Submit a comment

Proposed Change 2018

Code Reference(s):	**NECB20 Div.B Appendix C (first printing)**
Subject:	NECB Climatic Values
Title:	Updated Climatic Data
Description:	This proposed change updates Table C-1 to incorporate the effects of climate change.
Related Proposed Change(s):	PCF 1979, PCF 1980, PCF 2048

This change could potentially affect the following topic areas:

- ☐ Division A
- ☐ Division C
- ☐ Building operations
- ☐ Small Buildings
- ☐ Fire Protection
- ☐ Accessibility
- ☑ Building Envelope
- ☑ Heating, Ventilating and Air Conditioning
- ☑ Division B
- ☑ Design and Construction
- ☐ Housing
- ☑ Large Buildings
- ☐ Occupant safety in use
- ☐ Structural Requirements
- ☑ Energy Efficiency
- ☐ Plumbing
- ☐ Construction and Demolition Sites

Problem

In previous editions of the National Energy Code of Canada for Buildings (NECB), climatic data provided in Table C-1 were based on historical weather observations collected and analyzed by Environment and Climate Change Canada (ECCC). It was assumed that climatic data were time-independent (or stationary). However, in the face of extensive evidence that the climate is changing across Canada, this practice raises concerns for the design of buildings.

To assess the impacts of climate change trends on the climatic data and their associated climatic loads specified in the NECB, future climatic data sets have been developed by ECCC [1], based on the current body of research in climate modeling. These models simulate how the climate statistics are likely to change in various regions of Canada between 2024 and 2100 under various greenhouse gas (GHG) emissions scenarios called representative concentration pathways (RCPs). An RCP is a greenhouse gas concentration time profile. Four RCPs were used for the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5) in 2014: RCP2.6, RCP4.5, RCP6 and RCP8.5 (corresponding to radiative forcing values of 2.6 W/m^2, 4.5 W/m^2, 6 W/m^2 and 8.5 W/m^2, respectively, in 2100). These pathways represent different future greenhouse gas concentration time profiles that are possible depending on the volume of greenhouse gases emitted.

There has been international recognition in recent decades that the earth's climate is changing, with the potential to create higher climatic loads and more adverse environmental conditions than currently specified based on historical observations. The consequences of this pose an increased risk to building integrity and functionality, and occupant life safety. More frequent high heat events also increase risk to occupant life safety.

Justification

The results of targeted research conducted by ECCC [1] specifically designed to address the effect of future projections of climatic conditions were accounted for in the update of each parameter of Table C-1. The proposed approach for building design is based on a 50-year time horizon (from 2025 to 2075) and the RCP8.5 future emissions scenario, corresponding to a 2.5°C global warming compared to the 1986–2016 baseline period. The projected future values are applied to the Table C-1 parameters using the following approach.

For parameters used for building envelope design, such as the effects of snow, rain, wind and moisture, if the projected future value in the 50-year time horizon is greater than the current updated value calculated from historical observations, the projected value is used. If the future value is projected to decrease, the current value is retained. This approach, called the Minimax Method, assures that over the 50-year time horizon the annual risk of failure does not exceed that which has historically been considered as acceptable. For some variables, such as temperature, the governing case for design may be the minimum, while for others, such as wind, it is the maximum. For instance, for wind, projections mostly show increases in reference pressure in future, making the last year of service life the governing case; for heating degree-days, projections show a general warming trend, potentially making the first year of service life the worst. This is deemed an appropriate approach that ensures that the Table C-1 values reflect the maximum loads expected that correspond to the specified annual probability of exceedance.

The non-stationarity of future climate due to the impact of climate change is embedded in Table C-1 using climate change factors derived from regional averages using the Minimax approach [2]. For reference design wind pressures, most areas in Canada have a climate change factor of 1.05, while locations in Ontario, the Atlantic provinces, and west of 120°W in British Columbia have a climate change factor of 1.1. The Minimax approach to adopt future values is applied to the other parameters using the future change factors from the targeted research results.

