CHAPTER 16: STRUCTURAL DESIGN

1603.1.7 Revise subsection as follows:

1603.1.7 Flood Design Data. For buildings located in whole or in part in flood hazard areas as established in section 1612.3, the documentation pertaining to design, if required in section 1612.5, shall be included and the following information, referenced to the datum of the base flood elevation, shall be shown, regardless of whether flood loads govern the design of the building:

1. Flood design class assigned according to ASCE 24.
2. In flood hazard areas other than coastal high hazard areas or the elevation of the proposed lowest floor, including the basement.
3. In flood hazard areas other than coastal high hazard areas, the elevation to which any nonresidential building will be dry floodproofed.
4. In coastal high hazard areas the proposed elevation of the bottom of the lowest horizontal structural member of the lowest floor, including the basement.

1604.11 and Table 1604.11 Add section and table as follows: 1604.11 Snow, Wind and Earthquake Design Factors. Ground snow load, p_g, basic wind speed, V, and earthquake response accelerations for the maximum considered earthquake, S_S and S_1, for each city and town in the Commonwealth shall be as given in Table 1604.11.

TABLE 1604.11 SNOW LOADS, WIND SPEEDS, AND SEISMIC PARAMETERS

	SNOW LOADS		BASIC WIND SPEED, V^4 (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Abington	35	30	113	123	131	136	0.224	0.059	
Acton	50	35	108	117	126	130	0.302	0.070	
Acushnet	30	30	120	129	138	142	0.192	0.053	
Adams[2]	60[3]/1535	40	104	111	119	125	0.168	0.058	
Agawam	35	35	106	115	124	129	0.168	0.055	
Alford[2]	40	40	104	112	120	125	0.165	0.055	
Amesbury	50	30	107	116	125	129	0.356	0.077	
Amherst	40	35	105	114	123	128	0.171	0.057	
Andover	50	30	108	117	126	130	0.355	0.076	
Aquinnah (Gay Head)	25	25	124	134	143	147	0.161	0.048	
Arlington	40	30	109	119	128	132	0.286	0.067	
Ashburnham	60[3]/1151	35	106	114	123	128	0.288	0.069	
Ashby	60[3]/929	35	106	114	123	128	0.333	0.074	
Ashfield	50[3]/1338	40	104	112	120	126	0.167	0.057	
Ashland	40	35	109	119	128	132	0.235	0.062	
Athol	60	35	105	113	122	127	0.211	0.062	
Attleboro	35	30	114	124	132	137	0.206	0.057	
Auburn	50	35	108	118	127	131	0.199	0.058	
Avon	35	35	112	123	131	136	0.226	0.060	
Ayer	50	35	107	116	125	129	0.322	0.072	
Barnstable	30	25	122	130	138	144	0.160	0.049	
Barre	50[3]/893	35	106	115	124	129	0.202	0.060	
Becket[2]	60[3]/1566	40	104	113	120	125	0.162	0.055	
Bedford	50	30	108	118	127	131	0.309	0.070	
Belchertown	40	35	106	115	124	129	0.173	0.056	
Bellingham	40	35	110	121	129	134	0.209	0.058	
Belmont	40	30	109	119	128	132	0.280	0.067	
Berkley	30	30	116	126	135	139	0.204	0.055	
Berlin	50	35	108	117	127	131	0.246	0.064	
Bernardston	60	35	104	112	120	126	0.183	0.060	
Beverly	50	30	109	119	127	132	0.312	0.070	
Billerica	50	30	108	117	126	130	0.333	0.073	
Blackstone	40	35	111	121	130	135	0.203	0.057	
Blandford	50[3]/1273	40	105	114	122	127	0.162	0.055	
Bolton	50	35	108	117	126	130	0.273	0.067	

	SNOW LOADS		BASIC WIND SPEED, V[4] (mph)				SEISMIC PARAMETER S (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Boston	40	30	110	120	128	133	0.270	0.065	
Bourne	30	25	120	129	137	142	0.180	0.052	
Boxborough	50	35	108	117	126	130	0.296	0.069	
Boxford	50	30	108	117	126	130	0.354	0.076	
Boylston	50	35	108	117	126	130	0.229	0.062	
Braintree	35	30	112	122	130	135	0.238	0.061	
Brewster	25	25	122	130	139	145	0.150	0.048	
Bridgewater	30	30	115	125	133	138	0.210	0.057	
Brimfield	40	35	108	117	126	131	0.177	0.056	
Brockton	35	30	113	123	132	137	0.220	0.059	
Brookfield	50	35	108	117	126	130	0.184	0.057	
Brookline	40	30	110	120	128	133	0.263	0.065	
Buckland[2]	60	40	104	112	120	125	0.169	0.058	
Burlington	50	30	108	118	127	131	0.314	0.071	
Cambridge	40	30	110	120	128	133	0.272	0.066	
Canton	40	35	111	122	130	135	0.231	0.060	
Carlisle	50	30	108	117	126	130	0.320	0.072	
Carver	30	30	117	127	135	140	0.198	0.055	
Charlemont[2]	60[3]/987	40	104	112	120	125	0.169	0.058	
Charlton	50	35	109	118	127	131	0.187	0.057	
Chatham	25	25	124	132	140	146	0.140	0.046	
Chelmsford	50	30	108	117	125	130	0.346	0.075	
Chelsea	40	30	110	120	128	133	0.278	0.066	
Cheshire[2]	60[3]/1453	40	104	112	119	125	0.167	0.057	
Chester	60	40	105	113	121	126	0.162	0.055	
Chesterfield	50[3]/1165	40	105	113	121	126	0.164	0.056	
Chicopee	35	35	106	115	124	129	0.167	0.055	
Chilmark	25	25	125	134	143	147	0.158	0.047	
Clarksburg[2]	60[3]/1504	40	104	111	119	125	0.171	0.059	
Clinton	50	35	108	117	126	130	0.257	0.065	
Cohasset	35	30	112	122	130	136	0.239	0.061	
Colrain[2]	60	40	104	112	120	125	0.175	0.059	
Concord	50	35	108	118	127	131	0.297	0.069	
Conway	50	40	104	113	121	126	0.169	0.057	

