

**APPENDIX A. Design Charts**

**Table A1. Design and Capacity Moments for Office Building 20'x25' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-913.28	-831.75	218.71	197.69	-694.57	-634.06	-1657.09	-1657.09	-1772.62	-1545.75	370.21	318.86	-1402.41	-1226.89	-1657.09	-1657.09
2	565.32	588.78	123.02	120.07	688.34	708.85	2255.73	2255.73	1175.76	1246.58	218.68	210.27	1394.44	1456.85	2255.73	2255.73
3	-984.23	-1018.84	3.72	18.83	-980.51	-1000.01	-2330.56	-2330.56	-2040.04	-2125.27	24.81	59.34	-2015.23	-2065.93	-2330.56	-2330.56
4	-960.83	-965.30	96.20	93.57	-864.63	-871.73	-2330.56	-2330.56	-1957.72	-1976.05	169.65	164.82	-1788.07	-1811.23	-2330.56	-2330.56
5	553.25	548.77	113.91	111.26	667.16	660.03	2405.39	2405.39	1124.37	1106.04	201.50	196.62	1325.87	1302.66	2405.39	2405.39
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-922.30	-871.79	223.22	209.72	-699.08	-662.07	-1657.09	-1657.09	-1784.35	-1634.23	388.35	352.02	-1396.00	-1282.21	-1657.09	-1657.09
2	548.99	561.83	127.49	125.86	676.48	687.69	2255.73	2255.73	1101.48	1143.24	228.11	223.13	1329.59	1366.37	2255.73	2255.73
3	-958.11	-982.94	-2.03	8.21	-960.14	-974.73	-2330.56	-2330.56	-1919.71	-1986.31	7.06	33.44	-1912.65	-1952.87	-2330.56	-2330.56
4	-946.36	-947.02	95.45	93.48	-850.91	-853.54	-2330.56	-2330.56	-1877.09	-1883.01	169.67	165.15	-1707.42	-1717.86	-2330.56	-2330.56
5	542.83	542.18	120.96	118.95	663.79	661.13	2405.39	2405.39	1076.42	1070.51	215.55	210.99	1291.97	1281.50	2405.39	2405.39
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-908.22	-874.67	223.22	214.07	-685.00	-660.60	-1657.09	-1657.09	-1783.57	-1680.50	393.61	367.89	-1389.96	-1312.61	-1657.09	-1657.09
2	530.45	538.25	131.60	130.58	662.05	668.83	2255.73	2255.73	1063.75	1090.07	236.10	232.96	1299.85	1323.03	2255.73	2255.73
3	-928.67	-946.63	-5.92	1.17	-934.59	-945.46	-2330.56	-2330.56	-1860.22	-1910.66	-4.03	15.41	-1864.25	-1895.25	-2330.56	-2330.56
4	-922.01	-921.55	92.61	91.20	-829.40	-830.35	-2330.56	-2330.56	-1836.24	-1837.44	165.40	161.83	-1670.84	-1675.61	-2330.56	-2330.56
5	526.89	527.35	127.32	125.90	654.21	653.25	2405.39	2405.39	1049.41	1048.21	227.87	224.26	1277.28	1272.47	2405.39	2405.39

**Table A2. Design and Capacity Moments for Office Building 20'x27' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1148.84	-1037.12	244.40	219.17	-904.44	-817.95	-2087.67	-2087.67	-2177.48	-1881.47	411.88	351.95	-1765.60	-1529.52	-2087.67	-2087.67
2	709.41	742.18	137.29	133.48	846.70	875.66	2882.46	2882.46	1451.31	1522.39	243.57	233.11	1694.88	1755.50	2882.46	2882.46
3	-1250.80	-1296.96	7.56	25.17	-1243.24	-1271.79	-2970.77	-2970.77	-2549.05	-2657.82	34.55	73.57	-2514.50	-2584.25	-2970.77	-2970.77
4	-1216.88	-1223.92	104.78	101.94	-1112.10	-1121.98	-2970.77	-2970.77	-2434.40	-2460.25	184.68	179.78	-2249.72	-2280.47	-2970.77	-2970.77
5	692.33	685.31	121.56	118.68	813.89	803.99	3059.08	3059.08	1380.17	1354.36	214.84	209.90	1595.01	1564.26	3059.08	3059.08
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1159.55	-1089.78	250.75	234.36	-908.80	-855.42	-2087.67	-2087.67	-2253.01	-2049.53	435.07	391.96	-1817.94	-1657.57	-2087.67	-2087.67
2	685.19	703.16	142.10	140.00	827.29	843.16	2882.46	2882.46	1386.72	1443.87	254.01	247.72	1640.73	1691.59	2882.46	2882.46
3	-1211.02	-1244.86	0.99	13.17	-1210.03	-1231.69	-2970.77	-2970.77	-2447.88	-2547.05	14.50	45.05	-2433.38	-2502.00	-2970.77	-2970.77
4	-1193.84	-1195.09	104.79	102.52	-1089.05	-1092.57	-2970.77	-2970.77	-2385.71	-2349.63	186.13	181.18	-2199.58	-2168.45	-2970.77	-2970.77
5	676.64	675.40	128.96	126.66	805.60	802.06	3059.08	3059.08	1351.45	1342.53	229.61	224.60	1581.06	1567.13	3059.08	3059.08
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1150.07	-1103.41	251.69	240.54	-898.38	-862.87	-2087.67	-2087.67	-2261.42	-2120.10	443.08	412.25	-1818.34	-1707.85	-2087.67	-2087.67
2	665.64	676.56	146.44	145.12	812.08	821.68	2882.46	2882.46	1340.11	1376.41	262.58	258.58	1602.69	1634.99	2882.46	2882.46
3	-1179.83	-1204.65	-2.92	5.59	-1182.75	-1199.06	-2970.77	-2970.77	-2372.27	-2441.99	2.68	25.52	-2369.59	-2416.47	-2970.77	-2970.77
4	-1169.91	-1169.40	102.66	101.01	-1067.25	-1068.39	-2970.77	-2970.77	-2337.44	-2339.52	183.25	179.20	-2154.19	-2160.32	-2970.77	-2970.77
5	660.68	661.19	135.56	133.89	796.24	795.08	3059.08	3059.08	1320.02	1317.94	242.45	238.35	1562.47	1556.29	3059.08	3059.08

**Table A3. Design and Capacity Moments for Office Building 20'x30' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1549.40	-1389.78	270.51	240.50	-1278.89	-1149.28	-2567.17	-2567.17	-2910.86	-2503.81	506.12	431.69	-2404.74	-2072.12	-2567.17	-2567.17
2	947.13	994.60	150.83	146.05	1097.96	1140.65	3587.44	3587.44	1928.82	2058.07	296.89	283.30	2225.71	2341.37	3587.44	3587.44
3	-1699.43	-1764.11	10.83	31.27	-1688.60	-1732.84	-3689.46	-3689.46	-3447.08	-3595.61	46.99	94.25	-3400.09	-3501.36	-3689.46	-3689.46
4	-1649.18	-1660.16	113.25	110.13	-1535.93	-1550.03	-3689.46	-3689.46	-3280.67	-3317.46	221.96	216.50	-3058.71	-3100.96	-3689.46	-3689.46
5	922.36	911.38	128.13	124.98	1050.49	1036.36	3791.49	3791.49	1827.12	1790.32	251.71	246.19	2078.83	2036.51	3791.49	3791.49
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1569.36	-1469.11	278.86	259.35	-1290.50	-1209.76	-2567.17	-2567.17	-3025.25	-2741.87	537.11	482.85	-2488.14	-2259.02	-2567.17	-2567.17
2	915.29	941.33	155.82	153.20	1071.11	1094.53	3587.44	3587.44	1843.11	1922.86	309.23	300.94	2152.34	2223.80	3587.44	3587.44
3	-1645.59	-1693.77	3.62	17.89	-1641.97	-1675.88	-3689.46	-3689.46	-3310.33	-3434.20	23.01	60.69	-3287.32	-3373.51	-3689.46	-3689.46
4	-1619.71	-1621.84	114.24	111.63	-1505.47	-1510.21	-3689.46	-3689.46	-3218.08	-3231.07	225.43	219.56	-2992.65	-3011.51	-3689.46	-3689.46
5	903.05	900.93	135.68	133.04	1038.73	1033.97	3791.49	3791.49	1792.81	1779.82	268.31	262.37	2061.12	2042.19	3791.49	3791.49
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1561.10	-1493.93	280.88	267.62	-1280.22	-1226.31	-2567.17	-2567.17	-3047.62	-2849.04	549.13	510.02	-2498.49	-2339.02	-2567.17	-2567.17
2	890.75	906.53	160.20	158.57	1050.95	1065.10	3587.44	3587.44	1783.71	1834.71	319.05	313.74	2102.76	2148.45	3587.44	3587.44
3	-1605.53	-1641.15	-0.08	9.93	-1605.61	-1631.22	-3689.46	-3689.46	-3213.30	-3309.88	9.76	38.24	-3203.54	-3271.64	-3689.46	-3689.46
4	-1590.37	-1589.74	113.08	111.16	-1477.29	-1478.58	-3689.46	-3689.46	-3159.00	-3162.15	224.26	219.31	-2934.74	-2942.84	-3689.46	-3689.46
5	883.70	884.32	142.28	140.32	1025.98	1024.64	3791.49	3791.49	1755.17	1752.02	282.64	277.63	2037.81	2029.65	3791.49	3791.49

**Table A4. Design and Capacity Moments for Office Building 25'x25' (in.-kip)**

		Exterior Frame								Interior Frame							
		Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-949.56	-852.91	258.29	229.85	-691.27	-623.06	-1657.09	-1657.09	-1792.60	-1529.20	438.92	369.78	-1353.68	-1159.42	-1657.09	-1657.09	
2	612.40	641.26	147.17	142.95	759.57	784.21	2255.73	2255.73	1256.97	1343.44	265.60	253.43	1522.57	1596.87	2255.73	2255.73	
3	-1039.18	-1078.11	7.81	27.82	-1031.37	-1050.29	-2330.56	-2330.56	-2120.51	-2210.98	40.54	85.35	-2079.97	-2125.63	-2330.56	-2330.56	
4	-1010.40	-1016.78	114.75	111.48	-895.65	-905.30	-2330.56	-2330.56	-2023.67	-2049.11	205.38	199.98	-1818.29	-1849.13	-2330.56	-2330.56	
5	596.37	589.99	136.00	132.69	732.37	722.68	2405.39	2405.39	1189.86	1164.42	244.29	238.84	1434.15	1403.26	2405.39	2405.39	
		Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-959.05	-898.42	265.61	246.92	-693.44	-651.50	-1657.09	-1657.09	-1861.50	-1679.88	466.80	416.22	-1394.70	-1263.66	-1657.09	-1657.09	
2	590.04	606.05	152.76	150.42	742.80	756.47	2255.73	2255.73	1196.78	1249.71	277.96	270.65	1474.74	1520.36	2255.73	2255.73	
3	-1003.38	-1032.00	-0.63	13.38	-1004.01	-1018.62	-2330.56	-2330.56	-2029.97	-2105.73	14.82	50.78	-2015.15	-2054.95	-2330.56	-2330.56	
4	-989.27	-990.61	114.16	111.53	-875.11	-879.08	-2330.56	-2330.56	-1978.85	-1988.22	206.11	200.31	-1772.74	-1787.91	-2330.56	-2330.56	
5	581.99	580.64	144.76	142.10	726.75	722.74	2405.39	2405.39	1163.66	1154.29	262.18	256.32	1425.84	1410.61	2405.39	2405.39	
		Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-951.14	-910.67	266.53	253.77	-684.61	-656.90	-1657.09	-1657.09	-1870.58	-1744.93	476.32	439.96	-1394.26	-1304.97	-1657.09	-1657.09	
2	572.29	582.06	157.79	156.33	730.08	738.39	2255.73	2255.73	1154.19	1187.70	288.09	283.48	1442.28	1471.18	2255.73	2255.73	
3	-975.93	-996.86	-6.03	3.80	-981.96	-993.06	-2330.56	-2330.56	-1964.35	-2022.98	-1.11	26.03	-1965.46	-1996.95	-2330.56	-2330.56	
4	-968.20	-967.97	110.91	108.99	-857.29	-858.98	-2330.56	-2330.56	-1936.34	-1939.01	201.38	196.54	-1734.96	-1742.47	-2330.56	-2330.56	
5	567.62	567.86	152.56	150.62	720.18	718.48	2405.39	2405.39	1135.31	1132.64	277.73	272.83	1413.04	1405.47	2405.39	2405.39	

