

# **MMAH Supplementary Standard SB-1**

## **Climatic and Seismic Data**

**September 2, 2014 update**

**COMMENCEMENT**

MMAH Supplementary Standard SB-1 comes into force on the 1st day of January, 2014.

r<sub>5</sub> SB-1 as amended by Ontario Regulation 191/14 comes into force on the 1st day of January, 2015.

**EDITORIAL**

e<sub>2</sub> Editorial correction issued for January 1st, 2014.

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# SB-1 Climatic and Seismic Data

## Introduction

The great diversity of climate in Ontario has a considerable effect on the performance of buildings; consequently, building design must reflect this diversity. This Supplementary Standard briefly describes how climatic design values are computed and provides recommended design data for a number of cities, towns, and lesser populated locations. Through the use of such data, appropriate allowances can be made for climate variations in different localities of Ontario and the 2012 Building Code can be applied provincially.

The climatic design data provided in this Supplementary Standard are based on weather observations collected by the Atmospheric Environment Service, Environment Canada. The climatic design data have been researched and analyzed for the Canadian Commission on Building and Fire Codes by Environment Canada, and appear at the end of this Supplementary Standard in Table 1.2, Design Data for Selected Locations in Ontario.

As it is not practical to list values for all municipalities in Ontario, recommended climatic design values for locations not listed can be obtained by contacting the Atmospheric Environment Service, Environment Canada, 4905 Dufferin Street, Downsview, Ontario M3H 5T4, (416) 739-4365. It should be noted, however, that these recommended values may differ from the values accepted by municipal building authorities based on local experience.

The information on seismic hazard in spectral format has been provided by the Geological Survey of Canada of Natural Resources Canada. Information for municipalities not listed may be obtained through the Natural Resources Canada Web site at [www.EarthquakesCanada.ca](http://www.EarthquakesCanada.ca), or by writing to the Geological Survey of Canada at 7 Observatory Crescent, Ottawa, Ontario K1A 0Y3, or at P.O. Box 6000, Sidney, B.C. V8L 4B2.

## General

The choice of climatic elements tabulated in this Supplementary Standard and the form in which they are expressed have been dictated largely by the requirements for specific values in several sections of the 2012 Building Code. These elements include the Ground Snow Loads, Wind Pressures, Design Temperatures, Heating Degree-Days, One-Day and 15-Minute Rainfalls, the Annual Total Precipitation values and Seismic Data. The following notes briefly explain the significance of these particular elements in building design, and indicate which weather observations were used and how they were analyzed to yield the required design values.

In Table 1.2, Design Data for Selected Locations in Ontario, design weather recommendations are listed for over 230 locations, which have been chosen based on a variety of reasons. Many incorporated cities and towns with significant populations are included unless located close to larger cities. For sparsely populated areas, many smaller towns and villages are listed. Other locations have been added to the list when the demand for climatic design recommendations at these sites has been significant. The named locations refer to the specific latitude and longitude defined by the Gazetteer of Canada (Natural Resources Canada), available from Publishing and Depository Services Canada, Public Works and Government Services Canada, Ottawa, Ontario K1A 0S5.

Almost all of the weather observations used in preparing Table 1.2 were, of necessity, observed at inhabited locations. To estimate design values for arbitrary locations, the observed or computed values for the weather stations were mapped and interpolated appropriately. Where possible, adjustments have been applied for the influence of elevation and known topographical effects. Such influences include the tendency of cold air to collect in depressions, for precipitation to increase with elevation, and for generally stronger winds near large bodies of water. Elevations have been added to the Table because of their potential to significantly influence climatic design values.

Since interpolation from the values in Table 1.2 to other locations may not be valid due to local and other effects, Environment Canada will provide climatic design element recommendations for locations not listed in Table 1.2. Local effects are particularly significant in mountainous areas, where the values apply only to populated valleys and not to the mountain slopes and high passes, where very different conditions are known to exist.

## Changing and Variable Climates

Climate is not static. At any location, weather and climatic conditions vary from season to season, year to year, and over longer time periods (climate cycles). This has always been the case. Evidence is mounting that the climates of Ontario are changing and will continue to change significantly in the future. When estimating climatic design loads, this variability can be considered using appropriate statistical analysis, data records spanning sufficient periods, and meteorological judgement. The analysis generally assumes that the past climate will be representative of the future climate.

Past and ongoing modifications to atmospheric chemistry (from greenhouse gas emissions and land use changes) are expected to alter most climatic regimes in the future despite the success of the most ambitious greenhouse gas mitigation plans.<sup>(10)</sup> Some regions could see an increase in the frequency and intensity of many weather extremes, which will accelerate weathering processes. Consequently, many buildings will need to be designed, maintained and operated to adequately withstand ever changing climatic loads.

Similar to global trends, the last decade in Canada was noted as the warmest in instrumented record. Canada has warmed, on average, at almost twice the rate of the global average increase, while the western Arctic is warming at a rate that is unprecedented over the past 400 years.<sup>(10)</sup> Mounting evidence from Arctic communities indicates that rapid changes to climate in the North have resulted in melting permafrost and impacts from other climate changes have affected nearly every type of built structure. Furthermore, analyses of Canadian precipitation data shows that many regions of the country have, on average, also been tending towards wetter conditions.<sup>(10)</sup> In the United States, where the density of climate monitoring stations is greater, a number of studies have found an unambiguous upward trend in the frequency of heavy to extreme precipitation events, with these increases coincident with a general upward trend in the total amount of precipitation. Climate change model results, based on an ensemble of global climate models worldwide, project that future climate warming rates will be greatest in higher latitude countries such as Canada.<sup>(11)</sup>

## January Design Temperatures

A building and its heating system should be designed to maintain the inside temperature at some pre-determined level. To achieve this, it is necessary to know the most severe weather conditions under which the system will be expected to function satisfactorily. Failure to maintain the inside temperature at the pre-determined level will not usually be serious if the temperature drop is not great and if the duration is not long. The outside conditions used for design should, therefore, not be the most severe in many years, but should be the somewhat less severe conditions that are occasionally but not greatly exceeded.