	SNOW LOADS		BASIC WIND SPEED, V[4] (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Cummington[2]	60[3]/1396	40	104	113	120	126	0.164	0.056	
Dalton[2]	60[3]/1527	40	104	112	120	125	0.165	0.057	
Danvers	50	30	109	118	127	132	0.322	0.071	
Dartmouth	30	30	120	129	138	142	0.191	0.053	
Dedham	40	35	110	120	129	134	0.244	0.062	
Deerfield	50	35	105	113	121	126	0.174	0.058	
Dennis	30	25	122	130	138	144	0.156	0.049	
Dighton	30	30	116	126	135	139	0.202	0.055	
Douglas	40	35	110	120	129	133	0.196	0.057	
Dover	40	35	110	120	129	134	0.240	0.062	
Dracut	50	30	107	116	125	129	0.371	0.078	
Dudley	50	35	109	119	128	133	0.186	0.056	
Dunstable	50	35	107	115	124	129	0.375	0.078	
Duxbury	30	30	115	125	133	138	0.206	0.056	
E. Bridgewater	35	30	114	124	133	137	0.214	0.058	
E. Brookfield	50	35	108	117	126	130	0.188	0.058	
E. Longmeadow	35	35	107	116	125	130	0.171	0.055	
Eastham	25	25	122	130	139	144	0.150	0.048	
Easthampton	40	35	105	114	123	128	0.165	0.056	
Easton	35	30	113	123	131	136	0.219	0.059	
Edgartown	25	25	125	134	143	147	0.151	0.047	
Egremont[2]	40	40	104	112	120	125	0.165	0.055	
Erving	50	35	105	113	121	126	0.182	0.059	
Essex	50	30	109	118	127	132	0.321	0.071	
Everett	40	30	109	119	128	133	0.283	0.067	
Fairhaven	30	30	120	130	138	143	0.189	0.052	
Fall River	30	30	118	128	136	140	0.198	0.054	
Falmouth	30	25	122	131	140	145	0.168	0.049	
Fitchburg	60	35	106	115	124	128	0.300	0.070	
Florida[2]	60[3]/1784	40	104	111	119	125	0.169	0.058	
Foxborough	35	35	112	122	131	136	0.215	0.058	
Framingham	40	35	109	119	128	132	0.241	0.063	
Franklin	40	35	111	121	130	135	0.213	0.058	
Freetown	30	30	117	127	135	139	0.201	0.055	

	SNOW LOADS		BASIC WIND SPEED, V[4] (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Gardner	60[3]/1073	35	106	114	123	128	0.252	0.066	
Georgetown	50	30	108	117	125	130	0.356	0.076	
Gill	50	35	104	113	120	126	0.185	0.060	
Gloucester	50	30	109	119	128	132	0.305	0.070	
Goshen	50[3]/1349	40	104	113	121	126	0.165	0.056	
Gosnold	30	25	123	132	142	146	0.174	0.050	
Grafton	50	35	109	119	128	132	0.211	0.059	
Granby	35	35	106	114	123	128	0.168	0.056	
Granville	50	40	106	114	123	128	0.165	0.054	
Great Barrington[2]	50	40	104	113	120	125	0.164	0.055	
Greenfield	50	35	104	113	120	126	0.176	0.058	
Groton	60	35	107	116	125	129	0.343	0.075	
Groveland	50	30	108	116	125	130	0.361	0.077	
Hadley	40	35	105	114	123	128	0.169	0.056	
Halifax	30	30	116	125	134	138	0.209	0.057	
Hamilton	50	30	109	118	127	131	0.326	0.072	
Hampden	35	35	107	116	126	130	0.172	0.055	
Hancock[2]	50[3]/1595	40	104	111	119	124	0.171	0.057	
Hanover	35	30	114	124	132	137	0.221	0.059	
Hanson	35	30	114	124	132	137	0.216	0.058	
Hardwick	50	35	107	115	125	129	0.184	0.058	
Harvard	50	35	107	116	125	130	0.298	0.070	
Harwich	25	25	123	131	139	146	0.146	0.047	
Hatfield	40	35	105	114	122	127	0.168	0.056	
Haverhill	50	30	107	116	125	129	0.369	0.078	
Hawley[2]	60[3]/1482	40	104	112	120	125	0.167	0.057	
Heath[2]	60[3]/1526	40	104	112	120	125	0.171	0.058	
Hingham	35	30	112	122	130	135	0.239	0.061	
Hinsdale[2]	60[3]/1591	40	104	112	120	125	0.164	0.056	
Holbrook	35	30	112	123	131	136	0.229	0.060	
Holden	50	35	108	116	126	130	0.220	0.061	
Holland	40	35	108	117	127	131	0.177	0.056	
Holliston	40	35	110	120	129	133	0.225	0.060	
Holyoke	35	35	106	114	123	128	0.166	0.055	