**Table A5. Design and Capacity Moments for Office Building 25'x27' (in.-kip)**

		Exterior Frame								Interior Frame							
		Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1222.95	-1087.56	288.14	253.76	-934.81	-833.80	-2087.67	-2087.67	-2299.27	-1941.62	531.51	444.49	-1767.76	-1497.13	-2087.67	-2087.67	
2	795.57	836.80	164.18	158.69	959.75	995.49	2882.46	2882.46	1640.80	1759.75	322.40	306.05	1963.20	2065.80	2882.46	2882.46	
3	-1355.56	-1408.60	13.06	36.47	-1342.50	-1372.13	-2970.77	-2970.77	-2778.85	-2898.60	59.02	113.33	-2719.84	-2785.28	-2970.77	-2970.77	
4	-1312.53	-1322.69	124.90	121.40	-1187.63	-1201.29	-2970.77	-2970.77	-2636.57	-2673.86	243.87	238.30	-2392.71	-2435.57	-2970.77	-2970.77	
5	772.30	762.14	145.02	141.49	917.32	903.63	3059.08	3059.08	1543.29	1506.00	284.08	278.45	1827.37	1784.45	3059.08	3059.08	
		Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1269.14	-1185.38	301.35	279.06	-967.79	-906.32	-2087.67	-2087.67	-2463.89	-2217.46	576.90	513.11	-1886.99	-1704.35	-2087.67	-2087.67	
2	783.72	806.17	165.59	162.62	949.31	968.79	2882.46	2882.46	1549.63	1667.17	328.26	318.46	1877.89	1985.63	2882.46	2882.46	
3	-1333.09	-1371.84	2.67	19.03	-1330.42	-1352.81	-2970.77	-2970.77	-2706.57	-2807.93	25.35	69.53	-2681.23	-2738.41	-2970.77	-2970.77	
4	-1312.38	-1314.55	127.15	124.12	-1185.23	-1190.43	-2970.77	-2970.77	-2631.90	-2645.35	250.32	243.44	-2381.59	-2401.92	-2970.77	-2970.77	
5	772.45	770.28	147.28	144.22	919.73	914.50	3059.08	3059.08	1547.96	1534.52	290.58	283.62	1838.54	1818.14	3059.08	3059.08	
		Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1236.38	-1178.70	300.40	284.77	-935.98	-893.93	-2087.67	-2087.67	-2431.31	-2254.67	584.49	537.25	-1846.82	-1717.42	-2087.67	-2087.67	
2	744.69	758.69	175.56	173.68	920.25	932.37	2882.46	2882.46	1506.80	1554.14	349.44	343.06	1856.24	1897.20	2882.46	2882.46	
3	-1274.20	-1303.88	-2.20	9.64	-1276.40	-1294.24	-2970.77	-2970.77	-2574.59	-2656.56	8.53	43.02	-2566.07	-2613.55	-2970.77	-2970.77	
4	-1261.96	-1261.81	122.93	120.68	-1139.03	-1141.13	-2970.77	-2970.77	-2530.11	-2534.58	243.35	237.46	-2286.77	-2297.13	-2970.77	-2970.77	
5	738.03	738.17	162.40	160.11	900.43	898.28	3059.08	3059.08	1479.65	1475.17	322.57	316.31	1802.22	1791.48	3059.08	3059.08	

**Table A6. Design and Capacity Moments for Office Building 25'x30' (in.-kip)**

		Exterior Frame								Interior Frame							
		Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1693.17	-1495.33	318.78	278.98	-1374.39	-1216.35	-2909.01	-2909.01	-3162.59	-2657.03	586.88	488.97	-2575.71	-2168.06	-2909.01	-2909.01	
2	1097.24	1158.31	180.29	173.57	1277.53	1331.88	3929.28	3929.28	2260.70	2429.50	353.41	334.22	2614.11	2763.72	3929.28	3929.28	
3	-1894.71	-1970.41	17.41	43.77	-1877.30	-1926.64	-4031.30	-4031.30	-3880.75	-4048.72	71.13	130.67	-3809.62	-3918.05	-4031.30	-4031.30	
4	-1828.64	-1844.84	135.01	131.36	-1693.63	-1713.48	-4031.30	-4031.30	-3665.77	-3720.70	263.75	258.31	-3402.02	-3462.39	-4031.30	-4031.30	
5	1062.54	1046.34	152.86	149.17	1215.40	1195.51	4133.33	4133.33	2116.60	2061.67	299.41	293.91	2416.01	2355.58	4133.33	4133.33	
		Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1727.59	-1600.95	331.45	304.88	-1396.14	-1296.07	-2909.01	-2909.01	-3330.35	-2968.94	632.52	558.64	-2697.83	-2410.30	-2909.01	-2909.01	
2	1058.14	1092.23	186.63	182.91	1244.77	1275.14	3929.28	3929.28	2151.26	2257.74	369.65	357.72	2520.91	2615.46	3929.28	3929.28	
3	-1830.00	-1888.45	6.82	25.95	-1823.18	-1862.50	-4031.30	-4031.30	-3713.86	-3863.30	36.77	86.79	-3677.09	-3776.51	-4031.30	-4031.30	
4	-1795.79	-1799.83	136.57	133.22	-1659.22	-1666.61	-4031.30	-4031.30	-3593.21	-3615.04	268.73	261.57	-3324.48	-3353.47	-4031.30	-4031.30	
5	1041.14	1037.11	162.30	158.91	1203.44	1196.02	4133.33	4133.33	2080.66	2058.82	320.15	312.91	2400.81	2371.73	4133.33	4133.33	
		Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1725.08	-1639.83	335.19	316.95	-1389.89	-1322.88	-2909.01	-2909.01	-3377.80	-3121.83	651.66	597.52	-2726.14	-2524.31	-2909.01	-2909.01	
2	1029.44	1050.18	192.04	189.74	1221.48	1239.92	3929.28	3929.28	2079.01	2147.52	382.05	374.40	2461.06	2521.92	3929.28	3929.28	
3	-1784.01	-1827.80	1.37	15.01	-1782.64	-1812.79	-4031.30	-4031.30	-3600.15	-3719.10	17.39	56.22	-3582.76	-3662.88	-4031.30	-4031.30	
4	-1764.31	-1764.27	135.41	132.85	-1628.90	-1631.42	-4031.30	-4031.30	-3528.81	-3535.81	267.99	261.53	-3260.82	-3274.28	-4031.30	-4031.30	
5	1019.68	1019.72	170.43	167.83	1190.11	1187.55	4133.33	4133.33	2039.17	2032.17	338.02	331.47	2377.19	2363.64	4133.33	4133.33	

\*Three extra pieces of rebar were used to meet strength requirements.

**Table A7. Design and Capacity Moments for Office Building 30'x25' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-908.59	-775.41	404.01	342.35	-504.58	-433.06	-2127.70	-2127.70	-1658.74	-1327.99	672.35	534.53	-986.39	-793.46	-2127.70	-2127.70
2	624.93	669.05	244.30	232.74	869.23	901.79	2945.82	2945.82	1303.89	1425.67	444.95	414.15	1748.84	1839.82	2945.82	2945.82
3	-1055.07	-1100.01	37.93	76.47	-1017.14	-1023.54	-3027.63	-3027.63	-2160.54	-2247.73	130.07	206.27	-2030.47	-2041.46	-3027.63	-3027.63
4	-1011.14	-1024.67	176.39	172.45	-834.75	-852.22	-3027.63	-3027.63	-2030.52	-2074.63	321.83	319.61	-1708.69	-1755.02	-3027.63	-3027.63
5	595.63	582.09	210.65	206.66	806.28	788.75	3109.44	3109.44	1183.01	1138.89	386.00	383.71	1569.01	1522.60	3109.44	3109.44
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-938.17	-849.07	426.69	382.67	-511.48	-466.40	-2127.70	-2127.70	-1785.74	-1535.09	746.07	633.86	-1039.67	-901.23	-2127.70	-2127.70
2	596.34	622.16	255.22	248.52	851.56	870.68	2945.82	2945.82	1221.73	1282.80	471.77	451.55	1693.50	1734.35	2945.82	2945.82
3	-1011.66	-1049.13	16.73	47.36	-994.93	-1001.77	-3027.63	-3027.63	-2055.82	-2144.00	71.83	143.59	-1983.99	-2000.41	-3027.63	-3027.63
4	-989.17	-993.62	176.65	171.98	-812.52	-821.64	-3027.63	-3027.63	-1979.97	-2000.91	324.01	316.36	-1655.96	-1684.55	-3027.63	-3027.63
5	582.09	577.64	226.02	221.29	808.11	798.93	3109.44	3109.44	1162.55	1141.61	416.51	408.77	1579.06	1550.38	3109.44	3109.44
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-940.17	-879.18	433.60	402.30	-506.57	-476.88	-2127.70	-2127.70	-1829.15	-1646.83	778.71	692.50	-1050.44	-954.33	-2127.70	-2127.70
2	575.91	591.90	264.23	260.06	840.14	851.96	2945.82	2945.82	1168.66	1222.23	491.61	478.38	1660.27	1700.61	2945.82	2945.82
3	-979.66	-1008.67	3.80	26.75	-975.86	-981.92	-3027.63	-3027.63	-1976.84	-2052.00	33.76	93.52	-1943.08	-1958.48	-3027.63	-3027.63
4	-968.06	-968.93	172.20	168.25	-795.86	-800.68	-3027.63	-3027.63	-1936.19	-1944.55	317.96	309.46	-1618.23	-1635.09	-3027.63	-3027.63
5	567.77	566.89	239.41	235.41	807.18	802.30	3109.44	3109.44	1135.46	1127.10	443.93	435.33	1579.39	1562.43	3109.44	3109.44

**Table A8. Design and Capacity Moments for Office Building 30'x27' (in.-kip)**

		Exterior Frame								Interior Frame							
		Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1196.07	-1029.69	410.14	350.55	-785.93	-679.14	-2238.03	-2238.03	-2204.89	-1786.24	688.91	553.85	-1515.98	-1232.39	-2238.03	-2238.03	
2	814.86	869.04	242.13	231.24	1056.99	1100.28	3124.17	3124.17	1703.24	1853.68	441.95	412.67	2145.19	2266.35	3124.17	3124.17	
3	-1378.73	-1436.73	34.06	71.86	-1344.67	-1364.87	-3212.78	-3212.78	-2842.11	-2959.87	119.87	196.37	-2722.24	-2763.50	-3212.78	-3212.78	
4	-1322.18	-1338.51	177.73	173.48	-1144.45	-1165.03	-3212.78	-3212.78	-2668.28	-2722.69	324.40	320.84	-2343.88	-2401.85	-3212.78	-3212.78	
5	780.08	763.74	207.11	202.81	987.19	966.55	3301.40	3301.40	1558.46	1504.05	379.41	375.78	1937.87	1879.83	3301.40	3301.40	
		Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1233.11	-1123.00	431.78	389.96	-801.33	-733.04	-2238.03	-2238.03	-2365.98	-2053.24	759.77	651.94	-1606.21	-1401.30	-2238.03	-2238.03	
2	780.57	811.89	252.17	245.94	1032.74	1057.83	3124.17	3124.17	1604.09	1703.08	466.65	447.73	2070.74	2150.81	3124.17	3124.17	
3	-1324.86	-1372.33	15.05	44.40	-1309.81	-1327.93	-3212.78	-3212.78	-2707.62	-2822.38	65.71	135.69	-2641.91	-2686.69	-3212.78	-3212.78	
4	-1295.89	-1300.95	179.10	174.43	-1116.79	-1126.52	-3212.78	-3212.78	-2607.46	-2632.18	328.95	320.71	-2278.51	-2311.47	-3212.78	-3212.78	
5	763.67	758.61	221.43	216.71	985.10	975.32	3301.40	3301.40	1533.43	1508.71	408.25	399.94	1941.68	1908.65	3301.40	3301.40	
		Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-1235.36	-1160.34	438.64	409.21	-796.72	-751.13	-2238.03	-2238.03	-2418.49	-2192.29	791.16	709.44	-1627.33	-1482.85	-2238.03	-2238.03	
2	756.04	775.32	260.48	256.60	1016.52	1031.92	3124.17	3124.17	1540.12	1604.92	484.91	472.62	2025.03	2077.54	3124.17	3124.17	
3	-1286.42	-1322.90	4.18	25.86	-1282.24	-1297.04	-3212.78	-3212.78	-2611.65	-2708.25	32.16	89.31	-2579.49	-2618.94	-3212.78	-3212.78	
4	-1270.56	-1271.41	176.18	172.35	-1094.38	-1099.06	-3212.78	-3212.78	-2554.74	-2564.34	325.76	317.18	-2228.98	-2247.16	-3212.78	-3212.78	
5	746.38	745.52	233.81	229.93	980.19	975.45	3301.40	3301.40	1500.46	1490.86	433.77	425.09	1934.23	1915.95	3301.40	3301.40	