In future updates of Table C-1 values, it is expected that observed values will be updated to a new baseline period. Projected future values, based on ongoing research, will also be updated and referenced to the same new baseline period. In this way, both the observed and projected values will be reset to reflect knowledge at the time of the update. The projected values in this update that use the Minimax approach will not be compounded in future updates to Table C-1.

Terminology is also affected by the effects of a changing climate. Low-probability events have often been described as having a return period which, in a stationary (non-changing) climate, is defined as the average interval in years between such events. The reciprocal of the return period is defined as the annual exceedance probability. For instance, a 50-year return period event has an annual probability of 1/50 or 0.02. In a changing climate, the definition of the return period as an interval between events is not accurate. As a result, low-probability events are now identified with their annual exceedance probability rather than return period, since the annual probability can and often will change over time. For instance, a 50-year return period event is now described as a “1/50 annual probability event”, or sometimes just as the "1/50 value".

The uniform risk approach for wind results in a new 1/500 annual probability wind pressure value to reflect the ultimate load. In thunderstorm-prone regions, for wind values at low probabilities such as 1/500, the separate analysis of convective (e.g., thunderstorm) and synoptic (e.g., active low-pressure system with an embedded weather front) wind events generally results in higher wind values than the usual (up to the NECB 2020 edition) approach of analyzing the commingled convective and synoptic wind events as a single data set. This effect is not significant at higher annual probabilities such as 1/10 and 1/50. In addition to future values applied with the Minimax approach, the 500-year wind pressure values also account for the separate analysis of convective and synoptic wind events.

For parameters related to temperature and heating and cooling loads, such as degree-days below 18°C and 15°C, and January and July design temperatures, future values corresponding to a 50-year time horizon and RCP8.5 emissions scenario are applied in a similarly appropriate approach. Since warming is projected to occur for all locations, the current values for degree-day parameters and January design temperatures are all retained. The projected future values that reflect increased temperatures are applied to the July design temperatures. For cooling applications, the use of design temperatures mostly relates to occupant comfort; considering the prospect of more extreme heat events, applying future warmer temperatures also reduces the risk of future heat-related ill-health and mortality for occupants.

Analysis of the energy performance of buildings does not indicate an increased risk of overheating in buildings when mechanical cooling systems are provided and sized using historical July temperature data in the context of a future climate scenario.

However, sizing mechanical cooling systems based on future 50-year July temperature projections could result in oversized cooling equipment, which could increase construction costs. Also, the equipment may never experience the elevated temperature condition during its service life, which is considerably less than 50 years. Oversized cooling equipment can decrease energy efficiency and increase energy costs. The resulting oversizing could make equipment short-cycling worse and lead to inability of the equipment to meet latent loads, resulting in potentially excessive indoor humidity levels. In addition, short-cycling will decrease the service life of equipment. For the purposes of the design of mechanical cooling system equipment, Table C-1 provides July temperature data based on historical observations.

Further work is proposed on the use of future climate data in energy codes.

Extensive changes to the climate design data in Table C-1 and related documentation implement this approach.

PROPOSED CHANGE

NECB20 Div.B Appendix C (first printing)

Climatic Information for Building Design in Canada

Table C-1, which is referenced in Sentence 1.1.4.1.(1), represents a partial reproduction of Table C-2 of Division B of the NBC (see the section on Climatic and Seismic Information for Building Design in Canada in the NBC for further information on these climatic data categories). ~~The additional data for "Degree-Days Below 15°C" was developed by Environment and Climate Change Canada for inclusion in the NECB.~~

Table [C-1] C-1
Design Data for Selected Locations in Canada

Province and Location	Elev., m	Design Temperature				Degree-Days Below 18°C	Degree-Days Below 15°C	Hourly Wind Pressures, kPa (1)	
		January		July 2.5%					
		2.5% °C	1% °C	Historical (2)	Future			1/10	1/50