	SNOW LOADS		BASIC WIND SPEED, V[4] (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Hopedale	40	35	110	120	129	134	0.210	0.059	
Hopkinton	40	35	109	119	128	133	0.224	0.061	
Hubbardston	50[3]/990	35	106	115	124	129	0.226	0.063	
Hudson	50	35	108	117	127	131	0.260	0.065	
Hull	35	30	112	122	130	135	0.248	0.062	
Huntington	50	40	105	114	122	127	0.162	0.055	
Ipswich	50	30	108	118	126	131	0.335	0.073	
Kingston	30	30	116	126	134	139	0.205	0.056	
Lakeville	30	30	117	127	135	139	0.201	0.055	
Lancaster	50	35	107	116	126	130	0.271	0.067	
Lanesborough[2]	50[3]/1433	40	104	111	119	125	0.168	0.057	
Lawrence	50	30	107	116	125	129	0.368	0.077	
Lee[2]	50	40	104	112	120	125	0.163	0.055	
Leicester	50[3]/903	35	108	117	126	131	0.199	0.059	
Lenox[2]	50[3]/1228	40	104	112	120	125	0.165	0.056	
Leominster	60	35	107	115	125	129	0.284	0.068	
Leverett	40	35	105	114	122	127	0.175	0.058	
Lexington	40	30	109	118	127	132	0.296	0.069	
Leyden[2]	60[3]/867	40	104	112	120	125	0.179	0.059	
Lincoln	40	35	109	118	127	131	0.286	0.068	
Littleton	50	35	108	117	126	130	0.320	0.072	
Longmeadow	35	35	107	116	125	129	0.170	0.055	
Lowell	50	30	107	116	125	129	0.360	0.076	
Ludlow	35	35	107	115	125	129	0.170	0.055	
Lunenburg	60[3]/452	35	107	115	124	129	0.318	0.072	
Lynn	40	30	109	119	128	133	0.295	0.068	
Lynnfield	50	30	109	118	127	131	0.320	0.071	
Malden	40	30	109	119	128	132	0.288	0.068	
Manchester	50	30	109	119	128	132	0.309	0.070	
Mansfield	35	30	113	123	131	136	0.213	0.058	
Marblehead	40	30	109	119	128	133	0.299	0.069	
Marion	30	30	120	129	138	142	0.186	0.052	
Marlborough	50	35	108	118	127	131	0.249	0.064	
Marshfield	35	30	115	125	133	138	0.214	0.057	

	SNOW LOADS		BASIC WIND SPEED, V[4] (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Mashpee	30	25	121	130	139	144	0.165	0.049	
Mattapoisett	30	30	120	130	138	143	0.186	0.052	
Maynard	50	35	108	118	127	131	0.282	0.068	
Medfield	40	35	110	120	129	134	0.229	0.061	
Medford	40	30	109	119	128	132	0.287	0.067	
Medway	40	35	110	120	129	134	0.219	0.060	
Melrose	40	30	109	119	128	132	0.297	0.069	
Mendon	40	35	110	120	129	134	0.207	0.058	
Merrimac	50	30	107	116	124	129	0.363	0.077	
Methuen	50	30	107	116	125	129	0.372	0.078	
Middleborough	30	30	117	126	134	139	0.203	0.055	
Middlefield	60[3]/1449	40	104	113	120	126	0.162	0.056	
Middleton	50	30	108	118	127	131	0.334	0.073	
Milford	40	35	110	120	129	133	0.214	0.059	
Millbury	50	35	109	118	127	132	0.203	0.059	
Millis	40	35	110	120	129	134	0.224	0.060	
Millville	40	35	111	121	129	135	0.200	0.057	
Milton	40	30	111	121	129	134	0.246	0.062	
Monroe[2]	60[3]/1932	40	104	111	119	125	0.171	0.059	
Monson	40	35	108	116	126	130	0.173	0.055	
Montague	50	35	105	113	121	127	0.177	0.058	
Monterey	50[3]/1491	40	104	113	120	126	0.162	0.055	
Montgomery	40	40	105	114	122	127	0.163	0.055	
Mount Washington[2]	40	40	104	113	120	125	0.165	0.054	
Nahant	40	30	110	120	128	133	0.283	0.067	
Nantucket	25	25	128	137	147	150	0.123	0.043	
Natick	40	35	109	119	128	133	0.246	0.063	
Needham	40	35	110	120	129	133	0.249	0.063	
New Ashford[2]	50[3]/1900	40	104	111	119	124	0.170	0.058	
New Bedford	30	30	120	129	138	142	0.190	0.053	
New Braintree	50[3]/826	35	107	115	125	129	0.190	0.058	
New Marlborough	50	40	105	113	121	126	0.163	0.054	

	SNOW LOADS		BASIC WIND SPEED, V[4] (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
New Salem	50[3]/721	35	105	114	122	127	0.189	0.059	
Newbury	50	30	108	116	125	130	0.348	0.075	
Newburyport	50	30	107	116	125	130	0.350	0.076	
Newton	40	30	109	119	128	133	0.264	0.065	
Norfolk	40	35	111	121	130	135	0.219	0.059	
North Adams[2]	60[3]/1250	40	104	111	119	124	0.171	0.058	
North Andover	50	30	108	116	125	130	0.365	0.077	
North Attleborough	35	30	113	123	131	136	0.207	0.057	
North Brookfield	50[3]/804	35	107	116	125	130	0.190	0.058	
North Reading	50	30	108	118	127	131	0.332	0.073	
Northampton	40	35	105	114	123	128	0.167	0.056	
Northborough	50	35	108	118	127	131	0.231	0.062	
Northbridge	40	35	109	119	128	133	0.207	0.059	
Northfield	60	35	104	112	120	126	0.193	0.061	
Norton	35	30	114	124	132	137	0.210	0.057	
Norwell	35	30	114	123	132	136	0.226	0.059	
Norwood	40	35	111	121	129	135	0.232	0.061	
Oak Bluffs	25	25	124	133	142	146	0.157	0.048	
Oakham	50[3]/907	35	107	116	125	129	0.203	0.060	
Orange	60	35	105	113	122	127	0.199	0.061	
Orleans	25	25	122	130	139	145	0.148	0.048	
Otis	50[3]/1506	40	105	113	121	126	0.162	0.055	
Oxford	50	35	109	119	128	132	0.191	0.057	
Palmer	40	35	107	116	125	130	0.173	0.056	
Paxton	50[3]/1054	35	108	116	126	130	0.206	0.060	
Peabody	50	30	109	119	127	132	0.310	0.070	
Pelham	40	35	105	114	123	128	0.177	0.057	
Pembroke	30	30	115	124	133	138	0.215	0.058	
Pepperell	60	35	107	115	124	128	0.369	0.077	
Peru[2]	60[3]/1846	40	104	112	120	125	0.164	0.056	
Petersham	50[3]/770	35	106	114	123	128	0.202	0.060	
Phillipston	60[3]/1088	35	106	114	123	128	0.220	0.063	
Pittsfield[2]	50[3]/1124	40	104	112	119	125	0.166	0.056	