The January design temperatures are based on an analysis of January air temperatures only. Wind and solar radiation also affect the inside temperature of most buildings and may need to be considered for energy-efficient design.

The January design temperature is defined as the lowest temperature at or below which only a certain small percentage of the hourly outside air temperatures in January occur. In the past, stations with records from all or part of the period

1951-66 formed the basis for calculation of the 2.5 and 1% January temperatures. Where necessary, the data were adjusted for consistency. Since most of the temperatures were observed at airports, design values for the core areas of large cities could be 1 or 2°C milder, although the values for the fringe areas are probably about the same as for the airports. No adjustments were made for this urban heat island effect. The design values for the next 20 to 30 years will probably differ from these tabulated values due to year-to-year climate variability and global climate change resulting from the impact of human on atmospheric chemistry.

The design temperatures were reviewed and updated using hourly temperature observations from stations for a 25-year period up to 2006 with at least 8 years of complete data. These data are consistent with data shown for Canadian locations in the 2009 Handbook of Fundamentals<sup>(12)</sup> published by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE). The most recent 25 years of record were used to provide a balance between accounting for trends in the climate and the sampling variation owing to year-to-year variation. The 1% and 2.5% values used for the design conditions represent percentiles of the cumulative frequency distribution of hourly temperatures and correspond to January temperatures that are colder for 8 and 19 hours, respectively, on average over the long term.

Table 1.2  
Design Data for Selected Locations in Ontario

Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								S <sub>a</sub>	S <sub>r</sub>	1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
Ailsa Craig	230	-17	-19	30	23	3840	25	103	800	950	180	2.2	0.4	0.39	0.50	0.130	0.082	0.052	0.016	0.045
Ajax	95	-20	-22	30	23	3820	23	92	760	825	160	1.0	0.4	0.37	0.48	0.180	0.120	0.070	0.022	0.074
Alexandria	80	-24	-26	30	23	4600	25	103	800	975	160	2.4	0.4	0.31	0.40	0.640	0.310	0.140	0.047	0.320
Alliston	220	-23	-25	29	23	4200	28	113	690	875	120	2.0	0.4	0.28	0.36	0.150	0.099	0.062	0.020	0.046
Almonte	120	-26	-28	30	23	4620	25	97	730	800	140	2.5	0.4	0.32	0.41	0.550	0.270	0.130	0.042	0.280
Armstrong	340	-37	-40	28	21	6500	23	97	525	725	100	2.7	0.4	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Arnprior	85	-27	-29	30	23	4680	23	86	630	775	140	2.5	0.4	0.29	0.37	0.610	0.290	0.130	0.044	0.310
Atikokan	400	-33	-35	29	22	5750	25	103	570	760	100	2.4	0.3	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Attawapiskat	10	-37	-39	28	21	7100	18	81	450	650	160	2.8	0.3	0.32	0.41	0.110	0.057	0.026	0.008	0.053
Aurora	270	-21	-23	30	23	4210	28	108	700	800	140	2.0	0.4	0.34	0.44	0.160	0.110	0.065	0.021	0.053
Bancroft	365	-28	-31	29	23	4740	25	92	720	900	100	3.1	0.4	0.25	0.32	0.260	0.170	0.089	0.030	0.089
Barrie	245	-24	-26	29	23	4380	28	97	700	900	120	2.5	0.4	0.28	0.36	0.150	0.110	0.065	0.021	0.044
Barriefield	100	-22	-24	28	23	3390	23	108	780	950	120	2.1	0.4	0.36	0.47	0.300	0.180	0.099	0.031	0.120
Beaverton	240	-24	-26	30	23	4300	25	108	720	950	120	2.2	0.4	0.28	0.36	0.160	0.120	0.070	0.023	0.047
Belleville	90	-22	-24	29	23	3910	23	97	760	850	180	1.7	0.4	0.33	0.43	0.250	0.160	0.088	0.028	0.100
Belmont	260	-17	-19	30	24	3840	25	97	850	950	180	1.7	0.4	0.36	0.47	0.160	0.097	0.056	0.017	0.086
Big Trout Lake (Kitchenuhmaykoosib)	215	-38	-40	26	20	7450	18	92	400	600	150	3.2	0.2	0.33	0.42	0.095	0.057	0.026	0.008	0.036
CFB Borden	225	-23	-25	29	23	4300	28	103	690	875	120	2.2	0.4	0.28	0.36	0.140	0.100	0.063	0.020	0.045
Bracebridge	310	-26	-28	29	23	4800	25	103	830	1050	120	3.1	0.4	0.27	0.35	0.180	0.120	0.072	0.024	0.056
Bradford	240	-23	-25	30	23	4280	28	108	680	800	120	2.1	0.4	0.28	0.36	0.150	0.100	0.065	0.021	0.049
Brampton	215	-19	-21	30	23	4100	28	119	720	820	140	1.3	0.4	0.34	0.44	0.210	0.120	0.063	0.020	0.110
Brantford	205	-18	-20	30	23	3900	23	103	780	850	160	1.3	0.4	0.33	0.42	0.190	0.110	0.061	0.019	0.089
Brighton	95	-21	-23	29	23	4000	23	94	760	850	160	1.6	0.4	0.37	0.48	0.240	0.150	0.083	0.027	0.099
Brockville	85	-23	-25	29	23	4060	25	103	770	975	180	2.2	0.4	0.34	0.44	0.350	0.220	0.120	0.036	0.150
Burk's Falls	305	-26	-28	29	22	5020	25	97	810	1010	120	2.7	0.4	0.27	0.35	0.210	0.140	0.075	0.026	0.074
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Table 1.2 (Cont'd)  
Design Data for Selected Locations in Ontario