**Table A9. Design and Capacity Moments for Office Building 30'x30' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1731.60	-1507.98	417.57	360.85	-1314.03	-1147.13	-3022.96	-3022.96	-3194.77	-2628.71	709.59	578.85	-2485.18	-2049.86	-3022.96	-3022.96
2	1164.92	1236.14	239.42	229.38	1404.34	1465.52	4043.22	4043.22	2410.24	2607.36	438.18	410.98	2848.42	3018.34	4043.22	4043.22
3	-1974.15	-2055.35	28.75	65.39	-1945.40	-1989.96	-4145.25	-4145.25	-4048.03	-4219.86	105.79	182.11	-3942.24	-4037.75	-4145.25	-4145.25
4	-1896.58	-1917.24	178.95	174.37	-1717.63	-1742.87	-4145.25	-4145.25	-3802.82	-3872.55	326.88	321.71	-3475.94	-3550.84	-4145.25	-4145.25
5	1121.23	1100.56	202.74	198.12	1323.97	1298.68	4247.27	4247.27	2228.82	2159.09	371.44	366.20	2600.26	2525.29	4247.27	4247.27
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1780.31	-1634.37	437.74	398.78	-1342.57	-1235.59	-3022.96	-3022.96	-3407.94	-2992.69	776.10	674.37	-2631.84	-2318.32	-3022.96	-3022.96
2	1121.20	1161.74	248.37	242.70	1369.57	1404.44	4043.22	4043.22	2284.43	2411.77	460.25	443.00	2744.68	2854.77	4043.22	4043.22
3	-1903.57	-1968.44	12.35	39.97	-1891.22	-1928.47	-4145.25	-4145.25	-3868.00	-4028.57	56.91	124.13	-3811.09	-3904.44	-4145.25	-4145.25
4	-1863.21	-1869.16	181.44	176.81	-1681.77	-1692.35	-4145.25	-4145.25	-3726.42	-3756.54	333.82	325.03	-3392.60	-3431.51	-4145.25	-4145.25
5	1099.93	1093.99	215.73	211.06	1315.66	1305.05	4247.27	4247.27	2195.98	2165.86	398.07	389.19	2594.05	2555.05	4247.27	4247.27
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1783.65	-1684.85	444.42	417.34	-1339.23	-1267.51	-3022.96	-3022.96	-3477.66	-3180.24	805.60	729.83	-2672.06	-2450.41	-3022.96	-3022.96
2	1089.87	1114.66	255.79	252.28	1345.66	1366.94	4043.22	4043.22	2203.35	2285.96	476.54	465.43	2679.89	2751.39	4043.22	4043.22
3	-1853.74	-1902.97	3.80	23.86	-1849.94	-1879.11	-4145.25	-4145.25	-3742.27	-3874.47	28.67	82.23	-3713.60	-3792.24	-4145.25	-4145.25
4	-1830.86	-1831.56	180.15	176.48	-1650.71	-1655.08	-4145.25	-4145.25	-3659.62	-3670.63	333.63	325.09	-3325.99	-3345.54	-4145.25	-4145.25
5	1077.71	1077.01	226.85	223.12	1304.56	1300.13	4247.27	4247.27	2125.37	2142.68	421.13	412.50	2546.50	2555.18	4247.27	4247.27

**\*Four extra pieces of rebar was used to meet strength requirements.**

**Table A10. Design and Capacity Moments for Office Building 35'x25' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-967.19	-763.34	584.30	461.95	-382.89	-301.39	-2935.03	-2935.03	-1679.77	-1235.89	970.19	718.71	-709.58	-517.18	-2935.03	-2935.03
2	756.23	832.39	388.50	358.73	1144.73	1191.12	4176.46	4176.46	1621.12	1806.95	736.35	664.57	2357.47	2471.52	4176.46	4176.46
3	-1252.35	-1303.89	117.45	180.26	-1134.90	-1123.63	-4271.96	-4271.96	-1558.22	-2630.44	351.97	459.90	-1206.26	-2170.55	-4271.96	-4271.96
4	-1178.86	-1207.92	263.37	264.45	-915.49	-943.47	-4271.96	-4271.96	-2385.07	-2457.62	518.83	535.01	-1866.25	-1922.62	-4271.96	-4271.96
5	687.15	658.08	317.30	330.77	1004.45	988.85	4367.45	4367.45	1355.04	1282.50	626.63	642.71	1981.67	1925.21	4367.45	4367.45
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1043.28	-891.77	655.28	555.19	-388.00	-336.58	-2935.03	-2935.03	-1926.01	-1542.01	1164.60	926.55	-761.41	-615.46	-2935.03	-2935.03
2	708.16	757.82	412.80	395.47	1120.96	1153.29	4176.46	4176.46	1481.36	1623.79	801.73	747.34	2283.09	2371.13	4176.46	4176.46
3	-1189.94	-1242.13	62.25	127.67	-1127.69	-1114.46	-4271.96	-4271.96	-2426.20	-2525.34	222.68	351.96	-2203.53	-2173.39	-4271.96	-4271.96
4	-1149.17	-1162.39	295.50	299.50	-853.67	-862.89	-4271.96	-4271.96	-2310.15	-2355.90	527.85	525.65	-1782.31	-1830.26	-4271.96	-4271.96
5	675.60	662.38	335.76	325.05	1011.36	987.43	4367.45	4367.45	1347.31	1301.56	671.27	694.86	2018.58	1996.42	4367.45	4367.45
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1066.43	-956.83	674.70	599.17	-391.73	-357.66	-2935.03	-2935.03	-2037.97	-1733.32	1250.02	1049.33	-787.95	-683.99	-2935.03	-2935.03
2	677.75	709.90	429.29	416.95	1107.04	1126.85	4176.46	4176.46	1395.43	1497.16	845.10	805.97	2240.53	2303.13	4176.46	4176.46
3	-1145.30	-1190.62	37.01	87.86	-1108.29	-1102.76	-4271.96	-4271.96	-2321.15	-2422.34	146.41	268.86	-2174.75	-2153.49	-4271.96	-4271.96
4	-1123.99	-1128.84	259.19	252.59	-864.80	-876.25	-4271.96	-4271.96	-2254.12	-2278.04	506.97	497.93	-1747.16	-1780.12	-4271.96	-4271.96
5	659.64	654.79	365.06	358.38	1024.70	1013.17	4367.45	4367.45	1320.87	1296.95	718.63	709.45	2039.50	2006.40	4367.45	4367.45

**Table A11. Design and Capacity Moments for Office Building 35'x27' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1239.72	-989.57	597.84	477.39	-641.88	-512.18	-3183.95	-3183.95	-2167.40	-1615.64	1005.26	753.70	-1162.14	-861.94	-3183.95	-3183.95
2	953.76	1045.67	385.97	357.40	1339.73	1403.07	4598.13	4598.13	2039.98	2265.35	734.09	664.38	2774.07	2929.73	4598.13	4598.13
3	-1590.77	-1657.10	109.50	172.81	-1481.27	-1484.29	-4706.92	-4706.92	-3273.12	-3374.15	333.68	445.81	-2939.45	-2928.35	-4706.92	-4706.92
4	-1495.35	-1530.94	265.29	265.24	-1230.06	-1265.70	-4706.92	-4706.92	-3032.73	-3125.30	521.27	534.44	-2511.47	-2590.87	-4706.92	-4706.92
5	873.65	838.06	311.53	311.42	1185.18	1149.48	4815.70	4815.70	1727.52	1534.94	613.68	626.75	2341.20	2161.69	4815.70	4815.70
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1331.72	-1148.13	658.93	563.64	-672.79	-584.49	-3183.95	-3183.95	-2469.90	-1999.61	1182.18	950.89	-1287.72	-1048.72	-3183.95	-3183.95
2	897.62	956.53	407.78	389.75	1305.40	1346.28	4598.13	4598.13	1875.56	2045.28	794.27	742.03	2669.83	2787.31	4598.13	4598.13
3	-1514.82	-1580.58	63.88	123.10	-1450.94	-1457.48	-4706.92	-4706.92	-3106.08	-3236.94	220.83	347.66	-2885.26	-2889.29	-4706.92	-4706.92
4	-1460.84	-1476.46	268.58	262.90	-1192.26	-1213.56	-4706.92	-4706.92	-2944.08	-3000.05	524.07	521.58	-2420.02	-2478.48	-4706.92	-4706.92
5	860.05	826.81	335.24	329.48	1195.29	1156.29	4815.70	4815.70	1719.48	1663.50	657.30	654.69	2376.78	2318.19	4815.70	4815.70
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1359.98	-1228.09	685.03	613.12	-674.95	-614.97	-3183.95	-3183.95	-2607.22	-2237.41	1278.09	1084.69	-1329.13	-1152.72	-3183.95	-3183.95
2	862.24	900.00	423.54	412.02	1285.78	1312.02	4598.13	4598.13	1775.25	1895.11	834.78	798.13	2610.03	2693.24	4598.13	4598.13
3	-1461.27	-1517.64	36.03	84.92	-1425.24	-1432.72	-4706.92	-4706.92	-2976.38	-3106.45	139.42	259.54	-2836.97	-2846.92	-4706.92	-4706.92
4	-1431.52	-1437.02	265.68	258.93	-1165.84	-1178.09	-4706.92	-4706.92	-2878.38	-2906.86	520.36	509.86	-2358.03	-2397.01	-4706.92	-4706.92
5	841.34	835.84	356.45	349.62	1197.79	1185.46	4815.70	4815.70	1688.67	1660.19	701.84	691.19	2390.51	2351.38	4815.70	4815.70

**Table A12. Design and Capacity Moments for Office Building 35'x30' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1753.96	-1421.72	614.60	497.08	-1139.36	-924.64	-3462.27	-3462.27	-3069.52	-2329.83	1050.48	800.16	-2019.04	-1529.67	-3462.27	-3462.27
2	1319.02	1438.45	382.81	355.86	1701.83	1794.31	4968.68	4968.68	2784.63	3077.33	731.38	664.73	3516.01	3742.06	4968.68	4968.68
3	-2213.89	-2307.28	98.57	162.19	-2115.32	-2145.09	-5084.55	-5084.55	-4541.34	-4695.63	307.35	424.36	-4234.00	-4271.28	-5084.55	-5084.55
4	-2082.21	-2128.31	267.07	265.62	-1815.14	-1862.69	-5084.55	-5084.55	-4190.10	-4313.96	523.37	532.50	-3666.74	-3781.47	-5084.55	-5084.55
5	1220.73	1174.64	304.52	303.01	1525.25	1477.65	5200.43	5200.43	2399.96	2276.10	598.20	607.23	2998.16	2883.33	5200.43	5200.43
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1872.30	-1632.66	672.30	581.72	-1200.00	-1050.94	-3462.27	-3462.27	-3463.79	-2846.73	1220.71	996.98	-2243.08	-1849.75	-3462.27	-3462.27
2	1249.21	1324.07	402.30	385.70	1651.51	1709.77	4968.68	4968.68	2580.27	2795.23	785.66	737.16	3365.93	3532.39	4968.68	4968.68
3	-2115.55	-2205.46	57.04	114.43	-2058.51	-2091.03	-5084.55	-5084.55	-4317.07	-4504.21	200.08	326.82	-4117.00	-4177.40	-5084.55	-5084.55
4	-2039.84	-2059.11	272.54	266.24	-1767.30	-1792.87	-5084.55	-5084.55	-4080.92	-4125.01	532.10	526.53	-3548.83	-3598.49	-5084.55	-5084.55
5	1203.29	1184.02	326.53	320.16	1529.82	1504.18	5200.43	5200.43	2389.77	2318.69	640.01	634.32	3029.78	2953.01	5200.43	5200.43
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1909.10	-1738.61	696.96	629.82	-1212.14	-1108.79	-3462.27	-3462.27	-3642.60	-3163.69	1311.59	1128.48	-2331.01	-2035.21	-3462.27	-3462.27
2	1205.38	1252.79	416.35	405.87	1621.73	1658.66	4968.68	4968.68	2456.79	2606.36	821.85	788.38	3278.64	3394.74	4968.68	4968.68
3	-2046.92	-2122.60	33.54	79.73	-2013.38	-2042.87	-5084.55	-5084.55	-4146.85	-4326.61	127.69	243.87	-4019.17	-4082.75	-5084.55	-5084.55
4	-2003.55	-2009.91	272.22	265.39	-1731.33	-1744.52	-5084.55	-5084.55	-4000.14	-4034.84	534.08	522.04	-3466.07	-3512.81	-5084.55	-5084.55
5	1179.84	1173.48	345.75	338.84	1525.59	1512.32	5200.43	5200.43	2351.37	2316.68	681.09	668.90	3032.46	2985.58	5200.43	5200.43