	SNOW LOADS		BASIC WIND SPEED, V[4] (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Plainfield[2]	60[3]/1615	40	104	112	120	125	0.165	0.057	
Plainville	40	35	112	123	131	136	0.208	0.057	
Plymouth	30	30	117	127	135	140	0.196	0.055	
Plympton	30	30	116	126	134	139	0.205	0.056	
Princeton	50[3]/959	35	107	116	125	129	0.233	0.063	
Provincetown	25	25	118	127	135	140	0.181	0.053	
Quincy	40	30	111	121	130	135	0.245	0.062	
Randolph	35	30	112	122	130	135	0.233	0.061	
Raynham	35	30	115	125	133	138	0.209	0.057	
Reading	50	30	109	118	127	131	0.319	0.071	
Rehoboth	35	30	115	125	134	138	0.202	0.056	
Revere	40	30	110	119	128	133	0.282	0.067	
Richmond[2]	50	40	104	112	120	125	0.168	0.056	
Rochester	30	30	119	129	137	142	0.191	0.053	
Rockland	35	30	113	123	131	136	0.224	0.059	
Rockport	50	30	109	119	127	132	0.306	0.070	
Rowe[2]	60[3]/1516	40	104	111	119	125	0.170	0.058	
Rowley	50	30	108	117	126	130	0.344	0.074	
Royalston	60[3]/944	35	105	113	122	127	0.230	0.064	
Russell	40	40	105	114	122	127	0.163	0.055	
Rutland	50[3]/977	35	107	116	125	129	0.214	0.061	
Salem	50	30	109	119	128	132	0.307	0.070	
Salisbury	50	30	107	116	125	129	0.348	0.076	
Sandisfield	50[3]/1410	40	105	114	122	127	0.162	0.054	
Sandwich	30	25	119	129	137	142	0.176	0.051	
Saugus	40	30	109	119	128	132	0.298	0.069	
Savoy[2]	60[3]/1883	40	104	112	120	125	0.166	0.057	
Scituate	35	30	113	123	131	136	0.229	0.060	
Seekonk	35	30	115	125	134	138	0.201	0.056	
Sharon	35	35	112	122	130	135	0.222	0.059	
Sheffield[2]	40	40	104	113	120	125	0.164	0.054	
Shelburne	50	40	104	112	120	125	0.171	0.058	
Sherborn	40	35	109	120	128	133	0.236	0.062	
Shirley	60	35	107	116	125	129	0.307	0.071	

	SNOW LOADS		BASIC WIND SPEED, V[4] (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Shrewsbury	50	35	108	118	127	131	0.222	0.061	
Shutesbury	40	35	105	114	122	127	0.180	0.058	
Somerset	30	30	117	127	136	140	0.200	0.055	
Somerville	40	30	109	119	128	133	0.277	0.066	
South Hadley	35	35	106	114	123	128	0.167	0.056	
Southampton	40	35	105	114	123	128	0.164	0.055	
Southborough	40	35	109	119	128	132	0.237	0.062	
Southbridge	40	35	109	118	127	132	0.182	0.056	
Southwick	40	35	106	115	124	128	0.166	0.055	
Spencer	50	35	108	117	126	130	0.193	0.058	
Springfield	35	35	106	115	124	129	0.168	0.055	
Sterling	50	35	107	116	125	129	0.255	0.065	
Stockbridge[2]	50	40	104	112	120	125	0.164	0.055	
Stoneham	40	30	109	119	127	132	0.306	0.070	
Stoughton	35	35	112	122	131	136	0.225	0.059	
Stow	50	35	108	117	126	130	0.280	0.067	
Sturbridge	40	35	108	118	127	131	0.181	0.056	
Sudbury	40	35	109	118	127	131	0.268	0.066	
Sunderland	40	35	105	113	122	127	0.172	0.057	
Sutton	50	35	109	119	128	133	0.199	0.058	
Swampscott	40	30	109	119	128	133	0.295	0.068	
Swansea	30	30	117	127	135	139	0.200	0.055	
Taunton	35	30	115	125	134	138	0.206	0.056	
Templeton	60[3]/1003	35	106	114	123	128	0.233	0.064	
Tewksbury	50	30	108	117	126	130	0.348	0.075	
Tisbury	25	25	124	133	142	146	0.160	0.048	
Tolland	50	40	105	114	123	127	0.163	0.054	
Topsfield	50	30	108	118	126	131	0.339	0.074	
Townsend	60	35	106	115	124	128	0.355	0.076	
Truro	25	25	119	128	136	141	0.167	0.051	
Tyngsborough	50	30	107	116	124	129	0.375	0.078	
Tyringham[2]	50	40	104	113	120	125	0.162	0.055	
Upton	40	35	109	119	128	133	0.211	0.059	
Uxbridge	40	35	110	120	129	134	0.200	0.059	