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Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA		
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
		S <sub>s</sub>	S <sub>r</sub>																	
Burlington	80	-17	-19	31	23	3740	23	103	770	850	160	0.9	0.4	0.36	0.46	0.320	0.170	0.064	0.022	0.180
Cambridge	295	-18	-20	29	23	4100	25	113	800	890	160	1.6	0.4	0.28	0.36	0.180	0.100	0.060	0.019	0.073
Campbellford	150	-23	-26	30	23	4280	25	97	730	850	160	1.7	0.4	0.32	0.41	0.230	0.150	0.085	0.027	0.084
Cannington	255	-24	-26	30	23	4310	25	108	740	950	120	2.2	0.4	0.28	0.36	0.170	0.120	0.070	0.023	0.048
Carleton Place	135	-25	-27	30	23	4600	25	97	730	850	160	2.5	0.4	0.32	0.41	0.490	0.250	0.120	0.039	0.230
Cavan	200	-23	-25	30	23	4400	25	97	740	850	140	2.0	0.4	0.34	0.44	0.190	0.130	0.076	0.024	0.061
Centralia	260	-17	-19	30	23	3800	25	103	820	1000	180	2.3	0.4	0.38	0.49	0.130	0.080	0.052	0.016	0.041
Chapleau	425	-35	-38	27	21	5900	20	97	530	850	80	4.0	0.4	0.23	0.30	0.095	0.057	0.037	0.013	0.036
Chatham	180	-16	-18	31	24	3470	28	103	800	850	180	1.0	0.4	0.33	0.43	0.160	0.092	0.050	0.015	0.088
Chesley	275	-19	-21	29	22	4320	28	103	810	1125	140	2.8	0.4	0.37	0.48	0.120	0.082	0.053	0.018	0.037
Clinton	280	-17	-19	29	23	4150	25	103	810	1000	160	2.6	0.4	0.38	0.49	0.120	0.078	0.050	0.016	0.038
Coboconk	270	-25	-27	30	23	4500	25	108	740	950	120	2.5	0.4	0.27	0.35	0.180	0.130	0.074	0.025	0.055
Cobourg	90	-21	-23	29	23	3980	23	94	760	825	160	1.2	0.4	0.38	0.49	0.220	0.140	0.079	0.025	0.096
Cochrane	245	-34	-36	29	21	6200	20	92	575	875	80	2.8	0.3	0.27	0.35	0.180	0.098	0.054	0.018	0.094
Colborne	105	-21	-23	29	23	3980	23	94	760	850	160	1.6	0.4	0.38	0.49	0.230	0.140	0.081	0.026	0.098
Collingwood	190	-21	-23	29	23	4180	28	97	720	950	160	2.7	0.4	0.30	0.39	0.130	0.097	0.060	0.020	0.040
Cornwall	35	-23	-25	30	23	4250	25	103	780	960	180	2.2	0.4	0.32	0.41	0.620	0.310	0.140	0.046	0.310
Corunna	185	-16	-18	31	24	3600	25	100	760	800	180	1.0	0.4	0.36	0.47	0.120	0.074	0.047	0.015	0.040
Deep River	145	-29	-32	30	22	4900	23	92	650	850	100	2.5	0.4	0.27	0.35	0.630	0.300	0.130	0.043	0.320
Deseronto	85	-22	-24	29	23	4070	23	92	760	900	160	1.9	0.4	0.33	0.43	0.270	0.170	0.092	0.029	0.110
Dorchester	260	-18	-20	30	24	3900	28	103	850	950	180	1.9	0.4	0.36	0.47	0.160	0.096	0.056	0.017	0.081
Dorion	200	-33	-35	28	21	5950	20	103	550	725	160	2.8	0.4	0.30	0.39	0.095	0.057	0.026	0.008	0.036
Dresden	185	-16	-18	31	24	3750	28	97	760	820	180	1.0	0.4	0.33	0.43	0.150	0.088	0.050	0.015	0.078
Dryden	370	-34	-36	28	22	5850	25	97	550	700	120	2.4	0.3	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Dundalk	525	-22	-24	29	22	4700	28	108	750	1080	150	3.4	0.4	0.33	0.42	0.130	0.091	0.058	0.019	0.043
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

**Table 1.2 (Cont'd)**  
**Design Data for Selected Locations in Ontario**

Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA		
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
		S <sub>s</sub>	S <sub>t</sub>																	
Dunnville	175	-15	-17	30	24	3660	23	108	830	950	160	2.0	0.4	0.36	0.46	0.310	0.160	0.063	0.021	0.170
Durham	340	-20	-22	29	22	4340	28	103	815	1025	140	2.8	0.4	0.34	0.44	0.120	0.085	0.055	0.018	0.040
Dutton	225	-16	-18	31	24	3700	28	92	850	925	180	1.3	0.4	0.36	0.47	0.160	0.096	0.054	0.017	0.087
Earlton	245	-33	-36	29	22	5730	23	92	560	820	120	2.6	0.4	0.35	0.45	0.240	0.140	0.075	0.024	0.110
Edison	365	-34	-36	28	22	5740	25	108	510	680	120	2.4	0.3	0.24	0.31	0.095	0.057	0.026	0.008	0.036
Elliot Lake	380	-26	-28	29	21	4950	23	108	630	950	160	2.9	0.4	0.29	0.38	0.095	0.065	0.043	0.015	0.036
Elmvale	220	-24	-26	29	23	4200	28	97	720	950	140	2.6	0.4	0.28	0.36	0.140	0.100	0.064	0.021	0.040
Embro	310	-19	-21	30	23	3950	28	113	830	950	160	2.0	0.4	0.37	0.48	0.150	0.094	0.056	0.018	0.072
Englehart	205	-33	-36	29	22	5800	23	92	600	880	100	2.5	0.4	0.32	0.41	0.230	0.130	0.074	0.024	0.110
Espanola	220	-25	-27	29	21	4920	23	108	650	840	160	2.3	0.4	0.33	0.42	0.100	0.080	0.050	0.018	0.036
Exeter	265	-17	-19	30	23	3900	25	113	810	975	180	2.4	0.4	0.38	0.49	0.130	0.080	0.051	0.016	0.040
Fenelon Falls	260	-25	-27	30	23	4440	25	108	730	950	120	2.3	0.4	0.28	0.36	0.180	0.130	0.074	0.024	0.054
Fergus	400	-20	-22	29	23	4300	28	108	760	925	160	2.2	0.4	0.28	0.36	0.160	0.095	0.058	0.019	0.052
Forest	215	-16	-18	31	23	3740	25	103	810	875	160	2.0	0.4	0.37	0.48	0.120	0.076	0.049	0.015	0.038
Fort Erie	180	-15	-17	30	24	3650	23	108	860	1020	160	2.6	0.4	0.36	0.46	0.330	0.180	0.067	0.022	0.200
Fort Erie (Ridgeway)	190	-15	-17	30	24	3600	25	108	860	1000	160	2.5	0.4	0.36	0.46	0.330	0.180	0.066	0.022	0.190
Fort Frances	340	-33	-35	29	22	5440	25	108	570	725	120	2.3	0.3	0.24	0.31	0.095	0.057	0.026	0.008	0.036
Gananoque	80	-22	-24	28	23	4010	23	103	760	900	180	2.1	0.4	0.36	0.47	0.300	0.190	0.100	0.032	0.120
Geraldton	345	-36	-39	28	21	6450	20	86	550	725	100	2.9	0.4	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Glencoe	215	-16	-18	31	24	3680	28	103	800	925	180	1.5	0.4	0.33	0.43	0.160	0.092	0.053	0.016	0.080
Goderich	185	-16	-18	29	23	4000	25	92	810	950	180	2.4	0.4	0.43	0.55	0.110	0.075	0.049	0.016	0.036
Gore Bay	205	-24	-26	28	22	4700	23	92	640	860	160	2.6	0.4	0.34	0.44	0.095	0.067	0.044	0.015	0.036
Graham	495	-35	-37	29	22	5940	23	97	570	750	140	2.6	0.3	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Gravenhurst (Muskoka Airport)	255	-26	-28	29	23	4760	25	103	790	1050	120	2.7	0.4	0.28	0.36	0.170	0.120	0.070	0.024	0.052
Grimsby	85	-16	-18	30	23	3520	23	108	760	875	160	0.9	0.4	0.36	0.46	0.340	0.180	0.068	0.022	0.200
Guelph	340	-19	-21	29	23	4270	28	103	770	875	140	1.9	0.4	0.28	0.36	0.170	0.100	0.059	0.019	0.067
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

