000
U12	1.200	1.000	0.000	-1.000	0.200
U13	0.900	0.000	0.000	-1.000	0.000

5.2. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	256.00	0.00	0.00	1.00	0.00
1	Live	98.00	0.00	0.00	0.00	0.00
1	Wind	0.00	0.00	0.00	0.00	0.00
1	EQ	0.00	0.00	0.00	0.00	0.00
1	Snow	0.00	0.00	0.00	0.00	0.00

5.3. Sustained Load Factors

Load Case	Factor
	%
Dead	60
Live	0
Wind	0
EQ	0
Snow	0

6. Slenderness

6.1. Sway Criteria

Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	Y	10	16	0	3216.99	5	4030.51
Above	Y	8.333	12	28	4032	5	4030.51
Below	Y	(no column specified...)					

6.3. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
0.2 $E_c I_g + E_s I_{se}$ (Y-axis)	5.24e+006 kip-in^2
Minimum eccentricity, $e_{y\ min}$	1.08 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
Y	999.000	999.000	1.000	(N/A)	29.99

7.3. Magnification Factors: Y - axis

* Slenderness need not be considered.

Load Combo		At Ends					Along Length						
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ	
		kip	kip	kip			kip		kip				
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	358.40	(N/A)	2246.80	0.600	(N/A)	(N/A)	*
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	464.00	(N/A)	2572.84	0.397	(N/A)	(N/A)	*
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	405.20	(N/A)	2470.90	0.455	(N/A)	(N/A)	*
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	307.20	(N/A)	2246.80	0.600	(N/A)	(N/A)	*
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	405.20	(N/A)	2470.90	0.455	(N/A)	(N/A)	*
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	230.40	(N/A)	2246.80	0.600	(N/A)	(N/A)	*
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	307.20	(N/A)	2246.80	0.600	(N/A)	(N/A)	*
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	405.20	(N/A)	2470.90	0.455	(N/A)	(N/A)	*
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	230.40	(N/A)	2246.80	0.600	(N/A)	(N/A)	*
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	405.20	(N/A)	2470.90	0.455	(N/A)	(N/A)	*
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	230.40	(N/A)	2246.80	0.600	(N/A)	(N/A)	*
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	405.20	(N/A)	2470.90	0.455	(N/A)	(N/A)	*
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	230.40	(N/A)	2246.80	0.600	(N/A)	(N/A)	*

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. Y - axis

Load Combo			1st Order				2nd Order			Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	1.40	(N/A)	1.40	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U1	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U2	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)

Load Combo			1st Order M_{ns} k-ft	1st Order M_s k-ft	1st Order M_u k-ft	M_{min} k-ft		2nd Order M_i k-ft	2nd Order M_c k-ft	Ratio 2nd/1st
1	U2	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U3	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U3	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U4	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U4	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U5	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U5	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U6	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U6	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U7	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U7	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U8	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U8	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U9	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U9	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U10	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U10	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U11	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U11	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U12	Top	1.20	(N/A)	1.20	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U12	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)
1	U13	Top	0.90	(N/A)	0.90	(N/A)	M_2=	(N/A)	(N/A)	(N/A)
1	U13	Bot	0.00	(N/A)	0.00	(N/A)	M_1=	(N/A)	(N/A)	(N/A)

9. Factored Loads and Moments with Corresponding Capacity Ratios

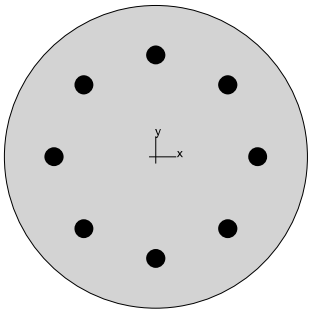
NOTE: Calculations are based on "Moment Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

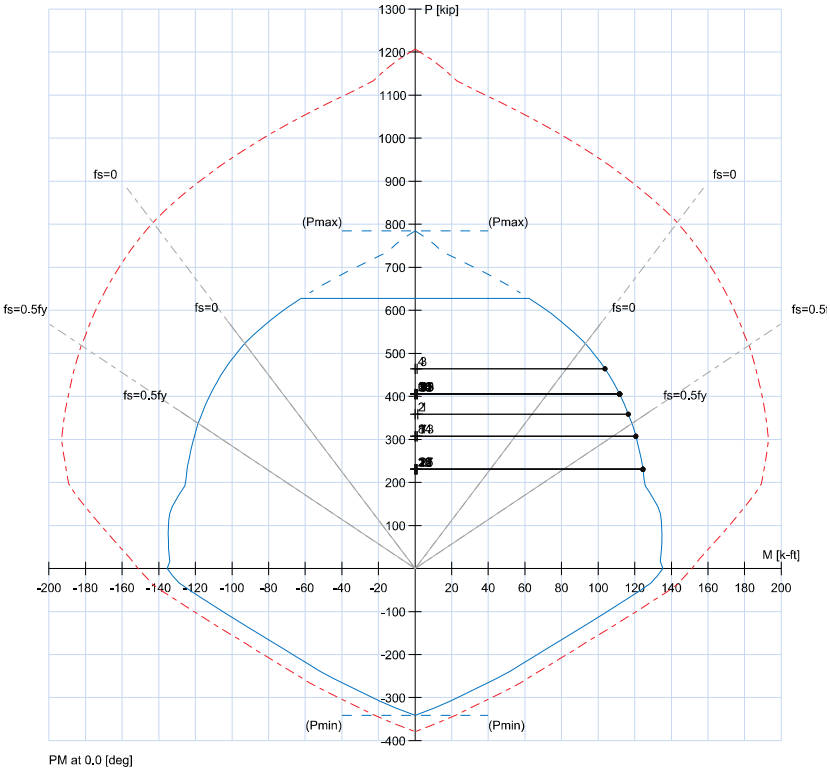
No.	Load Combo			Demand P_u kip	Demand M_{uy} k-ft	Capacity ϕP_n kip	Capacity ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	Parameters at Capacity ε_t	Parameters at Capacity ϕ	Capacity Ratio
1	1	U1	Top	358.40	1.40	358.40	116.45	10.36	0.00087	0.650	0.01
2	1	U1	Bot	358.40	0.00	358.40	116.45	10.36	0.00087	0.650	0.00
3	1	U2	Top	464.00	1.20	464.00	103.74	12.22	0.00028	0.650	0.01
4	1	U2	Bot	464.00	0.00	464.00	103.74	12.22	0.00028	0.650	0.00
5	1	U3	Top	405.20	1.20	405.20	111.73	11.15	0.00060	0.650	0.01
6	1	U3	Bot	405.20	0.00	405.20	111.73	11.15	0.00060	0.650	0.00
7	1	U4	Top	307.20	1.20	307.20	120.60	9.48	0.00123	0.650	0.01
8	1	U4	Bot	307.20	0.00	307.20	120.60	9.48	0.00123	0.650	0.00
9	1	U5	Top	405.20	1.20	405.20	111.73	11.15	0.00060	0.650	0.01
10	1	U5	Bot	405.20	0.00	405.20	111.73	11.15	0.00060	0.650	0.00
11	1	U6	Top	230.40	0.90	230.40	124.48	8.38	0.00179	0.650	0.01
12	1	U6	Bot	230.40	0.00	230.40	124.48	8.38	0.00179	0.650	0.00
13	1	U7	Top	307.20	1.20	307.20	120.60	9.48	0.00123	0.650	0.01
14	1	U7	Bot	307.20	0.00	307.20	120.60	9.48	0.00123	0.650	0.00
15	1	U8	Top	405.20	1.20	405.20	111.73	11.15	0.00060	0.650	0.01
16	1	U8	Bot	405.20	0.00	405.20	111.73	11.15	0.00060	0.650	0.00
17	1	U9	Top	230.40	0.90	230.40	124.48	8.38	0.00179	0.650	0.01
18	1	U9	Bot	230.40	0.00	230.40	124.48	8.38	0.00179	0.650	0.00
19	1	U10	Top	405.20	1.20	405.20	111.73	11.15	0.00060	0.650	0.01
20	1	U10	Bot	405.20	0.00	405.20	111.73	11.15	0.00060	0.650	0.00
21	1	U11	Top	230.40	0.90	230.40	124.48	8.38	0.00179	0.650	0.01

No.	Load Combo			Demand		Capacity		Parameters at Capacity			Capacity Ratio
				P_u	M_{uy}	ϕP_n	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	kip	k-ft	in			
22	1	U11	Bot	230.40	0.00	230.40	124.48	8.38	0.00179	0.650	0.00
23	1	U12	Top	405.20	1.20	405.20	111.73	11.15	0.00060	0.650	0.01
24	1	U12	Bot	405.20	0.00	405.20	111.73	11.15	0.00060	0.650	0.00
25	1	U13	Top	230.40	0.90	230.40	124.48	8.38	0.00179	0.650	0.01
26	1	U13	Bot	230.40	0.00	230.40	124.48	8.38	0.00179	0.650	0.00

10. Diagrams

10.1. PM at θ=0 [deg]





General Information	
Project	Mercer Island
Column	H-9.2-P1
Engineer	AK
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Y - axis
Slenderness	Considered
Column Type	Structural
Capacity Method	Moment capacity

Materials	
f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Circular
Diameter	16 in
A_g	201.062 in²
I_x	3216.99 in⁴
I_y	3216.99 in⁴

Reinforcement	
Pattern	All sides equal
Bar layout	Circular
Cover to	Transverse bars
Clear cover	1.5 in
Bars	8 #8
Confinement type	Tied
Total steel area, A_s	6.32 in²
Rho	3.14 %
Min. clear spacing	3.11 in

No.	Load Combo			P_u	M_{uy}	ϕP_n	ϕM_{ny}	Capacity
				kip	k-ft	kip	k-ft	Ratio
1	1	U1	Top	358.4	1.4	358.40	116.45	0.01
3	1	U2	Top	464.0	1.2	464.00	103.74	0.01
5	1	U3	Top	405.2	1.2	405.20	111.73	0.01
7	1	U4	Top	307.2	1.2	307.20	120.60	0.01
9	1	U5	Top	405.2	1.2	405.20	111.73	0.01
11	1	U6	Top	230.4	0.9	230.40	124.48	0.01
13	1	U7	Top	307.2	1.2	307.20	120.60	0.01
15	1	U8	Top	405.2	1.2	405.20	111.73	0.01
17	1	U9	Top	230.4	0.9	230.40	124.48	0.01
19	1	U10	Top	405.2	1.2	405.20	111.73	0.01
21	1	U11	Top	230.4	0.9	230.40	124.48	0.01
23	1	U12	Top	405.2	1.2	405.20	111.73	0.01
25	1	U13	Top	230.4	0.9	230.40	124.48	0.01
2	1	U1	Bot	358.4	0.0	358.40	116.45	0.00
4	1	U2	Bot	464.0	0.0	464.00	103.74	0.00

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.01

1. General Information

File Name	g:\2019 jobs\19028 mercer isl apartm...\3.5-h.col
Project	Mercer Island
Column	**H-3.5**
Engineer	AK
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Y - axis
Slenderness	Considered
Column Type	Structural
Capacity Method	Moment capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	5	ksi
E_c	4030.51	ksi
f_c	4.25	ksi
ε_u	0.003	in/in
β_1	0.8	

2.2. Steel

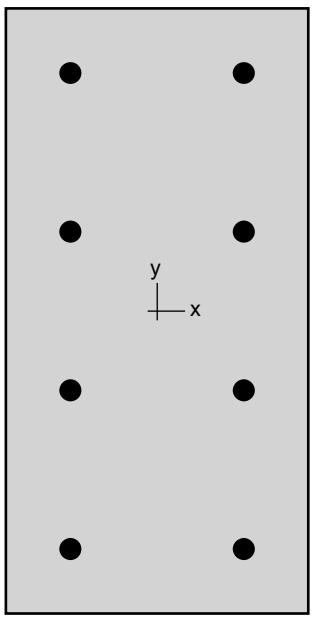
Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{yt}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Rectangular	
Width	12	in
Depth	24	in
A_g	288	in^2
I_x	13824	in^4
I_y	3456	in^4
r_x	6.9282	in
r_y	3.4641	in
X_o	0	in
Y_o	0	in

3.2. Section Figure



Rectangular 12 x 24 in 1.67% reinf.

Figure 1: Column section

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter in	Area in²	Bar	Diameter in	Area in²	Bar	Diameter in	Area in²
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#5 ties
For larger bars	#5 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9
Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Equal spacing
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	1.5 in
Bars	8 #7

Total steel area, A_s	4.80 in^2
Rho	1.67 %
Minimum clear spacing	5.42 in

5. Loading

5.1. Load Combinations

Combination	Dead	Live	Wind	EQ	Snow
U1	1.400	0.000	0.000	0.000	0.000
U2	1.200	1.600	0.000	0.000	0.500
U3	1.200	1.000	0.000	0.000	1.600
U4	1.200	0.000	0.800	0.000	1.600
U5	1.200	1.000	1.600	0.000	0.500
U6	0.900	0.000	1.600	0.000	0.000
U7	1.200	0.000	-0.800	0.000	1.600
U8	1.200	1.000	-1.600	0.000	0.500
U9	0.900	0.000	-1.600	0.000	0.000
U10	1.200	1.000	0.000	1.000	0.200
U11	0.900	0.000	0.000	1.000	0.000
U12	1.200	1.000	0.000	-1.000	0.200
U13	0.900	0.000	0.000	-1.000	0.000

5.2. Service Loads

No.	Load Case	Axial Load	Mx @ Top	Mx @ Bottom	My @ Top	My @ Bottom
		kip	k-ft	k-ft	k-ft	k-ft
1	Dead	326.00	0.00	0.00	1.00	0.00
1	Live	148.00	0.00	0.00	0.00	0.00
1	Wind	0.00	0.00	0.00	0.00	0.00
1	EQ	0.00	0.00	0.00	0.00	0.00
1	Snow	0.00	0.00	0.00	0.00	0.00

5.3. Sustained Load Factors

Load Case	Factor
	%
Dead	60
Live	0
Wind	0
EQ	0
Snow	0

6. Slenderness

6.1. Sway Criteria

Y-Axis	Non-sway column

6.2. Columns

Column	Axis	Height	Width	Depth	I	f'_c	E_c
		ft	in	in	in^4	ksi	ksi
Design	Y	10	12	24	3456	5	4030.51
Above	Y	8.333	12	28	4032	5	4030.51
Below	Y	(no column specified...)					

6.3. Y - Beams

Beam	Length	Width	Depth	I	f'_c	E_c
	ft	in	in	in^4	ksi	ksi
Above Left	(no beam specified...)					
Above Right	(no beam specified...)					
Below Left	(no beam specified...)					
Below Right	(no beam specified...)					

7. Moment Magnification

7.1. General Parameters

Factors	Code defaults
Stiffness reduction factor, ϕ_K	0.75
Cracked section coefficients, cI(beams)	0.35
Cracked section coefficients, cI(columns)	0.7
0.2 $E_c I_g + E_s I_{se}$ (Y-axis)	4.43e+006 kip-in^2
Minimum eccentricity, $e_{y\,min}$	0.96 in

7.2. Effective Length Factors

Axis	Ψ_{top}	Ψ_{bottom}	k (Nonsway)	k (Sway)	kl_u/r
Y	999.000	999.000	1.000	(N/A)	34.63

7.3. Magnification Factors: Y - axis

Load Combo		At Ends					Along Length					
		$\sum P_u$	P_c	$\sum P_c$	β_{ds}	δ_s	P_u	$k'l_u/r$	P_c	β_{dns}	C_m	δ
		kip	kip	kip			kip		kip			
1	U1	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	456.40	(N/A)	1899.52	0.600	0.600	1.000
1	U2	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	628.00	(N/A)	2212.35	0.374	0.600	1.000
1	U3	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	2117.48	0.435	0.600	1.000
1	U4	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	391.20	(N/A)	1899.52	0.600	0.600	1.000
1	U5	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	2117.48	0.435	0.600	1.000
1	U6	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	293.40	(N/A)	1899.52	0.600	0.600	1.000
1	U7	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	391.20	(N/A)	1899.52	0.600	0.600	1.000
1	U8	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	2117.48	0.435	0.600	1.000
1	U9	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	293.40	(N/A)	1899.52	0.600	0.600	1.000
1	U10	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	2117.48	0.435	0.600	1.000
1	U11	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	293.40	(N/A)	1899.52	0.600	0.600	1.000
1	U12	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	539.20	(N/A)	2117.48	0.435	0.600	1.000
1	U13	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	293.40	(N/A)	1899.52	0.600	0.600	1.000

8. Factored Moments

NOTE: Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

8.1. Y - axis

Load Combo			1st Order					2nd Order		Ratio
			M_{ns}	M_s	M_u	M_{min}		M_i	M_c	2nd/1st
			k-ft	k-ft	k-ft	k-ft		k-ft	k-ft	
1	U1	Top	1.40	(N/A)	1.40	36.51	M_2=	1.40	36.51	1.000
1	U1	Bot	0.00	(N/A)	0.00	36.51	M_1=	0.00	36.51	1.000
1	U2	Top	1.20	(N/A)	1.20	50.24	M_2=	1.20	50.24	1.000
1	U2	Bot	0.00	(N/A)	0.00	50.24	M_1=	0.00	50.24	1.000

Load Combo			1st Order M_{ns} k-ft	1st Order M_s k-ft	1st Order M_u k-ft	M_{min} k-ft	2nd Order	2nd Order M_i k-ft	2nd Order M_c k-ft	Ratio 2nd/1st
1	U3	Top	1.20	(N/A)	1.20	43.14	M_2=	1.20	43.14	1.000
1	U3	Bot	0.00	(N/A)	0.00	43.14	M_1=	0.00	43.14	1.000
1	U4	Top	1.20	(N/A)	1.20	31.30	M_2=	1.20	31.30	1.000
1	U4	Bot	0.00	(N/A)	0.00	31.30	M_1=	0.00	31.30	1.000
1	U5	Top	1.20	(N/A)	1.20	43.14	M_2=	1.20	43.14	1.000
1	U5	Bot	0.00	(N/A)	0.00	43.14	M_1=	0.00	43.14	1.000
1	U6	Top	0.90	(N/A)	0.90	23.47	M_2=	0.90	23.47	1.000
1	U6	Bot	0.00	(N/A)	0.00	23.47	M_1=	0.00	23.47	1.000
1	U7	Top	1.20	(N/A)	1.20	31.30	M_2=	1.20	31.30	1.000
1	U7	Bot	0.00	(N/A)	0.00	31.30	M_1=	0.00	31.30	1.000
1	U8	Top	1.20	(N/A)	1.20	43.14	M_2=	1.20	43.14	1.000
1	U8	Bot	0.00	(N/A)	0.00	43.14	M_1=	0.00	43.14	1.000
1	U9	Top	0.90	(N/A)	0.90	23.47	M_2=	0.90	23.47	1.000
1	U9	Bot	0.00	(N/A)	0.00	23.47	M_1=	0.00	23.47	1.000
1	U10	Top	1.20	(N/A)	1.20	43.14	M_2=	1.20	43.14	1.000
1	U10	Bot	0.00	(N/A)	0.00	43.14	M_1=	0.00	43.14	1.000
1	U11	Top	0.90	(N/A)	0.90	23.47	M_2=	0.90	23.47	1.000
1	U11	Bot	0.00	(N/A)	0.00	23.47	M_1=	0.00	23.47	1.000
1	U12	Top	1.20	(N/A)	1.20	43.14	M_2=	1.20	43.14	1.000
1	U12	Bot	0.00	(N/A)	0.00	43.14	M_1=	0.00	43.14	1.000
1	U13	Top	0.90	(N/A)	0.90	23.47	M_2=	0.90	23.47	1.000
1	U13	Bot	0.00	(N/A)	0.00	23.47	M_1=	0.00	23.47	1.000

9. Factored Loads and Moments with Corresponding Capacity Ratios

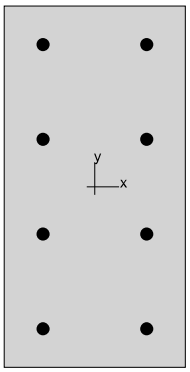
NOTE: Calculations are based on "Moment Capacity" Method.
Each loading combination includes the following cases:
Top - At column top
Bot - At column bottom

No.	Load Combo			Demand P_u kip	Demand M_{uy} k-ft	Capacity ϕP_n kip	Capacity ϕM_{ny} k-ft	Parameters at Capacity NA Depth in	Parameters at Capacity ε_t	Parameters at Capacity ϕ	Capacity Ratio
1	1	U1	Top	456.40	36.51	456.40	132.53	7.63	0.00071	0.650	0.28
2	1	U1	Bot	456.40	36.51	456.40	132.53	7.63	0.00071	0.650	0.28
3	1	U2	Top	628.00	50.24	628.00	110.55	10.05	-0.00018	0.650	0.45
4	1	U2	Bot	628.00	50.24	628.00	110.55	10.05	-0.00018	0.650	0.45
5	1	U3	Top	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
6	1	U3	Bot	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
7	1	U4	Top	391.20	31.30	391.20	135.79	6.86	0.00113	0.650	0.23
8	1	U4	Bot	391.20	31.30	391.20	135.79	6.86	0.00113	0.650	0.23
9	1	U5	Top	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
10	1	U5	Bot	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
11	1	U6	Top	293.40	23.47	293.40	138.49	5.82	0.00187	0.650	0.17
12	1	U6	Bot	293.40	23.47	293.40	138.49	5.82	0.00187	0.650	0.17
13	1	U7	Top	391.20	31.30	391.20	135.79	6.86	0.00113	0.650	0.23
14	1	U7	Bot	391.20	31.30	391.20	135.79	6.86	0.00113	0.650	0.23
15	1	U8	Top	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
16	1	U8	Bot	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
17	1	U9	Top	293.40	23.47	293.40	138.49	5.82	0.00187	0.650	0.17
18	1	U9	Bot	293.40	23.47	293.40	138.49	5.82	0.00187	0.650	0.17
19	1	U10	Top	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
20	1	U10	Bot	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
21	1	U11	Top	293.40	23.47	293.40	138.49	5.82	0.00187	0.650	0.17
22	1	U11	Bot	293.40	23.47	293.40	138.49	5.82	0.00187	0.650	0.17

No.	Load Combo			Demand		Capacity		Parameters at Capacity			Capacity Ratio
				P_u	M_{uy}	ϕP_n	ϕM_{ny}	NA Depth	ε_t	ϕ	
				kip	k-ft	kip	k-ft	in			
23	1	U12	Top	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
24	1	U12	Bot	539.20	43.14	539.20	124.81	8.73	0.00024	0.650	0.35
25	1	U13	Top	293.40	23.47	293.40	138.49	5.82	0.00187	0.650	0.17
26	1	U13	Bot	293.40	23.47	293.40	138.49	5.82	0.00187	0.650	0.17

10. Diagrams

10.1. PM at θ=0 [deg]



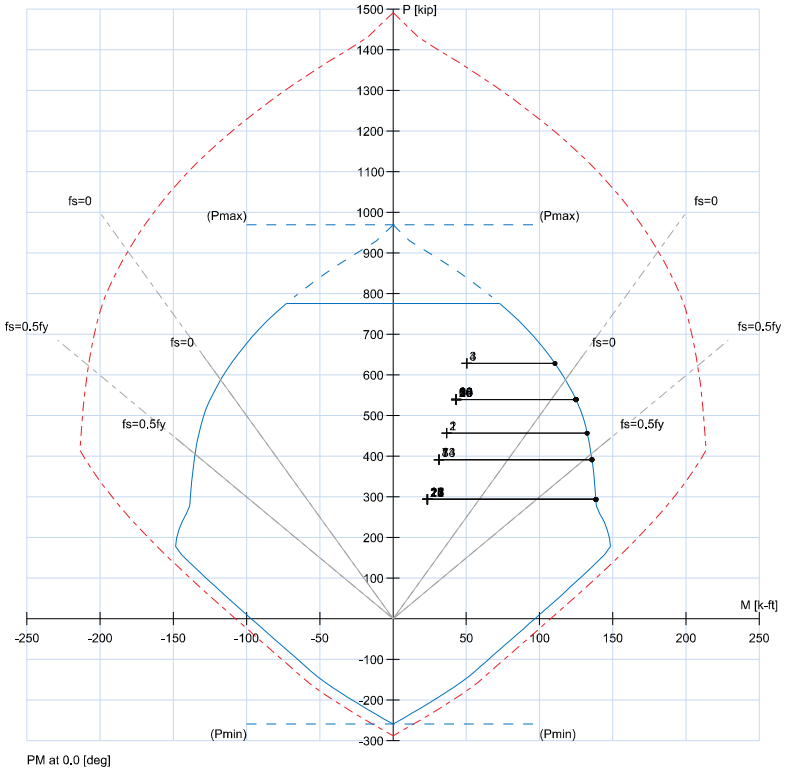
12 x 24 in

General Information	
Project	Mercer Island
Column	7.1-D-L1
Engineer	AK
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Y - axis
Slenderness	Considered
Column Type	Structural
Capacity Method	Moment capacity

Materials	
f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Rectangular
Width	12 in
Depth	24 in
A_g	288 in²
I_x	13824 in⁴
I_y	3456 in⁴

Reinforcement	
Pattern	Equal spacing
Bar layout	Rectangular
Cover to	Transverse bars
Clear cover	1.5 in
Bars	8 #7
Confinement type	Tied
Total steel area, A_s	4.80 in²
Rho	1.67 %
Min. clear spacing	5.42 in



PM at 0.0 [deg]

No.	Load Combo			P_u kip	M_{uy} k-ft	ϕP_n kip	ϕM_{ny} k-ft	Capacity Ratio
3	1	U2	Top	628.0	50.2	628.00	110.55	0.45
4	1	U2	Bot	628.0	50.2	628.00	110.55	0.45
5	1	U3	Top	539.2	43.1	539.20	124.81	0.35
6	1	U3	Bot	539.2	43.1	539.20	124.81	0.35
9	1	U5	Top	539.2	43.1	539.20	124.81	0.35
10	1	U5	Bot	539.2	43.1	539.20	124.81	0.35
15	1	U8	Top	539.2	43.1	539.20	124.81	0.35
16	1	U8	Bot	539.2	43.1	539.20	124.81	0.35
19	1	U10	Top	539.2	43.1	539.20	124.81	0.35
20	1	U10	Bot	539.2	43.1	539.20	124.81	0.35
23	1	U12	Top	539.2	43.1	539.20	124.81	0.35
24	1	U12	Bot	539.2	43.1	539.20	124.81	0.35
1	1	U1	Top	456.4	36.5	456.40	132.53	0.28
2	1	U1	Bot	456.4	36.5	456.40	132.53	0.28
7	1	U4	Top	391.2	31.3	391.20	135.79	0.23

Only 15 points out of 26 are listed.

Max. Capacity Ratio: 0.45

COLUMN DESIGN CRITERA

Story Heights		
Level Above	Height (ft)	Elev (ft)
RF	9.17	60.25
L4	9.17	51.08
L3	9.17	41.92
L2	12.75	32.75
L1	10.00	20.00
P1	10.00	10.00
P2	0.00	0.00

Load Table For Cladding Line Loads		
LOAD TYPE	DESCRIPTION	Weight Vert (psf)
P	Precast	35
G	Glazing	12
M	Metal Panel	8
E	EIFS	10
C	8" CMU	57
W	Wood Siding	8
X	None	0

Load Table For Floor Areas

LOAD TYPE	DESCRIPTION	CEILING + MEP	PARTITION	OTHER	FLOOR ALLOW	FLOOR DESC OR OTHER	SDL (psf)	LL (psf)	Reducible (Yes/No)	SW (psf)
G	Garage	0	0	5	0	Passenger Vehicles	5	40	No	
PC	Lobby/Corridors/Stairs	5	0	5	0	Concrete Floors	10	100	No	
RC	Residential Concrete	5	0	5	0	Residential Concrete Floors	10	32	Yes	
L	Loading Dock	0	0	5	0		5	250	No	
M	Mechanical	10	0	5	5		20	40	No	
R	Residential Wood	5	0	0	20	Typ. Floor w/ 1" Gypcrete Topping	25	40	Yes	
RF	Roof	5	0	6.5	10	Typical Solar Roof	21.5	25	No	
RG	Roof Green	5	0	30	10	4" Wet Soil	45	25	No	
RT	Retail	5	0	5	5		15	100	Yes	
S	Storage/Trash	5	0	10	5		20	125	No	
T	Outdoor Amenity	5	0	57	30	4" conc topping + pavers	92	100	No	-
A	Amenities	5	0	0	20	Typ. Floor w/ 1" Gypcrete Topping	25	100	No	
LA	Landscaping				440	4' Soil		20	No	
TS	Transfer Slab			130		3 Stories Wood Above	130	125	No	
Z2	super unknown						200	200	No	No
X	None						0	0	No	No

Project:	Mercer Island Apts
Date Updated:	11/13/2020
Column:	1
Location:	B-2

Level	Story	Slab	Tributary Area 1			Tributary Area 2			Cladding (or other line load)			Cumulative Dead Loads		
Level Above Column	Story Height	Slab Thickness	Load Type 1	Tributary Area 1	Load Description 1	Load Type 2	Tributary Area 2	Load Description 2	Cladding Type	Cladding Length	Cladding Description	Slab ρ_{conc} = 0.150	Column ρ_{conc} = 0.150	Cladding
	(ft)	(in)		(ft^2)			(ft^2)			(ft)		(k)	(k)	(k)
RF	9.17	0.0	X	0	None	X	0	None	E	25	EIFS	0	0	2
L4	9.17	0.0	X	0	None	X	0	None	E	25	EIFS	0	0	5
L3	9.17	0.0	X	0	None	X	0	None	E	25	EIFS	0	0	7
L2	12.75	14.0	TS	563	Transfer Slab	X	0	None	E	25	EIFS	98	5	10
L1	10.00	12.0	PC	524	Lobby/Corridors/Stairs	RT	39	Retail	E	25	EIFS	182	8	13
P1	10.00	0.0	X	0	None	X		None	X	0	None	182	12	13
P2	0.00	0.0	X	0	None	X	0	None	X	0	None	182	12	13

Live Load Reduction					Floor Area 1						Floor Area2						Column Moments	
Area 1 Reducibility	Area 2 Reducibility	Trib Area	Cumulative Reducible Trib Area	$1-R_{LL}$	Superimposed Floor Loads Dead Load	Unreducible Live Load	Reducible Live Load	SDL	Cumulative Unreducible LL	Cumulative Reducible LL	Superimposed Floor Loads Dead Load	Unreducible Live Load	Reducible Live Load	SDL	Cumulative Unreducible LL	Cumulative Reducible LL	Mu,x (positive only)	Mu,y (positive only)
(Yes/No)	(Yes/No)	(ft^2)	(ft^2)		(ksf)	(ksf)	(ksf)	(k)	(k)	(k)	(ksf)	(ksf)	(ksf)	(k)	(k)	(k)	(k-ft)	(k-ft)
No	No	0	0	1.00	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0	0
No	No	0	0	1.00	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0	0
No	No	0	0	1.00	0.000	0.000	0.000	0	0	0	0.000	0.000	0.000	0	0	0	0	0
No	No	561	0	1.00	0.130	0.125	0.000	73	70	0	0.000	0.000	0.000	0	0	0	0	0
No	Yes	1082	39	1.00	0.010	0.100	0.000	78	122	0	0.015	0.000	0.100	1	0	4	0	0
No	No	1080	39	1.00	0.000	0.000	0.000	78	122	0	0.000	0.000	0.000	1	0	4	0	0
No	No	1077	39	1.00	0.000	0.000	0.000	78	122	0	0.000	0.000	0.000	1	0	4	0	0

Column Axial Loads			Material	Confinement	Reliability	Column Dimensions		Column Area	
Service DL	Service LL	P_U 1.2D+1.6L	Column f'c	Confinement Factor	Reliability Factor - Phi	Column Width X	Column Width Y	Column Area	$A_{g,req}$ ρ= 1.00%
(k)	(k)	(k)	ksi			(in)	(in)	(ft^2)	(ft^2)
2	0	3	5	0.80	0.65	0	0	0.00	0.01
5	0	6	5	0.80	0.65	0	0	0.00	0.02
7	0	8	5	0.80	0.65	0	0	0.00	0.02
186	70	335	5	0.80	0.65	16	22	2.44	0.93
282	126	540	5	0.80	0.65	16	22	2.44	1.50
285	126	544	5	0.80	0.65	16	22	2.44	1.51
285	126	544	5	0.80	0.65	16	22	2.44	1.51

Confinement	Column Tie Volumetric Ratio Check For B					
Standard or Volumetric	Cover (in)	Tie Bar Size (#)	Tie Vertical Spacing (in)	Tie fy (ksi)	# Legs Y-Dir	# Legs X-Dir
Volumetric	1.5	5	3	60	0	0
Volumetric	1.5	5	3	60	0	0
Volumetric	1.5	5	3	60	0	0
Volumetric	1.5	5	3	60	2	4
Volumetric	1.5	5	3	60	2	4
Volumetric	1.5	5	3	60	2	4
Volumetric	1.5	5	3	60	2	4

bc X (in)	bc Y (in)	Ach (in^2)	Pu > 0.3Agf'c or f'c > 10ksi (Yes/No)	kf (c)	kn (c)	Eqn (a) Y-Dir (in^2)	Eqn (a) X-Dir (in^2)	Eqn (b) Y-Dir (in^2)	Eqn (b) X-Dir (in^2)	Eqn (c) Y-Dir (in^2)	Eqn (c) X-Dir (in^2)	Supply/ Demand > 1.0 Y-Dir	Supply/ Demand > 1.0 X-Dir	Recommended Quantity of Column Verts
			Yes							#VALUE!	#VALUE!			
			Yes							#VALUE!	#VALUE!			
			Yes							#VALUE!	#VALUE!			
13.0	19.0	247	No	1.00	1.33	0.41	0.61	0.29	0.43	0.010	0.010	1.50	2.05	8
13.0	19.0	247	Yes	1.00	1.33	0.41	0.61	0.29	0.43	0.003	0.004	1.50	2.05	8
13.0	19.0	247	Yes	1.00	1.33	0.41	0.61	0.29	0.43	0.003	0.004	1.50	2.05	8
13.0	19.0	247	Yes	1.00	1.33	0.41	0.61	0.29	0.43	0.003	0.004	1.50	2.05	8

Vert Reinforcement												Target rho	Axial Check	
Number of Vert X-Bars	Number of Vert Y-Bars	Max spcg ties (14") X-Bars (in)	Max spcg ties (14") Y-Bars (in)	Max spcg verts (6") X-Bars (in)	Max spcg verts (6") Y-Bars (in)	Spacing accept? (Yes/No)	Total # of Vert Bars	Size	fyt (ksi)	Ast (in^2)	ρ Vertical (%)	ρ,req'd Target (%)	ϕPn k	Capacity/ Demand Ratio
0	0							8	60	0.00	0.00%	#DIV/0!		
0	0							7	60	0.00	0.00%	#DIV/0!		
0	0							7	60	0.00	0.00%	#DIV/0!		
2	4	11.50	5.83	0.00	0.00	Yes	8	7	60	4.80	1.36%	0.00%	917	2.74
2	4	11.50	5.83	0.00	0.00	Yes	8	7	60	4.80	1.36%	0.00%	917	1.70
2	4	11.50	5.83	0.00	0.00	Yes	8	7	60	4.80	1.36%	0.00%	917	1.68
2	4	11.50	5.83	0.00	0.00	Yes	8	7	60	4.80	1.36%	0.00%	917	1.68

Slenderness Effects About X-Axis					Non-Sway Magnified Moments About X-Axis							
Unbraced Length Lu,x (ft)	Length Factor k,x	kLu/r,x	M1/M2	Consider Slender? (Yes/No)	βd	EI_{eff},xx (k-in^2)	Pc,xx (k)	Buckling Check	Cm	δns,xx	M2,xx (k-ft)	Mu,xx (k-ft)
9.17	1.0				0.00							
9.17	1.0				0.00							
9.17	1.0				0.00							
11.58	1.0	21.1	1.00	No	0.00	2.29E+07	11692	(O.K.)	1.00	1.04	35	
9.00	1.0	16.4	1.00	No	0.00	2.29E+07	19368	(O.K.)	1.00	1.04	57	
10.00	1.0	18.2	1.00	No	0.00	2.29E+07	15688	(O.K.)	1.00	1.05	57	
0.00	1.0	0.0	1.00	No	0.00	2.29E+07	#DIV/0!	#DIV/0!	1.00	#DIV/0!	57	

Slenderness Effects About Y-Axis					Non-Sway Magnified Moments About Y-Axis								Design		
Unbraced Length Lu,y (ft)	Length Factor k,y	kLu/r,y	M1/M2	Consider Slender? (Yes/No)	βd	EI_{eff},yy (in^4)	Pc,yy (k)	Buckling Check	Cm	δns,yy	M2,yy (k-ft)	Mu,yy (k-ft)	Mcrit X-axis (k-ft)	Mcrit Y-axis (k-ft)	Required Design (PM/axial)
9.17	1.0				0.60										
9.17	1.0				0.60										
9.17	1.0				0.60										
11.58	1.0	29.0	1.00	Yes	0.60	7.57E+06	3865	(O.K.)	1.00	1.13	30	34	96	83	Axial
9.00	1.0	22.5	1.00	Yes	0.60	7.57E+06	6403	(O.K.)	1.00	1.13	49	55	96	83	Axial
10.00	1.0	25.0	1.00	Yes	0.60	7.57E+06	5186	(O.K.)	1.00	1.16	49	57	96	83	Axial
0.00	1.0	0.0	1.00	No	0.60	7.57E+06	#DIV/0!	#DIV/0!	1.00	#DIV/0!	49		96	83	Axial

STUD RAILS

STUD RAIL SCHEDULE

MARK	SHEAR STUDS				DETAIL
	DIAMETER	So	N	S	
SR-1	1/2	4 5/8	21	3	I14
SR-2	1/2	4 5/8	21	3	I10
SR-3	1/2	4 5/8	28	3	E8
SR-4	1/2	4 5/8	38	3	E11
SR-5	1/2	4 5/8	21	3	E7
SR-6	1/2	4 5/8	8	3	C7

LEVEL 2 STUD RAILS LAYOUT

LEVEL 2 CONCRETE FRAMING PLAN

Responsible:

Construction project:
Construction member:
Position:
Date: November 13, 2020

JORDAHL® EXPERT Punching shear - Design

1. Input information

Column type	Rectangular internal column						
Column dimension	c_x / c_y	=	22	in	/	16	in
Slab type	In-situ concrete slab						
Slab thickness	h	=	14	in			
Concrete cover top/bottom	c_o / c_u	=	1	in	/	1	in
Effective depth	d_x / d_y	=	13	in	/	13	in
Concrete strength	5000 psi						
Density	Sand-lightweight concrete						
Prestress	f_{pc}	=	125	psi			
Punching shear load	V_u	=	334.1	kip			
Unbalanced moment	M_{ux} / M_{uy}	=	65.2	kip-ft	/	56.6	kip-ft
Seismic loading	Yes						

2. Output information (ACI 318-14)

2.1 Inner Critical Section (d/2 outside of column face)

2.1.1 Common Properties

Area	A_c	=	1664	in²			
Critical section perimeter	b_0	=	128	in			

2.1.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	0	in	/	0	in
Section moment of inertia	I_x / I_y	=	$2.442 \cdot 10^5$	in⁴	/	$3.238 \cdot 10^5$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴			

2.1.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	0	in	/	0	in
Section moment of inertia	I_1 / I_2	=	$3.238 \cdot 10^5$	in⁴	/	$2.442 \cdot 10^5$	in⁴
Principal axis rotation	θ	=	90.0	°			
Moment fraction	γ_1 / γ_2	=	0.4228		/	0.3777	
Unbalanced moment	M_{u1} / M_{u2}	=	56.6	kip-ft	/	-65.2	kip-ft

2.1.4 Stresses

Maximum shear stresss	v_u	=	233.8	psi			
	x / y	=	17.5	in	/	-14.5	in
Shear resistance (concrete only)	ϕv_c	=	184.3	psi			
Shear resistance (with studrails)	ϕv_n	=	314.7	psi			
Shear resistance (upper limit)	$\phi v_{n,max}$	=	360.6	psi			

Responsible:

Construction project:
Construction member:
Position:
Date: November 13, 2020

2.2 Outer Critical Section (d/2 outside of reinforced zone)

2.2.1 Common Properties

Area	A_c	=	5362.2	in²		
Critical section perimeter	b_0	=	412.5	in		

2.2.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	0	in	/ 0	in
Section moment of inertia	I_x / I_y	=	$1.026 \cdot 10^7$	in⁴	/ $1.080 \cdot 10^7$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴		

2.2.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	0	in	/ 0	in
Section moment of inertia	I_1 / I_2	=	$1.080 \cdot 10^7$	in⁴	/ $1.026 \cdot 10^7$	in⁴
Principal axis rotation	θ	=	90.0	°		
Moment fraction	γ_1 / γ_2	=	0.4053		/ 0.3947	
Unbalanced moment	M_{u1} / M_{u2}	=	56.6	kip-ft	/ -65.2	kip-ft

2.2.4 Stresses

Maximum shear stresss	v_u	=	64.6	psi		
	x / y	=	13.067	in	/ -66.625	in
Shear resistance	ϕv_c	=	90.2	psi		

3. Elements

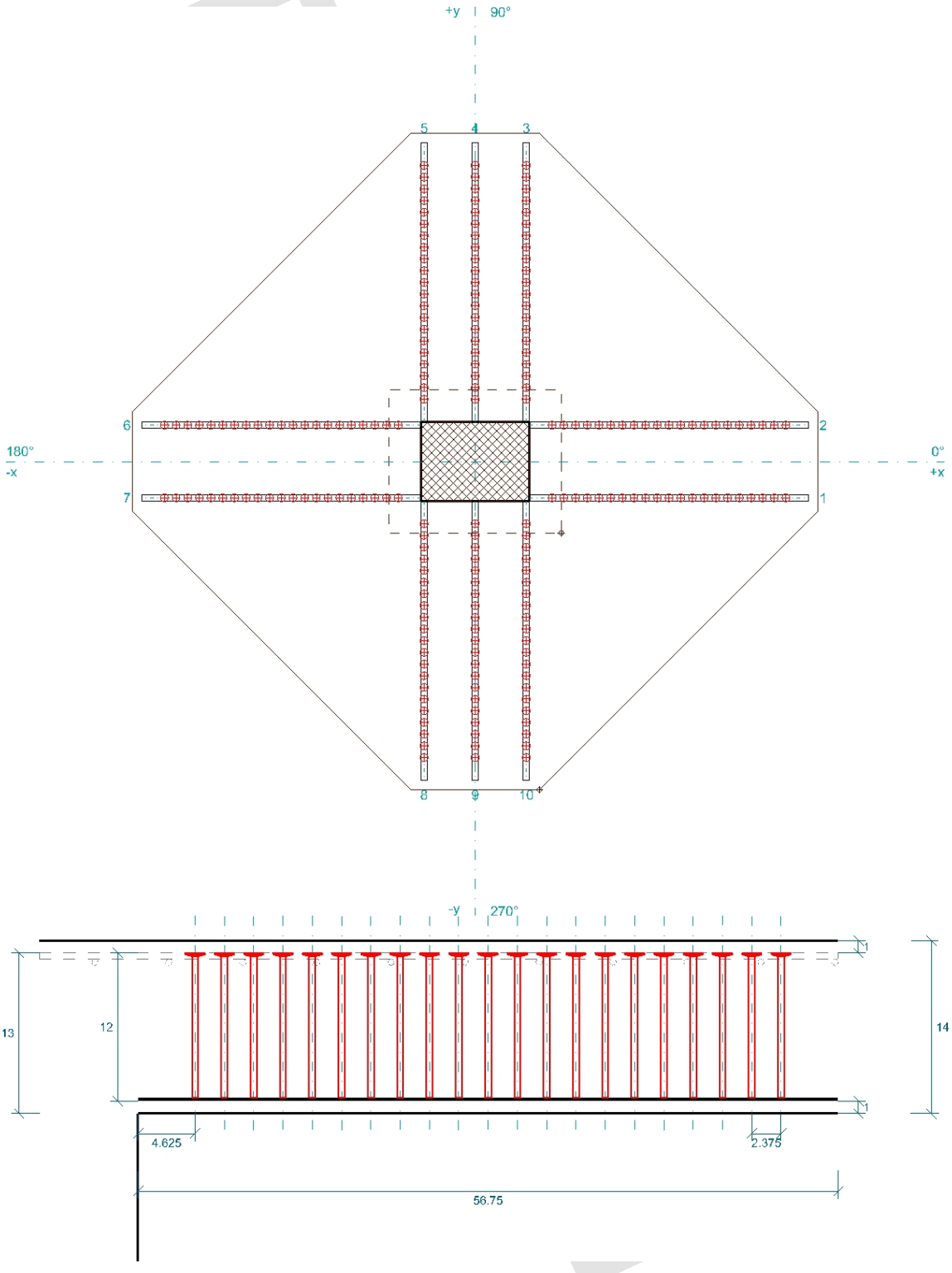
Number of studrails per column		=	10			
Number of studs per studrail		=	21			
Stud diameter	D	=	0.5	in		
Stud spacing	S / S_0	=	2.375	in	/ 4.625	in
Overall height of studrail	OAH	=	12	in		
Overall length of studrail	OAL	=	56.75	in		

4. Note

- The design against punching shear failure is based on the rules of ACI 318-14.
- This calculation is bases on product specific properties of DECON® Studrails®. Changes, even to similar products, are only possible with new calculations.
- All data have to be checked with the given edge boundaries and the feasibility. DECON assumes no liability for the input data of the user.

Responsible:

Construction project:
Construction member:
Position:
Date: November 13, 2020



Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

JORDAHL® EXPERT Punching shear - Design

1. Input information

Column type	Rectangular edge column					
Column dimension	c_x / c_y	=	16	in	/ 22	in
Edge	r_b	=	1	in		
Slab type	In-situ concrete slab					
Slab thickness	h	=	14	in		
Concrete cover top/bottom	c_o / c_u	=	1	in	/ 1	in
Effective depth	d_x / d_y	=	13	in	/ 13	in
Concrete strength	5000 psi					
Density	Normal concrete					
Prestress	f_{pc}	=	0	psi		
Punching shear load	V_u	=	172.3	kip		
Unbalanced moment	M_{ux} / M_{uy}	=	196.7	kip-ft	/ 58.9	kip-ft
Seismic loading	Yes					

2. Output information (ACI 318-14)

2.1 Inner Critical Section (d/2 outside of column face)

2.1.1 Common Properties

Area	A_c	=	1144	in²		
Critical section perimeter	b_0	=	88	in		

2.1.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	0	in	/ 7.611	in
Section moment of inertia	I_x / I_y	=	$1.106 \cdot 10^5$	in⁴	/ $1.877 \cdot 10^5$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴		

2.1.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	-7.611	in	/ 0	in
Section moment of inertia	I_1 / I_2	=	$1.877 \cdot 10^5$	in⁴	/ $1.106 \cdot 10^5$	in⁴
Principal axis rotation	θ	=	90.0	°		
Moment fraction	γ_1 / γ_2	=	0.3980		/ 0.3760	
Unbalanced moment	M_{u1} / M_{u2}	=	58.9	kip-ft	/ -196.7	kip-ft

Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

2.1.4 Stresses

Maximum shear stresss	v_u	=	417.1	psi			
	x / y	=	14.5	in	/	-12	in
Shear resistance (concrete only)	ϕv_c	=	212.1	psi			
Shear resistance (with studrails)	ϕv_n	=	474.8	psi			
Shear resistance (upper limit)	$\phi v_{n,max}$	=	424.3	psi			

2.2 Outer Critical Section (d/2 outside of reinforced zone)

2.2.1 Common Properties

Area	A_c	=	3604.4	in²			
Critical section perimeter	b_0	=	277.3	in			

2.2.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	0	in	/	43.433	in
Section moment of inertia	I_x / I_y	=	$3.019 \cdot 10^6$	in⁴	/	$1.158 \cdot 10^7$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴			

2.2.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	-43.433	in	/	0	in
Section moment of inertia	I_1 / I_2	=	$1.158 \cdot 10^7$	in⁴	/	$3.019 \cdot 10^6$	in⁴
Principal axis rotation	θ	=	90.0	°			
Moment fraction	γ_1 / γ_2	=	0.4646		/	0.2940	
Unbalanced moment	M_{u1} / M_{u2}	=	58.9	kip-ft	/	-196.7	kip-ft

2.2.4 Stresses

Maximum shear stresss	v_u	=	103.3	psi			
	x / y	=	83.25	in	/	-12	in
Shear resistance	ϕv_c	=	106.1	psi			

3. Elements

Number of studrails per column		=	11				
Number of studs per studrail		=	28				
Stud diameter	D	=	0.5	in			
Stud spacing	S / S_0	=	2.375	in	/	4.625	in
Overall height of studrail	OAH	=	12	in			
Overall length of studrail	OAL	=	73.375	in			

Responsible:

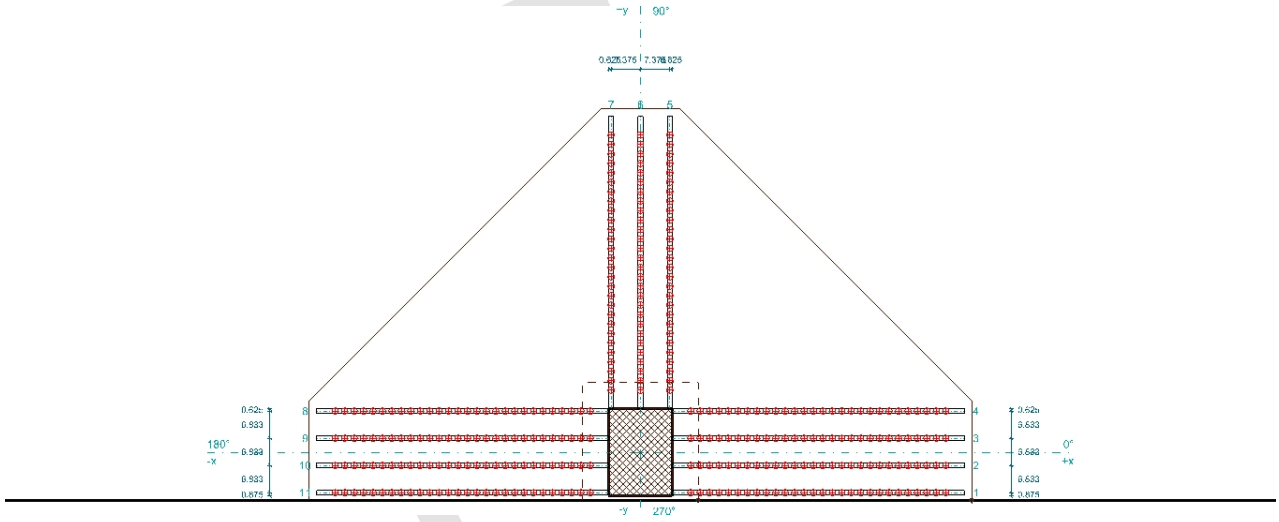
Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

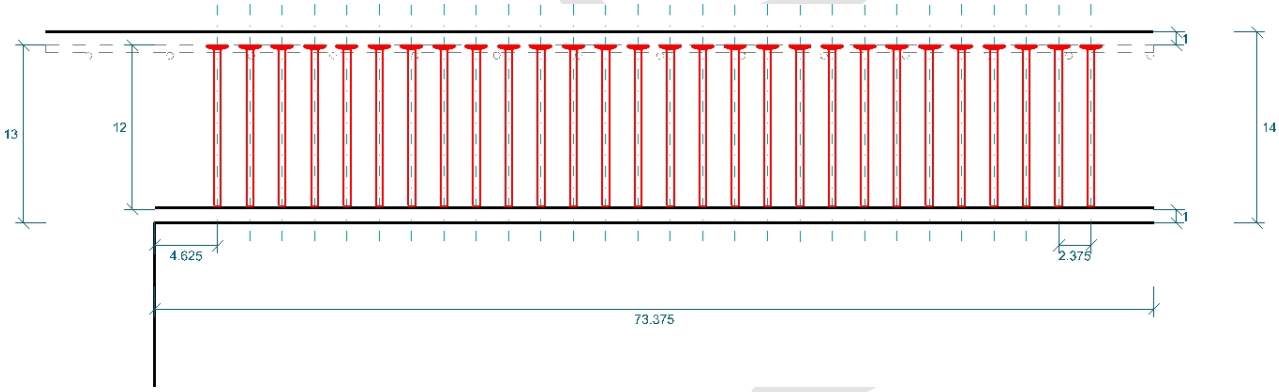
4. Note

- The design against punching shear failure is based on the rules of ACI 318-14.
- This calculation is bases on product specific properties of DECON® Studrails®. Changes, even to similar products, are only possible with new calculations.
- All data have to be checked with the given edge boundaries and the feasibility. DECON assumes no liability for the input data of the user.

Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020





Responsible:

Construction project:
Construction member:
Position:
Date: November 13, 2020

JORDAHL® EXPERT Punching shear - Design

1. Input information

Column type	Rectangular internal column					
Column dimension	c_x / c_y	=	16	in	/ 22	in
Slab type	In-situ concrete slab					
Slab thickness	h	=	14	in		
Concrete cover top/bottom	c_o / c_u	=	1	in	/ 1	in
Effective depth	d_x / d_y	=	13	in	/ 13	in
Concrete strength	5000 psi					
Density	Normal concrete					
Prestress	f_{pc}	=	125	psi		
Punching shear load	V_u	=	555.9	kip		
Unbalanced moment	M_{ux} / M_{uy}	=	23.3	kip-ft	/ 59	kip-ft

2. Output information (ACI 318-14)

2.1 Inner Critical Section (d/2 outside of column face)

2.1.1 Common Properties

Area	A_c	=	1664	in²		
Critical section perimeter	b_0	=	128	in		

2.1.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	0	in	/ 0	in
Section moment of inertia	I_x / I_y	=	$3.238 \cdot 10^5$	in⁴	/ $2.442 \cdot 10^5$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴		

2.1.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	0	in	/ 0	in
Section moment of inertia	I_1 / I_2	=	$3.238 \cdot 10^5$	in⁴	/ $2.442 \cdot 10^5$	in⁴
Principal axis rotation	θ	=	0.0	°		
Moment fraction	γ_1 / γ_2	=	0.4228		/ 0.3777	
Unbalanced moment	M_{u1} / M_{u2}	=	23.3	kip-ft	/ 59	kip-ft

2.1.4 Stresses

Maximum shear stresss	v_u	=	356.3	psi		
	x / y	=	14.5	in	/ -17.5	in
Shear resistance (concrete only)	ϕv_c	=	212.1	psi		
Shear resistance (with studrails)	ϕv_n	=	432.9	psi		
Shear resistance (upper limit)	$\phi v_{n,max}$	=	424.3	psi		

Responsible:

Construction project:
Construction member:
Position:
Date: November 13, 2020

2.2 Outer Critical Section (d/2 outside of reinforced zone)

2.2.1 Common Properties

Area	A_c	=	5399	in²		
Critical section perimeter	b_0	=	415.3	in		

2.2.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	0	in	/ 0	in
Section moment of inertia	I_x / I_y	=	$1.101 \cdot 10^7$	in⁴	/ $1.047 \cdot 10^7$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴		

2.2.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	0	in	/ 0	in
Section moment of inertia	I_1 / I_2	=	$1.101 \cdot 10^7$	in⁴	/ $1.047 \cdot 10^7$	in⁴
Principal axis rotation	θ	=	0.0	°		
Moment fraction	γ_1 / γ_2	=	0.4053		/ 0.3948	
Unbalanced moment	M_{u1} / M_{u2}	=	23.3	kip-ft	/ 59	kip-ft

2.2.4 Stresses

Maximum shear stresss	v_u	=	104.9	psi		
	x / y	=	67.125	in	/ -13.067	in
Shear resistance	ϕv_c	=	106.1	psi		

3. Elements

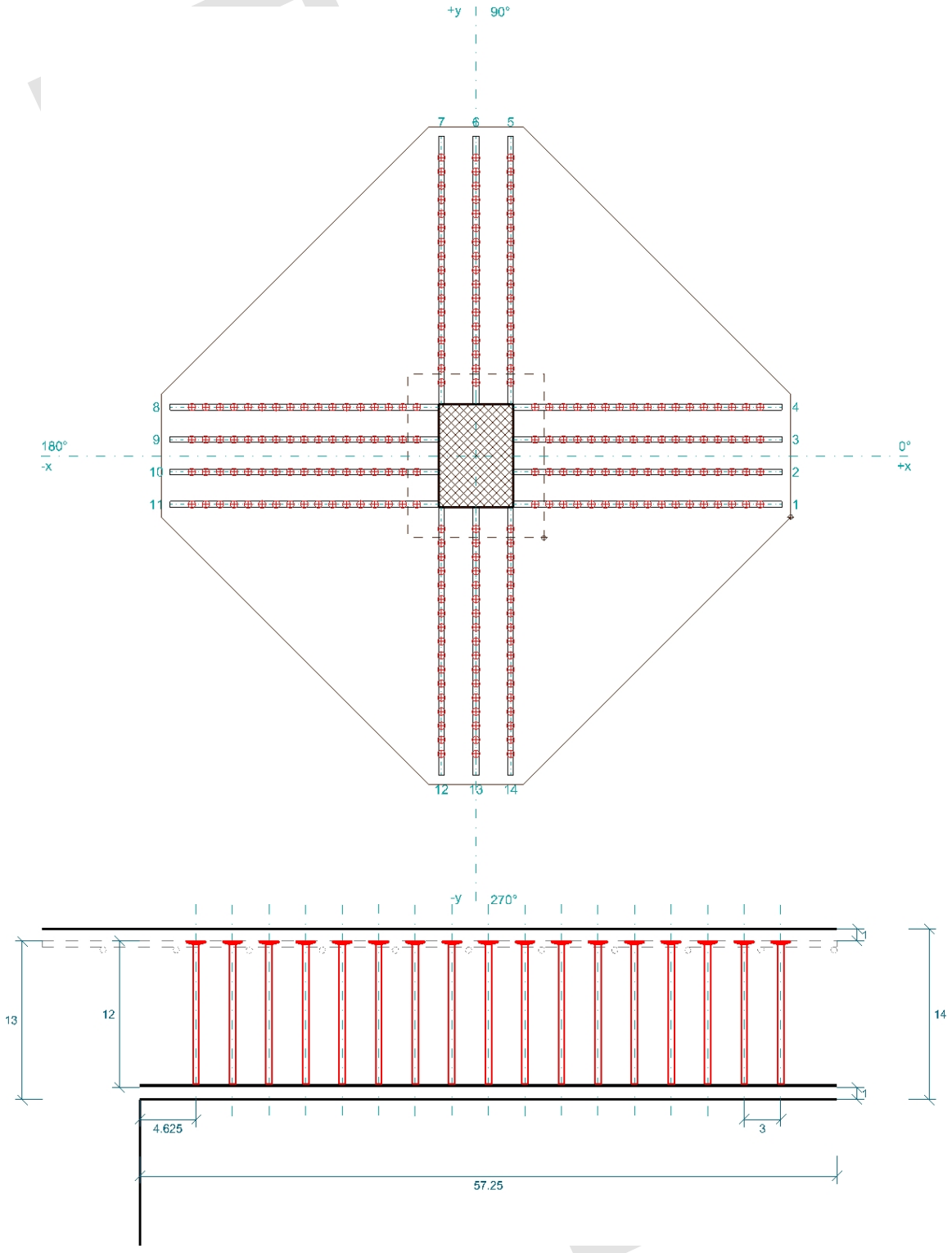
Number of studrails per column		=	14			
Number of studs per studrail		=	17			
Stud diameter	D	=	0.5	in		
Stud spacing	S / S_0	=	3	in	/ 4.625	in
Overall height of studrail	OAH	=	12	in		
Overall length of studrail	OAL	=	57.25	in		

4. Note

- The design against punching shear failure is based on the rules of ACI 318-14.
- This calculation is bases on product specific properties of DECON® Studrails®. Changes, even to similar products, are only possible with new calculations.
- All data have to be checked with the given edge boundaries and the feasibility. DECON assumes no liability for the input data of the user.

Responsible:

Construction project:
Construction member:
Position:
Date: November 13, 2020



Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

JORDAHL® EXPERT Punching shear - Design

1. Input information

Column type	Rectangular edge column					
Column dimension	c_x / c_y	=	16	in	/ 22	in
Edge	r_b	=	0	in		
Slab type	In-situ concrete slab					
Slab thickness	h	=	14	in		
Concrete cover top/bottom	c_o / c_u	=	1	in	/ 1	in
Effective depth	d_x / d_y	=	13	in	/ 13	in
Concrete strength	5000 psi					
Density	Normal concrete					
Prestress	f_{pc}	=	0	psi		
Punching shear load	V_u	=	228.4	kip		
Unbalanced moment	M_{ux} / M_{uy}	=	253.6	kip-ft	/ 64.8	kip-ft
Seismic loading	Yes					

2. Output information (ACI 318-14)

2.1 Inner Critical Section (d/2 outside of column face)

2.1.1 Common Properties

Area	A_c	=	1118	in²		
Critical section perimeter	b_0	=	86	in		

2.1.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	0	in	/ -8.055	in
Section moment of inertia	I_x / I_y	=	$1.009 \cdot 10^5$	in⁴	/ $1.822 \cdot 10^5$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴		

2.1.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	8.055	in	/ 0	in
Section moment of inertia	I_1 / I_2	=	$1.822 \cdot 10^5$	in⁴	/ $1.009 \cdot 10^5$	in⁴
Principal axis rotation	θ	=	90.0	°		
Moment fraction	γ_1 / γ_2	=	0.4021		/ 0.3710	
Unbalanced moment	M_{u1} / M_{u2}	=	64.8	kip-ft	/ -253.6	kip-ft

Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

2.1.4 Stresses

Maximum shear stresss	v_u	=	271	psi			
	x / y	=	14.5	in	/	-17.5	in
Shear resistance (concrete only)	ϕv_c	=	212.1	psi			
Shear resistance (with studrails)	ϕv_n	=	373.7	psi			
Shear resistance (upper limit)	$\phi v_{n,max}$	=	424.3	psi			

2.2 Outer Critical Section (d/2 outside of reinforced zone)

2.2.1 Common Properties

Area	A_c	=	3578.4	in²			
Critical section perimeter	b_0	=	275.3	in			

2.2.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	0	in	/	-43.832	in
Section moment of inertia	I_x / I_y	=	$2.940 \cdot 10^6$	in⁴	/	$1.140 \cdot 10^7$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴			

2.2.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	43.832	in	/	0	in
Section moment of inertia	I_1 / I_2	=	$1.140 \cdot 10^7$	in⁴	/	$2.940 \cdot 10^6$	in⁴
Principal axis rotation	θ	=	90.0	°			
Moment fraction	γ_1 / γ_2	=	0.4659		/	0.2924	
Unbalanced moment	M_{u1} / M_{u2}	=	64.8	kip-ft	/	-253.6	kip-ft

2.2.4 Stresses

Maximum shear stresss	v_u	=	104.5	psi			
	x / y	=	83.25	in	/	11	in
Shear resistance	ϕv_c	=	106.1	psi			

3. Elements

Number of studrails per column		=	8				
Number of studs per studrail		=	28				
Stud diameter	D	=	0.5	in			
Stud spacing	S / S_0	=	2.375	in	/	4.625	in
Overall height of studrail	OAH	=	12	in			
Overall length of studrail	OAL	=	73.375	in			

Responsible:

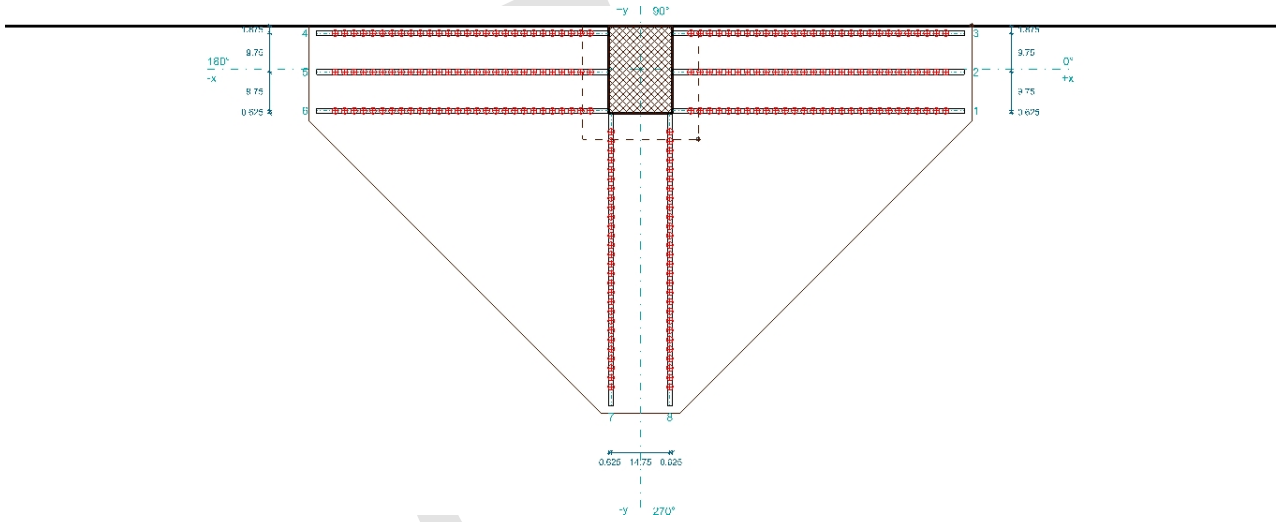
Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

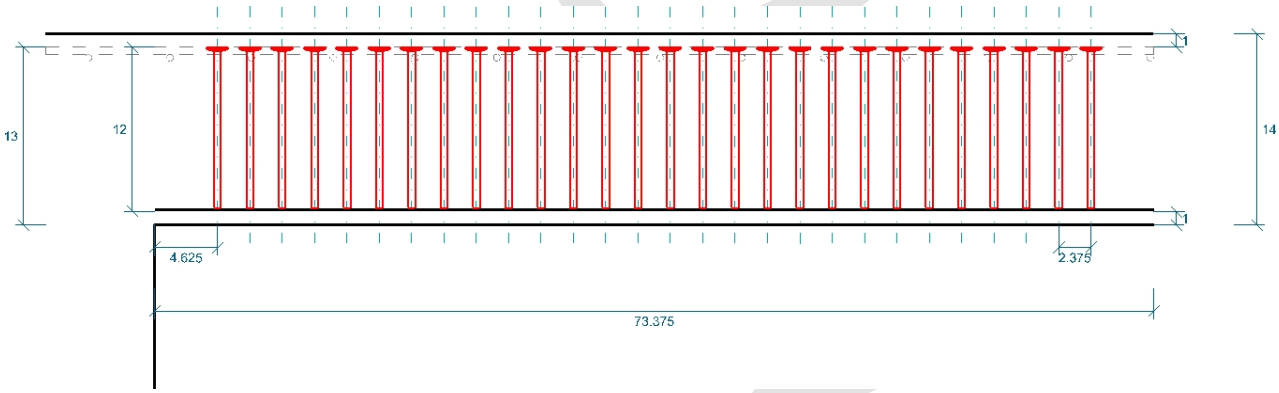
4. Note

- The design against punching shear failure is based on the rules of ACI 318-14.
- This calculation is bases on product specific properties of DECON® Studrails®. Changes, even to similar products, are only possible with new calculations.
- All data have to be checked with the given edge boundaries and the feasibility. DECON assumes no liability for the input data of the user.

Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020





Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

JORDAHL® EXPERT Punching shear - Design

1. Input information

Column type	Rectangular edge column					
Column dimension	c_x / c_y	=	16	in	/ 22	in
Edge	r_a	=	1	in		
Slab type	In-situ concrete slab					
Slab thickness	h	=	14	in		
Concrete cover top/bottom	c_o / c_u	=	1	in	/ 1	in
Effective depth	d_x / d_y	=	13	in	/ 13	in
Concrete strength	5000 psi					
Density	Normal concrete					
Prestress	f_{pc}	=	0	psi		
Punching shear load	V_u	=	134.1	kip		
Unbalanced moment	M_{ux} / M_{uy}	=	71.7	kip-ft	/ 124.6	kip-ft
Seismic loading	Yes					

2. Output information (ACI 318-14)

2.1 Inner Critical Section (d/2 outside of column face)

2.1.1 Common Properties

Area	A_c	=	1066	in²		
Critical section perimeter	b_0	=	82	in		

2.1.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	7.765	in	/ 0	in
Section moment of inertia	I_x / I_y	=	$2.336 \cdot 10^5$	in⁴	/ $6.412 \cdot 10^4$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴		

2.1.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	-7.765	in	/ 0	in
Section moment of inertia	I_1 / I_2	=	$2.336 \cdot 10^5$	in⁴	/ $6.412 \cdot 10^4$	in⁴
Principal axis rotation	θ	=	0.0	°		
Moment fraction	γ_1 / γ_2	=	0.4486		/ 0.3140	
Unbalanced moment	M_{u1} / M_{u2}	=	71.7	kip-ft	/ 124.6	kip-ft

Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

2.1.4 Stresses

Maximum shear stresss	v_u	=	169.7	psi			
	x / y	=	14.5	in	/	-17.5	in
Shear resistance (concrete only)	ϕv_c	=	212.1	psi			
Shear resistance (with studrails)	ϕv_n	=	349.5	psi			
Shear resistance (upper limit)	$\phi v_{n,max}$	=	424.3	psi			

2.2 Outer Critical Section (d/2 outside of reinforced zone)

2.2.1 Common Properties

Area	A_c	=	2915.1	in²			
Critical section perimeter	b_0	=	224.2	in			

2.2.2 Natural Axis Properties

Centroid coordinate	e_x / e_y	=	35.212	in	/	0	in
Section moment of inertia	I_x / I_y	=	$6.532 \cdot 10^6$	in⁴	/	$1.521 \cdot 10^6$	in⁴
Section product of inertia	I_{xy}	=	0	in⁴			

2.2.3 Principal Axis Properties

Centroid coordinate	e_1 / e_2	=	-35.212	in	/	0	in
Section moment of inertia	I_1 / I_2	=	$6.532 \cdot 10^6$	in⁴	/	$1.521 \cdot 10^6$	in⁴
Principal axis rotation	θ	=	0.0	°			
Moment fraction	γ_1 / γ_2	=	0.4750		/	0.2808	
Unbalanced moment	M_{u1} / M_{u2}	=	71.7	kip-ft	/	124.6	kip-ft

2.2.4 Stresses

Maximum shear stresss	v_u	=	76.7	psi			
	x / y	=	-9	in	/	-69.625	in
Shear resistance	ϕv_c	=	106.1	psi			

3. Elements

Number of studrails per column		=	7				
Number of studs per studrail		=	21				
Stud diameter	D	=	0.5	in			
Stud spacing	S / S_0	=	2.375	in	/	4.625	in
Overall height of studrail	OAH	=	12	in			
Overall length of studrail	OAL	=	56.75	in			

Responsible:

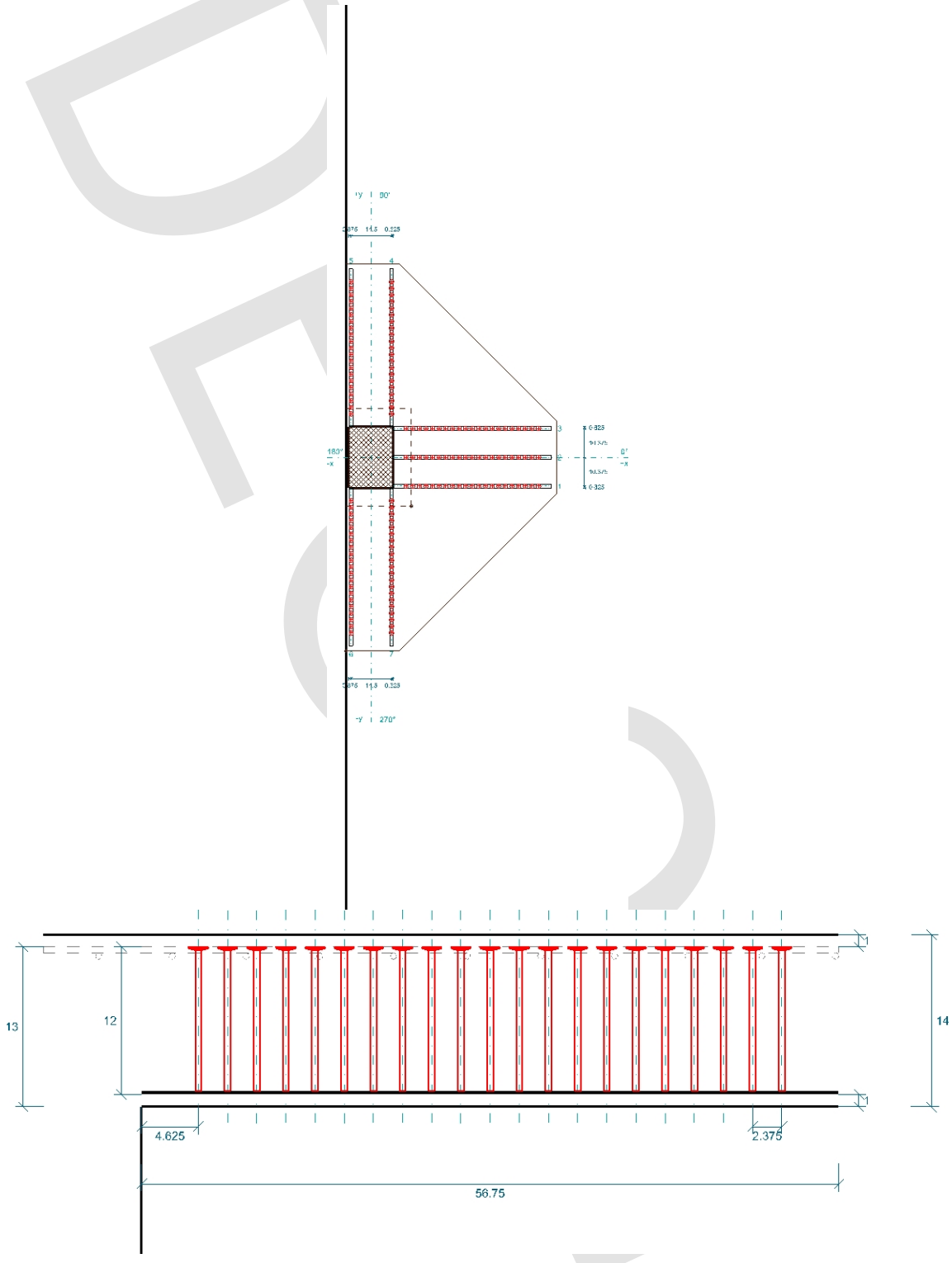
Construction project:
Construction member:
Position: F-2
Date: November 13, 2020

4. Note

- The design against punching shear failure is based on the rules of ACI 318-14.
- This calculation is bases on product specific properties of DECON® Studrails®. Changes, even to similar products, are only possible with new calculations.
- All data have to be checked with the given edge boundaries and the feasibility. DECON assumes no liability for the input data of the user.

Responsible:

Construction project:
Construction member:
Position: F-2
Date: November 13, 2020



SLAB DESIGN

Mild Slab Design Criteria

Code

ACI 318-14

Materials

Concrete f'c = 5,000 psi at 28 days
Reinforcing Steel fy = 60,000 psi

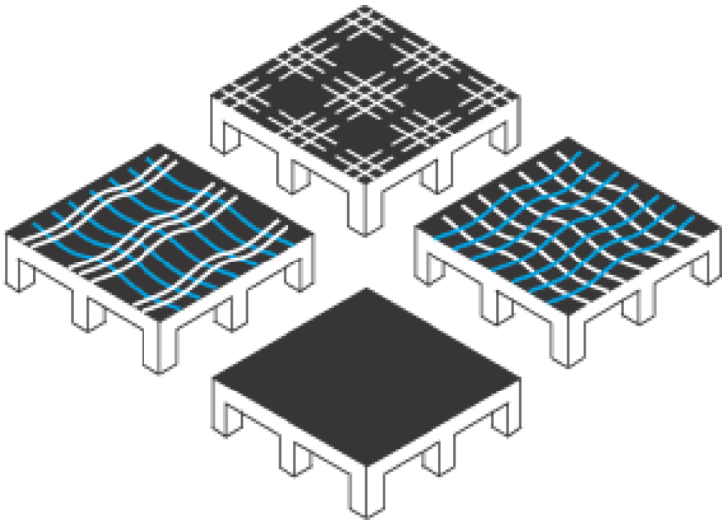
Analysis

Gravity loads on elevated slabs were considered according to the Design Criteria in the General Notes of the structural drawings including structure self-weight added to the noted superimposed dead load. Strength design was performed using the governing load combination 1.2DL + 1.6LL. Unfactored service loads were used to calculated long-term cracked deflection under dead load conditions and a long term cracked deflection under dead load and live load with target deflections depending on span length. Unbalanced live load was considered for the worst-case conditions.
Conventionally reinforced slabs were modeled in the Finite Element software RAM Concept as two-way, non-post-tensioned slabs with pinned connections assumed at wall supports. Minimum steel was provided, A_{smin} = .0018*thickness. Punching shear was checked using RAM Concept output and then Decon STDesign software to design studrails.

MERCER ISLAND APARTMENTS

PERMIT CALCULATIONS

11/12/20



LEVEL P1 MILD SLAB (11-8-20)_KR v1.0.cpt
11/13/2020

8.1

Table of Contents

Table of Contents (2)

Table of Contents (3)

Units

Geometry Units

Plan Dimensions: feet
Angles: degrees
Slab Thickness: inches
Elevations: inches
Support Dimensions: inches
Support Height: feet

Loading and Reaction Unit

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 Unit

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

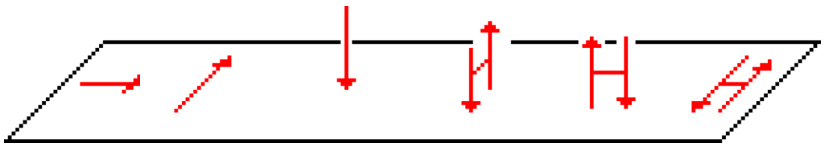
Concrete Volume: yd^3
Tendon Force: Kips
Reinforcing Stress: ksi
Reinforcing Area: in^2
Tendon Force Per Width: kips/ft
PT Weight: pounds
Reinforcement Weight: tons
Tendon Profile: inches
Cover: inches

Miscellaneous Unit

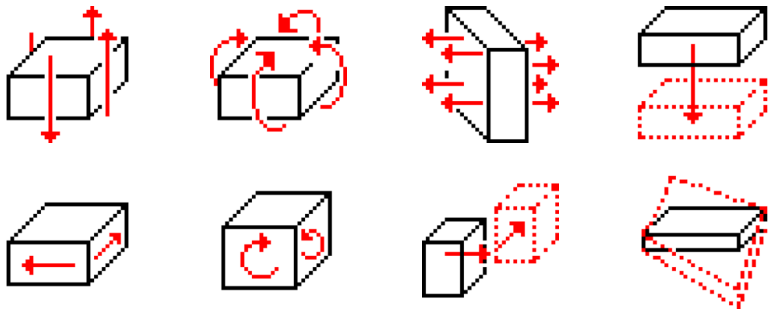
Floor Area: ft^2
Tendon Angles (for friction): radians
Density: pcf
Temperature Change: °F
Elongations: inches

Signs

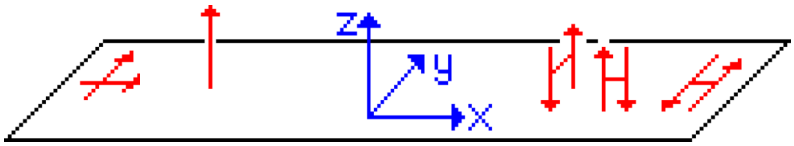
Positive Loads



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	150	150	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
5000 psi	150	150	3000	5000	3725	6399	0.2	5.556e-6	Code	2500000	3000000
6000 psi	150	150	3000	6000	3725	7450	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
½" Bonded	bonded	0.153	28000	160	243	270	3	4	6
0.6" Unbonded	unbonded	0.217	28000	175	243	270	0.6	1	8
0.6" Bonded	bonded	0.217	28000	160	243	270	4	4	8

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
½" Bonded	216	0.25	0.02	0.001	0.2	22
0.6" Unbonded	216	0.25	0	0.0014	0.07	22
0.6" Bonded	216	0.25	0.02	0.001	0.2	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	60	None	Code	Code	Code
#4	0.2	29000	60	None	Code	Code	Code
#5	0.31	29000	60	None	Code	Code	Code
#6	0.44	29000	60	None	Code	Code	Code
#7	0.6	29000	60	None	Code	Code	Code
#8	0.79	29000	60	None	Code	Code	Code
#9	1	29000	60	None	Code	Code	Code
#10	1.27	29000	60	None	Code	Code	Code
#11	1.56	29000	60	None	Code	Code	Code

Materials (2)

SSR Systems

SSR System Name	Stud Area (in²)	Head Area (in²)	Min Clear Head Spacing (inches)	Specified Stud Spacing (inches)	Fy (ksi)	Stud Spacing Rounding Increment (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
Temporary Construction (At Stressing) Loading	Stressing Dead	Normal	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 (Storage) Loading	Live (Storage)	Normal	1	0
Live (Parking) Loading	Live (Parking)	Normal	1	0
Live (Roof) Loading	Live (Roof)	Normal	1	0
Snow Loading	Snow	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

Initial Service LC

Active Design Criteria: Initial Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1.13	1.13
Temporary Construction (At Stressing) 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
Live (Storage) Loading	1	0
Live (Parking) 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

Load Combinations (2)

Service LC: D + S

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
Snow 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 (Storage) Loading	0.75	0
Live (Parking) Loading	0.75	0
Live (Roof) Loading	0.75	0

Service LC: D + 0.75L + 0.75S

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 (Storage) Loading	0.75	0
Live (Parking) Loading	0.75	0
Snow Loading	0.75	0

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 (Storage) Loading	1	1
Live (Parking) Loading	0.5	0.5
Live (Roof) Loading	0.5	0.5

Load Combinations (3)

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 (Storage) Loading	1.6	0
Live (Parking) 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 (Storage) Loading	1	0
Live (Parking) Loading	1	0
Live (Roof) Loading	1.6	0

Factored LC: 1.2D + 1.6L + 0.5S

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 (Storage) Loading	1.6	0
Live (Parking) Loading	1.6	0
Snow Loading	0.5	0

Load Combinations (4)

Factored LC: 1.2D + f1L + 1.6S

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 (Storage) Loading	1	0
Live (Parking) Loading	1	0
Snow Loading	1.6	0

Design Rules

Code Minimum Desig

318-14 Min. Reinforcement

User Minimum Desig

Specified Min. Reinforcement

Initial Service Desig

318-14 Initial Service Design

Service Design

318-14 Service Design
Include detailed section analysis

Sustained Service Desig

318-14 Sustained Service Design

Strength Design

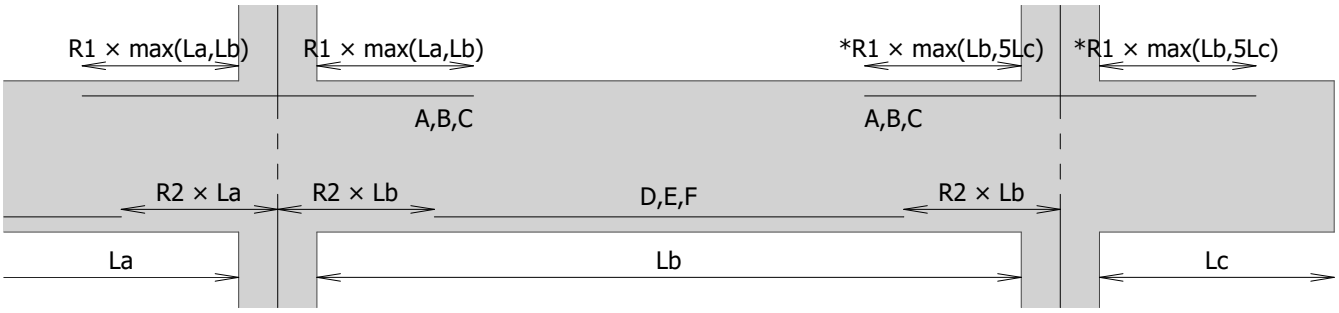
318-14 Strength Design
Punching Shear Design

Ductility Desig

318-14 Ductility Design

Detailing Rules

Custom Span Detailing Rules



Rule Name	*A Fraction*	*A R1*	*B Fraction*	*B R1*	*C Fraction*	*C R1*	*D Fraction*	*D R2*	*E Fraction*	*E R2*	*F Fraction*	*F R2*
None	0	0	0	0	0	0	0	0	0	0	0	0

"A", "B" and "C", are support reinforcement sets, based on the peak reinforcement in the support zone.
"D", "E" and "F", are span reinforcement sets, based on the peak reinforcement in the span zone.
"*R1" is never taken as greater than 0.2 when multiplied by Lc (or Lcc).
"Fraction" is the ratio of set reinforcement to peak reinforcement. It is always in the 0.0 to 1.0 range.

Load History

Load History Step Name	*Load Combination*	*Duration (days)*	*Total Age (days)*
Maximum Short Term Load	Service LC: D + L	30	33
Sustained Load	Sustained Service LC	5000	5033
Final Instantaneous Load	Service LC: D + L	0	5033

Tendon Parameters Groups

Banded Tendon Polyline Groups

Group Name	PT System	I.P. Ratio	Eff. Force (Kips)	Number of Strands	Optimize	Min Force (Kips)	Max Force (Kips)	Force Incr. (Kips)	Min Strands	Max Strands	Strands Increment

Distributed Tendon Quadrilateral Groups

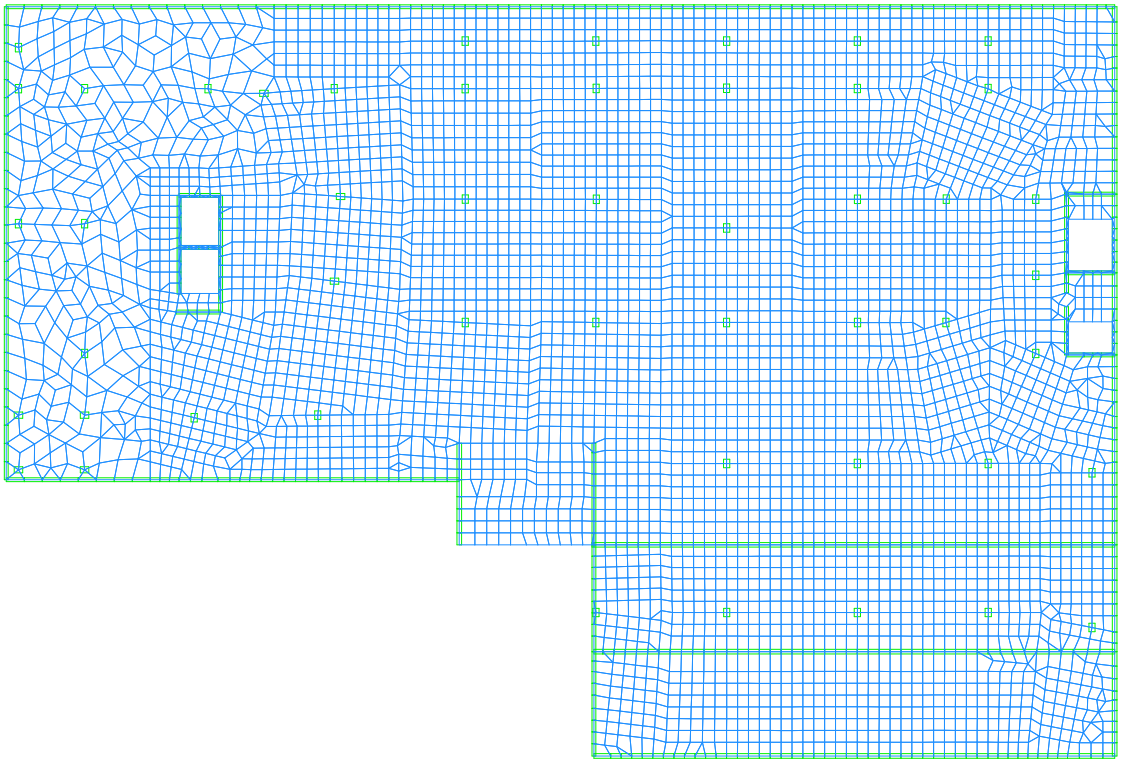
Group Name	PT System	I.P. Ratio	Spacing (feet)	Eff. Force (kips/ft)	# Strands (1/feet)	Optimize	Min Force (kips/ft)	Max Force (kips/ft)	Force Incr. (kips/ft)	Min Strands (1/feet)	Max Strands (1/feet)	Strands Ir (1/feet)

Profile Polyline Groups

Group Name	Elevation Reference	Elevation (inches)	Optimize	Min Elevation (inches)	Max Elevation (inches)	Elevation Incr. (inches)

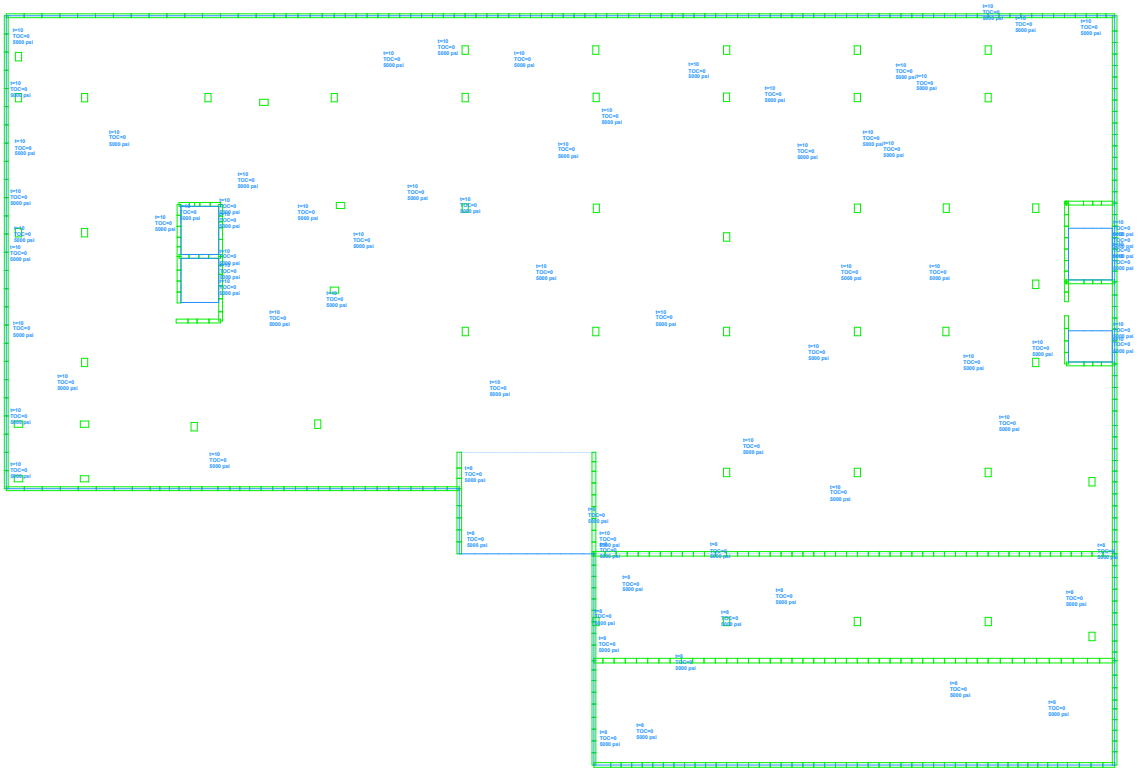
Element: Standard Plan

Element: Wall Elements Below; Column Elements Below; Slab Elements; User Notes; User Lines; User Dimensions;
Scale = 1:500



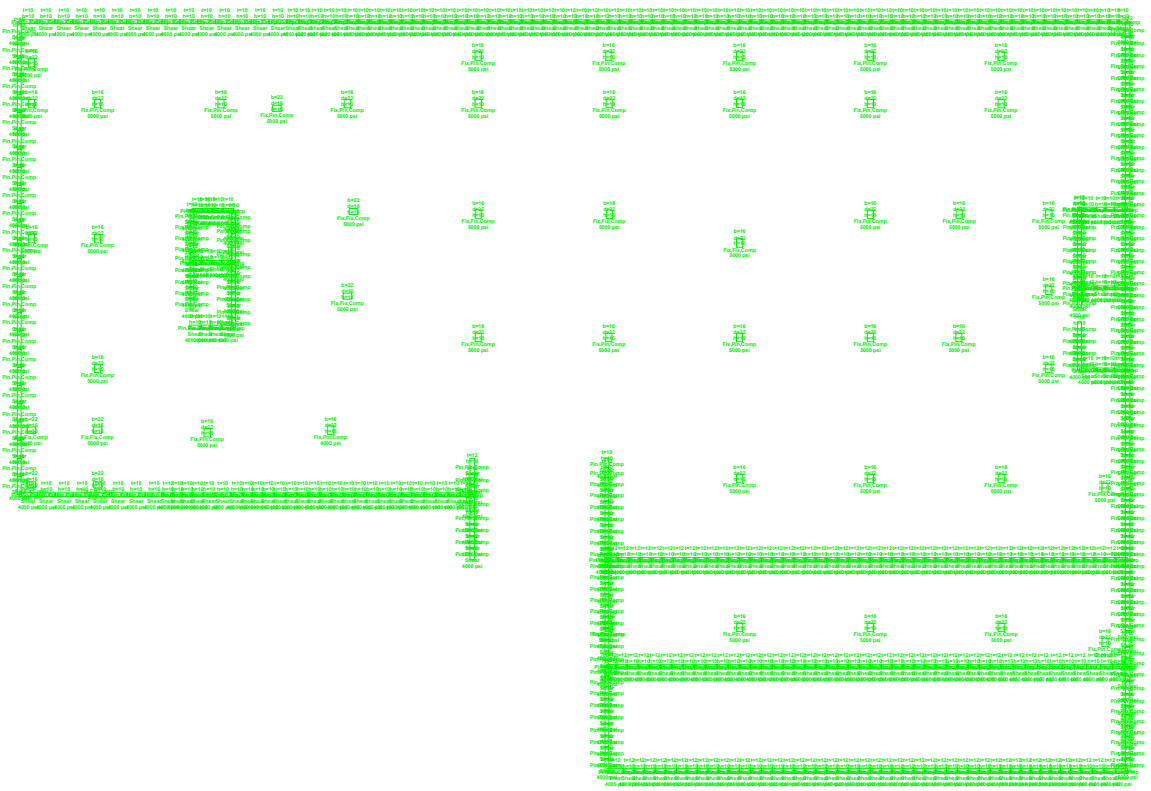
Element: Slab Summary Plan

Element: User Lines; User Notes; User Dimensions; Wall Elements Below; Wall Elements Above; Column Elements Below; Column Elements Above; Point Springs; Point Spring Icons; Line Springs; Line Spring Icons; Slab Elements; Slab Element Outline Only; Slab Element Thicknesses; Slab Element Elevations; Slab Element Concrete Models;
Scale = 1:500



Element: Supports Below Slab Summary Plan

Element: User Lines; User Notes; User Dimensions; Wall Elements Below; Wall Element Thicknesses; Wall Element Heights; Wall Element Fixity; Wall Element Shear Fixity; Wall Element Concrete Models; Column Elements Below; Column Element Dimensions; Column Element Heights; Column Element Fixity; Column Element Concrete Models; Point Springs; Point Spring Icons; Point Spring Values; Point Spring Elevations; Line Springs; Line Spring Icons; Line Spring Values; Line Spring Elevations;
Scale = 1:500

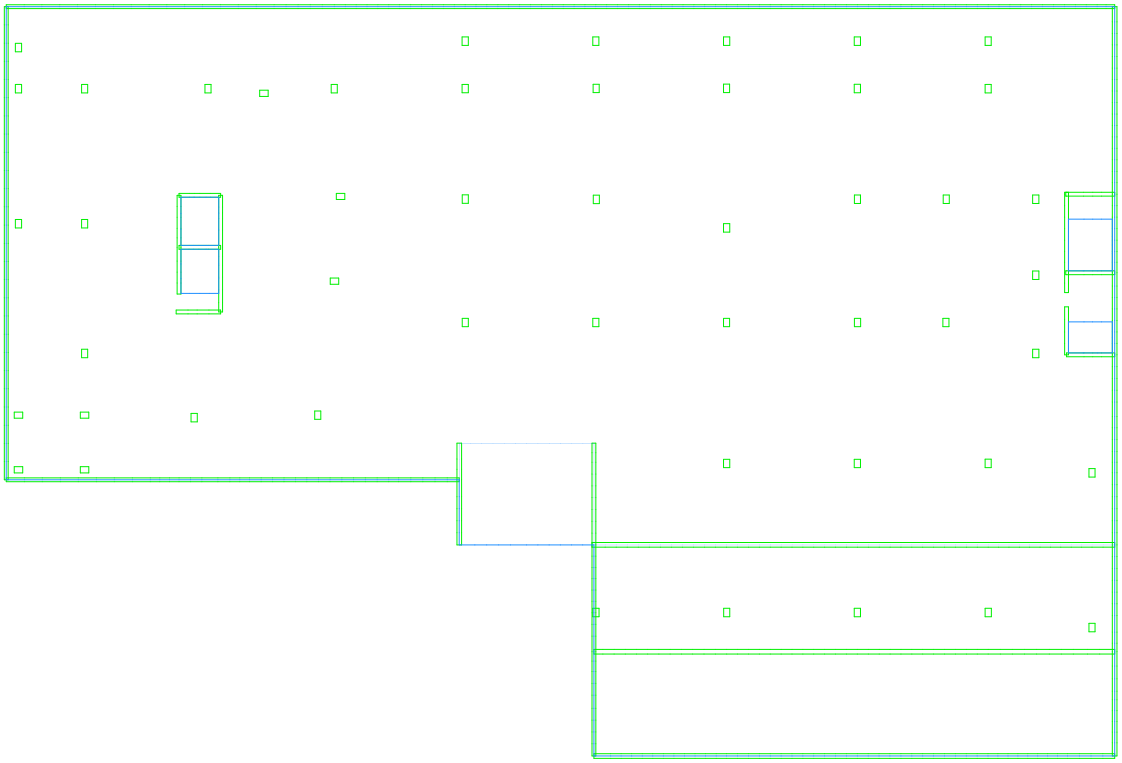


Element: Supports Above Slab Summary Plan

Element: User Lines; User Notes; User Dimensions; Wall Elements Above; Wall Element Thicknesses; Wall Element Heights; Wall Element Fixity; Wall Element Shear Fixity; Wall Element Concrete Models; Column Elements Above; Column Element Dimensions; Column Element Heights; Column Element Fixity; Column Element Concrete Models;
Scale = 1:500

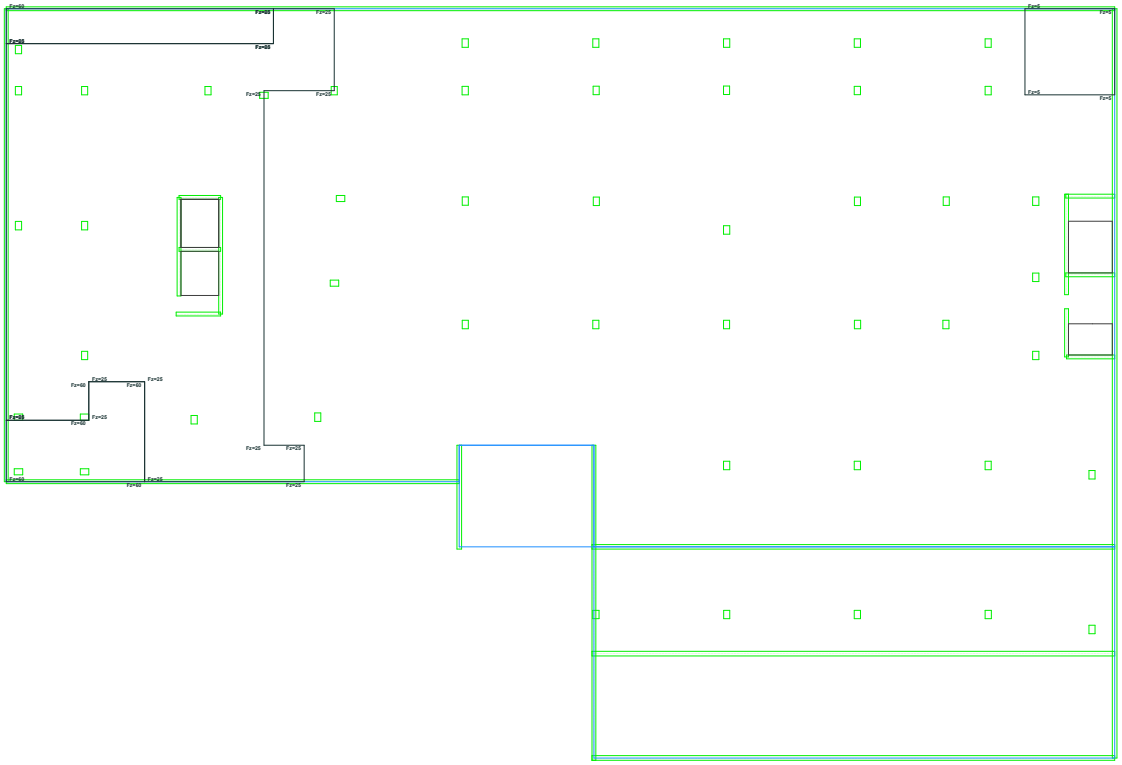
Temporary Construction (At Stressing) Loading: All Loads

Temporary Construction (At Stressing) 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 = 1:500



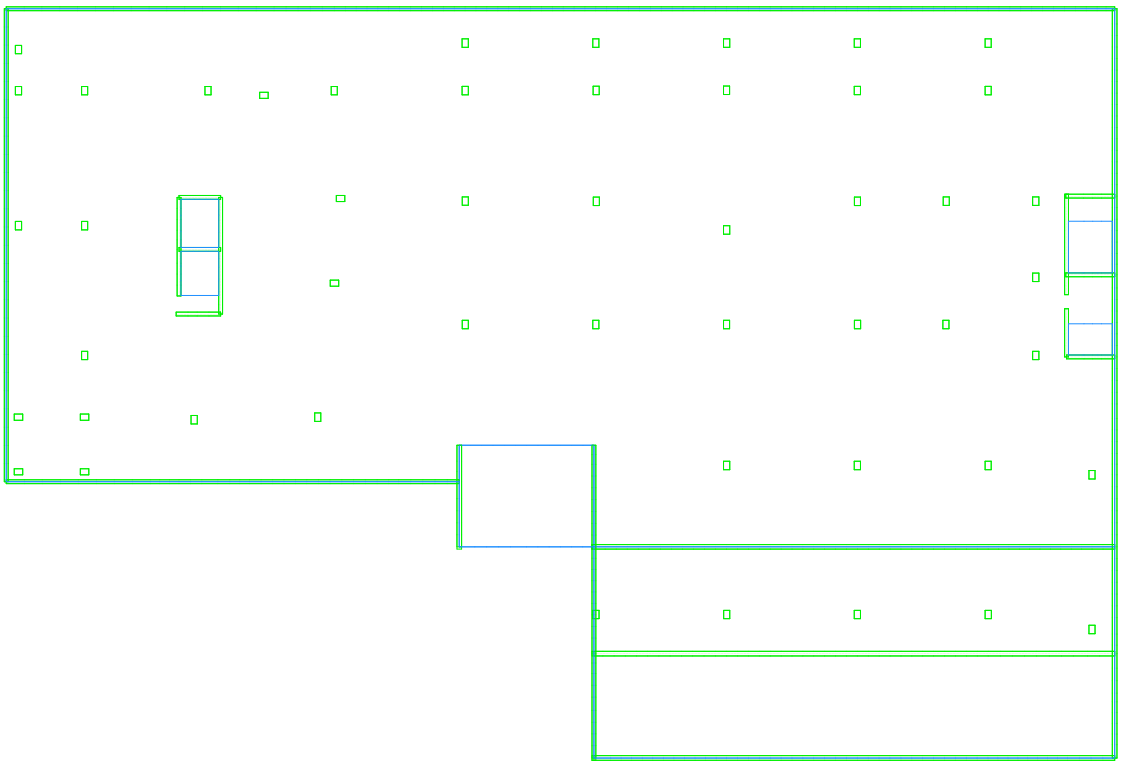
Other Dead Loading: All Loads Plan

Other Dead Loading: Point Loads; Point Load Values; Area Loads; Area Load Values; User Notes; User Lines; User Dimensions;
Mesh Input: Slab Areas; Slab Openings; Walls Below; Columns Below;
Element: Wall Element Outline Only; Slab Element Outline Only;
Scale = 1:500



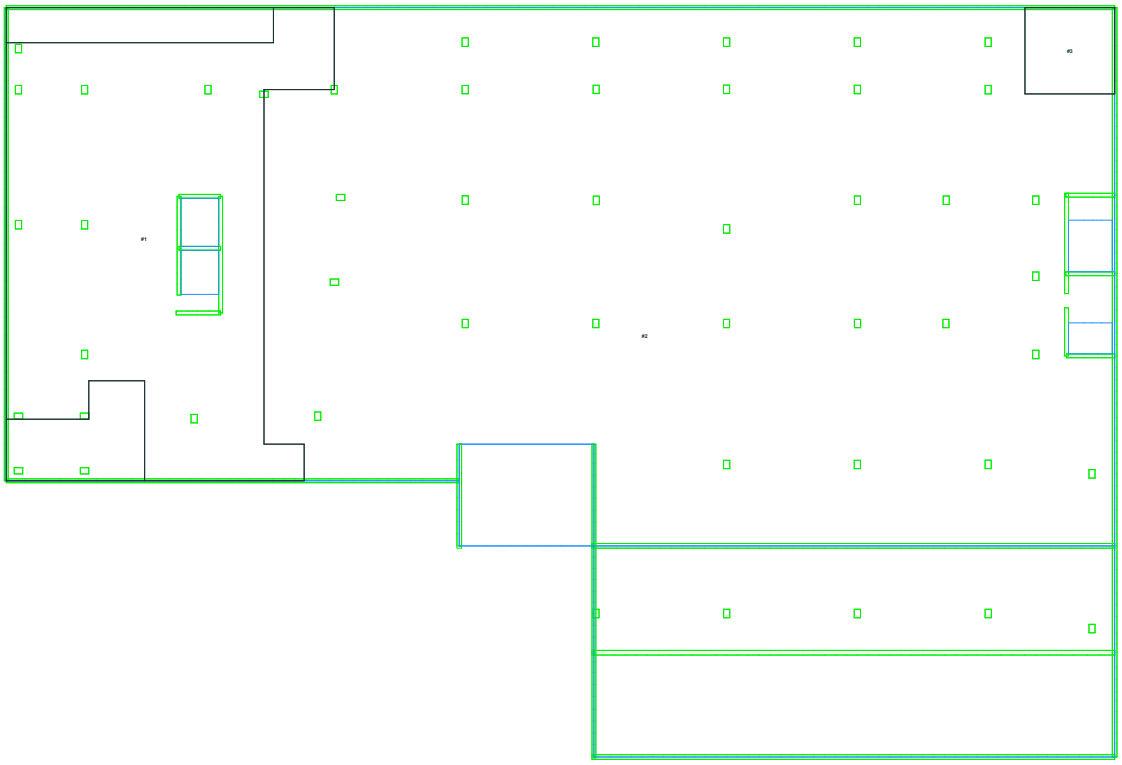
Live (Reducible) Loading: All Loads Plan

Live (Reducible) 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;
Mesh Input: Slab Areas; Walls Below; Columns Below;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:500



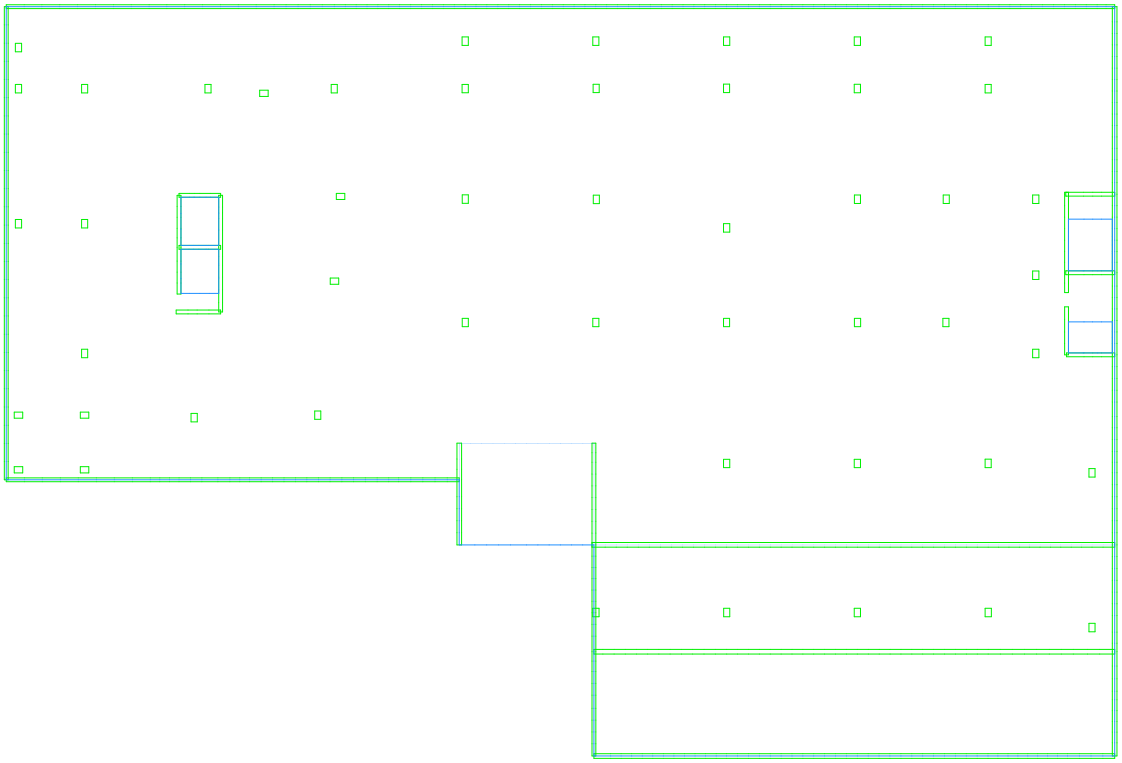
Live (Unreducible) Loading: All Loads Plan

Live (Unreducible) Loading: Area Loads; Area Load Numbers; User Lines;
Mesh Input: Slab Areas; Walls Below; Columns Below;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Other Dead Loading: Area Loads;
Scale = 1:500



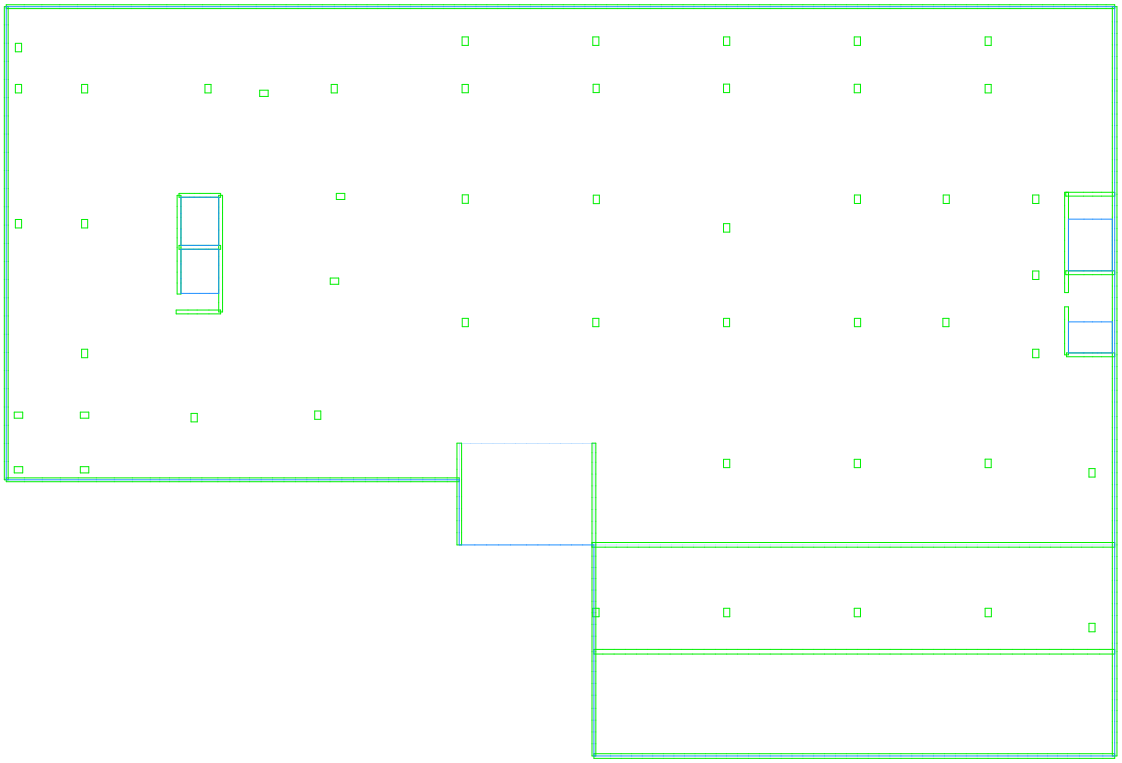
Live (Storage) Loading: All Loads Plan

Live (Storage) 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 = 1:500



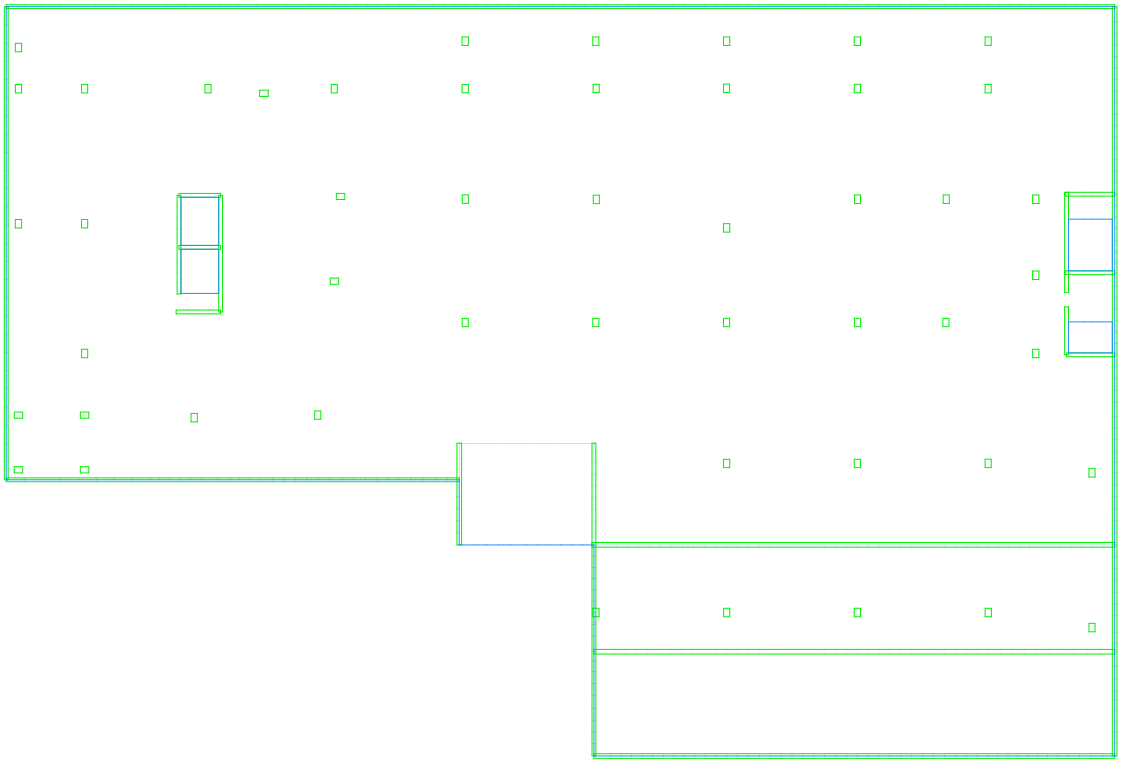
Live (Parking) Loading: All Loads Plan

Live (Parking) 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 = 1:500



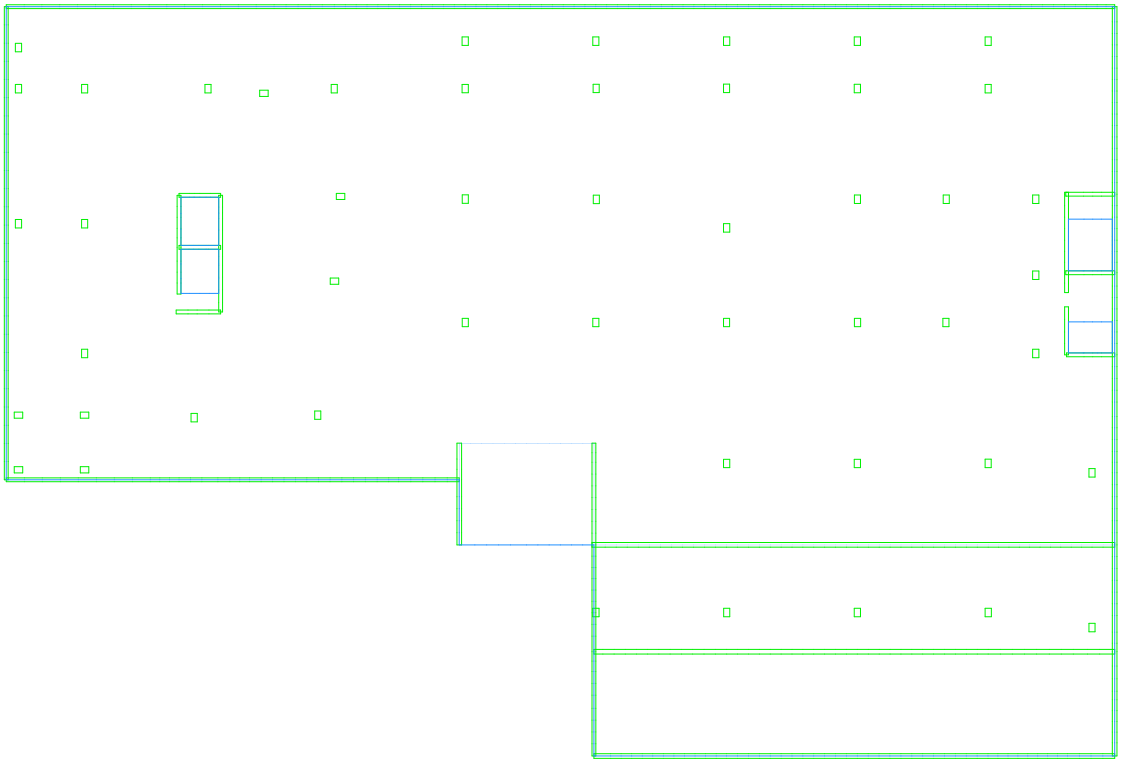
Live (Roof) Loading: All Loads Plan

Live (Roof) 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 = 1:500



Snow Loading: All Loads Plan

Snow 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 = 1:500

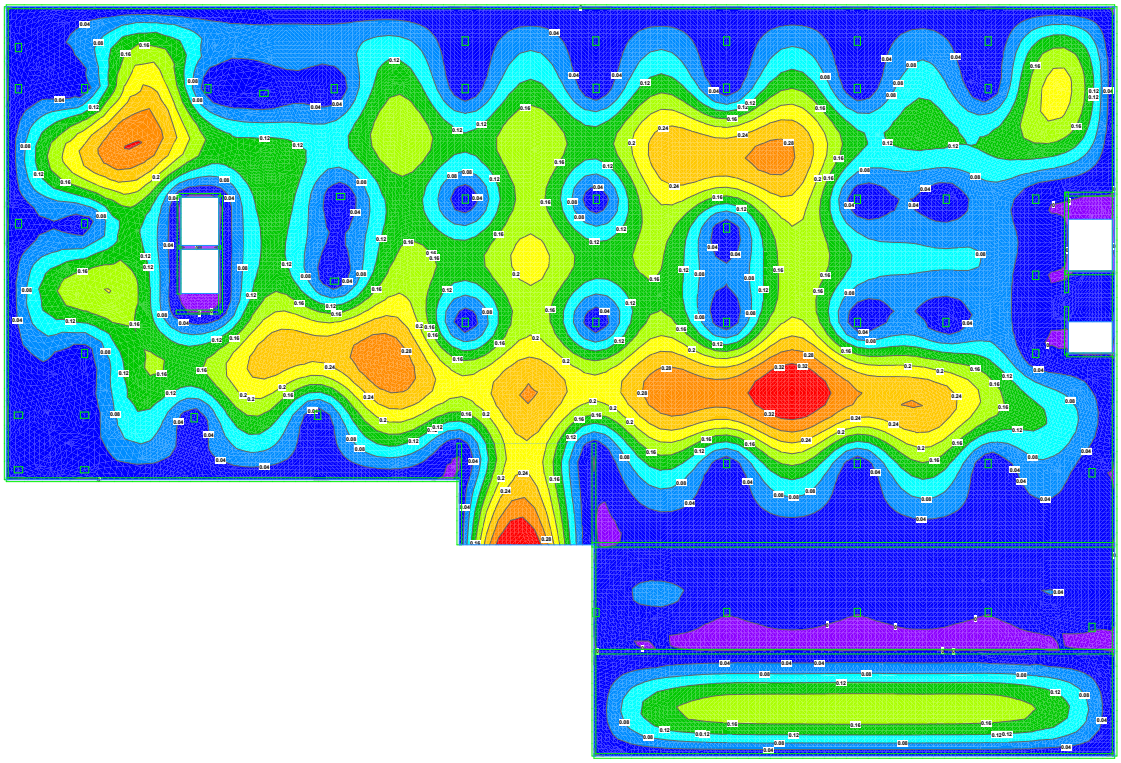


Service LC: D + L: Max Deflection Plan

Service LC: D + L: 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 = 1:200
Service LC: D + L - Vertical Deflection Plot (Maximum Values)

0 0.04 0.08 0.12 0.16 0.2 0.24 0.28 0.32

Min Value = -0.02774 inches @ (10.0,143.6) Max Value = 0.3798 inches @ (66.24,89.29)

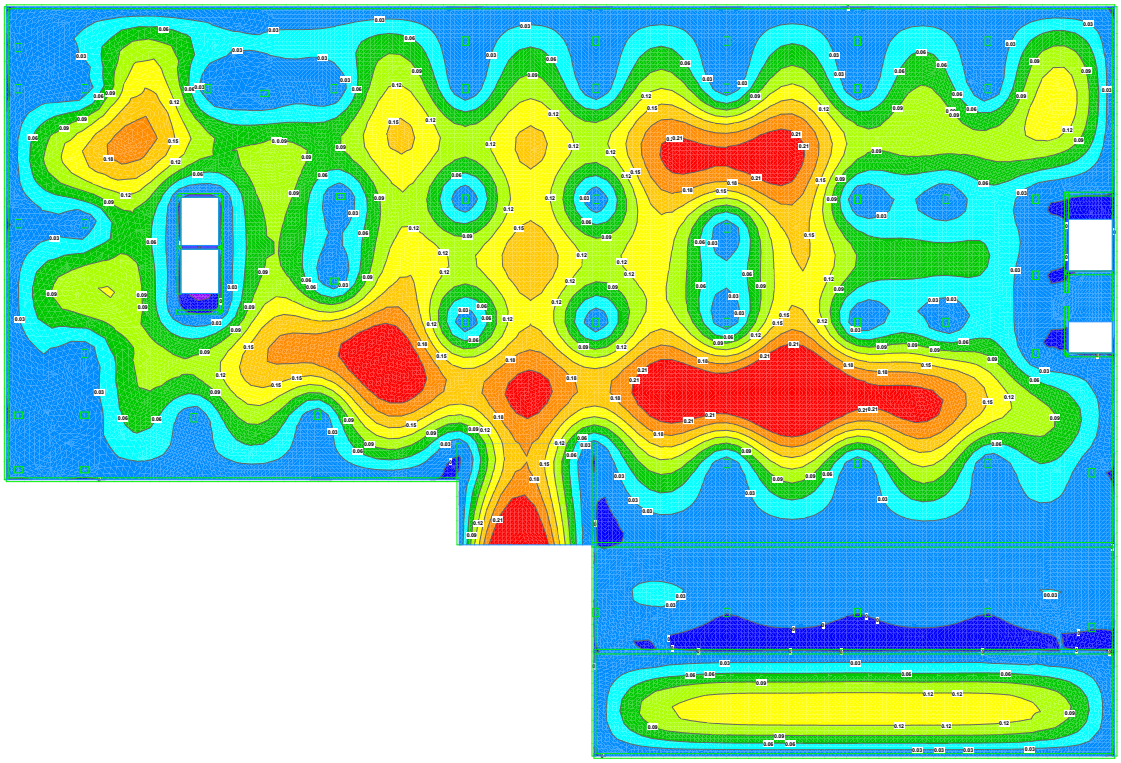


Service LC: D + L: Min Deflection Plan

Service LC: D + L: 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 = 1:200
Service LC: D + L - Vertical Deflection Plot (Minimum Values)

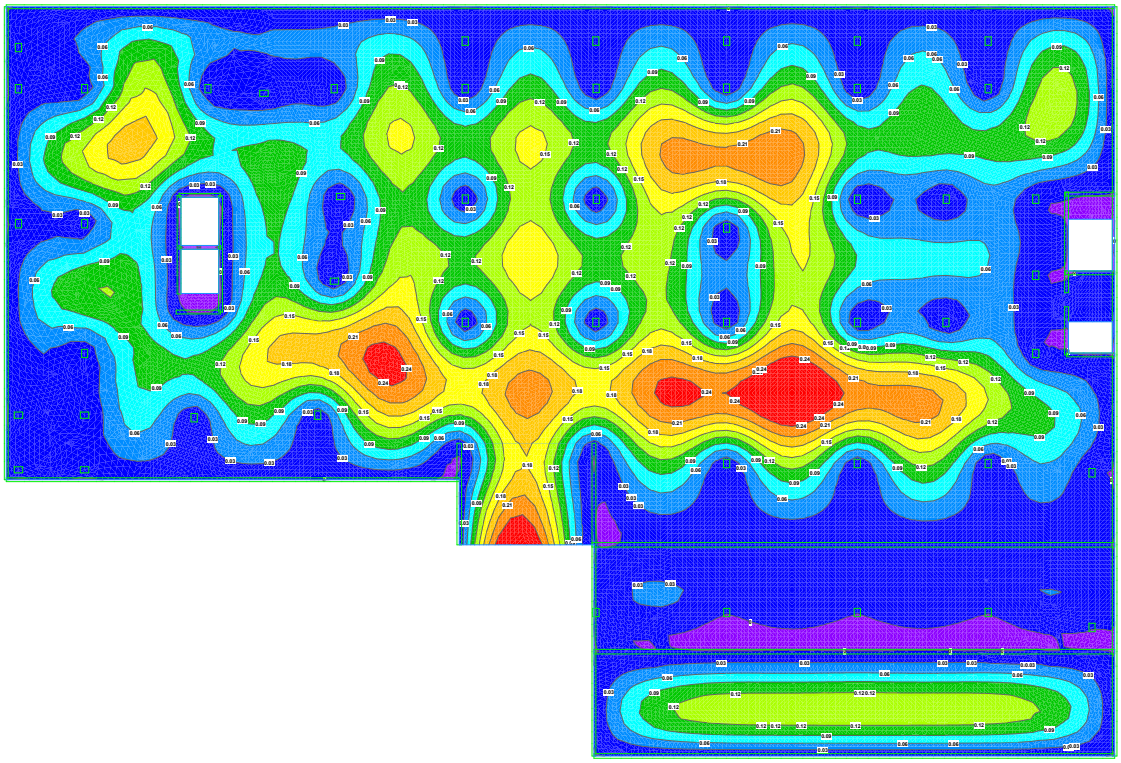
-0.03 0 0.03 0.06 0.09 0.12 0.15 0.18 0.21

Min Value = -0.04329 inches @ (10.0,143.8) Max Value = 0.2312 inches @ (147.3,122.3)



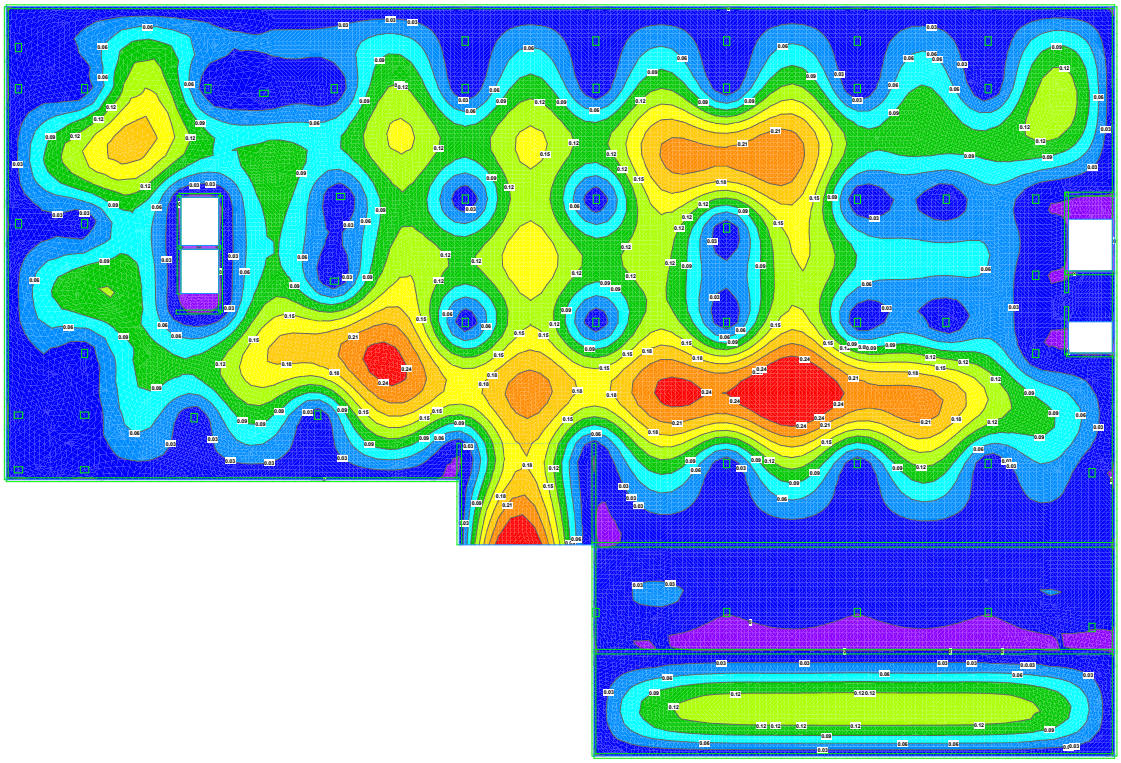
Service LC: D + Lr: Max Deflection Plan

Service LC: D + Lr: 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 = 1:550
Service LC: D + Lr - Vertical Deflection Plot (Maximum Values)
0 0.03 0.06 0.09 0.12 0.15 0.18 0.21 0.24
Min Value = -0.02774 inches @ (10.0,143.8) Max Value = 0.2312 inches @ (147.3,122.3)



Service LC: D + Lr: Min Deflection Plan

Service LC: D + Lr: 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 = 1:550
Service LC: D + Lr - Vertical Deflection Plot (Minimum Values)
0 0.03 0.06 0.09 0.12 0.15 0.18 0.21 0.24
Min Value = -0.02774 inches @ (10.0,143.8) Max Value = 0.2312 inches @ (147.3,122.3)

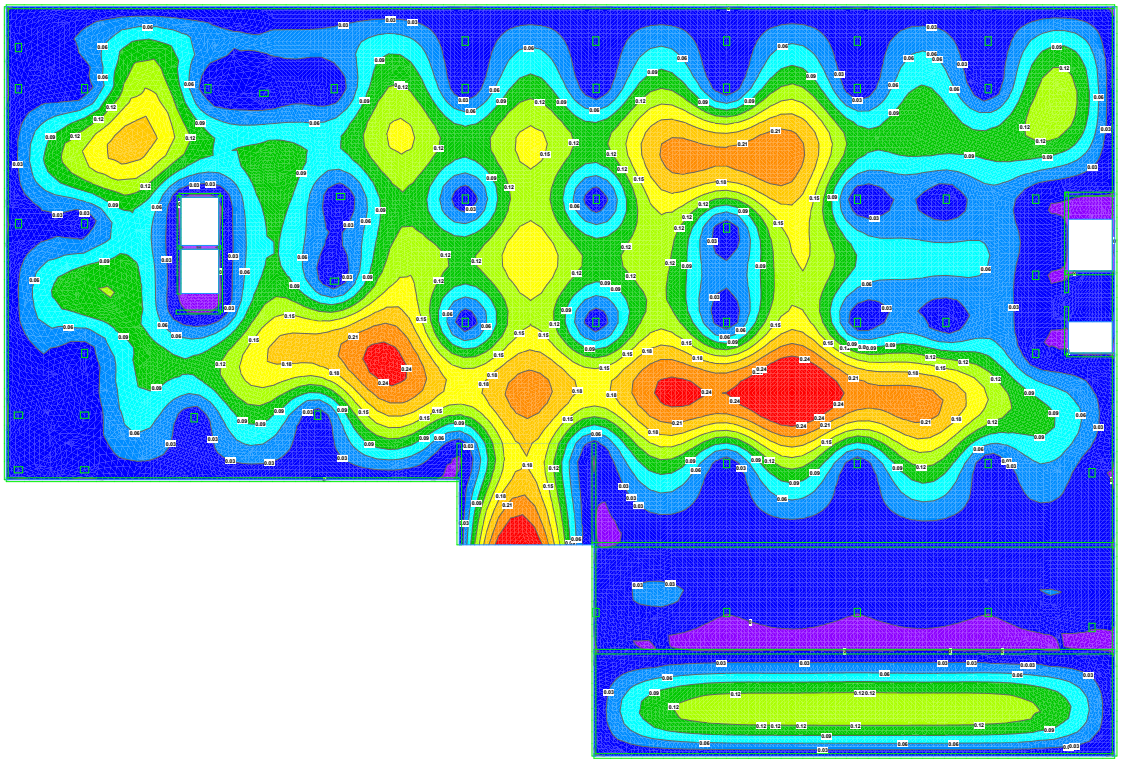


Service LC: D + S: Max Deflection Plan

Service LC: D + S: 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 = 1:200
Service LC: D + S - Vertical Deflection Plot (Maximum Values)

0 0.03 0.06 0.09 0.12 0.15 0.18 0.21 0.24

Min Value = -0.02774 inches @ (10.0,143.8) Max Value = 0.2312 inches @ (147.3,122.3)

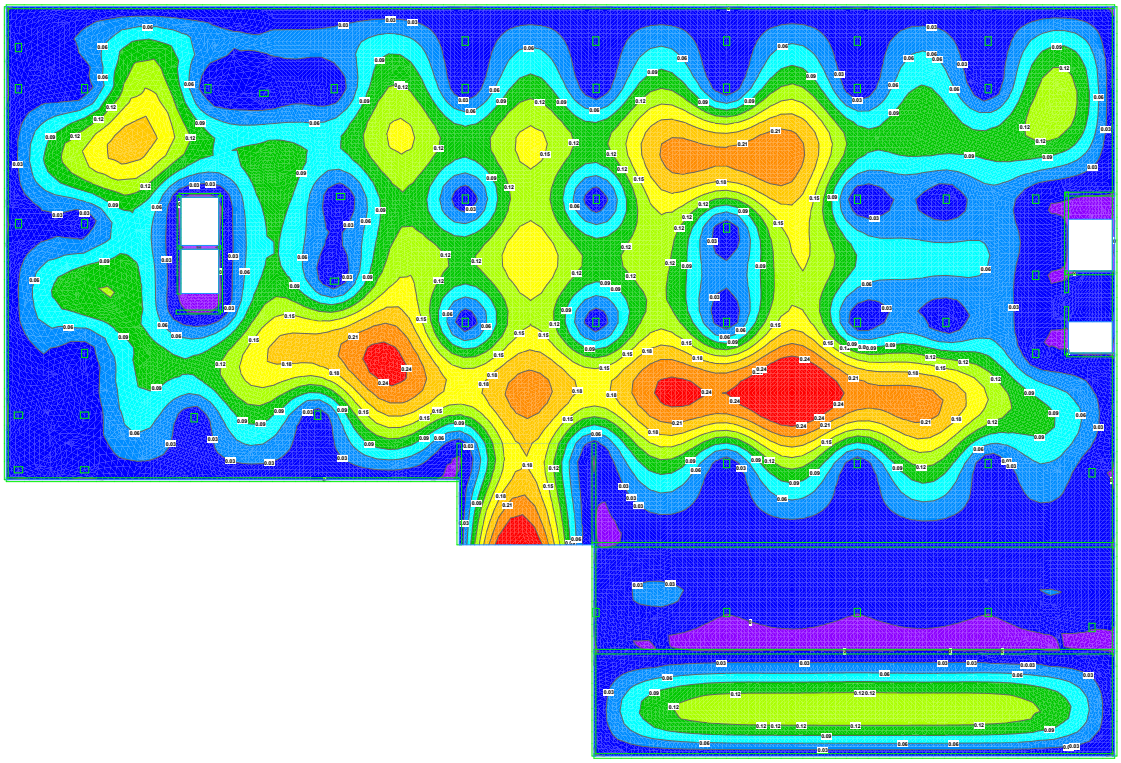


Service LC: D + S: Min Deflection Plan

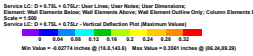
Service LC: D + S: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:200
Service LC: D + S - Vertical Deflection Plot (Minimum Values)

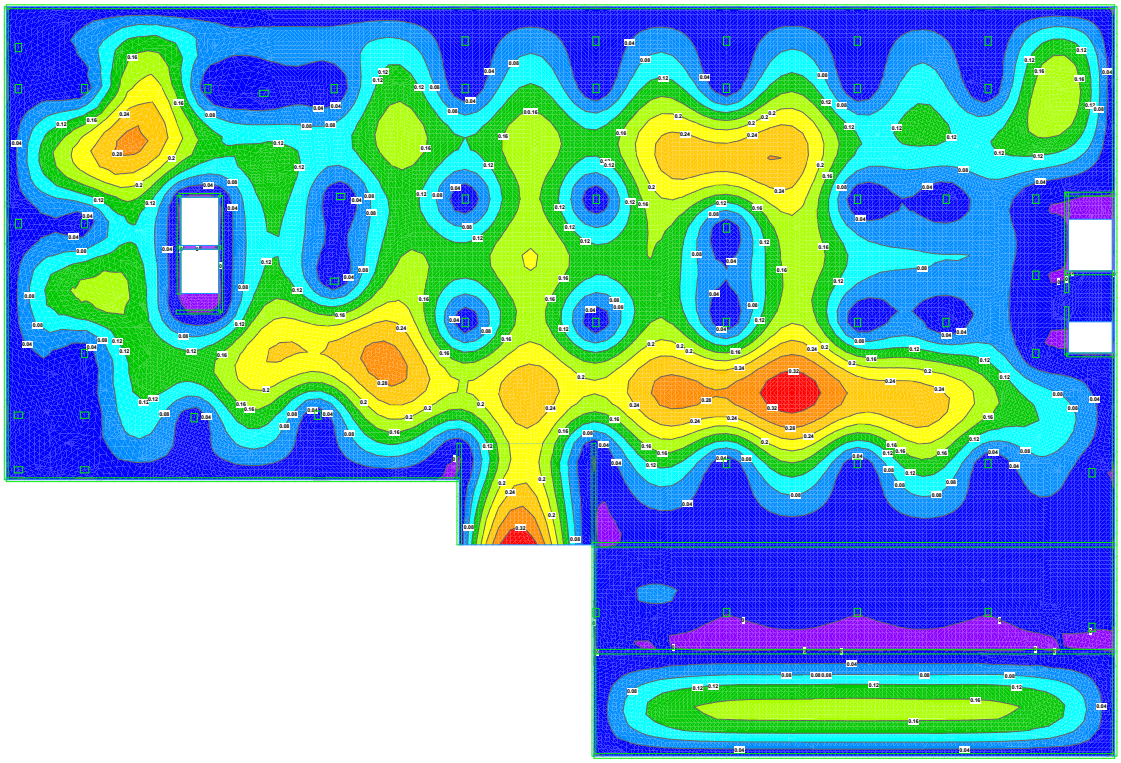
0 0.03 0.06 0.09 0.12 0.15 0.18 0.21 0.24

Min Value = -0.02774 inches @ (10.0,143.8) Max Value = 0.2312 inches @ (147.3,122.3)



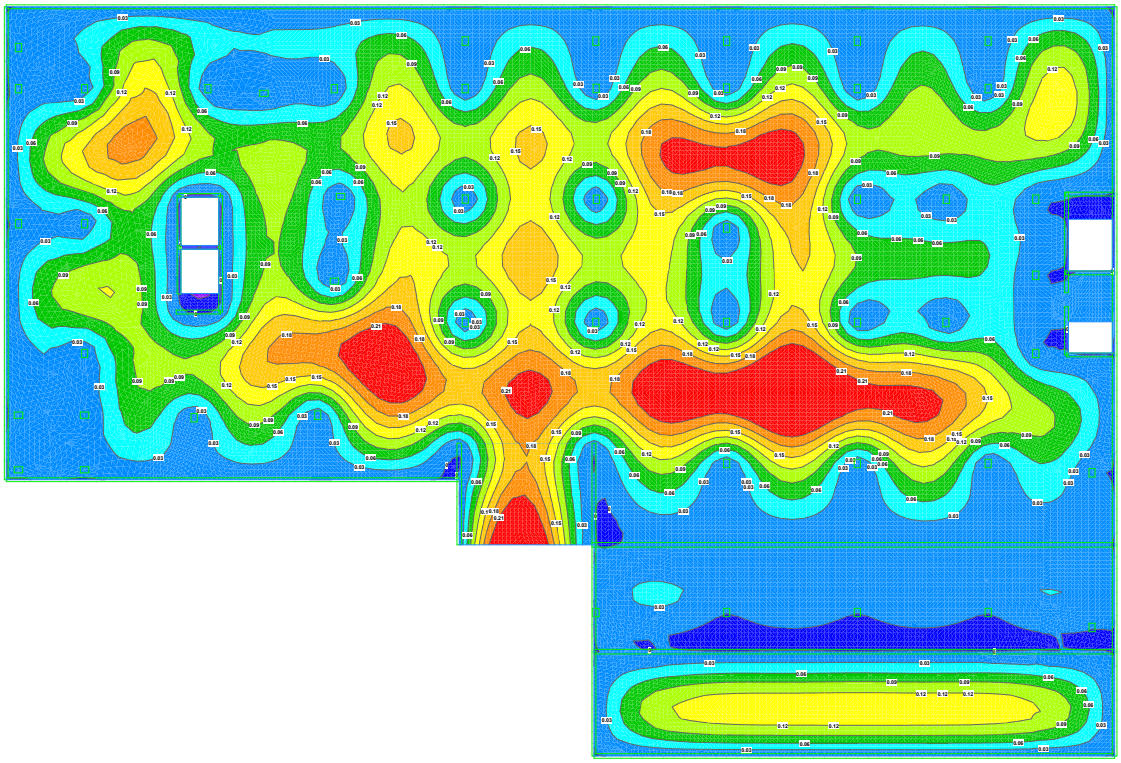
Service LC: D + 0.75L + 0.75Lr: Max Deflection Plan





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

Service LC: D + 0.75L + 0.75Lr: 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 = 1:200
Service LC: D + 0.75L + 0.75Lr - Vertical Deflection Plot (Minimum Values)
-0.03 0 0.03 0.06 0.09 0.12 0.15 0.18 0.21
Min Value = -0.0394 inches @ (10.3,143.8) Max Value = 0.2912 inches @ (147.3,122.3)

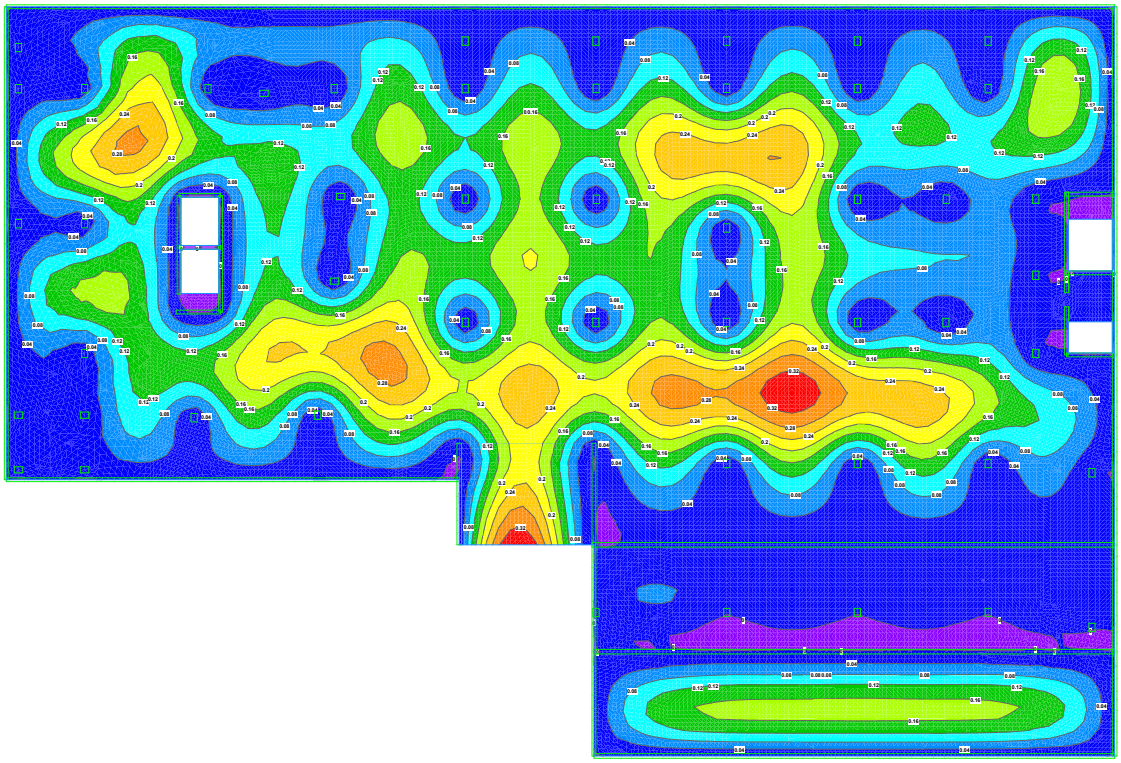


Service LC: D + 0.75L + 0.75S: Max Deflection Plan

Service LC: D + 0.75L + 0.75S: 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 = 1:200
Service LC: D + 0.75L + 0.75S - Vertical Deflection Plot (Maximum Values)

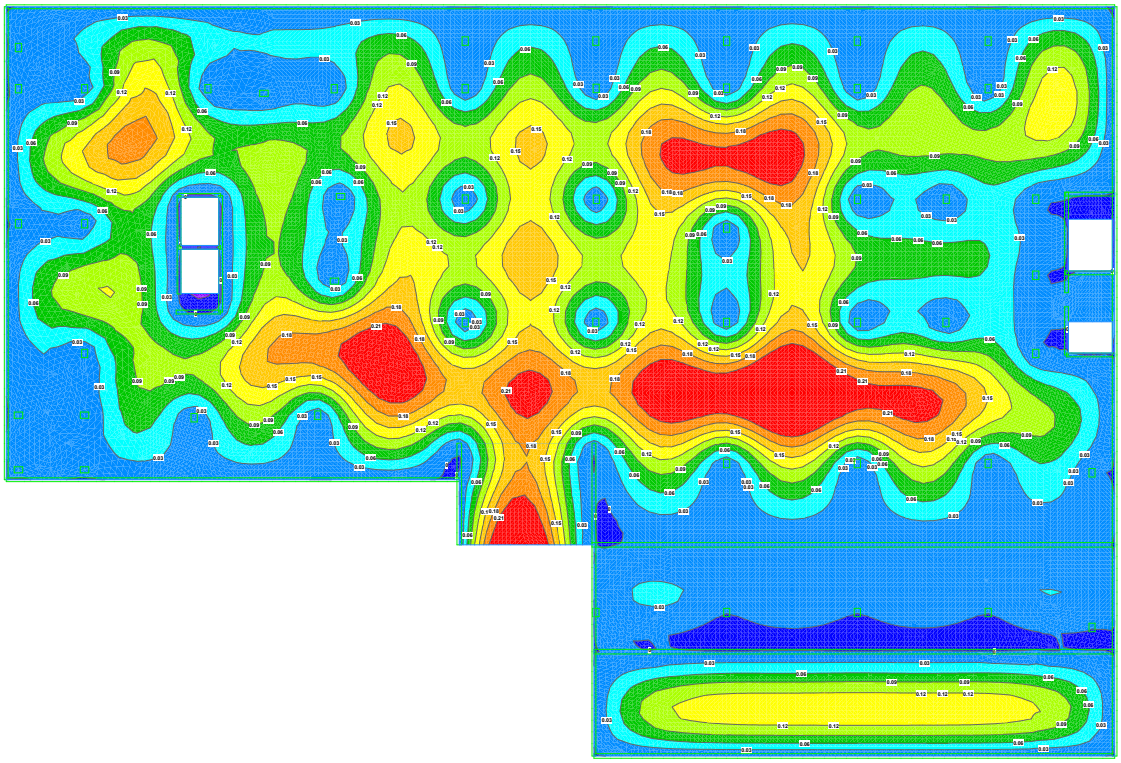
0 0.04 0.08 0.12 0.16 0.2 0.24 0.28 0.32

Min Value = -0.02774 inches @ (10.0,143.6) Max Value = 0.3561 inches @ (66.24,89.29)



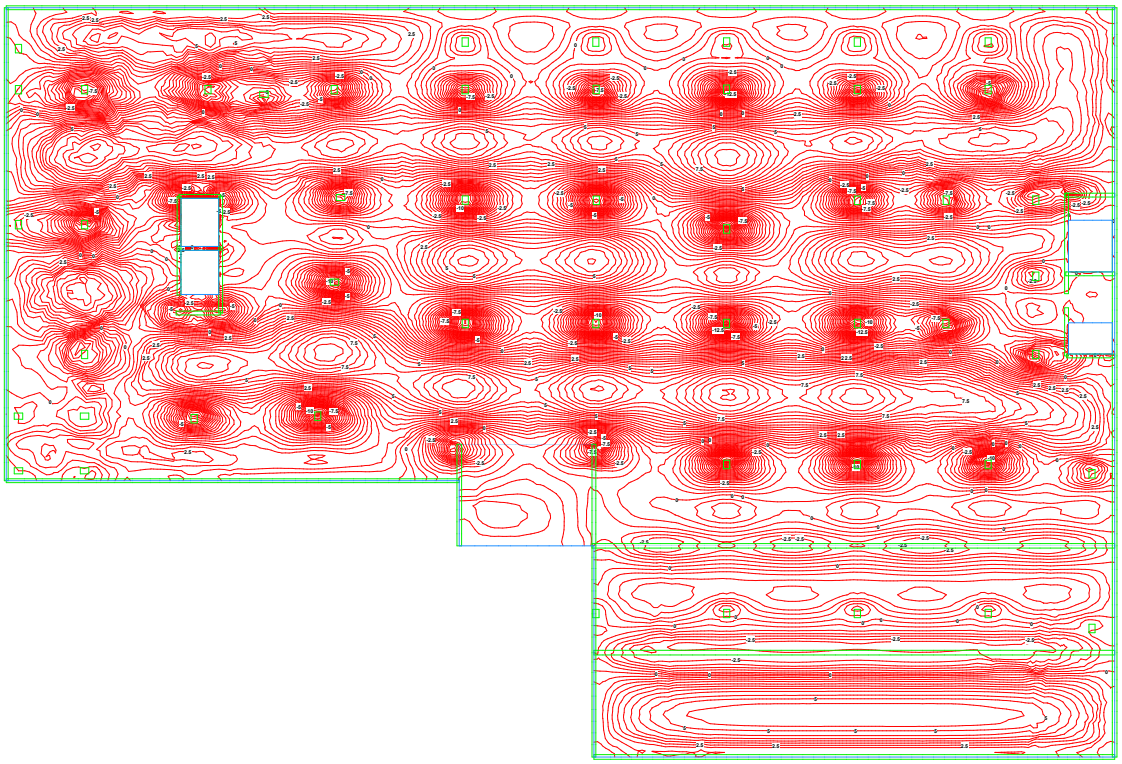
Service LC: D + 0.75L + 0.75S: Min Deflection Plan

Service LC: D + 0.75L + 0.75S: 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 = 1:200
Service LC: D + 0.75L + 0.75S - Vertical Deflection Plot (Minimum Value)
-0.03 0 0.03 0.06 0.09 0.12 0.15 0.18 0.21
Min Value = -0.0394 inches @ (10.3,143.8) Max Value = 0.2912 inches @ (147.3,122.3)



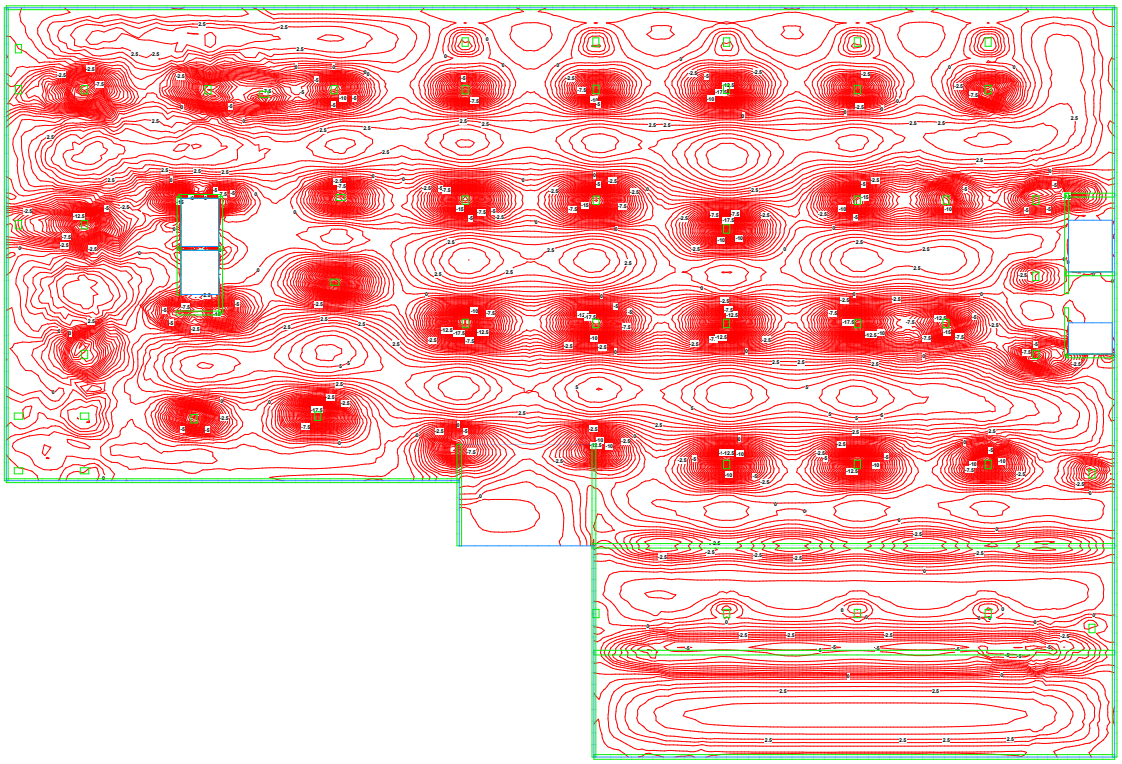
Factored LC: 1.4D: Max Mx Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Bending Moment Plot (Maximum Values) (X-Axis Direction)
Cnx Contour = 0.5 Kips
Min Value = -14.72 Kips @ (133.1,136.3) Max Value = 10.01 Kips @ (133.1,121)



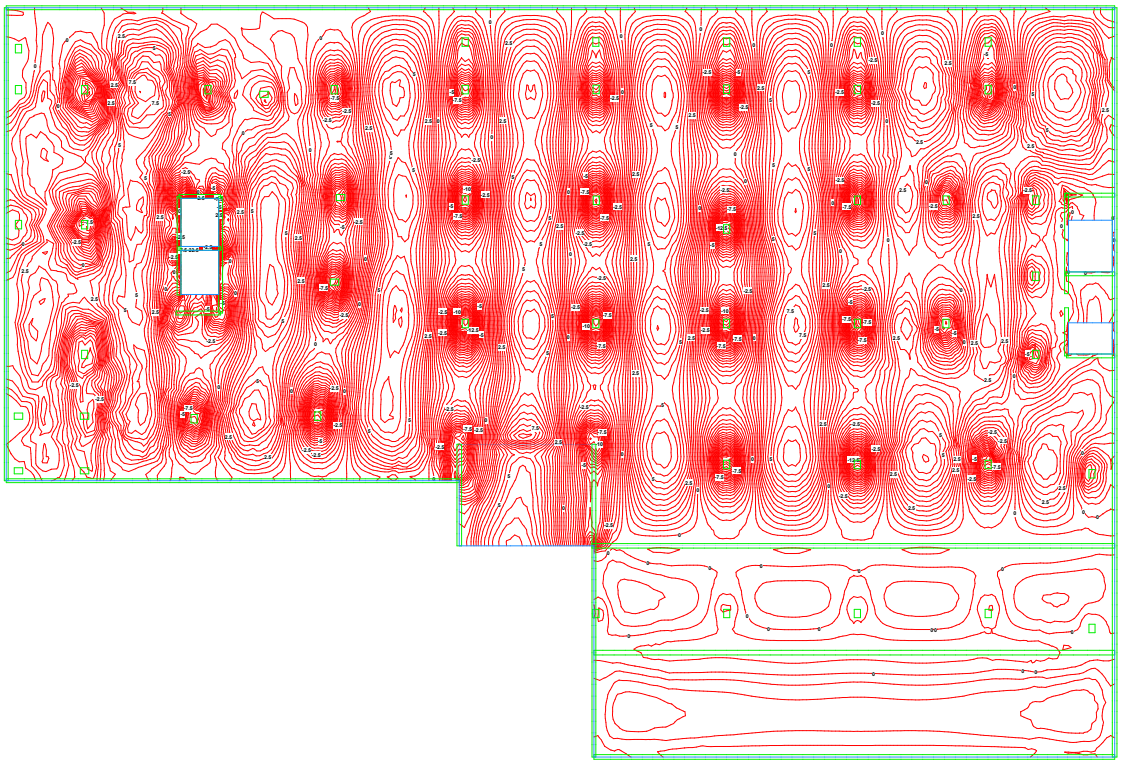
Factored LC: 1.4D: Min Mx Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Bending Moment Plot (Minimum Values) (X-Axis Direction)
Cne Contour = 6.5 Kips
Min Value = -22.9 Kips @ (133.1,134.3) Max Value = 6.434 Kips @ (133.1,121)



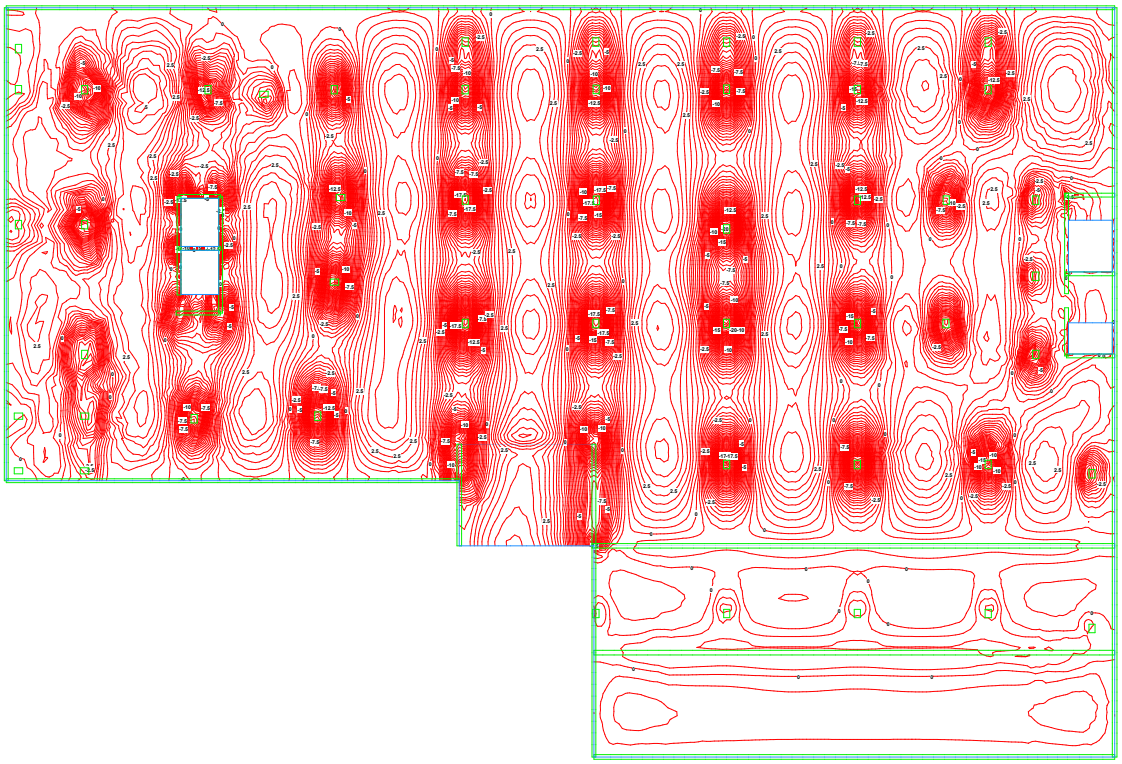
Factored LC: 1.4D: Max My Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 0.5 Kips
Min Value = -14.5 Kips @ (76.34,134.3) Max Value = 8.885 Kips @ (69.77,112.7)



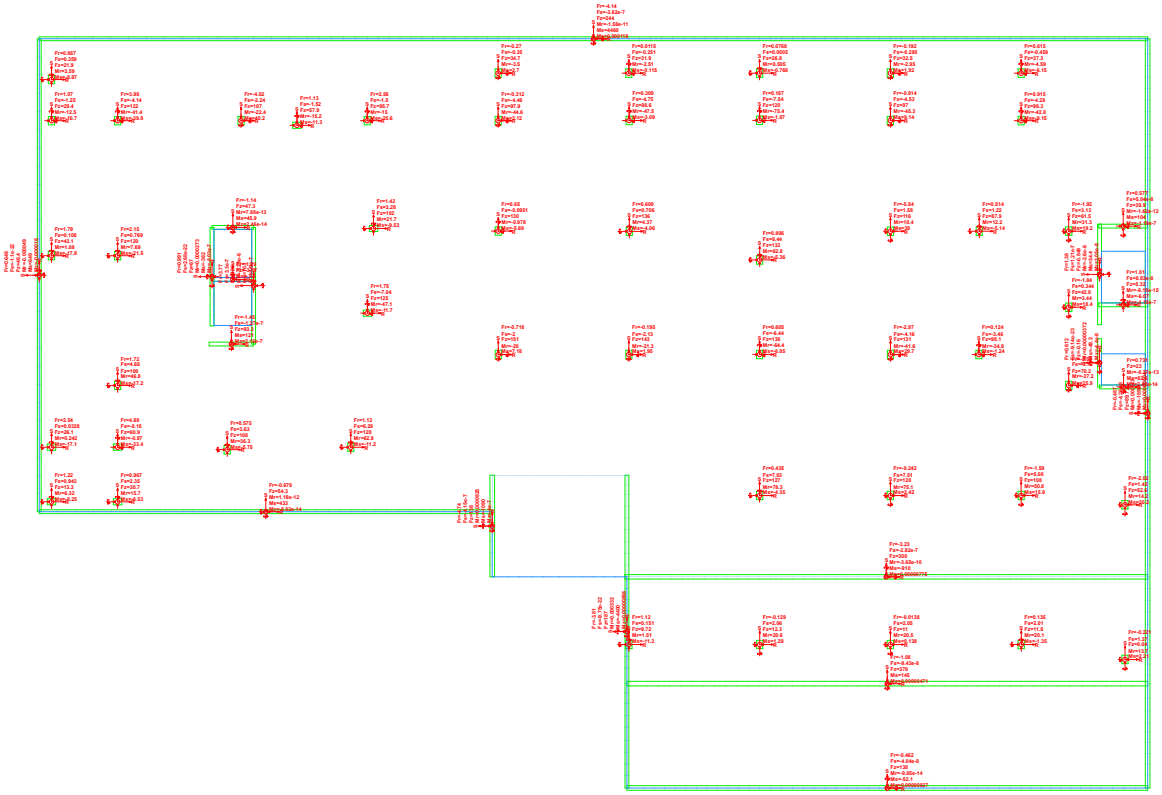
Factored LC: 1.4D: Min My Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 0.5 Kips
Min Value = -22.56 Kips @ (76.34,136.3) Max Value = 5.6 Kips @ (69.77,112.7)



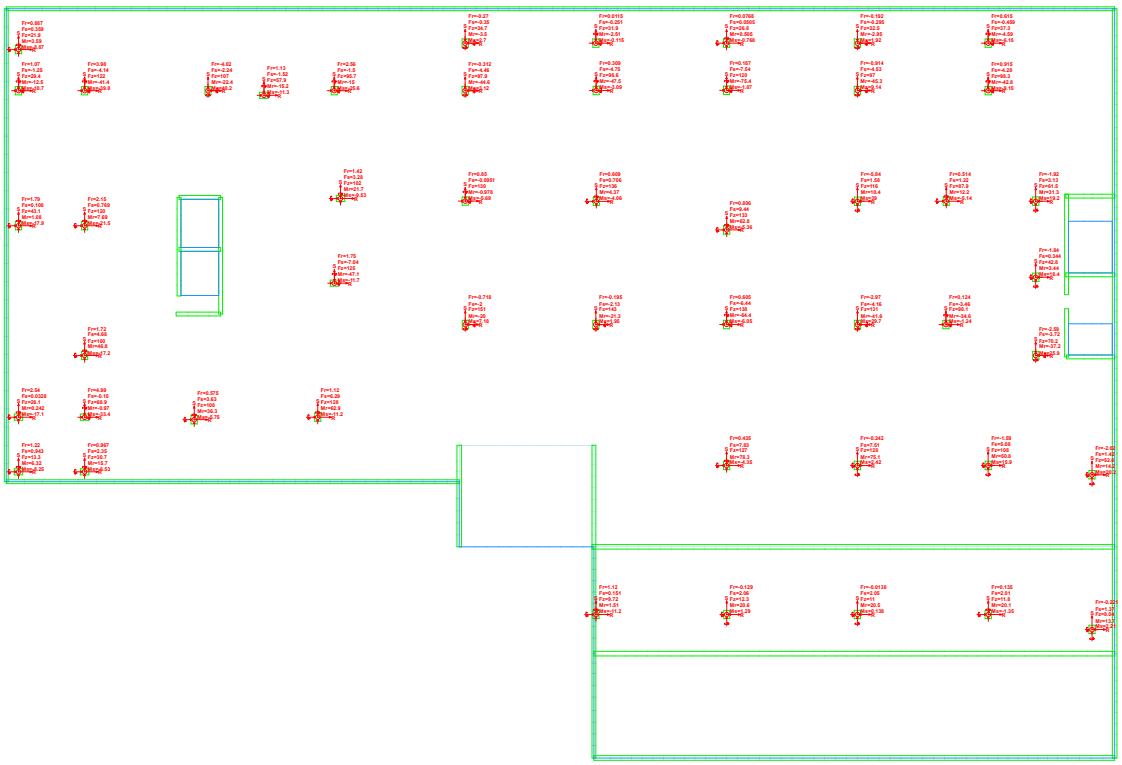
Factored LC: 1.4D: Std Reactions Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fz,Fx,Fz,Mx,My,Mz)(Standard Context)



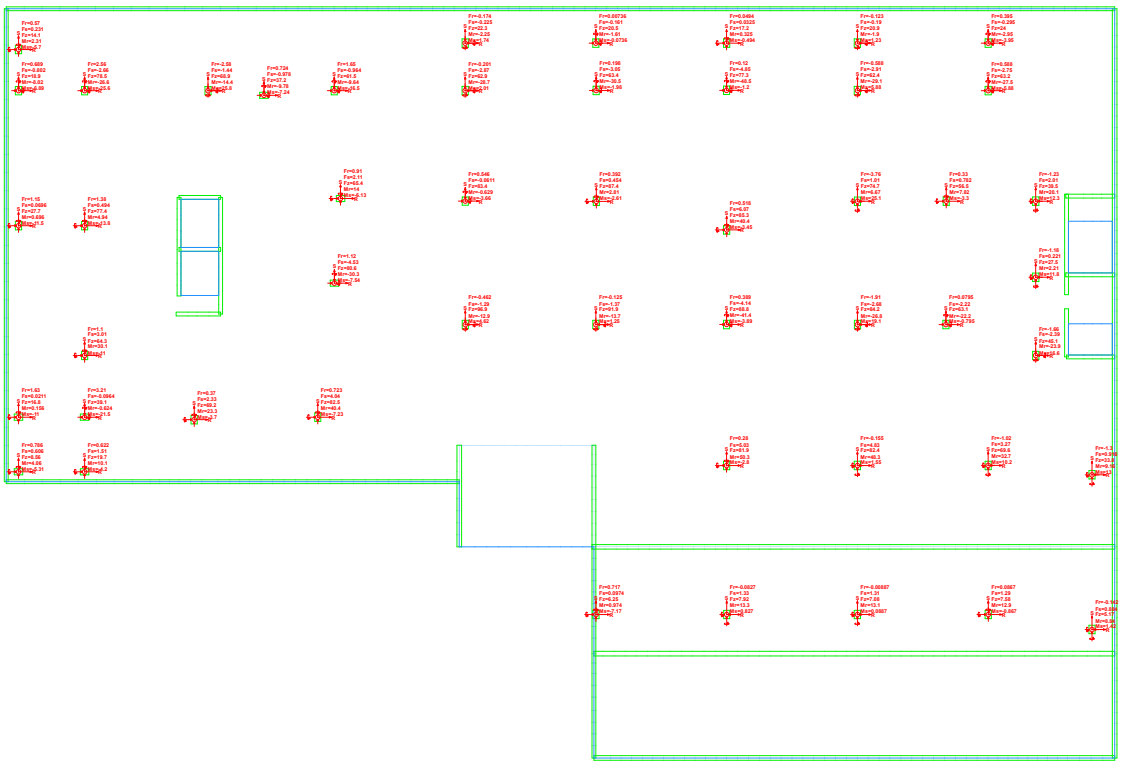
Factored LC: 1.4D: Max Reactions Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Reaction Plot: (Column Below)(Fz,Fx,Fy,Mr,Mx,My)(Max Fz Context)



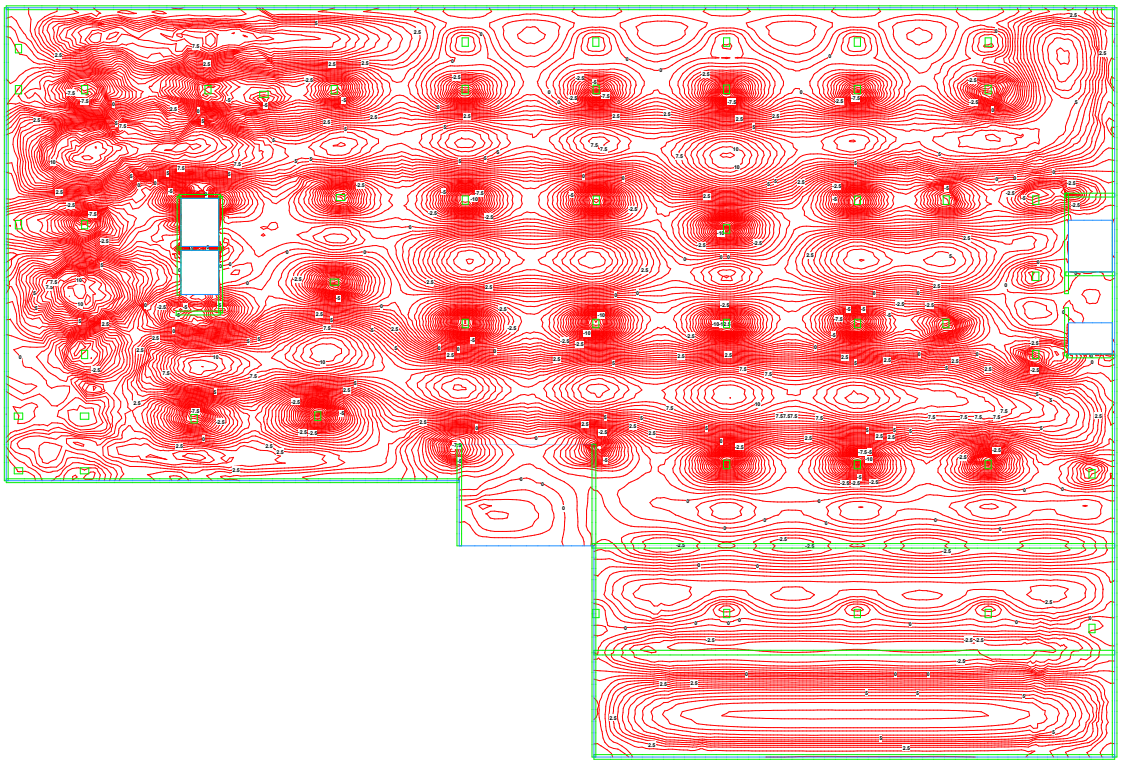
Factored LC: 1.4D: Min Reactions Plan

Factored LC: 1.4D: 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 = 1:100
Factored LC: 1.4D - Reaction Plot: (Column Below)(Fz,Fx,Fy,Mr,Mx,My)(Min Fz Context)



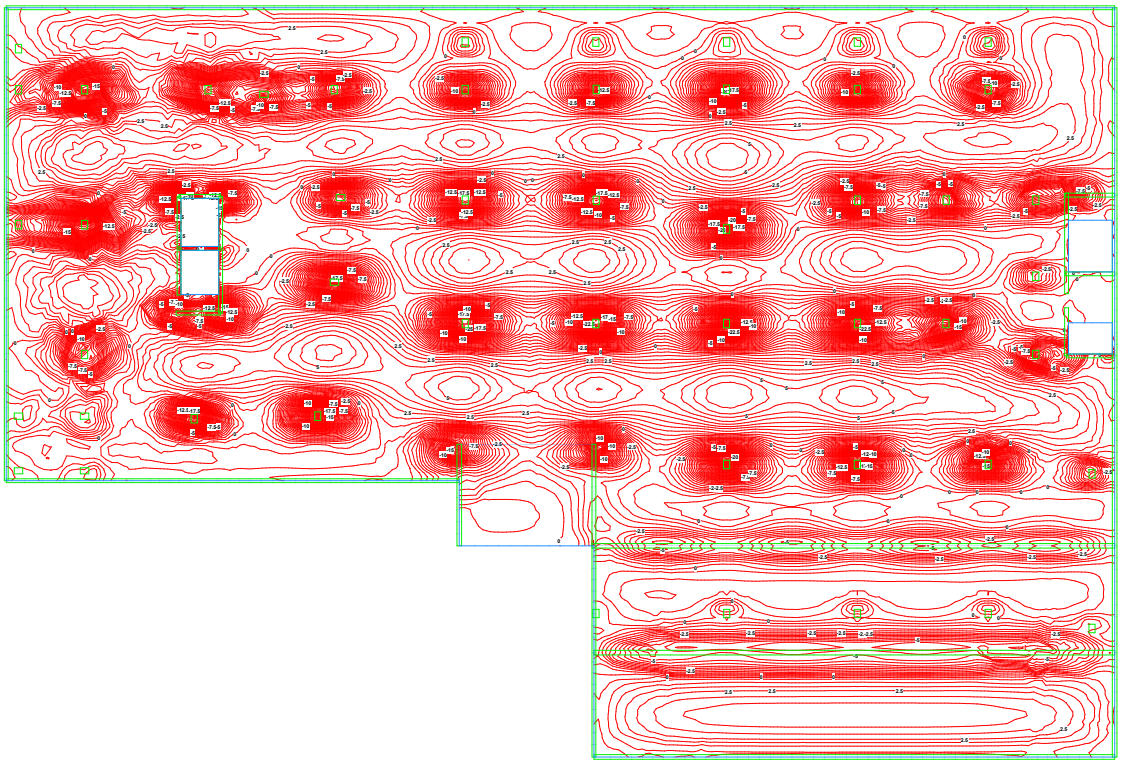
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Mx Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 0.5 Kips
Min Value = -14.72 Kips @ (133.1,136.3) Max Value = 12.66 Kips @ (-7.378,173.3)



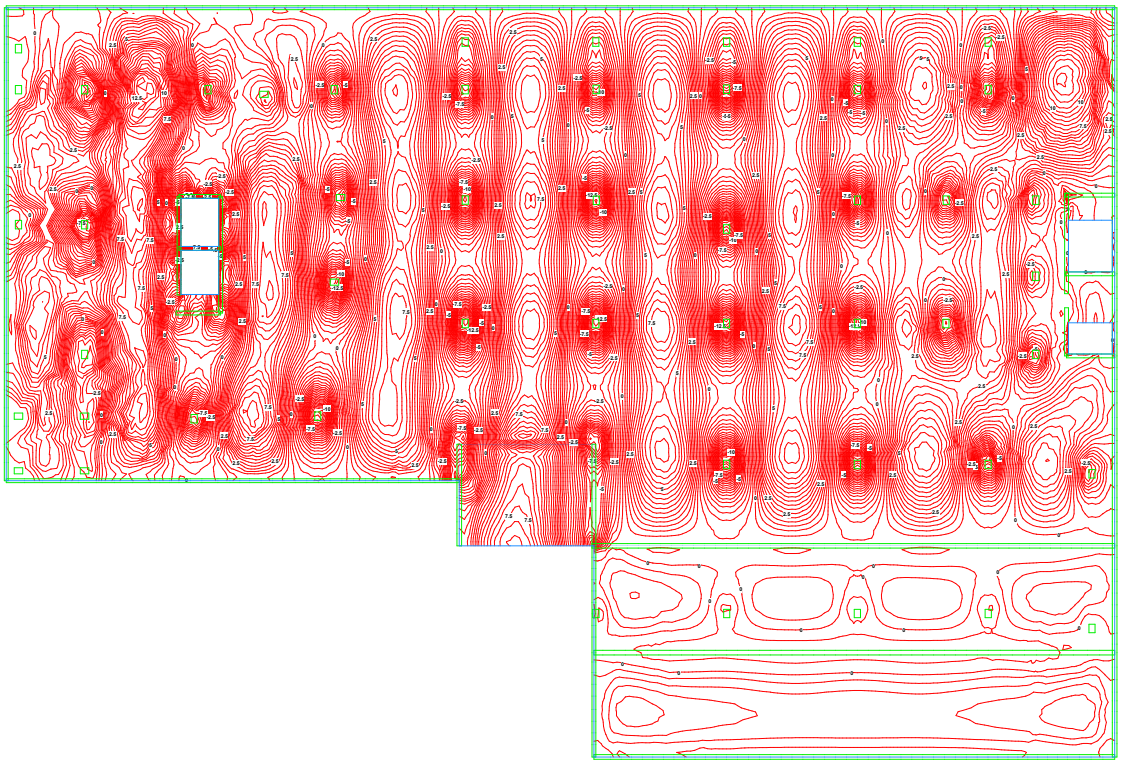
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Mx Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 0.5 Kips
Min Value = -26.82 Kips @ (-0.396,160.3) Max Value = 6.434 Kips @ (133.1,121)



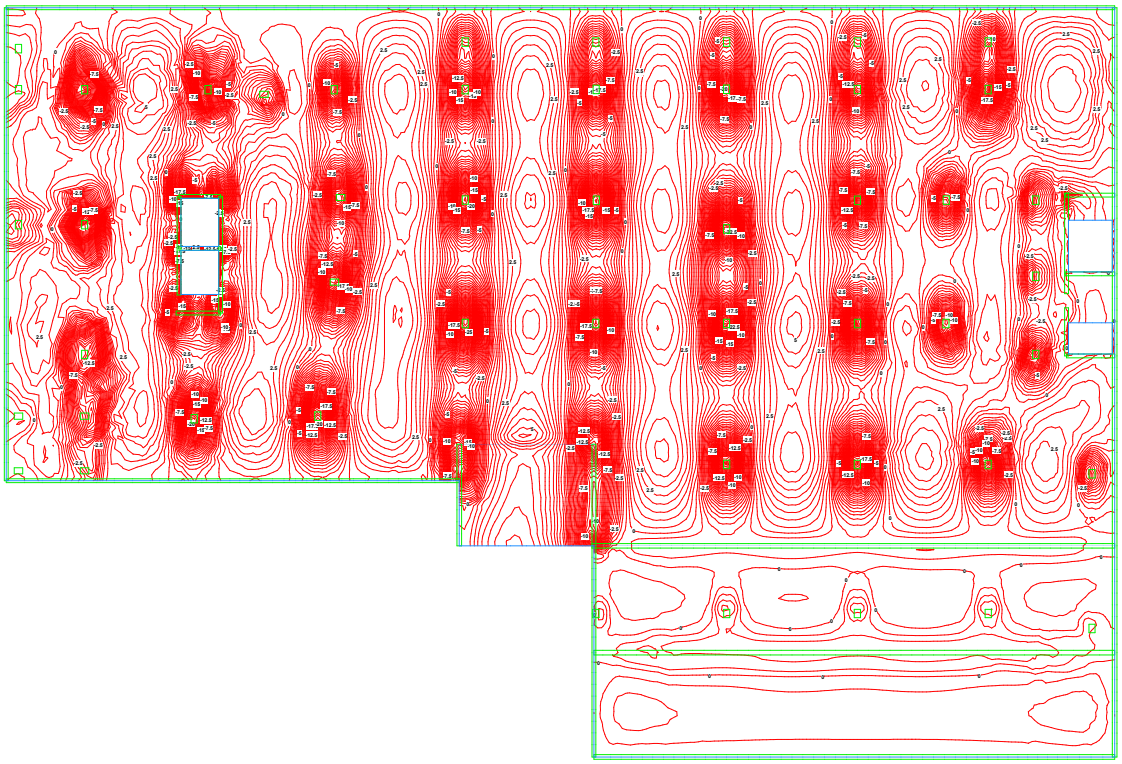
Factored LC: 1.2D + 1.6L + 0.5Lr: Max My Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 0.5 Kips
Min Value = -14.5 Kips @ (76.34,134.3) Max Value = 13 Kips @ (7.55,187.3)



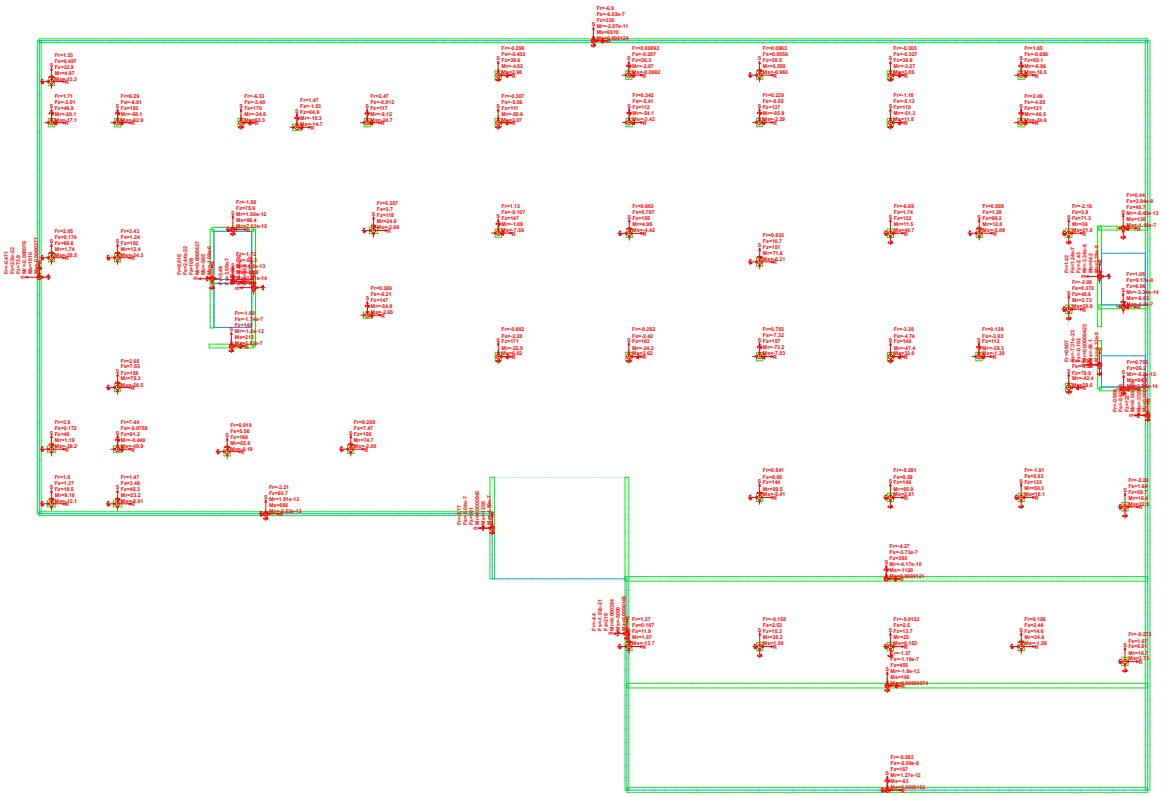
Factored LC: 1.2D + 1.6L + 0.5Lr: Min My Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 5.5 Kips
Min Value = -25.85 Kips @ (10.63,164.3) Max Value = 5.5 Kips @ (89.77,112.7)



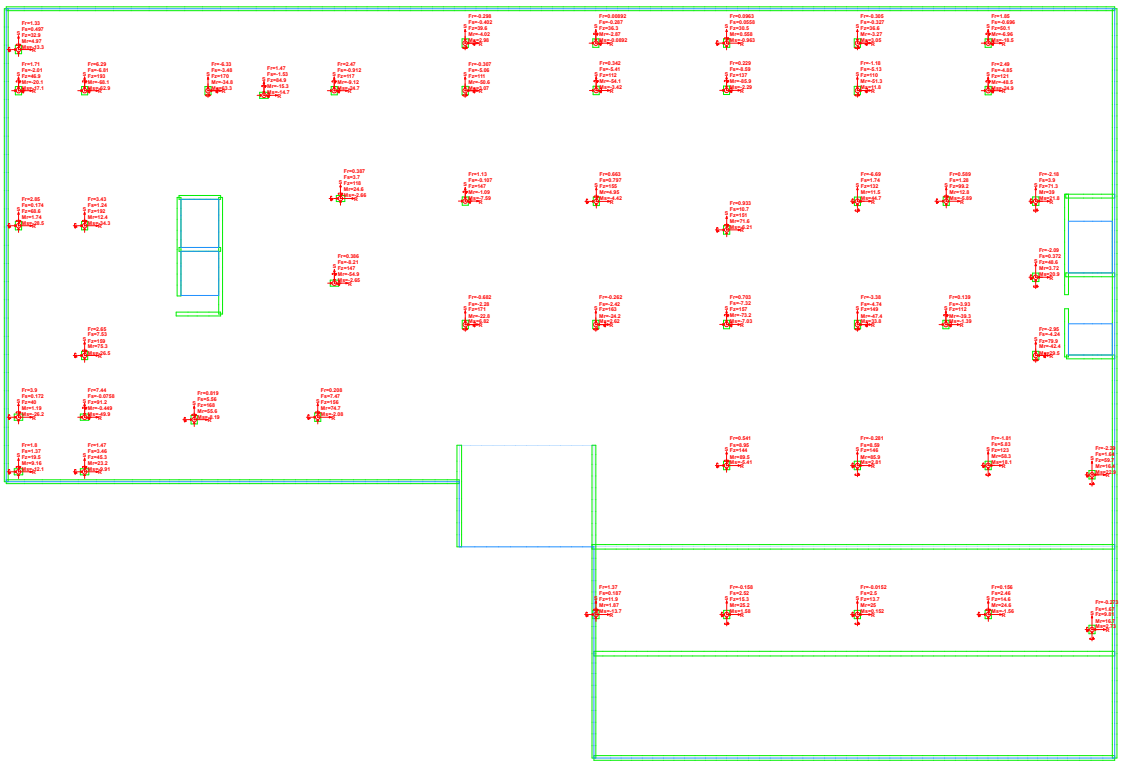
Factored LC: 1.2D + 1.6L + 0.5Lr: Std Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fz,Fx,Fy,Mr,My,Mz)(Standard Context)