	SNOW LOADS		BASIC WIND SPEED, V^4 (mph)				SEISMIC PARAMETERS (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Wakefield	50	30	109	118	127	132	0.311	0.070	
Wales	40	35	108	117	127	131	0.176	0.055	
Walpole	40	35	111	121	130	135	0.225	0.060	
Waltham	40	30	109	119	128	132	0.273	0.066	
Ware	40	35	107	115	125	129	0.179	0.057	
Wareham	30	30	119	129	137	142	0.188	0.053	
Warren	40	35	107	116	125	130	0.180	0.057	
Warwick	60[3]/915	35	105	113	121	126	0.206	0.062	
Washington[2]	60[3]/1751	40	104	112	120	125	0.163	0.056	
Watertown	40	30	109	119	128	133	0.272	0.066	
Wayland	40	35	109	119	128	132	0.261	0.065	
Webster	50	35	109	119	128	133	0.187	0.056	
Wellesley	40	35	109	119	128	133	0.250	0.063	
Wellfleet	25	25	120	129	137	143	0.160	0.050	
Wendell	50[3]/960	35	105	113	122	127	0.186	0.059	
Wenham	50	30	109	118	127	131	0.327	0.072	
W. Boylston	50	35	108	117	126	130	0.230	0.062	
W. Bridgewater	35	30	114	124	132	137	0.213	0.057	
W. Brookfield	40	35	107	116	125	130	0.183	0.057	
W. Newbury	50	30	107	116	125	129	0.362	0.077	
W. Springfield	35	35	106	115	124	129	0.167	0.055	
W. Stockbridge[2]	40	40	104	112	120	125	0.166	0.056	
W. Tisbury	25	25	124	133	142	146	0.160	0.048	
Westborough	50	35	109	118	127	132	0.230	0.062	
Westfield	40	35	106	114	123	128	0.165	0.055	
Westford	50	35	107	116	125	129	0.338	0.074	
Westhampton	50	40	105	114	122	127	0.164	0.056	
Westminster	60[3]/1007	35	106	115	124	128	0.262	0.067	
Weston	40	35	109	119	128	132	0.269	0.066	
Westport	30	30	119	128	137	141	0.195	0.053	
Westwood	40	35	110	121	129	134	0.238	0.062	
Weymouth	35	30	112	122	130	135	0.236	0.061	
Whately	50	35	105	113	121	127	0.169	0.057	
Whitman	35	30	114	124	132	137	0.219	0.058	

	SNOW LOADS		BASIC WIND SPEED, V^4 (mph)				SEISMIC PARAMETER S (g)		PEAK GROUND ACCELE-RATION
City/Town	Ground Snow Load, P_g (psf) / Mean Elevation (feet)	Minimum Flat Roof Snow Load, P_f[1] (psf)	Risk Category I	Risk Category II	Risk Category III	Risk Category IV	S_s	S_1	P_{ga}
Wilbraham	35	35	107	115	125	129	0.170	0.055	
Williamsburg	50	40	105	113	121	127	0.165	0.056	
Williamstown[2]	50	40	103	111	119	124	0.173	0.059	
Wilmington	50	30	108	118	126	131	0.327	0.072	
Winchendon	60	35	105	113	122	127	0.269	0.068	
Winchester	40	30	109	119	127	132	0.296	0.069	
Windsor[2]	60[3]/1857	40	104	112	120	125	0.165	0.057	
Winthrop	40	30	110	120	129	133	0.274	0.066	
Woburn	50	30	109	118	127	132	0.305	0.070	
Worcester	50	35	108	117	127	131	0.210	0.060	
Worthington	60[3]/1386	40	104	113	120	126	0.163	0.056	
Wrentham	40	35	112	122	130	135	0.213	0.058	
Yarmouth	30	25	123	131	139	145	0.152	0.048	

NOTES:
1. The design flat roof snow load shall be the larger of the calculated flat roof snow load using P_g or the value of P_f listed in this table.
2. Special Wind Region. Local conditions may cause higher wind speeds than the tabulated values. See ASCE/SEI 7.
3. Increase P_g listed by 0.021 x (Site Elevation - Mean Elevation) when the Site Elevation exceeds the Mean Elevation.
4. Commentary: The basic wind speed, V, is equivalent to the formally defined ultimate wind speed, V_{ult}, in 780 CMR. V_{asd} refers to allowable stress wind speeds.

1605.1 Add the following lines before Exceptions

For allowable stress design of structural steel in buildings and other structures, allowable stress design load combinations from ASCE 7, Section 2.4 that include the effects of wind or earthquake loads shall not be used. Instead two-thirds (2/3) of strength design load combinations from ASCE 7, Section 2.3 that include the effects of wind or earthquake loads shall be used

1605.2 Delete subsection.

1607.12.2 Delete subsection.

1608.2 Revise section as follows:

1608.2 Ground Snow Loads. The ground snow loads to be used in determining the design snow loads for roofs shall be determined in accordance with Table 1604.11.