**Table 1.2 (Cont'd)**  
**Design Data for Selected Locations in Ontario**

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Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								S <sub>s</sub>	S <sub>r</sub>	1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
Guthrie	280	-24	-26	29	23	4300	28	103	700	950	120	2.5	0.4	0.28	0.36	0.150	0.110	0.066	0.022	0.043
Haileybury	210	-32	-35	30	22	5600	23	92	590	820	120	2.4	0.4	0.34	0.44	0.250	0.150	0.079	0.026	0.120
Haldimand (Caledonia)	190	-18	-20	30	23	3750	23	108	810	875	160	1.2	0.4	0.34	0.44	0.310	0.160	0.063	0.022	0.170
Haldimand (Hagersville)	215	-17	-19	30	23	3760	25	97	840	875	160	1.3	0.4	0.36	0.46	0.250	0.140	0.062	0.019	0.140
Haliburton	335	-27	-29	29	23	4840	25	92	780	980	100	2.9	0.4	0.27	0.35	0.220	0.150	0.081	0.027	0.074
Halton Hills (Georgetown)	255	-19	-21	30	23	4200	28	119	750	850	140	1.4	0.4	0.29	0.37	0.200	0.120	0.062	0.020	0.110
Hamilton																				
Above Escarpment - West of John C. Munro Int'l Airport	240	-17	-19	31	23	3460	23	108	810	875	160	1.5	0.4	0.36	0.46	0.320	0.170	0.064	0.022	0.180
Above Escarpment - East of John C. Munro Int'l Airport	200	-17	-19	31	23	3460	23	108	810	875	160	1.3	0.4	0.36	0.46	0.320	0.170	0.064	0.022	0.180
Below Escarpment - West of Highway 403	90	-17	-19	31	23	3460	23	108	810	875	160	1.1	0.4	0.36	0.46	0.320	0.170	0.064	0.022	0.180
Below Escarpment - East of Highway 403	90	-17	-19	31	23	3460	23	108	810	875	160	1.1	0.4	0.36	0.46	0.320	0.170	0.064	0.022	0.180
Hanover	270	-19	-21	29	22	4300	28	103	790	1050	140	2.6	0.4	0.37	0.48	0.120	0.082	0.053	0.018	0.039
Hastings	200	-24	-26	30	23	4280	25	92	730	840	140	2.0	0.4	0.32	0.41	0.220	0.140	0.083	0.027	0.074
Hawkesbury	50	-25	-27	30	23	4610	23	103	800	925	160	2.3	0.4	0.32	0.41	0.570	0.290	0.130	0.044	0.300
Hearst	245	-35	-37	29	21	6450	20	86	520	825	80	2.8	0.3	0.23	0.30	0.095	0.057	0.033	0.012	0.036
Honey Harbour	180	-24	-26	29	23	4300	25	97	710	1050	160	2.7	0.4	0.30	0.39	0.150	0.110	0.065	0.022	0.044
Hornepayne	360	-37	-40	28	21	6340	20	93	420	750	80	3.6	0.4	0.23	0.30	0.095	0.057	0.027	0.010	0.036
Huntsville	335	-26	-29	29	22	4850	25	103	800	1000	120	2.9	0.4	0.27	0.35	0.200	0.140	0.075	0.026	0.068
Ingersoll	280	-18	-20	30	23	3920	28	108	840	950	180	1.7	0.4	0.37	0.48	0.160	0.097	0.057	0.018	0.082
Iroquois Falls	275	-33	-36	29	21	6100	20	86	575	825	100	2.9	0.3	0.29	0.37	0.190	0.100	0.059	0.020	0.096
Jellicoe	330	-36	-39	28	21	6400	20	86	550	750	100	2.7	0.4	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21