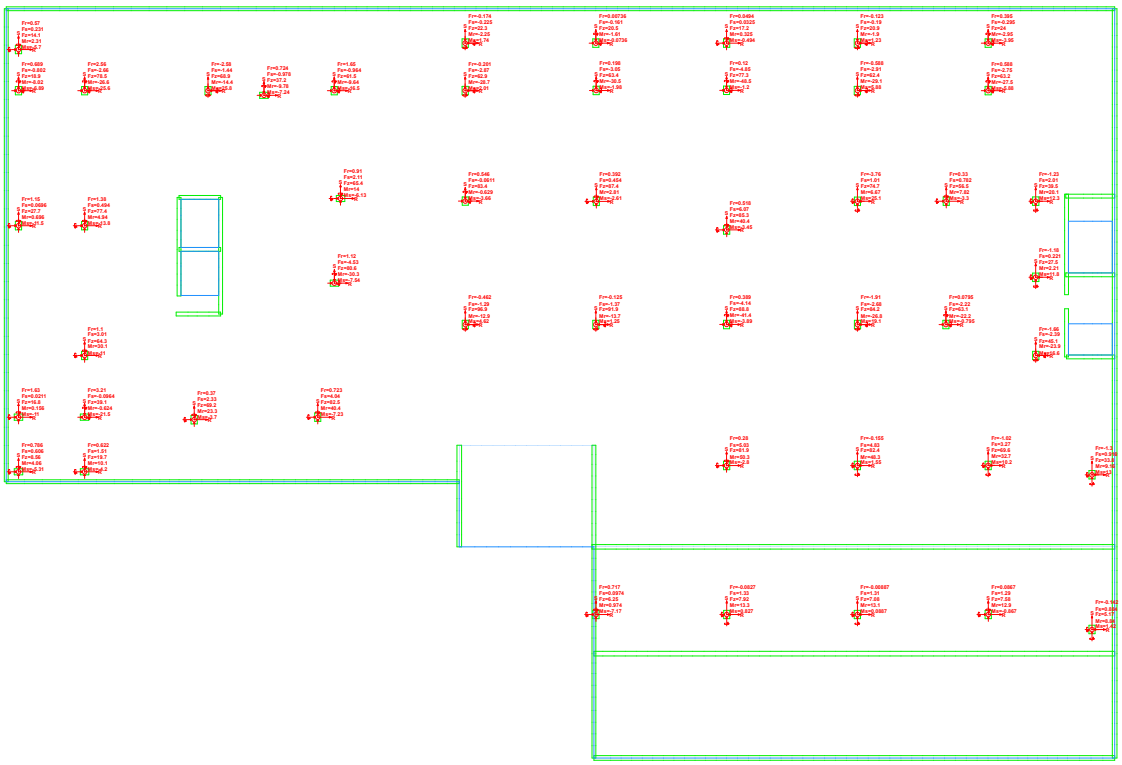
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,My,Mz)(Max Fz Contest)



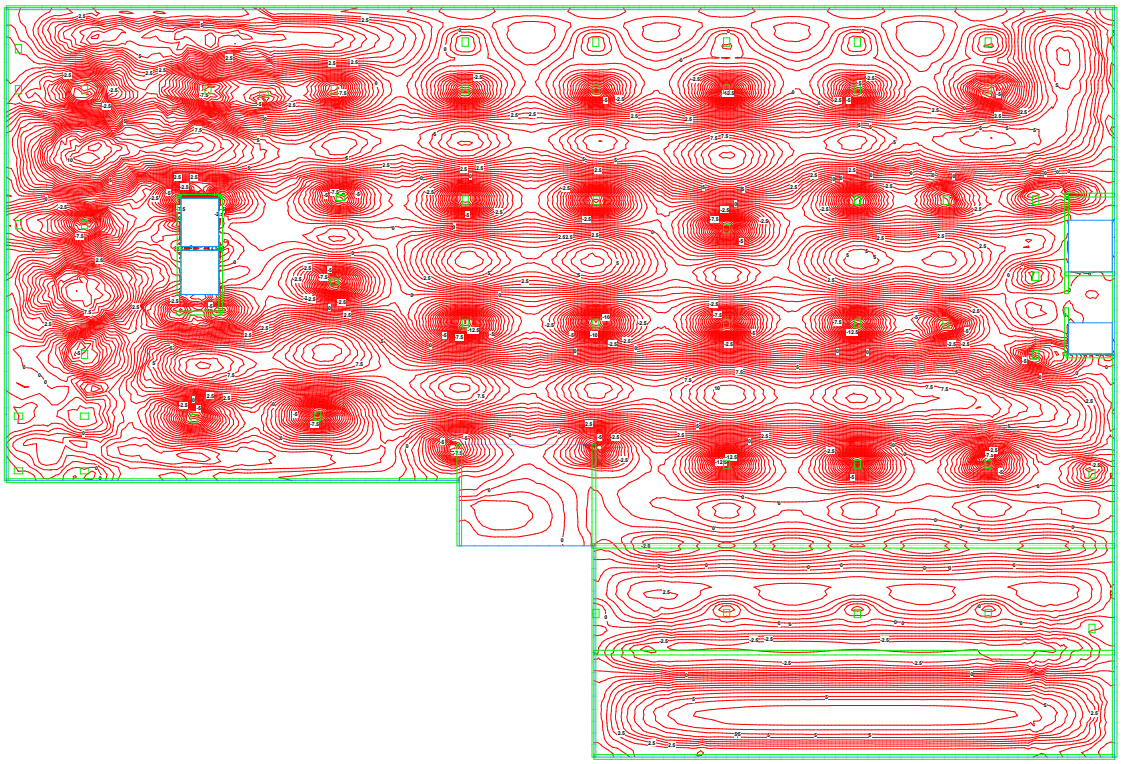
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Min Fz Content)



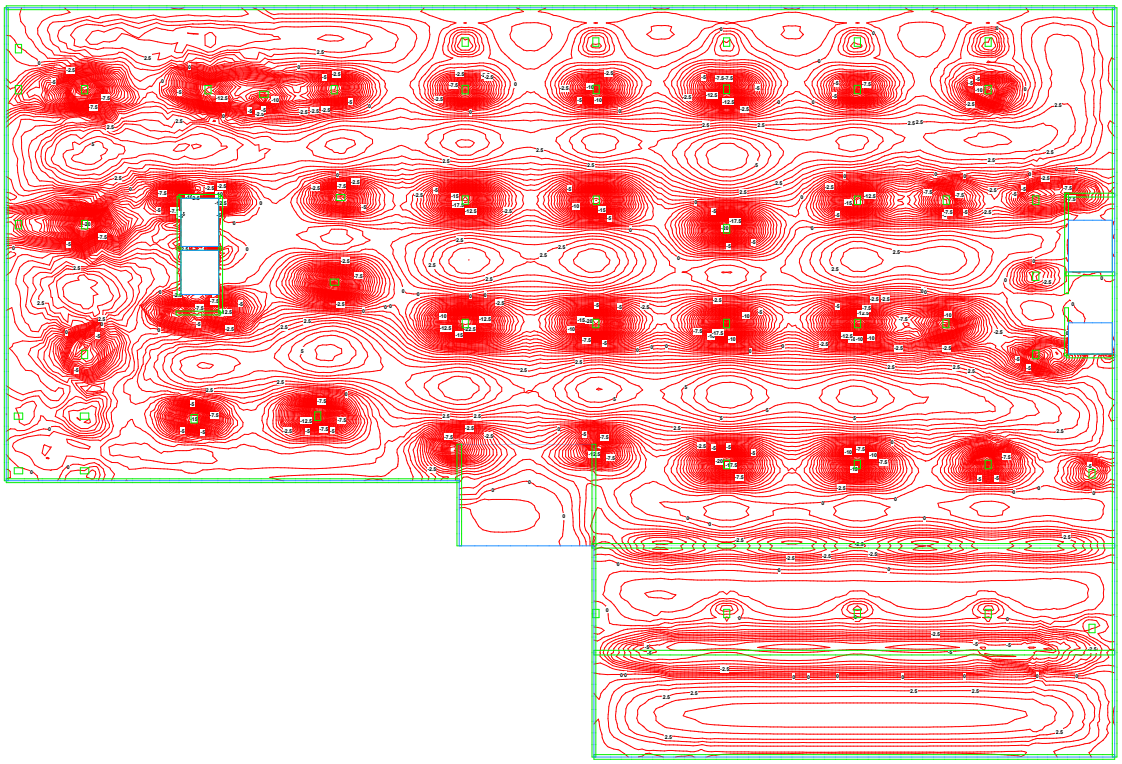
Factored LC: 1.2D + f1L + 1.6Lr: Max Mx Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 0.5 Kips
Min Value = -14.72 Kips @ (133.1,136.3) Max Value = 10.62 Kips @ (-7.376,173.3)



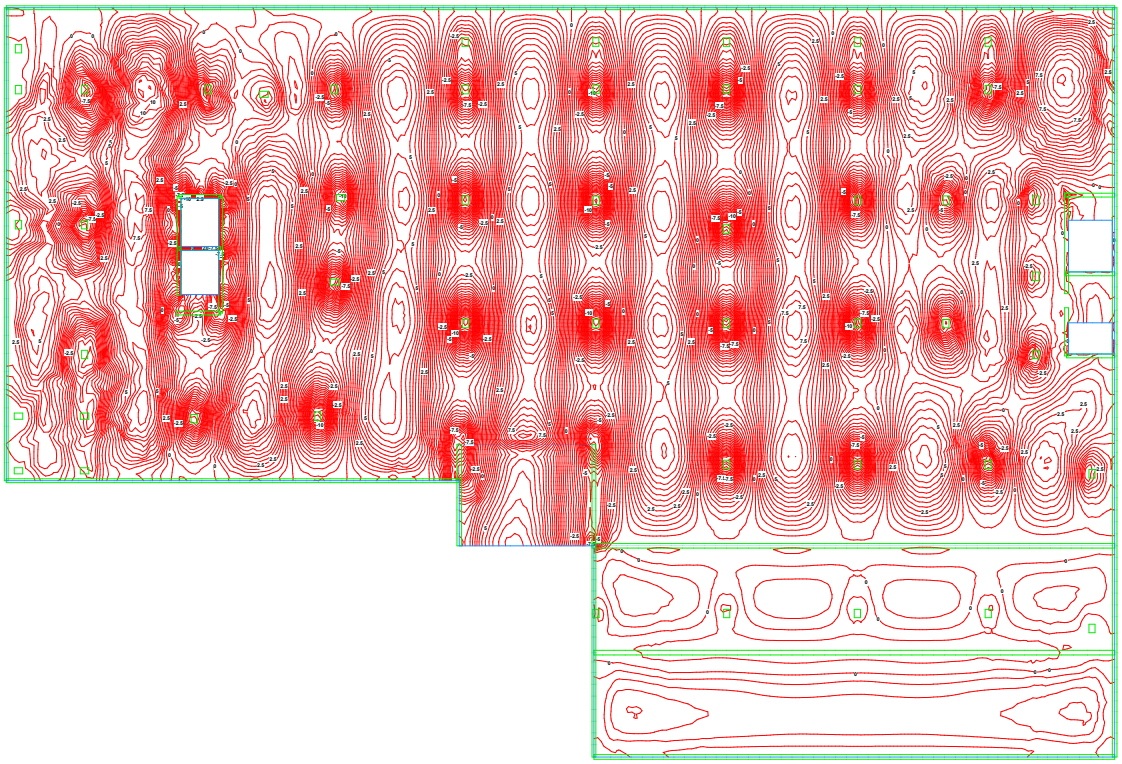
Factored LC: 1.2D + f1L + 1.6Lr: Min Mx Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 0.5 Kips
Min Value = -23.68 Kips @ (133.1,136.3) Max Value = 6.434 Kips @ (132.1,121)



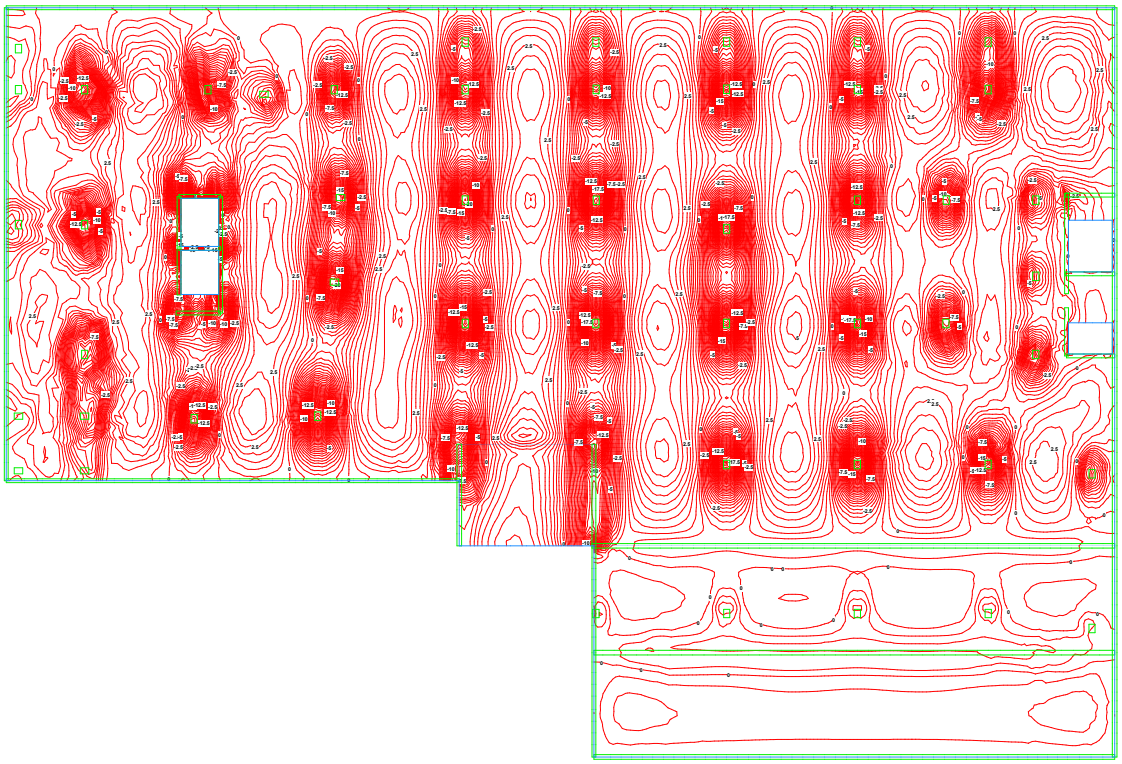
Factored LC: 1.2D + f1L + 1.6Lr: Max My Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 0.5 Kips
Min Value = -14.5 Kips @ (76.34,134.3) Max Value = 10.77 Kips @ (7.55,187.3)



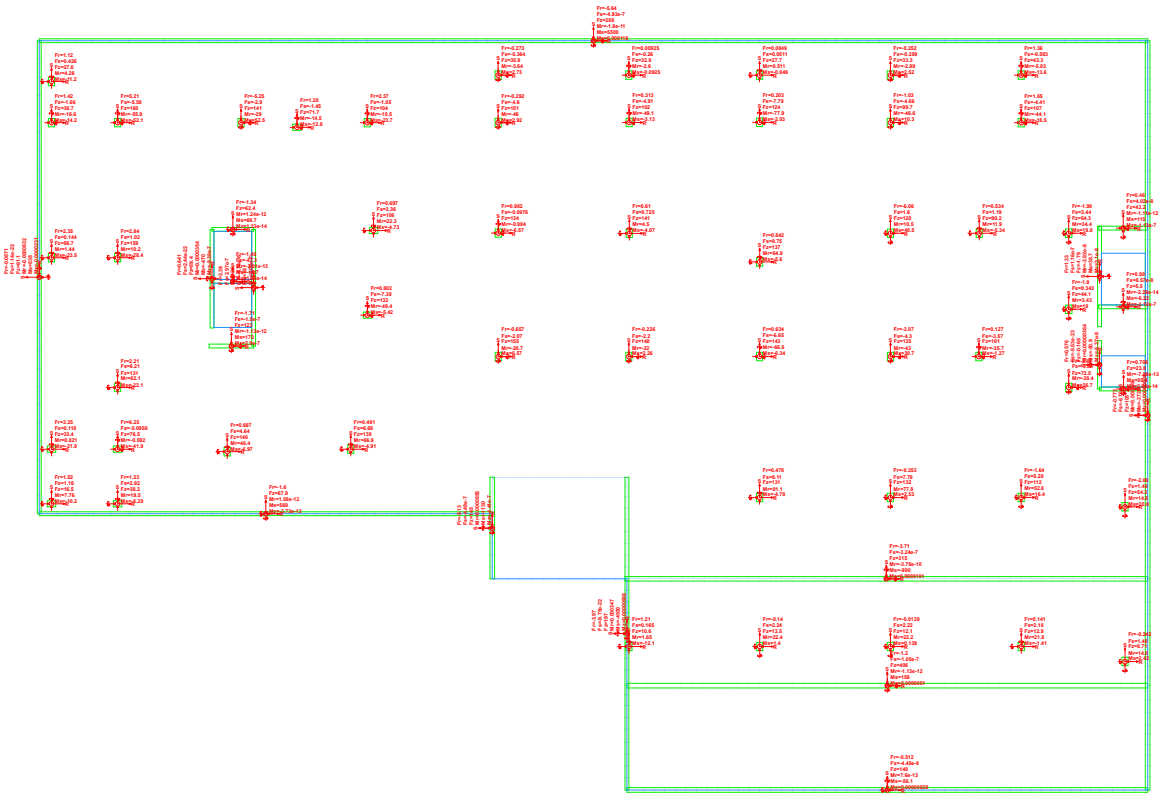
Factored LC: 1.2D + f1L + 1.6Lr: Min My Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
Cnx Contour = 0.5 Kips
Min Value = -23.21 Kips @ (76.34,136.3) Max Value = 5.5 Kips @ (69.77,112.7)



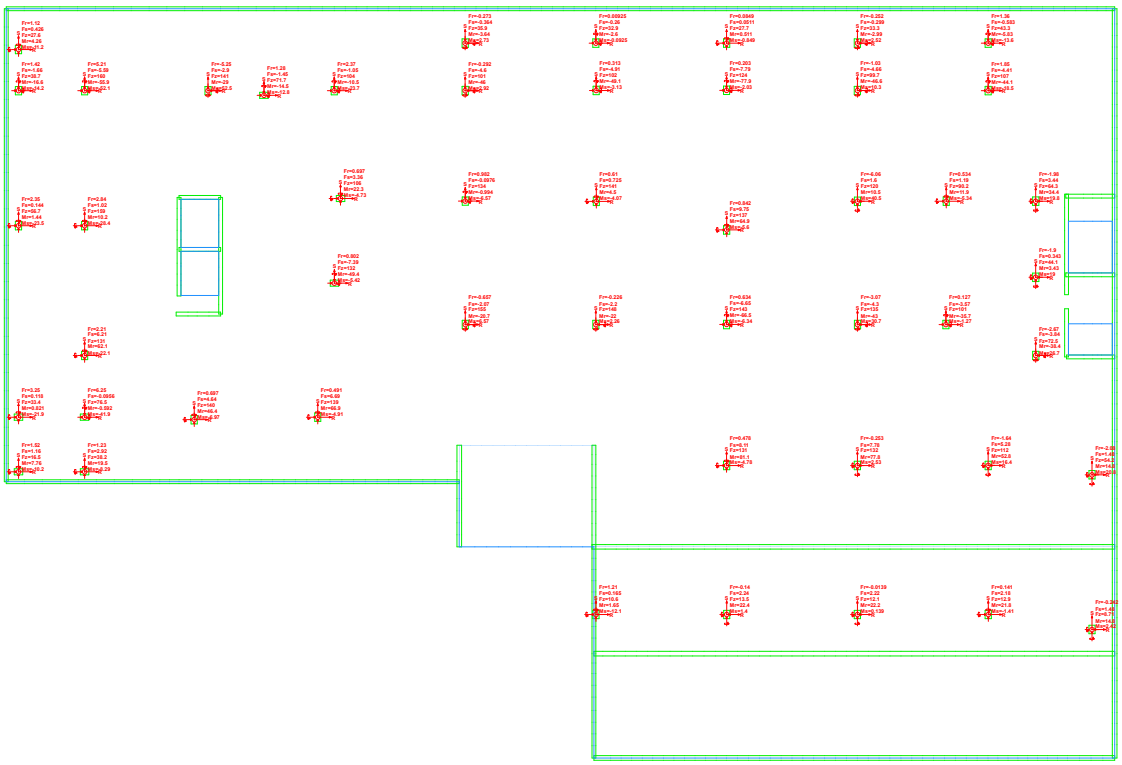
Factored LC: 1.2D + f1L + 1.6Lr: Std Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fz,Fx,Fz,Mr,Mx,Mz)(Standard Context)



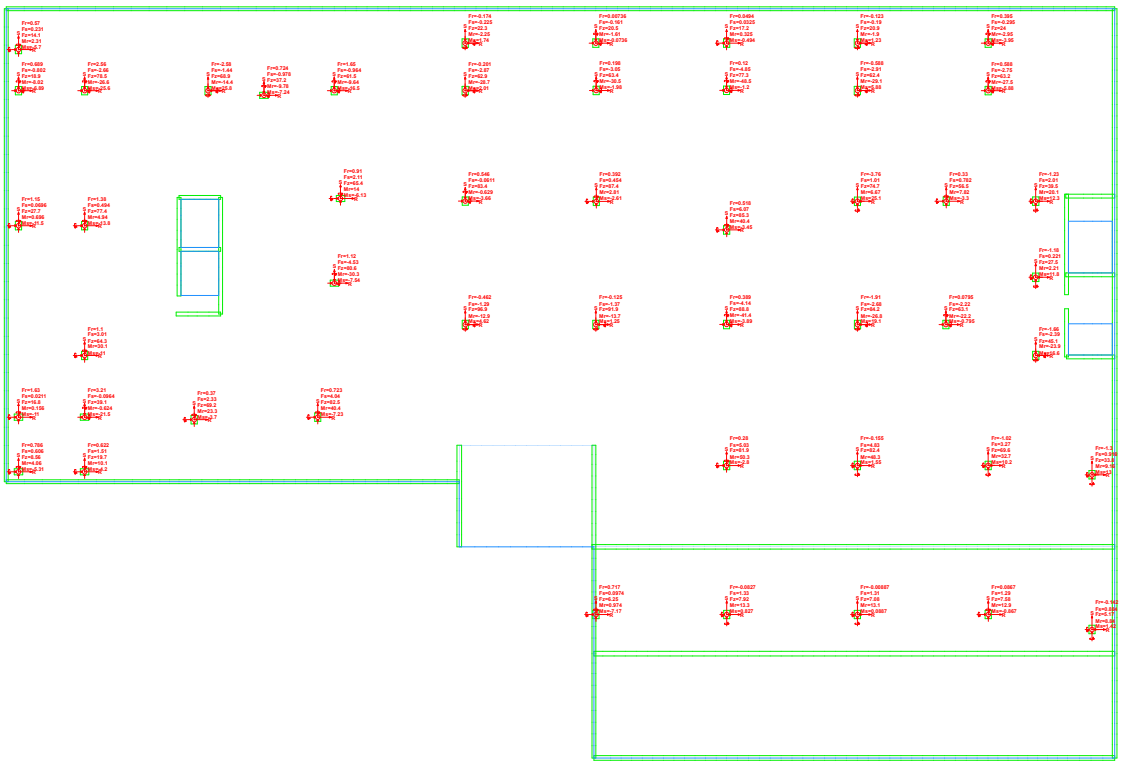
Factored LC: 1.2D + f1L + 1.6Lr: Max Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Column Below)(Fz,Fx,Fz,Mx,My,Mz)(Max Fz Context)



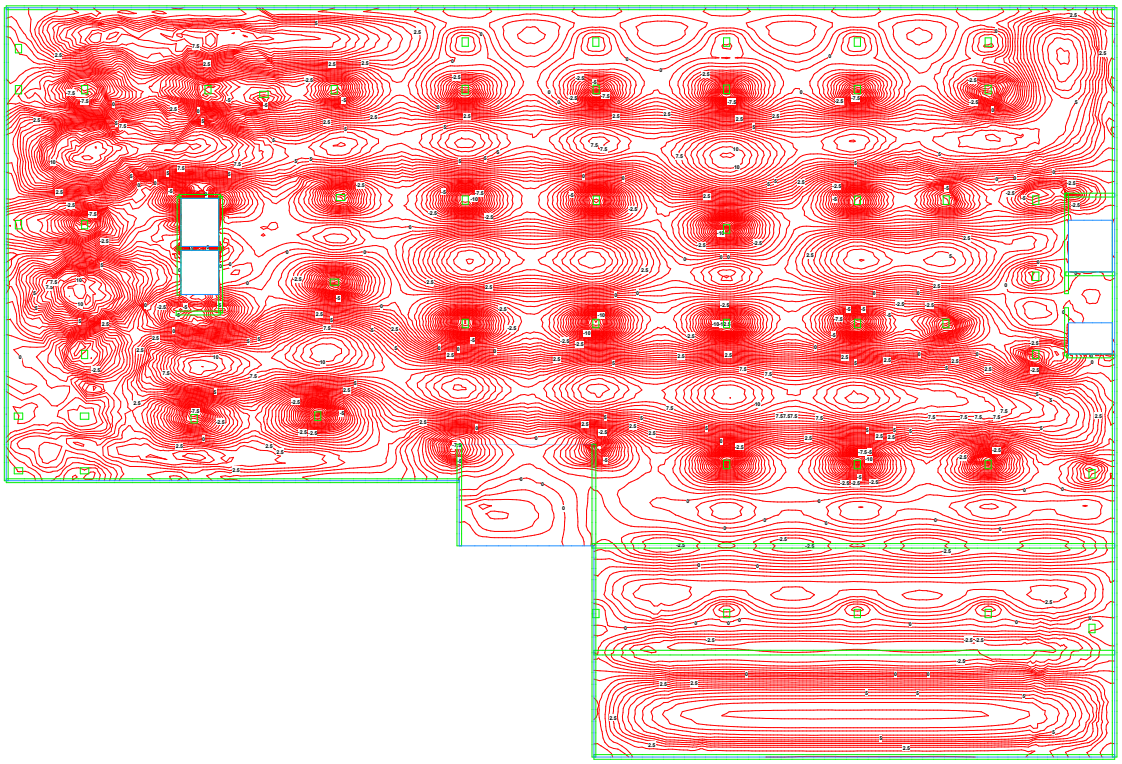
Factored LC: 1.2D + f1L + 1.6Lr: Min Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Column Below)(Fz,Fx,Fz,Mx,My,Mz)(Min Fz Context)



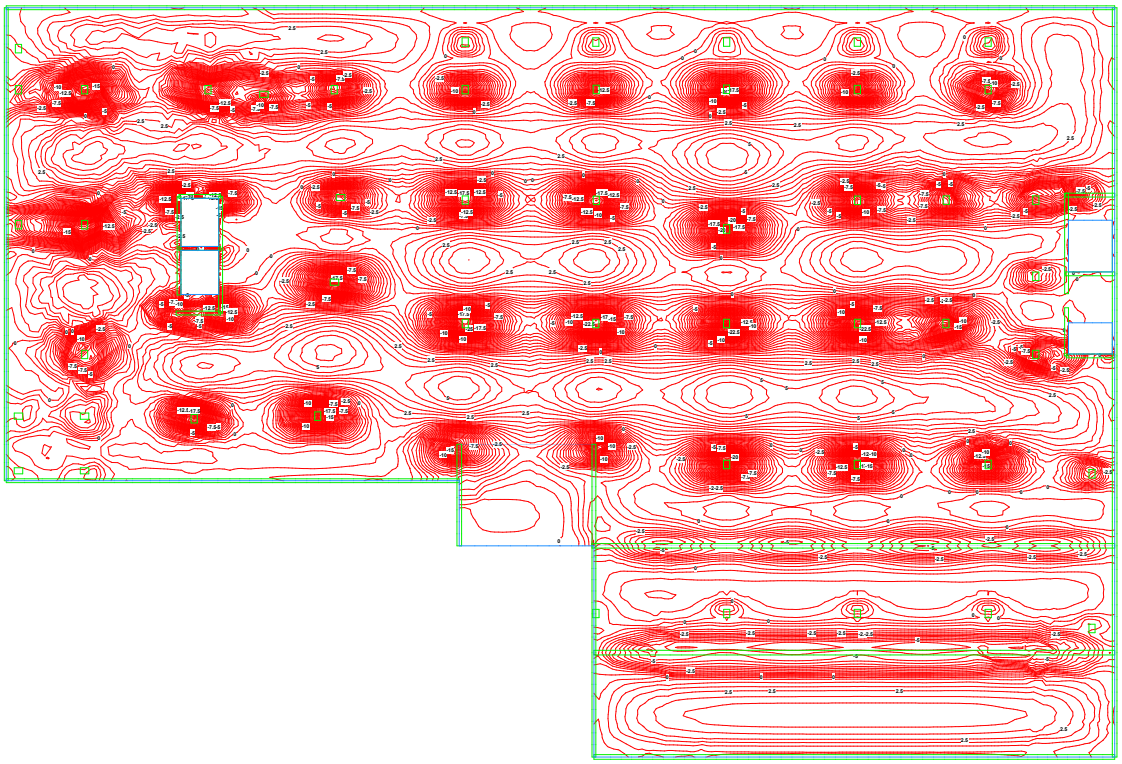
Factored LC: 1.2D + 1.6L + 0.5S: Max Mx Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 0.5 Kips
Min Value = -14.72 Kips @ (133.1,136.3) Max Value = 12.66 Kips @ (-7.376,173.3)



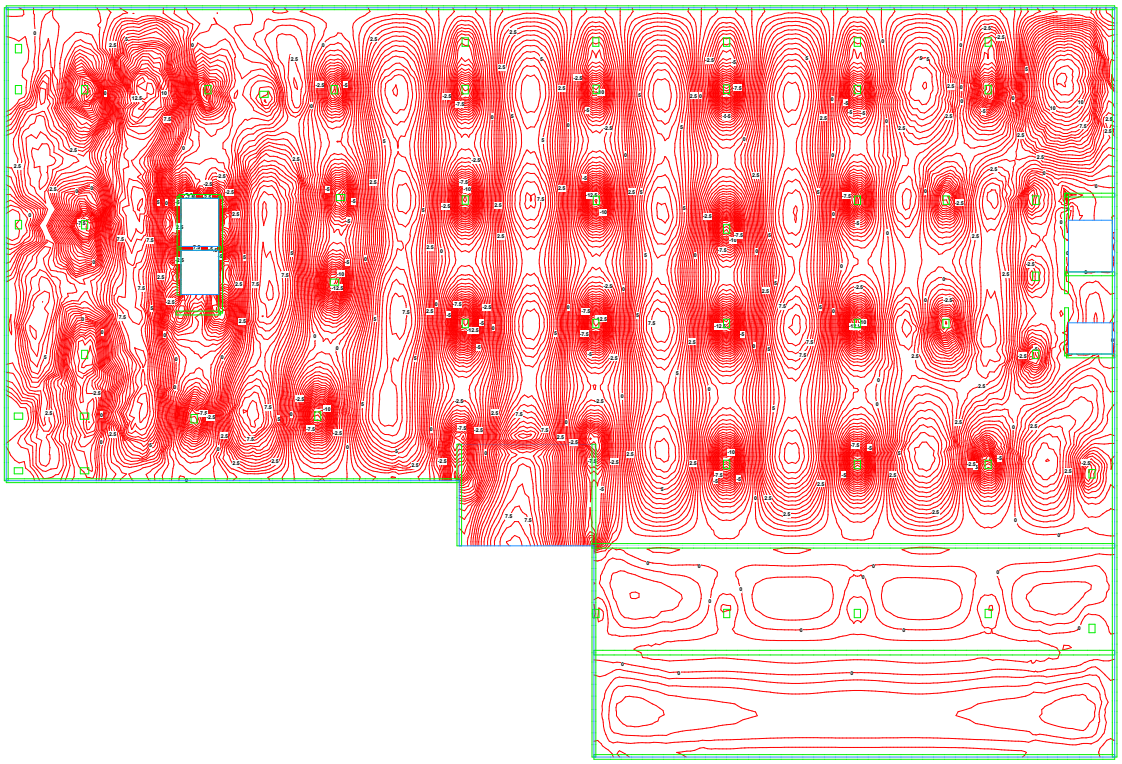
Factored LC: 1.2D + 1.6L + 0.5S: Min Mx Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 0.5 Kips
Min Value = -26.82 Kips @ (-0.398,160.3) Max Value = 6.434 Kips @ (133.1,121)



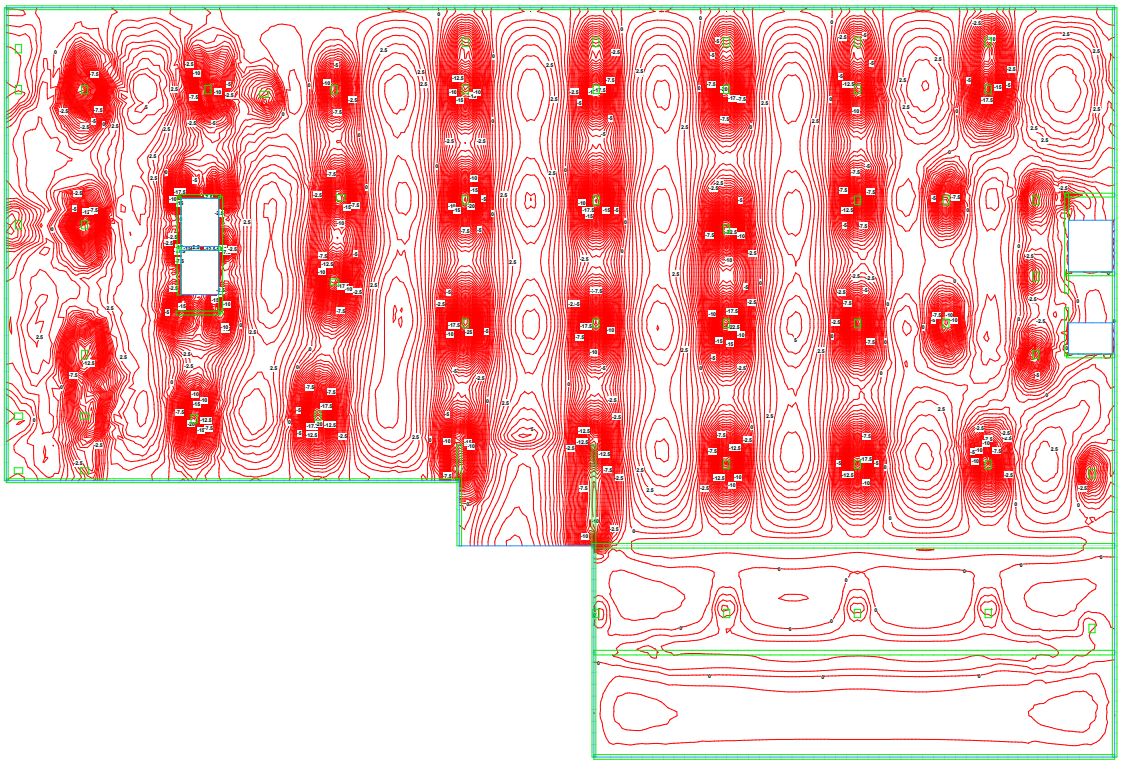
Factored LC: 1.2D + 1.6L + 0.5S: Max My Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 0.5 Kips
Min Value = -14.5 Kips @ (76.34,134.3) Max Value = 13 Kips @ (7.55,187.3)



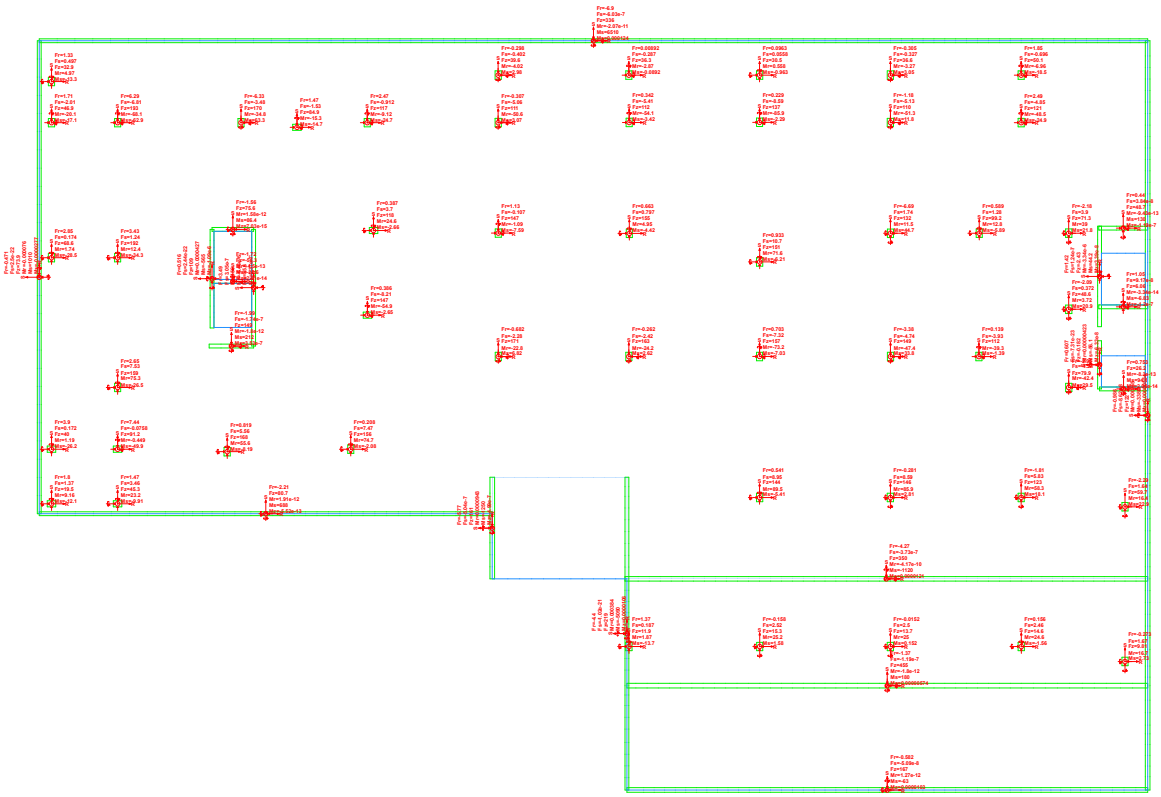
Factored LC: 1.2D + 1.6L + 0.5S: Min My Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 5.0 Kips
Min Value = -25.00 Kips @ (10.63,164.9) Max Value = 5.0 Kips @ (89.77,112.7)



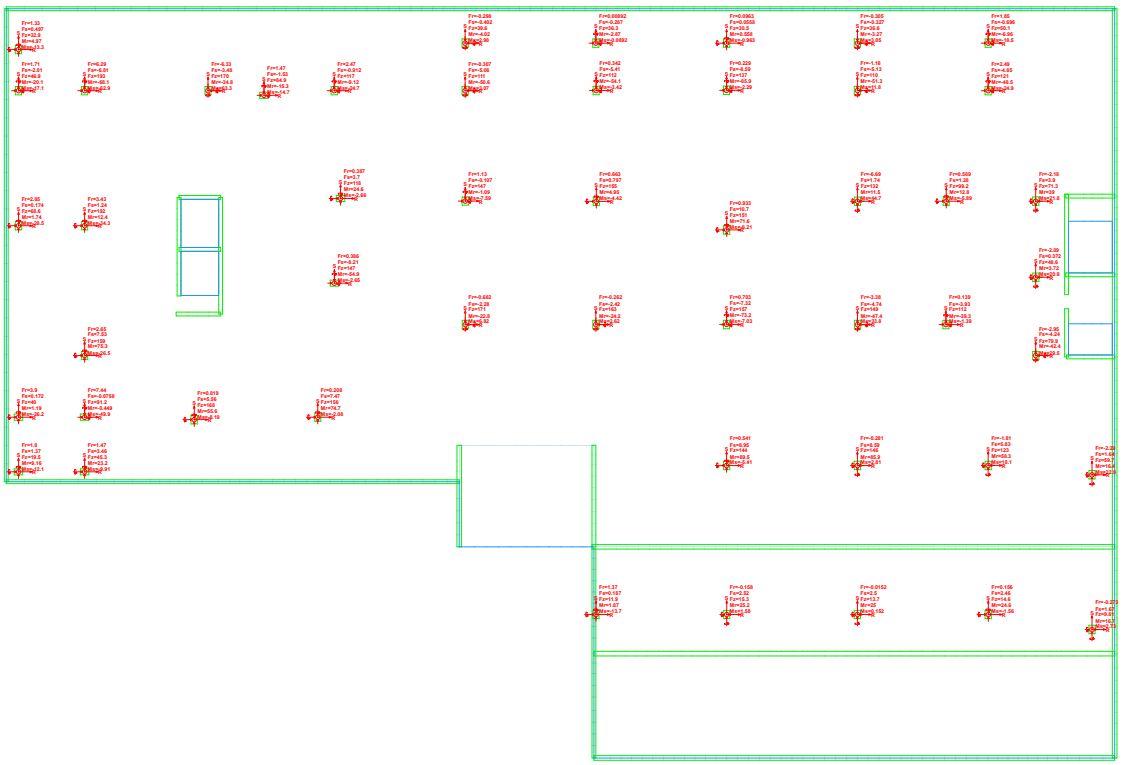
Factored LC: 1.2D + 1.6L + 0.5S: Std Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5S - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fr,Fx,Fz,Mr,My,Mx)(Standard Contest)



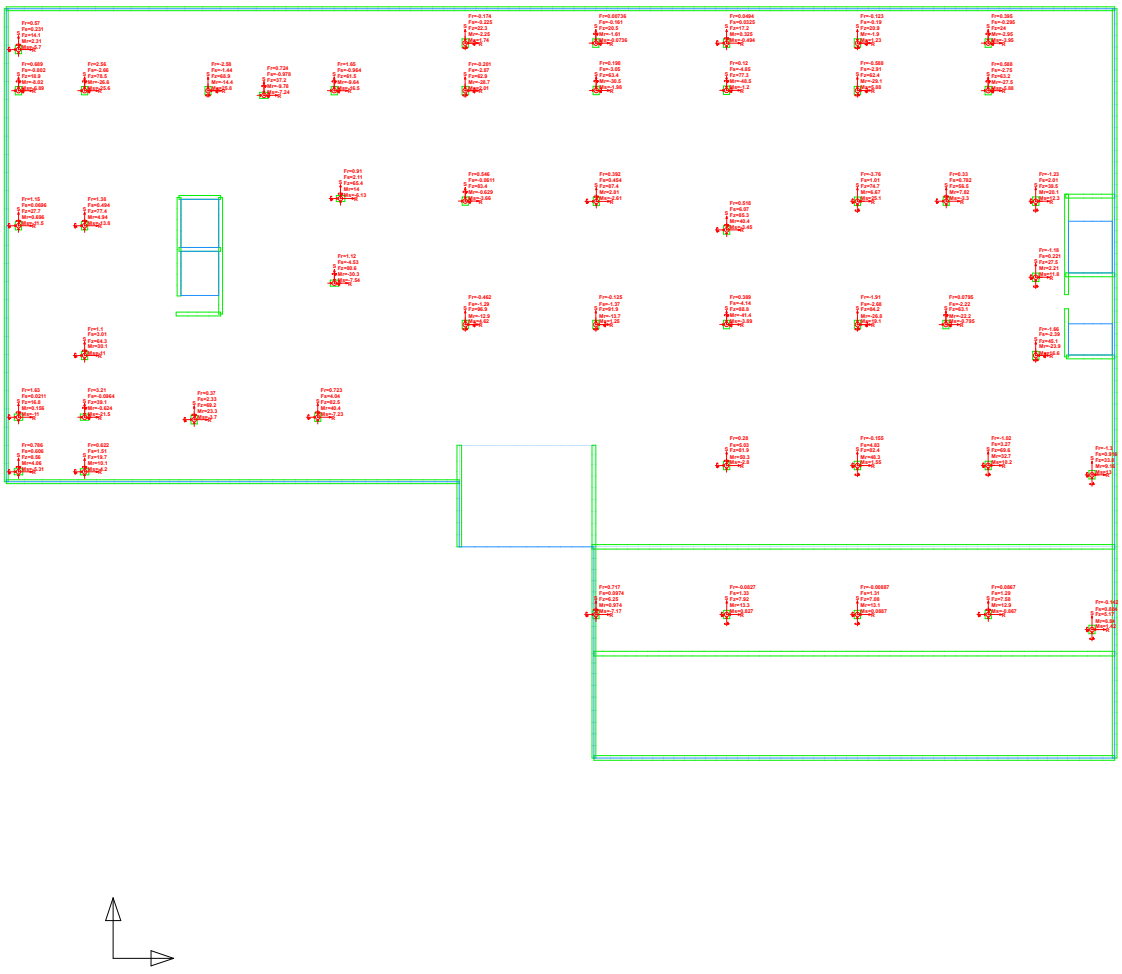
Factored LC: 1.2D + 1.6L + 0.5S: Max Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5S - Reaction Plot: (Column Below)(Fr,Fx,Fx,Mr,Ma,Mz)(Max Fx Context)



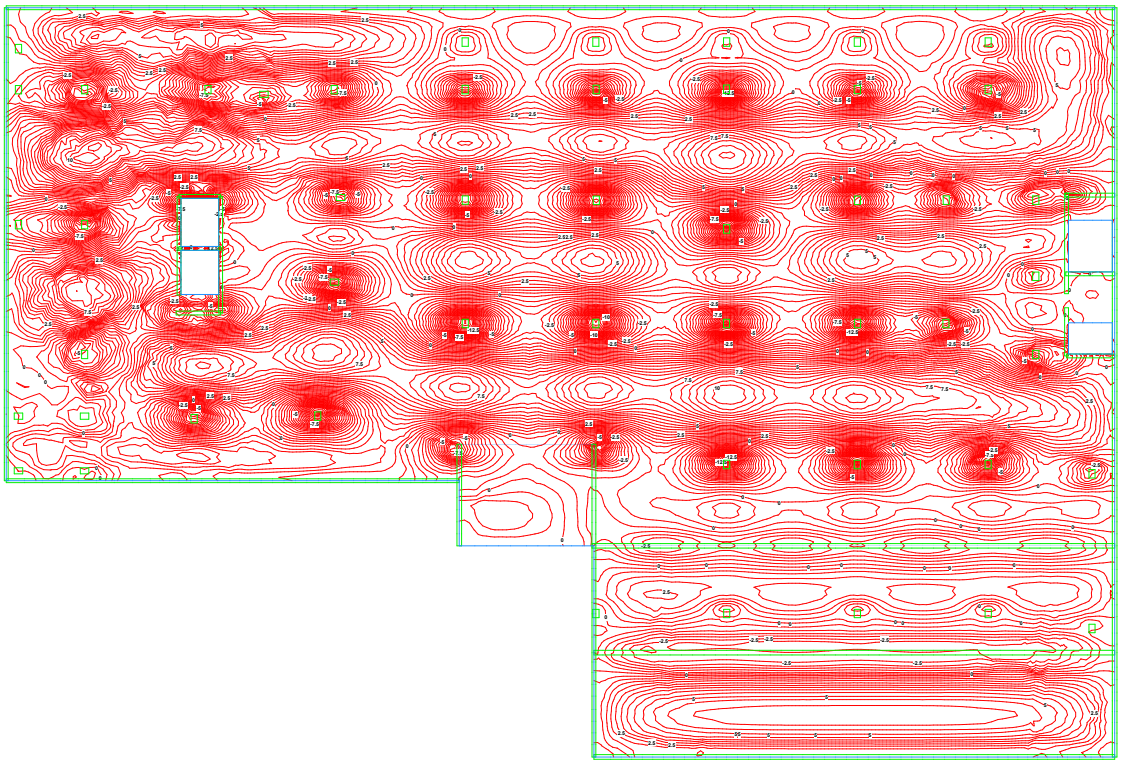
Factored LC: 1.2D + 1.6L + 0.5S: Min Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5S - Reaction Plot: (Column Below)(Fz,Fx,Fx,Mz,Ma,Mz)(Min Fz Contest)



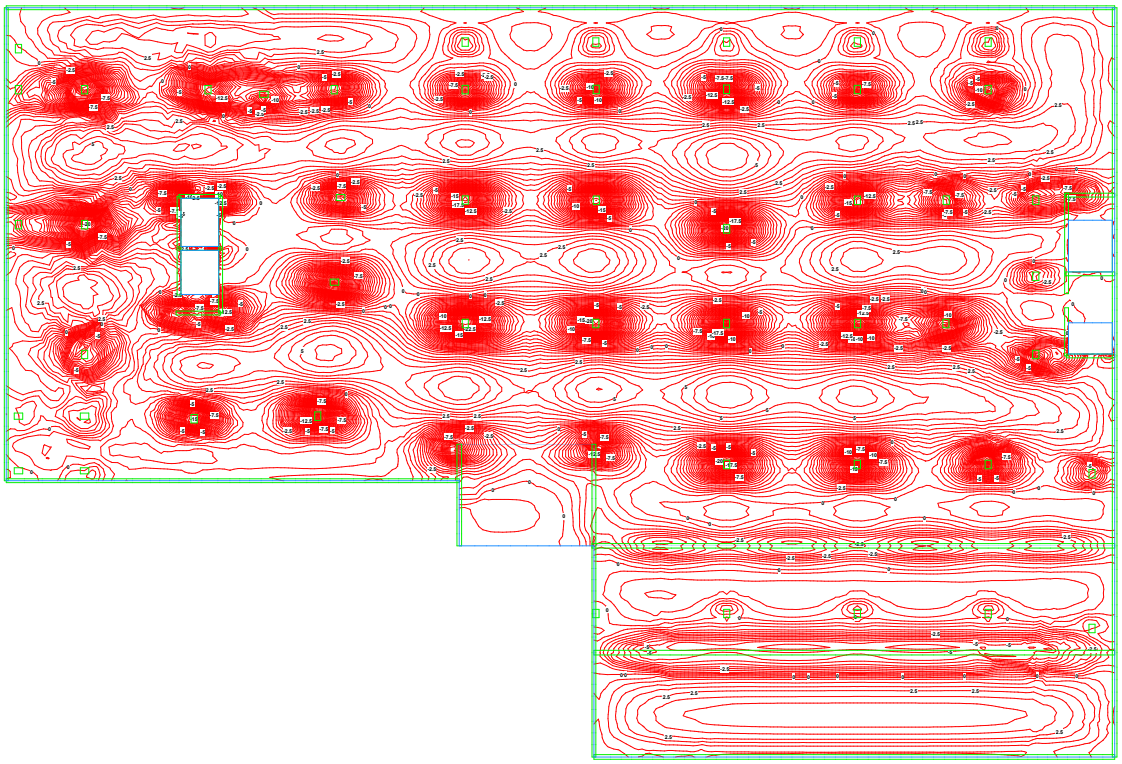
Factored LC: 1.2D + f1L + 1.6S: Max Mx Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Maximum Values) (X-Axis Direction)
Cne Contour = 5.0 Kips
Min Value = -14.72 Kips @ (133.1,136.3) Max Value = 10.62 Kips @ (-7.378,173.3)



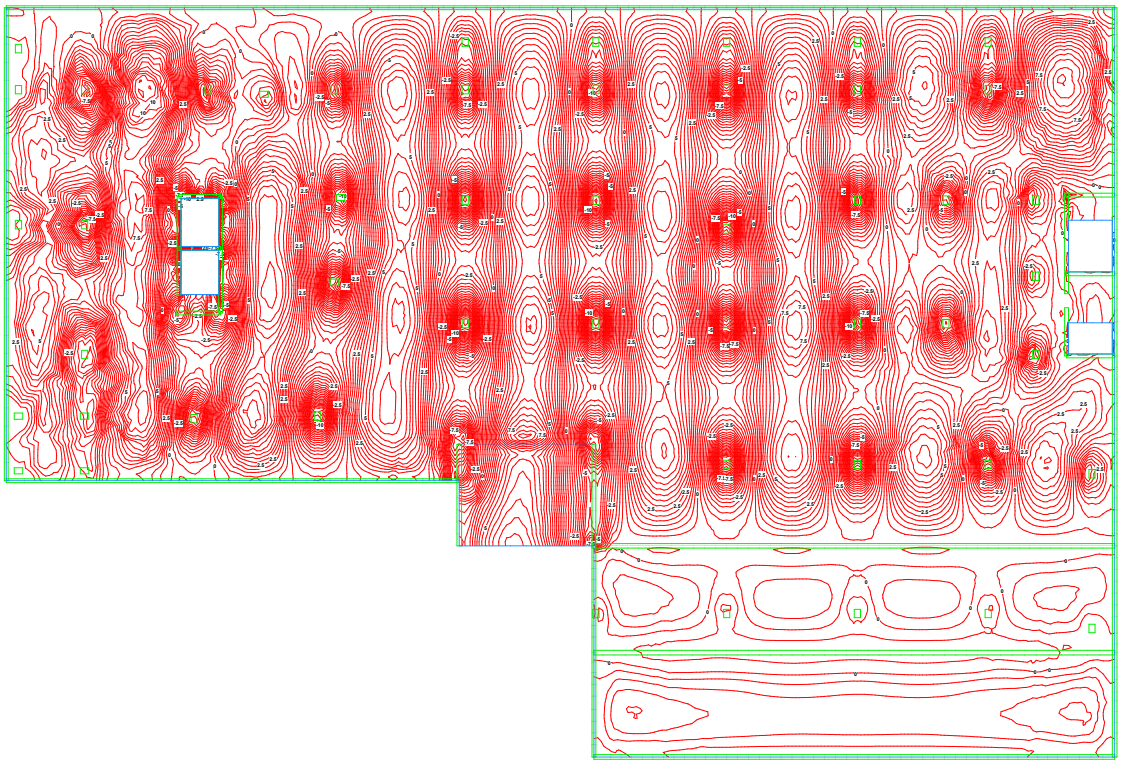
Factored LC: 1.2D + f1L + 1.6S: Min Mx Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Minimum Values) (K-Axis Direction)
One Contour = 0.5 Kips
Min Value = -23.68 Kips @ (133.1,136.3) Max Value = 6.434 Kips @ (132.1,121)



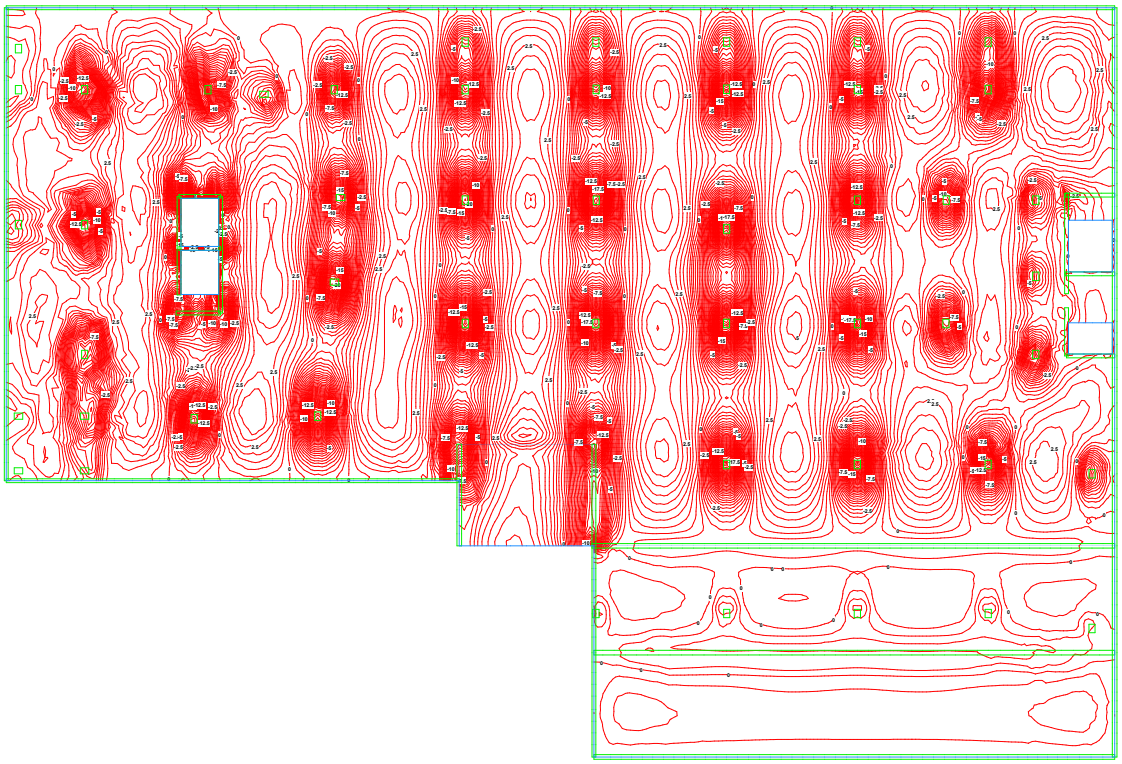
Factored LC: 1.2D + f1L + 1.6S: Max My Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 0.5 Kips
Min Value = -14.5 Kips @ (76.34,134.3) Max Value = 10.77 Kips @ (7.55,187.3)



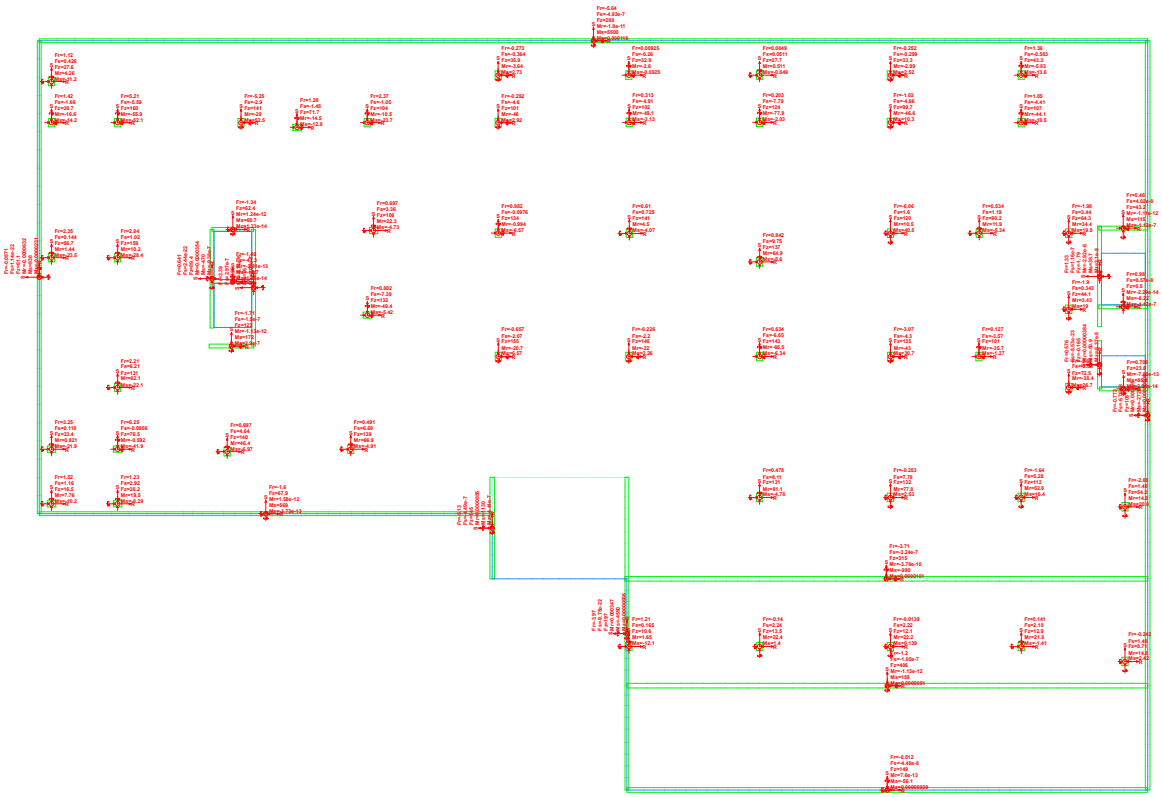
Factored LC: 1.2D + f1L + 1.6S: Min My Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:600
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 0.5 Kips
Min Value = -23.21 Kips @ (76.34,136.3) Max Value = 5.6 Kips @ (69.77,112.7)



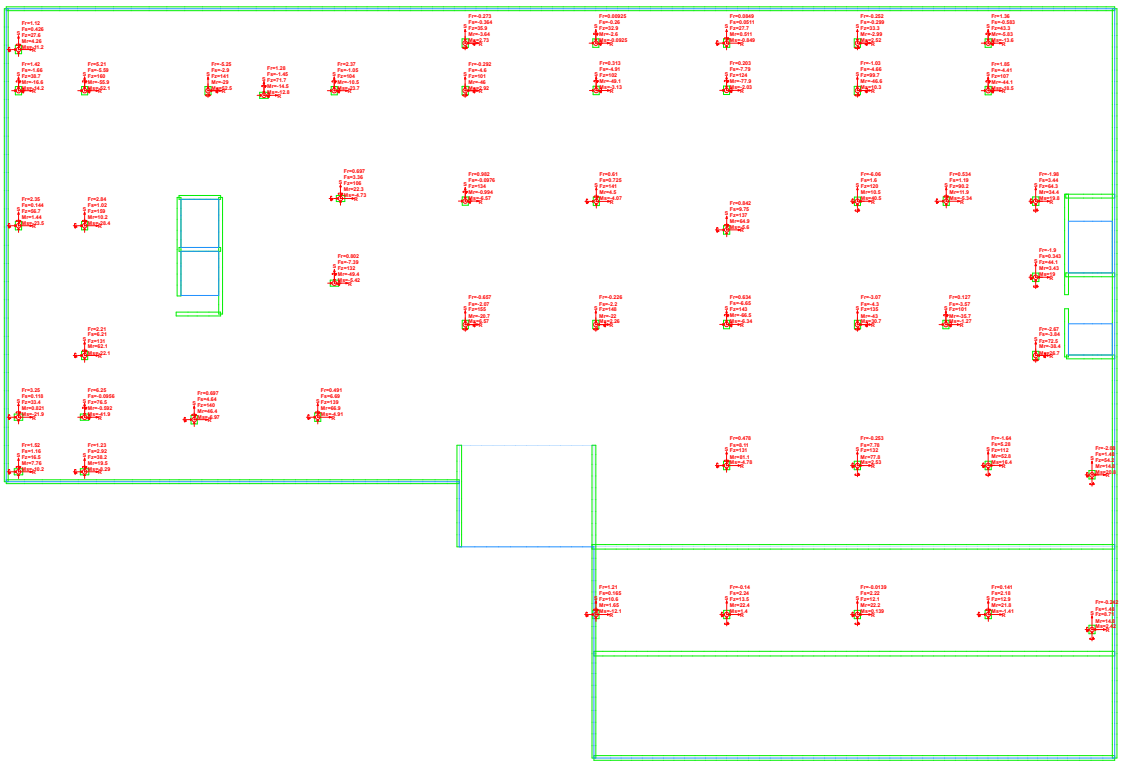
Factored LC: 1.2D + f1L + 1.6S: Std Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:600
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fr,Fx,Fz,Mr,My,Mx)(Standard Context)



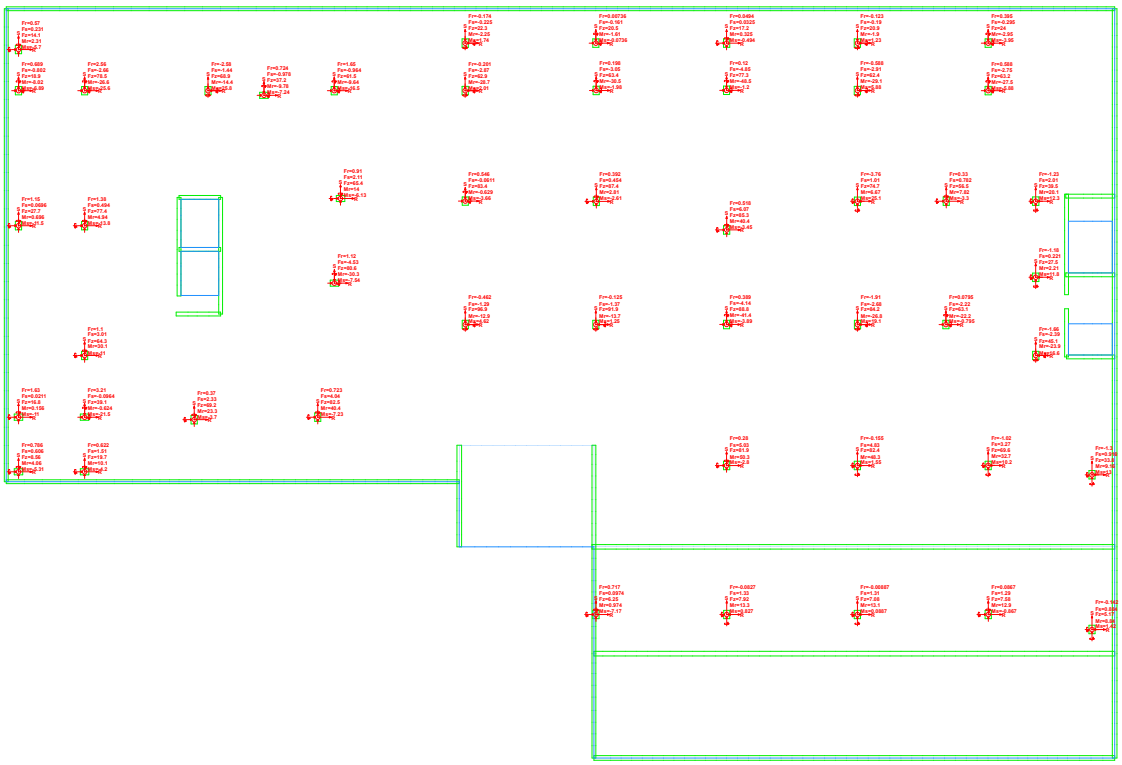
Factored LC: 1.2D + f1L + 1.6S: Max Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:100
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Column Below)(Fx,Fy,Fz,Mr,Mx,My)(Max Fz Context)



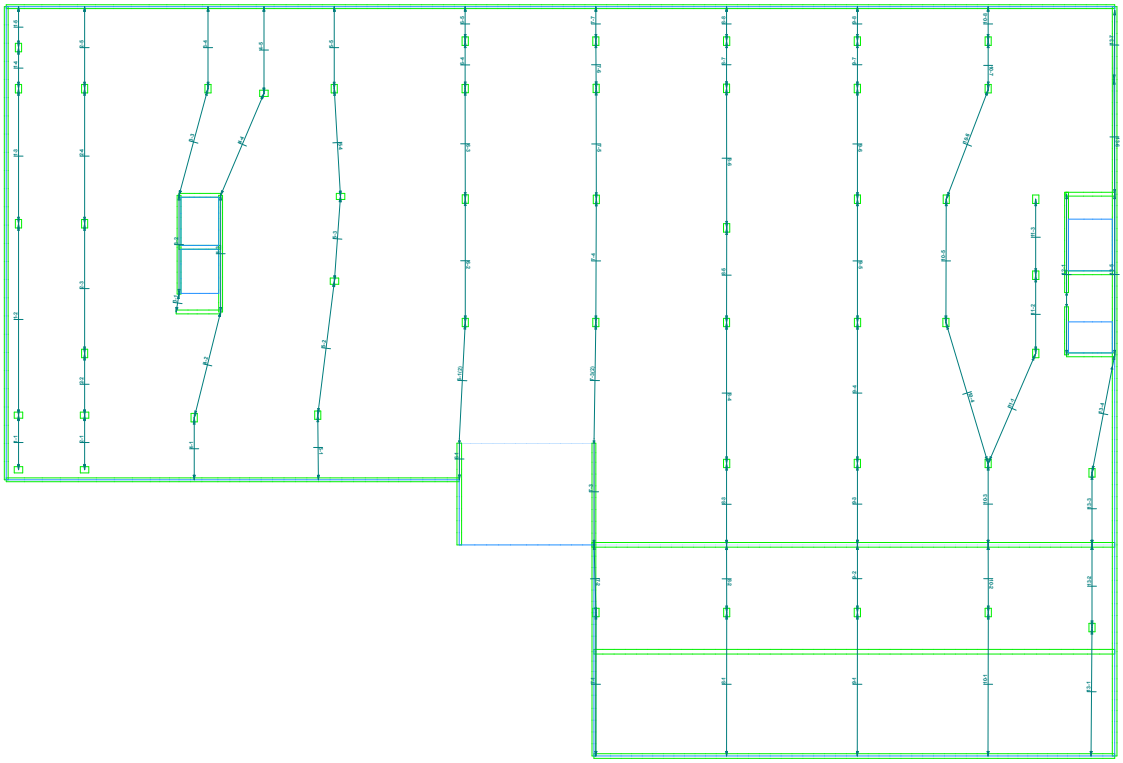
Factored LC: 1.2D + f1L + 1.6S: Min Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:100
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Column Below)(Fx,Fy,Fz,Mx,My,Mz)(Min Fz Contest)



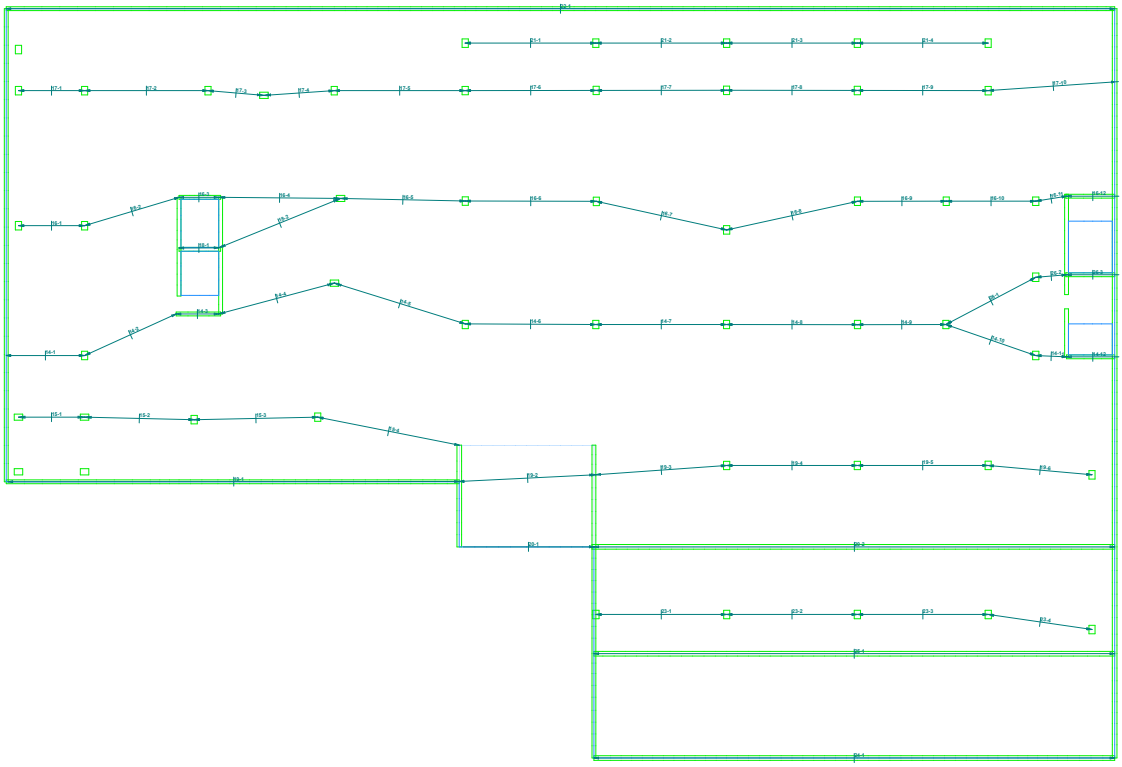
Design Strip: Latitude Design Spans Plan

Design Strip: Latitude SSc; SS Numbers; User Notes; 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 = 1:500



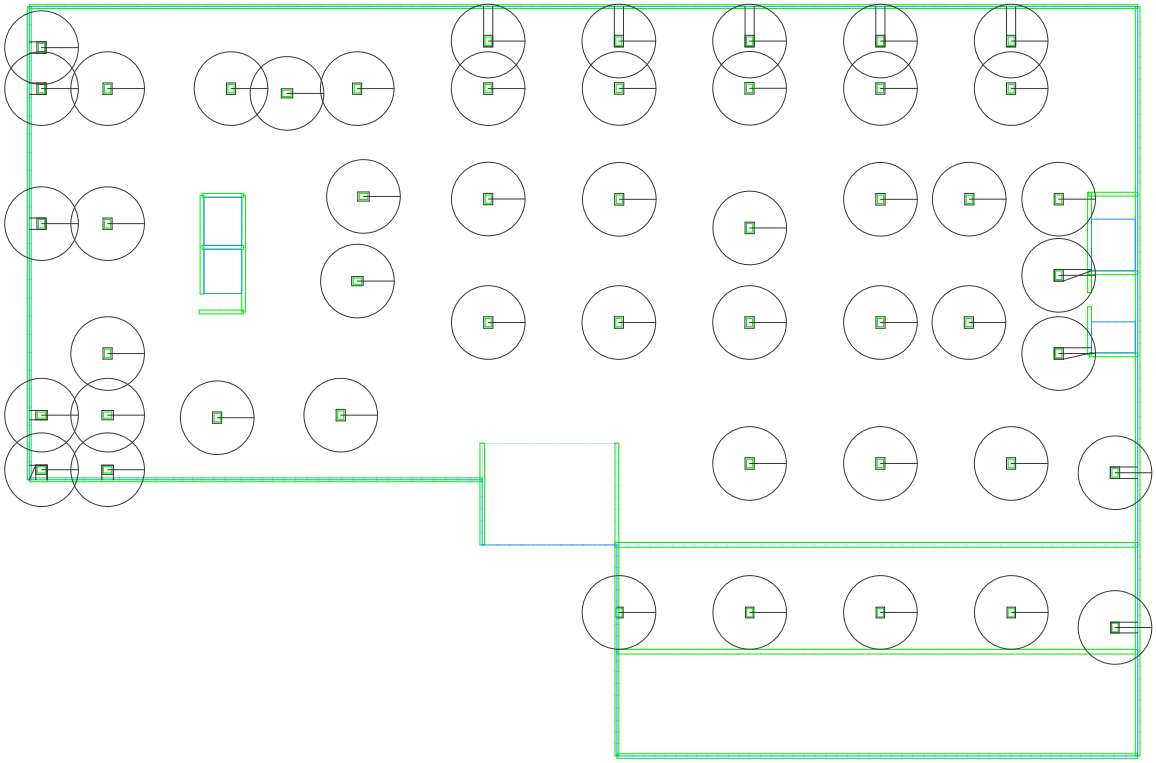
Design Strip: Longitude Design Spans Plan

Design Strip: Longitude SSc; SS Numbers; 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 = 1:500



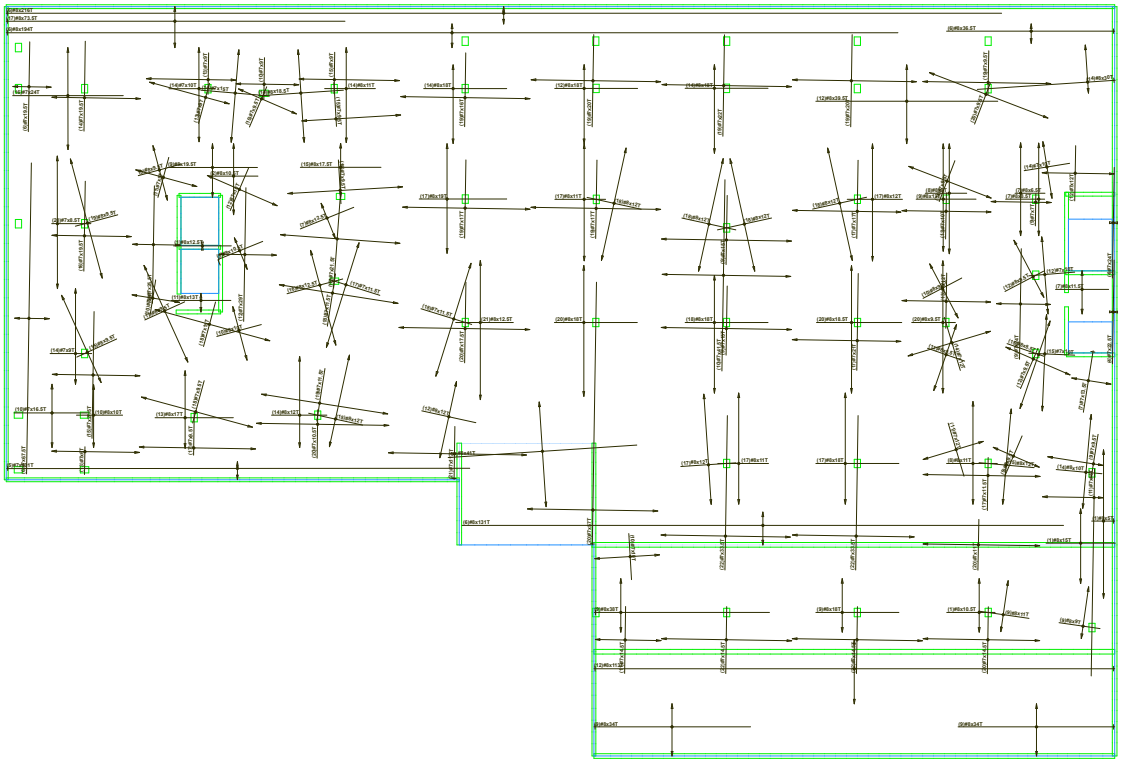
Design Strip: Punching Checks Plan

Design Strip: User Lines; User Notes; User Dimensions; Punching Checks; Punching Check Sections;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



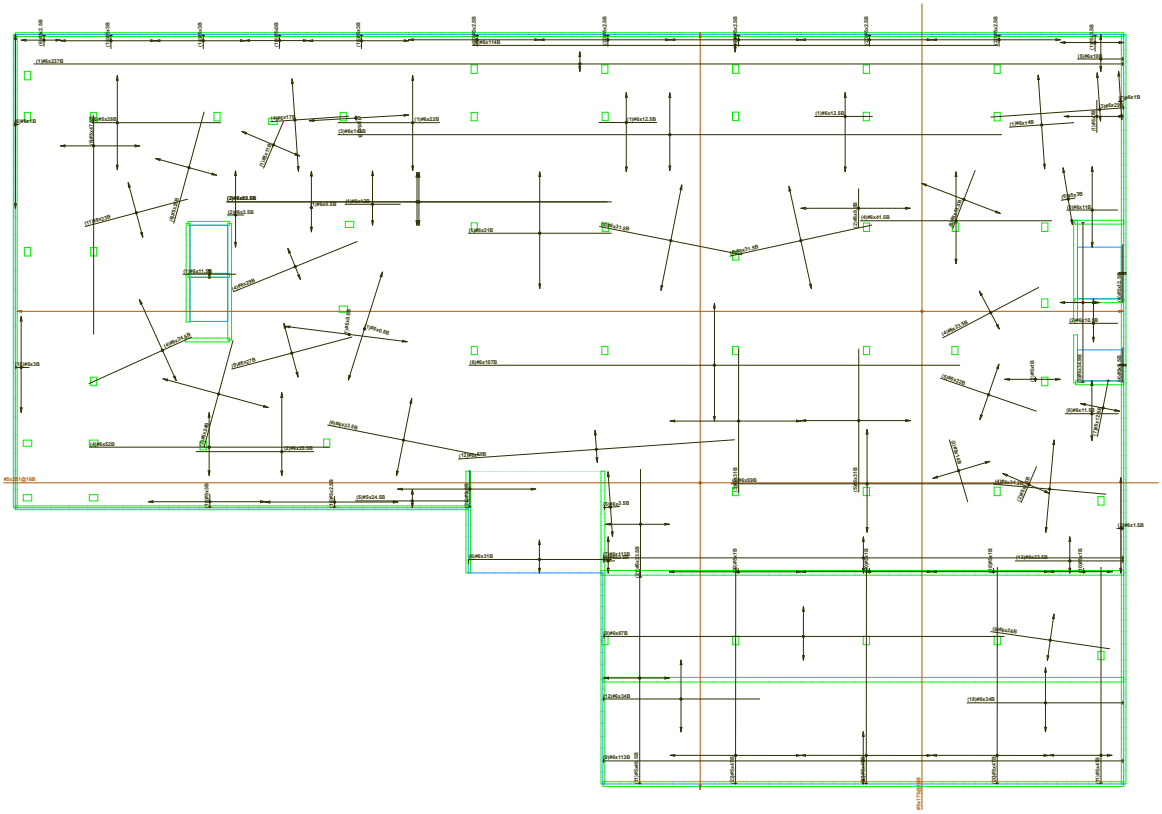
Reinforcement: Top Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Latitude User Concentrated Reinf.; Latitude Program Concentrated Reinf.; Latitude User Distributed Reinf.; Latitude Program Distributed Reinf.; Longitude User Concentrated Reinf.; Longitude Program Concentrated Reinf.; Longitude User Distributed Reinf.; Longitude Program Distributed Reinf.; Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Top Face Distributed Reinf.; Both Faces Distributed Reinf.; Concentrated Reinf. Descriptions; Concentrated Reinf. Extent; Distributed Reinf. Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



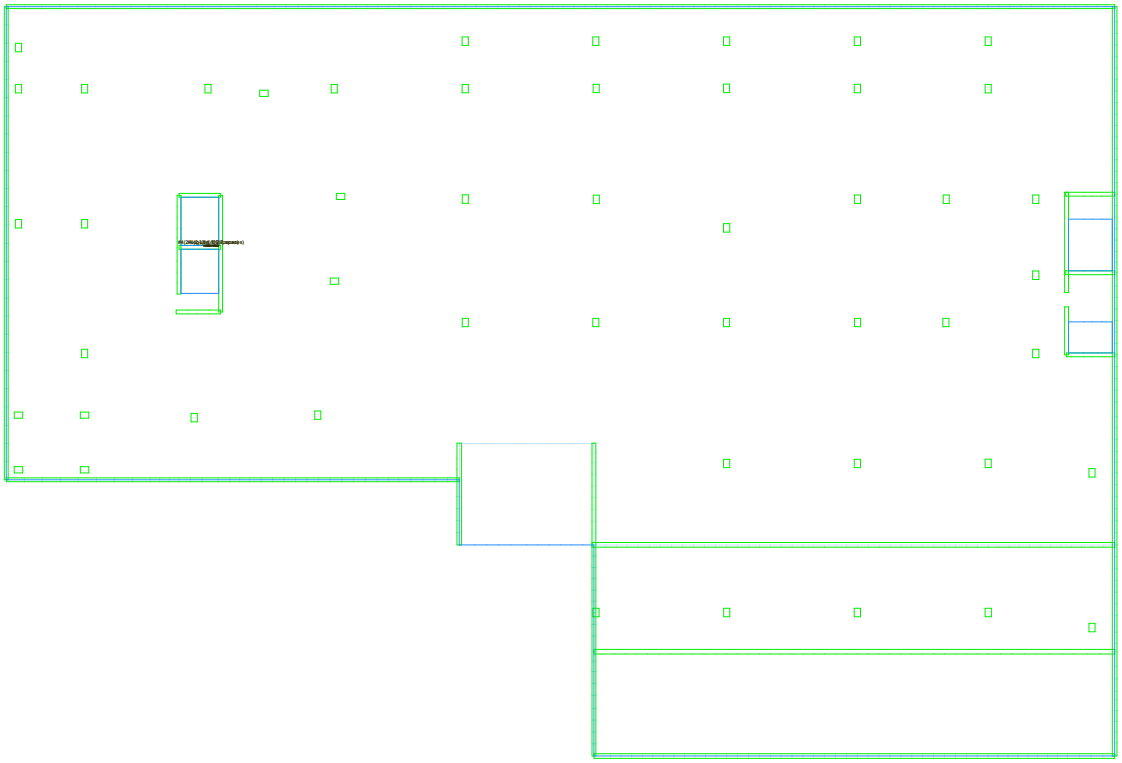
Reinforcement: Bottom Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Latitude User Concentrated Reinf.; Latitude Program Concentrated Reinf.; Latitude User Distributed Reinf.; Latitude Program Distributed Reinf.; Longitude User Concentrated Reinf.; Longitude Program Concentrated Reinf.; Longitude User Distributed Reinf.; Longitude Program Distributed Reinf.; Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Bottom Face Distributed Reinf.; Both Faces Distributed Reinf.; Concentrated Reinf. Descriptions; Concentrated Reinf. Extent; Distributed Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



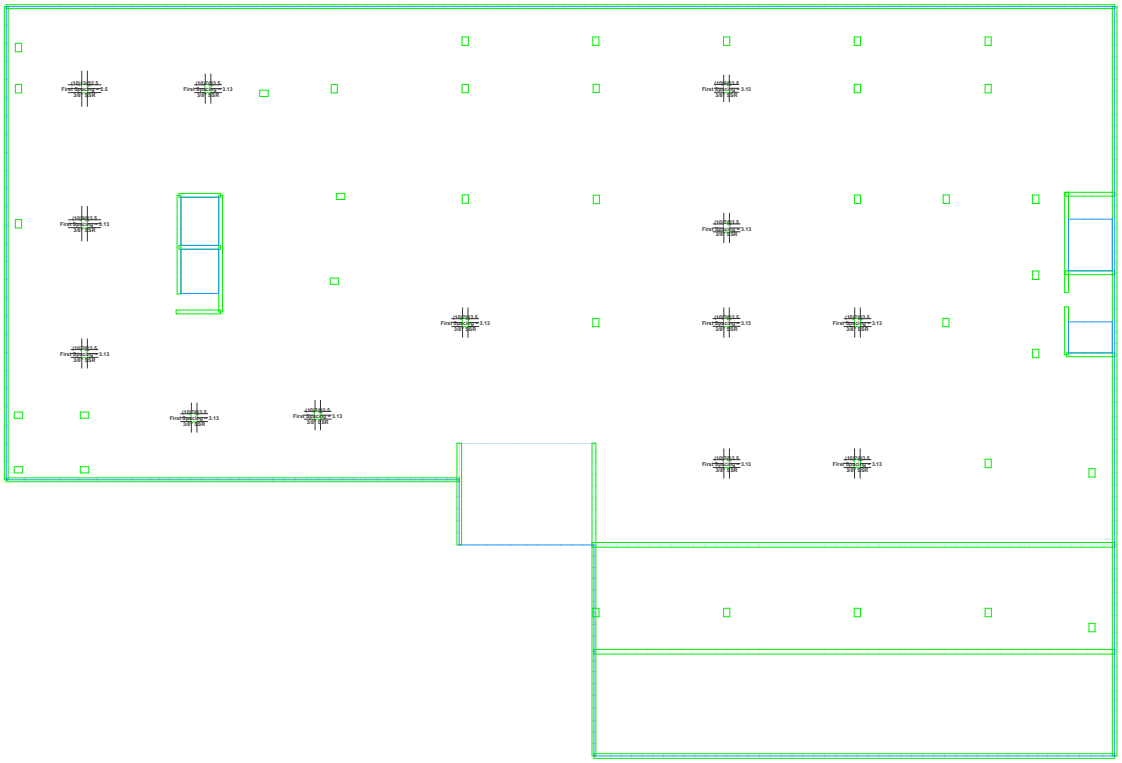
Reinforcement: Shear Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Latitude User Transverse Reinf.; Latitude Program Transverse Reinf.; Latitude User Individual Transverse Bars; Latitude Program Individual Transverse Bars; Longitude User Transverse Reinf.; Longitude Program Transverse Reinf.; Longitude User Individual Transverse Bars; Longitude Program Individual Transverse Bars; Transverse Reinf. Descriptions; Transverse Reinf. Extent; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



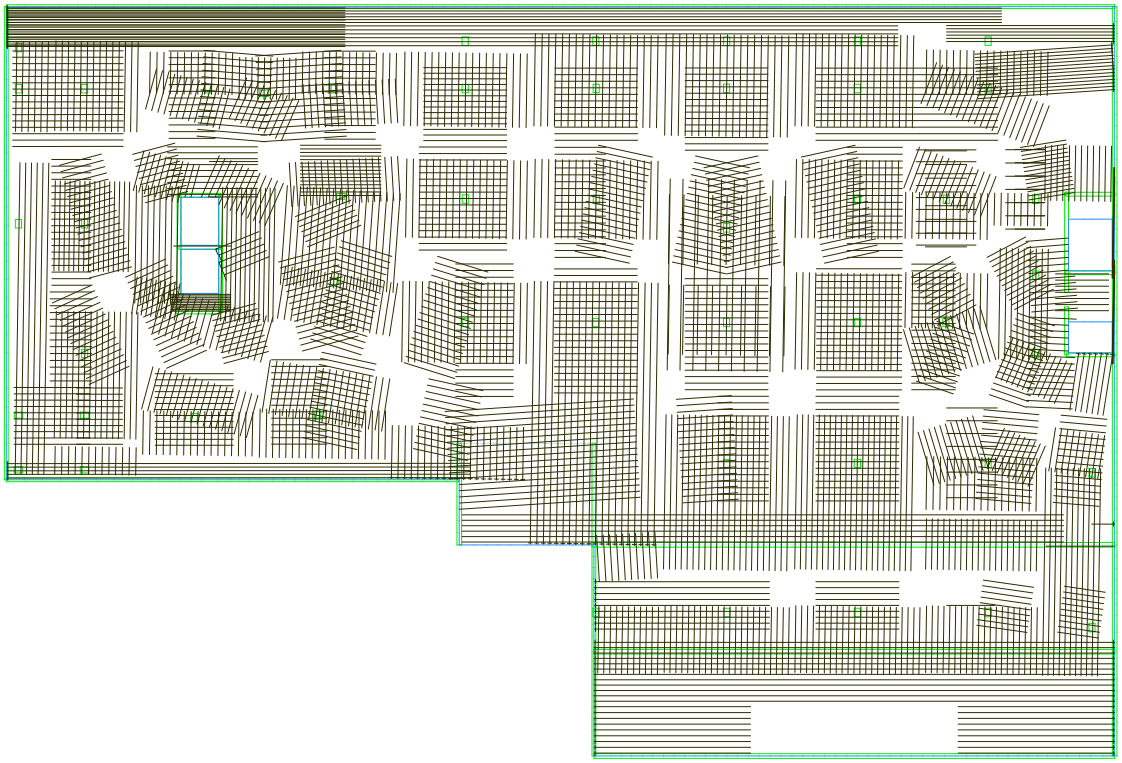
Reinforcement: SSR Plan

Reinforcement: User Lines; User Notes; User Dimensions; Program SSR Callouts; SSR Callout Details; Program SSR Rails;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



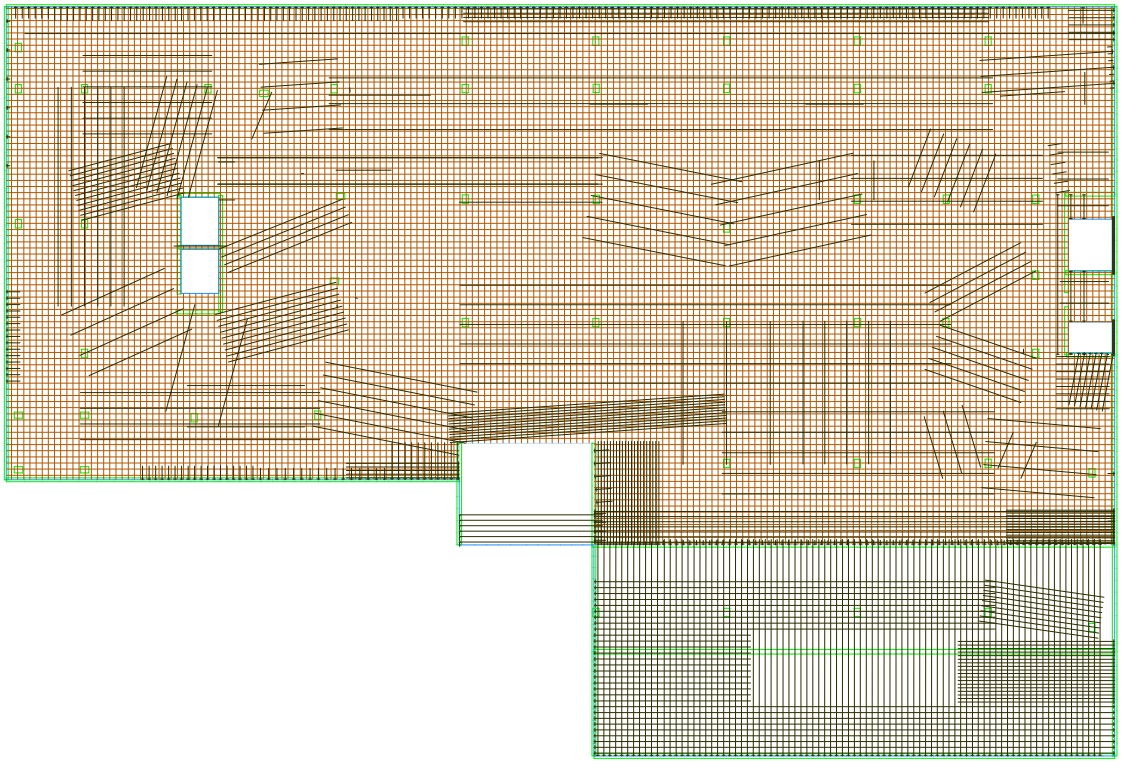
Reinforcement: Individual Top Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Longitude User Individual Bars; Longitude Program Individual Bars; Latitude User Individual Bars; Latitude Program Individual Bars; Top Face Individual Bars; Both Faces Individual Bars; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only; Scale = 1:500



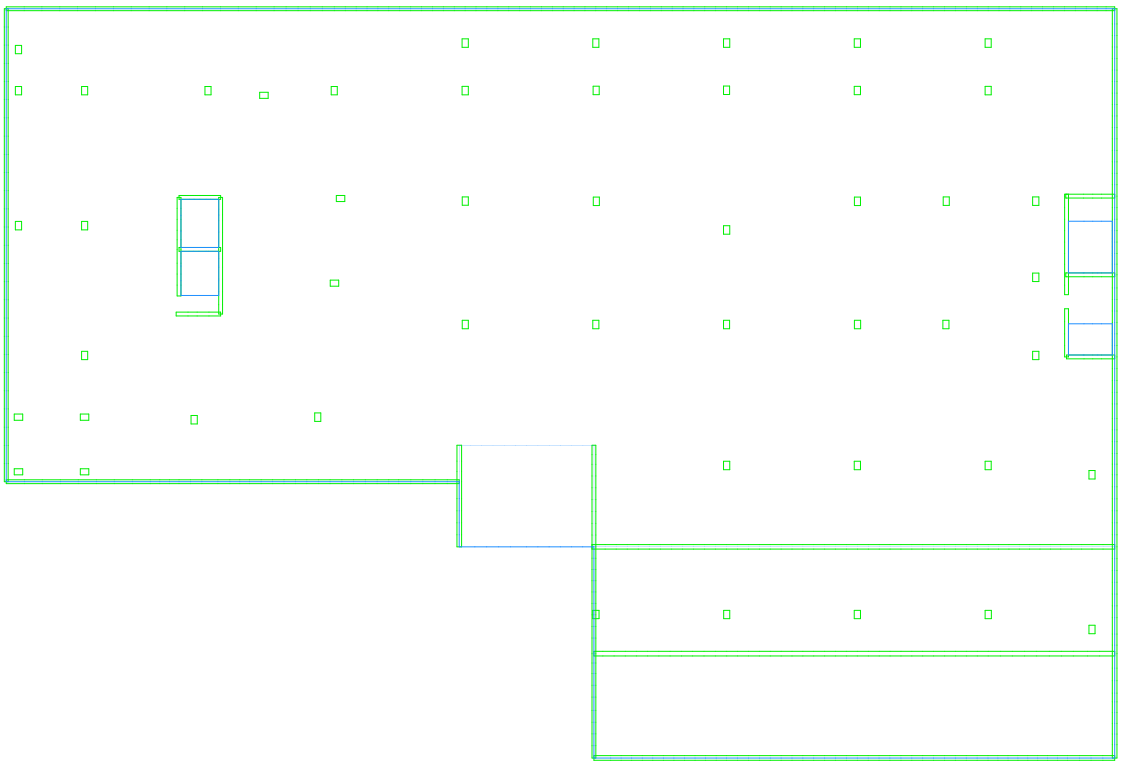
Reinforcement: Individual Bottom Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Longitude User Individual Bars; Longitude Program Individual Bars; Latitude User Individual Bars; Latitude Program Individual Bars; Bottom Face Individual Bars; Both Faces Individual Bars;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



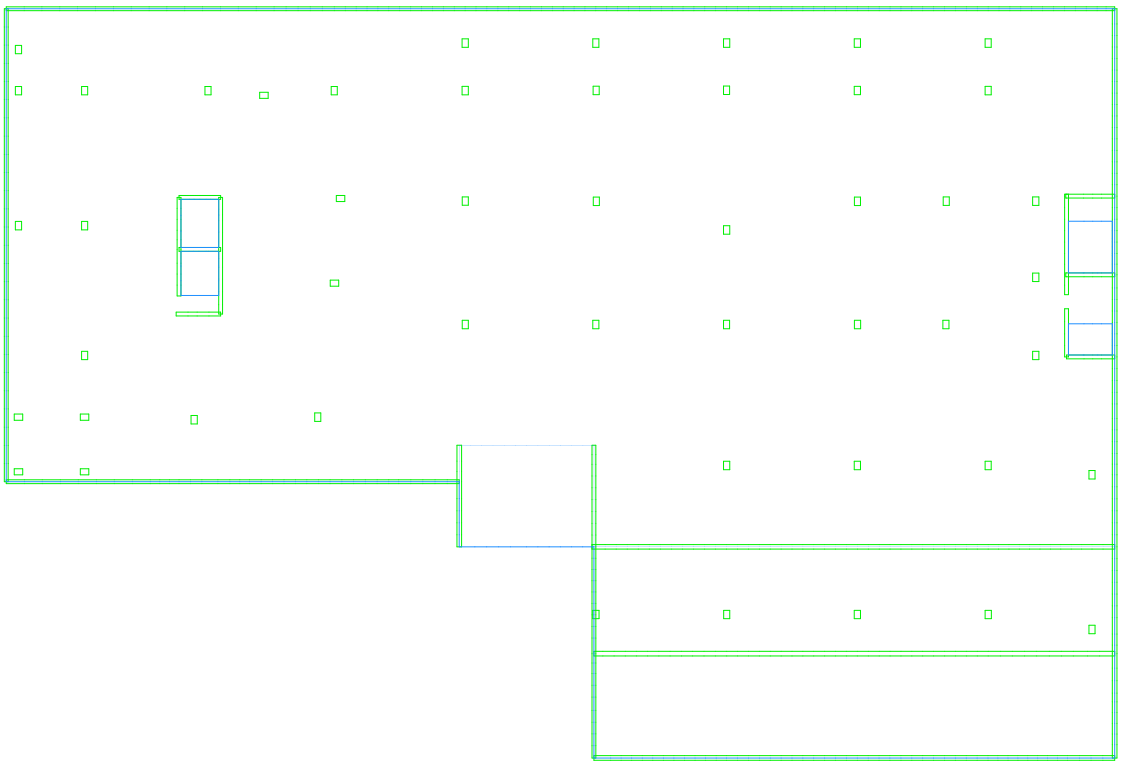
Latitude Tendon Parameters: Standard Plan

Latitude Tendon Parameters: User Lines; User Notes; User Dimensions; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Profile Polyline Ends; Distributed Tendon Profile Area Edge; Distributed Tendon Profile Span Changes; Distributed Tendon Profile Concrete Elevation Change; Tendon Void: Jack Region; Jack Region Hatching; Jack Region Corner Icon; Distributed Tendon Overlap Areas; Banded Tendons; Banded Tendon Description; Banded Tendon Fillet Graphics; Profile Points; Profile Elevation Values; Profile Nod Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only; Manual Latitude Tendon: Tendons; Num Strands; Tendon Points; Profile Values; Scale = 1:500



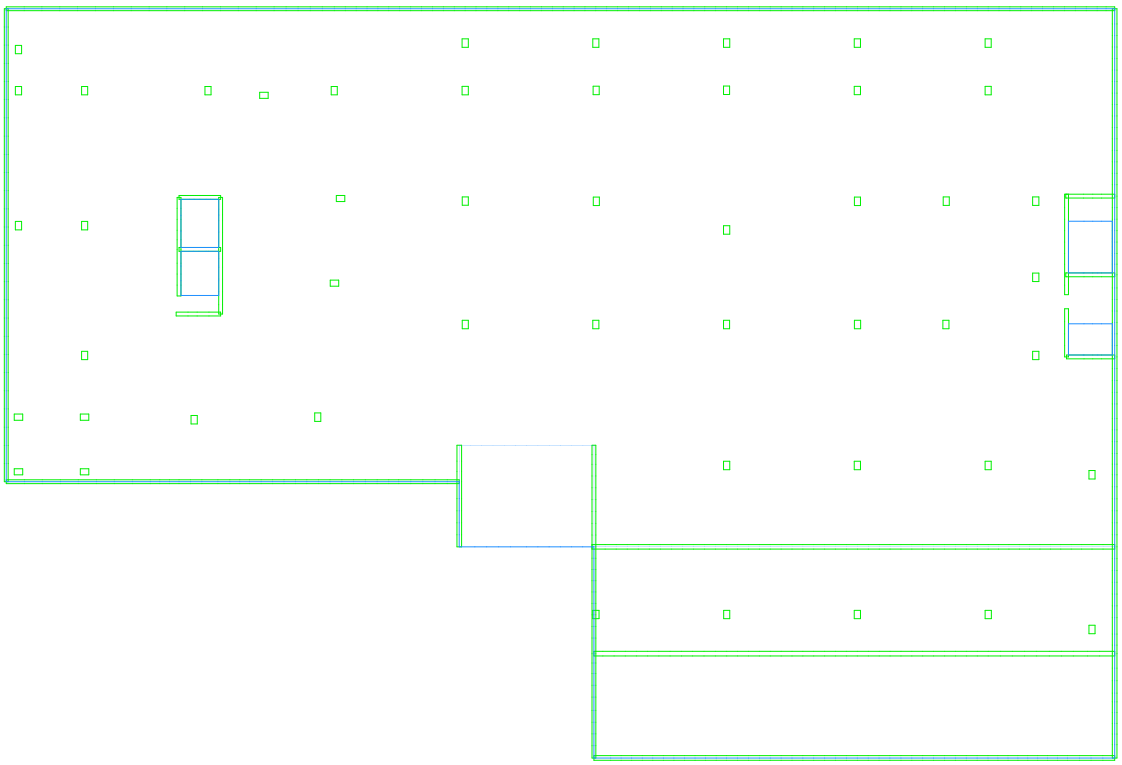
Manual Latitude Tendon: Standard Plan

Manual Latitude Tendon: User Lines; User Notes; User Dimensions; Tendons; Num Strands; Tendon Inflection Ratio; Tendon Points; Profile Values; Jacks;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Latitude Tendon Parameters: Banded Tendons; Banded Tendon Description; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Overlap Areas; Profile Points; Profile Elevation Values; Profile Nodes; Jack Region;
Scale = 1:500



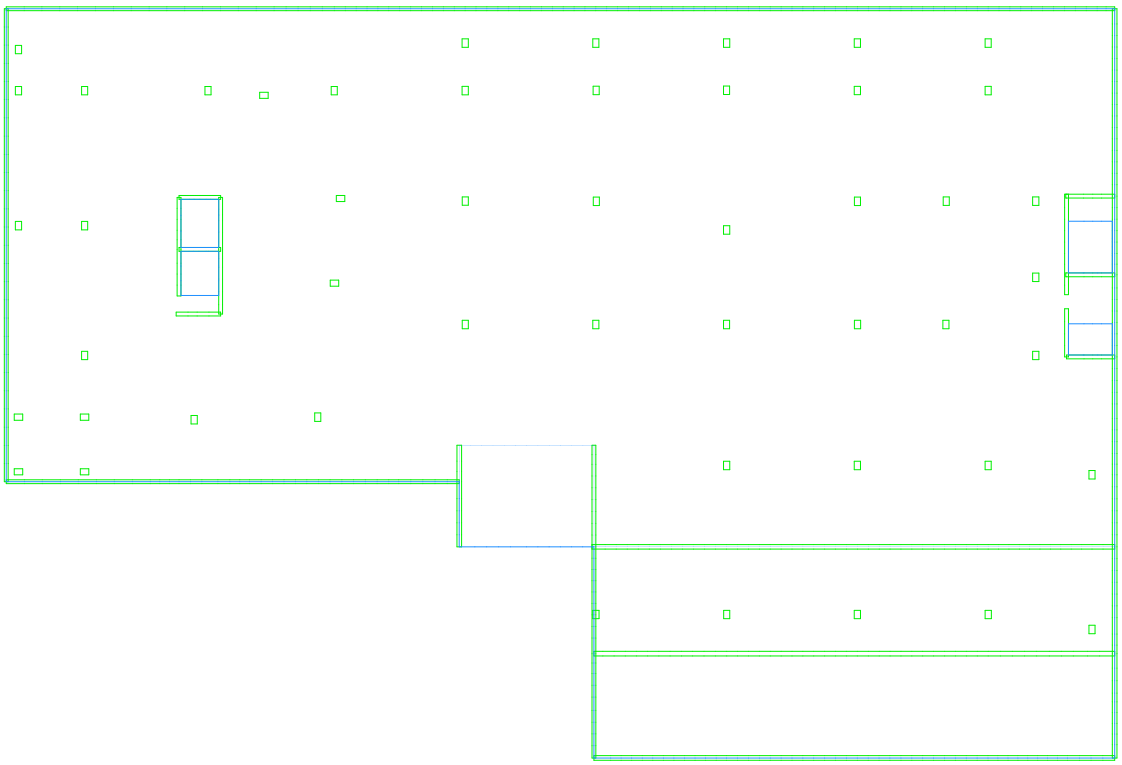
Longitude Tendon Parameters: Standard Plan

Longitude Tendon Parameters; User Lines; User Notes; User Dimensions; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Profile Polyline Ends; Distributed Tendon Profile Area Edge; Distributed Tendon Profile Span Changes; Distributed Tendon Profile Concrete Elevation Change; Tendon Void; Jack Region; Jack Region Hatching; Jack Region Corner Icon; Distributed Tendon Overlap Areas; Banded Tendons; Banded Tendon Description; Banded Tendon Fillet Graphics; Profile Points; Profile Elevation Values; Profile Name; Element; Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only; Manual Longitude Tendon: Tendons; Num Strands; Tendon Points; Profile Values;
Scale = 1:500



Manual Longitude Tendon: Standard Plan

Manual Longitude Tendon: User Lines; User Notes; User Dimensions; Tendons; Num Strands; Tendon Inflection Ratio; Tendon Points; Profile Values; Jacks;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Longitude Tendon Parameters: Banded Tendons; Banded Tendon Description; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Overlap Areas; Profile Points; Profile Elevation Values; Profile Nodes; Jack Region;
Scale = 1:500

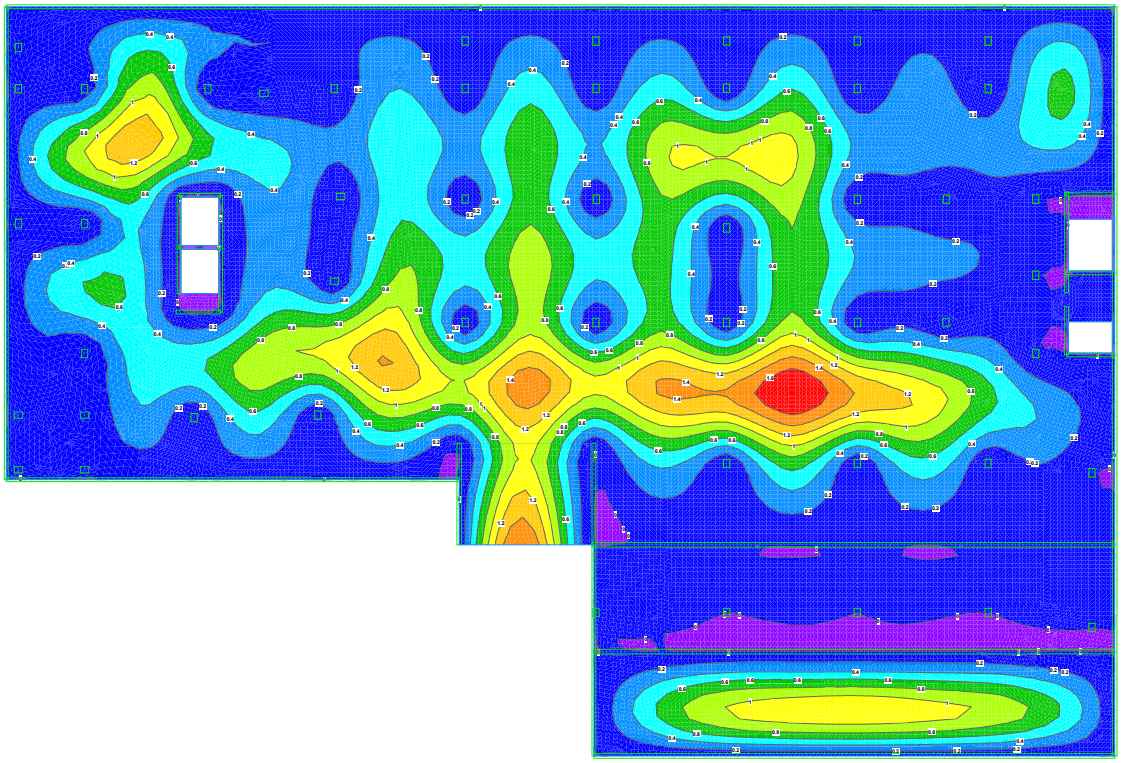


Maximum Short Term Load: Std Deflection Plan

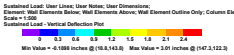
Maximum Short Term Load: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Maximum Short Term Load - Vertical Deflection Plot

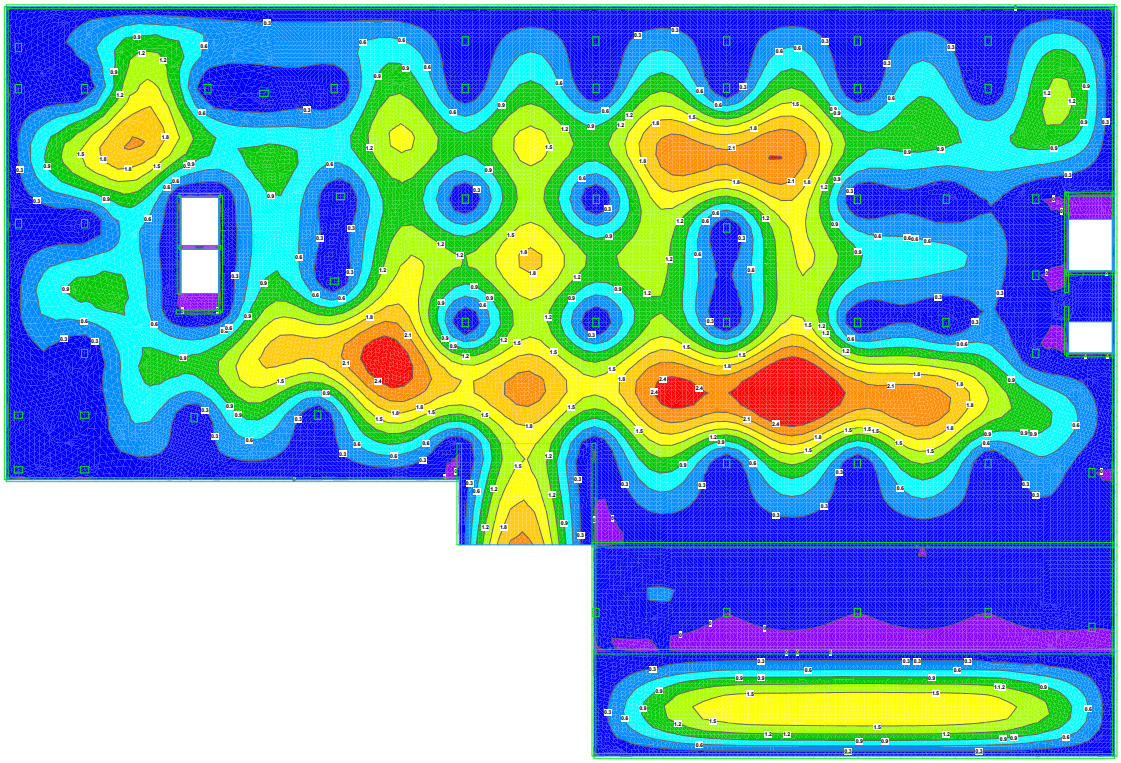
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6

Min Value = -0.1022 inches @ (10.3,143.8) Max Value = 1.82 inches @ (147.3,122.3)



Sustained Load: Std Deflection Plan



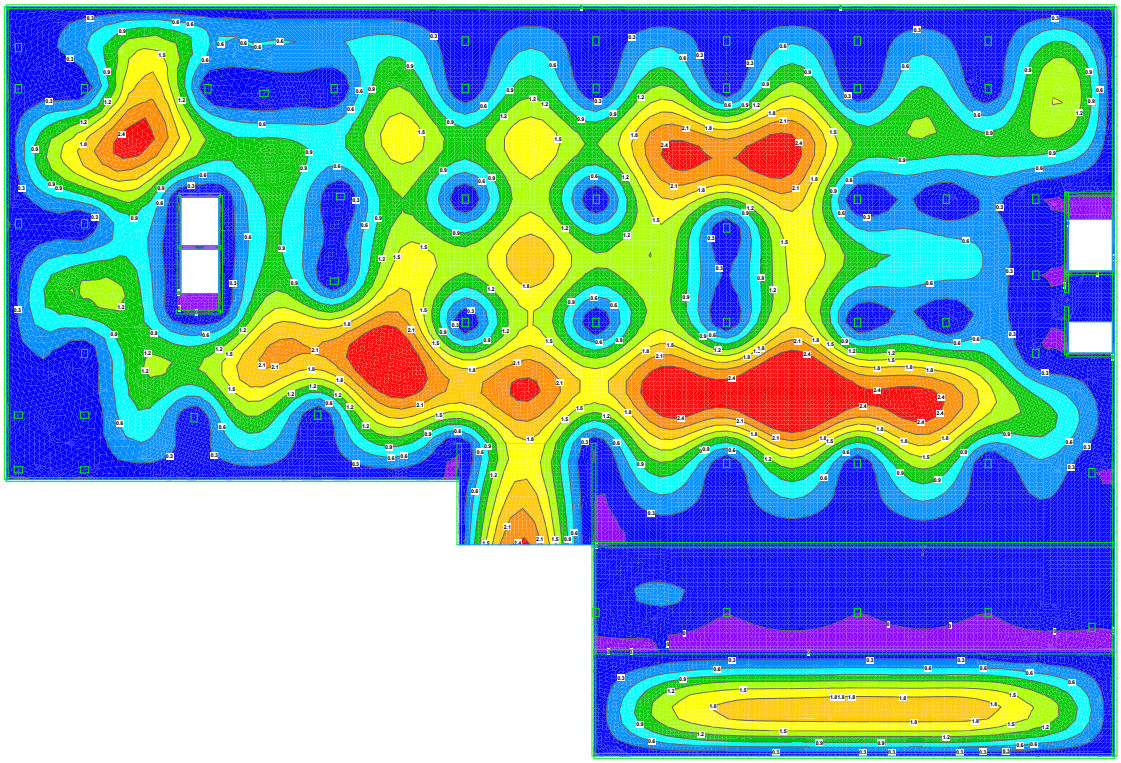


Final Instantaneous Load: Std Deflection Plan

Final Instantaneous Load: 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 = 1:500
Final Instantaneous Load - Vertical Deflection Plot

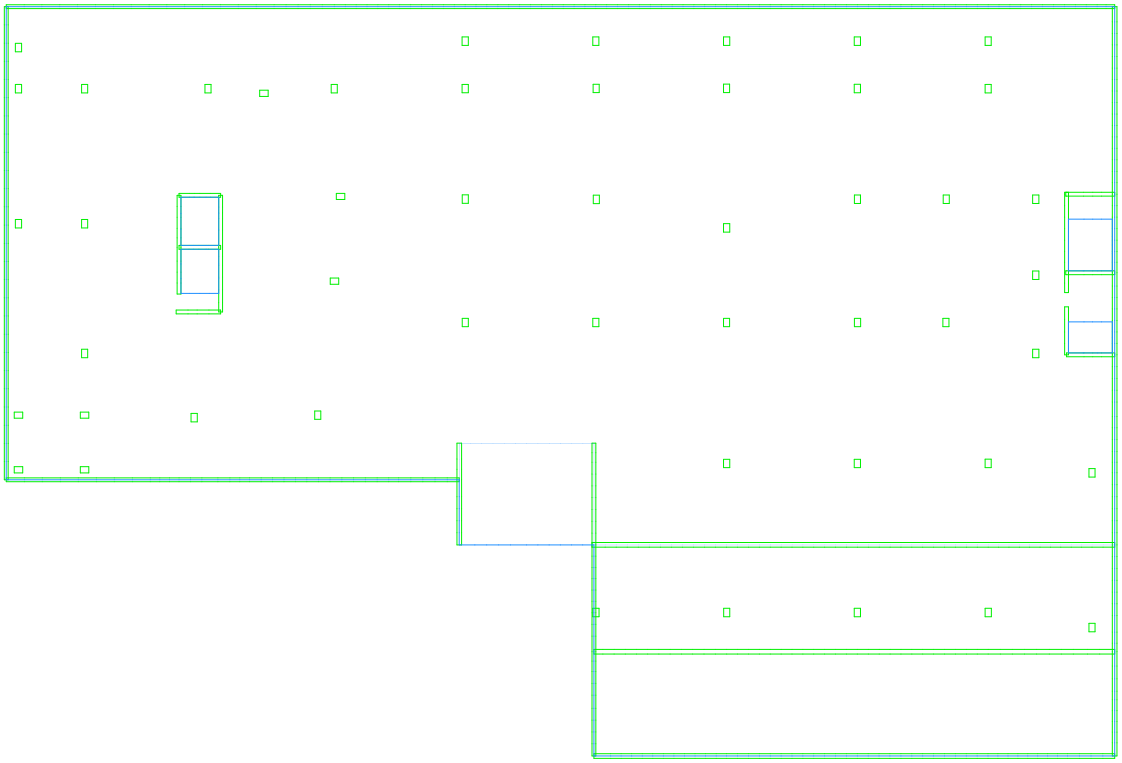
0 0.3 0.6 0.9 1.2 1.5 1.8 2.1 2.4

Min Value = -0.2216 inches @ (10.3,143.8) Max Value = 3.276 inches @ (147.3,122.3)



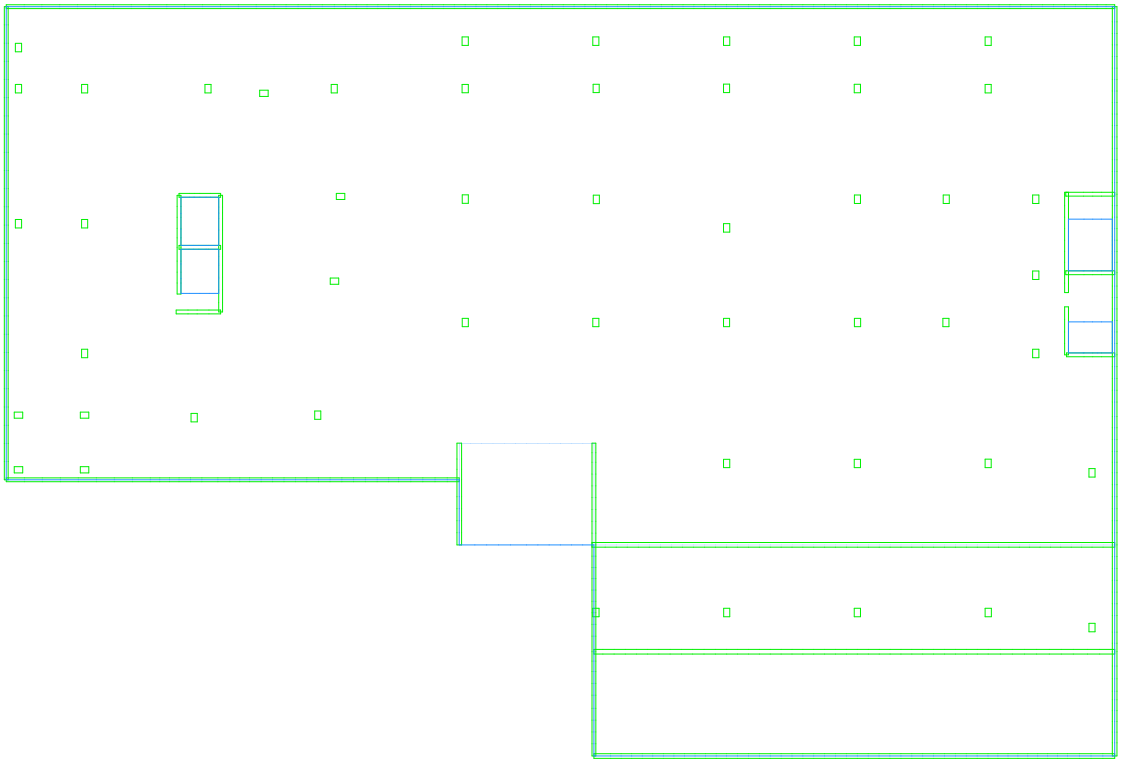
Additional Mass Loading: All Loads Plan

Additional Mass Loading; User Lines; User Notes; User Dimensions; Mass Point Loads; Mass Point Load Icons; Mass Point Load Values; Mass Line Loads; Mass Line Load Icons; Mass Line Load Values; Mass Area Loads; Mass Area Load Icons; Mass 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 = 1:500



Vibration Analysis: Excitation Areas Plan

Vibration Analysis: User Lines; User Notes; User Dimensions; Vibration Excitation Area; Vibration Excitation Area Hatching;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500

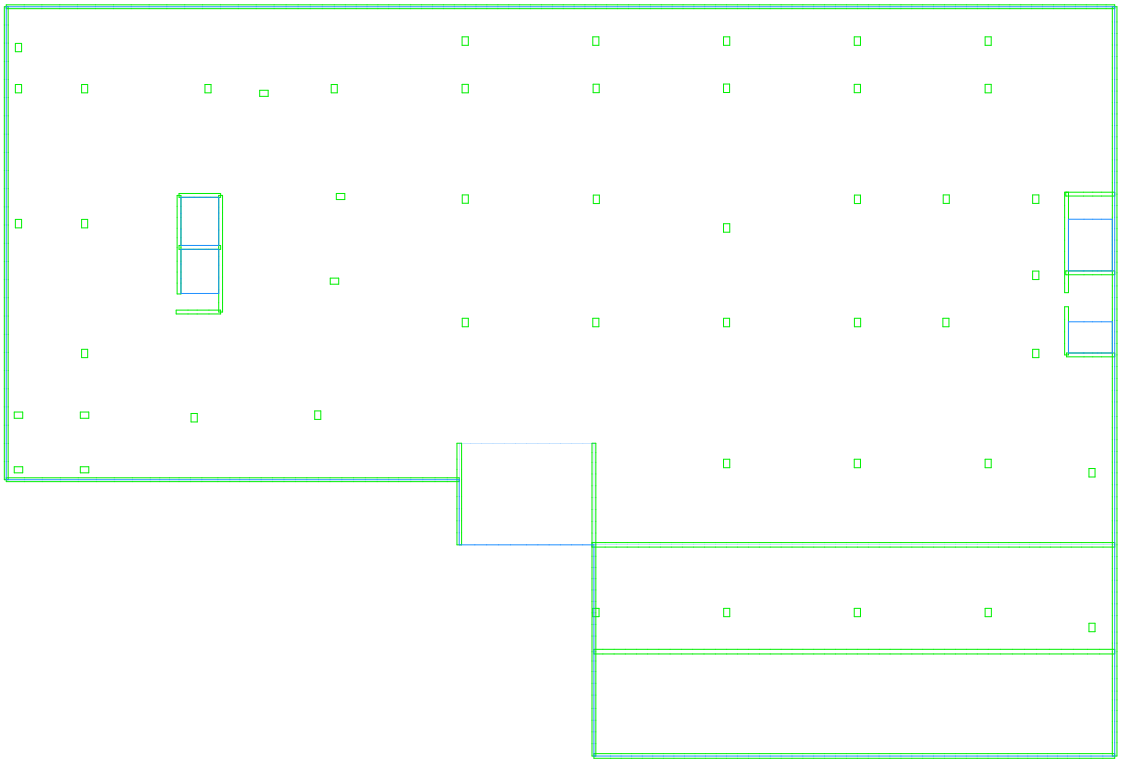


Vibration Analysis: Max RMS Velocity Plan

Vibration Analysis: 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 = 1:500
Vibration Analysis - (Vertical RMS Velocity Plot) (Maximum Values)

-0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4

Min Value = 0 ft/sec @ (0,0) Max Value = 0 ft/sec @ (0,0)

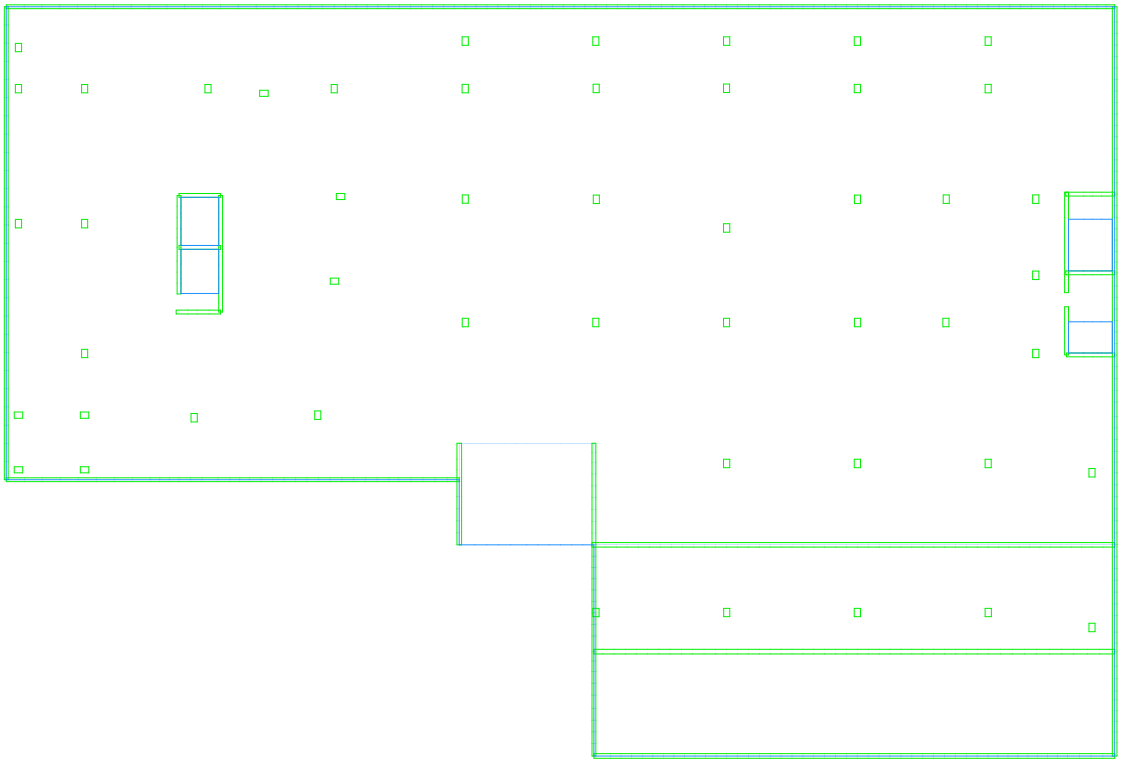


Vibration Analysis: Max RMS Acceleration Plan

Vibration Analysis: 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 = 1:500
Vibration Analysis - (Vertical RMS Acceleration Plot) (Maximum Values)

-0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4

Min Value = 0 ft/sec² @ (0,0) Max Value = 0 ft/sec² @ (0,0)

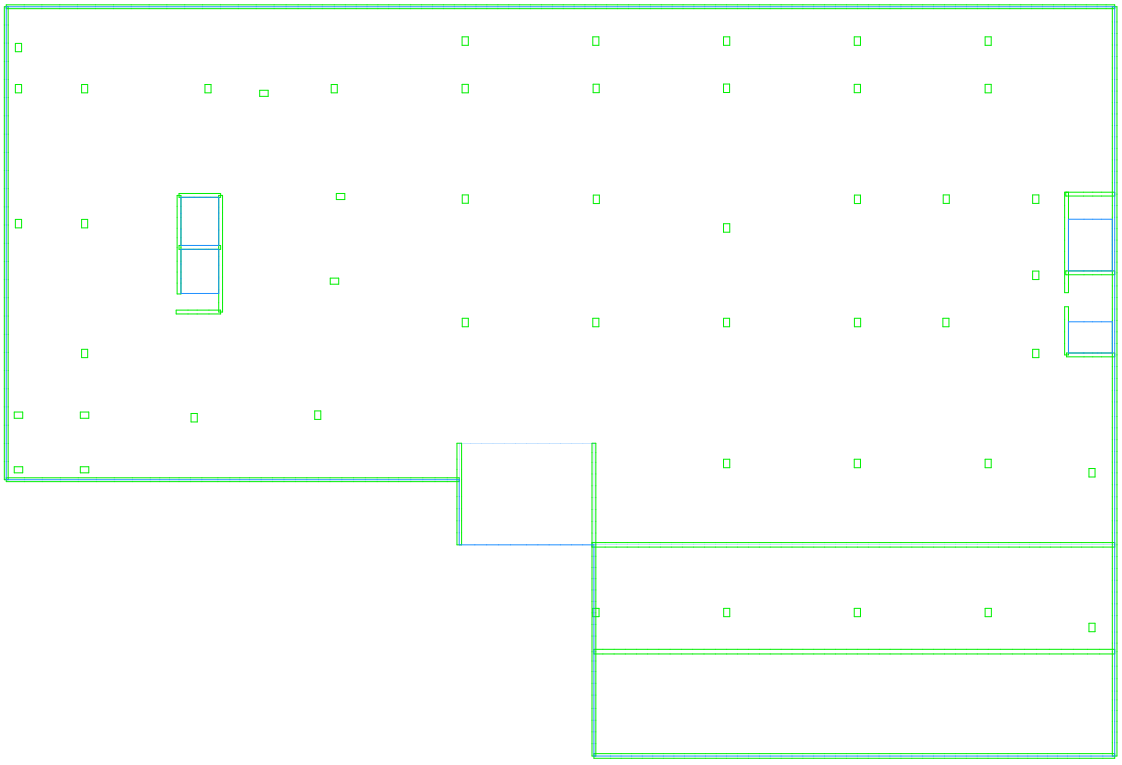


Vibration Analysis: Max Response Factor Plan

Vibration Analysis: 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 = 1:500
Vibration Analysis - (Vertical Response Factor Plot) (Maximum Values)

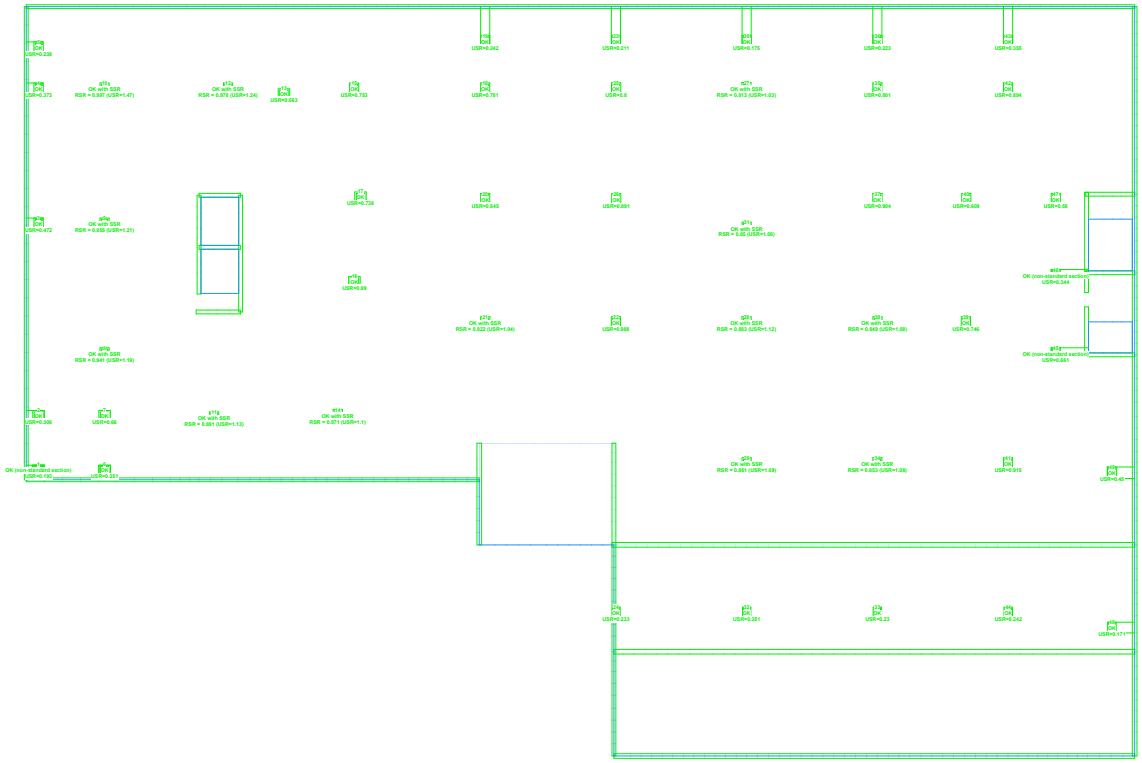
-0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4

Min Value = 0 @ (0,0) Max Value = 0 @ (0,0)



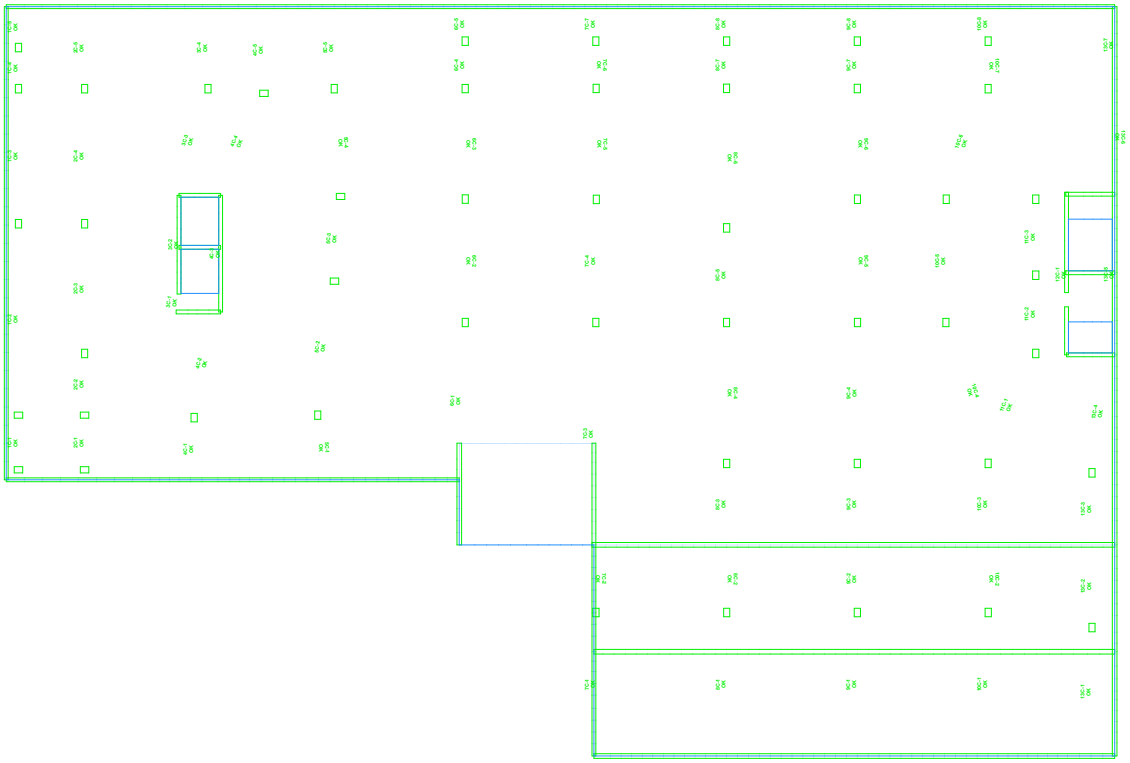
Design Status: Punching Shear Status Plan

Design Status: User Lines; User Notes; User Dimensions; PC Designs; PC Design Numbers; PC Design Status; PC Design Stress Ratios; PC Design Sections;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



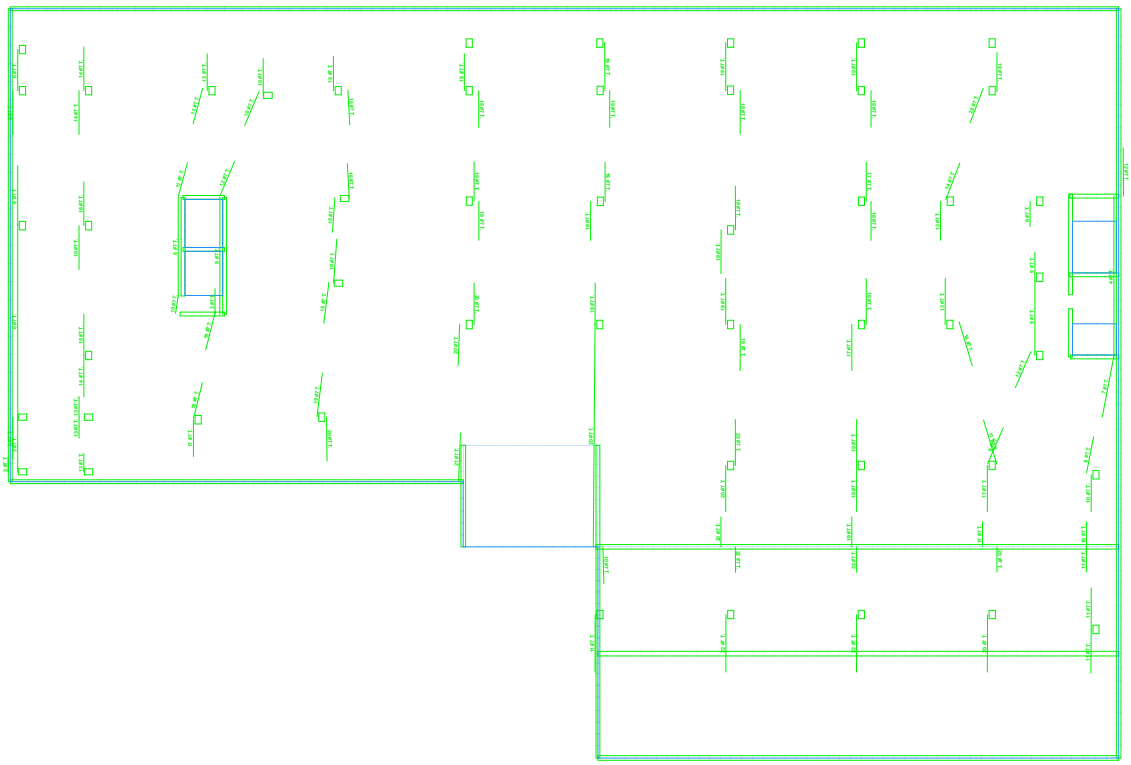
Design Status: Latitude Status Plan

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;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



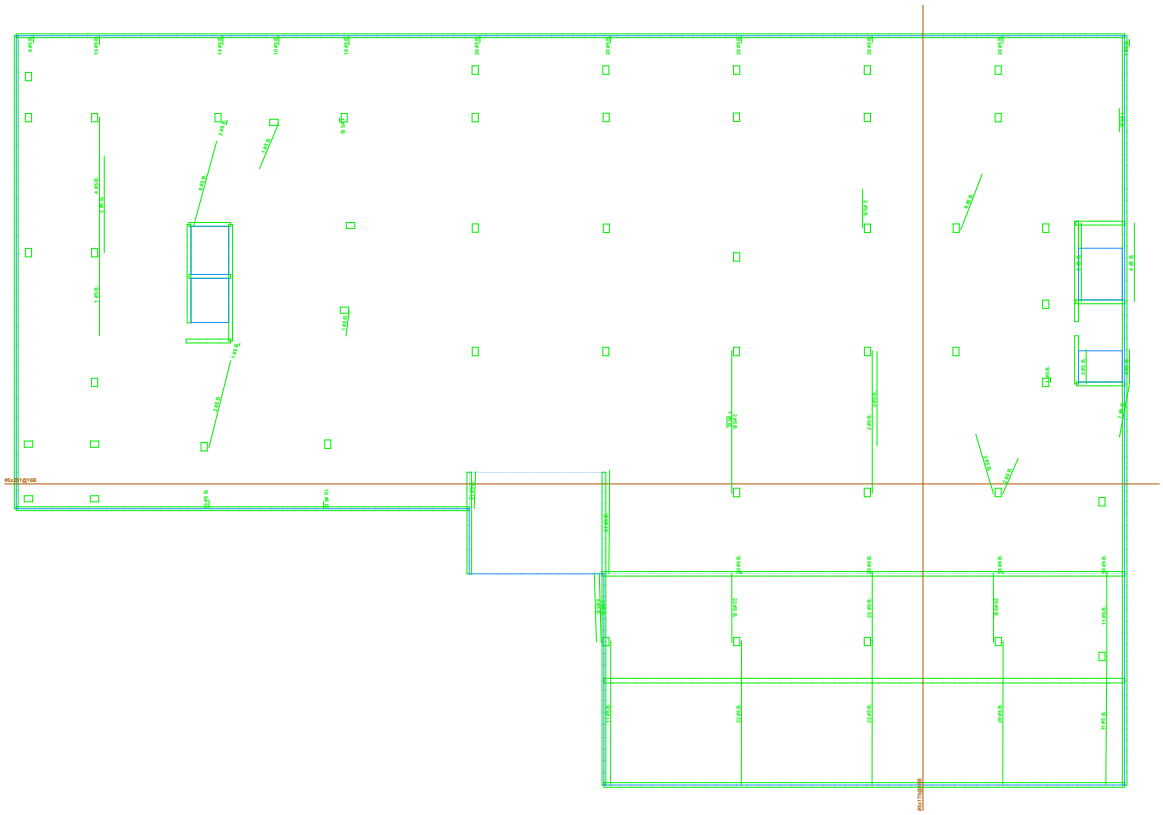
Design Status: Latitude Top Reinforcement Plan

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;
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 = 1:500



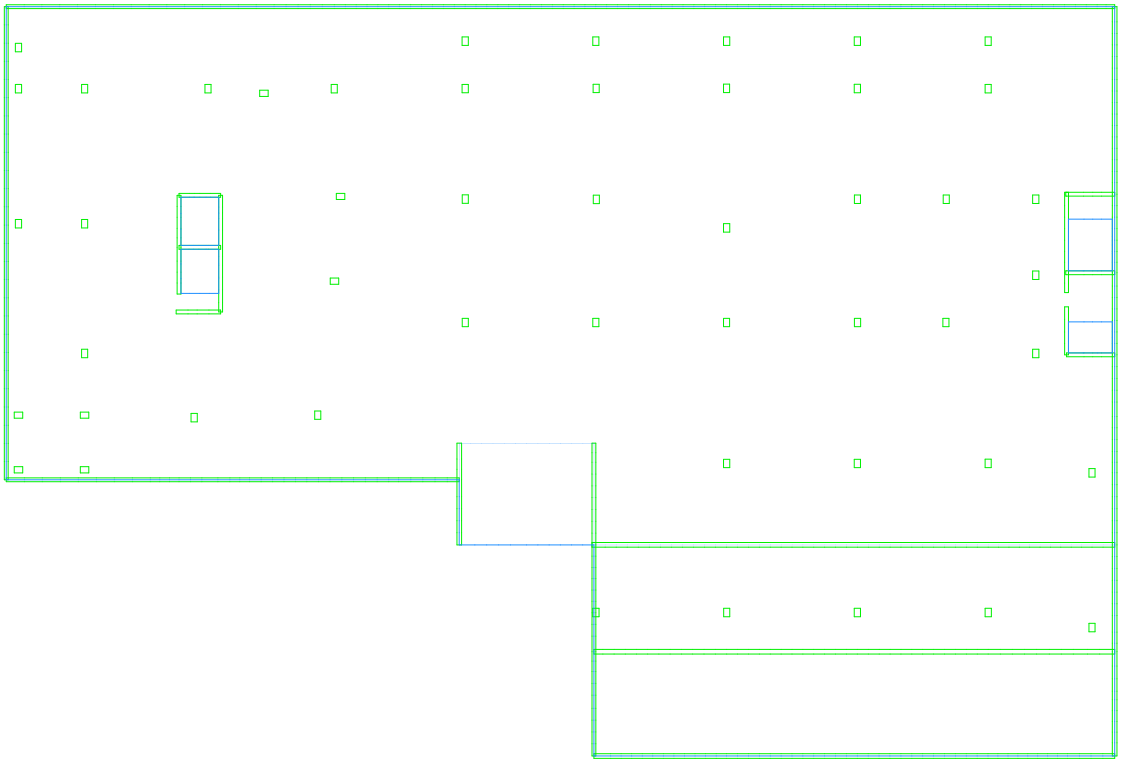
Design Status: Latitude Bottom Reinforcement Plan

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;
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 = 1:500



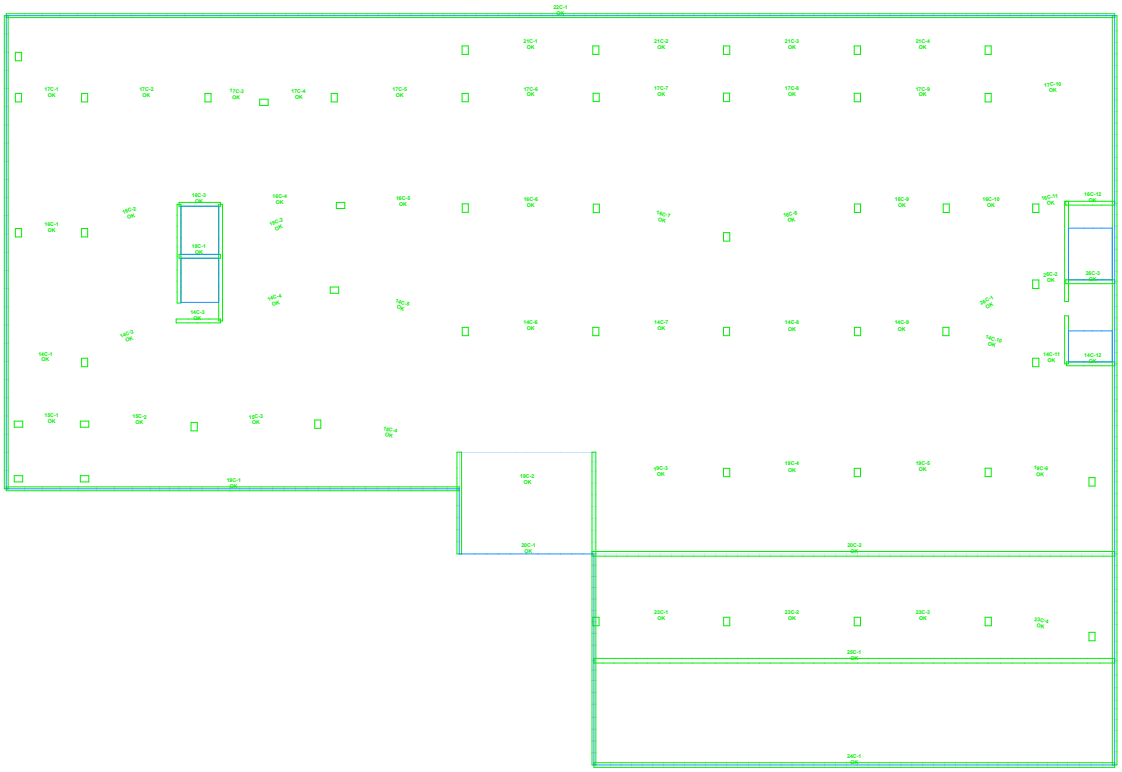
Design Status: Latitude Shear Reinforcement Plan

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; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only; Scale = 1:500



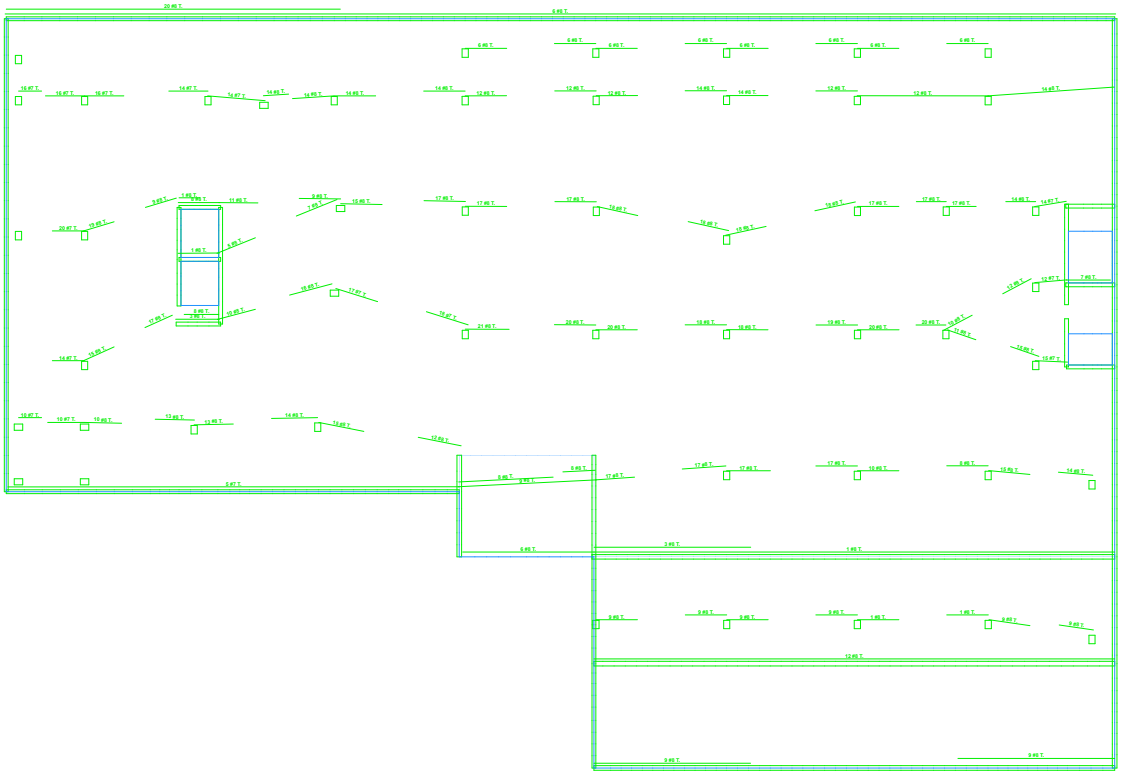
Design Status: Longitude Status Plan

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; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only; Scale = 1:500



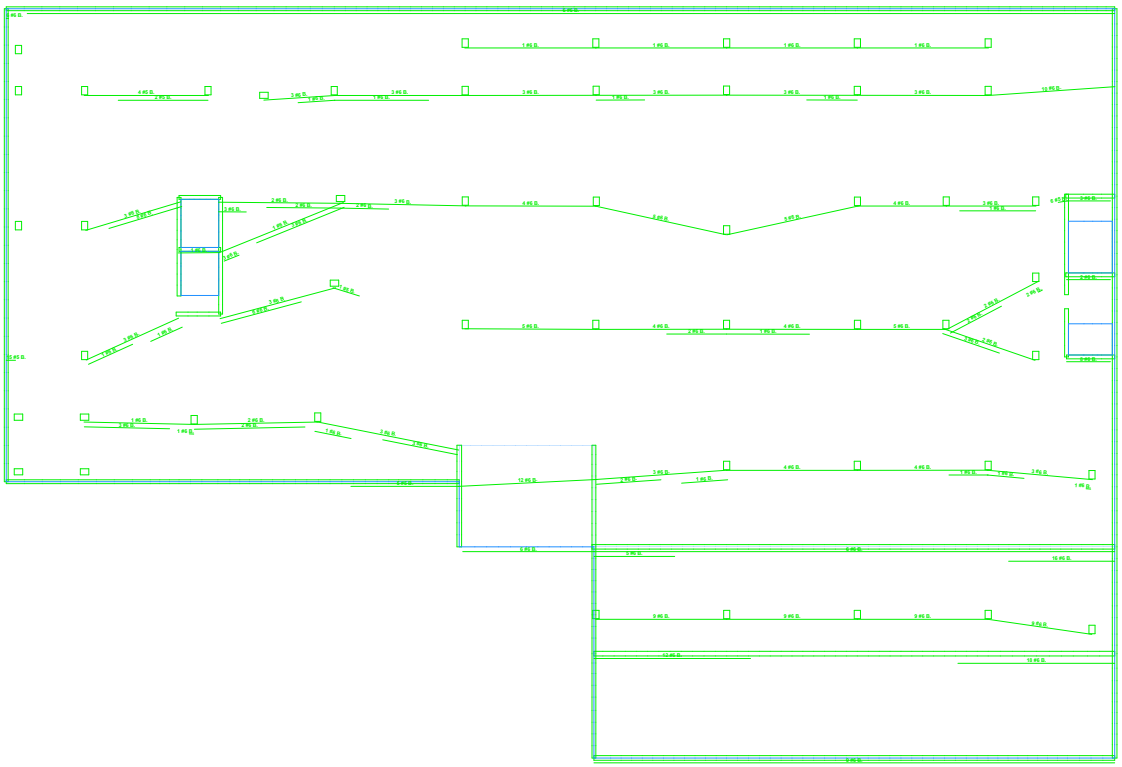
Design Status: Longitude Top Reinforcement Plan

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;
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 = 1:500



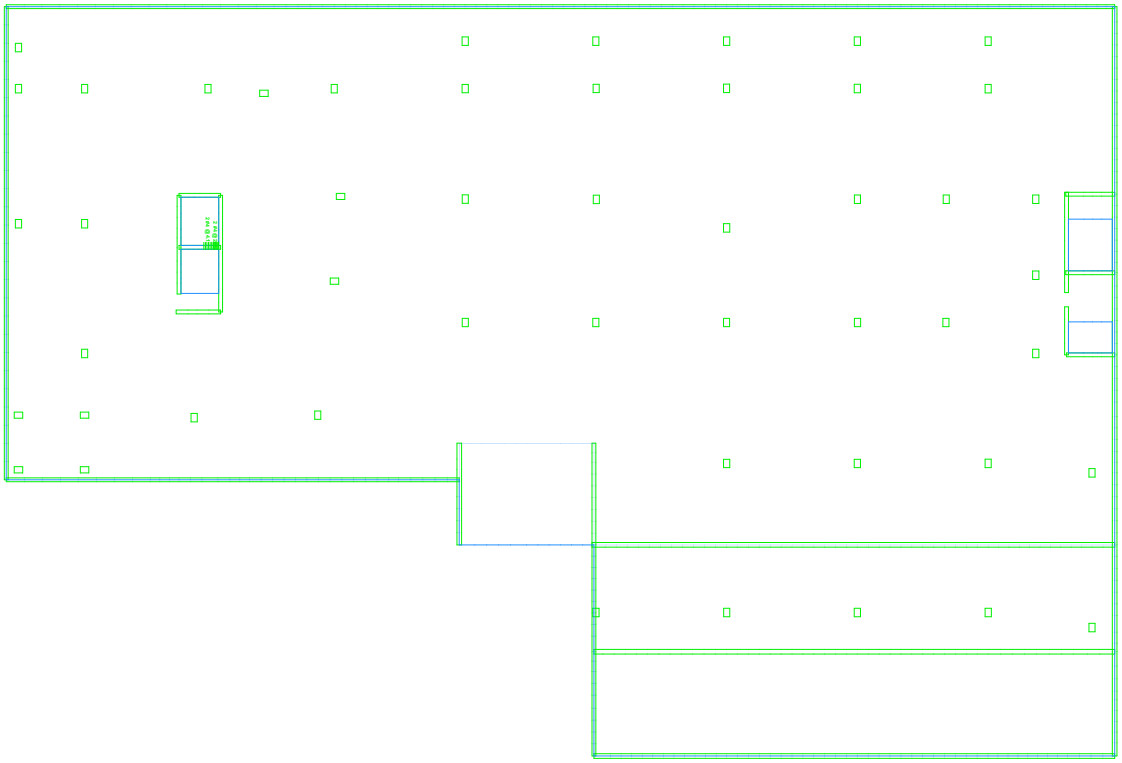
Design Status: Longitude Bottom Reinforcement Plan

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; 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 = 1:500



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;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



Estimate

Concrete Costs

Materials:	100 per yd³	x	937.7 yd³	=	93770
Labor:	50 per yd³	x	937.7 yd³	=	46880
Total:	150 per yd³	x	937.7 yd³	=	140600

Post-Tensioning Costs

Materials:	1 per pounds	x	0 pounds	=	0
Labor:	0.5 per pounds	x	0 pounds	=	0
Total:	1.5 per pounds	x	0 pounds	=	0

Formwork Costs

Materials:	1 per ft²	x	31540 ft²	=	31540
Labor:	1 per ft²	x	31540 ft²	=	31540
Total:	2 per ft²	x	31540 ft²	=	63090

Mild Steel Reinforcing Cost

Materials:	1000 per tons	x	73.42 tons	=	73420
Labor:	500 per tons	x	73.42 tons	=	36710
Total:	1500 per tons	x	73.42 tons	=	110100

SSR Costs

Materials:	2 per stud	x	980 studs	=	1960
Labor:	1 per stud	x	980 studs	=	980
Total:	3 per stud	x	980 studs	=	2940

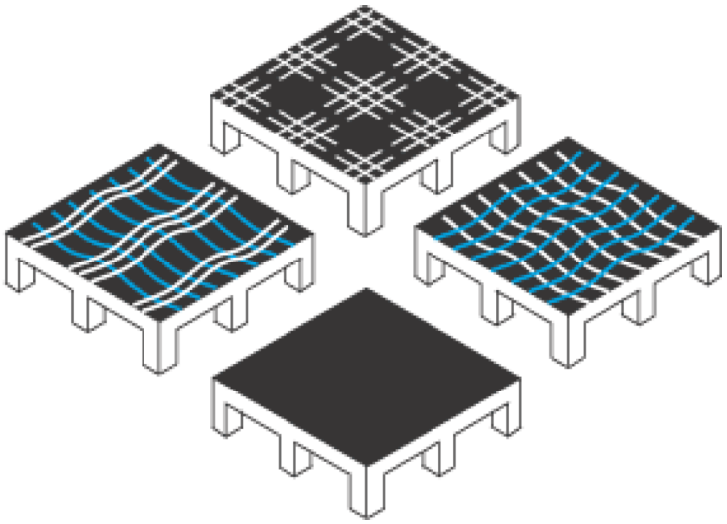
Total Costs

Materials:	6.362 per ft²	x	31540 ft²	=	200700
Labor:	3.681 per ft²	x	31540 ft²	=	116100
Total:	10.04 per ft²	x	31540 ft²	=	316800

MERCER ISLAND APARTMENTS

PERMIT CALCULATIONS

11/12/20



LEVEL 1 MILD SLAB (11-8-20)_KR v8.1.cpt
11/13/2020

8.1

Table of Contents

Table of Contents (2)

Table of Contents (3)

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

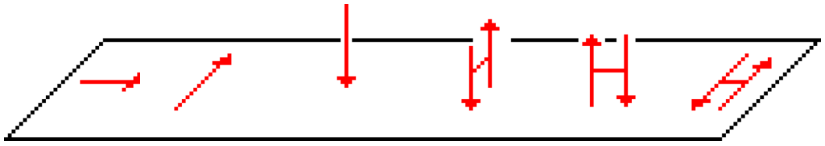
Concrete Volume: yd^3
Tendon Force: Kips
Reinforcing Stress: ksi
Reinforcing Area: in^2
Tendon Force Per Width: kips/ft
PT Weight: pounds
Reinforcement Weight: tons
Tendon Profile: inches
Cover: inches

Miscellaneous Unit

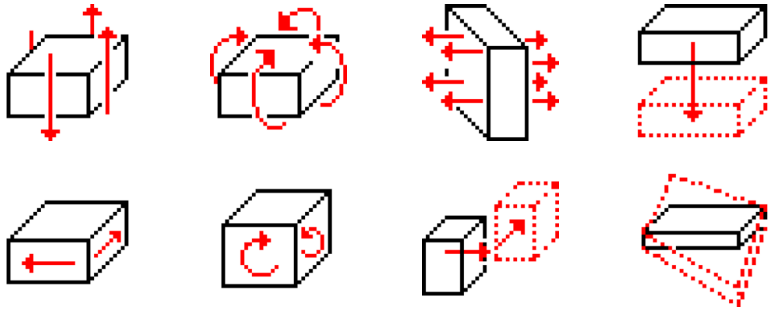
Floor Area: ft^2
Tendon Angles (for friction): radians
Density: pcf
Temperature Change: °F
Elongations: inches

Signs

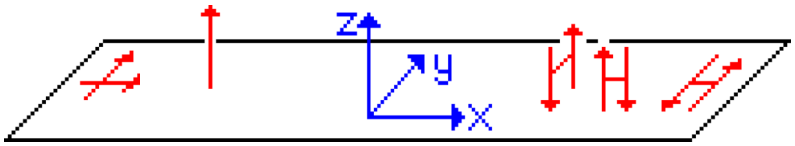
Positive Loads



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	150	150	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
5000 psi	150	150	3000	5000	3725	6399	0.2	5.556e-6	Code	2500000	3000000
6000 psi	150	150	3000	6000	3725	7450	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
½" Bonded	bonded	0.153	28000	160	243	270	3	4	6
0.6" Unbonded	unbonded	0.217	28000	175	243	270	0.6	1	8
0.6" Bonded	bonded	0.217	28000	160	243	270	4	4	8

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
½" Bonded	216	0.25	0.02	0.001	0.2	22
0.6" Unbonded	216	0.25	0	0.0014	0.07	22
0.6" Bonded	216	0.25	0.02	0.001	0.2	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	60	None	Code	Code	Code
#4	0.2	29000	60	None	Code	Code	Code
#5	0.31	29000	60	None	Code	Code	Code
#6	0.44	29000	60	None	Code	Code	Code
#7	0.6	29000	60	None	Code	Code	Code
#8	0.79	29000	60	None	Code	Code	Code
#9	1	29000	60	None	Code	Code	Code
#10	1.27	29000	60	None	Code	Code	Code
#11	1.56	29000	60	None	Code	Code	Code

Materials (2)

SSR Systems

SSR System Name	*Stud Area (in²)*	*Head Area (in²)*	*Min Clear Head Spacing (inches)*	*Specified Stud Spacing (inches)*	*Fy (ksi)*	*Stud Spacing Rounding Increment (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
Temporary Construction (At Stressing) Loading	Stressing Dead	Normal	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 (Storage) Loading	Live (Storage)	Normal	1	0
Live (Parking) Loading	Live (Parking)	Normal	1	0
Live (Roof) Loading	Live (Roof)	Normal	1	0
Snow Loading	Snow	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

Initial Service LC

Active Design Criteria: Initial Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1.13	1.13
Temporary Construction (At Stressing) 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
Live (Storage) Loading	1	0
Live (Parking) 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

Load Combinations (2)

Service LC: D + S

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
Snow 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 (Storage) Loading	0.75	0
Live (Parking) Loading	0.75	0
Live (Roof) Loading	0.75	0

Service LC: D + 0.75L + 0.75S

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 (Storage) Loading	0.75	0
Live (Parking) Loading	0.75	0
Snow Loading	0.75	0

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 (Storage) Loading	1	1
Live (Parking) Loading	0.5	0.5
Live (Roof) Loading	0.5	0.5

Load Combinations (3)

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 (Storage) Loading	1.6	0
Live (Parking) 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 (Storage) Loading	1	0
Live (Parking) Loading	1	0
Live (Roof) Loading	1.6	0

Factored LC: 1.2D + 1.6L + 0.5S

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 (Storage) Loading	1.6	0
Live (Parking) Loading	1.6	0
Snow Loading	0.5	0

Load Combinations (4)

Factored LC: 1.2D + f1L + 1.6S

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 (Storage) Loading	1	0
Live (Parking) Loading	1	0
Snow Loading	1.6	0

Design Rules

Code Minimum Desig

318-14 Min. Reinforcement

User Minimum Desig

Specified Min. Reinforcement

Initial Service Desig

318-14 Initial Service Design

Service Design

318-14 Service Design
Include detailed section analysis

Sustained Service Desig

318-14 Sustained Service Design

Strength Design

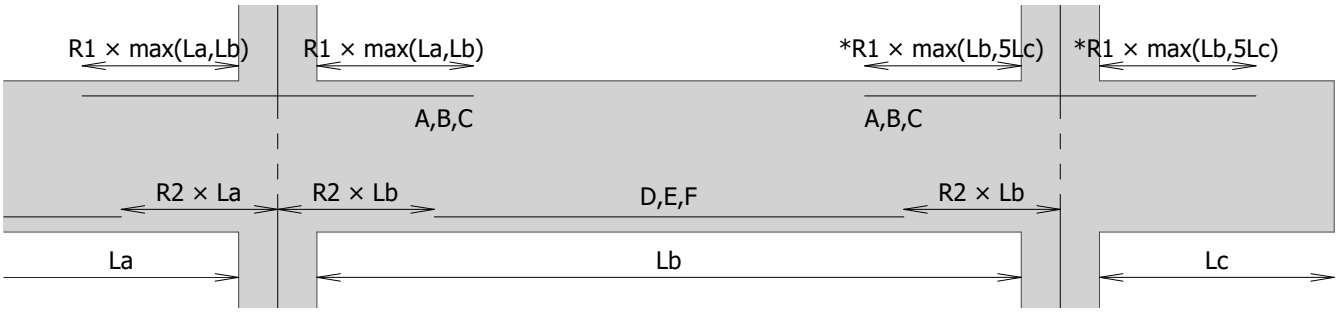
318-14 Strength Design
Punching Shear Design

Ductility Desig

318-14 Ductility Design

Detailing Rules

Custom Span Detailing Rules



Rule Name	*A Fraction*	*A R1*	*B Fraction*	*B R1*	*C Fraction*	*C R1*	*D Fraction*	*D R2*	*E Fraction*	*E R2*	*F Fraction*	*F R2*
None	0	0	0	0	0	0	0	0	0	0	0	0

"A", "B" and "C", are support reinforcement sets, based on the peak reinforcement in the support zone.
"D", "E" and "F", are span reinforcement sets, based on the peak reinforcement in the span zone.
"*R1" is never taken as greater than 0.2 when multiplied by Lc (or Lcc).
"Fraction" is the ratio of set reinforcement to peak reinforcement. It is always in the 0.0 to 1.0 range.