FIGURE 1608.5.1

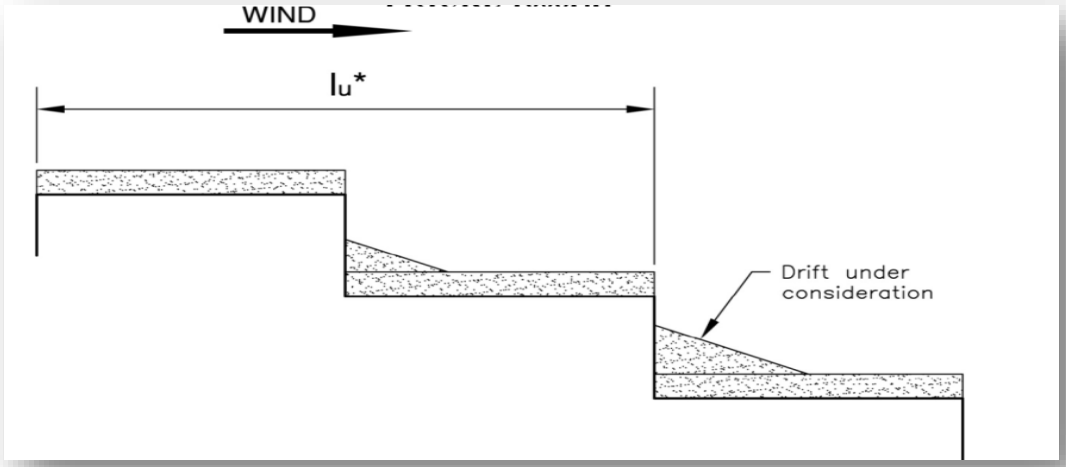
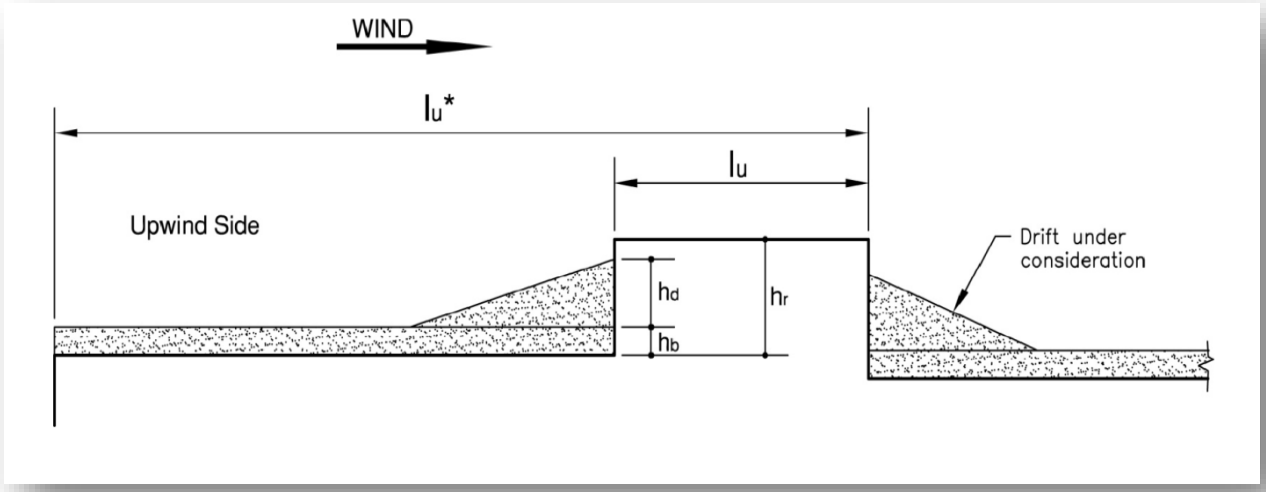


FIGURE 1608.5.2



1608.4 through 1608.11 Add sections as follows:

1608.4 Curved Roofs. Section 7.4.3 of ASCE 7 applies to curved roofs only. The effective loaded area of a curved roof shall be that area of the surface of the roof where the tangents to the surface have a slope of 50º or less. The total

uniform snow load for curved roofs shall be Pf multiplied by the total horizontal projected area of the roof. This total load shall be applied uniformly over the effective loaded area of the roof.

1608.5 Drifts on Multiple Level Roofs. For multiple stepped roofs similar to that shown in Figure 1608.5.1, the sum of all the roof lengths upwind above the drift under consideration, l_u*, in Figure 1608.5.1, shall replace l_u in Figure 7.7-2 of ASCE 7. For multiple level roofs similar to that shown in Figure 1608.5.2, if the total calculated height of a drift and the underlying uniform snow layer on the upwind side of a higher roof ($h_d + h_b$) is equal to or greater than $0.7(h_b + h_c)$, then the length, l_u*, as shown in Figure 1608.5.2, shall be used in place of l_u in Figure 7.7-2 of ASCE 7.

1608.6 Very High Roof Separations. When the ratio h_r/L_T is greater than 1.0, where L_T is the dimension in feet of the upper roof perpendicular to the wind flow (perpendicular to l_u in Figure7.7-2 of ASCE 7) and $h_r = h_b + h_c$, the drift surcharge load on the lower roof due to drifting of snow from the upper roof may be reduced. The reduced height of the drift surcharge, h_{dr}, shall be not less than: $h_{dr} = h_r (2 - h_r/L_T)$, except that when h_r/L_T is greater than 2.0, hdr shall be equal to zero.

1608.9 Sliding Snow. In addition to the sliding snow load on a lower roof as required in section 7.9 of ASCE 7, the lower roof shall be designed for a windward drift surcharge at the wall separating the upper and lower roofs in accordance with Figure 1608.5.1 and Figure 7.7-2 of ASCE 7. The sliding snow load and the windward drift surcharge need not be considered to act concurrently.

1609.3 Replace the first paragraph with the following: 1609.3 Basic Wind Speed. The basic wind speed, V in mph, shall be determined in accordance with Table 1604.11. The basic wind speed, V, for the special wind regions indicated near mountainous terrain and near gorges shall be in accordance with the local jurisdiction requirements. The basic wind speeds, V, determined by the local authority having jurisdiction shall be in accordance with Chapter 26 of ASCE 7.