**Table 1.2 (Cont'd)**  
**Design Data for Selected Locations in Ontario**

Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								S <sub>s</sub>	S <sub>r</sub>	1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
Kapuskasing	245	-34	-36	29	21	6250	20	86	550	825	100	2.8	0.3	0.24	0.31	0.110	0.068	0.042	0.014	0.045
Kemptville	90	-25	-27	30	23	4540	25	92	750	925	160	2.3	0.4	0.32	0.41	0.560	0.280	0.130	0.042	0.280
Kenora	370	-33	-35	28	22	5630	25	113	515	630	120	2.3	0.3	0.24	0.31	0.095	0.057	0.026	0.008	0.036
Killaloe	185	-28	-31	30	22	4960	23	86	680	825	120	2.7	0.4	0.27	0.35	0.440	0.230	0.110	0.036	0.210
Kincardine	190	-17	-19	28	22	3890	25	92	800	950	180	2.6	0.4	0.43	0.55	0.110	0.075	0.049	0.016	0.036
Kingston	80	-22	-24	28	23	4000	23	108	780	950	180	2.1	0.4	0.36	0.47	0.290	0.180	0.099	0.031	0.120
Kinmount	295	-26	-28	29	23	4600	25	108	750	950	120	2.7	0.4	0.27	0.35	0.200	0.140	0.077	0.026	0.062
Kirkland Lake	325	-33	-36	29	22	6000	23	92	600	875	100	2.9	0.3	0.30	0.39	0.220	0.120	0.069	0.022	0.100
Kitchener	335	-19	-21	29	23	4200	28	119	780	925	140	2.0	0.4	0.29	0.37	0.160	0.095	0.058	0.018	0.054
Lakefield	240	-24	-26	30	23	4330	25	92	720	850	140	2.2	0.4	0.29	0.38	0.200	0.140	0.079	0.026	0.062
Lansdowne House	240	-38	-40	28	21	7150	23	92	500	680	140	2.9	0.2	0.25	0.32	0.095	0.057	0.026	0.008	0.036
Leamington	190	-15	-17	31	24	3400	28	113	800	875	180	0.8	0.4	0.36	0.47	0.170	0.092	0.047	0.015	0.091
Lindsay	265	-24	-26	30	23	4320	25	103	720	850	140	2.3	0.4	0.29	0.38	0.180	0.120	0.074	0.024	0.053
Lion's Head	185	-19	-21	27	22	4300	25	103	700	950	180	2.7	0.4	0.37	0.48	0.110	0.082	0.053	0.018	0.036
Listowel	380	-19	-21	29	23	4300	28	119	800	1000	160	2.6	0.4	0.36	0.47	0.130	0.085	0.054	0.018	0.043
London	245	-18	-20	30	24	3900	28	103	825	975	180	1.9	0.4	0.36	0.47	0.150	0.093	0.055	0.017	0.076
Lucan	300	-17	-19	30	23	3900	25	113	810	1000	180	2.3	0.4	0.39	0.50	0.130	0.083	0.052	0.017	0.046
Maitland	85	-23	-25	29	23	4080	25	103	770	975	180	2.2	0.4	0.34	0.44	0.370	0.220	0.120	0.036	0.150
Markdale	425	-20	-22	29	22	4500	28	103	820	1050	160	3.4	0.4	0.32	0.41	0.120	0.088	0.056	0.019	0.040
Markham	175	-21	-23	31	24	4000	25	86	720	825	140	1.3	0.4	0.34	0.44	0.180	0.110	0.067	0.022	0.061
Martin	485	-35	-37	29	22	5900	25	103	560	750	120	2.6	0.3	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Matheson	265	-33	-36	29	21	6080	20	86	580	825	100	2.8	0.3	0.30	0.39	0.200	0.110	0.063	0.020	0.098
Mattawa	165	-29	-31	30	22	5050	23	86	700	875	100	2.1	0.4	0.25	0.32	0.460	0.230	0.100	0.035	0.240
Midland	190	-24	-26	29	23	4200	25	97	740	1060	160	2.7	0.4	0.30	0.39	0.150	0.110	0.064	0.022	0.042
Milton	200	-18	-20	30	23	3920	25	125	750	850	160	1.3	0.4	0.33	0.43	0.260	0.140	0.063	0.020	0.140
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

**Table 1.2 (Cont'd)**  
**Design Data for Selected Locations in Ontario**

r<sub>s</sub>

Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								S <sub>s</sub>	S <sub>r</sub>	1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
Milverton	370	-19	-21	29	23	4200	28	108	800	1050	160	2.4	0.4	0.33	0.43	0.140	0.086	0.054	0.018	0.044
Minden	270	-27	-29	29	23	4640	25	97	780	1010	100	2.7	0.4	0.27	0.35	0.200	0.140	0.078	0.026	0.065
Mississauga	160	-18	-20	30	23	3880	25	113	720	800	160	1.1	0.4	0.34	0.44	0.260	0.150	0.065	0.020	0.140
Mississauga (Lester B. Pearson International Airport)	170	-20	-22	31	24	3890	26	108	685	790	160	1.1	0.4	0.34	0.44	0.210	0.120	0.065	0.021	0.120
Mississauga (Port Credit)	75	-18	-20	29	23	3780	25	108	720	800	160	0.9	0.4	0.37	0.48	0.280	0.150	0.065	0.021	0.150
Mitchell	335	-18	-20	29	23	4100	28	113	810	1050	160	2.4	0.4	0.37	0.48	0.130	0.083	0.053	0.017	0.042
Moosonee	10	-36	-38	28	22	6800	18	81	500	700	160	2.2	0.3	0.27	0.35	0.130	0.068	0.040	0.014	0.057
Morrisburg	75	-23	-25	30	23	4370	25	103	800	950	180	2.3	0.4	0.32	0.41	0.600	0.300	0.140	0.044	0.310
Mount Forest	420	-21	-24	28	22	4700	28	103	740	940	140	2.7	0.4	0.32	0.41	0.130	0.087	0.055	0.018	0.043
Nakina	325	-36	-38	28	21	6500	20	86	540	750	100	2.8	0.4	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Nanticoke (Jarvis)	205	-17	-18	30	23	3700	28	108	840	900	160	1.4	0.4	0.37	0.48	0.220	0.120	0.062	0.019	0.120
Nanticoke (Port Dover)	180	-15	-17	30	24	3600	25	108	860	950	140	1.2	0.4	0.37	0.48	0.190	0.110	0.060	0.018	0.093
Napanee	90	-22	-24	29	23	4140	23	92	770	900	160	1.9	0.4	0.33	0.43	0.280	0.170	0.094	0.030	0.110
New Liskeard	180	-32	-35	30	22	5570	23	92	570	810	100	2.3	0.4	0.33	0.43	0.240	0.140	0.078	0.025	0.120
Newcastle	115	-20	-22	30	23	3990	23	86	760	830	160	1.5	0.4	0.37	0.48	0.200	0.130	0.074	0.024	0.081
Newcastle (Bowmanville)	95	-20	-22	30	23	4000	23	86	760	830	160	1.4	0.4	0.37	0.48	0.200	0.130	0.073	0.023	0.078
Newmarket	185	-22	-24	30	23	4260	28	108	700	800	140	2.0	0.4	0.29	0.38	0.160	0.110	0.065	0.021	0.051
Niagara Falls	210	-16	-18	30	23	3600	23	96	810	950	160	2.0	0.4	0.33	0.43	0.340	0.190	0.070	0.023	0.200
North Bay	210	-28	-30	28	22	5150	25	95	775	975	120	2.2	0.4	0.27	0.34	0.250	0.150	0.079	0.027	0.110
Norwood	225	-24	-26	30	23	4320	25	92	720	850	120	2.1	0.4	0.32	0.41	0.210	0.140	0.083	0.027	0.070
Oakville	90	-18	-20	30	23	3760	23	97	750	850	160	0.9	0.4	0.36	0.47	0.320	0.170	0.065	0.022	0.180
Orangeville	430	-21	-23	29	23	4450	28	108	730	875	140	2.3	0.4	0.28	0.36	0.150	0.097	0.060	0.020	0.051
Orillia	230	-25	-27	29	23	4260	25	103	740	1000	120	2.4	0.4	0.28	0.36	0.160	0.110	0.068	0.023	0.046
Oshawa	110	-19	-21	30	23	3860	23	86	760	875	160	1.4	0.4	0.37	0.48	0.190	0.120	0.072	0.023	0.074
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