Load History

Load History Step Name	*Load Combination*	*Duration (days)*	*Total Age (days)*
Maximum Short Term Load	Service LC: D + L	30	33
Sustained Load	Sustained Service LC	5000	5033
Final Instantaneous Load	Service LC: D + L	0	5033

Tendon Parameters Groups

Banded Tendon Polyline Groups

Group Name	PT System	I.P. Ratio	Eff. Force (Kips)	Number of Strands	Optimize	Min Force (Kips)	Max Force (Kips)	Force Incr. (Kips)	Min Strands	Max Strands	Strands Increment

Distributed Tendon Quadrilateral Groups

Group Name	PT System	I.P. Ratio	Spacing (feet)	Eff. Force (kips/ft)	# Strands (1/feet)	Optimize	Min Force (kips/ft)	Max Force (kips/ft)	Force Incr. (kips/ft)	Min Strands (1/feet)	Max Strands (1/feet)	Strands Ir (1/feet)

Profile Polyline Groups

Group Name	Elevation Reference	Elevation (inches)	Optimize	Min Elevation (inches)	Max Elevation (inches)	Elevation Incr. (inches)

Element: Standard Plan

Element: Wall Elements Below; Column Elements Below; Slab Elements; User Notes; User Lines; User Dimensions;
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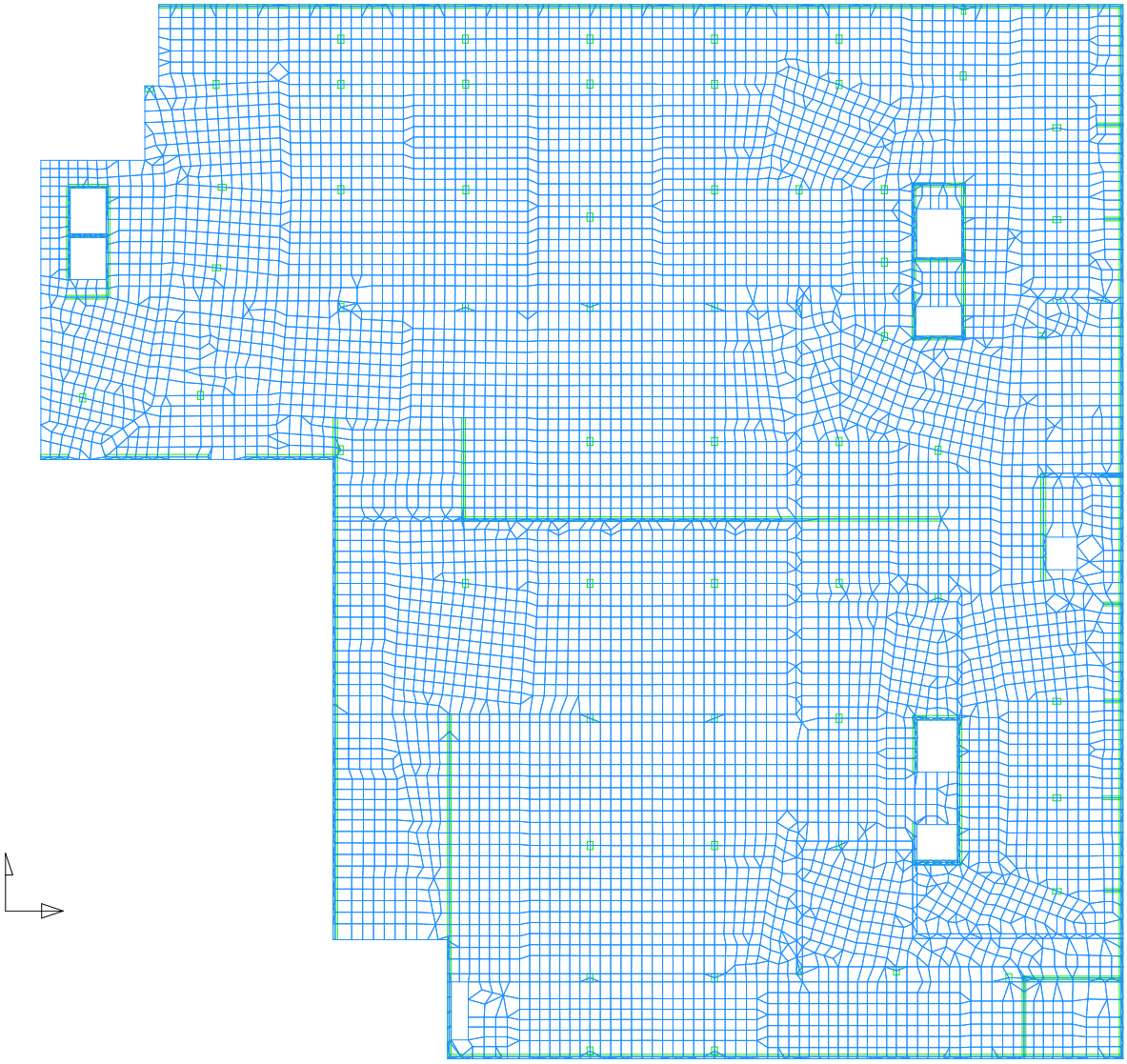
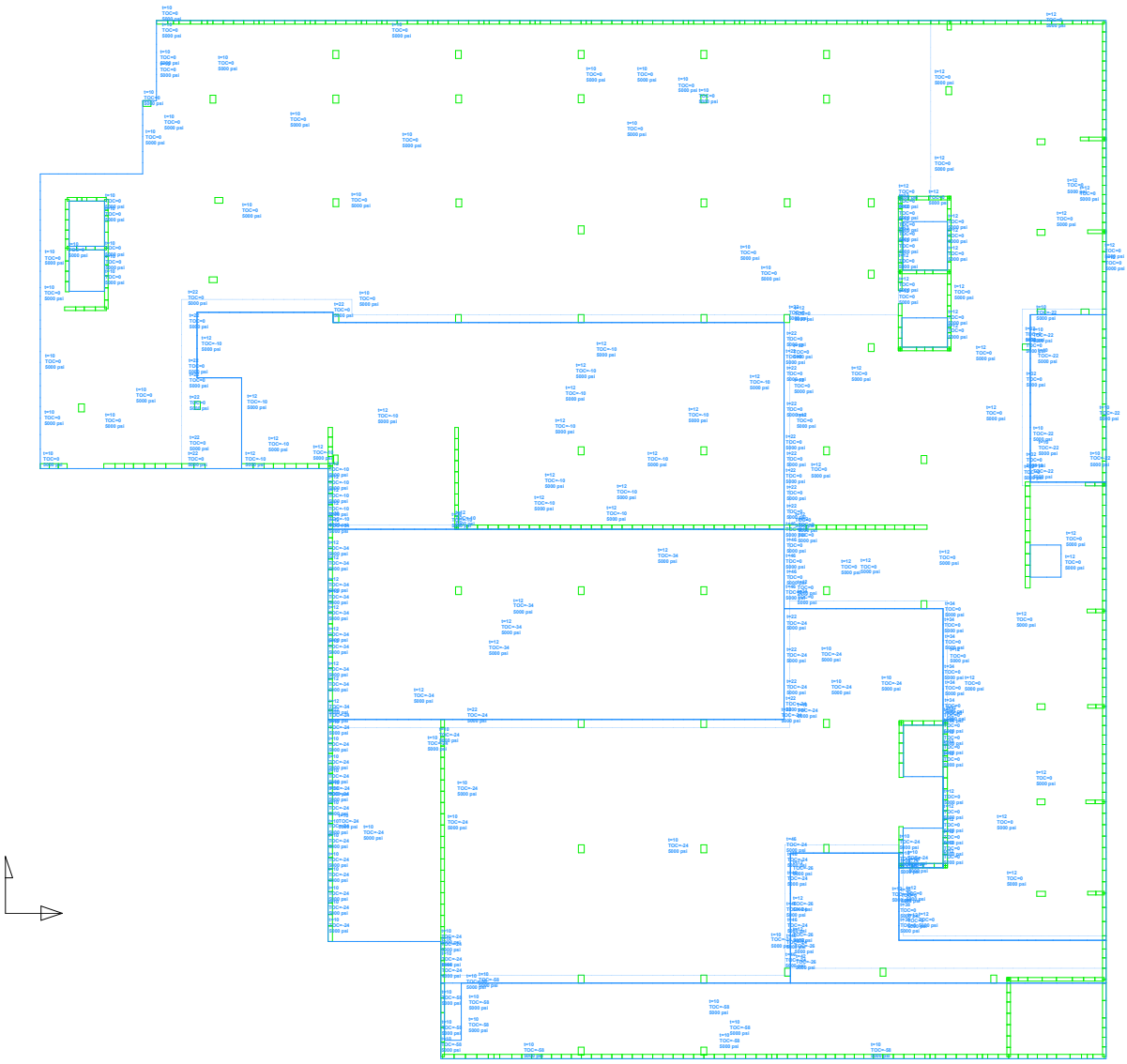


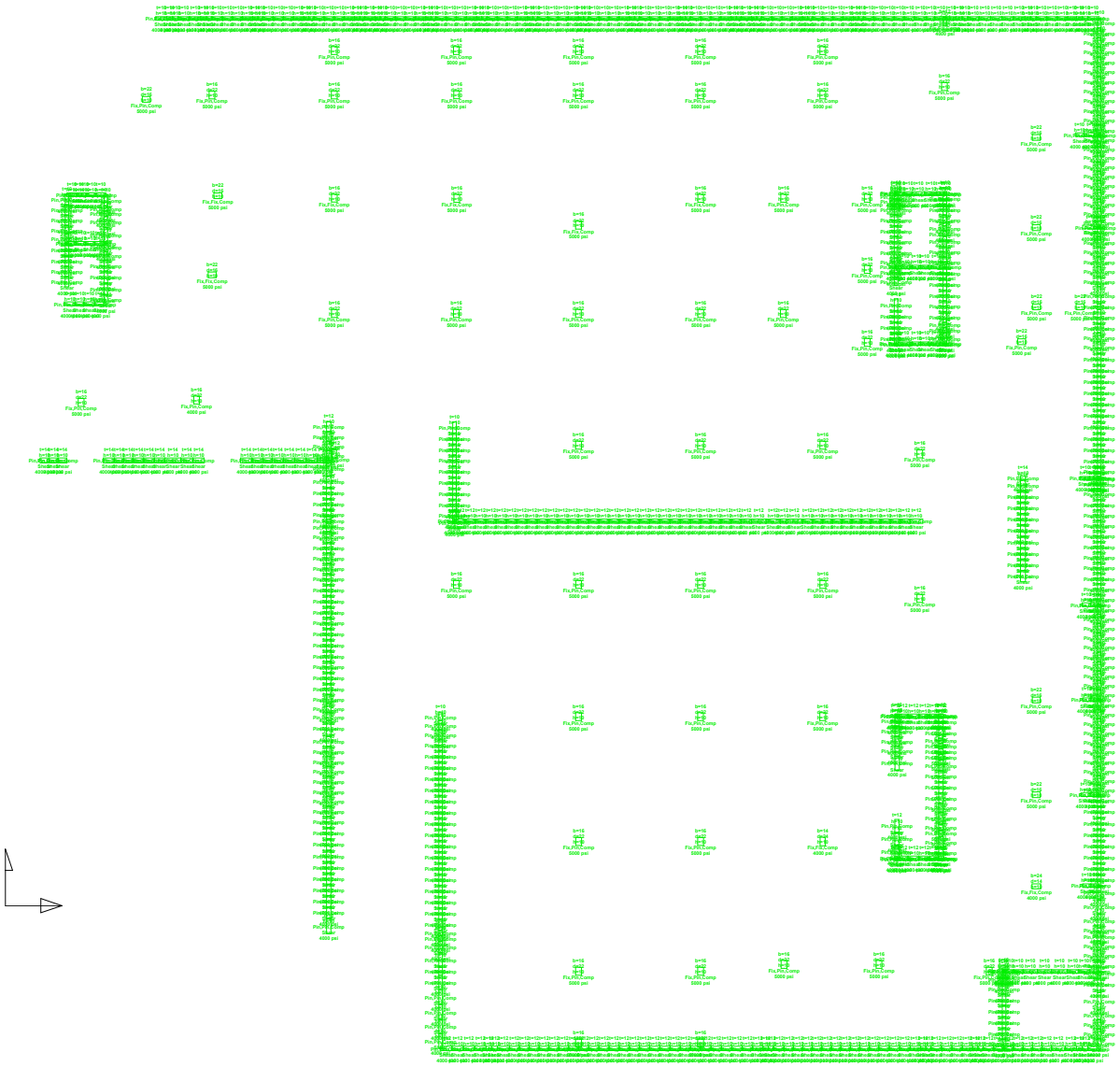
Element: Slab Summary Plan

Element: User Lines; User Notes; User Dimensions; Wall Elements Below; Wall Elements Above; Column Elements Below; Column Elements Above; Point Springs; Point Spring Icons; Line Springs; Line Spring Icons; Slab Elements; Slab Element Outline Only; Slab Element Thicknesses; Slab Element Elevations; Slab Element Concrete Models;
Scale = 1:500



Element: Supports Below Slab Summary Plan

Element: User Lines; User Notes; User Dimensions; Wall Elements Below; Wall Element Thicknesses; Wall Element Heights; Wall Element Fixity; Wall Element Shear Fixity; Wall Element Concrete Models; Column Elements Below; Column Element Dimensions; Column Element Heights; Column Element Fixity; Column Element Concrete Models; Point Springs; Point Spring Icons; Point Spring Values; Point Spring Elevations; Line Springs; Line Spring Icons; Line Spring Values; Line Spring Elevations;
Scale = 1:500

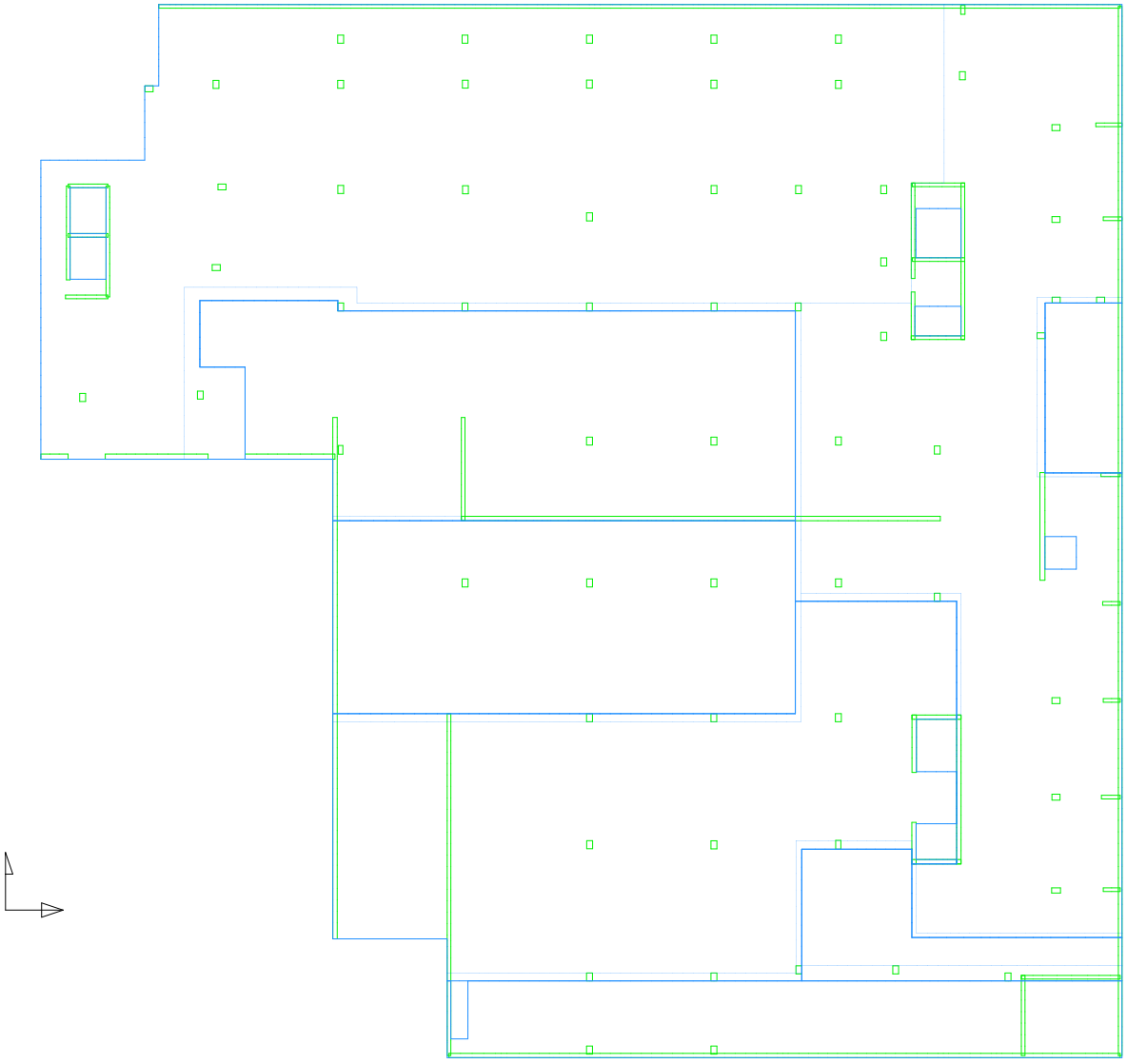


Element: Supports Above Slab Summary Plan

Element: User Lines; User Notes; User Dimensions; Wall Elements Above; Wall Element Thicknesses; Wall Element Heights; Wall Element Fixity; Wall Element Shear Fixity; Wall Element Concrete Models; Column Elements Above; Column Element Dimensions; Column Element Heights; Column Element Fixity; Column Element Concrete Models;
Scale = 1:500

Temporary Construction (At Stressing) Loading: All Loads

Temporary Construction (At Stressing) 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 = 1:500

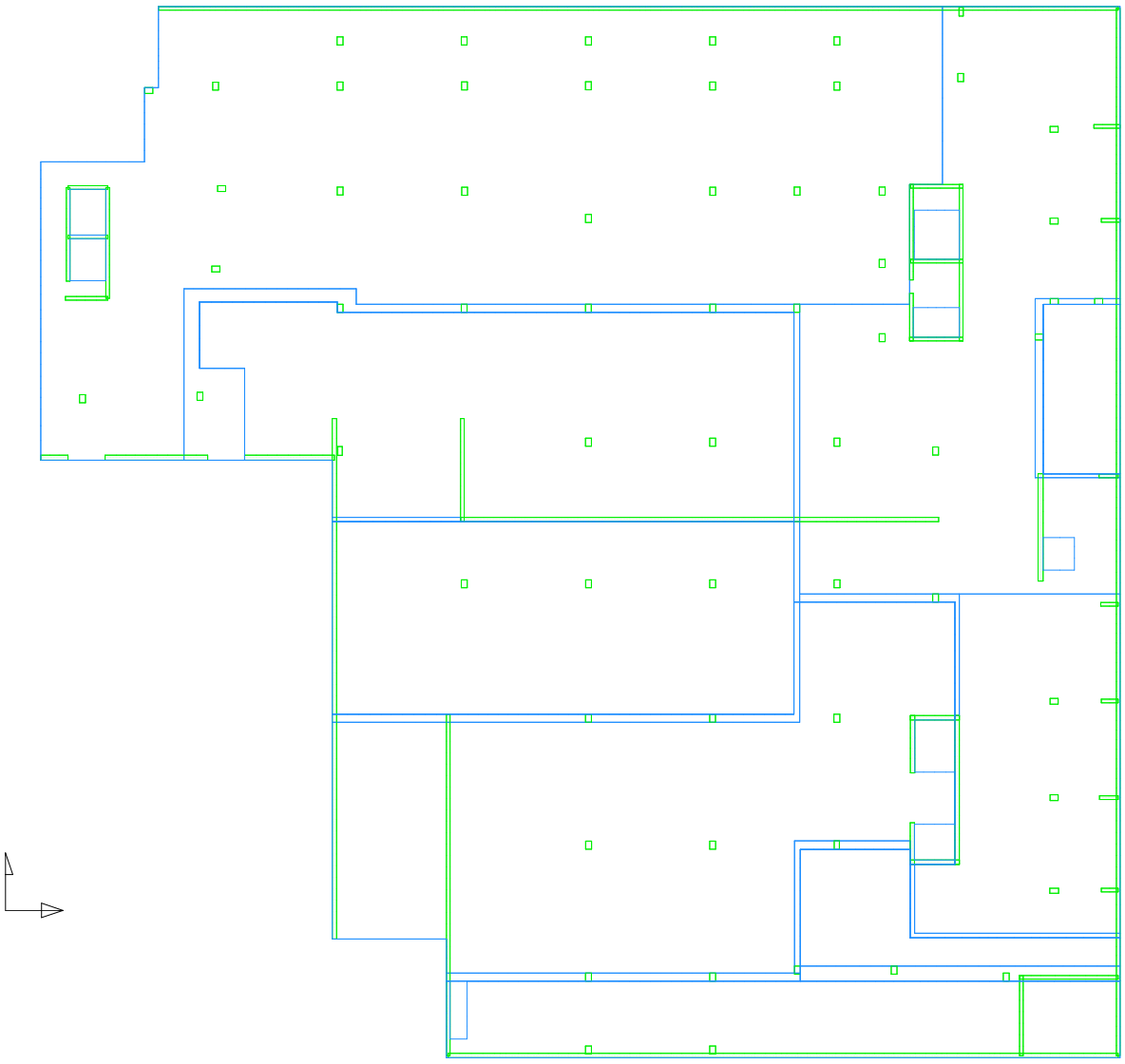


Other Dead Loading: All Loads Plan

Other Dead Loading: Point Loads; Point Load Values; Area Loads; Area Load Values; User Notes; User Lines; User Dimensions;
Mesh Input: Slab Areas; Slab Openings; Walls Below; Columns Below;
Element: Wall Element Outline Only; Slab Element Outline Only;
Scale = 1:500

Live (Reducible) Loading: All Loads Plan

Live (Reducible) 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;
Mesh Input: Slab Areas; Walls Below; Columns Below;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:500

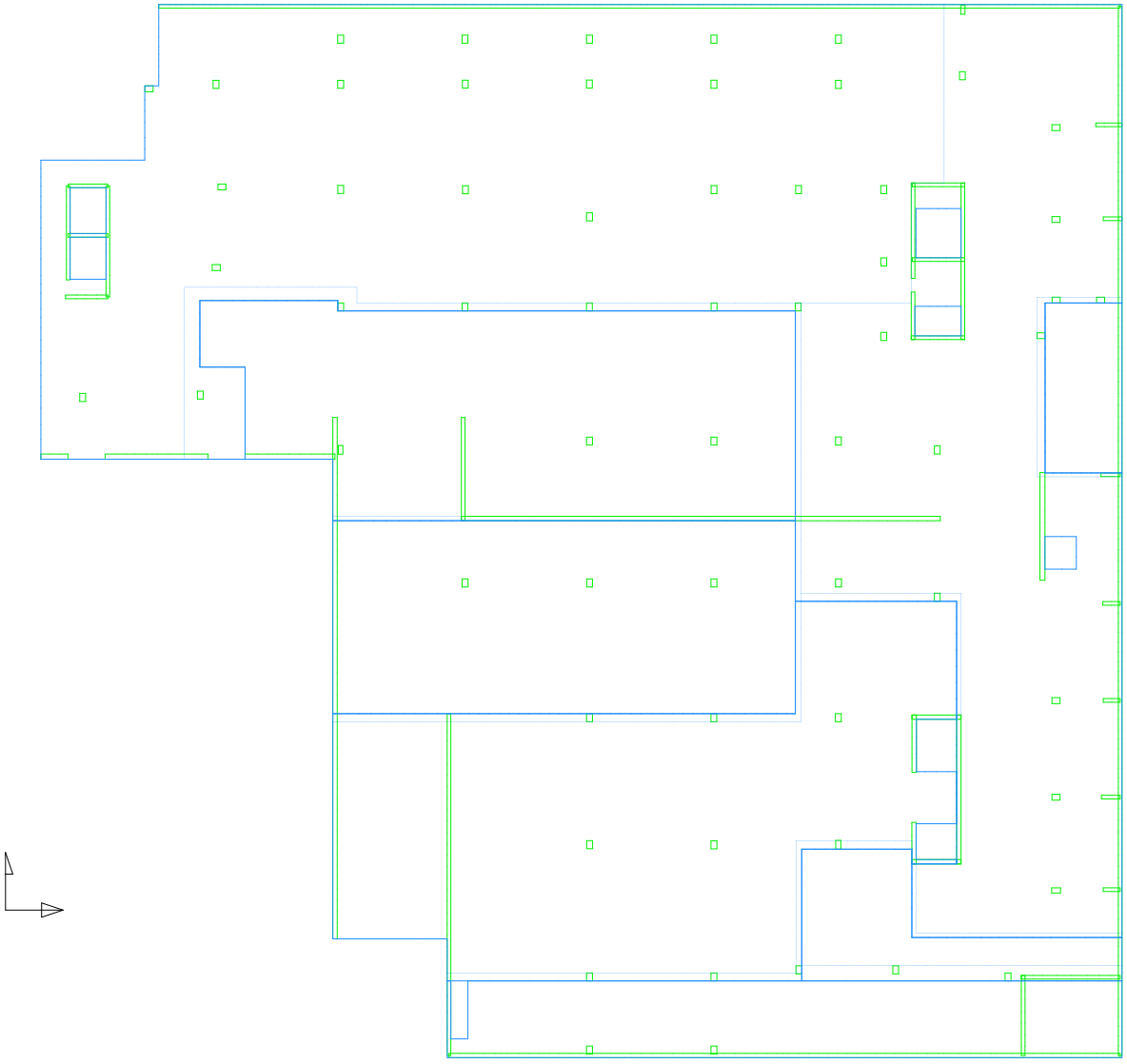


Live (Unreducible) Loading: All Loads Plan

Live (Unreducible) Loading: Area Loads; Area Load Numbers; User Lines;
Mesh Input: Slab Areas; Walls Below; Columns Below;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Other Dead Loading: Area Loads;
Scale = 1:500

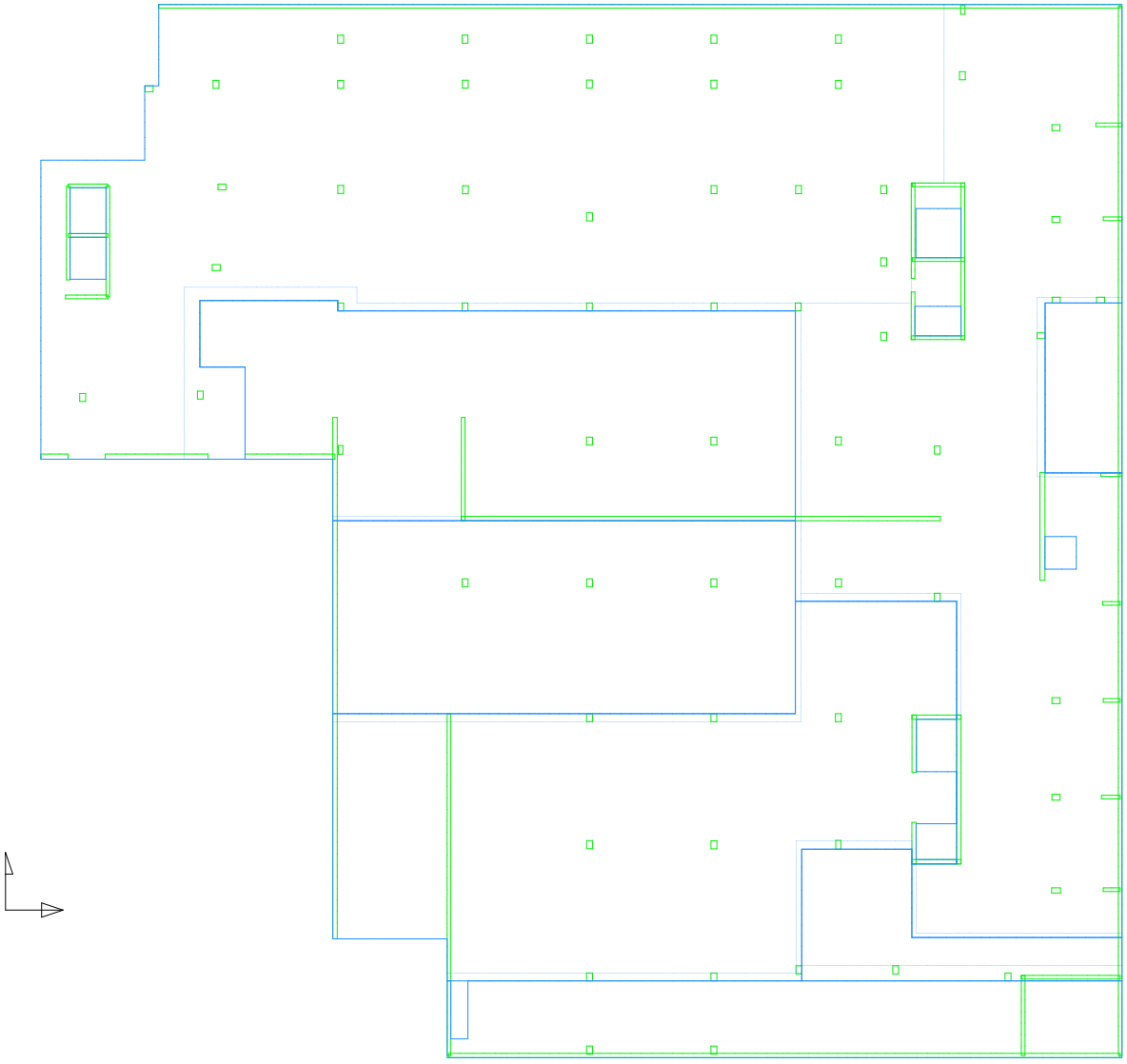
Live (Storage) Loading: All Loads Plan

Live (Storage) 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 = 1:500



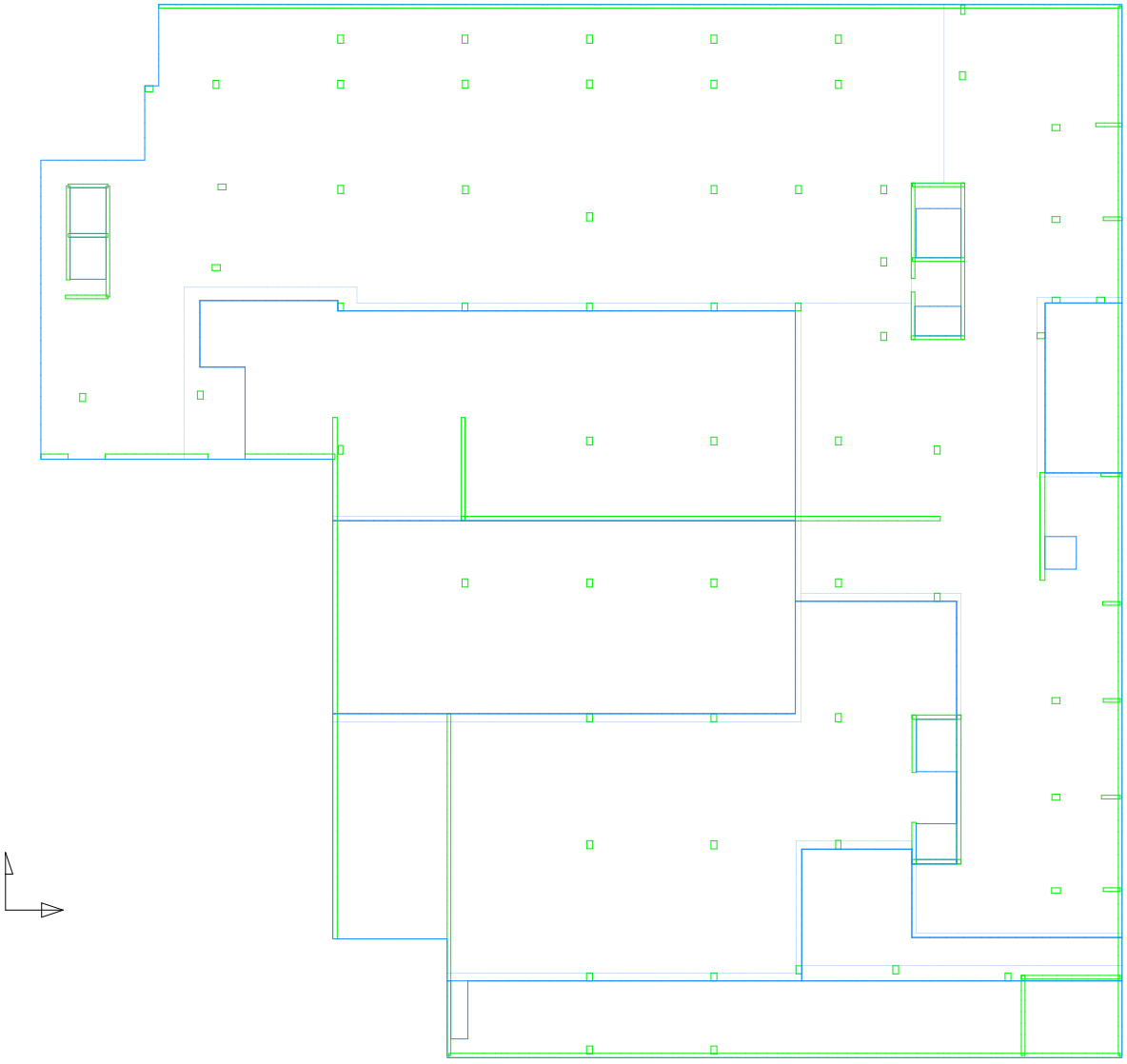
Live (Parking) Loading: All Loads Plan

Live (Parking) 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 = 1:500



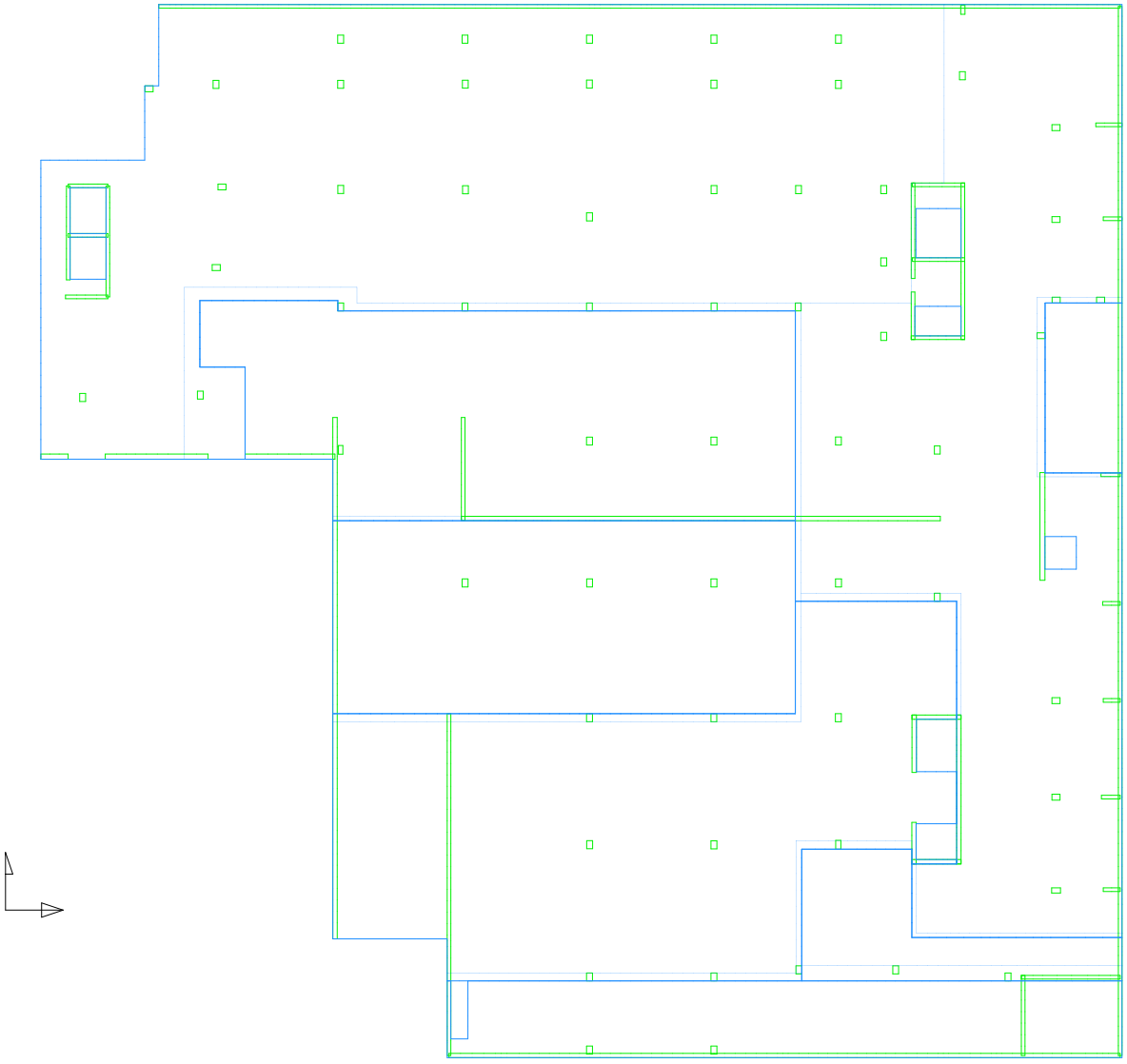
Live (Roof) Loading: All Loads Plan

Live (Roof) 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 = 1:500



Snow Loading: All Loads Plan

Snow 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 = 1:500

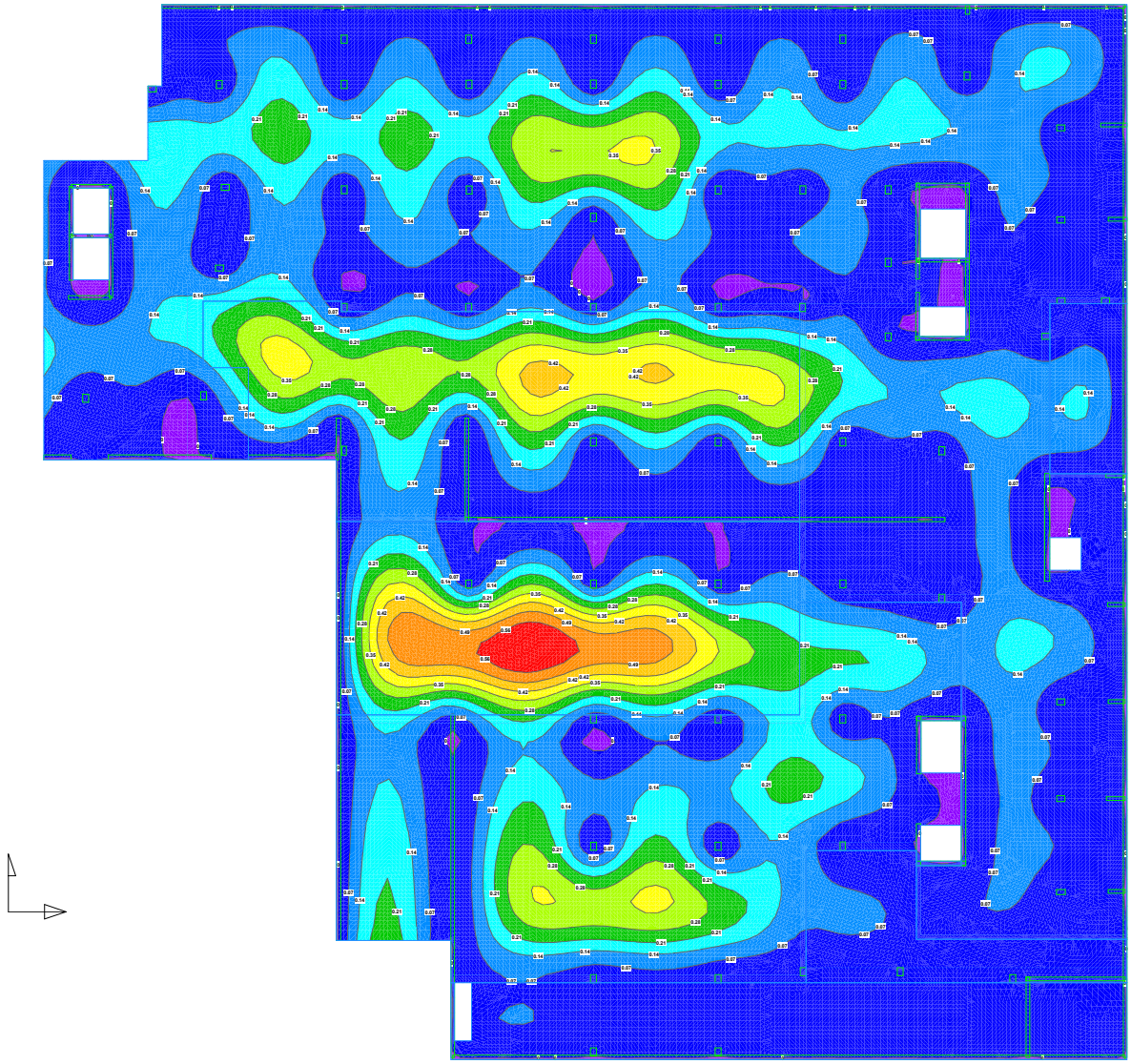


Service LC: D + L: Max Deflection Plan

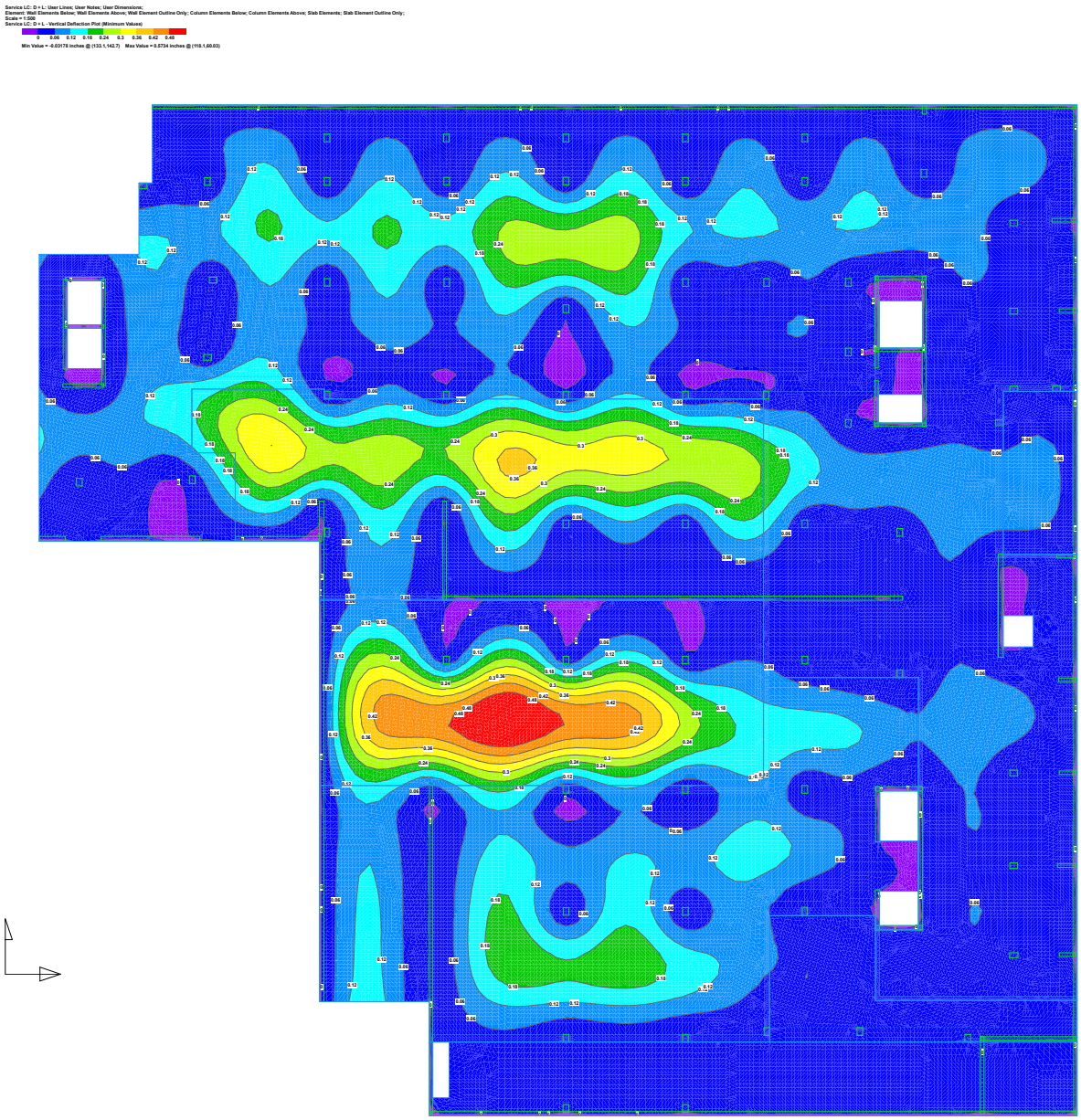
Service LC: D + L; User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Service LC: D + L - Vertical Deflection Plot (Maximum Values)

0 0.07 0.14 0.21 0.28 0.35 0.42 0.49 0.56

Min Value = -0.02824 inches @ (133.1,142.7) Max Value = 0.6434 inches @ (118.1,60.03)



Service LC: D + L: Min Deflection Plan

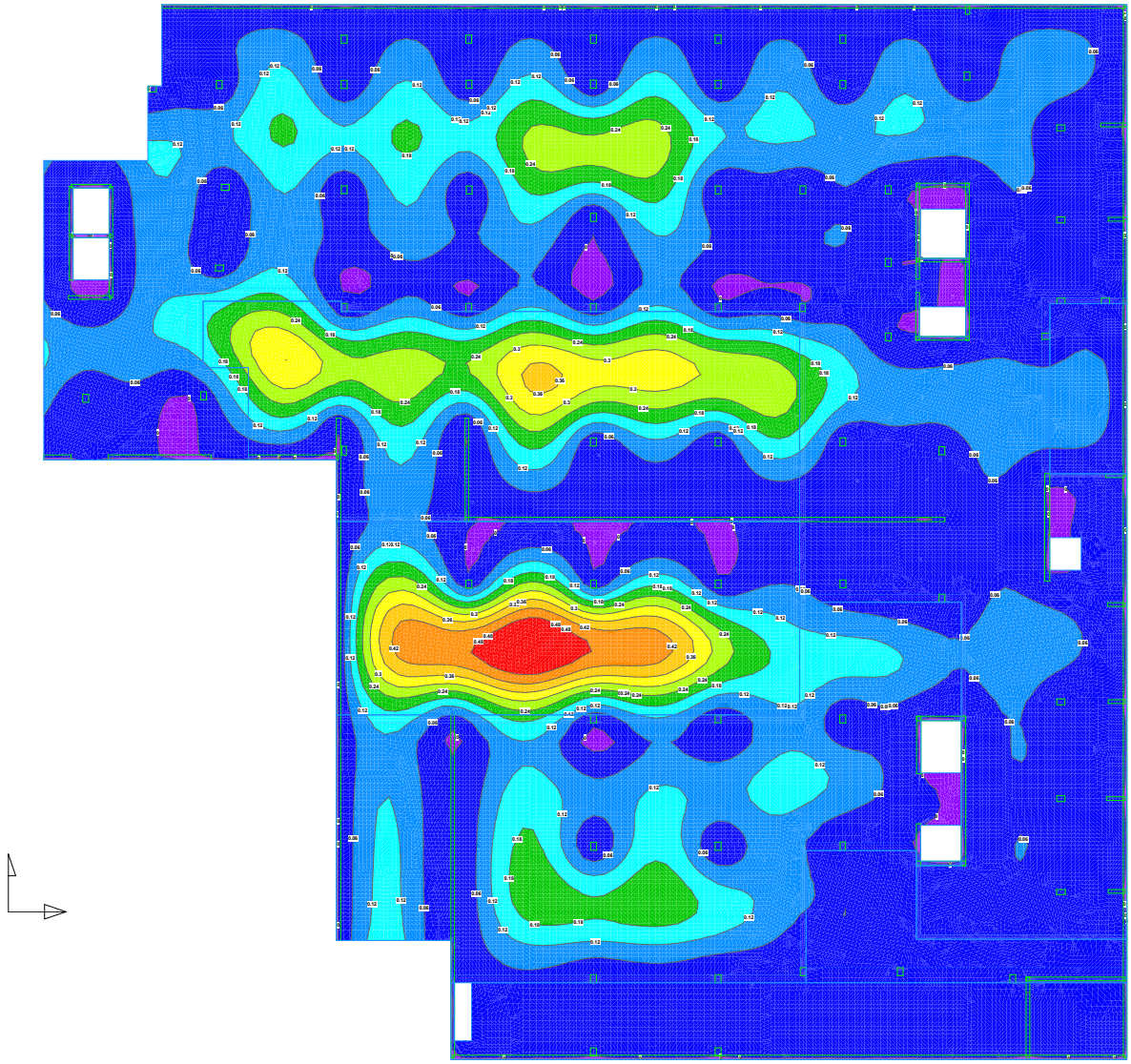


Service LC: D + Lr: Max Deflection Plan

Service LC: D + Lr: 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 = 1:550
Service LC: D + Lr - Vertical Deflection Plot (Maximum Values)

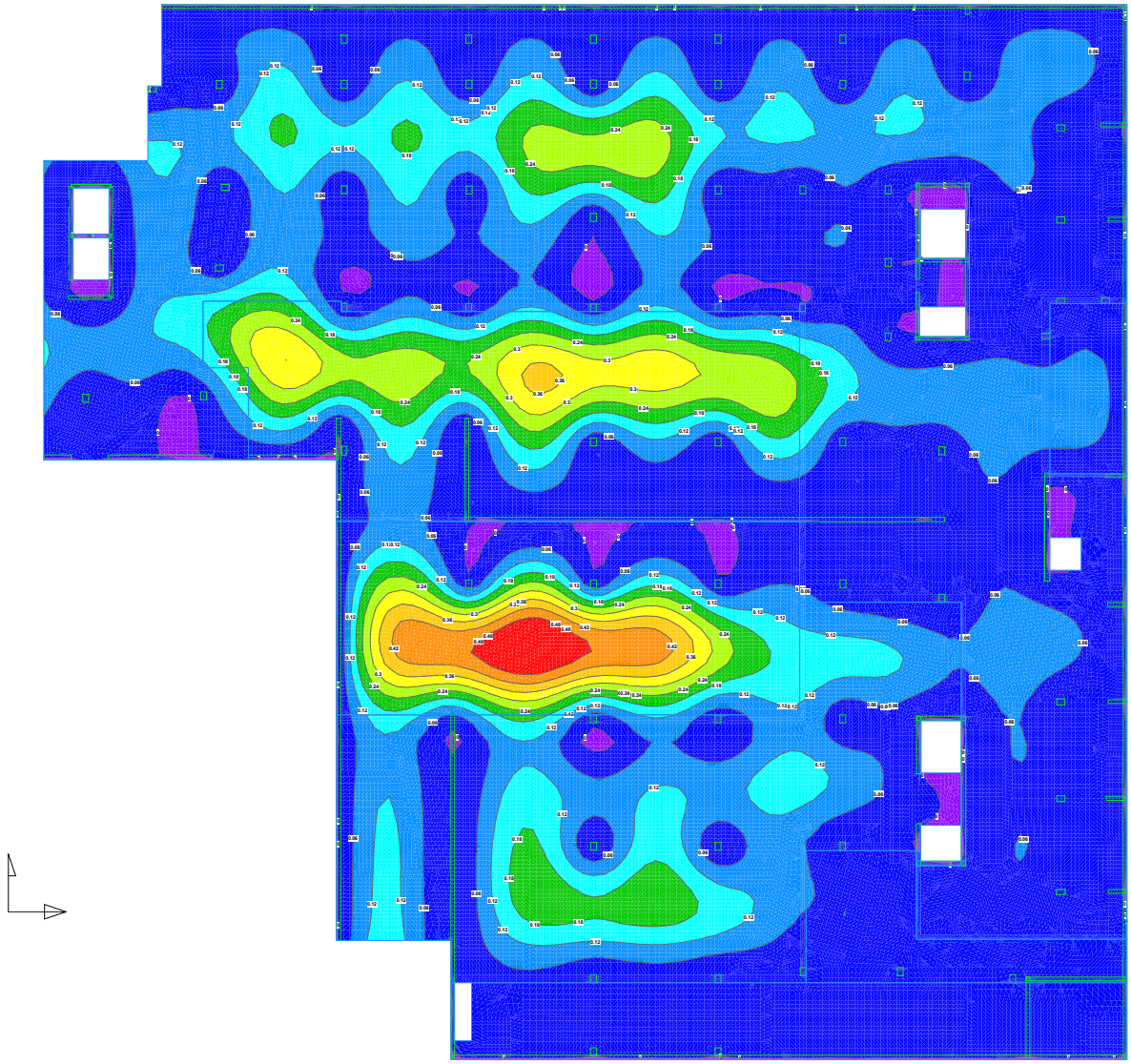
0 0.06 0.12 0.18 0.24 0.3 0.36 0.42 0.48

Min Value = -0.02824 inches @ (133.1,142.7) Max Value = 0.8734 inches @ (118.1,60.03)



Service LC: D + Lr: Min Deflection Plan

Service LC: D + Lr: 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 = 1:200
Service LC: D + Lr - Vertical Deflection Plot (Minimum Values)
0 0.06 0.12 0.18 0.24 0.3 0.36 0.42 0.48
Min Value = -0.02824 inches @ (133.1,142.7) Max Value = 0.0734 inches @ (116.1,60.03)

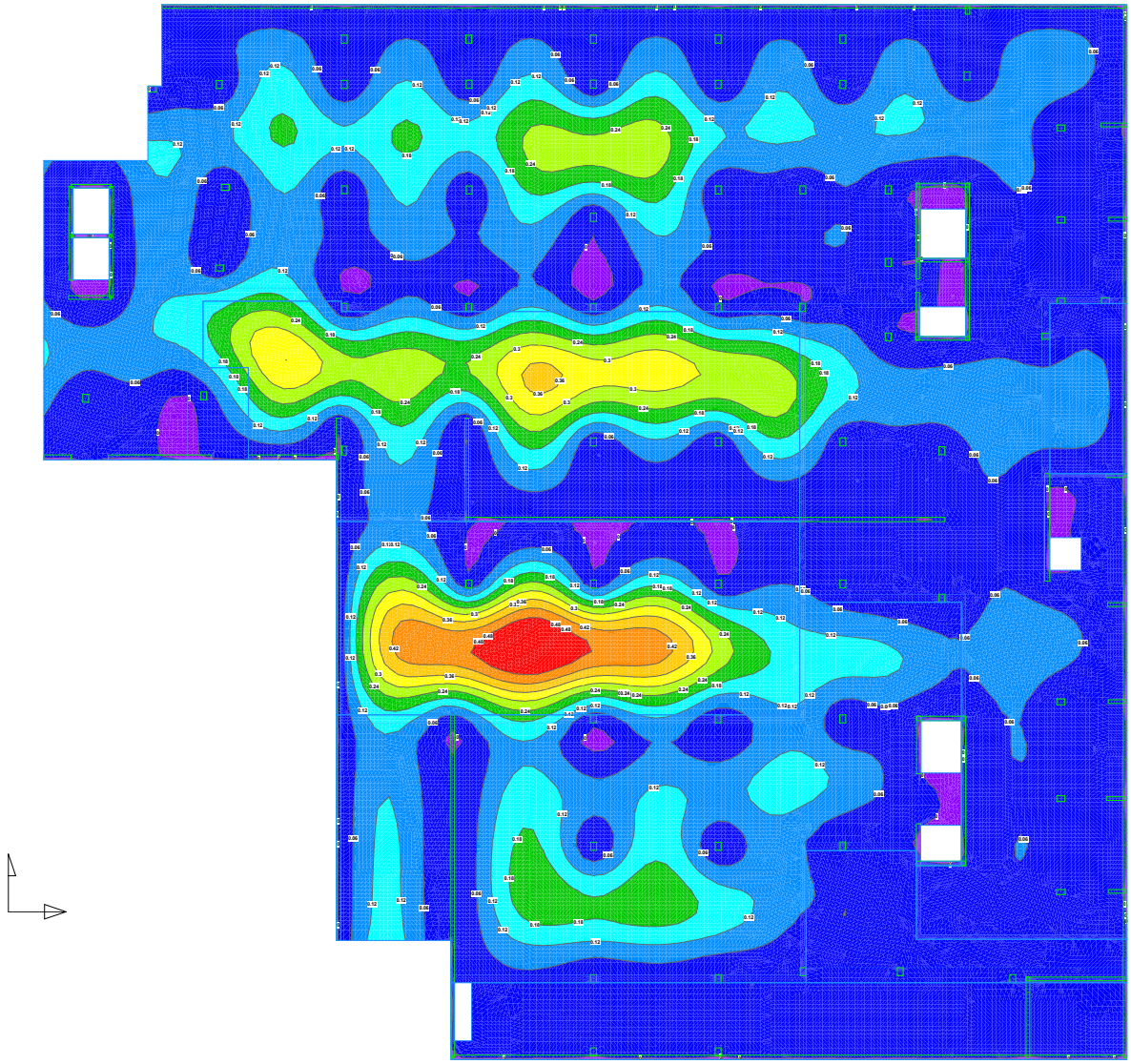


Service LC: D + S: Max Deflection Plan

Service LC: D + S: 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 = 1:556
Service LC: D + S - Vertical Deflection Plot (Maximum Values)

0 0.06 0.12 0.18 0.24 0.3 0.36 0.42 0.48

Min Value = -0.02824 inches @ (133.1,142.7) Max Value = 0.8734 inches @ (116.1,60.03)

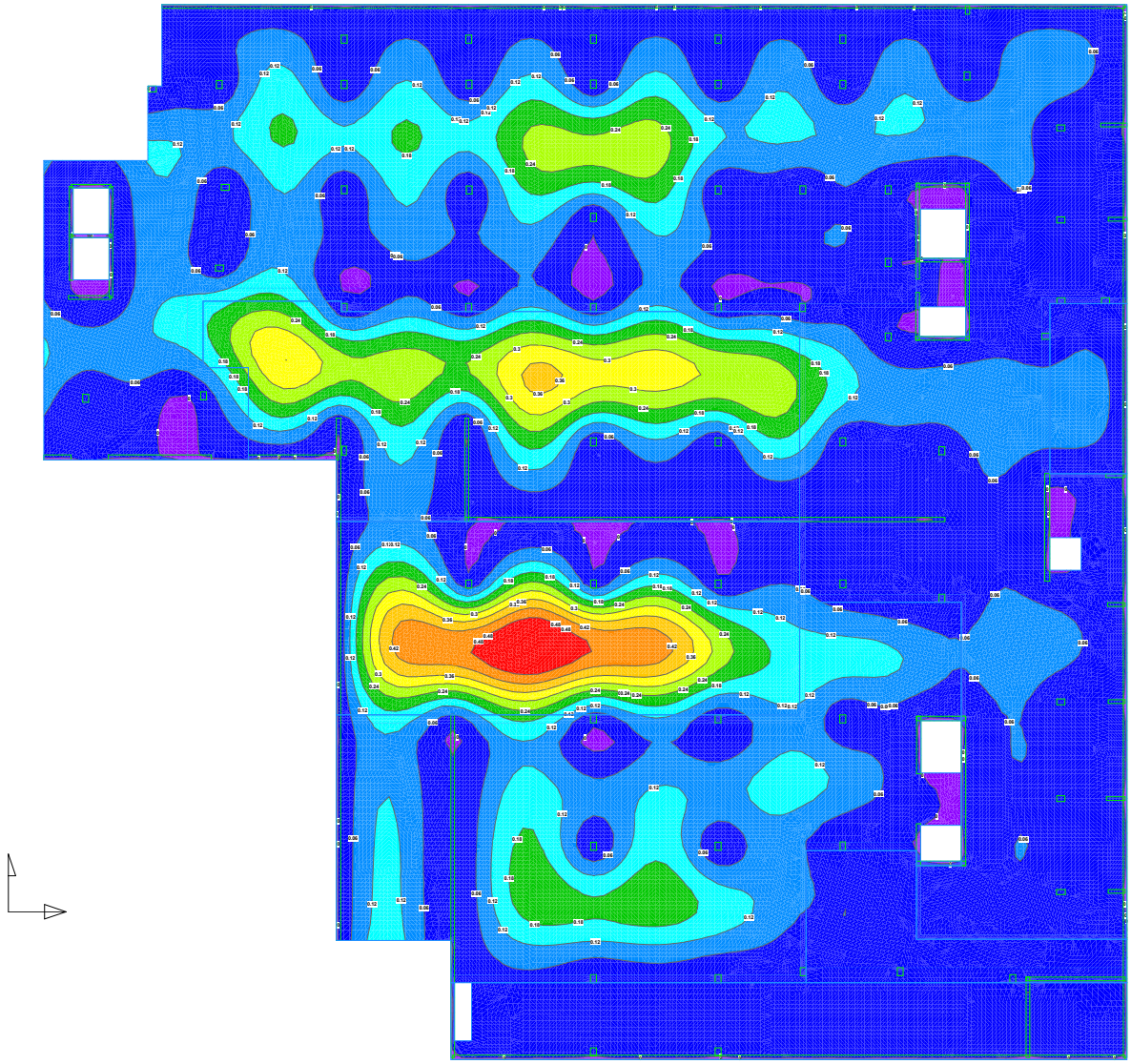


Service LC: D + S: Min Deflection Plan

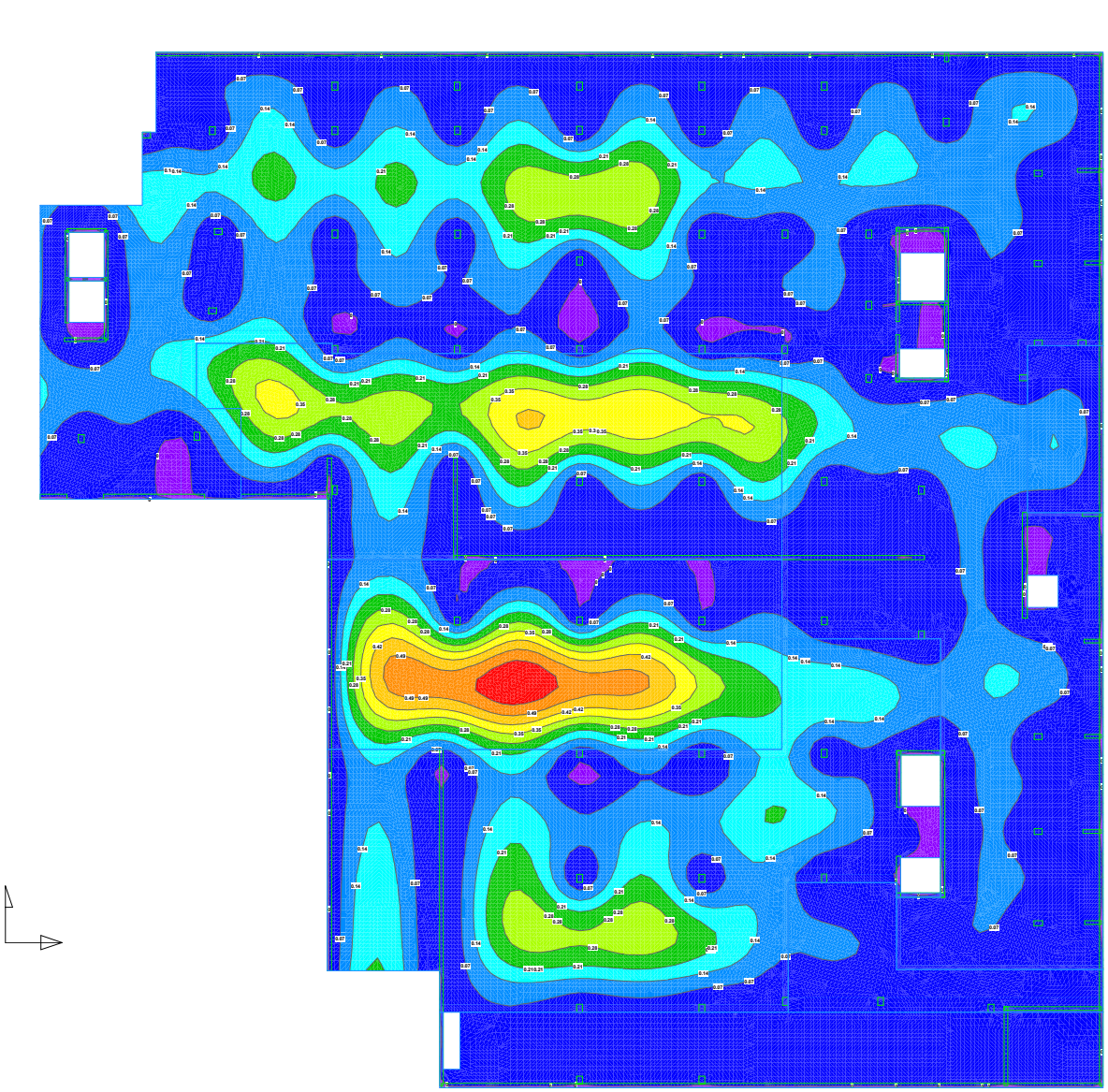
Service LC: D + S: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Service LC: D + S - Vertical Deflection Plot (Minimum Values)

0 0.06 0.12 0.18 0.24 0.3 0.36 0.42 0.48

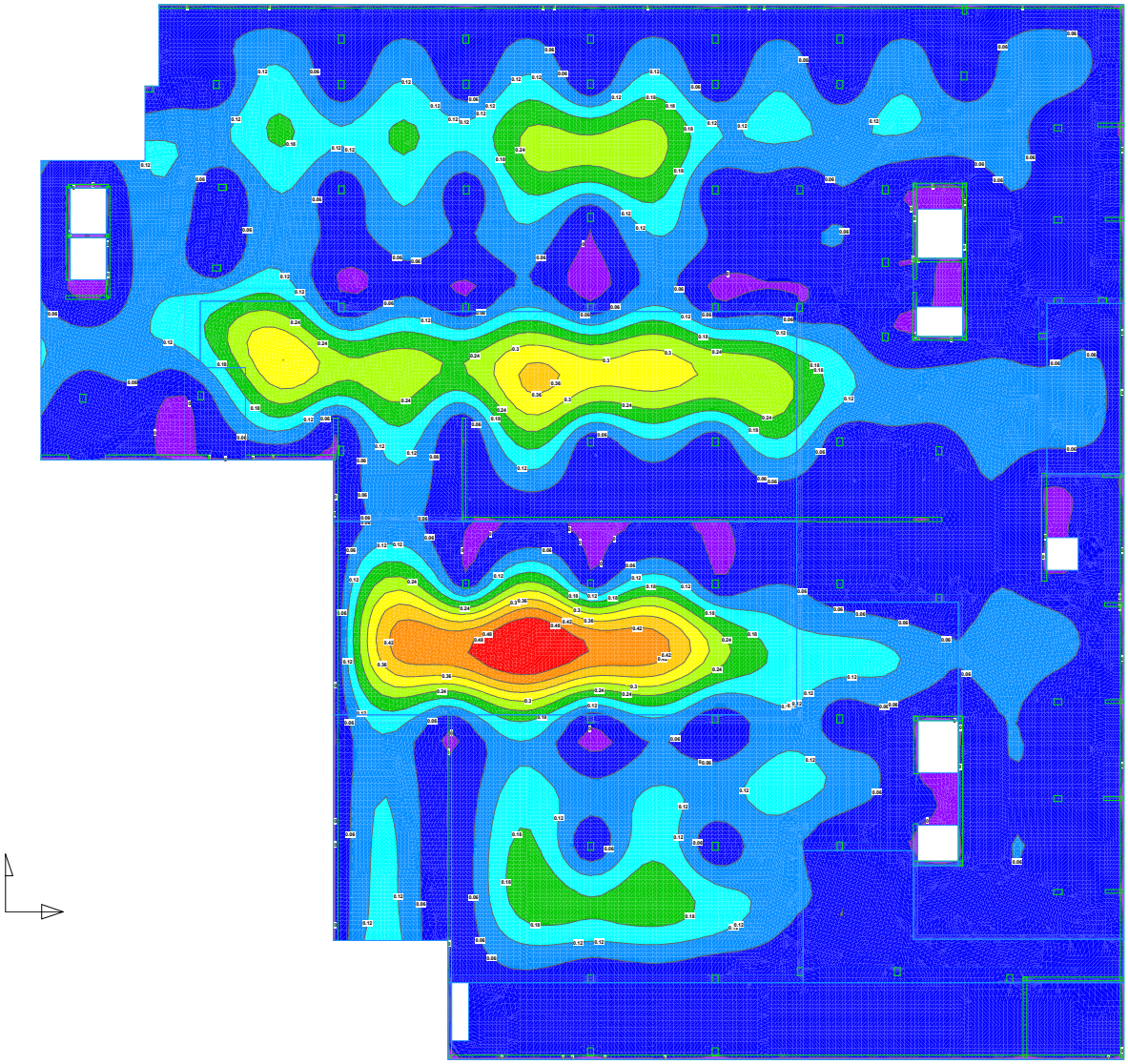
Min Value = -0.02824 inches @ (133.1,142.7) Max Value = 0.0734 inches @ (116.1,60.03)



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



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

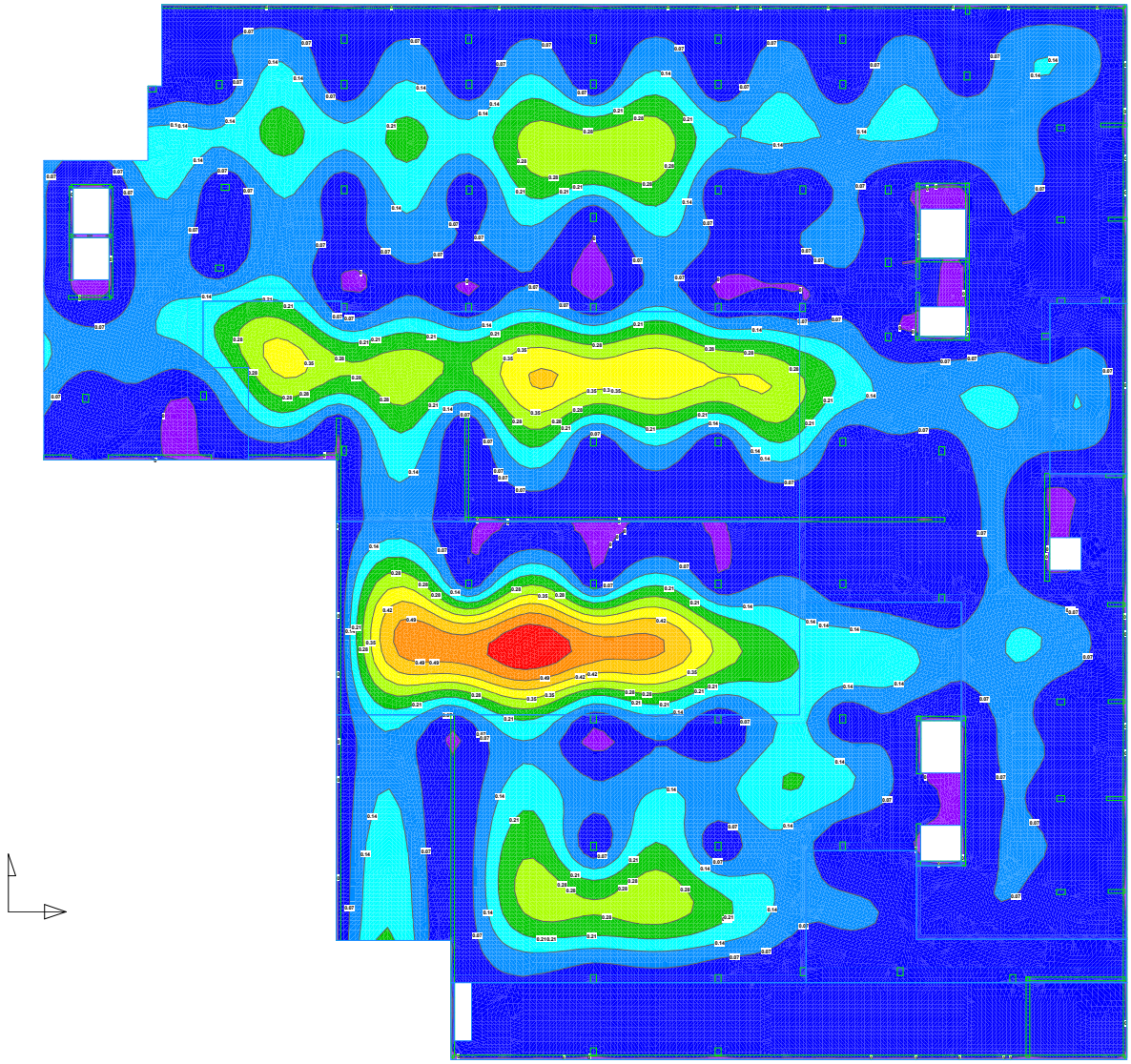


Service LC: D + 0.75L + 0.75S: Max Deflection Plan

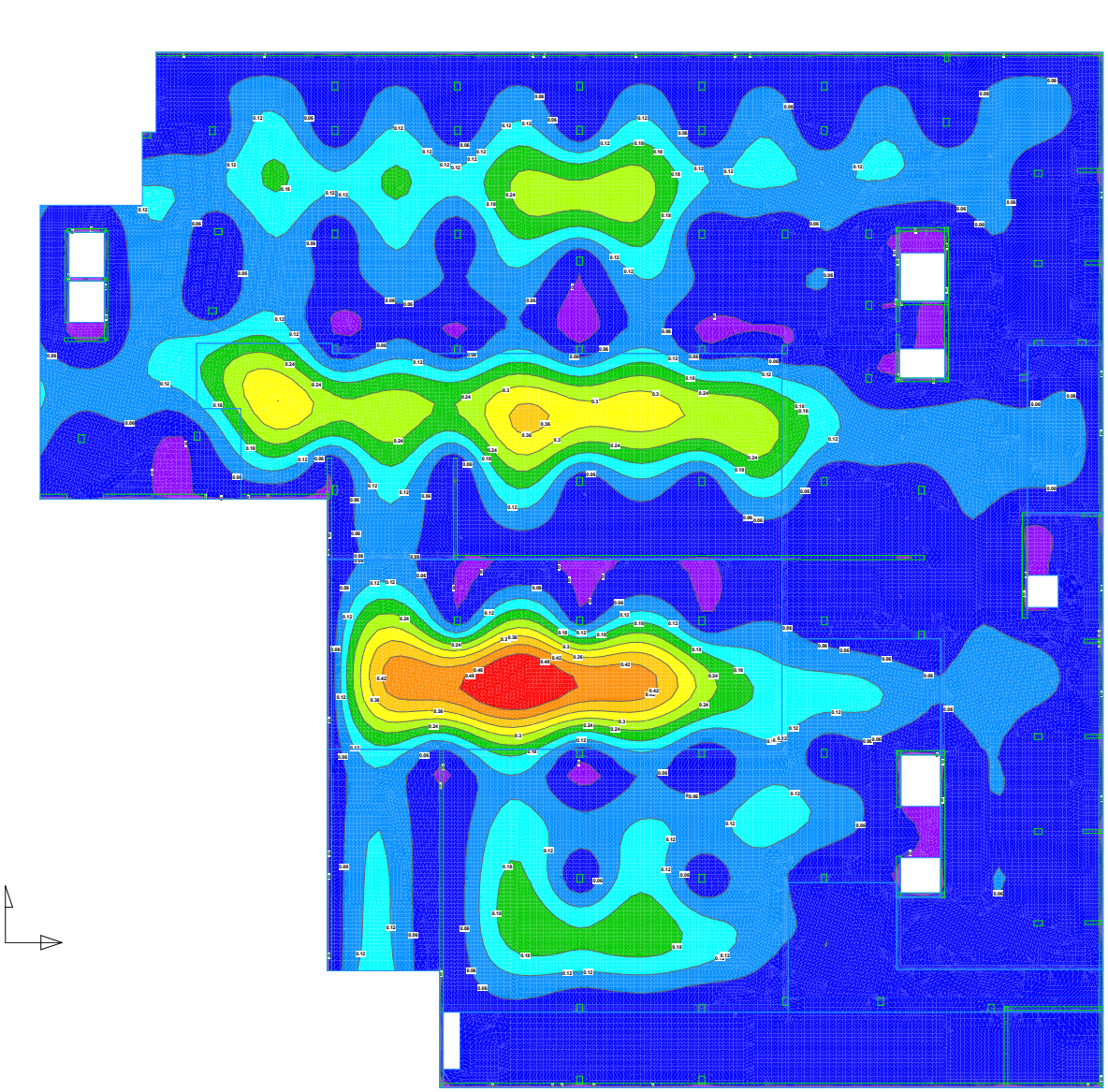
Service LC: D + 0.75L + 0.75S: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Service LC: D + 0.75L + 0.75S - Vertical Deflection Plot (Maximum Values)

0 0.07 0.14 0.21 0.28 0.35 0.42 0.49 0.56

Min Value = -0.02824 inches @ (133.1,142.7) Max Value = 0.6289 inches @ (110.1,60.03)

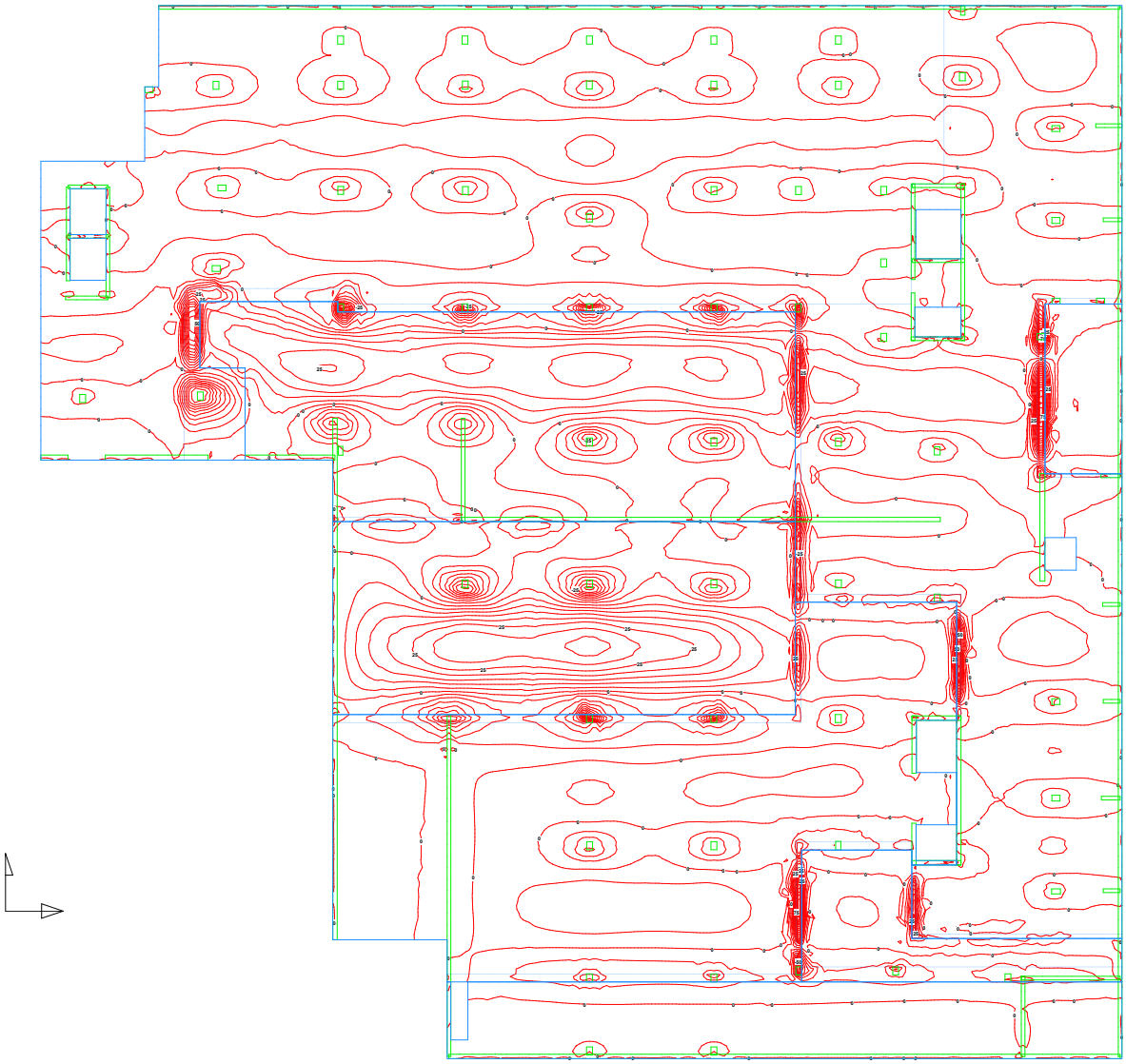


Service LC: D + 0.75L + 0.75S: Min Deflection Plan



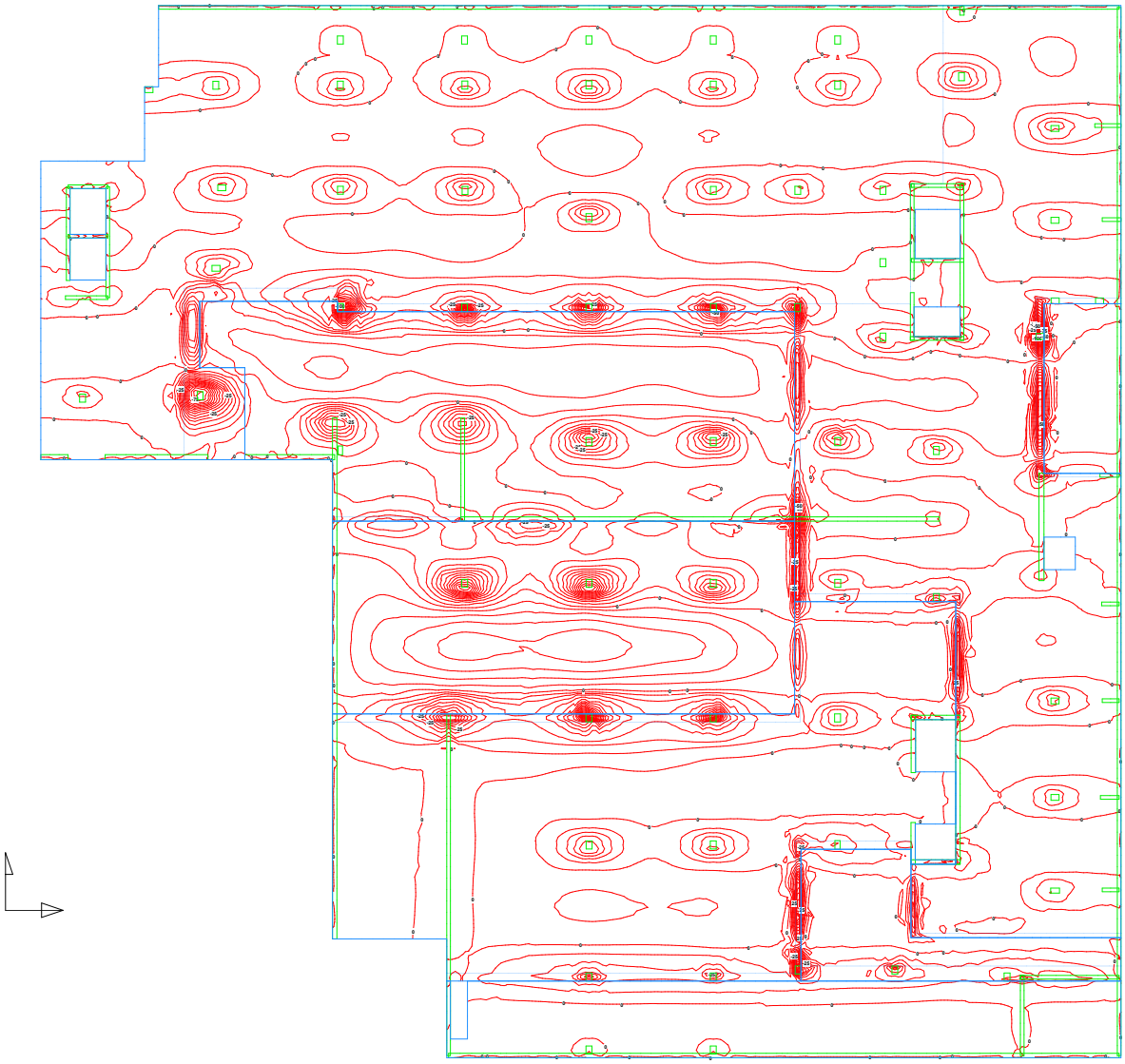
Factored LC: 1.4D: Max Mx Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -69.71 Kips @ (256.5,130.8) Max Value = 197.2 Kips @ (180.9,1.666)



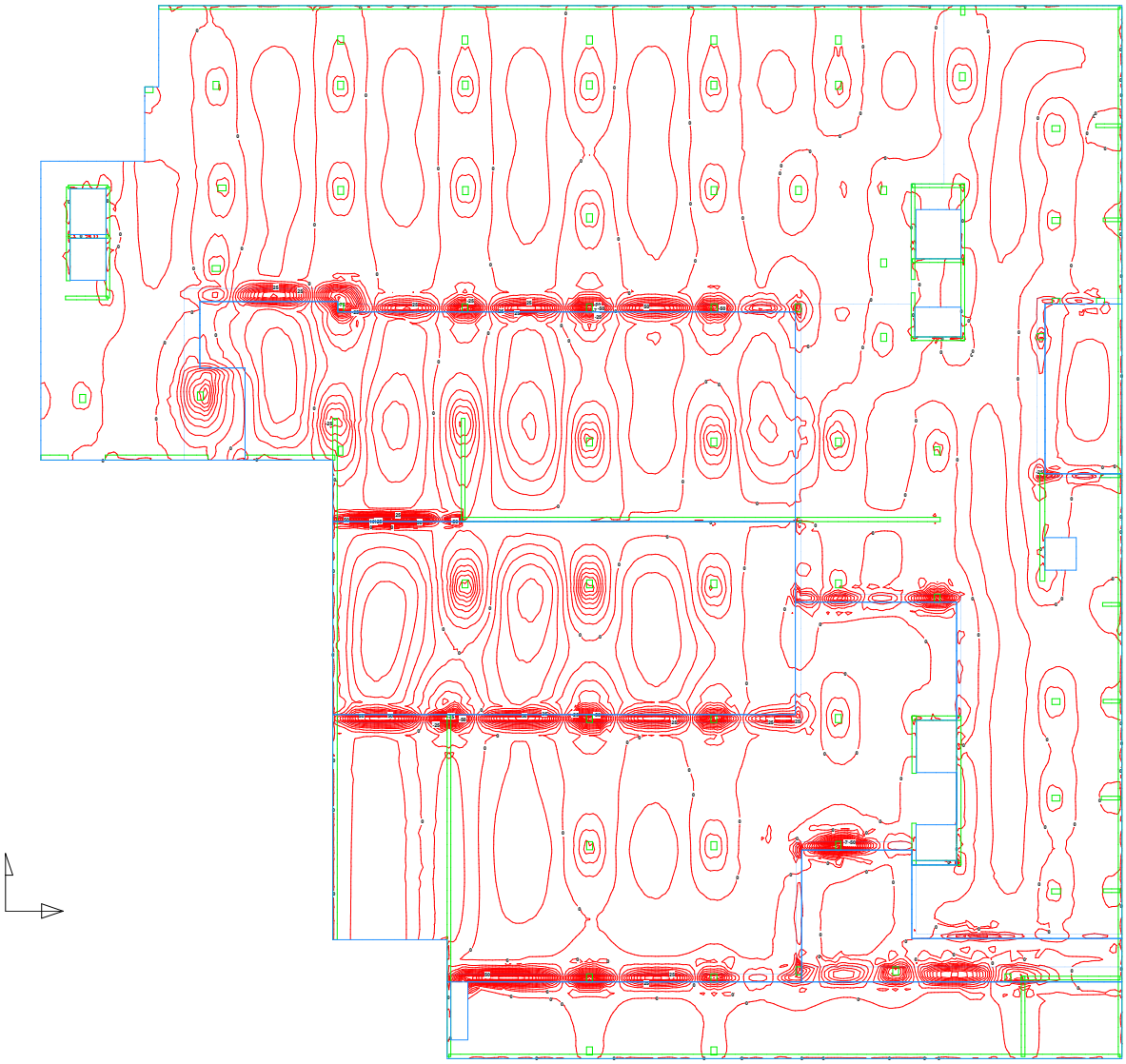
Factored LC: 1.4D: Min Mx Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -139.6 Kips @ (256.5,130.8) Max Value = 69.92 Kips @ (180.9,1.065)



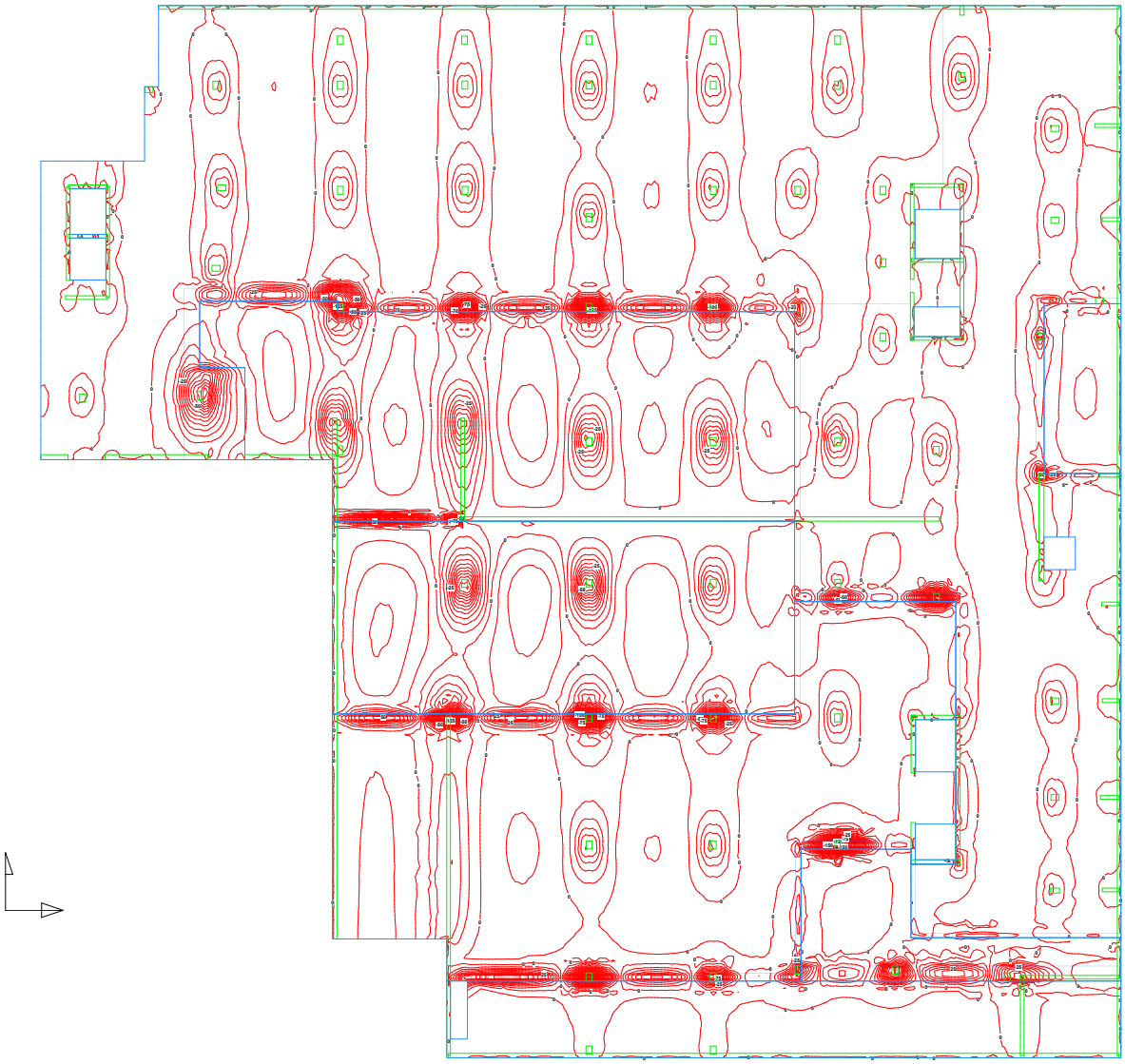
Factored LC: 1.4D: Max My Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -120.9 Kips @ (150.2,14.41) Max Value = 146 Kips @ (66.03,89.39)



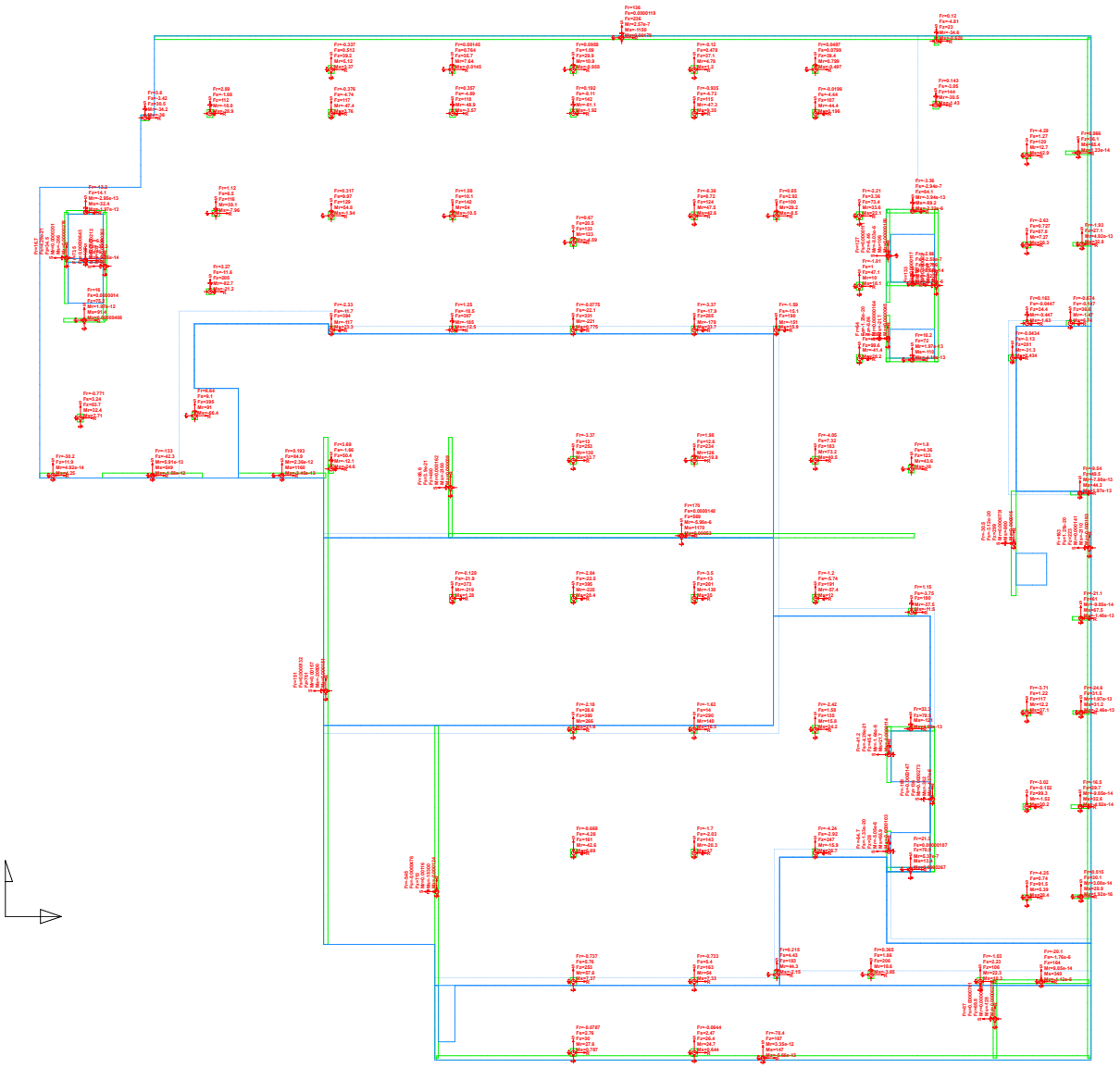
Factored LC: 1.4D: Min My Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -188.1 Kips @ (150.2,14.41) Max Value = 93.86 Kips @ (86.03,89.28)



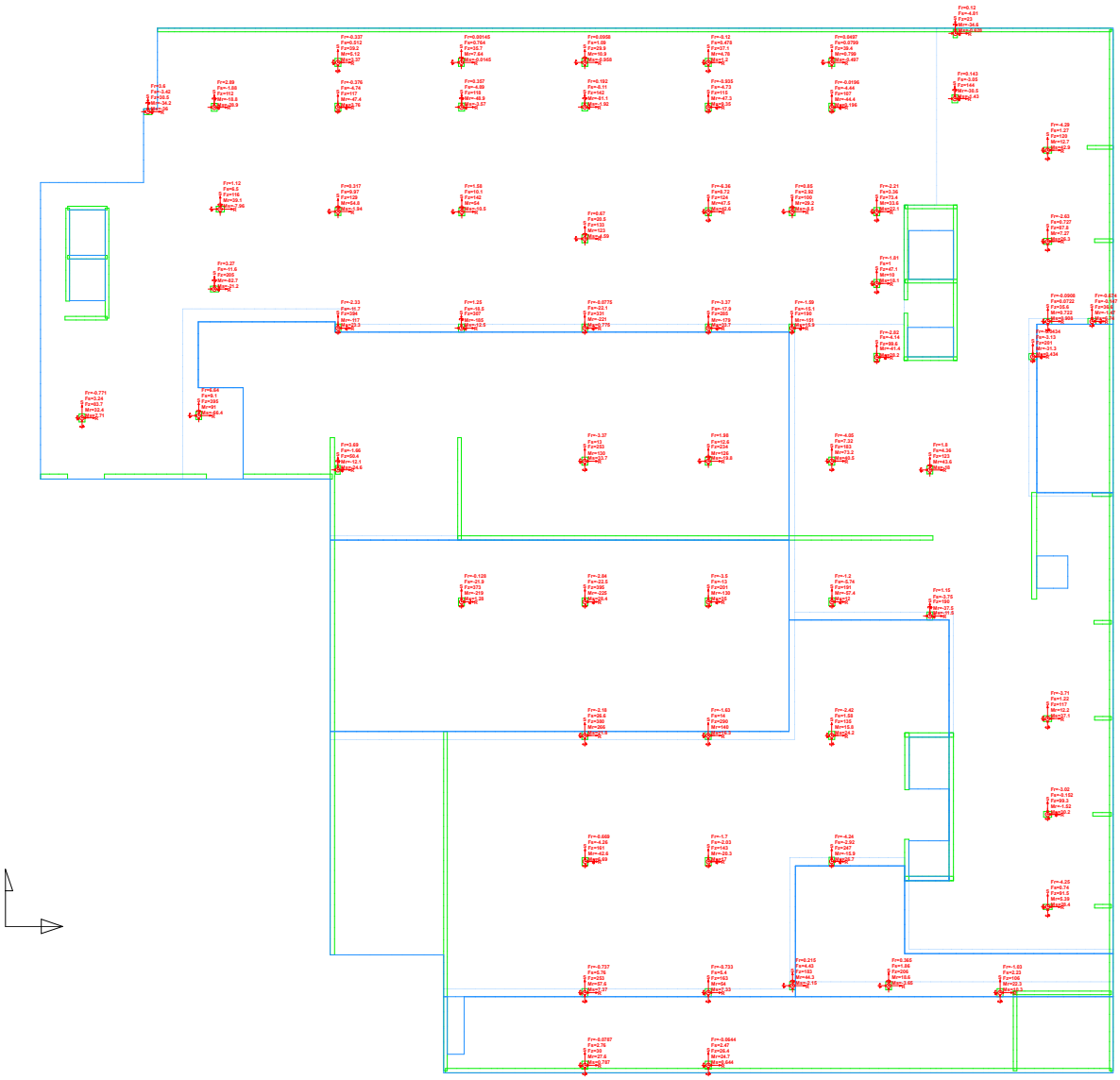
Factored LC: 1.4D: Std Reactions Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fr,Fx,Fz,Mr,My,Mx,Mz)(Standard Context)



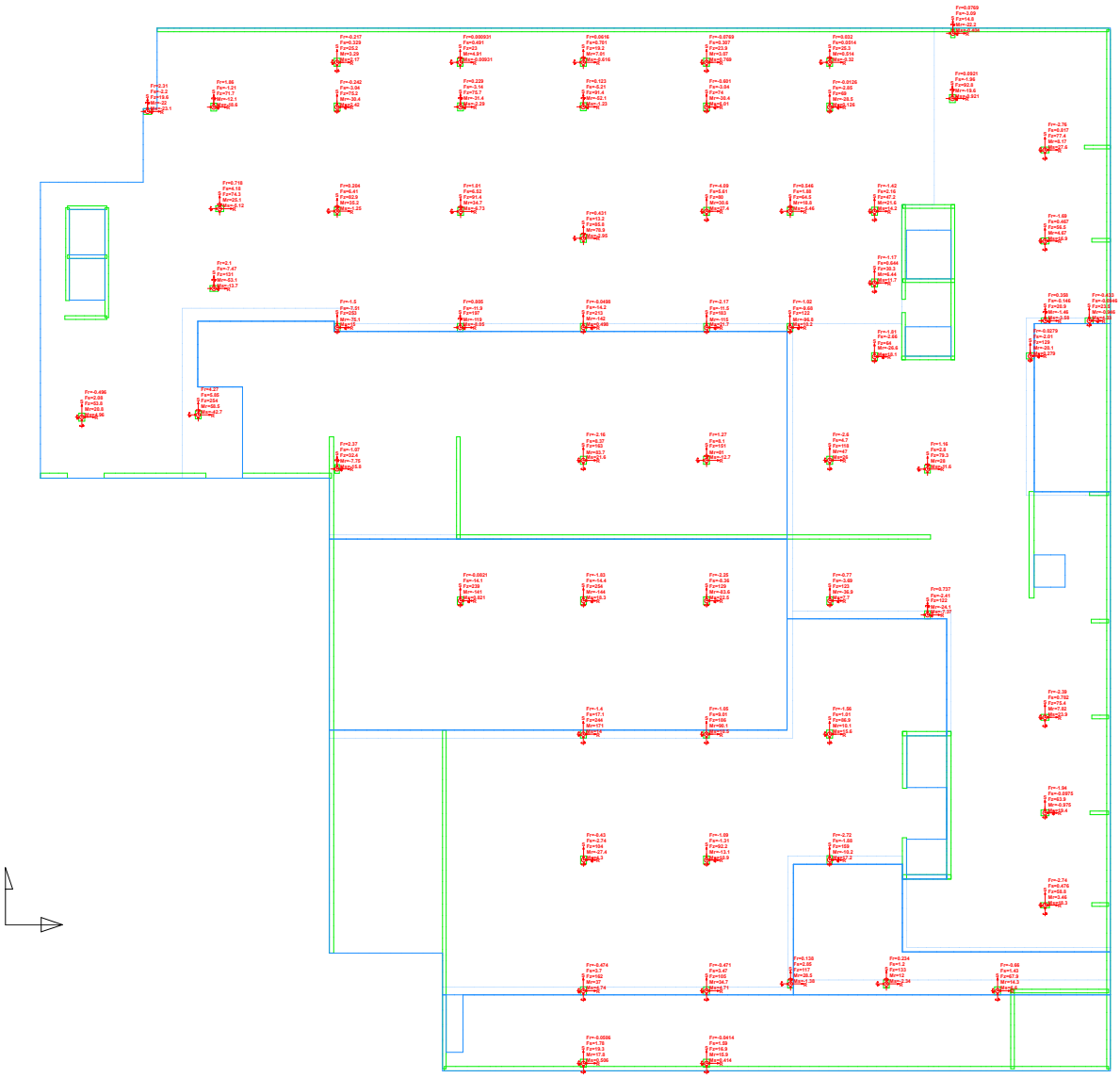
Factored LC: 1.4D: Max Reactions Plan

Factored LC: 1.4D: 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 = 1:100
Factored LC: 1.4D - Reaction Plot: (Column Below)(Fz,Fx,Fy,Mr,Mx,My)(Max Fz Context)



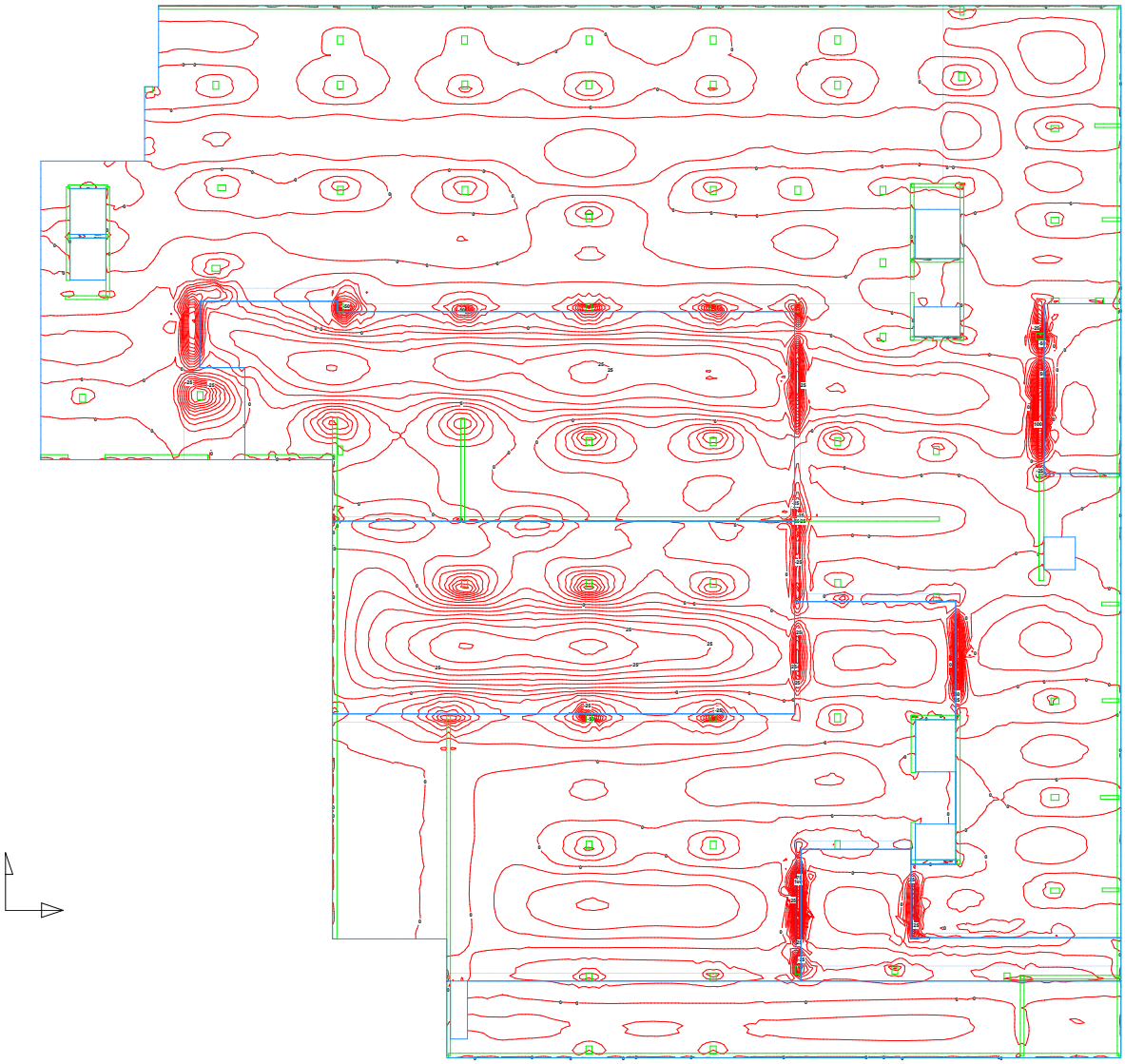
Factored LC: 1.4D: Min Reactions Plan

Factored LC: 1.4D: 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 = 1:500
Factored LC: 1.4D - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Min Fz Contest)



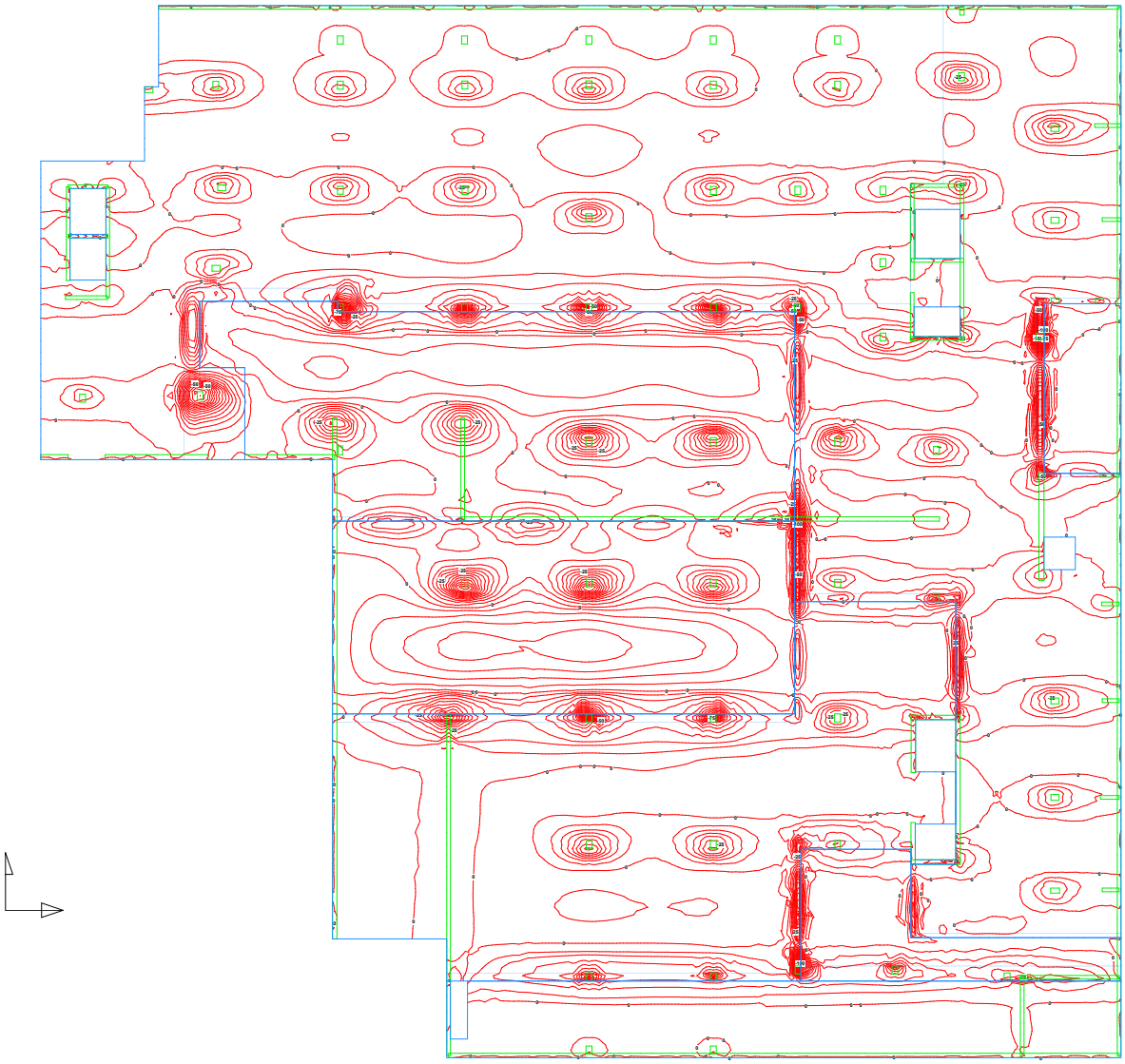
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Mx Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -69.71 Kips @ (256.5,130.8) Max Value = 148.7 Kips @ (180.9,1.665)



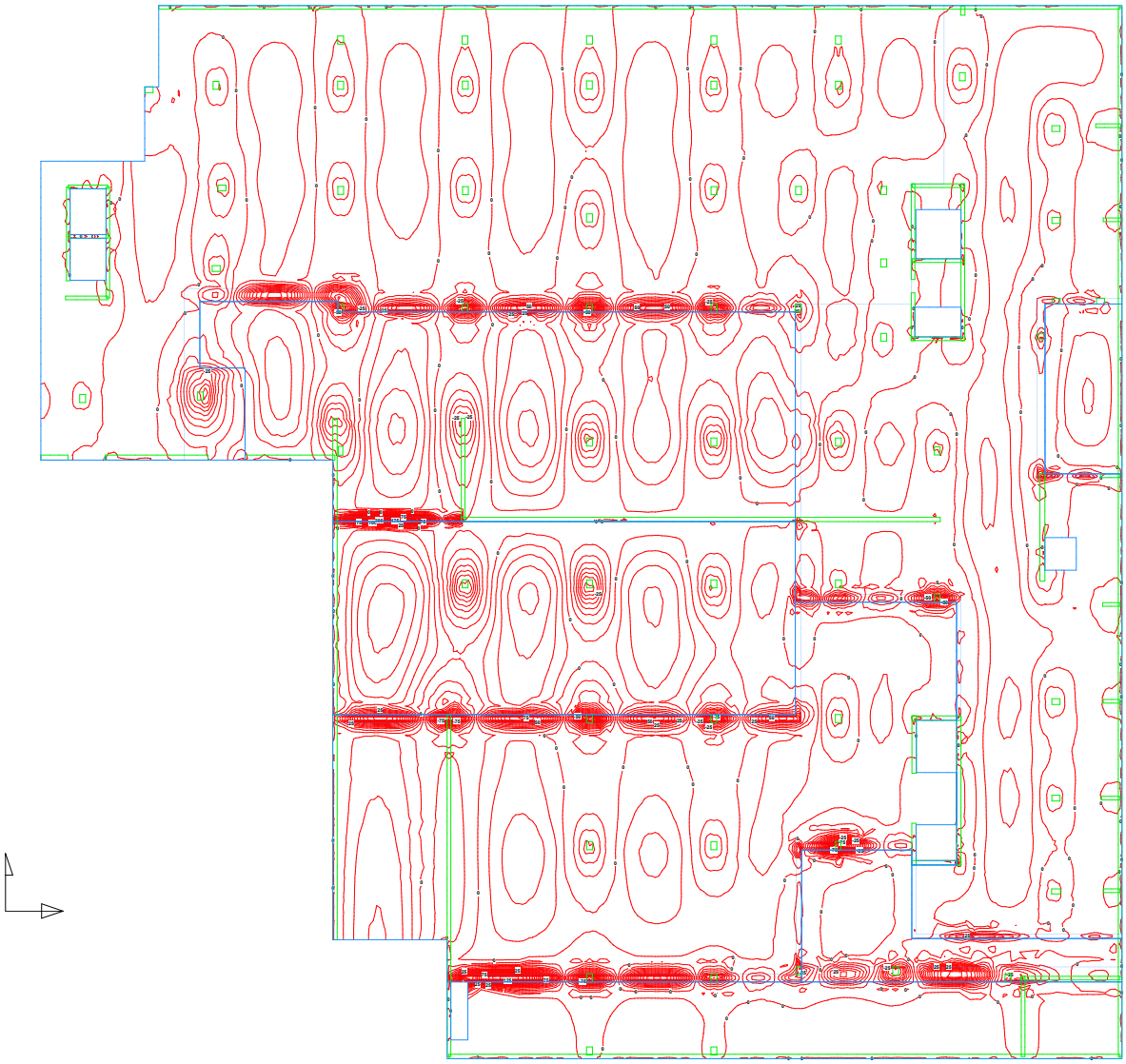
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Mx Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -182.6 Kips @ (256.5,130.8) Max Value = 68.92 Kips @ (180.9,1.665)



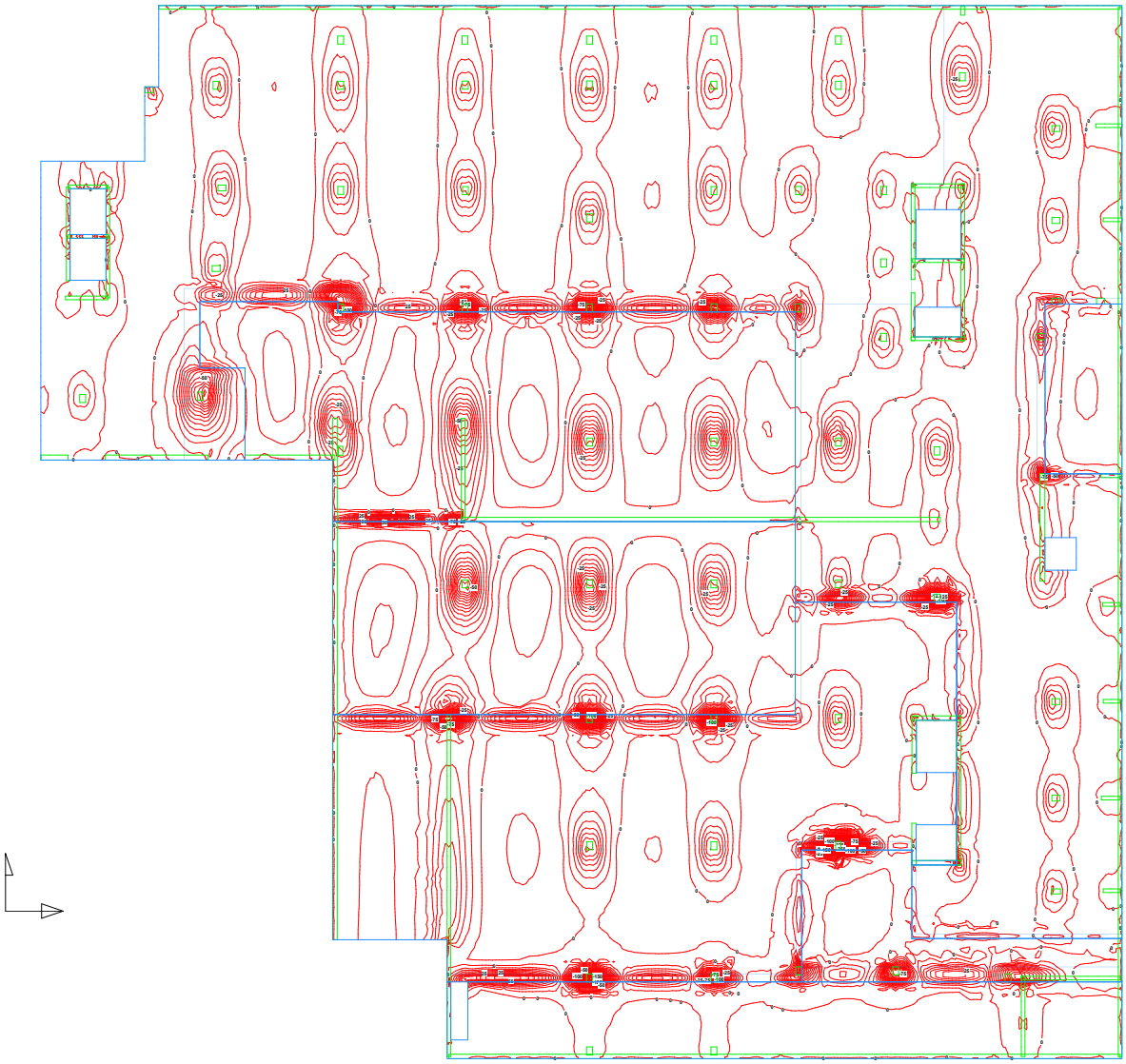
Factored LC: 1.2D + 1.6L + 0.5Lr: Max My Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -120.9 Kips @ (150.2,14.41) Max Value = 196.6 Kips @ (66.03,89.29)

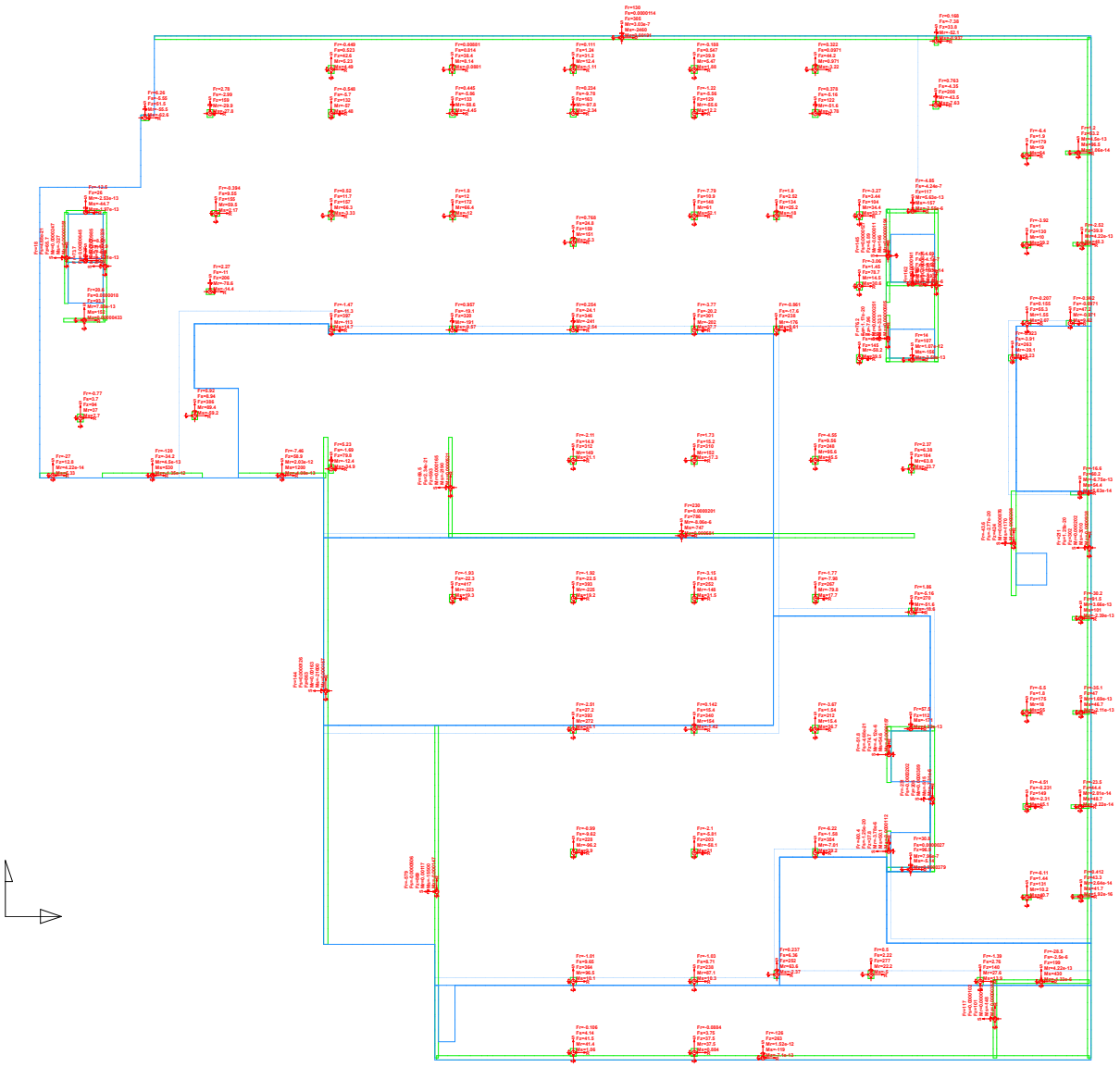


Factored LC: 1.2D + 1.6L + 0.5Lr: Min My Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -275.2 Kips @ (150.3,15.41) Max Value = 93.66 Kips @ (66.03,89.29)

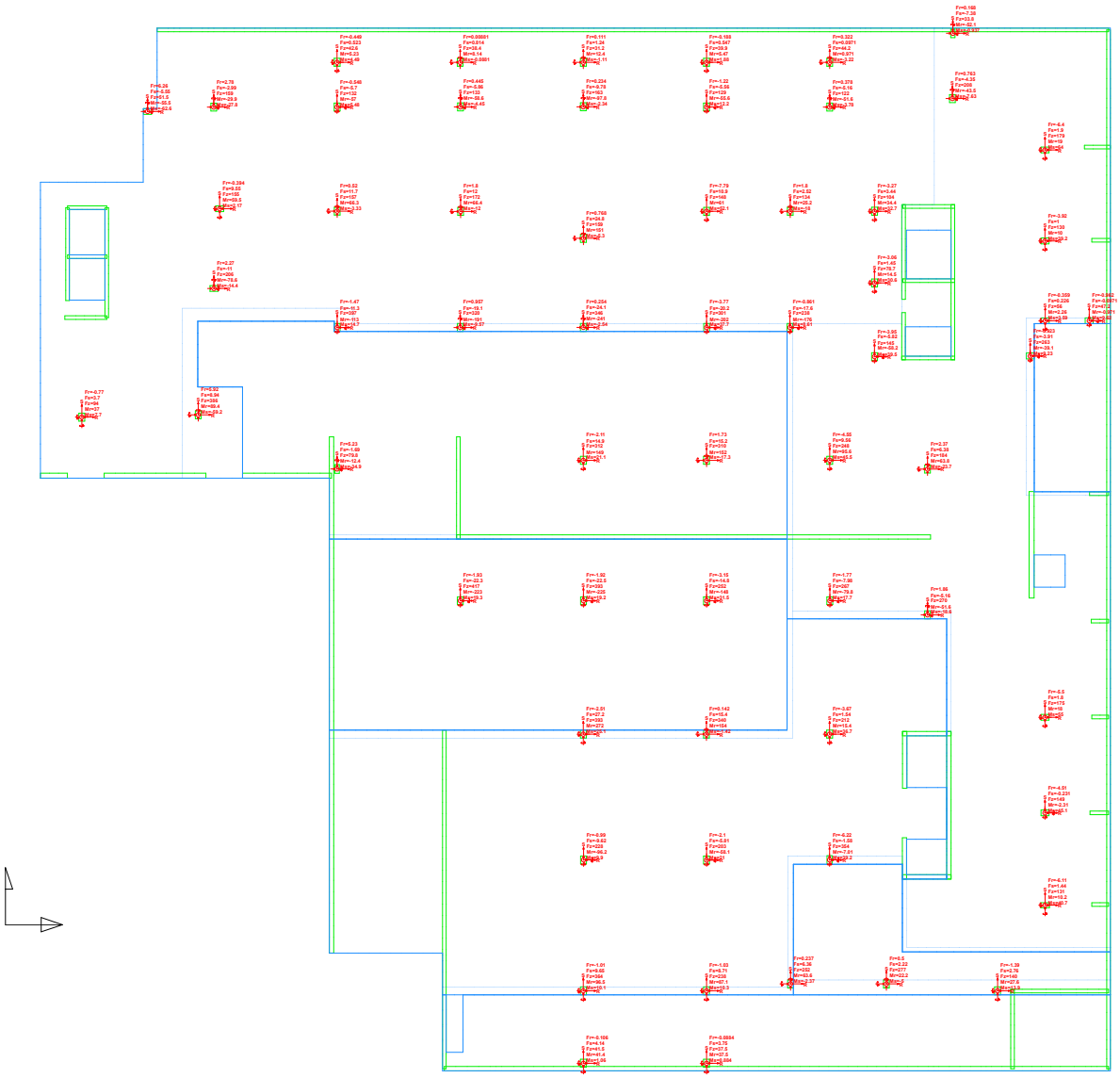


Factored LC: 1.2D + 1.6L + 0.5Lr: Std Reactions Plan



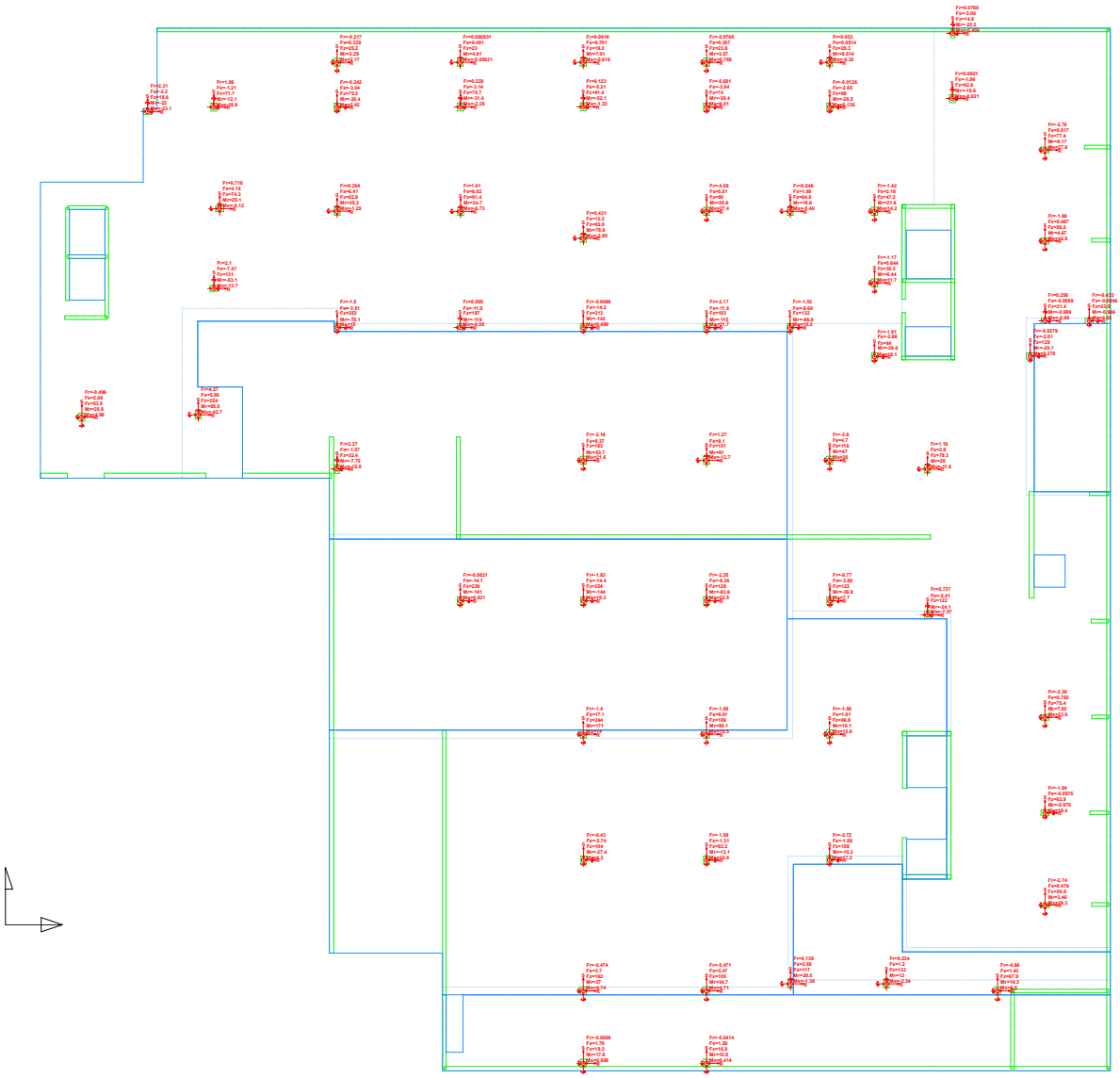
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Max Fz Contest)



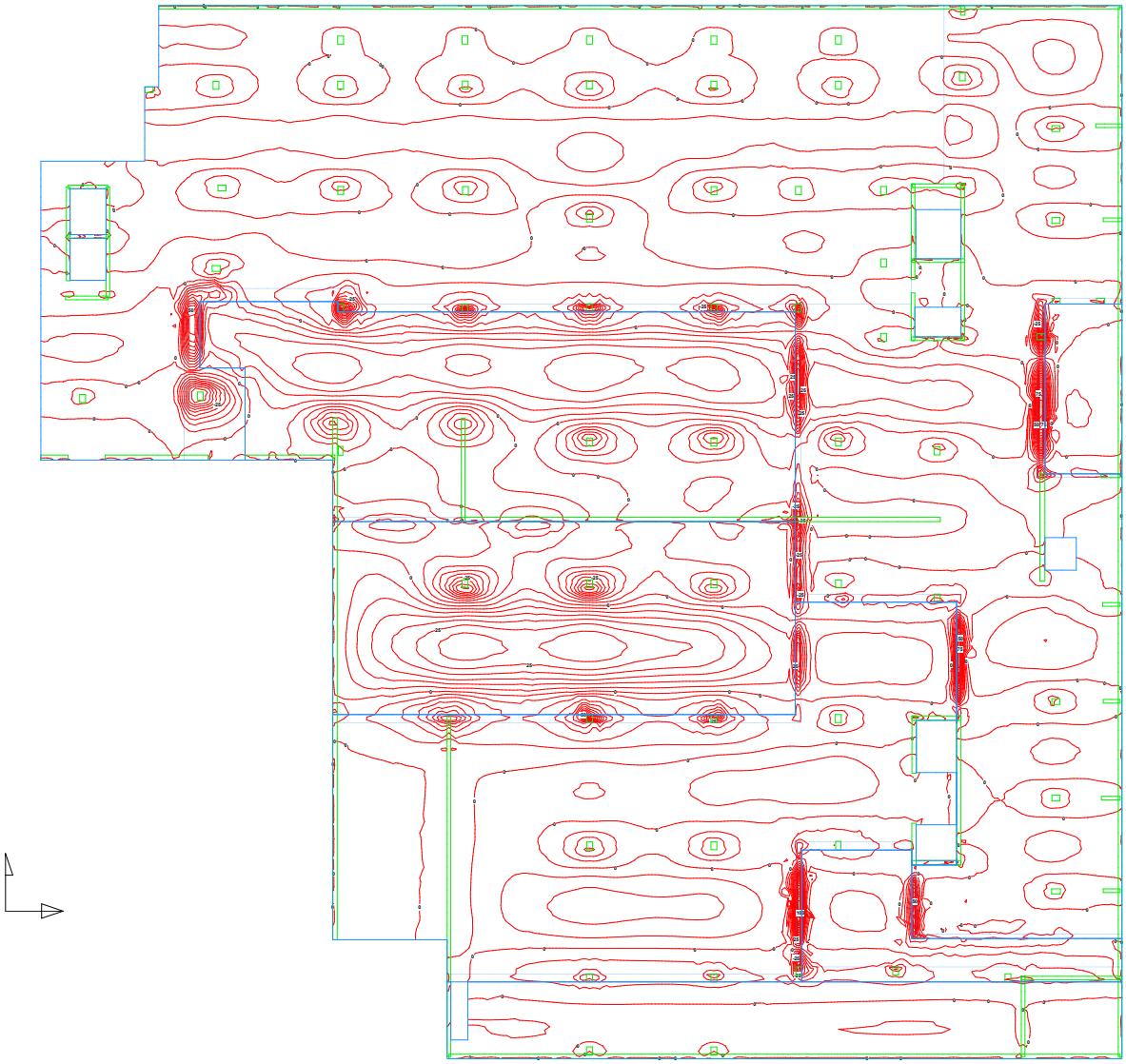
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,My,Mz)(Min Fz Context)



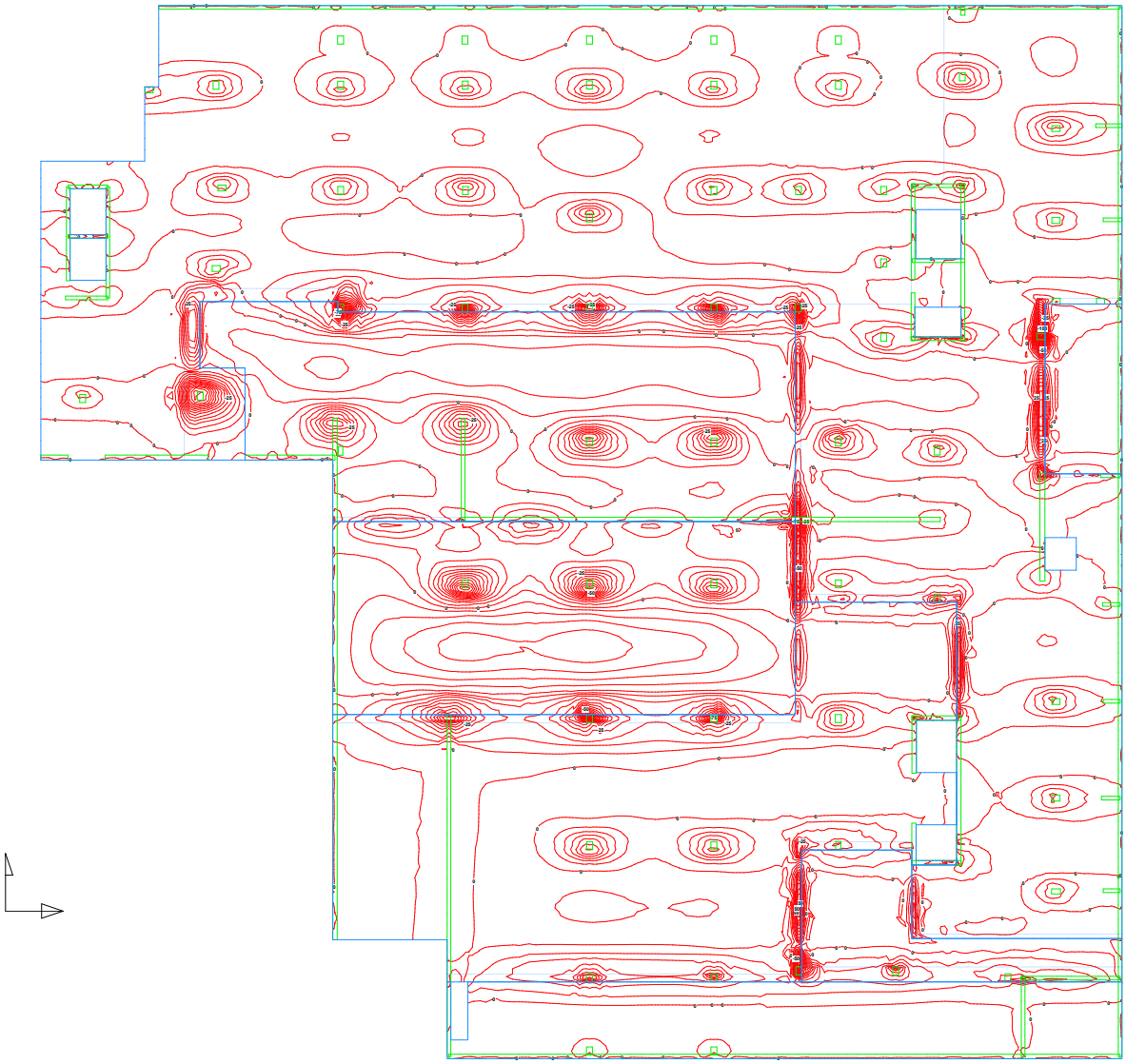
Factored LC: 1.2D + f1L + 1.6Lr: Max Mx Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -69.71 Kips @ (256.5,130.8) Max Value = 127.4 Kips @ (180.9,1.665)



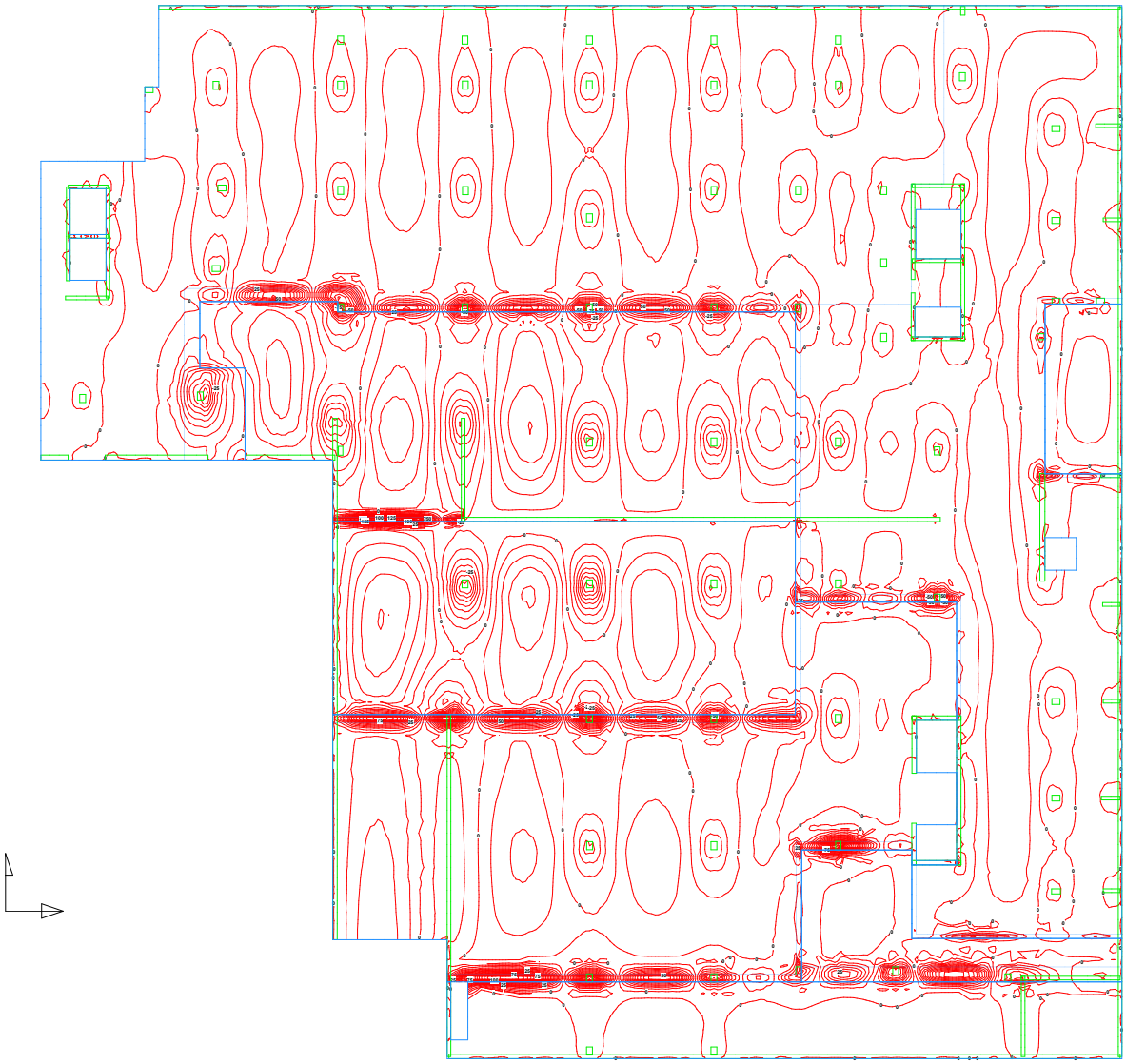
Factored LC: 1.2D + f1L + 1.6Lr: Min Mx Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -159 Kips @ (236.5,130.8) Max Value = 69.92 Kips @ (189.9,1.085)



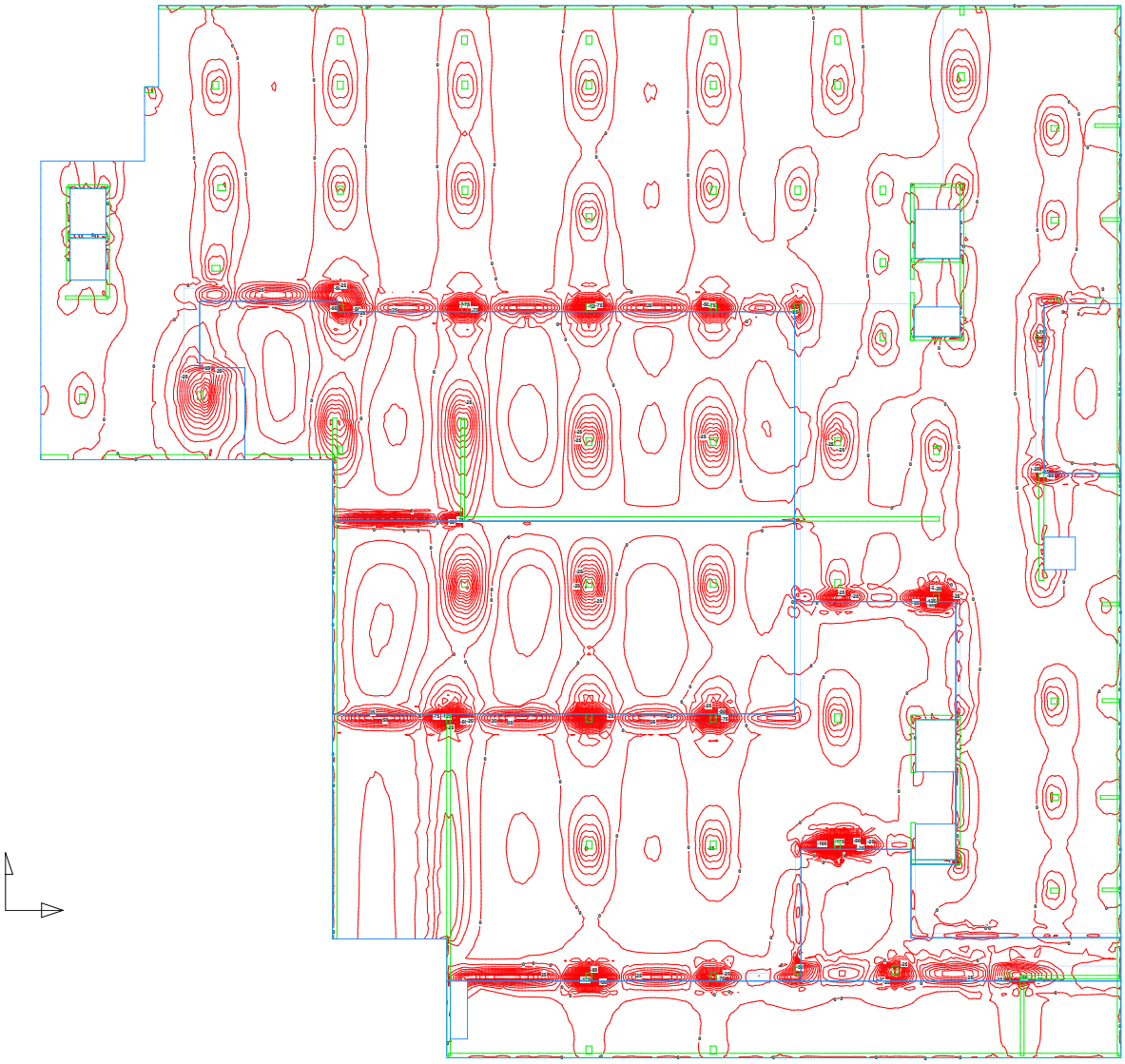
Factored LC: 1.2D + f1L + 1.6Lr: Max My Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -120.9 Kips @ (150.2,14.41) Max Value = 169.8 Kips @ (66.63,89.29)



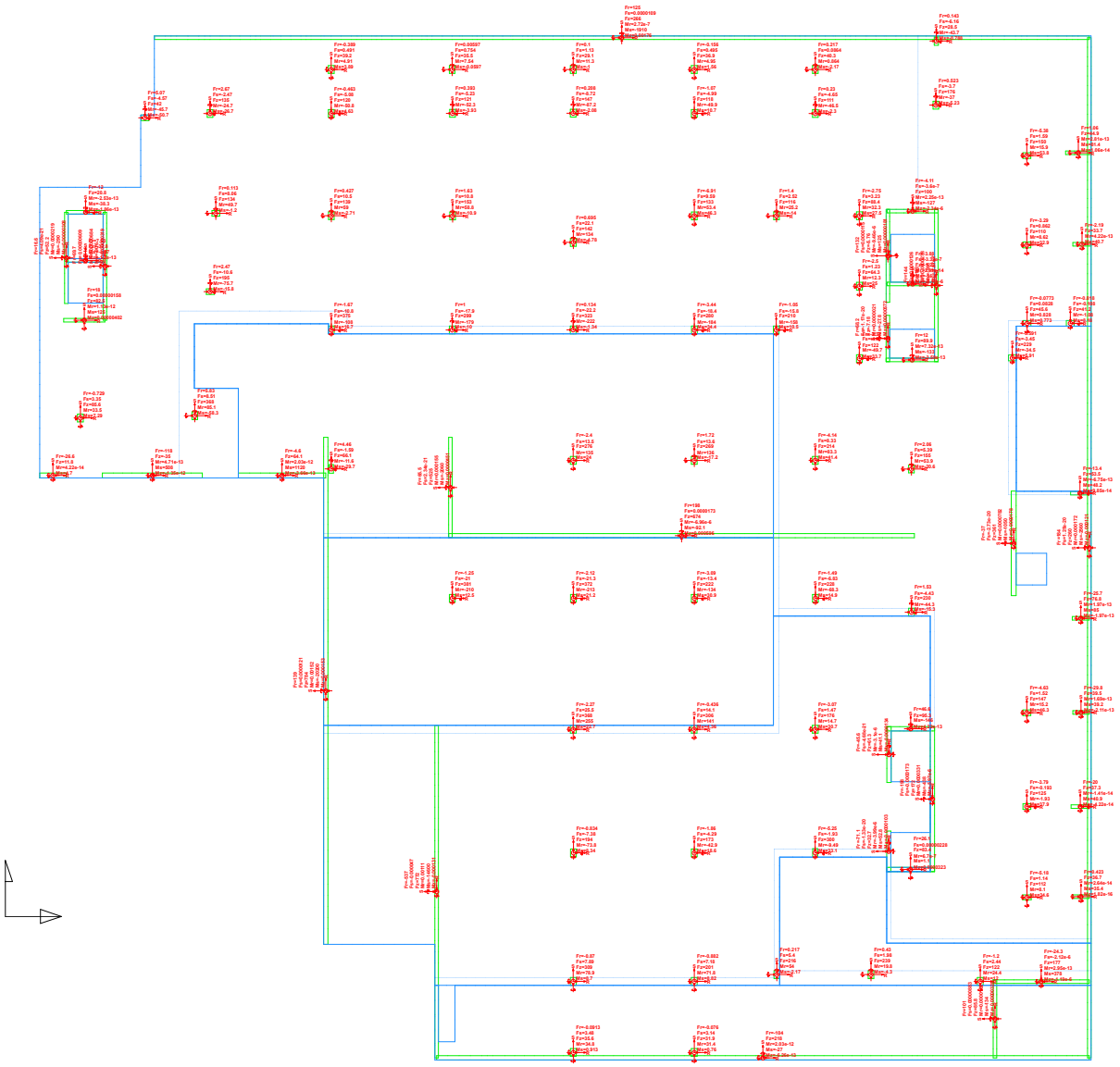
Factored LC: 1.2D + f1L + 1.6Lr: Min My Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -232.4 Kips @ (150.3,15.41) Max Value = 93.66 Kips @ (66.03,89.23)



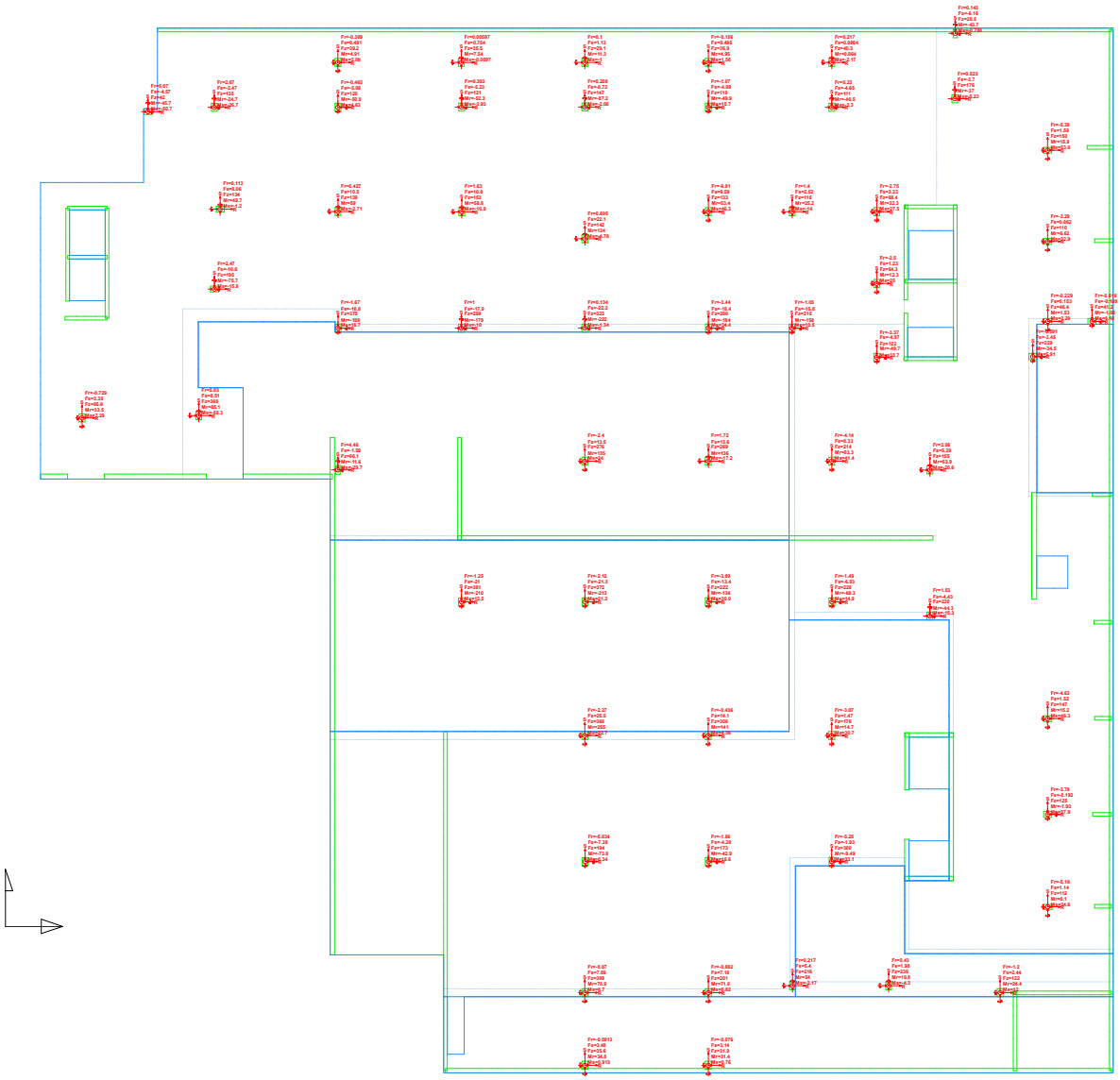
Factored LC: 1.2D + f1L + 1.6Lr: Std Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fz,Fx,Fz,Mr,Mx,Mz)(Standard Context)



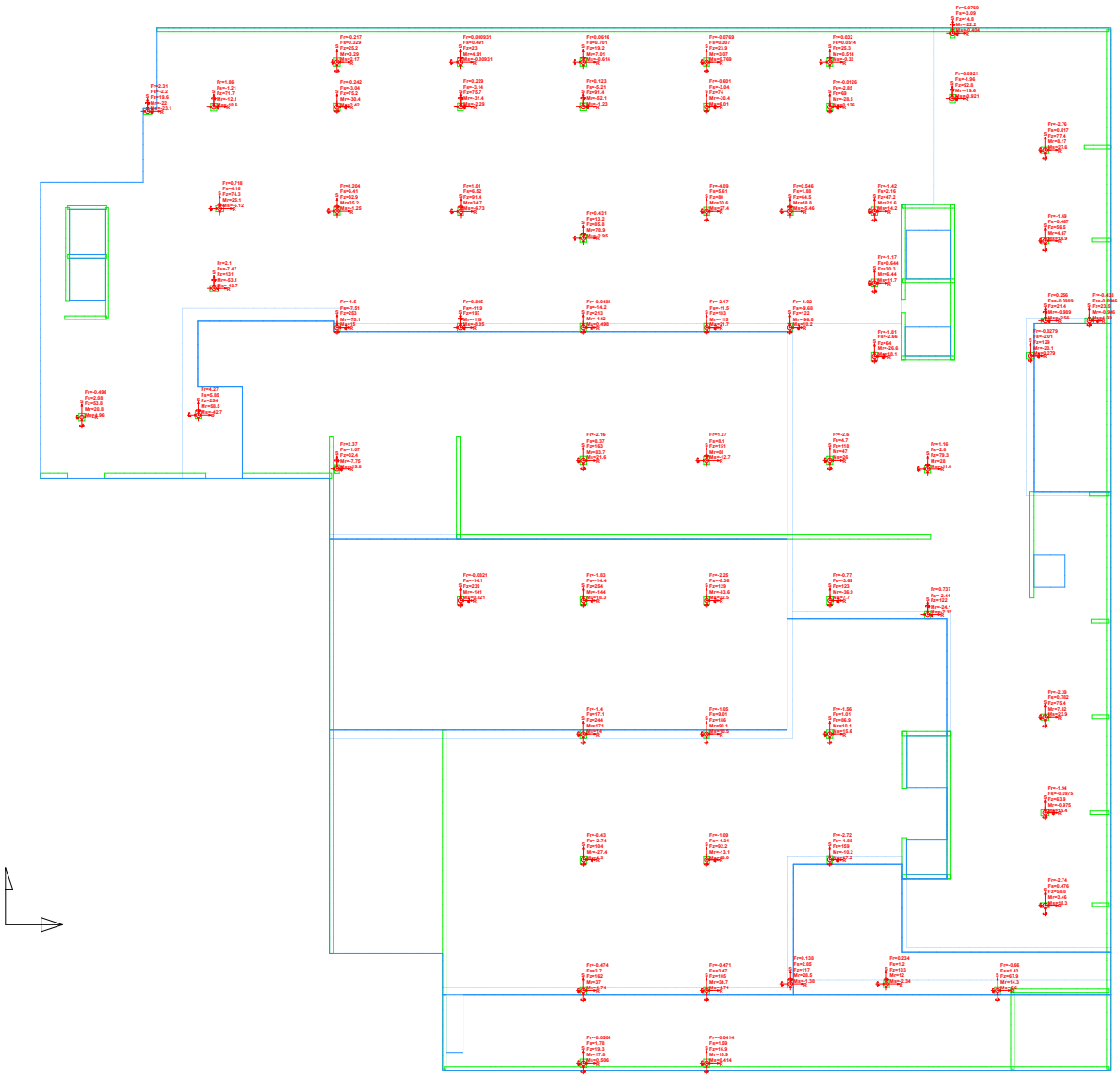
Factored LC: 1.2D + f1L + 1.6Lr: Max Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Column Below)(Fz,Fx,Fz,Mr,Mx,My)(Max Fz Context)



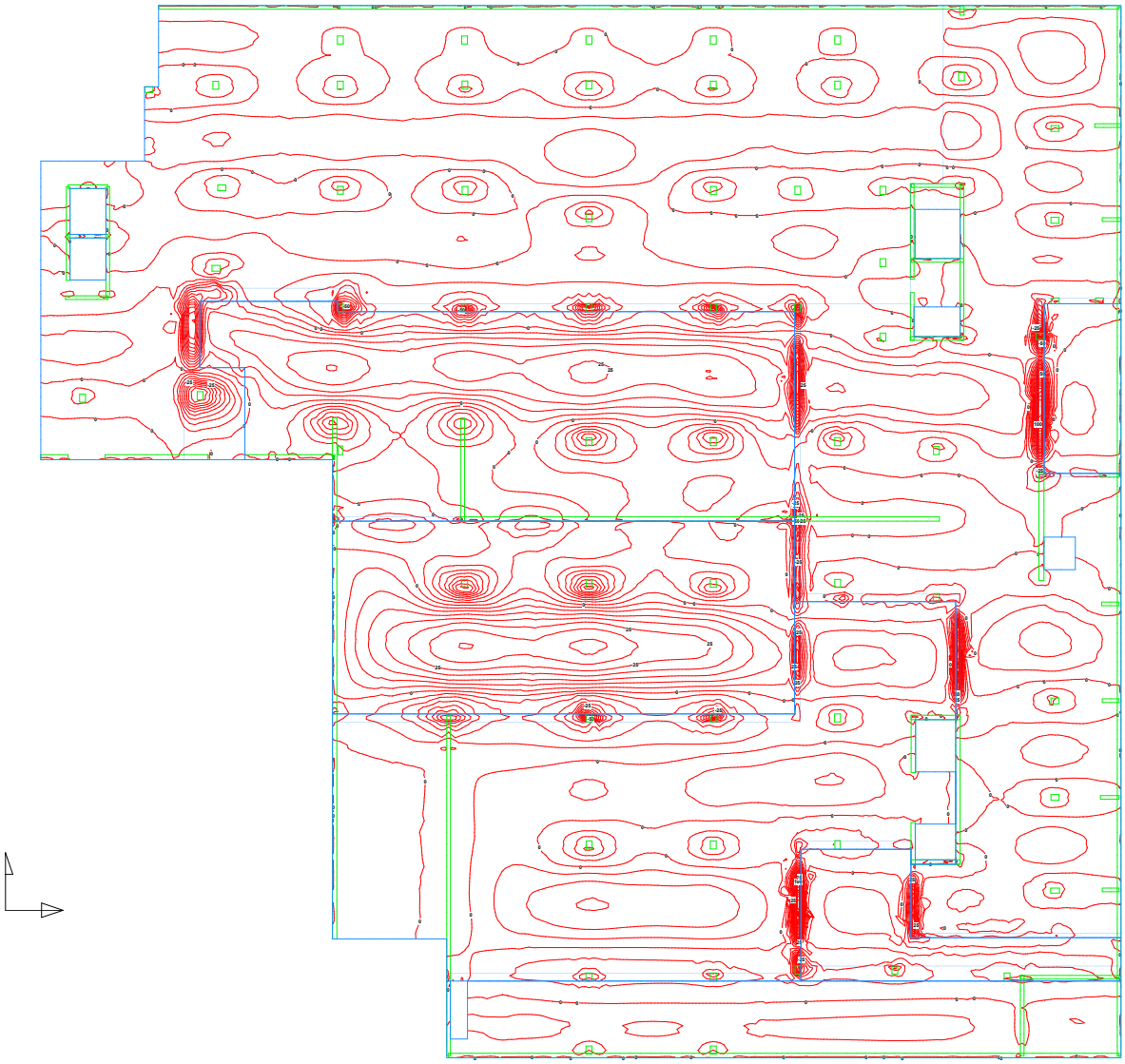
Factored LC: 1.2D + f1L + 1.6Lr: Min Reactions Plan

Factored LC: 1.2D + f1L + 1.6Lr: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:100
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Column Below)(Fz,Fx,Fz,Mx,My,Mz)(Min Fz Context)



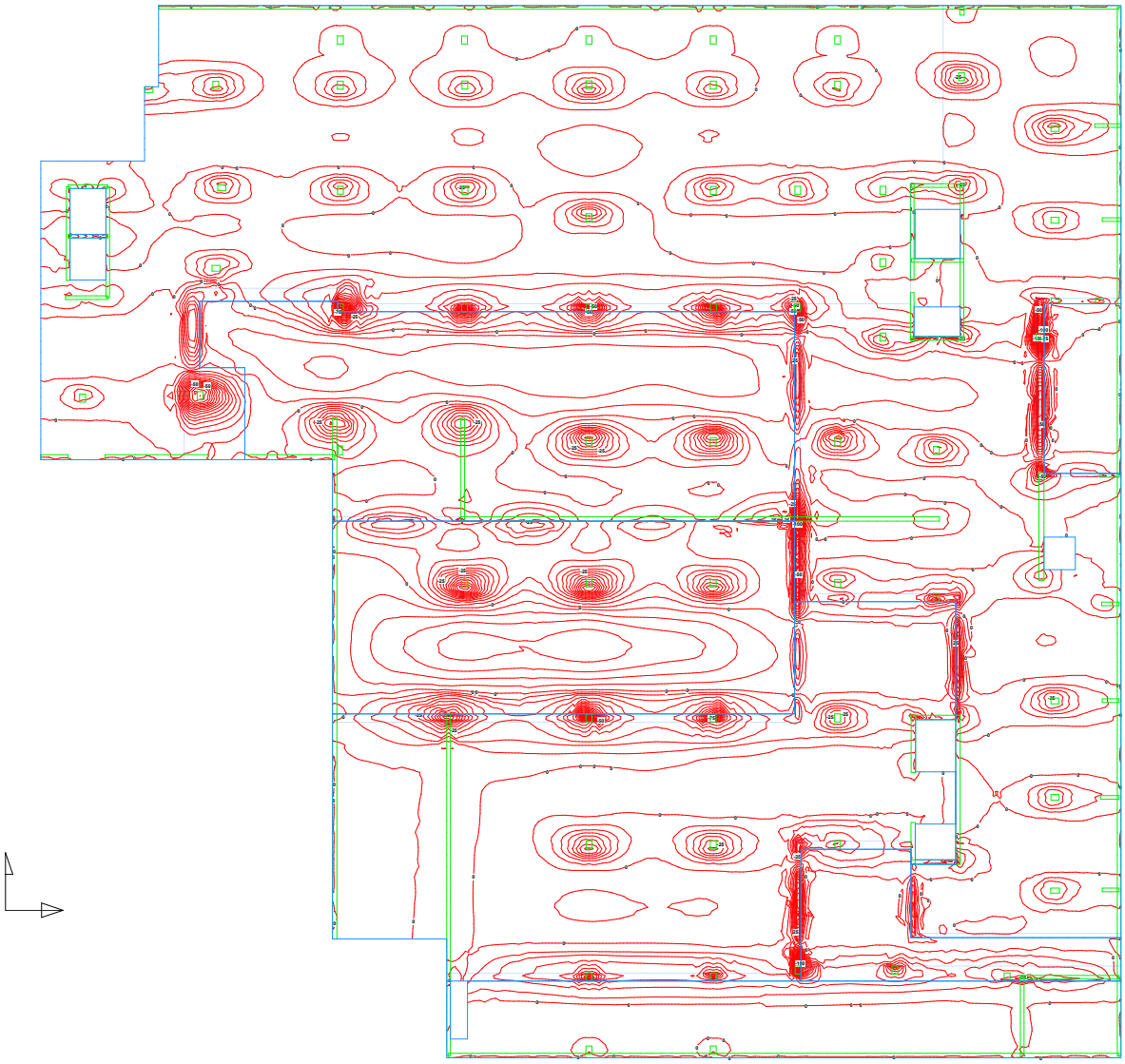
Factored LC: 1.2D + 1.6L + 0.5S: Max Mx Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -69.71 Kips @ (256.5,130.8) Max Value = 148.7 Kips @ (180.9,1.665)



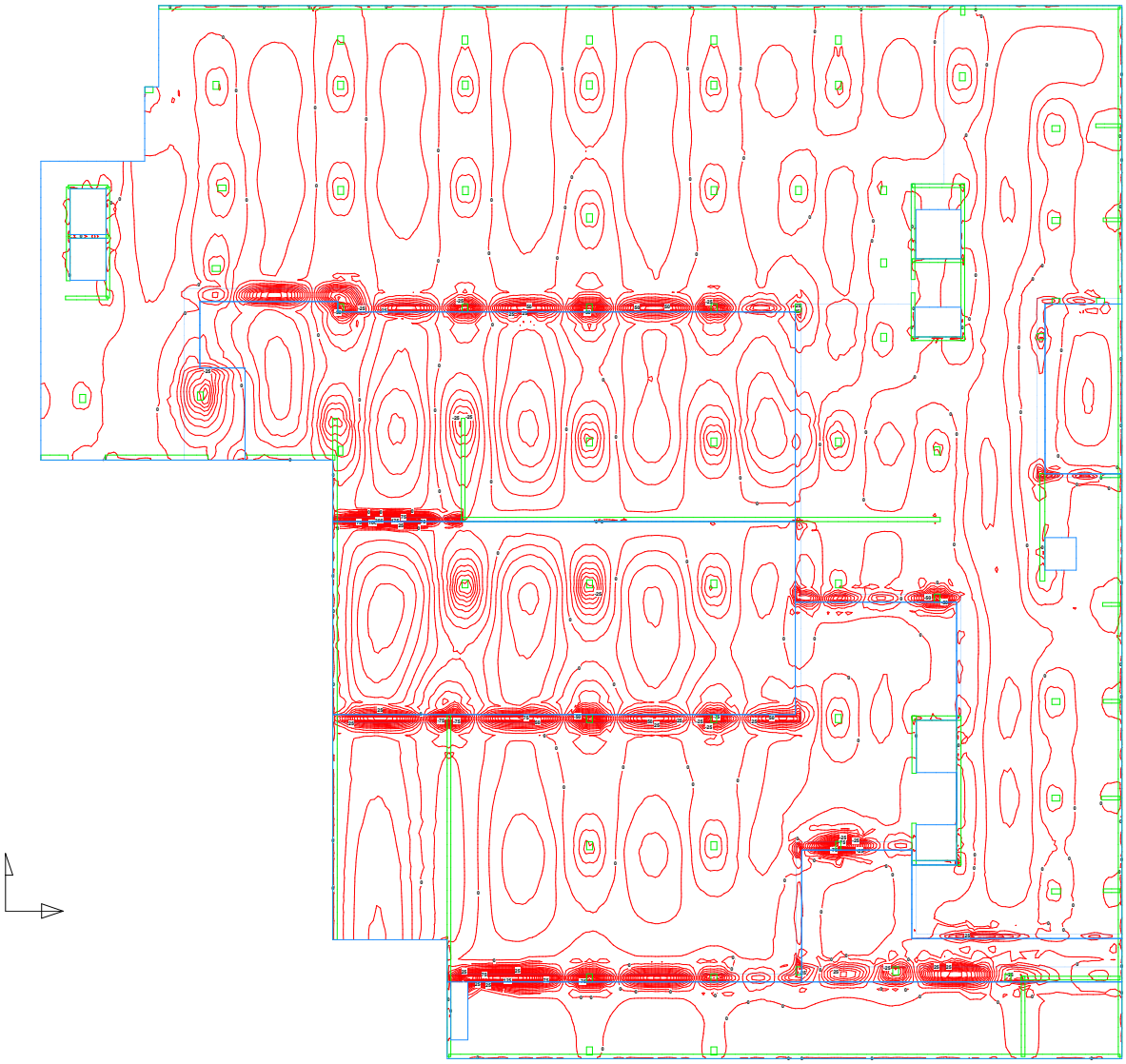
Factored LC: 1.2D + 1.6L + 0.5S: Min Mx Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Minimum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -182.6 Kips @ (256.5,130.8) Max Value = 68.92 Kips @ (180.9,1.065)



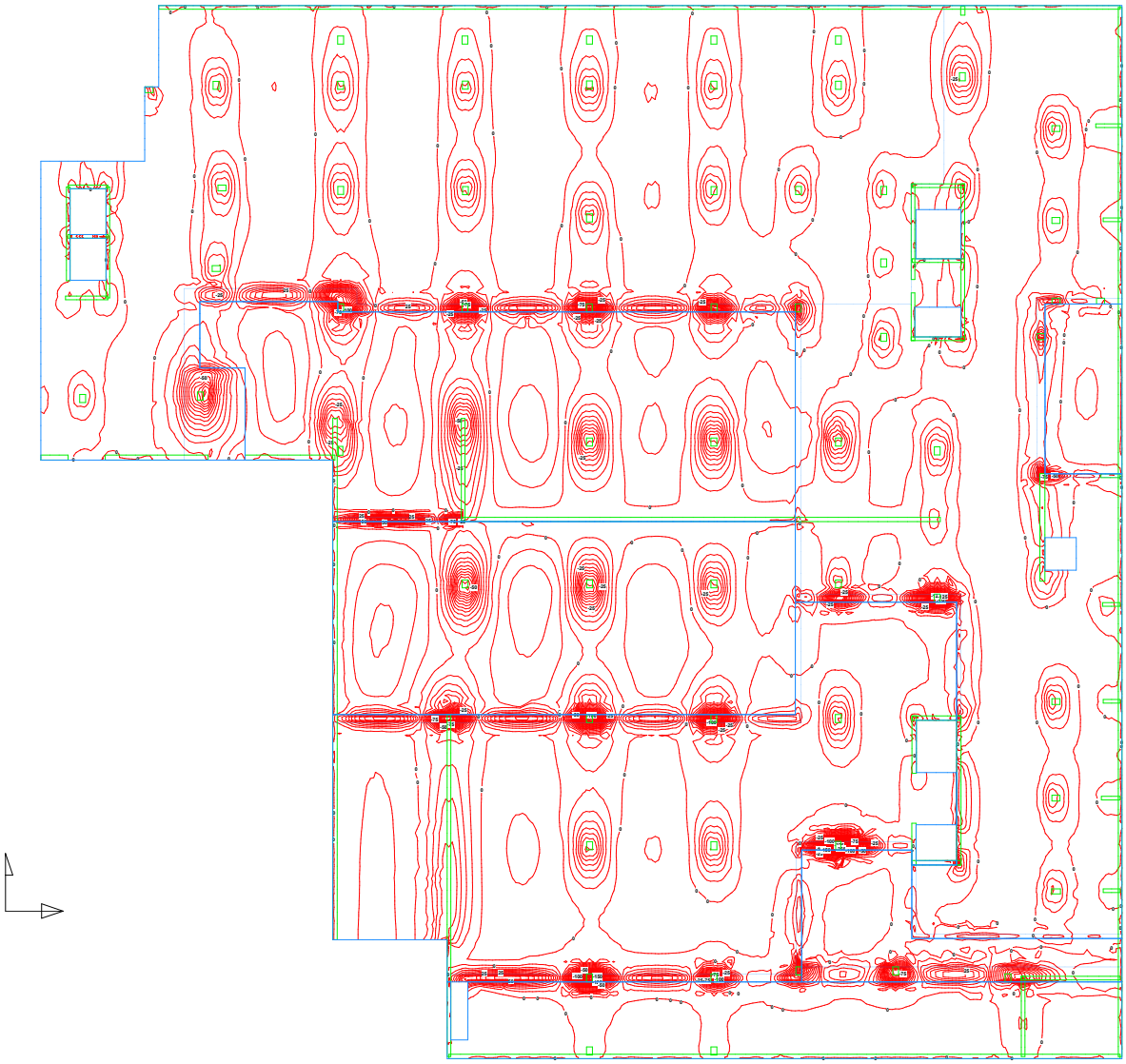
Factored LC: 1.2D + 1.6L + 0.5S: Max My Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -120.9 Kips @ (150.2,14.41) Max Value = 196.6 Kips @ (66.63,89.29)

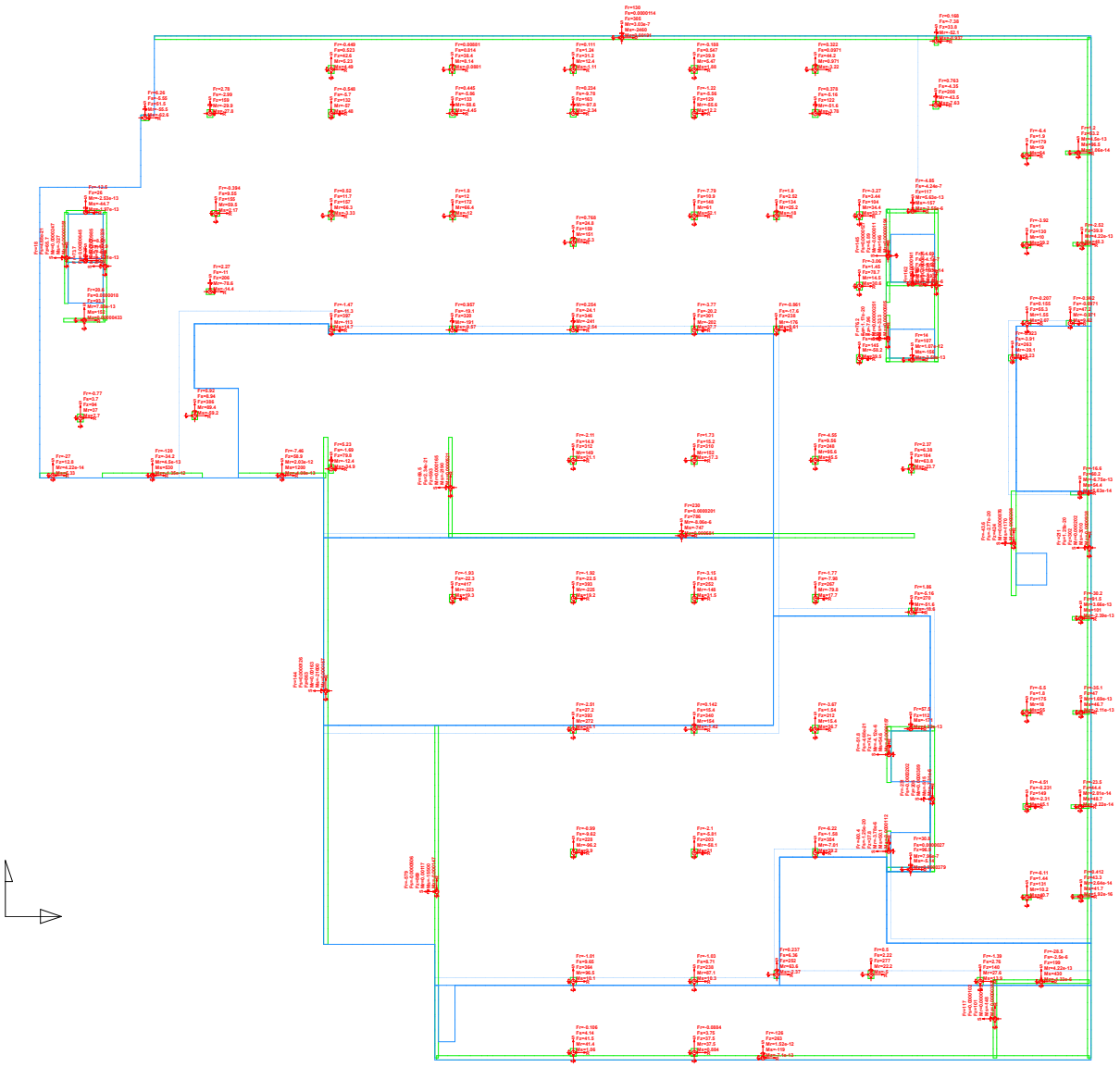


Factored LC: 1.2D + 1.6L + 0.5S: Min My Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -275.2 Kips @ (150.3,15.41) Max Value = 93.66 Kips @ (66.03,89.29)

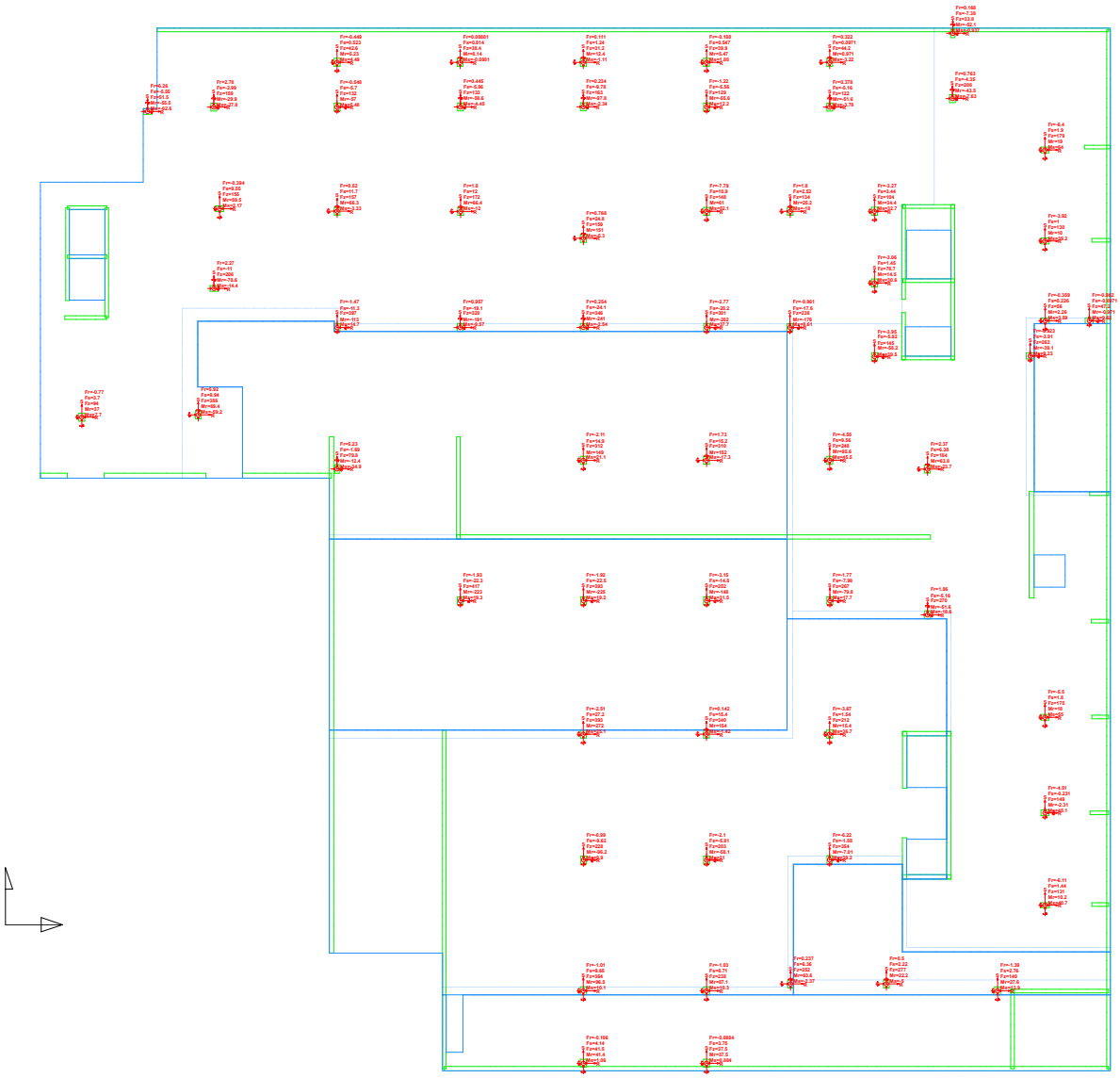


Factored LC: 1.2D + 1.6L + 0.5S: Std Reactions Plan



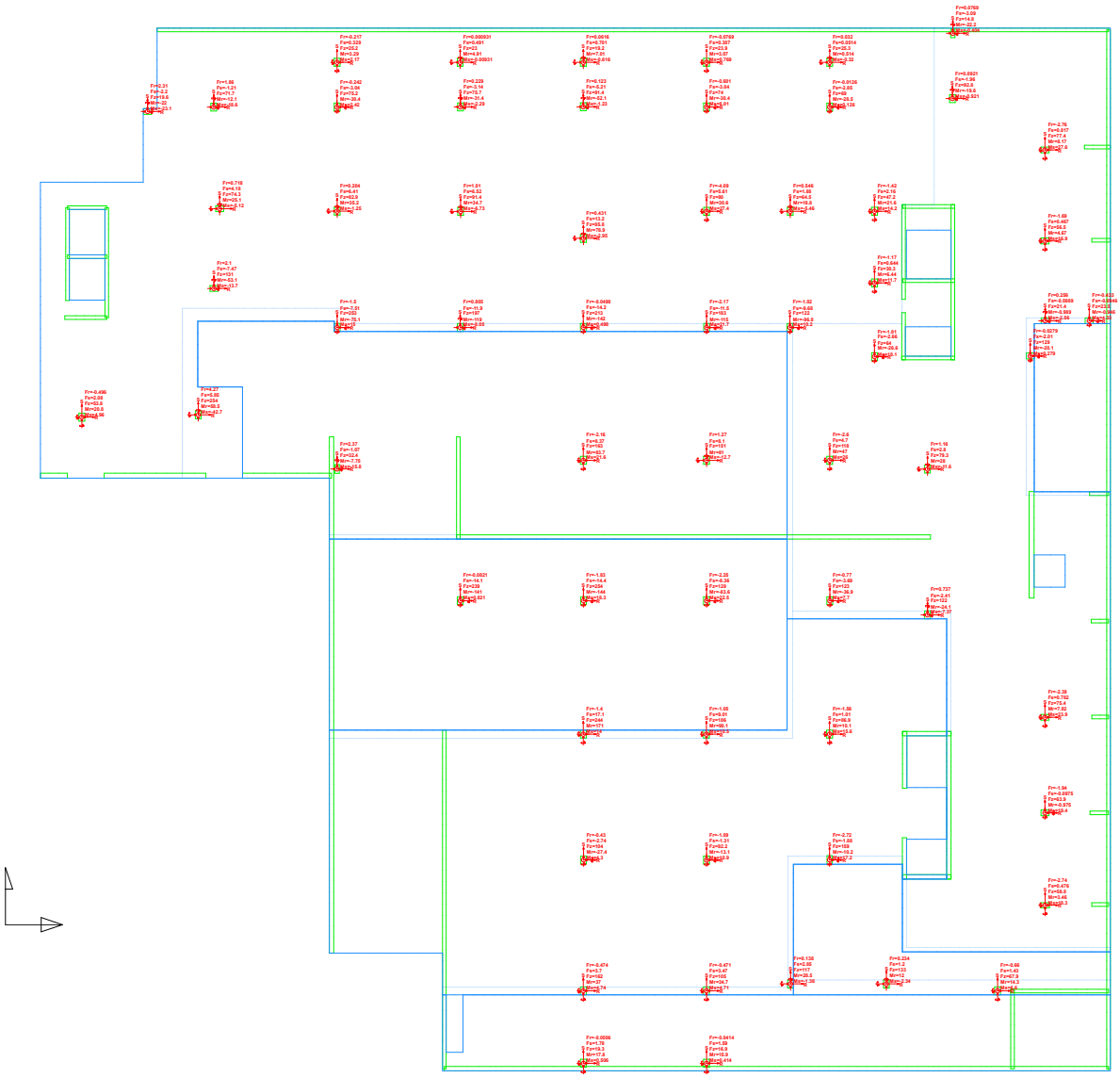
Factored LC: 1.2D + 1.6L + 0.5S: Max Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5S - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,My)(Max Fz Context)



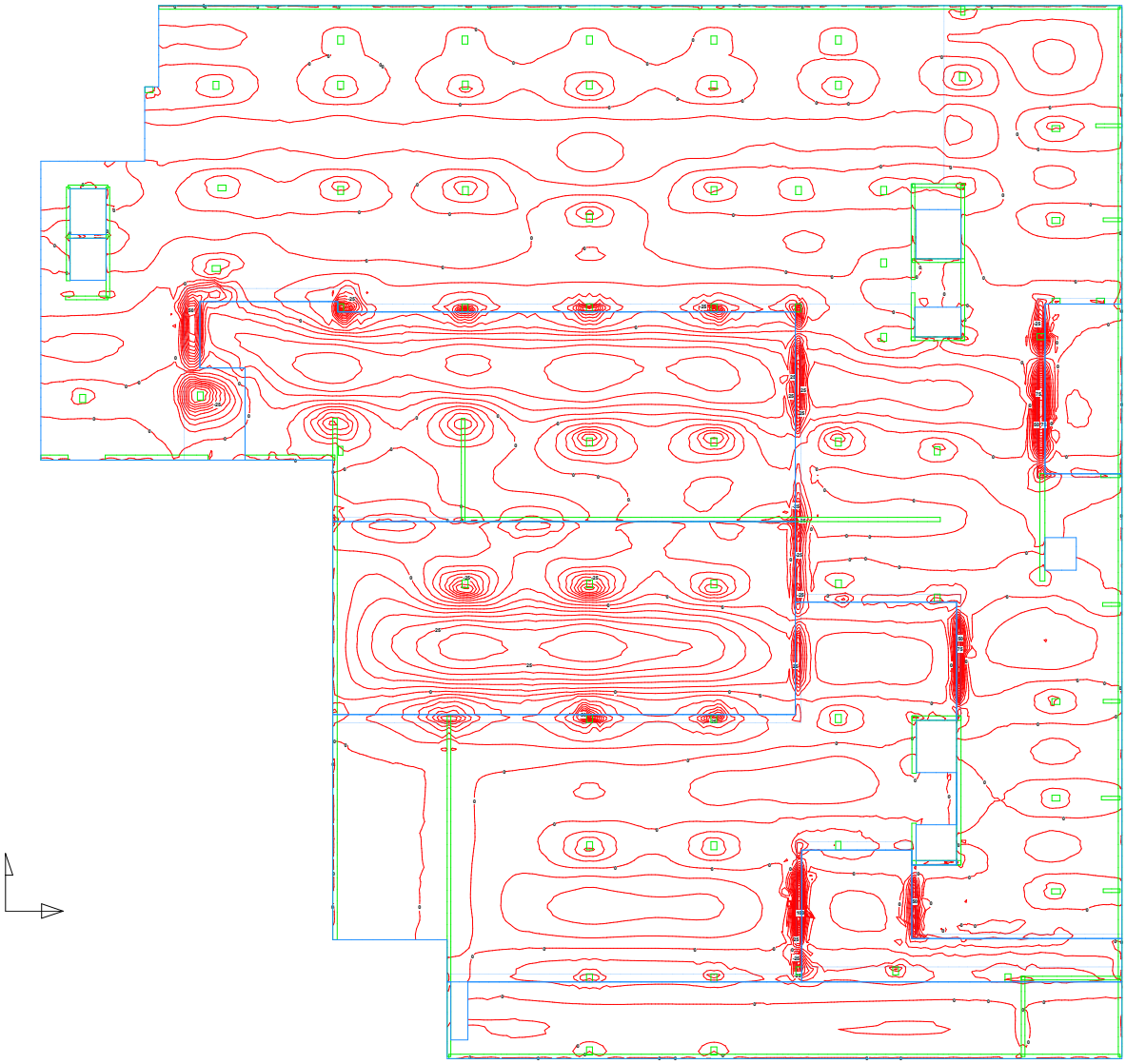
Factored LC: 1.2D + 1.6L + 0.5S: Min Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5S - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Min Fz Contest)



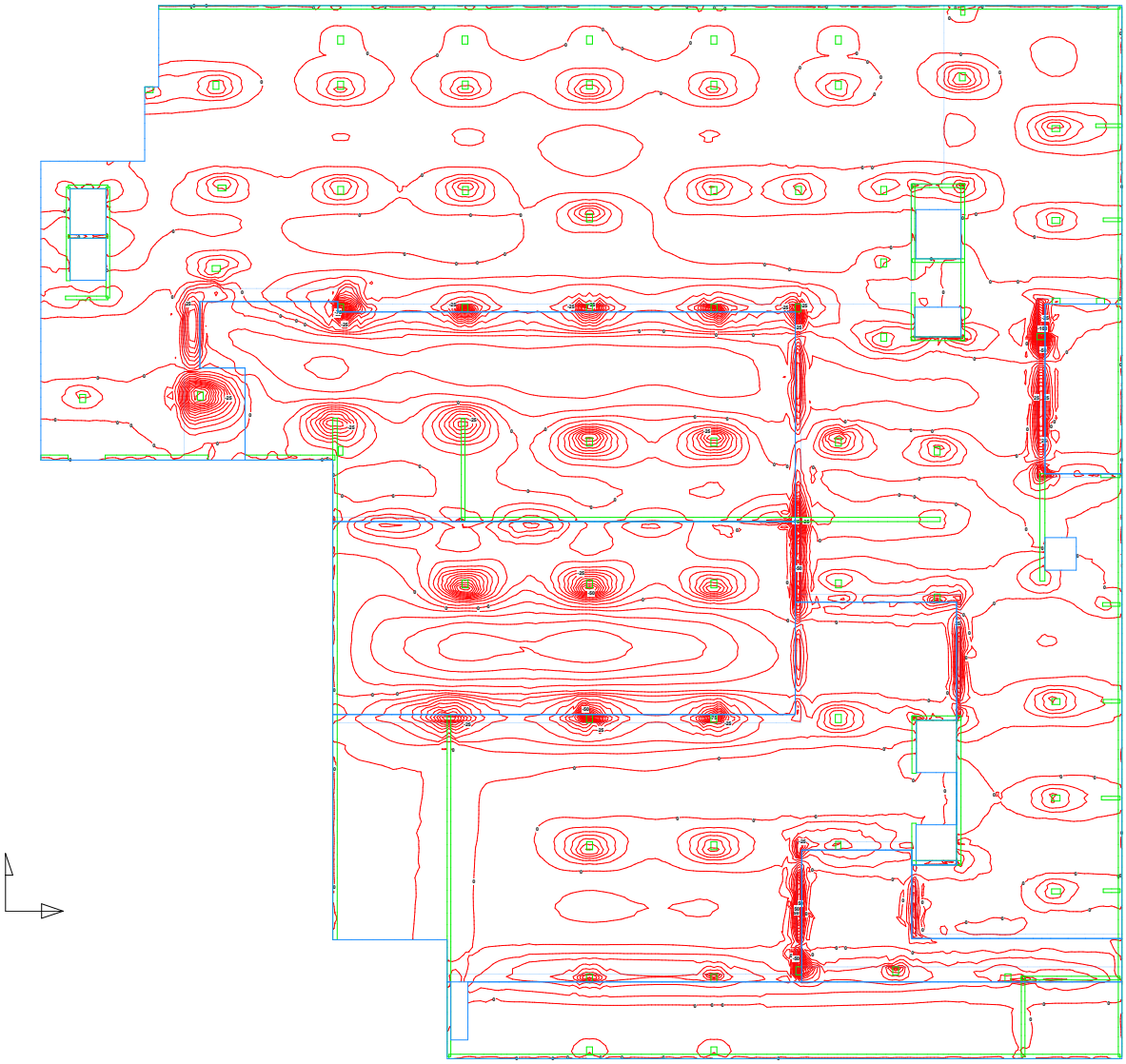
Factored LC: 1.2D + f1L + 1.6S: Max Mx Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Maximum Values) (X-Axis Direction)
One Contour = 5 Kips
Min Value = -69.71 Kips @ (256.5,130.8) Max Value = 127.4 Kips @ (180.9,1.665)



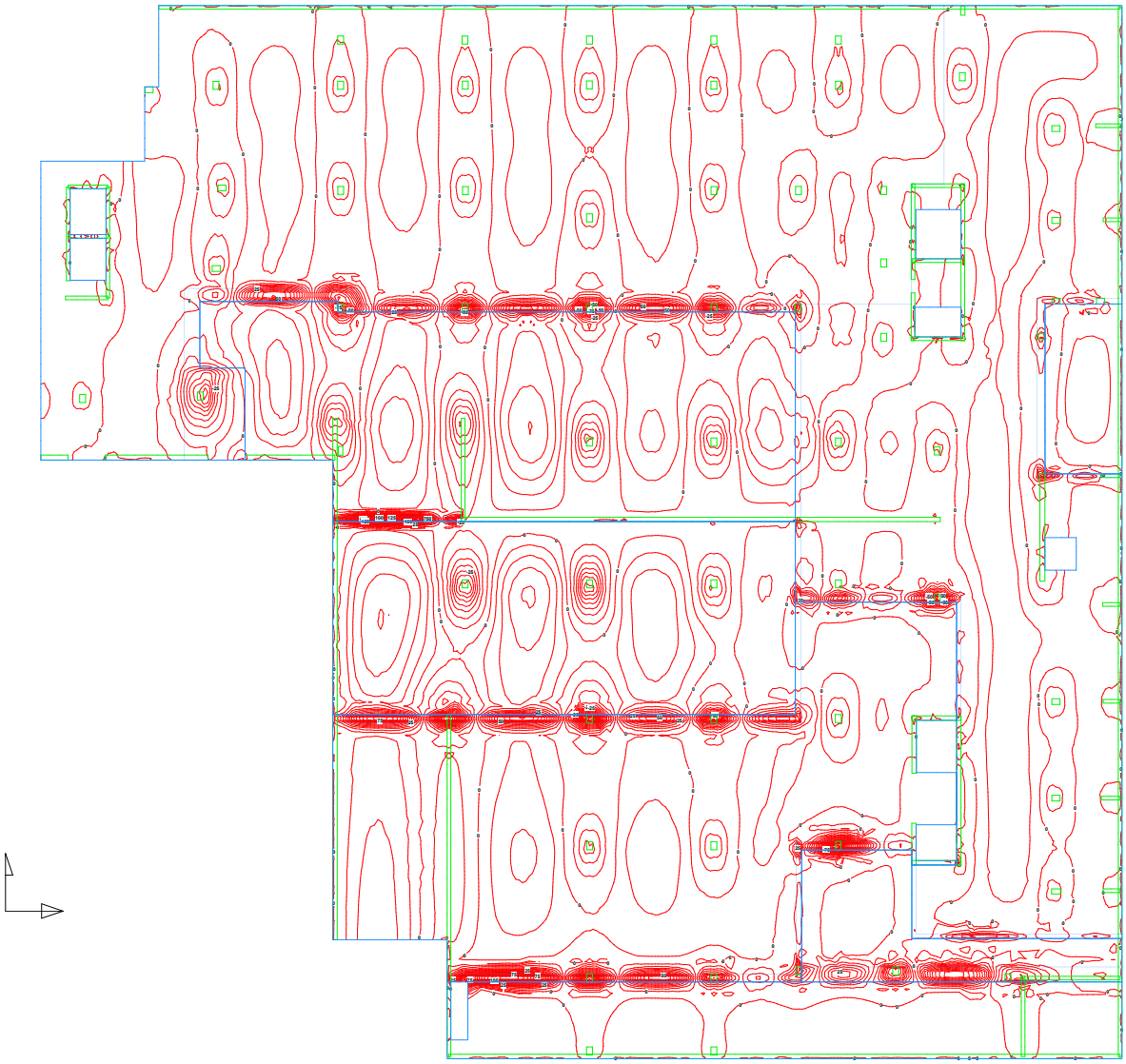
Factored LC: 1.2D + f1L + 1.6S: Min Mx Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:000
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Minimum Values) (K-Axis Direction)
One Contour = 5 Kips
Min Value = -159 Kips @ (236.5,130.8) Max Value = 69.92 Kips @ (189.9,1.085)



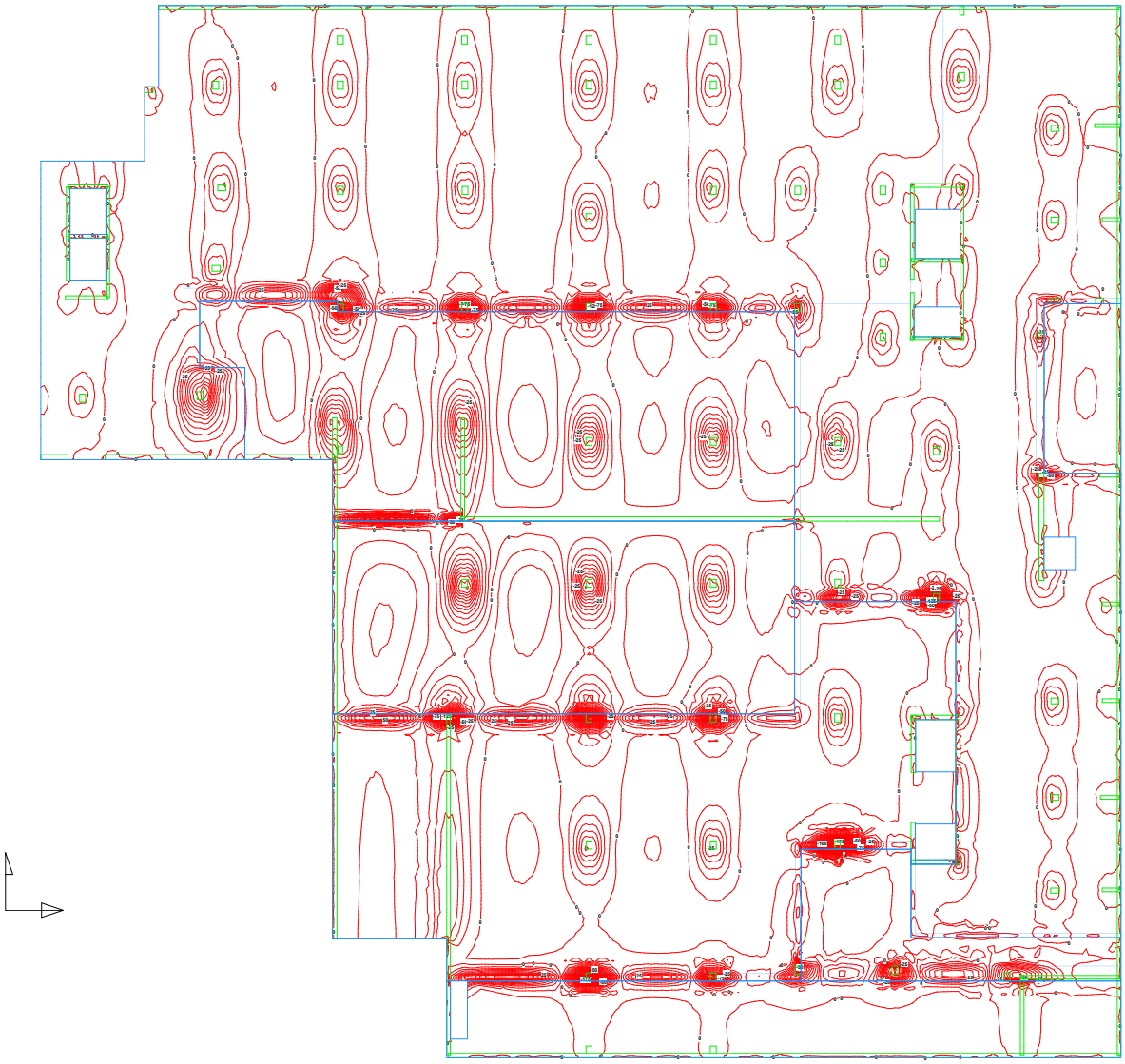
Factored LC: 1.2D + f1L + 1.6S: Max My Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:100
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -120.9 Kips @ (150.2,14.41) Max Value = 169.8 Kips @ (66.63,89.29)



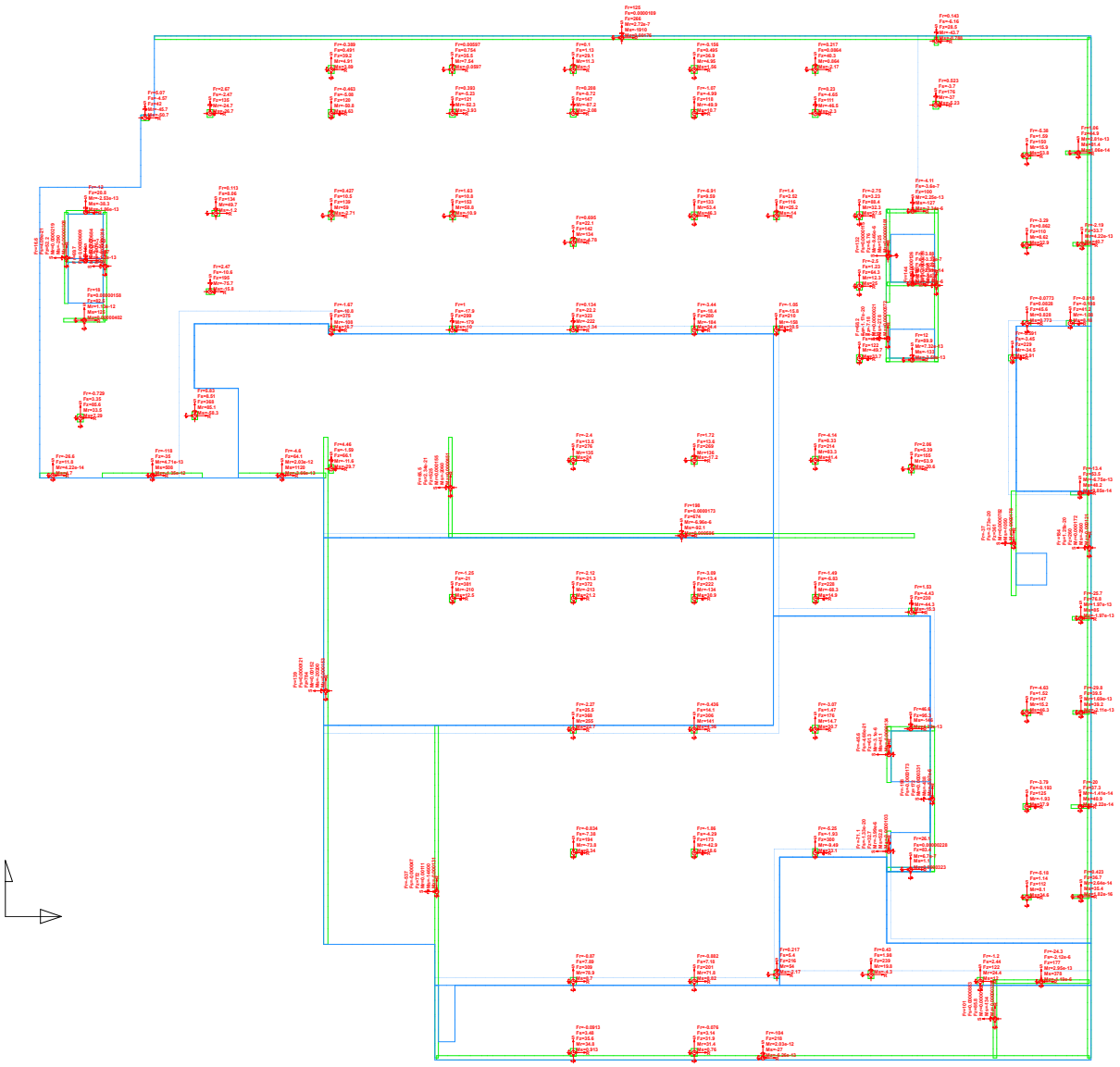
Factored LC: 1.2D + f1L + 1.6S: Min My Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
One Contour = 5 Kips
Min Value = -232.4 Kips @ (150.3,15.41) Max Value = 93.66 Kips @ (66.03,89.29)



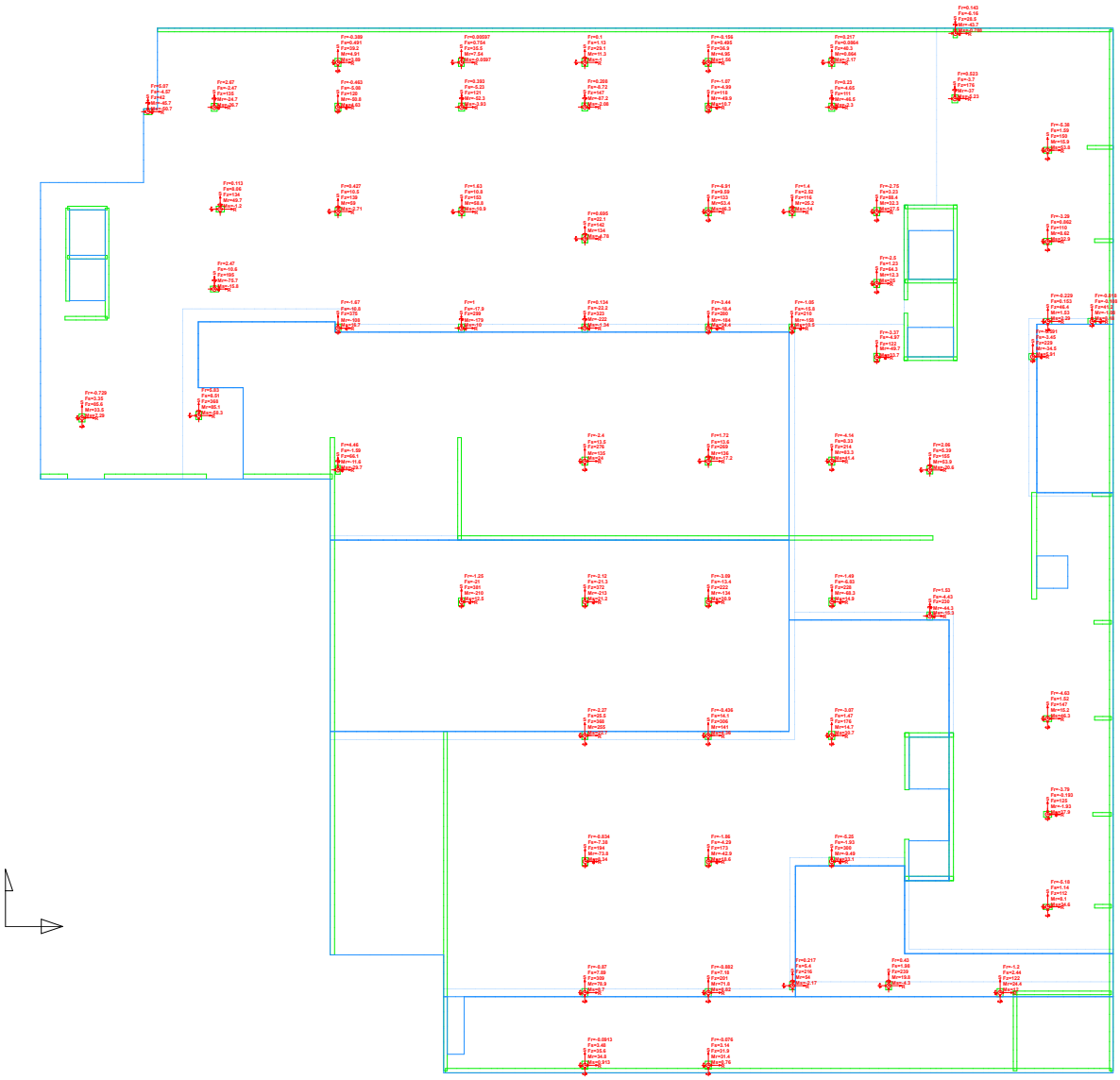
Factored LC: 1.2D + f1L + 1.6S: Std Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:500
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fr,Fx,Fz,Mr,My,Mx)(Standard Context)