**Table A13. Design and Capacity Moments for Residential Building 20'x21' (in.-kip)**

		Exterior Frame								Interior Frame							
		Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-459.31	-437.14	92.06	86.71	-367.25	-350.43	-757.87	-757.87	-894.48	-824.85	155.61	141.06	-738.87	-683.79	-757.87	-757.87	
2	278.75	284.51	48.79	48.37	327.54	332.88	948.00	948.00	549.55	580.90	85.05	83.72	634.60	664.62	948.00	948.00	
3	-474.84	-485.49	-8.31	-3.80	-483.15	-489.29	-995.53	-995.53	-954.66	-984.95	-9.72	2.17	-964.38	-982.78	-995.53	-995.53	
4	-469.93	-470.32	49.83	48.75	-420.10	-421.57	-995.53	-995.53	-936.18	-939.13	86.03	83.36	-850.15	-855.77	-995.53	-995.53	
5	275.90	275.51	61.46	60.37	337.36	335.88	1043.07	1043.07	549.61	546.67	106.37	103.68	655.98	650.35	1043.07	1043.07	
		Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-452.75	-439.61	91.97	88.71	-360.78	-350.90	-757.87	-757.87	-891.94	-849.26	157.96	148.60	-733.98	-700.66	-757.87	-757.87	
2	269.28	272.41	50.77	50.53	320.05	322.94	948.00	948.00	539.47	550.52	88.67	87.93	628.14	638.45	948.00	948.00	
3	-460.30	-467.19	-10.32	-7.54	-470.62	-474.73	-995.53	-995.53	-920.95	-941.53	-15.40	-7.53	-936.35	-949.06	-995.53	-995.53	
4	-458.01	-457.88	48.26	47.60	-409.75	-410.28	-995.53	-995.53	-912.38	-912.92	83.84	82.02	-828.54	-830.90	-995.53	-995.53	
5	267.80	267.92	65.01	64.34	332.81	332.26	1043.07	1043.07	533.53	532.99	113.13	111.30	646.66	644.29	1043.07	1043.07	
		Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	
1	-443.08	-434.42	90.70	88.53	-352.38	-345.89	-757.87	-757.87	-877.32	-849.41	156.93	150.64	-720.39	-698.77	-757.87	-757.87	
2	260.65	262.58	52.71	52.55	313.36	315.13	948.00	948.00	521.01	527.79	92.13	91.66	613.14	619.45	948.00	948.00	
3	-447.30	-452.11	-12.33	-10.47	-459.63	-462.58	-995.53	-995.53	-892.94	-907.30	-19.97	-14.60	-912.91	-921.90	-995.53	-995.53	
4	-446.06	-445.81	45.58	45.15	-400.48	-400.66	-995.53	-995.53	-888.59	-888.39	79.41	78.18	-809.18	-810.21	-995.53	-995.53	
5	259.79	260.03	70.17	67.94	329.96	327.97	1043.07	1043.07	517.56	517.76	119.29	118.05	636.85	635.81	1043.07	1043.07	

**Table A14. Design and Capacity Moments for Residential Building 20'x24' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-718.89	-672.25	134.96	124.95	-583.93	-547.30	-1167.28	-1167.28	-1390.87	-1251.97	258.05	229.19	-1132.82	-1022.78	-1167.28	-1167.28
2	437.03	449.63	73.48	72.35	510.51	521.98	1534.98	1534.98	887.20	928.07	145.85	142.05	1033.05	1070.12	1534.98	1534.98
3	-755.79	-777.23	-3.52	4.25	-759.31	-772.98	-1596.26	-1596.26	-1532.21	-1589.36	2.64	23.88	-1529.57	-1565.48	-1596.26	-1596.26
4	-743.65	-745.16	63.83	62.21	-679.82	-682.95	-1596.26	-1596.26	-1487.73	-1495.98	125.54	121.65	-1362.19	-1374.33	-1596.26	-1596.26
5	430.72	420.52	75.96	74.33	506.68	494.85	1657.55	1657.55	861.01	852.76	149.79	145.87	1010.80	998.63	1657.55	1657.55
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-714.83	-686.69	136.24	130.04	-578.59	-556.65	-1167.28	-1167.28	-1405.83	-1317.13	265.92	246.61	-1139.91	-1070.52	-1167.28	-1167.28
2	422.83	429.68	76.12	75.50	498.95	505.18	1534.98	1534.98	852.38	875.93	151.70	149.53	1004.08	1025.46	1534.98	1534.98
3	-733.24	-747.69	-6.27	-1.32	-739.51	-749.01	-1596.26	-1596.26	-1476.87	-1518.47	-107.07	7.91	-1583.94	-1510.56	-1596.26	-1596.26
4	-727.28	-727.25	62.88	61.82	-664.40	-665.43	-1596.26	-1596.26	-1454.55	-1456.67	124.58	121.58	-1329.97	-1335.09	-1596.26	-1596.26
5	419.58	419.61	80.36	79.28	499.94	498.89	1657.55	1657.55	839.18	837.06	259.53	156.50	1098.71	993.56	1657.55	1657.55
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-703.66	-685.03	135.46	131.31	-568.20	-553.72	-1167.28	-1167.28	-1394.14	-1334.93	266.99	253.74	-1127.15	-1081.19	-1167.28	-1167.28
2	410.47	414.66	78.65	78.25	489.12	492.91	1534.98	1534.98	824.81	839.39	156.99	155.63	981.80	995.02	1534.98	1534.98
3	-714.25	-724.49	-8.43	-5.09	-722.68	-729.58	-1596.26	-1596.26	-1433.95	-1464.01	-13.55	-3.02	-1447.50	-1467.03	-1596.26	-1596.26
4	-710.85	-710.42	60.65	59.94	-650.20	-650.48	-1596.26	-1596.26	-1421.66	-1421.69	120.61	118.45	-1301.05	-1303.24	-1596.26	-1596.26
5	408.58	409.00	84.44	83.72	493.02	492.72	1657.55	1657.55	817.20	817.17	168.19	166.00	985.39	983.17	1657.55	1657.55

**Table A15. Design and Capacity Moments for Residential Building 20'x27' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1043.81	-956.43	220.73	200.75	-823.08	-755.68	-1753.31	-1753.31	-2004.01	-1762.91	375.61	326.46	-1628.40	-1436.45	-1753.31	-1753.31
2	634.76	659.54	121.74	118.99	756.50	778.53	2406.01	2406.01	1299.35	1373.09	216.63	208.78	1515.98	1581.87	2406.01	2406.01
3	-1119.27	-1157.09	2.56	17.03	-1116.71	-1140.06	-2487.59	-2487.59	-2285.79	-2379.40	21.29	54.75	-2264.50	-2324.65	-2487.59	-2487.59
4	-1094.03	-1098.45	96.81	94.21	-997.22	-1004.24	-2487.59	-2487.59	-2197.26	-2215.34	170.95	165.99	-2026.31	-2049.35	-2487.59	-2487.59
5	622.27	617.85	111.99	109.37	734.26	727.22	2569.18	2569.18	1247.00	1228.91	198.25	193.24	1445.25	1422.15	2569.18	2569.18
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1047.22	-993.61	225.08	212.38	-822.14	-781.23	-1753.31	-1753.31	-2053.59	-1892.66	392.84	358.57	-1660.75	-1534.09	-1753.31	-1753.31
2	614.14	627.59	125.86	124.35	740.00	751.94	2406.01	2406.01	1245.63	1289.60	225.30	220.69	1470.93	1510.29	2406.01	2406.01
3	-1085.29	-1112.00	-2.35	7.31	-1087.64	-1104.69	-2487.59	-2487.59	-2199.53	-2272.51	5.58	30.62	-2193.95	-2241.89	-2487.59	-2487.59
4	-1072.58	-1073.09	96.63	94.72	-975.95	-978.37	-2487.59	-2487.59	-2152.63	-2158.25	171.95	167.52	-1980.68	-1990.73	-2487.59	-2487.59
5	607.81	607.30	118.50	116.57	726.31	723.87	2569.18	2569.18	1219.56	1213.94	211.29	206.81	1430.85	1420.75	2569.18	2569.18
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1036.33	-1000.69	225.31	216.75	-811.02	-783.94	-1753.31	-1753.31	-2052.55	-1942.53	398.11	374.05	-1654.44	-1568.48	-1753.31	-1753.31
2	597.17	605.34	129.66	128.70	726.83	734.04	2406.01	2406.01	1205.95	1233.59	232.67	229.76	1438.62	1463.35	2406.01	2406.01
3	-1058.44	-1077.73	-5.39	1.26	-1063.83	-1076.47	-2487.59	-2487.59	-2136.08	-2190.83	-3.65	14.58	-2139.73	-2176.25	-2487.59	-2487.59
4	-1051.06	-1050.47	94.60	93.27	-956.46	-957.20	-2487.59	-2487.59	-2109.22	-2110.12	169.10	165.67	-1940.12	-1944.45	-2487.59	-2487.59
5	593.49	594.08	124.37	123.01	717.86	717.09	2569.18	2569.18	1191.04	1190.15	222.67	219.20	1413.71	1409.35	2569.18	2569.18

**Table A16. Design and Capacity Moments for Residential Building 20'x30' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1412.73	-1286.07	247.34	223.67	-1165.39	-1062.40	-2407.50	-2407.50	-2685.76	-2350.05	420.03	363.40	-2265.73	-1986.65	-2407.50	-2407.50
2	850.32	886.77	135.56	132.08	985.88	1018.85	3264.93	3264.93	1731.53	1834.83	240.86	231.32	1972.39	2066.15	3264.93	3264.93
3	-1525.50	-1579.25	5.43	22.13	-1520.07	-1557.12	-3360.20	-3360.20	-3098.63	-3227.75	28.65	66.18	-3069.98	-3161.57	-3360.20	-3360.20
4	-1487.44	-1494.61	105.36	102.52	-1382.08	-1392.09	-3360.20	-3360.20	-2968.21	-2994.59	186.01	180.83	-2782.20	-2813.76	-3360.20	-3360.20
5	831.99	824.82	118.95	116.09	950.94	940.91	3455.47	3455.47	1655.52	1629.14	209.65	204.84	1865.17	1833.98	3455.47	3455.47
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1423.19	-1345.00	253.30	238.17	-1169.89	-1106.83	-2407.50	-2407.50	-2766.74	-2539.37	441.52	401.59	-2325.22	-2137.78	-2407.50	-2407.50
2	823.61	843.40	139.86	137.95	963.47	981.35	3264.93	3264.93	1660.83	1723.18	250.18	244.49	1911.01	1967.67	3264.93	3264.93
3	-1480.45	-1519.07	0.08	11.39	-1480.37	-1507.68	-3360.20	-3360.20	-2983.64	-3086.33	11.42	39.98	-2972.22	-3046.35	-3360.20	-3360.20
4	-1461.00	-1462.00	106.02	103.85	-1354.98	-1358.15	-3360.20	-3360.20	-2912.92	-2921.37	188.58	183.72	-2724.34	-2737.65	-3360.20	-3360.20
5	814.43	813.43	125.61	123.41	940.04	936.84	3455.47	3455.47	1623.10	1614.66	223.81	218.89	1846.91	1833.55	3455.47	3455.47
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1412.44	-1360.38	254.43	244.21	-1158.01	-1116.17	-2407.50	-2407.50	-2775.38	-2618.51	449.23	421.00	-2326.15	-2197.51	-2407.50	-2407.50
2	802.30	814.29	143.74	142.54	946.04	956.83	3264.93	3264.93	1578.14	1649.70	257.84	254.23	1835.98	1903.93	3264.93	3264.93
3	-1445.97	-1474.06	-2.73	5.09	-1448.70	-1468.97	-3360.20	-3360.20	-2901.03	-2979.01	2.06	23.07	-2898.97	-2955.94	-3360.20	-3360.20
4	-1434.52	-1433.73	104.86	103.30	-1329.66	-1330.43	-3360.20	-3360.20	-2859.69	-2861.17	187.36	183.50	-2672.33	-2677.67	-3360.20	-3360.20
5	796.99	797.78	131.52	129.94	928.51	927.72	3455.47	3455.47	1588.78	1587.29	243.34	231.43	1832.12	1818.72	3455.47	3455.47

\*Two extra pieces of rebar were used to meet strength requirements.