**Table 1.2 (Cont'd)**  
**Design Data for Selected Locations in Ontario**

Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA		
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
		S <sub>s</sub>	S <sub>r</sub>																	
Ottawa (Metropolitan)																				
Ottawa (City Hall)	70	-25	-27	30	23	4440	23	86	750	900	160	2.4	0.4	0.32	0.41	0.640	0.310	0.140	0.046	0.320
Ottawa (Barrhaven)	98	-25	-27	30	23	4500	25	92	750	900	160	2.4	0.4	0.32	0.41	0.630	0.300	0.140	0.045	0.320
Ottawa (Kanata)	98	-25	-27	30	23	4520	25	92	730	900	160	2.5	0.4	0.32	0.41	0.620	0.300	0.130	0.045	0.320
Ottawa (MacDonald-Cartier Int'l Airport)	125	-25	-27	30	23	4500	24	89	750	900	160	2.4	0.4	0.32	0.41	0.630	0.310	0.140	0.046	0.320
Ottawa (Orleans)	70	-26	-28	30	23	4500	23	91	750	900	160	2.4	0.4	0.32	0.41	0.630	0.310	0.140	0.046	0.320
Owen Sound	215	-19	-21	29	22	4030	28	113	760	1075	160	2.8	0.4	0.37	0.48	0.120	0.085	0.055	0.018	0.036
Pagwa River	185	-35	-37	28	21	6500	20	86	540	825	80	2.4	0.4	0.23	0.30	0.095	0.057	0.026	0.009	0.036
Paris	245	-18	-20	30	23	4000	23	96	790	925	160	1.4	0.4	0.33	0.42	0.018	0.100	0.060	0.019	0.084
Parkhill	205	-16	-18	31	23	3800	25	103	800	925	180	2.1	0.4	0.39	0.50	0.120	0.079	0.051	0.016	0.041
Parry Sound	215	-24	-26	28	22	4640	23	97	820	1050	160	2.8	0.4	0.30	0.39	0.160	0.110	0.065	0.022	0.050
Pelham (Fonthill)	230	-15	-17	30	23	3690	23	96	820	950	160	2.3	0.4	0.33	0.42	0.340	0.190	0.068	0.022	0.200
Pembroke	125	-28	-31	30	23	4980	23	105	640	825	100	2.5	0.4	0.27	0.35	0.630	0.300	0.130	0.044	0.320
Penetanguishene	220	-24	-26	29	23	4200	25	97	720	1050	160	2.8	0.4	0.30	0.39	0.140	0.110	0.064	0.022	0.041
Perth	130	-25	-27	30	23	4540	25	92	730	900	140	2.3	0.4	0.32	0.41	0.360	0.210	0.110	0.036	0.140
Pelawawa	135	-29	-31	30	23	4980	23	92	640	825	100	2.6	0.4	0.27	0.35	0.630	0.300	0.130	0.043	0.320
Peterborough	200	-23	-25	30	23	4400	25	92	710	840	140	2.0	0.4	0.32	0.41	0.190	0.130	0.078	0.025	0.062
Petrolia	195	-16	-18	31	24	3640	25	108	810	920	180	1.3	0.4	0.36	0.47	0.130	0.079	0.049	0.015	0.048
Pickering (Dumbarton)	85	-19	-21	30	23	3800	23	92	730	825	140	1.0	0.4	0.37	0.48	0.180	0.120	0.069	0.022	0.078
Picton	95	-21	-23	29	23	3980	23	92	770	940	160	2.0	0.4	0.38	0.49	0.260	0.160	0.088	0.028	0.110
Plattsville	300	-19	-21	29	23	4150	28	103	820	950	140	1.9	0.4	0.33	0.42	0.150	0.096	0.058	0.018	0.069
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Effective Date: January 1, 2015