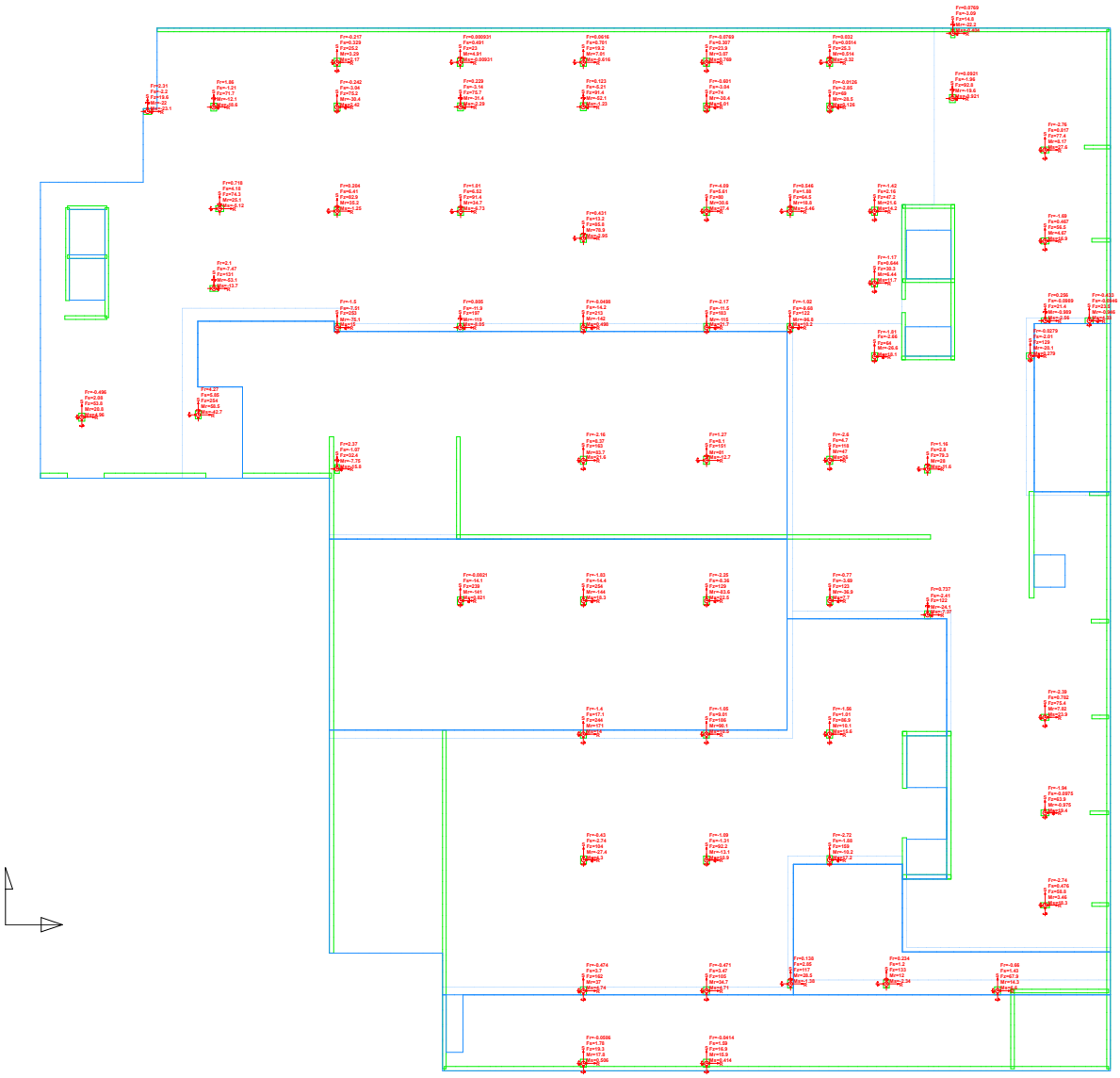
Factored LC: 1.2D + f1L + 1.6S: Max Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:100
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Max Fz Context)



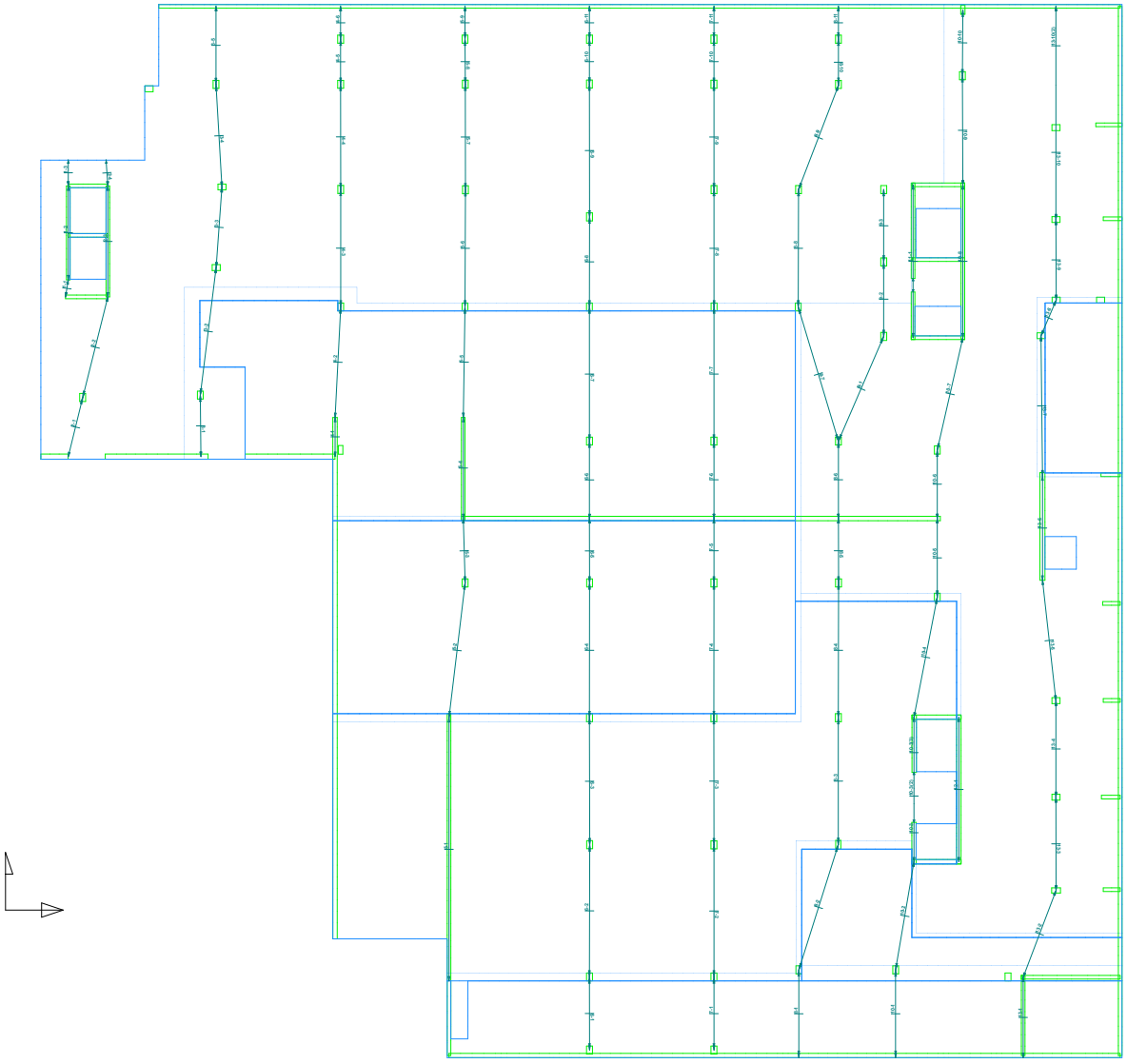
Factored LC: 1.2D + f1L + 1.6S: Min Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:100
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Min Fz Contact)



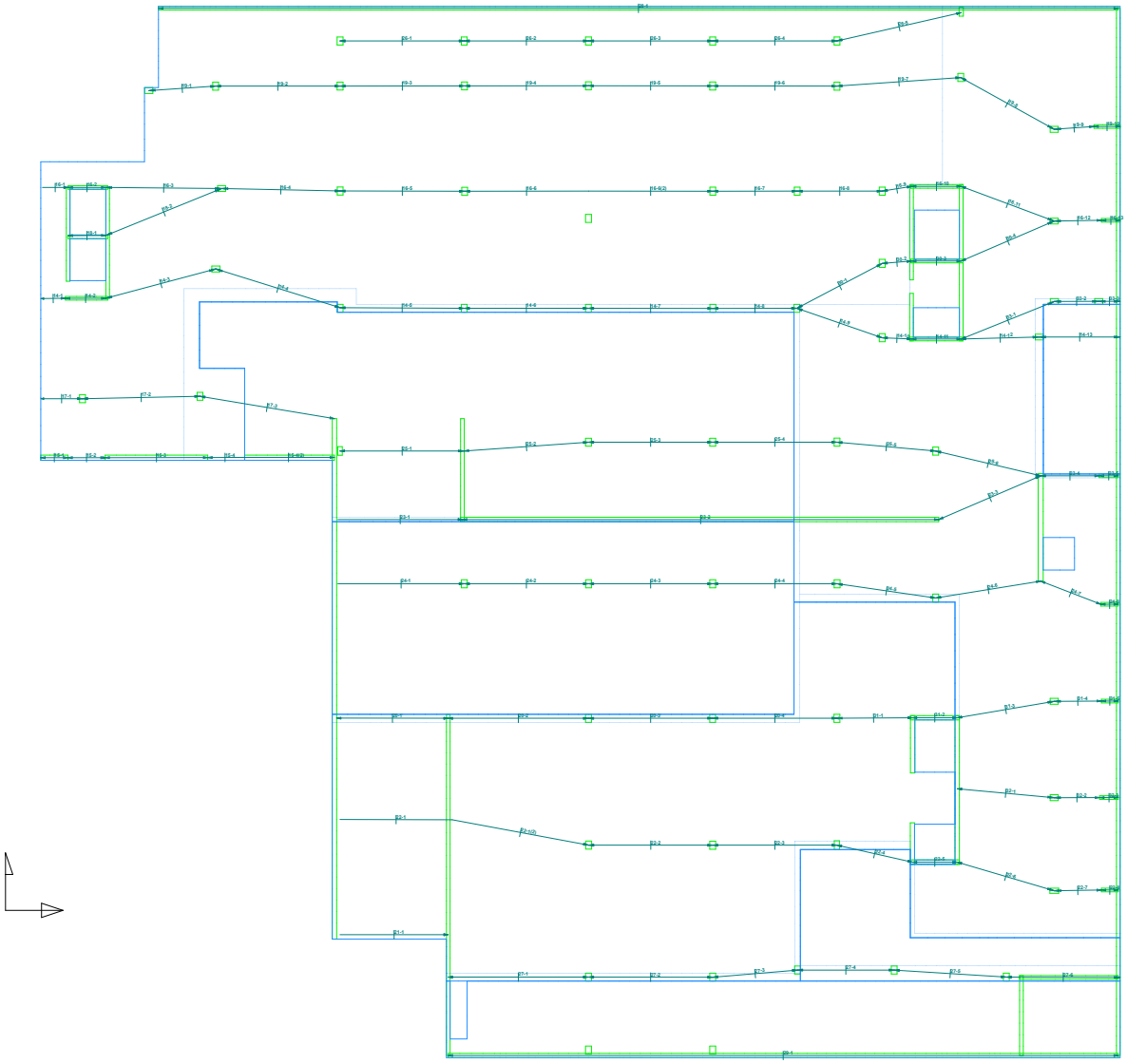
Design Strip: Latitude Design Spans Plan

Design Strip: Latitude SSc; SS Numbers; User Notes; 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 = 1:500



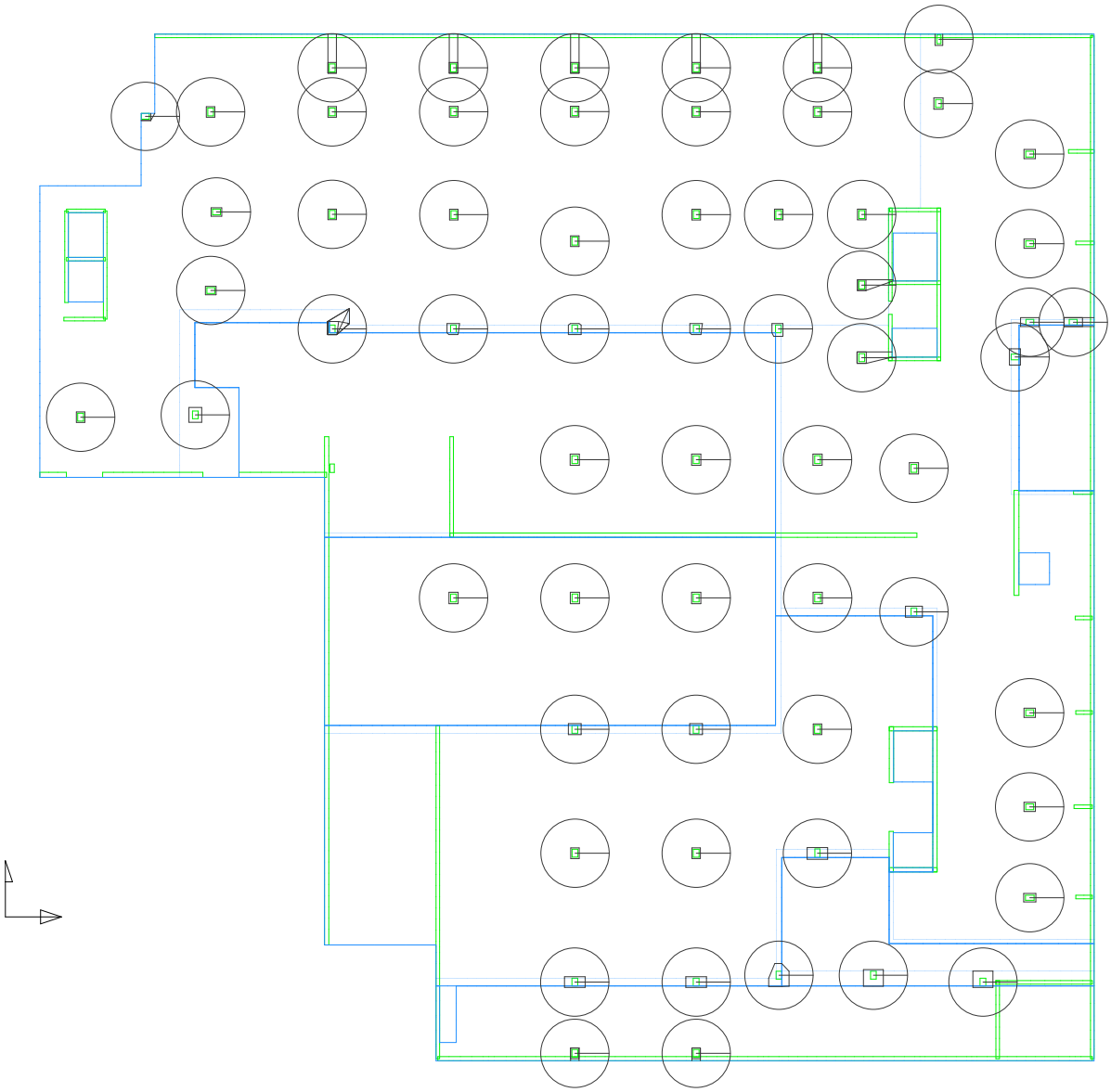
Design Strip: Longitude Design Spans Plan

Design Strip: Longitude SSic; SS Numbers; 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 = 1:500



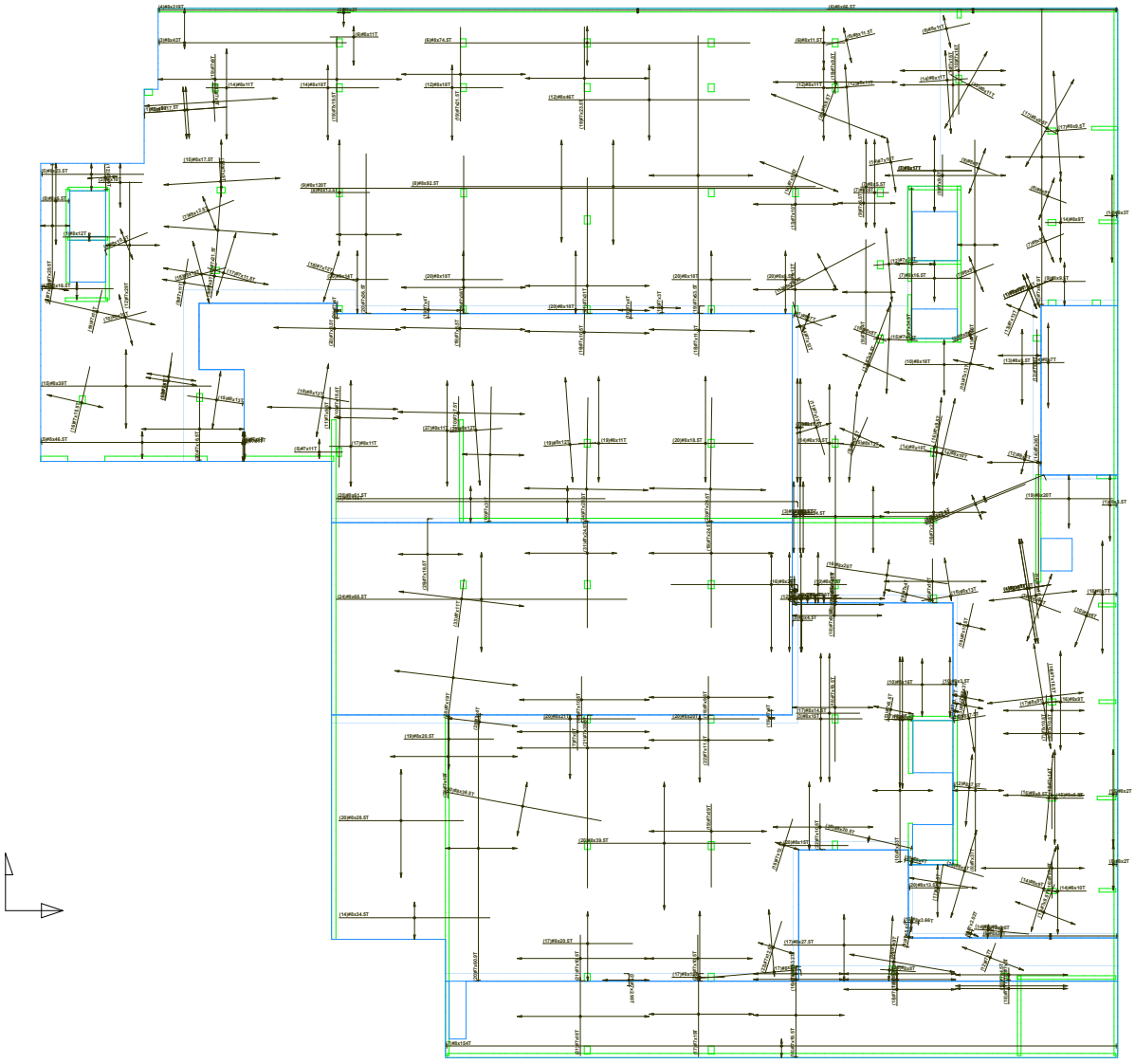
Design Strip: Punching Checks Plan

Design Strip: User Lines; User Notes; User Dimensions; Punching Checks; Punching Check Sections;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



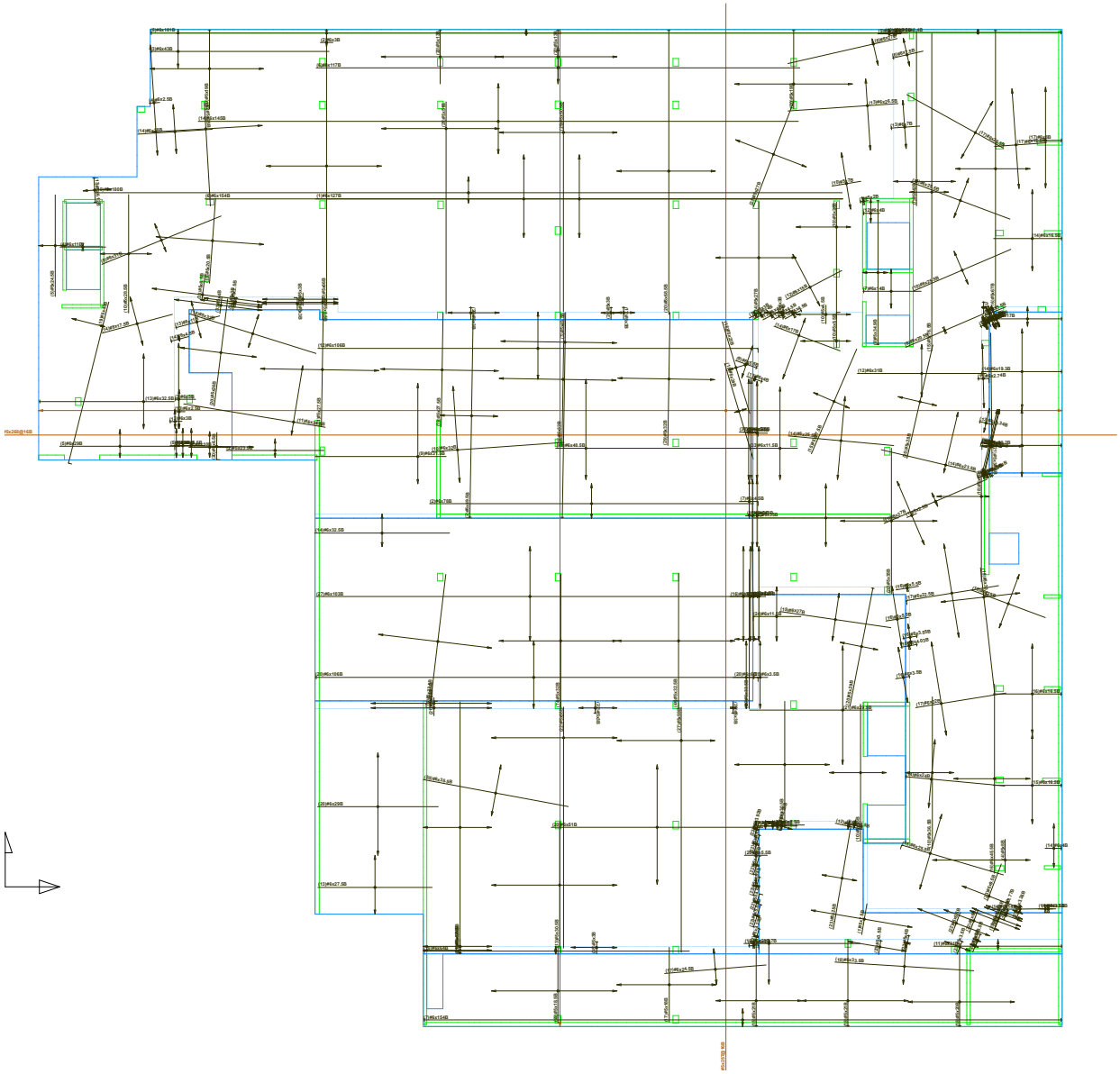
Reinforcement: Top Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Latitude User Concentrated Reinf.; Latitude Program Concentrated Reinf.; Latitude User Distributed Reinf.; Latitude Program Distributed Reinf.; Longitude User Concentrated Reinf.; Longitude Program Concentrated Reinf.; Longitude User Distributed Reinf.; Longitude Program Distributed Reinf.; Top Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Top Face Distributed Reinf.; Both Faces Distributed Reinf.; Concentrated Reinf. Descriptions; Concentrated Reinf. Extent; Distributed Reinf. Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500

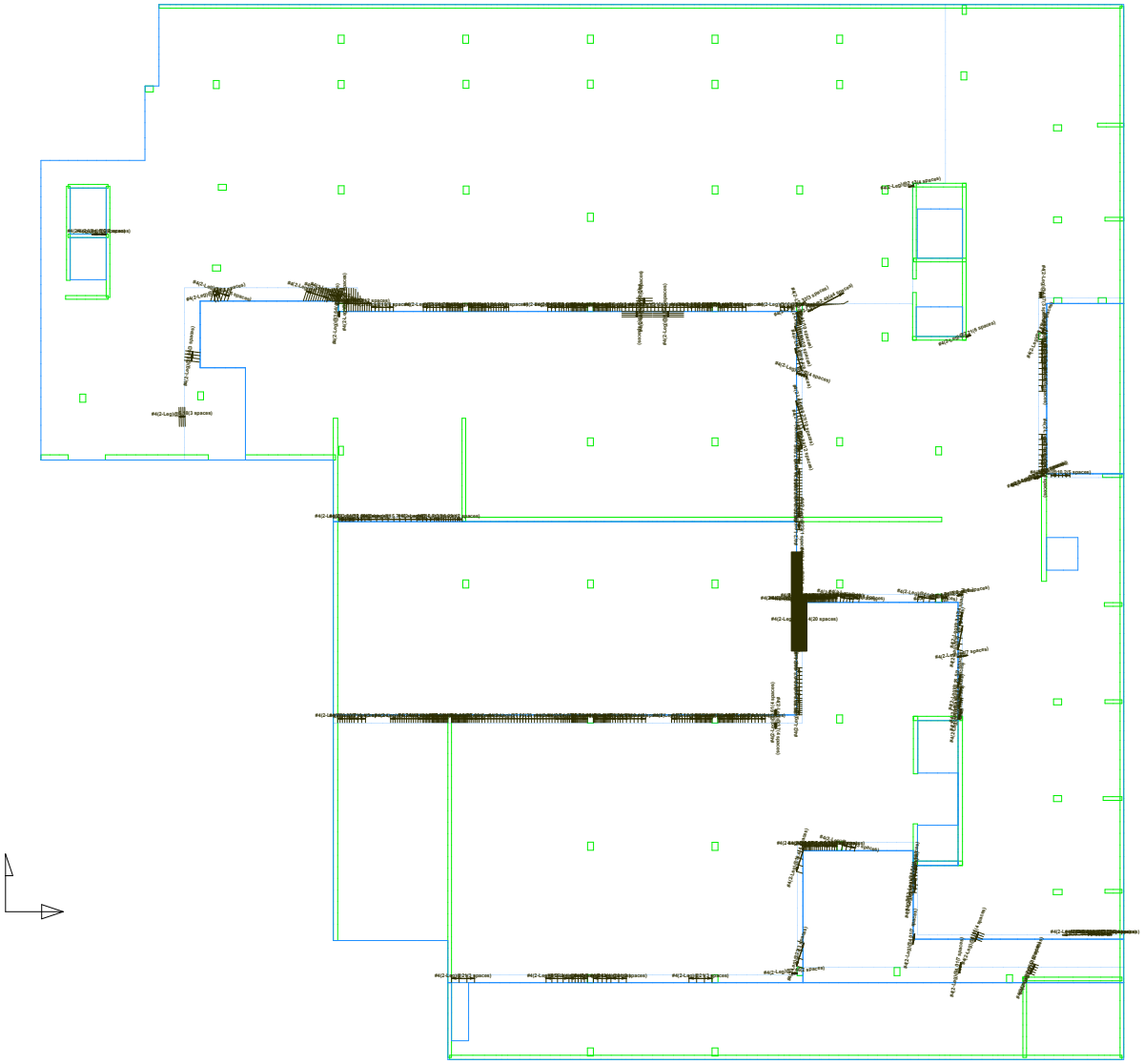


Reinforcement: Bottom Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Latitude User Concentrated Reinf.; Latitude Program Concentrated Reinf.; Latitude User Distributed Reinf.; Latitude Program Distributed Reinf.; Longitude User Concentrated Reinf.; Longitude Program Concentrated Reinf.; Longitude User Distributed Reinf.; Longitude Program Distributed Reinf.; Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Bottom Face Distributed Reinf.; Both Faces Distributed Reinf.; Concentrated Reinf. Descriptions; Concentrated Reinf. Extent; Distributed Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500

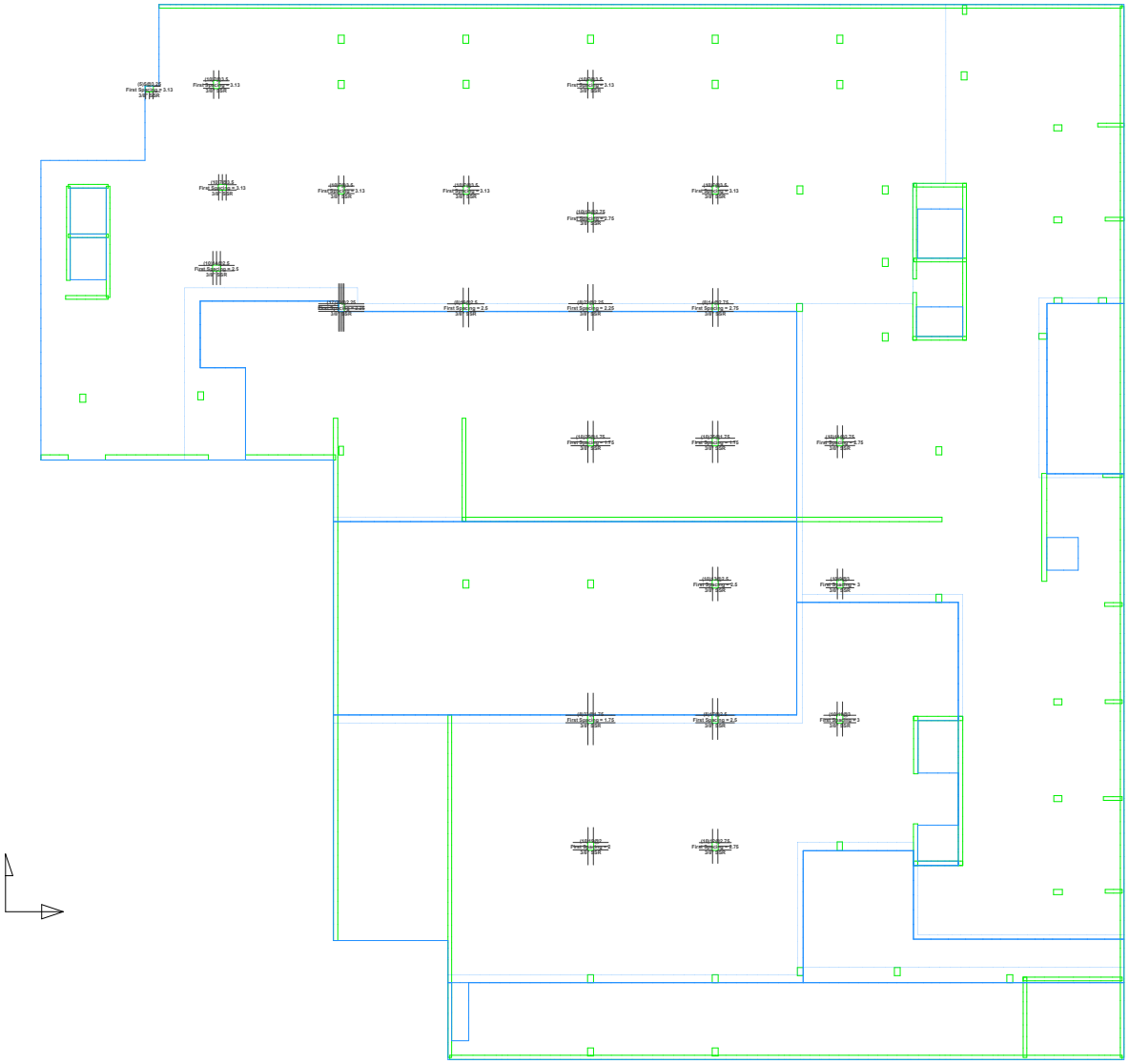


Reinforcement: Shear Bars Plan



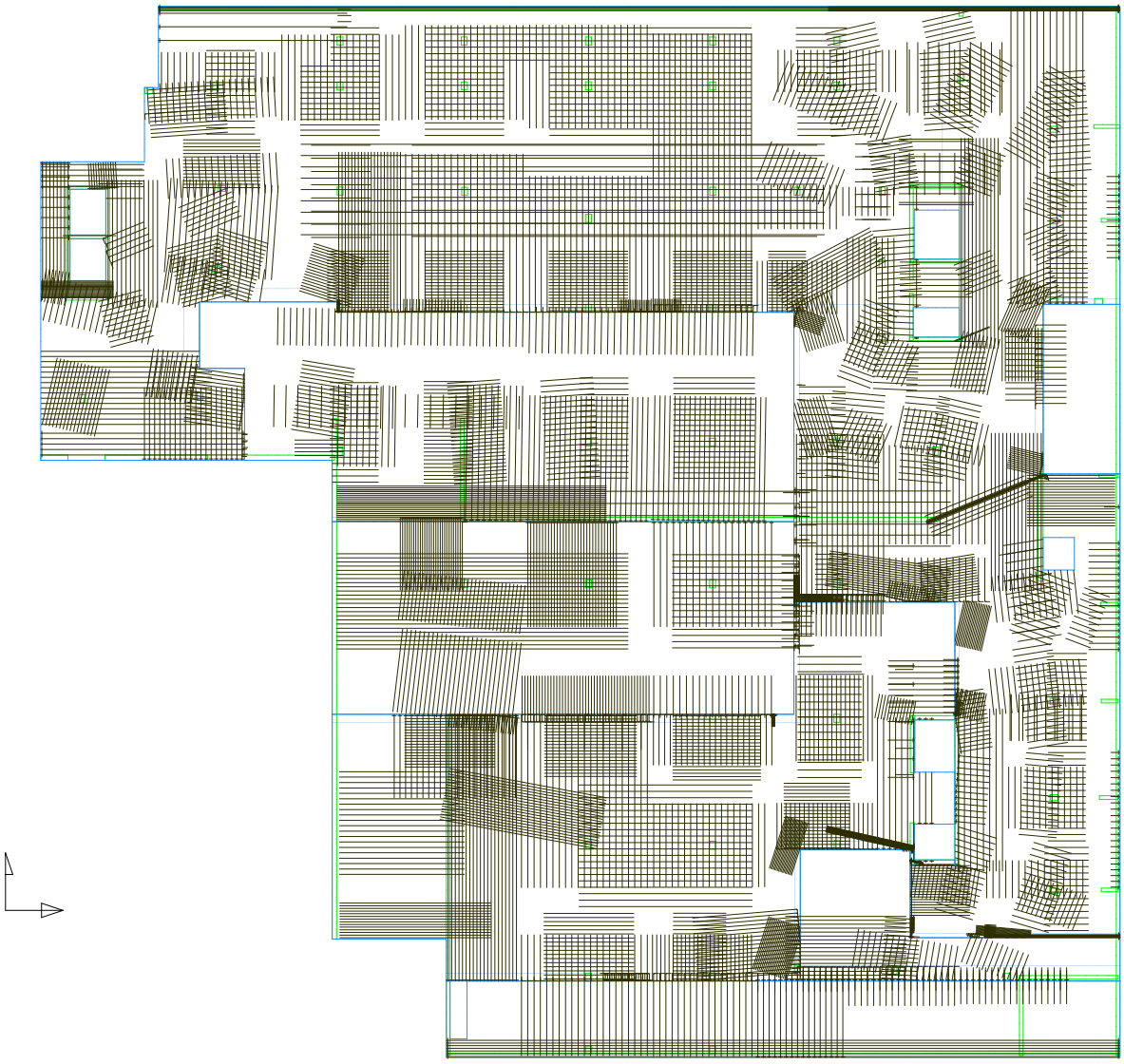
Reinforcement: SSR Plan

Reinforcement: User Lines; User Notes; User Dimensions; Program SSR Callouts; SSR Callout Details; Program SSR Rails;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



Reinforcement: Individual Top Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Longitude User Individual Bars; Longitude Program Individual Bars; Latitude User Individual Bars; Latitude Program Individual Bars; Top Face Individual Bars; Both Faces Individual Bars; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only; Scale = 1:500



Reinforcement: Individual Bottom Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Longitude User Individual Bars; Longitude Program Individual Bars; Latitude User Individual Bars; Latitude Program Individual Bars; Bottom Face Individual Bars; Both Faces Individual Bars;
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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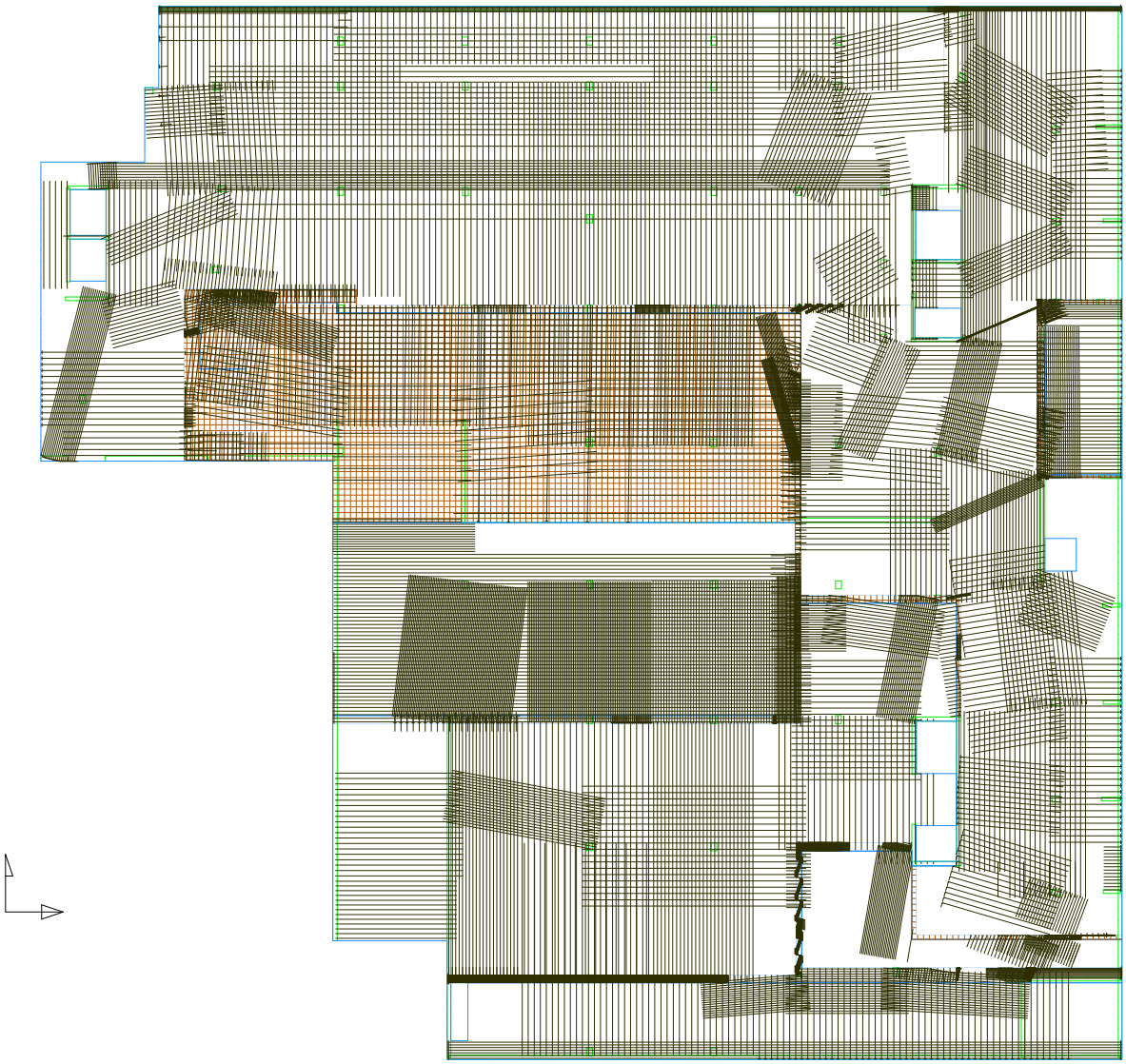
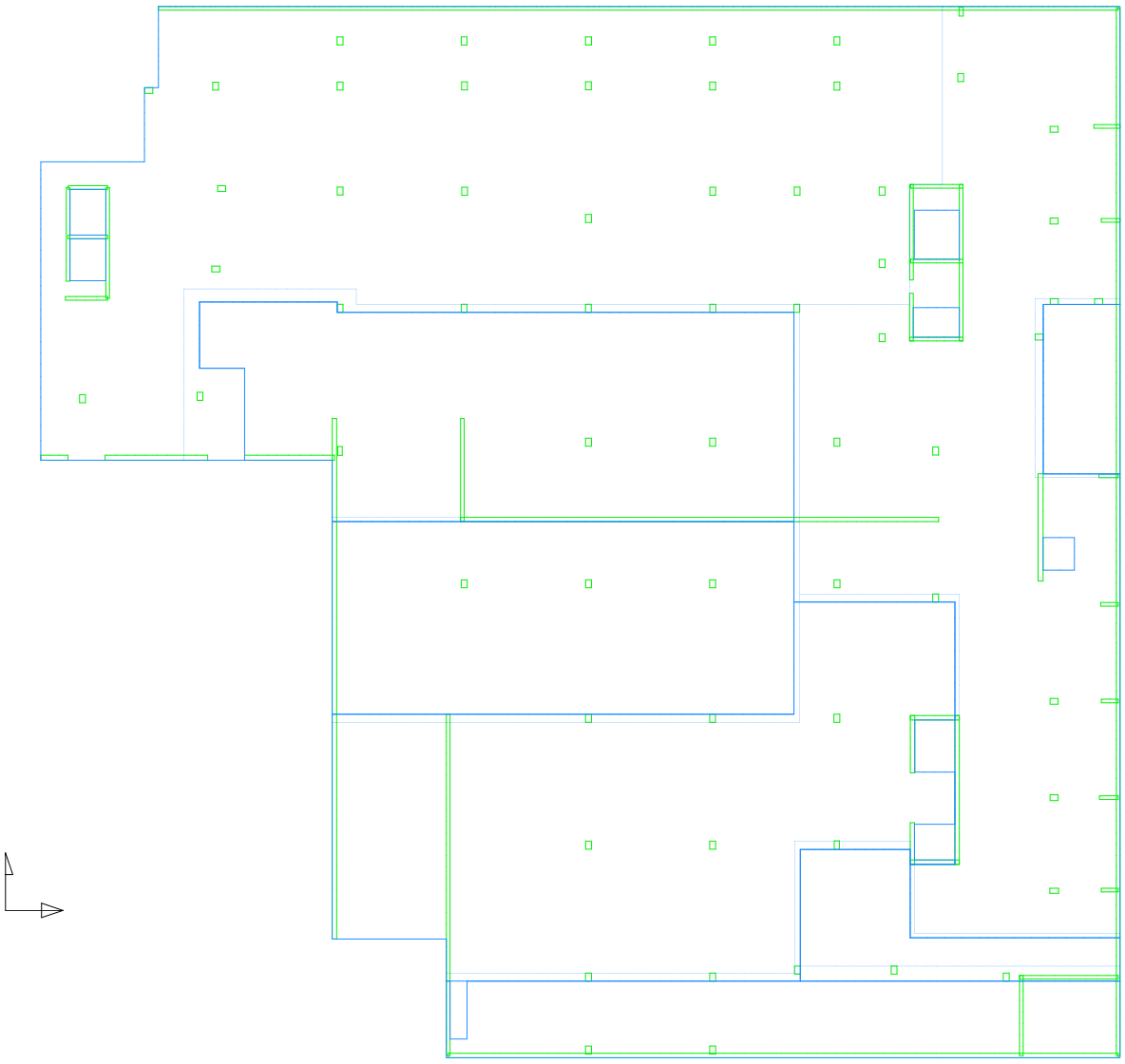


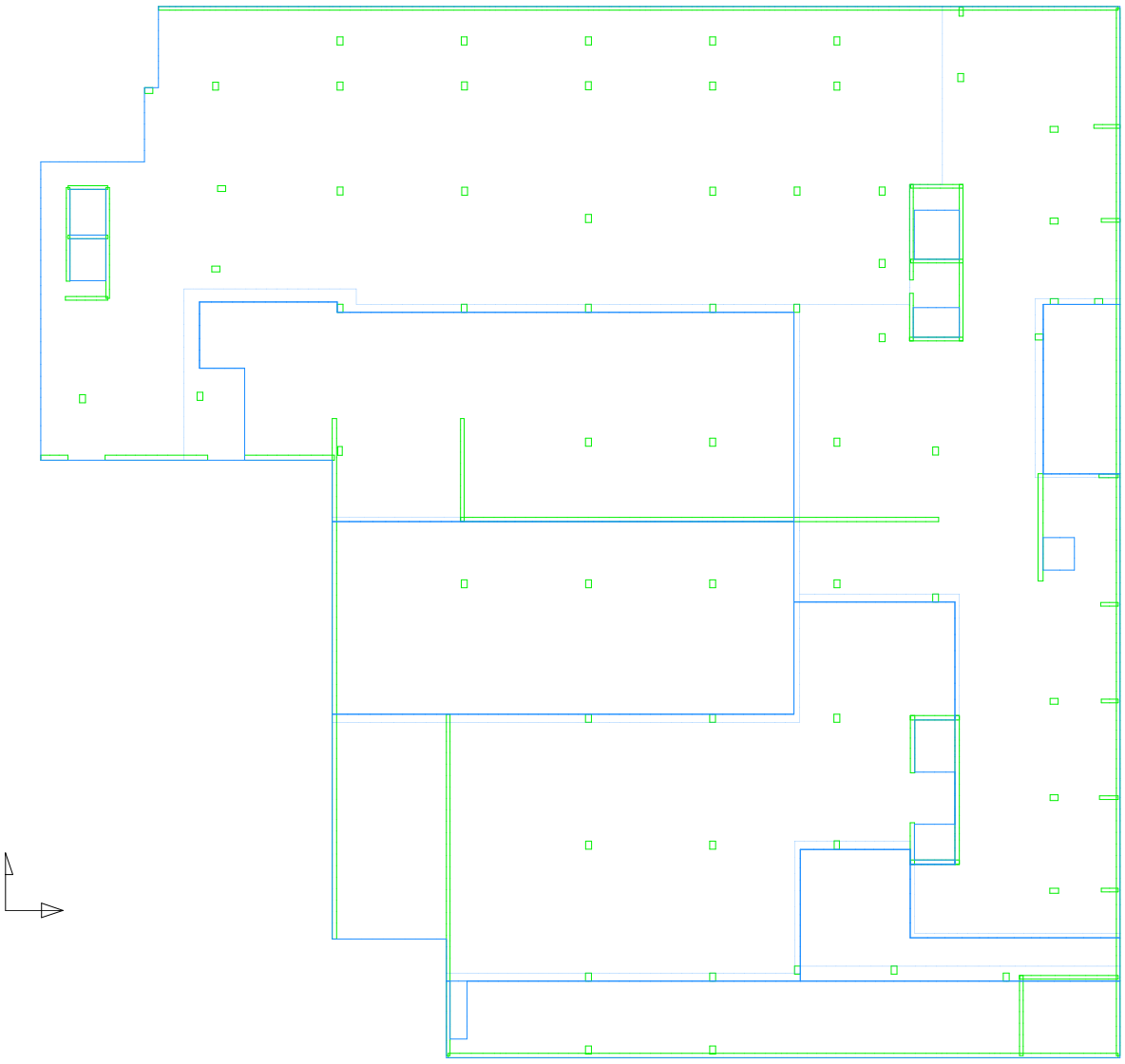
Latitude Tendon Parameters: Standard Plan

Latitude Tendon Parameters; User Lines; User Notes; User Dimensions; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Profile Polyline Ends; Distributed Tendon Profile Area Edge; Distributed Tendon Profile Span Changes; Distributed Tendon Profile Concrete Elevation Change; Tendon Void; Jack Region; Jack Region Hatching; Jack Region Corner Icon; Distributed Tendon Overlap Areas; Banded Tendons; Banded Tendon Description; Banded Tendon Fillet Graphics; Profile Points; Profile Elevation Values; Profile Nod
Element; Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Manual Latitude Tendon; Tendons; Num Strands; Tendon Points; Profile Values;
Scale = 1:500



Manual Latitude Tendon: Standard Plan

Manual Latitude Tendon: User Lines; User Notes; User Dimensions; Tendons; Num Strands; Tendon Inflection Ratio; Tendon Points; Profile Values; Jacks;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Latitude Tendon Parameters: Banded Tendons; Banded Tendon Description; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Overlap Areas; Profile Points; Profile Elevation Values; Profile Nodes; Jack Region;
Scale = 1:500



Longitude Tendon Parameters: Standard Plan

Longitude Tendon Parameters; User Lines; User Notes; User Dimensions; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Profile Polyline Ends; Distributed Tendon Profile Area Edge; Distributed Tendon Profile Span Changes; Distributed Tendon Profile Concrete Elevation Change; Tendon Void; Jack Region; Jack Region Hatching; Jack Region Corner Icon; Distributed Tendon Overlap Areas; Banded Tendons; Banded Tendon Description; Banded Tendon Fillet Graphics; Profile Points; Profile Elevation Values; Profile N
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Manual Longitude Tendon: Tendons; Num Strands; Tendon Points; Profile Values;
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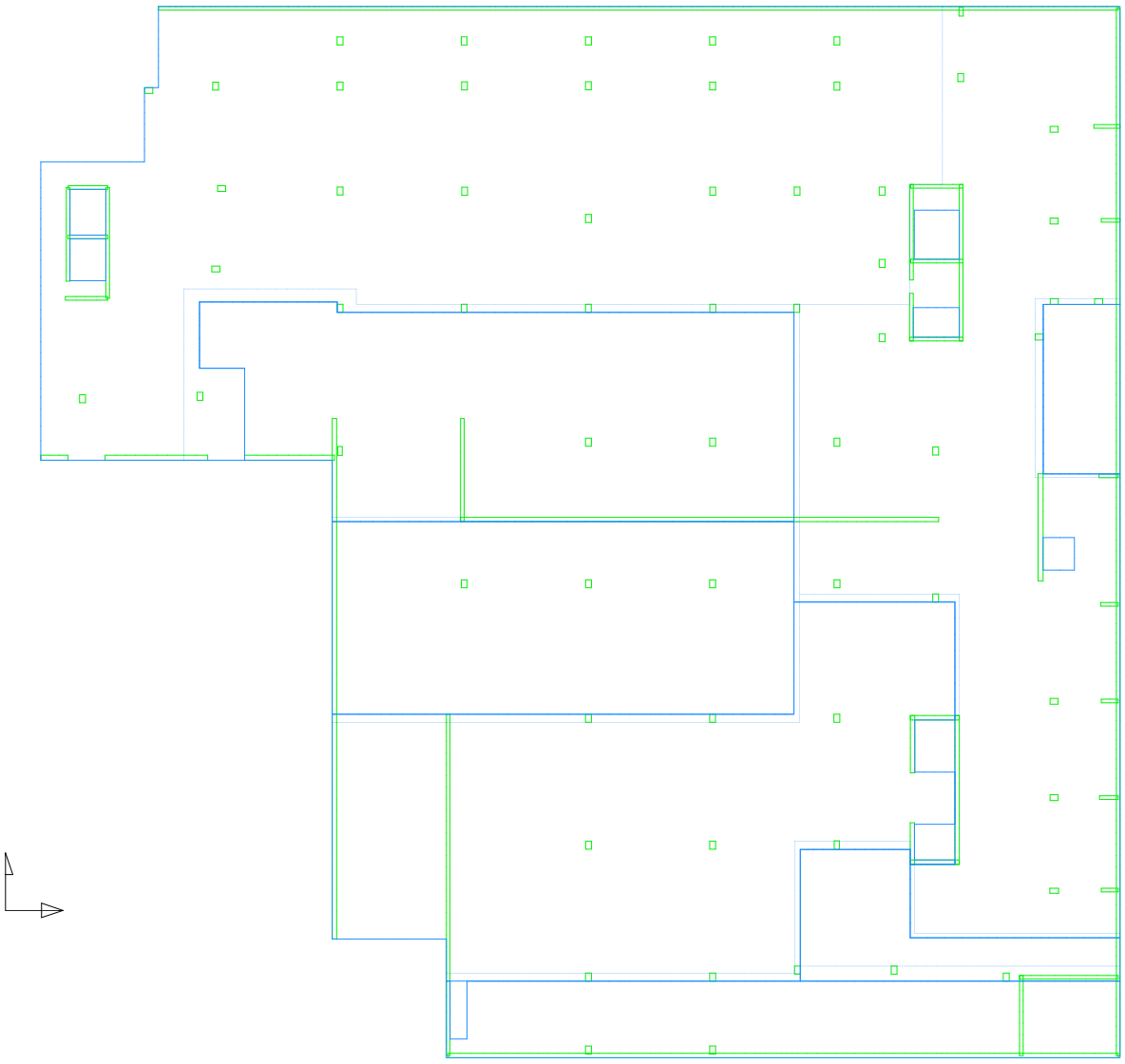
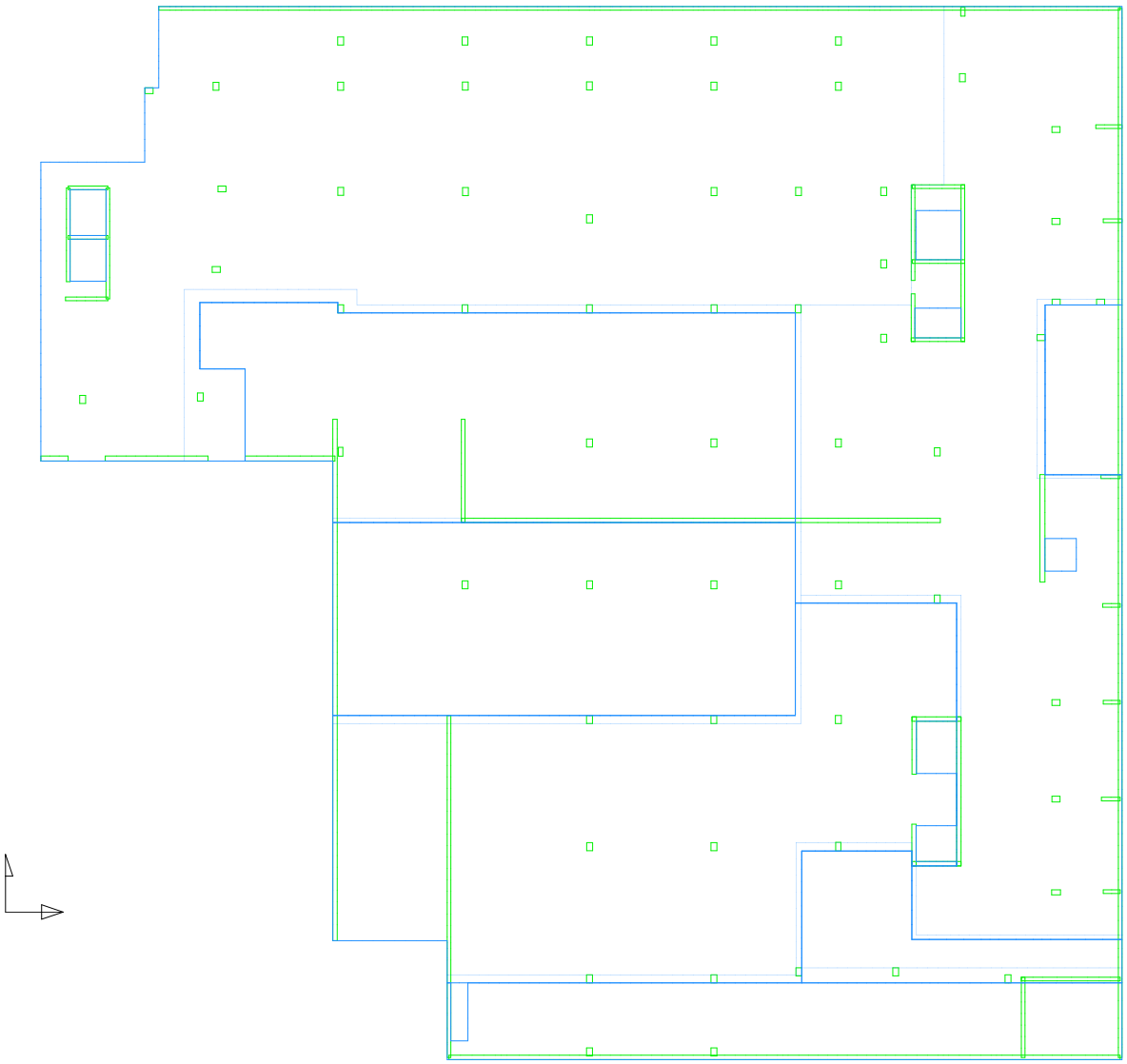


Manual Longitude Tendon: Standard Plan

Manual Longitude Tendon: User Lines; User Notes; User Dimensions; Tendons; Num Strands; Tendon Inflection Ratio; Tendon Points; Profile Values; Jacks;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Longitude Tendon Parameters: Banded Tendons; Banded Tendon Description; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Overlap Areas; Profile Points; Profile Elevation Values; Profile Nodes; Jack Region;
Scale = 1:500

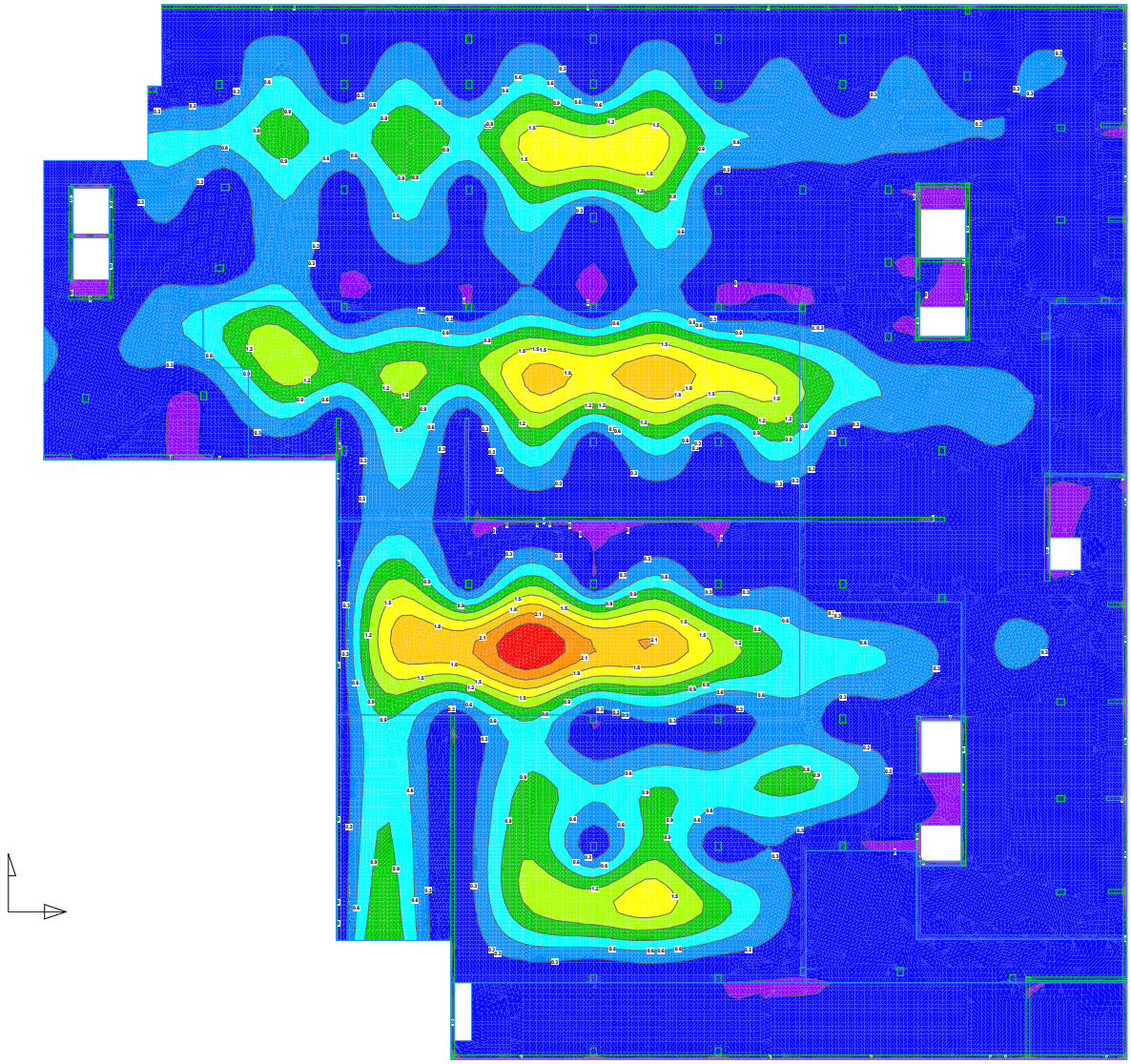


Maximum Short Term Load: Std Deflection Plan

Maximum Short Term Load: 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 = 1:500
Maximum Short Term Load - Vertical Deflection Plot

0 0.3 0.6 0.9 1.2 1.5 1.8 2.1 2.4

Min Value = -0.09156 inches @ (74.6,68.6) Max Value = 2.738 inches @ (116.1,60.83)

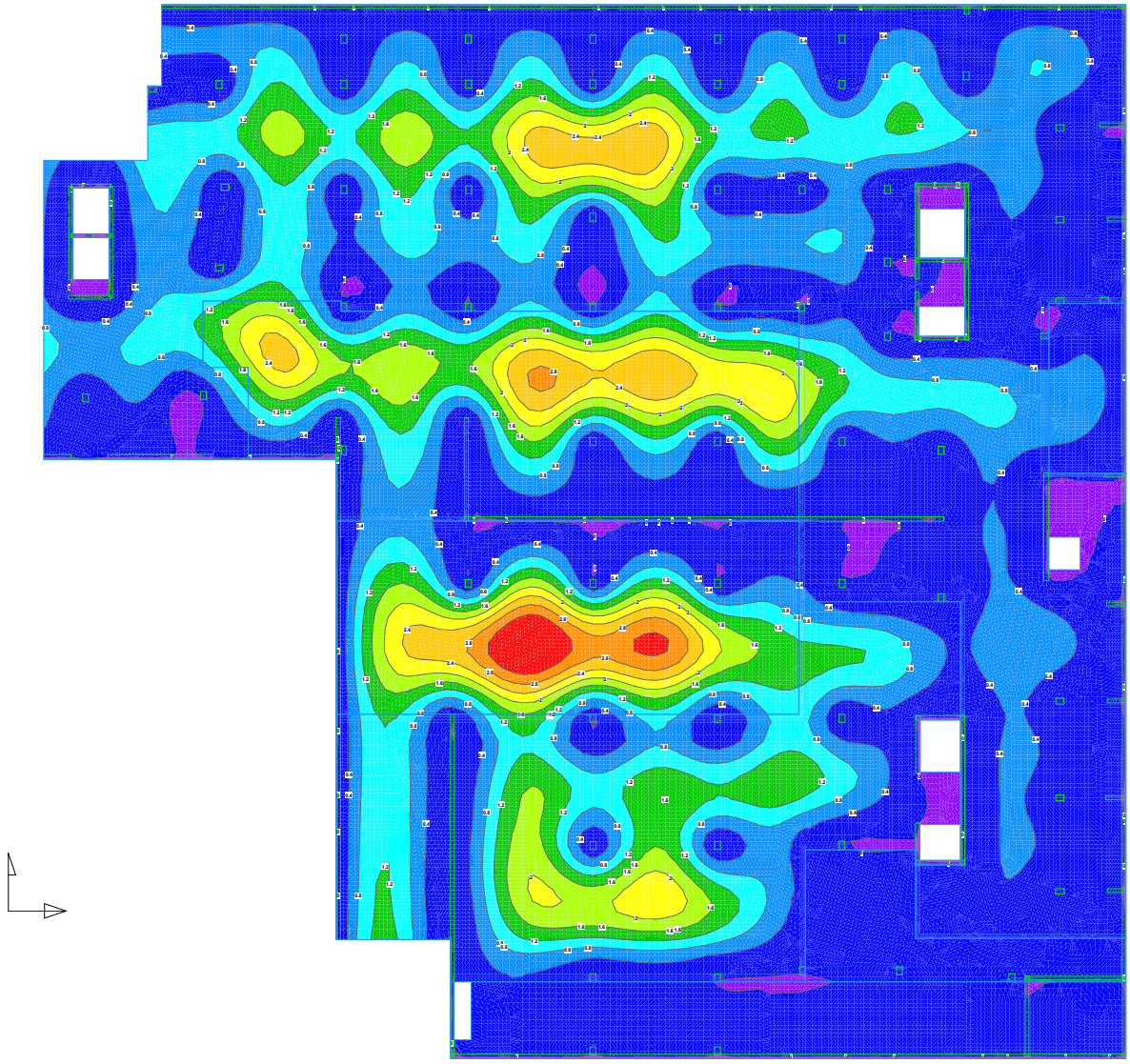


Sustained Load: Std Deflection Plan

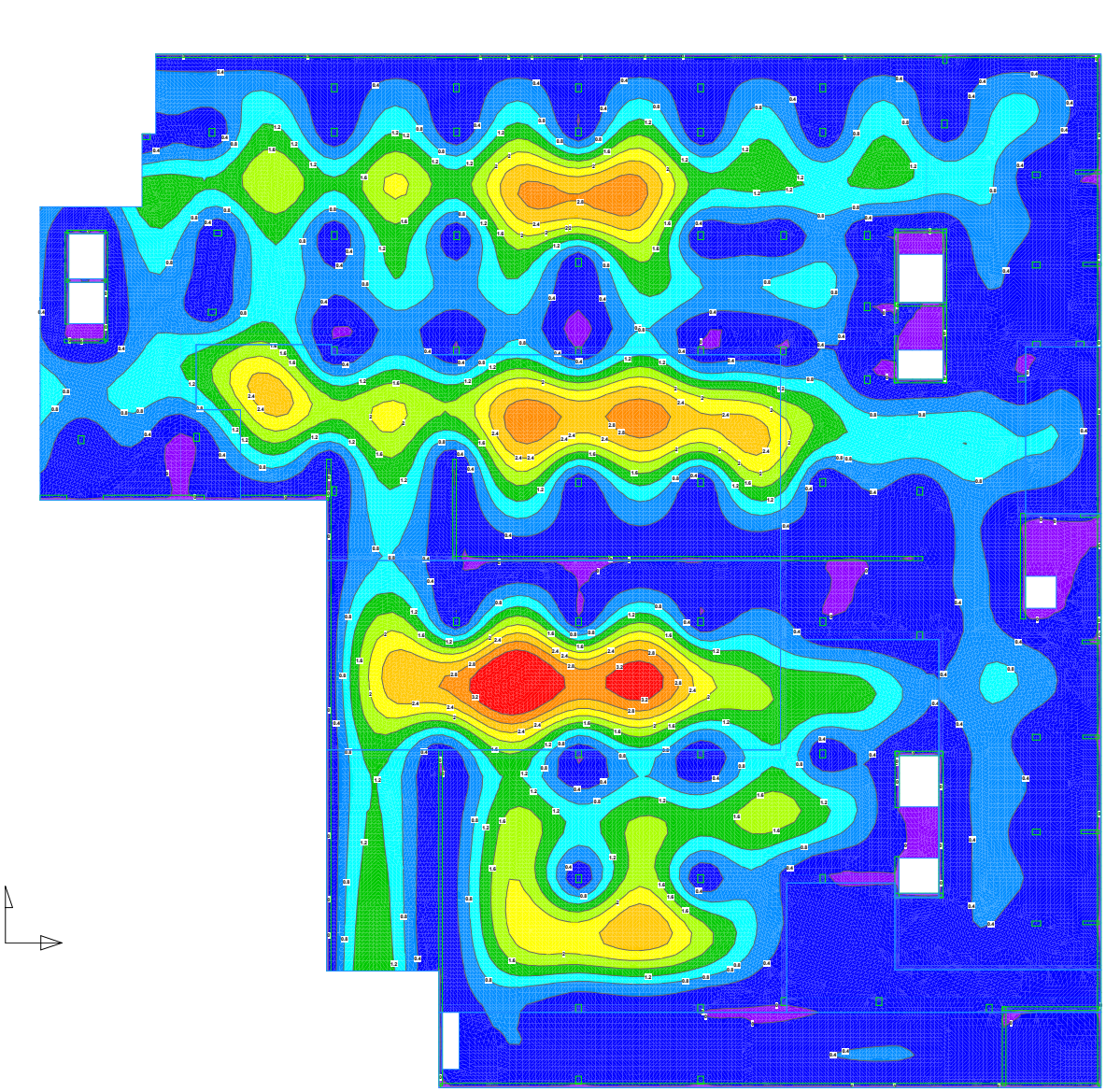
Sustained Load: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500
Sustained Load - Vertical Deflection Plot

0 0.4 0.8 1.2 1.6 2 2.4 2.8 3.2

Min Value = -0.1333 inches @ (10.0,143.0) Max Value = 3.831 inches @ (116.1,60.0)

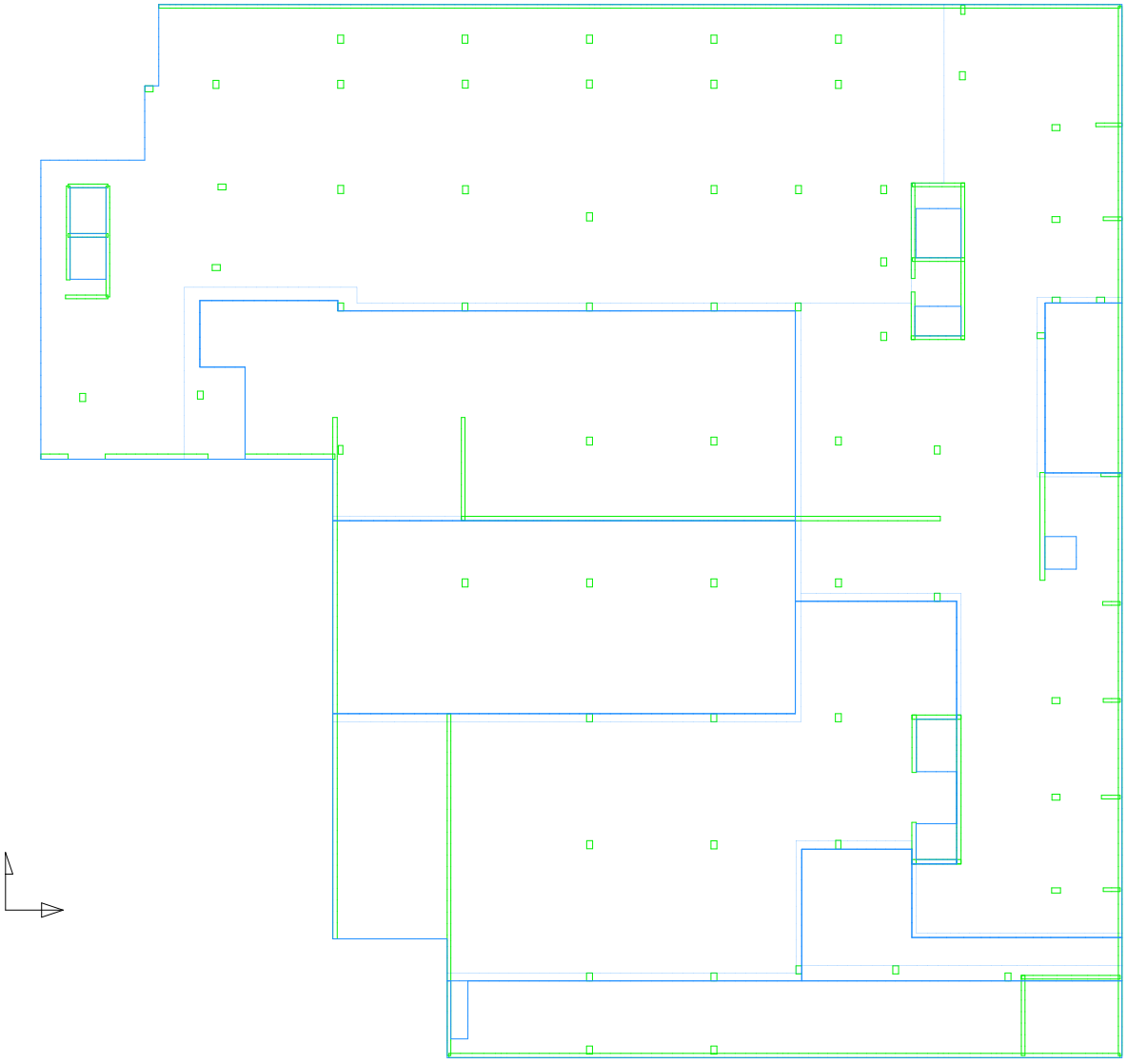


Final Instantaneous Load: Std Deflection Plan



Additional Mass Loading: All Loads Plan

Additional Mass Loading: User Lines; User Notes; User Dimensions; Mass Point Loads; Mass Point Load Icons; Mass Point Load Values; Mass Line Loads; Mass Line Load Icons; Mass Line Load Values; Mass Area Loads; Mass Area Load Icons; Mass 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 = 1:500



Vibration Analysis: Excitation Areas Plan

Vibration Analysis; User Lines; User Notes; User Dimensions; Vibration Excitation Area; Vibration Excitation Area Hatching;
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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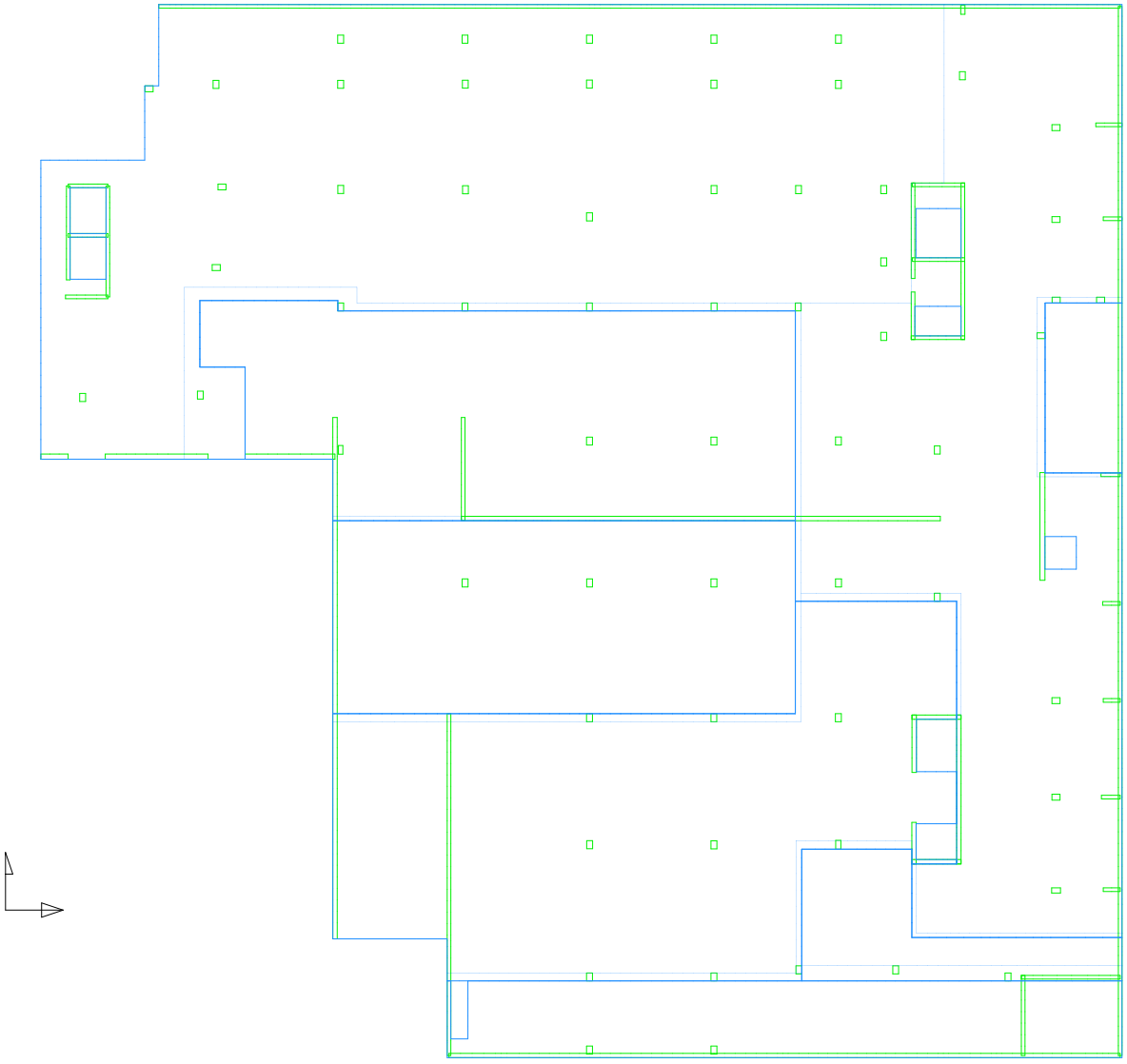
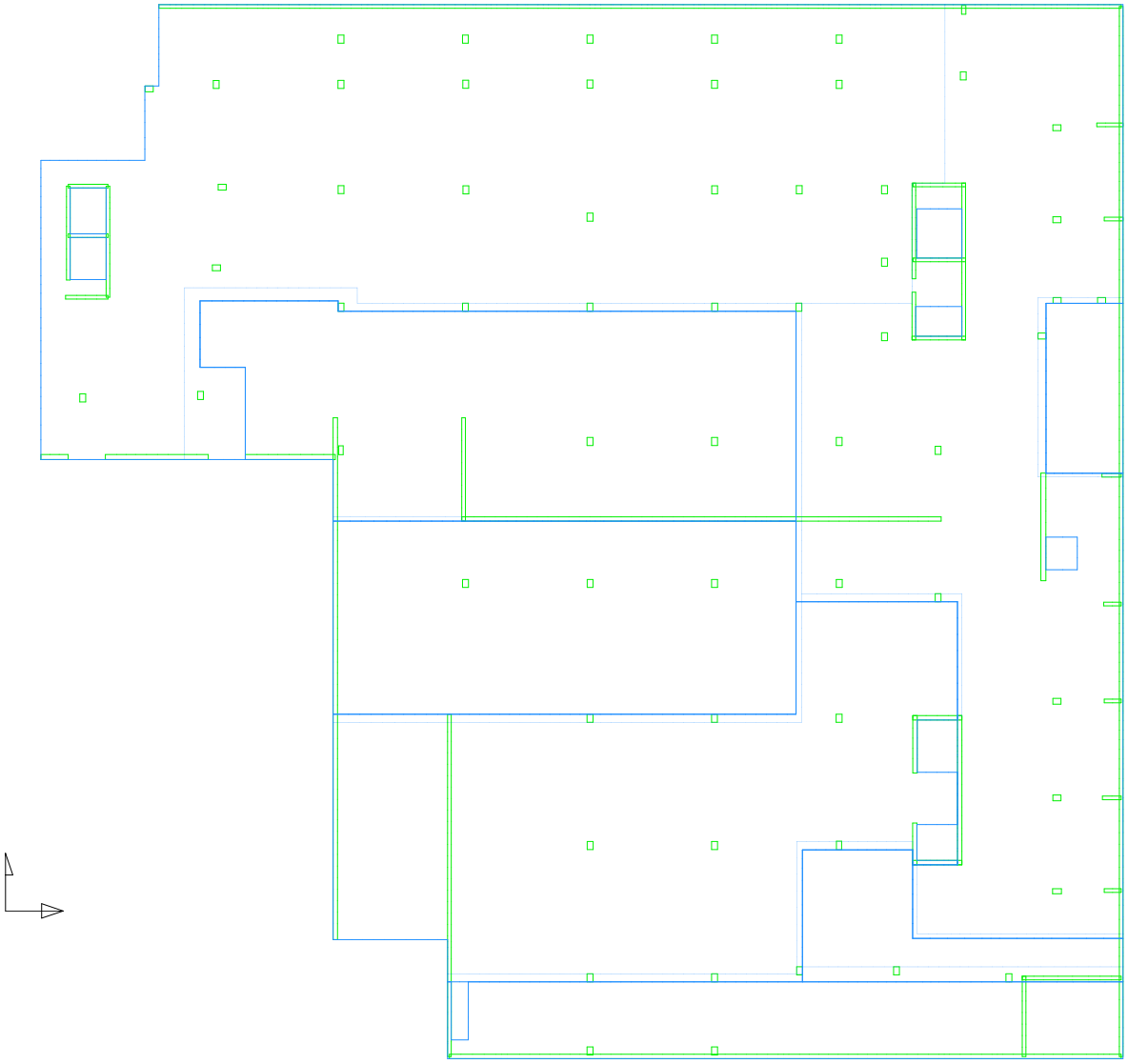


Vibration Analysis: Max RMS Velocity Plan

Vibration Analysis: 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 = 1:500
Vibration Analysis - (Vertical RMS Velocity Plot) (Maximum Values)

-0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4

Min Value = 0 ft/sec @ (0,0) Max Value = 0 ft/sec @ (0,0)

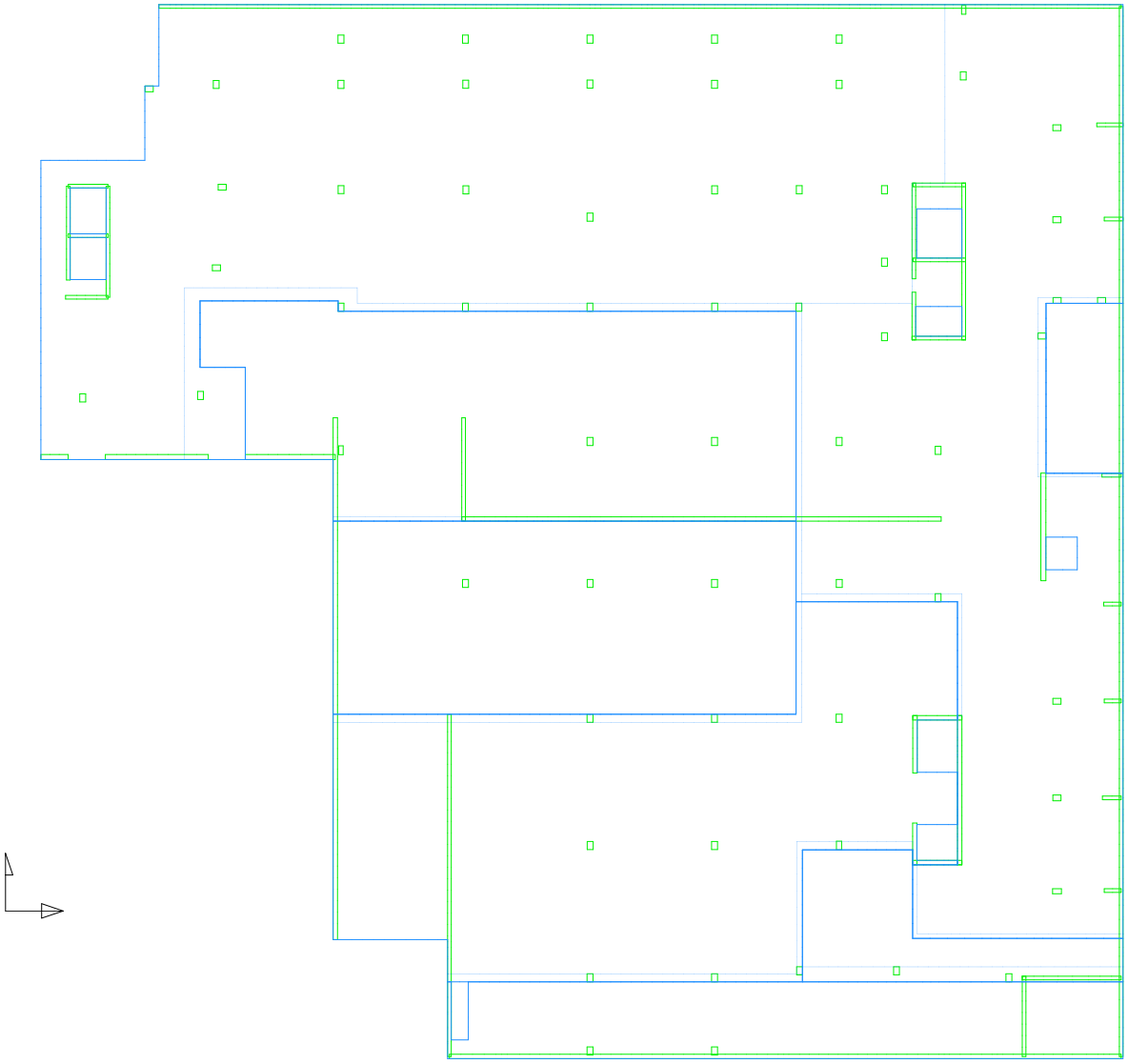


Vibration Analysis: Max RMS Acceleration Plan

Vibration Analysis: 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 = 1:500
Vibration Analysis - (Vertical RMS Acceleration Plot) (Maximum Values)

-0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4

Min Value = 0 ft/sec² @ (0,0) Max Value = 0 ft/sec² @ (0,0)

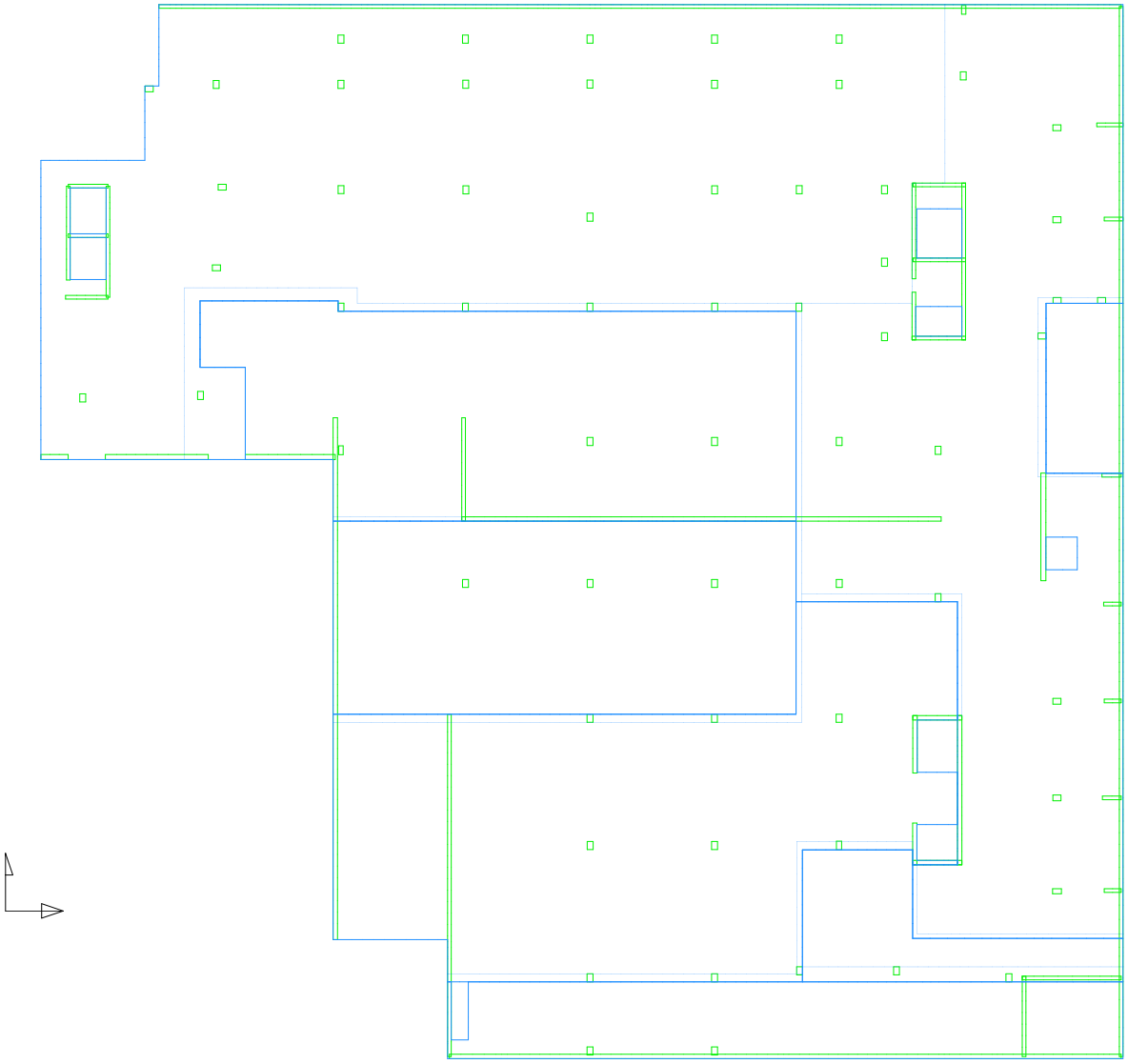


Vibration Analysis: Max Response Factor Plan

Vibration Analysis: 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 = 1:500
Vibration Analysis - (Vertical Response Factor Plot) (Maximum Values)

-0.4 -0.3 -0.2 -0.1 0 0.1 0.2 0.3 0.4

Min Value = 0 @ (0,0) Max Value = 0 @ (0,0)



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;
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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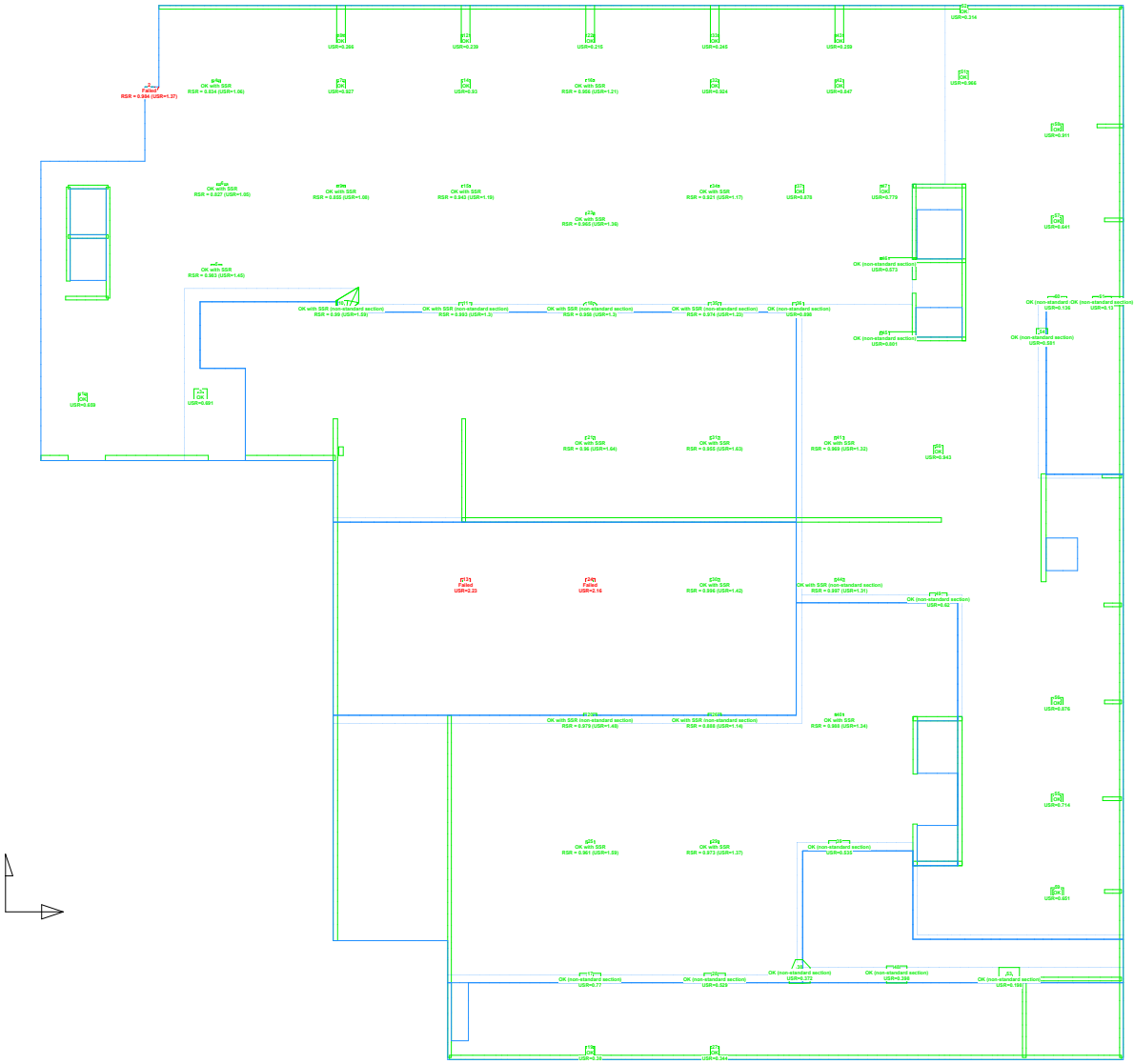
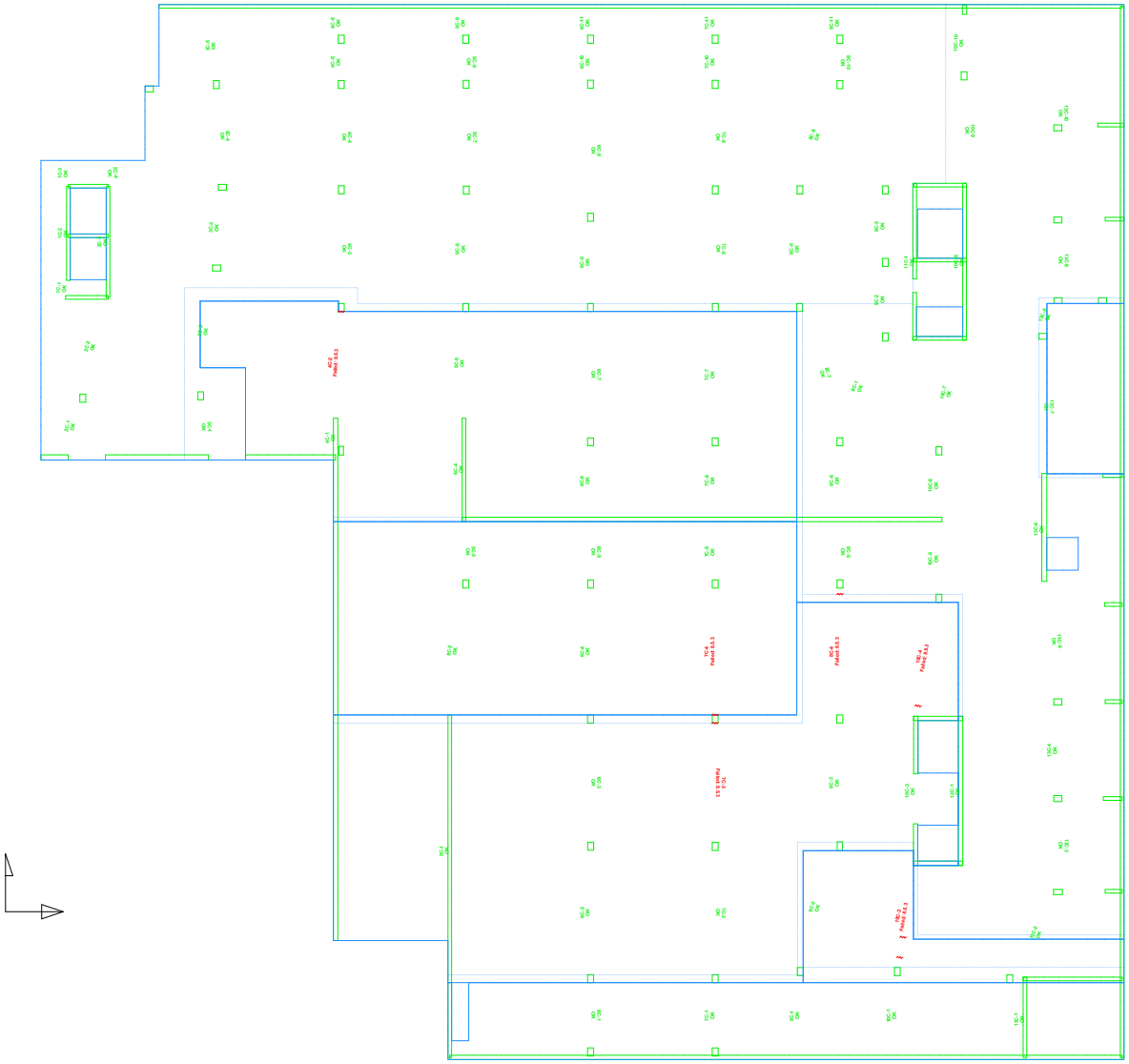


Design Status: Latitude Status Plan

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;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



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;
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.;
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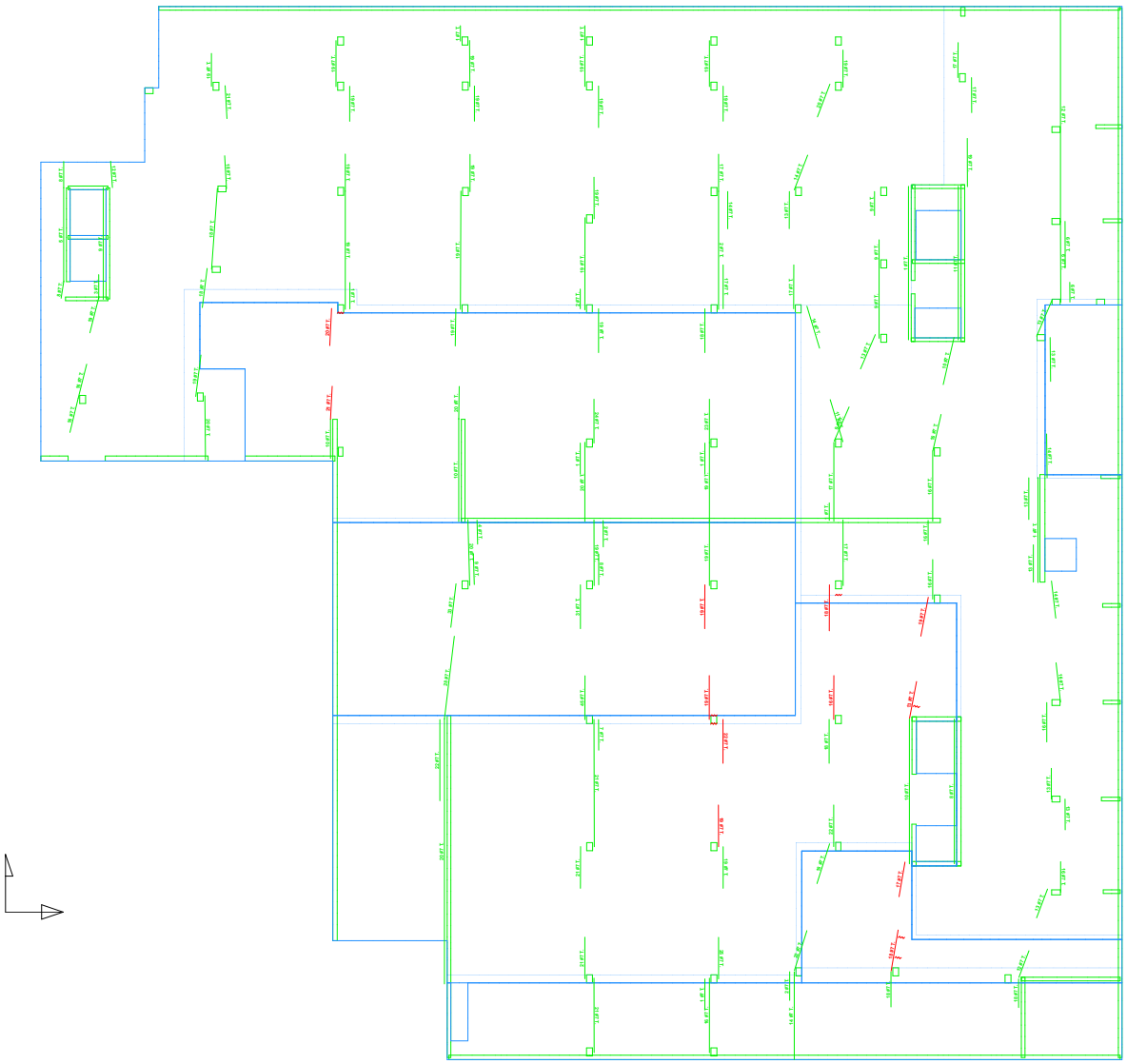
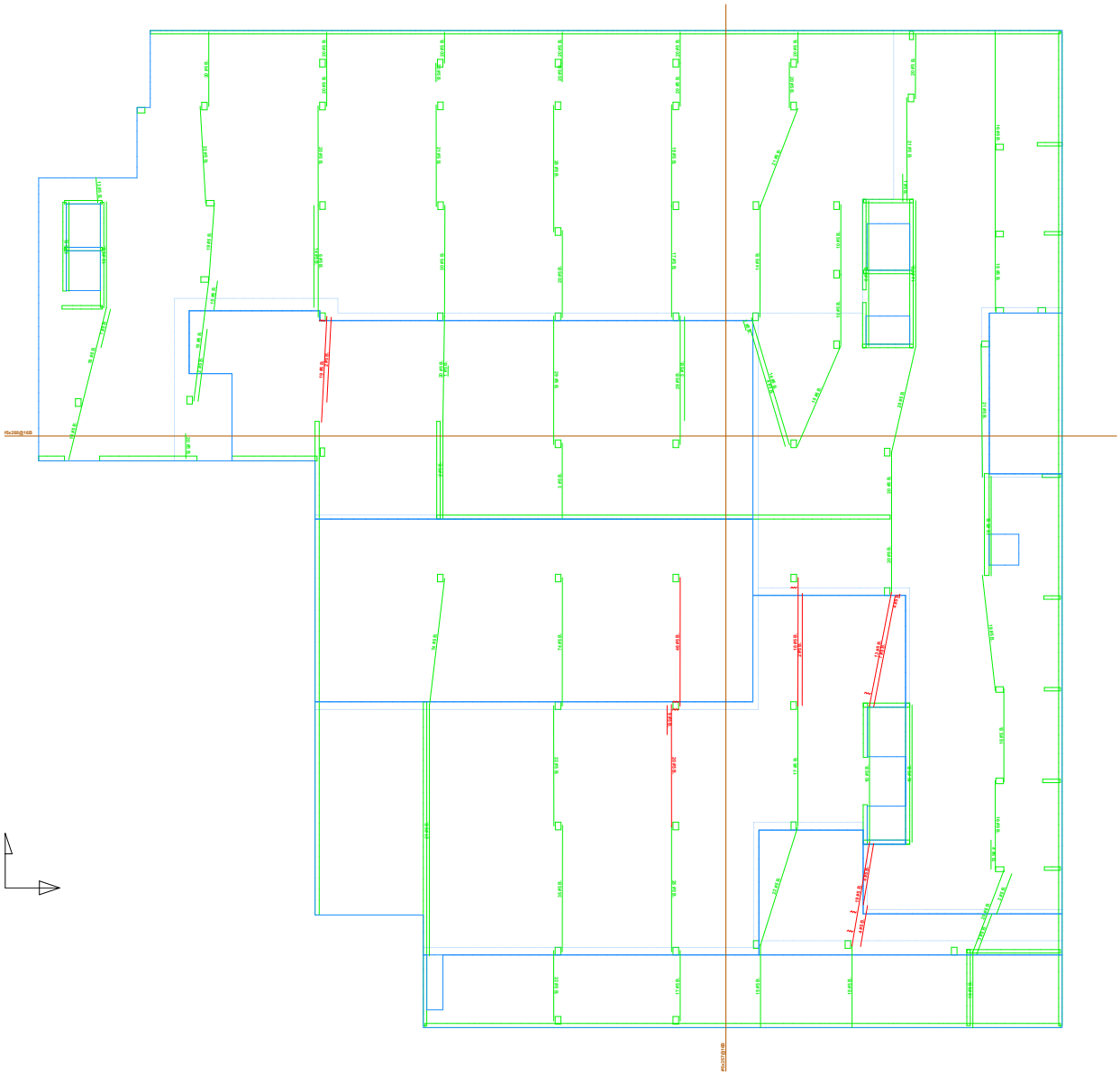


Design Status: Latitude Bottom Reinforcement Plan

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;
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 = 1:500



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;
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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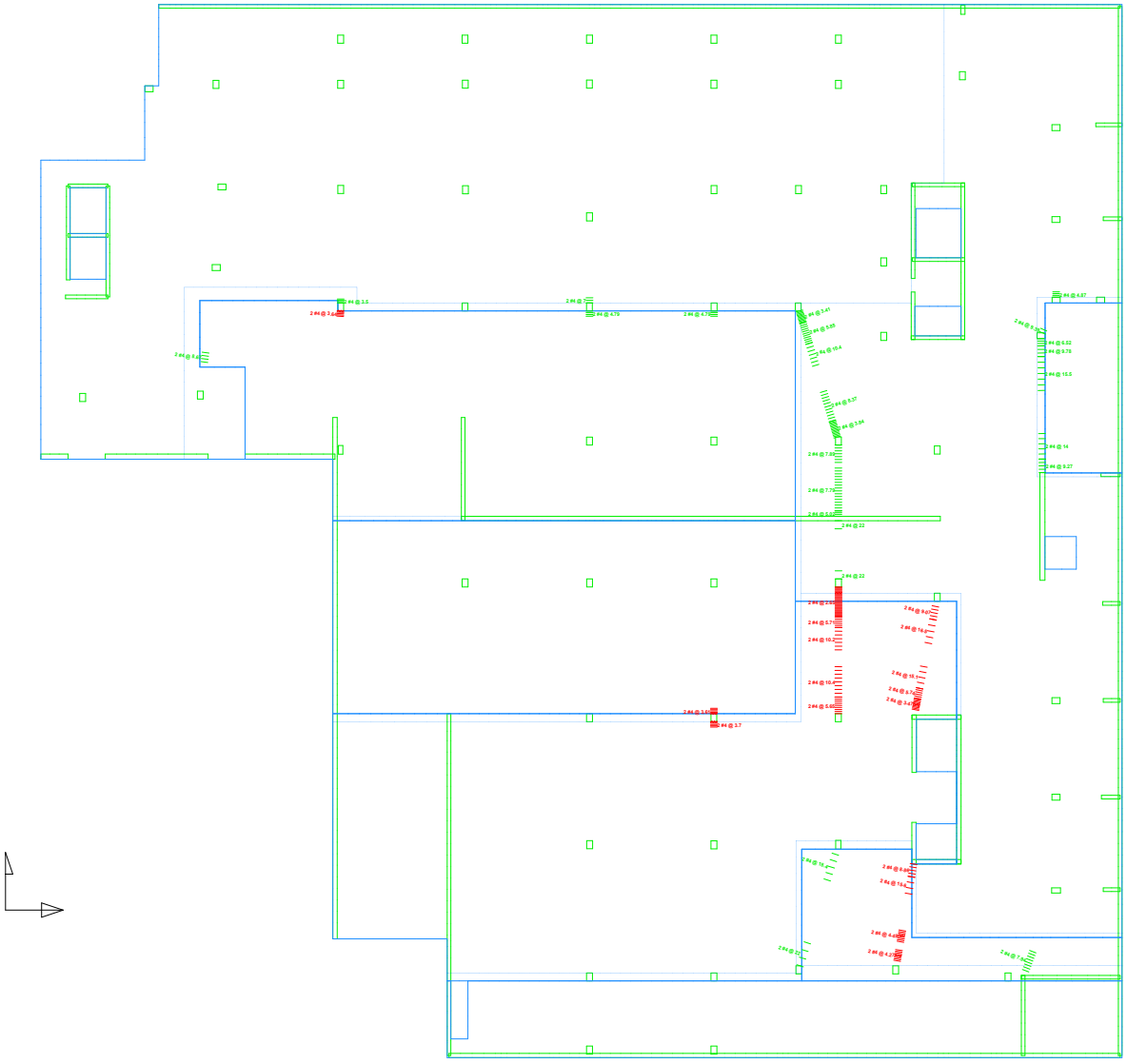
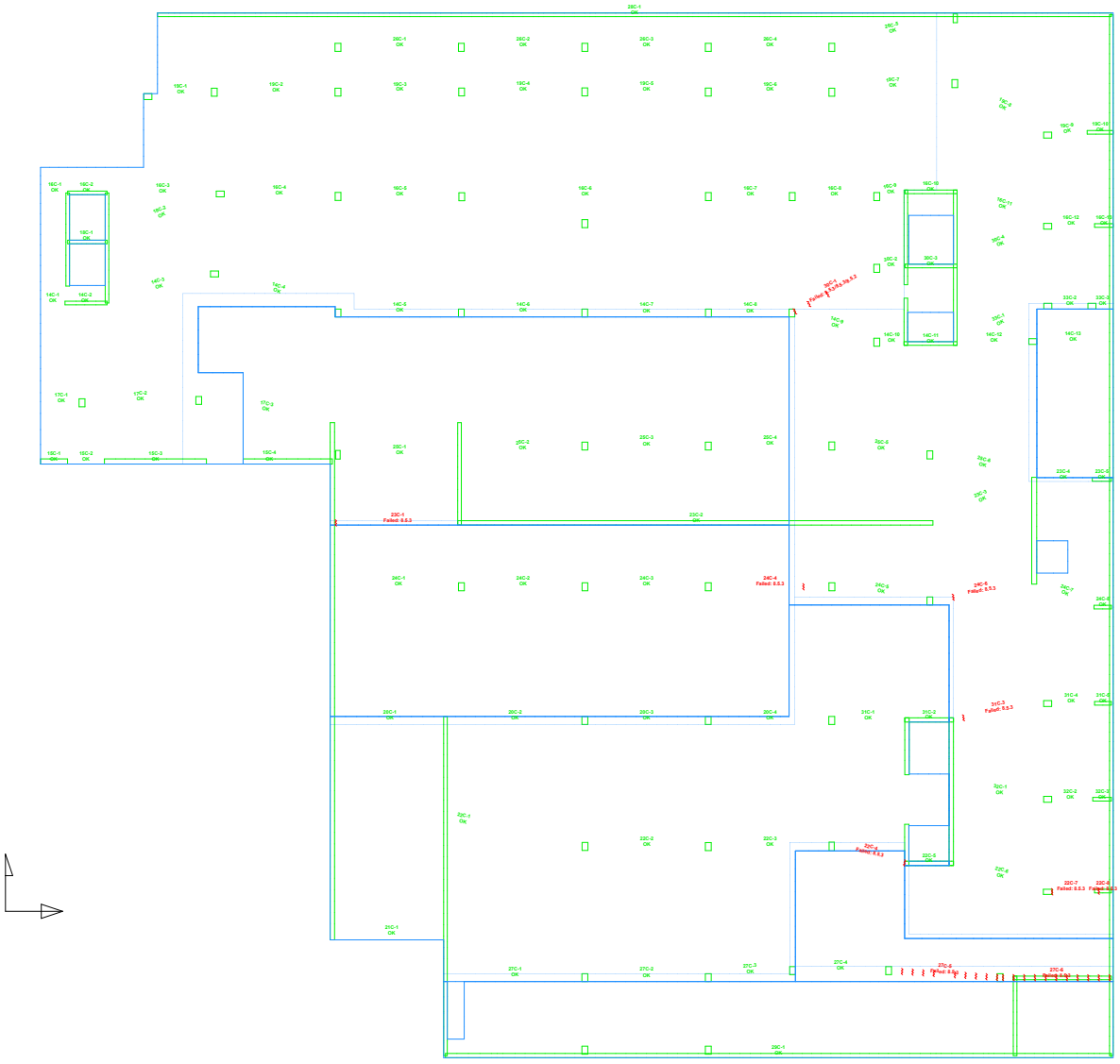


Design Status: Longitude Status Plan

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; Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only; Scale = 1:500



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;
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.;
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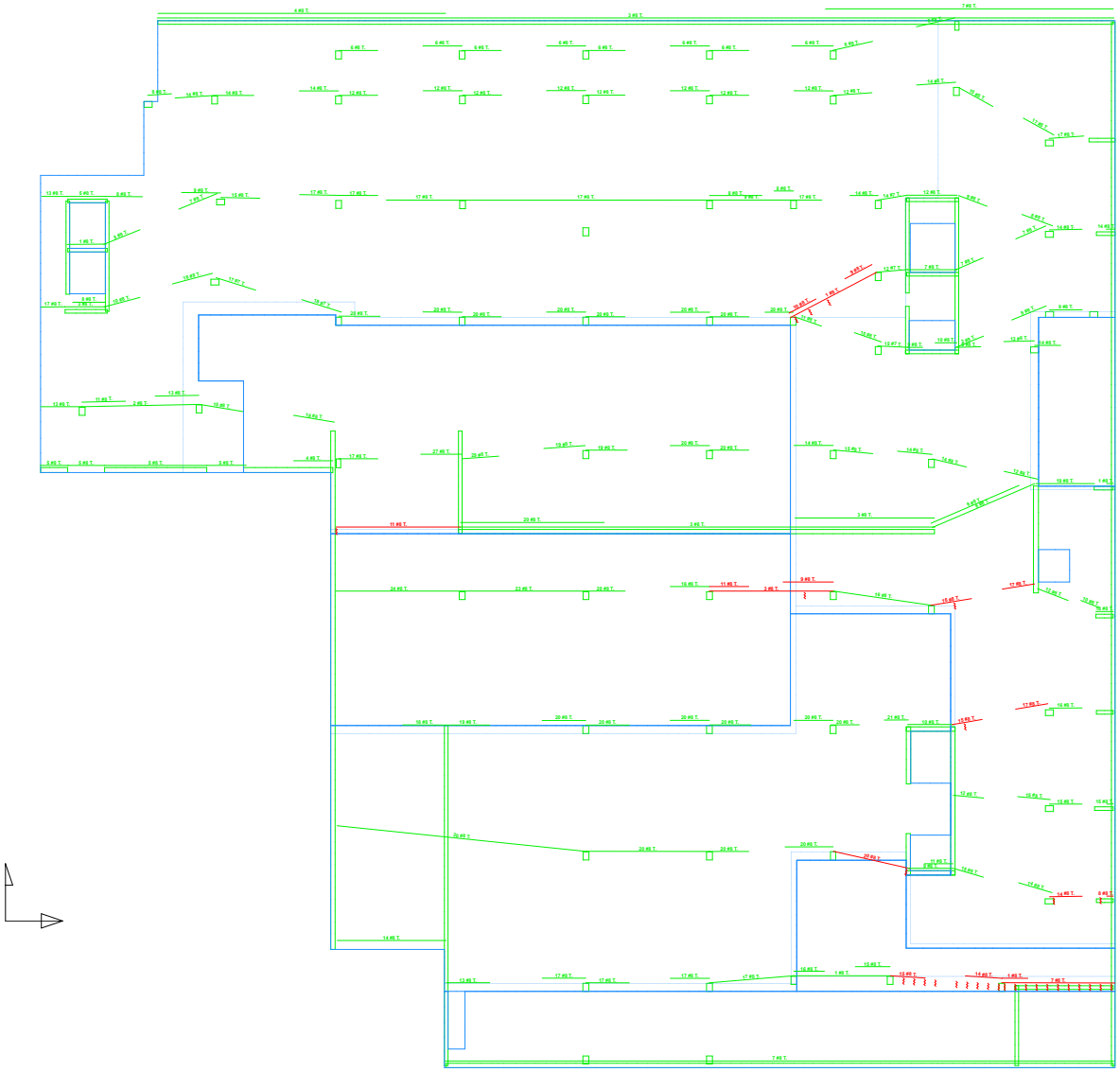
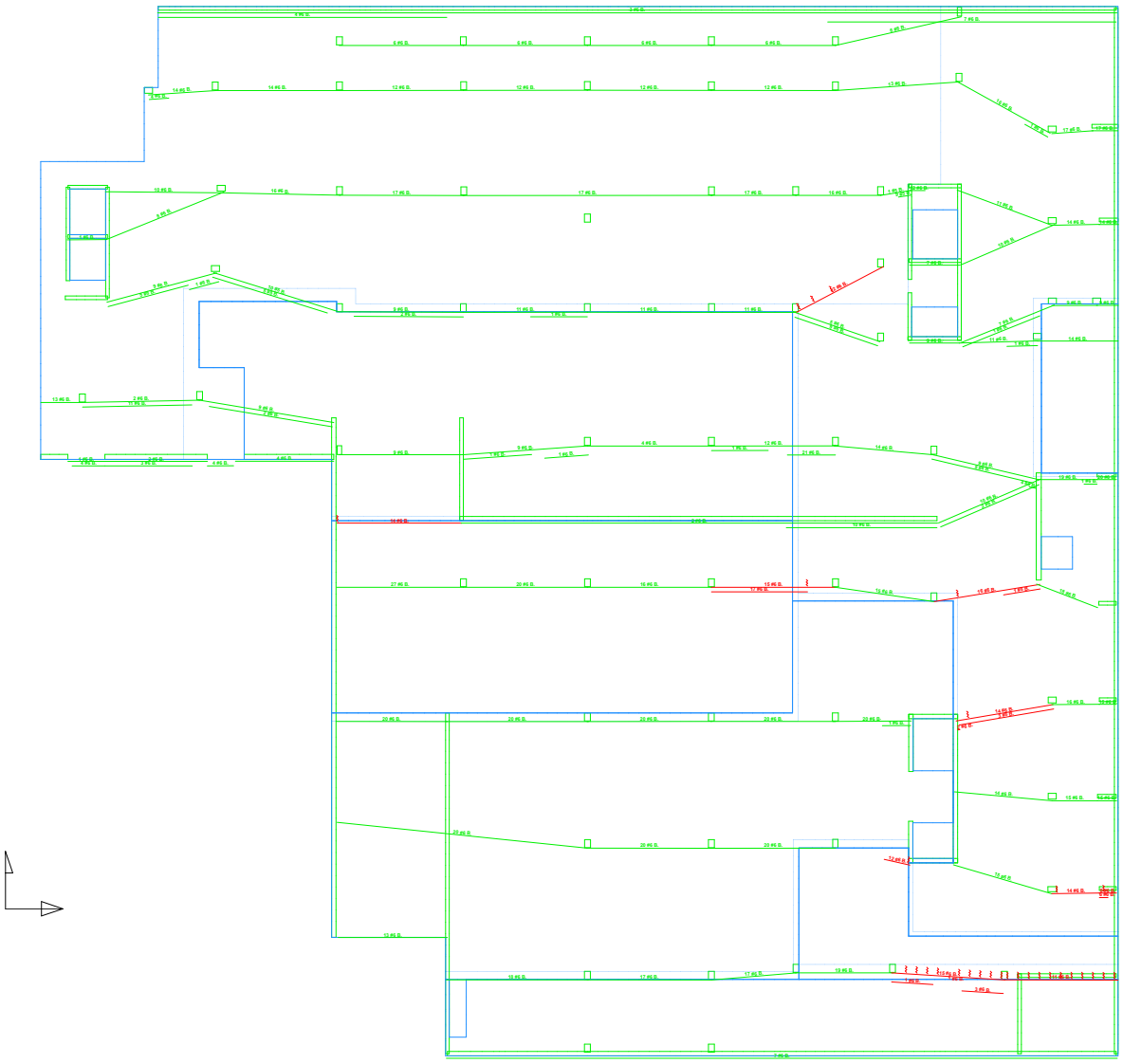


Design Status: Longitude Bottom Reinforcement Plan

Design Status: User Lines; User Notes; User Dimensions; Longitude Span Designs; Span Design Bottom Bars; Span Design Bar Descriptions; Longitude OS Designs; OS Design Bottom Bars; 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 = 1:500



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;
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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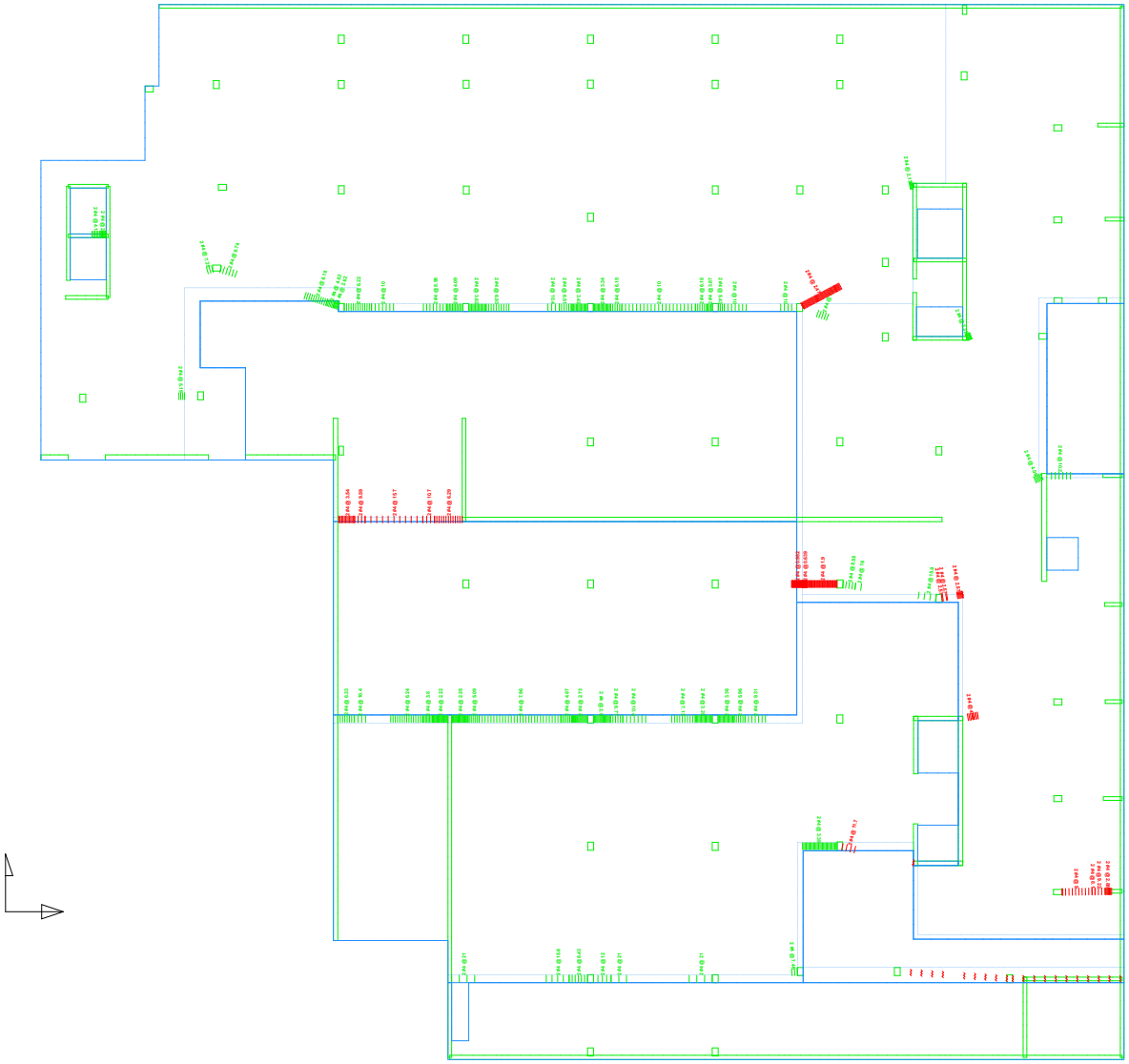


Estimate

Concrete Costs

Materials:	100 per yd³	x	1720 yd³	=	172000
Labor:	50 per yd³	x	1720 yd³	=	85990
Total:	150 per yd³	x	1720 yd³	=	258000

Post-Tensioning Costs

Materials:	1 per pounds	x	0 pounds	=	0
Labor:	0.5 per pounds	x	0 pounds	=	0
Total:	1.5 per pounds	x	0 pounds	=	0

Formwork Costs

Materials:	1 per ft²	x	47860 ft²	=	47860
Labor:	1 per ft²	x	47860 ft²	=	47860
Total:	2 per ft²	x	47860 ft²	=	95730

Mild Steel Reinforcing Cost

Materials:	1000 per tons	x	127.7 tons	=	127700
Labor:	500 per tons	x	127.7 tons	=	63840
Total:	1500 per tons	x	127.7 tons	=	191500

SSR Costs

Materials:	2 per stud	x	3142 studs	=	6284
Labor:	1 per stud	x	3142 studs	=	3142
Total:	3 per stud	x	3142 studs	=	9426

Total Costs

Materials:	7.392 per ft²	x	47860 ft²	=	353800
Labor:	4.196 per ft²	x	47860 ft²	=	200800
Total:	11.59 per ft²	x	47860 ft²	=	554600

Post-tensioned Slab Design Criteria

Code

ACI 318-14

Materials

Concrete f'c = 5,500 psi @ 28 days, f'ci = 3,000 psi
Reinforcing Steel fy = 60,000 psi

Analysis

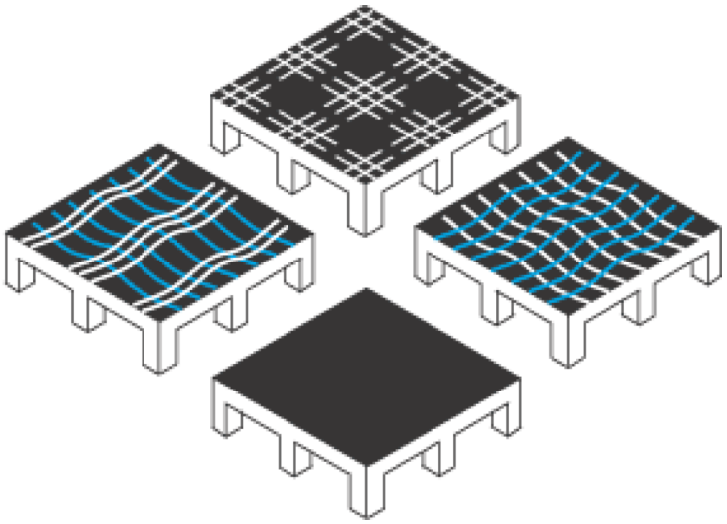
Gravity loads on elevated slabs were considered according to the Design Criteria in the General Notes of the structural drawings including structure self-weight added to the noted superimposed dead load. Strength design was performed using the governing load combination 1.2DL + 1.6LL. Strength design was performed using the load combination 1.2DL + 1.6LL. Unfactored service loads were used to calculated long-term cracked deflection under dead load conditions and a long term cracked deflection under dead load and live load. Unbalanced live load was considered for the worst case conditions.
Post-tensioned slabs use ½" unbonded tendons with fpu = 270 ksi (final effective tension force per tendon = 26.8 kips) and were designed using the Finite Element computer software program RAM Concept. The cover requirements for the PT tendons are ¾" at all bays for a "restrained" condition,
Average slab pre-compression P/A values were limited to minimum of 125 psi and a maximum of 305 psi. Stress limitations were as follows:

	Initial Stress	Sustained Stress	Total Stress
Tension Stresses			
Top Fiber	3 √ f'c	6 √ f'c	6 √ f'c
Bottom Fiber	3 √ f'c	6 √ f'c	6 √ f'c
Compression Stresses	.6 fci	.45 f'c	.6 f'c

MERCER ISLAND APARTMENTS

PERMIT CALCULATIONS

11/12/20



LEVEL 2 PT SLAB (10-19-2020)_KR v8.2.cpt
11/13/2020

8.1

Table of Contents

Table of Contents (2)

Table of Contents (3)

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

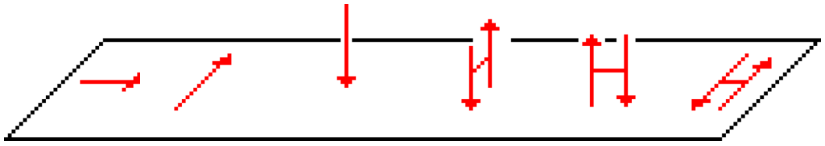
Concrete Volume: yd^3
Tendon Force: Kips
Reinforcing Stress: ksi
Reinforcing Area: in^2
Tendon Force Per Width: kips/ft
PT Weight: pounds
Reinforcement Weight: tons
Tendon Profile: inches
Cover: inches

Miscellaneous Unit

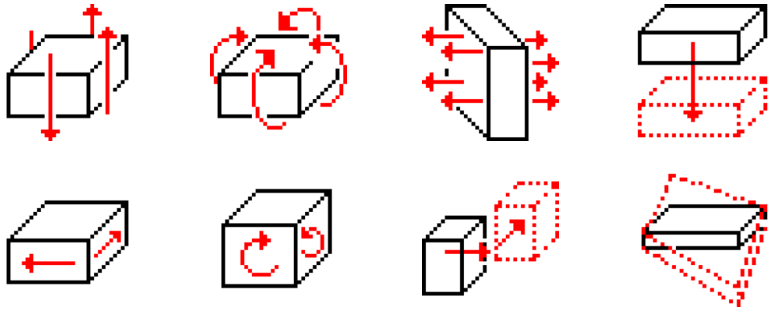
Floor Area: ft^2
Tendon Angles (for friction): radians
Density: pcf
Temperature Change: °F
Elongations: inches

Signs

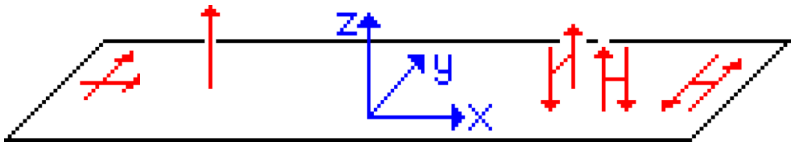
Positive Loads



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	150	150	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
5000 psi	150	150	3000	5000	3725	6399	0.2	5.556e-6	Code	2500000	3000000
6000 psi	150	150	3000	6000	3725	7450	0.2	5.556e-6	Code	2500000	3000000
5500 psi	150	150	3000	5500	3725	6950	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
½" Bonded	bonded	0.153	28000	160	243	270	3	4	6
0.6" Unbonded	unbonded	0.217	28000	175	243	270	0.6	1	8
0.6" Bonded	bonded	0.217	28000	160	243	270	4	4	8

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
½" Bonded	216	0.25	0.02	0.001	0.2	22
0.6" Unbonded	216	0.25	0	0.0014	0.07	22
0.6" Bonded	216	0.25	0.02	0.001	0.2	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	60	None	Code	Code	Code
#4	0.2	29000	60	None	Code	Code	Code
#5	0.31	29000	60	None	Code	Code	Code
#6	0.44	29000	60	None	Code	Code	Code
#7	0.6	29000	60	None	Code	Code	Code
#8	0.79	29000	60	None	Code	Code	Code
#9	1	29000	60	None	Code	Code	Code
#10	1.27	29000	60	None	Code	Code	Code
#11	1.56	29000	60	None	Code	Code	Code

Materials (2)

SSR Systems

SSR System Name	Stud Area (in²)	Head Area (in²)	Min Clear Head Spacing (inches)	Specified Stud Spacing (inches)	Fy (ksi)	Stud Spacing Rounding Increment (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
Temporary Construction (At Stressing) Loading	Stressing Dead	Normal	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 (Storage) Loading	Live (Storage)	Normal	1	0
Live (Parking) Loading	Live (Parking)	Normal	1	0
Live (Roof) Loading	Live (Roof)	Normal	1	0
Snow Loading	Snow	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

Initial Service LC

Active Design Criteria: Initial Service Design
Analysis: Linear

Loading	*Standard Factor*	*Alt. Envelope Factor*
Self-Dead Loading	1	1
Balance Loading	1.13	1.13
Temporary Construction (At Stressing) 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
Live (Storage) Loading	1	0
Live (Parking) 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

Load Combinations (2)

Service LC: D + S

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
Snow 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 (Storage) Loading	0.75	0
Live (Parking) Loading	0.75	0
Live (Roof) Loading	0.75	0

Service LC: D + 0.75L + 0.75S

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 (Storage) Loading	0.75	0
Live (Parking) Loading	0.75	0
Snow Loading	0.75	0

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 (Storage) Loading	1	1
Live (Parking) Loading	0.5	0.5
Live (Roof) Loading	0.5	0.5

Load Combinations (3)

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 (Storage) Loading	1.6	0
Live (Parking) 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 (Storage) Loading	1	0
Live (Parking) Loading	1	0
Live (Roof) Loading	1.6	0

Factored LC: 1.2D + 1.6L + 0.5S

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 (Storage) Loading	1.6	0
Live (Parking) Loading	1.6	0
Snow Loading	0.5	0

Load Combinations (4)

Factored LC: 1.2D + f1L + 1.6S

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 (Storage) Loading	1	0
Live (Parking) Loading	1	0
Snow Loading	1.6	0

Design Rules

Code Minimum Desig

318-14 Min. Reinforcement

User Minimum Desig

Specified Min. Reinforcement

Initial Service Desig

318-14 Initial Service Design

Service Design

318-14 Service Design
Include detailed section analysis

Sustained Service Desig

318-14 Sustained Service Design

Strength Design

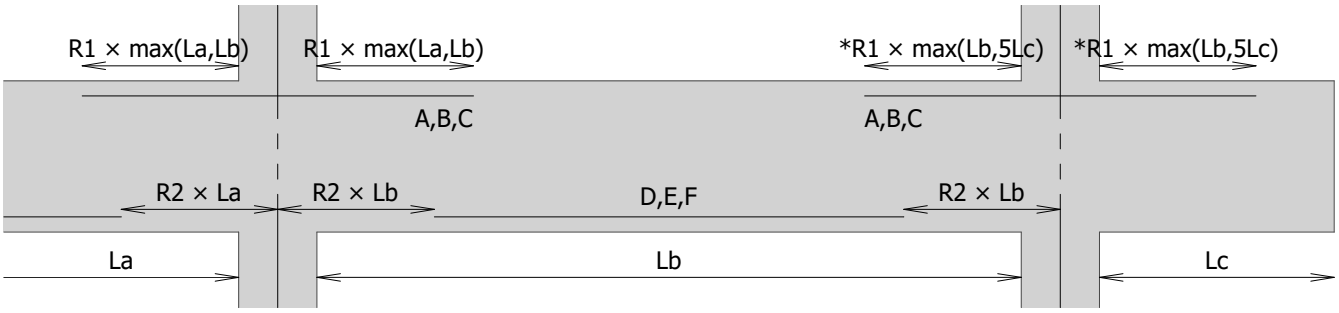
318-14 Strength Design
Punching Shear Design

Ductility Desig

318-14 Ductility Design

Detailing Rules

Custom Span Detailing Rules



Rule Name	*A Fraction*	*A R1*	*B Fraction*	*B R1*	*C Fraction*	*C R1*	*D Fraction*	*D R2*	*E Fraction*	*E R2*	*F Fraction*	*F R2*
None	0	0	0	0	0	0	0	0	0	0	0	0

"A", "B" and "C", are support reinforcement sets, based on the peak reinforcement in the support zone.
"D", "E" and "F", are span reinforcement sets, based on the peak reinforcement in the span zone.
"*R1" is never taken as greater than 0.2 when multiplied by Lc (or Lcc).
"Fraction" is the ratio of set reinforcement to peak reinforcement. It is always in the 0.0 to 1.0 range.

Load History

Load History Step Name	*Load Combination*	*Duration (days)*	*Total Age (days)*
Maximum Short Term Load	Service LC: D + L	30	33
Sustained Load	Sustained Service LC	5000	5033
Final Instantaneous Load	Service LC: D + L	0	5033

Tendon Parameters Groups

Banded Tendon Polyline Groups

Group Name	PT System	I.P. Ratio	Eff. Force (Kips)	Number of Strands	Optimize	Min Force (Kips)	Max Force (Kips)	Force Incr. (Kips)	Min Strands	Max Strands	Strands Increment

Distributed Tendon Quadrilateral Groups

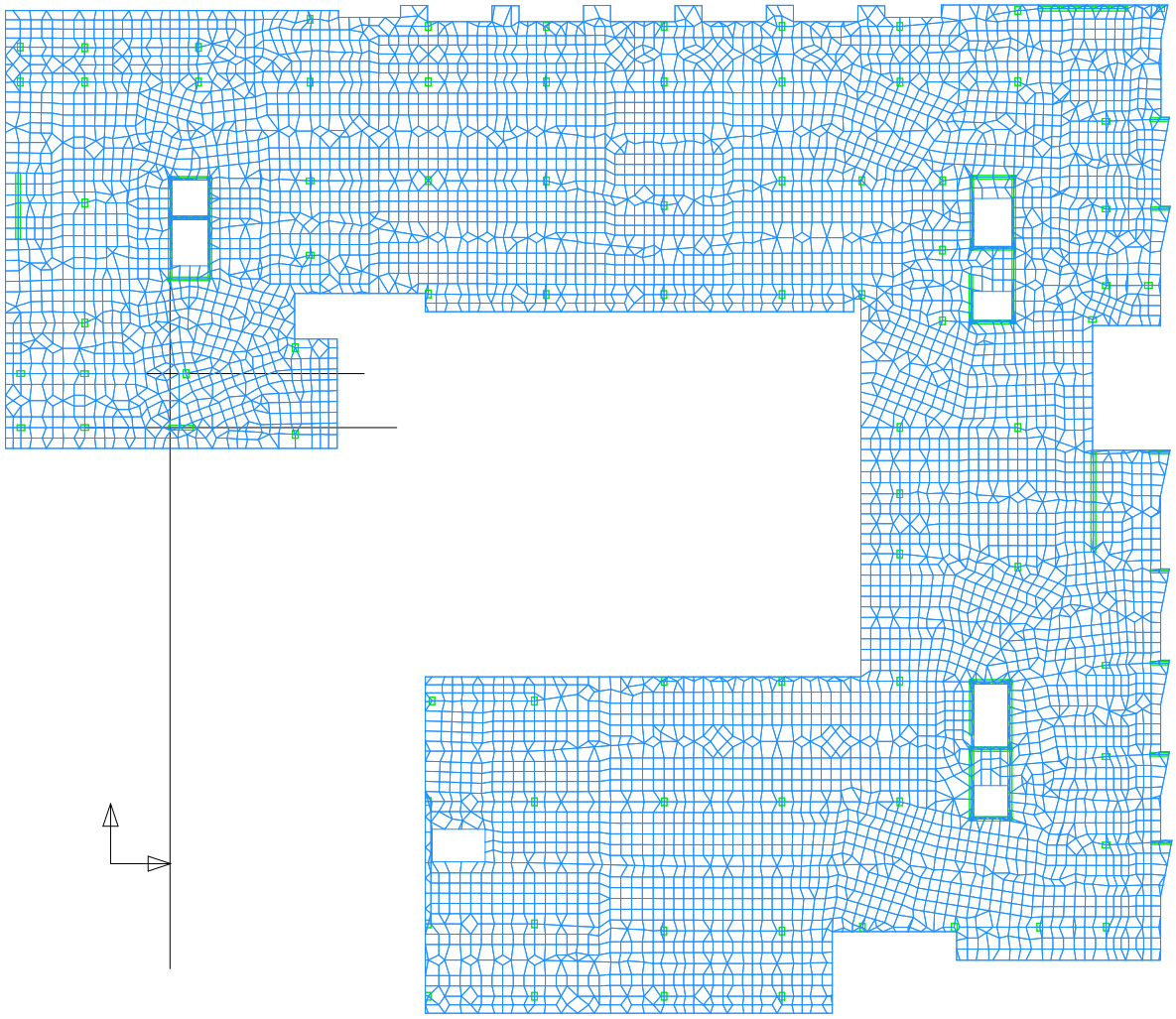
Group Name	PT System	I.P. Ratio	Spacing (feet)	Eff. Force (kips/ft)	# Strands (1/feet)	Optimize	Min Force (kips/ft)	Max Force (kips/ft)	Force Incr. (kips/ft)	Min Strands (1/feet)	Max Strands (1/feet)	Strands Ir (1/feet)

Profile Polyline Groups

Group Name	Elevation Reference	Elevation (inches)	Optimize	Min Elevation (inches)	Max Elevation (inches)	Elevation Incr. (inches)

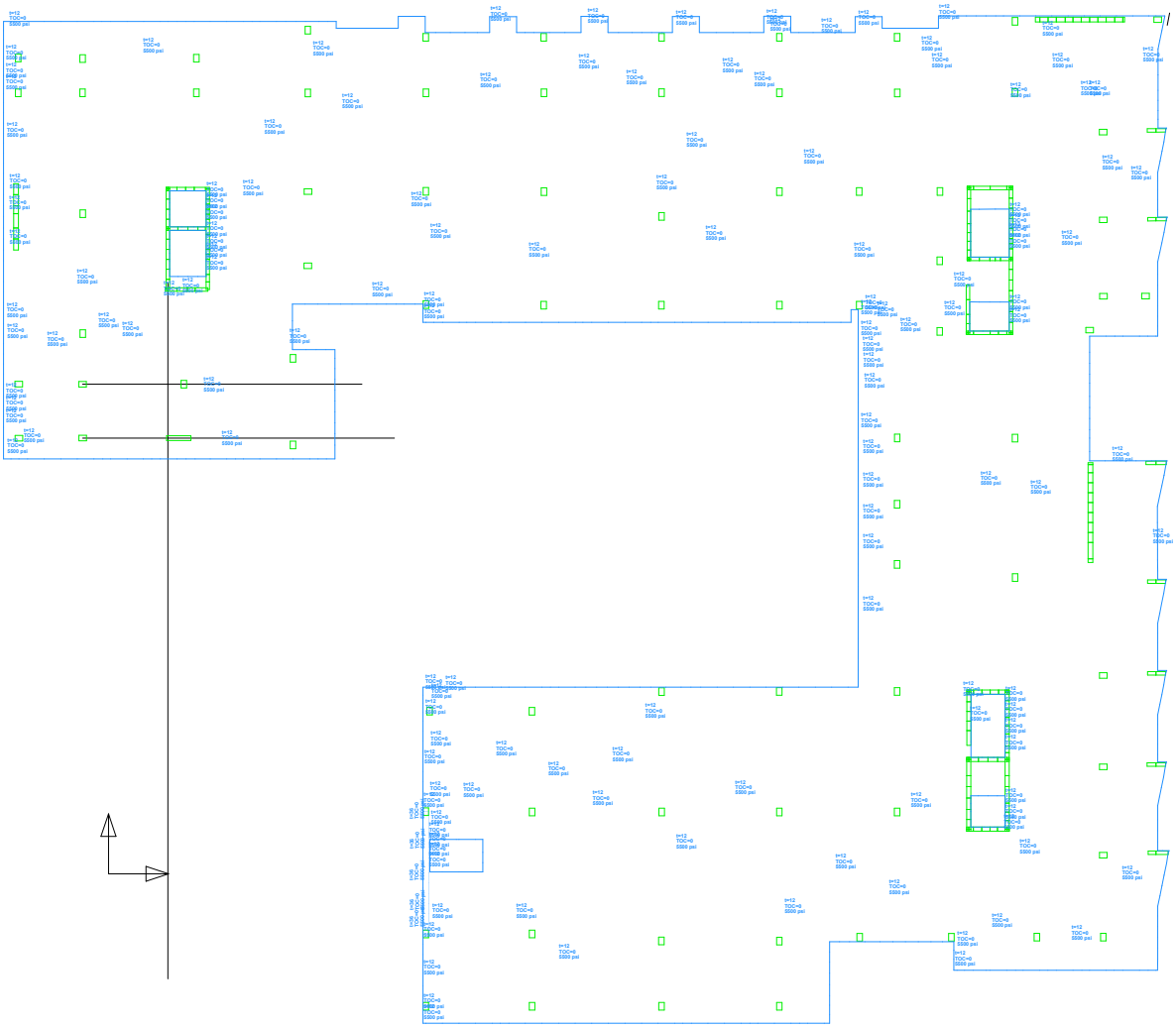
Element: Standard Plan

Element: Wall Elements Above; Wall Elements Below; Column Elements Above; Column Elements Below; Point Supports; Point Support Icons; Line Supports; Line Support Icons; Slab Elements; Point Springs; Point Spring Icons; Line Springs; Line Spring Icons; Area Springs; Area Spring Icons; User Notes; User Lines; User Dimensions; Mesh Input; Slab Areas; Walls Below; Columns Below;
Scale = 1:320



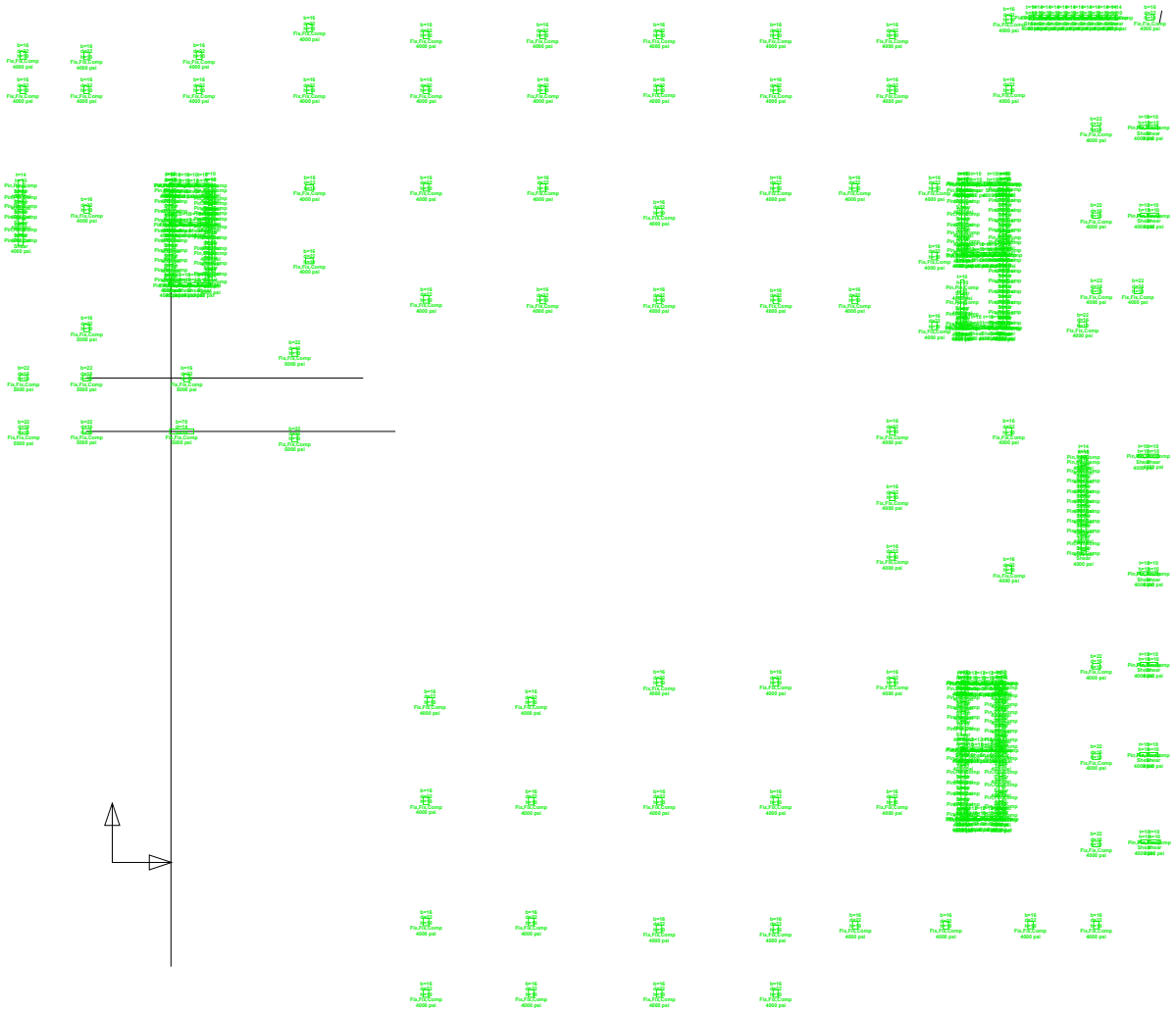
Element: Slab Summary Plan

Element: User Lines; User Notes; User Dimensions; Wall Elements Below; Wall Elements Above; Column Elements Below; Column Elements Above; Point Springs; Point Spring Icons; Line Springs; Line Spring Icons; Slab Elements; Slab Element Outline Only; Slab Element Thicknesses; Slab Element Elevations; Slab Element Concrete Models;
Drawing Import: User Lines; User Notes; User Dimensions;
Scale = 1:150



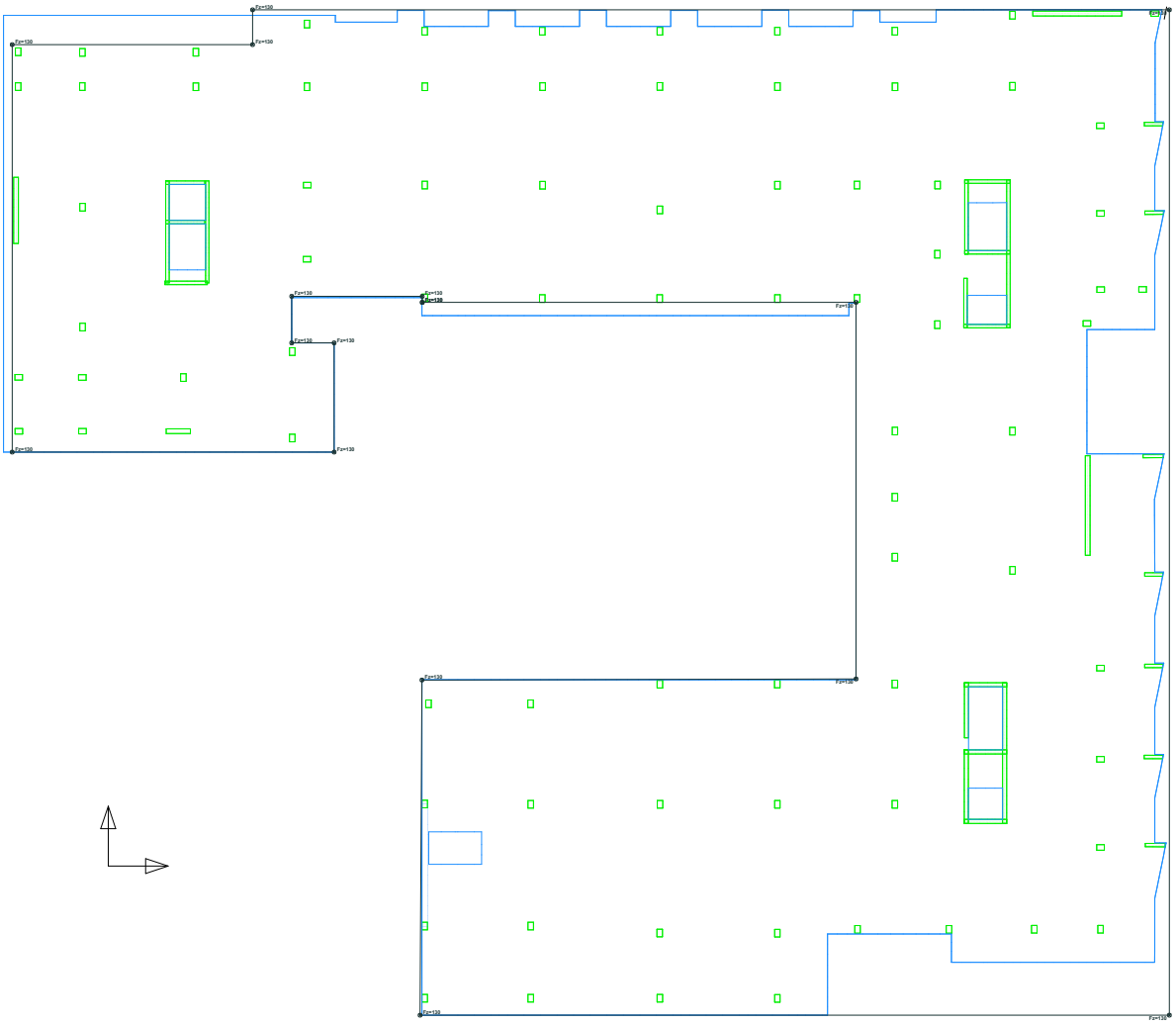
Element: Supports Below Slab Summary Plan

Element: User Lines; User Notes; User Dimensions; Wall Elements Below; Wall Element Thicknesses; Wall Element Heights; Wall Element Fixity; Wall Element Shear Fixity; Wall Element Concrete Models; Column Elements Below; Column Element Dimensions; Column Element Heights; Column Element Fixity; Column Element Concrete Models; Point Springs; Point Spring Icons; Point Spring Values; Point Spring Elevations; Line Springs; Line Spring Icons; Line Spring Values; Line Spring Elevations; Drawing Import: User Lines; User Notes; User Dimensions;
Scale = 1:150



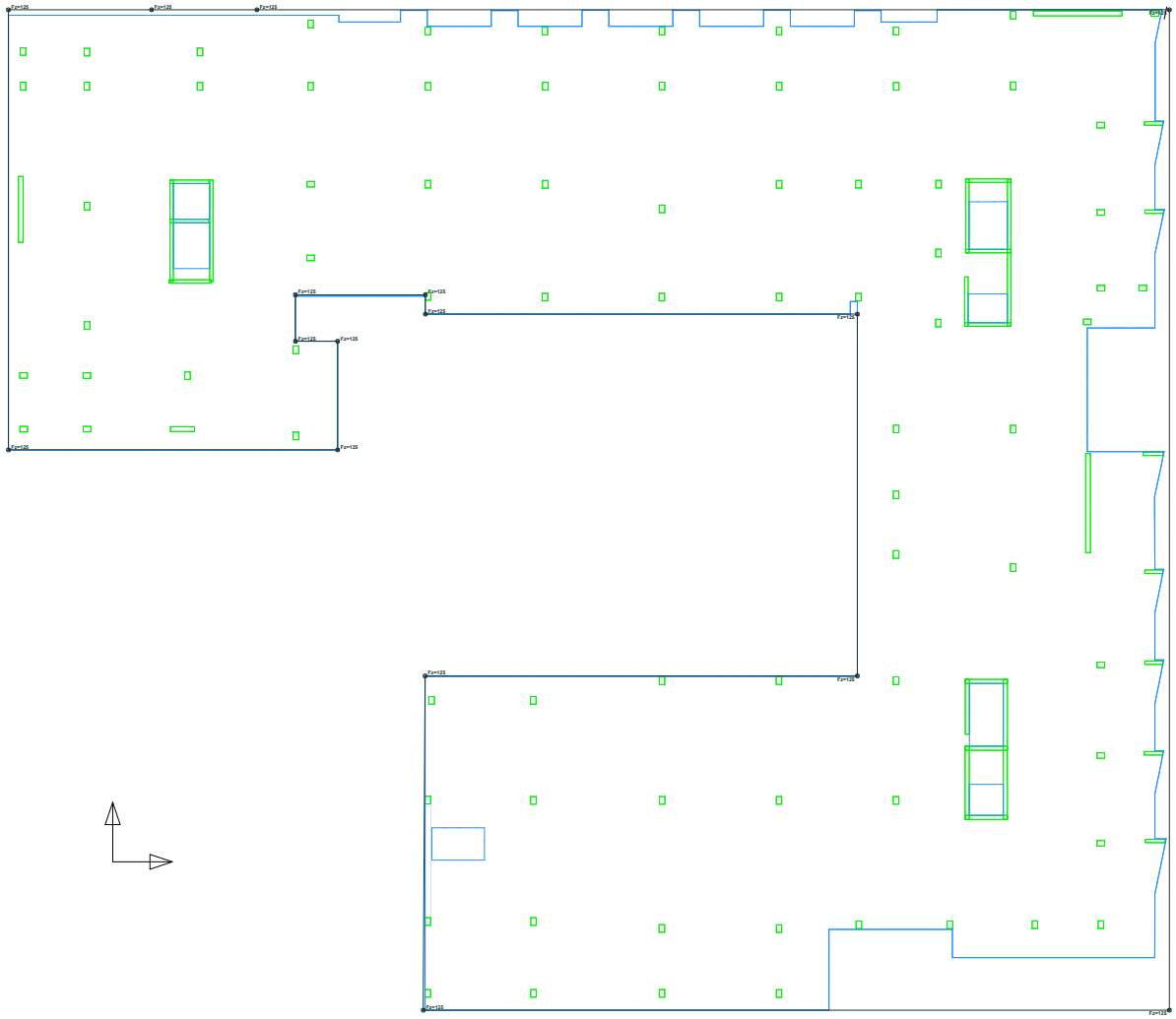
Other Dead Loading: All Loads Plan

Other Dead 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 Lines; User Notes; User Dimensions;
Mesh Input: Slab Areas; Walls Below; Columns Below;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:100



Live (Unreducible) Loading: All Loads Plan

Live (Unreducible) 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 Lines; User Notes; User Dimensions;
Mesh Input: Slab Areas; Walls Below; Columns Below;
Element: Wall Elements Above; Wall Elements Below; Wall Element Outline Only; Column Elements Above; Column Elements Below; Slab Elements; Slab Element Outline Only;
Scale = 1:100

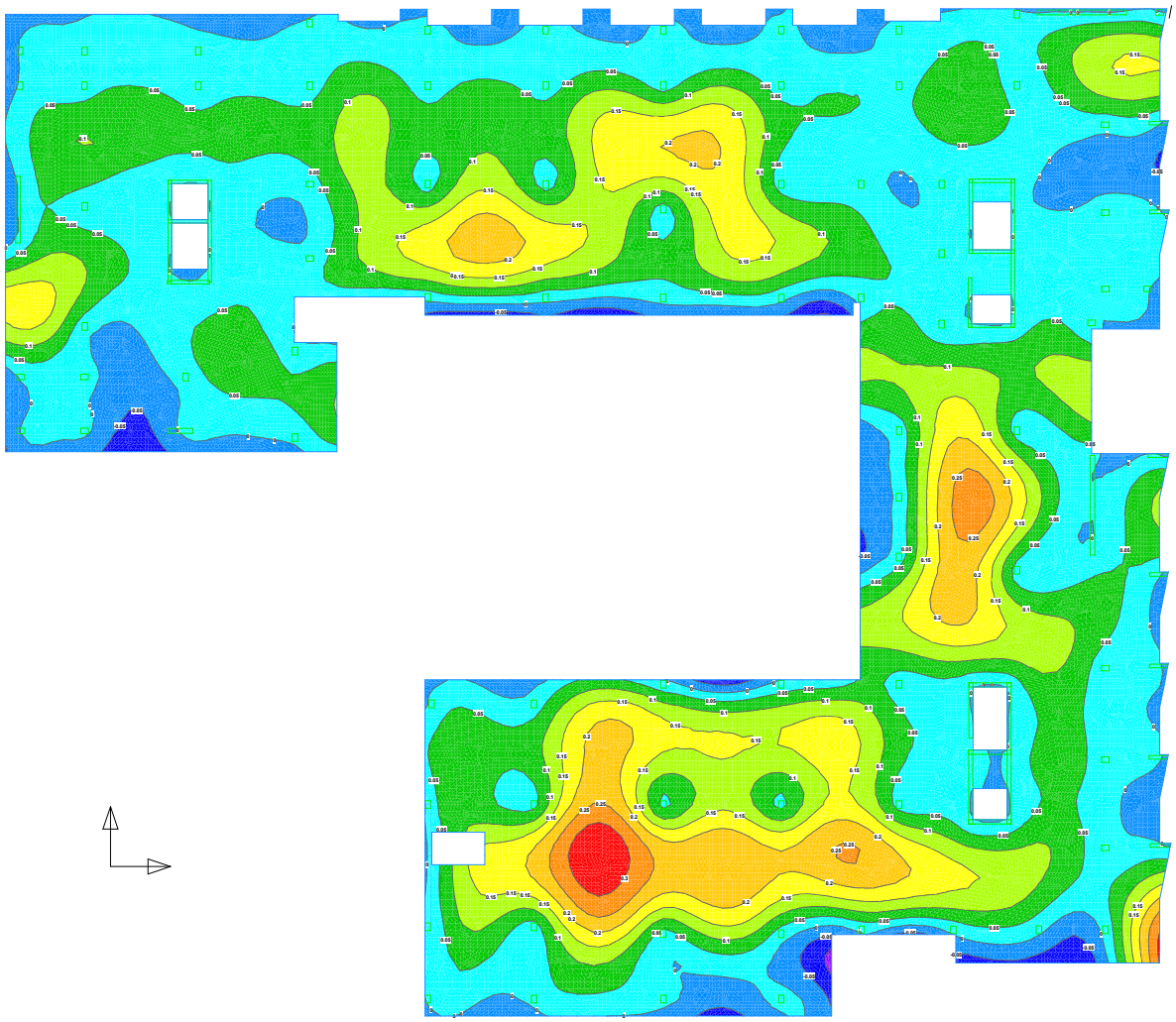


Service LC: D + L: Max Deflection Plan

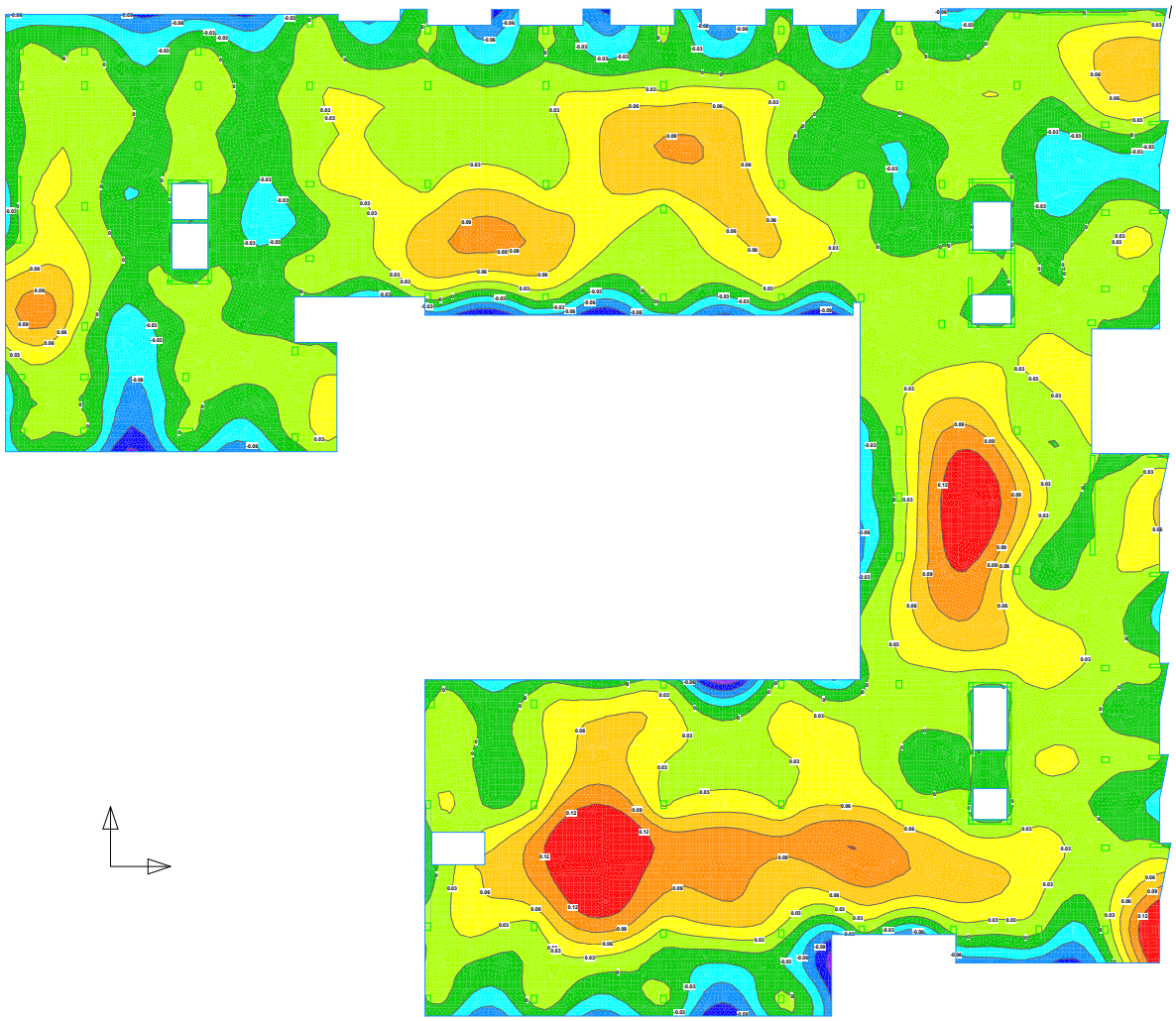
Service LC: D + L; User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:20.9
Service LC: D + L - Vertical Deflection Plot (Maximum Values)

-0.1 -0.05 0 0.05 0.1 0.15 0.2 0.25 0.3

Min Value = -0.1136 inches @ (172.6,-23.96) Max Value = 0.3418 inches @ (117.6,2.665)



Service LC: D + L: Min Deflection Plan

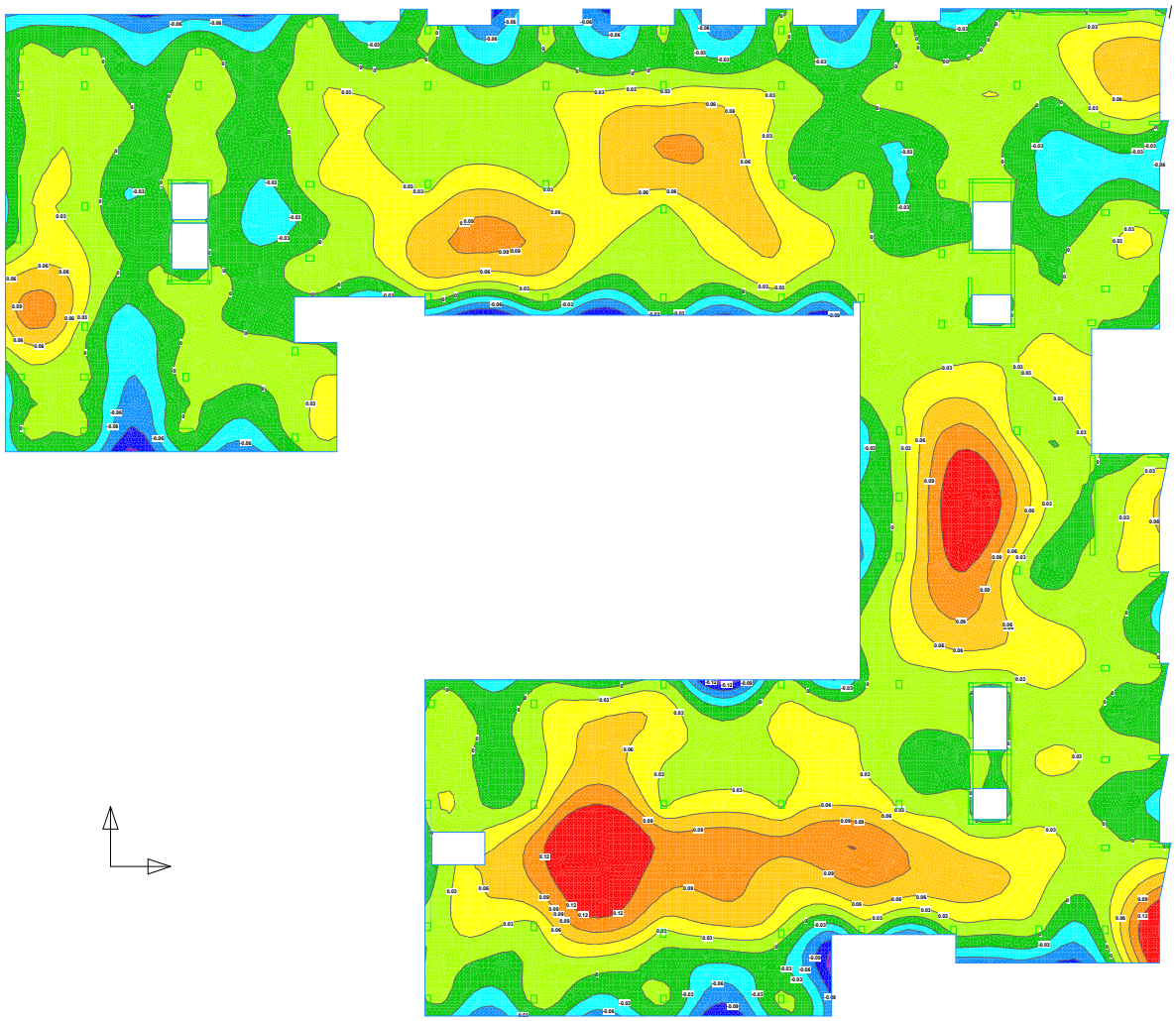


Service LC: D + Lr: Max Deflection Plan

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 = 1:200
Service LC: D + Lr - Vertical Deflection Plot (Maximum Values)

-0.12 -0.09 -0.06 -0.03 0 0.03 0.06 0.09 0.12

Min Value = -0.1407 inches @ (146.5,44.97) Max Value = 0.1012 inches @ (252.6, -17.9)

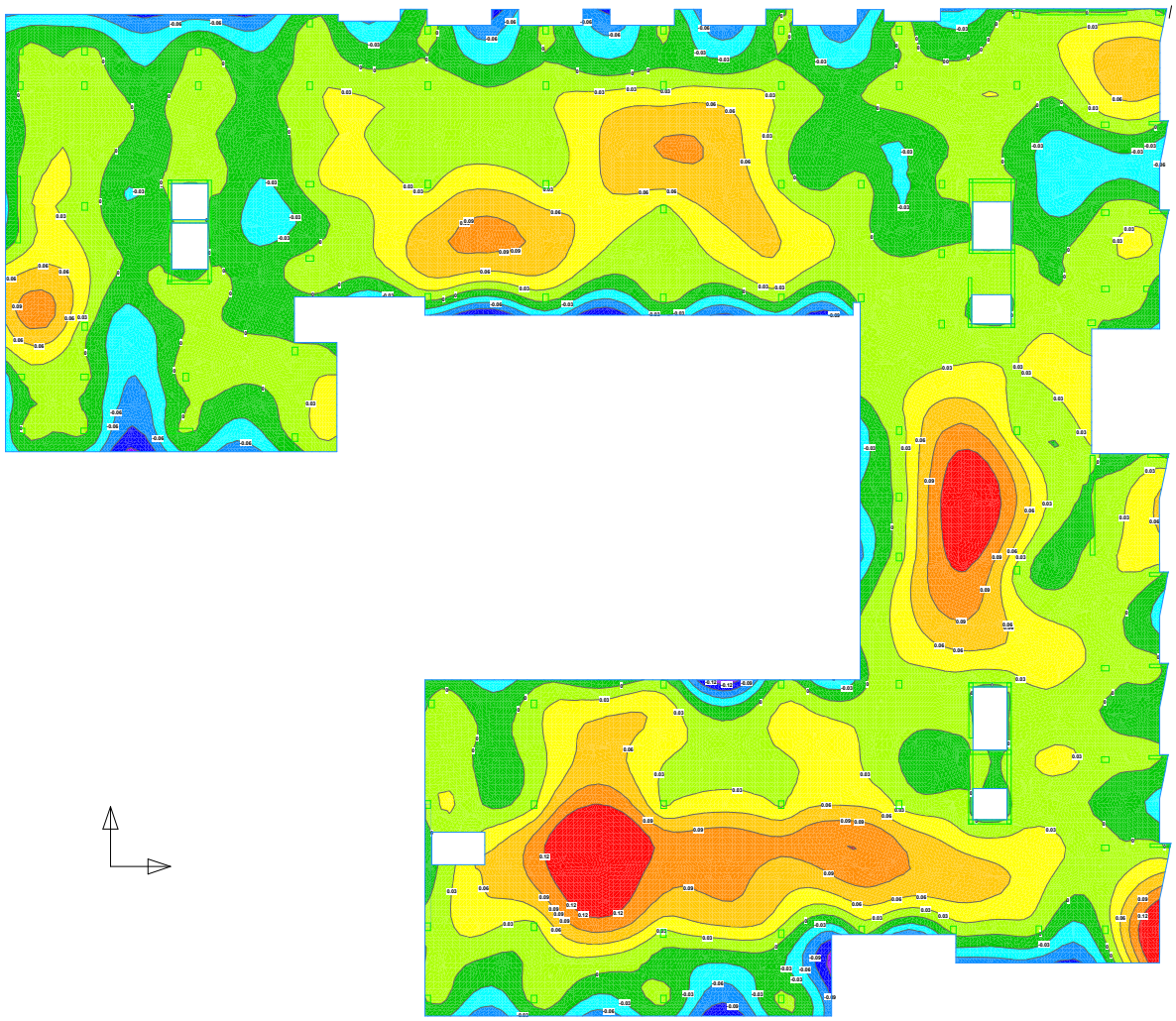


Service LC: D + Lr: Min Deflection Plan

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 = 1:200
Service LC: D + Lr - Vertical Deflection Plot (Minimum Values)

-0.12 -0.09 -0.06 -0.03 0 0.03 0.06 0.09 0.12

Min Value = -0.1407 inches @ (146.5,44.97) Max Value = 0.1012 inches @ (252.6, -17.9)

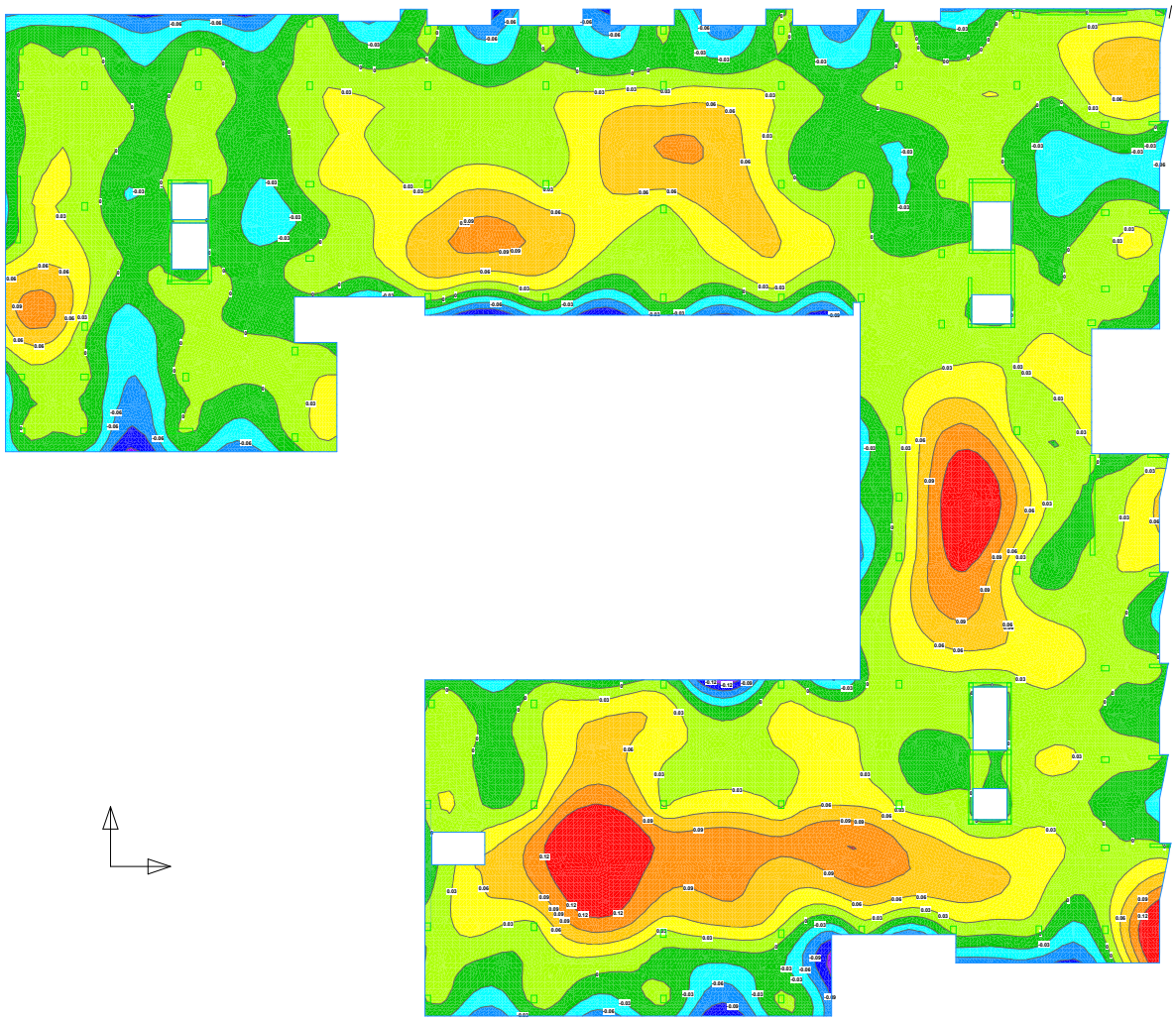


Service LC: D + S: Max Deflection Plan

Service LC: D + S; 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 + S - Vertical Deflection Plot (Maximum Values)

-0.12 -0.09 -0.06 -0.03 0 0.03 0.06 0.09 0.12

Min Value = -0.1407 inches @ (146.5,44.97) Max Value = 0.1012 inches @ (252.6, -17.9)

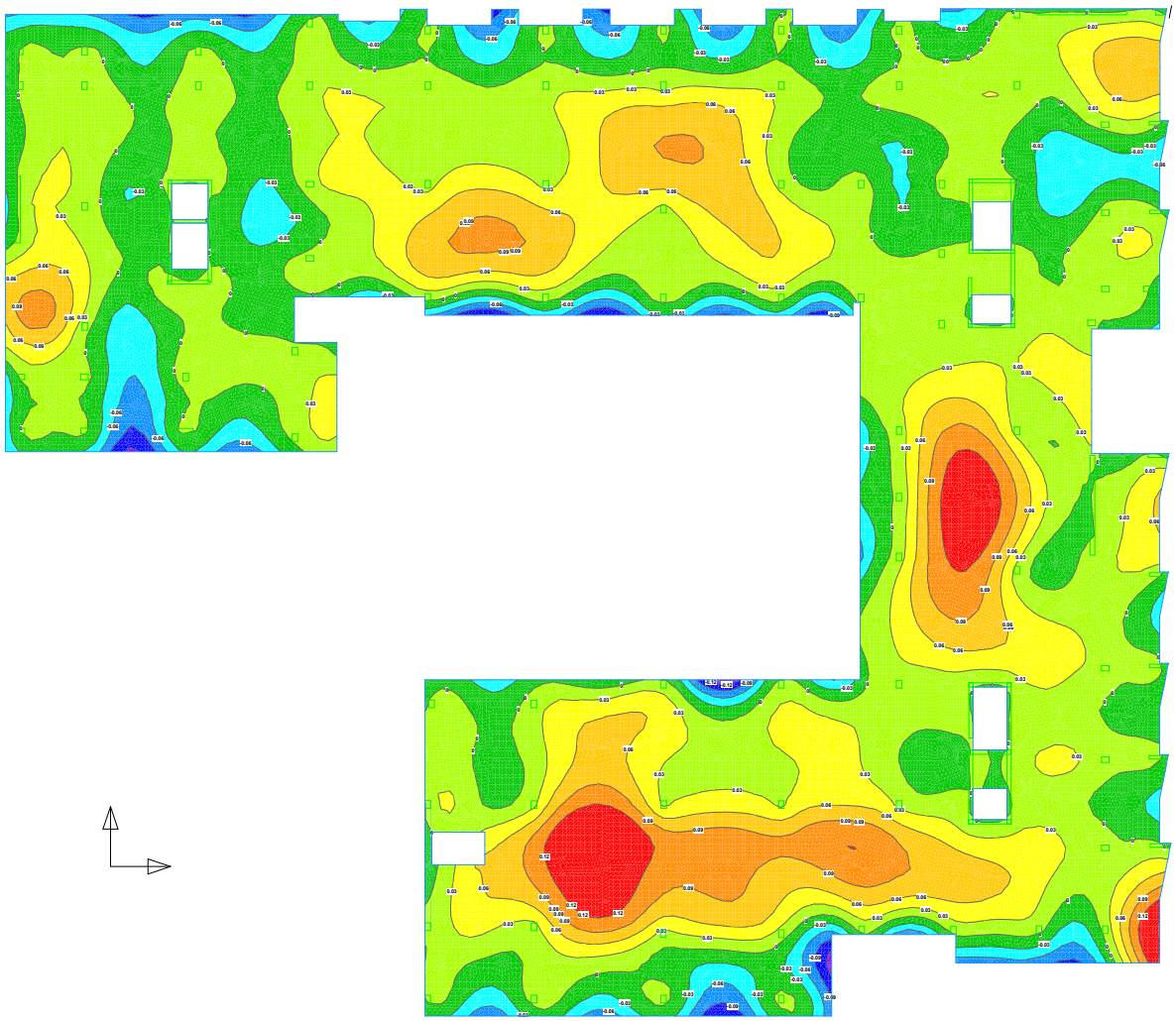


Service LC: D + S: Min Deflection Plan

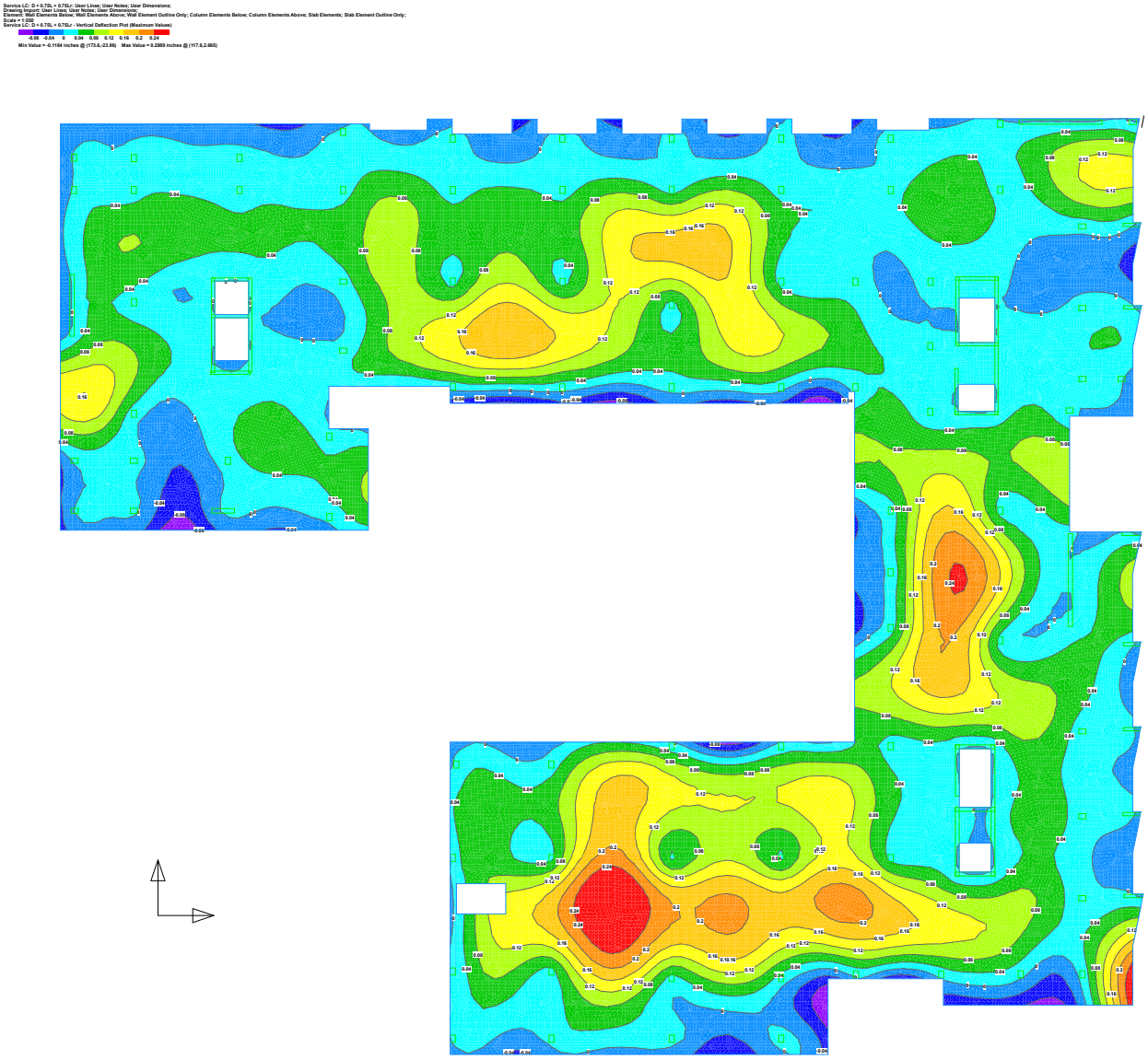
Service LC: D + S; User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:250
Service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

-0.12 -0.09 -0.06 -0.03 0 0.03 0.06 0.09 0.12

Min Value = -0.1407 inches @ (146.5,44.97) Max Value = 0.1012 inches @ (252.6, -17.9)



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

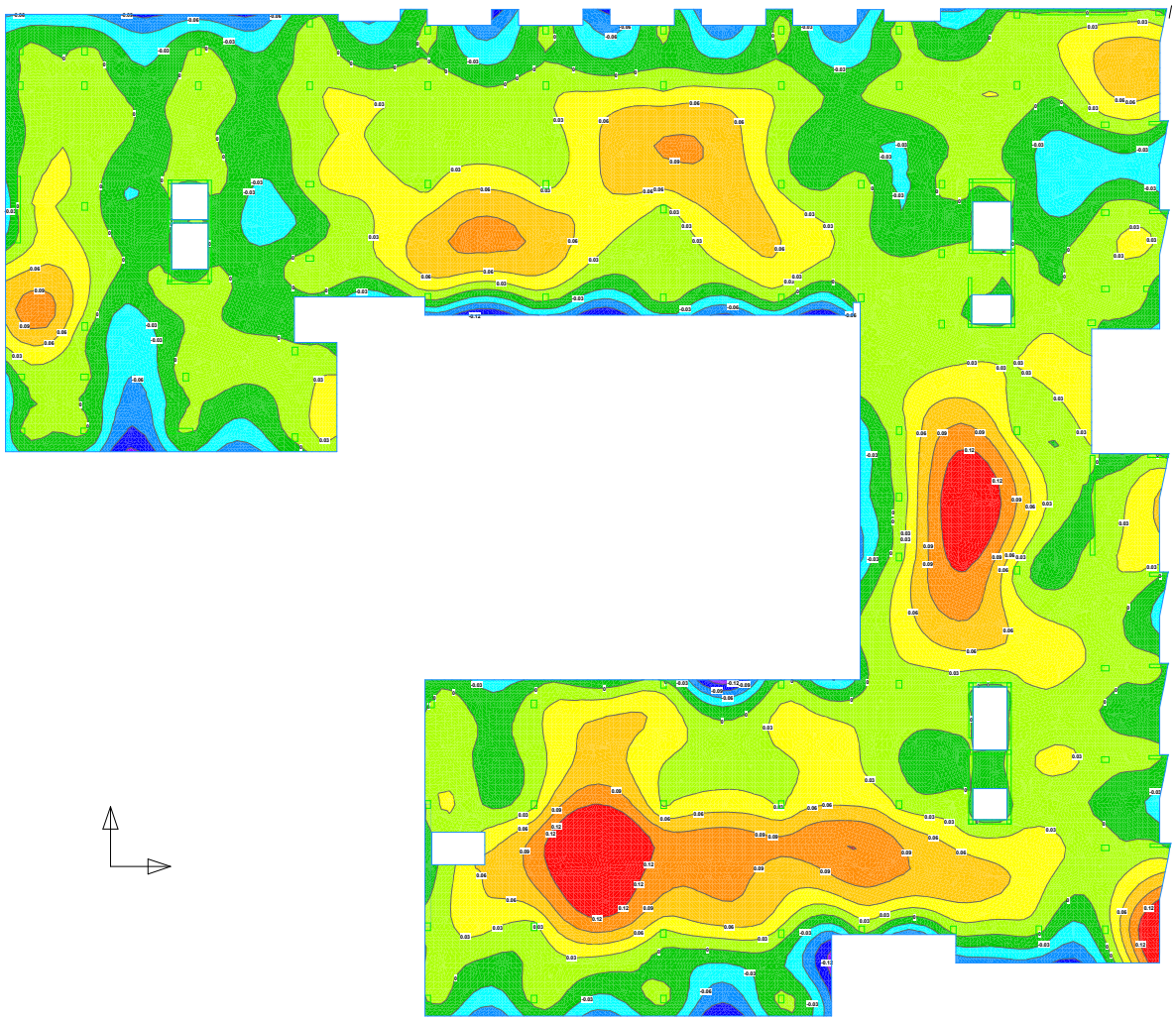


Service LC: D + 0.75L + 0.75Lr: Min Deflection Plan

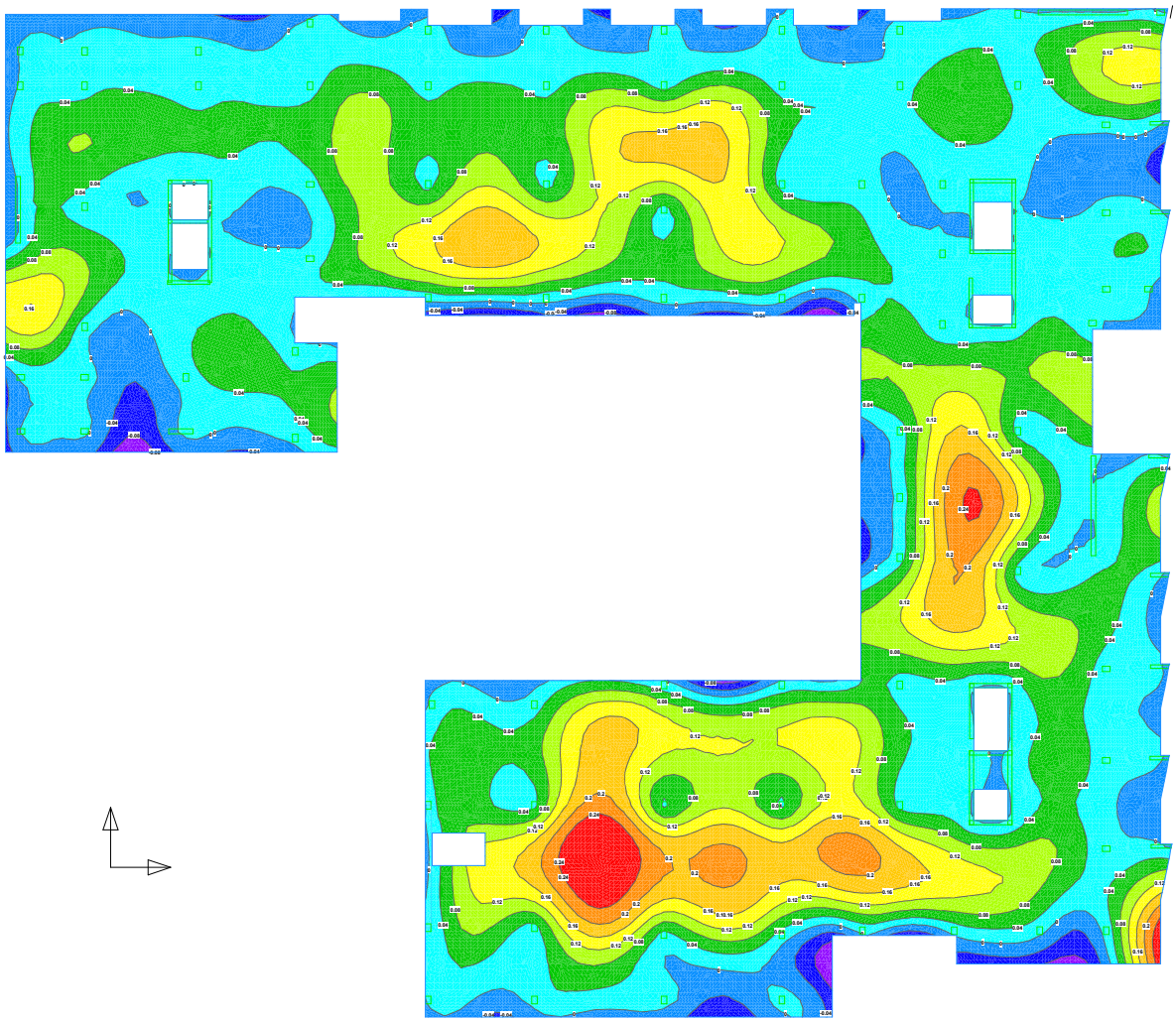
Service LC: D + 0.75L + 0.75Lr: User Lines; User Notes; User Dimensions;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:240
Service LC: D + 0.75L + 0.75Lr - Vertical Deflection Plot (Minimum Values)