1610 Replace section as follows:

SECTION 1610 LATERAL SOIL AND HYDROSTATIC LOADS 1610.1 General. Basement, foundation, and retaining walls shall be designed to resist lateral loads due to soil and water pressure. Lateral soil pressure on said walls shall be determined in accordance with the principles of soil mechanics and as provided in 780 CMR 18.00. Floors or similar elements below the water table shall be designed to resist the upward pressure of the water.

EXCEPTION: Uninhabitable spaces with concrete floors on the ground with an under-slab drainage system, including sump pits and sump pumps, designed to keep the water level a minimum of one foot below the bottom of the floor slab need not be designed to resist water pressure.

1610.2 Seismic Loads on Foundation Walls and Retaining Walls. Exterior foundation walls and retaining walls shall be designed to resist an allowable earthquake force, F_w, for horizontal backfill surface, equal to:

$$F_w = 0.1(S_S)(F_a)(\gamma_t)(H)^2$$

where S_S is the maximum considered earthquake spectral response acceleration from Table 1604.11, F_a is the site coefficient from Table 1613.3.3(1), γ_t is the total unit weight of the soil, and H is the height of the wall measured as the difference in elevation of finished ground surface or floor in front of and behind the wall. The resultant allowable earthquake force from the backfill shall be distributed as an inverted triangle over the height of the wall.

Surcharges that are applied over extended periods of time shall be included in the total static lateral soil pressure and their earthquake lateral force shall be computed and added to the force determined above. The point of application of the earthquake force from extended duration surcharge shall be determined on an individual case basis.

If the backfill or the existing soil behind the backfill consists of loose saturated granular soil, the potential for liquefaction of the backfill or existing soil adjacent to the wall during seismic loading shall be evaluated in accordance with the requirements of section 1806.4.
If the backfill or existing soil beyond the backfill is potentially subject to liquefaction, the increase in design lateral load on the foundation wall or retaining wall shall be determined by a registered design professional.

For wall strength design, a load factor of 1.43 shall be applied to the allowable earthquake force calculated above

1612.1 Revise section as follows:

1612.1 General. Within flood hazard areas as established in section 1612.3, all new construction of buildings, structures and portions of buildings and structures, including substantial improvement and restoration of substantial damage to buildings and structures, and substantial repair of a foundation shall be designed and constructed to resist the effects of flood hazards and flood loads. For buildings that are located in more than one flood hazard area, the provisions associated with the most restrictive flood hazard area shall apply.

Replace subsection 1612.2 with the following:

1612.2 Design and construction.
The design and construction of buildings and structures located in flood hazard areas, including coastal high hazard areas and coastal A zones, shall be in accordance with Chapter 5 of ASCE 7 and ASCE 24–. For minimum elevation requirements for lowest floor, bottom of lowest horizontal structural member, utilities, flood-resistant materials and wet and dry flood-proofing refer to tables in ASCE 24 which are to be amended as shown below. The design and construction of buildings and structures located in coastal dunes shall be in accordance with Appendix G.
Exceptions: Existing non-residential structures and non-residential portions of existing mixed use structures in Coastal A Zones shall be allowed to meet the A Zone requirements.

1612.3 Revise section as follows:

1612.3 Establishment of Flood Hazard Areas. See 780 CMR 2.00 for definition of flood hazard areas.

1612.4 Revise subsection 1.3 as follows:

1.3. For dry floodproofed nonresidential buildings, construction documents shall include a statement that the dry floodproofing is designed in accordance with ASCE 24 and shall include the flood emergency plan specified in Chapter 6 of ASCE 24 and certified as-built level of protection.

ASCE 24 Tables for flood-resistant materials and dry and wet-floodproofing - REVISED

		Flood Design Class 1	Flood Design Class 2	Flood Design Class 3	Flood Design Class 4
Minimum Elevation of Lowest Floor (A Zone)	All A Zones not Identified as Coastal A Zones	BFE +2 ft	BFE +2 ft	BFE +2 ft	BFE + 3 ft

Minimum Elevation of Lowest Horizontal Structural Member	All V Zones and Coastal A Zones	BFE + 3 ft	BFE + 3 ft	BFE + 3 ft	BFE + 3 ft
Minimum Elevation Below Which Flood-Damage-Resistant Materials Shall be Used	All A Zones not Identified as Coastal A Zones	BFE +2 ft	BFE +2 ft	BFE +2 ft	BFE + 3 ft
-	All V Zones and Coastal A Zones	BFE + 3 ft	BFE + 3 ft	BFE + 3 ft	BFE + 3 ft
Minimum Elevation** of Utilities and Equipment	All A Zones not Identified as Coastal A Zones	BFE +2 ft	BFE +2 ft	BFE +2 ft	BFE + 3 ft
	All V Zones and Coastal A Zones	BFE + 3 ft	BFE + 3 ft	BFE + 3 ft	BFE + 3 ft
Minimum Elevation of Dry Flood-proofing of non-residential structures and non-residential portions of mixed used buildings	All A Zones not Identified as Coastal A Zones	BFE +2 ft	BFE +2 ft	BFE +2 ft	BFE + 3 ft
	All V Zones and Coastal A Zones	Not Permitted	Not Permitted	Not Permitted	Not Permitted
Minimum Elevation of Wet Floodproofing***	All A Zones not Identified as Coastal A Zones	BFE +2 ft	BFE +2 ft	BFE +2 ft	BFE +3 ft
	Zone V	Not Permitted	Not Permitted	Not Permitted	Not Permitted
*Flood design class 1 structures shall be allowed below the minimum elevation if the structure meets the wet floodproofing requirements of ASCE 24-14 section 6.3.					
**Unless otherwise permitted by ASCE 24-14 Chapter 7, except in V zones where protection of utilities and equipment below the indicated elevation is not accepted.					
***Only if permitted by ASCE 24-14 section 6.3.1.					

