Project	1914-1916 Pine Street, San Francisco
Job No.	201623.10
By	AL
Date	10/30/2016
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SHEARWALL DESIGN SUMMARY - FLEXIBLE DIAPHRAGM ASSUMPTIONS
2007 CBC SHEAR WALL CRITERIA
1914-1916 PINE STREET, SAN FRANCISCO - SEISMIC RETROFIT

Note: Collector Loads in areas of discontinuities will be amplified by 1.25 as per ASCE 7-05 12.3.3.4 (in Blue), if applicable.

Sources : 2012 California Building Code, Table 2306.4.1, Page 324.
Simpson Catalog C-2014.

Table 4.3.4 Maximum Shear Wall Aspect Ratios

Shear Wall Sheathing Type	Maximum h/b_s Ratio
Wood structural panels, all edges nailed	3-½:1[1]
Particleboard, all edges nailed	2:1
Diagonal sheathing, conventional	2:1
Gypsum wallboard	2:1[2]
Portland cement plaster	2:1[2]
Fiberboard	1-½:1

1. For design to resist seismic forces, the shear wall aspect ratio shall not exceed 2:1 unless the nominal unit shear capacity is multiplied by $2b_s/h$.
2. Walls having aspect ratios exceeding 1-½:1 shall be blocked.

Note: Value reduced by 2w/h for EQ loads for walls with 2.0<=h/b<=3.5 per NDS SDPWS-2005 Table 4.3.4.

Connector Capacities:

Z =	174	lbs (nail shear capacity)
A34 =	412	lbs (Framing angle capacity - Reduced by 1.25 per ASCE 7-05 12.3.3.4)
SDS Screw =	340	lbs (SDS 1/4 x 3 1/2 Screw)
Fanchor =	1,516	lbs (Foundation Anchor capacity)

Assumed for (N) design, modeified for (E) conditions later.

				Wall Dimensions					Panel Data		Nail Data			Allowable Wall Shear			Required Hardware								
																	Shear Walls				Shearwall to Floor			Mudsill Anchors	
Loading Direction	Gridline Wall Location	Cross - Gridline	**F_{MAX} (kips)**	Height (feet)	Width (feet)	Service Load (lb/ft)	Collector Force (lbs)	Shearwall Chord Force (lbs)	No. Panels	Thickness (inches)	Size	Edge (inches)	Field (inches)	Tabular Value (lb/ft)	Modified** (lb/ft)	Check	Shearwall Chords	Holdown	Anchor Diameter	Coiled Strap Perpendicular to Framing	No. Framing Angles/ Wall	Framing Angle Spacing (inches)	SDS Screw Spacing (inches)	No. Anchors	Anchor Spacing (inches)
N-S	1	A - F	5.76	7.00	18.00	320	1,651	2,240	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS14 Strap w/ 10d	14 - A34" Angle	14.40	12.00	7 - 5/8" Bolts	32
	2	C - F.5	7.04	7.00	12.50	563	3,080	3,941	1	0.47	10d	3	12	665	665	**ok**	3 - 2x6	HDU5 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	18 - A34" Angle	7.89	6.82	5 - 5/8" Bolts	30
	4	A - D	2.96	7.00	11.00	269	2,285	1,883	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	9 - A34" Angle	14.67	13.20	5 - 5/8" Bolts	32
		F - G	2.15	7.00	8.00	269	2,285	1,883	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	6 - A34" Angle	13.71	12.00	3 - 5/8" Bolts	32
	5	D - G	3.76	7.00	13.00	289	1,418	2,023	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS14 Strap w/ 10d	10 - A34" Angle	14.18	12.00	5 - 5/8" Bolts	32
	6	D - G	3.76	7.00	13.00	289	1,418	2,023	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS14 Strap w/ 10d	10 - A34" Angle	14.18	12.00	5 - 5/8" Bolts	32
	7	A - C	2.79	7.00	9.00	310	2,589	2,170	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	7 - A34" Angle	13.50	10.80	4 - 5/8" Bolts	32
		F - G	2.79	7.00	9.00	310	2,589	2,170	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	7 - A34" Angle	13.50	10.80	4 - 5/8" Bolts	32
	9	C - G	7.04	7.00	15.00	469	3,384	3,283	1	0.47	10d	4	12	530	530	**ok**	3 - 2x6	HDU4 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	18 - A34" Angle	9.47	8.18	6 - 5/8" Bolts	32
	10	A - D	3.76	7.00	10.50	358	2,267	2,506	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU4 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	10 - A34" Angle	11.45	9.69	4 - 5/8" Bolts	32
		F - F.5	1.97	7.00	5.50	358	2,267	2,506	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU4 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	5 - A34" Angle	11.00	9.43	3 - 5/8" Bolts	32

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Note: Collector Loads in areas of discontinuities will be amplified by 1.25 as per ASCE 7-05 12.3.3.4 (in Blue), if applicable.