-0.12 -0.09 -0.06 -0.03 0 0.03 0.06 0.09 0.12

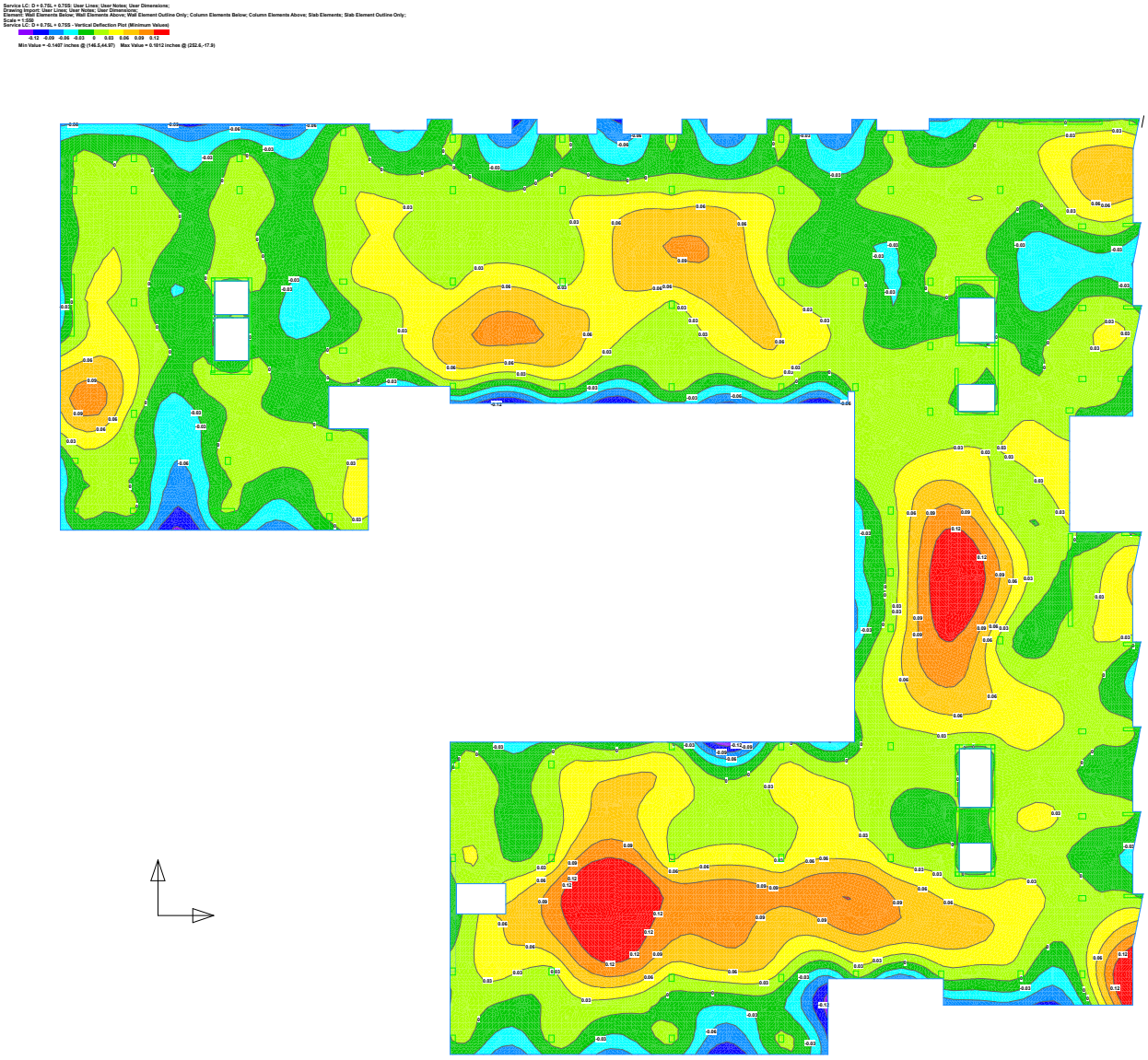
Min Value = -0.1497 inches @ (146.5,44.97) Max Value = 0.1012 inches @ (252.6, -17.9)



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

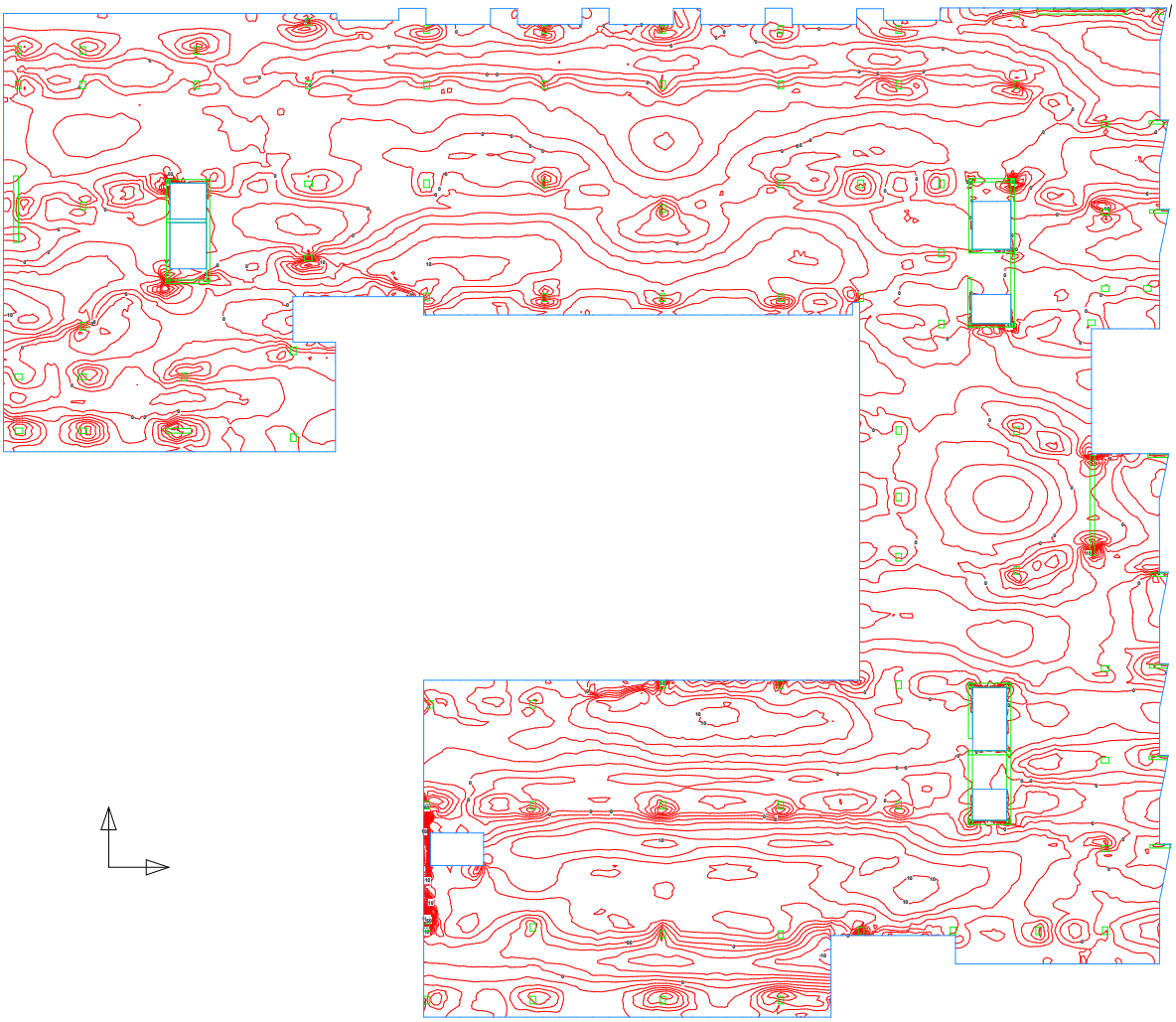


Service LC: D + 0.75L + 0.75S: Min Deflection Plan



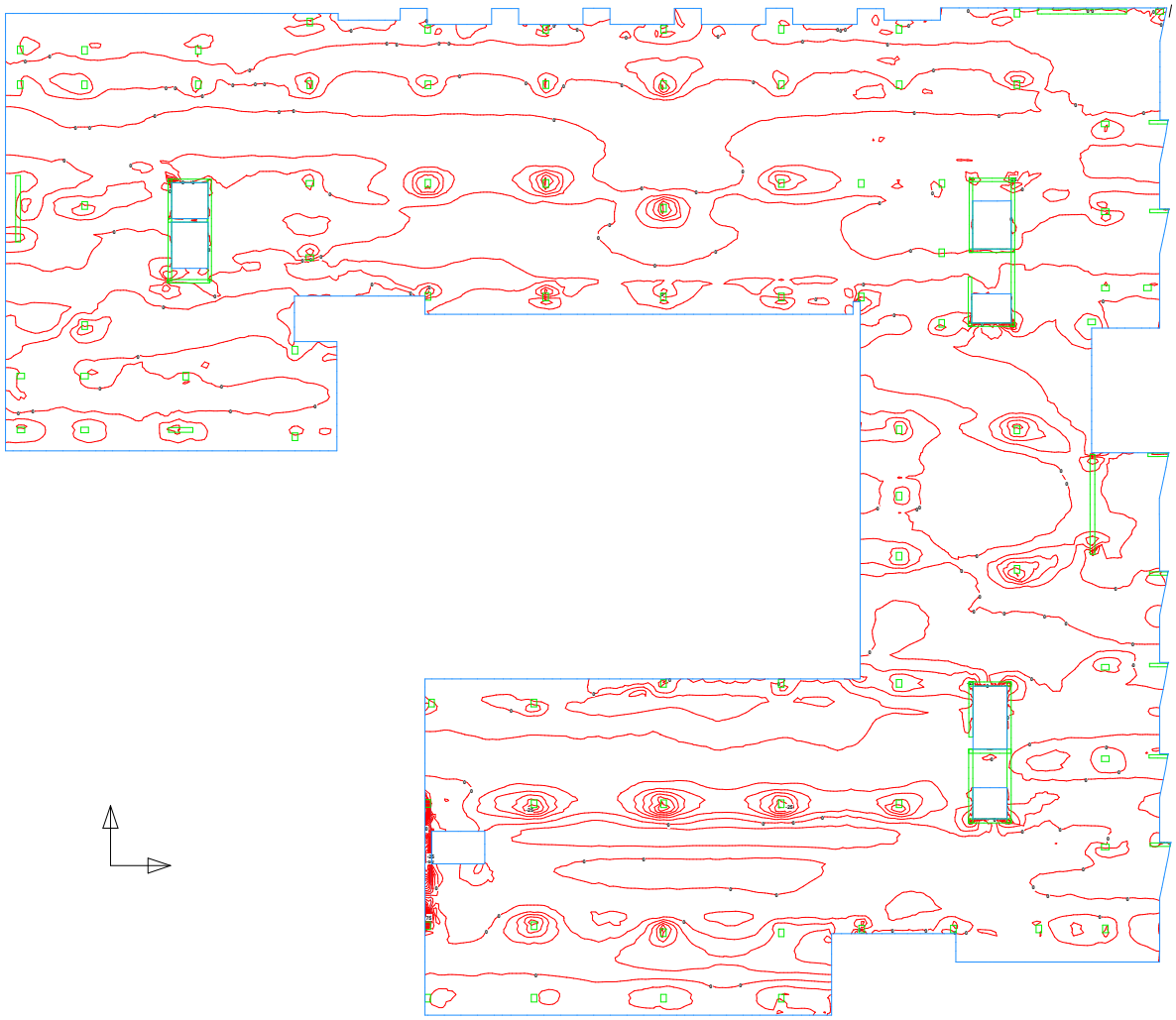
Factored LC: 1.4D: Max Mx Plan

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 = 1:120
Factored LC: 1.4D - Bending Moment Plot (Maximum Values) (X-Axis Direction)
Area Contour = 2 Kips
Min Value = -28.35 Kips @ (76.39,3.311) Max Value = 124.5 Kips @ (75.72,-12.64)



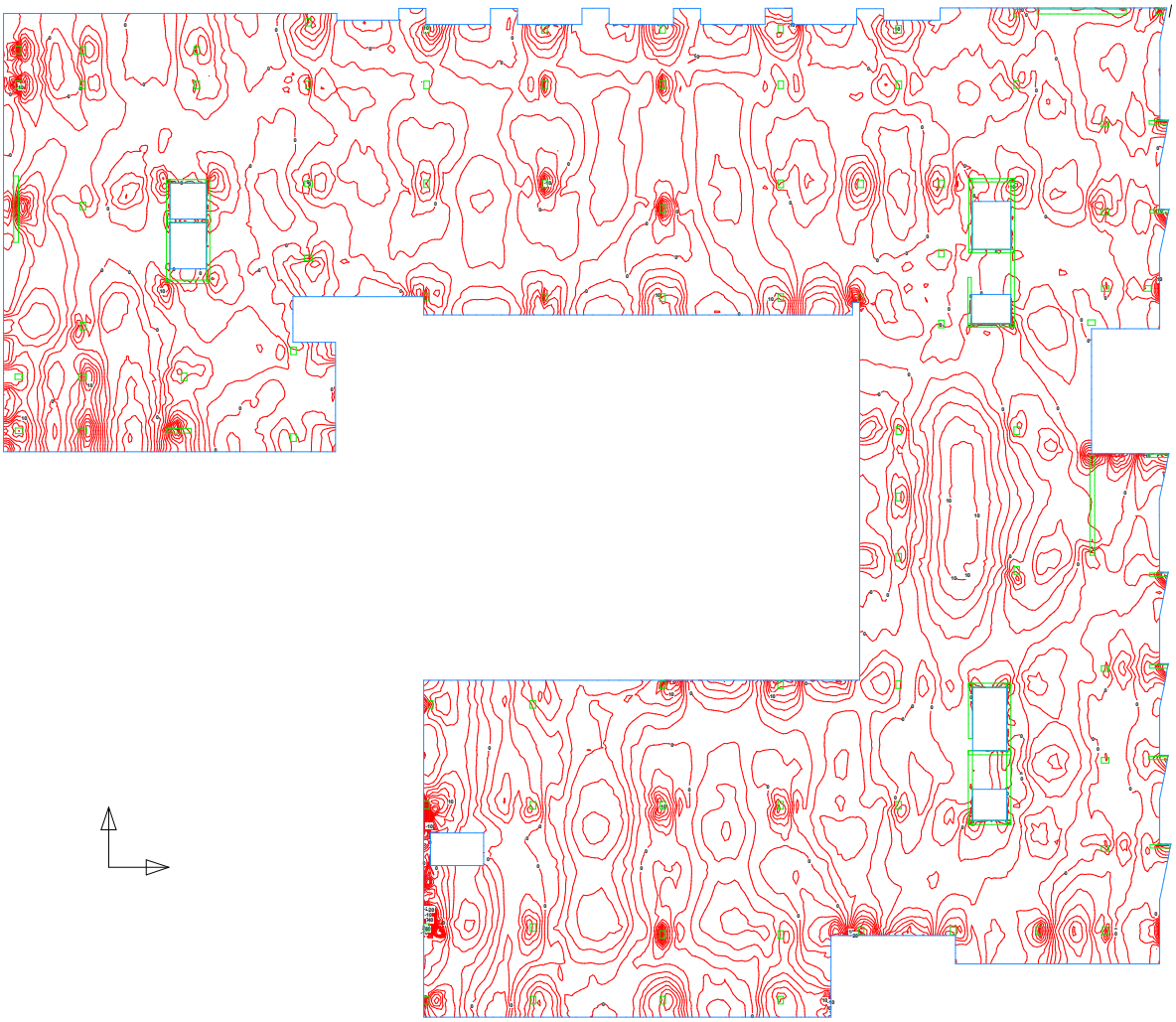
Factored LC: 1.4D: Min Mx Plan

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 = 1:120
Factored LC: 1.4D - Bending Moment Plot (Minimum Values) (X-Axis Direction)
Area Contour = 5 Kips
Min Value = -62.46 Kips @ (76.72,1.471) Max Value = 114.2 Kips @ (75.72,-12.64)



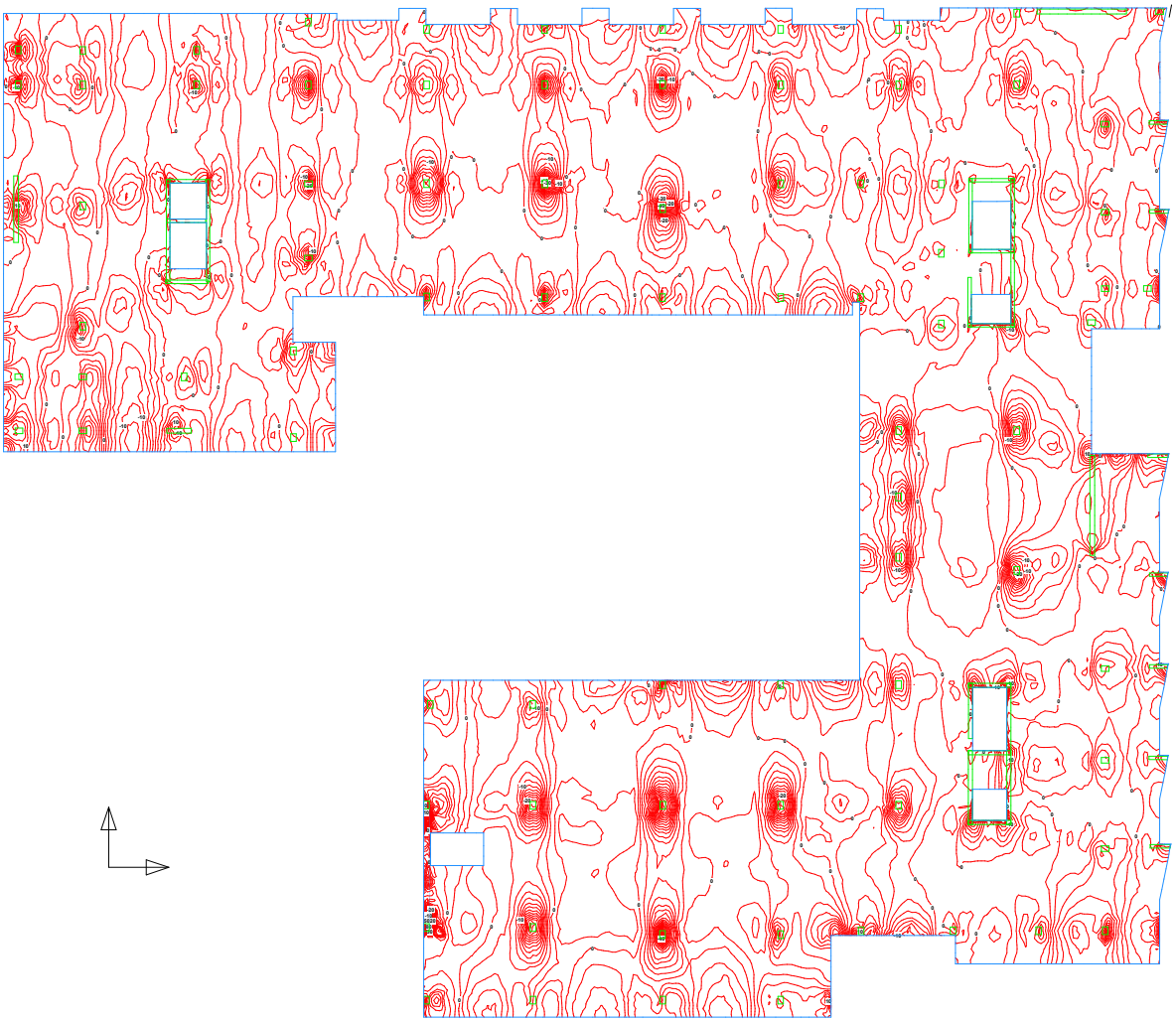
Factored LC: 1.4D: Max My Plan

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 = 1:120
Factored LC: 1.4D - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
Area Contour = 2 Kips
Min Value = -40.64 Kips @ (77.05,11.29) Max Value = 107.9 Kips @ (76.72,-13.25)



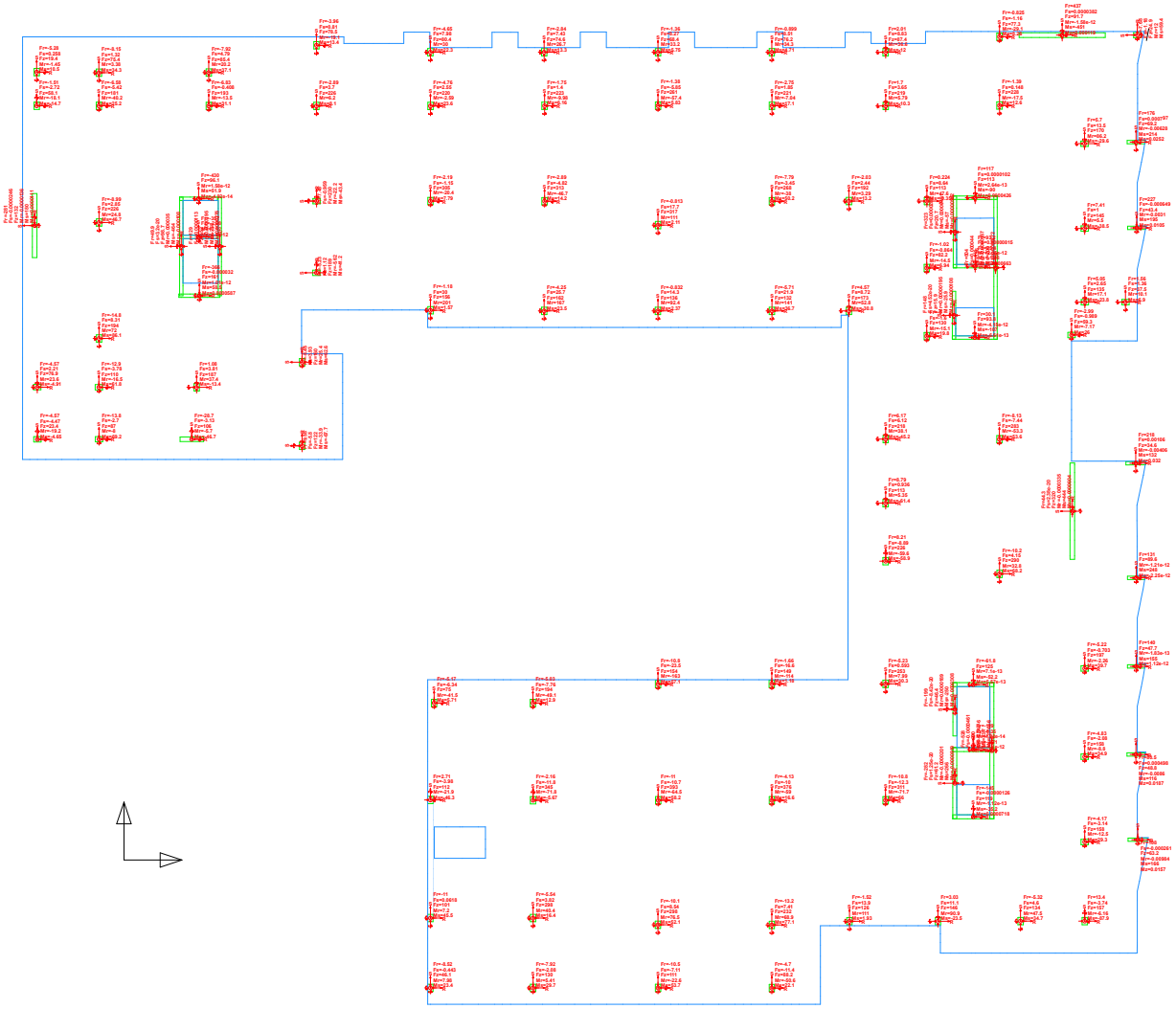
Factored LC: 1.4D: Min My Plan

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 = 1:120
Factored LC: 1.4D - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
Area Contour = 2 Kips
Min Value = -53.39 Kips @ (132.7,-16.1) Max Value = 95.67 Kips @ (76.72,-13.28)



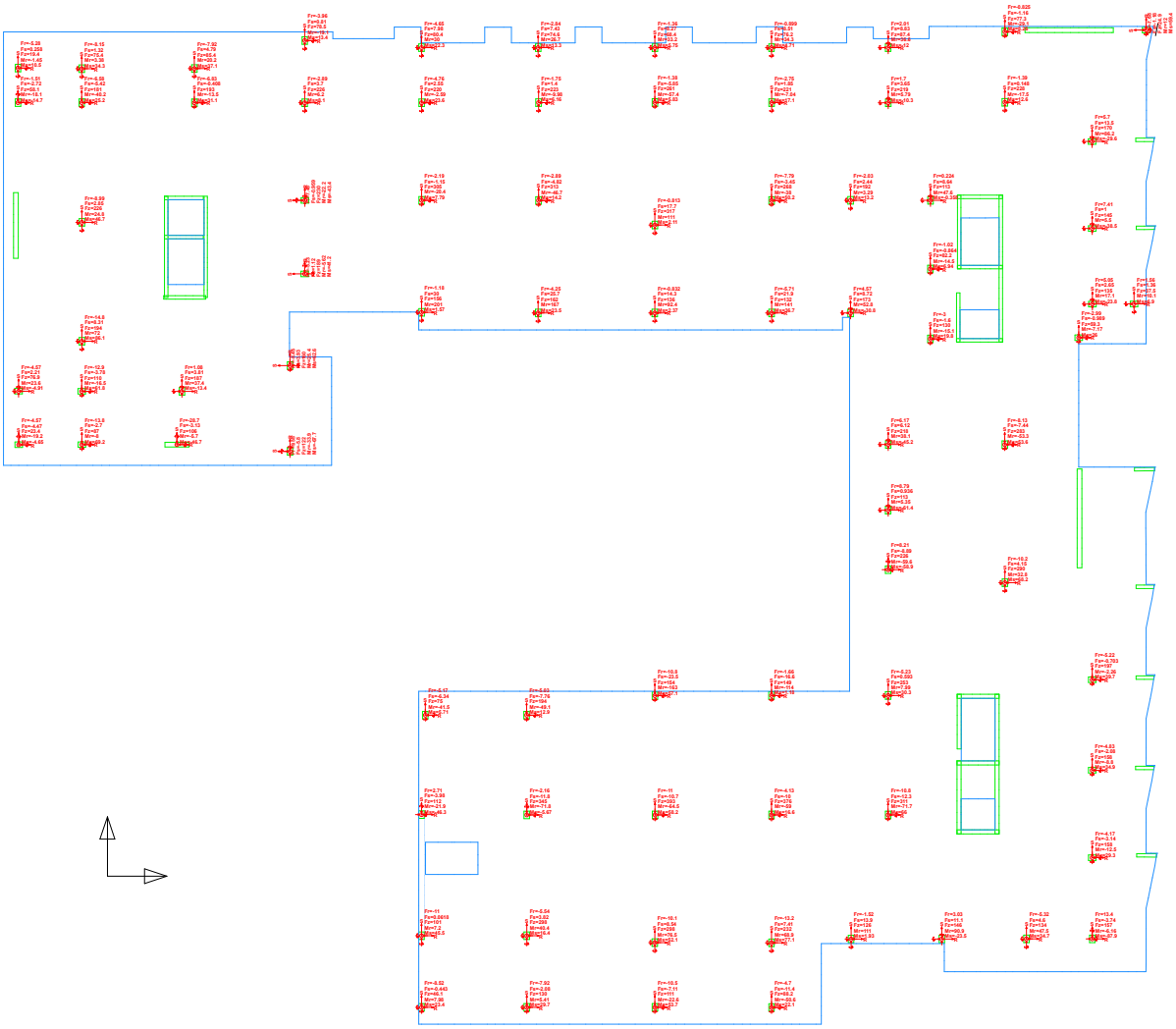
Factored LC: 1.4D: Std Reactions Plan

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 = 1:100
Factored LC: 1.4D - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fz,Fx,Fz,Mr,Mx,My)(Standard Context)



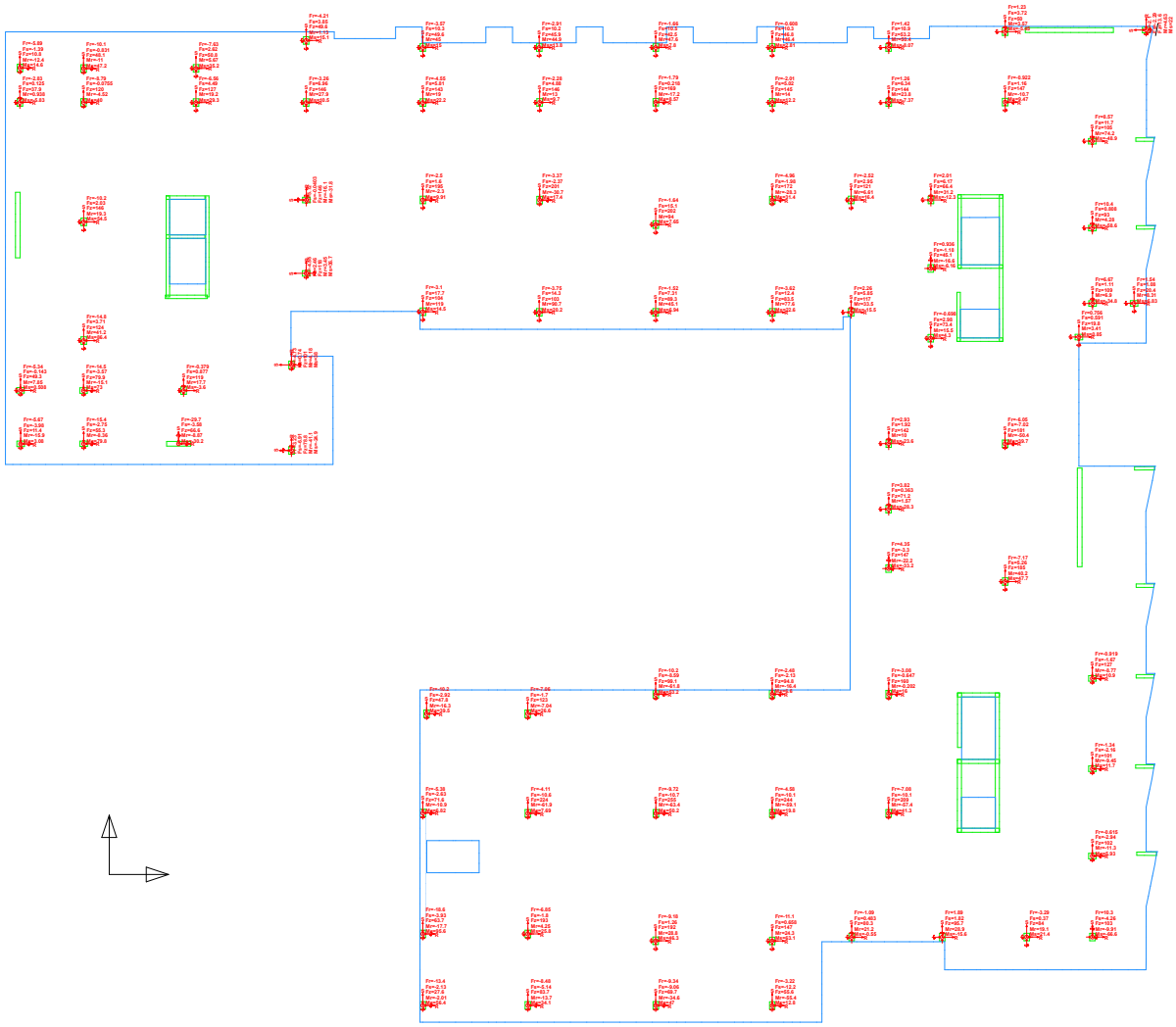
Factored LC: 1.4D: Max Reactions Plan

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 = 1:100
Factored LC: 1.4D - Reaction Plot: (Column Below)(Fz,Fx,Fy,Mr,Mx,My)(Max Fz Context)



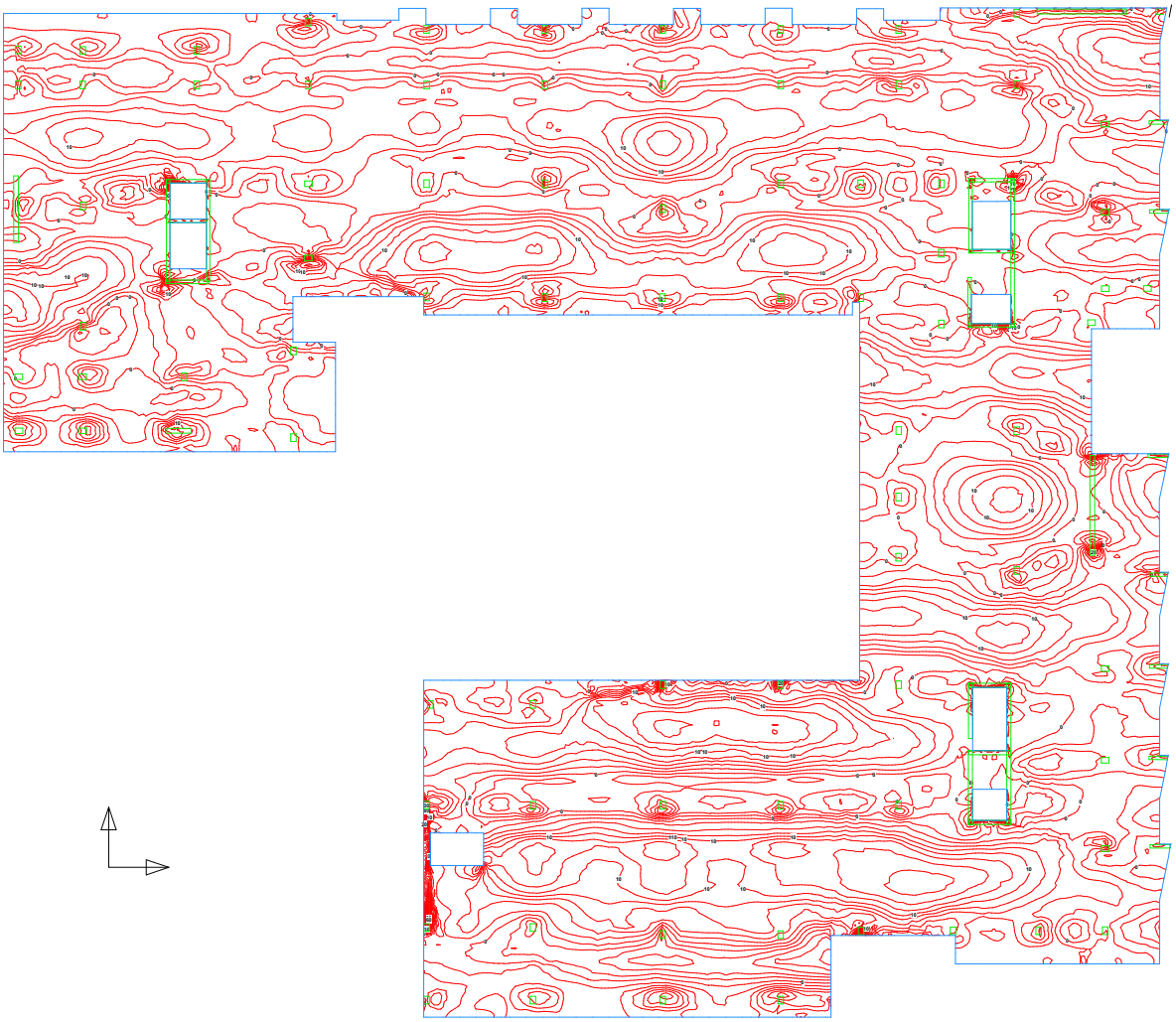
Factored LC: 1.4D: Min Reactions Plan

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 = 1:100
Factored LC: 1.4D - Reaction Plot: (Column Below)(Fz,Fx,Fy,Mr,My,Mx)(Min Fz Context)



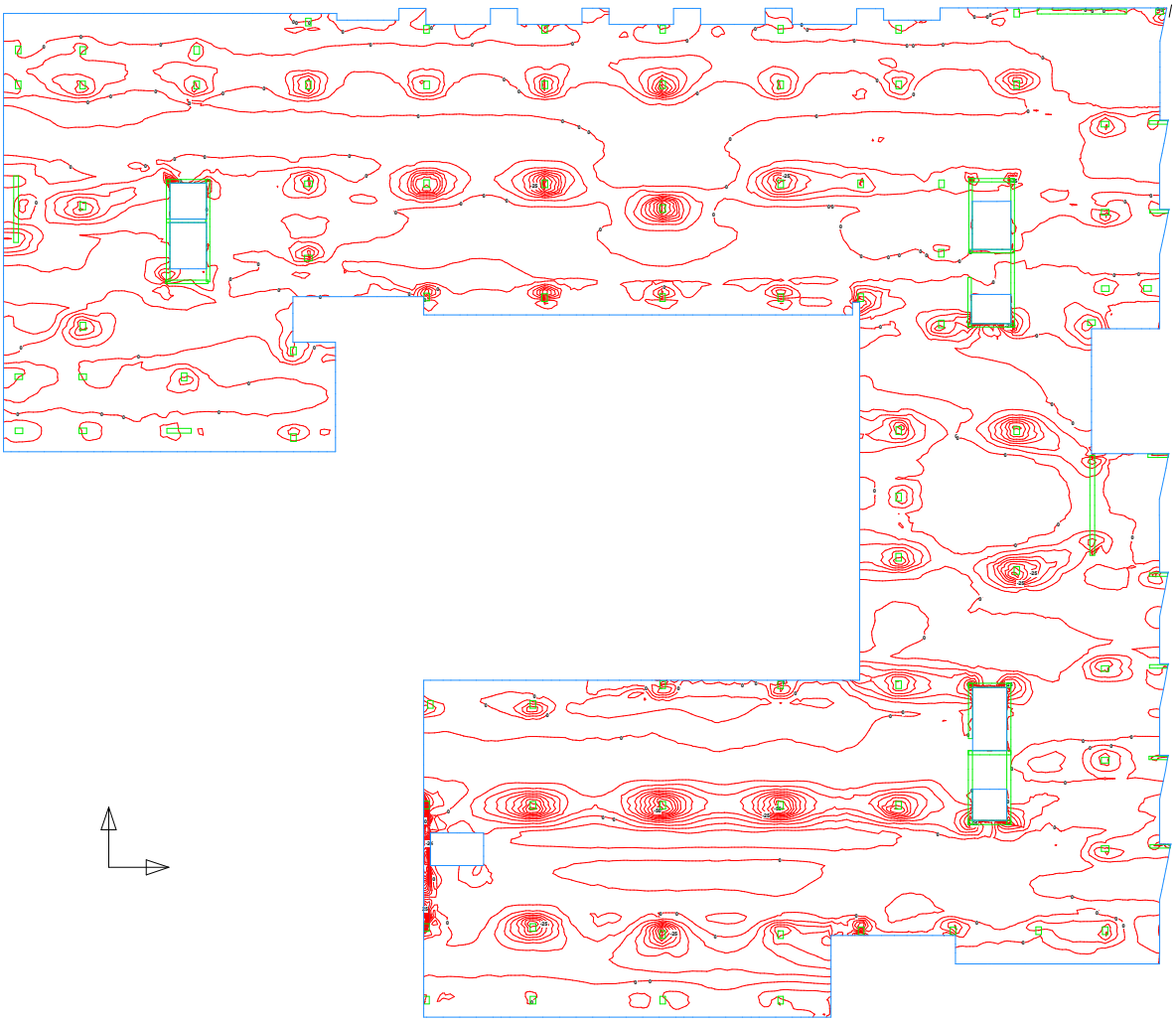
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Mx Plan

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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Maximum Values) (X-Axis Direction)
Plot Contour = 2 Kips
Min Value = -26.94 Kips @ (217.3,165.4) Max Value = 124.5 Kips @ (75.72,-12.64)



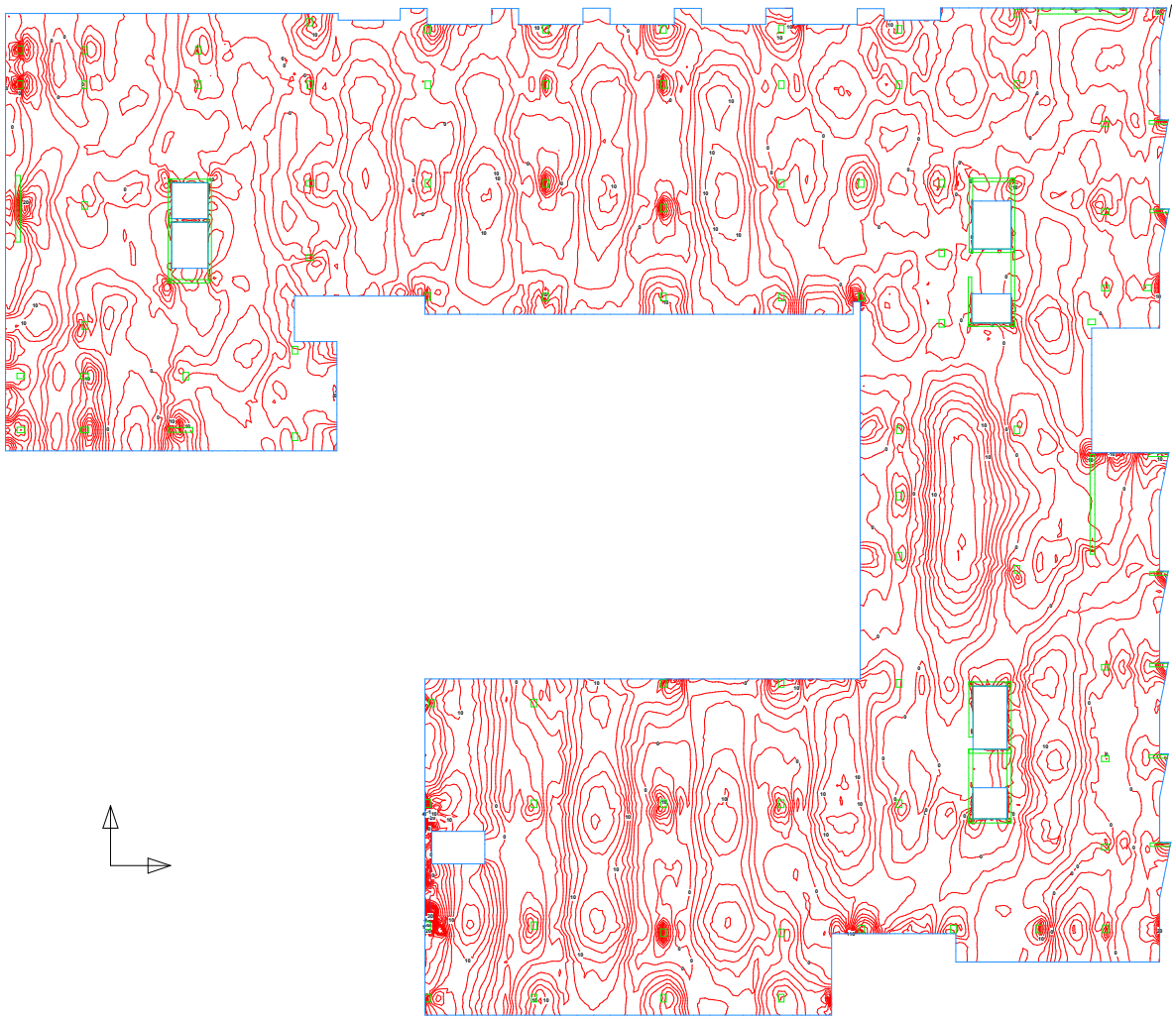
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Mx Plan

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 = 1:120
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Minimum Values) (X-Axis Direction)
Area Contour = 5 Kips
Min Value = -62.48 Kips @ (76.72,1.471) Max Value = 107.1 Kips @ (75.72,-12.64)



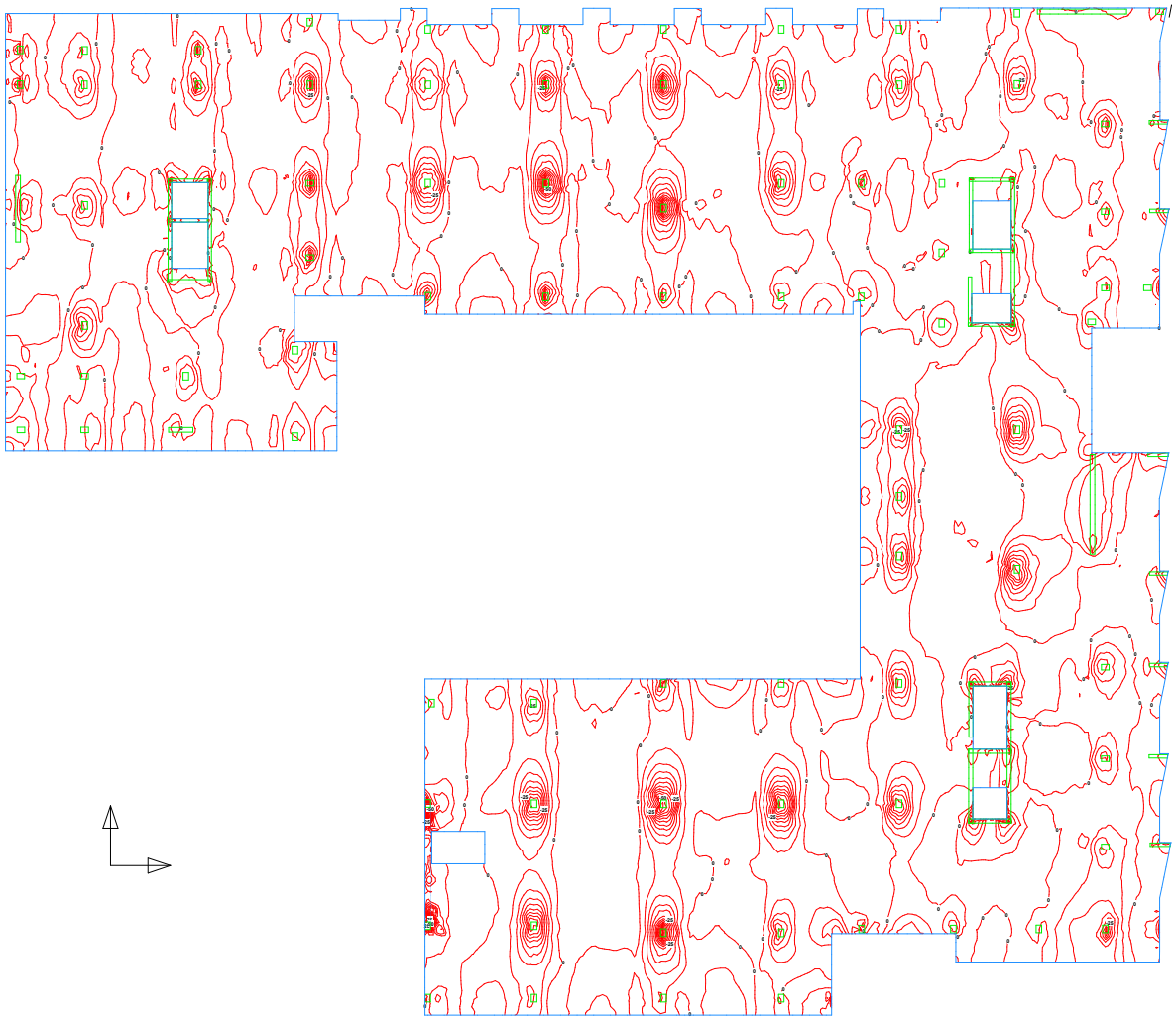
Factored LC: 1.2D + 1.6L + 0.5Lr: Max My Plan

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 = 1:120
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
Area Contour = 2 Kips
Min Value = -39.62 Kips @ (77.05,11.29) Max Value = 107.9 Kips @ (76.72,-13.25)



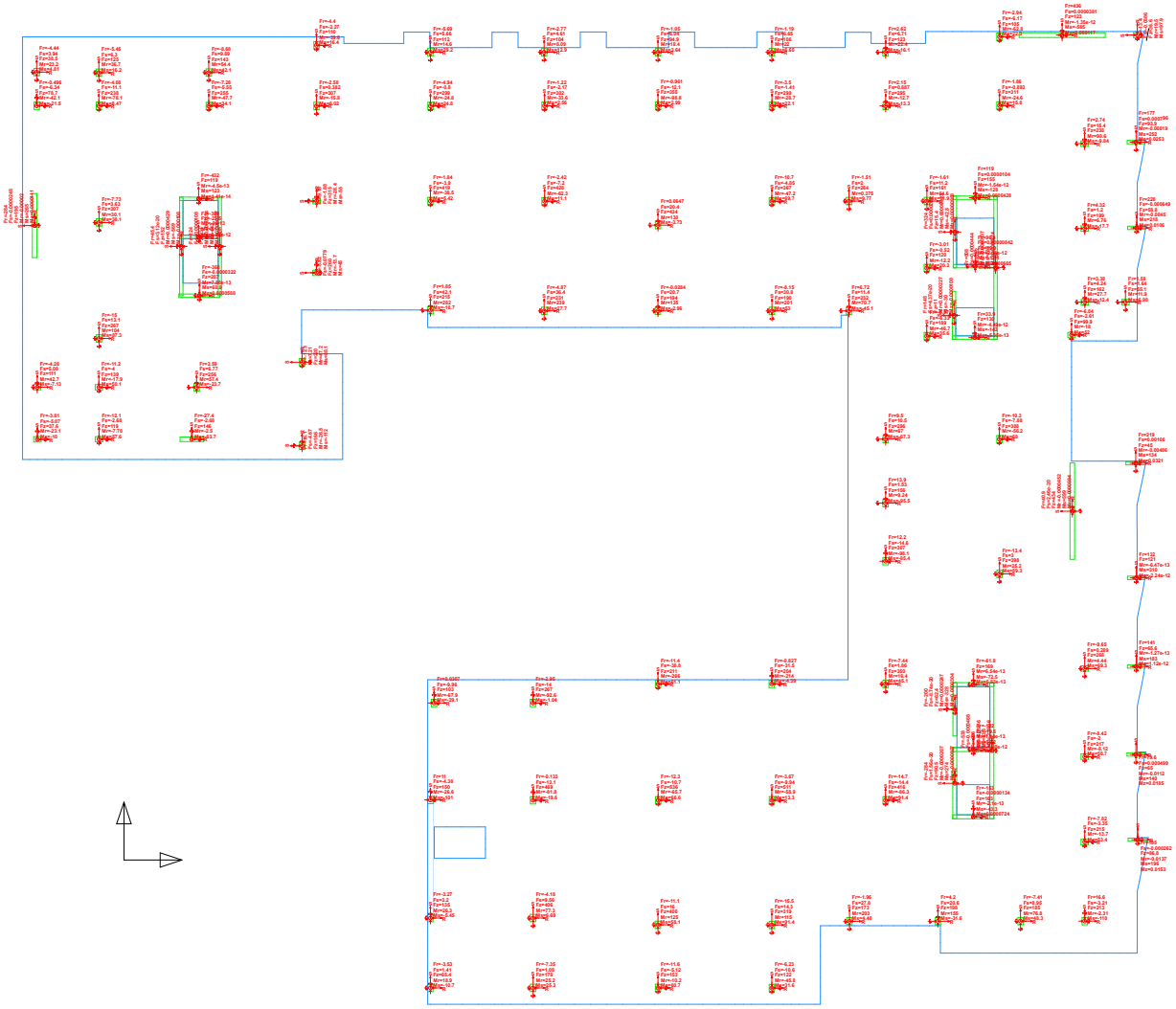
Factored LC: 1.2D + 1.6L + 0.5Lr: Min My Plan

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 = 1:120
Factored LC: 1.2D + 1.6L + 0.5Lr - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
Area Contour = 5 Kips
Min Value = -91.96 Kips @ (132.7,-16.1) Max Value = 83.46 Kips @ (76.72,-13.28)



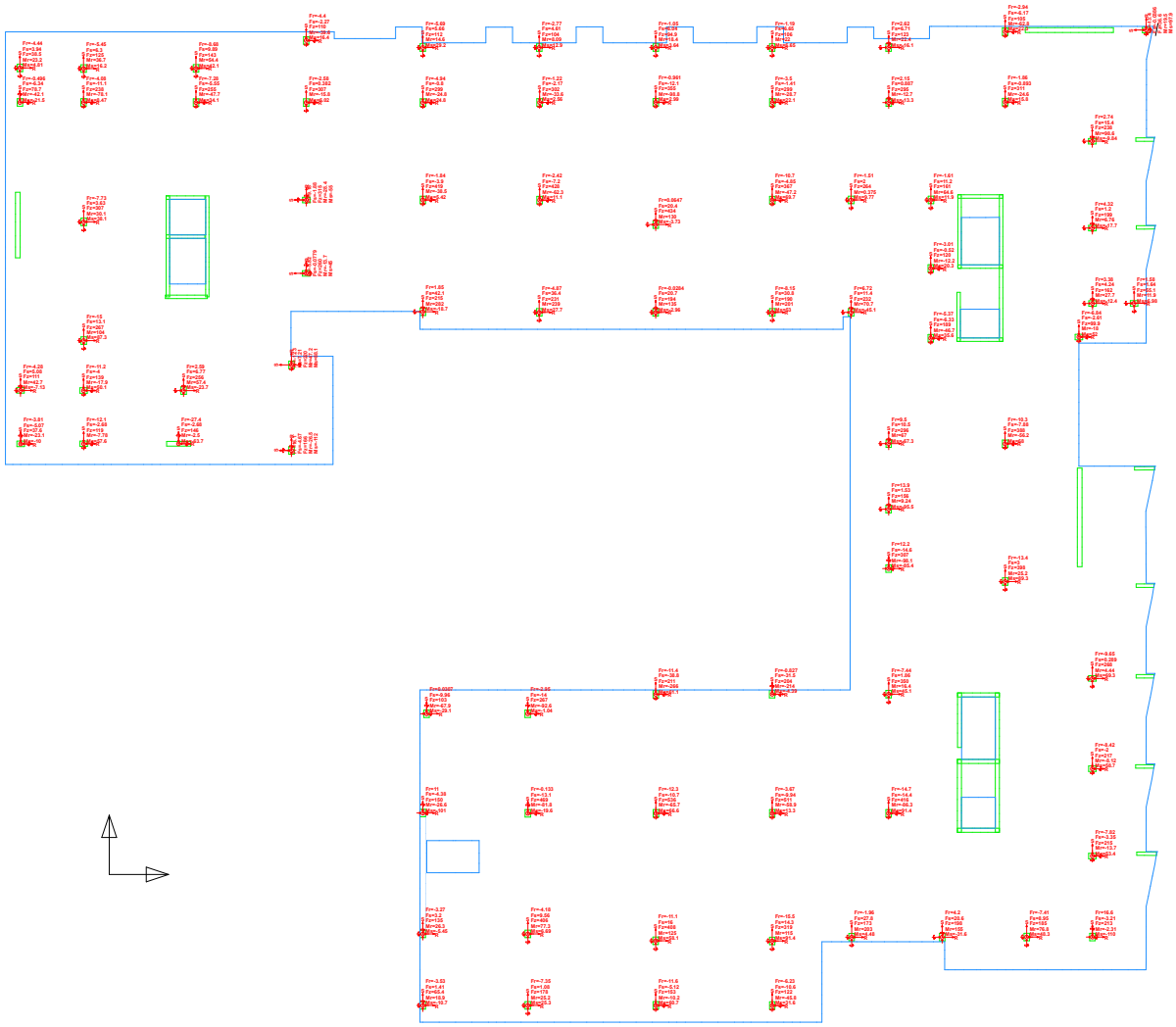
Factored LC: 1.2D + 1.6L + 0.5Lr: Std Reactions Plan

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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fz,Fx,Fz,Mr,Mx,Mz)(Standard Context)



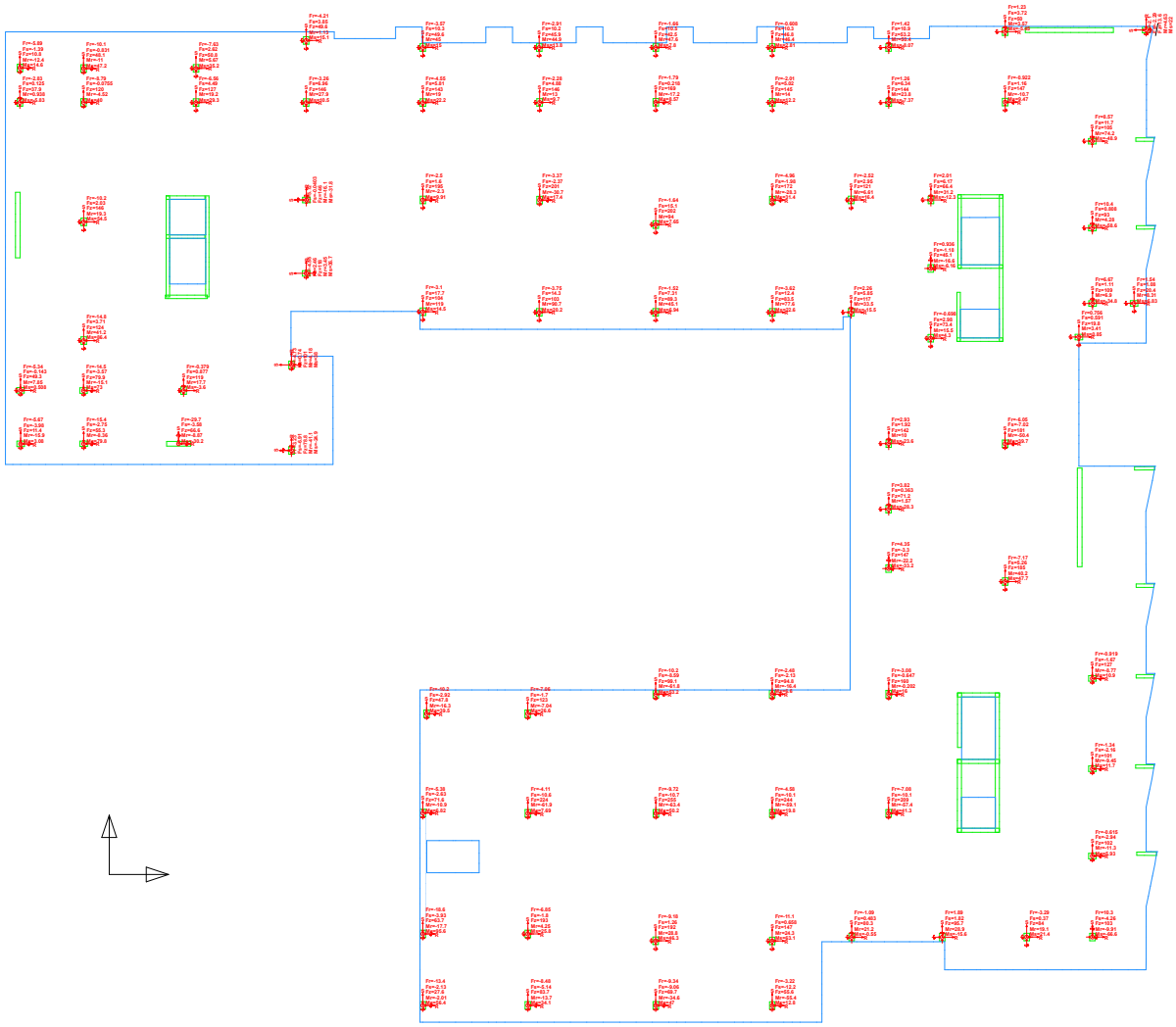
Factored LC: 1.2D + 1.6L + 0.5Lr: Max Reactions Plan

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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,My,Mx,Mz)(Max Fz Contest)



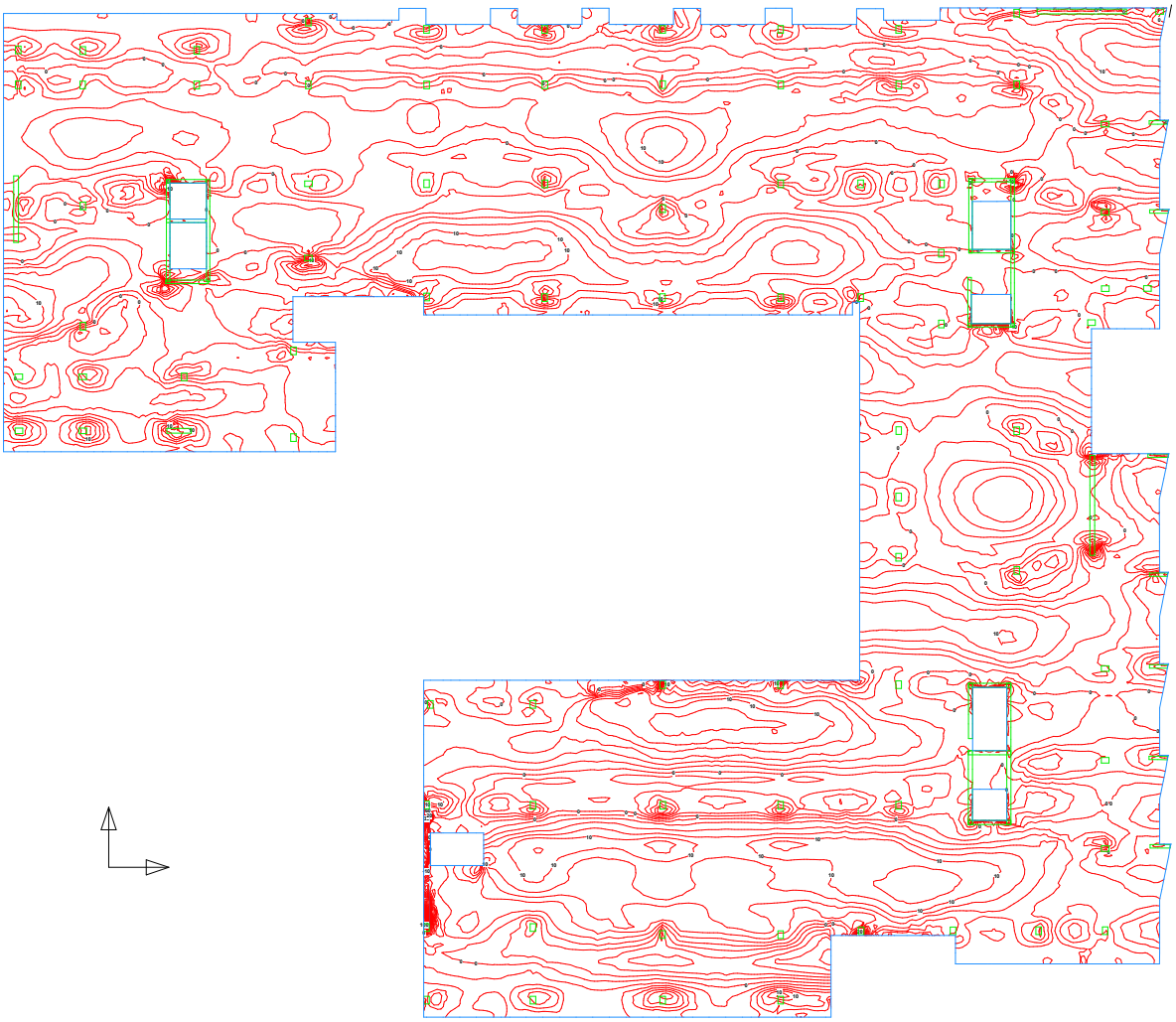
Factored LC: 1.2D + 1.6L + 0.5Lr: Min Reactions Plan

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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5Lr - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,My,Mx,Mz)(Min Fr Context)



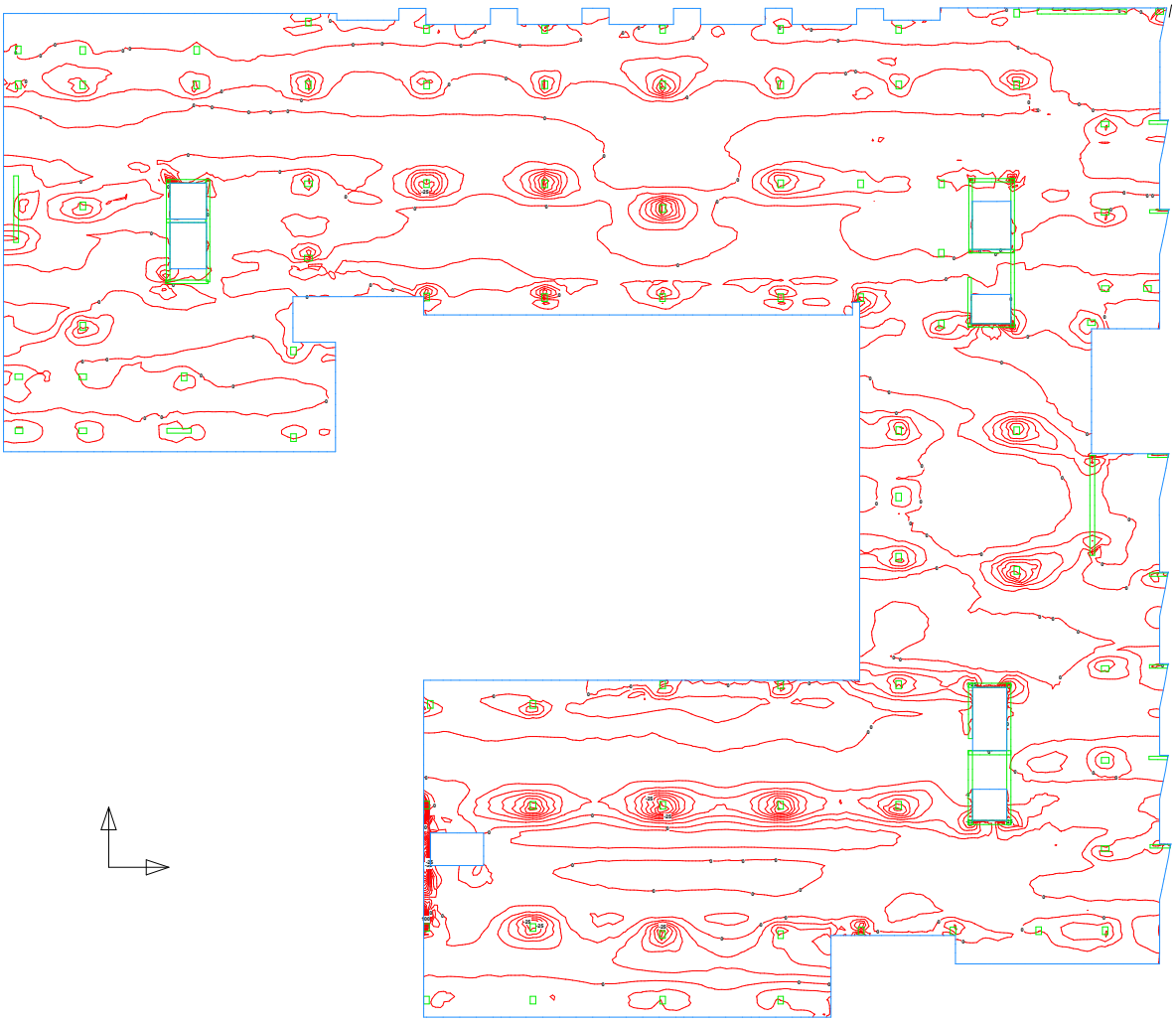
Factored LC: 1.2D + f1L + 1.6Lr: Max Mx Plan

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 = 1:120
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Maximum Values) (X-Axis Direction)
Area Contour = 2 Kips
Min Value = -26.64 Kips @ (217.3,165.4) Max Value = 124.5 Kips @ (75.72,-12.64)



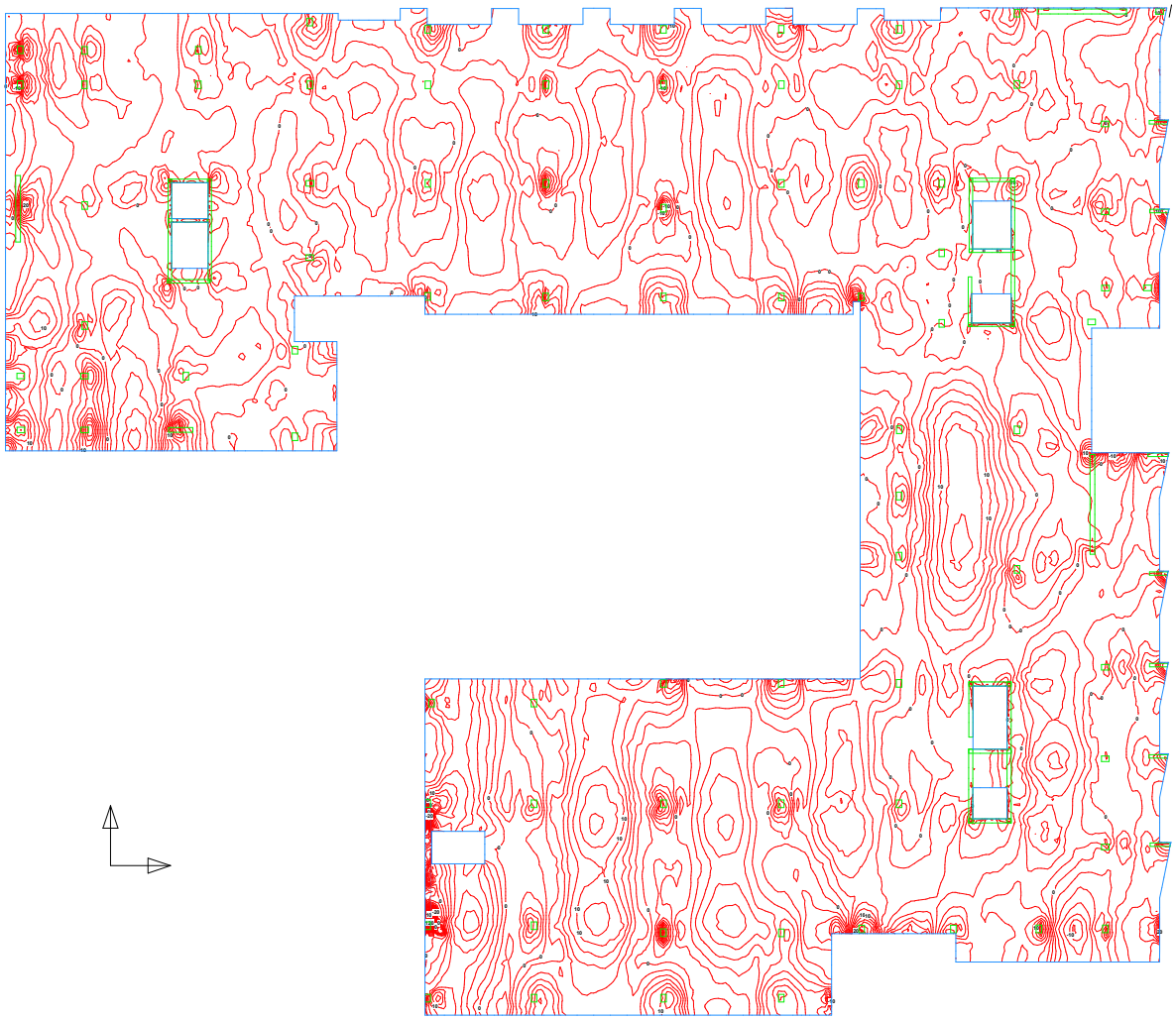
Factored LC: 1.2D + f1L + 1.6Lr: Min Mx Plan

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 = 1:120
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Minimum Values) (X-Axis Direction)
Area Contour = 5 Kips
Min Value = -62.46 Kips @ (76.72,1.471) Max Value = 111.3 Kips @ (75.72,-12.64)



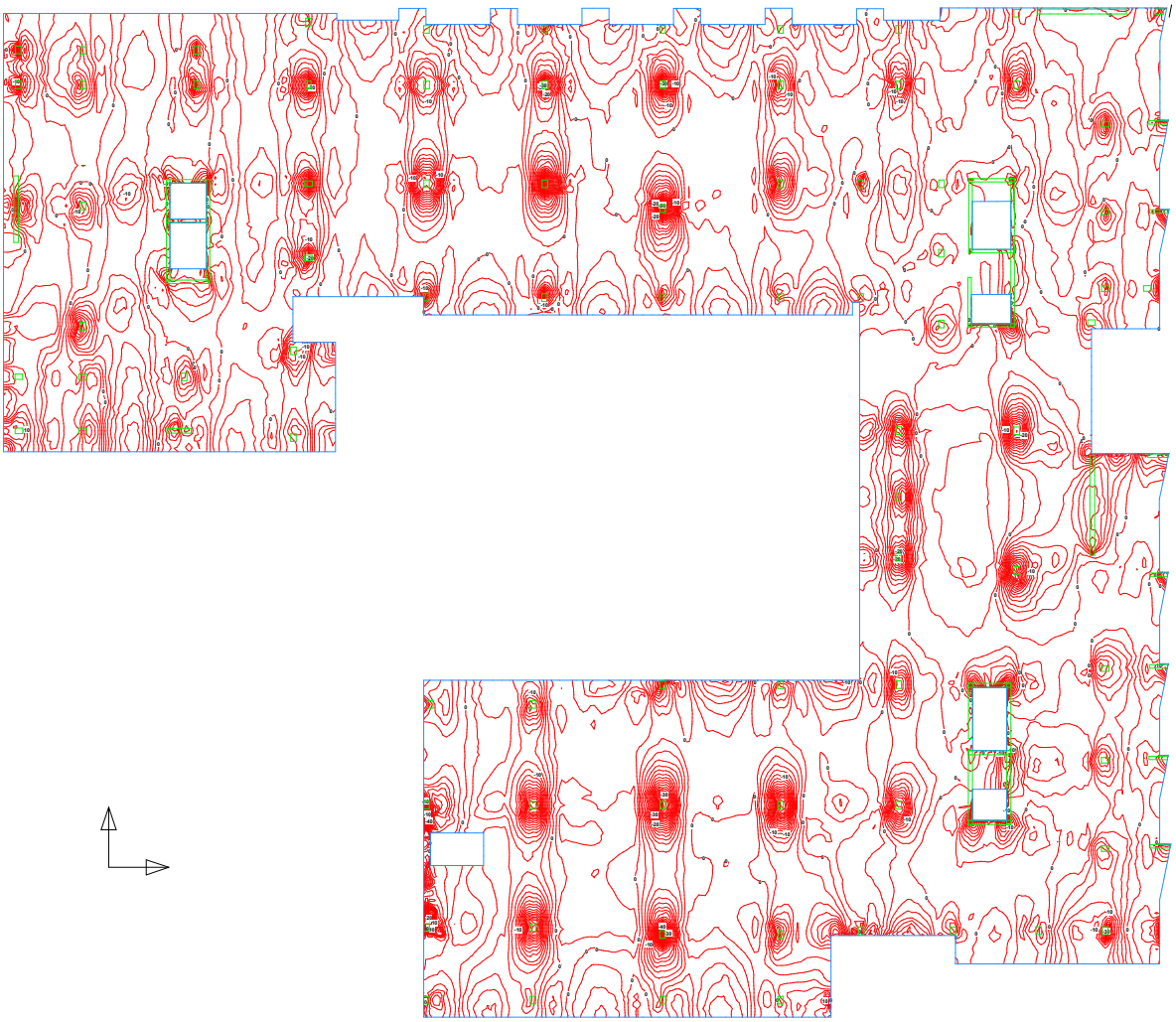
Factored LC: 1.2D + f1L + 1.6Lr: Max My Plan

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 = 1:120
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
Area Contour = 2 Kips
Min Value = -40.14 Kips @ (77.05,11.29) Max Value = 107.9 Kips @ (76.72,-13.25)



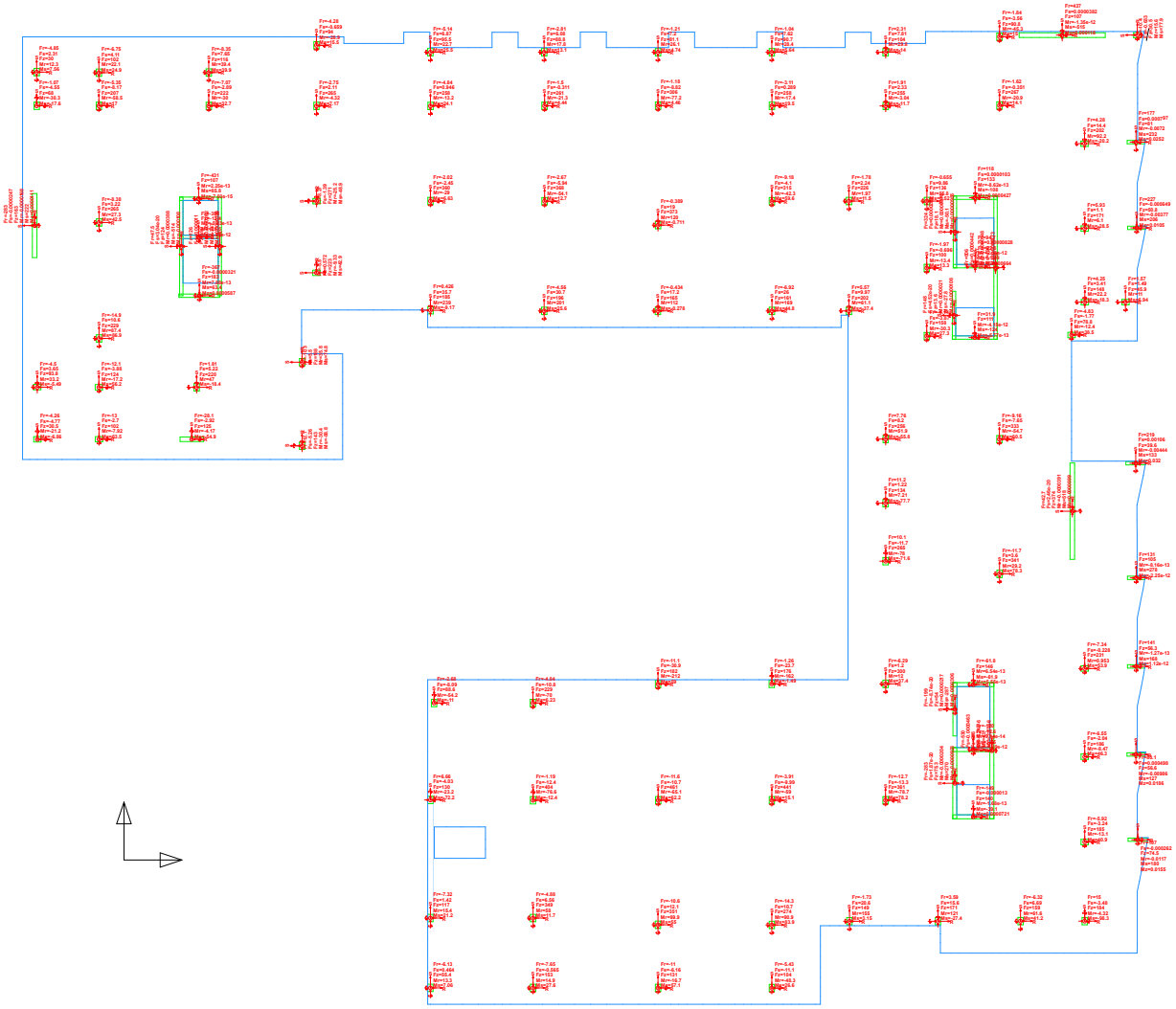
Factored LC: 1.2D + f1L + 1.6Lr: Min My Plan

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 = 1:120
Factored LC: 1.2D + f1L + 1.6Lr - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
Area Contour = 2 Kips
Min Value = -67.68 Kips @ (132.7,-16.1) Max Value = 89.93 Kips @ (76.72,-13.28)



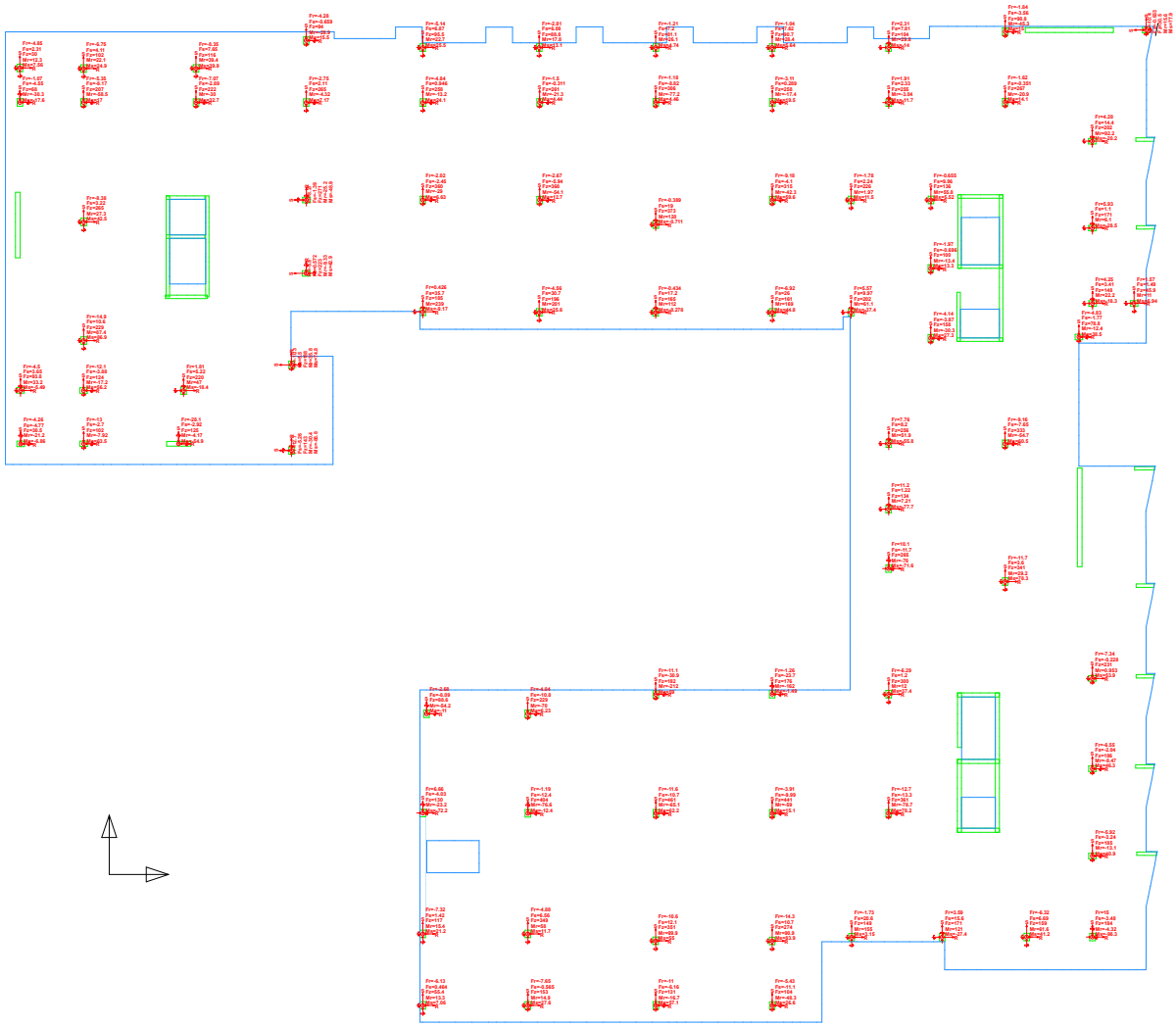
Factored LC: 1.2D + f1L + 1.6Lr: Std Reactions Plan

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 = 1:100
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fz,Fx,Fz,Mr,Mx,Mz)(Standard Context)



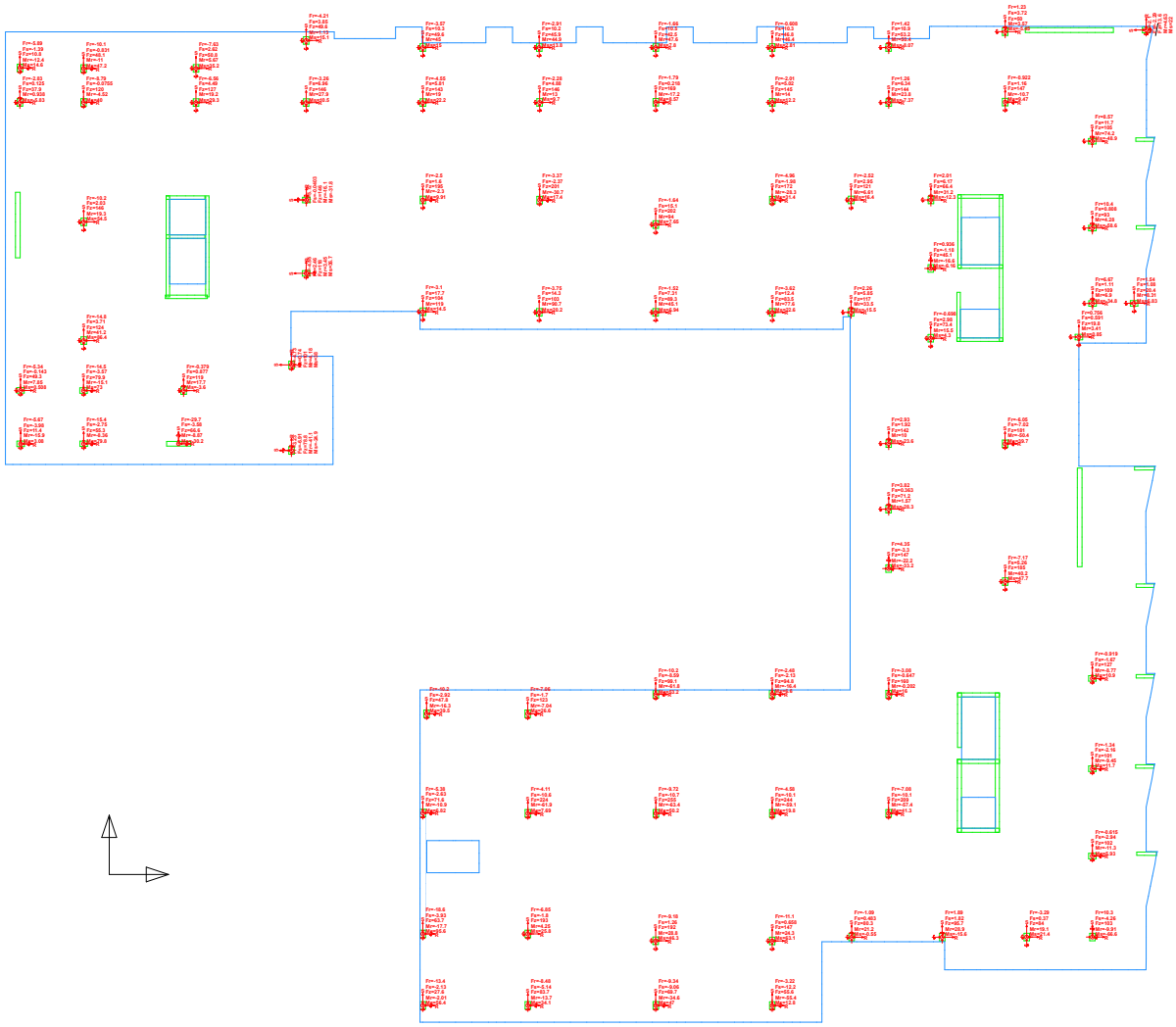
Factored LC: 1.2D + f1L + 1.6Lr: Max Reactions Plan

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 = 1:100
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Column Below)(Fz,Fx,Fz,Mr,Mx,My)(Max Fz Context)



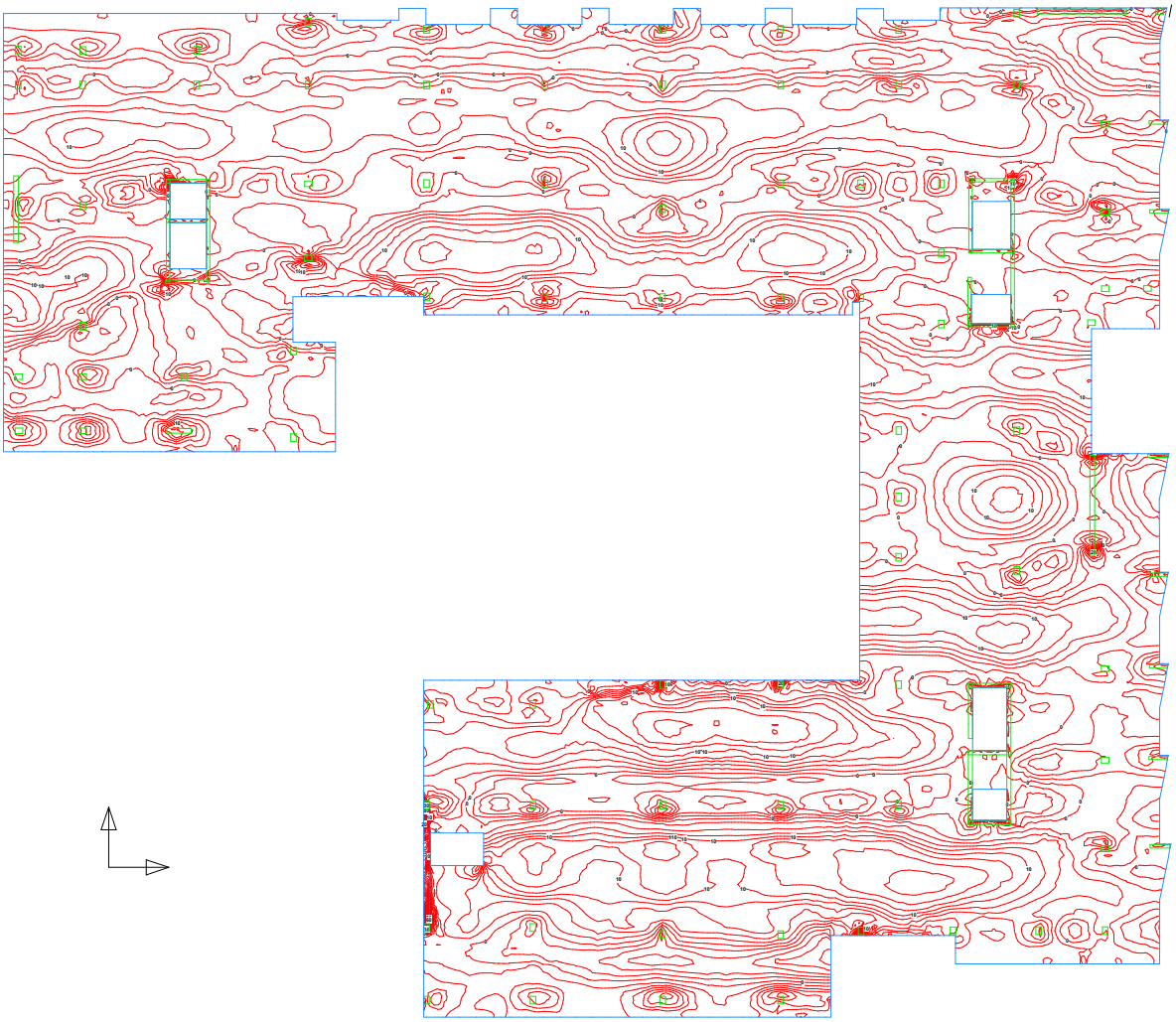
Factored LC: 1.2D + f1L + 1.6Lr: Min Reactions Plan

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 = 1:500
Factored LC: 1.2D + f1L + 1.6Lr - Reaction Plot: (Column Below)(Fz,Fx,Fz,Mr,Mx,My)(Min Fz Context)



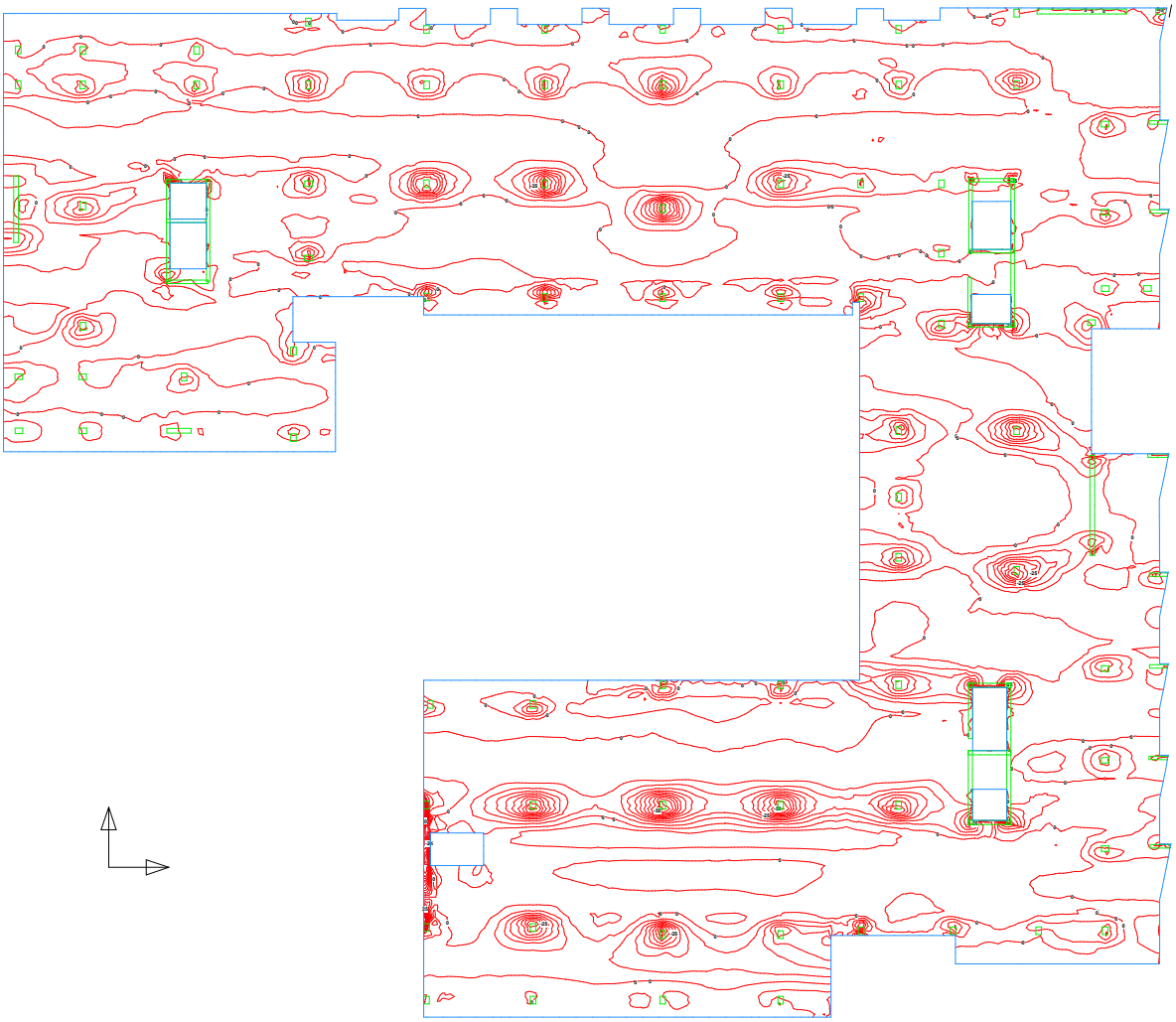
Factored LC: 1.2D + 1.6L + 0.5S: Max Mx Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Maximum Values) (X-Axis Direction)
Plot Contour = 2 Kips
Min Value = -26.94 Kips @ (217.3,165.4) Max Value = 124.5 Kips @ (75.72,-12.64)



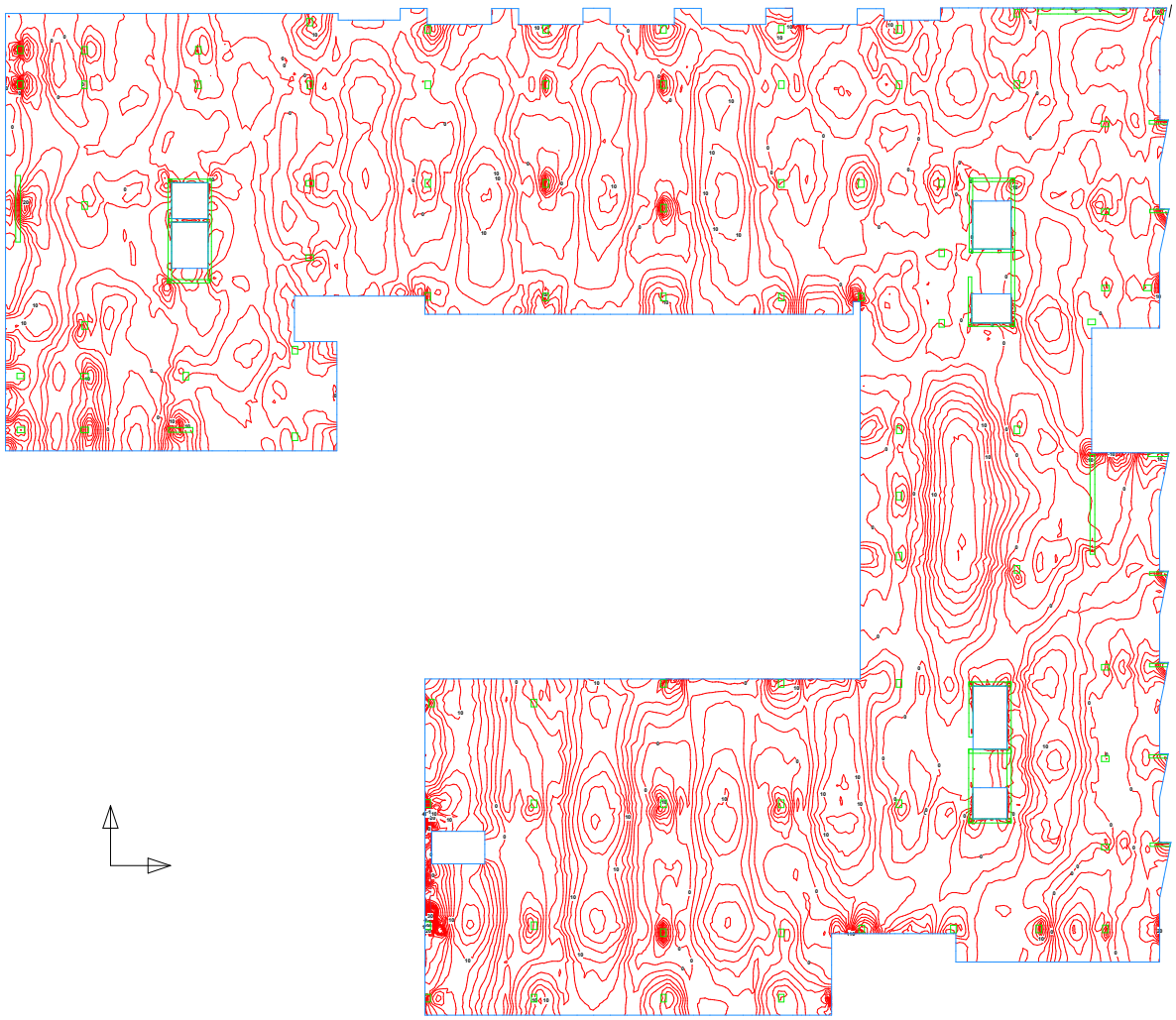
Factored LC: 1.2D + 1.6L + 0.5S: Min Mx Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:120
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Minimum Values) (X-Axis Direction)
Area Contour = 5 Kips
Min Value = -62.46 Kips @ (76.72,1.471) Max Value = 107.1 Kips @ (75.72,-12.64)



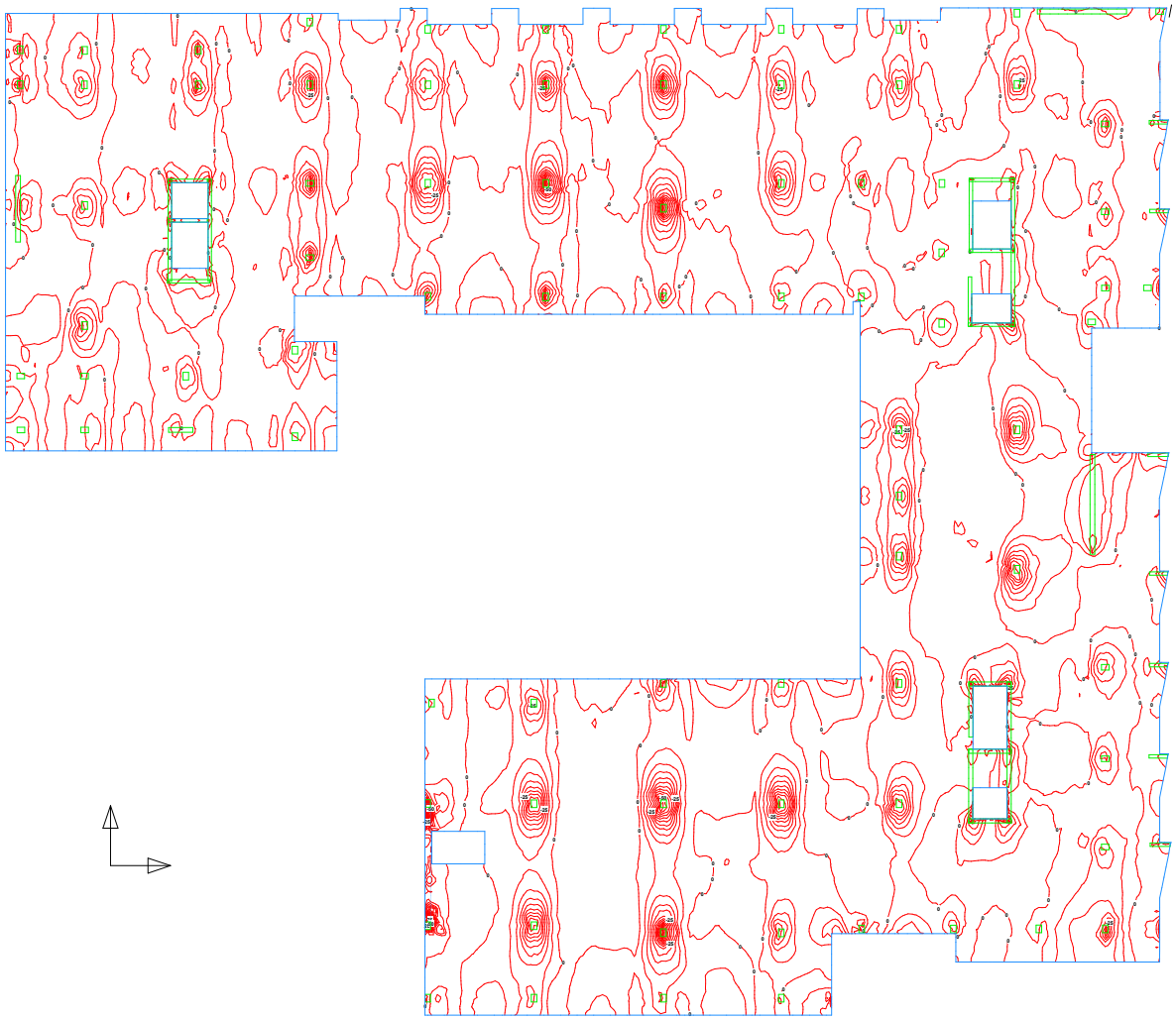
Factored LC: 1.2D + 1.6L + 0.5S: Max My Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:120
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
Area Contour = 2 Kips
Min Value = -39.62 Kips @ (77.05,11.29) Max Value = 107.9 Kips @ (76.72,-13.25)



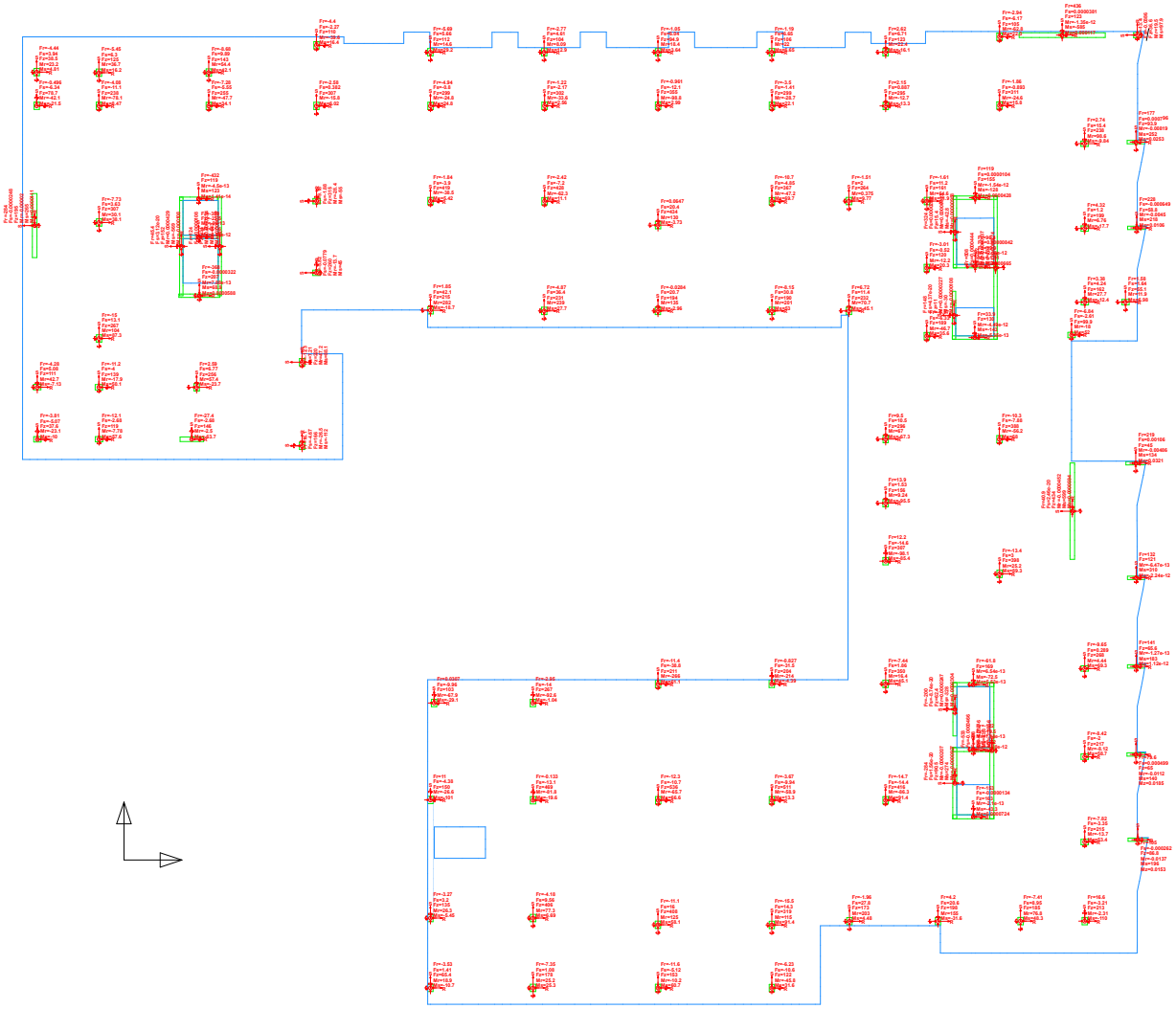
Factored LC: 1.2D + 1.6L + 0.5S: Min My Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:120
Factored LC: 1.2D + 1.6L + 0.5S - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
Area Contour = 5 Kips
Min Value = -91.96 Kips @ (132.7,-16.1) Max Value = 83.46 Kips @ (76.72,-13.28)



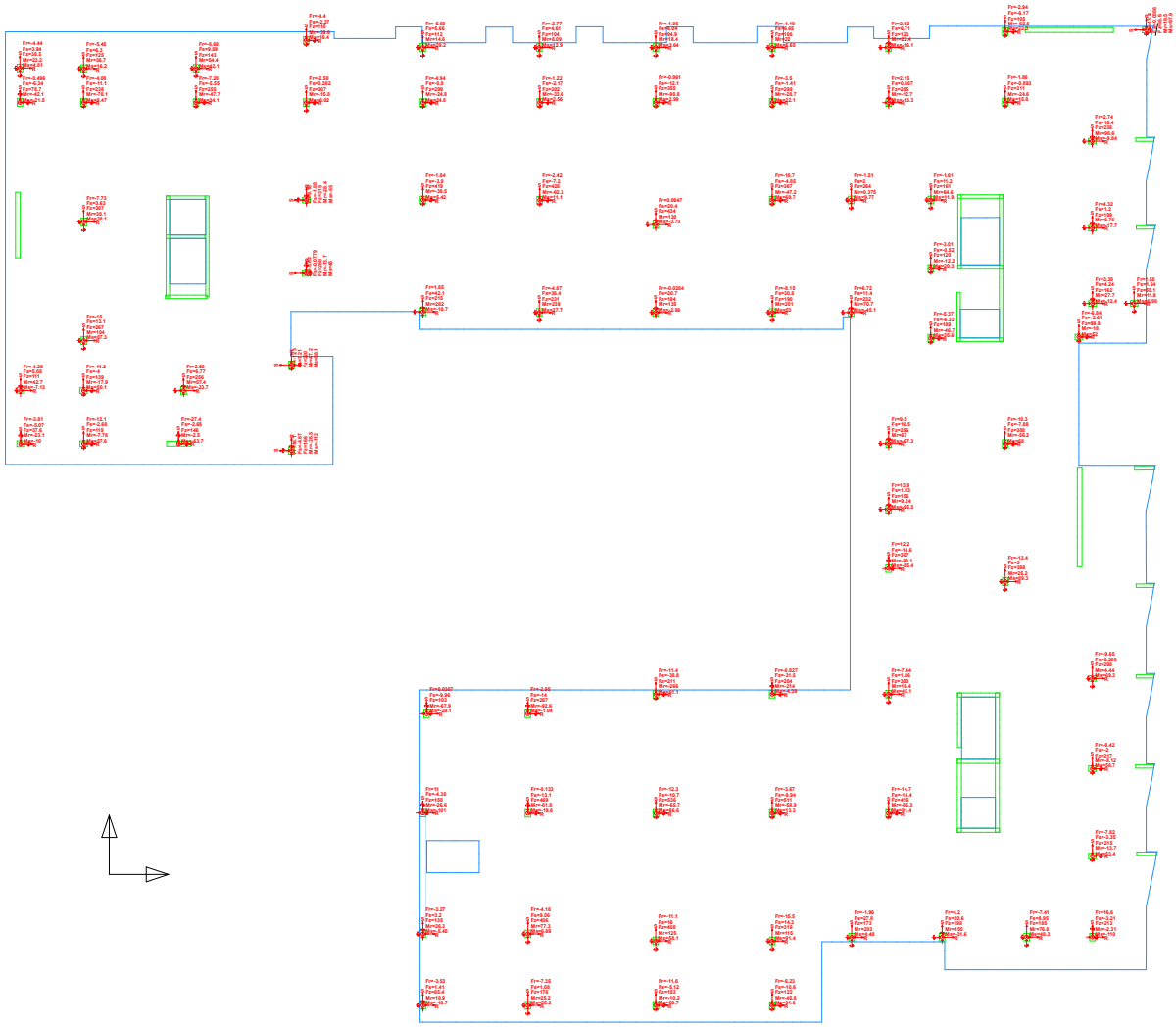
Factored LC: 1.2D + 1.6L + 0.5S: Std Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:100
Factored LC: 1.2D + 1.6L + 0.5S - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fr,Fx,Fz,Mr,Mx,Mz)(Standard Context)



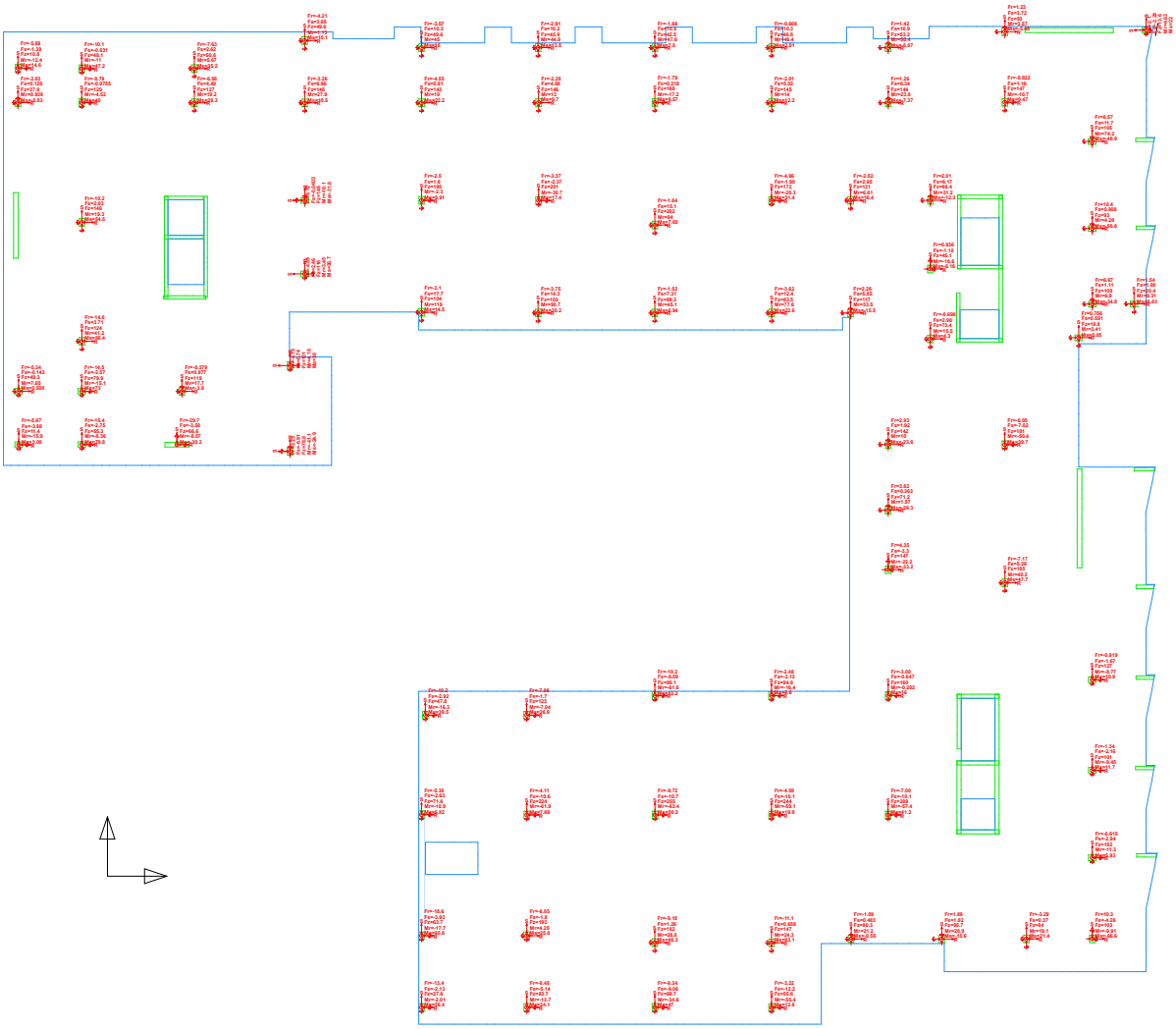
Factored LC: 1.2D + 1.6L + 0.5S: Max Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Max Fr Context)



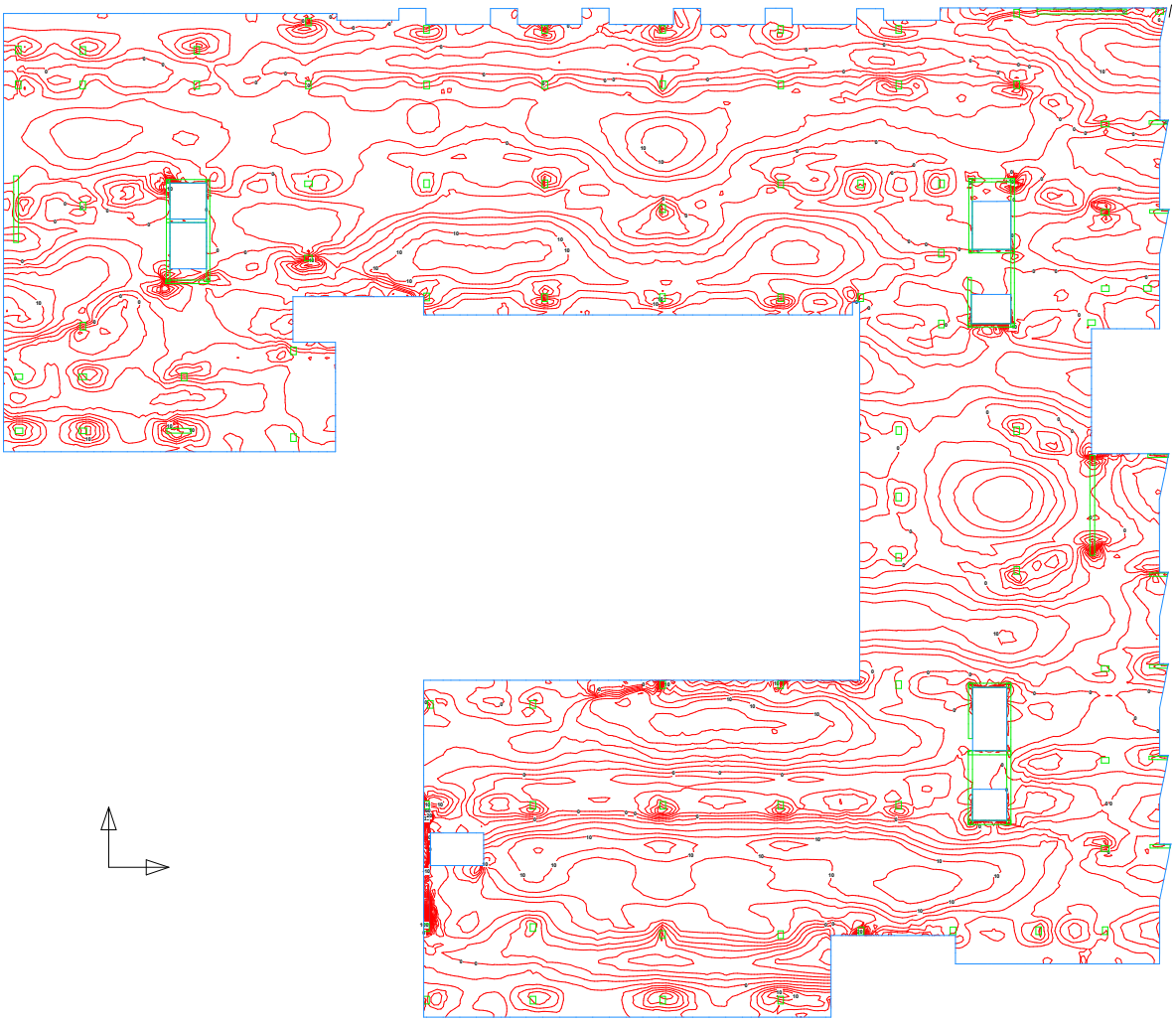
Factored LC: 1.2D + 1.6L + 0.5S: Min Reactions Plan

Factored LC: 1.2D + 1.6L + 0.5S: 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 = 1:500
Factored LC: 1.2D + 1.6L + 0.5S - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Min Fz Contest)



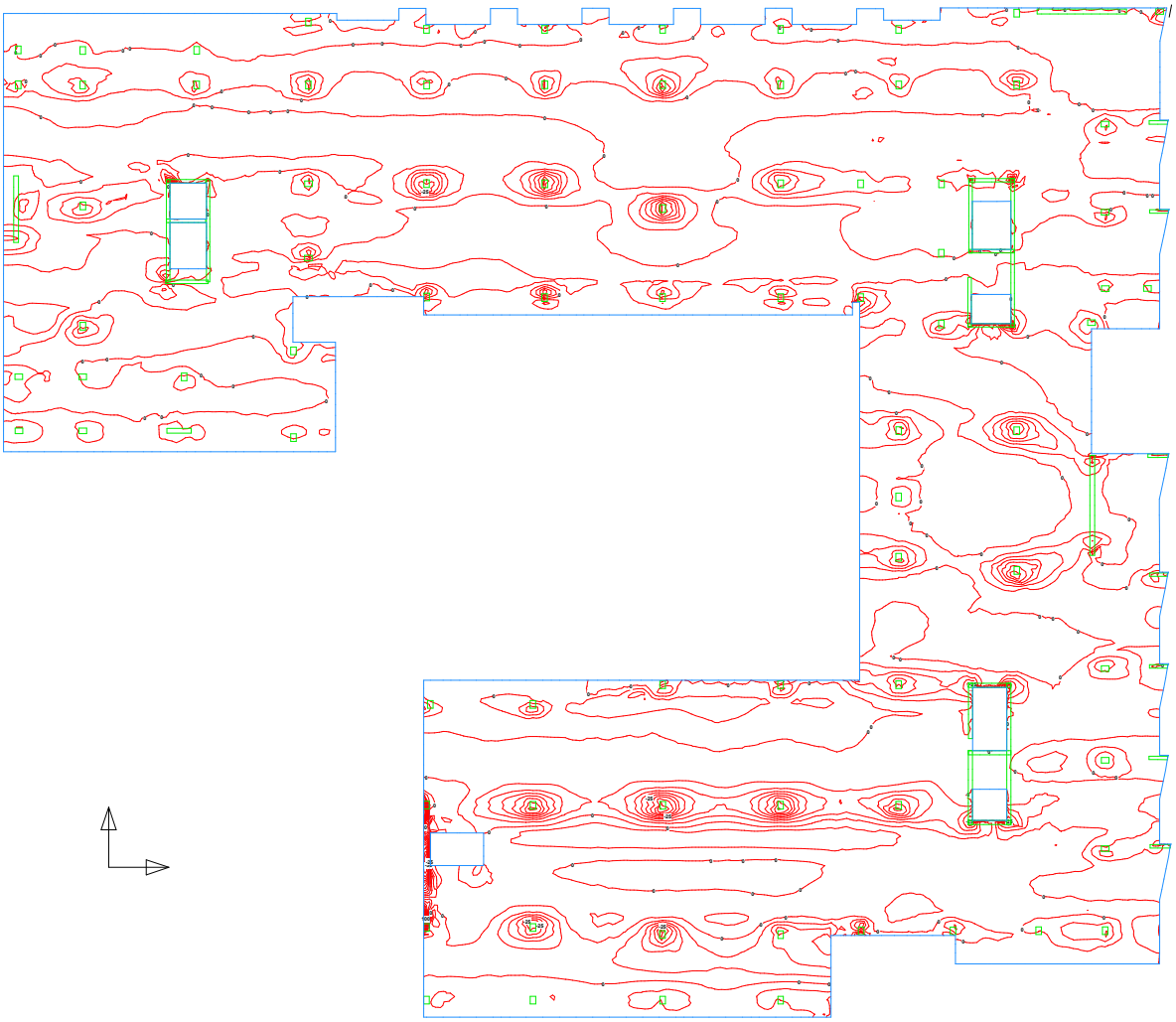
Factored LC: 1.2D + f1L + 1.6S: Max Mx Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:120
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Maximum Values) (X-Axis Direction)
Area Contour = 2 Kips
Min Value = -26.64 Kips @ (217.3,165.4) Max Value = 124.5 Kips @ (75.72,-12.64)



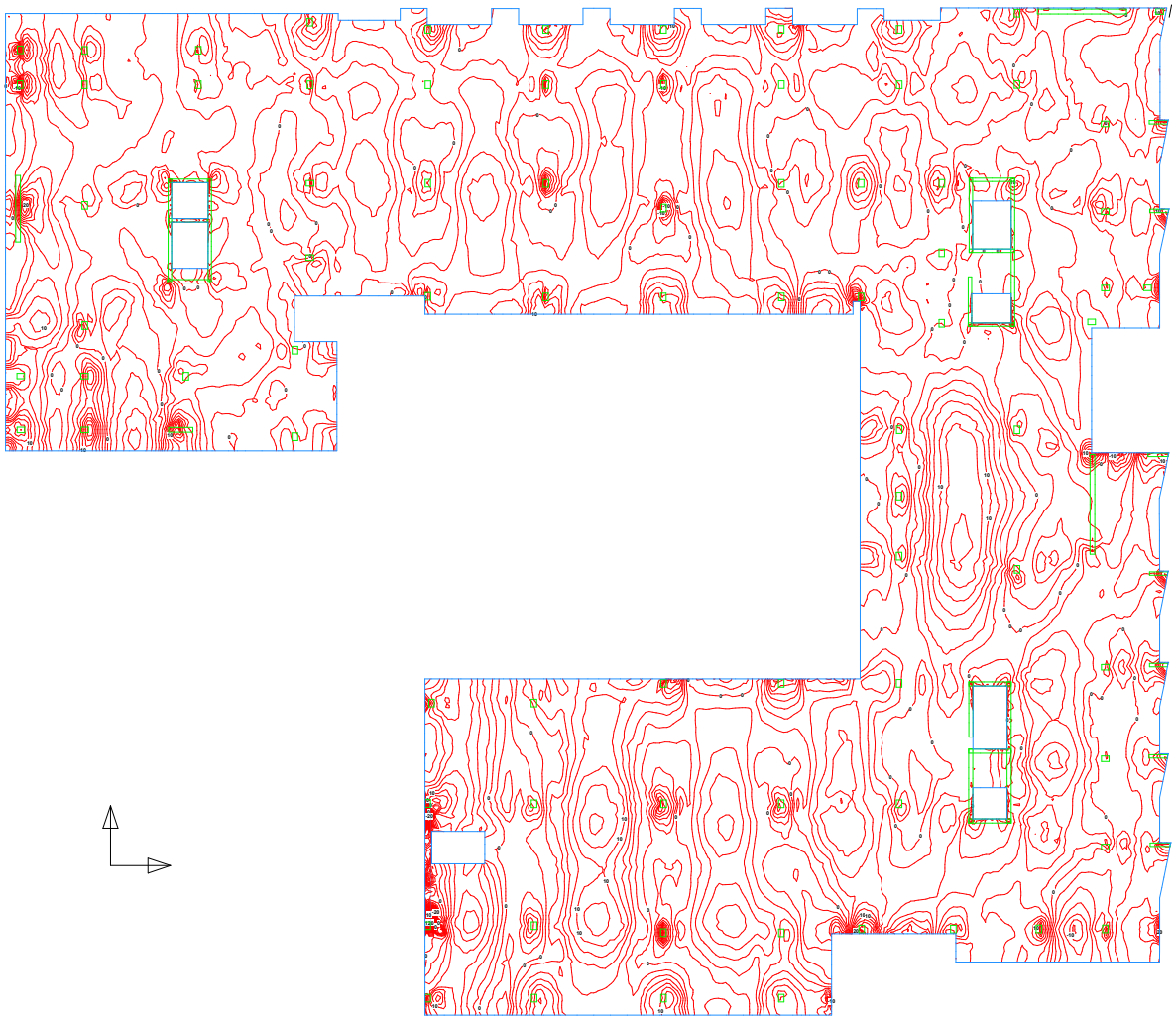
Factored LC: 1.2D + f1L + 1.6S: Min Mx Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:120
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Minimum Values) (K-Axis Direction)
Area Contour = 5 Kips
Min Value = -62.46 Kips @ (76.72,1.471) Max Value = 111.3 Kips @ (75.72,-12.64)



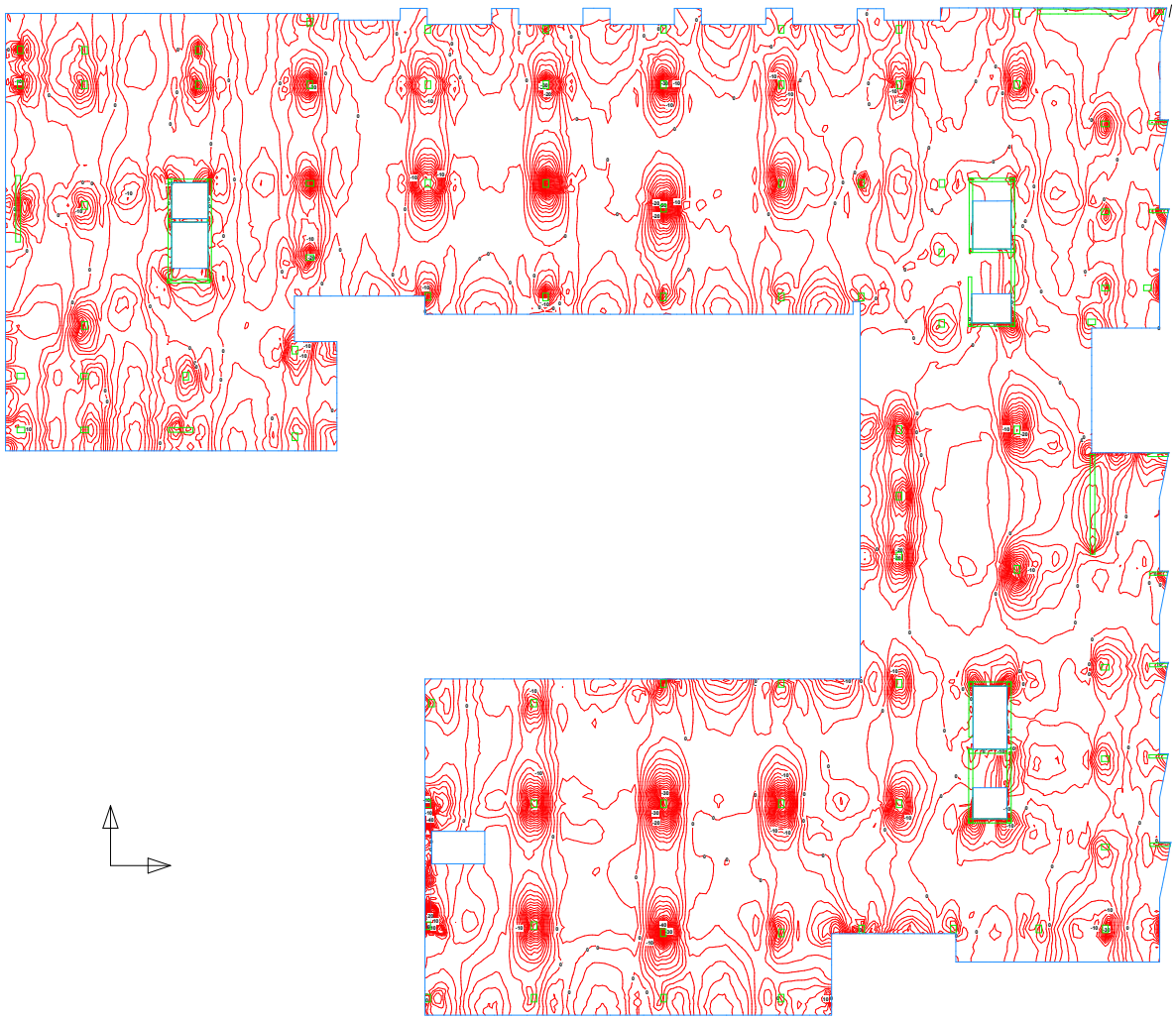
Factored LC: 1.2D + f1L + 1.6S: Max My Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:120
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Maximum Values) (Y-Axis Direction)
Contour Line Contour = 2 Kips
Min Value = -40.14 Kips @ (77.05,11.29) Max Value = 107.9 Kips @ (76.72,-13.25)



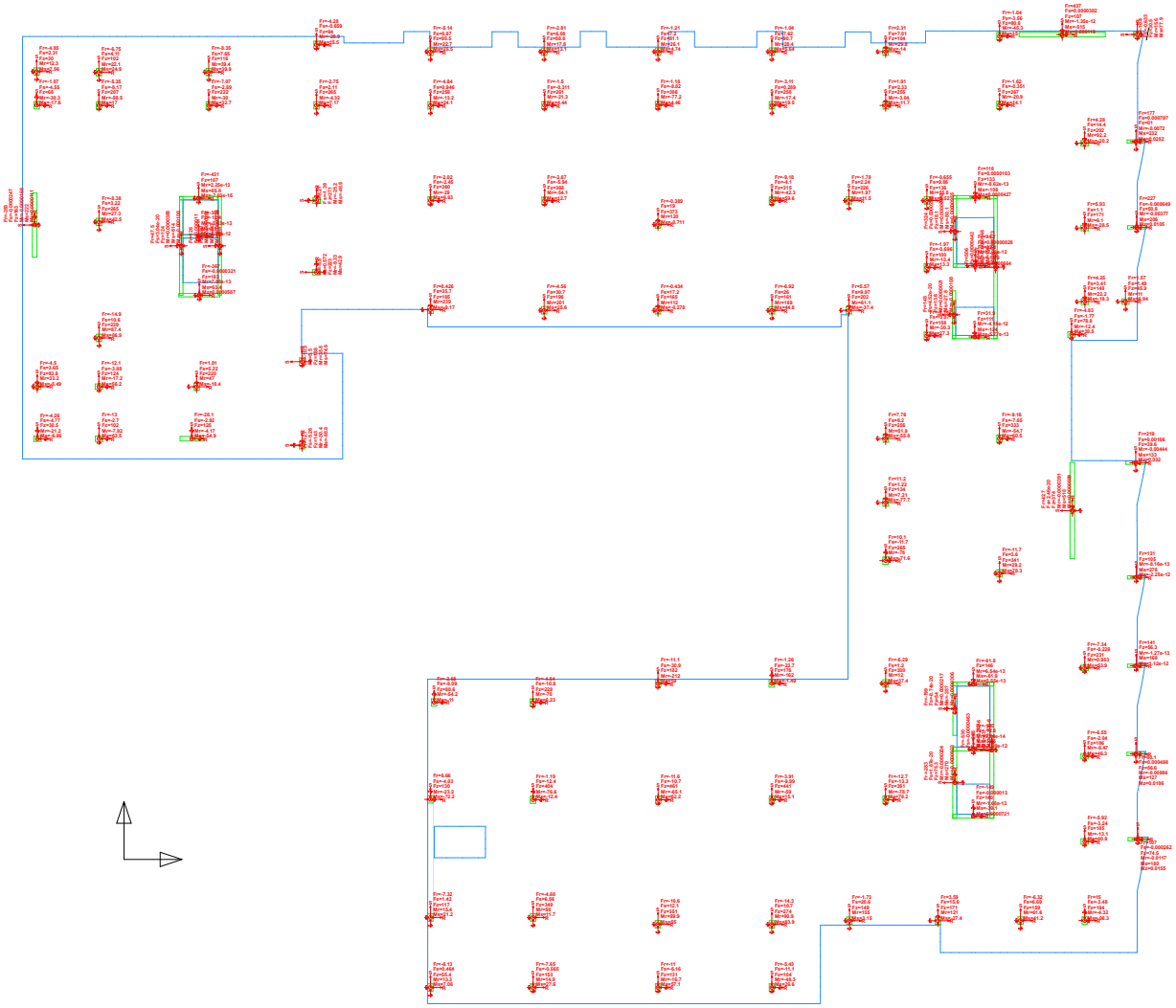
Factored LC: 1.2D + f1L + 1.6S: Min My Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:120
Factored LC: 1.2D + f1L + 1.6S - Bending Moment Plot (Minimum Values) (Y-Axis Direction)
Area Contour = 2 Kips
Min Value = -67.68 Kips @ (132.7,-16.1) Max Value = 89.93 Kips @ (76.72,-13.28)



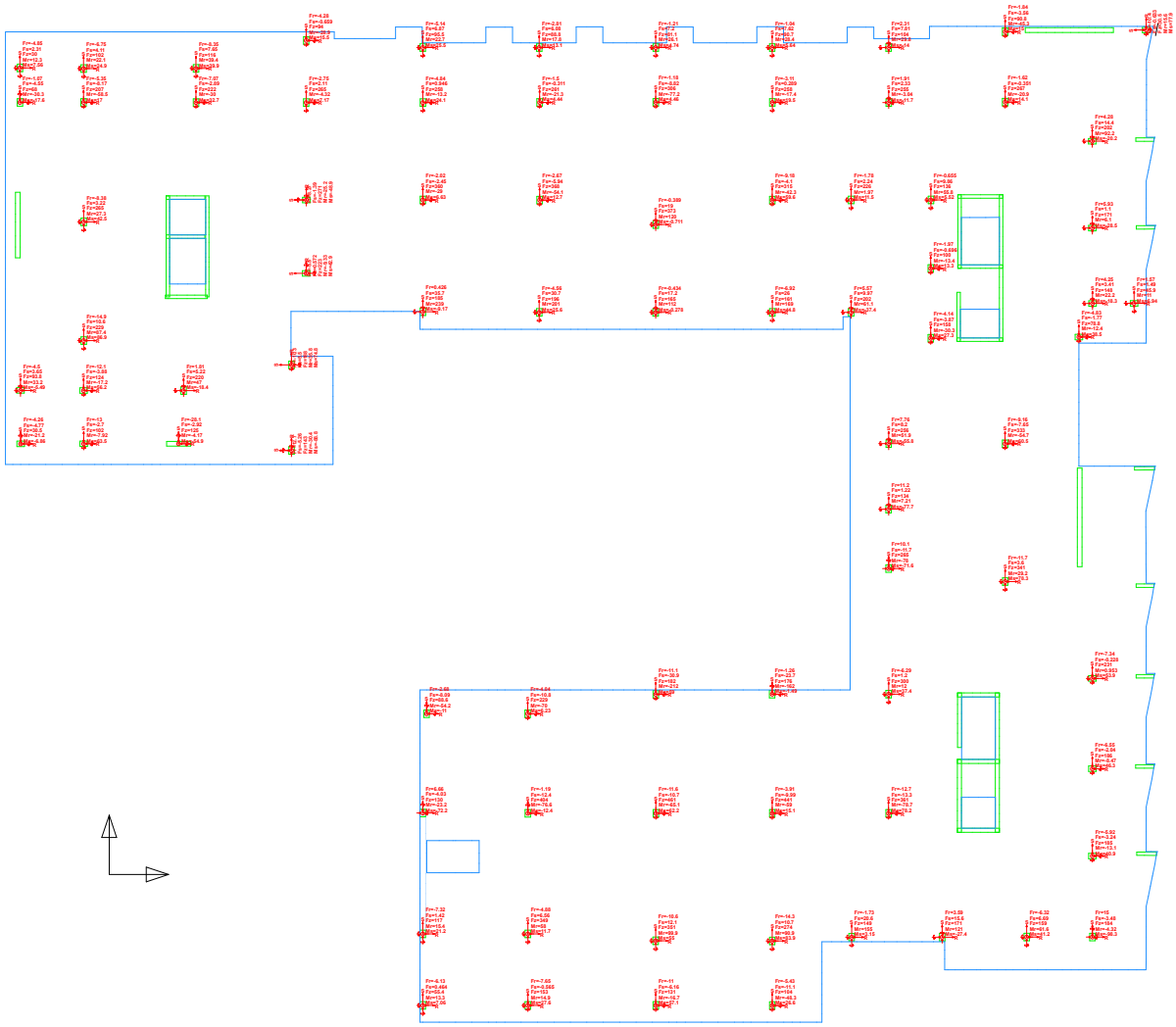
Factored LC: 1.2D + f1L + 1.6S: Std Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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;
Design Status: PC Design Numbers;
Pattern: Solid
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Wall Below,Column Below,Point Spring,Line Spring,Point Support,Line Support)(Fz,Fx,Fy,Mz,Mx,My)(Standard Context)



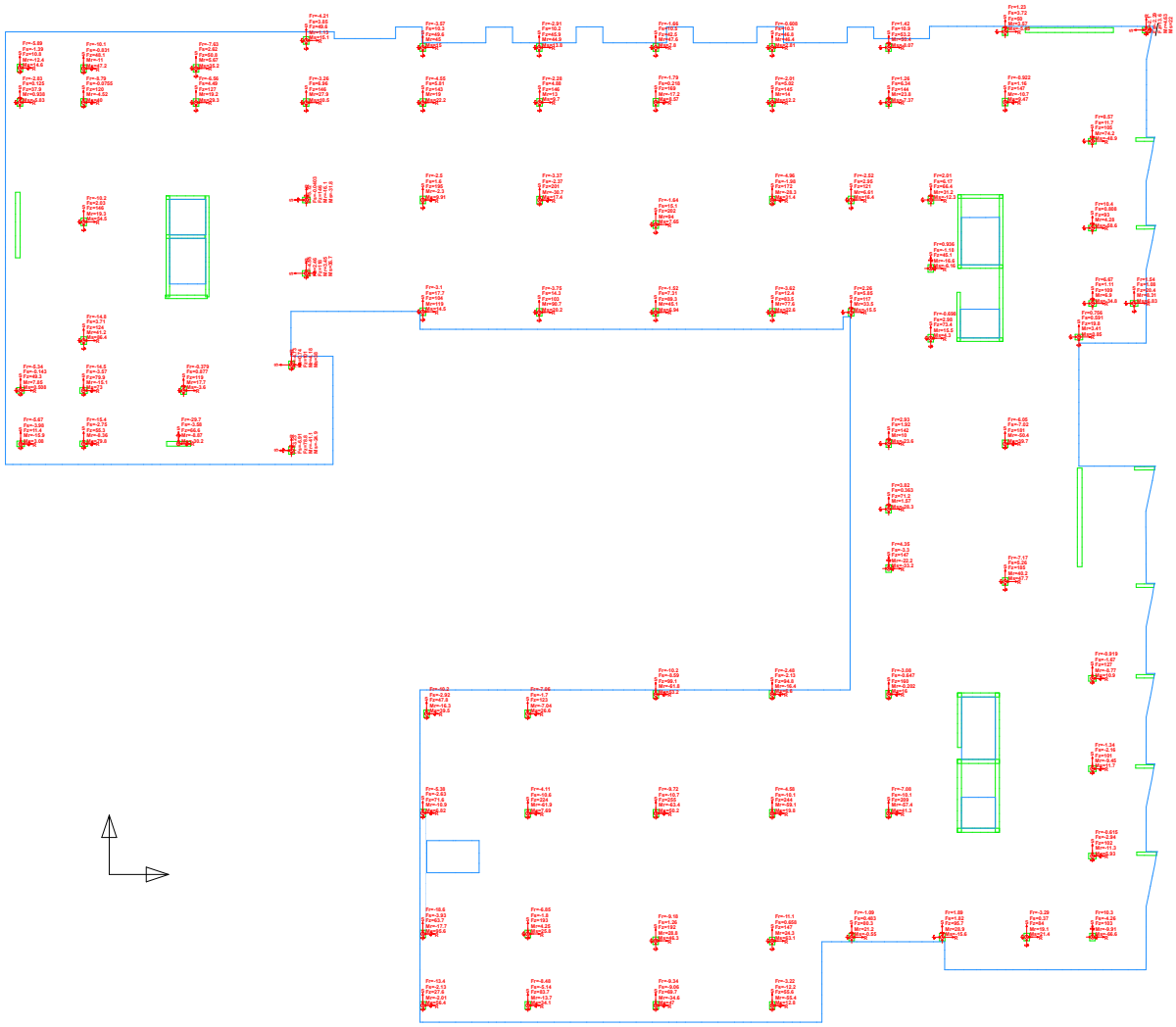
Factored LC: 1.2D + f1L + 1.6S: Max Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:100
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,Mz)(Max Fx Context)



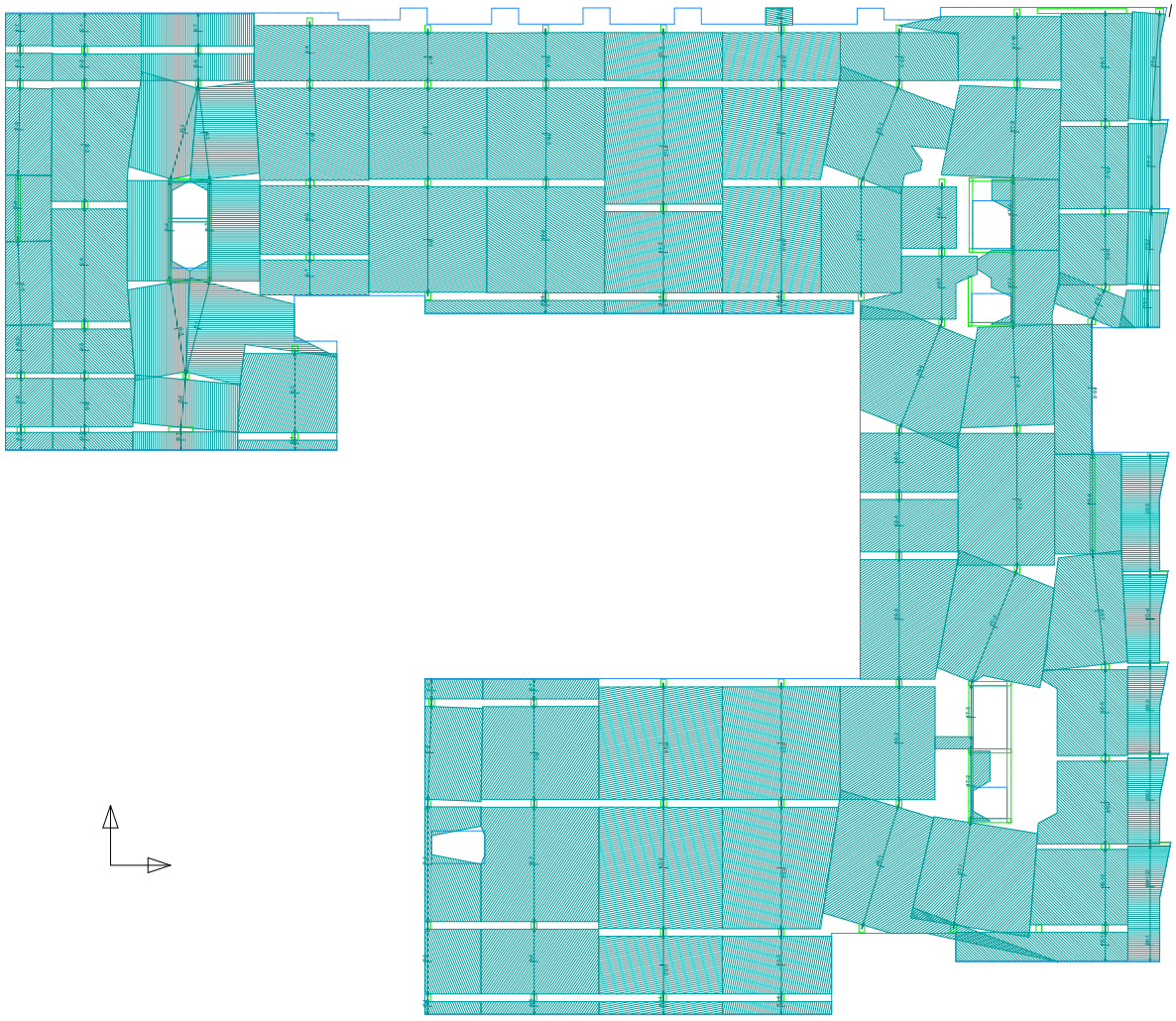
Factored LC: 1.2D + f1L + 1.6S: Min Reactions Plan

Factored LC: 1.2D + f1L + 1.6S: 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 = 1:100
Factored LC: 1.2D + f1L + 1.6S - Reaction Plot: (Column Below)(Fr,Fx,Fz,Mr,Mx,My)(Min Fx Corner)



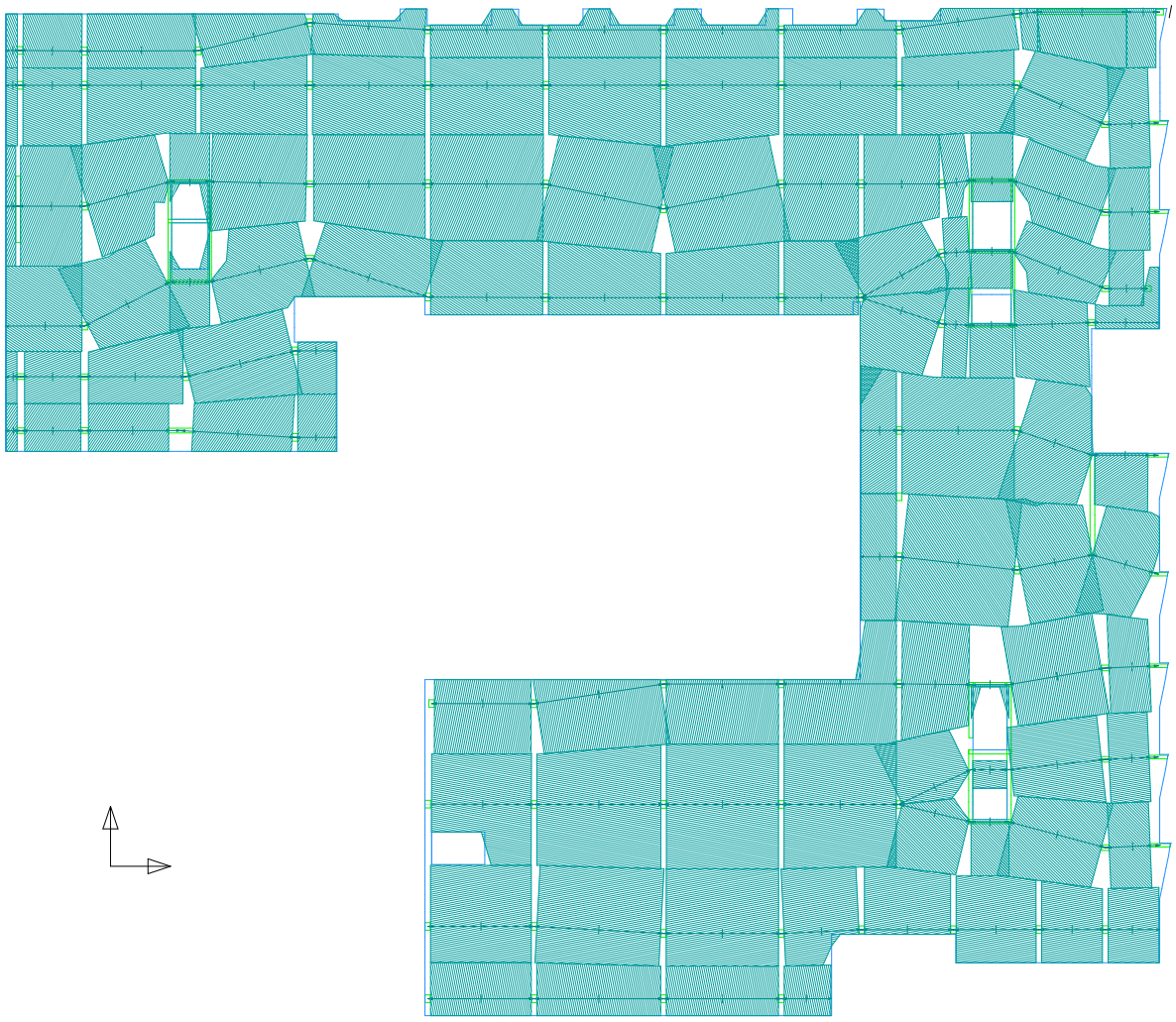
Design Strip: Latitude Design Spans Plan

Design Strip: Latitude Span Boundaries; Latitude SSx; SS Numbers; Latitude DSx; Latitude Strip Boundaries; Latitude SSSc; 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 = 1:500



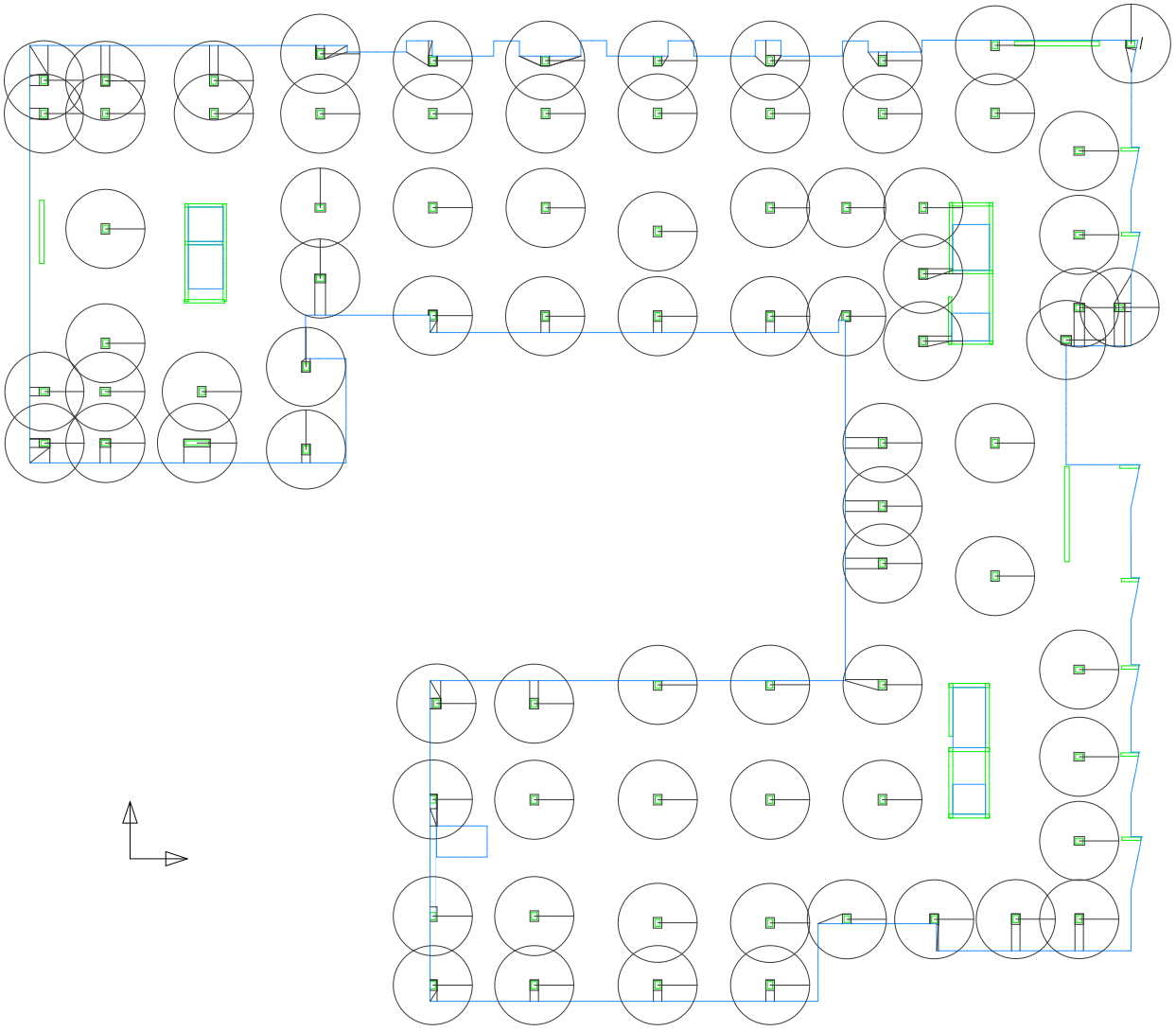
Design Strip: Longitude Design Spans Plan

Design Strip: Longitude Span Boundaries; Longitude SSs; Longitude DSs; Longitude Strip Boundaries; Longitude 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 = 1:500

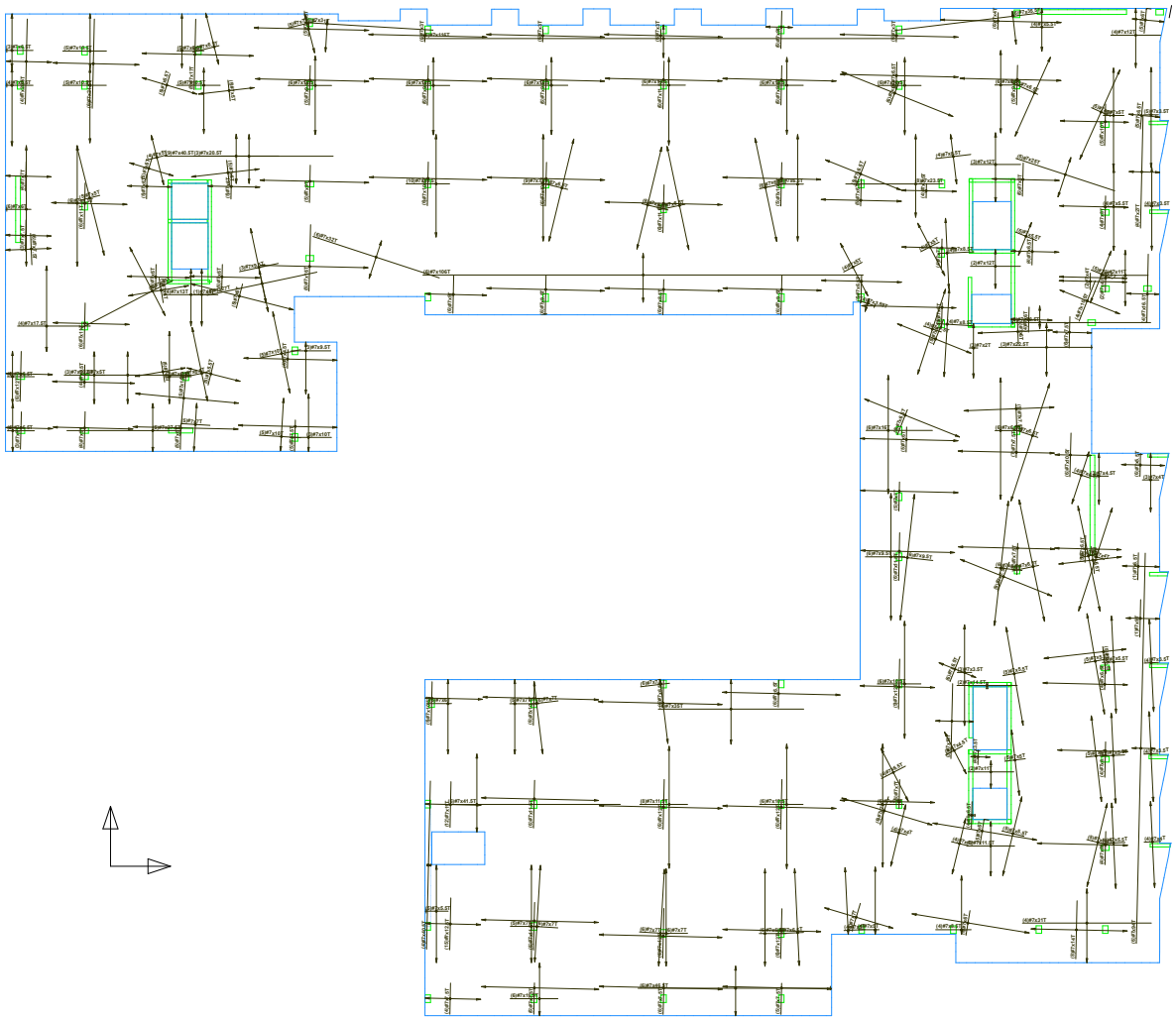


Design Strip: Punching Checks Plan

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 = 1:500

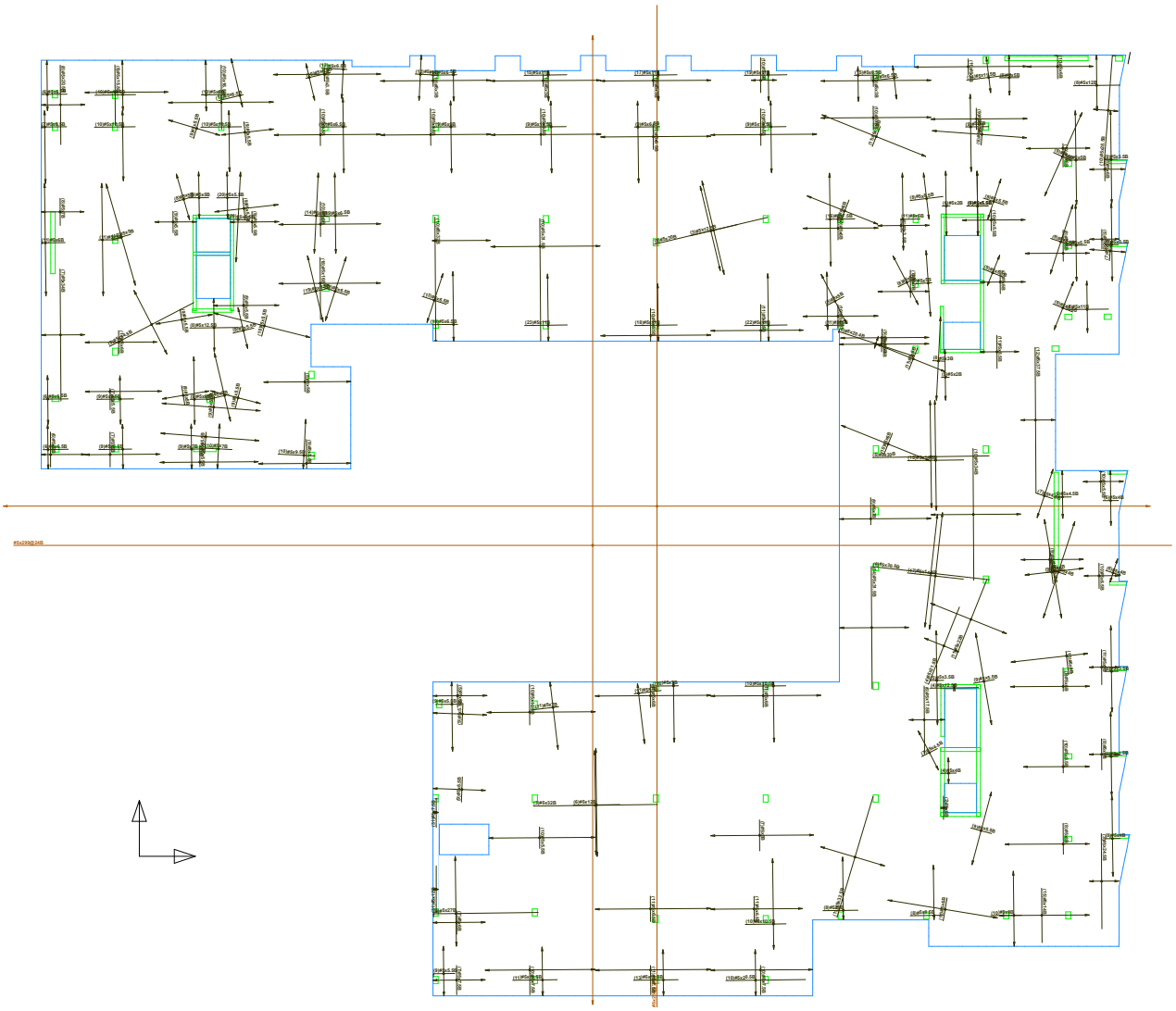


Reinforcement: Top Bars Plan



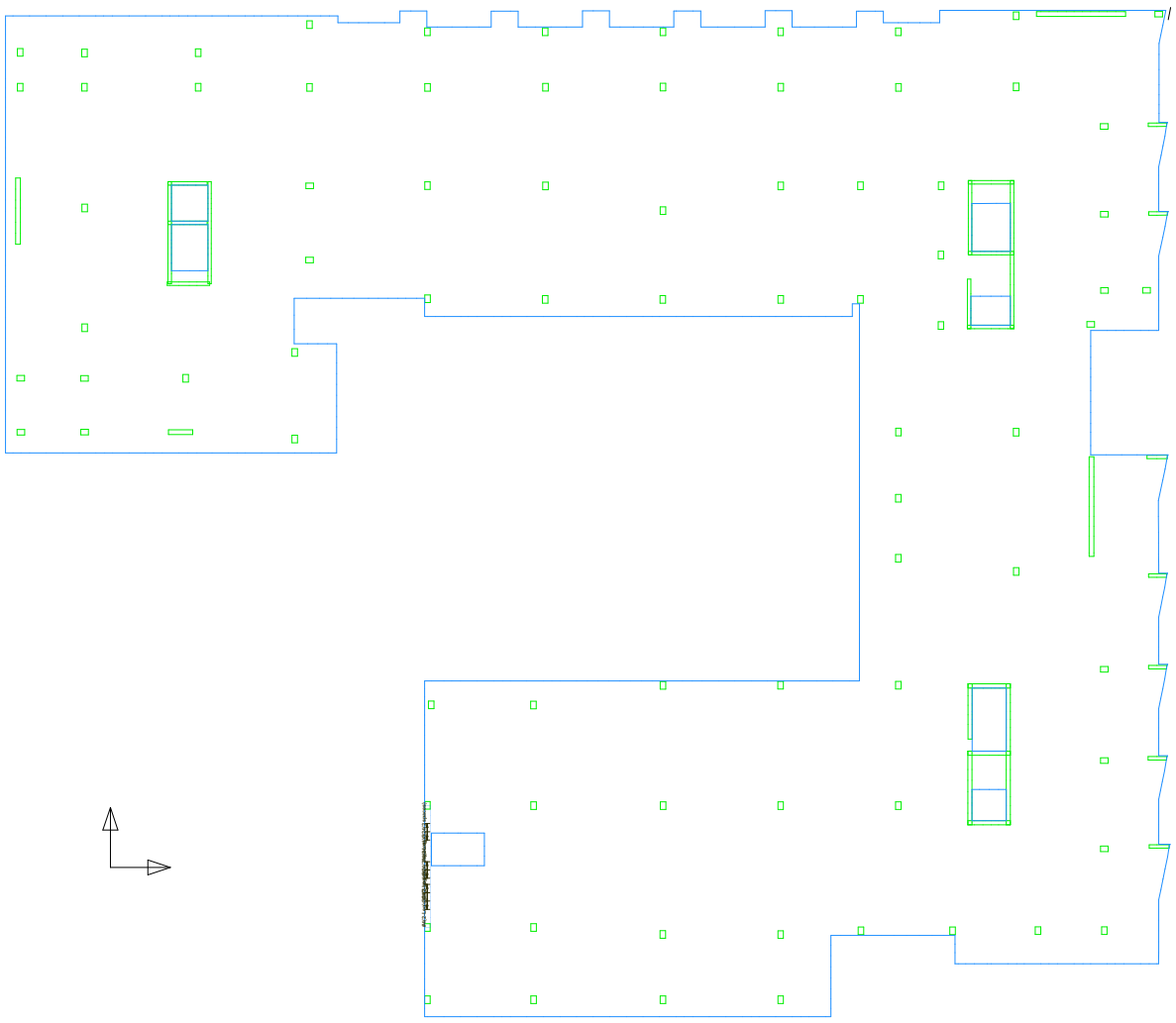
Reinforcement: Bottom Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Latitude User Concentrated Reinf.; Latitude Program Concentrated Reinf.; Latitude User Distributed Reinf.; Latitude Program Distributed Reinf.; Longitude User Concentrated Reinf.; Longitude Program Concentrated Reinf.; Longitude User Distributed Reinf.; Longitude Program Distributed Reinf.; Bottom Face Concentrated Reinf.; Both Faces Concentrated Reinf.; Bottom Face Distributed Reinf.; Both Faces Distributed Reinf.; Concentrated Reinf. Descriptions; Concentrated Reinf. Extent; Distributed
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 = 1:500



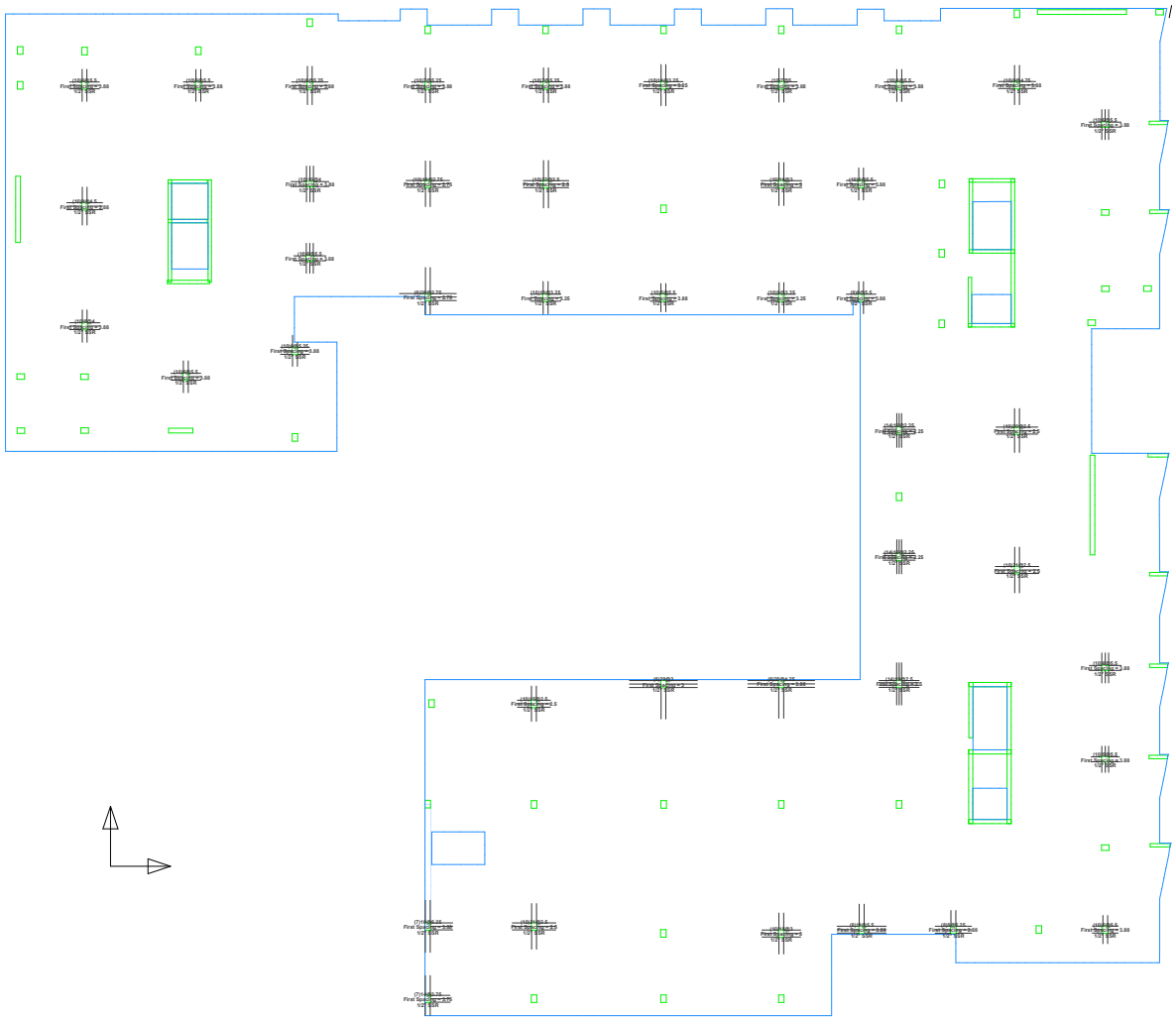
Reinforcement: Shear Bars Plan

Reinforcement: User Lines; User Notes; User Dimensions; Latitude User Transverse Reinf.; Latitude Program Transverse Reinf.; Latitude User Individual Transverse Bars; Latitude Program Individual Transverse Bars; Longitude User Transverse Reinf.; Longitude Program Transverse Reinf.; Longitude User Individual Transverse Bars; Longitude Program Individual Transverse Bars; Transverse Reinf. Descriptions; Transverse Reinf. Extent;
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 = 1:500



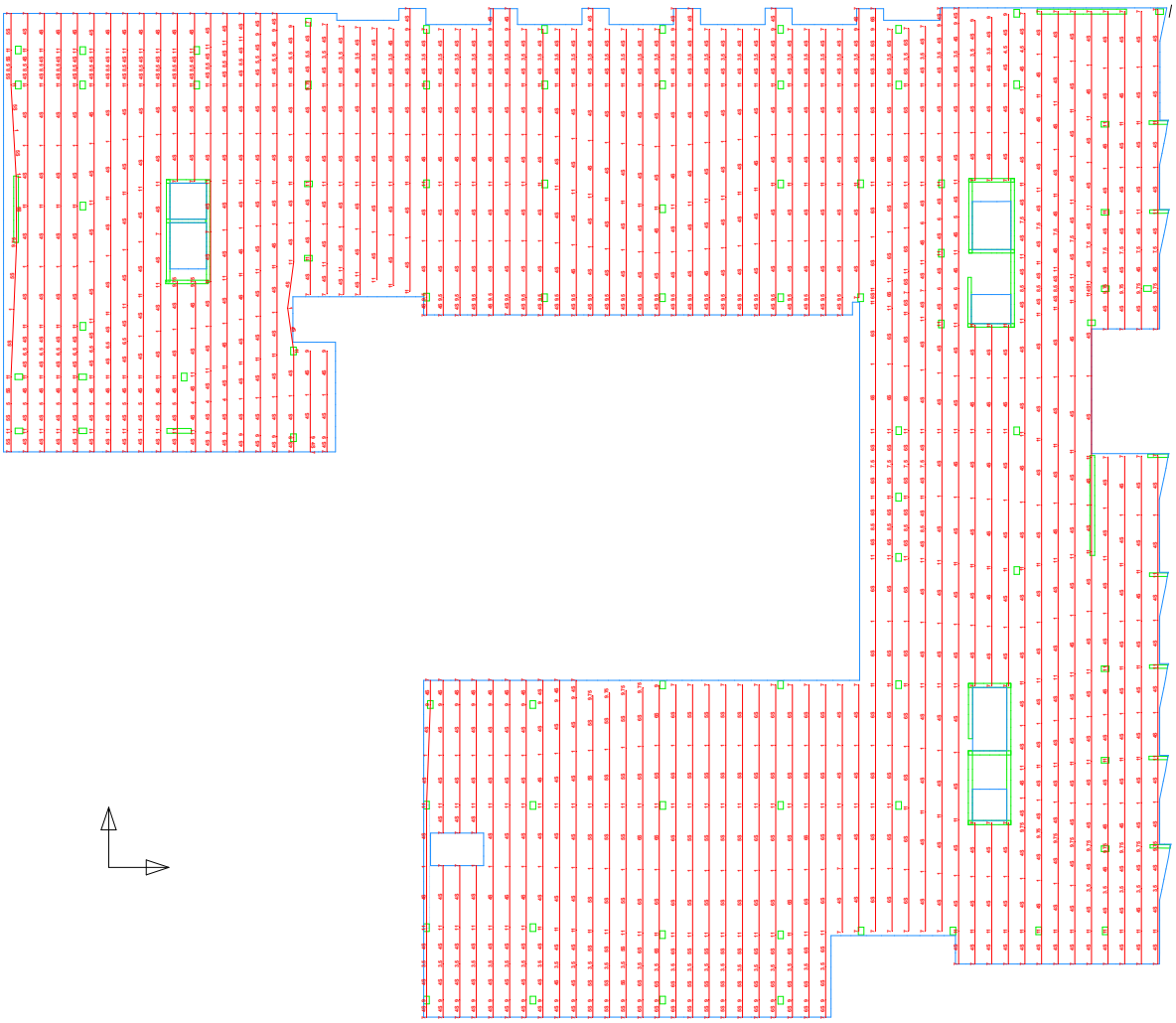
Reinforcement: SSR Plan

Reinforcement: User Lines; User Notes; User Dimensions; Program SSR Callouts; SSR Callout Details; Program SSR Rails;
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 = 1:50



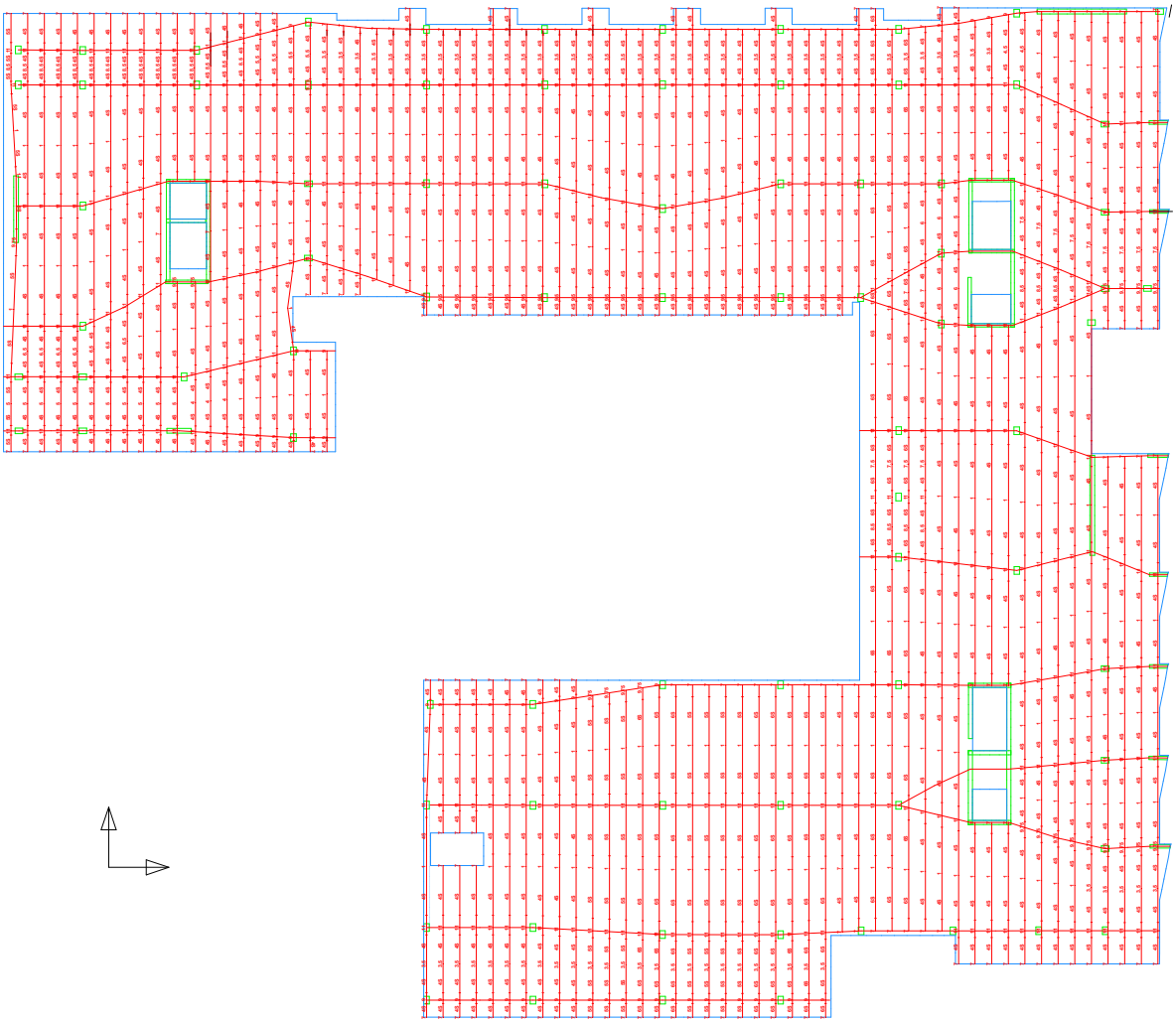
Latitude Tendon Parameters: Standard Plan

Latitude Tendon Parameters; User Lines; User Notes; User Dimensions; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Profile Polyline Ends; Distributed Tendon Profile Area Edge; Distributed Tendon Profile Span Changes; Distributed Tendon Profile Concrete Elevation Change; Tendon Void; Jack Region; Jack Region Hatching; Jack Region Corner Icon; Distributed Tendon Overlap Areas; Banded Tendons; Banded Tendon Description; Banded Tendon Fillet Graphics; Profile Points; Profile Elevation Values; Profile Nod
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;
Manual Latitude Tendon: Tendons; Num Strands; Tendon Points; Profile Values;
Scale = 1:500



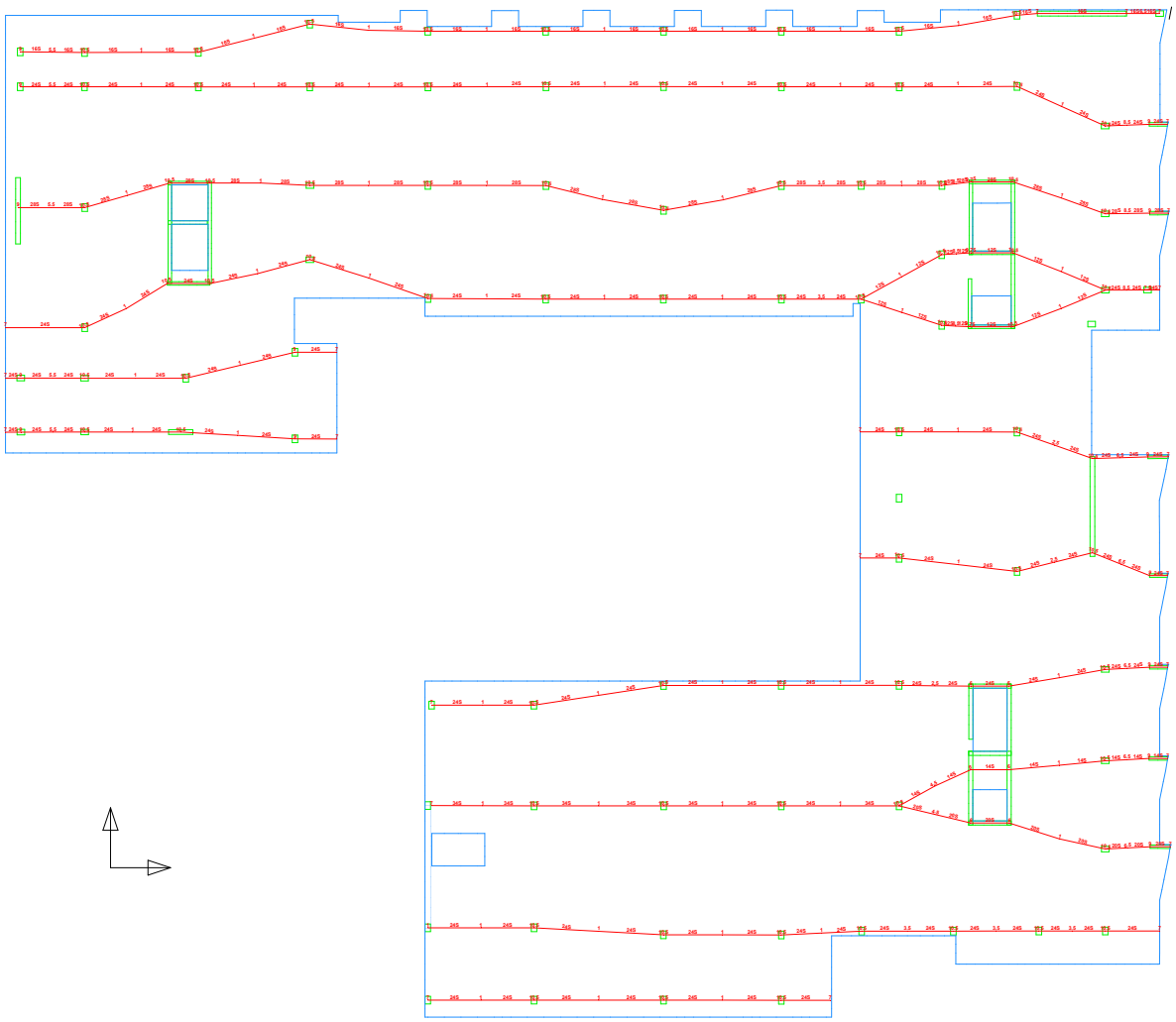
Manual Latitude Tendon: Standard Plan

Manual Latitude Tendon; Tendons; Num Strands; Tendon Inflection Ratio; Jacks; Tendon Points; Profile 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;
Latitude Tendon Parameters: Banded Tendons; Banded Tendon Description; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Overlap Areas; Profile Points; Profile Elevation Values; Profile Nodes; Jack Region;
Manual Latitude Tendon: Highlight Selected Tendons;
Manual Latitude Tendon: Tendons;
Scale = 1:500



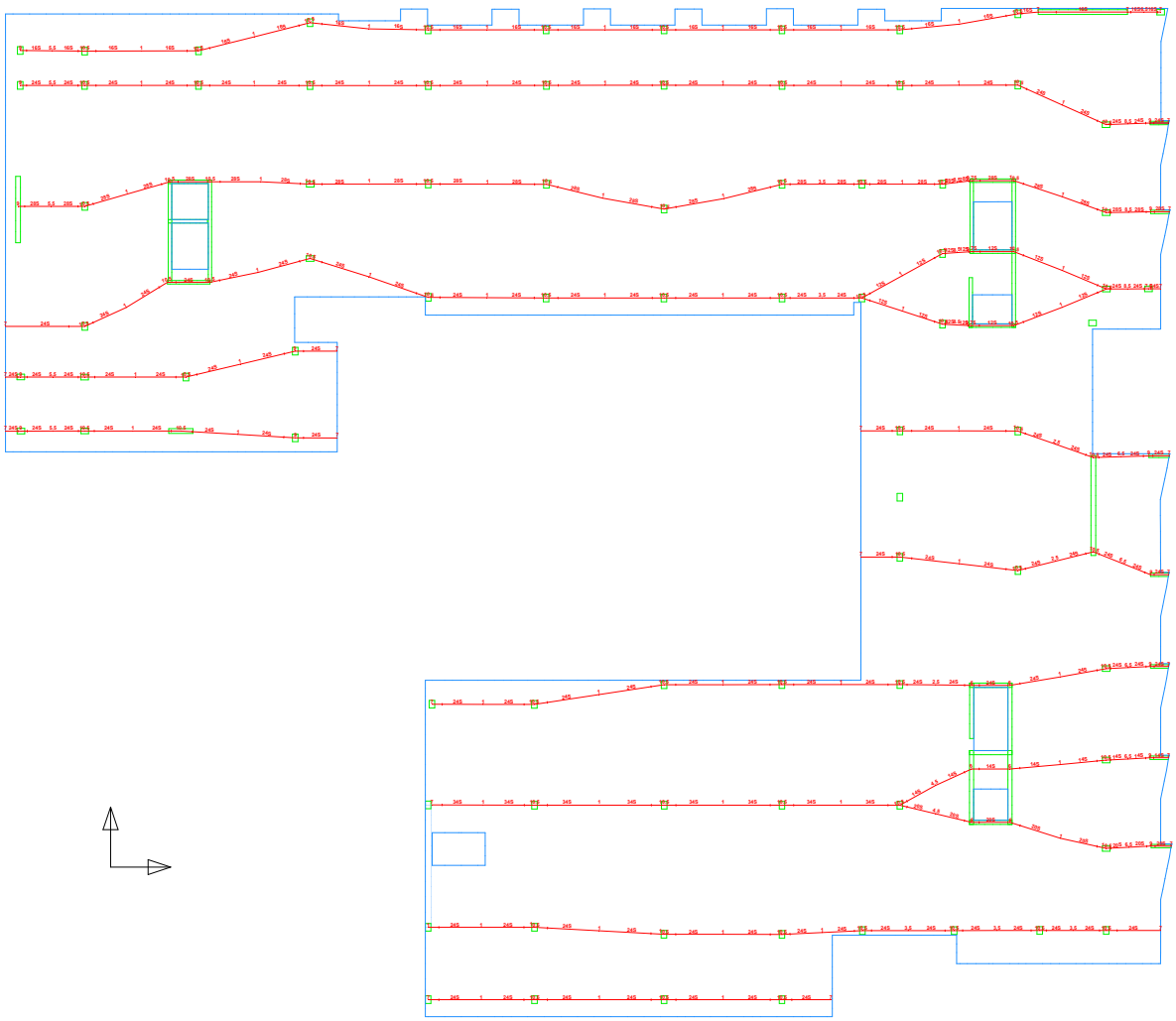
Longitude Tendon Parameters: Standard Plan