Table 1.2 (Cont'd)  
Design Data for Selected Locations in Ontario

r<sub>s</sub>

Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA		
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
Point Alexander	150	-29	-32	30	22	4960	23	92	650	850	100	S <sub>s</sub>	S <sub>t</sub>	0.27	0.35	0.630	0.300	0.130	0.043	0.320
Port Burwell	195	-15	-17	30	24	3800	25	92	930	1000	180	1.2	0.4	0.36	0.47	0.170	0.099	0.058	0.018	0.092
Port Colborne	180	-15	-17	30	24	3600	23	108	850	1000	160	2.3	0.4	0.36	0.46	0.330	0.180	0.066	0.022	0.190
Port Elgin	205	-17	-19	28	22	4100	25	92	790	850	180	2.8	0.4	0.43	0.55	0.110	0.078	0.051	0.017	0.036
Port Hope	100	-21	-23	29	23	3970	23	94	760	825	180	1.2	0.4	0.37	0.48	0.210	0.130	0.077	0.024	0.094
Port Perry	270	-22	-24	30	23	4260	25	97	720	850	140	2.4	0.4	0.34	0.44	0.170	0.120	0.070	0.023	0.053
Port Stanley	180	-15	-17	31	24	3850	25	92	940	975	180	1.2	0.4	0.36	0.47	0.170	0.099	0.055	0.017	0.090
Prescott	90	-23	-25	29	23	4120	25	103	770	975	180	2.2	0.4	0.34	0.44	0.420	0.240	0.120	0.038	0.018
Princeton	280	-18	-20	30	23	4000	25	97	810	925	160	1.5	0.4	0.33	0.42	0.160	0.100	0.059	0.018	0.082
Raith	475	-34	-37	28	22	5900	23	97	570	750	120	2.7	0.4	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Rayside-Balfour (Chelmsford)	270	-28	-30	29	21	5200	25	92	650	850	180	2.5	0.4	0.35	0.45	0.140	0.097	0.057	0.020	0.045
Red Lake	360	-35	-37	28	21	6220	20	92	470	630	120	2.4	0.3	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Renfrew	115	-27	-30	30	23	4900	23	97	620	810	140	2.5	0.4	0.27	0.35	0.580	0.290	0.130	0.043	0.300
Richmond Hill	230	-21	-23	31	24	4000	25	97	740	850	140	1.5	0.4	0.34	0.44	0.180	0.110	0.065	0.021	0.063
Rockland	50	-26	-28	30	23	4600	23	92	780	950	160	2.4	0.4	0.31	0.40	0.600	0.300	0.140	0.045	0.310
Sarnia	190	-16	-18	31	24	3750	25	100	750	825	180	1.1	0.4	0.36	0.47	0.120	0.073	0.048	0.015	0.037
Sault Ste. Marie	190	-25	-28	29	22	4960	23	97	660	950	200	3.1	0.4	0.34	0.44	0.095	0.057	0.032	0.012	0.036
Schreiber	310	-34	-36	27	21	5960	20	103	600	850	160	3.3	0.4	0.30	0.39	0.095	0.057	0.026	0.008	0.036
Seaforth	310	-17	-19	30	23	4100	25	108	810	1025	160	2.5	0.4	0.37	0.48	0.120	0.080	0.051	0.017	0.040
Shelburne	495	-22	-24	29	23	4700	28	108	740	900	150	3.1	0.4	0.31	0.40	0.140	0.094	0.059	0.020	0.046
Simcoe	210	-17	-19	30	24	3700	28	113	860	950	160	1.3	0.4	0.35	0.45	0.180	0.100	0.060	0.018	0.093
Sioux Lookout	375	-34	-36	28	22	5950	25	97	520	710	100	2.4	0.3	0.23	0.30	0.095	0.057	0.026	0.008	0.036
Smiths Falls	130	-25	-27	30	23	4540	25	92	730	850	140	2.3	0.4	0.32	0.41	0.390	0.220	0.120	0.037	0.170
Smithville	185	-16	-18	30	23	3650	23	108	800	900	160	1.5	0.4	0.33	0.42	0.340	0.180	0.068	0.022	0.200
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Table 1.2 (Cont'd)  
Design Data for Selected Locations in Ontario

Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								S <sub>s</sub>	S <sub>t</sub>	1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
Smooth Rock Falls	235	-34	-36	29	21	6250	20	92	560	850	80	2.7	0.3	0.25	0.32	0.160	0.089	0.049	0.017	0.085
South River	355	-27	-29	29	22	5090	25	103	830	975	120	2.8	0.4	0.27	0.35	0.230	0.140	0.077	0.027	0.086
Southampton	180	-17	-19	28	22	4100	25	92	800	830	180	2.7	0.4	0.41	0.53	0.110	0.078	0.051	0.017	0.036
St. Catharines	105	-16	-18	30	23	3540	23	92	770	850	160	1.0	0.4	0.36	0.46	0.340	0.190	0.069	0.023	0.200
St. Mary's	310	-18	-20	30	23	4000	28	108	820	1025	160	2.2	0.4	0.36	0.47	0.140	0.086	0.054	0.017	0.049
St. Thomas	225	-16	-18	31	24	3780	25	103	900	975	180	1.4	0.4	0.36	0.47	0.160	0.096	0.056	0.017	0.088
Stirling	120	-23	-25	30	23	4220	25	97	740	850	120	1.7	0.4	0.31	0.40	0.250	0.160	0.088	0.028	0.096
Stratford	360	-18	-20	29	23	4050	28	113	820	1050	160	2.3	0.4	0.35	0.45	0.140	0.087	0.055	0.018	0.045
Strathroy	225	-17	-19	31	24	3780	25	103	770	950	180	1.9	0.4	0.36	0.47	0.140	0.086	0.052	0.016	0.064
Sturgeon Falls	205	-28	-30	29	21	5200	25	95	700	910	140	2.2	0.4	0.27	0.35	0.220	0.130	0.072	0.025	0.086
Sudbury	275	-28	-30	29	21	5180	25	97	650	875	200	2.5	0.4	0.36	0.46	0.150	0.100	0.059	0.020	0.051
Sundridge	340	-27	-29	29	22	5080	25	97	840	975	120	2.8	0.4	0.27	0.35	0.230	0.140	0.076	0.026	0.082
Tavistock	340	-19	-21	29	23	4100	28	113	820	1010	160	2.1	0.4	0.35	0.45	0.140	0.090	0.056	0.018	0.053
Temagami	300	-30	-33	30	22	5420	23	92	650	875	120	2.6	0.4	0.29	0.37	0.250	0.150	0.077	0.026	0.120
Thamesford	280	-19	-21	30	23	3950	28	108	820	975	160	1.9	0.4	0.37	0.48	0.160	0.095	0.056	0.018	0.076
Theford	205	-16	-18	31	23	3710	25	103	810	900	180	2.1	0.4	0.39	0.50	0.120	0.077	0.050	0.016	0.038
Thunder Bay	210	-31	-33	29	21	5650	23	108	560	710	160	2.9	0.4	0.30	0.39	0.095	0.057	0.026	0.008	0.036
Tillsonburg	215	-17	-19	30	24	3840	25	103	880	980	160	1.3	0.4	0.34	0.44	0.170	0.100	0.058	0.018	0.091
Timmins	300	-34	-36	29	21	5940	20	108	560	875	100	3.1	0.3	0.27	0.35	0.140	0.090	0.054	0.018	0.056
Timmins (Porcupine)	295	-34	-36	29	21	6000	20	103	560	875	100	2.9	0.3	0.29	0.37	0.160	0.094	0.056	0.018	0.068
Toronto (Metropolitan)																				
Etobicoke	160	-20	-22	31	24	3800	26	108	720	800	160	1.1	0.4	0.34	0.44	0.210	0.120	0.065	0.021	0.110
North York	175	-20	-22	31	24	3760	25	108	730	850	150	1.2	0.4	0.34	0.44	0.190	0.110	0.066	0.021	0.078
Scarborough	180	-20	-22	31	24	3800	25	92	730	825	160	1.2	0.4	0.36	0.47	0.190	0.110	0.068	0.022	0.076
Toronto (City Hall)	90	-18	-20	31	23	3520	25	97	720	820	160	0.9	0.4	0.34	0.44	0.220	0.130	0.067	0.021	0.120
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21