**Table A17. Design and Capacity Moments for Residential Building 20'x32' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1697.10	-1530.18	272.46	243.48	-1424.64	-1286.70	-2905.44	-2905.44	-3222.11	-2794.29	512.22	440.25	-2709.89	-2354.04	-2905.44	-2905.44
2	1021.48	1070.60	149.79	145.25	1171.27	1215.85	3993.72	3993.72	2091.30	2224.99	295.14	282.29	2386.44	2507.28	3993.72	3993.72
3	-1851.03	-1919.70	9.23	29.13	-1841.80	-1890.57	-4102.55	-4102.55	-3777.45	-3937.91	42.26	88.52	-3735.19	-3849.39	-4102.55	-4102.55
4	-1798.96	-1809.90	113.47	110.34	-1685.49	-1699.56	-4102.55	-4102.55	-3602.74	-3639.22	222.62	216.91	-3380.12	-3422.31	-4102.55	-4102.55
5	996.51	985.69	126.55	123.38	1123.06	1109.07	4211.38	4211.38	1950.22	1951.98	248.77	243.00	2198.99	2194.98	4211.38	4211.38
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1717.20	-1613.22	280.45	261.79	-1436.75	-1351.43	-2905.44	-2905.44	-3339.67	-3044.52	541.73	489.90	-2797.94	-2554.62	-2905.44	-2905.44
2	989.11	998.46	154.44	151.97	1143.55	1150.43	3993.72	3993.72	2003.72	2085.66	306.65	298.85	2310.37	2384.51	3993.72	3993.72
3	-1795.73	-1846.19	2.78	16.48	-1792.95	-1829.71	-4102.55	-4102.55	-3635.19	-3766.47	20.24	56.46	-3614.95	-3710.01	-4102.55	-4102.55
4	-1768.67	-1770.68	114.79	112.24	-1653.88	-1658.44	-4102.55	-4102.55	-3538.26	-3550.75	226.71	220.88	-3311.55	-3329.87	-4102.55	-4102.55
5	976.77	974.90	133.63	131.05	1110.40	1105.95	4211.38	4211.38	1952.67	1940.43	264.40	258.51	2217.07	2198.94	4211.38	4211.38
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1708.41	-1639.00	282.51	269.89	-1425.90	-1369.11	-2905.44	-2905.44	-3362.01	-3156.14	553.32	516.22	-2808.69	-2639.92	-2905.44	-2905.44
2	964.14	980.32	158.53	157.00	1122.67	1137.32	3993.72	3993.72	1942.94	1995.22	315.82	310.82	2258.76	2306.04	3993.72	3993.72
3	-1754.67	-1791.72	-0.28	9.26	-1754.95	-1782.46	-4102.55	-4102.55	-3584.84	-3636.14	8.63	35.74	-3576.21	-3600.40	-4102.55	-4102.55
4	-1738.45	-1737.74	114.14	112.28	-1624.31	-1625.46	-4102.55	-4102.55	-3477.04	-3479.86	226.50	221.69	-3250.54	-3258.17	-4102.55	-4102.55
5	957.03	957.88	139.80	137.91	1096.83	1095.79	4211.38	4211.38	1913.97	1911.41	277.82	272.95	2191.79	2184.36	4211.38	4211.38

\*Two extra pieces of rebar were used to meet strength requirements.

**Table A18. Design and Capacity Moments for Residential Building 25'x21' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-495.68	-446.05	186.91	166.06	-308.77	-279.99	-1261.75	-1261.75	-942.72	-803.72	345.49	290.11	-597.23	-513.61	-1261.75	-1261.75
2	317.26	332.15	109.85	106.94	427.11	439.09	1689.32	1689.32	653.75	689.54	216.51	207.18	870.26	896.72	1689.32	1689.32
3	-537.40	-557.25	3.54	18.58	-533.87	-538.68	-1750.40	-1750.40	-1096.19	-1142.32	29.02	65.74	-1067.17	-1076.58	-1750.40	-1750.40
4	-524.90	-527.92	85.59	83.03	-439.32	-444.90	-1750.40	-1750.40	-1054.39	-1067.24	166.89	162.26	-887.50	-904.98	-1750.40	-1750.40
5	308.90	305.88	108.02	105.44	416.92	411.32	1811.48	1811.48	618.81	605.96	211.75	207.08	830.56	813.04	1811.48	1811.48
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-497.64	-466.65	189.63	173.54	-308.01	-293.11	-1261.75	-1261.75	-972.17	-877.39	365.71	324.74	-606.46	-552.65	-1261.75	-1261.75
2	304.10	312.41	115.43	115.12	419.53	427.53	1689.32	1689.32	619.11	647.37	227.54	222.13	846.65	869.50	1689.32	1689.32
3	-517.05	-531.42	-0.81	14.66	-517.87	-516.77	-1750.40	-1750.40	-1046.29	-1084.54	5.27	35.42	-1041.02	-1049.12	-1750.40	-1750.40
4	-511.59	-512.20	180.96	176.47	-330.64	-335.74	-1750.40	-1750.40	-1026.60	-1031.25	163.84	158.70	-862.76	-872.55	-1750.40	-1750.40
5	299.86	299.24	63.77	59.26	363.63	358.50	1811.48	1811.48	601.74	597.08	228.48	223.29	830.22	820.37	1811.48	1811.48
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-490.81	-470.21	190.57	181.16	-300.24	-289.05	-1261.75	-1261.75	-970.98	-906.07	370.89	341.53	-600.09	-564.54	-1261.75	-1261.75
2	293.35	298.44	118.89	117.88	412.24	416.32	1689.32	1689.32	593.78	611.63	236.88	233.37	830.66	845.00	1689.32	1689.32
3	-500.81	-511.23	-9.95	-2.57	-510.77	-513.81	-1750.40	-1750.40	-1008.68	-1037.90	-11.47	10.88	-1020.15	-1027.02	-1750.40	-1750.40
4	-498.28	-498.15	78.45	77.01	-419.84	-421.15	-1750.40	-1750.40	-999.80	-1001.08	155.24	151.24	-844.56	-849.84	-1750.40	-1750.40
5	290.87	291.01	122.45	120.99	413.32	412.00	1811.48	1811.48	583.81	582.53	243.24	239.19	827.05	821.72	1811.48	1811.48

**Table A19. Design and Capacity Moments for Residential Building 25'x24' (in.-kip)**

	Exterior Frame								Interior Frame							
Column 20"x20"																
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-760.35	-692.02	190.90	171.76	-569.45	-520.26	-1354.91	-1354.91	-1443.24	-1250.63	357.00	305.18	-1086.24	-945.45	-1354.91	-1354.91
2	483.18	503.03	107.59	105.02	590.77	608.05	1830.71	1830.71	985.45	1047.11	212.46	204.15	1197.91	1251.26	1830.71	1830.71
3	-819.92	-848.54	1.82	15.84	-818.10	-832.71	-1898.69	-1898.69	-1664.24	-1733.55	23.02	58.23	-1641.22	-1675.32	-1898.69	-1898.69
4	-800.89	-804.66	87.37	84.83	-713.53	-719.84	-1898.69	-1898.69	-1598.55	-1615.08	170.82	165.77	-1427.73	-1449.31	-1898.69	-1898.69
5	472.42	468.66	104.55	101.99	576.97	570.65	1966.66	1966.66	940.65	924.11	205.17	200.08	1145.82	1124.19	1966.66	1966.66
Column 24"x24"																
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-763.40	-721.20	195.03	182.70	-568.37	-538.50	-1354.91	-1354.91	-1484.54	-1355.33	375.85	338.91	-1108.69	-1016.42	-1354.91	-1354.91
2	465.91	476.85	111.68	110.26	577.59	587.11	1830.71	1830.71	940.40	977.32	222.00	217.12	1162.40	1194.44	1830.71	1830.71
3	-792.53	-812.86	-3.91	5.57	-796.45	-807.29	-1898.69	-1898.69	-1595.66	-1651.04	3.69	30.86	-1591.97	-1620.18	-1898.69	-1898.69
4	-783.43	-784.07	86.42	84.54	-697.02	-699.54	-1898.69	-1898.69	-1562.35	-1567.98	170.45	165.67	-1391.90	-1402.31	-1898.69	-1898.69
5	460.45	459.81	111.17	109.26	571.62	569.07	1966.66	1966.66	918.15	912.52	219.95	215.13	1138.10	1127.65	1966.66	1966.66
Column 28"x28"																
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-754.69	-726.71	194.96	186.61	-559.73	-540.10	-1354.91	-1354.91	-1484.15	-1396.18	381.27	355.13	-1102.88	-1041.05	-1354.91	-1354.91
2	451.75	458.42	115.45	114.55	567.20	572.97	1830.71	1830.71	907.36	930.49	230.13	227.07	1137.49	1157.56	1830.71	1830.71
3	-770.84	-785.48	-7.88	-1.32	-778.72	-786.80	-1898.69	-1898.69	-1545.02	-1586.73	-8.65	11.38	-1553.67	-1575.35	-1898.69	-1898.69
4	-765.94	-765.65	83.45	82.12	-682.50	-683.54	-1898.69	-1898.69	-1527.34	-1528.69	165.45	161.68	-1361.89	-1367.01	-1898.69	-1898.69
5	448.57	448.86	117.14	115.80	565.71	564.66	1966.66	1966.66	894.61	893.25	232.84	229.03	1127.45	1122.28	1966.66	1966.66

**Table A20. Design and Capacity Moments for Residential Building 25'x27' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1101.31	-979.16	256.88	226.41	-844.43	-752.75	-1850.88	-1850.88	-2072.84	-1750.66	433.76	361.89	-1639.08	-1388.77	-1850.88	-1850.88
2	716.41	753.44	145.23	140.54	861.64	893.98	2503.58	2503.58	1479.25	1586.67	261.61	248.56	1740.86	1835.23	2503.58	2503.58
3	-1220.60	-1268.70	9.34	30.43	-1211.26	-1238.27	-2585.17	-2585.17	-2505.34	-2612.68	45.05	90.80	-2460.29	-2521.88	-2585.17	-2585.17
4	-1181.92	-1190.85	114.82	111.49	-1067.10	-1079.36	-2585.17	-2585.17	-2377.00	-2410.95	205.23	200.04	-2171.77	-2210.91	-2585.17	-2585.17
5	695.44	686.51	133.03	129.67	828.47	816.18	2666.75	2666.75	1391.34	1357.38	238.57	233.34	1629.91	1590.72	2666.75	2666.75
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1118.70	-1041.15	265.80	245.50	-852.90	-795.65	-1850.88	-1850.88	-2170.32	-1943.31	465.37	411.72	-1704.95	-1531.59	-1850.88	-1850.88
2	690.49	711.15	150.61	147.99	841.10	859.14	2503.58	2503.58	1407.55	1474.43	273.78	265.82	1681.33	1740.25	2503.58	2503.58
3	-1178.59	-1214.81	0.62	15.69	-1177.97	-1199.12	-2585.17	-2585.17	-2397.75	-2491.01	18.42	56.15	-2379.33	-2434.86	-2585.17	-2585.17
4	-1159.05	-1161.13	115.21	112.41	-1043.84	-1048.72	-2585.17	-2585.17	-2327.20	-2340.35	207.75	201.77	-2119.45	-2138.58	-2585.17	-2585.17
5	666.18	678.00	141.45	138.61	807.63	816.61	2666.75	2666.75	1364.38	1351.23	255.82	249.77	1620.20	1601.00	2666.75	2666.75
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1113.36	-1061.35	267.84	253.89	-845.52	-807.46	-1850.88	-1850.88	-2191.92	-2032.75	477.59	438.55	-1714.33	-1594.20	-1850.88	-1850.88
2	670.59	683.19	155.34	153.71	825.93	836.90	2503.58	2503.58	1358.44	1401.13	283.47	278.41	1641.91	1679.54	2503.58	2503.58
3	-1147.38	-1174.19	-4.42	6.26	-1151.80	-1167.93	-2585.17	-2585.17	-2321.14	-2394.94	2.71	31.63	-2318.43	-2363.31	-2585.17	-2585.17
4	-1136.38	-1136.22	113.19	111.01	-1023.19	-1025.21	-2585.17	-2585.17	-2281.00	-2285.08	205.19	200.05	-2075.81	-2085.03	-2585.17	-2585.17
5	664.58	664.74	148.81	146.70	813.39	811.44	2666.75	2666.75	1333.97	1329.89	270.64	265.44	1604.61	1595.33	2666.75	2666.75

\* One extra piece of rebar was used to meet strength requirements.