Longitude Tendon Parameters: Banded Tendons; Banded Tendon Description; Banded Tendon Fillet Graphics; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Profile Area Edge; Distributed Tendon Profile Span Changes; Distributed Tendon Profile Concrete Elevation Change; Distributed Tendon Profile Polyline Ends; Distributed Tendon Overlap Areas; Tendon Void; Tendon Profile Polylines; Tendon Profile Polyline Details; Profile Points; Profile Elevation Values; Profile Nodes; Jack Region; Jack Region Hatching; Jack 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;
Manual Longitude Tendon: Tendons; Num Strands; Tendon Points; Profile Values;
Scale = 1:128



Manual Longitude Tendon: Standard Plan

Manual Longitude Tendon: Tendons; Num Strands; Tendon Inflection Ratio; Jacks; Tendon Points; Profile Values; 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;
Longitude Tendon Parameters; Banded Tendons; Banded Tendon Description; Distributed Tendon Quadrilateral; Distributed Tendon Description; Distributed Tendon Overlap Areas; Profile Points; Profile Elevation Values; Profile Nodes; Jack Region;
Scale = 1:500

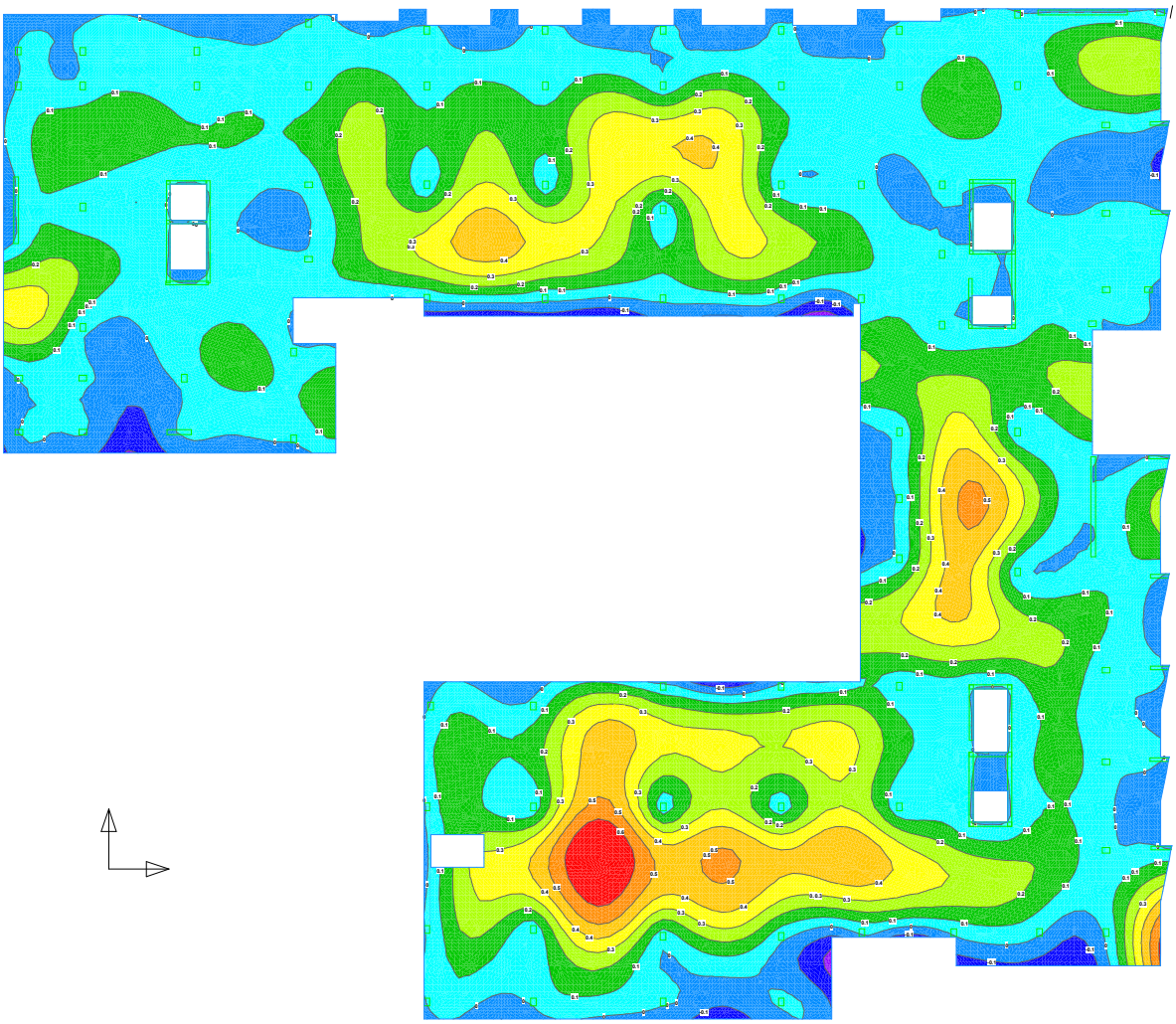


Maximum Short Term Load: Std Deflection Plan

Maximum Short Term Load: 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 = 1:96
Maximum Short Term Load - Vertical Deflection Plot

-0.2 -0.1 0 0.1 0.2 0.3 0.4 0.5 0.6

Min Value = -0.2462 inches @ (172.3,132.8) Max Value = 0.7165 inches @ (117.6,2.665)

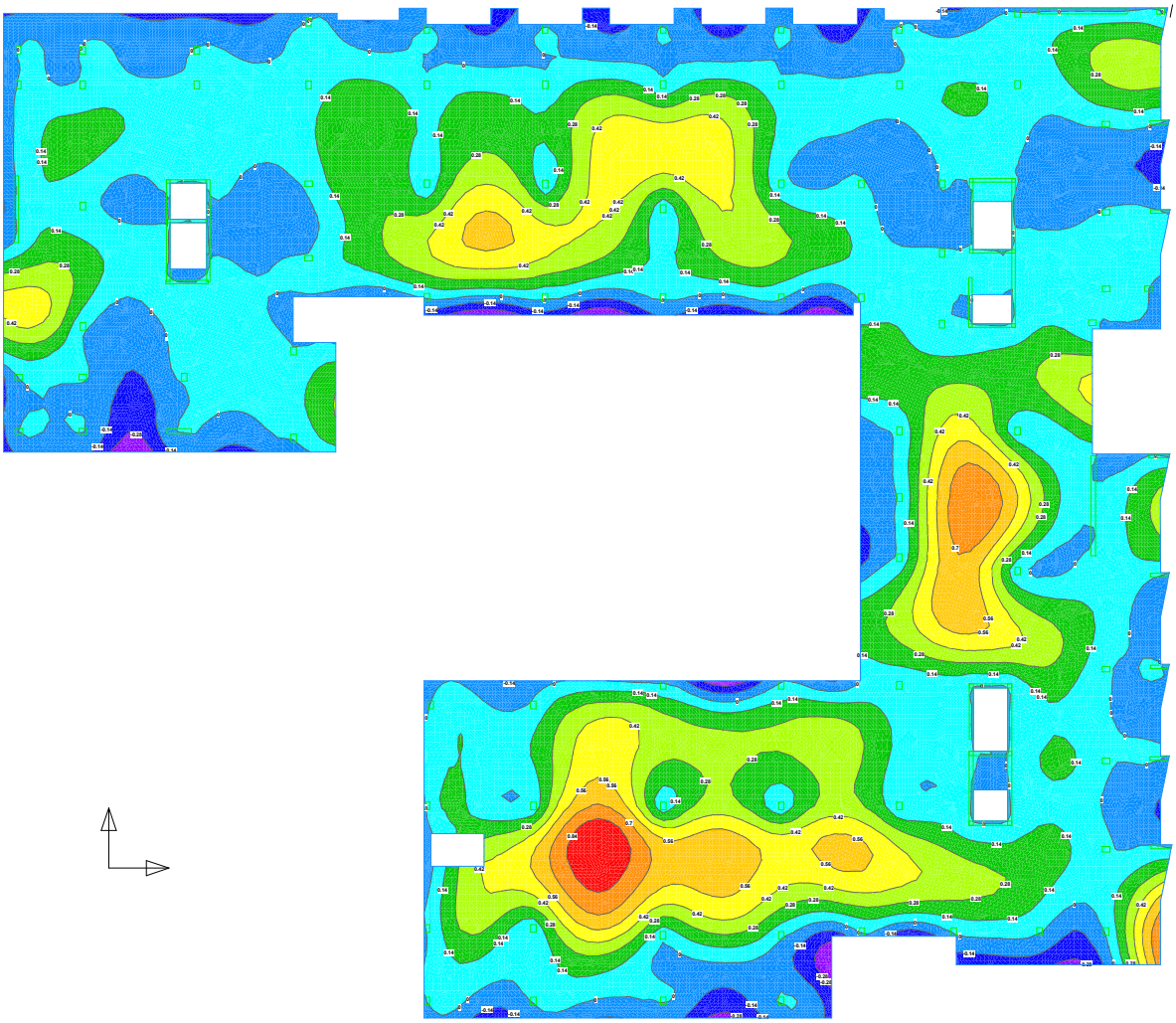


Sustained Load: Std Deflection Plan

Sustained Load: 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 = 1:204
Sustained Load - Vertical Deflection Plot

-0.28 -0.14 0 0.14 0.28 0.42 0.56 0.7 0.84

Min Value = -0.4912 inches @ (172.6,-21.26) Max Value = 0.979 inches @ (117.6,5.194)

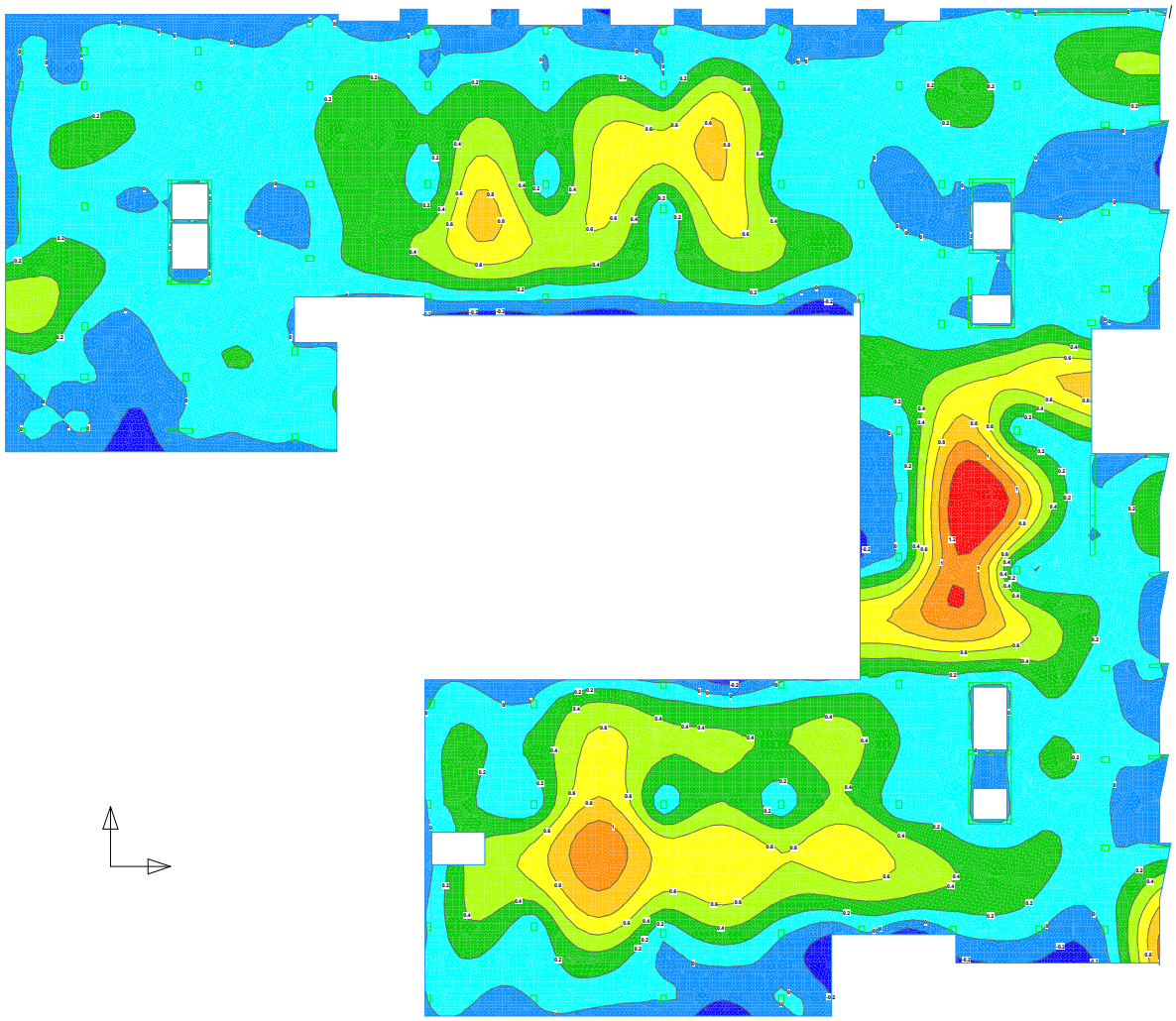


Final Instantaneous Load: Std Deflection Plan

Final Instantaneous Load: 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 = 1:300
Final Instantaneous Load - Vertical Deflection Plot

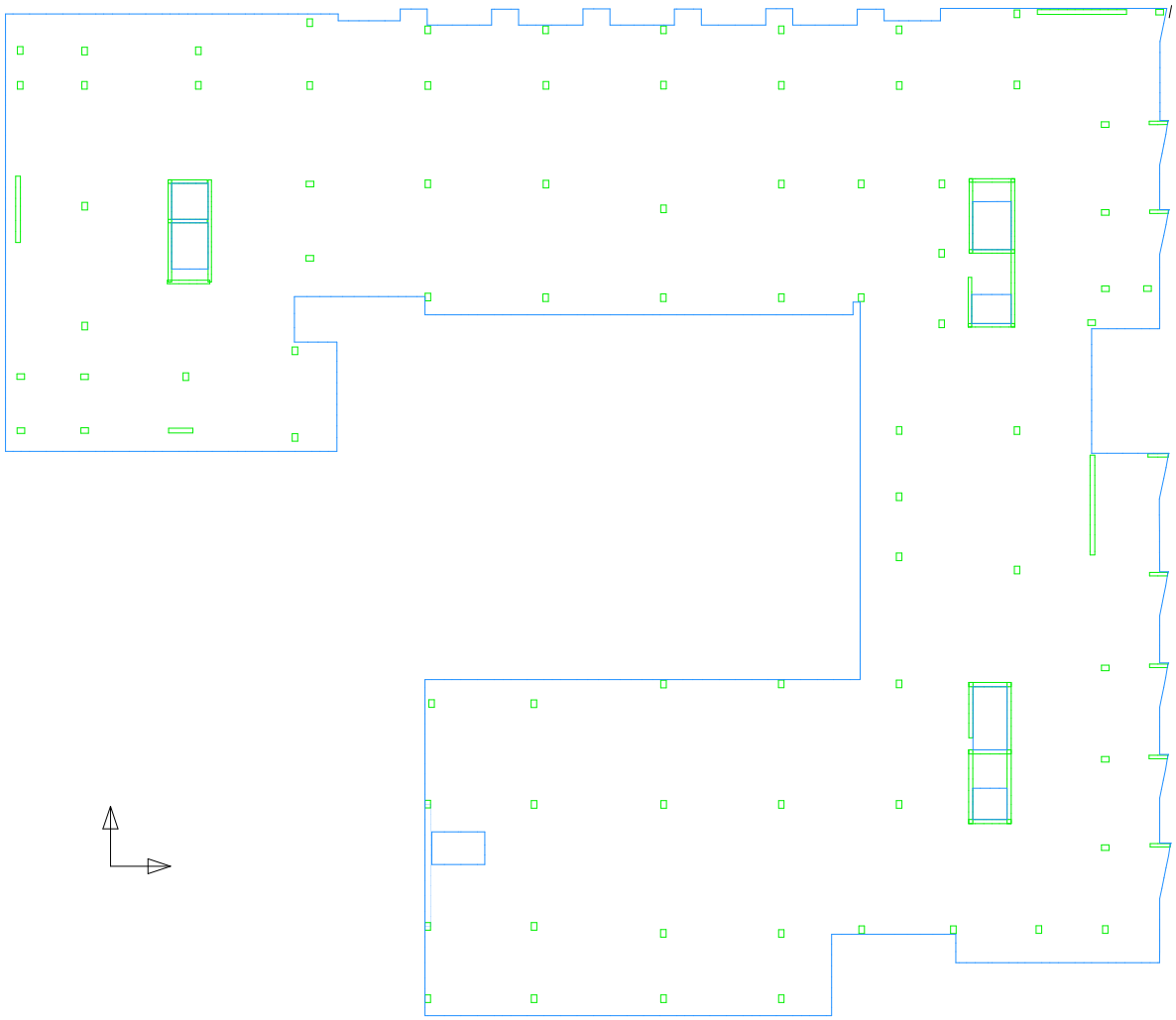
-0.4 -0.2 0 0.2 0.4 0.6 0.8 1 1.2

Min Value = -0.4298 inches @ (172.3,132.8) Max Value = 1.912 inches @ (200.8,86.86)



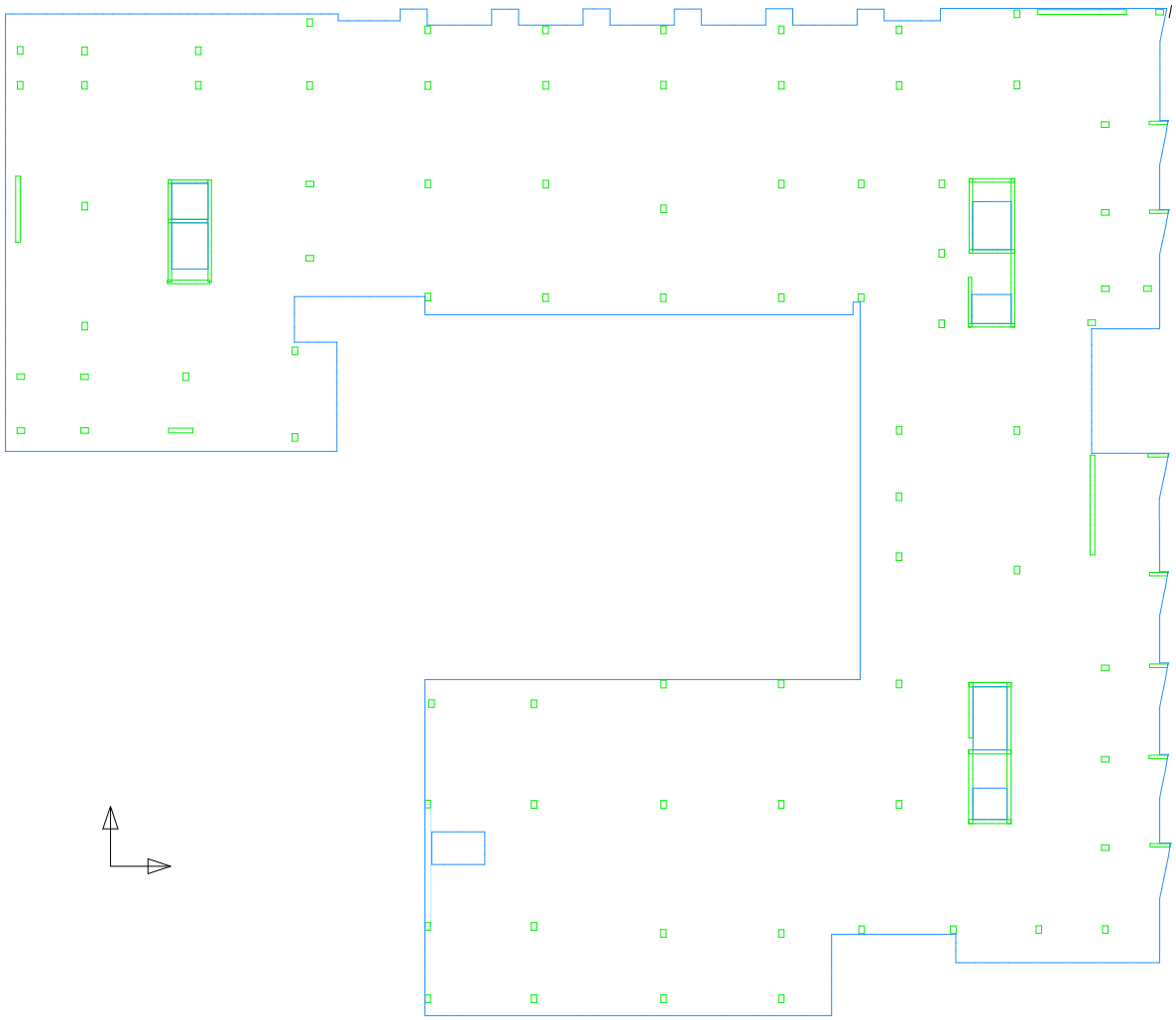
Additional Mass Loading: All Loads Plan

Additional Mass Loading: User Lines; User Notes; User Dimensions; Mass Point Loads; Mass Point Load Icons; Mass Point Load Values; Mass Line Loads; Mass Line Load Icons; Mass Line Load Values; Mass Area Loads; Mass Area Load Icons; Mass 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 = 1:500

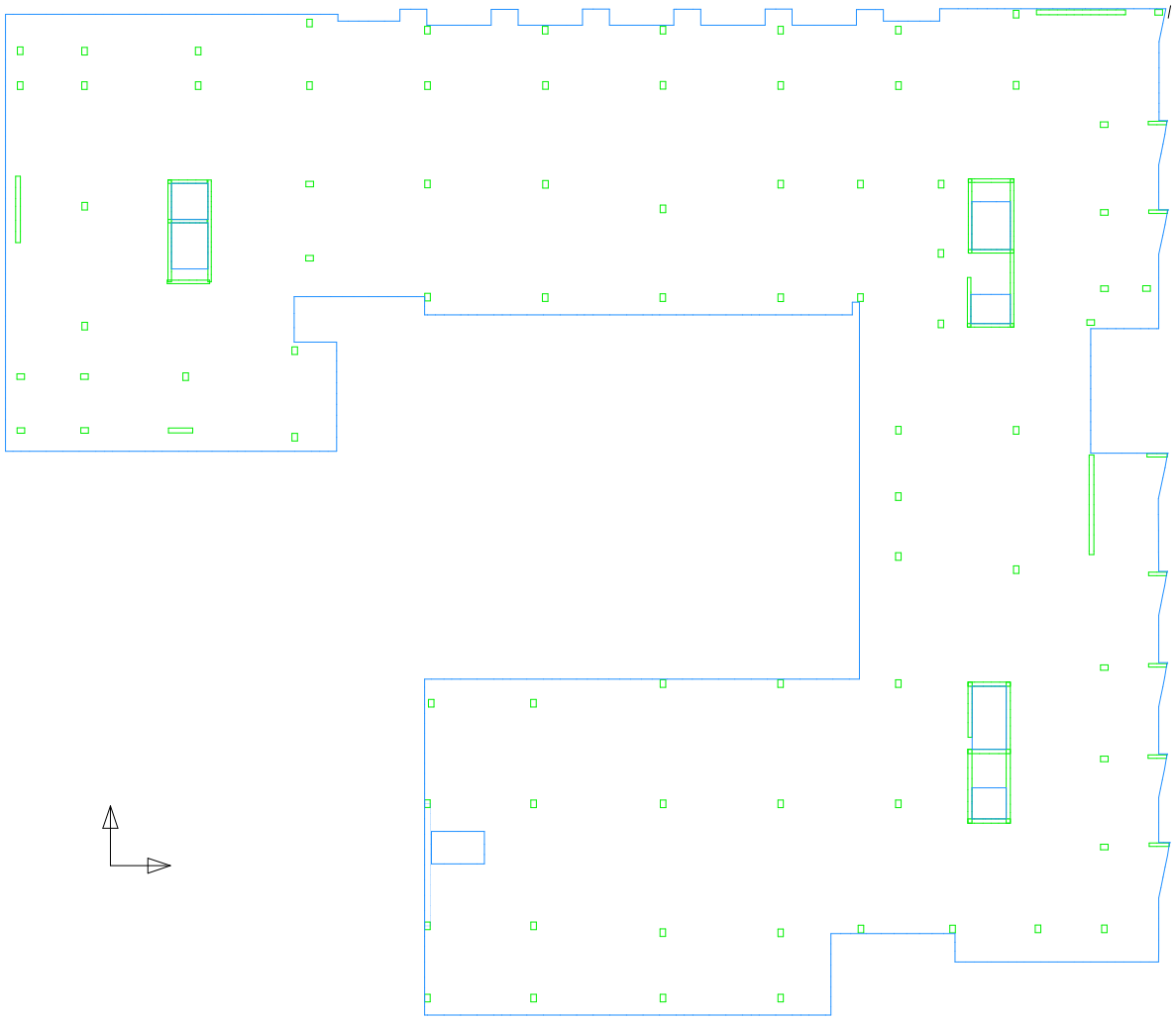


Vibration Analysis: Excitation Areas Plan

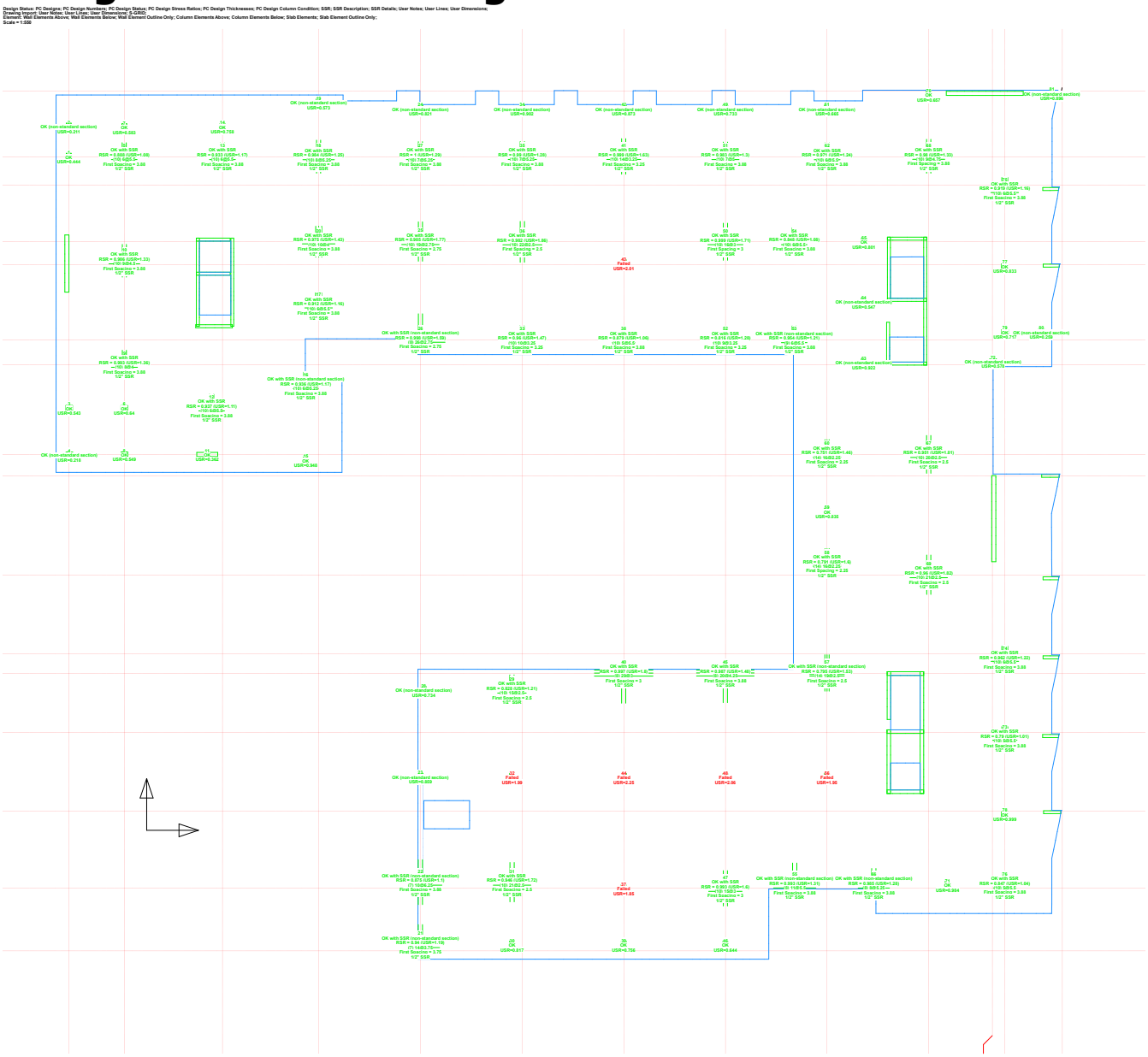
Vibration Analysis: User Lines; User Notes; User Dimensions; Vibration Excitation Area; Vibration Excitation Area Hatching;
Drawing Import: User Lines; User Notes; User Dimensions;
Element: Wall Elements Below; Wall Elements Above; Wall Element Outline Only; Column Elements Below; Column Elements Above; Slab Elements; Slab Element Outline Only;
Scale = 1:500



Vibration Analysis: Max RMS Velocity Plan

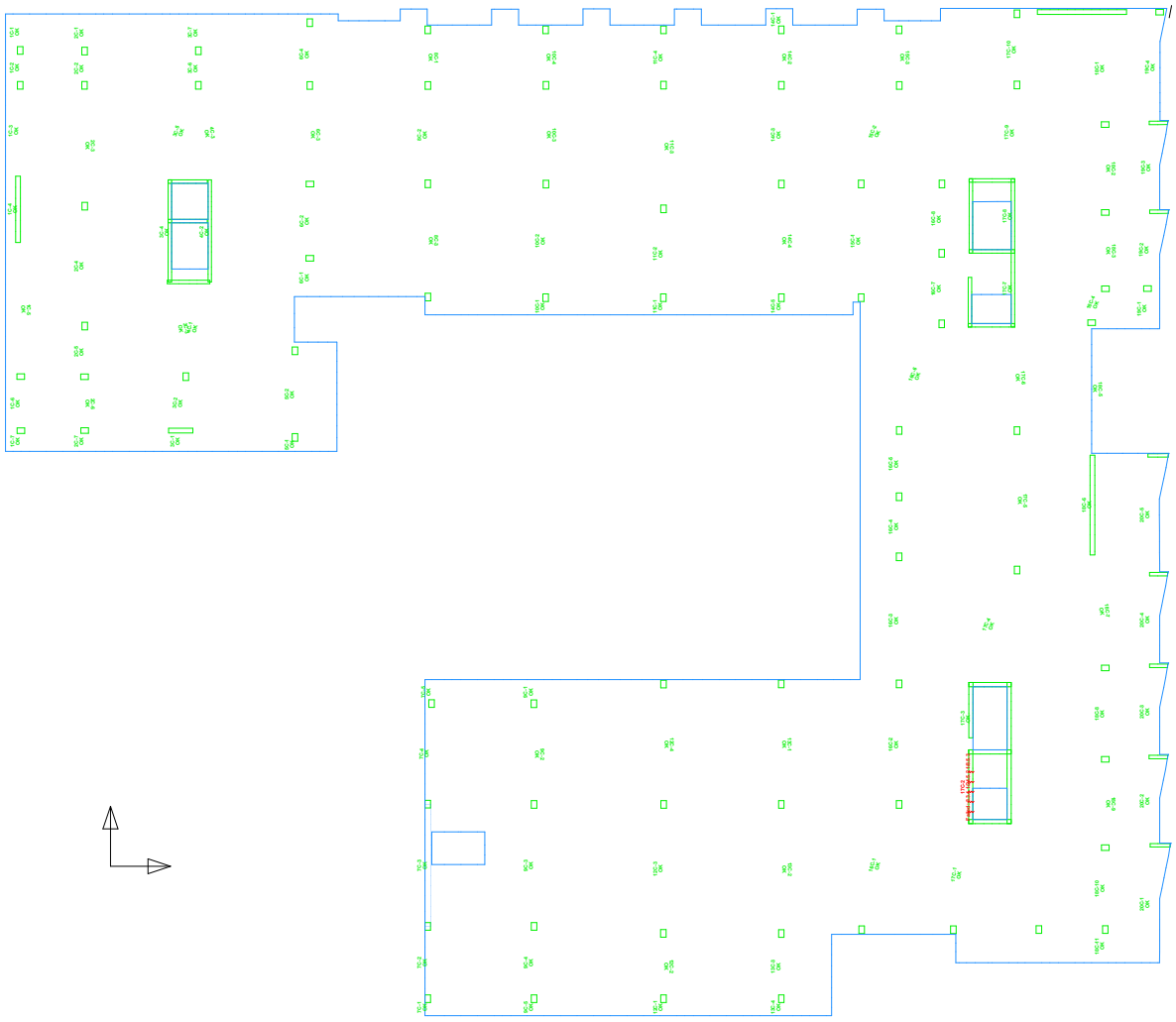


Design Status: Punching Shear Status Plan



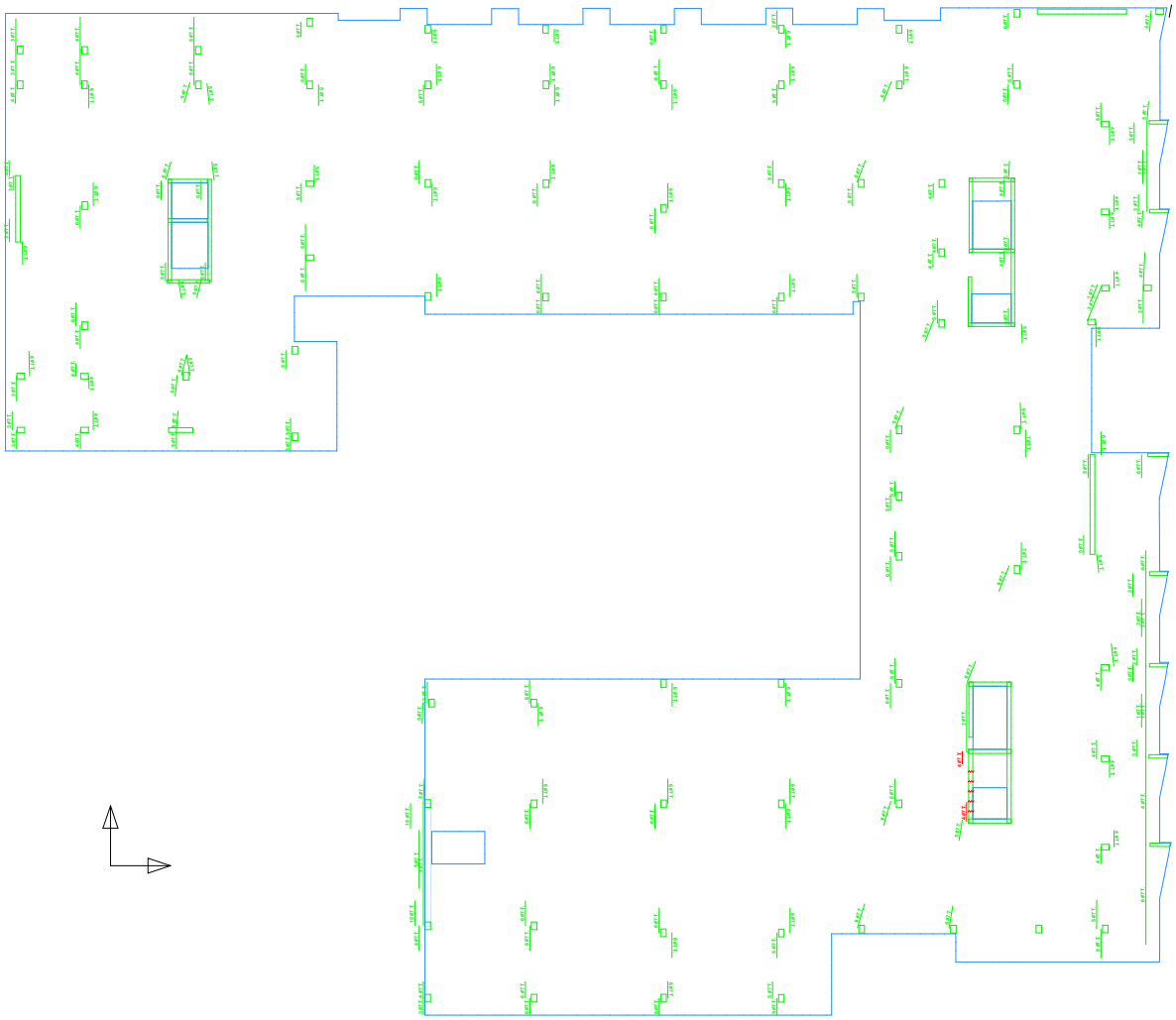
Design Status: Latitude Status Plan

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 = 1:550

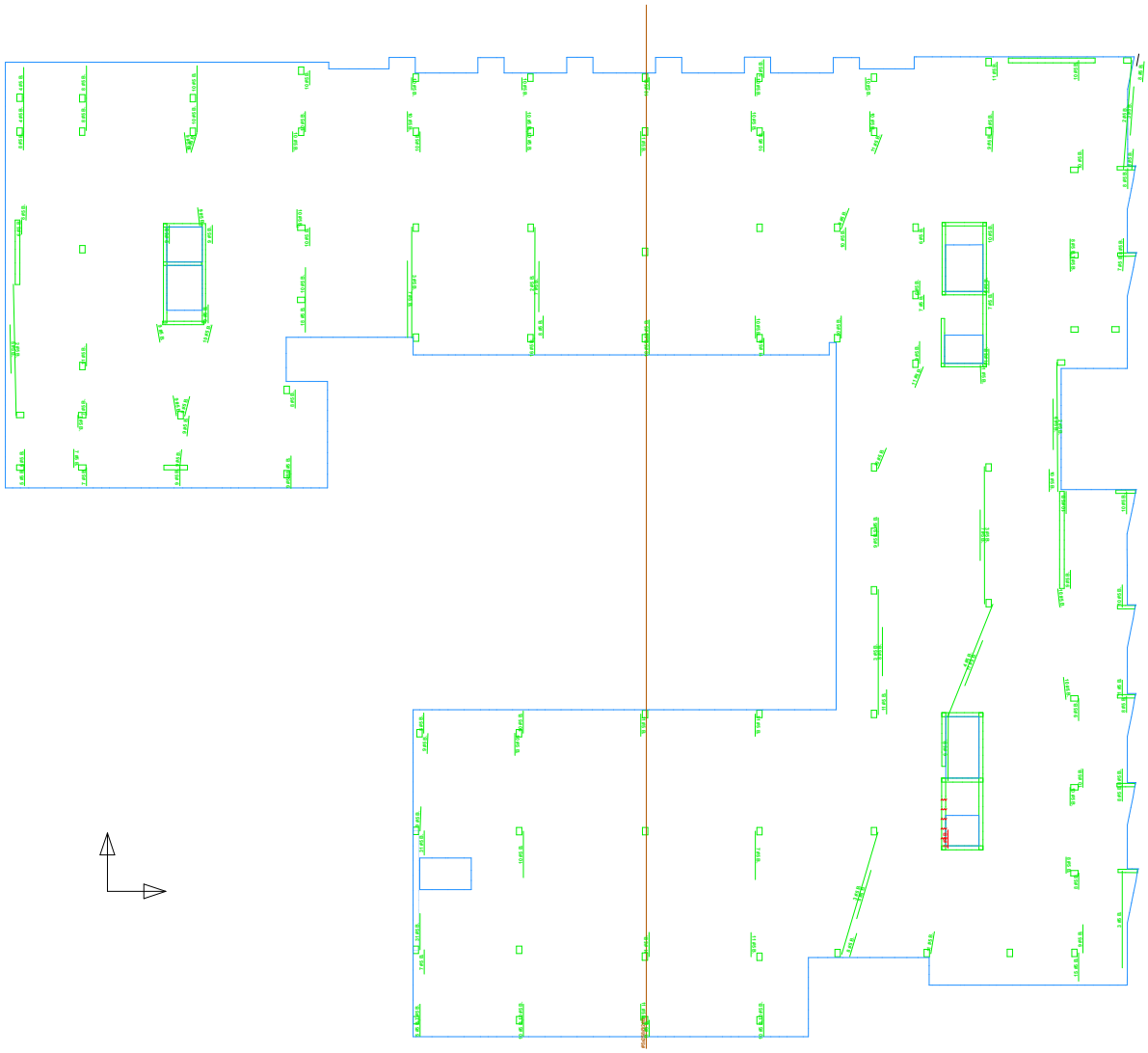


Design Status: Latitude Top Reinforcement Plan

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 = 1:100

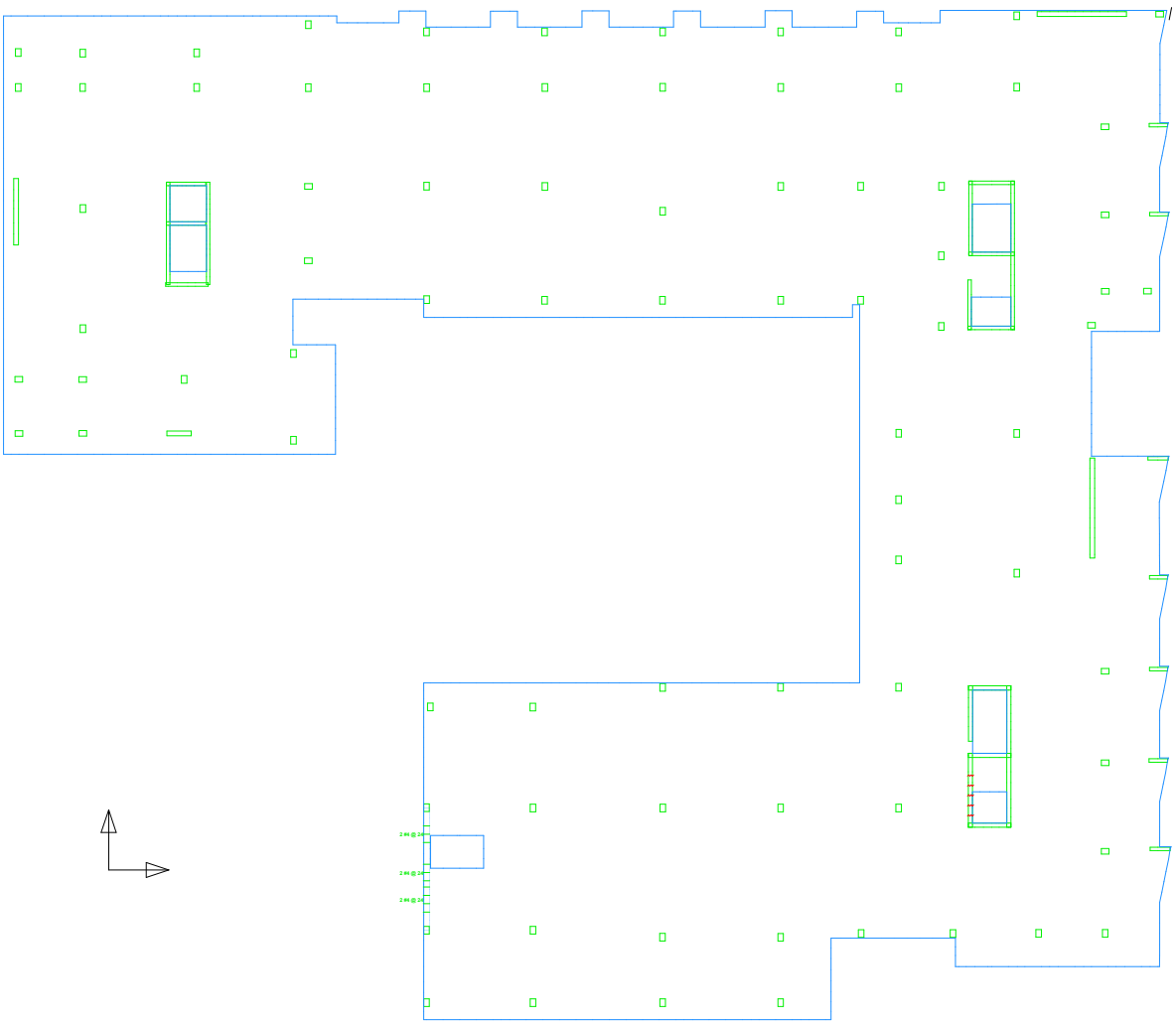


Design Status: Latitude Bottom Reinforcement Plan



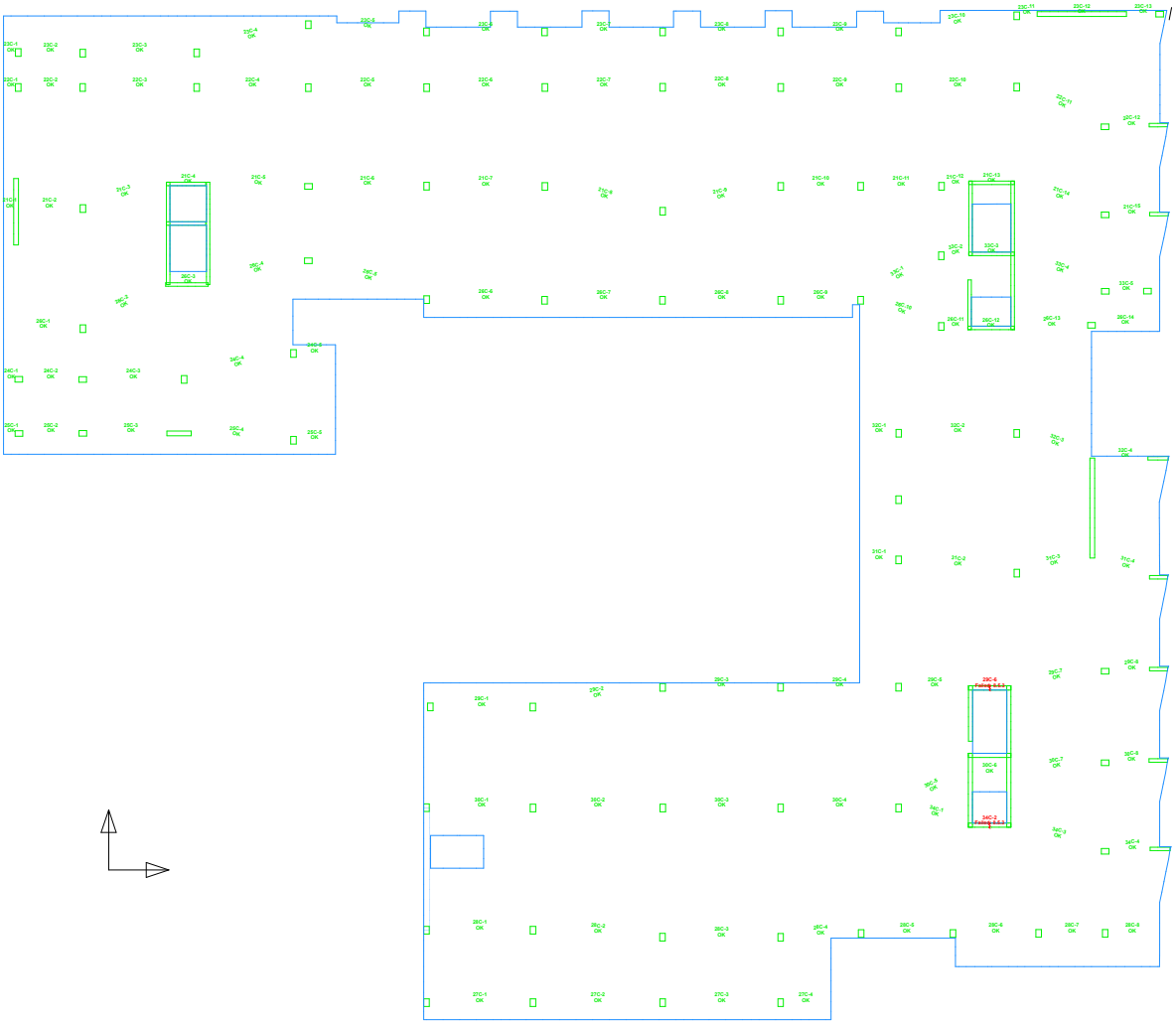
Design Status: Latitude Shear Reinforcement Plan

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 = 1:550



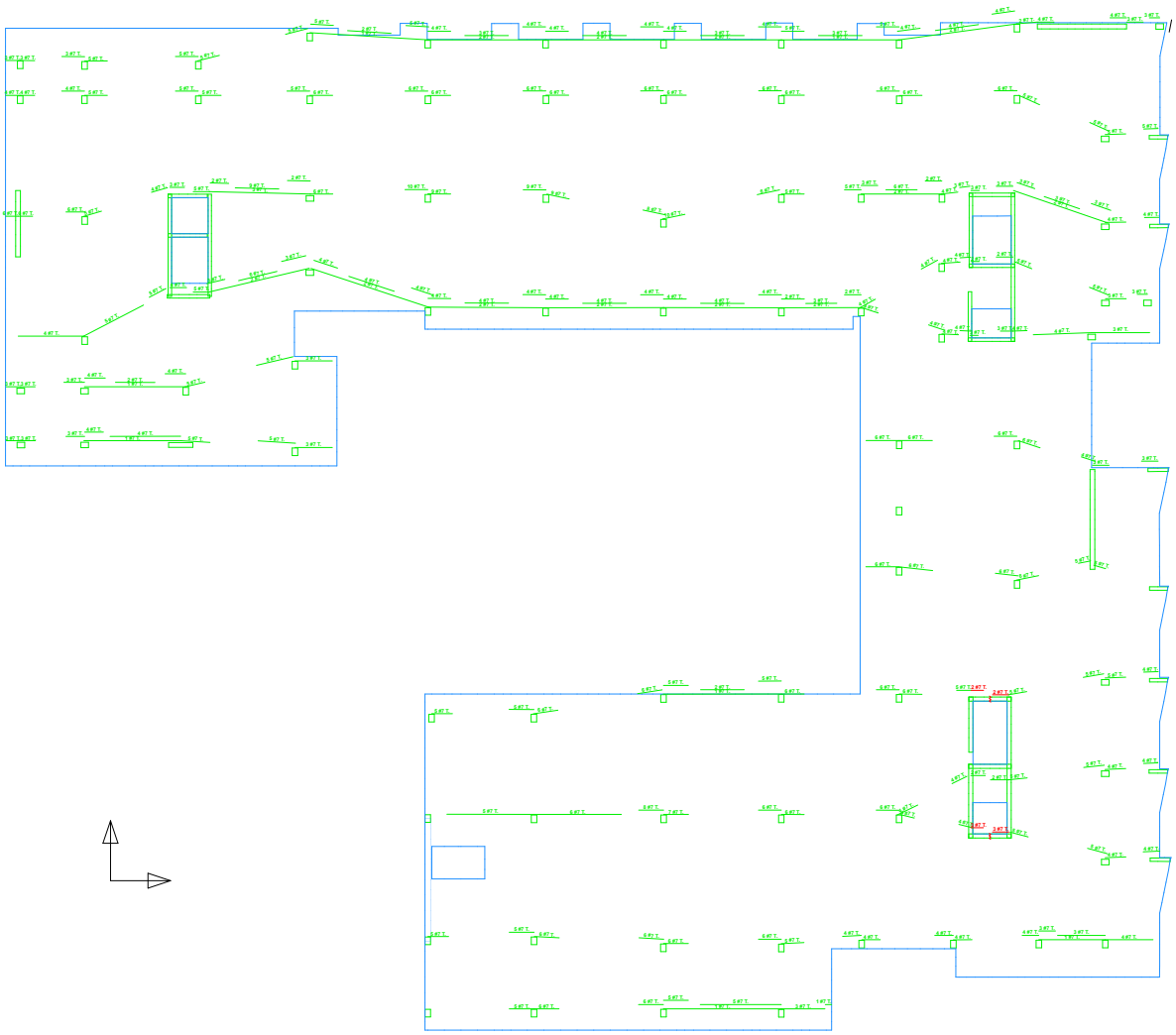
Design Status: Longitude Status Plan

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 = 1:500



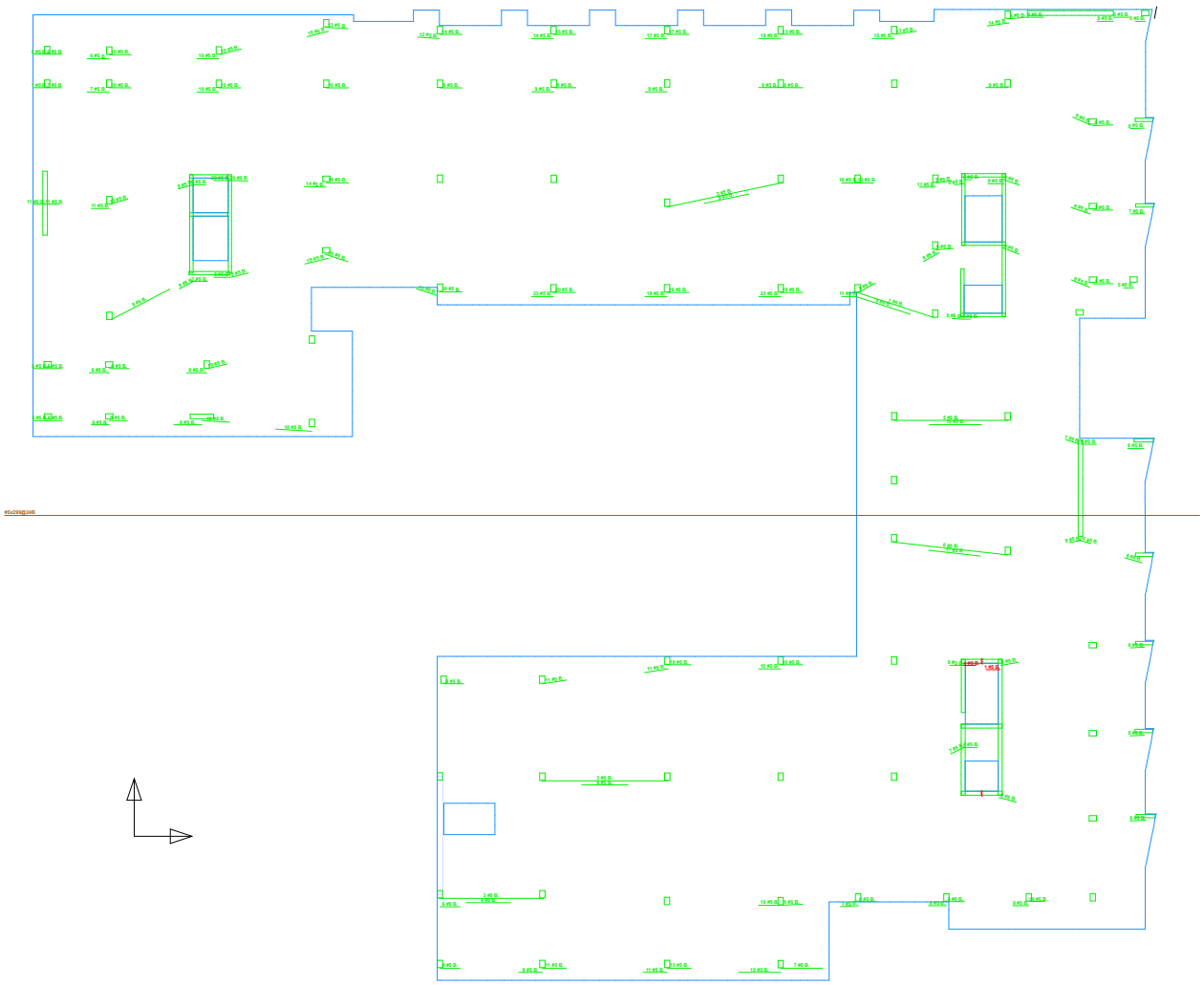
Design Status: Longitude Top Reinforcement Plan

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 = 1:100



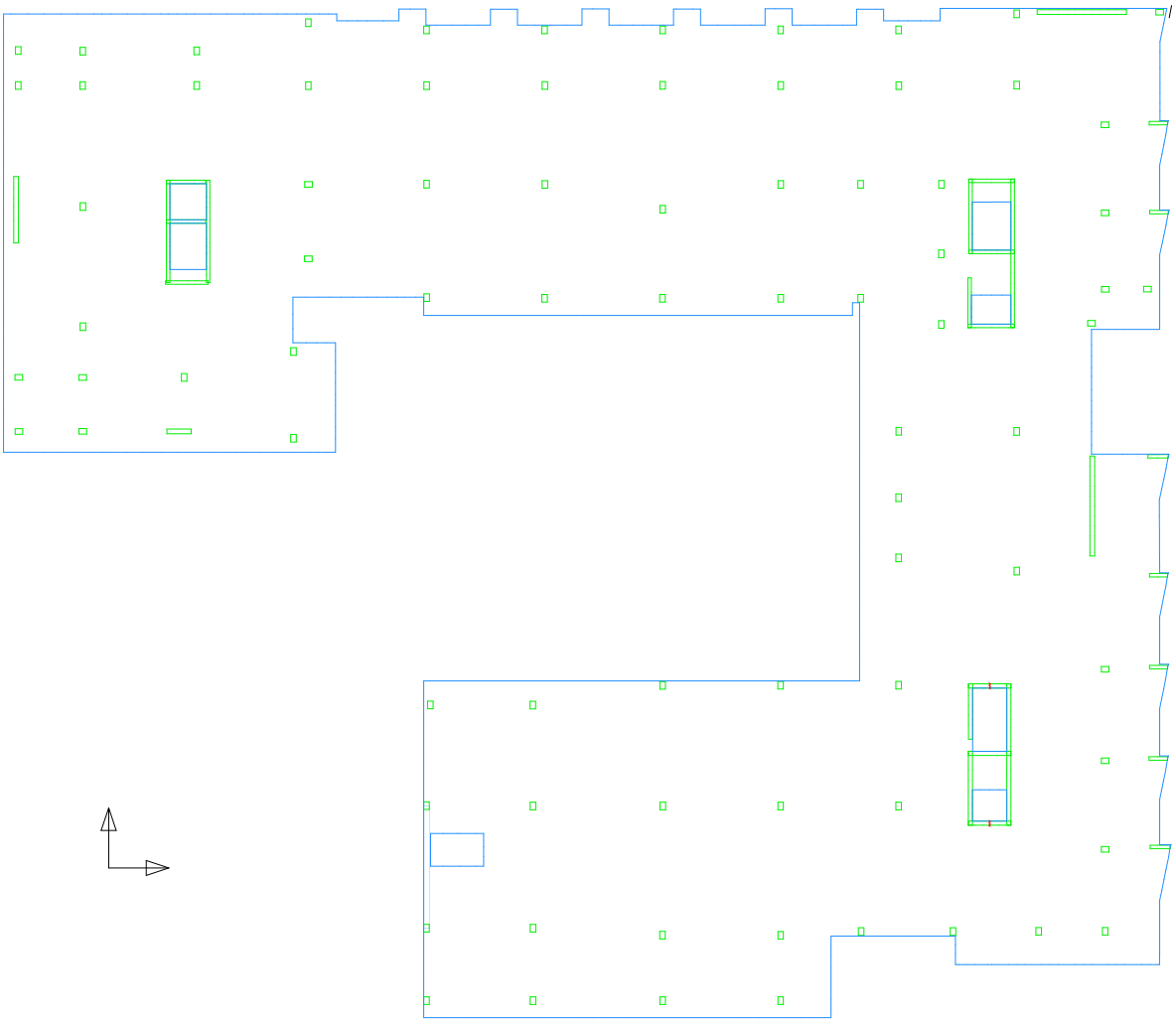
Design Status: Longitude Bottom Reinforcement Plan

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 = 1:100



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 = 1:550



Estimate

Concrete Costs

Materials:	100 per yd³	x	1515 yd³	=	151500
Labor:	50 per yd³	x	1515 yd³	=	75730
Total:	150 per yd³	x	1515 yd³	=	227200

Post-Tensioning Costs

Materials:	1 per pounds	x	48790 pounds	=	48790
Labor:	0.5 per pounds	x	48790 pounds	=	24390
Total:	1.5 per pounds	x	48790 pounds	=	73180

Formwork Costs

Materials:	1 per ft²	x	40820 ft²	=	40820
Labor:	1 per ft²	x	40820 ft²	=	40820
Total:	2 per ft²	x	40820 ft²	=	81630

Mild Steel Reinforcing Cost

Materials:	1000 per tons	x	24.71 tons	=	24710
Labor:	500 per tons	x	24.71 tons	=	12350
Total:	1500 per tons	x	24.71 tons	=	37060

SSR Costs

Materials:	2 per stud	x	4808 studs	=	9616
Labor:	1 per stud	x	4808 studs	=	4808
Total:	3 per stud	x	4808 studs	=	14420

Total Costs

Materials:	6.747 per ft²	x	40820 ft²	=	275400
Labor:	3.874 per ft²	x	40820 ft²	=	158100
Total:	10.62 per ft²	x	40820 ft²	=	433500

CONCRETE LATERAL

Lateral Design Criteria

Code

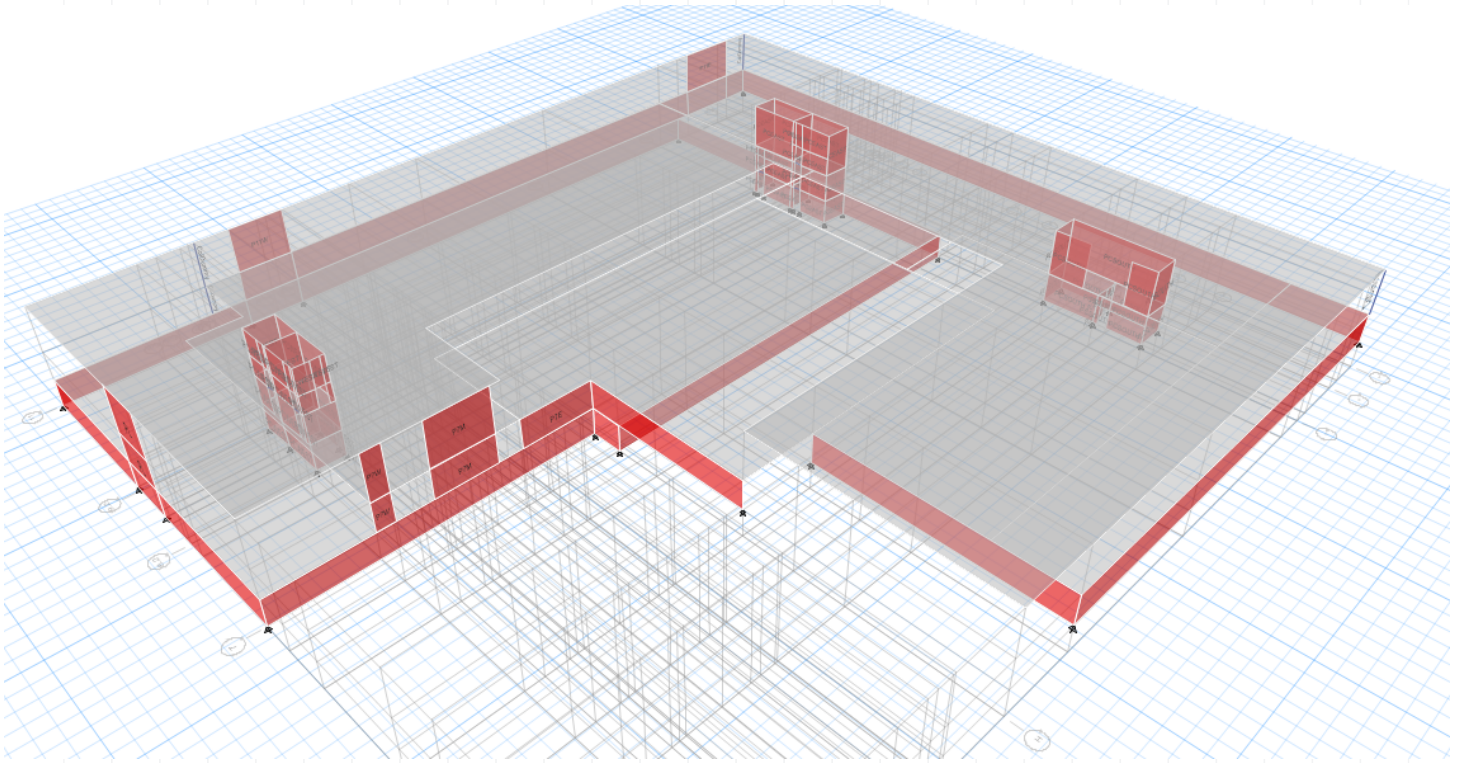
ASCE 7-10

Analysis

A "two-stage" analysis per ASCE 7-10 Section 12.2.3.2 was used for the building lateral analysis. The equivalent lateral force (ELF) procedure was used, lumping the seismic mass of the wood building above the lower concrete portion of the building on the concrete podium slab.

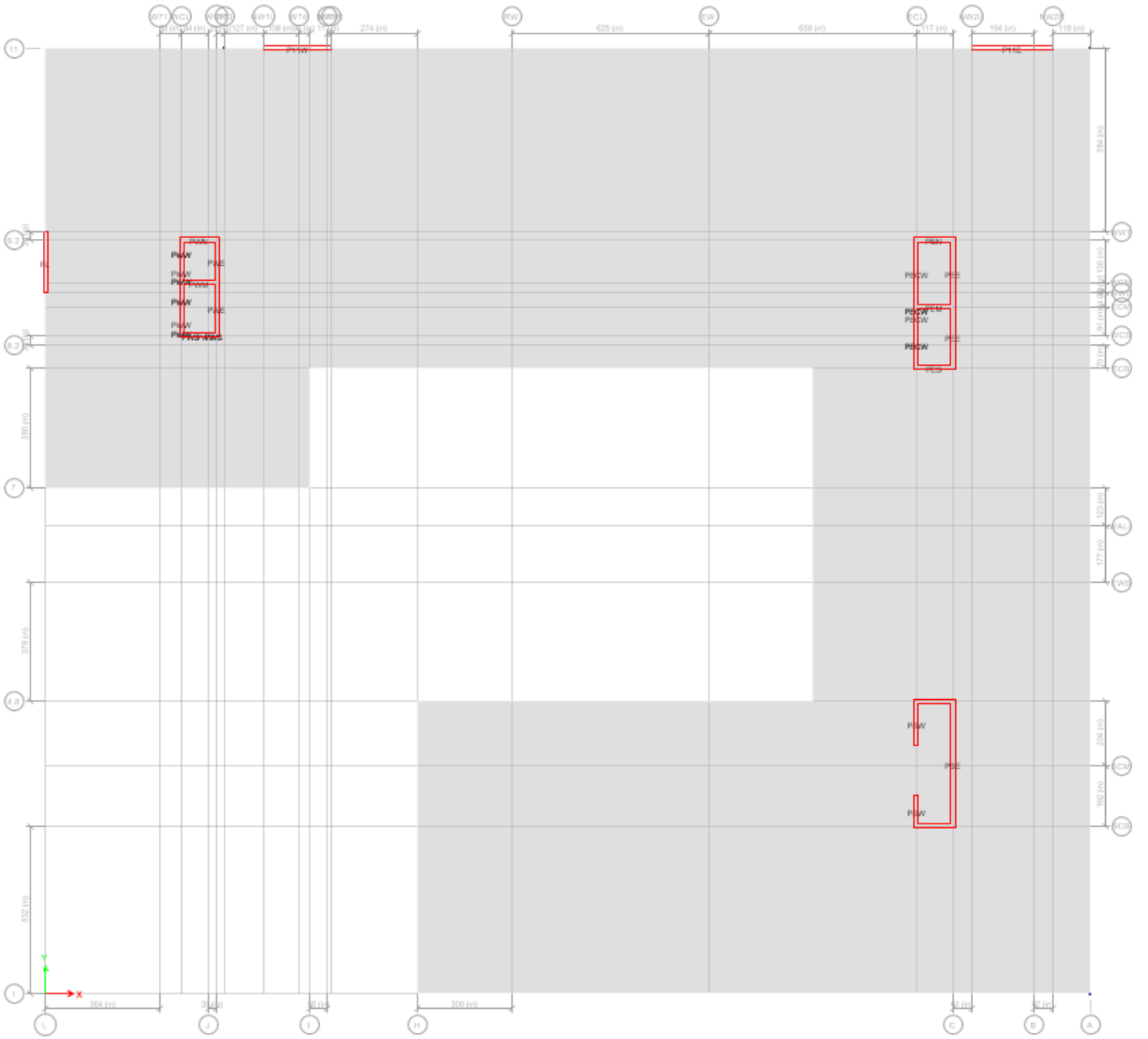
For the lower, concrete portion of the structure, a "bearing wall system" consisting of "Special Reinforced Concrete Shear Walls" was used for the primary lateral force-resisting system corresponding to an R-factor of 5, a C_d-value of 5 and an Ω-factor of 2.5. The lateral force resisting system consists of horizontal concrete cast-in-place (rigid) diaphragms and concrete cast-in-place special reinforced concrete shear walls for vertical elements. An ETABS model was created to capture torsional demands and provide output for the corresponding forces on lateral resisting elements. Excel spreadsheets were used to post-process the ETABS output and design the elements per ACI 318-14. The SPColumn program was used to analyze the PM interaction of the shear walls. An overturning analysis and shear wall footing design was performed using the finite element analysis program SAFE.

ETABS MODEL



ISOMETRIC

ETABS MODEL



PLAN VIEW W/ PIER LABELS

Project:	MIMU
Address:	2885 78TH St SE
Lat:	N 47.58473
Long:	W 122.234008
Building Code:	IBC 2015
Date Updated:	11/12/2020

KEY	
	= User Input
	= Data Pulled From Spreadsheet
	= Calculated Value (or "no fill")
	= Input Value (Typ Constant)

Story Heights

Level Above	Height (ft)	Elev (ft)	Slab t (in)	Floor Area (sf)	
-	-	-	-	-	
-	-	-	0.0	20000	
Roof	9.33	60.32	0.0	20000	
L5	9.33	50.99	0.0	20000	
L4	9.33	41.66	0.0	20000	
L3	9.33	32.33	0.0	20000	
L2	12.00	23.00	14.0	20000	*Two-Stage Analysis, L2 is top
L1	11.00	11.00	12.0	30000	
P1	9.00	0.00	0.0	30000	
P2	0.00	-9.00	0.0	30000	

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Project:	MIMU
Date Updated:	11/12/2020

BUILDING DEAD LOADS

SECTION	LOCATION	TYPE	MATERIAL		WEIGHT (psf)	*USE*
Roof	Roof West	Roofing	2 Ply Bitumen Roofing		2	
		Finish	1x Sheathing		2.3	
		Framing	2x12 @ 12"		4.4	
		Insulation	10"		2.5	
		MEP			3	
		Misc			1.5	
				Σ	**15.7**	16
Roof - PV	Photovoltaic	Floor Finish	PV		12	
		Finish	1x Sheathing		2.3	
		Framing	2x14 @ 16"		4.2	
		Ceiling	5/8" Gypsum		2.8	
		Insulation	10"		2.5	
		MEP			5	
		Misc			2.5	
					31.3	32
Floor	Level 3-5	Floor Finish	Carpet		2	
Typ Wood		Finish	1" Gypcrete Topping		9	
		Finish	1x Sheathing		3.3	
		Framing	12" TJI @ 16" oc		3	
		Ceiling	5/8" Gypsum		2.8	
		Misc			4	
				Σ	**24.1**	25
Transfer Slab	Level 2	Floor SDL	Wood framing included		120	
		Framing	12" concrete		150	
		Ceiling/Flr Allow			8	
		Misc			1.5	
				Σ	**279.5**	280
Floor	Level 1 - Retail	Floor Finish	Allowance		10	
		Framing	12" concrete		150	
		Ceiling	5/8" Gypsum		2.8	
		MEP			5	
		Misc			1.5	
				Σ	**169.3**	170
Floor	Level 1 - Units	Floor Finish	Allowance		5	
		Framing	10" concrete		125	
		Ceiling	5/8" Gypsum		2.8	
		MEP			2.5	
		Misc			4	
				Σ	**139.3**	140
Floor	Level 1 - Courtyard	Floor Finish	Allowance		7	
		Framing	12" concrete		150	
		Topping			50	
		Ceiling	5/8" Gypsum		2.8	
		MEP			3	
		Misc			2	
				Σ	**214.8**	215
Floor	Level 1 - Landscaped	Floor Finish	Waterproofing		1.5	
		Soil	36"		360	
		Framing	12" concrete		150	
		Ceiling	5/8" Gypsum		2.8	
		MEP			1.5	
		Misc			1.5	
				Σ	**517.3**	518
Ext Wall	All Levels	Ext Finish	Siding		2.5	
		Ext Finish	5/8" Gypsum		2.8	
		Framing	6" Wood Studs @ 16"		1.7	
		Insulation	6" Batt		1.5	
		Int Finish	5/8" Gypsum		2.8	
		Misc			0	
				Σ	**11.3**	12
Int. Wall	All Levels	Ext Finish	5/8" Gypsum		2.8	
		Framing	2x6 Wood Studs @ 16"		1.7	
		Int Finish	5/8" Gypsum		2.8	
		Misc			1	
				Σ	**8.3**	9

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Project:	MIMU
Date Updated:	11/12/2020

11/12/2020

SEISMIC BUILDING WEIGHTS

Level	Description	Weight (psf, plf)	L (ft) or A (ft²)	H (ft)	Total (kips)
Roof	Roof	16	30982	0	0
	Ext Wall below	12	480	0	0
	Int Wall below	9	428	0	0
	Misc	0	1	0	0
				Σ	**0**
Roof PV	Roof PV	32	10960	0	0
	Ext Wall below	12	1083	0	0
	Int Wall below	9	1420	0	0
	Misc	0	1	0	0
				Σ	**0**
Level 3-5	Floor	25	41942	0	0
	Ext Wall above/below	12	1083	0	0
	Int Wall above/below	9	1420	0	0
	Misc	0	1	0	0
				Σ	**0**
Level 2	Floor West	280	41942	1	11744
	Columns below	250	52	7.5	98
	Concrete Wall below	150	268	7.5	302
	Ext Wall below	12	1083	7.5	97
	Int Wall below	9	1420	7.5	96
	Misc	0	1	1	0
				Σ	**12336**
Level 1 - Retail	Floor - Retail	170	22510	1	3827
	Columns above/below	250	52	12.5	163
	Concrete Wall above/below	150	268	12.5	503
	Ext Wall above/below	12	1083	12.5	162
	Int Wall above/below	9	1420	12.5	160
	Misc	0	1	1	0
				Σ	**4814**
Level 1 - Units	Floor - Units	170	15400	1	2618
	Columns below	250	0	12.5	0
	Concrete Wall below	150	0	12.5	0
	Ext Wall below	12	0	12.5	0
	Int Wall below	9	0	12.5	0
	Misc	0	1	1	0
				Σ	**2618**
Level 1 - Courtya	Courtyard	367	10170	1	3727
	Columns above/below	250	70	5	88
	Concrete Wall above/below	150	268	5	201
	Ext Wall above/below	518	1083	5	2805
	Int Wall above/below	0	1420	5	0
	Misc	0	1	1	0
				Σ	**6821**

Total Building Seismic Weight = ***26589***

ETABS FLOOR AREA MASSES

Level	Floor Area (ft²)	Description	SDL (psf)	MASS (k-sec²/in)
Roof	30982	Roof	0	
		Ext Wall below	0	
		Int Wall below	0	
		Misc	0	
				0.000E+00
Roof PV	10960	Roof PV	0	
		Ext Wall below	0	
		Int Wall below	0	
		Misc	0	
				0.000E+00
Level 3-5	41942	Floor	0	
		Ext Wall above/below	0	
		Int Wall above/below	0	
		Misc	0	
				0.000E+00
Level 2	41942	SDL	130	
		Columns below	2	
		Ext Wall below	2	
		Int Wall below	2	
		Misc	0	
				2.461E-06
Level 1 - Ret	22510	SDL	25	
		Columns above/below	7	
		Ext Wall above/below	7	
		Int Wall above/below	7	
		Misc	0	
				8.363E-07
Level 1 - Unit	15400	SDL	20	
		Columns below	0	
		Ext Wall below	0	
		Int Wall below	0	
		Misc	0	
				3.594E-07
Level 1 - Cou	10170	SDL	220	
		Columns above/below	9	
		Ext Wall above/below	276	
		Int Wall above/below	0	
		Misc	0	**9.065E-06**

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2015 IBC Static Design Spectra and Base Shear (ASCE 7-10 Chapters 11 and 12)

Project:	MIMIU
Date Updated:	11/12/2020

S_s	1.38	F_a	1	$T_{X,ETABS}$	0.15 sec	**Weight**	26,613 k	**Dynamic $V_{,X}$**	5,781 k		
S_1	0.531	F_v	1.50	$T_{Y,ETABS}$	0.11 sec	**Height**	25 ft	**Dynamic $V_{,Y}$**	6,455 k		
S_{DS}	0.920			$T_{\theta,ETABS}$	0.09 sec				From ETABS Static Load Case		
S_{D1}	0.531					Cs_{MAX}	0.184				
SDC	D	**Soil Class**	D	$T_{CODE,A}$	0.22 sec	Cs_{MIN}	0.040				
I	1			$T_{CODE,MAX}$	0.31 sec	$Cs_{MIN,SDC-EF}$	0.000	**Scale To:**			
R	5	**Cd**	5								
Ct	0.02			$T_{X,DESIGN}$	0.15 sec	$Cs_{DESIGN,X}$	0.184	$V_{DYN,X}$	4,162 k		
Cu	1.4			$T_{Y,DESIGN}$	0.11 sec	$Cs_{DESIGN,Y}$	0.184	$V_{DYN,Y}$	4,162 k		
x	0.75										
				$k_{,X}$	1.00	$V_{STAT,X}$	4,897 k		278.21	(Enter into ETABS -> SPECTX)	
Ev	0.184 x D			$k_{,Y}$	1.00	$V_{STAT,Y}$	4,897 k		249.16	(Enter into ETABS -> SPECTY)	

Floor	**Weight**	**Ht Abv Story Bel**	**Height**	**Wx*Hx^kx**	**Wy*Hy^ky**	**Fx**	**Fy**	**Vx**	**Vy**	**0.4*S_{DS}*I**	**0.2*S_{DS}*I**	**EQN 952644,X**	**EQN 952644,Y**	**Fpx/Wp**	**Fpy/Wp**
		ft	ft	k-ft	k-ft	k	k	k	k	k	k	k	k	k	k
-	-	0.00	0.00	0	0	0	0	0	0	0.368	0.184	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
-	-	0.00	0.00	0	0	0	0	0	0	0.368	0.184	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
-	-	0.00	0.00	0	0	0	0	0	0	0.368	0.184	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
ROOF	-	9.33	60.32	0	0	0	0	0	0	0.368	0.184	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
L5	-	9.33	50.99	0	0	0	0	0	0	0.368	0.184	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
L4	-	9.33	41.66	0	0	0	0	0	0	0.368	0.184	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
L3	-	9.33	32.33	0	0	0	0	0	0	0.368	0.184	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
L2	7,266	12.00	23.00	167,122	167,122	2,206	2,206	2,206	2,206	0.368	0.184	0.304	0.304	0.304	0.304
L1	18,527	11.00	11.00	203,793	203,793	2,690	2,690	4,897	4,897	0.368	0.184	0.190	0.190	0.190	0.190
P1	820	9.00	0.00	0	0	0	0	4,897	4,897	0.368	0.184	0.184	0.184	0.184	0.184
P2	-	0.00	-9.00	0	0	0	0	4,897	4,897	0.368	0.184	0.184	0.184	0.184	0.184
Σ	26,613			370,915	370,915	4,897	4,897								

	Design Response Spectrum			
	Period	Spectral Acceleration		
	0.00	0.368		
To =	0.12	0.920	To =	0.1154
Ts =	0.58	0.920	Ts =	0.5772
	0.63	0.836	TL =	6
	0.70	0.760		
	0.77	0.691		
	0.85	0.628		
	0.93	0.571		
	1.02	0.519		
	1.12	0.472		
	1.24	0.429		
	1.36	0.390		
	1.50	0.355		
	1.65	0.322		
	1.81	0.293		
	1.99	0.266		
	2.19	0.242		
	2.41	0.220		
	2.65	0.200		
	2.92	0.182		
	3.21	0.165		
	3.53	0.150		
	3.88	0.137		
	4.27	0.124		
	4.70	0.113		
	5.17	0.103		
	5.69	0.093		
*>TL	6.25	0.081		
	6.88	0.067		
	7.57	0.056		
	8.32	0.046		
	9.16	0.038		
	10.07	0.031		
	11.08	0.026		
	12.19	0.021		
	13.40	0.018		
	14.75	0.015		
	16.22	0.012		

Project:	MIMU
Date Updated:	11/12/2020

Copy Down With Import Label	Beam Designations and Properties Imported from: Display -> Show Tables... -> Model -> Structure Data -> Mass Summary -> Mass Summary by Story, k-in (Run any Load Case)				Copy Down With Import Mass (Column F * 386.4)
	Story	UX k*sec^2/in	UY k*sec^2/in	UZ k*sec^2/in	kips
L2	L2	18.804789	18.804789	0	7266.2
L1	L1	47.946729	47.946729	0	18526.6
P1	P1	2.123077	2.123077	0	820.4
P2	P2	0.005619	0.005619	0	2.2
					26615.3

Project:	MIMU
Date Updated:	11/12/2020

Display -> Show Tables… -> Analysis -> Results -> Structure Results -> Story Forces
Run only X & Y loads, k-in (after SPECTX and SPECTY are scaled)

1	2	3	4	5	6	7	8	9	0
	Story	Load Case/Combo	Location	P kip	VX kip	VY kip	T kip-in	MX kip-in	MY kip-in
SL2LSPECTX Max	L2	SPECTX Max	Top	0	5831.391	4585.411	11248835	0	0
SL2LSPECTX Max	L2	SPECTX Max	Bottom	0	5831.391	4585.411	11248835	825373.9	1049650
SL2LSPECTY Max	L2	SPECTY Max	Top	0	5222.492	4106.613	10074260	0	0
SL2LSPECTY Max	L2	SPECTY Max	Bottom	0	5222.492	4106.613	10074260	739190.4	940048.5
SL1LSPECTX Max	L1	SPECTX Max	Top	0	9554.688	8024.884	18220523	825373.9	1049650
SL1LSPECTX Max	L1	SPECTX Max	Bottom	0	9554.688	8024.884	18220523	1644155	1993402
SL1LSPECTY Max	L1	SPECTY Max	Top	0	8557.011	7186.945	16317981	739190.4	940048.5
SL1LSPECTY Max	L1	SPECTY Max	Bottom	0	8557.011	7186.945	16317981	1472476	1785256
SP1LSPECTX Max	P1	SPECTX Max	Top	567.514	4162.113	1686.777	11752137	1827344	699470
SP1LSPECTX Max	P1	SPECTX Max	Bottom	567.514	4162.113	1686.777	11752137	1796232	563885.2
SP1LSPECTY Max	P1	SPECTY Max	Top	508.256	3727.516	1510.648	10525008	1636537	626433.1
SP1LSPECTY Max	P1	SPECTY Max	Bottom	508.256	3727.516	1510.648	10525008	1608674	505005.7

X Load	SPECTX Max
Y Load	SPECTY Max

After SPECTX & SPECTY have been scaled!

Story Label	SPECTX M Story Shear k	SPECTY M Story Shear k	SPECTX M Story Force k	SPECTY M Story Force k	Building Width X ft	Building Width Y ft	5% Torsion Force X k-in	5% Torsion Force Y k-in	Accidental Amplification Ax	Accidental Amplification Ay	Ax*5% Torsion Force X k-in	Ay*5% Torsion Force Y k-in
-	#N/A	#N/A	#N/A	#N/A	61	168	#N/A	#N/A	1.00	1.00	#N/A	#N/A
Roof	#N/A	#N/A	#N/A	#N/A	61	168	#N/A	#N/A	1.00	1.00	#N/A	#N/A
L5	#N/A	#N/A	#N/A	#N/A	61	168	#N/A	#N/A	1.00	1.00	#N/A	#N/A
L4	#N/A	#N/A	#N/A	#N/A	61	168	#N/A	#N/A	1.00	1.00	#N/A	#N/A
L3	#N/A	#N/A	#N/A	#N/A	61	168	#N/A	#N/A	1.00	1.00	#N/A	#N/A
L2	5,831	4,107	5,831	4,107	61	168	213,429	413,947	1.13	1.28	241,175	529,852
L1	9,555	7,187	3,723	3,080	61	168	136,273	310,497	1.00	1.36	136,273	422,277
P1	4,162	1,511	-5,393	-5,676	61	168	-197,368	-572,171	1.08	1.23	-213,158	-703,770

1. Enter into ETABS, Mz
Xtp Static Ytp Static

2. From Ax Spreadsheet

3. Enter into ETABS, Mz
AXtp Static AYtp Static

Project:	MIMU
Date Updated:	11/12/2020

Amplification of Accidental Mass Offset

IBC 2015

Formatted for ETABS 2017 Input/Output

Etabs File = Hycroft ETABs2017 Model_v1.0

X-Direction +/- 5% Y-Offset Case	**RXTP**
X-Direction + 5% Y-Offset Case	**RXTN**
Y-Direction +/- 5% X-Offset Case	**RYTP**
Y-Direction - 5% X-Offset Case	**RYTN**

Project:	MIMU
Date Upda	11/12/2020

1	2	3	4	5
Story Label	**Y Up**	**Y Down**	**X Left**	**X Right**
-	120	28	120	27
-	120	28	120	27
Roof	120	28	120	27
L5	120	28	120	27
L3	120	28	120	27
L2	120	28	120	27
L1	120	28	120	27
P1	120	28	120	27
P2	120	28	120	27

Project:	MIMU
Date Upda	11/12/2020

1	2	3
Story Label	**X-Width** ft	**Y-Width** ft
-	276.00	240.0
-	276.00	240.0
Roof	276.00	240.0
L5	276.00	240.0
L3	276.00	240.0
L2	276.00	240.0
L1	276.00	240.0
P1	276.00	240.0
P2	276.00	240.0

Project:	MIMU
Date Updated:	11/12/2020

Level Above	Height (ft)	Elev (ft)
-	-	-
-	-	-
Roof	9.33	62.32
L5	9.33	52.99
L3	9.33	34.33
L2	15.00	25.00
L1	10.00	10.00
P1	9.00	0.00
P2	0.00	-9.00

	1	2	3	4	5	6
Story Heights						
Display -> Show Tables... -> Model -> Structure Layout -> Story Data (Loads Don't Matte						
k-ft						
Story	Height ft	Elevation ft	Master Story	Similar To	Splice Story	
L2	180	401	No	None	No	
L1	116	221	No	None	No	
P1	105	105	No	None	No	
P2	0	0	No	None	No	

Project:	MIMU
Date Updated:	11/12/2020

	1	2	3	4	5	6	7	8	9	10	11
Copy Down	Displacements for Corners of Building										
With Import	Display -> Show Tables... -> Analysis -> Results -> Displacements -> Joint Displacements										
Label	(Run Control load cases only), k-in										
	Story	Label	Unique Name	d Case/Cor		UX	UY	UZ	RX	RY	RZ
						in	in	in	rad	rad	rad
SL2P27LRXTP Max	L2	27	107	RXTP Max		0.126016	0.054888	0.024765	0.000384	0.000535	0.000043
SL2P27LRXTP Min	L2	27	107	RXTP Min		-0.12602	-0.05489	-0.02477	-0.00038	-0.00054	-4.3E-05
SL2P27LRXTN Max	L2	27	107	RXTN Max		0.126016	0.054888	0.024765	0.000384	0.000535	0.000043
SL2P27LRXTN Min	L2	27	107	RXTN Min		-0.12602	-0.05489	-0.02477	-0.00038	-0.00054	-4.3E-05
SL2P27LRYTP Max	L2	27	107	RYTP Max		0.112858	0.049157	0.022179	0.000344	0.000479	0.000038
SL2P27LRYTP Min	L2	27	107	RYTP Min		-0.11286	-0.04916	-0.02218	-0.00034	-0.00048	-3.8E-05
SL2P27LRYTN Max	L2	27	107	RYTN Max		0.112858	0.049157	0.022179	0.000344	0.000479	0.000038
SL2P27LRYTN Min	L2	27	107	RYTN Min		-0.11286	-0.04916	-0.02218	-0.00034	-0.00048	-3.8E-05
SL2P28LRXTP Max	L2	28	108	RXTP Max		0.222204	0.054888	0.00352	0.000754	0.000376	0.000043
SL2P28LRXTP Min	L2	28	108	RXTP Min		-0.2222	-0.05489	-0.00352	-0.00075	-0.00038	-4.3E-05
SL2P28LRXTN Max	L2	28	108	RXTN Max		0.222204	0.054888	0.00352	0.000754	0.000376	0.000043
SL2P28LRXTN Min	L2	28	108	RXTN Min		-0.2222	-0.05489	-0.00352	-0.00075	-0.00038	-4.3E-05
SL2P28LRYTP Max	L2	28	108	RYTP Max		0.199002	0.049157	0.003152	0.000676	0.000336	0.000038
SL2P28LRYTP Min	L2	28	108	RYTP Min		-0.199	-0.04916	-0.00315	-0.00068	-0.00034	-3.8E-05
SL2P28LRYTN Max	L2	28	108	RYTN Max		0.199002	0.049157	0.003152	0.000676	0.000336	0.000038
SL2P28LRYTN Min	L2	28	108	RYTN Min		-0.199	-0.04916	-0.00315	-0.00068	-0.00034	-3.8E-05
SL2P120LRXTP Max	L2	120	270	RXTP Max		0.126016	0.116152	0.056082	0.000119	0.000283	0.000043
SL2P120LRXTP Min	L2	120	270	RXTP Min		-0.12602	-0.11615	-0.05608	-0.00012	-0.00028	-4.3E-05
SL2P120LRXTN Max	L2	120	270	RXTN Max		0.126016	0.116152	0.056082	0.000119	0.000283	0.000043
SL2P120LRXTN Min	L2	120	270	RXTN Min		-0.12602	-0.11615	-0.05608	-0.00012	-0.00028	-4.3E-05
SL2P120LRYTP Max	L2	120	270	RYTP Max		0.112858	0.104024	0.050226	0.000106	0.000254	0.000038
SL2P120LRYTP Min	L2	120	270	RYTP Min		-0.11286	-0.10402	-0.05023	-0.00011	-0.00025	-3.8E-05
SL2P120LRYTN Max	L2	120	270	RYTN Max		0.112858	0.104024	0.050226	0.000106	0.000254	0.000038
SL2P120LRYTN Min	L2	120	270	RYTN Min		-0.11286	-0.10402	-0.05023	-0.00011	-0.00025	-3.8E-05
SL1P27LRXTP Max	L1	27	8	RXTP Max		0.026061	0.008889	0.000719	0.000171	0.000069	0.000008
SL1P27LRXTP Min	L1	27	8	RXTP Min		-0.02606	-0.00889	-0.00072	-0.00017	-6.9E-05	-8E-06
SL1P27LRXTN Max	L1	27	8	RXTN Max		0.026061	0.008889	0.000719	0.000171	0.000069	0.000008
SL1P27LRXTN Min	L1	27	8	RXTN Min		-0.02606	-0.00889	-0.00072	-0.00017	-6.9E-05	-8E-06
SL1P27LRYTP Max	L1	27	8	RYTP Max		0.023339	0.007961	0.000644	0.000153	0.000061	0.000007
SL1P27LRYTP Min	L1	27	8	RYTP Min		-0.02334	-0.00796	-0.00064	-0.00015	-6.1E-05	-7E-06
SL1P27LRYTN Max	L1	27	8	RYTN Max		0.023339	0.007961	0.000644	0.000153	0.000061	0.000007
SL1P27LRYTN Min	L1	27	8	RYTN Min		-0.02334	-0.00796	-0.00064	-0.00015	-6.1E-05	-7E-06
SL1P28LRXTP Max	L1	28	10	RXTP Max		0.024083	0.008889	0.000413	0.000138	0.000138	0.000008
SL1P28LRXTP Min	L1	28	10	RXTP Min		-0.02408	-0.00889	-0.00041	-0.00014	-0.00014	-8E-06
SL1P28LRXTN Max	L1	28	10	RXTN Max		0.024083	0.008889	0.000413	0.000138	0.000138	0.000008
SL1P28LRXTN Min	L1	28	10	RXTN Min		-0.02408	-0.00889	-0.00041	-0.00014	-0.00014	-8E-06
SL1P28LRYTP Max	L1	28	10	RYTP Max		0.021568	0.007961	0.00037	0.000123	0.000124	0.000007
SL1P28LRYTP Min	L1	28	10	RYTP Min		-0.02157	-0.00796	-0.00037	-0.00012	-0.00012	-7E-06
SL1P28LRYTN Max	L1	28	10	RYTN Max		0.021568	0.007961	0.00037	0.000123	0.000124	0.000007
SL1P28LRYTN Min	L1	28	10	RYTN Min		-0.02157	-0.00796	-0.00037	-0.00012	-0.00012	-7E-06
SL1P120LRXTP Max	L1	120	68	RXTP Max		0.026061	0.025858	0.032289	0.000082	0.000128	0.000008
SL1P120LRXTP Min	L1	120	68	RXTP Min		-0.02606	-0.02586	-0.03229	-8.2E-05	-0.00013	-8E-06
SL1P120LRXTN Max	L1	120	68	RXTN Max		0.026061	0.025858	0.032289	0.000082	0.000128	0.000008
SL1P120LRXTN Min	L1	120	68	RXTN Min		-0.02606	-0.02586	-0.03229	-8.2E-05	-0.00013	-8E-06
SL1P120LRYTP Max	L1	120	68	RYTP Max		0.023339	0.023158	0.028918	0.000073	0.000114	0.000007
SL1P120LRYTP Min	L1	120	68	RYTP Min		-0.02334	-0.02316	-0.02892	-7.3E-05	-0.00011	-7E-06
SL1P120LRYTN Max	L1	120	68	RYTN Max		0.023339	0.023158	0.028918	0.000073	0.000114	0.000007
SL1P120LRYTN Min	L1	120	68	RYTN Min		-0.02334	-0.02316	-0.02892	-7.3E-05	-0.00011	-7E-06
SP1P27LRXTP Max	P1	27	7	RXTP Max		0	0	0	0.000156	0.000257	0.000458
SP1P27LRXTP Min	P1	27	7	RXTP Min		0	0	0	-0.00016	-0.00026	-0.00046
SP1P27LRXTN Max	P1	27	7	RXTN Max		0	0	0	0.000156	0.000257	0.000458
SP1P27LRXTN Min	P1	27	7	RXTN Min		0	0	0	-0.00016	-0.00026	-0.00046
SP1P27LRYTP Max	P1	27	7	RYTP Max		0	0	0	0.00014	0.00023	0.00041
SP1P27LRYTP Min	P1	27	7	RYTP Min		0	0	0	-0.00014	-0.00023	-0.00041
SP1P27LRYTN Max	P1	27	7	RYTN Max		0	0	0	0.00014	0.00023	0.00041
SP1P27LRYTN Min	P1	27	7	RYTN Min		0	0	0	-0.00014	-0.00023	-0.00041
SP1P28LRXTP Max	P1	28	9	RXTP Max		0	0	0	0.000151	0.000092	0.0003
SP1P28LRXTP Min	P1	28	9	RXTP Min		0	0	0	-0.00015	-9.2E-05	-0.0003
SP1P28LRXTN Max	P1	28	9	RXTN Max		0	0	0	0.000151	0.000092	0.0003
SP1P28LRXTN Min	P1	28	9	RXTN Min		0	0	0	-0.00015	-9.2E-05	-0.0003
SP1P28LRYTP Max	P1	28	9	RYTP Max		0	0	0	0.000135	0.000082	0.000268
SP1P28LRYTP Min	P1	28	9	RYTP Min		0	0	0	-0.00014	-8.2E-05	-0.00027
SP1P28LRYTN Max	P1	28	9	RYTN Max		0	0	0	0.000135	0.000082	0.000268
SP1P28LRYTN Min	P1	28	9	RYTN Min		0	0	0	-0.00014	-8.2E-05	-0.00027
SP1P120LRXTP Max	P1	120	269	RXTP Max		0.007022	0.005369	0.014245	0.000049	0.000027	0.000002

SP1P120LRXTP Min	P1	120	269	RXTP Min	-0.00702	-0.00537	-0.01425	-4.9E-05	-2.7E-05	-2E-06
SP1P120LRXTN Max	P1	120	269	RXTN Max	0.007022	0.005369	0.014245	0.000049	0.000027	0.000002
SP1P120LRXTN Min	P1	120	269	RXTN Min	-0.00702	-0.00537	-0.01425	-4.9E-05	-2.7E-05	-2E-06
SP1P120LRYTP Max	P1	120	269	RYTP Max	0.006289	0.004808	0.012757	0.000044	0.000024	0.000002
SP1P120LRYTP Min	P1	120	269	RYTP Min	-0.00629	-0.00481	-0.01276	-4.4E-05	-2.4E-05	-2E-06
SP1P120LRYTN Max	P1	120	269	RYTN Max	0.006289	0.004808	0.012757	0.000044	0.000024	0.000002
SP1P120LRYTN Min	P1	120	269	RYTN Min	-0.00629	-0.00481	-0.01276	-4.4E-05	-2.4E-05	-2E-06

Project:	MIMU
Date Updated:	11/12/2020

Story Label	**Y Up Point**	**RXTP Delta** in	**RXTN Delta** in	**Y Down Point**	**RXTP Delta** in	**RXTN Delta** in	**RXTP Delta avg** in	**RXTN Delta avg** in	**RXTP Delta max** in	**RXTN Delta max** in	**RXTP Ax**	**RXTN Ax**		**Output Ax**
L2	120	0.13	0.13	28	0.22	0.22	0.17	0.2	0.22	0.2	1.13	1.13	**L2**	1.13
L1	120	0.03	0.03	28	0.02	0.02	0.03	0.0	0.03	0.0	1.00	1.00	**L1**	1.00
P1	120	0.01	0.01	28	0.00	0.00	0.00	0.0	0.01	0.0	2.78	2.78	**P1**	1.08
P2	120	0.00	0.00	28	0.00	0.00	0.00	0.0	0.00	0.0	0.00	0.00	**P2**	0.00

<1.4, no Extreme Torsional Irregularity Type 1b

Project:	MIMU
Date Updated:	11/12/2020

Story Label	**X Left Point**	**RYTP Delta** in	**RYTN Delta** in	**X Right Point**	**RYTP Delta** in	**RYTN Delta** in	**RYTP Delta avg** in	**RYTN Delta avg** in	**RYTP Delta max** in	**RYTN Delta max** in	**RYTP Ay**	**RYTN Ay**		**Output Ay**
L2	120	0.10	0.10	27	0.05	0.05	0.1	0.1	0.1	0.1	1.28	1.28	**L2**	1.28
L1	120	0.02	0.02	27	0.01	0.01	0.0	0.0	0.0	0.0	1.54	1.54	**L1**	1.36
P1	120	0.00	0.00	27	0.00	0.00	0.0	0.0	0.0	0.0	2.78	2.78	**P1**	1.23
P2	120	0.00	0.00	27	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	**P2**	0.00

<1.4, no Extreme Torsional Irregularity Type 1b

Project:	MIMU
Date Updated:	11/12/2020

Wall and Stress Calculation

IBC 2015

Formatted for ETABS 2017 Input/Output

Etabs File = Hycroft ETABs2017 Model_v1.0

Input ETABS information into shaded cells

Additional information on pier and story-specific results can be found on sheet 'Piers'

Combo	
FXTP	Includes +/- 5% Acc Ecc
FXTN	Includes +/- 5% Acc Ecc
FYTP	Includes +/- 5% Acc Ecc
FYTN	Includes +/- 5% Acc Ecc

Maximum Wall stress :	4.6	***Sqrt(f'c)*b*d**	Limit Wall stress to < 6
Maximum Link stress :	1.5	***Sqrt(f'c)*b*d**	Want to limit Link Beams stress to < 8

Project:	MIMU
Date Updated:	11/12/2020

1 2 3 4 5 6 7 8 9

Material Properties Imported from:
Display -> Show Tables... -> Model -> Definitions -> Material Properties ->
Material Properties - Concrete (Load Cases don't matter), k-in

Name	E kip/in^2	v	a 1/F	G kip/in^2	Unite Weight kip/in^3	Unit Mass kip-s^2/in^4	Fc kip/in^2	Lightweight?
C5000X100	4031	2.00E-01	5.50E-06	1679.583	0.000087	2.248E-07	5	No
C5000X100NM	4031	2.00E-01	5.50E-06	1679.583	0	0	5	No
C5000X33	1330.068	2.00E-01	5.50E-06	554.195	0.000087	2.248E-07	5	No
C5000X33NM	1330.068	2.00E-01	5.50E-06	554.195	0	0	5	No
C5000X50	2015	2.00E-01	5.50E-06	839.583	0.000087	2.248E-07	5	No
C5000X5NM	202	2.00E-01	5.50E-06	84.167	0	0	5	No
C5000X70	2821	2.00E-01	5.50E-06	1175.417	0.000087	2.248E-07	5	No
C5000X70NM	2821	2.00E-01	5.50E-06	1175.417	0	0	5	No
C7000X70	3338	0.2	0.0000055	1390.833	0.000087	2.253E-07	7	No
CONC-4000	3604.997	0.2	0.0000055	1502.082	0.000087	2.248E-07	4	No

Project:	MIMU
Date Updated:	11/12/2020

1	2	3	4	5	6	7	8	9	10	11

Copy Down	Pier Forces Imported from:
With Import	Display - Show Tables... -> Analysis -> Results -> Wall Results -> Pier Forces
Label	(Run loads to get Load Combos shown on "Cover"), k-in [Sort by Load (delete unused Load Cases), Sort by Story

	Story	Pier	Load Case/Combo	Location	P kip	V2 kip	V3 kip	T kip-in	M2 kip-in	M3 kip-in
PPLSL2LFXTP	L2	PL	FXTP Max	Top	7.639	274.427	3.718	50.188	784.749	513.03
	L2	PL	FXTP Max	Bottom	7.639	274.427	3.718	50.188	475.173	48956.39
PPLSL2LFXTP	L2	PL	FXTP Min	Top	-7.639	-274.427	-3.718	-50.188	-784.749	-513.03
	L2	PL	FXTP Min	Bottom	-7.639	-274.427	-3.718	-50.188	-475.173	-48956.4
PPLSL2LFXTN	L2	PL	FXTN Max	Top	7.639	274.427	3.718	50.188	784.749	513.03
	L2	PL	FXTN Max	Bottom	7.639	274.427	3.718	50.188	475.173	48956.39
PPLSL2LFXTN	L2	PL	FXTN Min	Top	-7.639	-274.427	-3.718	-50.188	-784.749	-513.03
	L2	PL	FXTN Min	Bottom	-7.639	-274.427	-3.718	-50.188	-475.173	-48956.4
PPLSL2LFYTP	L2	PL	FYTP Max	Top	6.841	245.772	3.33	44.947	702.807	459.461
	L2	PL	FYTP Max	Bottom	6.841	245.772	3.33	44.947	425.556	43844.48
PPLSL2LFYTP	L2	PL	FYTP Min	Top	-6.841	-245.772	-3.33	-44.947	-702.807	-459.461
	L2	PL	FYTP Min	Bottom	-6.841	-245.772	-3.33	-44.947	-425.556	-43844.5
PPLSL2LFYTN	L2	PL	FYTN Max	Top	6.841	245.772	3.33	44.947	702.807	459.461
	L2	PL	FYTN Max	Bottom	6.841	245.772	3.33	44.947	425.556	43844.48
PPLSL2LFYTN	L2	PL	FYTN Min	Top	-6.841	-245.772	-3.33	-44.947	-702.807	-459.461
	L2	PL	FYTN Min	Bottom	-6.841	-245.772	-3.33	-44.947	-425.556	-43844.5
PP11WSL2LFXTP	L2	P11W	FXTP Max	Top	7.048	712.735	10.246	144.015	899.114	1806.528
	L2	P11W	FXTP Max	Bottom	7.048	712.735	10.246	144.015	949.904	126496.2
PP11WSL2LFXTP	L2	P11W	FXTP Min	Top	-7.048	-712.735	-10.246	-144.015	-899.114	-1806.53
	L2	P11W	FXTP Min	Bottom	-7.048	-712.735	-10.246	-144.015	-949.904	-126496
PP11WSL2LFXTN	L2	P11W	FXTN Max	Top	7.048	712.735	10.246	144.015	899.114	1806.528
	L2	P11W	FXTN Max	Bottom	7.048	712.735	10.246	144.015	949.904	126496.2
PP11WSL2LFXTN	L2	P11W	FXTN Min	Top	-7.048	-712.735	-10.246	-144.015	-899.114	-1806.53
	L2	P11W	FXTN Min	Bottom	-7.048	-712.735	-10.246	-144.015	-949.904	-126496
PP11WSL2LFYTP	L2	P11W	FYTP Max	Top	6.312	638.313	9.176	128.977	805.231	1617.894
	L2	P11W	FYTP Max	Bottom	6.312	638.313	9.176	128.977	850.717	113287.8
PP11WSL2LFYTP	L2	P11W	FYTP Min	Top	-6.312	-638.313	-9.176	-128.977	-805.231	-1617.89
	L2	P11W	FYTP Min	Bottom	-6.312	-638.313	-9.176	-128.977	-850.717	-113288
PP11WSL2LFYTN	L2	P11W	FYTN Max	Top	6.312	638.313	9.176	128.977	805.231	1617.894
	L2	P11W	FYTN Max	Bottom	6.312	638.313	9.176	128.977	850.717	113287.8
PP11WSL2LFYTN	L2	P11W	FYTN Min	Top	-6.312	-638.313	-9.176	-128.977	-805.231	-1617.89
	L2	P11W	FYTN Min	Bottom	-6.312	-638.313	-9.176	-128.977	-850.717	-113288
PP11ESL2LFXTP	L2	P11E	FXTP Max	Top	5.628	1022.564	7.288	265.346	525.597	2010.678
	L2	P11E	FXTP Max	Bottom	5.628	1022.564	7.288	265.346	837.806	182054.2
PP11ESL2LFXTP	L2	P11E	FXTP Min	Top	-5.628	-1022.56	-7.288	-265.346	-525.597	-2010.68
	L2	P11E	FXTP Min	Bottom	-5.628	-1022.56	-7.288	-265.346	-837.806	-182054
PP11ESL2LFXTN	L2	P11E	FXTN Max	Top	5.628	1022.564	7.288	265.346	525.597	2010.678
	L2	P11E	FXTN Max	Bottom	5.628	1022.564	7.288	265.346	837.806	182054.2
PP11ESL2LFXTN	L2	P11E	FXTN Min	Top	-5.628	-1022.56	-7.288	-265.346	-525.597	-2010.68
	L2	P11E	FXTN Min	Bottom	-5.628	-1022.56	-7.288	-265.346	-837.806	-182054
PP11ESL2LFYTP	L2	P11E	FYTP Max	Top	5.04	915.79	6.527	237.639	470.715	1800.728
	L2	P11E	FYTP Max	Bottom	5.04	915.79	6.527	237.639	750.325	163044.6
PP11ESL2LFYTP	L2	P11E	FYTP Min	Top	-5.04	-915.79	-6.527	-237.639	-470.715	-1800.73
	L2	P11E	FYTP Min	Bottom	-5.04	-915.79	-6.527	-237.639	-750.325	-163045
PP11ESL2LFYTN	L2	P11E	FYTN Max	Top	5.04	915.79	6.527	237.639	470.715	1800.728
	L2	P11E	FYTN Max	Bottom	5.04	915.79	6.527	237.639	750.325	163044.6
PP11ESL2LFYTN	L2	P11E	FYTN Min	Top	-5.04	-915.79	-6.527	-237.639	-470.715	-1800.73
	L2	P11E	FYTN Min	Bottom	-5.04	-915.79	-6.527	-237.639	-750.325	-163045
PPESSL2LFXTP	L2	PES	FXTP Max	Top	134.296	492.318	5.482	161.295	306.531	35676.9
	L2	PES	FXTP Max	Bottom	256.527	492.331	13.188	603.674	572.29	49772.31
PPESSL2LFXTP	L2	PES	FXTP Min	Top	-134.296	-492.318	-5.482	-161.295	-306.531	-35676.9
	L2	PES	FXTP Min	Bottom	-256.527	-492.331	-13.188	-603.674	-572.29	-49772.3
PPESSL2LFXTN	L2	PES	FXTN Max	Top	134.296	492.318	5.482	161.295	306.531	35676.9
	L2	PES	FXTN Max	Bottom	256.527	492.331	13.188	603.674	572.29	49772.31
PPESSL2LFXTN	L2	PES	FXTN Min	Top	-134.296	-492.318	-5.482	-161.295	-306.531	-35676.9
	L2	PES	FXTN Min	Bottom	-256.527	-492.331	-13.188	-603.674	-572.29	-49772.3
PPESSL2LFYTP	L2	PES	FYTP Max	Top	120.273	440.912	4.91	144.453	274.524	31951.61
	L2	PES	FYTP Max	Bottom	229.741	440.923	11.811	540.64	512.533	44575.21
PPESSL2LFYTP	L2	PES	FYTP Min	Top	-120.273	-440.912	-4.91	-144.453	-274.524	-31951.6
	L2	PES	FYTP Min	Bottom	-229.741	-440.923	-11.811	-540.64	-512.533	-44575.2
PPESSL2LFYTN	L2	PES	FYTN Max	Top	120.273	440.912	4.91	144.453	274.524	31951.61
	L2	PES	FYTN Max	Bottom	229.741	440.923	11.811	540.64	512.533	44575.21

PPESSL2LFYTN	L2	PES	FYTN Min	Top	-120.273	-440.912	-4.91	-144.453	-274.524	-31951.6
	L2	PES	FYTN Min	Bottom	-229.741	-440.923	-11.811	-540.64	-512.533	-44575.2
PPWWSL2LFXTP	L2	PWW	FXTP Max	Top	639.825	1061.065	15.142	339.132	1221.425	29030.68
	L2	PWW	FXTP Max	Bottom	779.52	1017.68	13.43	439.451	1311.665	98580
PPWWSL2LFXTP	L2	PWW	FXTP Min	Top	-639.825	-1061.07	-15.142	-339.132	-1221.43	-29030.7
	L2	PWW	FXTP Min	Bottom	-779.52	-1017.68	-13.43	-439.451	-1311.67	-98580
PPWWSL2LFXTN	L2	PWW	FXTN Max	Top	639.825	1061.065	15.142	339.132	1221.425	29030.68
	L2	PWW	FXTN Max	Bottom	779.52	1017.68	13.43	439.451	1311.665	98580
PPWWSL2LFXTN	L2	PWW	FXTN Min	Top	-639.825	-1061.07	-15.142	-339.132	-1221.43	-29030.7
	L2	PWW	FXTN Min	Bottom	-779.52	-1017.68	-13.43	-439.451	-1311.67	-98580
PPWWSL2LFYTP	L2	PWW	FYTP Max	Top	573.016	950.271	13.561	303.72	1093.887	25999.37
	L2	PWW	FYTP Max	Bottom	698.124	911.416	12.027	393.565	1174.704	88286.52
PPWWSL2LFYTP	L2	PWW	FYTP Min	Top	-573.016	-950.271	-13.561	-303.72	-1093.89	-25999.4
	L2	PWW	FYTP Min	Bottom	-698.124	-911.416	-12.027	-393.565	-1174.7	-88286.5
PPWWSL2LFYTN	L2	PWW	FYTN Max	Top	573.016	950.271	13.561	303.72	1093.887	25999.37
	L2	PWW	FYTN Max	Bottom	698.124	911.416	12.027	393.565	1174.704	88286.52
PPWWSL2LFYTN	L2	PWW	FYTN Min	Top	-573.016	-950.271	-13.561	-303.72	-1093.89	-25999.4
	L2	PWW	FYTN Min	Bottom	-698.124	-911.416	-12.027	-393.565	-1174.7	-88286.5
PPWESL2LFXTP	L2	PWE	FXTP Max	Top	698.09	1185.26	13.321	703.373	845.406	58513.01
	L2	PWE	FXTP Max	Bottom	983.729	1188.92	56.015	6512.03	2986.098	168728.9
PPWESL2LFXTP	L2	PWE	FXTP Min	Top	-698.09	-1185.26	-13.321	-703.373	-845.406	-58513
	L2	PWE	FXTP Min	Bottom	-983.729	-1188.92	-56.015	-6512.03	-2986.1	-168729
PPWESL2LFXTN	L2	PWE	FXTN Max	Top	698.09	1185.26	13.321	703.373	845.406	58513.01
	L2	PWE	FXTN Max	Bottom	983.729	1188.92	56.015	6512.03	2986.098	168728.9
PPWESL2LFXTN	L2	PWE	FXTN Min	Top	-698.09	-1185.26	-13.321	-703.373	-845.406	-58513
	L2	PWE	FXTN Min	Bottom	-983.729	-1188.92	-56.015	-6512.03	-2986.1	-168729
PPWESL2LFYTP	L2	PWE	FYTP Max	Top	625.197	1061.498	11.93	629.929	757.131	52403.23
	L2	PWE	FYTP Max	Bottom	881.01	1064.776	50.166	5832.06	2674.297	151110.6
PPWESL2LFYTP	L2	PWE	FYTP Min	Top	-625.197	-1061.5	-11.93	-629.929	-757.131	-52403.2
	L2	PWE	FYTP Min	Bottom	-881.01	-1064.78	-50.166	-5832.06	-2674.3	-151111
PPWESL2LFYTN	L2	PWE	FYTN Max	Top	625.197	1061.498	11.93	629.929	757.131	52403.23
	L2	PWE	FYTN Max	Bottom	881.01	1064.776	50.166	5832.06	2674.297	151110.6
PPWESL2LFYTN	L2	PWE	FYTN Min	Top	-625.197	-1061.5	-11.93	-629.929	-757.131	-52403.2
	L2	PWE	FYTN Min	Bottom	-881.01	-1064.78	-50.166	-5832.06	-2674.3	-151111
PPWNSL2LFXTP	L2	PWN	FXTP Max	Top	247.077	347.359	9.893	297.04	550.119	28037.93
	L2	PWN	FXTP Max	Bottom	502.505	348.36	25.657	1170.895	1099.608	41337.84
PPWNSL2LFXTP	L2	PWN	FXTP Min	Top	-247.077	-347.359	-9.893	-297.04	-550.119	-28037.9
	L2	PWN	FXTP Min	Bottom	-502.505	-348.36	-25.657	-1170.9	-1099.61	-41337.8
PPWNSL2LFXTN	L2	PWN	FXTN Max	Top	247.077	347.359	9.893	297.04	550.119	28037.93
	L2	PWN	FXTN Max	Bottom	502.505	348.36	25.657	1170.895	1099.608	41337.84
PPWNSL2LFXTN	L2	PWN	FXTN Min	Top	-247.077	-347.359	-9.893	-297.04	-550.119	-28037.9
	L2	PWN	FXTN Min	Bottom	-502.505	-348.36	-25.657	-1170.9	-1099.61	-41337.8
PPWNSL2LFYTP	L2	PWN	FYTP Max	Top	221.278	311.089	8.86	266.023	492.677	25110.28
	L2	PWN	FYTP Max	Bottom	450.035	311.986	22.978	1048.633	984.789	37021.45
PPWNSL2LFYTP	L2	PWN	FYTP Min	Top	-221.278	-311.089	-8.86	-266.023	-492.677	-25110.3
	L2	PWN	FYTP Min	Bottom	-450.035	-311.986	-22.978	-1048.63	-984.789	-37021.4
PPWNSL2LFYTN	L2	PWN	FYTN Max	Top	221.278	311.089	8.86	266.023	492.677	25110.28
	L2	PWN	FYTN Max	Bottom	450.035	311.986	22.978	1048.633	984.789	37021.45
PPWNSL2LFYTN	L2	PWN	FYTN Min	Top	-221.278	-311.089	-8.86	-266.023	-492.677	-25110.3
	L2	PWN	FYTN Min	Bottom	-450.035	-311.986	-22.978	-1048.63	-984.789	-37021.4
PPENSL2LFXTP	L2	PEN	FXTP Max	Top	179.458	418.193	2.514	37.339	218.323	31623.87
	L2	PEN	FXTP Max	Bottom	179.458	418.193	2.514	37.339	238.713	43652.37
PPENSL2LFXTP	L2	PEN	FXTP Min	Top	-179.458	-418.193	-2.514	-37.339	-218.323	-31623.9
	L2	PEN	FXTP Min	Bottom	-179.458	-418.193	-2.514	-37.339	-238.713	-43652.4
PPENSL2LFXTN	L2	PEN	FXTN Max	Top	179.458	418.193	2.514	37.339	218.323	31623.87
	L2	PEN	FXTN Max	Bottom	179.458	418.193	2.514	37.339	238.713	43652.37
PPENSL2LFXTN	L2	PEN	FXTN Min	Top	-179.458	-418.193	-2.514	-37.339	-218.323	-31623.9
	L2	PEN	FXTN Min	Bottom	-179.458	-418.193	-2.514	-37.339	-238.713	-43652.4
PPENSL2LFYTP	L2	PEN	FYTP Max	Top	160.72	374.526	2.252	33.44	195.526	28321.79
	L2	PEN	FYTP Max	Bottom	160.72	374.526	2.252	33.44	213.787	39094.3
PPENSL2LFYTP	L2	PEN	FYTP Min	Top	-160.72	-374.526	-2.252	-33.44	-195.526	-28321.8
	L2	PEN	FYTP Min	Bottom	-160.72	-374.526	-2.252	-33.44	-213.787	-39094.3
PPENSL2LFYTN	L2	PEN	FYTN Max	Top	160.72	374.526	2.252	33.44	195.526	28321.79
	L2	PEN	FYTN Max	Bottom	160.72	374.526	2.252	33.44	213.787	39094.3
PPENSL2LFYTN	L2	PEN	FYTN Min	Top	-160.72	-374.526	-2.252	-33.44	-195.526	-28321.8
	L2	PEN	FYTN Min	Bottom	-160.72	-374.526	-2.252	-33.44	-213.787	-39094.3
PPWSSL2LFXTP	L2	PWS	FXTP Max	Top	247.58	337.036	2.367	176.519	312.889	11955.16
	L2	PWS	FXTP Max	Bottom	424.691	293.579	5.767	149.42	478.562	16505.21
PPWSSL2LFXTP	L2	PWS	FXTP Min	Top	-247.58	-337.036	-2.367	-176.519	-312.889	-11955.2
	L2	PWS	FXTP Min	Bottom	-424.691	-293.579	-5.767	-149.42	-478.562	-16505.2
PPWSSL2LFXTN	L2	PWS	FXTN Max	Top	247.58	337.036	2.367	176.519	312.889	11955.16

	L2	PWS	FXTN Max	Bottom	424.691	293.579	5.767	149.42	478.562	16505.21
PPWSSL2LFXTN	L2	PWS	FXTN Min	Top	-247.58	-337.036	-2.367	-176.519	-312.889	-11955.2
	L2	PWS	FXTN Min	Bottom	-424.691	-293.579	-5.767	-149.42	-478.562	-16505.2
PPWSSL2LFYTP	L2	PWS	FYTP Max	Top	221.728	301.843	2.12	158.088	280.218	10706.83
	L2	PWS	FYTP Max	Bottom	380.346	262.924	5.165	133.818	428.592	14781.77
PPWSSL2LFYTP	L2	PWS	FYTP Min	Top	-221.728	-301.843	-2.12	-158.088	-280.218	-10706.8
	L2	PWS	FYTP Min	Bottom	-380.346	-262.924	-5.165	-133.818	-428.592	-14781.8
PPWSSL2LFYTN	L2	PWS	FYTN Max	Top	221.728	301.843	2.12	158.088	280.218	10706.83
	L2	PWS	FYTN Max	Bottom	380.346	262.924	5.165	133.818	428.592	14781.77
PPWSSL2LFYTN	L2	PWS	FYTN Min	Top	-221.728	-301.843	-2.12	-158.088	-280.218	-10706.8
	L2	PWS	FYTN Min	Bottom	-380.346	-262.924	-5.165	-133.818	-428.592	-14781.8
PPECWSL2LFXTP	L2	PECW	FXTP Max	Top	946.936	854.758	20.329	217.826	1551.986	27870.68
	L2	PECW	FXTP Max	Bottom	1024.27	846.848	20.2	257.348	2104.761	103351.7
PPECWSL2LFXTP	L2	PECW	FXTP Min	Top	-946.936	-854.758	-20.329	-217.826	-1551.99	-27870.7
	L2	PECW	FXTP Min	Bottom	-1024.27	-846.848	-20.2	-257.348	-2104.76	-103352
PPECWSL2LFXTN	L2	PECW	FXTN Max	Top	946.936	854.758	20.329	217.826	1551.986	27870.68
	L2	PECW	FXTN Max	Bottom	1024.27	846.848	20.2	257.348	2104.761	103351.7
PPECWSL2LFXTN	L2	PECW	FXTN Min	Top	-946.936	-854.758	-20.329	-217.826	-1551.99	-27870.7
	L2	PECW	FXTN Min	Bottom	-1024.27	-846.848	-20.2	-257.348	-2104.76	-103352
PPECWSL2LFYTP	L2	PECW	FYTP Max	Top	848.059	765.506	18.207	195.082	1389.931	24960.49
	L2	PECW	FYTP Max	Bottom	917.318	758.422	18.091	230.476	1884.987	92559.94
PPECWSL2LFYTP	L2	PECW	FYTP Min	Top	-848.059	-765.506	-18.207	-195.082	-1389.93	-24960.5
	L2	PECW	FYTP Min	Bottom	-917.318	-758.422	-18.091	-230.476	-1884.99	-92559.9
PPECWSL2LFYTN	L2	PECW	FYTN Max	Top	848.059	765.506	18.207	195.082	1389.931	24960.49
	L2	PECW	FYTN Max	Bottom	917.318	758.422	18.091	230.476	1884.987	92559.94
PPECWSL2LFYTN	L2	PECW	FYTN Min	Top	-848.059	-765.506	-18.207	-195.082	-1389.93	-24960.5
	L2	PECW	FYTN Min	Bottom	-917.318	-758.422	-18.091	-230.476	-1884.99	-92559.9
PPEESL2LFXTP	L2	PEE	FXTP Max	Top	1009.776	983.187	21.488	216.37	1600.725	42990.11
	L2	PEE	FXTP Max	Bottom	1009.776	983.187	21.488	216.37	2267.157	136247.2
PPEESL2LFXTP	L2	PEE	FXTP Min	Top	-1009.78	-983.187	-21.488	-216.37	-1600.73	-42990.1
	L2	PEE	FXTP Min	Bottom	-1009.78	-983.187	-21.488	-216.37	-2267.16	-136247
PPEESL2LFXTN	L2	PEE	FXTN Max	Top	1009.776	983.187	21.488	216.37	1600.725	42990.11
	L2	PEE	FXTN Max	Bottom	1009.776	983.187	21.488	216.37	2267.157	136247.2
PPEESL2LFXTN	L2	PEE	FXTN Min	Top	-1009.78	-983.187	-21.488	-216.37	-1600.73	-42990.1
	L2	PEE	FXTN Min	Bottom	-1009.78	-983.187	-21.488	-216.37	-2267.16	-136247
PPEESL2LFYTP	L2	PEE	FYTP Max	Top	904.338	880.525	19.244	193.777	1433.581	38501.19
	L2	PEE	FYTP Max	Bottom	904.338	880.525	19.244	193.777	2030.426	122020.6
PPEESL2LFYTP	L2	PEE	FYTP Min	Top	-904.338	-880.525	-19.244	-193.777	-1433.58	-38501.2
	L2	PEE	FYTP Min	Bottom	-904.338	-880.525	-19.244	-193.777	-2030.43	-122021
PPEESL2LFYTN	L2	PEE	FYTN Max	Top	904.338	880.525	19.244	193.777	1433.581	38501.19
	L2	PEE	FYTN Max	Bottom	904.338	880.525	19.244	193.777	2030.426	122020.6
PPEESL2LFYTN	L2	PEE	FYTN Min	Top	-904.338	-880.525	-19.244	-193.777	-1433.58	-38501.2
	L2	PEE	FYTN Min	Bottom	-904.338	-880.525	-19.244	-193.777	-2030.43	-122021
PPEMSL2LFXTP	L2	PEM	FXTP Max	Top	33.175	564.618	2.973	32.711	258.074	45396.45
	L2	PEM	FXTP Max	Bottom	47.63	564.745	3.15	35.385	285.25	54954.85
PPEMSL2LFXTP	L2	PEM	FXTP Min	Top	-33.175	-564.618	-2.973	-32.711	-258.074	-45396.4
	L2	PEM	FXTP Min	Bottom	-47.63	-564.745	-3.15	-35.385	-285.25	-54954.9
PPEMSL2LFXTN	L2	PEM	FXTN Max	Top	33.175	564.618	2.973	32.711	258.074	45396.45
	L2	PEM	FXTN Max	Bottom	47.63	564.745	3.15	35.385	285.25	54954.85
PPEMSL2LFXTN	L2	PEM	FXTN Min	Top	-33.175	-564.618	-2.973	-32.711	-258.074	-45396.4
	L2	PEM	FXTN Min	Bottom	-47.63	-564.745	-3.15	-35.385	-285.25	-54954.9
PPEMSL2LFYTP	L2	PEM	FYTP Max	Top	29.711	505.662	2.663	29.295	231.126	40656.26
	L2	PEM	FYTP Max	Bottom	42.657	505.775	2.821	31.69	255.465	49216.6
PPEMSL2LFYTP	L2	PEM	FYTP Min	Top	-29.711	-505.662	-2.663	-29.295	-231.126	-40656.3
	L2	PEM	FYTP Min	Bottom	-42.657	-505.775	-2.821	-31.69	-255.465	-49216.6
PPEMSL2LFYTN	L2	PEM	FYTN Max	Top	29.711	505.662	2.663	29.295	231.126	40656.26
	L2	PEM	FYTN Max	Bottom	42.657	505.775	2.821	31.69	255.465	49216.6
PPEMSL2LFYTN	L2	PEM	FYTN Min	Top	-29.711	-505.662	-2.663	-29.295	-231.126	-40656.3
	L2	PEM	FYTN Min	Bottom	-42.657	-505.775	-2.821	-31.69	-255.465	-49216.6
PPWMSL2LFXTP	L2	PWM	FXTP Max	Top	51.274	447.05	11.382	358.633	623.478	36617.44
	L2	PWM	FXTP Max	Bottom	37.77	448.319	31.153	1453.85	1305.652	45824.3
PPWMSL2LFXTP	L2	PWM	FXTP Min	Top	-51.274	-447.05	-11.382	-358.633	-623.478	-36617.4
	L2	PWM	FXTP Min	Bottom	-37.77	-448.319	-31.153	-1453.85	-1305.65	-45824.3
PPWMSL2LFXTN	L2	PWM	FXTN Max	Top	51.274	447.05	11.382	358.633	623.478	36617.44
	L2	PWM	FXTN Max	Bottom	37.77	448.319	31.153	1453.85	1305.652	45824.3
PPWMSL2LFXTN	L2	PWM	FXTN Min	Top	-51.274	-447.05	-11.382	-358.633	-623.478	-36617.4
	L2	PWM	FXTN Min	Bottom	-37.77	-448.319	-31.153	-1453.85	-1305.65	-45824.3
PPWMSL2LFYTP	L2	PWM	FYTP Max	Top	45.92	400.37	10.194	321.186	558.376	32793.93
	L2	PWM	FYTP Max	Bottom	33.826	401.506	27.9	1302.042	1169.319	41039.44
PPWMSL2LFYTP	L2	PWM	FYTP Min	Top	-45.92	-400.37	-10.194	-321.186	-558.376	-32793.9
	L2	PWM	FYTP Min	Bottom	-33.826	-401.506	-27.9	-1302.04	-1169.32	-41039.4

PPWMSL2LFYTN	L2	PWM	FYTN Max	Top	45.92	400.37	10.194	321.186	558.376	32793.93
	L2	PWM	FYTN Max	Bottom	33.826	401.506	27.9	1302.042	1169.319	41039.44
PPWMSL2LFYTN	L2	PWM	FYTN Min	Top	-45.92	-400.37	-10.194	-321.186	-558.376	-32793.9
	L2	PWM	FYTN Min	Bottom	-33.826	-401.506	-27.9	-1302.04	-1169.32	-41039.4
PPSWSL2LFXTP	L2	PSW	FXTP Max	Top	798.088	230.147	20.055	262.721	1386.096	17606.35
	L2	PSW	FXTP Max	Bottom	798.088	230.147	20.055	262.721	2223.828	26914.43
PPSWSL2LFXTP	L2	PSW	FXTP Min	Top	-798.088	-230.147	-20.055	-262.721	-1386.1	-17606.4
	L2	PSW	FXTP Min	Bottom	-798.088	-230.147	-20.055	-262.721	-2223.83	-26914.4
PPSWSL2LFXTN	L2	PSW	FXTN Max	Top	798.088	230.147	20.055	262.721	1386.096	17606.35
	L2	PSW	FXTN Max	Bottom	798.088	230.147	20.055	262.721	2223.828	26914.43
PPSWSL2LFXTN	L2	PSW	FXTN Min	Top	-798.088	-230.147	-20.055	-262.721	-1386.1	-17606.4
	L2	PSW	FXTN Min	Bottom	-798.088	-230.147	-20.055	-262.721	-2223.83	-26914.4
PPSWSL2LFYTP	L2	PSW	FYTP Max	Top	714.754	206.115	17.961	235.288	1241.363	15767.94
	L2	PSW	FYTP Max	Bottom	714.754	206.115	17.961	235.288	1991.621	24104.09
PPSWSL2LFYTP	L2	PSW	FYTP Min	Top	-714.754	-206.115	-17.961	-235.288	-1241.36	-15767.9
	L2	PSW	FYTP Min	Bottom	-714.754	-206.115	-17.961	-235.288	-1991.62	-24104.1
PPSWSL2LFYTN	L2	PSW	FYTN Max	Top	714.754	206.115	17.961	235.288	1241.363	15767.94
	L2	PSW	FYTN Max	Bottom	714.754	206.115	17.961	235.288	1991.621	24104.09
PPSWSL2LFYTN	L2	PSW	FYTN Min	Top	-714.754	-206.115	-17.961	-235.288	-1241.36	-15767.9
	L2	PSW	FYTN Min	Bottom	-714.754	-206.115	-17.961	-235.288	-1991.62	-24104.1
PPSESL2LFXTP	L2	PSE	FXTP Max	Top	1106.358	1091.43	29.971	236.959	2155.273	58240.84
	L2	PSE	FXTP Max	Bottom	1106.358	1091.43	29.971	236.959	3239.508	138428.1
PPSESL2LFXTP	L2	PSE	FXTP Min	Top	-1106.36	-1091.43	-29.971	-236.959	-2155.27	-58240.8
	L2	PSE	FXTP Min	Bottom	-1106.36	-1091.43	-29.971	-236.959	-3239.51	-138428
PPSESL2LFXTN	L2	PSE	FXTN Max	Top	1106.358	1091.43	29.971	236.959	2155.273	58240.84
	L2	PSE	FXTN Max	Bottom	1106.358	1091.43	29.971	236.959	3239.508	138428.1
PPSESL2LFXTN	L2	PSE	FXTN Min	Top	-1106.36	-1091.43	-29.971	-236.959	-2155.27	-58240.8
	L2	PSE	FXTN Min	Bottom	-1106.36	-1091.43	-29.971	-236.959	-3239.51	-138428
PPSESL2LFYTP	L2	PSE	FYTP Max	Top	990.835	977.465	26.841	212.216	1930.225	52159.48
	L2	PSE	FYTP Max	Bottom	990.835	977.465	26.841	212.216	2901.247	123973.7
PPSESL2LFYTP	L2	PSE	FYTP Min	Top	-990.835	-977.465	-26.841	-212.216	-1930.23	-52159.5
	L2	PSE	FYTP Min	Bottom	-990.835	-977.465	-26.841	-212.216	-2901.25	-123974
PPSESL2LFYTN	L2	PSE	FYTN Max	Top	990.835	977.465	26.841	212.216	1930.225	52159.48
	L2	PSE	FYTN Max	Bottom	990.835	977.465	26.841	212.216	2901.247	123973.7
PPSESL2LFYTN	L2	PSE	FYTN Min	Top	-990.835	-977.465	-26.841	-212.216	-1930.23	-52159.5
	L2	PSE	FYTN Min	Bottom	-990.835	-977.465	-26.841	-212.216	-2901.25	-123974
PP7WSL1LFXTP	L1	P7W	FXTP Max	Top	2.958	42.494	2.326	8.088	111.603	325.338
	L1	P7W	FXTP Max	Bottom	2.958	42.494	2.326	8.088	158.543	4604.057
PP7WSL1LFXTP	L1	P7W	FXTP Min	Top	-2.958	-42.494	-2.326	-8.088	-111.603	-325.338
	L1	P7W	FXTP Min	Bottom	-2.958	-42.494	-2.326	-8.088	-158.543	-4604.06
PP7WSL1LFXTN	L1	P7W	FXTN Max	Top	2.958	42.494	2.326	8.088	111.603	325.338
	L1	P7W	FXTN Max	Bottom	2.958	42.494	2.326	8.088	158.543	4604.057
PP7WSL1LFXTN	L1	P7W	FXTN Min	Top	-2.958	-42.494	-2.326	-8.088	-111.603	-325.338
	L1	P7W	FXTN Min	Bottom	-2.958	-42.494	-2.326	-8.088	-158.543	-4604.06
PP7WSL1LFYTP	L1	P7W	FYTP Max	Top	2.65	38.057	2.083	7.244	99.95	291.367
	L1	P7W	FYTP Max	Bottom	2.65	38.057	2.083	7.244	141.988	4123.313
PP7WSL1LFYTP	L1	P7W	FYTP Min	Top	-2.65	-38.057	-2.083	-7.244	-99.95	-291.367
	L1	P7W	FYTP Min	Bottom	-2.65	-38.057	-2.083	-7.244	-141.988	-4123.31
PP7WSL1LFYTN	L1	P7W	FYTN Max	Top	2.65	38.057	2.083	7.244	99.95	291.367
	L1	P7W	FYTN Max	Bottom	2.65	38.057	2.083	7.244	141.988	4123.313
PP7WSL1LFYTN	L1	P7W	FYTN Min	Top	-2.65	-38.057	-2.083	-7.244	-99.95	-291.367
	L1	P7W	FYTN Min	Bottom	-2.65	-38.057	-2.083	-7.244	-141.988	-4123.31
PP7MSL1LFXTP	L1	P7M	FXTP Max	Top	3.899	80.679	5.674	112.691	340.057	778.502
	L1	P7M	FXTP Max	Bottom	3.899	80.679	5.674	112.691	410.8	8580.306
PP7MSL1LFXTP	L1	P7M	FXTP Min	Top	-3.899	-80.679	-5.674	-112.691	-340.057	-778.502
	L1	P7M	FXTP Min	Bottom	-3.899	-80.679	-5.674	-112.691	-410.8	-8580.31
PP7MSL1LFXTN	L1	P7M	FXTN Max	Top	3.899	80.679	5.674	112.691	340.057	778.502
	L1	P7M	FXTN Max	Bottom	3.899	80.679	5.674	112.691	410.8	8580.306
PP7MSL1LFXTN	L1	P7M	FXTN Min	Top	-3.899	-80.679	-5.674	-112.691	-340.057	-778.502
	L1	P7M	FXTN Min	Bottom	-3.899	-80.679	-5.674	-112.691	-410.8	-8580.31
PP7MSL1LFYTP	L1	P7M	FYTP Max	Top	3.492	72.254	5.082	100.924	304.549	697.213
	L1	P7M	FYTP Max	Bottom	3.492	72.254	5.082	100.924	367.905	7684.372
PP7MSL1LFYTP	L1	P7M	FYTP Min	Top	-3.492	-72.254	-5.082	-100.924	-304.549	-697.213
	L1	P7M	FYTP Min	Bottom	-3.492	-72.254	-5.082	-100.924	-367.905	-7684.37
PP7MSL1LFYTN	L1	P7M	FYTN Max	Top	3.492	72.254	5.082	100.924	304.549	697.213
	L1	P7M	FYTN Max	Bottom	3.492	72.254	5.082	100.924	367.905	7684.372
PP7MSL1LFYTN	L1	P7M	FYTN Min	Top	-3.492	-72.254	-5.082	-100.924	-304.549	-697.213
	L1	P7M	FYTN Min	Bottom	-3.492	-72.254	-5.082	-100.924	-367.905	-7684.37
PP7ESL1LFXTP	L1	P7E	FXTP Max	Top	59.171	51.498	6.348	135.132	291.246	8385.765
	L1	P7E	FXTP Max	Bottom	59.171	51.498	6.348	135.132	445.845	8692.566
PP7ESL1LFXTP	L1	P7E	FXTP Min	Top	-59.171	-51.498	-6.348	-135.132	-291.246	-8385.77

	L1	P7E	FXTP Min	Bottom	-59.171	-51.498	-6.348	-135.132	-445.845	-8692.57
PP7ESL1LFXTN	L1	P7E	FXTN Max	Top	59.171	51.498	6.348	135.132	291.246	8385.765
	L1	P7E	FXTN Max	Bottom	59.171	51.498	6.348	135.132	445.845	8692.566
PP7ESL1LFXTN	L1	P7E	FXTN Min	Top	-59.171	-51.498	-6.348	-135.132	-291.246	-8385.77
	L1	P7E	FXTN Min	Bottom	-59.171	-51.498	-6.348	-135.132	-445.845	-8692.57
PP7ESL1LFYTP	L1	P7E	FYTP Max	Top	52.993	46.121	5.685	121.022	260.835	7510.144
	L1	P7E	FYTP Max	Bottom	52.993	46.121	5.685	121.022	399.291	7784.909
PP7ESL1LFYTP	L1	P7E	FYTP Min	Top	-52.993	-46.121	-5.685	-121.022	-260.835	-7510.14
	L1	P7E	FYTP Min	Bottom	-52.993	-46.121	-5.685	-121.022	-399.291	-7784.91
PP7ESL1LFYTN	L1	P7E	FYTN Max	Top	52.993	46.121	5.685	121.022	260.835	7510.144
	L1	P7E	FYTN Max	Bottom	52.993	46.121	5.685	121.022	399.291	7784.909
PP7ESL1LFYTN	L1	P7E	FYTN Min	Top	-52.993	-46.121	-5.685	-121.022	-260.835	-7510.14
	L1	P7E	FYTN Min	Bottom	-52.993	-46.121	-5.685	-121.022	-399.291	-7784.91
PPLSL1LFXTP	L1	PL	FXTP Max	Top	7.639	285.948	16.725	170.079	475.173	48956.39
	L1	PL	FXTP Max	Bottom	7.639	285.948	16.725	170.079	1525.969	82116.75
PPLSL1LFXTP	L1	PL	FXTP Min	Top	-7.639	-285.948	-16.725	-170.079	-475.173	-48956.4
	L1	PL	FXTP Min	Bottom	-7.639	-285.948	-16.725	-170.079	-1525.97	-82116.8
PPLSL1LFXTN	L1	PL	FXTN Max	Top	7.639	285.948	16.725	170.079	475.173	48956.39
	L1	PL	FXTN Max	Bottom	7.639	285.948	16.725	170.079	1525.969	82116.75
PPLSL1LFXTN	L1	PL	FXTN Min	Top	-7.639	-285.948	-16.725	-170.079	-475.173	-48956.4
	L1	PL	FXTN Min	Bottom	-7.639	-285.948	-16.725	-170.079	-1525.97	-82116.8
PPLSL1LFYTP	L1	PL	FYTP Max	Top	6.841	256.09	14.979	152.32	425.556	43844.48
	L1	PL	FYTP Max	Bottom	6.841	256.09	14.979	152.32	1366.631	73542.33
PPLSL1LFYTP	L1	PL	FYTP Min	Top	-6.841	-256.09	-14.979	-152.32	-425.556	-43844.5
	L1	PL	FYTP Min	Bottom	-6.841	-256.09	-14.979	-152.32	-1366.63	-73542.3
PPLSL1LFYTN	L1	PL	FYTN Max	Top	6.841	256.09	14.979	152.32	425.556	43844.48
	L1	PL	FYTN Max	Bottom	6.841	256.09	14.979	152.32	1366.631	73542.33
PPLSL1LFYTN	L1	PL	FYTN Min	Top	-6.841	-256.09	-14.979	-152.32	-425.556	-43844.5
	L1	PL	FYTN Min	Bottom	-6.841	-256.09	-14.979	-152.32	-1366.63	-73542.3
PPESSL1LFXTP	L1	PES	FXTP Max	Top	393.731	239.628	1.862	9.225	145.916	25700.33
	L1	PES	FXTP Max	Bottom	393.731	239.628	1.862	9.225	104.03	7187.335
PPESSL1LFXTP	L1	PES	FXTP Min	Top	-393.731	-239.628	-1.862	-9.225	-145.916	-25700.3
	L1	PES	FXTP Min	Bottom	-393.731	-239.628	-1.862	-9.225	-104.03	-7187.34
PPESSL1LFXTN	L1	PES	FXTN Max	Top	393.731	239.628	1.862	9.225	145.916	25700.33
	L1	PES	FXTN Max	Bottom	393.731	239.628	1.862	9.225	104.03	7187.335
PPESSL1LFXTN	L1	PES	FXTN Min	Top	-393.731	-239.628	-1.862	-9.225	-145.916	-25700.3
	L1	PES	FXTN Min	Bottom	-393.731	-239.628	-1.862	-9.225	-104.03	-7187.34
PPESSL1LFYTP	L1	PES	FYTP Max	Top	352.619	214.607	1.667	8.261	130.68	23016.76
	L1	PES	FYTP Max	Bottom	352.619	214.607	1.667	8.261	93.167	6436.851
PPESSL1LFYTP	L1	PES	FYTP Min	Top	-352.619	-214.607	-1.667	-8.261	-130.68	-23016.8
	L1	PES	FYTP Min	Bottom	-352.619	-214.607	-1.667	-8.261	-93.167	-6436.85
PPESSL1LFYTN	L1	PES	FYTN Max	Top	352.619	214.607	1.667	8.261	130.68	23016.76
	L1	PES	FYTN Max	Bottom	352.619	214.607	1.667	8.261	93.167	6436.851
PPESSL1LFYTN	L1	PES	FYTN Min	Top	-352.619	-214.607	-1.667	-8.261	-130.68	-23016.8
	L1	PES	FYTN Min	Bottom	-352.619	-214.607	-1.667	-8.261	-93.167	-6436.85
PPWWSL1LFXTP	L1	PWW	FXTP Max	Top	965.085	315.08	15.121	114.301	1223.318	74421.67
	L1	PWW	FXTP Max	Bottom	965.085	315.08	15.121	114.301	556.27	60616.65
PPWWSL1LFXTP	L1	PWW	FXTP Min	Top	-965.085	-315.08	-15.121	-114.301	-1223.32	-74421.7
	L1	PWW	FXTP Min	Bottom	-965.085	-315.08	-15.121	-114.301	-556.27	-60616.6
PPWWSL1LFXTN	L1	PWW	FXTN Max	Top	965.085	315.08	15.121	114.301	1223.318	74421.67
	L1	PWW	FXTN Max	Bottom	965.085	315.08	15.121	114.301	556.27	60616.65
PPWWSL1LFXTN	L1	PWW	FXTN Min	Top	-965.085	-315.08	-15.121	-114.301	-1223.32	-74421.7
	L1	PWW	FXTN Min	Bottom	-965.085	-315.08	-15.121	-114.301	-556.27	-60616.6
PPWWSL1LFYTP	L1	PWW	FYTP Max	Top	864.313	282.18	13.542	102.366	1095.583	66650.75
	L1	PWW	FYTP Max	Bottom	864.313	282.18	13.542	102.366	498.185	54287.21
PPWWSL1LFYTP	L1	PWW	FYTP Min	Top	-864.313	-282.18	-13.542	-102.366	-1095.58	-66650.7
	L1	PWW	FYTP Min	Bottom	-864.313	-282.18	-13.542	-102.366	-498.185	-54287.2
PPWWSL1LFYTN	L1	PWW	FYTN Max	Top	864.313	282.18	13.542	102.366	1095.583	66650.75
	L1	PWW	FYTN Max	Bottom	864.313	282.18	13.542	102.366	498.185	54287.21
PPWWSL1LFYTN	L1	PWW	FYTN Min	Top	-864.313	-282.18	-13.542	-102.366	-1095.58	-66650.7
	L1	PWW	FYTN Min	Bottom	-864.313	-282.18	-13.542	-102.366	-498.185	-54287.2
PPWESL1LFXTP	L1	PWE	FXTP Max	Top	1288.431	415.504	20.175	122.919	1612.83	105406
	L1	PWE	FXTP Max	Bottom	1288.431	415.504	20.175	122.919	757.743	92582.28
PPWESL1LFXTP	L1	PWE	FXTP Min	Top	-1288.43	-415.504	-20.175	-122.919	-1612.83	-105406
	L1	PWE	FXTP Min	Bottom	-1288.43	-415.504	-20.175	-122.919	-757.743	-92582.3
PPWESL1LFXTN	L1	PWE	FXTN Max	Top	1288.431	415.504	20.175	122.919	1612.83	105406
	L1	PWE	FXTN Max	Bottom	1288.431	415.504	20.175	122.919	757.743	92582.28
PPWESL1LFXTN	L1	PWE	FXTN Min	Top	-1288.43	-415.504	-20.175	-122.919	-1612.83	-105406
	L1	PWE	FXTN Min	Bottom	-1288.43	-415.504	-20.175	-122.919	-757.743	-92582.3
PPWESL1LFYTP	L1	PWE	FYTP Max	Top	1153.897	372.118	18.069	110.084	1444.422	94399.76
	L1	PWE	FYTP Max	Bottom	1153.897	372.118	18.069	110.084	678.621	82915.07

PPWESL1LFYTP	L1	PWE	FYTP Min	Top	-1153.9	-372.118	-18.069	-110.084	-1444.42	-94399.8
	L1	PWE	FYTP Min	Bottom	-1153.9	-372.118	-18.069	-110.084	-678.621	-82915.1
PPWESL1LFYTN	L1	PWE	FYTN Max	Top	1153.897	372.118	18.069	110.084	1444.422	94399.76
	L1	PWE	FYTN Max	Bottom	1153.897	372.118	18.069	110.084	678.621	82915.07
PPWESL1LFYTN	L1	PWE	FYTN Min	Top	-1153.9	-372.118	-18.069	-110.084	-1444.42	-94399.8
	L1	PWE	FYTN Min	Bottom	-1153.9	-372.118	-18.069	-110.084	-678.621	-82915.1
PPWNSL1LFXTP	L1	PWN	FXTP Max	Top	746.57	238.674	4.234	24.519	351.929	24068.46
	L1	PWN	FXTP Max	Bottom	746.57	238.674	4.234	24.519	180.106	6055.373
PPWNSL1LFXTP	L1	PWN	FXTP Min	Top	-746.57	-238.674	-4.234	-24.519	-351.929	-24068.5
	L1	PWN	FXTP Min	Bottom	-746.57	-238.674	-4.234	-24.519	-180.106	-6055.37
PPWNSL1LFXTN	L1	PWN	FXTN Max	Top	746.57	238.674	4.234	24.519	351.929	24068.46
	L1	PWN	FXTN Max	Bottom	746.57	238.674	4.234	24.519	180.106	6055.373
PPWNSL1LFXTN	L1	PWN	FXTN Min	Top	-746.57	-238.674	-4.234	-24.519	-351.929	-24068.5
	L1	PWN	FXTN Min	Bottom	-746.57	-238.674	-4.234	-24.519	-180.106	-6055.37
PPWNSL1LFYTP	L1	PWN	FYTP Max	Top	668.615	213.752	3.792	21.959	315.181	21555.29
	L1	PWN	FYTP Max	Bottom	668.615	213.752	3.792	21.959	161.3	5423.086
PPWNSL1LFYTP	L1	PWN	FYTP Min	Top	-668.615	-213.752	-3.792	-21.959	-315.181	-21555.3
	L1	PWN	FYTP Min	Bottom	-668.615	-213.752	-3.792	-21.959	-161.3	-5423.09
PPWNSL1LFYTN	L1	PWN	FYTN Max	Top	668.615	213.752	3.792	21.959	315.181	21555.29
	L1	PWN	FYTN Max	Bottom	668.615	213.752	3.792	21.959	161.3	5423.086
PPWNSL1LFYTN	L1	PWN	FYTN Min	Top	-668.615	-213.752	-3.792	-21.959	-315.181	-21555.3
	L1	PWN	FYTN Min	Bottom	-668.615	-213.752	-3.792	-21.959	-161.3	-5423.09
PPENSL1LFXTP	L1	PEN	FXTP Max	Top	417.501	222.75	11.534	581.125	440.594	24429.97
	L1	PEN	FXTP Max	Bottom	416.67	225.678	4.833	317.197	188.829	7107.835
PPENSL1LFXTP	L1	PEN	FXTP Min	Top	-417.501	-222.75	-11.534	-581.125	-440.594	-24430
	L1	PEN	FXTP Min	Bottom	-416.67	-225.678	-4.833	-317.197	-188.829	-7107.84
PPENSL1LFXTN	L1	PEN	FXTN Max	Top	417.501	222.75	11.534	581.125	440.594	24429.97
	L1	PEN	FXTN Max	Bottom	416.67	225.678	4.833	317.197	188.829	7107.835
PPENSL1LFXTN	L1	PEN	FXTN Min	Top	-417.501	-222.75	-11.534	-581.125	-440.594	-24430
	L1	PEN	FXTN Min	Bottom	-416.67	-225.678	-4.833	-317.197	-188.829	-7107.84
PPENSL1LFYTP	L1	PEN	FYTP Max	Top	373.907	199.491	10.33	520.445	394.588	21879.05
	L1	PEN	FYTP Max	Bottom	373.162	202.113	4.328	284.076	169.112	6365.652
PPENSL1LFYTP	L1	PEN	FYTP Min	Top	-373.907	-199.491	-10.33	-520.445	-394.588	-21879.1
	L1	PEN	FYTP Min	Bottom	-373.162	-202.113	-4.328	-284.076	-169.112	-6365.65
PPENSL1LFYTN	L1	PEN	FYTN Max	Top	373.907	199.491	10.33	520.445	394.588	21879.05
	L1	PEN	FYTN Max	Bottom	373.162	202.113	4.328	284.076	169.112	6365.652
PPENSL1LFYTN	L1	PEN	FYTN Min	Top	-373.907	-199.491	-10.33	-520.445	-394.588	-21879.1
	L1	PEN	FYTN Min	Bottom	-373.162	-202.113	-4.328	-284.076	-169.112	-6365.65
PPWSSL1LFXTP	L1	PWS	FXTP Max	Top	764.717	251.503	7.804	88.049	425.526	23415.93
	L1	PWS	FXTP Max	Bottom	764.717	251.503	7.804	88.049	484.499	7699.677
PPWSSL1LFXTP	L1	PWS	FXTP Min	Top	-764.717	-251.503	-7.804	-88.049	-425.526	-23415.9
	L1	PWS	FXTP Min	Bottom	-764.717	-251.503	-7.804	-88.049	-484.499	-7699.68
PPWSSL1LFXTN	L1	PWS	FXTN Max	Top	764.717	251.503	7.804	88.049	425.526	23415.93
	L1	PWS	FXTN Max	Bottom	764.717	251.503	7.804	88.049	484.499	7699.677
PPWSSL1LFXTN	L1	PWS	FXTN Min	Top	-764.717	-251.503	-7.804	-88.049	-425.526	-23415.9
	L1	PWS	FXTN Min	Bottom	-764.717	-251.503	-7.804	-88.049	-484.499	-7699.68
PPWSSL1LFYTP	L1	PWS	FYTP Max	Top	684.867	225.242	6.989	78.855	381.093	20970.89
	L1	PWS	FYTP Max	Bottom	684.867	225.242	6.989	78.855	433.909	6895.696
PPWSSL1LFYTP	L1	PWS	FYTP Min	Top	-684.867	-225.242	-6.989	-78.855	-381.093	-20970.9
	L1	PWS	FYTP Min	Bottom	-684.867	-225.242	-6.989	-78.855	-433.909	-6895.7
PPWSSL1LFYTN	L1	PWS	FYTN Max	Top	684.867	225.242	6.989	78.855	381.093	20970.89
	L1	PWS	FYTN Max	Bottom	684.867	225.242	6.989	78.855	433.909	6895.696
PPWSSL1LFYTN	L1	PWS	FYTN Min	Top	-684.867	-225.242	-6.989	-78.855	-381.093	-20970.9
	L1	PWS	FYTN Min	Bottom	-684.867	-225.242	-6.989	-78.855	-433.909	-6895.7
PPECWSL1LFXTP	L1	PECW	FXTP Max	Top	1544.191	189.255	23.077	301.044	1853.775	66032.79
	L1	PECW	FXTP Max	Bottom	1560.978	194.977	19.886	145.76	637.454	58411.89
PPECWSL1LFXTP	L1	PECW	FXTP Min	Top	-1544.19	-189.255	-23.077	-301.044	-1853.78	-66032.8
	L1	PECW	FXTP Min	Bottom	-1560.98	-194.977	-19.886	-145.76	-637.454	-58411.9
PPECWSL1LFXTN	L1	PECW	FXTN Max	Top	1544.191	189.255	23.077	301.044	1853.775	66032.79
	L1	PECW	FXTN Max	Bottom	1560.978	194.977	19.886	145.76	637.454	58411.89
PPECWSL1LFXTN	L1	PECW	FXTN Min	Top	-1544.19	-189.255	-23.077	-301.044	-1853.78	-66032.8
	L1	PECW	FXTN Min	Bottom	-1560.98	-194.977	-19.886	-145.76	-637.454	-58411.9
PPECWSL1LFYTP	L1	PECW	FYTP Max	Top	1382.951	169.494	20.668	269.61	1660.208	59137.81
	L1	PECW	FYTP Max	Bottom	1397.985	174.618	17.809	130.54	570.892	52312.67
PPECWSL1LFYTP	L1	PECW	FYTP Min	Top	-1382.95	-169.494	-20.668	-269.61	-1660.21	-59137.8
	L1	PECW	FYTP Min	Bottom	-1397.99	-174.618	-17.809	-130.54	-570.892	-52312.7
PPECWSL1LFYTN	L1	PECW	FYTN Max	Top	1382.951	169.494	20.668	269.61	1660.208	59137.81
	L1	PECW	FYTN Max	Bottom	1397.985	174.618	17.809	130.54	570.892	52312.67
PPECWSL1LFYTN	L1	PECW	FYTN Min	Top	-1382.95	-169.494	-20.668	-269.61	-1660.21	-59137.8
	L1	PECW	FYTN Min	Bottom	-1397.99	-174.618	-17.809	-130.54	-570.892	-52312.7
PPEESL1LFXTP	L1	PEE	FXTP Max	Top	1769.284	276.245	26.569	297.227	2178.981	99284.51

	L1	PEE	FXTP Max	Bottom	1769.284	276.245	26.569	297.227	966.293	109038
PPEESL1LFXTP	L1	PEE	FXTP Min	Top	-1769.28	-276.245	-26.569	-297.227	-2178.98	-99284.5
	L1	PEE	FXTP Min	Bottom	-1769.28	-276.245	-26.569	-297.227	-966.293	-109038
PPEESL1LFXTN	L1	PEE	FXTN Max	Top	1769.284	276.245	26.569	297.227	2178.981	99284.51
	L1	PEE	FXTN Max	Bottom	1769.284	276.245	26.569	297.227	966.293	109038
PPEESL1LFXTN	L1	PEE	FXTN Min	Top	-1769.28	-276.245	-26.569	-297.227	-2178.98	-99284.5
	L1	PEE	FXTN Min	Bottom	-1769.28	-276.245	-26.569	-297.227	-966.293	-109038
PPEESL1LFYTP	L1	PEE	FYTP Max	Top	1584.54	247.4	23.795	266.191	1951.457	88917.46
	L1	PEE	FYTP Max	Bottom	1584.54	247.4	23.795	266.191	865.395	97652.53
PPEESL1LFYTP	L1	PEE	FYTP Min	Top	-1584.54	-247.4	-23.795	-266.191	-1951.46	-88917.5
	L1	PEE	FYTP Min	Bottom	-1584.54	-247.4	-23.795	-266.191	-865.395	-97652.5
PPEESL1LFYTN	L1	PEE	FYTN Max	Top	1584.54	247.4	23.795	266.191	1951.457	88917.46
	L1	PEE	FYTN Max	Bottom	1584.54	247.4	23.795	266.191	865.395	97652.53
PPEESL1LFYTN	L1	PEE	FYTN Min	Top	-1584.54	-247.4	-23.795	-266.191	-1951.46	-88917.5
	L1	PEE	FYTN Min	Bottom	-1584.54	-247.4	-23.795	-266.191	-865.395	-97652.5
PPEMSL1LFXTP	L1	PEM	FXTP Max	Top	126.646	255.832	11.656	627.296	344.423	24826.99
	L1	PEM	FXTP Max	Bottom	100.195	256.054	3.592	160.885	174.629	8201.866
PPEMSL1LFXTP	L1	PEM	FXTP Min	Top	-126.646	-255.832	-11.656	-627.296	-344.423	-24827
	L1	PEM	FXTP Min	Bottom	-100.195	-256.054	-3.592	-160.885	-174.629	-8201.87
PPEMSL1LFXTN	L1	PEM	FXTN Max	Top	126.646	255.832	11.656	627.296	344.423	24826.99
	L1	PEM	FXTN Max	Bottom	100.195	256.054	3.592	160.885	174.629	8201.866
PPEMSL1LFXTN	L1	PEM	FXTN Min	Top	-126.646	-255.832	-11.656	-627.296	-344.423	-24827
	L1	PEM	FXTN Min	Bottom	-100.195	-256.054	-3.592	-160.885	-174.629	-8201.87
PPEMSL1LFYTP	L1	PEM	FYTP Max	Top	113.422	229.119	10.439	561.795	308.459	22234.62
	L1	PEM	FYTP Max	Bottom	89.733	229.318	3.217	144.085	156.395	7345.447
PPEMSL1LFYTP	L1	PEM	FYTP Min	Top	-113.422	-229.119	-10.439	-561.795	-308.459	-22234.6
	L1	PEM	FYTP Min	Bottom	-89.733	-229.318	-3.217	-144.085	-156.395	-7345.45
PPEMSL1LFYTN	L1	PEM	FYTN Max	Top	113.422	229.119	10.439	561.795	308.459	22234.62
	L1	PEM	FYTN Max	Bottom	89.733	229.318	3.217	144.085	156.395	7345.447
PPEMSL1LFYTN	L1	PEM	FYTN Min	Top	-113.422	-229.119	-10.439	-561.795	-308.459	-22234.6
	L1	PEM	FYTN Min	Bottom	-89.733	-229.318	-3.217	-144.085	-156.395	-7345.45
PPWMSL1LFXTP	L1	PWM	FXTP Max	Top	101.488	272.173	5.093	34.152	362.285	24952.74
	L1	PWM	FXTP Max	Bottom	101.488	272.173	5.093	34.152	235.275	8219.254
PPWMSL1LFXTP	L1	PWM	FXTP Min	Top	-101.488	-272.173	-5.093	-34.152	-362.285	-24952.7
	L1	PWM	FXTP Min	Bottom	-101.488	-272.173	-5.093	-34.152	-235.275	-8219.25
PPWMSL1LFXTN	L1	PWM	FXTN Max	Top	101.488	272.173	5.093	34.152	362.285	24952.74
	L1	PWM	FXTN Max	Bottom	101.488	272.173	5.093	34.152	235.275	8219.254
PPWMSL1LFXTN	L1	PWM	FXTN Min	Top	-101.488	-272.173	-5.093	-34.152	-362.285	-24952.7
	L1	PWM	FXTN Min	Bottom	-101.488	-272.173	-5.093	-34.152	-235.275	-8219.25
PPWMSL1LFYTP	L1	PWM	FYTP Max	Top	90.891	243.753	4.561	30.586	324.456	22347.24
	L1	PWM	FYTP Max	Bottom	90.891	243.753	4.561	30.586	210.708	7361.02
PPWMSL1LFYTP	L1	PWM	FYTP Min	Top	-90.891	-243.753	-4.561	-30.586	-324.456	-22347.2
	L1	PWM	FYTP Min	Bottom	-90.891	-243.753	-4.561	-30.586	-210.708	-7361.02
PPWMSL1LFYTN	L1	PWM	FYTN Max	Top	90.891	243.753	4.561	30.586	324.456	22347.24
	L1	PWM	FYTN Max	Bottom	90.891	243.753	4.561	30.586	210.708	7361.02
PPWMSL1LFYTN	L1	PWM	FYTN Min	Top	-90.891	-243.753	-4.561	-30.586	-324.456	-22347.2
	L1	PWM	FYTN Min	Bottom	-90.891	-243.753	-4.561	-30.586	-210.708	-7361.02
PPSWSL1LFXTP	L1	PSW	FXTP Max	Top	1596.165	395.919	9.153	250.462	1064.121	26626.49
	L1	PSW	FXTP Max	Bottom	1607.022	390.728	13.129	377.599	776.339	56241.56
PPSWSL1LFXTP	L1	PSW	FXTP Min	Top	-1596.17	-395.919	-9.153	-250.462	-1064.12	-26626.5
	L1	PSW	FXTP Min	Bottom	-1607.02	-390.728	-13.129	-377.599	-776.339	-56241.6
PPSWSL1LFXTN	L1	PSW	FXTN Max	Top	1596.165	395.919	9.153	250.462	1064.121	26626.49
	L1	PSW	FXTN Max	Bottom	1607.022	390.728	13.129	377.599	776.339	56241.56
PPSWSL1LFXTN	L1	PSW	FXTN Min	Top	-1596.17	-395.919	-9.153	-250.462	-1064.12	-26626.5
	L1	PSW	FXTN Min	Bottom	-1607.02	-390.728	-13.129	-377.599	-776.339	-56241.6
PPSWSL1LFYTP	L1	PSW	FYTP Max	Top	1429.498	354.578	8.197	224.309	953.008	23846.22
	L1	PSW	FYTP Max	Bottom	1439.22	349.929	11.758	338.171	695.275	50368.96
PPSWSL1LFYTP	L1	PSW	FYTP Min	Top	-1429.5	-354.578	-8.197	-224.309	-953.008	-23846.2
	L1	PSW	FYTP Min	Bottom	-1439.22	-349.929	-11.758	-338.171	-695.275	-50369
PPSWSL1LFYTN	L1	PSW	FYTN Max	Top	1429.498	354.578	8.197	224.309	953.008	23846.22
	L1	PSW	FYTN Max	Bottom	1439.22	349.929	11.758	338.171	695.275	50368.96
PPSWSL1LFYTN	L1	PSW	FYTN Min	Top	-1429.5	-354.578	-8.197	-224.309	-953.008	-23846.2
	L1	PSW	FYTN Min	Bottom	-1439.22	-349.929	-11.758	-338.171	-695.275	-50369
PPSESL1LFXTP	L1	PSE	FXTP Max	Top	1831.657	465.306	107.063	663.185	4450.62	77561.42
	L1	PSE	FXTP Max	Bottom	1846.468	467.373	11.807	106.479	170.071	112796.7
PPSESL1LFXTP	L1	PSE	FXTP Min	Top	-1831.66	-465.306	-107.063	-663.185	-4450.62	-77561.4
	L1	PSE	FXTP Min	Bottom	-1846.47	-467.373	-11.807	-106.479	-170.071	-112797
PPSESL1LFXTN	L1	PSE	FXTN Max	Top	1831.657	465.306	107.063	663.185	4450.62	77561.42
	L1	PSE	FXTN Max	Bottom	1846.468	467.373	11.807	106.479	170.071	112796.7
PPSESL1LFXTN	L1	PSE	FXTN Min	Top	-1831.66	-465.306	-107.063	-663.185	-4450.62	-77561.4
	L1	PSE	FXTN Min	Bottom	-1846.47	-467.373	-11.807	-106.479	-170.071	-112797

PPSESL1LFYTP	L1	PSE	FYTP Max	Top	1640.4	416.72	95.883	593.937	3985.897	69462.65
	L1	PSE	FYTP Max	Bottom	1653.664	418.571	10.574	95.36	152.313	101018.8
PPSESL1LFYTP	L1	PSE	FYTP Min	Top	-1640.4	-416.72	-95.883	-593.937	-3985.9	-69462.7
	L1	PSE	FYTP Min	Bottom	-1653.66	-418.571	-10.574	-95.36	-152.313	-101019
PPSESL1LFYTN	L1	PSE	FYTN Max	Top	1640.4	416.72	95.883	593.937	3985.897	69462.65
	L1	PSE	FYTN Max	Bottom	1653.664	418.571	10.574	95.36	152.313	101018.8
PPSESL1LFYTN	L1	PSE	FYTN Min	Top	-1640.4	-416.72	-95.883	-593.937	-3985.9	-69462.7
	L1	PSE	FYTN Min	Bottom	-1653.66	-418.571	-10.574	-95.36	-152.313	-101019
PPSMSL1LFXTP	L1	PSM	FXTP Max	Top	222.668	247.447	2.783	100.764	231.301	4109.475
	L1	PSM	FXTP Max	Bottom	156.92	125.929	2.15	90.867	32.6	8791.381
PPSMSL1LFXTP	L1	PSM	FXTP Min	Top	-222.668	-247.447	-2.783	-100.764	-231.301	-4109.48
	L1	PSM	FXTP Min	Bottom	-156.92	-125.929	-2.15	-90.867	-32.6	-8791.38
PPSMSL1LFXTN	L1	PSM	FXTN Max	Top	222.668	247.447	2.783	100.764	231.301	4109.475
	L1	PSM	FXTN Max	Bottom	156.92	125.929	2.15	90.867	32.6	8791.381
PPSMSL1LFXTN	L1	PSM	FXTN Min	Top	-222.668	-247.447	-2.783	-100.764	-231.301	-4109.48
	L1	PSM	FXTN Min	Bottom	-156.92	-125.929	-2.15	-90.867	-32.6	-8791.38
PPSMSL1LFYTP	L1	PSM	FYTP Max	Top	199.417	221.609	2.492	90.242	207.149	3680.374
	L1	PSM	FYTP Max	Bottom	140.534	112.78	1.925	81.378	29.196	7873.406
PPSMSL1LFYTP	L1	PSM	FYTP Min	Top	-199.417	-221.609	-2.492	-90.242	-207.149	-3680.37
	L1	PSM	FYTP Min	Bottom	-140.534	-112.78	-1.925	-81.378	-29.196	-7873.41
PPSMSL1LFYTN	L1	PSM	FYTN Max	Top	199.417	221.609	2.492	90.242	207.149	3680.374
	L1	PSM	FYTN Max	Bottom	140.534	112.78	1.925	81.378	29.196	7873.406
PPSMSL1LFYTN	L1	PSM	FYTN Min	Top	-199.417	-221.609	-2.492	-90.242	-207.149	-3680.37
	L1	PSM	FYTN Min	Bottom	-140.534	-112.78	-1.925	-81.378	-29.196	-7873.41
PPESSP1LFXTP	P1	PES	FXTP Max	Top	274.438	67.74	1.239	13.096	79.531	8755.927
	P1	PES	FXTP Max	Bottom	274.438	67.74	1.239	13.096	53.492	4426.859
PPESSP1LFXTP	P1	PES	FXTP Min	Top	-274.438	-67.74	-1.239	-13.096	-79.531	-8755.93
	P1	PES	FXTP Min	Bottom	-274.438	-67.74	-1.239	-13.096	-53.492	-4426.86
PPESSP1LFXTN	P1	PES	FXTN Max	Top	274.438	67.74	1.239	13.096	79.531	8755.927
	P1	PES	FXTN Max	Bottom	274.438	67.74	1.239	13.096	53.492	4426.859
PPESSP1LFXTN	P1	PES	FXTN Min	Top	-274.438	-67.74	-1.239	-13.096	-79.531	-8755.93
	P1	PES	FXTN Min	Bottom	-274.438	-67.74	-1.239	-13.096	-53.492	-4426.86
PPESSP1LFYTP	P1	PES	FYTP Max	Top	245.782	60.667	1.109	11.729	71.226	7841.655
	P1	PES	FYTP Max	Bottom	245.782	60.667	1.109	11.729	47.906	3964.617
PPESSP1LFYTP	P1	PES	FYTP Min	Top	-245.782	-60.667	-1.109	-11.729	-71.226	-7841.66
	P1	PES	FYTP Min	Bottom	-245.782	-60.667	-1.109	-11.729	-47.906	-3964.62
PPESSP1LFYTN	P1	PES	FYTN Max	Top	245.782	60.667	1.109	11.729	71.226	7841.655
	P1	PES	FYTN Max	Bottom	245.782	60.667	1.109	11.729	47.906	3964.617
PPESSP1LFYTN	P1	PES	FYTN Min	Top	-245.782	-60.667	-1.109	-11.729	-71.226	-7841.66
	P1	PES	FYTN Min	Bottom	-245.782	-60.667	-1.109	-11.729	-47.906	-3964.62
PPWWSP1LFXTP	P1	PWW	FXTP Max	Top	853.305	255.411	4.815	89.96	473.569	82998.69
	P1	PWW	FXTP Max	Bottom	853.305	255.411	4.815	89.96	115.858	82766.4
PPWWSP1LFXTP	P1	PWW	FXTP Min	Top	-853.305	-255.411	-4.815	-89.96	-473.569	-82998.7
	P1	PWW	FXTP Min	Bottom	-853.305	-255.411	-4.815	-89.96	-115.858	-82766.4
PPWWSP1LFXTN	P1	PWW	FXTN Max	Top	853.305	255.411	4.815	89.96	473.569	82998.69
	P1	PWW	FXTN Max	Bottom	853.305	255.411	4.815	89.96	115.858	82766.4
PPWWSP1LFXTN	P1	PWW	FXTN Min	Top	-853.305	-255.411	-4.815	-89.96	-473.569	-82998.7
	P1	PWW	FXTN Min	Bottom	-853.305	-255.411	-4.815	-89.96	-115.858	-82766.4
PPWWSP1LFYTP	P1	PWW	FYTP Max	Top	764.205	228.742	4.312	80.567	424.121	74332.17
	P1	PWW	FYTP Max	Bottom	764.205	228.742	4.312	80.567	103.76	74124.14
PPWWSP1LFYTP	P1	PWW	FYTP Min	Top	-764.205	-228.742	-4.312	-80.567	-424.121	-74332.2
	P1	PWW	FYTP Min	Bottom	-764.205	-228.742	-4.312	-80.567	-103.76	-74124.1
PPWWSP1LFYTN	P1	PWW	FYTN Max	Top	764.205	228.742	4.312	80.567	424.121	74332.17
	P1	PWW	FYTN Max	Bottom	764.205	228.742	4.312	80.567	103.76	74124.14
PPWWSP1LFYTN	P1	PWW	FYTN Min	Top	-764.205	-228.742	-4.312	-80.567	-424.121	-74332.2
	P1	PWW	FYTN Min	Bottom	-764.205	-228.742	-4.312	-80.567	-103.76	-74124.1
PPWESP1LFXTP	P1	PWE	FXTP Max	Top	740.991	167.558	6.677	170.066	478.279	73852.27
	P1	PWE	FXTP Max	Bottom	730.657	179.129	4.165	92.59	53.718	73055.51
PPWESP1LFXTP	P1	PWE	FXTP Min	Top	-740.991	-167.558	-6.677	-170.066	-478.279	-73852.3
	P1	PWE	FXTP Min	Bottom	-730.657	-179.129	-4.165	-92.59	-53.718	-73055.5
PPWESP1LFXTN	P1	PWE	FXTN Max	Top	740.991	167.558	6.677	170.066	478.279	73852.27
	P1	PWE	FXTN Max	Bottom	730.657	179.129	4.165	92.59	53.718	73055.51
PPWESP1LFXTN	P1	PWE	FXTN Min	Top	-740.991	-167.558	-6.677	-170.066	-478.279	-73852.3
	P1	PWE	FXTN Min	Bottom	-730.657	-179.129	-4.165	-92.59	-53.718	-73055.5
PPWESP1LFYTP	P1	PWE	FYTP Max	Top	663.619	150.062	5.98	152.308	428.339	66140.8
	P1	PWE	FYTP Max	Bottom	654.364	160.425	3.73	82.922	48.109	65427.23
PPWESP1LFYTP	P1	PWE	FYTP Min	Top	-663.619	-150.062	-5.98	-152.308	-428.339	-66140.8
	P1	PWE	FYTP Min	Bottom	-654.364	-160.425	-3.73	-82.922	-48.109	-65427.2
PPWESP1LFYTN	P1	PWE	FYTN Max	Top	663.619	150.062	5.98	152.308	428.339	66140.8
	P1	PWE	FYTN Max	Bottom	654.364	160.425	3.73	82.922	48.109	65427.23
PPWESP1LFYTN	P1	PWE	FYTN Min	Top	-663.619	-150.062	-5.98	-152.308	-428.339	-66140.8

	P1	PWE	FYTN Min	Bottom	-654.364	-160.425	-3.73	-82.922	-48.109	-65427.2
PPWNSP1LFXTP	P1	PWN	FXTP Max	Top	723.692	57.944	30.715	1605.864	634.427	6670.999
	P1	PWN	FXTP Max	Bottom	684.398	58.277	4.509	204.637	184.141	5005.794
PPWNSP1LFXTP	P1	PWN	FXTP Min	Top	-723.692	-57.944	-30.715	-1605.86	-634.427	-6671
	P1	PWN	FXTP Min	Bottom	-684.398	-58.277	-4.509	-204.637	-184.141	-5005.79
PPWNSP1LFXTN	P1	PWN	FXTN Max	Top	723.692	57.944	30.715	1605.864	634.427	6670.999
	P1	PWN	FXTN Max	Bottom	684.398	58.277	4.509	204.637	184.141	5005.794
PPWNSP1LFXTN	P1	PWN	FXTN Min	Top	-723.692	-57.944	-30.715	-1605.86	-634.427	-6671
	P1	PWN	FXTN Min	Bottom	-684.398	-58.277	-4.509	-204.637	-184.141	-5005.79
PPWNSP1LFYTP	P1	PWN	FYTP Max	Top	648.126	51.894	27.508	1438.184	568.182	5974.429
	P1	PWN	FYTP Max	Bottom	612.935	52.192	4.038	183.27	164.913	4483.102
PPWNSP1LFYTP	P1	PWN	FYTP Min	Top	-648.126	-51.894	-27.508	-1438.18	-568.182	-5974.43
	P1	PWN	FYTP Min	Bottom	-612.935	-52.192	-4.038	-183.27	-164.913	-4483.1
PPWNSP1LFYTN	P1	PWN	FYTN Max	Top	648.126	51.894	27.508	1438.184	568.182	5974.429
	P1	PWN	FYTN Max	Bottom	612.935	52.192	4.038	183.27	164.913	4483.102
PPWNSP1LFYTN	P1	PWN	FYTN Min	Top	-648.126	-51.894	-27.508	-1438.18	-568.182	-5974.43
	P1	PWN	FYTN Min	Bottom	-612.935	-52.192	-4.038	-183.27	-164.913	-4483.1
PPENSP1LFXTP	P1	PEN	FXTP Max	Top	285.034	54.443	0.935	16.486	82.722	6422.033
	P1	PEN	FXTP Max	Bottom	285.034	54.443	0.935	16.486	21.9	5351.423
PPENSP1LFXTP	P1	PEN	FXTP Min	Top	-285.034	-54.443	-0.935	-16.486	-82.722	-6422.03
	P1	PEN	FXTP Min	Bottom	-285.034	-54.443	-0.935	-16.486	-21.9	-5351.42
PPENSP1LFXTN	P1	PEN	FXTN Max	Top	285.034	54.443	0.935	16.486	82.722	6422.033
	P1	PEN	FXTN Max	Bottom	285.034	54.443	0.935	16.486	21.9	5351.423
PPENSP1LFXTN	P1	PEN	FXTN Min	Top	-285.034	-54.443	-0.935	-16.486	-82.722	-6422.03
	P1	PEN	FXTN Min	Bottom	-285.034	-54.443	-0.935	-16.486	-21.9	-5351.42
PPENSP1LFYTP	P1	PEN	FYTP Max	Top	255.272	48.759	0.837	14.765	74.084	5751.461
	P1	PEN	FYTP Max	Bottom	255.272	48.759	0.837	14.765	19.613	4792.64
PPENSP1LFYTP	P1	PEN	FYTP Min	Top	-255.272	-48.759	-0.837	-14.765	-74.084	-5751.46
	P1	PEN	FYTP Min	Bottom	-255.272	-48.759	-0.837	-14.765	-19.613	-4792.64
PPENSP1LFYTN	P1	PEN	FYTN Max	Top	255.272	48.759	0.837	14.765	74.084	5751.461
	P1	PEN	FYTN Max	Bottom	255.272	48.759	0.837	14.765	19.613	4792.64
PPENSP1LFYTN	P1	PEN	FYTN Min	Top	-255.272	-48.759	-0.837	-14.765	-74.084	-5751.46
	P1	PEN	FYTN Min	Bottom	-255.272	-48.759	-0.837	-14.765	-19.613	-4792.64
PPWSSP1LFXTP	P1	PWS	FXTP Max	Top	730.11	96.092	25.033	1033.75	890.555	13376.39
	P1	PWS	FXTP Max	Bottom	719.474	97.286	2.989	210.969	115.862	3879.766
PPWSSP1LFXTP	P1	PWS	FXTP Min	Top	-730.11	-96.092	-25.033	-1033.75	-890.555	-13376.4
	P1	PWS	FXTP Min	Bottom	-719.474	-97.286	-2.989	-210.969	-115.862	-3879.77
PPWSSP1LFXTN	P1	PWS	FXTN Max	Top	730.11	96.092	25.033	1033.75	890.555	13376.39
	P1	PWS	FXTN Max	Bottom	719.474	97.286	2.989	210.969	115.862	3879.766
PPWSSP1LFXTN	P1	PWS	FXTN Min	Top	-730.11	-96.092	-25.033	-1033.75	-890.555	-13376.4
	P1	PWS	FXTN Min	Bottom	-719.474	-97.286	-2.989	-210.969	-115.862	-3879.77
PPWSSP1LFYTP	P1	PWS	FYTP Max	Top	653.874	86.058	22.419	925.808	797.565	11979.66
	P1	PWS	FYTP Max	Bottom	644.348	87.127	2.677	188.94	103.764	3474.65
PPWSSP1LFYTP	P1	PWS	FYTP Min	Top	-653.874	-86.058	-22.419	-925.808	-797.565	-11979.7
	P1	PWS	FYTP Min	Bottom	-644.348	-87.127	-2.677	-188.94	-103.764	-3474.65
PPWSSP1LFYTN	P1	PWS	FYTN Max	Top	653.874	86.058	22.419	925.808	797.565	11979.66
	P1	PWS	FYTN Max	Bottom	644.348	87.127	2.677	188.94	103.764	3474.65
PPWSSP1LFYTN	P1	PWS	FYTN Min	Top	-653.874	-86.058	-22.419	-925.808	-797.565	-11979.7
	P1	PWS	FYTN Min	Bottom	-644.348	-87.127	-2.677	-188.94	-103.764	-3474.65
PPECWSP1LFXTP	P1	PECW	FXTP Max	Top	1332.519	134.845	2.885	95.222	310.52	62223.18
	P1	PECW	FXTP Max	Bottom	1332.519	134.845	2.885	95.222	54.378	57771.07
PPECWSP1LFXTP	P1	PECW	FXTP Min	Top	-1332.52	-134.845	-2.885	-95.222	-310.52	-62223.2
	P1	PECW	FXTP Min	Bottom	-1332.52	-134.845	-2.885	-95.222	-54.378	-57771.1
PPECWSP1LFXTN	P1	PECW	FXTN Max	Top	1332.519	134.845	2.885	95.222	310.52	62223.18
	P1	PECW	FXTN Max	Bottom	1332.519	134.845	2.885	95.222	54.378	57771.07
PPECWSP1LFXTN	P1	PECW	FXTN Min	Top	-1332.52	-134.845	-2.885	-95.222	-310.52	-62223.2
	P1	PECW	FXTN Min	Bottom	-1332.52	-134.845	-2.885	-95.222	-54.378	-57771.1
PPECWSP1LFYTP	P1	PECW	FYTP Max	Top	1193.381	120.765	2.584	85.279	278.097	55725.99
	P1	PECW	FYTP Max	Bottom	1193.381	120.765	2.584	85.279	48.7	51738.75
PPECWSP1LFYTP	P1	PECW	FYTP Min	Top	-1193.38	-120.765	-2.584	-85.279	-278.097	-55726
	P1	PECW	FYTP Min	Bottom	-1193.38	-120.765	-2.584	-85.279	-48.7	-51738.8
PPECWSP1LFYTN	P1	PECW	FYTN Max	Top	1193.381	120.765	2.584	85.279	278.097	55725.99
	P1	PECW	FYTN Max	Bottom	1193.381	120.765	2.584	85.279	48.7	51738.75
PPECWSP1LFYTN	P1	PECW	FYTN Min	Top	-1193.38	-120.765	-2.584	-85.279	-278.097	-55726
	P1	PECW	FYTN Min	Bottom	-1193.38	-120.765	-2.584	-85.279	-48.7	-51738.8
PPEESP1LFXTP	P1	PEE	FXTP Max	Top	1057.611	210.201	5.075	172.73	538.605	47624.22
	P1	PEE	FXTP Max	Bottom	1057.611	210.201	5.075	172.73	152.696	48452.99
PPEESP1LFXTP	P1	PEE	FXTP Min	Top	-1057.61	-210.201	-5.075	-172.73	-538.605	-47624.2
	P1	PEE	FXTP Min	Bottom	-1057.61	-210.201	-5.075	-172.73	-152.696	-48453
PPEESP1LFXTN	P1	PEE	FXTN Max	Top	1057.611	210.201	5.075	172.73	538.605	47624.22
	P1	PEE	FXTN Max	Bottom	1057.611	210.201	5.075	172.73	152.696	48452.99

PPEESP1LFXTN	P1	PEE	FXTN Min	Top	-1057.61	-210.201	-5.075	-172.73	-538.605	-47624.2
	P1	PEE	FXTN Min	Bottom	-1057.61	-210.201	-5.075	-172.73	-152.696	-48453
PPEESP1LFYTP	P1	PEE	FYTP Max	Top	947.178	188.253	4.545	154.694	482.365	42651.42
	P1	PEE	FYTP Max	Bottom	947.178	188.253	4.545	154.694	136.752	43393.64
PPEESP1LFYTP	P1	PEE	FYTP Min	Top	-947.178	-188.253	-4.545	-154.694	-482.365	-42651.4
	P1	PEE	FYTP Min	Bottom	-947.178	-188.253	-4.545	-154.694	-136.752	-43393.6
PPEESP1LFYTN	P1	PEE	FYTN Max	Top	947.178	188.253	4.545	154.694	482.365	42651.42
	P1	PEE	FYTN Max	Bottom	947.178	188.253	4.545	154.694	136.752	43393.64
PPEESP1LFYTN	P1	PEE	FYTN Min	Top	-947.178	-188.253	-4.545	-154.694	-482.365	-42651.4
	P1	PEE	FYTN Min	Bottom	-947.178	-188.253	-4.545	-154.694	-136.752	-43393.6
PPEMSP1LFXTP	P1	PEM	FXTP Max	Top	34.718	96.012	1.401	6.237	89.567	12237.95
	P1	PEM	FXTP Max	Bottom	34.718	96.012	1.401	6.237	58.596	4832.022
PPEMSP1LFXTP	P1	PEM	FXTP Min	Top	-34.718	-96.012	-1.401	-6.237	-89.567	-12237.9
	P1	PEM	FXTP Min	Bottom	-34.718	-96.012	-1.401	-6.237	-58.596	-4832.02
PPEMSP1LFXTN	P1	PEM	FXTN Max	Top	34.718	96.012	1.401	6.237	89.567	12237.95
	P1	PEM	FXTN Max	Bottom	34.718	96.012	1.401	6.237	58.596	4832.022
PPEMSP1LFXTN	P1	PEM	FXTN Min	Top	-34.718	-96.012	-1.401	-6.237	-89.567	-12237.9
	P1	PEM	FXTN Min	Bottom	-34.718	-96.012	-1.401	-6.237	-58.596	-4832.02
PPEMSP1LFYTP	P1	PEM	FYTP Max	Top	31.093	85.987	1.255	5.586	80.214	10960.09
	P1	PEM	FYTP Max	Bottom	31.093	85.987	1.255	5.586	52.477	4327.474
PPEMSP1LFYTP	P1	PEM	FYTP Min	Top	-31.093	-85.987	-1.255	-5.586	-80.214	-10960.1
	P1	PEM	FYTP Min	Bottom	-31.093	-85.987	-1.255	-5.586	-52.477	-4327.47
PPEMSP1LFYTN	P1	PEM	FYTN Max	Top	31.093	85.987	1.255	5.586	80.214	10960.09
	P1	PEM	FYTN Max	Bottom	31.093	85.987	1.255	5.586	52.477	4327.474
PPEMSP1LFYTN	P1	PEM	FYTN Min	Top	-31.093	-85.987	-1.255	-5.586	-80.214	-10960.1
	P1	PEM	FYTN Min	Bottom	-31.093	-85.987	-1.255	-5.586	-52.477	-4327.47
PPWMSP1LFXTP	P1	PWM	FXTP Max	Top	35.926	89.426	12.689	668.377	192.785	10541.44
	P1	PWM	FXTP Max	Bottom	53.139	90.588	3.544	154.396	118.125	4660.779
PPWMSP1LFXTP	P1	PWM	FXTP Min	Top	-35.926	-89.426	-12.689	-668.377	-192.785	-10541.4
	P1	PWM	FXTP Min	Bottom	-53.139	-90.588	-3.544	-154.396	-118.125	-4660.78
PPWMSP1LFXTN	P1	PWM	FXTN Max	Top	35.926	89.426	12.689	668.377	192.785	10541.44
	P1	PWM	FXTN Max	Bottom	53.139	90.588	3.544	154.396	118.125	4660.779
PPWMSP1LFXTN	P1	PWM	FXTN Min	Top	-35.926	-89.426	-12.689	-668.377	-192.785	-10541.4
	P1	PWM	FXTN Min	Bottom	-53.139	-90.588	-3.544	-154.396	-118.125	-4660.78
PPWMSP1LFYTP	P1	PWM	FYTP Max	Top	32.175	80.088	11.364	598.587	172.655	9440.73
	P1	PWM	FYTP Max	Bottom	47.591	81.129	3.173	138.275	105.791	4174.112
PPWMSP1LFYTP	P1	PWM	FYTP Min	Top	-32.175	-80.088	-11.364	-598.587	-172.655	-9440.73
	P1	PWM	FYTP Min	Bottom	-47.591	-81.129	-3.173	-138.275	-105.791	-4174.11
PPWMSP1LFYTN	P1	PWM	FYTN Max	Top	32.175	80.088	11.364	598.587	172.655	9440.73
	P1	PWM	FYTN Max	Bottom	47.591	81.129	3.173	138.275	105.791	4174.112
PPWMSP1LFYTN	P1	PWM	FYTN Min	Top	-32.175	-80.088	-11.364	-598.587	-172.655	-9440.73
	P1	PWM	FYTN Min	Bottom	-47.591	-81.129	-3.173	-138.275	-105.791	-4174.11

1 2 3

, lastly within each Story sort by Pier]

	Moment	Shear	Load	MOMENT k-ft
PPLSL2	48956	274	FXTP	4080
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PP11WSL2	126496	811	FXTP	10541
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
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			FXTN	
			FYTP	
			FYTP	
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			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PP11ESL2	182054	1023	FXTP	15171
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPESSL2	49772	492	FXTP	4148
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
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			FYTN	
			FYTN	

			FYTN	
			FYTN	
PPWWSL2	98580	1061	FXTP	8215
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
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			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWESL2	168729	1189	FXTP	14061
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWNSL2	41338	903	FXTP	3445
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPENSL2	43652	788	FXTP	3638
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWSSL2	16505	337	FXTP	1375
			FXTP	
			FXTP	
			FXTP	
			FXTN	

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			FYTN	
PPECWSL2	103352	855	FXTP	8613
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPEESL2	136247	983	FXTP	11354
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			FXTP	
			FXTP	
			FXTN	
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			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPEMSL2	54955	565	FXTP	4580
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
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			FYTN	
			FYTN	
			FYTN	
PPWMSL2	45824	448	FXTP	3819
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			FXTP	
			FXTN	
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			FYTP	
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			FYTN	
PPSWSL2	26914	230	FXTP	2243
			FXTP	
			FXTP	
			FXTP	
			FXTN	
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			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPSESL2	138428	1091	FXTP	11536
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PP7WSL1	4604	42	FXTP	384
			FXTP	
			FXTP	
			FXTP	
			FXTN	
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			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PP7MSL1	8580	81	FXTP	715
			FXTP	
			FXTP	
			FXTP	
			FXTN	
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			FXTN	
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			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PP7ESL1	8693	51	FXTP	724
			FXTP	
			FXTP	

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			FYTN	
PPLSL1	82117	286	FXTP	6843
			FXTP	
			FXTP	
			FXTP	
			FXTN	
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			FYTP	
			FYTP	
			FYTP	
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			FYTN	
			FYTN	
			FYTN	
PPESSL1	25700	240	FXTP	2142
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			FXTP	
			FXTP	
			FXTN	
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			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWWSL1	74422	315	FXTP	6202
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWESL1	105406	416	FXTP	8784
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
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			FYTN	
PPWNSL1	24068	239	FXTP	2006
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPENSL1	24430	226	FXTP	2036
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWSSL1	23416	252	FXTP	1951
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPECWSL1	66033	195	FXTP	5503
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPEESL1	109038	276	FXTP	9087

			FXTP	
			FXTP	
			FXTP	
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			FYTP	
			FYTP	
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			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPEMSL1	24827	256	FXTP	2069
			FXTP	
			FXTP	
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PPWMSL1	24953	272	FXTP	2079
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPSWSL1	56242	396	FXTP	4687
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPSESL1	112797	467	FXTP	9400
			FXTP	
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PPSMSL1	8791	247	FXTP	733
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPESSP1	8756	68	FXTP	730
			FXTP	
			FXTP	
			FXTP	
			FXTN	
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			FYTP	
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			FYTN	
PPWWSP1	82999	255	FXTP	6917
			FXTP	
			FXTP	
			FXTP	
			FXTN	
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			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
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			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWESP1	73852	179	FXTP	6154
			FXTP	
			FXTP	
			FXTP	
			FXTN	
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			FYTN	
PPWNSP1	6671	58	FXTP	556
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
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			FYTN	
			FYTN	
PPENSP1	6422	54	FXTP	535
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWSSP1	13376	97	FXTP	1115
			FXTP	
			FXTP	
			FXTP	
			FXTN	
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			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPECWSP1	62223	135	FXTP	5185
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPEESP1	48453	210	FXTP	4038
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	

			FXTN	
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			FYTN	
			FYTN	
			FYTN	
PPEMSP1	12238	96	FXTP	1020
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
			FXTN	
			FXTN	
			FYTP	
			FYTP	
			FYTP	
			FYTP	
			FYTN	
			FYTN	
			FYTN	
			FYTN	
PPWMSP1	10541	91	FXTP	878
			FXTP	
			FXTP	
			FXTP	
			FXTN	
			FXTN	
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Project:	MIMU
Date Updated:	11/12/2020

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Copy Down With Import Label

Pier Designations and Properties Imported from:
Display -> Show Tables... -> Model -> Definitions -> Pier/Spandrel Section Properties -> Pier Section Properties
(Load Case doesn't matter), k-in

These calculations needed to be copied down to match all rows which have imported data, but not further.