Table 1.2 (Cont'd)  
Design Data for Selected Locations in Ontario

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Location	Elevation, m	Design Temperature				Degree Days Below 18°C	15 Min Rainfall, mm	One Day Rainfall, 1/50, mm	Annual Rainfall, mm	Annual Total Precipitation, mm	Driving Rain Wind Pressures, Pa, 1/5	Snow Load, kPa, 1/50		Hourly Wind Pressures, kPa		Seismic Data				
		January		July 2.5%								1/10	1/50	S <sub>a</sub> (0.2)	S <sub>a</sub> (0.5)	S <sub>a</sub> (1.0)	S <sub>a</sub> (2.0)	PGA		
		2.5%, °C	1%, °C	Dry, °C	Wet, °C															
		S <sub>s</sub>	S <sub>r</sub>																	
Trenton	80	-22	-24	29	23	4110	23	97	760	850	160	1.6	0.4	0.36	0.47	0.240	0.150	0.085	0.027	0.099
Trout Creek	330	-27	-29	29	22	5100	25	103	780	975	120	2.7	0.4	0.27	0.35	0.240	0.150	0.078	0.027	0.095
Uxbridge	275	-22	-24	30	23	4240	25	103	700	850	140	2.4	0.4	0.33	0.42	0.160	0.110	0.069	0.022	0.049
Vaughan (Woodbridge)	165	-20	-22	31	24	4100	26	113	700	800	140	1.1	0.4	0.34	0.44	0.190	0.110	0.064	0.021	0.081
Vittoria	215	-15	-17	30	24	3680	25	113	880	950	160	1.3	0.4	0.36	0.47	0.180	0.100	0.060	0.018	0.093
Walkerton	275	-18	-20	30	22	4300	28	103	790	1025	160	2.7	0.4	0.39	0.50	0.120	0.081	0.052	0.018	0.038
Wallaceburg	180	-16	-18	31	24	3600	28	97	760	825	180	0.9	0.4	0.35	0.45	0.150	0.085	0.047	0.015	0.071
Waterloo	330	-19	-21	29	23	4200	28	119	780	925	160	2.0	0.4	0.29	0.37	0.150	0.094	0.058	0.018	0.052
Watford	240	-17	-19	31	24	3740	25	108	790	950	160	1.9	0.4	0.36	0.47	0.130	0.081	0.050	0.016	0.050
Wawa	290	-34	-36	26	21	5840	20	93	725	950	160	4.1	0.4	0.30	0.39	0.095	0.057	0.028	0.010	0.036
Welland	180	-15	-17	30	23	3670	23	103	840	975	160	2.2	0.4	0.33	0.43	0.340	0.180	0.068	0.022	0.200
West Lorne	215	-16	-18	31	24	3700	28	103	840	900	180	1.3	0.4	0.36	0.47	0.160	0.095	0.054	0.016	0.088
Whitby	85	-20	-22	30	23	3820	23	86	760	850	160	1.2	0.4	0.37	0.48	0.190	0.120	0.071	0.022	0.075
Whitby (Brooklin)	160	-20	-22	30	23	4010	23	86	770	850	140	1.9	0.4	0.35	0.45	0.180	0.120	0.070	0.023	0.066
White River	375	-39	-42	28	21	6150	20	92	575	825	100	4.5	0.4	0.23	0.30	0.095	0.057	0.026	0.009	0.036
Warton	185	-19	-21	29	22	4300	25	103	740	1000	180	2.7	0.4	0.37	0.48	0.110	0.083	0.053	0.018	0.036
Windsor	185	-16	-18	32	24	3400	28	103	800	900	180	0.8	0.4	0.36	0.47	0.150	0.085	0.045	0.014	0.073
Wingham	310	-18	-20	30	23	4220	28	108	780	1050	160	2.6	0.4	0.39	0.50	0.120	0.079	0.051	0.017	0.039
Woodstock	300	-19	-21	30	23	3910	28	113	830	930	160	1.9	0.4	0.34	0.44	0.160	0.098	0.058	0.018	0.079
Wyoming	215	-16	-18	31	24	3700	25	103	815	900	180	1.6	0.4	0.36	0.47	0.130	0.077	0.049	0.015	0.043
Column 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21