**Table A21. Design and Capacity Moments for Residential Building 25'x30' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1549.87	-1391.38	260.49	444.02	-1289.38	-947.36	-2038.81	-2038.81	-2926.52	-2505.65	444.02	375.46	-2482.50	-2130.19	-2038.81	-2038.81
2	985.87	1033.16	143.44	-9.70	1129.31	1023.46	2798.27	2798.27	2024.18	2160.11	258.81	246.83	2282.99	2406.94	2798.27	2798.27
3	-1702.19	-1766.10	6.71	339.62	-1695.48	-1426.48	-2893.20	-2893.20	-3481.82	-3630.82	37.55	82.14	-3444.27	-3548.68	-2893.20	-2893.20
4	-1651.70	1662.62	115.50	112.14	-1536.20	1774.76	-2893.20	-2893.20	-3311.54	-3351.92	206.87	201.17	-3104.67	-3150.75	-2893.20	-2893.20
5	960.20	949.28	130.26	126.87	1090.46	1076.15	2988.13	2988.13	1916.81	1876.43	242.96	228.14	2159.77	2104.57	2988.13	2988.13
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1571.75	-1472.31	268.84	250.06	-1302.91	-1222.25	-2038.81	-2038.81	-3050.50	-2758.65	473.37	423.37	-2577.13	-2335.28	-2038.81	-2038.81
2	953.65	979.69	148.23	145.87	1101.88	1125.56	2798.27	2798.27	1935.39	2018.93	269.69	262.46	2205.08	2281.39	2798.27	2798.27
3	-1648.90	-1696.26	-0.61	13.44	-1649.51	-1682.82	-2893.20	-2893.20	-3343.58	-3468.33	14.27	49.83	-3329.31	-3418.50	-2893.20	-2893.20
4	-1623.09	-1625.35	116.59	113.88	-1506.50	-1511.47	-2893.20	-2893.20	-3249.86	-3264.61	210.61	204.65	-3039.25	-3059.96	-2893.20	-2893.20
5	940.88	938.63	137.85	135.11	1078.73	1073.74	2988.13	2988.13	1882.57	1867.82	249.55	243.54	2132.12	2111.36	2988.13	2988.13
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1565.02	-1498.64	270.98	258.20	-1294.04	-1240.44	-2038.81	-2038.81	-3077.85	-2874.86	484.93	449.05	-2592.92	-2425.81	-2038.81	-2038.81
2	928.86	944.66	152.46	150.99	1081.32	1095.65	2798.27	2798.27	1874.49	1927.54	278.35	273.77	2152.84	2201.31	2798.27	2798.27
3	-1609.53	-1644.30	-4.39	5.44	-1613.92	-1638.86	-2893.20	-2893.20	-3246.47	-3343.36	1.50	28.24	-3244.97	-3315.12	-2893.20	-2893.20
4	-1594.64	-1594.19	115.51	113.53	-1479.13	-1480.66	-2893.20	-2893.20	-3192.10	-3196.15	209.84	204.91	-2982.26	-2991.24	-2893.20	-2893.20
5	921.50	921.94	144.45	142.45	1065.95	1064.39	2988.13	2988.13	1844.56	1840.50	262.87	257.89	2107.43	2098.39	2988.13	2988.13

**\*Six extra pieces of rebar were used to meet strength requirements.**

**Table A22. Design and Capacity Moments for Residential Building 25'x32' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1885.71	-1675.20	258.50	227.69	-1627.21	-1447.51	-3487.02	-3487.02	-3548.76	-3007.78	437.95	366.56	-3110.81	-2641.22	-3487.02	-3487.02
2	1201.96	1266.17	142.02	137.24	1343.98	1403.41	4351.88	4351.88	2480.30	2657.78	255.71	242.84	2736.01	2900.62	4351.88	4351.88
3	-2096.31	-2178.40	8.20	29.45	-2088.11	-2148.95	-4459.99	-4459.99	-4305.72	-4491.74	41.73	87.36	-4263.99	-4404.38	-4459.99	-4459.99
4	-2026.51	-2042.90	115.06	111.65	-1911.45	-1931.25	-4459.99	-4459.99	-4075.07	-4130.82	205.88	200.38	-3869.19	-3930.44	-4459.99	-4459.99
5	1166.46	1150.07	128.02	124.59	1294.48	1274.66	4568.10	4568.10	2286.36	2276.72	229.62	224.07	2515.98	2500.79	4568.10	4568.10
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1922.25	-1788.55	268.34	247.86	-1653.91	-1540.69	-3487.02	-3487.02	-3726.52	-3343.49	470.65	417.47	-3255.87	-2926.02	-3487.02	-3487.02
2	1161.98	1197.56	146.70	144.05	1308.68	1341.61	4351.88	4351.88	2367.82	2478.87	266.61	258.71	2634.43	2737.58	4351.88	4351.88
3	-2029.53	-2092.07	0.20	15.39	-2029.33	-2076.68	-4459.99	-4459.99	-4131.81	-4292.74	17.05	54.43	-4114.76	-4238.31	-4459.99	-4459.99
4	-1993.31	-1997.12	116.77	113.87	-1876.54	-1883.25	-4459.99	-4459.99	-4001.70	-4023.09	210.68	204.56	-3791.02	-3818.53	-4459.99	-4459.99
5	1144.57	1140.76	135.45	132.52	1280.02	1273.28	4568.10	4568.10	2295.28	2228.23	244.91	238.73	2540.19	2466.96	4568.10	4568.10
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1919.47	-1829.80	271.38	257.35	-1648.09	-1572.45	-3487.02	-3487.02	-3775.92	-3506.07	484.46	445.78	-3291.46	-3060.29	-3487.02	-3487.02
2	1132.32	1153.89	150.73	149.08	1283.05	1302.97	4351.88	4351.88	2292.98	2364.17	275.03	269.98	2568.01	2634.15	4351.88	4351.88
3	-1981.60	-2028.14	-3.64	7.10	-1985.24	-2021.04	-4459.99	-4459.99	-4011.28	-4138.75	3.80	32.38	-4007.48	-4106.37	-4459.99	-4459.99
4	-1960.54	-1960.24	116.34	114.19	-1844.20	-1846.05	-4459.99	-4459.99	-3934.54	-3940.95	211.18	205.95	-3723.36	-3735.00	-4459.99	-4459.99
5	1122.32	1122.61	141.78	139.60	1264.10	1262.21	4568.10	4568.10	2252.04	2245.63	257.79	252.51	2509.83	2498.14	4568.10	4568.10

\*Thirteen extra pieces of rebar were used to meet strength requirements.

**Table A23. Design and Capacity Moments for Residential Building 28'x21' (in.-kip)**

	Exterior Frame						Interior Frame									
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-505.52	-442.83	247.72	214.26	-257.80	-228.57	-1367.04	-1367.04	-943.37	-776.81	447.20	363.38	-496.17	-413.43	-1367.04	-1367.04
2	333.47	353.42	150.66	145.26	484.13	498.68	1857.58	1857.58	691.02	750.52	295.02	278.57	986.04	1029.09	1857.58	1857.58
3	-562.30	-585.09	13.69	36.36	-548.61	-548.73	-1918.89	-1918.89	-1144.10	-1191.66	63.03	113.96	-1081.07	-1077.70	-1918.89	-1918.89
4	-546.09	-551.01	111.32	108.17	-434.77	-442.84	-1918.89	-1918.89	-1094.31	-1112.66	216.43	212.44	-877.88	-900.22	-1918.89	-1918.89
5	321.29	316.37	141.41	138.23	462.70	454.60	1980.21	1980.21	640.45	622.09	276.58	272.54	917.03	894.63	1980.21	1980.21
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-513.05	-472.68	256.90	233.86	-256.15	-238.82	-1367.04	-1367.04	-990.97	-871.79	484.26	418.92	-506.71	-452.87	-1367.04	-1367.04
2	318.09	329.51	157.57	154.52	475.66	484.03	1857.58	1857.58	648.84	686.69	311.97	301.68	960.81	988.37	1857.58	1857.58
3	-539.02	-556.55	0.90	17.82	-538.12	-538.73	-1918.89	-1918.89	-1087.84	-1131.31	24.98	69.74	-1062.86	-1061.57	-1918.89	-1918.89
4	-532.12	-533.45	108.68	105.77	-423.44	-427.68	-1918.89	-1918.89	-1064.34	-1071.96	212.97	206.91	-851.37	-865.05	-1918.89	-1918.89
5	312.00	310.67	152.03	149.09	464.03	459.76	1980.21	1980.21	623.90	616.28	299.64	293.52	923.54	909.80	1980.21	1980.21
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-508.34	-481.22	257.75	241.64	-250.59	-239.58	-1367.04	-1367.04	-998.22	-914.55	496.93	448.07	-501.29	-466.48	-1367.04	-1367.04
2	306.17	313.21	163.93	161.77	470.10	474.98	1857.58	1857.58	619.67	644.04	325.55	318.97	945.22	963.01	1857.58	1857.58
3	-521.19	-534.22	-8.36	3.94	-529.55	-530.28	-1918.89	-1918.89	-1046.18	-1081.11	-1.76	33.94	-1047.94	-1047.17	-1918.89	-1918.89
4	-518.30	-518.38	102.46	100.22	-415.84	-418.16	-1918.89	-1918.89	-1036.42	-1039.04	202.10	196.39	-834.32	-842.65	-1918.89	-1918.89
5	302.63	302.55	161.48	159.20	464.11	461.75	1980.21	1980.21	605.45	602.83	320.11	314.34	925.56	917.17	1980.21	1980.21

**Table A24. Design and Capacity Moments for Residential Building 28'x24' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-772.39	-685.67	254.11	223.01	-518.28	-462.66	-1652.62	-1652.62	-1447.67	-1213.89	465.40	385.61	-982.27	-828.28	-1652.62	-1652.62
2	504.49	531.17	147.72	142.91	652.21	674.08	2249.92	2249.92	1040.01	1119.84	290.05	275.21	1330.06	1395.05	2249.92	2249.92
3	-854.43	-887.79	10.72	32.21	-843.71	-855.58	-2324.58	-2324.58	-1743.93	-1818.05	53.47	103.60	-1690.46	-1714.45	-2324.58	-2324.58
4	-829.01	-835.39	113.80	110.50	-715.21	-724.89	-2324.58	-2324.58	-1661.05	-1685.88	221.71	216.59	-1439.34	-1469.29	-2324.58	-2324.58
5	488.89	482.51	136.84	133.51	625.73	616.02	2399.24	2399.24	974.77	949.93	267.76	262.59	1242.53	1212.52	2399.24	2399.24
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-783.10	-727.99	262.76	241.93	-520.34	-486.06	-1652.62	-1652.62	-1514.63	-1350.35	500.03	439.89	-1014.60	-910.46	-1652.62	-1652.62
2	484.45	499.46	153.71	151.03	638.16	650.49	2249.92	2249.92	985.07	1034.82	304.71	295.65	1289.78	1330.47	2249.92	2249.92
3	-822.88	-847.98	0.69	16.15	-822.19	-831.83	-2324.58	-2324.58	-1664.99	-1729.77	21.46	63.48	-1643.53	-1666.29	-2324.58	-2324.58
4	-810.79	-812.36	112.97	110.15	-697.82	-702.21	-2324.58	-2324.58	-1621.90	-1631.69	221.99	215.65	-1399.91	-1416.04	-2324.58	-2324.58
5	476.65	475.08	146.16	143.32	622.81	618.40	2399.24	2399.24	952.98	943.19	288.35	281.95	1241.33	1225.14	2399.24	2399.24
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-777.42	-740.55	264.12	249.79	-513.30	-490.76	-1652.62	-1652.62	-1526.38	-1411.91	512.51	468.54	-1013.87	-943.37	-1652.62	-1652.62
2	468.85	478.04	159.02	157.35	627.87	635.39	2249.92	2249.92	947.02	978.72	316.51	310.76	1263.53	1289.48	2249.92	2249.92
3	-798.97	-817.46	-5.84	5.16	-804.81	-812.30	-2324.58	-2324.58	-1607.78	-1658.84	1.01	33.48	-1606.77	-1625.36	-2324.58	-2324.58
4	-792.71	-792.69	109.21	107.11	-683.50	-685.58	-2324.58	-2324.58	-1585.33	-1588.49	215.95	210.39	-1369.38	-1378.10	-2324.58	-2324.58
5	464.33	464.36	154.41	152.28	618.74	616.64	2399.24	2399.24	928.77	925.61	306.32	300.69	1235.09	1226.30	2399.24	2399.24