Shear Design — **fy =** 60 — **Rebar**

Label	Story	Pier	s Ana	Ole	Oth	Boess	dth	Tnes		Material	Bottc	Bottc	Bottc	Top	Top	To	f'c	Length	Width	Area	Vu,max	K	rho,n	Reinf	Pier	Story			
			deg			in	in	in	in		in	in	in	in	in	in	ksi	ft	in	ft^2	k			in^2/ft					
PPLSL2	L2	PL	90	1	0	192	14	192	14	C5000X7(	0	###	221	0	###	401	5	16.50	14	19.25	274	1.4	0.25%	0.42	PL	L2	#5 @ 12" EF	0.000	#4 @ 12" EF
PP11WSL2	L2	P11W	0	1	0	210	14	210	14	C5000X7(	799	###	221	799	###	401	5	17.50	14	20.42	811	3.9	0.53%	0.89	P11W	L2	#5 @ 8" EF	0.400	#5 @ 12" EF
PP11ESL2	L2	P11E	0	1	0	256	14	256	14	C5000X7(	###	###	221	###	###	401	5	21.33	14	24.89	1023	4.0	0.56%	0.94	P11E	L2	#6 @ 8" EF	0.620	#5 @ 8" EF
PPESSL2	L2	PES	0	1	0	117	14	117	14	C5000X7(	###	###	221	###	###	401	5	10.33	14	12.05	492	4.0	0.55%	0.93	PES	L2	#5 @ 8" EF	0.930	#6 @ 8" EF
PPWWSL2	L2	PWW	90	10	0	303	11	303	14	C5000X7(	432	###	221	432	###	401	5	25.83	11	22.97	1061	4.5	0.66%	0.84	PWW	L2	#5 @ 8" EF	1.320	#5 @ 4" EF
PPWESL2	L2	PWE	90	2	0	303	14	303	14	C5000X7(	544	###	221	544	###	401	5	25.83	14	30.14	1189	3.9	0.53%	0.88	PWE	L2	#5 @ 8" EF	1.860	#8 @ 8" EF
PPWNSL2	L2	PWN	0	1	0	112	14	112	14	C5000X7(	488	###	221	488	###	401	5	9.91	14	11.57	803	6.8	1.10%	1.85	PWN	L2	#5 @ 4" EF	2.370	#6 @ 4" EF
PPENSL2	L2	PEN	0	1	0	117	14	117	14	C5000X7(	###	###	221	###	###	401	5	10.33	14	12.05	788	6.4	1.03%	1.72	PEN	L2	#5 @ 4" EF	2.640	Too Large
PPWSSL2	L2	PWS	0	5	0	112	9.5	112	14	C5000X7(	479	###	221	488	###	401	5	9.91	10	7.85	337	4.2	0.59%	0.68	PWS	L2	#5 @ 8" EF	5.000	
PPECWSL2	L2	PECW	90	6	0	406	13	406	14	C5000X7(	###	###	221	###	###	401	5	34.41	13	36.59	855	2.3	0.25%	0.38	PECW	L2	#4 @ 12" EF		
PPEESL2	L2	PEE	90	2	0	406	14	406	14	C5000X7(	###	###	221	###	###	401	5	34.41	14	40.15	983	2.4	0.25%	0.42	PEE	L2	#5 @ 12" EF		
PPEMSL2	L2	PEM	0	1	0	117	14	117	14	C5000X7(	###	###	221	###	###	401	5	10.33	14	12.05	565	4.6	0.67%	1.12	PEM	L2	#6 @ 8" EF		
PPWMSL2	L2	PWM	0	1	0	112	14	112	14	C5000X7(	488	###	221	488	###	401	5	9.91	14	11.57	448	3.8	0.51%	0.86	PWM	L2	#5 @ 8" EF		
PPSWSL2	L2	PSW	90	2	0	396	8.4	396	8.4	C5000X7(	###	745	221	###	745	401	5	33.58	8	23.55	230	1.0	0.25%	0.25	PSW	L2	#4 @ 12" EF		
PPSESL2	L2	PSE	90	1	0	396	14	396	14	C5000X7(	###	730	221	###	730	401	5	33.58	14	39.18	1091	2.7	0.30%	0.51	PSE	L2	#5 @ 12" EF		
PP7WSL1	L1	P7W	0	1	0	68	12	68	12	C5000X7(	398	###	105	398	###	221	5	5.67	12	5.67	42	0.7	0.25%	0.36	P7W	L1	#4 @ 12" EF		
PP7MSL1	L1	P7M	0	1	0	235	12	235	12	C5000X7(	685	###	105	685	###	221	5	19.58	12	19.58	81	0.4	0.25%	0.36	P7M	L1	#4 @ 12" EF		
PP7ESL1	L1	P7E	0	1	0	285	12	285	12	C5000X7(	###	###	105	###	###	221	5	23.75	12	23.75	51	0.2	0.25%	0.36	P7E	L1	#4 @ 12" EF		
PPLSL1	L1	PL	90	1	0	192	14	192	14	C5000X7(	0	###	105	0	###	221	5	16.50	14	19.25	286	1.5	0.25%	0.42	PL	L1	#5 @ 12" EF		
PPESSL1	L1	PES	0	1	0	117	14	117	14	C5000X7(	###	###	105	###	###	221	5	10.33	14	12.05	240	2.0	0.25%	0.42	PES	L1	#5 @ 12" EF		
PPWWSL1	L1	PWW	90	3	0	303	10	303	10	C5000X7(	432	###	105	432	###	221	5	25.83	10	21.68	315	1.4	0.25%	0.30	PWW	L1	#4 @ 12" EF		
PPWESL1	L1	PWE	90	2	0	303	14	303	14	C5000X7(	544	###	105	544	###	221	5	25.83	14	30.14	416	1.4	0.25%	0.42	PWE	L1	#5 @ 12" EF		
PPWNSL1	L1	PWN	0	1	0	112	14	112	14	C5000X7(	488	###	105	488	###	221	5	9.91	14	11.57	239	2.0	0.25%	0.42	PWN	L1	#5 @ 12" EF		
PPENSL1	L1	PEN	0	1	0	117	14	117	14	C5000X7(	###	###	105	###	###	221	5	10.33	14	12.05	226	1.8	0.25%	0.42	PEN	L1	#5 @ 12" EF		
PPWSSL1	L1	PWS	0	1	0	112	14	112	14	C5000X7(	488	###	105	488	###	221	5	9.91	14	11.57	252	2.1	0.25%	0.42	PWS	L1	#5 @ 12" EF		
PPECWSL1	L1	PECW	90	7	0	406	12	406	13	C5000X7(	###	###	105	###	###	221	5	34.41	12	33.03	195	0.6	0.25%	0.35	PECW	L1	#4 @ 12" EF		
PPEESL1	L1	PEE	90	2	0	406	14	406	14	C5000X7(	###	###	105	###	###	221	5	34.41	14	40.15	276	0.7	0.25%	0.42	PEE	L1	#5 @ 12" EF		
PPEMSL1	L1	PEM	0	1	0	117	14	117	14	C5000X7(	###	###	105	###	###	221	5	10.33	14	12.05	256	2.1	0.25%	0.42	PEM	L1	#5 @ 12" EF		
PPWMSL1	L1	PWM	0	1	0	112	14	112	14	C5000X7(	488	###	105	488	###	221	5	9.91	14	11.57	272	2.3	0.25%	0.42	PWM	L1	#5 @ 12" EF		
PPSWSL1	L1	PSW	90	6	0	396	13	396	14	C5000X7(	###	734	105	###	730	221	5	33.58	13	35.62	396	1.1	0.25%	0.38	PSW	L1	#4 @ 12" EF		
PPSESL1	L1	PSE	90	2	0	396	14	396	14	C5000X7(	###	730	105	###	730	221	5	33.58	14	39.18	467	1.2	0.25%	0.42	PSE	L1	#5 @ 12" EF		
PPSMSL1	L1	PSM	0	5	0	117	9.7	117	14	C5000X7(	###	724	105	###	724	221	5	10.33	10	8.34	247	2.9	0.34%	0.39	PSM	L1	#4 @ 12" EF		
PPESSP1	P1	PES	0	1	0	117	14	117	14	C5000X7(	###	###	0	###	###	105	5	10.33	14	12.05	68	0.6	0.25%	0.42	PES	P1	#5 @ 12" EF		
PPWWSP1	P1	PWW	90	2	0	303	14	303	14	C5000X7(	432	###	0	432	###	105	5	25.83	14	30.14	255	0.8	0.25%	0.42	PWW	P1	#5 @ 12" EF		
PPWESP1	P1	PWE	90	10	0	303	11	303	14	C5000X7(	544	###	0	544	###	105	5	25.83	11	22.97	179	0.8	0.25%	0.32	PWE	P1	#4 @ 12" EF		
PPWNSP1	P1	PWN	0	1	0	112	14	112	14	C5000X7(	488	###	0	488	###	105	5	9.91	14	11.57	58	0.5	0.25%	0.42	PWN	P1	#5 @ 12" EF		
PPENSP1	P1	PEN	0	1	0	117	14	117	14	C5000X7(	###	###	0	###	###	105	5	10.33	14	12.05	54	0.4	0.25%	0.42	PEN	P1	#5 @ 12" EF		
PPWSSP1	P1	PWS	0	1	0	112	14	112	14	C5000X7(	488	###	0	488	###	105	5	9.91	14	11.57	97	0.8	0.25%	0.42	PWS	P1	#5 @ 12" EF		
PPECWSP1	P1	PECW	90	4	0	406	12	406	12	C5000X7(	###	###	0	###	###	105	5	34.41	12	33.03	135	0.4	0.25%	0.35	PECW	P1	#4 @ 12" EF		
PPEESP1	P1	PEE	90	2	0	406	14	406	14	C5000X7(	###	###	0	###	###	105	5	34.41	14	40.15	210	0.5	0.25%	0.42	PEE	P1	#5 @ 12" EF		
PPEMSP1	P1	PEM	0	1	0	117	14	117	14	C5000X7(	###	###	0	###	###	105	5	10.33	14	12.05	96	0.8	0.25%	0.42	PEM	P1	#5 @ 12" EF		
PPWMSP1	P1	PWM	0	1	0	112	14	112	14	C5000X7(	488	###	0	488	###	105	5	9.91	14	11.57	91	0.8	0.25%	0.42	PWM	P1	#5 @ 12" EF		

Horizontal (Shear)
Reinf design

Project:	MIMU
Date Updated:	11/12/2020

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22

Frame Section Properties Imported from:
Display -> Show Tables... -> Model -> Definitions -> Frame Sections -> Frame Sections
(Load Cases don't matter), k-in

Name	Material	Shape	t3	t2	tf	tw	twb	Radius	Mirror Abou	Area	AS2	AS3	J	I22	I33	S22	S33	Z22	Z33	R22	R33
			in	in	in	in	in	in		in^2	in^2	in^2	in^4	in^4	in^4	in^3	in^3	in^3	in^3	in	in
B12X28C5000X	C5000X33	Concrete Re	28	12						336	280	280	11785.68	4032	21952	672	1568	1008	2352	3.4641	8.0829
B12X28C5000X	C5000X33NM	Concrete Re	28	12						336	280	280	11785.68	4032	21952	672	1568	1008	2352	3.4641	8.0829
B14X20C5000X	C5000X33	Concrete Re	20	14						280	233.33	233.33	10387.39	4573.33	9333.33	653.33	933.33	980	1400	4.0415	5.7735
B14X30C5000X	C5000X33	Concrete Re	30	14						420	350	350	19404.52	6860	31500	980	2100	1470	3150	4.0415	8.6603
B14X30C5000X	C5000X33NM	Concrete Re	30	14						420	350	350	19404.52	6860	31500	980	2100	1470	3150	4.0415	8.6603
B14X34C5000X	C5000X33	Concrete Re	34	14						476	396.67	396.67	23050.63	7774.67	45854.67	1110.67	2697.33	1666	4046	4.0415	9.815
B14X40C5000X	C5000X33	Concrete Re	40	14						560	466.67	466.67	28529.4	9146.67	74666.67	1306.67	3733.33	1960	5600	4.0415	11.547
B14X72C5000X	C5000X33	Concrete Re	72	14						1008	840	840	57789.6	16464	435456	2352	12096	3528	18144	4.0415	20.7846

Project:	MIMU
Date Updated:	11/12/2020

1	2	3	4	5	6	7	8	9	10	11
Copy Down With Import Label	**Beam Designations and Properties Imported from:**									
	Display -> Show Tables... -> Model -> Assignments -> Frame Assignments -> Frame Assignments - Summary (Selection Only) - (Load Cases don't matter), k-in									
	Story	Label	Unique Nai	Design Type	Length in	Analysis Section	Design Section	Max Station Spacing in	Min Number Stations	Releases
C2SL2	L2	C2	8	Column	180	ColDummy	N/A		3	
C3SL2	L2	C3	9	Column	180	ColDummy	N/A		3	
C4SL2	L2	C4	10	Column	180	ColDummy	N/A		3	
C2SL1	L1	C2	7	Column	116	ColDummy	N/A		3	
B1SL1	L1	B1	4	Beam	36	B14X40C5000X33	N/A	24		
B2SL1	L1	B2	5	Beam	36	B14X40C5000X33	N/A	24		
B3SL1	L1	B3	3	Beam	36	B14X40C5000X33	N/A	24		
B3SP1	P1	B3	1	Beam	36	B14X20C5000X33	N/A	24		
B4SP1	P1	B4	2	Beam	36	B14X20C5000X33	N/A	24		

Project:	MIMU
Date Updated:	11/12/2020

Copy Down With Import Label	Beam Forces Imported from: Display -> Show Tables... -> Analysis -> Results -> Frame Results -> Beam Forces (Selection Only) (Run Load Cases for X & Y Loads), k-in														
	1	2	3	4	5	6	7	8	9	10	11	12		1	2	3
	Story	Beam	Unique Nam	Load	Station in	P kip	V2 kip	V3 kip	T kip-in	M2 kip-in	M3 kip-in			Moment	Shear	
B1SL1LFXTP Max	L1	B1	4	FXTP Max	0	0	59.916	0	12.685	0	1224.135		B1SL1	1224	60	
B1SL1LFXTP Max	L1	B1	4	FXTP Max	18	0	59.916	0	12.685	0	175.067					
B1SL1LFXTP Max	L1	B1	4	FXTP Max	36	0	59.916	0	12.685	0	941.57					
B1SL1LFXTP Min	L1	B1	4	FXTP Min	0	0	-59.916	0	-12.685	0	-1224.14					
B1SL1LFXTP Min	L1	B1	4	FXTP Min	18	0	-59.916	0	-12.685	0	-175.067					
B1SL1LFXTP Min	L1	B1	4	FXTP Min	36	0	-59.916	0	-12.685	0	-941.57					
B1SL1LFXTN Max	L1	B1	4	FXTN Max	0	0	59.916	0	12.685	0	1224.135					
B1SL1LFXTN Max	L1	B1	4	FXTN Max	18	0	59.916	0	12.685	0	175.067					
B1SL1LFXTN Max	L1	B1	4	FXTN Max	36	0	59.916	0	12.685	0	941.57					
B1SL1LFXTN Min	L1	B1	4	FXTN Min	0	0	-59.916	0	-12.685	0	-1224.14					
B1SL1LFXTN Min	L1	B1	4	FXTN Min	18	0	-59.916	0	-12.685	0	-175.067					
B1SL1LFXTN Min	L1	B1	4	FXTN Min	36	0	-59.916	0	-12.685	0	-941.57					
B1SL1LFYTP Max	L1	B1	4	FYTP Max	0	0	53.66	0	11.36	0	1096.314					
B1SL1LFYTP Max	L1	B1	4	FYTP Max	18	0	53.66	0	11.36	0	156.787					
B1SL1LFYTP Max	L1	B1	4	FYTP Max	36	0	53.66	0	11.36	0	843.253					
B1SL1LFYTP Min	L1	B1	4	FYTP Min	0	0	-53.66	0	-11.36	0	-1096.31					
B1SL1LFYTP Min	L1	B1	4	FYTP Min	18	0	-53.66	0	-11.36	0	-156.787					
B1SL1LFYTP Min	L1	B1	4	FYTP Min	36	0	-53.66	0	-11.36	0	-843.253					
B1SL1LFYTN Max	L1	B1	4	FYTN Max	0	0	53.66	0	11.36	0	1096.314					
B1SL1LFYTN Max	L1	B1	4	FYTN Max	18	0	53.66	0	11.36	0	156.787					
B1SL1LFYTN Max	L1	B1	4	FYTN Max	36	0	53.66	0	11.36	0	843.253					
B1SL1LFYTN Min	L1	B1	4	FYTN Min	0	0	-53.66	0	-11.36	0	-1096.31					
B1SL1LFYTN Min	L1	B1	4	FYTN Min	18	0	-53.66	0	-11.36	0	-156.787					
B1SL1LFYTN Min	L1	B1	4	FYTN Min	36	0	-53.66	0	-11.36	0	-843.253					
B2SL1LFXTP Max	L1	B2	5	FXTP Max	0	0	54.441	0	4.708	0	943.205		B2SL1	1018	54	
B2SL1LFXTP Max	L1	B2	5	FXTP Max	18	0	54.441	0	4.708	0	75.208					
B2SL1LFXTP Max	L1	B2	5	FXTP Max	36	0	54.441	0	4.708	0	1017.782					
B2SL1LFXTP Min	L1	B2	5	FXTP Min	0	0	-54.441	0	-4.708	0	-943.205					
B2SL1LFXTP Min	L1	B2	5	FXTP Min	18	0	-54.441	0	-4.708	0	-75.208					
B2SL1LFXTP Min	L1	B2	5	FXTP Min	36	0	-54.441	0	-4.708	0	-1017.78					
B2SL1LFXTN Max	L1	B2	5	FXTN Max	0	0	54.441	0	4.708	0	943.205					
B2SL1LFXTN Max	L1	B2	5	FXTN Max	18	0	54.441	0	4.708	0	75.208					
B2SL1LFXTN Max	L1	B2	5	FXTN Max	36	0	54.441	0	4.708	0	1017.782					
B2SL1LFXTN Min	L1	B2	5	FXTN Min	0	0	-54.441	0	-4.708	0	-943.205					
B2SL1LFXTN Min	L1	B2	5	FXTN Min	18	0	-54.441	0	-4.708	0	-75.208					
B2SL1LFXTN Min	L1	B2	5	FXTN Min	36	0	-54.441	0	-4.708	0	-1017.78					
B2SL1LFYTP Max	L1	B2	5	FYTP Max	0	0	48.757	0	4.216	0	844.718					
B2SL1LFYTP Max	L1	B2	5	FYTP Max	18	0	48.757	0	4.216	0	67.355					
B2SL1LFYTP Max	L1	B2	5	FYTP Max	36	0	48.757	0	4.216	0	911.507					
B2SL1LFYTP Min	L1	B2	5	FYTP Min	0	0	-48.757	0	-4.216	0	-844.718					
B2SL1LFYTP Min	L1	B2	5	FYTP Min	18	0	-48.757	0	-4.216	0	-67.355					
B2SL1LFYTP Min	L1	B2	5	FYTP Min	36	0	-48.757	0	-4.216	0	-911.507					
B2SL1LFYTN Max	L1	B2	5	FYTN Max	0	0	48.757	0	4.216	0	844.718					
B2SL1LFYTN Max	L1	B2	5	FYTN Max	18	0	48.757	0	4.216	0	67.355					
B2SL1LFYTN Max	L1	B2	5	FYTN Max	36	0	48.757	0	4.216	0	911.507					
B2SL1LFYTN Min	L1	B2	5	FYTN Min	0	0	-48.757	0	-4.216	0	-844.718					
B2SL1LFYTN Min	L1	B2	5	FYTN Min	18	0	-48.757	0	-4.216	0	-67.355					
B2SL1LFYTN Min	L1	B2	5	FYTN Min	36	0	-48.757	0	-4.216	0	-911.507					
B3SL1LFXTP Max	L1	B3	3	FXTP Max	0	0	36.052	0	7.109	0	606.98		B3SL1	693	36	
B3SL1LFXTP Max	L1	B3	3	FXTP Max	18	0	36.052	0	7.109	0	57					
B3SL1LFXTP Max	L1	B3	3	FXTP Max	36	0	36.052	0	7.109	0	692.884					
B3SL1LFXTP Min	L1	B3	3	FXTP Min	0	0	-36.052	0	-7.109	0	-606.98					
B3SL1LFXTP Min	L1	B3	3	FXTP Min	18	0	-36.052	0	-7.109	0	-57					
B3SL1LFXTP Min	L1	B3	3	FXTP Min	36	0	-36.052	0	-7.109	0	-692.884					
B3SL1LFXTN Max	L1	B3	3	FXTN Max	0	0	36.052	0	7.109	0	606.98					
B3SL1LFXTN Max	L1	B3	3	FXTN Max	18	0	36.052	0	7.109	0	57					
B3SL1LFXTN Max	L1	B3	3	FXTN Max	36	0	36.052	0	7.109	0	692.884					
B3SL1LFXTN Min	L1	B3	3	FXTN Min	0	0	-36.052	0	-7.109	0	-606.98					
B3SL1LFXTN Min	L1	B3	3	FXTN Min	18	0	-36.052	0	-7.109	0	-57					
B3SL1LFXTN Min	L1	B3	3	FXTN Min	36	0	-36.052	0	-7.109	0	-692.884					
B3SL1LFYTP Max	L1	B3	3	FYTP Max	0	0	32.287	0	6.367	0	543.6					
B3SL1LFYTP Max	L1	B3	3	FYTP Max	18	0	32.287	0	6.367	0	51.049					
B3SL1LFYTP Max	L1	B3	3	FYTP Max	36	0	32.287	0	6.367	0	620.535					
B3SL1LFYTP Min	L1	B3	3	FYTP Min	0	0	-32.287	0	-6.367	0	-543.6					
B3SL1LFYTP Min	L1	B3	3	FYTP Min	18	0	-32.287	0	-6.367	0	-51.049					
B3SL1LFYTP Min	L1	B3	3	FYTP Min	36	0	-32.287	0	-6.367	0	-620.535					
B3SL1LFYTN Max	L1	B3	3	FYTN Max	0	0	32.287	0	6.367	0	543.6					
B3SL1LFYTN Max	L1	B3	3	FYTN Max	18	0	32.287	0	6.367	0	51.049					
B3SL1LFYTN Max	L1	B3	3	FYTN Max	36	0	32.287	0	6.367	0	620.535					
B3SL1LFYTN Min	L1	B3	3	FYTN Min	0	0	-32.287	0	-6.367	0	-543.6					
B3SL1LFYTN Min	L1	B3	3	FYTN Min	18	0	-32.287	0	-6.367	0	-51.049					
B3SL1LFYTN Min	L1	B3	3	FYTN Min	36	0	-32.287	0	-6.367	0	-620.535					
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B3SP1LFXTP Max	P1	B3	1	FXTP Max	18	0	6.799	0	6.436	0	6.766					
B3SP1LFXTP Max	P1	B3	1	FXTP Max	36	0	6.799	0	6.436	0	116.422					
B3SP1LFXTP Min	P1	B3	1	FXTP Min	0	0	-6.799	0	-6.436	0	-128.47					
B3SP1LFXTP Min	P1	B3	1	FXTP Min	18	0	-6.799	0	-6.436	0	-6.766					
B3SP1LFXTP Min	P1	B3	1	FXTP Min	36	0	-6.799	0	-6.436	0	-116.422					
B3SP1LFXTN Max	P1	B3	1	FXTN Max	0	0	6.799	0	6.436	0	128.47					
B3SP1LFXTN Max	P1	B3	1	FXTN Max	18	0	6.799	0	6.436	0	6.766					
B3SP1LFXTN Max	P1	B3	1	FXTN Max	36	0	6.799	0	6.436	0	116.422					
B3SP1LFXTN Min	P1	B3	1	FXTN Min	0	0	-6.799	0	-6.436	0	-128.47					
B3SP1LFXTN Min	P1	B3	1	FXTN Min	18	0	-6.799	0	-6.436	0	-6.766					
B3SP1LFXTN Min	P1	B3	1	FXTN Min	36	0	-6.799	0	-6.436	0	-116.422					
B3SP1LFYTP Max	P1	B3	1	FYTP Max	0	0	6.09	0	5.764	0	115.055					
B3SP1LFYTP Max	P1	B3	1	FYTP Max	18	0	6.09	0	5.764	0	6.059					
B3SP1LFYTP Max	P1	B3	1	FYTP Max	36	0	6.09	0	5.764	0	104.265					
B3SP1LFYTP Min	P1	B3	1	FYTP Min	0	0	-6.09	0	-5.764	0	-115.055					

B3SP1LFYTP Min	P1	B3	1 FYTP Min	18	0	-6.09	0	-5.764	0	-6.059			
B3SP1LFYTP Min	P1	B3	1 FYTP Min	36	0	-6.09	0	-5.764	0	-104.265			
B3SP1LFYTN Max	P1	B3	1 FYTN Max	0	0	6.09	0	5.764	0	115.055			
B3SP1LFYTN Max	P1	B3	1 FYTN Max	18	0	6.09	0	5.764	0	6.059			
B3SP1LFYTN Max	P1	B3	1 FYTN Max	36	0	6.09	0	5.764	0	104.265			
B3SP1LFYTN Min	P1	B3	1 FYTN Min	0	0	-6.09	0	-5.764	0	-115.055			
B3SP1LFYTN Min	P1	B3	1 FYTN Min	18	0	-6.09	0	-5.764	0	-6.059			
B3SP1LFYTN Min	P1	B3	1 FYTN Min	36	0	-6.09	0	-5.764	0	-104.265			
B4SP1LFXTP Max	P1	B4	2 FXTP Max	0	0	5.769	0	5.123	0	120.538	B4SP1	121	6
B4SP1LFXTP Max	P1	B4	2 FXTP Max	18	0	5.769	0	5.123	0	18.103			
B4SP1LFXTP Max	P1	B4	2 FXTP Max	36	0	5.769	0	5.123	0	88.37			
B4SP1LFXTP Min	P1	B4	2 FXTP Min	0	0	-5.769	0	-5.123	0	-120.538			
B4SP1LFXTP Min	P1	B4	2 FXTP Min	18	0	-5.769	0	-5.123	0	-18.103			
B4SP1LFXTP Min	P1	B4	2 FXTP Min	36	0	-5.769	0	-5.123	0	-88.37			
B4SP1LFXTN Max	P1	B4	2 FXTN Max	0	0	5.769	0	5.123	0	120.538			
B4SP1LFXTN Max	P1	B4	2 FXTN Max	18	0	5.769	0	5.123	0	18.103			
B4SP1LFXTN Max	P1	B4	2 FXTN Max	36	0	5.769	0	5.123	0	88.37			
B4SP1LFXTN Min	P1	B4	2 FXTN Min	0	0	-5.769	0	-5.123	0	-120.538			
B4SP1LFXTN Min	P1	B4	2 FXTN Min	18	0	-5.769	0	-5.123	0	-18.103			
B4SP1LFXTN Min	P1	B4	2 FXTN Min	36	0	-5.769	0	-5.123	0	-88.37			
B4SP1LFYTP Max	P1	B4	2 FYTP Max	0	0	5.167	0	4.588	0	107.951			
B4SP1LFYTP Max	P1	B4	2 FYTP Max	18	0	5.167	0	4.588	0	16.213			
B4SP1LFYTP Max	P1	B4	2 FYTP Max	36	0	5.167	0	4.588	0	79.142			
B4SP1LFYTP Min	P1	B4	2 FYTP Min	0	0	-5.167	0	-4.588	0	-107.951			
B4SP1LFYTP Min	P1	B4	2 FYTP Min	18	0	-5.167	0	-4.588	0	-16.213			
B4SP1LFYTP Min	P1	B4	2 FYTP Min	36	0	-5.167	0	-4.588	0	-79.142			
B4SP1LFYTN Max	P1	B4	2 FYTN Max	0	0	5.167	0	4.588	0	107.951			
B4SP1LFYTN Max	P1	B4	2 FYTN Max	18	0	5.167	0	4.588	0	16.213			
B4SP1LFYTN Max	P1	B4	2 FYTN Max	36	0	5.167	0	4.588	0	79.142			
B4SP1LFYTN Min	P1	B4	2 FYTN Min	0	0	-5.167	0	-4.588	0	-107.951			
B4SP1LFYTN Min	P1	B4	2 FYTN Min	18	0	-5.167	0	-4.588	0	-16.213			
B4SP1LFYTN Min	P1	B4	2 FYTN Min	36	0	-5.167	0	-4.588	0	-79.142			

Project:	MIMU
Date Updated:	11/12/2020

Lamba = 1 fy = 60

Copy Down	Beam Designations and Properties Imported from							These calcs needed to be copied down to match all rows which have imported data, but not further.									These calcs needed to be copied down to match all rows which have imported data, but not further.						
With Import	Display -> Show Tables... -> Model -> Assignments -> Frame Assignments -> Frame Assignments - Sections																						
Label	(Selection Only) - (Load Cases don't matter), k-in							f'c	Height	Width	Vu Max Shear	Mu Max Moment	Vu/ Sqrt(f'c)bh	Overstress ID			ln	Aspect Ratio ln/h	Acw	V (max)	Beam Type	alpha	Avd req
	Story	Label	Unique Name	Design Type	Section Type	AnalysisSect	DesignProc	DesignSect	ksi	in	in	k	k-ft					in		in^2	k			
B1SL1	L1	B1	4	Beam	Concrete R	B14X40C5000	Concrete Frame Design	N/A	5	40	14	60	102	1.5			36	0.90	560	158.4	Either	43.36342	0.776143
B2SL1	L1	B2	5	Beam	Concrete R	B14X40C5000	Concrete Frame Design	N/A	5	40	14	54	85	1.4			36	0.90	560	158.4	Either	43.36342	0.705221
B3SL1	L1	B3	3	Beam	Concrete R	B14X40C5000	Concrete Frame Design	N/A	5	40	14	36	58	0.9			36	0.90	560	158.4	Either	43.36342	0.467012
B3SP1	P1	B3	1	Beam	Concrete R	B14X20C5000	Concrete Frame Design	N/A	5	20	14	7	11	0.3			36	1.80	280	79.2	Either	25.27772	0.151088
B4SP1	P1	B4	2	Beam	Concrete R	B14X20C5000	Concrete Frame Design	N/A	5	20	14	6	10	0.3			36	1.80	280	79.2	Either	25.27772	0.128199

Hycroft

Flexural Demand in Wall Piers

KR

11/13/2020

Section # **17**

Section ID **PPCSOUTH-L1**

SFX	1.000
SFY	1.000
Sds	0.920

LC	P kip	Mxx kip-ft	Myy kip-ft
1	6116	54728	-36695
2	10019	101096	-63013
3	7537	68244	-37575
4	7537	68244	-37575
5	7540	73828	-54701
6	7540	73828	-54701
7	7539	56622	-46885
8	7539	56622	-46885
9	7538	85450	-45392
10	7538	85450	-45392
11	3126	25197	-10204
12	3126	25197	-10204
13	3129	30782	-27330
14	3129	30782	-27330
15	3128	13575	-19513
16	3128	13575	-19513
17	3127	42404	-18020
18	3127	42404	-18020
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
31	0	0	0
32	0	0	0
33	0	0	0
34	0	0	0
35	0	0	0
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	0	0	0
41	0	0	0
42	0	0	0
43	0	0	0
44	0	0	0
45	0	0	0
46	0	0	0
47	0	0	0
48	0	0	0
49	0	0	0
50	0	0	0
51	0	0	0
52	0	0	0
53	0	0	0
54	0	0	0
55	0	0	0
56	0	0	0
57	0	0	0
58	0	0	0
59	0	0	0
60	0	0	0
61	0	0	0
62	0	0	0
63	0	0	0
64	0	0	0
65	0	0	0
66	0	0	0

DEAD	LIVE	EQX	EQY	AXTP	AYTP	-	-	-	-
1.4									
1.2	1.6								
1.38	0.5	1		1					
1.38	0.5	1		-1					
1.38	0.5	-1		1					
1.38	0.5	-1		-1					
1.38	0.5		1		1				
1.38	0.5		1		-1				
1.38	0.5		-1		1				
1.38	0.5		-1		-1				
0.72		1		1					
0.72		1		-1					
0.72		-1		1					
0.72		-1		-1					
0.72			1		1				
0.72			1		-1				
0.72			-1		1				
0.72			-1		-1				

	P kip	Mxx kip-ft	Myy kip-ft
D	0	0	0
L	0	0	0
Dead	4368	39091	-26211
Live	2986	33867	-19725
PECTX MA	-5	-25259	-20473
PECTY MA	-4	-22621	-18335
AXTP	0	0	0
AYTP	0	0	0
SOIL	0	0	0
EQX	-2	-2792	8563
EQY	0	-14414	-747
-			
-			
-			
EQX	-5	-25259	20473
EQY	4	-22621	-18335

	LC for value	LC for sign
SPECTX Ma	EQX	
SPECTY Ma	EQY	

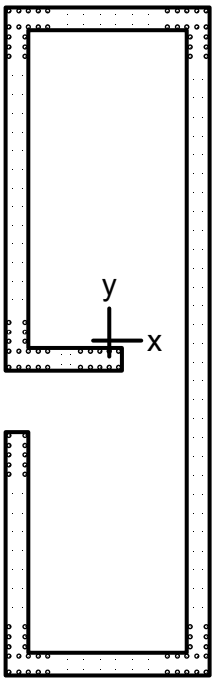
Pier ID	Index
PPL-L2	1
PPL-L1	2
PL-P1	3
PP11W-L2	4
PP11W-L1	5
PP11W-P1	6
PP11E-L2	7
PP11E-L1	8
PP11E-P1	9
PPCWEST-L2	10
PPCWEST-L1	11
PPCWEST-P1	12
PPCEAST-L2	13
PPCEAST-L1	14
PPCEAST-P1	15
PPCSOUTH-L2	16
PPCSOUTH-L1	17
PPCSOUTH-P1	18
PP7W-L2	19
PP7W-L3	20
PP7W-L4	21
PP7M-L2	22
PP7M-L1	23
PP7M-P1	24
PP7E-L2	25
P7E-L1	26
PP7E-P1	27
PPL-L2	28
PPL-L1	29
PPL-P1	30

Show on Screen
- ○ Top of Pier
- ◉ Bottom of Pier

Send to Generated File
- ○ Top of Pier
- ○ Bottom of Pier
- ◉ Top and Bottom of Pier

P-M-M enveloping
- ○ Use calcd combinations
- ◉ Envelope all possible P-M-M

Scale factor for moments	1/12	(typically 1/12, ETABS is in kip-in, PCAcol wants kip-ft)
# LC to include in generated file:	34	(input the number of load cases filled out in the table above)
Generated file output directory	C:\Temp\	(don't forget the slash at the end)
First section to generate number	1	(typically 1 to generate all sections)
Last section to generate number	141	(typically the number of sections to generate all sections)
Section Orientation	90	(do not change - determined from the "PierProp" sheet)



126 x 412 in

Code: ACI 318-14

Units: English

Run axis: Biaxial

Run option: Investigation

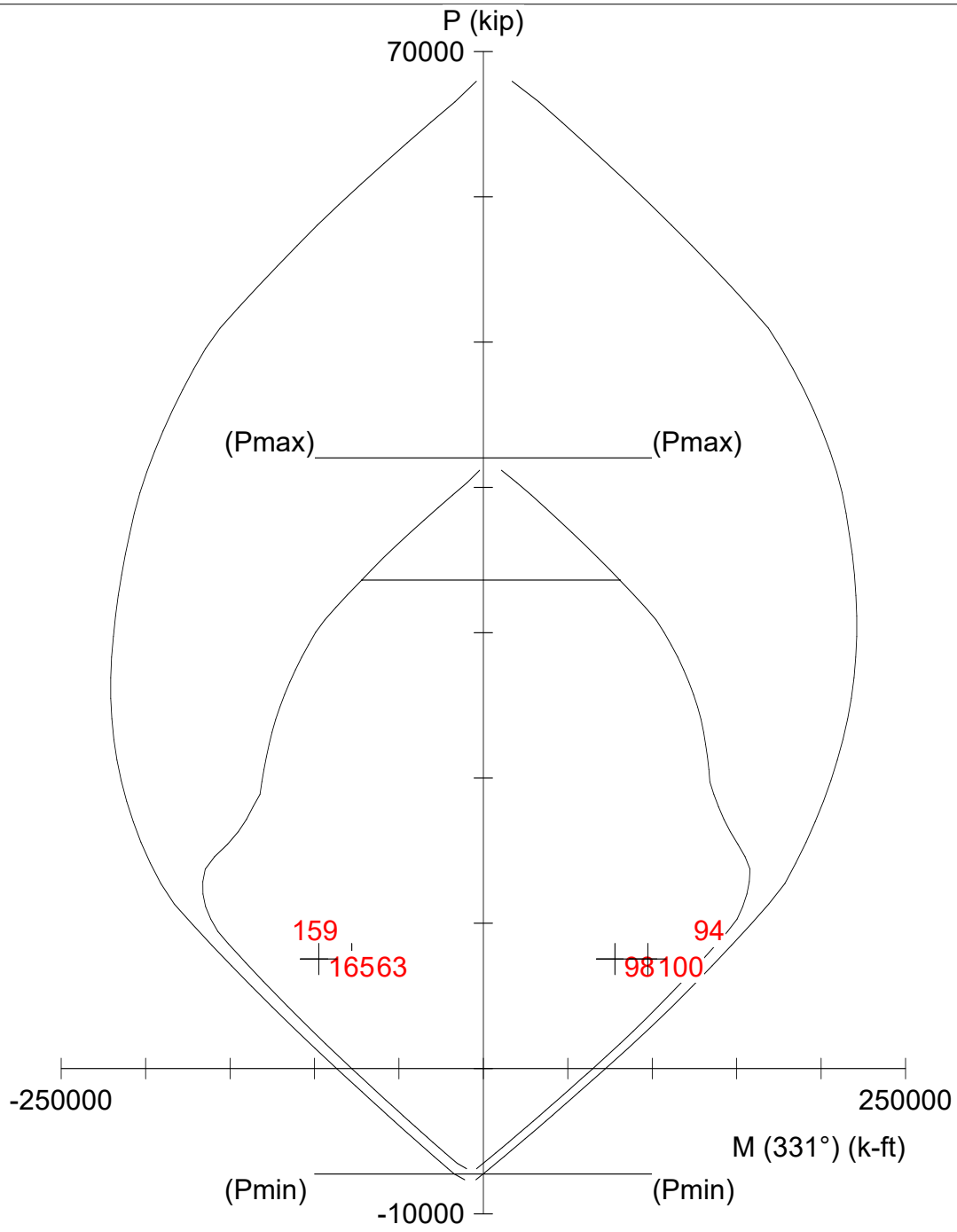
Slenderness: Not considered

Column type: Architectural

Bars: ASTM A615

Date: 11/13/20

Time: 01:52:11



File: C:\Users\krothrock\Documents_work_Projects\Hycroft MI 19028\Lateral\PM\PCSOUTH-L1.col

Project: Hycroft

Column: PCSOUTH-L1

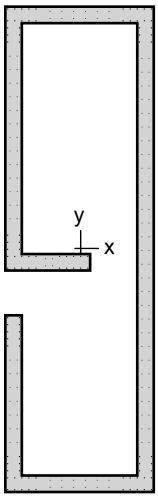
Engineer: KR

f'c = 5 ksi	fy = 60 ksi	Ag = 14560 in^2	226 bars
Ec = 4031 ksi	Es = 29000 ksi	As = 134.44 in^2	rho = 0.92%
fc = 4.25 ksi	e_yt = 0.00206897 in/in	Xo = -0.00 in	Ix = 2.71202e+008 in^4
e_u = 0.003 in/in		Yo = -0.00 in	Iy = 3.74242e+007 in^4
Beta1 = 0.8		Min clear spacing = 5.00 in	Clear cover = N/A

Confinement: Tied

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

spColumn v7.00
Computer program for the Strength Design of Reinforced Concrete Sections



Contents

List of Figures

1. General Information

File Name	C:\Users\krothrock\Documents_w...\PCSOUTH-L1.col
Project	Hycroft
Column	PCSOUTH-L1
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	5	ksi
E_c	4030.51	ksi
f_c	4.25	ksi
ε_u	0.003	in/in
β_1	0.8	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{yt}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	14560	in^2
I_x	2.71202e+008	in^4
I_y	3.74242e+007	in^4
r_x	136.479	in
r_y	50.6986	in
X_o	0	in
Y_o	0	in

3.2. Section Figure

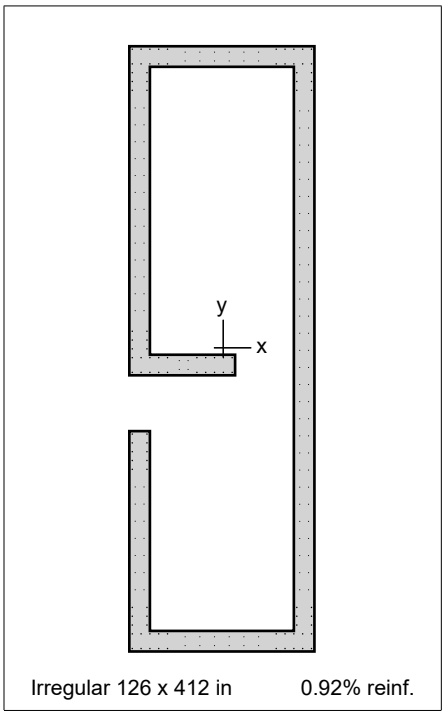


Figure 1: Column section

3.3. Exterior Points

Points	X	Y	Points	X	Y	Points	X	Y
	in	in		in	in		in	in
1	-63.9	-206.7	2	-63.9	-56.7	3	-49.9	-56.7
4	-49.9	-192.7	5	48.1	-192.7	6	48.1	191.3
7	-49.9	191.3	8	-49.9	-4.7	9	8.1	-4.7
10	8.1	-18.7	11	-63.9	-18.7	12	-63.9	205.3
13	62.1	205.3	14	62.1	-206.7			

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter	Area	Bar	Diameter	Area	Bar	Diameter	Area
	in	in^2		in	in^2		in	in^2
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9

Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Total steel area, A_s	134.44 in^2
Rho	0.92 %
Minimum clear spacing	5.00 in

(Note: Rho < 1.0%)

4.4. Bars Provided

Area	X	Y	Area	X	Y	Area	X	Y
in^2	in	in	in^2	in	in	in^2	in	in
0.79	-61.9	-204.7	0.79	-55.9	-204.7	0.79	-49.9	-204.7
0.79	-43.9	-204.7	0.79	-37.9	-204.7	0.79	-37.9	-194.7
0.79	-43.9	-194.7	0.79	-49.9	-194.7	0.79	-55.9	-194.7
0.79	-61.9	-194.7	0.79	60.1	-194.7	0.79	54.1	-194.7
0.79	48.1	-194.7	0.79	42.1	-194.7	0.79	36.1	-194.7
0.79	36.1	-204.7	0.79	42.1	-204.7	0.79	48.1	-204.7
0.79	54.1	-204.7	0.79	60.1	-204.7	0.79	6.1	-6.7
0.79	0.1	-6.7	0.79	-5.9	-6.7	0.79	-11.9	-6.7
0.79	-17.9	-6.7	0.79	-17.9	-16.7	0.79	-11.9	-16.7
0.79	-5.9	-16.7	0.79	0.1	-16.7	0.79	6.1	-16.7
0.79	-61.9	-6.7	0.79	-55.9	-6.7	0.79	-49.9	-6.7
0.79	-43.9	-6.7	0.79	-37.9	-6.7	0.79	-37.9	-16.7
0.79	-43.9	-16.7	0.79	-49.9	-16.7	0.79	-55.9	-16.7
0.79	-61.9	-16.7	0.79	-61.9	203.3	0.79	-55.9	203.3
0.79	-49.9	203.3	0.79	-43.9	203.3	0.79	-37.9	203.3
0.79	-37.9	193.3	0.79	-43.9	193.3	0.79	-49.9	193.3
0.79	-55.9	193.3	0.79	-61.9	193.3	0.79	60.1	203.3
0.79	54.1	203.3	0.79	48.1	203.3	0.79	42.1	203.3
0.79	36.1	203.3	0.79	36.1	193.3	0.79	42.1	193.3
0.79	48.1	193.3	0.79	54.1	193.3	0.79	60.1	193.3
0.79	-61.9	175.3	0.79	-61.9	181.3	0.79	-61.9	187.3
0.79	-51.9	175.3	0.79	-51.9	181.3	0.79	-51.9	187.3
0.79	50.1	175.3	0.79	50.1	181.3	0.79	50.1	187.3
0.79	60.1	175.3	0.79	60.1	181.3	0.79	60.1	187.3
0.79	-61.9	-0.7	0.79	-61.9	5.3	0.79	-61.9	11.3
0.79	-51.9	-0.7	0.79	-51.9	5.3	0.79	-51.9	11.3
0.79	-61.9	-188.7	0.79	-61.9	-182.7	0.79	-61.9	-176.7
0.79	-51.9	-188.7	0.79	-51.9	-182.7	0.79	-51.9	-176.7
0.79	50.1	-188.7	0.79	50.1	-182.7	0.79	50.1	-176.7
0.79	60.1	-188.7	0.79	60.1	-182.7	0.79	60.1	-176.7
0.79	-61.9	-58.7	0.79	-51.9	-58.7	0.79	-51.9	-64.7
0.79	-51.9	-70.7	0.79	-51.9	-76.7	0.79	-51.9	-82.7
0.79	-61.9	-82.7	0.79	-61.9	-76.7	0.79	-61.9	-70.7
0.79	-61.9	-64.7	0.44	-59.9	-164.7	0.44	-59.9	-153.1
0.44	-59.9	-141.4	0.44	-59.9	-129.7	0.44	-59.9	-118.1
0.44	-59.9	-106.4	0.44	-59.9	-94.7	0.44	-53.9	-164.7
0.44	-53.9	-153.1	0.44	-53.9	-141.4	0.44	-53.9	-129.7

Area	X	Y	Area	X	Y	Area	X	Y
in²	in	in	in²	in	in	in²	in	in
0.44	-53.9	-118.1	0.44	-53.9	-106.4	0.44	-53.9	-94.7
0.44	-29.9	-8.7	0.44	-23.9	-8.7	0.44	-29.9	-14.7
0.44	-23.9	-14.7	0.44	-25.9	-196.7	0.44	-15.9	-196.7
0.44	-5.9	-196.7	0.44	4.1	-196.7	0.44	14.1	-196.7
0.44	24.1	-196.7	0.44	-25.9	-202.7	0.44	-15.9	-202.7
0.44	-5.9	-202.7	0.44	4.1	-202.7	0.44	14.1	-202.7
0.44	24.1	-202.7	0.44	52.1	-164.7	0.44	52.1	-153.1
0.44	52.1	-141.5	0.44	52.1	-129.8	0.44	52.1	-118.2
0.44	52.1	-106.5	0.44	52.1	-94.9	0.44	52.1	-83.2
0.44	52.1	-71.6	0.44	52.1	-60.0	0.44	52.1	-48.3
0.44	52.1	-36.7	0.44	52.1	-25.0	0.44	52.1	-13.4
0.44	52.1	-1.7	0.44	52.1	9.9	0.44	52.1	21.5
0.44	52.1	33.2	0.44	52.1	44.8	0.44	52.1	56.5
0.44	52.1	68.1	0.44	52.1	79.8	0.44	52.1	91.4
0.44	52.1	103.0	0.44	52.1	114.7	0.44	52.1	126.3
0.44	52.1	138.0	0.44	52.1	149.6	0.44	52.1	161.3
0.44	58.1	-164.7	0.44	58.1	-153.1	0.44	58.1	-141.5
0.44	58.1	-129.8	0.44	58.1	-118.2	0.44	58.1	-106.5
0.44	58.1	-94.9	0.44	58.1	-83.2	0.44	58.1	-71.6
0.44	58.1	-60.0	0.44	58.1	-48.3	0.44	58.1	-36.7
0.44	58.1	-25.0	0.44	58.1	-13.4	0.44	58.1	-1.7
0.44	58.1	9.9	0.44	58.1	21.5	0.44	58.1	33.2
0.44	58.1	44.8	0.44	58.1	56.5	0.44	58.1	68.1
0.44	58.1	79.8	0.44	58.1	91.4	0.44	58.1	103.0
0.44	58.1	114.7	0.44	58.1	126.3	0.44	58.1	138.0
0.44	58.1	149.6	0.44	58.1	161.3	0.44	-25.9	195.3
0.44	-15.9	195.3	0.44	-5.9	195.3	0.44	4.1	195.3
0.44	14.1	195.3	0.44	24.1	195.3	0.44	-25.9	201.3
0.44	-15.9	201.3	0.44	-5.9	201.3	0.44	4.1	201.3
0.44	14.1	201.3	0.44	24.1	201.3	0.44	-59.9	25.3
0.44	-59.9	36.8	0.44	-59.9	48.3	0.44	-59.9	59.8
0.44	-59.9	71.3	0.44	-59.9	82.8	0.44	-59.9	94.3
0.44	-59.9	105.8	0.44	-59.9	117.3	0.44	-59.9	128.8
0.44	-59.9	140.3	0.44	-59.9	151.8	0.44	-59.9	163.3
0.44	-53.9	25.3	0.44	-53.9	36.8	0.44	-53.9	48.3
0.44	-53.9	59.8	0.44	-53.9	71.3	0.44	-53.9	82.8
0.44	-53.9	94.3	0.44	-53.9	105.8	0.44	-53.9	117.3
0.44	-53.9	128.8	0.44	-53.9	140.3	0.44	-53.9	151.8
0.44	-53.9	163.3						

5. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Moment Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	5899.30	54948.00	54958.50	5899.30	64741.73	64754.11	28.46	0.02407	0.900	0.85
2	7323.00	68657.20	61147.00	7323.00	78959.58	70322.45	35.07	0.01894	0.900	0.87
3	7323.00	68657.20	61147.00	7323.00	78959.58	70322.45	35.07	0.01894	0.900	0.87
4	7325.10	81076.30	69552.00	7325.10	81828.18	70197.01	35.98	0.01836	0.900	0.99
5	7325.10	81076.30	69552.00	7325.10	81828.18	70197.01	35.98	0.01836	0.900	0.99
6	7324.50	62222.70	68277.10	7324.50	64701.04	70996.59	30.59	0.02178	0.900	0.96
7	7324.50	62222.70	68277.10	7324.50	64701.04	70996.59	30.59	0.02178	0.900	0.96
8	3018.90	31094.20	35874.80	3018.90	45562.45	52567.50	19.74	0.03538	0.900	0.68

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
9	3018.90	31094.20	35874.80	3018.90	45562.45	52567.50	19.74	0.03538	0.900	0.68
10	3015.30	25109.70	20339.90	3015.30	63981.98	51828.07	24.74	0.02931	0.900	0.39
11	3015.30	25109.70	20339.90	3015.30	63981.98	51828.07	24.74	0.02931	0.900	0.39
12	3017.40	37528.80	28744.80	3017.40	67498.30	51699.64	25.69	0.02815	0.900	0.56
13	3017.40	37528.80	28744.80	3017.40	67498.30	51699.64	25.69	0.02815	0.900	0.56
14	3016.80	18675.10	27469.90	3016.80	35986.36	52933.68	17.14	0.03855	0.900	0.52
15	3016.80	18675.10	27469.90	3016.80	35986.36	52933.68	17.14	0.03855	0.900	0.52
16	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
17	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
18	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
19	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
20	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
21	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
22	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
23	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
24	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
25	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
26	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
27	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
28	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
29	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
30	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
31	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
32	6115.60	54728.00	36694.90	6115.60	95937.80	64325.92	38.09	0.01672	0.900	0.57
33	10019.30	101096.40	63013.30	10019.30	126659.24	78946.60	57.44	0.00789	0.900	0.80
34	7540.40	73828.10	54701.20	7540.40	95134.05	70487.35	40.59	0.01549	0.900	0.78
35	7540.40	73828.10	54701.20	7540.40	95134.05	70487.35	40.59	0.01549	0.900	0.78
36	7536.80	68243.70	37575.10	7536.80	125387.56	69038.61	50.18	0.00957	0.900	0.54
37	7536.80	68243.70	37575.10	7536.80	125387.56	69038.61	50.18	0.00957	0.900	0.54
38	7538.90	85450.20	46884.70	7538.90	125806.65	69027.42	50.32	0.00949	0.900	0.68
39	7538.90	85450.20	46884.70	7538.90	125806.65	69027.42	50.32	0.00949	0.900	0.68
40	7538.30	56621.60	45391.60	7538.30	88317.91	70801.45	38.42	0.01683	0.900	0.64
41	7538.30	56621.60	45391.60	7538.30	88317.91	70801.45	38.42	0.01683	0.900	0.64
42	3129.50	30781.70	27329.80	3129.50	59175.54	52539.52	23.55	0.03066	0.900	0.52
43	3129.50	30781.70	27329.80	3129.50	59175.54	52539.52	23.55	0.03066	0.900	0.52
44	3125.90	25197.30	10203.80	3125.90	121587.62	49237.64	45.04	0.01116	0.900	0.21
45	3125.90	25197.30	10203.80	3125.90	121587.62	49237.64	45.04	0.01116	0.900	0.21
46	3128.00	42403.80	19513.40	3128.00	109820.45	50537.22	37.34	0.01424	0.900	0.39
47	3128.00	42403.80	19513.40	3128.00	109820.45	50537.22	37.34	0.01424	0.900	0.39
48	3127.40	13575.20	18020.30	3127.40	40137.38	53280.08	18.36	0.03684	0.900	0.34
49	3127.40	13575.20	18020.30	3127.40	40137.38	53280.08	18.36	0.03684	0.900	0.34
50	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
51	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
52	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
53	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
54	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
55	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
56	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
57	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
58	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
59	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
60	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
61	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
62	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
63	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
64	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
65	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
66	5899.30	54948.00	-54958.50	5899.30	58839.50	-58850.74	28.04	0.02423	0.900	0.93
67	7323.00	68657.20	-61147.00	7323.00	72332.23	-64420.03	35.23	0.01897	0.900	0.95
68	7323.00	68657.20	-61147.00	7323.00	72332.23	-64420.03	35.23	0.01897	0.900	0.95
69	3018.90	31094.20	-35874.80	3018.90	40371.63	-46578.59	18.40	0.03590	0.900	0.77
70	3018.90	31094.20	-35874.80	3018.90	40371.63	-46578.59	18.40	0.03590	0.900	0.77
71	3015.30	25109.70	-20339.90	3015.30	56684.36	-45916.66	22.66	0.03078	0.900	0.44
72	3015.30	25109.70	-20339.90	3015.30	56684.36	-45916.66	22.66	0.03078	0.900	0.44
73	3017.40	37528.80	-28744.80	3017.40	59799.99	-45803.20	23.48	0.02980	0.900	0.63
74	3017.40	37528.80	-28744.80	3017.40	59799.99	-45803.20	23.48	0.02980	0.900	0.63
75	3016.80	18675.10	-27469.90	3016.80	31887.25	-46904.14	16.19	0.03857	0.900	0.59
76	3016.80	18675.10	-27469.90	3016.80	31887.25	-46904.14	16.19	0.03857	0.900	0.59
77	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
78	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
79	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
80	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
81	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
82	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
83	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
84	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
85	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
86	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
87	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
88	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
89	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
90	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
91	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
92	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
93	6115.60	54728.00	-36694.90	6115.60	87135.95	-58424.37	37.25	0.01767	0.900	0.63
94	10019.30	101096.40	-63013.30	10019.30	117139.62	-73012.94	57.17	0.00845	0.900	0.86
95	7540.40	73828.10	-54701.20	7540.40	87136.80	-64561.98	40.63	0.01584	0.900	0.85
96	7540.40	73828.10	-54701.20	7540.40	87136.80	-64561.98	40.63	0.01584	0.900	0.85
97	7536.80	68243.70	-37575.10	7536.80	114548.13	-63070.29	49.80	0.01061	0.900	0.60
98	7536.80	68243.70	-37575.10	7536.80	114548.13	-63070.29	49.80	0.01061	0.900	0.60
99	7538.90	85450.20	-46884.70	7538.90	114928.63	-63058.79	49.93	0.01054	0.900	0.74
100	7538.90	85450.20	-46884.70	7538.90	114928.63	-63058.79	49.93	0.01054	0.900	0.74
101	7538.30	56621.60	-45391.60	7538.30	80940.90	-64887.54	38.55	0.01702	0.900	0.70
102	7538.30	56621.60	-45391.60	7538.30	80940.90	-64887.54	38.55	0.01702	0.900	0.70
103	3129.50	30781.70	-27329.80	3129.50	52498.12	-46610.89	21.70	0.03183	0.900	0.59
104	3129.50	30781.70	-27329.80	3129.50	52498.12	-46610.89	21.70	0.03183	0.900	0.59
105	3125.90	25197.30	-10203.80	3125.90	109460.65	-44326.77	36.63	0.01423	0.900	0.23
106	3125.90	25197.30	-10203.80	3125.90	109460.65	-44326.77	36.63	0.01423	0.900	0.23
107	3128.00	42403.80	-19513.40	3128.00	97389.54	-44816.75	33.47	0.01796	0.900	0.44
108	3128.00	42403.80	-19513.40	3128.00	97389.54	-44816.75	33.47	0.01796	0.900	0.44
109	3127.40	13575.20	-18020.30	3127.40	35612.37	-47273.40	17.28	0.03705	0.900	0.38
110	3127.40	13575.20	-18020.30	3127.40	35612.37	-47273.40	17.28	0.03705	0.900	0.38
111	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
112	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
113	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
114	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00

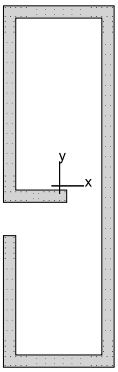
No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
115	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
116	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
117	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
118	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
119	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
120	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
121	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
122	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
123	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
124	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
125	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
126	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
127	5899.30	-54948.00	54958.50	5899.30	-64868.32	64880.72	27.60	0.02474	0.900	0.85
128	7323.00	-68657.20	61147.00	7323.00	-79100.59	70448.01	34.23	0.01948	0.900	0.87
129	7323.00	-68657.20	61147.00	7323.00	-79100.59	70448.01	34.23	0.01948	0.900	0.87
130	7325.10	-81076.30	69552.00	7325.10	-81974.26	70322.31	35.14	0.01890	0.900	0.99
131	7325.10	-81076.30	69552.00	7325.10	-81974.26	70322.31	35.14	0.01890	0.900	0.99
132	7324.50	-62222.70	68277.10	7324.50	-64816.69	71123.50	29.74	0.02233	0.900	0.96
133	7324.50	-62222.70	68277.10	7324.50	-64816.69	71123.50	29.74	0.02233	0.900	0.96
134	3018.90	-31094.20	35874.80	3018.90	-45676.30	52698.85	18.83	0.03650	0.900	0.68
135	3018.90	-31094.20	35874.80	3018.90	-45676.30	52698.85	18.83	0.03650	0.900	0.68
136	3015.30	-25109.70	20339.90	3015.30	-64141.70	51957.45	23.85	0.03041	0.900	0.39
137	3015.30	-25109.70	20339.90	3015.30	-64141.70	51957.45	23.85	0.03041	0.900	0.39
138	3017.40	-37528.80	28744.80	3017.40	-67666.72	51828.65	24.81	0.02925	0.900	0.55
139	3017.40	-37528.80	28744.80	3017.40	-67666.72	51828.65	24.81	0.02925	0.900	0.55
140	3016.80	-18675.10	27469.90	3016.80	-36076.38	53066.06	16.22	0.03967	0.900	0.52
141	3016.80	-18675.10	27469.90	3016.80	-36076.38	53066.06	16.22	0.03967	0.900	0.52
142	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
143	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
144	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
145	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
146	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
147	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
148	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
149	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
150	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
151	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
152	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
153	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
154	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
155	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
156	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
157	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
158	6115.60	-54728.00	36694.90	6115.60	-96121.80	64449.26	37.26	0.01736	0.900	0.57
159	10019.30	-101096.40	63013.30	10019.30	-126938.15	79120.45	56.74	0.00823	0.900	0.80
160	7540.40	-73828.10	54701.20	7540.40	-95303.57	70612.94	39.77	0.01601	0.900	0.77
161	7540.40	-73828.10	54701.20	7540.40	-95303.57	70612.94	39.77	0.01601	0.900	0.77
162	7536.80	-68243.70	37575.10	7536.80	-125611.17	69161.70	49.38	0.01008	0.900	0.54
163	7536.80	-68243.70	37575.10	7536.80	-125611.17	69161.70	49.38	0.01008	0.900	0.54
164	7538.90	-85450.20	46884.70	7538.90	-126031.03	69150.53	49.52	0.01000	0.900	0.68
165	7538.90	-85450.20	46884.70	7538.90	-126031.03	69150.53	49.52	0.01000	0.900	0.68
166	7538.30	-56621.60	45391.60	7538.30	-88475.24	70927.55	37.59	0.01735	0.900	0.64
167	7538.30	-56621.60	45391.60	7538.30	-88475.24	70927.55	37.59	0.01735	0.900	0.64

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
168	3129.50	-30781.70	27329.80	3129.50	-59322.06	52669.63	22.65	0.03174	0.900	0.52
169	3129.50	-30781.70	27329.80	3129.50	-59322.06	52669.63	22.65	0.03174	0.900	0.52
170	3125.90	-25197.30	10203.80	3125.90	-122934.27	49782.94	41.95	0.01145	0.900	0.20
171	3125.90	-25197.30	10203.80	3125.90	-122934.27	49782.94	41.95	0.01145	0.900	0.20
172	3128.00	-42403.80	19513.40	3128.00	-110092.01	50662.19	36.48	0.01528	0.900	0.39
173	3128.00	-42403.80	19513.40	3128.00	-110092.01	50662.19	36.48	0.01528	0.900	0.39
174	3127.40	-13575.20	18020.30	3127.40	-40236.85	53412.13	17.45	0.03794	0.900	0.34
175	3127.40	-13575.20	18020.30	3127.40	-40236.85	53412.13	17.45	0.03794	0.900	0.34
176	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
177	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
178	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
179	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
180	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
181	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
182	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
183	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
184	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
185	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
186	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
187	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
188	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
189	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
190	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
191	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
192	5899.30	-54948.00	-54958.50	5899.30	-59388.57	-59399.92	25.41	0.02544	0.900	0.93
193	7323.00	-68657.20	-61147.00	7323.00	-73199.40	-65192.34	31.52	0.02025	0.900	0.94
194	7323.00	-68657.20	-61147.00	7323.00	-73199.40	-65192.34	31.52	0.02025	0.900	0.94
195	3018.90	-31094.20	-35874.80	3018.90	-40566.41	-46803.35	17.21	0.03735	0.900	0.77
196	3018.90	-31094.20	-35874.80	3018.90	-40566.41	-46803.35	17.21	0.03735	0.900	0.77
197	3015.30	-25109.70	-20339.90	3015.30	-56955.61	-46136.43	21.62	0.03205	0.900	0.44
198	3015.30	-25109.70	-20339.90	3015.30	-56955.61	-46136.43	21.62	0.03205	0.900	0.44
199	3017.40	-37528.80	-28744.80	3017.40	-60086.04	-46022.30	22.47	0.03103	0.900	0.62
200	3017.40	-37528.80	-28744.80	3017.40	-60086.04	-46022.30	22.47	0.03103	0.900	0.62
201	3016.80	-18675.10	-27469.90	3016.80	-32041.56	-47131.16	14.91	0.04012	0.900	0.58
202	3016.80	-18675.10	-27469.90	3016.80	-32041.56	-47131.16	14.91	0.04012	0.900	0.58
203	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
204	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
205	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
206	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
207	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
208	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
209	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
210	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
211	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
212	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
213	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
214	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
215	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
216	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
217	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
218	0.00	0.00	0.00	0.00	118484.17	0.00	19.99	0.06602	0.900	0.00
219	6115.60	-54728.00	-36694.90	6115.60	-88172.42	-59119.29	34.10	0.01879	0.900	0.62
220	10019.30	-101096.40	-63013.30	10019.30	-118614.24	-73932.20	53.04	0.00965	0.900	0.85

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
221	7540.40	-73828.10	-54701.20	7540.40	-88320.25	-65438.84	36.54	0.01709	0.900	0.84
222	7540.40	-73828.10	-54701.20	7540.40	-88320.25	-65438.84	36.54	0.01709	0.900	0.84
223	7536.80	-68243.70	-37575.10	7536.80	-116416.64	-64099.20	45.22	0.01180	0.900	0.59
224	7536.80	-68243.70	-37575.10	7536.80	-116416.64	-64099.20	45.22	0.01180	0.900	0.59
225	7538.90	-85450.20	-46884.70	7538.90	-116807.46	-64089.81	45.34	0.01173	0.900	0.73
226	7538.90	-85450.20	-46884.70	7538.90	-116807.46	-64089.81	45.34	0.01173	0.900	0.73
227	7538.30	-56621.60	-45391.60	7538.30	-81989.29	-65728.00	34.58	0.01829	0.900	0.69
228	7538.30	-56621.60	-45391.60	7538.30	-81989.29	-65728.00	34.58	0.01829	0.900	0.69
229	3129.50	-30781.70	-27329.80	3129.50	-52756.95	-46840.75	20.60	0.03312	0.900	0.58
230	3129.50	-30781.70	-27329.80	3129.50	-52756.95	-46840.75	20.60	0.03312	0.900	0.58
231	3125.90	-25197.30	-10203.80	3125.90	-110002.89	-44546.32	36.05	0.01489	0.900	0.23
232	3125.90	-25197.30	-10203.80	3125.90	-110002.89	-44546.32	36.05	0.01489	0.900	0.23
233	3128.00	-42403.80	-19513.40	3128.00	-97871.89	-45038.72	32.78	0.01875	0.900	0.43
234	3128.00	-42403.80	-19513.40	3128.00	-97871.89	-45038.72	32.78	0.01875	0.900	0.43
235	3127.40	-13575.20	-18020.30	3127.40	-35787.59	-47506.00	16.01	0.03853	0.900	0.38
236	3127.40	-13575.20	-18020.30	3127.40	-35787.59	-47506.00	16.01	0.03853	0.900	0.38
237	-3015.30	25109.70	20339.90	-3015.30	30108.69	24389.29	12.34	0.07278	0.900	0.83
238	-3015.30	25109.70	20339.90	-3015.30	30108.69	24389.29	12.34	0.07278	0.900	0.83
239	-3125.90	25197.30	10203.80	-3125.90	57017.44	23089.56	20.30	0.02653	0.900	0.44
240	-3125.90	25197.30	10203.80	-3125.90	57017.44	23089.56	20.30	0.02653	0.900	0.44
241	-3128.00	42403.80	19513.40	-3128.00	50550.54	23262.37	18.40	0.03768	0.900	0.84
242	-3128.00	42403.80	19513.40	-3128.00	50550.54	23262.37	18.40	0.03768	0.900	0.84
243	-3127.40	13575.20	18020.30	-3127.40	18215.33	24179.81	8.85	0.09361	0.900	0.75
244	-3127.40	13575.20	18020.30	-3127.40	18215.33	24179.81	8.85	0.09361	0.900	0.75
245	-3125.90	25197.30	-10203.80	-3125.90	40673.62	-16471.04	15.35	0.05604	0.900	0.62
246	-3125.90	25197.30	-10203.80	-3125.90	40673.62	-16471.04	15.35	0.05604	0.900	0.62
247	-3015.30	-25109.70	20339.90	-3015.30	-30257.11	24509.52	11.11	0.07976	0.900	0.83
248	-3015.30	-25109.70	20339.90	-3015.30	-30257.11	24509.52	11.11	0.07976	0.900	0.83
249	-3125.90	-25197.30	10203.80	-3125.90	-57301.64	23204.63	19.11	0.03364	0.900	0.44
250	-3125.90	-25197.30	10203.80	-3125.90	-57301.64	23204.63	19.11	0.03364	0.900	0.44
251	-3128.00	-42403.80	19513.40	-3128.00	-50802.86	23378.48	17.19	0.04485	0.900	0.83
252	-3128.00	-42403.80	19513.40	-3128.00	-50802.86	23378.48	17.19	0.04485	0.900	0.83
253	-3127.40	-13575.20	18020.30	-3127.40	-18306.83	24301.27	7.58	0.10106	0.900	0.74
254	-3127.40	-13575.20	18020.30	-3127.40	-18306.83	24301.27	7.58	0.10106	0.900	0.74
255	-3125.90	-25197.30	-10203.80	-3125.90	-40873.06	-16551.79	14.24	0.06365	0.900	0.62
256	-3125.90	-25197.30	-10203.80	-3125.90	-40873.06	-16551.79	14.24	0.06365	0.900	0.62

6. Diagrams

6.1. PM at θ=139 [deg]



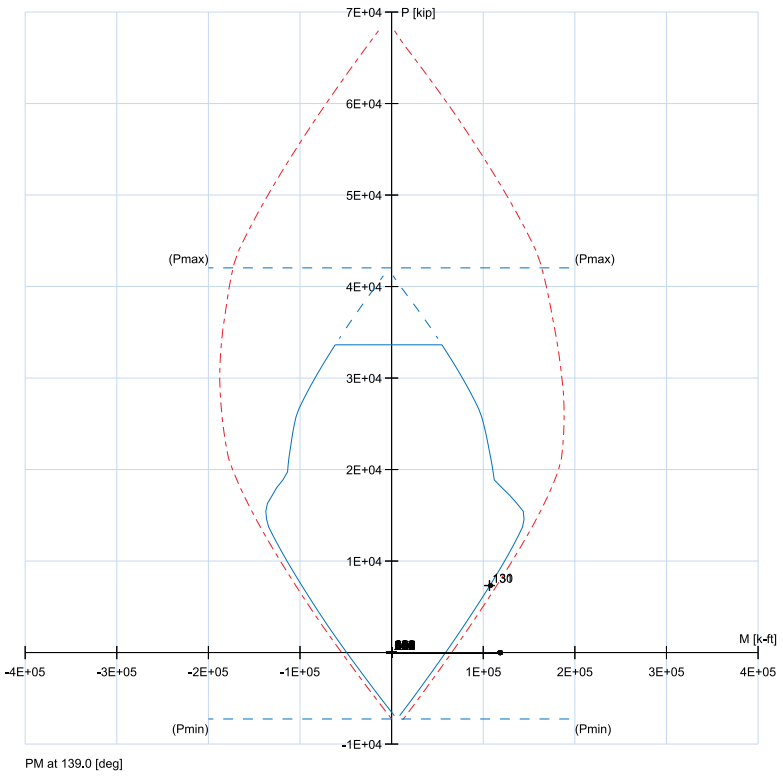
126 x 412 in

General Information	
Project	Hycroft
Column	PCSOUTH-L1
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

Materials	
f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Irregular
A_g	14560 in²
I_x	2.71202e+008 in⁴
I_y	3.74242e+007 in⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	134.44 in²
Rho	0.92 %
Min. clear spacing	5.00 in



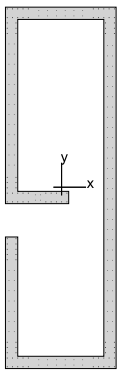
PM at 139.0 [deg]

No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
130	7325.1	-81076.3	69552.0	7325.10	-81974.26	70322.31	0.99
131	7325.1	-81076.3	69552.0	7325.10	-81974.26	70322.31	0.99
16	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
17	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
18	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
19	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
20	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
21	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
22	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
23	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
24	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
25	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
26	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
27	0.0	0.0	0.0	0.00	118484.17	0.00	0.00
28	0.0	0.0	0.0	0.00	118484.17	0.00	0.00

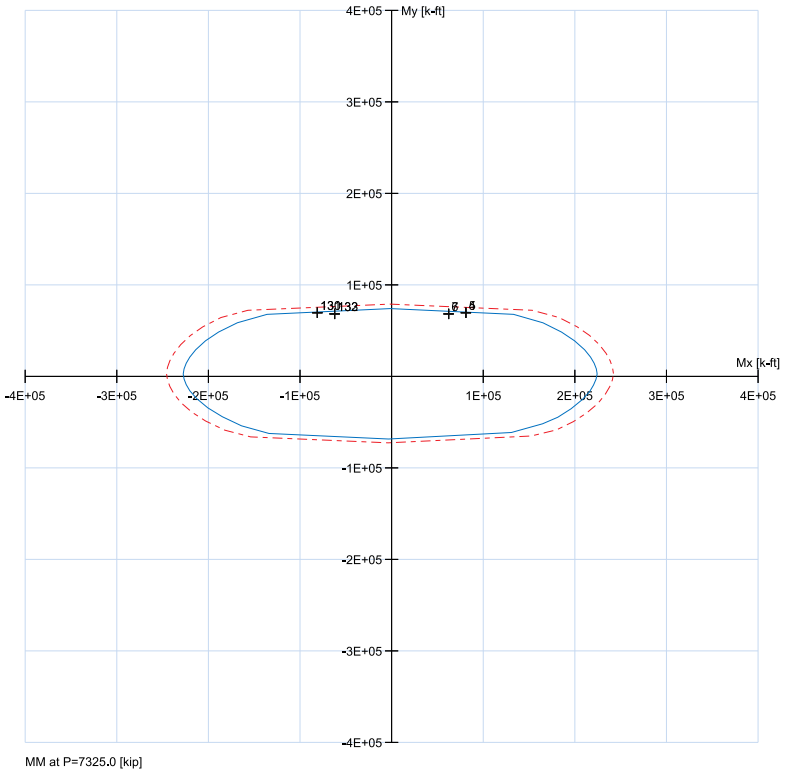
Only 15 points out of 114 are listed.

Max. Capacity Ratio: 0.99

6.2. MM at P=7325 [kip]



126 x 412 in



MM at P=7325.0 [kip]

General Information

Project	Hycroft
Column	PCSOUTH-L1
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

Materials

f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Irregular
A_g	14560 in^2
I_x	2.71202e+008 in^4
I_y	3.74242e+007 in^4

Reinforcement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	134.44 in^2
Rho	0.92 %
Min. clear spacing	5.00 in

No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
4	7325.1	81076.3	69552.0	7325.10	81828.18	70197.01	0.99
5	7325.1	81076.3	69552.0	7325.10	81828.18	70197.01	0.99
130	7325.1	-81076.3	69552.0	7325.10	-81974.26	70322.31	0.99
131	7325.1	-81076.3	69552.0	7325.10	-81974.26	70322.31	0.99
6	7324.5	62222.7	68277.1	7324.50	64701.04	70996.59	0.96
7	7324.5	62222.7	68277.1	7324.50	64701.04	70996.59	0.96
132	7324.5	-62222.7	68277.1	7324.50	-64816.69	71123.50	0.96
133	7324.5	-62222.7	68277.1	7324.50	-64816.69	71123.50	0.96

Max. Capacity Ratio: 0.99

Hycroft

Flexural Demand in Wall Piers 11/13/2020

KR

Section # **16**

Section ID **PPCSOUTH-L2**

SFX	1.000
SFY	1.000
Sds	0.920

LC	P kip	Mxx kip-ft	Myy kip-ft
1	4035	69984	-51103
2	7048	126167	-92226
3	5110	86886	-57805
4	5110	86886	-57805
5	5111	92846	-73497
6	5111	92846	-73497
7	5110	80399	-66303
8	5110	80399	-66303
9	5110	99333	-64999
10	5110	99333	-64999
11	2063	32812	-18289
12	2063	32812	-18289
13	2064	38772	-33981
14	2064	38772	-33981
15	2063	26325	-26787
16	2063	26325	-26787
17	2064	45259	-25484
18	2064	45259	-25484
19	0	0	0
20	0	0	0
21	0	0	0
22	0	0	0
23	0	0	0
24	0	0	0
25	0	0	0
26	0	0	0
27	0	0	0
28	0	0	0
29	0	0	0
30	0	0	0
31	0	0	0
32	0	0	0
33	0	0	0
34	0	0	0
35	0	0	0
36	0	0	0
37	0	0	0
38	0	0	0
39	0	0	0
40	0	0	0
41	0	0	0
42	0	0	0
43	0	0	0
44	0	0	0
45	0	0	0
46	0	0	0
47	0	0	0
48	0	0	0
49	0	0	0
50	0	0	0
51	0	0	0
52	0	0	0
53	0	0	0
54	0	0	0
55	0	0	0
56	0	0	0
57	0	0	0
58	0	0	0
59	0	0	0
60	0	0	0
61	0	0	0
62	0	0	0
63	0	0	0
64	0	0	0
65	0	0	0
66	0	0	0

DEAD	LIVE	EQX	EQY	AXTP	AYTP	-	-	-	-
1.4									
1.2	1.6								
1.38	0.5	1		1					
1.38	0.5	1		-1					
1.38	0.5	-1		1					
1.38	0.5	-1		-1					
1.38	0.5		1		1				
1.38	0.5		1		-1				
1.38	0.5		-1		1				
1.38	0.5		-1		-1				
0.72		1		1					
0.72		1		-1					
0.72		-1		1					
0.72		-1		-1					
0.72			1		1				
0.72			1		-1				
0.72			-1		1				
0.72			-1		-1				

	P kip	Mxx kip-ft	Myy kip-ft
D	0	0	0
L	0	0	0
Dead	2882	49989	-36502
Live	2243	41363	-30265
PECTX MA	-1	-19753	-21832
PECTY MA	-1	-17690	-19552
AXTP	0	0	0
AYTP	0	0	0
SOIL	0	0	0
EQX	0	-2980	7846
EQY	0	-9467	-652
-			
-			
-			
EQX	-1	-19753	21832
EQY	-1	-17690	-19552

LC for value	LC for sign
SPECTX Ma	EQX
SPECTY Ma	EQY

Show on Screen
- ○ Top of Pier
- ◉ Bottom of Pier

Send to Generated File
- ○ Top of Pier
- ○ Bottom of Pier
- ◉ Top and Bottom of Pier

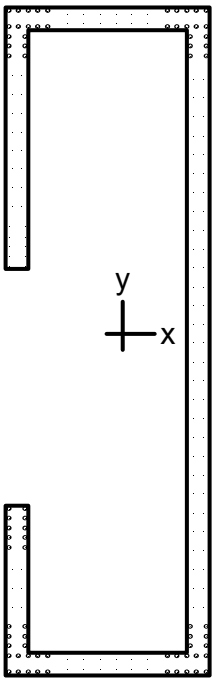
P-M-M enveloping
- ○ Use calcd combinations
- ◉ Envelope all possible P-M-M

	Scale factor for moments	1/12 (typically 1/12, ETABS is in kip-in, PCAcol wants kip-ft)
	# LC to include in generated file:	34 (input the number of load cases filled out in the table above)
2	Generated file output directory	C:\Temp\ (don't forget the slash at the end)
	First section to generate number	1 (typically 1 to generate all sections)
	Last section to generate number	141 (typically the number of sections to generate all sections)
	Section Orientation	90 (do not change - determined from the "PierProp" sheet)

3

2

Pier ID	Index
PPL-L2	1
PPL-L1	2
PL-P1	3
PP11W-L2	4
PP11W-L1	5
PP11W-P1	6
PP11E-L2	7
PP11E-L1	8
PP11E-P1	9
PPCWEST-L2	10
PPCWEST-L1	11
PPCWEST-P1	12
PPCEAST-L2	13
PPCEAST-L1	14
PPCEAST-P1	15
PPCSOUTH-L2	16
PPCSOUTH-L1	17
PPCSOUTH-P1	18
PP7W-L2	19
PP7W-L3	20
PP7W-L4	21
PP7M-L2	22
PP7M-L1	23
PP7M-P1	24
PP7E-L2	25
P7E-L1	26
PP7E-P1	27
PPL-L2	28
PPL-L1	29
PPL-P1	30



126.069 x 412 in

Code: ACI 318-14

Units: English

Run axis: Biaxial

Run option: Investigation

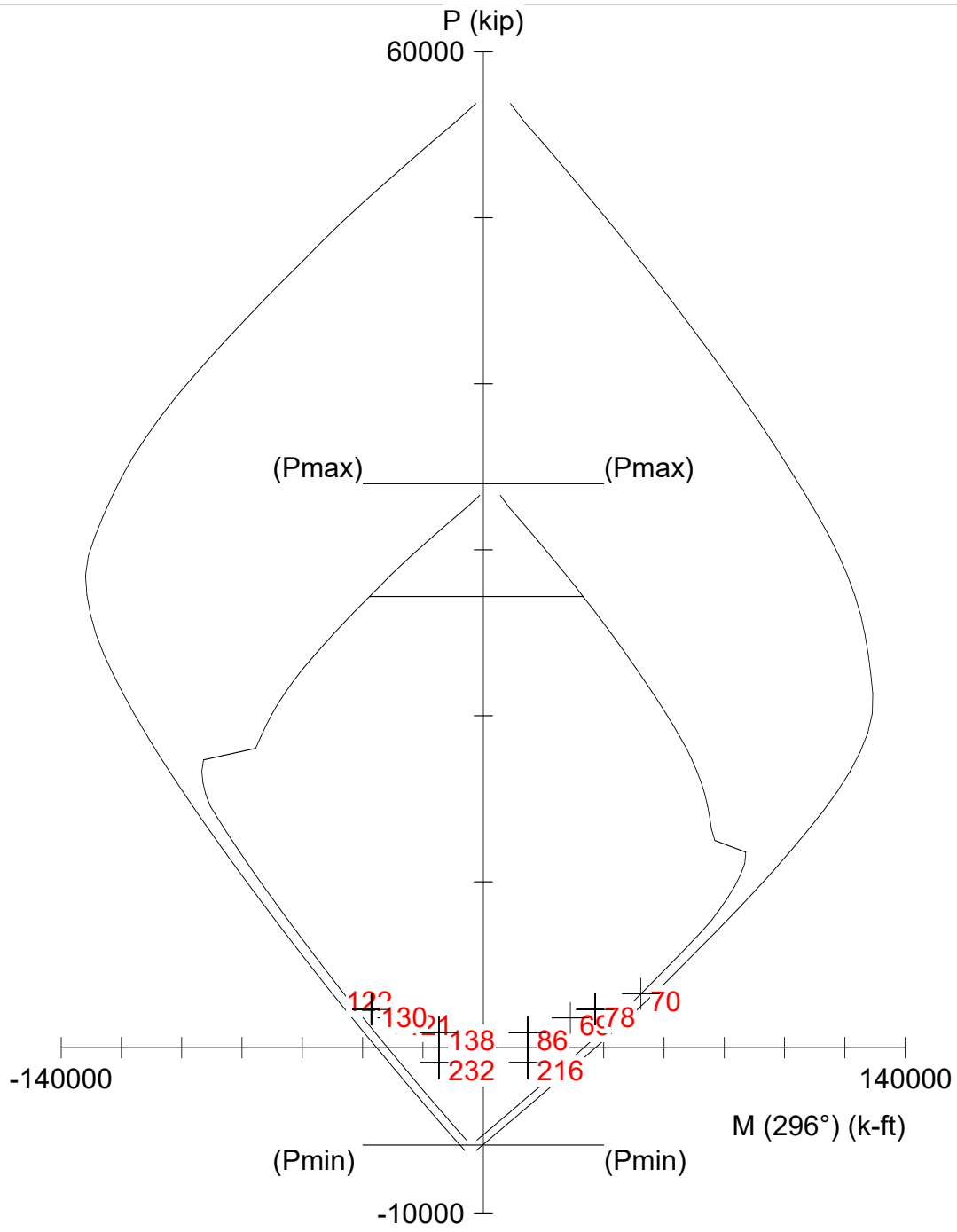
Slenderness: Not considered

Column type: Architectural

Bars: ASTM A615

Date: 11/13/20

Time: 08:51:59



File: C:\Users\krothrock\Documents_work_Projects\Hycroft MI 19028\Lateral\PM\PCSOUTH-L2.col

Project: Hycroft

Column: PCSOUTH-L2

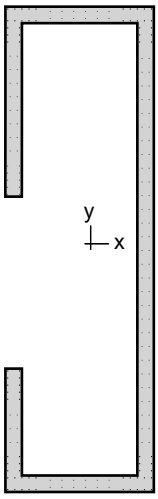
Engineer: KR

f'c = 5 ksi	fy = 60 ksi	Ag = 12236 in^2	188 bars
Ec = 4031 ksi	Es = 29000 ksi	As = 108.62 in^2	rho = 0.89%
fc = 4.25 ksi	e_yt = 0.00206897 in/in	Xo = -0.00 in	Ix = 2.66354e+008 in^4
e_u = 0.003 in/in		Yo = -0.00 in	Iy = 3.10521e+007 in^4
Beta1 = 0.8		Min clear spacing = 5.00 in	Clear cover = N/A

Confinement: Tied

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

spColumn v7.00
Computer program for the Strength Design of Reinforced Concrete Sections



Contents

List of Figures

1. General Information

File Name	C:\Users\krothrock\Documents_w...\PCSOUTH-L2.col
Project	Hycroft
Column	PCSOUTH-L2
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

2. Material Properties

2.1. Concrete

Type	Standard	
f'_c	5	ksi
E_c	4030.51	ksi
f_c	4.25	ksi
ε_u	0.003	in/in
β_1	0.8	

2.2. Steel

Type	Standard	
f_y	60	ksi
E_s	29000	ksi
ε_{yt}	0.00206897	in/in

3. Section

3.1. Shape and Properties

Type	Irregular	
A_g	12236	in^2
I_x	2.66354e+008	in^4
I_y	3.10521e+007	in^4
r_x	147.54	in
r_y	50.3762	in
X_o	0	in
Y_o	0	in

3.2. Section Figure

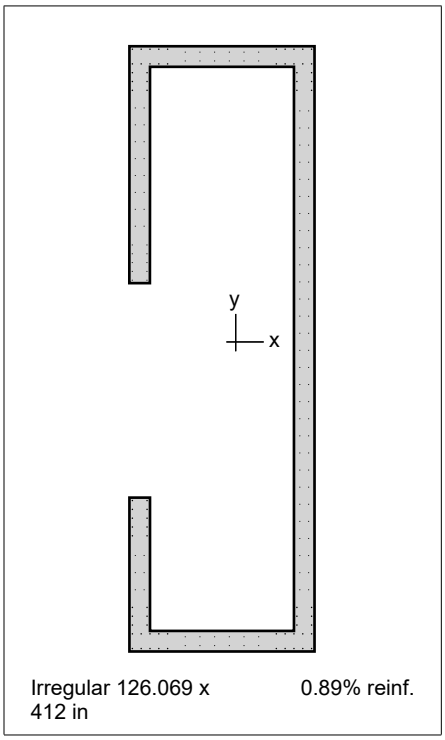


Figure 1: Column section

3.3. Exterior Points

Points	X	Y	Points	X	Y	Points	X	Y
	in	in		in	in		in	in
1	-72.4	-210.7	2	-72.4	-106.0	3	-58.4	-106.0
4	-58.4	-196.7	5	39.6	-196.7	6	39.6	187.3
7	-58.4	187.3	8	-58.4	116.0	9	-58.4	40.0
10	-72.4	40.0	11	-72.4	116.0	12	-72.4	201.3
13	53.6	201.3	14	53.6	-210.7			

4. Reinforcement

4.1. Bar Set: ASTM A615

Bar	Diameter	Area	Bar	Diameter	Area	Bar	Diameter	Area
	in	in^2		in	in^2		in	in^2
#3	0.38	0.11	#4	0.50	0.20	#5	0.63	0.31
#6	0.75	0.44	#7	0.88	0.60	#8	1.00	0.79
#9	1.13	1.00	#10	1.27	1.27	#11	1.41	1.56
#14	1.69	2.25	#18	2.26	4.00			

4.2. Confinement and Factors

Confinement type	Tied
For #10 bars or less	#3 ties
For larger bars	#4 ties
Capacity Reduction Factors	
Axial compression, (a)	0.8
Tension controlled ϕ, (b)	0.9

Compression controlled ϕ, (c)	0.65

4.3. Arrangement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Total steel area, A_s	108.62 in^2
Rho	0.89 %
Minimum clear spacing	5.00 in

(Note: Rho < 1.0%)

4.4. Bars Provided

Area	X	Y	Area	X	Y	Area	X	Y
in^2	in	in	in^2	in	in	in^2	in	in
0.79	-70.4	-208.7	0.79	-64.4	-208.7	0.79	-58.4	-208.7
0.79	-52.4	-208.7	0.79	-46.4	-208.7	0.79	-46.4	-198.7
0.79	-52.4	-198.7	0.79	-58.4	-198.7	0.79	-64.4	-198.7
0.79	-70.4	-198.7	0.79	51.6	-198.7	0.79	45.6	-198.7
0.79	39.6	-198.7	0.79	33.6	-198.7	0.79	27.6	-198.7
0.79	27.6	-208.7	0.79	33.6	-208.7	0.79	39.6	-208.7
0.79	45.6	-208.7	0.79	51.6	-208.7	0.79	-70.4	199.3
0.79	-64.4	199.3	0.79	-58.4	199.3	0.79	-52.4	199.3
0.79	-46.4	199.3	0.79	-46.4	189.3	0.79	-52.4	189.3
0.79	-58.4	189.3	0.79	-64.4	189.3	0.79	-70.4	189.3
0.79	51.6	199.3	0.79	45.6	199.3	0.79	39.6	199.3
0.79	33.6	199.3	0.79	27.6	199.3	0.79	27.6	189.3
0.79	33.6	189.3	0.79	39.6	189.3	0.79	45.6	189.3
0.79	51.6	189.3	0.79	-70.4	171.3	0.79	-70.4	177.3
0.79	-70.4	183.3	0.79	-60.4	171.3	0.79	-60.4	177.3
0.79	-60.4	183.3	0.79	41.6	171.3	0.79	41.6	177.3
0.79	41.6	183.3	0.79	51.6	171.3	0.79	51.6	177.3
0.79	51.6	183.3	0.79	-70.4	-192.7	0.79	-70.4	-186.7
0.79	-70.4	-180.7	0.79	-60.4	-192.7	0.79	-60.4	-186.7
0.79	-60.4	-180.7	0.79	41.6	-192.7	0.79	41.6	-186.7
0.79	41.6	-180.7	0.79	51.6	-192.7	0.79	51.6	-186.7
0.79	51.6	-180.7	0.79	-70.4	-108.0	0.79	-60.4	-108.0
0.79	-60.4	-114.0	0.79	-60.4	-120.0	0.79	-60.4	-126.0
0.79	-60.4	-132.0	0.79	-70.4	-132.0	0.79	-70.4	-126.0
0.79	-70.4	-120.0	0.79	-70.4	-114.0	0.44	-68.4	-168.7
0.44	-68.4	-157.1	0.44	-68.4	-145.4	0.44	-62.4	-168.7
0.44	-62.4	-157.1	0.44	-62.4	-145.4	0.44	-34.4	-200.7
0.44	-24.4	-200.7	0.44	-14.4	-200.7	0.44	-4.4	-200.7
0.44	5.6	-200.7	0.44	15.6	-200.7	0.44	-34.4	-206.7
0.44	-24.4	-206.7	0.44	-14.4	-206.7	0.44	-4.4	-206.7
0.44	5.6	-206.7	0.44	15.6	-206.7	0.44	43.6	-168.7
0.44	43.6	-157.1	0.44	43.6	-145.4	0.44	43.6	-133.8
0.44	43.6	-122.1	0.44	43.6	-110.5	0.44	43.6	-98.9
0.44	43.6	-87.2	0.44	43.6	-75.6	0.44	43.6	-63.9
0.44	43.6	-52.3	0.44	43.6	-40.6	0.44	43.6	-29.0
0.44	43.6	-17.4	0.44	43.6	-5.7	0.44	43.6	5.9
0.44	43.6	17.6	0.44	43.6	29.2	0.44	43.6	40.9

Area	X	Y	Area	X	Y	Area	X	Y
in²	in	in	in²	in	in	in²	in	in
0.44	43.6	52.5	0.44	43.6	64.1	0.44	43.6	75.8
0.44	43.6	87.4	0.44	43.6	99.1	0.44	43.6	110.7
0.44	43.6	122.4	0.44	43.6	134.0	0.44	43.6	145.6
0.44	43.6	157.3	0.44	49.6	-168.7	0.44	49.6	-157.1
0.44	49.6	-145.4	0.44	49.6	-133.8	0.44	49.6	-122.1
0.44	49.6	-110.5	0.44	49.6	-98.9	0.44	49.6	-87.2
0.44	49.6	-75.6	0.44	49.6	-63.9	0.44	49.6	-52.3
0.44	49.6	-40.6	0.44	49.6	-29.0	0.44	49.6	-17.4
0.44	49.6	-5.7	0.44	49.6	5.9	0.44	49.6	17.6
0.44	49.6	29.2	0.44	49.6	40.9	0.44	49.6	52.5
0.44	49.6	64.1	0.44	49.6	75.8	0.44	49.6	87.4
0.44	49.6	99.1	0.44	49.6	110.7	0.44	49.6	122.4
0.44	49.6	134.0	0.44	49.6	145.6	0.44	49.6	157.3
0.44	-34.4	191.3	0.44	-24.4	191.3	0.44	-14.4	191.3
0.44	-4.4	191.3	0.44	5.6	191.3	0.44	15.6	191.3
0.44	-34.4	197.3	0.44	-24.4	197.3	0.44	-14.4	197.3
0.44	-4.4	197.3	0.44	5.6	197.3	0.44	15.6	197.3
0.44	-68.4	78.8	0.44	-68.4	90.3	0.44	-68.4	101.8
0.44	-68.4	113.3	0.44	-68.4	124.8	0.44	-68.4	136.3
0.44	-68.4	147.8	0.44	-68.4	159.3	0.44	-62.4	78.8
0.44	-62.4	90.3	0.44	-62.4	101.8	0.44	-62.4	113.3
0.44	-62.4	124.8	0.44	-62.4	136.3	0.44	-62.4	147.8
0.44	-62.4	159.3	0.44	-70.4	42.0	0.44	-60.4	42.0
0.44	-60.4	48.0	0.44	-60.4	54.0	0.44	-60.4	60.0
0.44	-60.4	66.0	0.44	-70.4	66.0	0.44	-70.4	60.0
0.44	-70.4	54.0	0.44	-70.4	48.0			

5. Factored Loads and Moments with Corresponding Capacity Ratios

NOTE: Calculations are based on "Moment Capacity" Method.

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
1	1795.20	12674.20	25949.50	1795.20	17478.23	35785.41	10.09	0.05778	0.900	0.73
2	3253.40	22831.30	41976.70	3253.40	22561.80	41481.20	12.40	0.04721	0.900	1.01 #
3	2313.50	16281.80	33515.30	2313.50	18396.76	37868.86	10.67	0.05380	0.900	0.89
4	2313.50	16281.80	33515.30	2313.50	18396.76	37868.86	10.67	0.05380	0.900	0.89
5	2307.60	16256.70	33249.50	2307.60	18501.61	37840.96	10.70	0.05379	0.900	0.88
6	2307.60	16256.70	33249.50	2307.60	18501.61	37840.96	10.70	0.05379	0.900	0.88
7	2312.00	16310.00	33385.20	2312.00	18495.68	37859.09	10.70	0.05376	0.900	0.88
8	2312.00	16310.00	33385.20	2312.00	18495.68	37859.09	10.70	0.05376	0.900	0.88
9	2309.10	16228.50	33379.60	2309.10	18402.29	37850.76	10.67	0.05382	0.900	0.88
10	2309.10	16228.50	33379.60	2309.10	18402.29	37850.76	10.67	0.05382	0.900	0.88
11	921.10	6494.50	13404.20	921.10	15629.25	32257.70	9.05	0.06620	0.900	0.42
12	921.10	6494.50	13404.20	921.10	15629.25	32257.70	9.05	0.06620	0.900	0.42
13	915.20	6469.30	13138.50	915.20	15867.38	32225.07	9.12	0.06610	0.900	0.41
14	915.20	6469.30	13138.50	915.20	15867.38	32225.07	9.12	0.06610	0.900	0.41
15	919.60	6522.70	13274.10	919.60	15844.26	32244.06	9.11	0.06607	0.900	0.41
16	919.60	6522.70	13274.10	919.60	15844.26	32244.06	9.11	0.06607	0.900	0.41
17	916.70	6441.20	13268.50	916.70	15650.23	32238.57	9.06	0.06623	0.900	0.41
18	916.70	6441.20	13268.50	916.70	15650.23	32238.57	9.06	0.06623	0.900	0.41
19	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00
20	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00
21	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio	
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ		
	kip	k-ft	k-ft	kip	k-ft	k-ft	in				
22	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
23	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
24	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
25	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
26	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
27	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
28	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
29	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
30	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
31	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
32	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
33	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
34	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
35	1598.80	37730.60	25351.10	1598.80	50321.03	33810.57	18.88	0.04090	0.900	0.75	
36	2763.90	49203.00	31261.80	2763.90	60013.29	38130.27	22.33	0.03333	0.900	0.82	
37	2041.80	44271.30	37313.50	2041.80	42572.16	35881.41	17.06	0.04347	0.900	1.04	#
38	2041.80	41271.30	37313.50	2041.80	39798.88	35982.29	16.31	0.04486	0.900	1.04	#
39	1990.20	43366.60	25016.80	1990.20	60695.79	35013.46	21.94	0.03449	0.900	0.71	
40	1990.20	43366.60	25016.80	1990.20	60695.79	35013.46	21.94	0.03449	0.900	0.71	
41	2147.30	57836.10	31676.80	2147.30	64807.39	35494.97	23.17	0.03219	0.900	0.89	
42	2147.30	57836.10	31676.80	2147.30	64807.39	35494.97	23.17	0.03219	0.900	0.89	
43	1884.70	39801.70	30653.60	1884.70	45620.02	35134.63	17.78	0.04251	0.900	0.87	
44	1884.70	39801.70	30653.60	1884.70	45620.02	35134.63	17.78	0.04251	0.900	0.87	
45	843.50	24748.90	19113.60	843.50	40260.69	31093.38	15.73	0.05003	0.900	0.61	
46	843.50	24748.90	19113.60	843.50	40260.69	31093.38	15.73	0.05003	0.900	0.61	
47	791.80	13844.10	6816.90	791.80	61261.19	30165.30	21.45	0.03565	0.900	0.23	
48	791.80	13844.10	6816.90	791.80	61261.19	30165.30	21.45	0.03565	0.900	0.23	
49	948.90	28313.70	13476.80	948.90	64479.60	30691.10	22.39	0.03343	0.900	0.44	
50	948.90	28313.70	13476.80	948.90	64479.60	30691.10	22.39	0.03343	0.900	0.44	
51	686.40	10279.30	12453.70	686.40	25544.33	30947.78	11.63	0.06132	0.900	0.40	
52	686.40	10279.30	12453.70	686.40	25544.33	30947.78	11.63	0.06132	0.900	0.40	
53	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
54	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
55	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
56	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
57	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
58	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
59	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
60	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
61	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
62	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
63	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
64	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
65	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
66	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
67	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
68	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
69	1795.20	12674.20	-25949.50	1795.20	19359.41	-39636.98	14.15	0.03845	0.900	0.65	
70	3253.40	22831.30	-46976.70	3253.40	22861.69	-47039.20	19.05	0.03093	0.900	1.00	
71	2313.50	16281.80	-33515.30	2313.50	20558.82	-42319.31	15.59	0.03560	0.900	0.79	
72	2313.50	16281.80	-33515.30	2313.50	20558.82	-42319.31	15.59	0.03560	0.900	0.79	
73	2307.60	16256.70	-33249.50	2307.60	20674.18	-42284.48	15.61	0.03560	0.900	0.79	
74	2307.60	16256.70	-33249.50	2307.60	20674.18	-42284.48	15.61	0.03560	0.900	0.79	

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio	
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ		
	kip	k-ft	k-ft	kip	k-ft	k-ft	in				
75	2312.00	16310.00	-33385.20	2312.00	20668.95	-42307.58	15.62	0.03558	0.900	0.79	
76	2312.00	16310.00	-33385.20	2312.00	20668.95	-42307.58	15.62	0.03558	0.900	0.79	
77	2309.10	16228.50	-33379.60	2309.10	20563.60	-42296.23	15.58	0.03562	0.900	0.79	
78	2309.10	16228.50	-33379.60	2309.10	20563.60	-42296.23	15.58	0.03562	0.900	0.79	
79	921.10	6494.50	-13404.20	921.10	16961.45	-35007.25	12.11	0.04448	0.900	0.38	
80	921.10	6494.50	-13404.20	921.10	16961.45	-35007.25	12.11	0.04448	0.900	0.38	
81	915.20	6469.30	-13138.50	915.20	17217.63	-34967.26	12.17	0.04442	0.900	0.38	
82	915.20	6469.30	-13138.50	915.20	17217.63	-34967.26	12.17	0.04442	0.900	0.38	
83	919.60	6522.70	-13274.10	919.60	17194.56	-34992.00	12.17	0.04440	0.900	0.38	
84	919.60	6522.70	-13274.10	919.60	17194.56	-34992.00	12.17	0.04440	0.900	0.38	
85	916.70	6441.20	-13268.50	916.70	16982.31	-34982.57	12.11	0.04450	0.900	0.38	
86	916.70	6441.20	-13268.50	916.70	16982.31	-34982.57	12.11	0.04450	0.900	0.38	
87	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
88	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
89	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
90	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
91	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
92	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
93	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
94	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
95	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
96	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
97	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
98	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
99	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
100	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
101	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
102	0.00	0.00	0.00	0.00	97137.17	0.00	13.22	0.09472	0.900	0.00	
103	1598.80	37730.60	-25351.10	1598.80	55695.48	-37421.64	22.89	0.02795	0.900	0.68	
104	2763.90	69203.00	-41261.80	2763.90	71524.60	-42646.03	32.38	0.02021	0.900	0.97	
105	2041.80	54271.30	-37313.50	2041.80	57643.34	-39631.88	24.70	0.02616	0.900	0.94	
106	2041.80	54271.30	-37313.50	2041.80	57643.34	-39631.88	24.70	0.02616	0.900	0.94	
107	1990.20	43366.60	-25016.80	1990.20	67659.88	-39030.83	27.14	0.02338	0.900	0.64	
108	1990.20	43366.60	-25016.80	1990.20	67659.88	-39030.83	27.14	0.02338	0.900	0.64	
109	2147.30	57836.10	-31676.80	2147.30	72396.09	-39651.33	29.06	0.02165	0.900	0.80	
110	2147.30	57836.10	-31676.80	2147.30	72396.09	-39651.33	29.06	0.02165	0.900	0.80	
111	1884.70	39801.70	-30653.60	1884.70	50722.32	-39064.21	22.40	0.02866	0.900	0.78	
112	1884.70	39801.70	-30653.60	1884.70	50722.32	-39064.21	22.40	0.02866	0.900	0.78	
113	843.50	24748.90	-19113.60	843.50	43733.41	-33775.36	18.44	0.03466	0.900	0.57	
114	843.50	24748.90	-19113.60	843.50	43733.41	-33775.36	18.44	0.03466	0.900	0.57	
115	791.80	13844.10	-6816.90	791.80	66628.95	-32808.39	23.86	0.02587	0.900	0.21	
116	791.80	13844.10	-6816.90	791.80	66628.95	-32808.39	23.86	0.02587	0.900	0.21	
117	948.90	28313.70	-13476.80	948.90	70446.94	-33531.45	25.05	0.02424	0.900	0.40	
118	948.90	28313.70	-13476.80	948.90	70446.94	-33531.45	25.05	0.02424	0.900	0.40	
119	686.40	10279.30	-12453.70	686.40	27573.14	-33405.71	14.33	0.04182	0.900	0.37	
120	686.40	10279.30	-12453.70	686.40	27573.14	-33405.71	14.33	0.04182	0.900	0.37	
121	1795.20	-12674.20	25949.50	1795.20	-17483.65	35796.49	10.01	0.05794	0.900	0.72	
122	3253.40	-22831.30	42976.70	3253.40	-22029.77	41467.93	12.50	0.04708	0.900	1.04	#
123	2313.50	-16281.80	33515.30	2313.50	-18394.86	37864.93	10.71	0.05375	0.900	0.89	
124	2313.50	-16281.80	33515.30	2313.50	-18394.86	37864.93	10.71	0.05375	0.900	0.89	
125	2307.60	-16256.70	33249.50	2307.60	-18499.77	37837.20	10.73	0.05374	0.900	0.88	
126	2307.60	-16256.70	33249.50	2307.60	-18499.77	37837.20	10.73	0.05374	0.900	0.88	
127	2312.00	-16310.00	33385.20	2312.00	-18493.78	37855.20	10.73	0.05372	0.900	0.88	

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio	
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ		
	kip	k-ft	k-ft	kip	k-ft	k-ft	in				
128	2312.00	-16310.00	33385.20	2312.00	-18493.78	37855.20	10.73	0.05372	0.900	0.88	
129	2309.10	-16228.50	33379.60	2309.10	-18400.44	37846.95	10.70	0.05378	0.900	0.88	
130	2309.10	-16228.50	33379.60	2309.10	-18400.44	37846.95	10.70	0.05378	0.900	0.88	
131	921.10	-6494.50	13404.20	921.10	-15645.76	32291.77	8.78	0.06687	0.900	0.42	
132	921.10	-6494.50	13404.20	921.10	-15645.76	32291.77	8.78	0.06687	0.900	0.42	
133	915.20	-6469.30	13138.50	915.20	-15884.24	32259.28	8.84	0.06677	0.900	0.41	
134	915.20	-6469.30	13138.50	915.20	-15884.24	32259.28	8.84	0.06677	0.900	0.41	
135	919.60	-6522.70	13274.10	919.60	-15861.03	32278.16	8.84	0.06675	0.900	0.41	
136	919.60	-6522.70	13274.10	919.60	-15861.03	32278.16	8.84	0.06675	0.900	0.41	
137	916.70	-6441.20	13268.50	916.70	-15666.83	32272.76	8.79	0.06691	0.900	0.41	
138	916.70	-6441.20	13268.50	916.70	-15666.83	32272.76	8.79	0.06691	0.900	0.41	
139	1598.80	-37730.60	25351.10	1598.80	-50343.71	33825.82	18.77	0.04116	0.900	0.75	
140	2763.90	-69203.00	36261.80	2763.90	-71883.30	37666.25	25.72	0.02805	0.900	0.96	
141	2041.80	-47271.30	37313.50	2041.80	-45334.20	35784.45	17.79	0.04215	0.900	1.04	#
142	2041.80	-48271.30	37313.50	2041.80	-46250.09	35751.12	18.04	0.04170	0.900	1.04	#
143	1990.20	-43366.60	25016.80	1990.20	-60706.24	35019.48	21.92	0.03457	0.900	0.71	
144	1990.20	-43366.60	25016.80	1990.20	-60706.24	35019.48	21.92	0.03457	0.900	0.71	
145	2147.30	-57836.10	31676.80	2147.30	-64807.58	35495.09	23.18	0.03221	0.900	0.89	
146	2147.30	-57836.10	31676.80	2147.30	-64807.58	35495.09	23.18	0.03221	0.900	0.89	
147	1884.70	-39801.70	30653.60	1884.70	-45630.43	35142.63	17.73	0.04264	0.900	0.87	
148	1884.70	-39801.70	30653.60	1884.70	-45630.43	35142.63	17.73	0.04264	0.900	0.87	
149	843.50	-24748.90	19113.60	843.50	-40305.79	31128.21	15.46	0.05075	0.900	0.61	
150	843.50	-24748.90	19113.60	843.50	-40305.79	31128.21	15.46	0.05075	0.900	0.61	
151	791.80	-13844.10	6816.90	791.80	-61332.33	30200.32	21.18	0.03640	0.900	0.23	
152	791.80	-13844.10	6816.90	791.80	-61332.33	30200.32	21.18	0.03640	0.900	0.23	
153	948.90	-28313.70	13476.80	948.90	-64544.72	30722.07	22.15	0.03407	0.900	0.44	
154	948.90	-28313.70	13476.80	948.90	-64544.72	30722.07	22.15	0.03407	0.900	0.44	
155	686.40	-10279.30	12453.70	686.40	-25576.92	30987.27	11.32	0.06216	0.900	0.40	
156	686.40	-10279.30	12453.70	686.40	-25576.92	30987.27	11.32	0.06216	0.900	0.40	
157	1795.20	-12674.20	-25949.50	1795.20	-19566.82	-40061.64	11.02	0.04188	0.900	0.65	
158	3253.40	-22831.30	-46976.70	3253.40	-23239.62	-47816.88	13.35	0.03436	0.900	0.98	
159	2313.50	-16281.80	-33515.30	2313.50	-20809.98	-42836.36	11.81	0.03895	0.900	0.78	
160	2313.50	-16281.80	-33515.30	2313.50	-20809.98	-42836.36	11.81	0.03895	0.900	0.78	
161	2307.60	-16256.70	-33249.50	2307.60	-20926.53	-42800.61	11.83	0.03894	0.900	0.78	
162	2307.60	-16256.70	-33249.50	2307.60	-20926.53	-42800.61	11.83	0.03894	0.900	0.78	
163	2312.00	-16310.00	-33385.20	2312.00	-20921.53	-42824.64	11.84	0.03892	0.900	0.78	
164	2312.00	-16310.00	-33385.20	2312.00	-20921.53	-42824.64	11.84	0.03892	0.900	0.78	
165	2309.10	-16228.50	-33379.60	2309.10	-20814.51	-42812.38	11.80	0.03896	0.900	0.78	
166	2309.10	-16228.50	-33379.60	2309.10	-20814.51	-42812.38	11.80	0.03896	0.900	0.78	
167	921.10	-6494.50	-13404.20	921.10	-17118.07	-35330.56	9.65	0.04823	0.900	0.38	
168	921.10	-6494.50	-13404.20	921.10	-17118.07	-35330.56	9.65	0.04823	0.900	0.38	
169	915.20	-6469.30	-13138.50	915.20	-17376.21	-35289.38	9.71	0.04816	0.900	0.37	
170	915.20	-6469.30	-13138.50	915.20	-17376.21	-35289.38	9.71	0.04816	0.900	0.37	
171	919.60	-6522.70	-13274.10	919.60	-17353.11	-35314.66	9.71	0.04814	0.900	0.38	
172	919.60	-6522.70	-13274.10	919.60	-17353.11	-35314.66	9.71	0.04814	0.900	0.38	
173	916.70	-6441.20	-13268.50	916.70	-17138.98	-35305.35	9.65	0.04825	0.900	0.38	
174	916.70	-6441.20	-13268.50	916.70	-17138.98	-35305.35	9.65	0.04825	0.900	0.38	
175	1598.80	-37730.60	-25351.10	1598.80	-56254.51	-37797.29	20.54	0.02998	0.900	0.67	
176	2763.90	-69203.00	-41261.80	2763.90	-73079.97	-43573.41	26.19	0.02274	0.900	0.95	
177	2041.80	-54271.30	-37313.50	2041.80	-58384.58	-40141.55	21.51	0.02831	0.900	0.93	
178	2041.80	-54271.30	-37313.50	2041.80	-58384.58	-40141.55	21.51	0.02831	0.900	0.93	
179	1990.20	-43366.60	-25016.80	1990.20	-68527.43	-39531.29	24.15	0.02516	0.900	0.63	
180	1990.20	-43366.60	-25016.80	1990.20	-68527.43	-39531.29	24.15	0.02516	0.900	0.63	

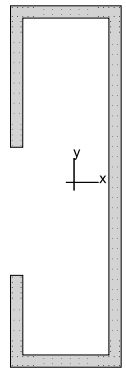
No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
181	2147.30	-57836.10	-31676.80	2147.30	-73444.48	-40225.51	25.61	0.02342	0.900	0.79
182	2147.30	-57836.10	-31676.80	2147.30	-73444.48	-40225.51	25.61	0.02342	0.900	0.79
183	1884.70	-39801.70	-30653.60	1884.70	-51308.19	-39515.44	19.49	0.03098	0.900	0.78
184	1884.70	-39801.70	-30653.60	1884.70	-51308.19	-39515.44	19.49	0.03098	0.900	0.78
185	843.50	-24748.90	-19113.60	843.50	-44064.50	-34031.08	16.73	0.03707	0.900	0.56
186	843.50	-24748.90	-19113.60	843.50	-44064.50	-34031.08	16.73	0.03707	0.900	0.56
187	791.80	-13844.10	-6816.90	791.80	-67030.67	-33006.20	22.79	0.02712	0.900	0.21
188	791.80	-13844.10	-6816.90	791.80	-67030.67	-33006.20	22.79	0.02712	0.900	0.21
189	948.90	-28313.70	-13476.80	948.90	-70904.66	-33749.32	23.92	0.02534	0.900	0.40
190	948.90	-28313.70	-13476.80	948.90	-70904.66	-33749.32	23.92	0.02534	0.900	0.40
191	686.40	-10279.30	-12453.70	686.40	-27797.50	-33677.57	12.30	0.04509	0.900	0.37
192	686.40	-10279.30	-12453.70	686.40	-27797.50	-33677.57	12.30	0.04509	0.900	0.37
193	-921.10	6494.50	13404.20	-921.10	11956.74	24677.89	7.17	0.09089	0.900	0.54
194	-921.10	6494.50	13404.20	-921.10	11956.74	24677.89	7.17	0.09089	0.900	0.54
195	-915.20	6469.30	13138.50	-915.20	12160.36	24696.47	7.23	0.09056	0.900	0.53
196	-915.20	6469.30	13138.50	-915.20	12160.36	24696.47	7.23	0.09056	0.900	0.53
197	-919.60	6522.70	13274.10	-919.60	12126.90	24679.01	7.22	0.09066	0.900	0.54
198	-919.60	6522.70	13274.10	-919.60	12126.90	24679.01	7.22	0.09066	0.900	0.54
199	-916.70	6441.20	13268.50	-916.70	11988.40	24695.41	7.18	0.09079	0.900	0.54
200	-916.70	6441.20	13268.50	-916.70	11988.40	24695.41	7.18	0.09079	0.900	0.54
201	-843.50	24748.90	19113.60	-843.50	31595.99	24401.62	12.80	0.06647	0.900	0.78
202	-843.50	24748.90	19113.60	-843.50	31595.99	24401.62	12.80	0.06647	0.900	0.78
203	-791.80	13844.10	6816.90	-791.80	48909.07	24083.06	17.74	0.04601	0.900	0.28
204	-791.80	13844.10	6816.90	-791.80	48909.07	24083.06	17.74	0.04601	0.900	0.28
205	-948.90	28313.70	13476.80	-948.90	49220.32	23427.96	17.85	0.04524	0.900	0.58
206	-948.90	28313.70	13476.80	-948.90	49220.32	23427.96	17.85	0.04524	0.900	0.58
207	-686.40	10279.30	12453.70	-686.40	20952.62	25384.77	9.80	0.07754	0.900	0.49
208	-686.40	10279.30	12453.70	-686.40	20952.62	25384.77	9.80	0.07754	0.900	0.49
209	-921.10	6494.50	-13404.20	-921.10	12049.15	-24868.62	8.76	0.06467	0.900	0.54
210	-921.10	6494.50	-13404.20	-921.10	12049.15	-24868.62	8.76	0.06467	0.900	0.54
211	-915.20	6469.30	-13138.50	-915.20	12258.89	-24896.57	8.82	0.06444	0.900	0.53
212	-915.20	6469.30	-13138.50	-915.20	12258.89	-24896.57	8.82	0.06444	0.900	0.53
213	-919.60	6522.70	-13274.10	-919.60	12222.01	-24872.55	8.80	0.06452	0.900	0.53
214	-919.60	6522.70	-13274.10	-919.60	12222.01	-24872.55	8.80	0.06452	0.900	0.53
215	-916.70	6441.20	-13268.50	-916.70	12084.18	-24892.71	8.77	0.06459	0.900	0.53
216	-916.70	6441.20	-13268.50	-916.70	12084.18	-24892.71	8.77	0.06459	0.900	0.53
217	-843.50	24748.90	-19113.60	-843.50	32076.56	-24772.76	13.82	0.04914	0.900	0.77
218	-843.50	24748.90	-19113.60	-843.50	32076.56	-24772.76	13.82	0.04914	0.900	0.77
219	-791.80	13844.10	-6816.90	-791.80	49925.10	-24583.34	18.29	0.03621	0.900	0.28
220	-791.80	13844.10	-6816.90	-791.80	49925.10	-24583.34	18.29	0.03621	0.900	0.28
221	-948.90	28313.70	-13476.80	-948.90	49801.82	-23704.75	18.21	0.03640	0.900	0.57
222	-948.90	28313.70	-13476.80	-948.90	49801.82	-23704.75	18.21	0.03640	0.900	0.57
223	-686.40	10279.30	-12453.70	-686.40	21414.31	-25944.10	11.30	0.05537	0.900	0.48
224	-686.40	10279.30	-12453.70	-686.40	21414.31	-25944.10	11.30	0.05537	0.900	0.48
225	-921.10	-6494.50	13404.20	-921.10	-11993.29	24753.33	6.46	0.09393	0.900	0.54
226	-921.10	-6494.50	13404.20	-921.10	-11993.29	24753.33	6.46	0.09393	0.900	0.54
227	-915.20	-6469.30	13138.50	-915.20	-12197.44	24771.77	6.52	0.09358	0.900	0.53
228	-915.20	-6469.30	13138.50	-915.20	-12197.44	24771.77	6.52	0.09358	0.900	0.53
229	-919.60	-6522.70	13274.10	-919.60	-12163.95	24754.39	6.51	0.09369	0.900	0.54
230	-919.60	-6522.70	13274.10	-919.60	-12163.95	24754.39	6.51	0.09369	0.900	0.54
231	-916.70	-6441.20	13268.50	-916.70	-12024.98	24770.76	6.47	0.09382	0.900	0.54
232	-916.70	-6441.20	13268.50	-916.70	-12024.98	24770.76	6.47	0.09382	0.900	0.54
233	-843.50	-24748.90	19113.60	-843.50	-31689.03	24473.47	12.14	0.06929	0.900	0.78

No.	Demand			Capacity			Parameters at Capacity			Capacity Ratio
	P_u	M_{ux}	M_{uy}	ϕP_n	ϕM_{nx}	ϕM_{ny}	NA Depth	ε_t	ϕ	
	kip	k-ft	k-ft	kip	k-ft	k-ft	in			
234	-843.50	-24748.90	19113.60	-843.50	-31689.03	24473.47	12.14	0.06929	0.900	0.78
235	-791.80	-13844.10	6816.90	-791.80	-49049.45	24152.18	17.11	0.04867	0.900	0.28
236	-791.80	-13844.10	6816.90	-791.80	-49049.45	24152.18	17.11	0.04867	0.900	0.28
237	-948.90	-28313.70	13476.80	-948.90	-49370.99	23499.66	17.18	0.04821	0.900	0.57
238	-948.90	-28313.70	13476.80	-948.90	-49370.99	23499.66	17.18	0.04821	0.900	0.57
239	-686.40	-10279.30	12453.70	-686.40	-21010.46	25454.85	9.17	0.08009	0.900	0.49
240	-686.40	-10279.30	12453.70	-686.40	-21010.46	25454.85	9.17	0.08009	0.900	0.49
241	-921.10	-6494.50	-13404.20	-921.10	-12148.27	-25073.22	6.84	0.07048	0.900	0.53
242	-921.10	-6494.50	-13404.20	-921.10	-12148.27	-25073.22	6.84	0.07048	0.900	0.53
243	-915.20	-6469.30	-13138.50	-915.20	-12359.43	-25100.78	6.91	0.07021	0.900	0.52
244	-915.20	-6469.30	-13138.50	-915.20	-12359.43	-25100.78	6.91	0.07021	0.900	0.52
245	-919.60	-6522.70	-13274.10	-919.60	-12322.31	-25076.67	6.89	0.07031	0.900	0.53
246	-919.60	-6522.70	-13274.10	-919.60	-12322.31	-25076.67	6.89	0.07031	0.900	0.53
247	-916.70	-6441.20	-13268.50	-916.70	-12183.54	-25097.41	6.86	0.07038	0.900	0.53
248	-916.70	-6441.20	-13268.50	-916.70	-12183.54	-25097.41	6.86	0.07038	0.900	0.53
249	-843.50	-24748.90	-19113.60	-843.50	-32263.55	-24917.19	12.50	0.05323	0.900	0.77
250	-843.50	-24748.90	-19113.60	-843.50	-32263.55	-24917.19	12.50	0.05323	0.900	0.77
251	-791.80	-13844.10	-6816.90	-791.80	-50111.09	-24674.93	17.48	0.03891	0.900	0.28
252	-791.80	-13844.10	-6816.90	-791.80	-50111.09	-24674.93	17.48	0.03891	0.900	0.28
253	-948.90	-28313.70	-13476.80	-948.90	-49986.98	-23792.88	17.41	0.03925	0.900	0.57
254	-948.90	-28313.70	-13476.80	-948.90	-49986.98	-23792.88	17.41	0.03925	0.900	0.57
255	-686.40	-10279.30	-12453.70	-686.40	-21567.97	-26130.29	9.62	0.06008	0.900	0.48
256	-686.40	-10279.30	-12453.70	-686.40	-21567.97	-26130.29	9.62	0.06008	0.900	0.48

Section capacity exceeded. Revise design!

6. Diagrams

6.1. PM at θ=40 [deg]



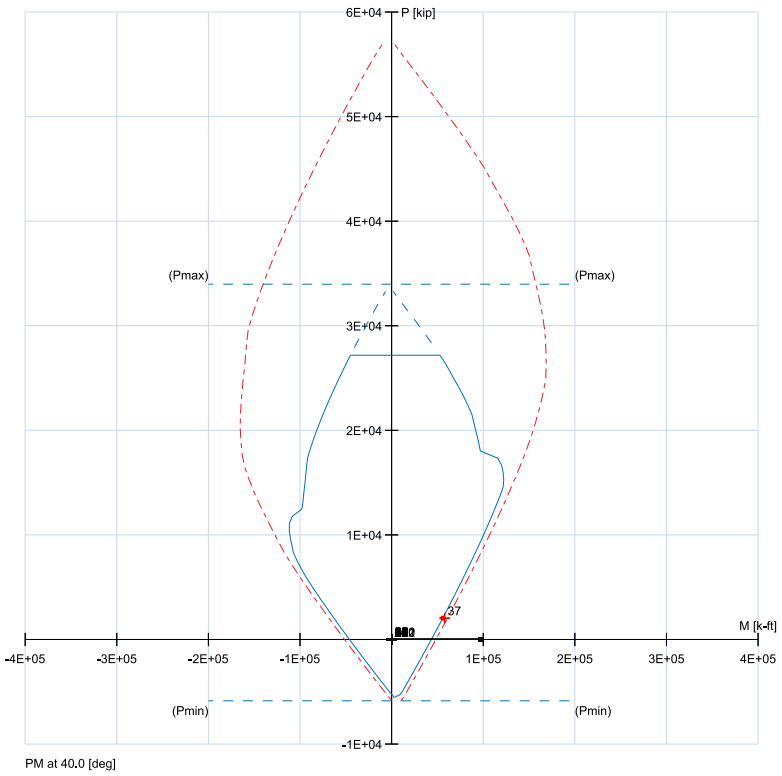
126.069 x 412 in

General Information	
Project	Hycroft
Column	PCSOUTH-L2
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

Materials	
f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Irregular
A_g	12236 in²
I_x	2.66354e+008 in⁴
I_y	3.10521e+007 in⁴

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	108.62 in²
Rho	0.89 %
Min. clear spacing	5.00 in



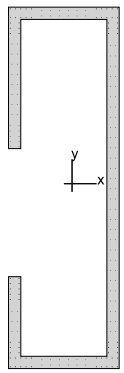
PM at 40.0 [deg]

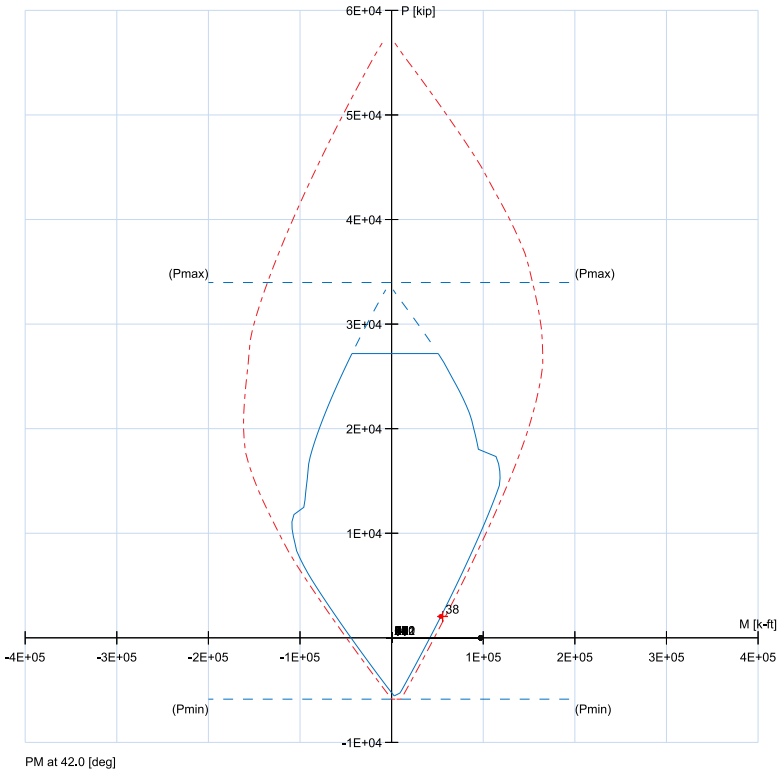
No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
37	2041.8	44271.3	37313.5	2041.80	42572.16	35881.41	1.04
19	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
20	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
21	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
22	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
23	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
24	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
25	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
26	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
27	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
28	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
29	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
30	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
31	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
32	0.0	0.0	0.0	0.00	97137.17	0.00	0.00

Only 15 points out of 49 are listed.

Max. Capacity Ratio: 1.04

6.2. PM at θ=42 [deg]





PM at 42.0 [deg]

General Information

Project	Hycroft
Column	PCSOUTH-L2
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

Materials

f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Irregular
A_g	12236 in²
I_x	2.66354e+008 in⁴
I_y	3.10521e+007 in⁴

Reinforcement

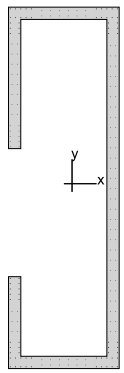
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	108.62 in²
Rho	0.89 %
Min. clear spacing	5.00 in

No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
38	2041.8	41271.3	37313.5	2041.80	39798.88	35982.29	1.04
19	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
20	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
21	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
22	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
23	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
24	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
25	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
26	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
27	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
28	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
29	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
30	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
31	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
32	0.0	0.0	0.0	0.00	97137.17	0.00	0.00

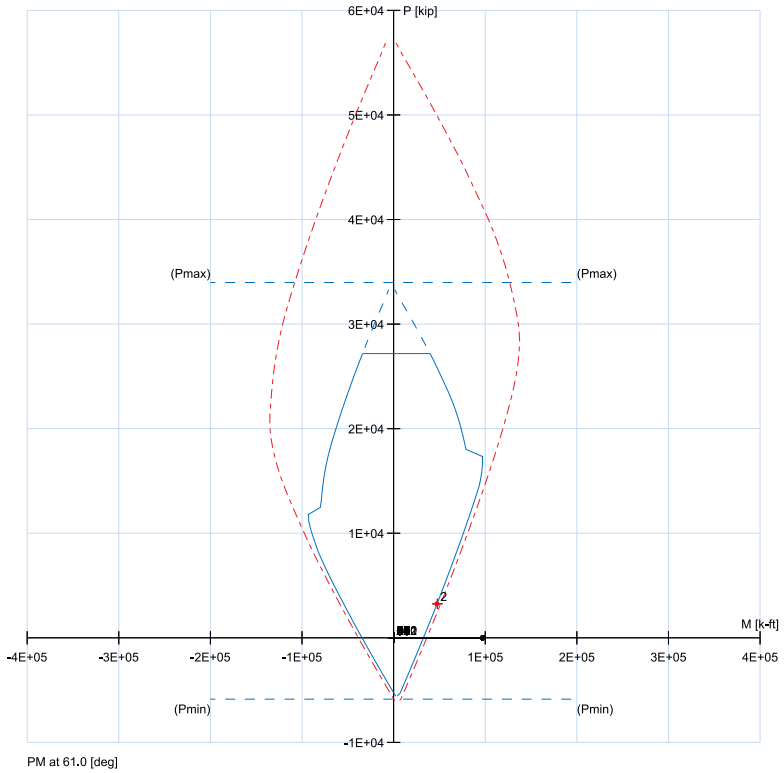
Only 15 points out of 49 are listed.

Max. Capacity Ratio: 1.04

6.3. PM at θ=61 [deg]



126.069 x 412 in



PM at 61.0 [deg]

General Information

Project	Hycroft
Column	PCSOUTH-L2
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

Materials

f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Irregular
A_g	12236 in²
I_x	2.66354e+008 in⁴
I_y	3.10521e+007 in⁴

Reinforcement

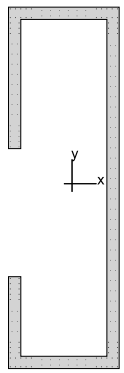
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	108.62 in²
Rho	0.89 %
Min. clear spacing	5.00 in

No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
2	3253.4	22831.3	41976.7	3253.40	22561.80	41481.20	1.01
19	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
20	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
21	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
22	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
23	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
24	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
25	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
26	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
27	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
28	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
29	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
30	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
31	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
32	0.0	0.0	0.0	0.00	97137.17	0.00	0.00

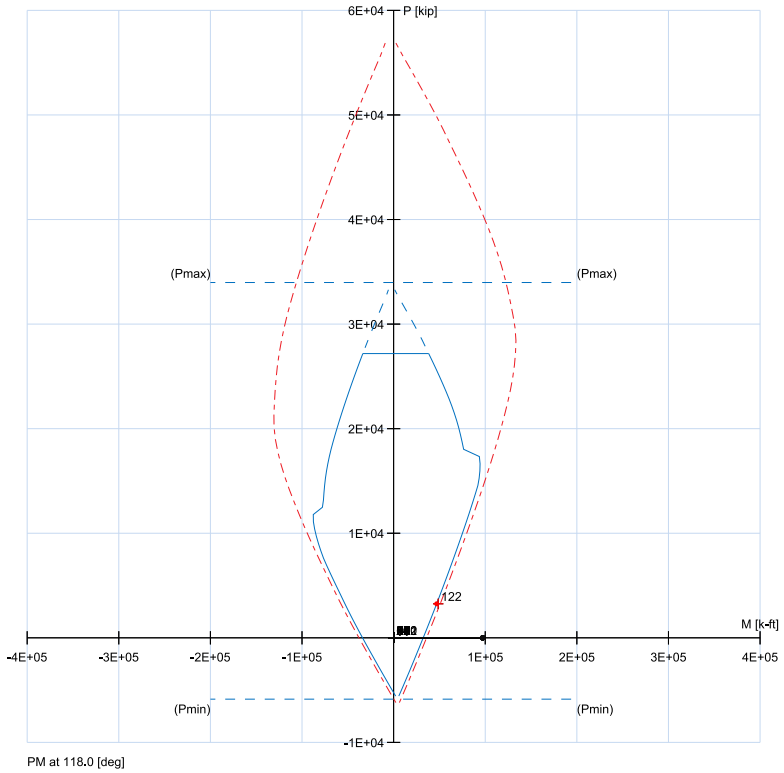
Only 15 points out of 49 are listed.

Max. Capacity Ratio: 1.04

6.4. PM at θ=118 [deg]



126.069 x 412 in



PM at 118.0 [deg]

General Information	
Project	Hycroft
Column	PCSOUTH-L2
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

Materials	
f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Irregular
A_g	12236 in^2
I_x	2.66354e+008 in^4
I_y	3.10521e+007 in^4

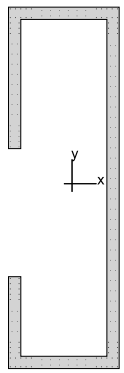
Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	108.62 in^2
Rho	0.89 %
Min. clear spacing	5.00 in

No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
122	3253.4	-22831.3	42976.7	3253.40	-22029.77	41467.93	1.04
19	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
20	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
21	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
22	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
23	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
24	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
25	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
26	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
27	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
28	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
29	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
30	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
31	0.0	0.0	0.0	0.00	97137.17	0.00	0.00
32	0.0	0.0	0.0	0.00	97137.17	0.00	0.00

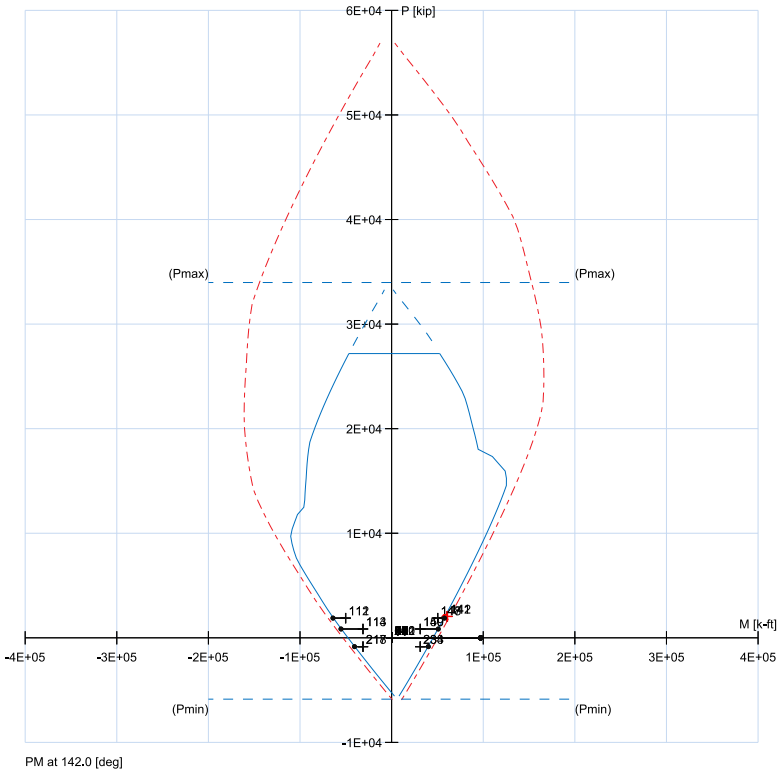
Only 15 points out of 49 are listed.

Max. Capacity Ratio: 1.04

6.5. PM at θ=142 [deg]



126.069 x 412 in



PM at 142.0 [deg]

General Information

Project	Hycroft
Column	PCSOUTH-L2
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

Materials

f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Irregular
A_g	12236 in^2
I_x	2.66354e+008 in^4
I_y	3.10521e+007 in^4

Reinforcement

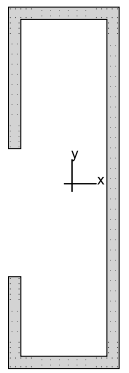
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	108.62 in^2
Rho	0.89 %
Min. clear spacing	5.00 in

No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
141	2041.8	-47271.3	37313.5	2041.80	-45334.20	35784.45	1.04
142	2041.8	-48271.3	37313.5	2041.80	-46250.09	35751.12	1.04
147	1884.7	-39801.7	30653.6	1884.70	-45630.43	35142.63	0.87
148	1884.7	-39801.7	30653.6	1884.70	-45630.43	35142.63	0.87
111	1884.7	39801.7	-30653.6	1884.70	50722.32	-39064.21	0.78
112	1884.7	39801.7	-30653.6	1884.70	50722.32	-39064.21	0.78
233	-843.5	-24748.9	19113.6	-843.50	-31689.03	24473.47	0.78
234	-843.5	-24748.9	19113.6	-843.50	-31689.03	24473.47	0.78
217	-843.5	24748.9	-19113.6	-843.50	32076.56	-24772.76	0.77
218	-843.5	24748.9	-19113.6	-843.50	32076.56	-24772.76	0.77
149	843.5	-24748.9	19113.6	843.50	-40305.79	31128.21	0.61
150	843.5	-24748.9	19113.6	843.50	-40305.79	31128.21	0.61
113	843.5	24748.9	-19113.6	843.50	43733.41	-33775.36	0.57
114	843.5	24748.9	-19113.6	843.50	43733.41	-33775.36	0.57
19	0.0	0.0	0.0	0.00	97137.17	0.00	0.00

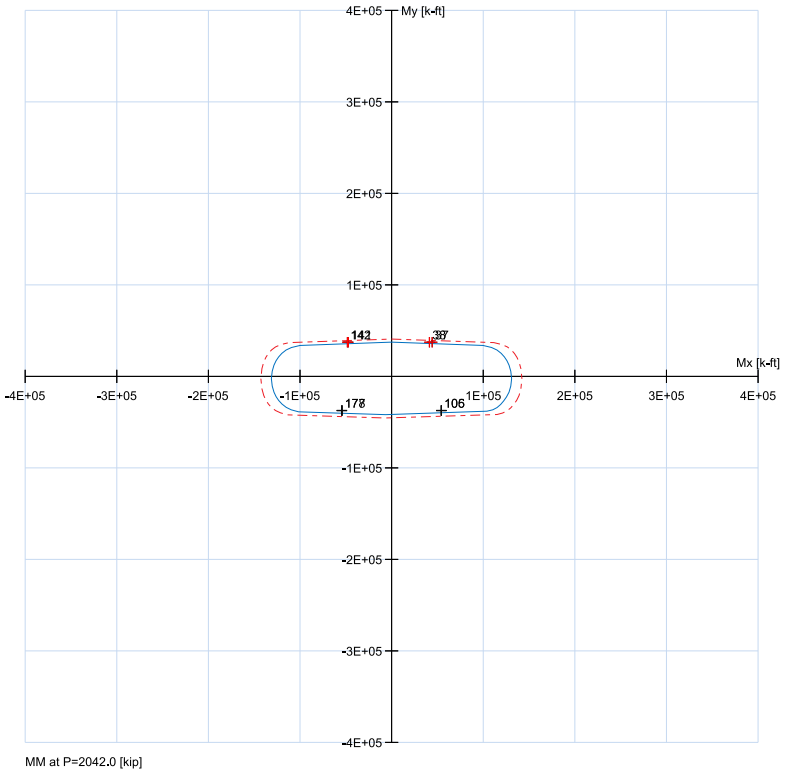
Only 15 points out of 62 are listed.

Max. Capacity Ratio: 1.04

6.6. MM at P=2042 [kip]



126.069 x 412 in



MM at P=2042.0 [kip]

General Information

Project	Hycroft
Column	PCSOUTH-L2
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

Materials

f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section

Type	Irregular
A_g	12236 in^2
I_x	2.66354e+008 in^4
I_y	3.10521e+007 in^4

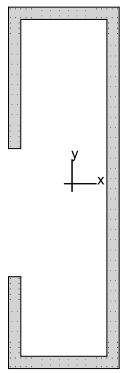
Reinforcement

Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	108.62 in^2
Rho	0.89 %
Min. clear spacing	5.00 in

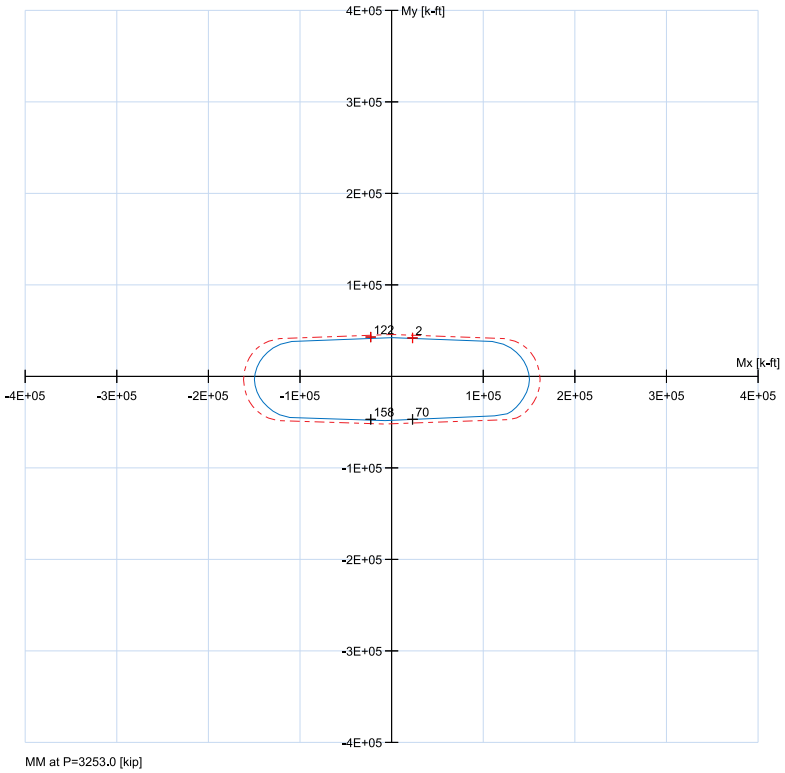
No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
37	2041.8	44271.3	37313.5	2041.80	42572.16	35881.41	1.04
38	2041.8	41271.3	37313.5	2041.80	39798.88	35982.29	1.04
141	2041.8	-47271.3	37313.5	2041.80	-45334.20	35784.45	1.04
142	2041.8	-48271.3	37313.5	2041.80	-46250.09	35751.12	1.04
105	2041.8	54271.3	-37313.5	2041.80	57643.34	-39631.88	0.94
106	2041.8	54271.3	-37313.5	2041.80	57643.34	-39631.88	0.94
177	2041.8	-54271.3	-37313.5	2041.80	-58384.58	-40141.55	0.93
178	2041.8	-54271.3	-37313.5	2041.80	-58384.58	-40141.55	0.93

Max. Capacity Ratio: 1.04

6.7. MM at P=3253 [kip]



126.069 x 412 in



MM at P=3253.0 [kip]

General Information	
Project	Hycroft
Column	PCSOUTH-L2
Engineer	KR
Code	ACI 318-14
Bar Set	ASTM A615
Units	English
Run Option	Investigation
Run Axis	Biaxial
Slenderness	Not Considered
Column Type	Architectural
Capacity Method	Moment capacity

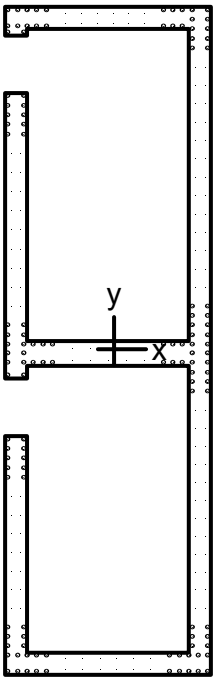
Materials	
f'_c	5 ksi
E_c	4030.51 ksi
f_y	60 ksi
E_s	29000 ksi

Section	
Type	Irregular
A_g	12236 in^2
I_x	2.66354e+008 in^4
I_y	3.10521e+007 in^4

Reinforcement	
Pattern	Irregular
Bar layout	---
Cover to	---
Clear cover	---
Bars	---
Confinement type	Tied
Total steel area, A_s	108.62 in^2
Rho	0.89 %
Min. clear spacing	5.00 in

No.	P_u kip	M_{ux} k-ft	M_{uy} k-ft	ϕP_n kip	ϕM_{nx} k-ft	ϕM_{ny} k-ft	Capacity Ratio
122	3253.4	-22831.3	42976.7	3253.40	-22029.77	41467.93	1.04
2	3253.4	22831.3	41976.7	3253.40	22561.80	41481.20	1.01
70	3253.4	22831.3	-46976.7	3253.40	22861.69	-47039.20	1.00
158	3253.4	-22831.3	-46976.7	3253.40	-23239.62	-47816.88	0.98

Max. Capacity Ratio: 1.04



130 x 420 in

Code: ACI 318-14

Units: English

Run axis: Biaxial

Run option: Investigation

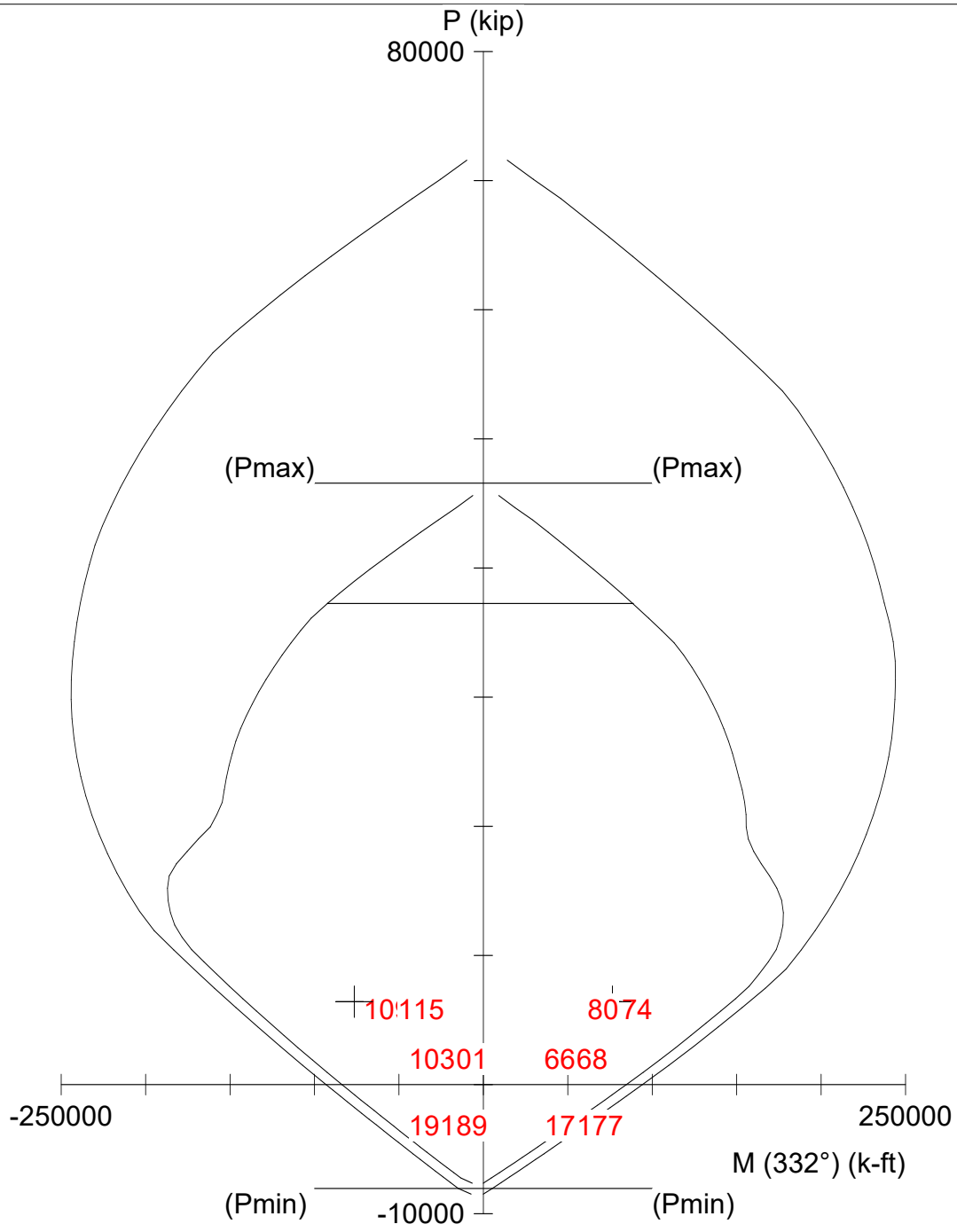
Slenderness: Not considered

Column type: Architectural

Bars: ASTM A615

Date: 11/13/20

Time: 11:02:19



File: C:\Users\krothrock\Documents_work_Projects\Hycroft MI 19028\Lateral\PM\PCEAST-L1.col

Project: Hycroft

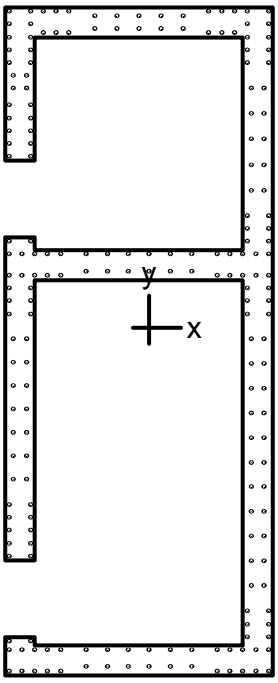
Column: PCEAST-L1

Engineer: KR

f'c = 5 ksi	fy = 60 ksi	Ag = 15240 in^2	240 bars
Ec = 4031 ksi	Es = 29000 ksi	As = 149.00 in^2	rho = 0.98%
fc = 4.25 ksi	e_yt = 0.00206897 in/in	Xo = -0.00 in	Ix = 2.74078e+008 in^4
e_u = 0.003 in/in		Yo = -0.00 in	Iy = 4.00122e+007 in^4
Beta1 = 0.8		Min clear spacing = 3.00 in	Clear cover = N/A

Confinement: Tied

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65



126 x 314 in

Code: ACI 318-14

Units: English

Run axis: Biaxial

Run option: Investigation

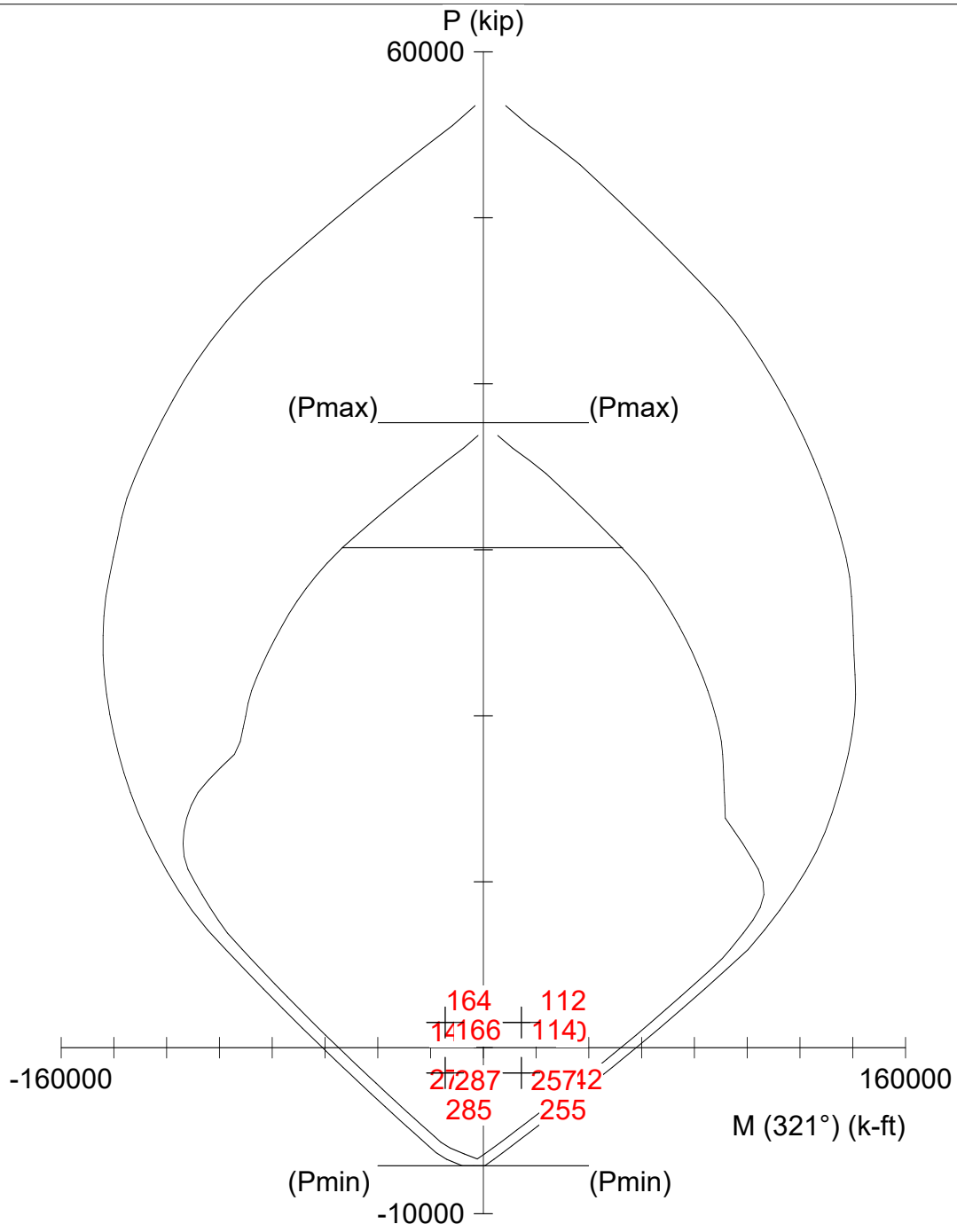
Slenderness: Not considered

Column type: Architectural

Bars: ASTM A615

Date: 11/13/20

Time: 09:22:10



File: C:\Users\krothrock\Documents_work_Projects\Hycroft MI 19028\Lateral\PM\PCWEST-L1.col

Project: Hycroft

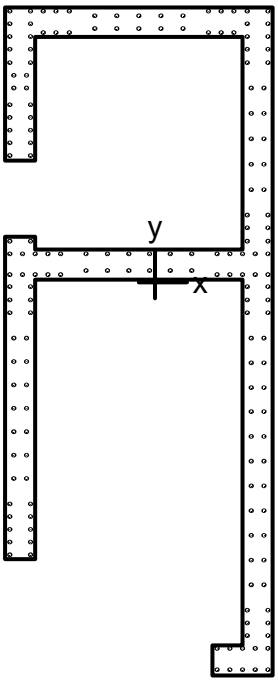
Column: PCWEST-L1

Engineer: KR

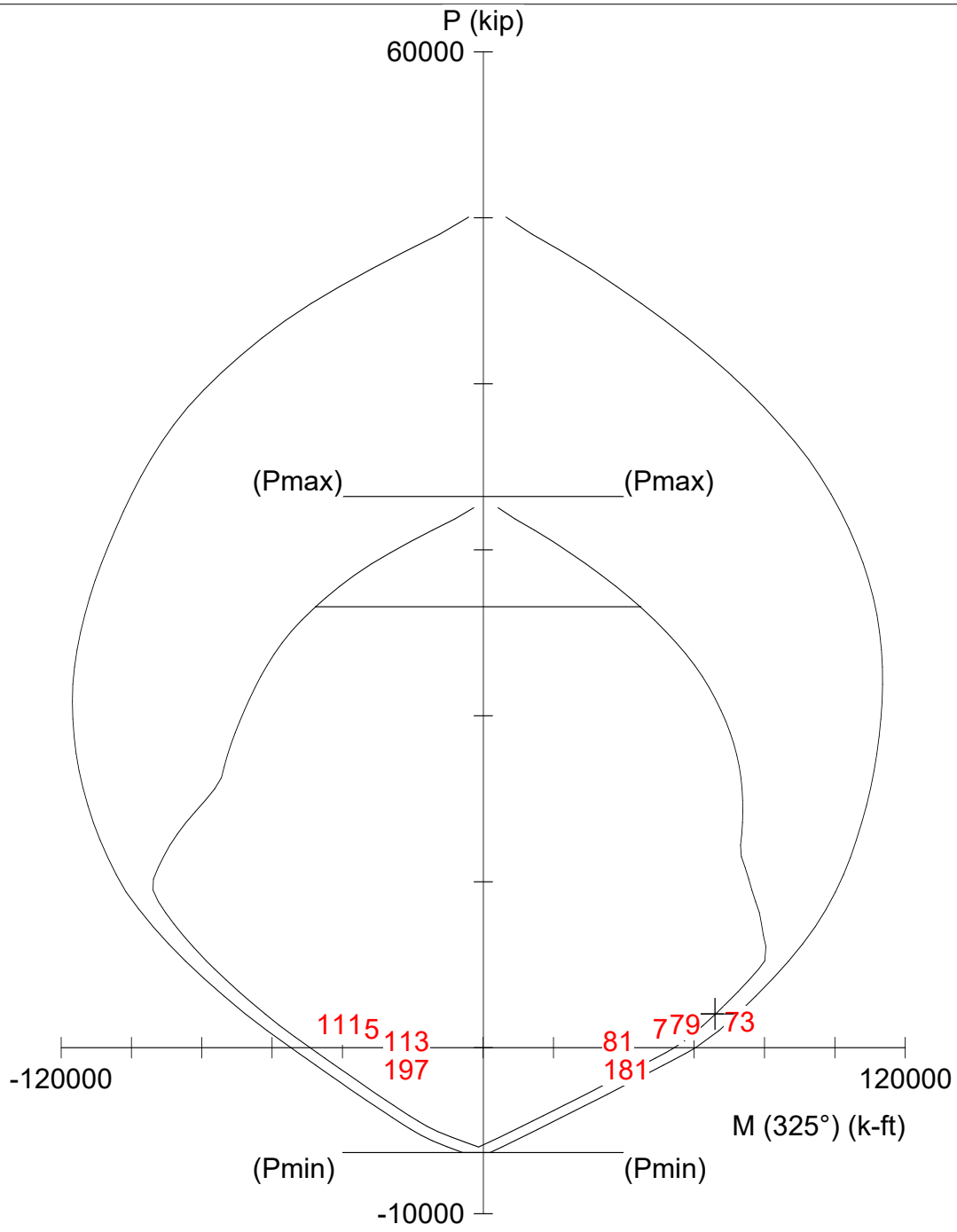
f'c = 5 ksi	fy = 60 ksi	Ag = 11900 in^2	204 bars
Ec = 4031 ksi	Es = 29000 ksi	As = 131.76 in^2	rho = 1.11%
fc = 4.25 ksi	e_yt = 0.00206897 in/in	Xo = -0.00 in	Ix = 1.2558e+008 in^4
e_u = 0.003 in/in		Yo = -0.00 in	Iy = 2.75642e+007 in^4
Beta1 = 0.8		Min clear spacing = 3.00 in	Clear cover = N/A

Confinement: Tied

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65



126 x 314.562 in



Code: ACI 318-14

Units: English

Run axis: Biaxial

Run option: Investigation

Slenderness: Not considered

Column type: Architectural

Bars: ASTM A615

Date: 11/13/20

Time: 10:18:28

File: C:\Users\krothrock\Documents_work_Projects\Hycroft MI 19028\Lateral\PM\PCWEST-L2.col

Project: Hycroft

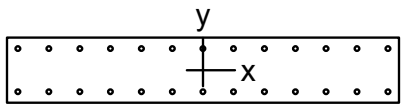
Column: PCWEST-L2

Engineer: KR

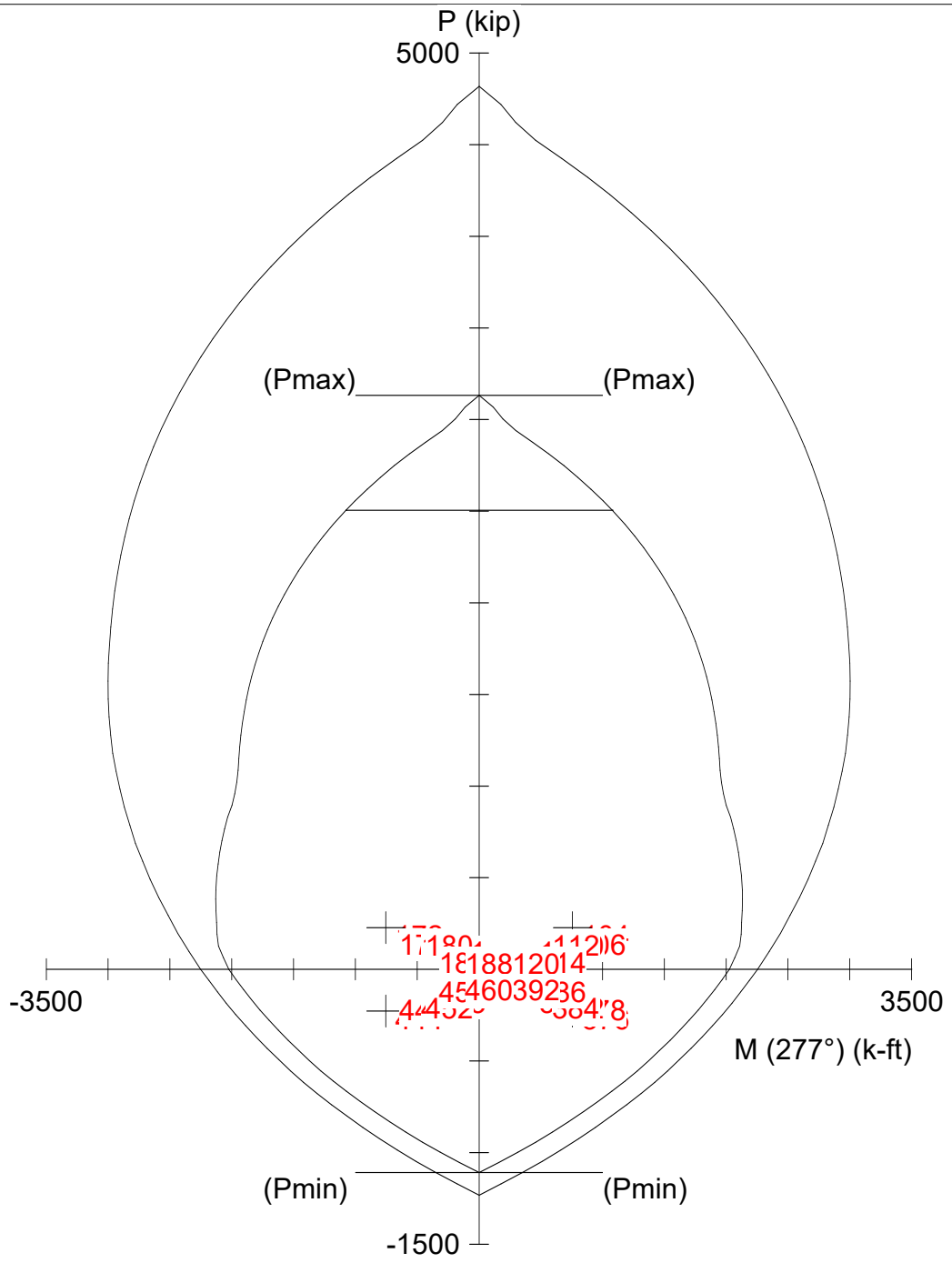
f'c = 5 ksi	fy = 60 ksi	Ag = 10483.5 in^2	180 bars
Ec = 4031 ksi	Es = 29000 ksi	As = 117.00 in^2	rho = 1.12%
fc = 4.25 ksi	e_yt = 0.00206897 in/in	Xo = -0.00 in	Ix = 8.64418e+007 in^4
e_u = 0.003 in/in		Yo = 0.00 in	Iy = 2.57169e+007 in^4
Beta1 = 0.8		Min clear spacing = 5.00 in	Clear cover = N/A

Confinement: Tied

phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65



72 x 12 in



Code: ACI 318-14

Units: English

Run axis: Biaxial

Run option: Investigation

Slenderness: Not considered

Column type: Architectural

Bars: ASTM A615

Date: 11/13/20

Time: 11:22:06

File: C:\Users\krothrock\Documents_work_Projects\Hycroft MI 19028\Lateral\PM\P7W-L2.col

Project: Hycroft

Column: P7W-L1

Engineer: KR

f'c = 5 ksi	fy = 60 ksi	Ag = 864 in^2	26 #8 bars
Ec = 4031 ksi	Es = 29000 ksi	As = 20.54 in^2	rho = 2.38%
fc = 4.25 ksi	e_yt = 0.00206897 in/in	Xo = 0.00 in	Ix = 10368 in^4
e_u = 0.003 in/in		Yo = -0.00 in	Iy = 373248 in^4
Beta1 = 0.8		Min clear spacing = 4.66 in	Clear cover = N/A

Confinement: Tied

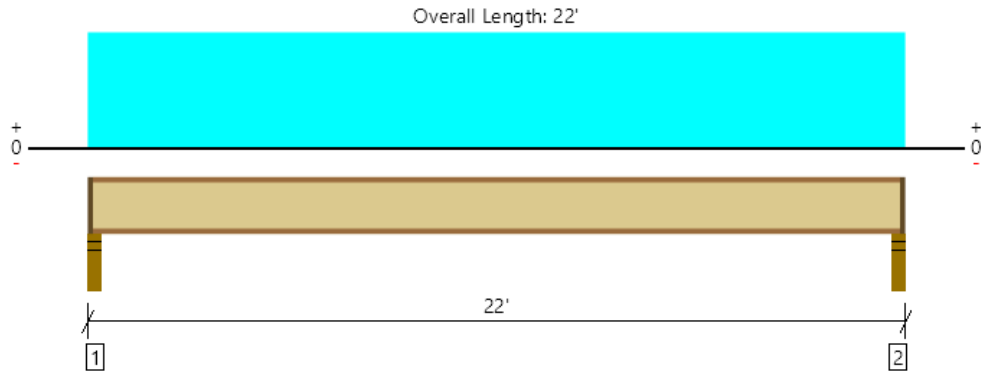
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

WOOD GRAVITY

JOISTS & BEAMS

Floor			
Member Name	Results	Current Solution	Comments
Typical Floor Joists (1 BR)	Passed	1 piece(s) 11 7/8" TJI® 560 @ 16" OC	
Typical Floor Joists (STUDIO)	Passed	1 piece(s) 11 7/8" TJI® 110 @ 16" OC	
Typical Floor Joists (2 BR-1)	Passed	2 piece(s) 11 7/8" TJI® 230 @ 16" OC	
Typical Floor Joists (2 BR-2/3BR-1)	Passed	2 piece(s) 11 7/8" TJI® 560 @ 16" OC	
Typical Floor Joists (2 BR-3)	Passed	2 piece(s) 11 7/8" TJI® 560 @ 16" OC	
B-3 (5'-6")	Passed	1 piece(s) 3 1/2" x 7" 1.8E Parallam® PSL	
Typical Corridor Joists	Passed	1 piece(s) 11 7/8" TJI® 110 @ 16" OC	
Typical Corridor Beam	Passed	1 piece(s) 3 1/2" x 5 1/4" 1.8E Parallam® PSL	
Typical Interior Header (B1)	Passed	1 piece(s) 4 x 10 Douglas Fir-Larch No. 1	
Typical Exterior Header (B2)	Passed	1 piece(s) 6 x 10 Douglas Fir-Larch No. 1	
Typical Exterior Header (B2)-13'-9"	Passed	1 piece(s) 6 x 10 Douglas Fir-Larch No. 1	
Typical Stairs Joists (J1)	Passed	1 piece(s) 11 7/8" TJI® 110 @ 16" OC	
Typical Stairs Beam	Passed	1 piece(s) 3 1/2" x 7" 1.8E Parallam® PSL	
Roof			
Member Name	Results	Current Solution	Comments
Typical Roof Joist (J-4)	Passed	2 piece(s) 11 7/8" TJI® 560 @ 16" OC	
Typical Roof Joist (J-5)	Passed	1 piece(s) 14" TJI® 560 @ 16" OC	

Floor, Typical Floor Joists (1 BR)
1 piece(s) 11 7/8" TJI® 560 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	941 @ 2 1/2"	1396 (2.25")	Passed (67%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	925 @ 3 1/2"	2050	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	5031 @ 11'	9500	Passed (53%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.408 @ 11'	0.540	Passed (L/635)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.662 @ 11'	0.719	Passed (L/391)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	38	38	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	365	585	950	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.75"	365	585	950	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 10" o/c	
Bottom Edge (Lu)	21' 10" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PLF)	0 to 22'	N/A	33.2	53.2	Default Load

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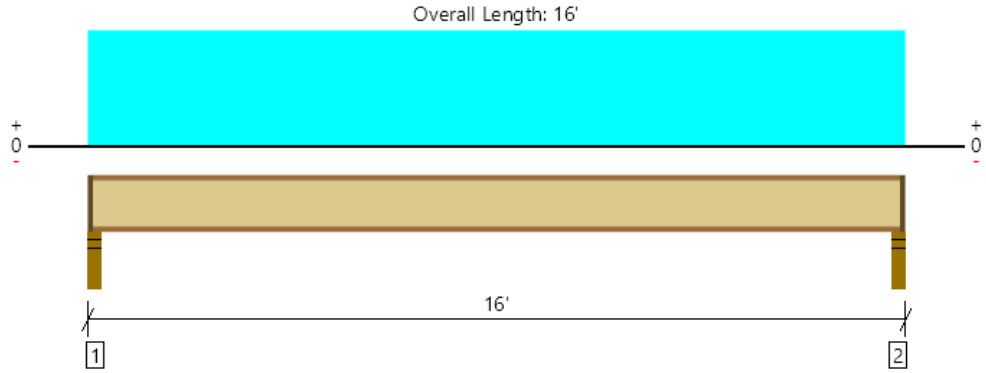
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, Typical Floor Joists (STUDIO)
1 piece(s) 11 7/8" TJI® 110 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	682 @ 2 1/2"	1041 (2.25")	Passed (66%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	666 @ 3 1/2"	1560	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2623 @ 8'	3160	Passed (83%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.239 @ 8'	0.390	Passed (L/782)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.388 @ 8'	0.519	Passed (L/481)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	45	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	266	426	692	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.75"	266	426	692	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	3' 5" o/c	
Bottom Edge (Lu)	15' 10" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PLF)	0 to 16'	N/A	33.2	53.2	Default Load

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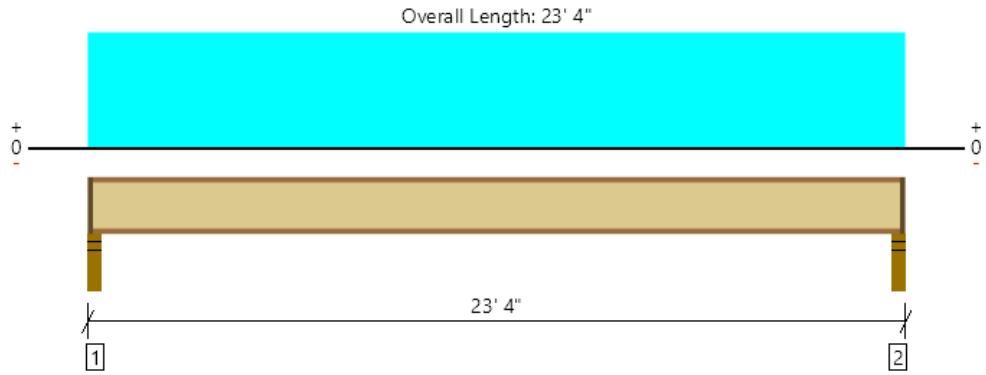
Floor, Typical Floor Joists (2 BR-1)
2 piece(s) 11 7/8" TJI® 230 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	999 @ 2 1/2"	2366 (2.25")	Passed (42%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	983 @ 3 1/2"	3310	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	5672 @ 11' 8"	8430	Passed (67%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.454 @ 11' 8"	0.573	Passed (L/606)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.737 @ 11' 8"	0.764	Passed (L/373)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	36	35	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	387	621	1008	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.75"	387	621	1008	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' o/c	
Bottom Edge (Lu)	23' 2" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PLF)	0 to 23' 4"	N/A	33.2	53.2	Default Load

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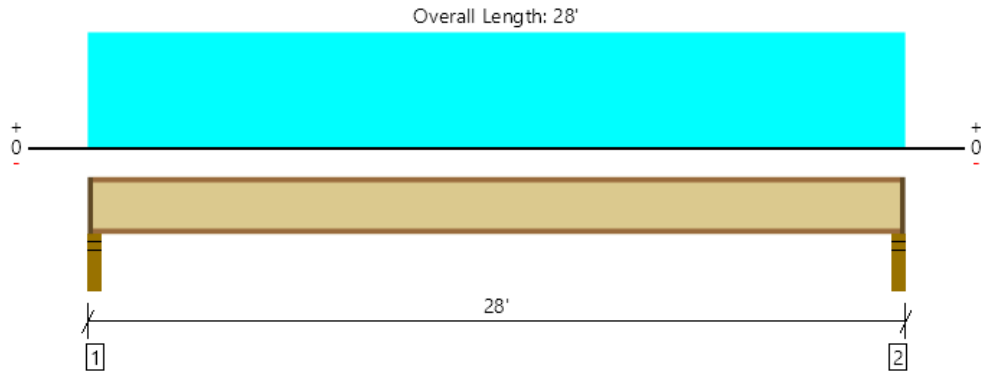
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, Typical Floor Joists (2 BR-2/3BR-1)
2 piece(s) 11 7/8" TJI® 560 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1201 @ 2 1/2"	2793 (2.25")	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1184 @ 3 1/2"	4100	Passed (29%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	8217 @ 14'	19000	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.536 @ 14'	0.690	Passed (L/618)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.870 @ 14'	0.919	Passed (L/380)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	38	35	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 7/8" Weyerhaeuser Edge Gold™ Panel (32" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	465	745	1210	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.75"	465	745	1210	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 9" o/c	
Bottom Edge (Lu)	27' 10" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PLF)	0 to 28'	N/A	33.2	53.2	Default Load

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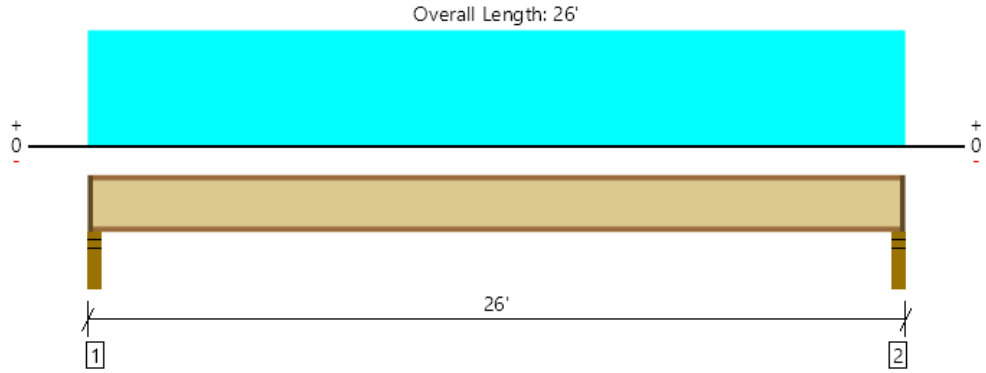
Floor, Typical Floor Joists (2 BR-3)
2 piece(s) 11 7/8" TJI® 560 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1114 @ 2 1/2"	2793 (2.25")	Passed (40%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1098 @ 3 1/2"	4100	Passed (27%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	7069 @ 13'	19000	Passed (37%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.409 @ 13'	0.640	Passed (L/751)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.664 @ 13'	0.853	Passed (L/463)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	37	35	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	432	692	1124	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.75"	432	692	1124	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	9' 5" o/c	
Bottom Edge (Lu)	25' 10" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PLF)	0 to 26'	N/A	33.2	53.2	Default Load

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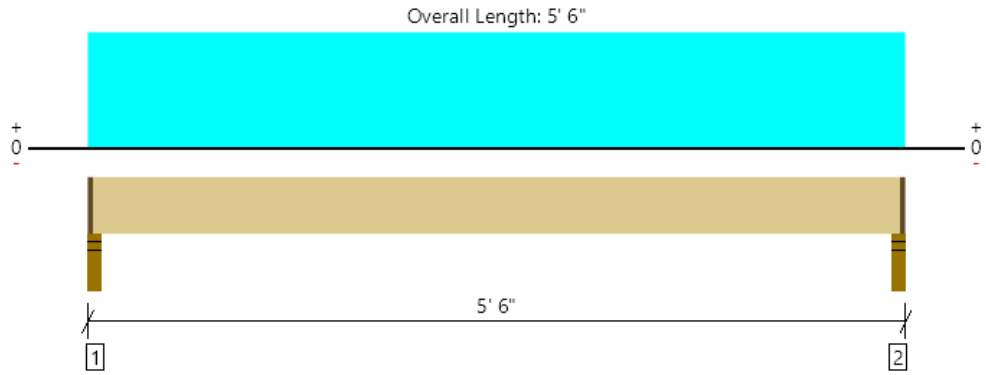
Floor, B-3 (5'-6")
1 piece(s) 3 1/2" x 7" 1.8E Parallam® PSL



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2256 @ 2"	3347 (2.25")	Passed (67%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1599 @ 10 1/2"	3757	Passed (43%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2845 @ 2' 9"	6322	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.055 @ 2' 9"	0.129	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.091 @ 2' 9"	0.172	Passed (L/683)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.52"	913	1431	2344	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.52"	913	1431	2344	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 4" o/c	
Bottom Edge (Lu)	5' 4" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 5' 4 3/4"	N/A	7.6	--	
1 - Uniform (PLF)	0 to 5' 6" (Front)	N/A	324.8	520.3	Default Load

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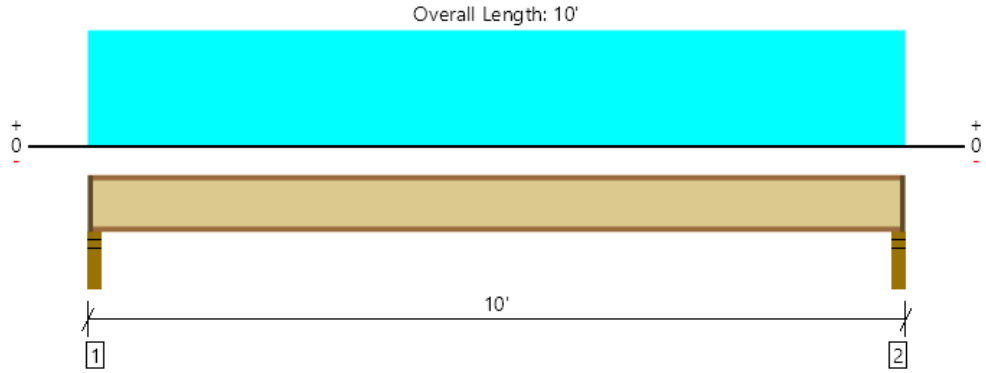
Floor, Typical Corridor Joists
1 piece(s) 11 7/8" TJI® 110 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	423 @ 2 1/2"	1041 (2.25")	Passed (41%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	407 @ 3 1/2"	1560	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	992 @ 5'	3160	Passed (31%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.041 @ 5'	0.240	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.067 @ 5'	0.319	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	63	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	166	266	432	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.75"	166	266	432	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 9" o/c	
Bottom Edge (Lu)	9' 10" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PLF)	0 to 10'	N/A	33.2	53.2	Default Load

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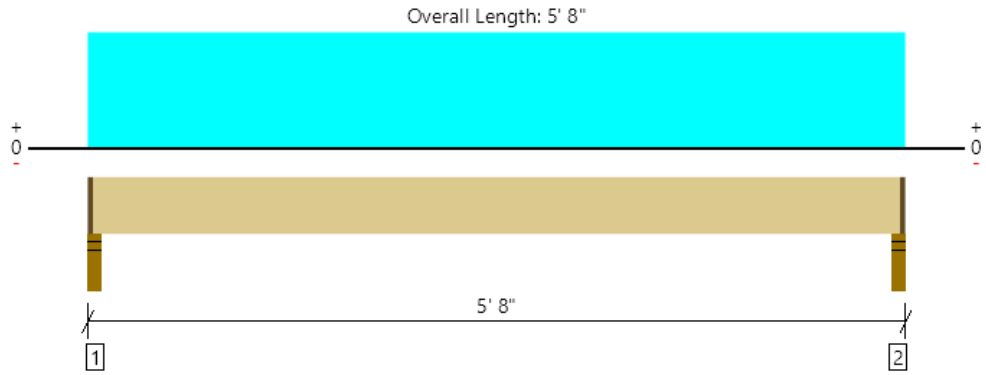
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, Typical Corridor Beam

1 piece(s) 3 1/2" x 5 1/4" 1.8E Parallam® PSL



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	1790 @ 2"	3347 (2.25")	Passed (53%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	1380 @ 8 3/4"	2818	Passed (49%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	2331 @ 2' 10"	3672	Passed (64%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.106 @ 2' 10"	0.133	Passed (L/605)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.173 @ 2' 10"	0.178	Passed (L/369)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	724	1133	1857	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.50"	724	1133	1857	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	5' 6" o/c	
Bottom Edge (Lu)	5' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 5' 6 3/4"	N/A	5.7	--	
1 - Uniform (PLF)	0 to 5' 8" (Front)	N/A	250.0	400.0	Default Load

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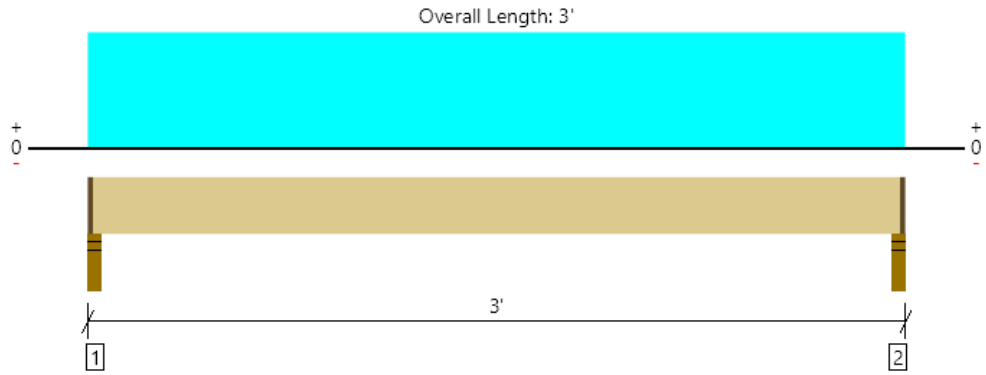
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Floor, Typical Interior Header (B1)

1 piece(s) 4 x 10 Douglas Fir-Larch No. 1



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	2007 @ 2"	3347 (2.25")	Passed (60%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	629 @ 1' 3/4"	3885	Passed (16%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1278 @ 1' 6"	4991	Passed (26%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.003 @ 1' 6"	0.067	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.004 @ 1' 6"	0.089	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	836	1320	2156	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.50"	836	1320	2156	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	2' 10" o/c	
Bottom Edge (Lu)	2' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 2' 10 3/4"	N/A	8.2	--	
1 - Uniform (PLF)	0 to 3' (Front)	N/A	550.0	880.0	Default Load

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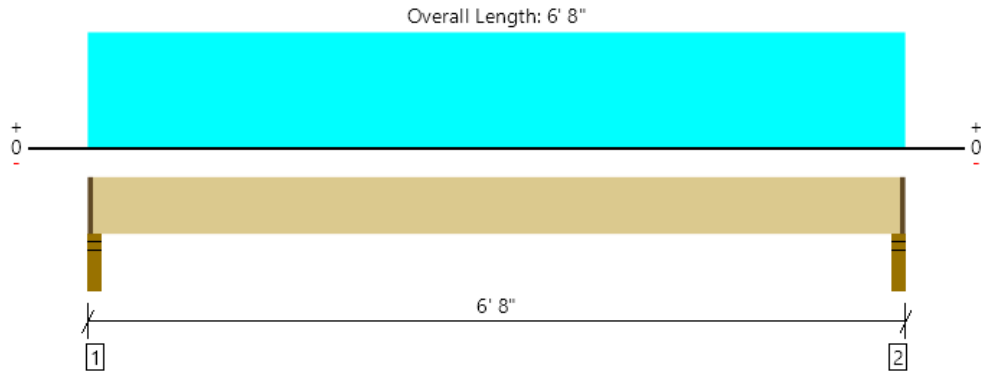
Floor, Typical Exterior Header (B2)

1 piece(s) 6 x 10 Douglas Fir-Larch No. 1



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3996 @ 2"	5259 (2.25")	Passed (76%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2784 @ 1' 1"	5922	Passed (47%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	6204 @ 3' 4"	9307	Passed (67%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.048 @ 3' 4"	0.158	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.079 @ 3' 4"	0.211	Passed (L/960)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.71"	1612	2511	4123	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.71"	1612	2511	4123	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	6' 6" o/c	
Bottom Edge (Lu)	6' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 6' 6 3/4"	N/A	13.2	--	
1 - Uniform (PLF)	0 to 6' 8" (Front)	N/A	470.8	753.3	Default Load

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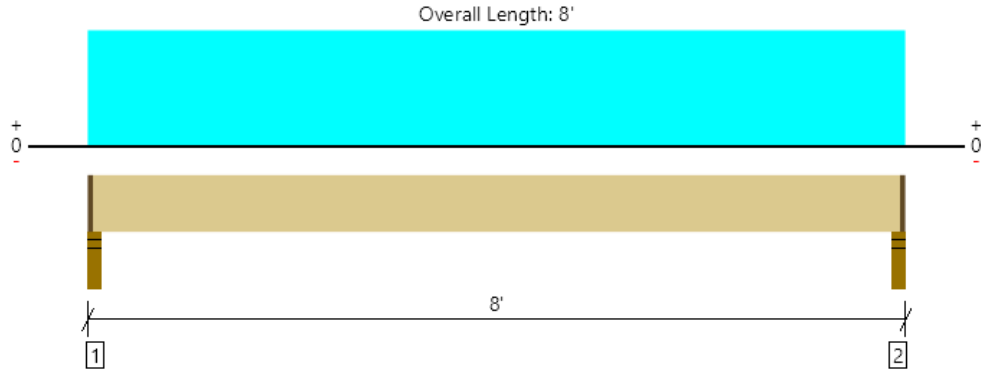
Floor, Typical Exterior Header (B2)-13'-9"
1 piece(s) 6 x 10 Douglas Fir-Larch No. 1



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	3597 @ 2"	5259 (2.25")	Passed (68%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	2693 @ 1' 1"	5922	Passed (45%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	6783 @ 4'	9307	Passed (73%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.077 @ 4'	0.192	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.127 @ 4'	0.256	Passed (L/725)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.54"	1452	2240	3692	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.54"	1452	2240	3692	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' 10" o/c	
Bottom Edge (Lu)	7' 10" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 7' 10 3/4"	N/A	13.2	--	
1 - Uniform (PLF)	0 to 8' (Front)	N/A	350.0	560.0	Default Load

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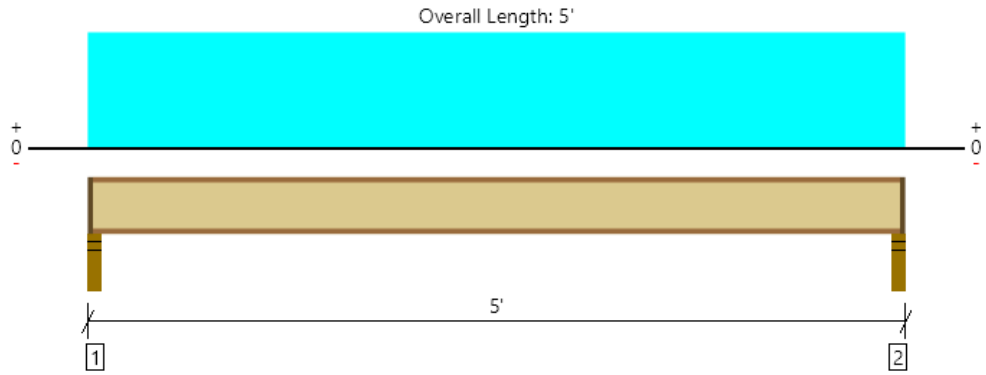
Floor, Typical Stairs Joists (J1)
1 piece(s) 11 7/8" TJI® 110 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	207 @ 2 1/2"	1041 (2.25")	Passed (20%)	1.00	1.0 D + 1.0 L (All Spans)
Shear (lbs)	191 @ 3 1/2"	1560	Passed (12%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	227 @ 2' 6"	3160	Passed (7%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.004 @ 2' 6"	0.115	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.007 @ 2' 6"	0.153	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
TJ-Pro™ Rating	72	40	Passed	--	--

System : Floor
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A structural analysis of the deck has not been performed.
- Deflection analysis is based on composite action with a single layer of 23/32" Weyerhaeuser Edge™ Panel (24" Span Rating) that is glued and nailed down.
- Additional considerations for the TJ-Pro™ Rating include: None.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.75"	83	133	216	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.75"	83	133	216	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 10" o/c	
Bottom Edge (Lu)	4' 10" o/c	

•TJI joists are only analyzed using Maximum Allowable bracing solutions.
•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Floor Live (1.00)	Comments
1 - Uniform (PLF)	0 to 5'	N/A	33.2	53.2	Default Load

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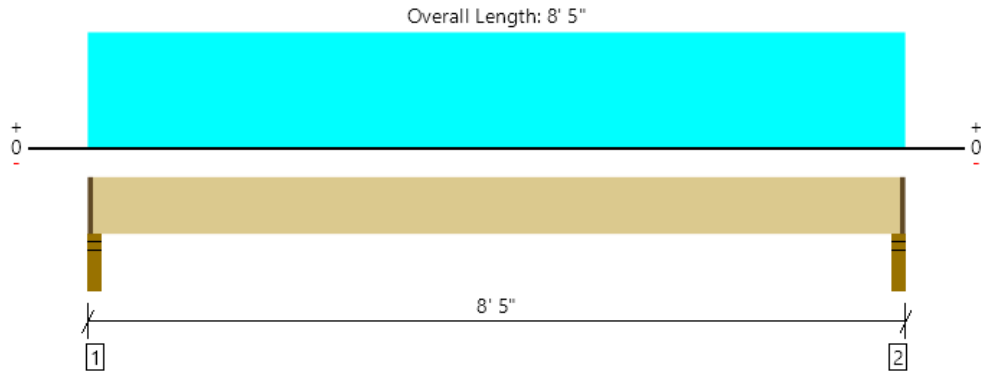
Floor, Typical Stairs Beam

1 piece(s) 3 1/2" x 7" 1.8E Parallam® PSL



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	954 @ 2"	3347 (2.25")	Passed (29%)	--	1.0 D + 1.0 L (All Spans)
Shear (lbs)	775 @ 10 1/2"	3757	Passed (21%)	1.00	1.0 D + 1.0 L (All Spans)
Moment (Ft-lbs)	1898 @ 4' 2 1/2"	6322	Passed (30%)	1.00	1.0 D + 1.0 L (All Spans)
Live Load Defl. (in)	0.094 @ 4' 2 1/2"	0.202	Passed (L/999+)	--	1.0 D + 1.0 L (All Spans)
Total Load Defl. (in)	0.134 @ 4' 2 1/2"	0.269	Passed (L/724)	--	1.0 D + 1.0 L (All Spans)

System : Floor
Member Type : Flush Beam
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Floor Live	Total	
1 - Stud wall - SPF	3.50"	2.25"	1.50"	294	683	977	1 1/4" Rim Board
2 - Stud wall - SPF	3.50"	2.25"	1.50"	294	683	977	1 1/4" Rim Board

• Rim Board is assumed to carry all loads applied directly above it, bypassing the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 3" o/c	
Bottom Edge (Lu)	8' 3" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Loads	Location (Side)	Tributary Width	Dead (0.90)	Floor Live (1.00)	Comments
0 - Self Weight (PLF)	1 1/4" to 8' 3 3/4"	N/A	7.6	--	
1 - Uniform (PLF)	0 to 8' 5" (Front)	N/A	62.4	162.4	Default Load

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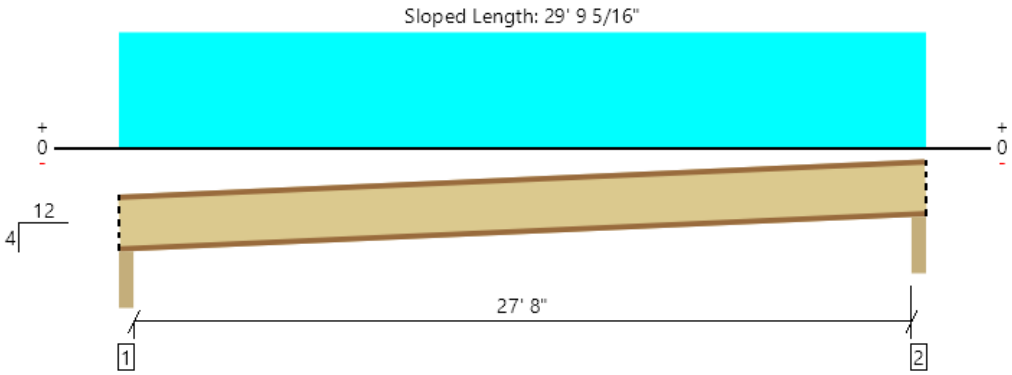
Roof, Typical Roof Joist (J-4)
2 piece(s) 11 7/8" TJI® 560 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Member Length : 30' 1 5/16"

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 4/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	826 @ 2 1/2"	3968 (3.50")	Passed (21%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	809 @ 3 1/2"	4715	Passed (17%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	5663 @ 14' 1 1/2"	21850	Passed (26%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.417 @ 14' 1 1/2"	0.733	Passed (L/844)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.733 @ 14' 1 1/2"	0.978	Passed (L/480)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/480) and TL (L/360).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Total	
1 - Beveled Plate - SPF	3.50"	3.50"	1.75"	356	470	470	1296	Blocking
2 - Beveled Plate - SPF	3.50"	3.50"	1.75"	356	470	470	1296	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	10' 8" o/c	
Bottom Edge (Lu)	29' 9" o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PLF)	0 to 28' 3"	N/A	23.9	33.2	33.2	Default Load

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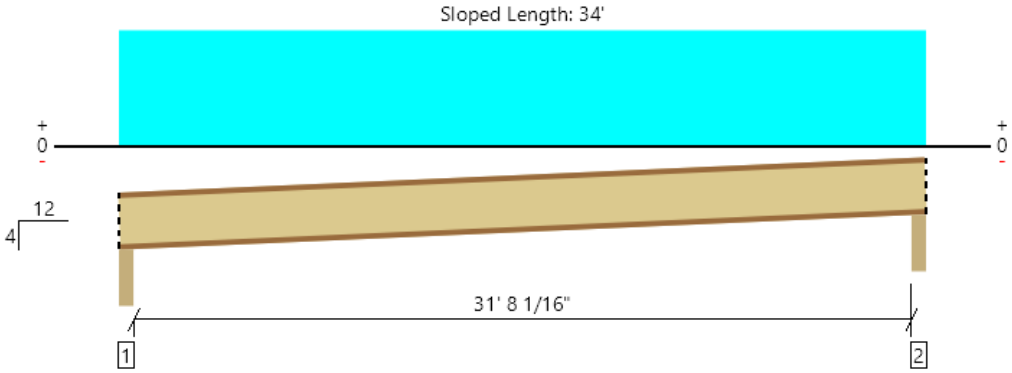
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

Roof, Typical Roof Joist (J-5)

1 piece(s) 14" TJI® 560 @ 16" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Member Length : 34' 4 5/8"

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2015
Design Methodology : ASD
Member Pitch : 4/12

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	943 @ 2 1/2"	1984 (3.50")	Passed (48%)	1.15	1.0 D + 1.0 S (All Spans)
Shear (lbs)	926 @ 3 1/2"	2749	Passed (34%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	7410 @ 16' 1 1/2"	12966	Passed (57%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.977 @ 16' 1 1/2"	1.678	Passed (L/412)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	1.719 @ 16' 1 1/2"	2.237	Passed (L/234)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.