1613.1 Revise section as follows: 1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7, excluding Chapter 14 and Appendix 11A, but including Massachusetts Amendments to Tables 12.2-1 and 12.14-1. The seismic design category

for a structure is permitted to be determined in accordance with section 1613 or ASCE 7, but seismic design category A shall not be used in the Commonwealth. Any structure that could satisfy the requirements of seismic design category A in section 1613 or ASCE 7 shall be assigned to seismic design category B for purposes of implementing 780 CMR.

1613.1 Revise section as follows and add the following commentary to the end of section: 1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with Chapters 11, 12, 13, 15, 17 and 18 of ASCE 7, as applicable, including Massachusetts Amendments. The seismic design category for a structure is permitted to be determined in accordance with section 1613 or ASCE 7. Any structure that could satisfy the requirements of seismic design category A in section 1613 or ASCE 7 shall be assigned to seismic design category B for purposes of implementing 780 CMR.

Commentary on Provisions. Section 1613 presents criteria for the design and construction of buildings and nonbuilding structures subject to earthquake ground motion. The specified earthquake loads rely on post-elastic energy dissipation in the structure, and because of this fact, the provisions for design, detailing and construction shall be satisfied even for structures and members for which load combinations containing earthquake load produce lesser effects than other load combinations.

The purpose of section 1613 is to minimize the hazard to life of occupants of all buildings and nonbuilding structures, to increase the expected performance of high occupancy assembly and education buildings as compared to ordinary buildings, and to improve the capability of essential facilities to function during and after an earthquake. Because of the complexity of and the great number of variables involved in seismic design (e.g. variability in ground motion, soil types, dynamic characteristics of the structure, material strength properties, and construction practice), section 1613 presents only minimum criteria in general terms. These minimum criteria are considered to be prudent and economically justified for the protection of life safety in buildings subject to earthquakes and for improved capability of essential facilities to function immediately following an earthquake.

Absolute safety and prevention of damage, even in an earthquake event with a reasonable probability of occurrence, cannot be achieved economically in most buildings. The “design earthquake” ground motion specified in section 1613 may result in both structural and nonstructural damage. For most buildings designed and constructed according to the minimum requirements of section 1613, it is expected that structural damage from a major earthquake may be repairable, but the repair may not be economically feasible. For ground motions larger than the design earthquake, the intent of section 1613 is that there will be a low likelihood of building collapse.

1613.2.1 Revise subsection as follows: 1613.2.1

Mapped Acceleration Parameters. The parameters S_S and S_1 shall be determined from Table 1604.11.

NOTE: The following amendments pertain to **ASCE 7. ASCE 7, TABLE 12.2-1**.

Revise as follows:

Note p. Replace “ordinary moment frame” with “ordinary steel moment frame.”

Limitations: Amend as follows:

Seismic Force-Resisting System	Seismic Design Category
A.3	B is NP
A.4	B is NP
A.9	B and C are NP

A.10	B is NP
A.11	B is NP
A.13	B and C are NP
A.14	B is NP
A.17	B and C are limited to 35 ft. and note 1.
B.6	B is NP
B.7	B is NP
B.18	B and C are NP
B.19	B is NP
B.20	B is NP
B.24	B and C are limited to 35 ft. and note 1.
C.7	B is NP
E.3	B and C are NP
F	B is NP
H	B and C are limited to 100 ft. and 65 ft., respectively and note 2

NOTE 1: Permitted only at exterior walls and firerated walls and not permitted for buildings in Risk Category IV and not permitted for buildings where the seismic weight of any laterally supported level (floor or roof) exceeds 25 psf.

NOTE 2: Connections, including connections to foundations, shall be designed for two times the computed forces and moments resulting from seismic loads, in combination with other loads, as applicable, but need not be designed for forces greater than the expected nominal yield strength ($R_yF_yA_g$) of diagonal braces in braced frames or 1.1 times the expected flexural capacity of beams ($1.1R_yM_p$) in moment frames. Columns that are part of the seismic forceresisting system shall satisfy the requirements of section D1.4a of ANSI/AISC 341 Seismic Provisions for Structural Steel Buildings. K-Braced Frames shall not be permitted. Beams in V-Type and Inverted VType Braced Frames shall meet the following additional requirements:
a. A beam that is intersected by braces shall be continuous between columns.
b. A beam that is intersected by braces shall be designed to support the effects of all tributary dead and live loads from load combinations stipulated by 780 CMR16.00 assuming that braces are not present.
c. Top and bottom flanges of the beam at the point of intersection of braces shall be designed to support a horizontal force perpendicular to the longitudinal axis of the beam that is equal to two percent of the nominal beam flange strength: F_yb_{ftbf}.

ASCE 7, TABLE 12.14-1 Revise as follows: Limitations: Amend as follows:

Seismic Force-Resisting System	**Seismic Design Category**

A.3	B is NP
A.4	B is NP
A.9	B is NP
A.10	B is NP
A.11	B is NP
A.15	See note 1.
B.6	B is NP
B.7	B is NP
B.18	B is NP
B.19	B is NP
B.20	B is NP
B.24	See note 1.

NOTE 1: Permitted only at exterior walls and fire-rated walls and not permitted for buildings in Risk Category IV and not permitted for buildings where the seismic weight of any laterally supported level (floor or roof) exceeds 25 psf.