**Table A25. Design and Capacity Moments for Residential Building 28'x27' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1121.57	-1006.55	258.73	229.65	-862.84	-776.90	-1753.31	-1753.31	-2108.11	-1795.24	479.10	403.26	-1629.01	-1391.98	-1753.31	-1753.31
2	725.91	760.38	145.44	141.10	871.35	901.48	2406.01	2406.01	1486.87	1589.95	286.16	272.68	1773.03	1862.63	2406.01	2406.01
3	-1231.00	-1277.08	7.91	28.31	-1223.09	-1248.77	-2487.59	-2487.59	-2507.85	-2614.58	44.76	93.62	-2463.09	-2520.96	-2487.59	-2487.59
4	-1195.67	-1203.46	115.12	111.77	-1080.55	-1091.69	-2487.59	-2487.59	-2389.04	-2420.10	224.71	218.86	-2164.33	-2201.24	-2487.59	-2487.59
5	706.52	698.73	133.33	129.95	839.85	828.68	2569.18	2569.18	1405.81	1374.76	261.11	255.20	1666.92	1629.96	2569.18	2569.18
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1135.73	-1063.53	266.81	247.76	-868.92	-815.77	-1753.31	-1753.31	-2196.64	-1980.46	511.29	455.67	-1685.35	-1524.79	-1753.31	-1753.31
2	700.59	719.72	150.71	148.31	851.30	868.03	2406.01	2406.01	1417.72	1480.90	299.07	290.97	1716.79	1771.87	2406.01	2406.01
3	-1190.20	-1224.14	-0.19	14.07	-1190.39	-1210.07	-2487.59	-2487.59	-2403.48	-2493.30	17.28	56.68	-2386.20	-2436.62	-2487.59	-2487.59
4	-1172.67	-1174.38	115.39	112.68	-1057.28	-1061.70	-2487.59	-2487.59	-2339.93	-2351.51	227.21	220.82	-2112.72	-2130.69	-2487.59	-2487.59
5	690.88	689.18	141.62	138.89	832.50	828.07	2569.18	2569.18	1377.85	1366.27	279.66	273.21	1657.51	1639.48	2569.18	2569.18
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1128.85	-1080.75	268.46	255.50	-860.39	-825.25	-1753.31	-1753.31	-2213.10	-2063.64	523.31	483.37	-1689.79	-1580.27	-1753.31	-1753.31
2	680.82	692.47	155.40	153.91	836.22	846.38	2406.01	2406.01	1369.74	1409.70	309.48	304.36	1679.22	1714.06	2406.01	2406.01
3	-1159.49	-1184.28	-4.93	5.05	-1164.42	-1179.23	-2487.59	-2487.59	-2329.10	-2398.65	1.11	30.83	-2327.99	-2367.82	-2487.59	-2487.59
4	-1149.78	-1149.56	113.14	111.18	-1036.64	-1038.38	-2487.59	-2487.59	-2293.75	-2297.16	224.09	218.76	-2069.66	-2078.40	-2487.59	-2487.59
5	675.21	675.43	148.92	146.92	824.13	822.35	2569.18	2569.18	1347.09	1343.68	295.64	290.23	1642.73	1633.91	2569.18	2569.18

**Table A26. Design and Capacity Moments for Residential Building 28'x30' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1635.26	-1495.65	351.07	318.20	-1284.19	-1177.45	-2619.07	-2619.07	-3156.94	-2767.26	619.14	535.75	-2537.80	-2231.51	-2619.07	-2619.07
2	1015.88	1055.21	190.38	185.63	1206.26	1240.84	3476.50	3476.50	2071.58	2192.07	349.90	335.91	2421.48	2527.98	3476.50	3476.50
3	-1724.78	-1785.75	3.98	27.36	-1720.80	-1758.39	-3571.77	-3571.77	-3508.79	-3657.49	32.91	88.32	-3475.88	-3569.17	-3571.77	-3571.77
4	-1694.89	-1700.97	148.26	144.20	-1546.63	-1556.77	-3571.77	-3571.77	-3398.42	-3427.05	270.19	262.55	-3128.23	-3164.50	-3571.77	-3571.77
5	1001.01	994.94	167.28	163.19	1168.29	1158.13	3667.04	3667.04	2006.02	1977.40	305.48	297.78	2311.50	2275.18	3667.04	3667.04
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1608.31	-1498.95	350.09	323.93	-1258.22	-1175.02	-2619.07	-2619.07	-3115.73	-2794.40	621.79	551.71	-2493.94	-2242.69	-2619.07	-2619.07
2	995.14	1024.31	195.33	191.83	1190.47	1216.14	3476.50	3476.50	2025.37	2119.53	359.56	348.76	2384.93	2468.29	3476.50	3476.50
3	-1695.34	-1746.35	3.70	22.86	-1691.64	-1723.49	-3571.77	-3571.77	-3446.21	-3579.22	28.84	77.32	-3417.37	-3501.90	-3571.77	-3571.77
4	-1666.53	-1669.58	147.67	144.16	-1518.86	-1525.42	-3571.77	-3571.77	-3341.99	-3360.48	269.89	262.43	-3072.10	-3098.05	-3571.77	-3571.77
5	980.43	977.38	175.07	171.53	1155.50	1148.91	3667.04	3667.04	1964.35	1945.86	320.74	313.21	2285.09	2259.07	3667.04	3667.04
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1604.21	-1531.06	353.54	335.67	-1250.67	-1195.39	-2619.07	-2619.07	-3153.72	-2929.02	639.29	588.58	-2514.43	-2340.44	-2619.07	-2619.07
2	968.99	986.73	200.96	198.79	1169.95	1185.52	3476.50	3476.50	1969.98	2019.97	371.42	364.56	2341.40	2384.53	3476.50	3476.50
3	-1654.01	-1691.69	-1.70	11.83	-1655.71	-1679.86	-3571.77	-3571.77	-3343.09	-3447.80	10.54	47.53	-3332.55	-3400.27	-3571.77	-3571.77
4	-1637.58	-1637.40	146.36	143.75	-1491.22	-1493.65	-3571.77	-3571.77	-3282.90	-3288.62	269.10	262.64	-3013.80	-3025.98	-3571.77	-3571.77
5	960.53	960.70	183.67	181.02	1144.20	1141.72	3667.04	3667.04	1925.49	1919.76	338.36	331.83	2263.85	2251.59	3667.04	3667.04

**\*Four extra pieces of rebar were used to meet strength requirements.**

**Table A27. Design and Capacity Moments for Residential Building 28'x32' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1955.53	-1723.40	371.30	324.08	-1584.23	-1399.32	-3361.22	-3361.22	-3634.06	-3041.87	681.54	565.59	-2952.52	-2476.28	-3361.22	-3361.22
2	1282.72	1354.89	208.48	200.42	1491.20	1555.31	4449.50	4449.50	2638.97	2838.35	408.23	385.19	3047.20	3223.54	4449.50	4449.50
3	-2198.16	-2285.95	20.60	51.70	-2177.56	-2234.25	-4558.33	-4558.33	-4495.92	-4689.35	84.80	154.67	-4411.12	-4534.68	-4558.33	-4558.33
4	-2118.64	-2138.38	157.30	153.04	-1961.34	-1985.34	-4558.33	-4558.33	-4238.49	-4305.32	307.10	300.96	-3931.39	-4004.36	-4558.33	-4558.33
5	1240.87	1221.25	175.60	171.30	1416.47	1392.55	4667.16	4667.16	2465.43	2398.78	343.65	337.45	2809.08	2736.23	4667.16	4667.16
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-2001.71	-1852.66	387.12	355.48	-1614.59	-1497.18	-3361.22	-3361.22	-3844.14	-3418.74	737.64	649.72	-3106.50	-2769.02	-3361.22	-3361.22
2	1238.72	1279.16	215.62	211.14	1454.34	1490.30	4449.50	4449.50	2513.74	2640.10	426.82	412.46	2940.56	3052.56	4449.50	4449.50
3	-2125.63	-2193.81	8.18	30.89	-2117.45	-2162.92	-4558.33	-4558.33	-4308.10	-4480.79	44.15	103.35	-4263.95	-4377.44	-4558.33	-4558.33
4	-2038.99	-2089.22	159.81	155.84	-1879.18	-1933.38	-4558.33	-4558.33	-4160.74	-4188.01	314.28	305.86	-3846.46	-3882.15	-4558.33	-4558.33
5	1218.27	1213.20	186.18	182.16	1404.45	1395.36	4667.16	4667.16	2428.93	2401.93	366.99	358.49	2795.92	2760.42	4667.16	4667.16
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-2002.74	-1902.50	392.29	370.56	-1610.45	-1531.94	-3361.22	-3361.22	-3909.12	-3607.64	762.08	697.58	-3147.04	-2910.06	-3361.22	-3361.22
2	1206.74	1231.33	221.61	218.84	1428.35	1450.17	4449.50	4449.50	2432.11	2513.43	440.74	431.53	2872.85	2944.96	4449.50	4449.50
3	-2074.35	-2125.42	2.15	18.36	-2072.20	-2107.06	-4558.33	-4558.33	-4178.50	-4317.33	21.85	67.94	-4156.65	-4249.39	-4558.33	-4558.33
4	-2050.06	-2050.36	159.28	156.23	-1890.78	-1894.13	-4558.33	-4558.33	-4091.20	-4100.47	315.14	307.45	-3776.06	-3793.02	-4558.33	-4558.33
5	1195.03	1194.89	195.20	192.10	1390.23	1386.99	4667.16	4667.16	2384.38	2375.42	386.94	379.16	2771.32	2754.58	4667.16	4667.16

**\*Five extra pieces of rebar were used to meet strength requirements.**

**Table A28. Design and Capacity Moments for Residential Building 30'x21' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-510.83	-435.96	319.99	264.95	-190.84	-171.01	-1566.40	-1566.40	-941.77	-751.64	553.85	437.42	-387.92	-314.22	-1566.40	-1566.40
2	348.12	373.18	197.29	188.35	545.41	561.53	2178.15	2178.15	718.03	801.90	383.57	357.79	1101.60	1159.69	2178.15	2178.15
3	-583.64	-608.40	28.45	59.63	-555.19	-548.77	-2246.12	-2246.12	-1190.51	-1237.19	109.03	173.90	-1081.48	-1063.29	-2246.12	-2246.12
4	-563.88	-570.89	139.82	136.52	-424.06	-434.37	-2246.12	-2246.12	-1134.75	-1158.12	271.75	270.02	-863.00	-888.10	-2246.12	-2246.12
5	331.48	324.47	178.82	175.27	510.30	499.74	2314.10	2314.10	661.56	638.19	349.28	347.49	1010.84	985.68	2314.10	2314.10
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-524.46	-474.69	330.29	295.06	-194.17	-179.63	-1566.40	-1566.40	-1007.75	-865.28	613.11	517.41	-394.64	-347.87	-1566.40	-1566.40
2	330.33	345.08	207.05	201.86	537.38	546.94	2178.15	2178.15	679.73	727.45	408.43	391.49	1088.16	1118.94	2178.15	2178.15
3	-557.58	-577.85	8.88	33.74	-548.70	-544.11	-2246.12	-2246.12	-1129.08	-1176.12	53.90	115.72	-1075.18	-1060.40	-2246.12	-2246.12
4	-549.22	-551.45	136.85	133.06	-412.37	-418.39	-2246.12	-2246.12	-1102.18	-1113.05	267.31	260.86	-834.87	-852.19	-2246.12	-2246.12
5	322.13	319.90	192.73	188.90	514.86	508.80	2314.10	2314.10	645.97	635.10	379.03	372.51	1025.00	1007.61	2314.10	2314.10
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-522.29	-488.39	333.67	308.47	-188.62	-179.92	-1566.40	-1566.40	-1024.39	-921.69	636.84	562.74	-387.55	-358.95	-1566.40	-1566.40
2	317.19	326.37	215.33	212.08	532.52	538.45	2178.15	2178.15	646.24	677.67	427.44	416.36	1073.68	1094.03	2178.15	2178.15
3	-538.17	-553.70	-4.88	13.84	-543.05	-539.86	-2246.12	-2246.12	-1083.39	-1123.23	14.32	66.26	-1069.07	-1056.97	-2246.12	-2246.12
4	-534.96	-535.35	129.15	125.97	-405.81	-409.38	-2246.12	-2246.12	-1073.01	-1077.24	253.95	246.71	-819.06	-830.53	-2246.12	-2246.12
5	312.46	312.06	205.23	202.01	517.69	514.07	2314.10	2314.10	627.12	622.89	406.08	398.76	1033.20	1021.65	2314.10	2314.10