Supports	Bearing Length			Loads to Supports (lbs)				Accessories
	Total	Available	Required	Dead	Roof Live	Snow	Total	
1 - Beveled Plate - SPF	3.50"	3.50"	1.75"	407	536	536	1479	Blocking
2 - Beveled Plate - SPF	3.50"	3.50"	1.75"	407	536	536	1479	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	7' o/c	
Bottom Edge (Lu)	34' o/c	

- TJI joists are only analyzed using Maximum Allowable bracing solutions.
- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Roof Live (non-snow: 1.25)	Snow (1.15)	Comments
1 - Uniform (PLF)	0 to 32' 3 1/16"	N/A	23.9	33.2	33.2	Default Load

Weyerhaeuser Notes

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

STUD WALLS

PCS Structural Solutions

Project: MERCER ISLAND Job Number: 19-028

Sheet: 1 of 1 Name: AK

Originating Office: Seattle Date : 5/19/2020

	DEAD	LIVE	SNOW
ROOF:	18 PSF	25 PSF	25 PSF
RESIDENTIAL:	30 PSF	40 PSF	0 PSF
STAIRS:	10 PSF	100 PSF	0 PSF
WALLS:	9 PSF	0 PSF	0 PSF

LEVE	WALL	TRIB. WIDTH (ft)	DL (plf)	LLroof (plf)	SL (plf)	DL (lbs)	LL (lbs)	SL (lbs)
4	A.1	1.83	42.09	45.75	45.75	55.98	60.85	60.85
	9.1	4.50	103.50	112.50	112.50	137.66	149.63	149.63
	4.3	10.83	249.09	270.75	270.75	331.29	360.10	360.10
	C.2	12.33	283.59	308.25	308.25	377.17	409.97	409.97
	Exterior	14.00	322.00	350.00	350.00	428.26	465.50	465.50
	O.1	16.17	371.91	404.25	404.25	494.64	537.65	537.65
	J.1	18.92	435.16	473.00	473.00	578.76	629.09	629.09
	Q.1/(4.2-2x6)	22.00	506.00	550.00	550.00	672.98	731.50	731.50
	1.11	24.67	567.41	616.75	616.75	754.66	820.28	820.28

LEVE	WALL	TRIB. WIDTH (ft)	DL (plf)	LLfloor (plf)	SL (plf)	DL (lbs)	LLfloor (lbs)	SL/LLroof
3	A.1	1.83	96.99	73.20	45.75	129.00	97.36	60.85
	9.1	4.50	238.5	180.00	112.50	317.21	239.40	149.63
	4.3	10.83	573.99	433.20	270.75	763.41	576.16	360.10
	C.2	12.33	653.49	493.20	308.25	869.14	655.96	409.97
	Exterior	14.00	742	560.00	350.00	986.86	744.80	465.50
	O.1	16.17	857.01	646.80	404.25	1139.82	860.24	537.65
	J.1	18.92	1002.76	756.80	473.00	1333.67	1006.54	629.09
	Q.1	22.00	1166	880.00	550.00	1550.78	1170.40	731.50
	1.11	24.67	1307.51	986.80	616.75	1738.99	1312.44	820.28

LEVE	WALL	TRIB. WIDTH (ft)	DL (plf)	LLfloor (plf)	SL (plf)	DL (lbs)	LLfloor (lbs)	SL/LLroof
2	A.1	1.83	151.89	146.40	45.75	202.01	194.71	60.85
	9.1	4.50	373.5	360.00	112.50	496.76	478.80	149.63
	4.3	10.83	898.89	866.40	270.75	1195.52	1152.31	360.10
	C.2	12.33	1023.39	986.40	308.25	1361.11	1311.91	409.97
	Exterior	14.00	1162	1120.00	350.00	1545.46	1489.60	465.50
	O.1	16.17	1342.11	1293.60	404.25	1785.01	1720.49	537.65
	J.1	18.92	1570.36	1513.60	473.00	2088.58	2013.09	629.09
	Q.1	22.00	1826	1760.00	550.00	2428.58	2340.80	731.50
	1.11	24.67	2047.61	1973.60	616.75	2723.32	2624.89	820.28

PCS Structural Solutions

Project: Mercer Island | Job Number: 19-028

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - A.1

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE: DF#2

F_b =	900 PSI		
F_c =	1350 PSI		
$F_{c\perp}$ =	625 PSI		
E =	1.60E+06 PSI		

APPLIED LOADS:

W_{WIND} =	8.0 PSF	P_{DEAD} =	190	LBS
$W_{SEISMIC}$ =	5.0 PSF	P_{LIVE} =	195	LBS
		P_{SNOW} =	61	LBS
		P_{WIND} =	0	LBS
		$P_{SEISMIC}$ =	0	LBS

STUD SIZE: (1) 2x4

A_X =	5.25 IN^2				
S_X =	3.06 IN^3				
I_X =	5.36 IN^4				
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)				
F_{cE} =	469.1 PSI				
C_b =	1.25 (NDS 3.10.4)				

MISCELLANEOUS:

HEIGHT =	9.33 FT		
SPACING =	16 IN		
ECCENTRICITY =	0.1 IN		
$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)		
		APPLY?	
$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1)
$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9)

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	385	73	73	3	75	292
2	251	48	73	2	74	289
3	382	73	73	3	75	292
4	382	73	52	3	54	212
5	190	36	70	2	71	277
6	190	36	51	2	52	203
7	382	73	38	3	40	158

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.17	0.19	0.09	0.25	0.16	0.14	L/822
2	0.11	0.16	0.06	0.19	0.10	0.13	L/830
3	0.17	0.16	0.09	0.22	0.15	0.14	L/822
4*	0.16	0.07	0.09	0.10	0.15	0.05	L/2422
5*	0.08	0.09	0.05	0.10	0.08	0.06	L/1859
6	0.08	0.08	0.05	0.09	0.08	0.09	L/1184
7	0.16	0.06	0.09	0.10	0.15	0.07	L/1515
MAX. --->	0.17	0.19	0.09	0.25	0.16	0.14	L/822
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:

C_{fu} =	1.1 (NDS 4.3.7)	
F_V =	150 PSI	

ALLOWABLE STRESSES:

F_V' =	173 PSI	
F_b' =	1708 PSI	

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:

A_X =	10.50 IN^2	
S_X =	2.63 IN^3	
I_X =	1.97 IN^4	

APPLIED STRESSES:

f_v =	24 PSI	<--- O.K.
f_b =	382 PSI	<--- O.K.
Δ_{MAX} =	0.007 IN	

PCS Structural Solutions

Project: Mercer Island | Job Number: 19-028

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - 9.1

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE: DF#2

F_b =	900 PSI		
F_c =	1350 PSI		
$F_{c\perp}$ =	625 PSI		
E =	1.60E+06 PSI		

APPLIED LOADS:

W_{WIND} =	8.0 PSF	P_{DEAD} =	467	LBS
$W_{SEISMIC}$ =	5.0 PSF	P_{LIVE} =	479	LBS
		P_{SNOW} =	150	LBS
		P_{WIND} =	0	LBS
		$P_{SEISMIC}$ =	0	LBS

STUD SIZE: (1) 2x4

A_X =	5.25 IN^2		
S_X =	3.06 IN^3		
I_X =	5.36 IN^4		
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)		
F_{cE} =	469.1 PSI		
C_b =	1.25 (NDS 3.10.4)		

MISCELLANEOUS:

HEIGHT =	9.33 FT		
SPACING =	16 IN		
ECCENTRICITY =	0.1 IN		
$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)		
		APPLY?	
$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1)
$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9)

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	946	180	73	8	77	304
2	616	117	73	5	76	297
3	938	179	73	8	77	303
4	938	179	52	8	57	224
5	467	89	70	4	72	282
6	467	89	51	4	53	208
7	938	179	38	8	43	170

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.41	0.20	0.23	0.49	0.38	0.14	L/791
2	0.27	0.17	0.15	0.29	0.25	0.14	L/809
3	0.41	0.17	0.23	0.44	0.38	0.14	L/791
4*	0.40	0.07	0.23	0.27	0.38	0.05	L/2299
5*	0.20	0.09	0.11	0.15	0.19	0.06	L/1822
6	0.20	0.08	0.11	0.14	0.19	0.10	L/1152
7	0.40	0.07	0.23	0.27	0.38	0.08	L/1414
MAX. --->	0.41	0.20	0.23	0.49	0.38	0.14	L/791
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:

C_{fu} =	1.1 (NDS 4.3.7)	
F_V =	150 PSI	

ALLOWABLE STRESSES:

F_V' =	173 PSI	
F_b' =	1708 PSI	

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:

A_X =	10.50 IN^2	
S_X =	2.63 IN^3	
I_X =	1.97 IN^4	

APPLIED STRESSES:

f_V =	59 PSI	<--- O.K.
f_b =	939 PSI	<--- O.K.
Δ_{MAX} =	0.017 IN	

PCS Structural Solutions

Project: Mercer Island | Job Number: 19-028

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - 4.3

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE:	DF#2		APPLIED LOADS:			
F_b =	900 PSI		W_{WIND} =	8.0 PSF	P_{DEAD} =	1124 LBS
F_c =	1350 PSI		$W_{SEISMIC}$ =	5.0 PSF	P_{LIVE} =	1152 LBS
$F_{c\perp}$ =	625 PSI				P_{SNOW} =	360 LBS
E =	1.60E+06 PSI				P_{WIND} =	0 LBS
					$P_{SEISMIC}$ =	0 LBS

STUD SIZE:	(1) 2x4		MISCELLANEOUS:			
A_X =	5.25 IN^2			HEIGHT =	9.33 FT	
S_X =	3.06 IN^3			SPACING =	16 IN	
I_X =	5.36 IN^4			ECCENTRICITY =	0.1 IN	
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)			$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)	
					APPLY?	
F_{cE} =	469.1 PSI		$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1)
C_D =	1.25 (NDS 3.10.4)		$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9)

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	2276	433	73	19	84	331
2	1484	283	73	12	80	315
3	2258	430	73	19	84	330
4	2258	430	52	19	64	251
5	1124	214	70	9	75	296
6	1124	214	51	9	57	222
7	2258	430	38	19	50	197

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	1.00	0.21	0.55	3.80	0.92	0.15	L/726
2	0.64	0.18	0.36	0.86	0.60	0.15	L/763
3	0.98	0.19	0.55	3.18	0.92	0.15	L/727
4*	0.96	0.08	0.55	1.85	0.92	0.05	L/2052
5*	0.48	0.09	0.27	0.39	0.46	0.06	L/1739
6	0.48	0.09	0.27	0.39	0.46	0.10	L/1082
7	0.96	0.08	0.55	1.87	0.92	0.09	L/1220
MAX. --->	1.00	0.21	0.55	3.80	0.92	0.15	L/726
	O.K.	O.K.	O.K.	N.G.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:			ALLOWABLE STRESSES:	
C_{fu} =	1.1 (NDS 4.3.7)		F_v' =	173 PSI
F_v =	150 PSI		F_b' =	1708 PSI

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:			APPLIED STRESSES:		
A_X =	10.50 IN^2		f_v =	141 PSI	<--- O.K.
S_X =	2.63 IN^3		f_b =	2261 PSI	<--- N.G.
I_X =	1.97 IN^4		Δ_{MAX} =	0.040 IN	

PCS Structural Solutions

Project: Mercer Island | Job Number: 19-028

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - 4.3

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE:	DF#2		APPLIED LOADS:			
F_b =	900 PSI		W_{WIND} =	8.0 PSF	P_{DEAD} =	691 LBS
F_c =	1350 PSI		$W_{SEISMIC}$ =	5.0 PSF	P_{LIVE} =	576 LBS
$F_{c\perp}$ =	625 PSI				P_{SNOW} =	360 LBS
E =	1.60E+06 PSI				P_{WIND} =	0 LBS
					$P_{SEISMIC}$ =	0 LBS

STUD SIZE:	(1) 2x4		MISCELLANEOUS:			
A_X =	5.25 IN^2			HEIGHT =	9.33 FT	
S_X =	3.06 IN^3			SPACING =	16 IN	
I_X =	5.36 IN^4			ECCENTRICITY =	0.1 IN	
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)			$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)	
					APPLY?	
F_{cE} =	469.1 PSI		$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1)
C_b =	1.25 (NDS 3.10.4)		$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9)

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	1268	241	73	11	79	310
2	1051	200	73	9	78	306
3	1394	265	73	12	80	313
4	1394	265	52	12	59	233
5	691	132	70	6	73	287
6	691	132	51	6	54	213
7	1394	265	38	12	46	179

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.55	0.20	0.31	0.72	0.51	0.14	L/774
2	0.45	0.17	0.26	0.51	0.43	0.14	L/785
3	0.60	0.18	0.34	0.77	0.57	0.15	L/768
4*	0.59	0.07	0.34	0.51	0.57	0.05	L/2207
5*	0.29	0.09	0.17	0.21	0.28	0.06	L/1793
6	0.29	0.09	0.17	0.21	0.28	0.10	L/1127
7	0.59	0.07	0.34	0.52	0.57	0.08	L/1341
MAX. --->	0.60	0.20	0.34	0.77	0.57	0.15	L/768
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:			ALLOWABLE STRESSES:	
C_{fu} =	1.1 (NDS 4.3.7)		F_v' =	173 PSI
F_v =	150 PSI		F_b' =	1708 PSI

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:			APPLIED STRESSES:		
A_X =	10.50 IN^2		f_v =	100 PSI	<--- O.K.
S_X =	2.63 IN^3		f_b =	1602 PSI	<--- O.K.
I_X =	1.97 IN^4		Δ_{MAX} =	0.028 IN	

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Project: Mercer Island | Job Number: 19-028

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - C.2

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE: DF#2

F_b =	900 PSI	W_{WIND} =	8.0 PSF
F_c =	1350 PSI	$W_{SEISMIC}$ =	5.0 PSF
$F_{c\perp}$ =	625 PSI		
E =	1.60E+06 PSI		

APPLIED LOADS:

P_{DEAD} =	1279	LBS
P_{LIVE} =	1312	LBS
P_{SNOW} =	410	LBS
P_{WIND} =	0	LBS
$P_{SEISMIC}$ =	0	LBS

STUD SIZE: (2) 2x4

A_X =	10.50 IN^2		
S_X =	6.13 IN^3		
I_X =	10.72 IN^4		
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)		
F_{cE} =	469.1 PSI	$C_{SYS(BENDING)}$ =	1.50
C_b =	1.13 (NDS 3.10.4)	$C_{r(BENDING)}$ =	1.15

MISCELLANEOUS:

HEIGHT =	9.33 FT		
SPACING =	16 IN		
ECCENTRICITY =	0.1 IN		
$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)		
	APPLY?		
	YES	(SDPWS T3.1.1.1)	
	YES	(NDS 4.3.9)	

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.525EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	703
2 & 3	1.15	1785	0.26	0.247	440	1785	703
4 & 5	1.60	2484	0.19	0.181	449	3240	703
6 & 7	1.60	2484	0.19	0.181	449	2484	703

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	2591	247	73	22	86	169
2	1689	161	73	14	81	159
3	2571	245	73	21	86	168
4	2571	245	52	21	66	129
5	1279	122	70	11	76	149
6	1279	122	51	11	57	113
7	2571	245	38	21	52	102

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.57	0.11	0.35	0.55	0.53	0.08	L/1424
2	0.37	0.09	0.23	0.27	0.34	0.07	L/1507
3	0.56	0.09	0.35	0.51	0.52	0.08	L/1426
4*	0.54	0.04	0.35	0.38	0.52	0.03	L/4002
5*	0.27	0.05	0.17	0.14	0.26	0.03	L/3442
6	0.27	0.05	0.17	0.13	0.26	0.05	L/2133
7	0.54	0.04	0.35	0.38	0.52	0.05	L/2364
MAX. --->	0.57	0.11	0.35	0.55	0.53	0.08	L/1424
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:

C_{fu} =	1.1 (NDS 4.3.7)	
F_V =	150 PSI	

ALLOWABLE STRESSES:

F_V' =	173 PSI	
F_b' =	1708 PSI	

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:

A_X =	10.50 IN^2	
S_X =	2.63 IN^3	
I_X =	1.97 IN^4	

APPLIED STRESSES:

f_V =	161 PSI	<--- O.K.
f_b =	2574 PSI	<--- N.G.
Δ_{MAX} =	0.046 IN	

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Project: Mercer Island | Job Number: 19-028

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - C.2

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE:	DF#2		APPLIED LOADS:			
F_b =	900 PSI		W_{WIND} =	8.0 PSF	P_{DEAD} =	787 LBS
F_c =	1350 PSI		$W_{SEISMIC}$ =	5.0 PSF	P_{LIVE} =	656 LBS
$F_{c\perp}$ =	625 PSI				P_{SNOW} =	110 LBS
E =	1.60E+06 PSI				P_{WIND} =	0 LBS
					$P_{SEISMIC}$ =	0 LBS

STUD SIZE:	(1) 2x4		MISCELLANEOUS:		
A_X =	5.25 IN^2		HEIGHT =	9.33 FT	
S_X =	3.06 IN^3		SPACING =	16 IN	
I_X =	5.36 IN^4		ECCENTRICITY =	0.1 IN	
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)		$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)	
				APPLY?	
F_{cE} =	469.1 PSI		$C_{SYS(BENDING)}$ =	1.50 YES	(SDPWS T3.1.1.1)
C_D =	1.25 (NDS 3.10.4)		$C_{r(BENDING)}$ =	1.15 YES	(NDS 4.3.9)

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	1443	275	73	12	80	314
2	897	171	73	7	77	303
3	1362	259	73	11	80	312
4	1362	259	52	11	59	232
5	787	150	70	7	74	289
6	787	150	51	7	55	215
7	1362	259	38	11	46	178

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.63	0.20	0.35	0.89	0.59	0.15	L/765
2	0.39	0.17	0.22	0.42	0.36	0.14	L/794
3	0.59	0.17	0.33	0.74	0.55	0.15	L/769
4*	0.58	0.07	0.33	0.49	0.55	0.05	L/2213
5*	0.33	0.09	0.19	0.24	0.32	0.06	L/1781
6	0.33	0.09	0.19	0.24	0.32	0.10	L/1117
7	0.58	0.07	0.33	0.49	0.55	0.08	L/1346
MAX. --->	0.63	0.20	0.35	0.89	0.59	0.15	L/765
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:		ALLOWABLE STRESSES:	
C_{fu} =	1.1 (NDS 4.3.7)	F_v' =	173 PSI
F_v =	150 PSI	F_b' =	1708 PSI

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:		APPLIED STRESSES:		
A_X =	10.50 IN^2	f_v =	85 PSI	<--- O.K.
S_X =	2.63 IN^3	f_b =	1367 PSI	<--- O.K.
I_X =	1.97 IN^4	Δ_{MAX} =	0.024 IN	

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Project: Mercer Island | Job Number: 19-028

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - C.2

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE:	DF#2		APPLIED LOADS:			
F_b =	900 PSI		W_{WIND} =	8.0 PSF	P_{DEAD} =	1545 LBS
F_c =	1350 PSI		$W_{SEISMIC}$ =	5.0 PSF	P_{LIVE} =	1490 LBS
$F_{c\perp}$ =	625 PSI				P_{SNOW} =	466 LBS
E =	1.60E+06 PSI				P_{WIND} =	0 LBS
					$P_{SEISMIC}$ =	0 LBS

STUD SIZE:	(1) 2x6		MISCELLANEOUS:			
A_X =	8.25 IN^2			HEIGHT =	9.33 FT	
S_X =	7.56 IN^3			SPACING =	16 IN	
I_X =	20.80 IN^4			ECCENTRICITY =	0.1 IN	
$C_{F(BENDING)}$ =	1.3 (NDS 4.3.6)			$C_{F(COMPRESSION)}$ =	1.10 (NDS 4.3.6)	
					APPLY?	
F_{cE} =	1158.4 PSI		$C_{SYS(BENDING)}$ =	1.35	YES	(SDPWS T3.1.1.1)
C_b =	1.25 (NDS 3.10.4)		$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9)

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.53SEISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1485	0.78	0.600	891	1346	781
2 & 3	1.15	1708	0.68	0.547	933	1547	781
4 & 5	1.60	2376	0.49	0.425	1009	2527	781
6 & 7	1.60	2376	0.49	0.425	1009	2153	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	3035	368	73	25	88	140
2	2011	244	73	17	83	132
3	3012	365	73	25	88	140
4	3012	365	52	25	68	108
5	1545	187	70	13	78	123
6	1545	187	51	13	59	93
7	3012	365	38	25	54	86

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.41	0.10	0.47	0.32	0.32	0.04	L/2691
2	0.26	0.09	0.31	0.18	0.21	0.04	L/2864
3	0.39	0.09	0.47	0.29	0.32	0.04	L/2695
4*	0.36	0.04	0.47	0.19	0.32	0.02	L/6752
5*	0.19	0.05	0.24	0.09	0.16	0.02	L/5902
6	0.19	0.04	0.24	0.09	0.16	0.03	L/4042
7	0.36	0.04	0.47	0.19	0.32	0.03	L/4392
MAX. --->	0.41	0.10	0.47	0.32	0.32	0.04	L/2691
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:		ALLOWABLE STRESSES:	
C_{fu} =	1.15 (NDS 4.3.7)	F_v' =	173 PSI
F_v =	150 PSI	F_b' =	1547 PSI

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:		APPLIED STRESSES:		
A_X =	16.50 IN^2	f_v =	122 PSI	<--- O.K.
S_X =	4.13 IN^3	f_b =	1950 PSI	<--- N.G.
I_X =	3.09 IN^4	Δ_{MAX} =	0.035 IN	

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Project: Mercer Island | Job Number: 19-028

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - 0.1 (Demising)

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE: DF#2

F_b =	900 PSI		
F_c =	1350 PSI		
$F_{c\perp}$ =	625 PSI		
E =	1.60E+06 PSI		

APPLIED LOADS:

W_{WIND} =	8.0 PSF	P_{DEAD} =	839 LBS
$W_{SEISMIC}$ =	5.0 PSF	P_{LIVE} =	860 LBS
		P_{SNOW} =	269 LBS
		P_{WIND} =	0 LBS
		$P_{SEISMIC}$ =	0 LBS

STUD SIZE: (1) 2x4

A_X =	5.25 IN^2		
S_X =	3.06 IN^3		
I_X =	5.36 IN^4		
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)		
F_{cE} =	469.1 PSI		
C_b =	1.25 (NDS 3.10.4)		

MISCELLANEOUS:

HEIGHT =	9.33 FT		
SPACING =	16 IN		
ECCENTRICITY =	0.1 IN		
$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)		
		APPLY?	
$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1)
$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9)

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	1699	324	73	14	81	319
2	1108	211	73	9	78	307
3	1686	321	73	14	81	319
4	1686	321	52	14	61	239
5	839	160	70	7	74	290
6	839	160	51	7	55	216
7	1686	321	38	14	47	185

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.74	0.21	0.41	1.22	0.69	0.15	L/753
2	0.48	0.17	0.27	0.54	0.45	0.14	L/782
3	0.73	0.18	0.41	1.10	0.68	0.15	L/753
4*	0.71	0.07	0.41	0.74	0.68	0.05	L/2152
5*	0.36	0.09	0.20	0.26	0.34	0.06	L/1774
6	0.36	0.09	0.20	0.26	0.34	0.10	L/1111
7	0.71	0.07	0.41	0.75	0.68	0.09	L/1297
MAX. --->	0.74	0.21	0.41	1.22	0.69	0.15	L/753
	O.K.	O.K.	O.K.	N.G.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:

C_{fu} =	1.1 (NDS 4.3.7)		
F_V =	150 PSI		

ALLOWABLE STRESSES:

F_v' =	173 PSI		
F_b' =	1708 PSI		

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:

A_X =	10.50 IN^2		
S_X =	2.63 IN^3		
I_X =	1.97 IN^4		

APPLIED STRESSES:

f_v =	105 PSI	<--- O.K.	
f_b =	1688 PSI	<--- O.K.	
Δ_{MAX} =	0.030 IN		

PCS Structural Solutions

Project: Mercer Island | Job Number: 19-028 | NOTES:

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - J.1 (Demising)

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE:	DF#2		APPLIED LOADS:		P_{DEAD} =	981	LBS
F_b =	900	PSI	W_{WIND} =	8.0 PSF	P_{LIVE} =	1007	LBS
F_c =	1350	PSI	$W_{SEISMIC}$ =	5.0 PSF	P_{SNOW} =	315	LBS
$F_{c\perp}$ =	625	PSI			P_{WIND} =	0	LBS
E =	1.60E+06	PSI			$P_{SEISMIC}$ =	0	LBS

STUD SIZE:	(1) 2x4		MISCELLANEOUS:		HEIGHT =	9.33	FT
A_X =	5.25	IN^2			SPACING =	16	IN
S_X =	3.06	IN^3			ECCENTRICITY =	0.1	IN
I_X =	5.36	IN^4			$C_{F(COMPRESSION)}$ =	1.15	(NDS 4.3.6)
$C_{F(BENDING)}$ =	1.5	(NDS 4.3.6)				APPLY?	
F_{cE} =	469.1	PSI		$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1) Is not applied w/ Cr
C_b =	1.25	(NDS 3.10.4)		$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9) Is not applied w/ Csys

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT.\ LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	1988	379	73	17	83	325
2	1296	247	73	11	79	311
3	1972	376	73	16	83	324
4	1972	376	52	16	63	245
5	981	187	70	8	75	293
6	981	187	51	8	56	219
7	1972	376	38	16	49	191

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.87	0.21	0.48	1.84	0.81	0.15	L/739
2	0.56	0.17	0.32	0.68	0.53	0.14	L/773
3	0.85	0.18	0.48	1.64	0.80	0.15	L/740
4*	0.84	0.08	0.48	1.08	0.80	0.05	L/2101
5*	0.42	0.09	0.24	0.32	0.40	0.06	L/1756
6	0.42	0.09	0.24	0.32	0.40	0.10	L/1096
7	0.84	0.08	0.48	1.09	0.80	0.09	L/1258
MAX. --->	0.87	0.21	0.48	1.84	0.81	0.15	L/739
	O.K.	O.K.	O.K.	N.G.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:			ALLOWABLE STRESSES:			STUD REACTIONS (OUT - OF - PLANE)
C_{fu} =	1.1	(NDS 4.3.7)	F_v' =	173	PSI	
F_v =	150	PSI	F_b' =	1708	PSI	50 LB

DBL TOP PLATE PROPERTIES:			APPLIED STRESSES:			
A_X =	10.50	IN^2	f_v =	123	PSI	<--- O.K.
S_X =	2.63	IN^3	f_b =	1975	PSI	<--- N.G.
I_X =	1.97	IN^4	Δ_{MAX} =	0.035	IN	

PCS Structural Solutions

Project: Mercer Island | Job Number: 19-028 | NOTES:

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - J.1 (Demising)

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE:	DF#2	APPLIED LOADS:		P_{DEAD} =	604	LBS
F_b =	900 PSI	W_{WIND} =	8.0 PSF	P_{LIVE} =	503	LBS
F_c =	1350 PSI	$W_{SEISMIC}$ =	5.0 PSF	P_{SNOW} =	315	LBS
$F_{c\perp}$ =	625 PSI			P_{WIND} =	0	LBS
E =	1.60E+06 PSI			$P_{SEISMIC}$ =	0	LBS

STUD SIZE:	(1) 2x4	MISCELLANEOUS:	HEIGHT =	9.33 FT	
A_X =	5.25 IN^2		SPACING =	16 IN	
S_X =	3.06 IN^3		ECCENTRICITY =	0.1 IN	
I_X =	5.36 IN^4		$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)	
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)			APPLY?	
F_{cE} =	469.1 PSI		$C_{SYS(BENDING)}$ =	1.50 YES	(SDPWS T3.1.1.1) Is not applied w/ Cr
C_b =	1.25 (NDS 3.10.4)		$C_{r(BENDING)}$ =	1.15 YES	(NDS 4.3.9) Is not applied w/ Csys

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	1107	211	73	9	78	307
2	918	175	73	8	77	303
3	1217	232	73	10	79	309
4	1217	232	52	10	59	229
5	604	115	70	5	73	285
6	604	115	51	5	54	211
7	1217	232	38	10	45	175

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.48	0.20	0.27	0.59	0.45	0.14	L/782
2	0.40	0.17	0.22	0.43	0.37	0.14	L/792
3	0.53	0.17	0.30	0.62	0.49	0.14	L/777
4*	0.52	0.07	0.30	0.41	0.49	0.05	L/2242
5*	0.26	0.09	0.15	0.18	0.25	0.06	L/1804
6	0.26	0.09	0.15	0.18	0.25	0.10	L/1136
7	0.52	0.07	0.30	0.41	0.49	0.08	L/1368
MAX. --->	0.53	0.20	0.30	0.62	0.49	0.14	L/777
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:		ALLOWABLE STRESSES:		STUD REACTIONS (OUT - OF - PLANE)
C_{fu} =	1.1 (NDS 4.3.7)	F_v' =	173 PSI	
F_v =	150 PSI	F_b' =	1708 PSI	50 LB

DBL TOP PLATE PROPERTIES:		APPLIED STRESSES:		
A_X =	10.50 IN^2	f_v =	87 PSI	<--- O.K.
S_X =	2.63 IN^3	f_b =	1400 PSI	<--- O.K.
I_X =	1.97 IN^4	Δ_{MAX} =	0.025 IN	

PCS Structural Solutions

Project: Mercer Island | Job Number: 19-028 | NOTES:

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - Q.1 (Demising)

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE:	DF#2		APPLIED LOADS:	P_{DEAD} =	1141	LBS
F_b =	900 PSI		W_{WIND} =	8.0 PSF	P_{LIVE} =	1120 LBS
F_c =	1350 PSI		$W_{SEISMIC}$ =	5.0 PSF	P_{SNOW} =	366 LBS
$F_{c\perp}$ =	625 PSI				P_{WIND} =	0 LBS
E =	1.60E+06 PSI				$P_{SEISMIC}$ =	0 LBS

STUD SIZE:	(1) 2x4		MISCELLANEOUS:	HEIGHT =	9.33 FT	
A_X =	5.25 IN^2			SPACING =	16 IN	
S_X =	3.06 IN^3			ECCENTRICITY =	0.1 IN	
I_X =	5.36 IN^4			$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)	
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)				APPLY?	
F_{cE} =	469.1 PSI		$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1) Is not applied w/ Cr
C_b =	1.25 (NDS 3.10.4)		$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9) Is not applied w/ Csys

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	2262	431	73	19	84	330
2	1507	287	73	13	80	315
3	2256	430	73	19	84	330
4	2256	430	52	19	64	251
5	1141	217	70	10	76	296
6	1141	217	51	10	57	222
7	2256	430	38	19	50	197

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.99	0.21	0.55	3.59	0.92	0.15	L/727
2	0.65	0.18	0.37	0.88	0.61	0.15	L/762
3	0.98	0.18	0.55	3.15	0.92	0.15	L/727
4*	0.96	0.08	0.55	1.84	0.92	0.05	L/2052
5*	0.48	0.09	0.28	0.40	0.46	0.06	L/1737
6	0.48	0.09	0.28	0.40	0.46	0.10	L/1080
7	0.96	0.08	0.55	1.86	0.92	0.09	L/1221
MAX. --->	0.99	0.21	0.55	3.59	0.92	0.15	L/727
	O.K.	O.K.	O.K.	N.G.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:		ALLOWABLE STRESSES:	
C_{fu} =	1.1 (NDS 4.3.7)	F_v' =	173 PSI
F_v =	150 PSI	F_b' =	1708 PSI

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:		APPLIED STRESSES:		
A_X =	10.50 IN^2	f_v =	144 PSI	<--- O.K.
S_X =	2.63 IN^3	f_b =	2296 PSI	<--- N.G.
I_X =	1.97 IN^4	Δ_{MAX} =	0.041 IN	

PCS Structural Solutions

Project: Mercer Island | Job Number: 19-028 | NOTES:

Sheet: 1 of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/20

STUD WALL DESIGN - Q.1 (Demising)

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE:	DF#2	APPLIED LOADS:		P_{DEAD} =	702	LBS
F_b =	900 PSI	W_{WIND} =	8.0 PSF	P_{LIVE} =	585	LBS
F_c =	1350 PSI	$W_{SEISMIC}$ =	5.0 PSF	P_{SNOW} =	366	LBS
$F_{c\perp}$ =	625 PSI			P_{WIND} =	0	LBS
E =	1.60E+06 PSI			$P_{SEISMIC}$ =	0	LBS

STUD SIZE:	(1) 2x4	MISCELLANEOUS:	HEIGHT =	9.33 FT	
A_X =	5.25 IN^2		SPACING =	16 IN	
S_X =	3.06 IN^3		ECCENTRICITY =	0.1 IN	
I_X =	5.36 IN^4		$C_{F(COMPRESSION)}$ =	1.15 (NDS 4.3.6)	
$C_{F(BENDING)}$ =	1.5 (NDS 4.3.6)			APPLY?	
F_{cE} =	469.1 PSI	$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1) Is not applied w/ Cr
C_b =	1.25 (NDS 3.10.4)	$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9) Is not applied w/ Csys

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT.\ LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	1287	245	73	11	79	311
2	1068	203	73	9	78	306
3	1415	270	73	12	80	313
4	1415	270	52	12	60	234
5	702	134	70	6	73	287
6	702	134	51	6	54	213
7	1415	270	38	12	46	180

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.56	0.20	0.31	0.74	0.52	0.14	L/773
2	0.46	0.17	0.26	0.52	0.43	0.14	L/784
3	0.61	0.18	0.35	0.79	0.57	0.15	L/767
4*	0.60	0.07	0.35	0.53	0.57	0.05	L/2203
5*	0.30	0.09	0.17	0.21	0.29	0.06	L/1791
6	0.30	0.09	0.17	0.21	0.29	0.10	L/1126
7	0.60	0.07	0.35	0.53	0.57	0.08	L/1337
MAX. --->	0.61	0.20	0.35	0.79	0.57	0.15	L/767
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:		ALLOWABLE STRESSES:		STUD REACTIONS (OUT - OF - PLANE)
C_{fu} =	1.1 (NDS 4.3.7)	F_v' =	173 PSI	
F_v =	150 PSI	F_b' =	1708 PSI	50 LB

DBL TOP PLATE PROPERTIES:		APPLIED STRESSES:		
A_X =	10.50 IN^2	f_v =	102 PSI	<--- O.K.
S_X =	2.63 IN^3	f_b =	1627 PSI	<--- O.K.
I_X =	1.97 IN^4	Δ_{MAX} =	0.029 IN	

PCS Structural Solutions

Project: Mercer Island Job Number: 19-028 NOTES:

Sheet: 1 of Name: AK

Originating Office: Seattle Date: 11/13/20

STUD WALL DESIGN - 1.11 (Demising)

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE: DF#2

F_b =	900	PSI	APPLIED LOADS:	P_{DEAD} =	1280	LBS
F_c =	1350	PSI	W_{WIND} = 8.0 PSF	P_{LIVE} =	1312	LBS
$F_{c\perp}$ =	625	PSI	$W_{SEISMIC}$ = 5.0 PSF	P_{SNOW} =	410	LBS
E =	1.60E+06	PSI		P_{WIND} =	0	LBS
				$P_{SEISMIC}$ =	0	LBS

STUD SIZE: (1) 2x4

A_X =	5.25	IN^2	MISCELLANEOUS:	HEIGHT =	9.33	FT
S_X =	3.06	IN^3		SPACING =	16	IN
I_X =	5.36	IN^4		ECCENTRICITY =	0.1	IN
				$C_{F(COMPRESSION)}$ =	1.15	(NDS 4.3.6)
$C_{F(BENDING)}$ =	1.5	(NDS 4.3.6)			APPLY?	
F_{cE} =	469.1	PSI	$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1) Is not applied w/ Cr
C_b =	1.25	(NDS 3.10.4)	$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9) Is not applied w/ Csys

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	2592	494	73	22	86	337
2	1690	322	73	14	81	319
3	2572	490	73	21	86	337
4	2572	490	52	21	66	257
5	1280	244	70	11	76	299
6	1280	244	51	11	57	225
7	2572	490	38	21	52	203

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	1.13	0.22	0.63	-2.85	1.05	0.16	L/712
2	0.73	0.18	0.41	1.10	0.69	0.15	L/753
3	1.11	0.19	0.63	-3.03	1.04	0.16	L/713
4*	1.09	0.08	0.63	-0.61	1.04	0.06	L/2001
5*	0.54	0.09	0.31	0.49	0.52	0.07	L/1721
6	0.54	0.09	0.31	0.48	0.52	0.10	L/1067
7	1.09	0.08	0.63	-0.66	1.04	0.09	L/1182
MAX. --->	1.13	0.22	0.63	1.10	1.05	0.16	L/712
	N.G.	O.K.	O.K.	N.G.	N.G.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:

C_{fu} =	1.1	(NDS 4.3.7)
F_V =	150	PSI

ALLOWABLE STRESSES:

F_V' =	173	PSI
F_b' =	1708	PSI

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:

A_X =	10.50	IN^2
S_X =	2.63	IN^3
I_X =	1.97	IN^4

APPLIED STRESSES:

f_V =	161	PSI	<--- O.K.
f_b =	2575	PSI	<--- N.G.
Δ_{MAX} =	0.046	IN	

Project: Mercer Island Job Number: 19-028 NOTES:

Sheet: 1 of Name: AK

Originating Office: Seattle Date: 11/13/20

STUD WALL DESIGN - 1.11 (Demising)

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE: DF#2

F_b =	900	PSI			P_{DEAD} =	295	LBS
F_c =	1350	PSI	W_{WIND} =	8.0 PSF	P_{LIVE} =	410	LBS
$F_{c\perp}$ =	625	PSI	$W_{SEISMIC}$ =	5.0 PSF	P_{SNOW} =	410	LBS
E =	1.60E+06	PSI			P_{WIND} =	0	LBS
					$P_{SEISMIC}$ =	0	LBS

STUD SIZE: (1) 2x4

A_X =	5.25	IN^2			HEIGHT =	9.33	FT
S_X =	3.06	IN^3			SPACING =	16	IN
I_X =	5.36	IN^4			ECCENTRICITY =	0.1	IN
					$C_{F(COMPRESSION)}$ =	1.15	(NDS 4.3.6)
$C_{F(BENDING)}$ =	1.5	(NDS 4.3.6)				APPLY?	
F_{cE} =	469.1	PSI			$C_{SYS(BENDING)}$ =	1.50	YES (SDPWS T3.1.1.1) Is not applied w/ Cr
C_b =	1.25	(NDS 3.10.4)			$C_{r(BENDING)}$ =	1.15	YES (NDS 4.3.9) Is not applied w/ Csys

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	705	134	73	6	76	299
2	705	134	73	6	76	299
3	911	173	73	8	77	303
4	911	173	52	8	57	223
5	295	56	70	2	71	279
6	295	56	51	2	52	205
7	911	173	38	8	43	169

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.31	0.19	0.17	0.36	0.29	0.14	L/804
2	0.31	0.17	0.17	0.33	0.29	0.14	L/804
3	0.39	0.17	0.22	0.42	0.37	0.14	L/793
4*	0.39	0.07	0.22	0.26	0.37	0.05	L/2305
5*	0.13	0.09	0.07	0.11	0.12	0.06	L/1845
6	0.13	0.08	0.07	0.11	0.12	0.10	L/1171
7	0.39	0.07	0.22	0.26	0.37	0.08	L/1419
MAX. --->	0.39	0.19	0.22	0.42	0.37	0.14	L/793
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:

C_{fu} =	1.1	(NDS 4.3.7)
F_V =	150	PSI

ALLOWABLE STRESSES:

F_V' =	173	PSI
F_b' =	1708	PSI

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:

A_X =	10.50	IN^2
S_X =	2.63	IN^3
I_X =	1.97	IN^4

APPLIED STRESSES:

f_V =	67	PSI	<--- O.K.
f_b =	1075	PSI	<--- O.K.
Δ_{MAX} =	0.019	IN	

PCS Structural Solutions

Project: Mercer Island Job Number: 19-028 NOTES:

Sheet: 1 of Name: AK

Originating Office: Seattle Date: 11/13/20

STUD WALL DESIGN - 1.11 (Demising)

2018 NDS/2018 IBC

WALL DATA

LUMBER TYPE: DF#2

F_b =	900	PSI	
F_c =	1350	PSI	
$F_{c\perp}$ =	625	PSI	
E =	1.60E+06	PSI	

APPLIED LOADS:

W_{WIND} =	8.0	PSF	
$W_{SEISMIC}$ =	5.0	PSF	
P_{DEAD} =	787	LBS	
P_{LIVE} =	656	LBS	
P_{SNOW} =	410	LBS	
P_{WIND} =	0	LBS	
$P_{SEISMIC}$ =	0	LBS	

STUD SIZE: (1) 2x4

A_X =	5.25	IN^2	
S_X =	3.06	IN^3	
I_X =	5.36	IN^4	
$C_{F(BENDING)}$ =	1.5	(NDS 4.3.6)	
F_{cE} =	469.1	PSI	
C_b =	1.25	(NDS 3.10.4)	

MISCELLANEOUS:

HEIGHT =	9.33	FT		
SPACING =	16	IN		
ECCENTRICITY =	0.1	IN		
$C_{F(COMPRESSION)}$ =	1.15	(NDS 4.3.6)		
		APPLY?		
$C_{SYS(BENDING)}$ =	1.50	YES	(SDPWS T3.1.1.1)	Is not applied w/ Cr
$C_{r(BENDING)}$ =	1.15	YES	(NDS 4.3.9)	Is not applied w/ Csys

LOAD CASES - IBC 1605.3.1

CASE 1	DEAD + LIVE + 5 PSF LAT.	CASE 4	DEAD + 0.45WIND + 0.75LIVE + 0.75SNOW
CASE 2	DEAD + SNOW + 5 PSF LAT.	CASE 5	DEAD + 0.60WIND
CASE 3	DEAD + 0.75LIVE + 0.75SNOW + 5 PSF LAT.	CASE 6	DEAD + 0.75EISMIC
		CASE 7	DEAD + 0.535EISMIC + 0.75LIVE + 0.75SNOW

ALLOWABLE STRESSES - Cd PER NDS T2.3.2, Cp PER NDS 3.7.1, ASSUME Cm, Ct, Ci, CL = 1.0

CASE	C_D	F_c*	F_{cE}/F_c*	C_P	F_c'	F_b'	$F_{c\perp}$
1	1.00	1553	0.30	0.280	435	1553	781
2 & 3	1.15	1785	0.26	0.247	440	1785	781
4 & 5	1.60	2484	0.19	0.181	449	3240	781
6 & 7	1.60	2484	0.19	0.181	449	2484	781

APPLIED STRESSES - NDS CHAPTER 3 DESIGN EQUATIONS

CASE	$P_{APPLIED}$	f_c	$M_{LAT. LOAD}$	$M_{ECC.}$	M_{TOTAL}	f_b
1	1444	275	73	12	80	314
2	1198	228	73	10	79	309
3	1587	302	73	13	81	317
4	1587	302	52	13	60	237
5	787	150	70	7	74	289
6	787	150	51	7	55	215
7	1587	302	38	13	47	183

DESIGN CHECKS - COMBINED STRESS CHECK PER NDS EQN 3.9-3

CASE	f_c/F_c'	f_b/F_b'	$f_c/F_{c\perp}$	Combined	f_c/F_{cE}	Deflection	L/?
1	0.63	0.20	0.35	0.89	0.59	0.15	L/765
2	0.52	0.17	0.29	0.61	0.49	0.14	L/778
3	0.69	0.18	0.39	0.97	0.64	0.15	L/758
4*	0.67	0.07	0.39	0.66	0.64	0.05	L/2170
5*	0.33	0.09	0.19	0.24	0.32	0.06	L/1781
6	0.33	0.09	0.19	0.24	0.32	0.10	L/1116
7	0.67	0.07	0.39	0.66	0.64	0.09	L/1312
MAX. --->	0.69	0.20	0.39	0.97	0.64	0.15	L/758
	O.K.	O.K.	O.K.	O.K.	O.K.		

* Deflections reduced by 0.42 per IBC Table 1604.3 footnote f. Increase deflection by 1.4 for jambs supporting glass.

PLATE BENDING - *ALIGN STUDS WITH JOISTS WHERE POSSIBLE*

MISCELLANEOUS:

C_{fu} =	1.1	(NDS 4.3.7)
F_V =	150	PSI

ALLOWABLE STRESSES:

F_V' =	173	PSI
F_b' =	1708	PSI

STUD REACTIONS (OUT - OF - PLANE)
50 LB

DBL TOP PLATE PROPERTIES:

A_X =	10.50	IN^2
S_X =	2.63	IN^3
I_X =	1.97	IN^4

APPLIED STRESSES:

f_V =	114	PSI	<--- O.K.
f_b =	1825	PSI	<--- N.G.
Δ_{MAX} =	0.032	IN	

Person
Brett O
Alex
Alex
Alex
Ashley
Ted
Brent
Steven W

Sheet Assumption
1
2
3
4
5

Date
?
7/21/2010
9/26/2012
3/24/2014
3/11/2016
12/19/2016
11/28/2017
5/31/2018

s:
Design assumes simple span & single axis (X-axis) bending.
Design assumes sheathing on both sides of stud (i.e. P.W. exterior, G.W.B. interior).
Match lumber type with structural general notes & project specifications.
All design values & section properties are from the NDS Supplement.
Plate bending check applies to Roof double top plate only & considers DL+SL only (Load Case 2 vertical load). Nc

Changes Made to Sheet
Original sheet layout
Updated to 2009 IBC, 2005 NDS
Updated to 2012 IBC, 2012 NDS
Added Assumptions, Code References
Updated to 2015 IBC, 2015 NDS
Added Notes to clarify application of Csys and Cr
Updated Header (Includes Portland) and Other Small Formatting Edits
Updated to 2018 IBC, 2018 NDS

) LL considered. Assumes plates act together as two plates, but not compositely.

WOOD LATERAL

Project:	Mercer Island
Engineer:	AK
Date Updated:	11/13/2020

ROOF FLOOR AREA (SF)	39368
TYP. FLOOR AREA (SF)	39368
Roof Exterior Walls (FT)	650
Exterior Walls (FT)	650

Load Summary

Level	Weight (K)	Note
RF	802.8	
L4	1319.8	
L3	1313.9	
∑	**3437**	

Story Heights

Level	Height (ft)	Elev (ft)
Roof	11.33	29.99
L4	9.33	18.66
L3	9.33	9.33

*SEISMIC BASE IS AT TRANSFER SLAB

Wood Floor, Wall, & Roof Weights

Level	Decription	SDL (PSF)	Area (SF)	SDL (LBS)
RF	Typ. Roof	15	39350	590250
	Mezzanine	5	450	2250
	-	0	0	0
	-	0	0	0
	-	0	0	0
	Interior Walls	9	39368	177156
	Exterior Walls	9	3682	33140.25
		Roof ∑	**39800**	**592500**
		Wall ∑	**43050**	**210296**
L4	Typ. Residential Floor	23	39350	905050
	-	0	0	0
	-	0	0	0
	-	0	0	0
	-	0	0	0
	Interior Walls	9	39368	354312
	Exterior Walls	9	6715	60431
		Floor ∑	**39350**	**905050**
		Wall ∑	**46083**	**414743**
L3	Typ. Residential Floor	23	39350	905050
	-	0	0	0
	-	0	0	0
	-	0	0	0
	Interior Walls	9	39368	354312
	Exterior Walls	9	6065	54581
		Floor ∑	**39350**	**905050**
		Wall ∑	**45433**	**408893**
L2 - Transfer Slab (Not Included)	Typ. Residential Floor	10	39350	393500
	-	0	0	0
	-	0	0	0
	-	0	0	0
	-	0	0	0
	Interior Walls	9	39368	354312
	Exterior Walls	9	0	0
		Floor ∑	**39350**	**393500**
		Wall ∑	**39368**	**354312**

SHEAR WALLS & DIAPHRAGMS

GE

1. DO NO
2. PLAN CENT
3. DOOR WITH FOUR
4. FOR R
5. SEE S
6. SEE S
7. SEE S
8. INSTA BATH
9. HAND CONT

1503

PROJECT # 19028
ENGR: AK
DATE: 11/13/2020

VERTICAL DISTRIBUTION OF SEISMIC FORCES (ASD)

Level	h_x (ft)	w_x(k)	$w_x h_x^k$ (k-ft)	$w_x h_x^k / \Sigma w_i h_i^k$ (%)	F_x (k) (ASD)	F_{tot} (k) (ASD)
Roof	29.99	802.8	24075.97	39%	134.90	134.90
4	18.66	1319.8	24627.47	40%	137.99	272.90
3	9.33	1313.9	12258.69	20%	68.69	341.59
Sum Σ		3436.5	60962.13			

INPUTS
OUTPUTS

k= 1
C_s= 0.142

801.1
1319.2
1316.1

S_{DS}= 0.92
I= 1

MAX F_{px} (k)= $0.4 S_{DS} I w_{px}$= 0.368 $*w_{px}$
MIN F_{px} (k)= $0.2 S_{DS} I w_{px}$= 0.184 $*w_{px}$

DIAPHRAGM DESIGN SEISMIC FORCES (ASD)

Level	w_{px} (k)	Σw_i (k)	F_x (k)	ΣF_i (k)	Diaphragm Force: $\Sigma F_x / \Sigma w_{px}$	Diaphragm Force: F_{px} (k)	Diaphragm Force: $\gamma = F_{px}/F_x$	Diaphragm Force: Max F_{px} (k)	Diaphragm Force: Min F_{px} (k)
Roof	802.8	802.8	134.90	134.90	0.18	147.72	1.09	295.43	147.72
4	1319.8	2122.6	137.99	272.90	0.18	242.84	1.76	485.69	242.84
3	1313.9	3436.5	68.69	341.59	0.18	241.76	3.52	483.52	241.76
Sum Σ	3436.5			341.59 ASD					

PROJECT # 19028
ENGR: AK
DATE: 11/13/2020

V (K)	341.6	ASD	
E/W			
GRID	% TOTAL MASS	TRIBUTARY (FT)	DISTRIBUTED SHEAR (KLF)
ALL	100%	249.69	1.37
-	0%	-	-
-	0%	-	-
-	0%	-	-
-	0%	-	-
∑	100%	250	

V (K)	341.6	ASD	
N/S			
GRID	% TOTAL MASS	TRIBUTARY (FT)	DISTRIBUTED SHEAR (KLF)
ALL	100%	361.58	0.94
-	0%	-	-
-	0%	-	-
-	0%	-	-
-	0%	-	-
∑	100%	362	

LVL 3				
E/W				
GRID	DISTRIBUTED SHEAR (KLF)	TRIBUTARY (FT)	AVAILABLE SHEAR WALL LENGTH (FT)	Vu (PLF)
1	1.37	24.2	213.92	154.5
2	1.37	28.4	217.49	178.5
3	1.37	29.1	48.5	821.5
4	1.37	21.0	41.41	693.8
5	1.37	22.2	42.25	717.9
6	1.37	21.5	30.5	962.6
7	1.37	19.2	56.75	463.1
8	1.37	22.0	44.92	670.0
9	1.37	22.5	36.08	853.1
10	1.37	18.3	120.34	208.5
11	1.37	20.3	79	352.2
	∑	248.69	931	

LVL 3				
N/S				
GRID	DISTRIBUTED SHEAR (KLF)	TRIBUTARY (FT)	AVAILABLE SHEAR WALL LENGTH (FT)	Vu (PLF)
A	0.94	20.88	49.7	397.1
B	0.94	11.79	47	238.2
C	0.94	19.13	60.08	300.8
D	0.94	22	31	670.4
E	0.94	22	56	369.5
F	0.94	22	62	333.0
G	0.94	22	62.42	333.0
H	0.94	22	62.42	333.0
I	0.94	22	62	333.0
J	0.94	25.17	56	422.7
K	0.94	19	129.93	138.1
L	0.94	19	112.09	160.1

PROJECT # 19028
ENGR: AK
DATE: 11/13/2020

(ASD)

460	**15/32" (1) Side**	10d @ 4"
600	**15/32" (1) Side**	10d @ 3"
920	**15/32" (2) Side**	10d @ 4"
1200	**15/32" (2) Side**	10d @ 3"

LVL 3

E-W

F.tot = 341.59 kips (ASD) If Skewed 1.25

GRID	v (plf)	Sheathing	Spacing
1	155	10d @ 4"	15/32" (1) Side
2	179	10d @ 4"	15/32" (1) Side
3	822	10d @ 4"	15/32" (2) Side
4	694	10d @ 4"	15/32" (2) Side
5	718	10d @ 4"	15/32" (2) Side
6	963	10d @ 4"	15/32" (2) Side
7	463	10d @ 4"	15/32" (1) Side
8	670	10d @ 4"	15/32" (2) Side
9	853	10d @ 4"	15/32" (2) Side
10	208	10d @ 4"	15/32" (1) Side
11	352	10d @ 4"	15/32" (1) Side

N-S

F.tot = 341.59 kips (ASD) Skewed 1.25

GRID	v (plf)	Sheathing	Spacing
A	397	10d @ 4"	15/32" (1) Side
B	238	10d @ 4"	15/32" (1) Side
C	301	10d @ 4"	15/32" (1) Side
D	670	10d @ 4"	15/32" (2) Side
E	369	10d @ 4"	15/32" (1) Side
F	333	10d @ 4"	15/32" (1) Side
G	333	10d @ 4"	15/32" (1) Side
H	333	10d @ 4"	15/32" (1) Side
I	333	10d @ 4"	15/32" (1) Side
J	423	10d @ 4"	15/32" (1) Side
K	138	10d @ 4"	15/32" (1) Side
L	160	10d @ 4"	15/32" (1) Side
M	363	10d @ 4"	15/32" (1) Side
N	426	10d @ 4"	15/32" (1) Side
O	374	10d @ 4"	15/32" (1) Side
P	512	10d @ 3"	15/32" (1) Side
Q	550	10d @ 3"	15/32" (1) Side

LVL 4

E-W

F.tot = 272.90 kips (ASD) ratio 1.25

GRID	v (plf)	Sheathing	Spacing
1	123	10d @ 4"	15/32" (1) Side
2	143	10d @ 4"	15/32" (1) Side
3	656	10d @ 4"	15/32" (2) Side
4	554	10d @ 3"	15/32" (1) Side
5	574	10d @ 3"	15/32" (1) Side
6	769	10d @ 4"	15/32" (2) Side
7	370	10d @ 4"	15/32" (1) Side
8	535	10d @ 3"	15/32" (1) Side
9	682	10d @ 4"	15/32" (2) Side
10	167	10d @ 4"	15/32" (1) Side
11	281	10d @ 4"	15/32" (1) Side
8	0	0	0

N-S

F.tot = 272.90 kips (ASD) ratio 1.25

GRID	v (plf)	Sheathing	Spacing
A	317	10d @ 4"	15/32" (1) Side
B	190	10d @ 4"	15/32" (1) Side
C	240		
D	536		
E	295		
F	266		
G	266		
H	266		
I	266		
J	338		
K	110		
L	128		
M	290		
N	340		
0	299		
P	409		
Q	440		

ROOF

E-W

F.tot = 134.90 kips (ASD) ratio 2.53

GRID	v (plf)	Sheathing	Spacing
1	61	10d @ 4"	15/32" (1) Side
2	71	10d @ 4"	15/32" (1) Side
3	324	10d @ 4"	15/32" (1) Side
4	274	10d @ 4"	15/32" (1) Side
5	284	10d @ 4"	15/32" (1) Side
6	380	10d @ 4"	15/32" (1) Side
7	183	10d @ 4"	15/32" (1) Side
8	265	10d @ 4"	15/32" (1) Side
9	337	10d @ 4"	15/32" (1) Side
10	82	10d @ 4"	15/32" (1) Side
11	139	10d @ 4"	15/32" (1) Side

N-S

F.tot = 134.90 kips (ASD) ratio 2.53

GRID	v (plf)	Sheathing	Spacing
A	157	10d @ 4"	15/32" (1) Side
B	94	10d @ 4"	15/32" (1) Side
C	119	10d @ 4"	15/32" (1) Side
D	265	10d @ 4"	15/32" (1) Side
E	146	10d @ 4"	15/32" (1) Side
F	131	10d @ 4"	15/32" (1) Side
G	131	10d @ 4"	15/32" (1) Side
H	131	10d @ 4"	15/32" (1) Side
I	131	10d @ 4"	15/32" (1) Side
J	167	10d @ 4"	15/32" (1) Side
K	55	10d @ 4"	15/32" (1) Side
L	63	10d @ 4"	15/32" (1) Side
M	143	10d @ 4"	15/32" (1) Side
N	168	10d @ 4"	15/32" (1) Side
O	148	10d @ 4"	15/32" (1) Side
P	202	10d @ 4"	15/32" (1) Side
Q	217	10d @ 4"	15/32" (1) Side

PROJECT # 19028
ENGR: AK
DATE: 11/13/2020

LVL 3

E-W

F.px = 169.23 kips (ASD) Multiplier 1

SW	vu (plf)	Sheathing	Spacing
1	77	19/32"	10d @ 6"
2	88	19/32"	10d @ 6"
3	407	19/32" Blocked	10d @ 4"
4	344	19/32" Blocked	10d @ 6"
5	356	19/32" Blocked	10d @ 6"
6	477	19/32" Blocked	10d @ 4"
7	229	19/32"	10d @ 6"
8	332	19/32" Blocked	10d @ 6"
9	423	19/32" Blocked	10d @ 4"
10	103	19/32"	10d @ 6"
11	175	19/32"	10d @ 6"

N-S

F.px = 169.23 kips (ASD) Multiplier 1

SW	vu (plf)	Sheathing	Spacing
A	197	19/32"	10d @ 6"
B	118	19/32"	10d @ 6"
C	149	19/32"	10d @ 6"
D	332	19/32" Blocked	10d @ 6"
E	183	19/32"	10d @ 6"
F	165	19/32"	10d @ 6"
G	165	19/32"	10d @ 6"
H	165	19/32"	10d @ 6"
I	165	19/32"	10d @ 6"
J	209	19/32"	10d @ 6"
K	68	19/32"	10d @ 6"
L	79	19/32"	10d @ 6"
M	180	19/32"	10d @ 6"
N	211	19/32"	10d @ 6"
0	185	19/32"	10d @ 6"
P	253	19/32" Blocked	10d @ 6"
Q	273	19/32" Blocked	10d @ 6"

% Length Blocking Required (E-W)	% Length Blocking Required (N-S)
LVL 3	LVL 3
-	-
-	-
41%	
30%	28%
33%	
50%	
28%	
43%	
	5%
	12%

LVL 4

E-W

F.px = 169.99 kips (ASD) Ratio 1.00

SW	vu (plf)	Sheathing	Spacing
1	77	19/32"	10d @ 6"
2	89	19/32"	10d @ 6"
3	409	19/32" Blocked	10d @ 4"
4	345	19/32" Blocked	10d @ 6"
5	357	19/32" Blocked	10d @ 6"
6	479	19/32" Blocked	10d @ 4"
7	230	19/32"	10d @ 6"
8	333	19/32" Blocked	10d @ 6"
9	425	19/32" Blocked	10d @ 4"
10	104	19/32"	10d @ 6"
11	175	19/32"	10d @ 6"

N-S

F.px = 169.99 kips (ASD) Ratio 1.00

SW	vu (plf)	Sheathing	Spacing
A	198	19/32"	10d @ 6"
B	119	19/32"	10d @ 6"
C	150	19/32"	10d @ 6"
D	334	19/32" Blocked	10d @ 6"
E	184	19/32"	10d @ 6"
F	166	19/32"	10d @ 6"
G	166	19/32"	10d @ 6"
H	166	19/32"	10d @ 6"
I	166	19/32"	10d @ 6"
J	210	19/32"	10d @ 6"
K	69	19/32"	10d @ 6"
L	80	19/32"	10d @ 6"
M	180	19/32"	10d @ 6"
N	212	19/32"	10d @ 6"
O	186	19/32"	10d @ 6"
P	255	19/32" Blocked	10d @ 6"
Q	274	19/32" Blocked	10d @ 6"

LVL 4	LVL 4
-	-
-	-
-	-
41%	
30%	28%
33%	
50%	
28%	
43%	
	6%
	12%

ROOF

E-W

F.px = 103.40 kips (ASD) Ratio 1.64

SW	vu (plf)	Sheathing	Spacing
1	47	19/32"	10d @ 6"
2	54	19/32"	10d @ 6"
3	249	19/32"	10d @ 6"
4	210	19/32"	10d @ 6"
5	217	19/32"	10d @ 6"
6	291	19/32" Blocked	10d @ 6"
7	140	19/32"	10d @ 6"
8	203	19/32"	10d @ 6"
9	258	19/32" Blocked	10d @ 6"
10	63	19/32"	10d @ 6"
11	107	19/32"	10d @ 6"

N-S

F.px = 103.40 kips (ASD) Ratio 1.64

SW	vu (plf)	Sheathing	Spacing
A	120	19/32"	10d @ 6"
B	72	19/32"	10d @ 6"
C	91	19/32"	10d @ 6"
D	203	19/32"	10d @ 6"
E	112	19/32"	10d @ 6"
F	101	19/32"	10d @ 6"
G	101	19/32"	10d @ 6"
H	101	19/32"	10d @ 6"
I	101	19/32"	10d @ 6"
J	128	19/32"	10d @ 6"
K	42	19/32"	10d @ 6"
L	48	19/32"	10d @ 6"
M	110	19/32"	10d @ 6"
N	129	19/32"	10d @ 6"
O	113	19/32"	10d @ 6"
P	155	19/32"	10d @ 6"
Q	167	19/32"	10d @ 6"

Roof	Roof
-	-
-	-
18%	
7%	

HOLDOWNS

PCS Structural Solutions

Project: Mercer Island | Job Number: 19028

Sheet: _____ of _____ | Name: AK

Originating Office: Seattle | Date: 11/13/2020

MULTISTORY SHEARWALL DESIGN

ENTER ALL LOADS UNFACTORED

Cs =	0.142	
SDS =	0.92	
ROOF DL =	18	psf
FLOOR DL =	23	psf
WALL WT =	9	psf
FLOOR DEPTH =	1	ft

Drift Limit

D =	0.02
C_d=	4.0

LOAD COMBOS - ALLOWABLE STRESS DESIGN

	D	L	S	E	
LC 1	0.9	0	0	0.714	HOLDOWN DESIGN
LC 2	1.0	1	1	0.714	POST DESIGN
LC 3	1.0	0	0	0.714	POST DESIGN

SPECIES	Fcp	G
HF	405 psi	0.43
DF	625 psi	0.5
DFpl	625 psi	0.43

SHEARWALL TYPES

TYPE	V_{ALLOW}	G_a
A	460 plf	15.00 k-in
B	600 plf	18.50 k-in
C	920 plf	30.00 k-in
D	1200 plf	37.00 k-in

CONT. ROD HOLDOWNS

TYPE	T_{ALLOW}	GRADE
0.500 in	4470 lbs	ASTM A307
0.625 in	7120 lbs	ASTM A307
0.750 in	10540 lbs	ASTM A307
0.875 in	14540 lbs	ASTM A307
1.000 in	19080 lbs	ASTM A307
1.125 in	24040 lbs	ASTM A307
1.250 in	30530 lbs	ASTM A307
1.500 in	44270 lbs	ASTM A307
1.750 in	59830 lbs	ASTM A307
M - 0.625	8900 lbs	ASTM F1554 GR55
M - 0.750	13170 lbs	ASTM F1554 GR55
M - 0.875	18180 lbs	ASTM F1554 GR55
M - 1.000	23850 lbs	ASTM F1554 GR55
M - 1.125	30050 lbs	ASTM F1554 GR55
M - 1.250	38160 lbs	ASTM F1554 GR55
M - 1.500	55330 lbs	ASTM F1554 GR55
M - 1.750	74790 lbs	ASTM F1554 GR55

POST TYPES

TYPE	E	AREA	D	CF	Fc	Ft
2x4	1.50E+06	5.25 in2	3.500 in	1.1	1350 psi	575 psi
2x6	1.50E+06	8.25 in2	5.500 in	1.1	1350 psi	575 psi
3x6	1.50E+06	13.75 in2	5.500 in	1.1	1350 psi	575 psi
4x6	1.50E+06	19.25 in2	5.500 in	1.1	1350 psi	575 psi
6x6	1.60E+06	30.25 in2	5.500 in	1.1	1000 psi	825 psi
6x8	1.60E+06	41.25 in2	5.500 in	1.1	1000 psi	825 psi
6x10	1.60E+06	52.25 in2	5.500 in	1.0	925 psi	675 psi

Structural Solutions

Project: Mercer Island | Job Number: 19028

Sheet: of | Name: AK

Originating Office: Seattle | Date: 11/13/20

MULTISTORY SHEARWALL DESIGN

LABEL	STATUS	Tmax (K)	Vmax (plf)	D/C - (1) SIDED SW	SHEATHING	CONT. HOLDOWN ROD DIAMETER	Cmax (K)
1.1	OK	0.0	155	26%	(1) SIDE	0.500	3.3
1.2-1.8	OK	0.0	155	26%	(1) SIDE	0.500	3.3
1.9	OK	0.0	155	26%	(1) SIDE	0.500	3.3
1.10	OK	0.0	155	26%	(1) SIDE	0.500	3.3
1.11	OK	0.0	155	26%	(1) SIDE	0.500	3.3
1.11	OK	0.0	155	26%	(1) SIDE	0.500	3.3
2.1	OK	0.0	179	30%	(1) SIDE	0.500	3.8
2.2	OK	0.0	179	30%	(1) SIDE	0.500	3.8
2.3	OK	0.0	179	30%	(1) SIDE	0.500	3.8
2.4-2.9	OK	0.0	179	30%	(1) SIDE	0.500	3.8
2.1	OK	0.0	179	30%	(1) SIDE	0.500	3.8
3.1	OK	0.0	822	137%	(2) SIDES	0.500	17.5
3.2	OK	4.0	822	137%	(2) SIDES	0.500	17.5
4.1	OK	7.9	694	116%	(2) SIDES	0.750	14.8
4.2	OK	14.2	694	116%	(2) SIDES	0.875	14.8
4.3	OK	10.3	694	116%	(2) SIDES	0.875	14.8
5.1	OK	0.0	719	120%	(2) SIDES	0.500	15.3
5.2	OK	15.3	719	120%	(2) SIDES	1.000	15.3
6.1	OK	0.0	963	160%	(2) SIDES	0.500	20.5
7.1	OK	0.0	463	77%	(1) SIDE	0.500	9.8
7.2	OK	0.0	463	77%	(1) SIDE	0.500	9.8
8.1	OK	7.0	670	112%	(2) SIDES	0.625	14.2
8.2	OK	3.5	670	112%	(2) SIDES	0.500	14.2
9.1	OK	12.8	854	142%	(2) SIDES	0.875	18.1
9.2	OK	12.2	854	142%	(2) SIDES	0.875	18.1
10.1	OK	2.2	209	35%	(1) SIDE	0.500	4.4
10.2-10.5	OK	2.7	209	35%	(1) SIDE	0.500	4.4
A.1	OK	6.1	397	66%	(1) SIDE	0.625	8.4
A.2	OK	8.0	397	66%	(1) SIDE	0.750	8.4
A.3	OK	5.2	397	66%	(1) SIDE	0.625	8.4
B1	OK	0.0	238	40%	(1) SIDE	0.500	5.1
B2	OK	0.0	238	40%	(1) SIDE	0.500	5.1
C1	OK	0.0	301	50%	(1) SIDE	0.500	6.4
C2	OK	0.0	301	50%	(1) SIDE	0.500	6.4
D1	OK	0.0	671	112%	(2) SIDES	0.500	14.3
E1-E2	OK	0.0	370	62%	(1) SIDE	0.500	7.9
F-I	OK	0.0	333	56%	(1) SIDE	0.500	7.1
J	OK	0.0	333	56%	(1) SIDE	0.500	7.1
K	OK	0.0	138	23%	(1) SIDE	0.500	2.9
L	OK	0.4	160	27%	(1) SIDE	0.500	3.4
M-O	OK	0.0	426	71%	(1) SIDE	0.500	9.1
P1	OK	0.0	512	85%	(1) SIDE	0.500	10.9
Q1	OK	0.0	551	92%	(1) SIDE	0.500	11.7
Q2	OK	5.9	551	92%	(1) SIDE	0.625	11.7

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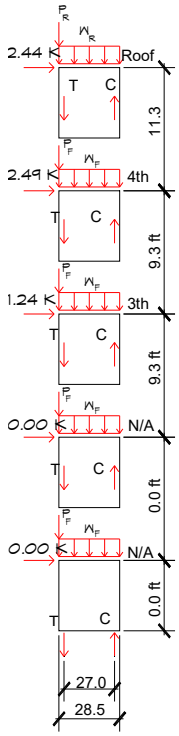
Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W1.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	24.17	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	28.5 ft		*Total Wall Length*		
L_{HD} =	27.0 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	61	A	0.13	0.5	0.00	(1)	2x4	0.380	0.002	OK
4th	DF	124	A	0.27	0.5	0.00	(1)	2x4	0.673	0.004	OK
3th	DF	155	A	0.34	0.5	0.00	(2)	2x4	0.599	0.004	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	86	0	2.44 K	2.44	0.07	0.54	11.3 ft	11.3	27.6	220.2	**0.0**
4th	87	0	2.49 K	4.93	0.10	0.69	9.3 ft	20.7	73.6	502.5	**0.0**
3th	44	0	1.24 K	6.17	0.10	0.69	9.3 ft	30.0	131.1	784.9	**0.0**
N/A	0	0	0.00 K	6.17	0.10	0.60	0.0 ft	30.0	131.1	1033.1	**0.0**
N/A	0	0	0.00 K	6.17	0.10	0.60	0.0 ft	30.0	131.1	1281.4	**0.0**
N/A	0	0	0.00 K	6.17	0.10	0.60	0.0 ft	30.0	131.1	1529.6	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	86	15	0.000	5.3	1.50E+06	10.3	0.062	0.285	0.000	27.0	0.000	0.285	**0.000**
4th	173	15	0.000	5.3	1.50E+06	8.3	0.100	0.222	0.000	16.7	0.000	0.222	**0.000**
3th	216	15	0.000	11	1.50E+06	8.3	0.123	0.123	0.000	8.3	0.000	0.123	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.0	0.692	10.3	0.146	132	625	347	0.211	0.380	0.380
4th	0.00	0.00	0.00	2.6	1.844	8.3	0.220	351	625	522	0.562	0.673	0.673
3th	0.00	0.00	0.00	4.6	3.286	8.3	0.220	313	625	522	0.501	0.599	0.599
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000

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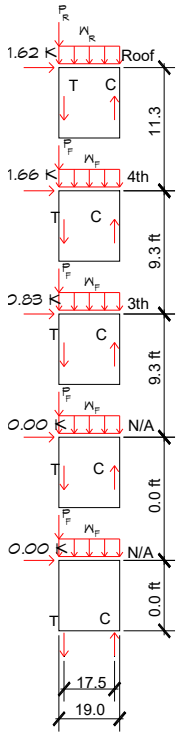
Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL 1.2-1.8

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	3.67	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	19.0 ft		*Total Wall Length*		
L_{HD} =	17.5 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	61	A	0.13	0.5	0.00	(1)	2x4	0.380	0.002	OK
4th	DF	124	A	0.27	0.5	0.00	(1)	2x4	0.673	0.004	OK
3th	DF	155	A	0.34	0.5	0.00	(2)	2x4	0.599	0.004	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	86	0	1.62 K	1.62	0.07	0.17	11.3 ft	11.3	18.4	31.7	**0.0**
4th	87	0	1.66 K	3.29	0.10	0.18	9.3 ft	20.7	49.1	65.3	**0.0**
3th	44	0	0.83 K	4.11	0.10	0.18	9.3 ft	30.0	87.4	98.9	**0.0**
N/A	0	0	0.00 K	4.11	0.10	0.09	0.0 ft	30.0	87.4	117.4	**0.0**
N/A	0	0	0.00 K	4.11	0.10	0.09	0.0 ft	30.0	87.4	135.9	**0.0**
N/A	0	0	0.00 K	4.11	0.10	0.09	0.0 ft	30.0	87.4	154.3	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	86	15	0.000	5.3	1.50E+06	10.3	0.064	0.290	0.000	27.0	0.000	0.290	**0.000**
4th	173	15	0.000	5.3	1.50E+06	8.3	0.102	0.226	0.000	16.7	0.000	0.226	**0.000**
3th	216	15	0.000	11	1.50E+06	8.3	0.124	0.124	0.000	8.3	0.000	0.124	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

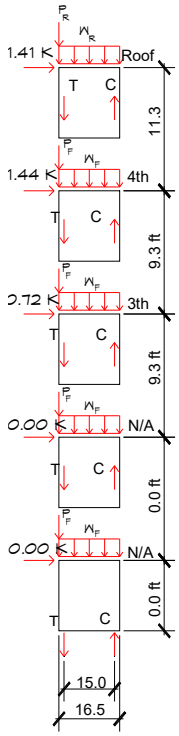
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.0	0.692	10.3	0.146	132	625	347	0.211	0.380	0.380
4th	0.00	0.00	0.00	2.6	1.844	8.3	0.220	351	625	522	0.562	0.673	0.673
3th	0.00	0.00	0.00	4.6	3.286	8.3	0.220	313	625	522	0.501	0.599	0.599
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W1.9

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	3.67	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	16.5 ft		*Total Wall Length*		
L_{HD} =	15.0 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	61	A	0.13	0.5	0.00	(1)	2x4	0.380	0.002	OK
4th	DF	124	A	0.27	0.5	0.00	(1)	2x4	0.673	0.004	OK
3th	DF	155	A	0.34	0.5	0.00	(2)	2x4	0.599	0.004	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	86	0	1.41 K	1.41	0.07	0.17	11.3 ft	11.3	15.9	23.9	**0.0**
4th	87	0	1.44 K	2.84	0.10	0.18	9.3 ft	20.7	42.5	49.3	**0.0**
3th	44	0	0.72 K	3.56	0.10	0.18	9.3 ft	30.0	75.7	74.8	**0.0**
N/A	0	0	0.00 K	3.56	0.10	0.09	0.0 ft	30.0	75.7	88.8	**0.0**
N/A	0	0	0.00 K	3.56	0.10	0.09	0.0 ft	30.0	75.7	102.9	**0.0**
N/A	0	0	0.00 K	3.56	0.10	0.09	0.0 ft	30.0	75.7	116.9	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	86	15	0.000	5.3	1.50E+06	10.3	0.065	0.293	0.000	27.0	0.000	0.293	**0.000**
4th	173	15	0.000	5.3	1.50E+06	8.3	0.103	0.227	0.000	16.7	0.000	0.227	**0.000**
3th	216	15	0.000	11	1.50E+06	8.3	0.124	0.124	0.000	8.3	0.000	0.124	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

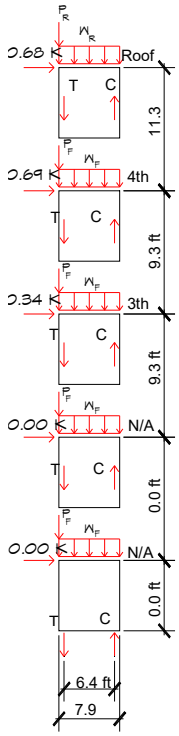
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.0	0.692	10.3	0.146	132	625	347	0.211	0.380	0.380
4th	0.00	0.00	0.00	2.6	1.844	8.3	0.220	351	625	522	0.562	0.673	0.673
3th	0.00	0.00	0.00	4.6	3.286	8.3	0.220	313	625	522	0.501	0.599	0.599
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W1.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	3.67	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	7.9 ft		*Total Wall Length*		
L_{HD} =	6.4 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	61	A	0.13	0.5	0.03	(1)	2x4	0.380	0.010	OK
4th	DF	124	A	0.27	0.5	0.18	(1)	2x4	0.673	0.008	OK
3th	DF	155	A	0.34	0.5	0.41	(2)	2x4	0.599	0.010	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	86	0	0.68 K	0.68	0.07	0.17	11.3 ft	11.3	7.7	5.8	**0.2**
4th	87	0	0.69 K	1.37	0.10	0.18	9.3 ft	20.7	20.4	12.1	**0.8**
3th	44	0	0.34 K	1.71	0.10	0.18	9.3 ft	30.0	36.4	18.4	**1.8**
N/A	0	0	0.00 K	1.71	0.10	0.09	0.0 ft	30.0	36.4	22.1	**0.0**
N/A	0	0	0.00 K	1.71	0.10	0.09	0.0 ft	30.0	36.4	25.8	**0.0**
N/A	0	0	0.00 K	1.71	0.10	0.09	0.0 ft	30.0	36.4	29.5	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	86	15	0.050	5.3	1.50E+06	10.3	0.074	0.316	0.088	27.0	0.524	0.839	**0.050**
4th	173	15	0.090	5.3	1.50E+06	8.3	0.112	0.242	0.131	16.7	0.261	0.502	**0.090**
3th	216	15	0.100	11	1.50E+06	8.3	0.130	0.130	0.145	8.3	0.145	0.275	**0.100**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

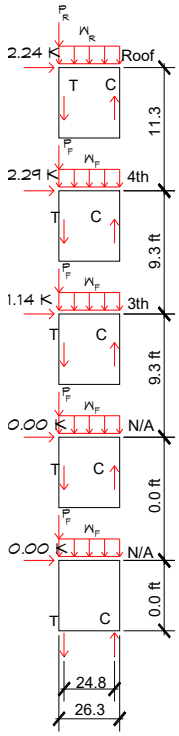
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.0	0.692	10.3	0.146	132	625	347	0.211	0.380	0.380
4th	0.00	0.00	0.00	2.6	1.844	8.3	0.220	351	625	522	0.562	0.673	0.673
3th	0.00	0.00	0.00	4.6	3.286	8.3	0.220	313	625	522	0.501	0.599	0.599
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W1.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	24.67	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	26.3 ft		*Total Wall Length*		
L_{HD} =	24.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	61	A	0.13	0.5	0.00	(1)	2x4	0.380	0.002	OK
4th	DF	124	A	0.27	0.5	0.00	(1)	2x4	0.673	0.004	OK
3th	DF	155	A	0.34	0.5	0.00	(2)	2x4	0.599	0.004	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	155	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	86	0	2.24 K	2.24	0.07	0.55	11.3 ft	11.3	25.4	190.0	**0.0**
4th	87	0	2.29 K	4.54	0.10	0.70	9.3 ft	20.7	67.8	434.1	**0.0**
3th	44	0	1.14 K	5.68	0.10	0.70	9.3 ft	30.0	120.8	678.1	**0.0**
N/A	0	0	0.00 K	5.68	0.10	0.62	0.0 ft	30.0	120.8	893.2	**0.0**
N/A	0	0	0.00 K	5.68	0.10	0.62	0.0 ft	30.0	120.8	1108.3	**0.0**
N/A	0	0	0.00 K	5.68	0.10	0.62	0.0 ft	30.0	120.8	1323.4	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	86	15	0.000	5.3	1.50E+06	10.3	0.063	0.286	0.000	27.0	0.000	0.286	**0.000**
4th	173	15	0.000	5.3	1.50E+06	8.3	0.100	0.223	0.000	16.7	0.000	0.223	**0.000**
3th	216	15	0.000	11	1.50E+06	8.3	0.123	0.123	0.000	8.3	0.000	0.123	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	216	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

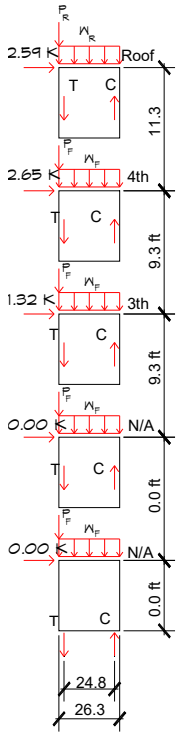
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.0	0.692	10.3	0.146	132	625	347	0.211	0.380	0.380
4th	0.00	0.00	0.00	2.6	1.844	8.3	0.220	351	625	522	0.562	0.673	0.673
3th	0.00	0.00	0.00	4.6	3.286	8.3	0.220	313	625	522	0.501	0.599	0.599
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.6	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W2.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	2.10	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	26.3 ft		*Total Wall Length*		
L_{HD} =	24.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	71	A	0.15	0.5	0.00	(1)	2x4	0.439	0.002	OK
4th	DF	143	A	0.31	0.5	0.00	(1)	2x4	0.777	0.004	OK
3th	DF	179	A	0.39	0.5	0.00	(2)	2x4	0.692	0.005	OK
N/A	DF	179	C	0.00	0.5	0.00	(2)	2x4	0.000	0.000	OK
N/A	DF	179	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	179	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	99	0	2.59 K	2.59	0.07	0.14	11.3 ft	11.3	29.4	50.0	**0.0**
4th	101	0	2.65 K	5.24	0.10	0.14	9.3 ft	20.7	78.3	99.7	**0.0**
3th	50	0	1.32 K	6.56	0.10	0.14	9.3 ft	30.0	139.5	149.3	**0.0**
N/A	0	0	0.00 K	6.56	0.10	0.05	0.0 ft	30.0	139.5	170.0	**0.0**
N/A	0	0	0.00 K	6.56	0.10	0.05	0.0 ft	30.0	139.5	190.8	**0.0**
N/A	0	0	0.00 K	6.56	0.10	0.05	0.0 ft	30.0	139.5	211.5	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	99	15	0.000	5.3	1.50E+06	10.3	0.072	0.330	0.000	27.0	0.000	0.330	**0.000**
4th	200	15	0.000	5.3	1.50E+06	8.3	0.116	0.257	0.000	16.7	0.000	0.257	**0.000**
3th	250	15	0.000	11	1.50E+06	8.3	0.142	0.142	0.000	8.3	0.000	0.142	**0.000**
N/A	250	30	0.000	11	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

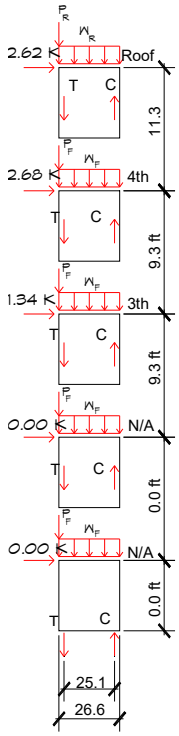
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.1	0.799	10.3	0.146	152	625	347	0.243	0.439	0.439
4th	0.00	0.00	0.00	3.0	2.130	8.3	0.220	406	625	522	0.649	0.777	0.777
3th	0.00	0.00	0.00	5.3	3.796	8.3	0.220	361	625	522	0.578	0.692	0.692
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W2.2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	3.67	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	26.6 ft		*Total Wall Length*		
L_{HD} =	25.1 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	71	A	0.15	0.5	0.00	(1)	2x4	0.439	0.002	OK
4th	DF	143	A	0.31	0.5	0.00	(1)	2x4	0.777	0.004	OK
3th	DF	179	A	0.39	0.5	0.00	(2)	2x4	0.692	0.005	OK
N/A	DF	179	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	179	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	179	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	99	0	2.62 K	2.62	0.07	0.17	11.3 ft	11.3	29.7	61.3	**0.0**
4th	101	0	2.68 K	5.31	0.10	0.18	9.3 ft	20.7	79.2	126.0	**0.0**
3th	50	0	1.34 K	6.65	0.10	0.18	9.3 ft	30.0	141.2	190.7	**0.0**
N/A	0	0	0.00 K	6.65	0.10	0.09	0.0 ft	30.0	141.2	225.8	**0.0**
N/A	0	0	0.00 K	6.65	0.10	0.09	0.0 ft	30.0	141.2	260.9	**0.0**
N/A	0	0	0.00 K	6.65	0.10	0.09	0.0 ft	30.0	141.2	295.9	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	99	15	0.000	5.3	1.50E+06	10.3	0.072	0.330	0.000	27.0	0.000	0.330	**0.000**
4th	200	15	0.000	5.3	1.50E+06	8.3	0.116	0.257	0.000	16.7	0.000	0.257	**0.000**
3th	250	15	0.000	11	1.50E+06	8.3	0.142	0.142	0.000	8.3	0.000	0.142	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

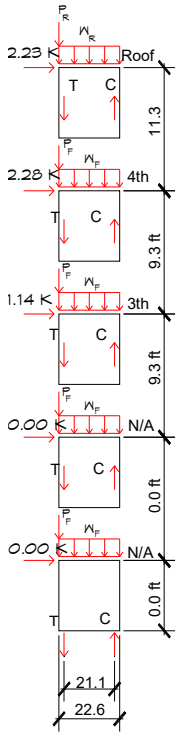
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.1	0.799	10.3	0.146	152	625	347	0.243	0.439	0.439
4th	0.00	0.00	0.00	3.0	2.130	8.3	0.220	406	625	522	0.649	0.777	0.777
3th	0.00	0.00	0.00	5.3	3.796	8.3	0.220	361	625	522	0.578	0.692	0.692
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W2.3

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	3.67	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	22.6 ft		*Total Wall Length*		
L_{HD} =	21.1 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	71	A	0.15	0.5	0.00	(1)	2x4	0.439	0.002	OK
4th	DF	143	A	0.31	0.5	0.00	(1)	2x4	0.777	0.004	OK
3th	DF	179	A	0.39	0.5	0.00	(2)	2x4	0.692	0.005	OK
N/A	DF	179	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	179	C	0.19	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	179	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	99	0	2.23 K	2.23	0.07	0.17	11.3 ft	11.3	25.3	44.5	**0.0**
4th	101	0	2.28 K	4.51	0.10	0.18	9.3 ft	20.7	67.3	91.5	**0.0**
3th	50	0	1.14 K	5.65	0.10	0.18	9.3 ft	30.0	120.0	138.6	**0.0**
N/A	0	0	0.00 K	5.65	0.10	0.09	0.0 ft	30.0	120.0	164.2	**0.0**
N/A	0	0	0.00 K	5.65	0.10	0.09	0.0 ft	30.0	120.0	189.9	**0.0**
N/A	0	0	0.00 K	5.65	0.10	0.09	0.0 ft	30.0	120.0	215.5	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	99	15	0.000	5.3	1.50E+06	10.3	0.073	0.332	0.000	27.0	0.000	0.332	**0.000**
4th	200	15	0.000	5.3	1.50E+06	8.3	0.116	0.259	0.000	16.7	0.000	0.259	**0.000**
3th	250	15	0.000	11	1.50E+06	8.3	0.142	0.142	0.000	8.3	0.000	0.142	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

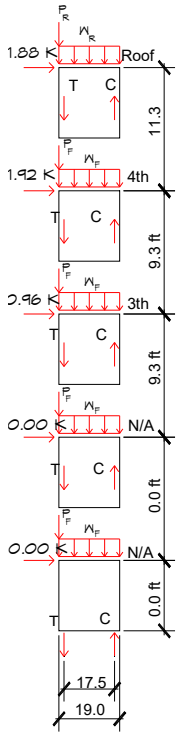
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.1	0.799	10.3	0.146	152	625	347	0.243	0.439	0.439
4th	0.00	0.00	0.00	3.0	2.130	8.3	0.220	406	625	522	0.649	0.777	0.777
3th	0.00	0.00	0.00	5.3	3.796	8.3	0.220	361	625	522	0.578	0.692	0.692
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W2.4

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	3.67	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	19.0 ft		*Total Wall Length*		
L_{HD} =	17.5 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	71	A	0.15	0.5	0.00	(1)	2x4	0.439	0.002	OK
4th	DF	143	A	0.31	0.5	0.00	(1)	2x4	0.777	0.004	OK
3th	DF	179	A	0.39	0.5	0.00	(2)	2x4	0.692	0.005	OK
N/A	DF	179	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	179	C	0.19	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	179	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	99	0	1.88 K	1.88	0.07	0.17	11.3 ft	11.3	21.2	31.7	**0.0**
4th	101	0	1.92 K	3.79	0.10	0.18	9.3 ft	20.7	56.6	65.3	**0.0**
3th	50	0	0.96 K	4.75	0.10	0.18	9.3 ft	30.0	101.0	98.9	**0.0**
N/A	0	0	0.00 K	4.75	0.10	0.09	0.0 ft	30.0	101.0	117.4	**0.0**
N/A	0	0	0.00 K	4.75	0.10	0.09	0.0 ft	30.0	101.0	135.9	**0.0**
N/A	0	0	0.00 K	4.75	0.10	0.09	0.0 ft	30.0	101.0	154.3	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	99	15	0.000	5.3	1.50E+06	10.3	0.074	0.335	0.000	27.0	0.000	0.335	**0.000**
4th	200	15	0.000	5.3	1.50E+06	8.3	0.118	0.261	0.000	16.7	0.000	0.261	**0.000**
3th	250	15	0.000	11	1.50E+06	8.3	0.143	0.143	0.000	8.3	0.000	0.143	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

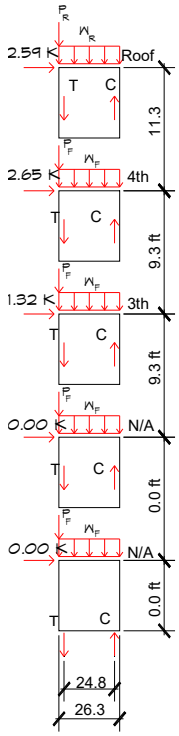
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.1	0.799	10.3	0.146	152	625	347	0.243	0.439	0.439
4th	0.00	0.00	0.00	3.0	2.130	8.3	0.220	406	625	522	0.649	0.777	0.777
3th	0.00	0.00	0.00	5.3	3.796	8.3	0.220	361	625	522	0.578	0.692	0.692
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W2.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	24.67	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	26.3 ft		*Total Wall Length*		
L_{HD} =	24.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	71	A	0.15	0.5	0.00	(1)	2x4	0.439	0.002	OK
4th	DF	143	A	0.31	0.5	0.00	(1)	2x4	0.777	0.004	OK
3th	DF	179	A	0.39	0.5	0.00	(2)	2x4	0.692	0.005	OK
N/A	DF	179	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	179	C	0.19	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	179	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	99	0	2.59 K	2.59	0.07	0.55	11.3 ft	11.3	29.4	190.0	**0.0**
4th	101	0	2.65 K	5.24	0.10	0.70	9.3 ft	20.7	78.3	434.1	**0.0**
3th	50	0	1.32 K	6.56	0.10	0.70	9.3 ft	30.0	139.5	678.1	**0.0**
N/A	0	0	0.00 K	6.56	0.10	0.62	0.0 ft	30.0	139.5	893.2	**0.0**
N/A	0	0	0.00 K	6.56	0.10	0.62	0.0 ft	30.0	139.5	1108.3	**0.0**
N/A	0	0	0.00 K	6.56	0.10	0.62	0.0 ft	30.0	139.5	1323.4	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	99	15	0.000	5.3	1.50E+06	10.3	0.072	0.330	0.000	27.0	0.000	0.330	**0.000**
4th	200	15	0.000	5.3	1.50E+06	8.3	0.116	0.257	0.000	16.7	0.000	0.257	**0.000**
3th	250	15	0.000	11	1.50E+06	8.3	0.142	0.142	0.000	8.3	0.000	0.142	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	250	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

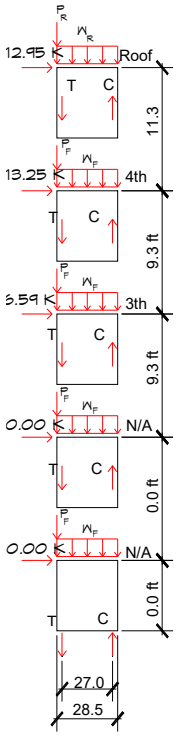
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.1	0.799	10.3	0.146	152	625	347	0.243	0.439	0.439
4th	0.00	0.00	0.00	3.0	2.130	8.3	0.220	406	625	522	0.649	0.777	0.777
3th	0.00	0.00	0.00	5.3	3.796	8.3	0.220	361	625	522	0.578	0.692	0.692
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	5.3	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W2.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	28.5	ft	*Total Wall Length*		
L_{HD} =	27.0	ft	*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	325	A	0.71	0.5	0.00	(3)	2x4	0.673	0.009	OK
4th	DF	657	C	0.71	0.5	0.00	(4)	2x4	0.894	0.009	OK
3th	DF	822	C	0.89	0.5	0.00	(7)	2x4	0.910	0.012	OK
N/A	DF	822	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	822	C	0.89	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	822	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	454	0	12.95 K	12.95	0.07	0.50	11.3 ft	11.3	146.7	204.3	**0.0**
4th	465	0	13.25 K	26.20	0.10	0.63	9.3 ft	20.7	391.1	464.6	**0.0**
3th	231	0	6.59 K	32.79	0.10	0.63	9.3 ft	30.0	697.1	724.9	**0.0**
N/A	0	0	0.00 K	32.79	0.10	0.55	0.0 ft	30.0	697.1	951.2	**0.0**
N/A	0	0	0.00 K	32.79	0.10	0.55	0.0 ft	30.0	697.1	1177.4	**0.0**
N/A	0	0	0.00 K	32.79	0.10	0.55	0.0 ft	30.0	697.1	1403.6	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	454	15	0.000	16	1.50E+06	10.3	0.319	0.902	0.000	27.0	0.000	0.902	**0.000**
4th	919	30	0.000	21	1.50E+06	8.3	0.260	0.583	0.000	16.7	0.000	0.583	**0.000**
3th	1151	30	0.000	37	1.50E+06	8.3	0.323	0.323	0.000	8.3	0.000	0.323	**0.000**
N/A	1151	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1151	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1151	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

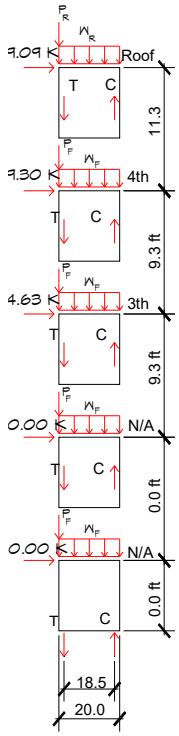
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	5.1	3.677	10.3	0.146	233	625	347	0.374	0.673	0.673
4th	0.00	0.00	0.00	13.7	9.803	8.3	0.220	467	625	522	0.747	0.894	0.894
3th	0.00	0.00	0.00	24.5	17.471	8.3	0.220	475	625	522	0.761	0.910	0.910
N/A	0.00	0.00	0.00	24.5	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	24.5	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	24.5	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W3.2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	20.0 ft		*Total Wall Length*		
L_{HD} =	18.5 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	325	A	0.71	0.5	0.00	(3)	2x4	0.673	0.016	OK
4th	DF	657	C	0.71	0.5	0.23	(4)	2x4	0.894	0.010	OK
3th	DF	822	C	0.89	0.5	0.89	(7)	2x4	0.910	0.018	OK
N/A	DF	822	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	822	C	0.89	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	822	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	454	0	9.09 K	9.09	0.07	0.50	11.3 ft	11.3	103.0	101.0	**0.0**
4th	465	0	9.30 K	18.38	0.10	0.63	9.3 ft	20.7	274.5	229.8	**1.0**
3th	231	0	4.63 K	23.01	0.10	0.63	9.3 ft	30.0	489.2	358.6	**4.0**
N/A	0	0	0.00 K	23.01	0.10	0.55	0.0 ft	30.0	489.2	470.6	**0.0**
N/A	0	0	0.00 K	23.01	0.10	0.55	0.0 ft	30.0	489.2	582.6	**0.0**
N/A	0	0	0.00 K	23.01	0.10	0.55	0.0 ft	30.0	489.2	694.6	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	454	15	0.010	16	1.50E+06	10.3	0.322	0.909	0.006	27.0	0.404	1.313	**0.010**
4th	919	30	0.080	21	1.50E+06	8.3	0.263	0.587	0.040	16.7	0.198	0.785	**0.080**
3th	1151	30	0.350	37	1.50E+06	8.3	0.325	0.325	0.177	8.3	0.177	0.501	**0.350**
N/A	1151	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1151	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1151	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

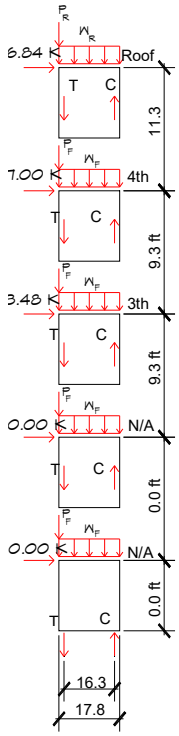
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	5.1	3.677	10.3	0.146	233	625	347	0.374	0.673	0.673
4th	0.00	0.00	0.00	13.7	9.803	8.3	0.220	467	625	522	0.747	0.894	0.894
3th	0.00	0.00	0.00	24.5	17.471	8.3	0.220	475	625	522	0.761	0.910	0.910
N/A	0.00	0.00	0.00	24.5	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	24.5	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	24.5	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W4.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	11.67	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	17.8 ft		*Total Wall Length*		
L_{HD} =	16.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	274	A	0.60	0.75	0.09	(2)	2x4	0.853	0.012	OK
4th	DF	554	B	0.92	0.75	0.35	(4)	2x4	0.755	0.014	OK
3th	DF	694	C	0.75	0.75	0.75	(6)	2x4	0.897	0.014	OK
N/A	DF	694	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	694	C	0.75	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	694	B	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	384	0	6.84 K	6.84	0.07	0.31	11.3 ft	11.3	77.5	50.9	**1.0**
4th	393	0	7.00 K	13.84	0.10	0.38	9.3 ft	20.7	206.6	112.4	**3.7**
3th	195	0	3.48 K	17.32	0.10	0.38	9.3 ft	30.0	368.3	173.9	**7.9**
N/A	0	0	0.00 K	17.32	0.10	0.29	0.0 ft	30.0	368.3	222.1	**0.0**
N/A	0	0	0.00 K	17.32	0.10	0.29	0.0 ft	30.0	368.3	270.2	**0.0**
N/A	0	0	0.00 K	17.32	0.10	0.29	0.0 ft	30.0	368.3	318.4	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	384	15	0.000	11	1.50E+06	10.3	0.277	0.909	0.000	27.0	0.269	1.178	**0.000**
4th	776	19	0.100	21	1.50E+06	8.3	0.356	0.632	0.057	16.7	0.149	0.781	**0.100**
3th	972	30	0.180	32	1.50E+06	8.3	0.276	0.276	0.103	8.3	0.103	0.378	**0.180**
N/A	972	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	972	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	972	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

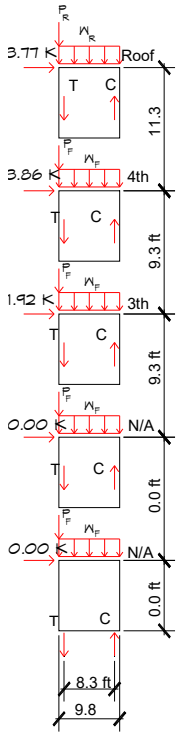
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	4.3	3.105	10.3	0.146	296	625	347	0.473	0.853	0.853
4th	0.00	0.00	0.00	11.6	8.278	8.3	0.220	394	625	522	0.631	0.755	0.755
3th	0.00	0.00	0.00	20.7	14.753	8.3	0.220	468	625	522	0.749	0.897	0.897
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W4.2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	5.67	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	9.8 ft		*Total Wall Length*		
L_{HD} =	8.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	274	A	0.60	0.875	0.18	(2)	2x4	0.853	0.015	OK
4th	DF	554	B	0.92	0.875	0.53	(4)	2x4	0.755	0.016	OK
3th	DF	694	C	0.75	0.875	0.98	(6)	2x4	0.897	0.016	OK
N/A	DF	694	C	0.00	0.875	0.00	(1)	2x4	0.000	0.000	OK
2	DF	694	C	0.75	0.875	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	694	B	0.00	0.875	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	384	0	3.77 K	3.77	0.07	0.20	11.3 ft	11.3	42.7	10.6	**2.7**
4th	393	0	3.86 K	7.63	0.10	0.23	9.3 ft	20.7	113.9	22.5	**7.7**
3th	195	0	1.92 K	9.55	0.10	0.23	9.3 ft	30.0	203.0	34.3	**14.2**
N/A	0	0	0.00 K	9.55	0.10	0.14	0.0 ft	30.0	203.0	42.2	***0.0***
N/A	0	0	0.00 K	9.55	0.10	0.14	0.0 ft	30.0	203.0	50.0	***0.0***
N/A	0	0	0.00 K	9.55	0.10	0.14	0.0 ft	30.0	203.0	57.8	***0.0***

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	384	15	0.000	11	1.50E+06	10.3	0.290	0.934	0.000	27.0	0.482	1.417	***0.000***
4th	776	19	0.100	21	1.50E+06	8.3	0.363	0.644	0.112	16.7	0.272	0.916	***0.100***
3th	972	30	0.160	32	1.50E+06	8.3	0.281	0.281	0.179	8.3	0.179	0.460	***0.160***
N/A	972	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	***0.000***
N/A	972	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	***0.000***
N/A	972	19	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	***0.000***

CHORDS - COMPRESSION CONTROLS

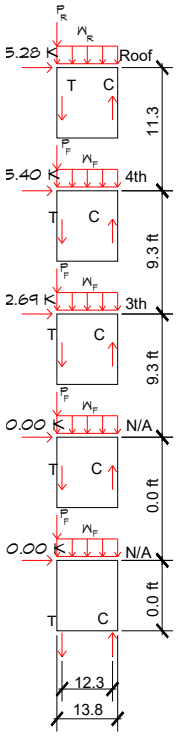
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	4.3	3.105	10.3	0.146	296	625	347	0.473	0.853	0.853
4th	0.00	0.00	0.00	11.6	8.278	8.3	0.220	394	625	522	0.631	0.755	0.755
3th	0.00	0.00	0.00	20.7	14.753	8.3	0.220	468	625	522	0.749	0.897	0.897
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W4.3

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	10.83	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	13.8 ft		*Total Wall Length*		
L_{HD} =	12.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	274	A	0.60	0.875	0.11	(2)	2x4	0.853	0.013	OK
4th	DF	554	B	0.92	0.875	0.36	(5)	2x4	0.604	0.015	OK
3th	DF	694	C	0.75	0.875	0.71	(6)	2x4	0.897	0.015	OK
N/A	DF	694	C	0.00	0.875	0.00	(1)	2x4	0.000	0.000	OK
2	DF	694	C	0.75	0.875	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	694	C	0.00	0.875	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	384	0	5.28 K	5.28	0.07	0.30	11.3 ft	11.3	59.8	29.1	**1.7**
4th	393	0	5.40 K	10.67	0.10	0.35	9.3 ft	20.7	159.4	64.0	**5.3**
3th	195	0	2.69 K	13.36	0.10	0.35	9.3 ft	30.0	284.0	98.9	**10.3**
N/A	0	0	0.00 K	13.36	0.10	0.27	0.0 ft	30.0	284.0	125.8	***0.0***
N/A	0	0	0.00 K	13.36	0.10	0.27	0.0 ft	30.0	284.0	152.8	***0.0***
N/A	0	0	0.00 K	13.36	0.10	0.27	0.0 ft	30.0	284.0	179.8	***0.0***

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	384	15	0.000	11	1.50E+06	10.3	0.282	0.916	0.000	27.0	0.359	1.275	***0.000***
4th	776	19	0.100	26	1.50E+06	8.3	0.357	0.634	0.076	16.7	0.199	0.833	***0.100***
3th	972	30	0.180	32	1.50E+06	8.3	0.278	0.278	0.137	8.3	0.137	0.415	***0.180***
N/A	972	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	***0.000***
N/A	972	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	***0.000***
N/A	972	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	***0.000***

CHORDS - COMPRESSION CONTROLS

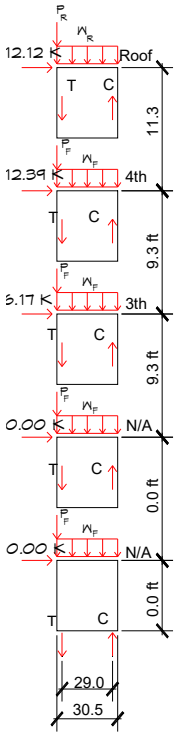
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	4.3	3.105	10.3	0.146	296	625	347	0.473	0.853	0.853
4th	0.00	0.00	0.00	11.6	8.278	8.3	0.220	315	625	522	0.505	0.604	0.604
3th	0.00	0.00	0.00	20.7	14.753	8.3	0.220	468	625	522	0.749	0.897	0.897
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	20.7	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W5.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	30.5 ft		*Total Wall Length*		
L_{HD} =	29.0 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	284	A	0.62	0.5	0.00	(2)	2x4	0.883	0.010	OK
4th	DF	574	B	0.96	0.5	0.00	(4)	2x4	0.782	0.014	OK
3th	DF	719	C	0.78	0.5	0.00	(6)	2x4	0.929	0.012	OK
N/A	DF	719	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	719	C	0.78	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	719	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	398	0	12.12 K	12.12	0.07	0.50	11.3 ft	11.3	137.4	233.8	**0.0**
4th	406	0	12.39 K	24.51	0.10	0.63	9.3 ft	20.7	366.1	531.7	**0.0**
3th	202	0	6.17 K	30.68	0.10	0.63	9.3 ft	30.0	652.3	829.7	**0.0**
N/A	0	0	0.00 K	30.68	0.10	0.55	0.0 ft	30.0	652.3	1088.5	**0.0**
N/A	0	0	0.00 K	30.68	0.10	0.55	0.0 ft	30.0	652.3	1347.4	**0.0**
N/A	0	0	0.00 K	30.68	0.10	0.55	0.0 ft	30.0	652.3	1606.3	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	398	15	0.000	11	1.50E+06	10.3	0.281	0.930	0.000	27.0	0.151	1.082	**0.000**
4th	804	19	0.100	21	1.50E+06	8.3	0.366	0.649	0.032	16.7	0.084	0.733	**0.100**
3th	1006	30	0.180	32	1.50E+06	8.3	0.283	0.283	0.058	8.3	0.058	0.341	**0.180**
N/A	1006	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1006	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1006	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

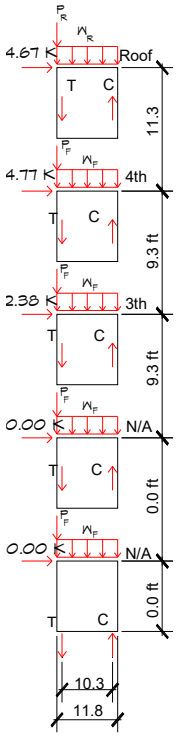
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	4.5	3.217	10.3	0.146	306	625	347	0.490	0.883	0.883
4th	0.00	0.00	0.00	12.0	8.573	8.3	0.220	408	625	522	0.653	0.782	0.782
3th	0.00	0.00	0.00	21.4	15.277	8.3	0.220	485	625	522	0.776	0.929	0.929
N/A	0.00	0.00	0.00	21.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	21.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	21.4	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W5.2

C_s =	0.142		Wall Weight =	9	psf	
S_{DS} =	0.92	sec	Roof Dead =	18	psf	
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf	
Trib Width =	1.67	ft	1+ 0.14Sds =	1.13		
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*			
L =	11.8 ft		*Total Wall Length*			
L_{HD} =	10.3 ft		*Distance from Holdown to comp post*			

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	284	A	0.62	1	0.15	(2)	2x4	0.883	0.015	OK
4th	DF	574	B	0.96	1	0.44	(4)	2x4	0.782	0.016	OK
3th	DF	719	C	0.78	1	0.80	(6)	2x4	0.929	0.014	OK
N/A	DF	719	C	0.00	1	0.00	(1)	2x4	0.000	0.000	OK
2	DF	719	C	0.78	1	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	719	C	0.00	1	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	398	0	4.67 K	4.67	0.07	0.13	11.3 ft	11.3	52.9	10.0	**2.9**
4th	406	0	4.77 K	9.44	0.10	0.13	9.3 ft	20.7	141.0	19.8	**8.3**
3th	202	0	2.38 K	11.82	0.10	0.13	9.3 ft	30.0	251.3	29.7	**15.3**
N/A	0	0	0.00 K	11.82	0.10	0.04	0.0 ft	30.0	251.3	33.7	**0.0**
N/A	0	0	0.00 K	11.82	0.10	0.04	0.0 ft	30.0	251.3	37.8	**0.0**
N/A	0	0	0.00 K	11.82	0.10	0.04	0.0 ft	30.0	251.3	41.8	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	398	15	0.070	11	1.50E+06	10.3	0.295	0.958	0.077	27.0	0.381	1.339	**0.070**
4th	804	19	0.085	21	1.50E+06	8.3	0.373	0.662	0.077	16.7	0.175	0.837	**0.085**
3th	1006	30	0.120	32	1.50E+06	8.3	0.289	0.289	0.109	8.3	0.109	0.398	**0.120**
N/A	1006	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1006	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1006	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	4.5	3.217	10.3	0.146	306	625	347	0.490	0.883	0.883
4th	0.00	0.00	0.00	12.0	8.573	8.3	0.220	408	625	522	0.653	0.782	0.782
3th	0.00	0.00	0.00	21.4	15.277	8.3	0.220	485	625	522	0.776	0.929	0.929
N/A	0.00	0.00	0.00	21.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	21.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	21.4	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

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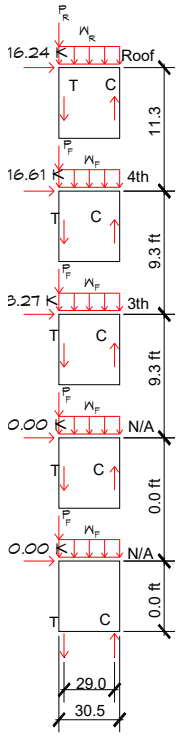

STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W6.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	30.5 ft		*Total Wall Length*		
L_{HD} =	29.0 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	380	A	0.83	0.5	0.00	(3)	2x4	0.789	0.014	OK
4th	DF	769	C	0.84	0.5	0.00	(5)	2x4	0.838	0.012	OK
3th	DF	963	D	0.80	0.5	0.00	(8)	2x4	0.933	0.013	OK
N/A	DF	963	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	963	C	1.05	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	963	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	532	0	16.24 K	16.24	0.07	0.50	11.3 ft	11.3	184.0	233.8	**0.0**
4th	545	0	16.61 K	32.85	0.10	0.63	9.3 ft	20.7	490.5	531.7	**0.0**
3th	271	0	8.27 K	41.12	0.10	0.63	9.3 ft	30.0	874.1	829.7	**0.0**
N/A	0	0	0.00 K	41.12	0.10	0.55	0.0 ft	30.0	874.1	1088.5	**0.0**
N/A	0	0	0.00 K	41.12	0.10	0.55	0.0 ft	30.0	874.1	1347.4	**0.0**
N/A	0	0	0.00 K	41.12	0.10	0.55	0.0 ft	30.0	874.1	1606.3	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	532	15	0.100	16	1.50E+06	10.3	0.373	0.984	0.039	27.0	0.198	1.181	**0.100**
4th	1077	30	0.120	26	1.50E+06	8.3	0.303	0.610	0.039	16.7	0.090	0.701	**0.120**
3th	1348	37	0.180	42	1.50E+06	8.3	0.307	0.307	0.058	8.3	0.058	0.365	**0.180**
N/A	1348	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1348	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1348	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	6.0	4.309	10.3	0.146	274	625	347	0.438	0.789	0.789
4th	0.00	0.00	0.00	16.1	11.486	8.3	0.220	438	625	522	0.700	0.838	0.838
3th	0.00	0.00	0.00	28.7	20.470	8.3	0.220	487	625	522	0.780	0.933	0.933
N/A	0.00	0.00	0.00	28.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	28.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	28.7	0.000	0.0	0.000	0	625	0			0.000

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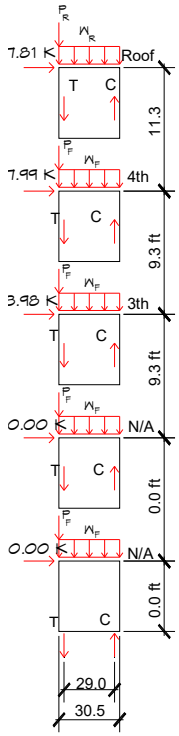

STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W7.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	30.5 ft		*Total Wall Length*		
L_{HD} =	29.0 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	183	A	0.40	0.5	0.00	(2)	2x4	0.569	0.008	OK
4th	DF	370	A	0.80	0.5	0.00	(3)	2x4	0.672	0.012	OK
3th	DF	463	B	0.77	0.5	0.00	(4)	2x4	0.898	0.013	OK
N/A	DF	463	C	0.00	0.5	0.00	(4)	2x4	0.000	0.000	OK
2	DF	463	C	0.50	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	463	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	256	0	7.81 K	7.81	0.07	0.50	11.3 ft	11.3	88.5	233.8	**0.0**
4th	262	0	7.99 K	15.80	0.10	0.63	9.3 ft	20.7	235.9	531.7	**0.0**
3th	130	0	3.98 K	19.78	0.10	0.63	9.3 ft	30.0	420.5	829.7	**0.0**
N/A	0	0	0.00 K	19.78	0.10	0.55	0.0 ft	30.0	420.5	1088.5	**0.0**
N/A	0	0	0.00 K	19.78	0.10	0.55	0.0 ft	30.0	420.5	1347.4	**0.0**
N/A	0	0	0.00 K	19.78	0.10	0.55	0.0 ft	30.0	420.5	1606.3	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	256	15	0.100	11	1.50E+06	10.3	0.181	0.768	0.039	27.0	0.198	0.965	**0.100**
4th	518	15	0.120	16	1.50E+06	8.3	0.291	0.586	0.039	16.7	0.090	0.677	**0.120**
3th	649	19	0.180	21	1.50E+06	8.3	0.295	0.295	0.058	8.3	0.058	0.353	**0.180**
N/A	649	30	0.000	21	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	649	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	649	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.9	2.073	10.3	0.146	197	625	347	0.316	0.569	0.569
4th	0.00	0.00	0.00	7.7	5.525	8.3	0.220	351	625	522	0.561	0.672	0.672
3th	0.00	0.00	0.00	13.8	9.847	8.3	0.220	469	625	522	0.750	0.898	0.898
N/A	0.00	0.00	0.00	13.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	13.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	13.8	0.000	0.0	0.000	0	625	0			0.000

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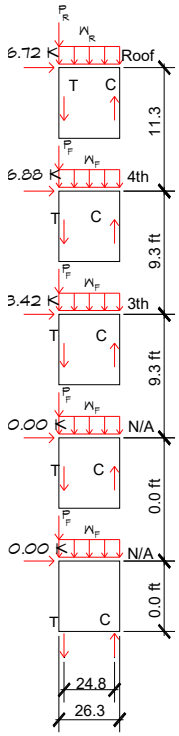

STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W7.2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	26.3 ft		*Total Wall Length*		
L_{HD} =	24.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	183	A	0.40	0.5	0.00	(2)	2x4	0.569	0.009	OK
4th	DF	370	A	0.80	0.5	0.00	(3)	2x4	0.672	0.012	OK
3th	DF	463	B	0.77	0.5	0.00	(4)	2x4	0.898	0.013	OK
N/A	DF	463	C	0.00	0.5	0.00	(4)	2x4	0.000	0.000	OK
2	DF	463	C	0.50	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	463	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	256	0	6.72 K	6.72	0.07	0.50	11.3 ft	11.3	76.2	173.5	**0.0**
4th	262	0	6.88 K	13.60	0.10	0.63	9.3 ft	20.7	203.1	394.5	**0.0**
3th	130	0	3.42 K	17.02	0.10	0.63	9.3 ft	30.0	361.9	615.6	**0.0**
N/A	0	0	0.00 K	17.02	0.10	0.55	0.0 ft	30.0	361.9	807.7	**0.0**
N/A	0	0	0.00 K	17.02	0.10	0.55	0.0 ft	30.0	361.9	999.8	**0.0**
N/A	0	0	0.00 K	17.02	0.10	0.55	0.0 ft	30.0	361.9	1191.9	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	256	15	0.100	11	1.50E+06	10.3	0.182	0.770	0.046	27.0	0.232	1.001	**0.100**
4th	518	15	0.120	16	1.50E+06	8.3	0.292	0.588	0.045	16.7	0.106	0.693	**0.120**
3th	649	19	0.180	21	1.50E+06	8.3	0.296	0.296	0.068	8.3	0.068	0.364	**0.180**
N/A	649	30	0.000	21	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	649	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	649	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.9	2.073	10.3	0.146	197	625	347	0.316	0.569	0.569
4th	0.00	0.00	0.00	7.7	5.525	8.3	0.220	351	625	522	0.561	0.672	0.672
3th	0.00	0.00	0.00	13.8	9.847	8.3	0.220	469	625	522	0.750	0.898	0.898
N/A	0.00	0.00	0.00	13.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	13.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	13.8	0.000	0.0	0.000	0	625	0			0.000

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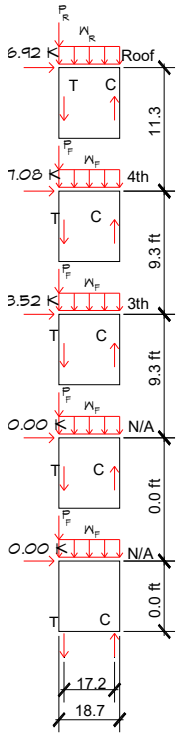


STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W8.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	11.67	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	18.7 ft		*Total Wall Length*		
L_{HD} =	17.2 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	265	A	0.58	0.625	0.11	(2)	2x4	0.823	0.010	OK
4th	DF	536	B	0.89	0.625	0.45	(3)	2x4	0.972	0.014	OK
3th	DF	670	C	0.73	0.625	0.98	(6)	2x4	0.866	0.011	OK
N/A	DF	670	C	0.00	0.5	0.00	(4)	2x4	0.000	0.000	OK
2	DF	670	C	0.73	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	670	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	371	0	6.92 K	6.92	0.07	0.31	11.3 ft	11.3	78.4	55.7	**0.8**
4th	379	0	7.08 K	14.00	0.10	0.38	9.3 ft	20.7	209.0	123.1	**3.2**
3th	189	0	3.52 K	17.52	0.10	0.38	9.3 ft	30.0	372.4	190.4	**7.0**
N/A	0	0	0.00 K	17.52	0.10	0.29	0.0 ft	30.0	372.4	243.1	**0.0**
N/A	0	0	0.00 K	17.52	0.10	0.29	0.0 ft	30.0	372.4	295.9	**0.0**
N/A	0	0	0.00 K	17.52	0.10	0.29	0.0 ft	30.0	372.4	348.6	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	371	15	0.010	11	1.50E+06	10.3	0.267	0.879	0.007	27.0	0.163	1.043	**0.010**
4th	750	19	0.080	16	1.50E+06	8.3	0.346	0.612	0.043	16.7	0.092	0.704	**0.080**
3th	938	30	0.100	32	1.50E+06	8.3	0.266	0.266	0.054	8.3	0.054	0.320	**0.100**
N/A	938	30	0.000	21	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	938	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	938	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

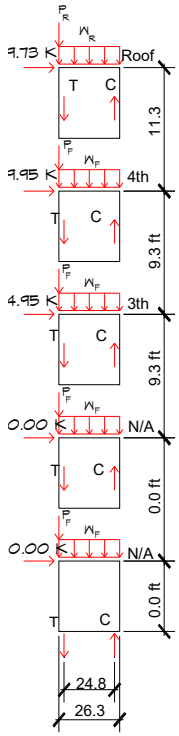
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	4.2	2.999	10.3	0.146	286	625	347	0.457	0.823	0.823
4th	0.00	0.00	0.00	11.2	7.995	8.3	0.220	508	625	522	0.812	0.972	0.972
3th	0.00	0.00	0.00	19.9	14.249	8.3	0.220	452	625	522	0.724	0.866	0.866
N/A	0.00	0.00	0.00	19.9	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	19.9	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	19.9	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W8.2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	11.67	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	26.3 ft		*Total Wall Length*		
L_{HD} =	24.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	265	A	0.58	0.5	0.00	(2)	2x4	0.823	0.011	OK
4th	DF	536	B	0.89	0.5	0.22	(3)	2x4	0.972	0.012	OK
3th	DF	670	C	0.73	0.5	0.78	(6)	2x4	0.866	0.012	OK
N/A	DF	670	C	0.00	0.5	0.00	(4)	2x4	0.000	0.000	OK
2	DF	670	C	0.73	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	670	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	371	0	9.73 K	9.73	0.07	0.31	11.3 ft	11.3	110.2	109.4	**0.0**
4th	379	0	9.95 K	19.68	0.10	0.38	9.3 ft	20.7	293.8	241.5	**1.0**
3th	189	0	4.95 K	24.63	0.10	0.38	9.3 ft	30.0	523.7	373.5	**3.5**
N/A	0	0	0.00 K	24.63	0.10	0.29	0.0 ft	30.0	523.7	476.7	**0.0**
N/A	0	0	0.00 K	24.63	0.10	0.29	0.0 ft	30.0	523.7	579.8	**0.0**
N/A	0	0	0.00 K	24.63	0.10	0.29	0.0 ft	30.0	523.7	683.0	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	371	15	0.050	11	1.50E+06	10.3	0.264	0.871	0.023	27.0	0.159	1.030	**0.050**
4th	750	19	0.000	16	1.50E+06	8.3	0.343	0.608	0.000	16.7	0.061	0.668	
3th	938	30	0.180	32	1.50E+06	8.3	0.264	0.264	0.068	8.3	0.068	0.332	**0.180**
N/A	938	30	0.000	21	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	938	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	938	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

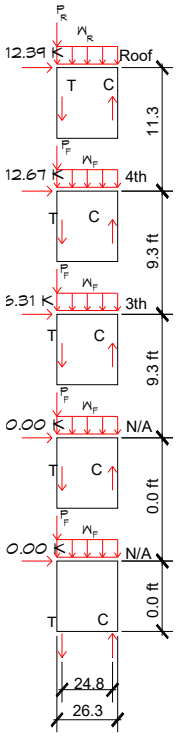
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	4.2	2.999	10.3	0.146	286	625	347	0.457	0.823	0.823
4th	0.00	0.00	0.00	11.2	7.995	8.3	0.220	508	625	522	0.812	0.972	0.972
3th	0.00	0.00	0.00	19.9	14.249	8.3	0.220	452	625	522	0.724	0.866	0.866
N/A	0.00	0.00	0.00	19.9	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	19.9	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	19.9	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W9.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	4.50	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	26.3 ft		*Total Wall Length*		
L_{HD} =	24.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	337	A	0.73	0.875	0.14	(3)	2x4	0.699	0.013	OK
4th	DF	682	C	0.74	0.875	0.45	(4)	2x4	0.928	0.011	OK
3th	DF	854	C	0.93	0.875	0.88	(7)	2x4	0.945	0.014	OK
N/A	DF	854	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	854	C	0.93	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	854	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	472	0	12.39 K	12.39	0.07	0.18	11.3 ft	11.3	140.3	64.9	**2.0**
4th	483	0	12.67 K	25.06	0.10	0.20	9.3 ft	20.7	374.1	135.2	**6.6**
3th	240	0	6.31 K	31.37	0.10	0.20	9.3 ft	30.0	666.8	205.6	**12.8**
N/A	0	0	0.00 K	31.37	0.10	0.11	0.0 ft	30.0	666.8	246.9	**0.0**
N/A	0	0	0.00 K	31.37	0.10	0.11	0.0 ft	30.0	666.8	288.3	**0.0**
N/A	0	0	0.00 K	31.37	0.10	0.11	0.0 ft	30.0	666.8	329.7	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	472	15	0.100	16	1.50E+06	10.3	0.332	0.939	0.046	27.0	0.232	1.170	**0.100**
4th	955	30	0.120	21	1.50E+06	8.3	0.271	0.607	0.045	16.7	0.106	0.712	**0.120**
3th	1195	30	0.180	37	1.50E+06	8.3	0.336	0.336	0.068	8.3	0.068	0.404	**0.180**
N/A	1195	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1195	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1195	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

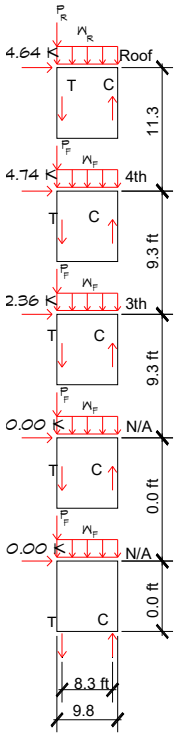
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	5.3	3.819	10.3	0.146	242	625	347	0.388	0.699	0.699
4th	0.00	0.00	0.00	14.3	10.181	8.3	0.220	485	625	522	0.776	0.928	0.928
3th	0.00	0.00	0.00	25.4	18.144	8.3	0.220	494	625	522	0.790	0.945	0.945
N/A	0.00	0.00	0.00	25.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	25.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	25.4	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W9.2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	22.00	ft^2	*Resists uplift only (due to near walls)*		
L =	9.8 ft		*Total Wall Length*		
L_{HD} =	8.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	337	A	0.13	0.875	0.13	(3)	2x4	0.699	0.020	OK
4th	DF	682	C	0.74	0.875	0.42	(4)	2x4	0.928	0.014	OK
3th	DF	854	C	0.93	0.875	0.84	(7)	2x4	0.945	0.019	OK
N/A	DF	854	C	0.00	0.875	0.00	(1)	2x4	0.000	0.000	OK
2	DF	854	C	0.93	0.875	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	854	C	0.00	0.875	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	472	0	4.64 K	4.64	0.40	0.50	11.3 ft	11.3	52.6	28.0	**1.9**
4th	483	0	4.74 K	9.38	0.55	0.63	9.3 ft	20.7	140.1	64.0	**6.1**
3th	240	0	2.36 K	11.75	0.55	0.63	9.3 ft	30.0	249.7	100.0	**12.2**
N/A	0	0	0.00 K	11.75	0.55	0.55	0.0 ft	30.0	249.7	132.0	**0.0**
N/A	0	0	0.00 K	11.75	0.55	0.55	0.0 ft	30.0	249.7	164.0	**0.0**
N/A	0	0	0.00 K	11.75	0.55	0.55	0.0 ft	30.0	249.7	196.0	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	472	15	0.080	16	1.50E+06	10.3	0.346	0.972	0.109	27.0	0.661	1.633	**0.080**
4th	955	30	0.120	21	1.50E+06	8.3	0.282	0.626	0.134	16.7	0.314	0.940	**0.120**
3th	1195	30	0.180	37	1.50E+06	8.3	0.344	0.344	0.202	8.3	0.202	0.545	**0.180**
N/A	1195	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1195	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	1195	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

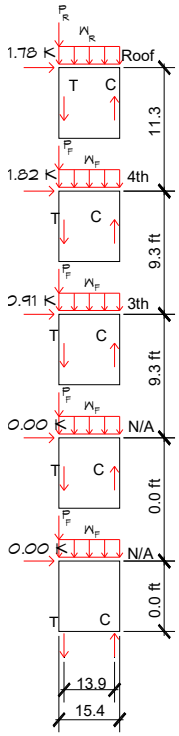
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	5.3	3.819	10.3	0.146	242	625	347	0.388	0.699	0.699
4th	0.00	0.00	0.00	14.3	10.181	8.3	0.220	485	625	522	0.776	0.928	0.928
3th	0.00	0.00	0.00	25.4	18.144	8.3	0.220	494	625	522	0.790	0.945	0.945
N/A	0.00	0.00	0.00	25.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	25.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	25.4	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL W10

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	1.67	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	15.4 ft		*Total Wall Length*		
L_{HD} =	13.9 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	82	A	0.18	0.5	0.02	(1)	2x4	0.512	0.009	OK
4th	DF	167	A	0.36	0.5	0.20	(2)	2x4	0.454	0.007	OK
3th	DF	209	A	0.45	0.5	0.48	(3)	2x4	0.539	0.010	OK
N/A	DF	209	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	209	C	0.23	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	209	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	115	0	1.78 K	1.78	0.07	0.13	11.3 ft	11.3	20.1	16.8	**0.1**
4th	118	0	1.82 K	3.60	0.10	0.13	9.3 ft	20.7	53.7	33.3	**0.9**
3th	59	0	0.91 K	4.50	0.10	0.13	9.3 ft	30.0	95.7	49.8	**2.2**
N/A	0	0	0.00 K	4.50	0.10	0.04	0.0 ft	30.0	95.7	56.3	**0.0**
N/A	0	0	0.00 K	4.50	0.10	0.04	0.0 ft	30.0	95.7	62.8	**0.0**
N/A	0	0	0.00 K	4.50	0.10	0.04	0.0 ft	30.0	95.7	69.3	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	115	15	0.080	5.3	1.50E+06	10.3	0.089	0.389	0.065	27.0	0.395	0.785	**0.080**
4th	233	15	0.120	11	1.50E+06	8.3	0.134	0.301	0.080	16.7	0.188	0.489	**0.120**
3th	292	15	0.180	16	1.50E+06	8.3	0.166	0.166	0.121	8.3	0.121	0.287	**0.180**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

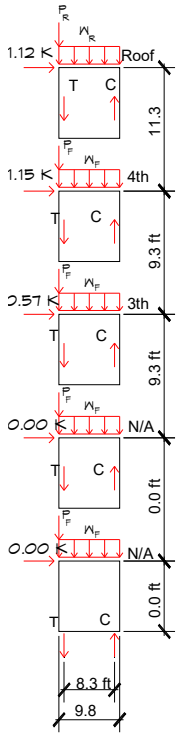
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.3	0.933	10.3	0.146	178	625	347	0.284	0.512	0.512
4th	0.00	0.00	0.00	3.5	2.488	8.3	0.220	237	625	522	0.379	0.454	0.454
3th	0.00	0.00	0.00	6.2	4.434	8.3	0.220	282	625	522	0.450	0.539	0.539
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000

Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL 10.2-10.5

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	3.67	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	9.8 ft		*Total Wall Length*		
L_{HD} =	8.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	82	A	0.18	0.5	0.07	(1)	2x4	0.512	0.013	OK
4th	DF	167	A	0.36	0.5	0.28	(2)	2x4	0.454	0.009	OK
3th	DF	209	A	0.45	0.5	0.60	(3)	2x4	0.539	0.013	OK
N/A	DF	209	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	209	C	0.23	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	209	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	115	0	1.12 K	1.12	0.07	0.17	11.3 ft	11.3	12.7	8.7	**0.3**
4th	118	0	1.15 K	2.27	0.10	0.18	9.3 ft	20.7	34.0	18.0	**1.3**
3th	59	0	0.57 K	2.85	0.10	0.18	9.3 ft	30.0	60.5	27.3	**2.7**
N/A	0	0	0.00 K	2.85	0.10	0.09	0.0 ft	30.0	60.5	32.7	**0.0**
N/A	0	0	0.00 K	2.85	0.10	0.09	0.0 ft	30.0	60.5	38.0	**0.0**
N/A	0	0	0.00 K	2.85	0.10	0.09	0.0 ft	30.0	60.5	43.4	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	115	15	0.080	5.3	1.50E+06	10.3	0.095	0.402	0.110	27.0	0.667	1.069	**0.080**
4th	233	15	0.120	11	1.50E+06	8.3	0.138	0.307	0.136	16.7	0.317	0.624	**0.120**
3th	292	15	0.180	16	1.50E+06	8.3	0.169	0.169	0.204	8.3	0.204	0.373	**0.180**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

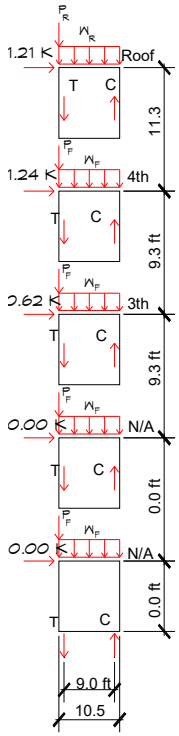
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.3	0.933	10.3	0.146	178	625	347	0.284	0.512	0.512
4th	0.00	0.00	0.00	3.5	2.488	8.3	0.220	237	625	522	0.379	0.454	0.454
3th	0.00	0.00	0.00	6.2	4.434	8.3	0.220	282	625	522	0.450	0.539	0.539
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL 10.2-10.5

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	14.29	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	10.5 ft		*Total Wall Length*		
L_{HD} =	9.0 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%		Post	%	Drift	CHECKS
Roof	DF	82	A	0.18	0.5	0.00	(1)	2x4	0.512	0.012	OK
4th	DF	167	A	0.36	0.5	0.00	(2)	2x4	0.454	0.009	OK
3th	DF	209	A	0.45	0.5	0.00	(3)	2x4	0.539	0.013	OK
N/A	DF	209	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	209	C	0.23	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	209	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	115	0	1.21 K	1.21	0.07	0.36	11.3 ft	11.3	13.7	20.6	**0.0**
4th	118	0	1.24 K	2.45	0.10	0.44	9.3 ft	20.7	36.6	45.9	**0.0**
3th	59	0	0.62 K	3.07	0.10	0.44	9.3 ft	30.0	65.2	71.3	**0.0**
N/A	0	0	0.00 K	3.07	0.10	0.36	0.0 ft	30.0	65.2	92.0	**0.0**
N/A	0	0	0.00 K	3.07	0.10	0.36	0.0 ft	30.0	65.2	112.8	**0.0**
N/A	0	0	0.00 K	3.07	0.10	0.36	0.0 ft	30.0	65.2	133.5	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	115	15	0.080	5.3	1.50E+06	10.3	0.094	0.399	0.101	27.0	0.612	1.011	**0.080**
4th	233	15	0.120	11	1.50E+06	8.3	0.137	0.306	0.124	16.7	0.291	0.597	**0.120**
3th	292	15	0.180	16	1.50E+06	8.3	0.169	0.169	0.187	8.3	0.187	0.355	**0.180**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	292	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

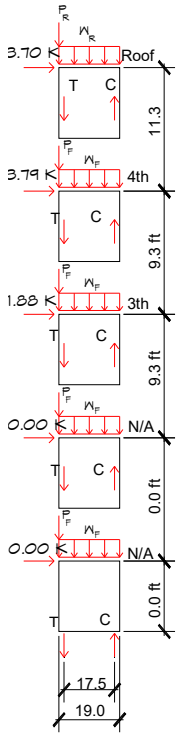
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.3	0.933	10.3	0.146	178	625	347	0.284	0.512	0.512
4th	0.00	0.00	0.00	3.5	2.488	8.3	0.220	237	625	522	0.379	0.454	0.454
3th	0.00	0.00	0.00	6.2	4.434	8.3	0.220	282	625	522	0.450	0.539	0.539
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	6.2	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL 11.1-11.3

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	3.67	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	19.0 ft		*Total Wall Length*		
L_{HD} =	17.5 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	139	A	0.30	0.5	0.07	(1)	2x4	0.866	0.009	OK
4th	DF	282	A	0.61	0.5	0.38	(2)	2x4	0.766	0.010	OK
3th	DF	352	A	0.77	0.5	0.85	(3)	2x4	0.911	0.013	OK
N/A	DF	352	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	352	C	0.38	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	352	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	195	0	3.70 K	3.70	0.07	0.17	11.3 ft	11.3	41.9	31.7	**0.3**
4th	199	0	3.79 K	7.49	0.10	0.18	9.3 ft	20.7	111.8	65.3	**1.7**
3th	99	0	1.88 K	9.37	0.10	0.18	9.3 ft	30.0	199.2	98.9	**3.8**
N/A	0	0	0.00 K	9.37	0.10	0.09	0.0 ft	30.0	199.2	117.4	**0.0**
N/A	0	0	0.00 K	9.37	0.10	0.09	0.0 ft	30.0	199.2	135.9	**0.0**
N/A	0	0	0.00 K	9.37	0.10	0.09	0.0 ft	30.0	199.2	154.3	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	195	15	0.080	5.3	1.50E+06	10.3	0.147	0.652	0.052	27.0	0.315	0.966	**0.080**
4th	394	15	0.120	11	1.50E+06	8.3	0.225	0.505	0.064	16.7	0.150	0.655	**0.120**
3th	493	15	0.180	16	1.50E+06	8.3	0.279	0.279	0.096	8.3	0.096	0.375	**0.180**
N/A	493	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	493	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	493	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

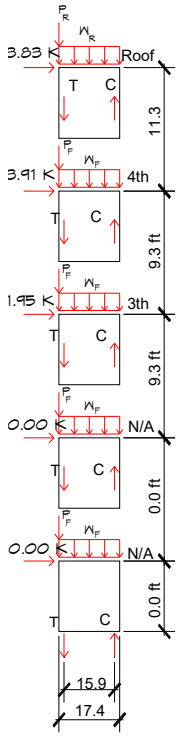
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.2	1.576	10.3	0.146	300	625	347	0.480	0.866	0.866
4th	0.00	0.00	0.00	5.9	4.203	8.3	0.220	400	625	522	0.640	0.766	0.766
3th	0.00	0.00	0.00	10.5	7.490	8.3	0.220	476	625	522	0.761	0.911	0.911
N/A	0.00	0.00	0.00	10.5	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	10.5	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	10.5	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL A.1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	1.83	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	17.4 ft		*Total Wall Length*		
L_{HD} =	15.9 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	157	A	0.34	0.625	0.13	(1)	2x4	0.976	0.005	OK
4th	DF	317	A	0.69	0.625	0.44	(2)	2x4	0.864	0.009	OK
3th	DF	397	A	0.86	0.625	0.86	(4)	2x4	0.770	0.011	OK
N/A	DF	397	C	0.00	0.625	0.00	(1)	2x4	0.000	0.000	OK
2	DF	397	C	0.43	0.625	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	397	C	0.00	0.625	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	220	0	3.83 K	3.83	0.07	0.13	11.3 ft	11.3	43.4	21.7	**0.9**
4th	225	0	3.91 K	7.74	0.10	0.13	9.3 ft	20.7	115.6	43.1	**3.1**
3th	112	0	1.95 K	9.69	0.10	0.13	9.3 ft	30.0	206.0	64.6	**6.1**
N/A	0	0	0.00 K	9.69	0.10	0.05	0.0 ft	30.0	206.0	73.3	**0.0**
N/A	0	0	0.00 K	9.69	0.10	0.05	0.0 ft	30.0	206.0	81.9	**0.0**
N/A	0	0	0.00 K	9.69	0.10	0.05	0.0 ft	30.0	206.0	90.6	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	220	15	0.000	5.3	1.50E+06	10.3	0.167	0.736	0.000	27.0	0.000	0.736	**0.000**
4th	444	15	0.000	11	1.50E+06	8.3	0.255	0.569	0.000	16.7	0.000	0.569	**0.000**
3th	556	15	0.000	21	1.50E+06	8.3	0.314	0.314	0.000	8.3	0.000	0.314	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

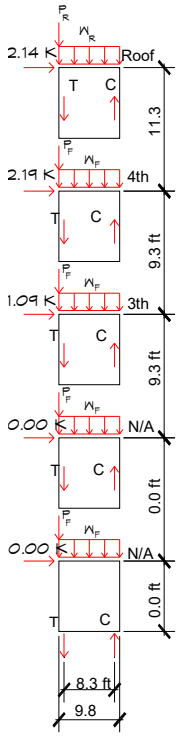
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.5	1.778	10.3	0.146	339	625	347	0.542	0.976	0.976
4th	0.00	0.00	0.00	6.6	4.740	8.3	0.220	451	625	522	0.722	0.864	0.864
3th	0.00	0.00	0.00	11.8	8.446	8.3	0.220	402	625	522	0.644	0.770	0.770
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL A.2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	1.83	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	9.8 ft		*Total Wall Length*		
L_{HD} =	8.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	157	A	0.34	0.75	0.14	(1)	2x4	0.976	0.005	OK
4th	DF	317	A	0.69	0.75	0.41	(2)	2x4	0.864	0.009	OK
3th	DF	397	A	0.86	0.75	0.76	(4)	2x4	0.770	0.011	OK
N/A	DF	397	C	0.00	0.75	0.00	(1)	2x4	0.000	0.000	OK
2	DF	397	C	0.43	0.75	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	397	C	0.00	0.75	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	220	0	2.14 K	2.14	0.07	0.13	11.3 ft	11.3	24.3	7.1	**1.4**
4th	225	0	2.19 K	4.33	0.10	0.13	9.3 ft	20.7	64.7	14.3	**4.3**
3th	112	0	1.09 K	5.42	0.10	0.13	9.3 ft	30.0	115.3	21.4	**8.0**
N/A	0	0	0.00 K	5.42	0.10	0.05	0.0 ft	30.0	115.3	24.5	**0.0**
N/A	0	0	0.00 K	5.42	0.10	0.05	0.0 ft	30.0	115.3	27.7	**0.0**
N/A	0	0	0.00 K	5.42	0.10	0.05	0.0 ft	30.0	115.3	30.8	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	220	15	0.000	5.3	1.50E+06	10.3	0.181	0.762	0.000	27.0	0.000	0.762	**0.000**
4th	444	15	0.000	11	1.50E+06	8.3	0.263	0.581	0.000	16.7	0.000	0.581	**0.000**
3th	556	15	0.000	21	1.50E+06	8.3	0.319	0.319	0.000	8.3	0.000	0.319	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

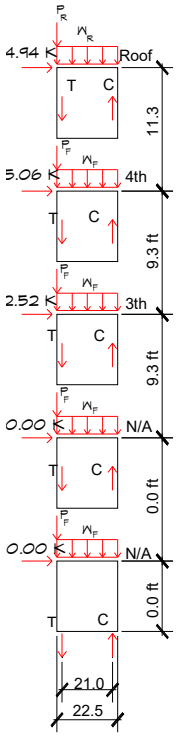
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.5	1.778	10.3	0.146	339	625	347	0.542	0.976	0.976
4th	0.00	0.00	0.00	6.6	4.740	8.3	0.220	451	625	522	0.722	0.864	0.864
3th	0.00	0.00	0.00	11.8	8.446	8.3	0.220	402	625	522	0.644	0.770	0.770
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL A.3

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	1.83	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	22.5 ft		*Total Wall Length*		
L_{HD} =	21.0 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	157	A	0.34	0.625	0.08	(1)	2x4	0.976	0.005	OK
4th	DF	317	A	0.69	0.625	0.35	(2)	2x4	0.864	0.009	OK
3th	DF	397	A	0.86	0.625	0.73	(4)	2x4	0.770	0.011	OK
N/A	DF	397	C	0.00	0.625	0.00	(1)	2x4	0.000	0.000	OK
2	DF	397	C	0.43	0.625	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	397	C	0.00	0.625	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	220	0	4.94 K	4.94	0.07	0.13	11.3 ft	11.3	56.0	35.8	**0.6**
4th	225	0	5.06 K	10.00	0.10	0.13	9.3 ft	20.7	149.3	70.9	**2.5**
3th	112	0	2.52 K	12.51	0.10	0.13	9.3 ft	30.0	266.1	105.9	**5.2**
N/A	0	0	0.00 K	12.51	0.10	0.05	0.0 ft	30.0	266.1	119.8	**0.0**
N/A	0	0	0.00 K	12.51	0.10	0.05	0.0 ft	30.0	266.1	133.6	**0.0**
N/A	0	0	0.00 K	12.51	0.10	0.05	0.0 ft	30.0	266.1	147.4	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	220	15	0.000	5.3	1.50E+06	10.3	0.163	0.729	0.000	27.0	0.000	0.729	**0.000**
4th	444	15	0.000	11	1.50E+06	8.3	0.253	0.566	0.000	16.7	0.000	0.566	**0.000**
3th	556	15	0.000	21	1.50E+06	8.3	0.313	0.313	0.000	8.3	0.000	0.313	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	556	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

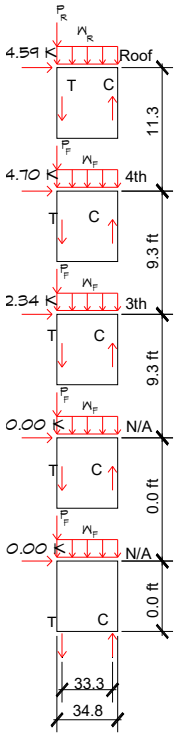
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.5	1.778	10.3	0.146	339	625	347	0.542	0.976	0.976
4th	0.00	0.00	0.00	6.6	4.740	8.3	0.220	451	625	522	0.722	0.864	0.864
3th	0.00	0.00	0.00	11.8	8.446	8.3	0.220	402	625	522	0.644	0.770	0.770
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	11.8	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL B1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	9.25	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	34.8 ft		*Total Wall Length*		
L_{HD} =	33.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	94	A	0.20	0.5	0.00	(1)	2x4	0.586	0.003	OK
4th	DF	190	A	0.41	0.5	0.00	(2)	2x4	0.519	0.005	OK
3th	DF	238	A	0.52	0.5	0.00	(4)	2x4	0.462	0.007	OK
N/A	DF	238	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	238	C	0.26	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	238	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	132	0	4.59 K	4.59	0.07	0.27	11.3 ft	11.3	52.0	165.4	**0.0**
4th	135	0	4.70 K	9.29	0.10	0.32	9.3 ft	20.7	138.6	360.0	**0.0**
3th	67	0	2.34 K	11.62	0.10	0.32	9.3 ft	30.0	247.1	554.7	**0.0**
N/A	0	0	0.00 K	11.62	0.10	0.23	0.0 ft	30.0	247.1	698.5	**0.0**
N/A	0	0	0.00 K	11.62	0.10	0.23	0.0 ft	30.0	247.1	842.2	**0.0**
N/A	0	0	0.00 K	11.62	0.10	0.23	0.0 ft	30.0	247.1	986.0	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	132	15	0.000	5.3	1.50E+06	10.3	0.095	0.432	0.000	27.0	0.000	0.432	**0.000**
4th	267	15	0.000	11	1.50E+06	8.3	0.150	0.337	0.000	16.7	0.000	0.337	**0.000**
3th	334	15	0.000	21	1.50E+06	8.3	0.187	0.187	0.000	8.3	0.000	0.187	**0.000**
N/A	334	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	334	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	334	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

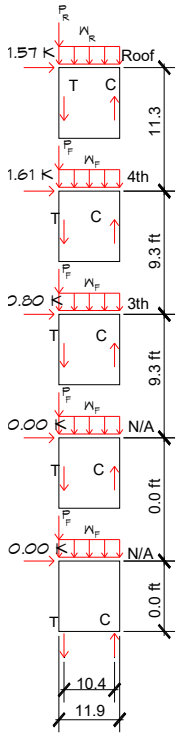
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.5	1.067	10.3	0.146	203	625	347	0.325	0.586	0.586
4th	0.00	0.00	0.00	4.0	2.843	8.3	0.220	271	625	522	0.433	0.519	0.519
3th	0.00	0.00	0.00	7.1	5.067	8.3	0.220	241	625	522	0.386	0.462	0.462
N/A	0.00	0.00	0.00	7.1	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	7.1	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	7.1	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL B2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	14.67	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	11.9	ft	*Total Wall Length*		
L_{HD} =	10.4	ft	*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	94	A	0.20	0.5	0.00	(1)	2x4	0.586	0.003	OK
4th	DF	190	A	0.41	0.5	0.00	(2)	2x4	0.519	0.006	OK
3th	DF	238	A	0.52	0.5	0.00	(4)	2x4	0.462	0.007	OK
N/A	DF	238	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	238	C	0.26	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	238	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	132	0	1.57 K	1.57	0.07	0.37	11.3 ft	11.3	17.8	26.9	**0.0**
4th	135	0	1.61 K	3.18	0.10	0.45	9.3 ft	20.7	47.4	60.1	**0.0**
3th	67	0	0.80 K	3.98	0.10	0.45	9.3 ft	30.0	84.6	93.3	**0.0**
N/A	0	0	0.00 K	3.98	0.10	0.37	0.0 ft	30.0	84.6	120.5	**0.0**
N/A	0	0	0.00 K	3.98	0.10	0.37	0.0 ft	30.0	84.6	147.8	**0.0**
N/A	0	0	0.00 K	3.98	0.10	0.37	0.0 ft	30.0	84.6	175.0	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	132	15	0.000	5.3	1.50E+06	10.3	0.105	0.451	0.000	27.0	0.000	0.451	**0.000**
4th	267	15	0.000	11	1.50E+06	8.3	0.156	0.346	0.000	16.7	0.000	0.346	**0.000**
3th	334	15	0.000	21	1.50E+06	8.3	0.190	0.190	0.000	8.3	0.000	0.190	**0.000**
N/A	334	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	334	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	334	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

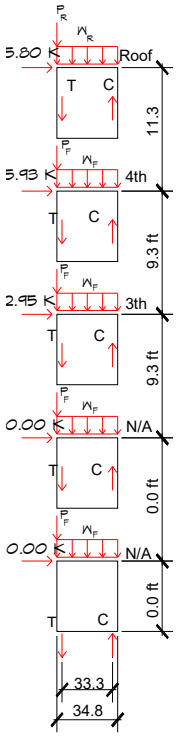
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.5	1.067	10.3	0.146	203	625	347	0.325	0.586	0.586
4th	0.00	0.00	0.00	4.0	2.843	8.3	0.220	271	625	522	0.433	0.519	0.519
3th	0.00	0.00	0.00	7.1	5.067	8.3	0.220	241	625	522	0.386	0.462	0.462
N/A	0.00	0.00	0.00	7.1	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	7.1	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	7.1	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL C1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	19.17	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	34.8 ft		*Total Wall Length*		
L_{HD} =	33.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	119	A	0.26	0.5	0.00	(1)	2x4	0.739	0.004	OK
4th	DF	240	A	0.52	0.5	0.00	(2)	2x4	0.655	0.007	OK
3th	DF	301	A	0.65	0.5	0.00	(4)	2x4	0.583	0.008	OK
N/A	DF	301	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	301	C	0.33	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	301	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	166	0	5.80 K	5.80	0.07	0.45	11.3 ft	11.3	65.7	273.7	**0.0**
4th	170	0	5.93 K	11.72	0.10	0.56	9.3 ft	20.7	175.0	618.8	**0.0**
3th	85	0	2.95 K	14.67	0.10	0.56	9.3 ft	30.0	312.0	963.9	**0.0**
N/A	0	0	0.00 K	14.67	0.10	0.48	0.0 ft	30.0	312.0	1258.1	**0.0**
N/A	0	0	0.00 K	14.67	0.10	0.48	0.0 ft	30.0	312.0	1552.2	**0.0**
N/A	0	0	0.00 K	14.67	0.10	0.48	0.0 ft	30.0	312.0	1846.4	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	166	15	0.000	5.3	1.50E+06	10.3	0.120	0.546	0.000	27.0	0.000	0.546	**0.000**
4th	337	15	0.000	11	1.50E+06	8.3	0.190	0.426	0.000	16.7	0.000	0.426	**0.000**
3th	421	15	0.000	21	1.50E+06	8.3	0.236	0.236	0.000	8.3	0.000	0.236	**0.000**
N/A	421	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	421	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	421	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

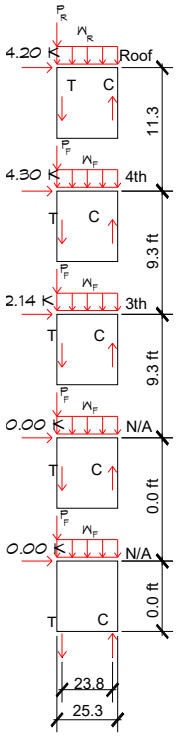
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.9	1.347	10.3	0.146	257	625	347	0.410	0.739	0.739
4th	0.00	0.00	0.00	5.0	3.590	8.3	0.220	342	625	522	0.547	0.655	0.655
3th	0.00	0.00	0.00	9.0	6.398	8.3	0.220	305	625	522	0.487	0.583	0.583
N/A	0.00	0.00	0.00	9.0	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	9.0	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	9.0	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL C2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	12.33	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	25.3 ft		*Total Wall Length*		
L_{HD} =	23.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	119	A	0.26	0.5	0.00	(1)	2x4	0.739	0.004	OK
4th	DF	240	A	0.52	0.5	0.00	(2)	2x4	0.655	0.007	OK
3th	DF	301	A	0.65	0.5	0.00	(4)	2x4	0.583	0.008	OK
N/A	DF	301	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	301	C	0.33	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	301	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	166	0	4.20 K	4.20	0.07	0.32	11.3 ft	11.3	47.6	105.1	**0.0**
4th	170	0	4.30 K	8.50	0.10	0.39	9.3 ft	20.7	126.9	232.6	**0.0**
3th	85	0	2.14 K	10.64	0.10	0.39	9.3 ft	30.0	226.2	360.2	**0.0**
N/A	0	0	0.00 K	10.64	0.10	0.31	0.0 ft	30.0	226.2	461.0	**0.0**
N/A	0	0	0.00 K	10.64	0.10	0.31	0.0 ft	30.0	226.2	561.8	**0.0**
N/A	0	0	0.00 K	10.64	0.10	0.31	0.0 ft	30.0	226.2	662.6	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	166	15	0.000	5.3	1.50E+06	10.3	0.122	0.550	0.000	27.0	0.000	0.550	**0.000**
4th	337	15	0.000	11	1.50E+06	8.3	0.191	0.428	0.000	16.7	0.000	0.428	**0.000**
3th	421	15	0.000	21	1.50E+06	8.3	0.237	0.237	0.000	8.3	0.000	0.237	**0.000**
N/A	421	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	421	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	421	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

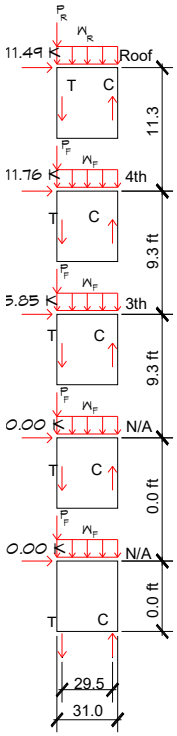
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.9	1.347	10.3	0.146	257	625	347	0.410	0.739	0.739
4th	0.00	0.00	0.00	5.0	3.590	8.3	0.220	342	625	522	0.547	0.655	0.655
3th	0.00	0.00	0.00	9.0	6.398	8.3	0.220	305	625	522	0.487	0.583	0.583
N/A	0.00	0.00	0.00	9.0	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	9.0	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	9.0	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL D1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	31.0 ft		*Total Wall Length*		
L_{HD} =	29.5 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	265	A	0.58	0.5	0.00	(2)	2x4	0.824	0.008	OK
4th	DF	536	B	0.89	0.5	0.00	(3)	2x4	0.973	0.012	OK
3th	DF	671	C	0.73	0.5	0.00	(6)	2x4	0.867	0.009	OK
N/A	DF	671	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	671	C	0.73	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	671	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	371	0	11.49 K	11.49	0.07	0.50	11.3 ft	11.3	130.2	241.5	**0.0**
4th	379	0	11.76 K	23.25	0.10	0.63	9.3 ft	20.7	347.2	549.2	**0.0**
3th	189	0	5.85 K	29.11	0.10	0.63	9.3 ft	30.0	618.7	857.0	**0.0**
N/A	0	0	0.00 K	29.11	0.10	0.55	0.0 ft	30.0	618.7	1124.3	**0.0**
N/A	0	0	0.00 K	29.11	0.10	0.55	0.0 ft	30.0	618.7	1391.7	**0.0**
N/A	0	0	0.00 K	29.11	0.10	0.55	0.0 ft	30.0	618.7	1659.1	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	371	15	0.000	11	1.50E+06	10.3	0.262	0.869	0.000	27.0	0.000	0.869	**0.000**
4th	750	19	0.000	16	1.50E+06	8.3	0.343	0.607	0.000	16.7	0.000	0.607	**0.000**
3th	939	30	0.000	32	1.50E+06	8.3	0.264	0.264	0.000	8.3	0.000	0.264	**0.000**
N/A	939	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	939	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	939	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

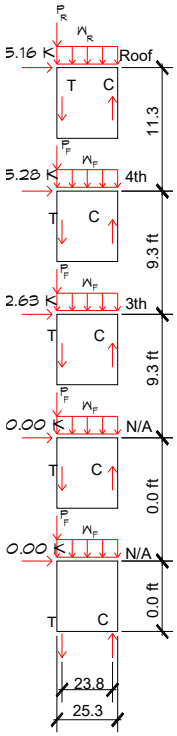
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	4.2	3.001	10.3	0.146	286	625	347	0.457	0.824	0.824
4th	0.00	0.00	0.00	11.2	8.000	8.3	0.220	508	625	522	0.813	0.973	0.973
3th	0.00	0.00	0.00	20.0	14.257	8.3	0.220	453	625	522	0.724	0.867	0.867
N/A	0.00	0.00	0.00	20.0	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	20.0	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	20.0	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL E1/E2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.145ds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.145ds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	25.3 ft		*Total Wall Length*		
L_{HD} =	23.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	146	A	0.32	0.5	0.00	(1)	2x4	0.908	0.004	OK
4th	DF	295	A	0.64	0.5	0.00	(2)	2x4	0.804	0.008	OK
3th	DF	370	A	0.80	0.5	0.00	(4)	2x4	0.717	0.010	OK
N/A	DF	370	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	370	C	0.40	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	370	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	204	0	5.16 K	5.16	0.07	0.50	11.3 ft	11.3	58.5	160.6	**0.0**
4th	209	0	5.28 K	10.44	0.10	0.63	9.3 ft	20.7	155.9	365.2	**0.0**
3th	104	0	2.63 K	13.07	0.10	0.63	9.3 ft	30.0	277.8	569.8	**0.0**
N/A	0	0	0.00 K	13.07	0.10	0.55	0.0 ft	30.0	277.8	747.7	**0.0**
N/A	0	0	0.00 K	13.07	0.10	0.55	0.0 ft	30.0	277.8	925.5	**0.0**
N/A	0	0	0.00 K	13.07	0.10	0.55	0.0 ft	30.0	277.8	1103.4	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	204	15	0.000	5.3	1.50E+06	10.3	0.150	0.676	0.000	27.0	0.000	0.676	**0.000**
4th	414	15	0.000	11	1.50E+06	8.3	0.235	0.525	0.000	16.7	0.000	0.525	**0.000**
3th	518	15	0.000	21	1.50E+06	8.3	0.291	0.291	0.000	8.3	0.000	0.291	**0.000**
N/A	518	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	518	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	518	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

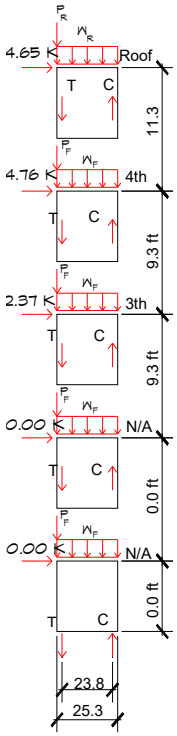
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.3	1.654	10.3	0.146	315	625	347	0.504	0.908	0.908
4th	0.00	0.00	0.00	6.2	4.410	8.3	0.220	420	625	522	0.672	0.804	0.804
3th	0.00	0.00	0.00	11.0	7.859	8.3	0.220	374	625	522	0.599	0.717	0.717
N/A	0.00	0.00	0.00	11.0	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	11.0	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	11.0	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL F-1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	25.3 ft		*Total Wall Length*		
L_{HD} =	23.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	132	A	0.29	0.5	0.00	(1)	2x4	0.819	0.004	OK
4th	DF	266	A	0.58	0.5	0.00	(2)	2x4	0.725	0.008	OK
3th	DF	333	A	0.72	0.5	0.00	(4)	2x4	0.646	0.009	OK
N/A	DF	333	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	333	C	0.36	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	333	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	184	0	4.65 K	4.65	0.07	0.50	11.3 ft	11.3	52.7	160.6	**0.0**
4th	188	0	4.76 K	9.41	0.10	0.63	9.3 ft	20.7	140.5	365.2	**0.0**
3th	94	0	2.37 K	11.78	0.10	0.63	9.3 ft	30.0	250.4	569.8	**0.0**
N/A	0	0	0.00 K	11.78	0.10	0.55	0.0 ft	30.0	250.4	747.7	**0.0**
N/A	0	0	0.00 K	11.78	0.10	0.55	0.0 ft	30.0	250.4	925.5	**0.0**
N/A	0	0	0.00 K	11.78	0.10	0.55	0.0 ft	30.0	250.4	1103.4	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	184	15	0.000	5.3	1.50E+06	10.3	0.136	0.609	0.000	27.0	0.000	0.609	**0.000**
4th	373	15	0.000	11	1.50E+06	8.3	0.212	0.473	0.000	16.7	0.000	0.473	**0.000**
3th	466	15	0.000	21	1.50E+06	8.3	0.262	0.262	0.000	8.3	0.000	0.262	**0.000**
N/A	466	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	466	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	466	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

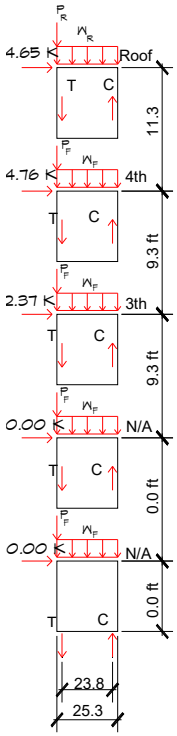
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.1	1.491	10.3	0.146	284	625	347	0.454	0.819	0.819
4th	0.00	0.00	0.00	5.6	3.974	8.3	0.220	378	625	522	0.606	0.725	0.725
3th	0.00	0.00	0.00	9.9	7.082	8.3	0.220	337	625	522	0.540	0.646	0.646
N/A	0.00	0.00	0.00	9.9	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	9.9	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	9.9	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL J

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	18.92	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	25.3 ft		*Total Wall Length*		
L_{HD} =	23.8 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	132	A	0.29	0.5	0.00	(1)	2x4	0.819	0.004	OK
4th	DF	266	A	0.58	0.5	0.00	(2)	2x4	0.725	0.008	OK
3th	DF	333	A	0.72	0.5	0.00	(4)	2x4	0.646	0.009	OK
N/A	DF	333	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	333	C	0.36	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	333	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	184	0	4.65 K	4.65	0.07	0.44	11.3 ft	11.3	52.7	142.9	**0.0**
4th	188	0	4.76 K	9.41	0.10	0.56	9.3 ft	20.7	140.5	323.0	**0.0**
3th	94	0	2.37 K	11.78	0.10	0.56	9.3 ft	30.0	250.4	503.0	**0.0**
N/A	0	0	0.00 K	11.78	0.10	0.47	0.0 ft	30.0	250.4	656.3	**0.0**
N/A	0	0	0.00 K	11.78	0.10	0.47	0.0 ft	30.0	250.4	809.7	**0.0**
N/A	0	0	0.00 K	11.78	0.10	0.47	0.0 ft	30.0	250.4	963.0	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	184	15	0.000	5.3	1.50E+06	10.3	0.136	0.609	0.000	27.0	0.000	0.609	**0.000**
4th	373	15	0.000	11	1.50E+06	8.3	0.212	0.473	0.000	16.7	0.000	0.473	**0.000**
3th	466	15	0.000	21	1.50E+06	8.3	0.262	0.262	0.000	8.3	0.000	0.262	**0.000**
N/A	466	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	466	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	466	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

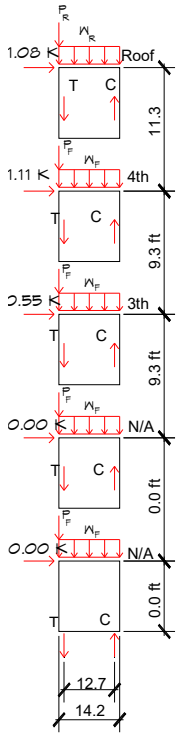
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.1	1.491	10.3	0.146	284	625	347	0.454	0.819	0.819
4th	0.00	0.00	0.00	5.6	3.974	8.3	0.220	378	625	522	0.606	0.725	0.725
3th	0.00	0.00	0.00	9.9	7.082	8.3	0.220	337	625	522	0.540	0.646	0.646
N/A	0.00	0.00	0.00	9.9	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	9.9	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	9.9	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL K

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	3.34	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	14.2	ft	*Total Wall Length*		
L_{HD} =	12.7	ft	*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	55	A	0.12	0.5	0.00	(1)	2x4	0.340	0.002	OK
4th	DF	110	A	0.24	0.5	0.00	(2)	2x4	0.301	0.003	OK
3th	DF	138	A	0.30	0.5	0.00	(4)	2x4	0.268	0.004	OK
N/A	DF	138	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	138	C	0.15	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	138	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	76	0	1.08 K	1.08	0.07	0.16	11.3 ft	11.3	12.3	17.3	**0.0**
4th	78	0	1.11 K	2.19	0.10	0.17	9.3 ft	20.7	32.7	35.5	**0.0**
3th	39	0	0.55 K	2.74	0.10	0.17	9.3 ft	30.0	58.3	53.8	**0.0**
N/A	0	0	0.00 K	2.74	0.10	0.08	0.0 ft	30.0	58.3	63.6	**0.0**
N/A	0	0	0.00 K	2.74	0.10	0.08	0.0 ft	30.0	58.3	73.4	**0.0**
N/A	0	0	0.00 K	2.74	0.10	0.08	0.0 ft	30.0	58.3	83.2	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	76	15	0.000	5.3	1.50E+06	10.3	0.059	0.259	0.000	27.0	0.000	0.259	**0.000**
4th	155	15	0.000	11	1.50E+06	8.3	0.089	0.199	0.000	16.7	0.000	0.199	**0.000**
3th	194	15	0.000	21	1.50E+06	8.3	0.110	0.110	0.000	8.3	0.000	0.110	**0.000**
N/A	194	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	194	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	194	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

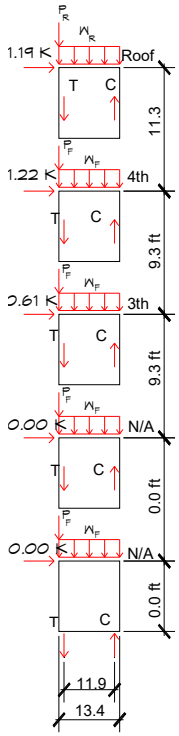
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	0.9	0.618	10.3	0.146	118	625	347	0.188	0.340	0.340
4th	0.00	0.00	0.00	2.3	1.649	8.3	0.220	157	625	522	0.251	0.301	0.301
3th	0.00	0.00	0.00	4.1	2.938	8.3	0.220	140	625	522	0.224	0.268	0.268
N/A	0.00	0.00	0.00	4.1	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.1	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.1	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL L

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	4.00	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	13.4 ft		*Total Wall Length*		
L_{HD} =	11.9 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	63	A	0.14	0.5	0.00	(1)	2x4	0.394	0.002	OK
4th	DF	128	A	0.28	0.5	0.00	(2)	2x4	0.349	0.004	OK
3th	DF	160	A	0.35	0.5	0.10	(4)	2x4	0.311	0.005	OK
N/A	DF	160	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	160	C	0.17	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	160	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	89	0	1.19 K	1.19	0.07	0.17	11.3 ft	11.3	13.5	16.6	**0.0**
4th	91	0	1.22 K	2.40	0.10	0.18	9.3 ft	20.7	35.9	34.5	**0.0**
3th	45	0	0.61 K	3.01	0.10	0.18	9.3 ft	30.0	64.0	52.4	**0.4**
N/A	0	0	0.00 K	3.01	0.10	0.10	0.0 ft	30.0	64.0	62.8	**0.0**
N/A	0	0	0.00 K	3.01	0.10	0.10	0.0 ft	30.0	64.0	73.1	**0.0**
N/A	0	0	0.00 K	3.01	0.10	0.10	0.0 ft	30.0	64.0	83.5	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	89	15	0.000	5.3	1.50E+06	10.3	0.069	0.301	0.000	27.0	0.000	0.301	**0.000**
4th	179	15	0.000	11	1.50E+06	8.3	0.104	0.231	0.000	16.7	0.000	0.231	**0.000**
3th	224	15	0.000	21	1.50E+06	8.3	0.127	0.127	0.000	8.3	0.000	0.127	**0.000**
N/A	224	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	224	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	224	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

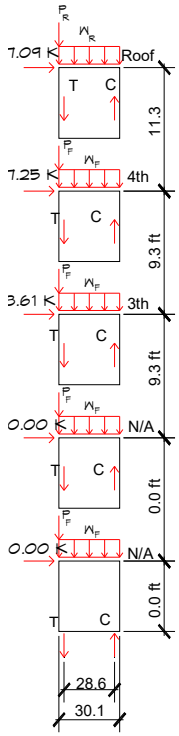
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	1.0	0.717	10.3	0.146	137	625	347	0.219	0.394	0.394
4th	0.00	0.00	0.00	2.7	1.911	8.3	0.220	182	625	522	0.291	0.349	0.349
3th	0.00	0.00	0.00	4.8	3.406	8.3	0.220	162	625	522	0.260	0.311	0.311
N/A	0.00	0.00	0.00	4.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.8	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	4.8	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL M-0

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	30.1 ft		*Total Wall Length*		
L_{HD} =	28.6 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	168	A	0.37	0.5	0.00	(2)	2x4	0.523	0.005	OK
4th	DF	340	A	0.74	0.5	0.00	(2)	2x4	0.927	0.010	OK
3th	DF	426	A	0.93	0.5	0.00	(4)	2x4	0.826	0.012	OK
N/A	DF	426	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	426	C	0.46	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	426	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	236	0	7.09 K	7.09	0.07	0.50	11.3 ft	11.3	80.3	227.4	**0.0**
4th	241	0	7.25 K	14.34	0.10	0.63	9.3 ft	20.7	214.1	517.3	**0.0**
3th	120	0	3.61 K	17.95	0.10	0.63	9.3 ft	30.0	381.5	807.1	**0.0**
N/A	0	0	0.00 K	17.95	0.10	0.55	0.0 ft	30.0	381.5	1058.9	**0.0**
N/A	0	0	0.00 K	17.95	0.10	0.55	0.0 ft	30.0	381.5	1310.7	**0.0**
N/A	0	0	0.00 K	17.95	0.10	0.55	0.0 ft	30.0	381.5	1562.6	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	236	15	0.000	11	1.50E+06	10.3	0.167	0.771	0.000	27.0	0.000	0.771	**0.000**
4th	477	15	0.000	11	1.50E+06	8.3	0.270	0.604	0.000	16.7	0.000	0.604	**0.000**
3th	597	15	0.000	21	1.50E+06	8.3	0.334	0.334	0.000	8.3	0.000	0.334	**0.000**
N/A	597	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	597	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	597	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	2.7	1.907	10.3	0.146	182	625	347	0.291	0.523	0.523
4th	0.00	0.00	0.00	7.1	5.083	8.3	0.220	484	625	522	0.775	0.927	0.927
3th	0.00	0.00	0.00	12.7	9.059	8.3	0.220	431	625	522	0.690	0.826	0.826
N/A	0.00	0.00	0.00	12.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	12.7	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	12.7	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

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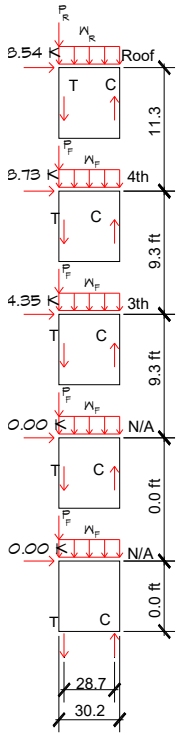


STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL P1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	16.17	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	30.2	ft	*Total Wall Length*		
L_{HD} =	28.7	ft	*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	202	A	0.44	0.5	0.00	(2)	2x4	0.629	0.007	OK
4th	DF	409	A	0.89	0.5	0.00	(3)	2x4	0.742	0.012	OK
3th	DF	512	B	0.85	0.5	0.00	(5)	2x4	0.794	0.013	OK
N/A	DF	512	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	512	C	0.56	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	512	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	283	0	8.54 K	8.54	0.07	0.39	11.3 ft	11.3	96.7	181.0	**0.0**
4th	290	0	8.73 K	17.27	0.10	0.49	9.3 ft	20.7	257.9	406.3	**0.0**
3th	144	0	4.35 K	21.62	0.10	0.49	9.3 ft	30.0	459.6	631.5	**0.0**
N/A	0	0	0.00 K	21.62	0.10	0.40	0.0 ft	30.0	459.6	818.5	**0.0**
N/A	0	0	0.00 K	21.62	0.10	0.40	0.0 ft	30.0	459.6	1005.5	**0.0**
N/A	0	0	0.00 K	21.62	0.10	0.40	0.0 ft	30.0	459.6	1192.5	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	283	15	0.050	11	1.50E+06	10.3	0.200	0.848	0.020	27.0	0.100	0.948	**0.050**
4th	573	15	0.060	16	1.50E+06	8.3	0.322	0.647	0.020	16.7	0.046	0.693	**0.060**
3th	717	19	0.090	26	1.50E+06	8.3	0.326	0.326	0.029	8.3	0.029	0.355	**0.090**
N/A	717	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	717	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	717	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

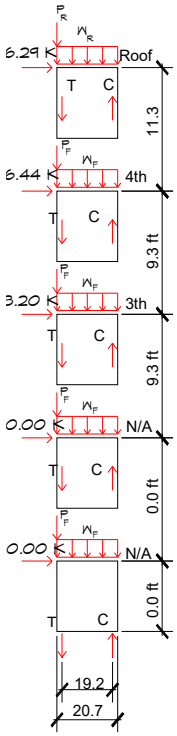
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	3.2	2.290	10.3	0.146	218	625	347	0.349	0.629	0.629
4th	0.00	0.00	0.00	8.5	6.106	8.3	0.220	388	625	522	0.620	0.742	0.742
3th	0.00	0.00	0.00	15.2	10.881	8.3	0.220	415	625	522	0.663	0.794	0.794
N/A	0.00	0.00	0.00	15.2	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	15.2	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	15.2	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL Q1

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14Sds =	0.77		Floor Dead =	25	psf
Trib Width =	22.00	ft	1+ 0.14Sds =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	20.7 ft		*Total Wall Length*		
L_{HD} =	19.2 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	217	A	0.47	0.5	0.00	(2)	2x4	0.676	0.009	OK
4th	DF	440	A	0.96	0.5	0.00	(3)	2x4	0.798	0.013	OK
3th	DF	551	B	0.92	0.5	0.00	(5)	2x4	0.854	0.014	OK
N/A	DF	551	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK
2	DF	551	C	0.60	0.5	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	551	C	0.00	0.5	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	304	0	6.29 K	6.29	0.07	0.50	11.3 ft	11.3	71.3	107.9	**0.0**
4th	311	0	6.44 K	12.73	0.10	0.63	9.3 ft	20.7	190.0	245.4	**0.0**
3th	155	0	3.20 K	15.93	0.10	0.63	9.3 ft	30.0	338.7	382.9	**0.0**
N/A	0	0	0.00 K	15.93	0.10	0.55	0.0 ft	30.0	338.7	502.4	**0.0**
N/A	0	0	0.00 K	15.93	0.10	0.55	0.0 ft	30.0	338.7	622.0	**0.0**
N/A	0	0	0.00 K	15.93	0.10	0.55	0.0 ft	30.0	338.7	741.5	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	304	15	0.050	11	1.50E+06	10.3	0.219	0.919	0.030	27.0	0.149	1.068	**0.050**
4th	616	15	0.060	16	1.50E+06	8.3	0.348	0.700	0.029	16.7	0.068	0.768	**0.060**
3th	771	19	0.090	26	1.50E+06	8.3	0.352	0.352	0.044	8.3	0.044	0.396	**0.090**
N/A	771	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	771	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	771	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

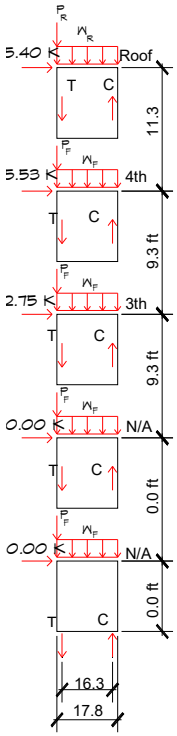
Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	3.4	2.463	10.3	0.146	235	625	347	0.375	0.676	0.676
4th	0.00	0.00	0.00	9.2	6.567	8.3	0.220	417	625	522	0.667	0.798	0.798
3th	0.00	0.00	0.00	16.4	11.704	8.3	0.220	446	625	522	0.713	0.854	0.854
N/A	0.00	0.00	0.00	16.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	16.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	16.4	0.000	0.0	0.000	0	625	0			0.000

PCS Structural Solutions

Project: Mercer Island Job Number: 19028

Sheet: of Name: AK

Originating Office: Seattle Date: 11/13/20



STATUS: OK

MULTI-STORY SHEARWALL DESIGN:

WALL Q2

C_s =	0.142		Wall Weight =	9	psf
S_{DS} =	0.92	sec	Roof Dead =	18	psf
0.9- 0.14S_{DS} =	0.77		Floor Dead =	25	psf
Trib Width =	9.08	ft	1+ 0.14S_{DS} =	1.13	
Trib Area =	4.00	ft^2	*Resists uplift only (due to near walls)*		
L =	17.8 ft		*Total Wall Length*		
L_{HD} =	16.3 ft		*Distance from Holdown to comp post*		

WALL SUMMARY

Level	DF?	Sv	WALL	%	HOLDOWN	%	Post		%	Drift	CHECKS
Roof	DF	217	A	0.47	0.625	0.09	(2)	2x4	0.676	0.009	OK
4th	DF	440	A	0.96	0.625	0.38	(3)	2x4	0.798	0.014	OK
3th	DF	551	B	0.92	0.625	0.83	(5)	2x4	0.854	0.014	OK
N/A	DF	551	C	0.00	0.625	0.00	(1)	2x4	0.000	0.000	OK
2	DF	551	C	0.60	0.625	0.00	(1)	2x4	0.000	0.000	OK
N/A	DF	551	C	0.00	0.625	0.00	(1)	2x4	0.000	0.000	OK

HOLDOWN

Level	v_u	Add Load	V	SV	P'	W'	h	Sh	M_{OT}	M_R	T_{ASD}
	plf	lbs	k	k	k	klf	ft	ft	kft	kft	k
Roof	304	0	5.40 K	5.40	0.07	0.27	11.3 ft	11.3	61.2	43.1	**0.6**
4th	311	0	5.53 K	10.93	0.10	0.31	9.3 ft	20.7	163.2	93.9	**2.7**
3th	155	0	2.75 K	13.68	0.10	0.31	9.3 ft	30.0	290.8	144.6	**5.9**
N/A	0	0	0.00 K	13.68	0.10	0.23	0.0 ft	30.0	290.8	182.1	**0.0**
N/A	0	0	0.00 K	13.68	0.10	0.23	0.0 ft	30.0	290.8	219.7	**0.0**
N/A	0	0	0.00 K	13.68	0.10	0.23	0.0 ft	30.0	290.8	257.2	**0.0**

DEFLECTION - PER SDPWS 4.3.2

Level	v_u	G_a	D_s	A_{chord}	E	h	d_{WALL}	Sd_{WALL}	d_{HD}	Sh	Sd_{HD}	d_{TOT}	Stretch
	plf	k-in	in	in2	psi	ft	in	in	in	ft	in	in	in
Roof	304	15	0.050	11	1.50E+06	10.3	0.220	0.922	0.035	27.0	0.176	1.098	**0.050**
4th	616	15	0.060	16	1.50E+06	8.3	0.349	0.702	0.034	16.7	0.081	0.783	**0.060**
3th	771	19	0.090	26	1.50E+06	8.3	0.353	0.353	0.052	8.3	0.052	0.404	**0.090**
N/A	771	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	771	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**
N/A	771	30	0.000	5.3	1.50E+06	0.0	0.000	0.000	0.000	0.0	0.000	0.000	**0.000**

CHORDS - COMPRESSION CONTROLS

Level	D	L	S	E	C_{ASD}	h	C_p	f_c	F_{cp}	F_c'	f_c/F_{cp}	f_c/F_c'	MAX
	k	k	k	k	k	ft		psi	psi	psi			
Roof	0.00	0.00	0.00	3.4	2.463	10.3	0.146	235	625	347	0.375	0.676	0.676
4th	0.00	0.00	0.00	9.2	6.567	8.3	0.220	417	625	522	0.667	0.798	0.798
3th	0.00	0.00	0.00	16.4	11.704	8.3	0.220	446	625	522	0.713	0.854	0.854
N/A	0.00	0.00	0.00	16.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	16.4	0.000	0.0	0.000	0	625	0			0.000
N/A	0.00	0.00	0.00	16.4	0.000	0.0	0.000	0	625	0			0.000