Sources : 2012 California Building Code, Table 2306.4.1, Page 324.
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Table 4.3.4 Maximum Shear Wall Aspect Ratios

Shear Wall Sheathing Type	Maximum h/b, Ratio
Wood structural panels, all edges nailed	3-½:1[1]
Particleboard, all edges nailed	2:1
Diagonal sheathing, conventional	2:1
Gypsum wallboard	2:1[2]
Portland cement plaster	2:1[2]
Fiberboard	1-½:1

1. For design to resist seismic forces, the shear wall aspect ratio shall not exceed 2:1 unless the nominal unit shear capacity is multiplied by $2b_s/h$.
2. Walls having aspect ratios exceeding 1-½:1 shall be blocked.

Note: Value reduced by 2w/h for EQ loads for walls with 2.0<=h/b<=3.5 per NDS SDPWS-2005 Table 4.3.4.

Connector Capacities:

Z = 174 lbs (nail shear capacity)
A34 = 412 lbs (Framing angle capacity - Reduced by 1.25 per ASCE 7-05 12.3.3.4)
SDS Screw = 340 lbs (SDS 1/4 x 3 1/2 Screw)
Fanchor = 1,516 lbs (Foundation Anchor capacity)

Assumed for (N) design, modeified for (E) conditions later.

				Wall Dimensions					Panel Data		Nail Data			Allowable Wall Shear			Required Hardware								
																	Shear Walls				Shearwall to Floor			Mudsill Anchors	
Loading Direction	Gridline Wall Location	Cross - Gridline	**F_{MAX} (kips)**	Height (feet)	Width (feet)	Service Load (lb/ft)	Collector Force (lbs)	Shearwall Chord Force (lbs)	No. Panels	Thickness (inches)	Size	Edge (inches)	Field (inches)	Tabular Value (lb/ft)	Modified** (lb/ft)	Check	Shearwall Chords	Holdown	Anchor Diameter	Coiled Strap Perpendicular to Framing	No. Framing Angles/ Wall	Framing Angle Spacing (inches)	SDS Screw Spacing (inches)	No. Anchors	Anchor Spacing (inches)
W-E	A	1 - 2	2.82	7.00	13.50	209	98	1,463	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS18 Strap w/ 10d	11 - A34" Angle	16.00	16.00	6 - 5/8" Bolts	32
		2 - 3	1.15	7.00	5.50	209	98	1,463	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS18 Strap w/ 10d	5 - A34" Angle	16.00	13.20	3 - 5/8" Bolts	32
		3 - 4	2.30	7.00	11.00	209	98	1,463	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS18 Strap w/ 10d	9 - A34" Angle	16.00	16.00	5 - 5/8" Bolts	32
		7 - 8	2.30	7.00	11.00	209	98	1,463	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS18 Strap w/ 10d	9 - A34" Angle	16.00	16.00	5 - 5/8" Bolts	32
		8 - 9	1.15	7.00	5.50	209	98	1,463	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS18 Strap w/ 10d	5 - A34" Angle	16.00	13.20	3 - 5/8" Bolts	32
		9 - 10	2.82	7.00	13.50	209	98	1,463	1	0.47	10d	6	12	340	340	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CS18 Strap w/ 10d	11 - A34" Angle	16.00	16.00	6 - 5/8" Bolts	32
	E	2 - 3.5	4.66	7.00	12.50	373	2,580	2,611	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU4 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	12 - A34" Angle	11.54	10.00	5 - 5/8" Bolts	32
		4 - 5	2.42	7.00	6.50	373	2,580	2,611	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU4 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	6 - A34" Angle	11.14	8.67	3 - 5/8" Bolts	32
		6	1.87	7.00	5.00	373	2,580	2,611	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU4 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	5 - A34" Angle	10.00	8.57	2 - 5/8" Bolts	30
		7	1.31	7.00	3.50	373	2,580	2,611	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU4 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	4 - A34" Angle	8.40	8.40	2 - 5/8" Bolts	32
		7.5 - 9.5	6.53	7.00	17.50	373	2,580	2,611	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU4 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	16 - A34" Angle	12.35	10.00	7 - 5/8" Bolts	32

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W-E (Cont)	G	1 - 3	5.08	7.00	17.50	290	3,041	2,030	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	14 - A34" Angle	15.00	13.13	7 - 5/8" Bolts	32
		3.5 - 3.8	1.60	7.00	5.50	290	3,041	2,030	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	5 - A34" Angle	13.20	11.00	3 - 5/8" Bolts	32
		4 - 5	2.18	7.00	7.50	290	3,041	2,030	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	6 - A34" Angle	12.86	11.25	3 - 5/8" Bolts	32
		7.5 - 7.8	1.60	7.00	5.50	290	3,041	2,030	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	5 - A34" Angle	13.20	11.00	3 - 5/8" Bolts	32
		8 - 9.3	2.18	7.00	7.50	290	3,041	2,030	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	6 - A34" Angle	12.86	11.25	3 - 5/8" Bolts	32
		9 .5- 9.8	2.18	7.00	7.50	290	3,041	2,030	1	0.47	10d	4	12	530	530	**ok**	2 - 2x6	HDU2 w/ 2-2x	5/8" w/ 8.50" Embed	Use CMSTC16 Strap w/ 16d	6 - A34" Angle	12.86	11.25	3 - 5/8" Bolts	32