**Table A29. Design and Capacity Moments for Residential Building 30'x24' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-783.40	-679.24	323.05	276.93	-460.35	-402.31	-1780.38	-1780.38	-1444.85	-1177.76	580.17	467.70	-864.68	-710.06	-1780.38	-1780.38
2	526.57	560.29	193.66	185.62	720.23	745.91	2454.77	2454.77	1094.09	1190.53	377.86	354.31	1471.95	1544.84	2454.77	2454.77
3	-888.46	-925.17	24.28	54.32	-864.18	-870.85	-2529.70	-2529.70	-1816.94	-1891.15	95.57	160.94	-1721.37	-1730.21	-2529.70	-2529.70
4	-858.22	-867.75	142.70	139.02	-715.52	-728.73	-2529.70	-2529.70	-1720.90	-1753.18	278.18	274.46	-1442.72	-1478.72	-2529.70	-2529.70
5	505.19	495.75	172.76	169.01	677.95	664.76	2604.63	2604.63	1004.13	971.70	337.65	333.80	1341.78	1305.50	2604.63	2604.63
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-801.59	-733.09	339.34	307.24	-462.25	-425.85	-1780.38	-1780.38	-1536.50	-1339.14	638.08	548.93	-898.42	-790.21	-1780.38	-1780.38
2	503.37	522.86	202.11	197.56	705.48	720.42	2454.77	2454.77	1028.45	1091.51	399.54	384.65	1427.99	1476.16	2454.77	2454.77
3	-853.66	-883.20	7.45	30.44	-846.21	-852.76	-2529.70	-2529.70	-1730.61	-1801.83	46.12	105.49	-1684.49	-1696.34	-2529.70	-2529.70
4	-838.09	-840.88	143.06	139.25	-695.03	-701.63	-2529.70	-2529.70	-1676.73	-1691.51	280.54	272.86	-1396.19	-1418.65	-2529.70	-2529.70
5	492.84	490.02	185.25	181.42	678.09	671.44	2604.63	2604.63	984.92	970.00	364.48	356.97	1349.40	1326.97	2604.63	2604.63
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-799.32	-752.79	343.62	321.19	-455.70	-431.60	-1780.38	-1780.38	-1561.46	-1419.99	662.11	595.08	-899.35	-824.91	-1780.38	-1780.38
2	486.17	498.19	209.31	206.49	695.48	704.68	2454.77	2454.77	984.88	1025.95	416.01	406.52	1400.89	1432.47	2454.77	2454.77
3	-827.49	-849.99	-3.06	13.73	-830.55	-836.26	-2529.70	-2529.70	-1667.09	-1726.43	13.78	61.84	-1653.31	-1664.59	-2529.70	-2529.70
4	-819.24	-819.52	139.00	136.04	-680.24	-683.48	-2529.70	-2529.70	-1638.22	-1643.74	274.63	266.99	-1363.59	-1376.75	-2529.70	-2529.70
5	480.11	479.71	196.18	193.11	676.29	672.82	2604.63	2604.63	960.31	954.66	388.38	380.78	1348.69	1335.44	2604.63	2604.63

**Table A30. Design and Capacity Moments for Residential Building 30'x27' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1139.19	-999.36	330.42	286.89	-808.77	-712.47	-2087.67	-2087.67	-2114.61	-1749.99	600.65	492.45	-1513.96	-1257.54	-2087.67	-2087.67
2	757.64	801.61	190.85	183.54	948.49	985.15	2882.46	2882.46	1566.71	1693.27	373.38	351.75	1940.09	2045.02	2882.46	2882.46
3	-1283.28	-1335.18	19.61	48.54	-1263.67	-1286.64	-2970.77	-2970.77	-2627.50	-2738.99	82.78	147.74	-2544.72	-2591.25	-2970.77	-2970.77
4	-1237.87	-1249.72	144.84	140.87	-1093.03	-1108.85	-2970.77	-2970.77	-2482.28	-2525.06	282.11	276.86	-2200.17	-2248.20	-2970.77	-2970.77
5	731.01	719.16	168.31	164.30	899.32	883.46	3059.08	3059.08	1455.48	1412.70	329.00	323.70	1784.48	1736.40	3059.08	3059.08
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1164.67	-1074.35	344.64	315.05	-820.03	-759.30	-2087.67	-2087.67	-2239.25	-1976.23	652.92	569.56	-1586.33	-1406.67	-2087.67	-2087.67
2	728.30	753.24	198.27	194.18	926.57	947.42	2882.46	2882.46	1483.63	1564.24	392.36	378.84	1875.99	1943.08	2882.46	2882.46
3	-1236.50	-1276.95	6.45	27.86	-1230.05	-1249.09	-2970.77	-2970.77	-2509.04	-2610.84	40.89	97.21	-2468.15	-2513.63	-2970.77	-2970.77
4	-1213.71	-1216.97	145.66	141.94	-1068.05	-1075.03	-2970.77	-2970.77	-2428.50	-2446.44	285.92	278.11	-2142.58	-2168.33	-2970.77	-2970.77
5	715.17	711.92	179.47	175.71	894.64	887.63	3059.08	3059.08	1429.28	1411.34	353.52	345.64	1782.80	1756.98	3059.08	3059.08
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1162.47	-1101.64	348.57	328.10	-813.90	-773.54	-2087.67	-2087.67	-2273.72	-2087.52	674.63	612.94	-1599.09	-1474.58	-2087.67	-2087.67
2	706.50	721.77	204.63	202.09	911.13	923.86	2882.46	2882.46	1428.56	1480.44	406.89	398.25	1835.45	1878.69	2882.46	2882.46
3	-1202.47	-1232.77	-1.07	14.33	-1203.54	-1218.44	-2970.77	-2970.77	-2425.05	-2507.48	15.65	60.06	-2409.40	-2447.42	-2970.77	-2970.77
4	-1190.02	-1190.29	143.12	140.24	-1046.90	-1050.05	-2970.77	-2970.77	-2380.06	-2386.39	282.76	275.48	-2097.30	-2110.91	-2970.77	-2970.77
5	698.95	698.68	189.16	186.24	888.11	884.92	3059.08	3059.08	1397.88	1391.56	374.83	367.45	1772.71	1759.01	3059.08	3059.08

**Table A31. Design and Capacity Moments for Residential Building 30'x30' (in.-kip)**

	Exterior Frame								Interior Frame							
	Column 20"x20"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1592.34	-1411.42	335.72	294.49	-1256.62	-1116.93	-2724.86	-2724.86	-2967.24	-2491.67	616.63	512.70	-2350.61	-1978.97	-2724.86	-2724.86
2	1048.09	1103.74	188.59	181.88	1236.68	1285.62	3582.28	3582.28	2154.50	2314.57	369.79	349.83	2524.29	2664.40	3582.28	3582.28
3	-1776.79	-1846.40	15.75	43.57	-1761.04	-1802.83	-3677.55	-3677.55	-3630.61	-3786.05	71.54	135.54	-3559.07	-3650.51	-3677.55	-3677.55
4	-1716.92	-1731.20	145.64	141.52	-1571.28	-1589.68	-3677.55	-3677.55	-3434.05	-3486.41	284.32	278.04	-3149.73	-3208.37	-3677.55	-3677.55
5	1015.74	1001.45	164.87	160.72	1180.61	1162.17	3772.82	3772.82	2019.38	1967.02	322.31	315.96	2341.69	2282.98	3772.82	3772.82
	Column 24"x24"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1624.67	-1509.29	348.92	321.45	-1275.75	-1187.84	-2724.86	-2724.86	-3126.60	-2789.26	665.44	587.33	-2461.16	-2201.93	-2724.86	-2724.86
2	1011.92	1043.06	195.23	191.52	1207.15	1234.58	3582.28	3582.28	2052.30	2152.61	386.72	374.45	2439.02	2527.06	3582.28	3582.28
3	-1717.82	-1770.91	4.54	24.59	-1713.28	-1746.32	-3677.55	-3677.55	-3478.12	-3614.83	34.25	87.81	-3443.87	-3527.02	-3677.55	-3677.55
4	-1687.22	-1690.80	147.48	143.85	-1539.74	-1546.95	-3677.55	-3677.55	-3368.40	-3389.26	290.00	282.00	-3078.40	-3107.26	-3677.55	-3677.55
5	995.94	992.36	174.87	171.21	1170.81	1163.57	3772.82	3772.82	1986.26	1965.40	344.77	336.69	2331.03	2302.09	3772.82	3772.82
	Column 28"x28"															
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-1622.25	-1544.96	352.88	334.07	-1269.37	-1210.89	-2724.86	-2724.86	-3171.09	-2934.33	685.91	629.01	-2485.18	-2305.32	-2724.86	-2724.86
2	984.98	1003.93	200.89	198.59	1185.87	1202.52	3582.28	3582.28	1984.53	2048.60	399.70	391.90	2384.23	2440.50	3582.28	3582.28
3	-1675.28	-1714.66	-1.17	13.03	-1676.45	-1701.63	-3677.55	-3677.55	-3371.92	-3480.52	13.35	54.64	-3358.57	-3425.88	-3677.55	-3677.55
4	-1657.95	-1657.97	146.25	143.52	-1511.70	-1514.45	-3677.55	-3677.55	-3308.77	-3315.60	289.38	282.28	-3019.39	-3033.32	-3677.55	-3677.55
5	975.79	955.72	183.56	180.79	1159.35	1136.51	3772.82	3772.82	1947.26	1940.43	363.97	356.79	2311.23	2297.22	3772.82	3772.82

**\*Five extra pieces of rebar were used to meet strength requirements.**

**Table A32. Design and Capacity Moments for Residential Building 30'x32' (in.-kip)**

Moment	Exterior Frame								Interior Frame							
	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
<b>Column 20"x20"</b>																
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-2000.69	-1783.78	384.71	337.62	-1615.98	-1446.16	-3589.12	-3589.12	-3758.67	-3183.72	662.85	550.67	-3095.82	-2633.05	-3589.12	-3589.12
2	1305.18	1371.08	268.86	263.27	1574.04	1634.35	4677.40	4677.40	2689.09	2879.20	498.53	482.27	3187.62	3361.47	4677.40	4677.40
3	-2218.91	-2304.01	-33.97	1.95	-2252.88	-2302.06	-4786.22	-4786.22	-4551.86	-4746.60	-16.37	63.29	-4568.23	-4683.31	-4786.22	-4786.22
4	-2147.14	-2163.46	178.80	171.33	-1968.34	-1992.13	-4786.22	-4786.22	-4311.92	-4372.29	324.41	310.53	-3987.51	-4061.76	-4786.22	-4786.22
5	1267.83	1251.52	199.74	192.22	1467.57	1443.74	4895.05	4895.05	2532.44	2472.07	363.61	349.65	2896.05	2821.72	4895.05	4895.05
<b>Column 24"x24"</b>																
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-2038.77	-1901.54	400.18	368.77	-1638.59	-1532.77	-3589.12	-3589.12	-3948.43	-3544.68	715.89	631.72	-3232.54	-2912.96	-3589.12	-3589.12
2	1263.06	1299.64	275.38	272.31	1538.44	1571.95	4677.40	4677.40	2569.61	2687.69	513.65	503.89	3083.26	3191.58	4677.40	4677.40
3	-2149.47	-2213.52	-47.61	-22.35	-2197.08	-2235.87	-4786.22	-4786.22	-4369.38	-4536.97	-60.20	4.46	-4429.58	-4532.51	-4786.22	-4786.22
4	-2112.58	-2116.41	182.18	176.45	-1930.40	-1939.96	-4786.22	-4786.22	-4235.53	-4258.80	334.64	321.33	-3900.89	-3937.47	-4786.22	-4786.22
5	1244.59	1240.77	212.34	206.56	1456.93	1447.33	4895.05	4895.05	2492.99	2469.72	391.15	377.75	2884.14	2847.47	4895.05	4895.05
<b>Column 28"x28"</b>																
Moment	$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$		$M_u$		$M_{sec}$		$M_{req'd}$		$\phi M_n$	
Location	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof	1	Roof
1	-2036.02	-1944.39	405.11	383.62	-1630.91	-1560.77	-3589.12	-3589.12	-4001.40	-3719.49	738.59	677.39	-3262.81	-3042.10	-3589.12	-3589.12
2	1231.65	1253.85	281.21	279.28	1512.86	1533.13	4677.40	4677.40	2490.35	2565.48	525.78	519.63	3016.13	3085.11	4677.40	4677.40
3	-2099.60	-2146.81	-54.14	-36.51	-2153.74	-2183.32	-4786.22	-4786.22	-4243.54	-4375.20	-83.50	-34.61	-4327.04	-4409.81	-4786.22	-4786.22
4	-2078.42	-2078.20	181.77	177.70	-1896.65	-1900.50	-4786.22	-4786.22	-4165.72	-4172.91	336.54	325.86	-3829.18	-3847.05	-4786.22	-4786.22
5	1221.03	1221.25	222.83	218.72	1443.86	1439.97	4895.05	4895.05	2447.11	2439.91	413.49	402.73	2860.60	2842.64	4895.05	4895.05

**\*Eight extra pieces of rebar were used to meet strength requirements.**