				Dry °C	Wet °C	Dry °C	Wet °C				
British Columbia											
100 Mile House	1040	-30	-32	29	17	34	21	5030	4040	~~0.27~~ 0.30	~~0.35~~ 0.39
Abbotsford	70	-8	-10	29	20	35	25	2860	2000	~~0.33~~ 0.36	~~0.44~~ 0.48
Agassiz	15	-9	-11	31	21	37	26	2750	1900	~~0.35~~ 0.39	~~0.47~~ 0.52
Alberni	12	-5	-8	31	19	37	24	3100	2220	~~0.24~~ 0.26	~~0.32~~ 0.35
Ashcroft	305	-24	-27	34	20	39	24	3700	2790	~~0.29~~ 0.32	~~0.38~~ 0.42
Bamfield	20	-2	-4	23	17	28	21	3080	2060	~~0.38~~ 0.42	~~0.50~~ 0.55
Beatton River	840	-37	-39	26	18	31	22	6300	5230	~~0.23~~ 0.25	~~0.30~~ 0.33
Bella Bella	25	-5	-7	23	18	28	22	3180	2150	~~0.40~~ 0.44	~~0.50~~ 0.55
Bella Coola	40	-14	-18	27	19	33	24	3560	2660	~~0.29~~ 0.32	~~0.39~~ 0.43
Burns Lake	755	-31	-34	26	17	32	22	5450	4430	~~0.29~~ 0.32	~~0.39~~ 0.43
Cache Creek	455	-24	-27	34	20	39	24	3700	2790	~~0.29~~ 0.32	~~0.39~~ 0.43
Campbell River	20	-5	-7	26	18	32	23	3000	2130	~~0.41~~ 0.45	~~0.48~~ 0.53
Carmi	845	-24	-26	31	19	36	23	4750	3770	~~0.29~~ 0.30	~~0.38~~ 0.40
Castlegar	430	-18	-20	32	20	37	24	3580	2680	~~0.26~~ 0.27	~~0.34~~ 0.36
Chetwynd	605	-35	-38	27	18	33	22	5500	4480	~~0.30~~ 0.33	~~0.40~~ 0.44
Chilliwack	10	-9	-11	30	20	36	25	2780	1920	~~0.35~~ 0.39	~~0.47~~ 0.52
Comox	15	-7	-9	27	18	33	23	2930	2220	~~0.41~~ 0.45	~~0.48~~ 0.53
Courtenay	10	-7	-9	28	18	34	23	2930	2220	~~0.41~~ 0.45	~~0.48~~ 0.53

Cranbrook	910	-26	-28	32	18	37	22	4400	3450	~~0.25~~ 0.26	~~0.33~~ 0.35
Crescent Valley	585	-18	-20	31	20	36	24	3650	2740	~~0.25~~ 0.26	~~0.33~~ 0.35
Crofton	5	-4	-6	28	19	34	24	2880	2020	~~0.32~~ 0.35	~~0.40~~ 0.44
Dawson Creek	665	-38	-40	27	18	32	22	5900	4860	~~0.30~~ 0.33	~~0.40~~ 0.44
Dease Lake	800	-37	-40	24	15	29	19	6730	5630	~~0.23~~ 0.25	~~0.30~~ 0.33
Dog Creek	450	-28	-30	29	17	34	21	4800	3820	~~0.27~~ 0.30	~~0.35~~ 0.39
Duncan	10	-6	-8	28	19	33	24	2980	2110	~~0.31~~ 0.34	~~0.39~~ 0.43
Elko	1065	-28	-31	30	19	35	23	4600	3630	~~0.30~~ 0.32	~~0.40~~ 0.42
Fernie	1010	-27	-30	30	19	35	23	4750	3770	~~0.30~~ 0.32	~~0.40~~ 0.42
Fort Nelson	465	-39	-42	28	18	32	22	6710	5740	~~0.23~~ 0.25	~~0.30~~ 0.33
Fort St. John	685	-35	-37	26	18	31	22	5750	4710	~~0.29~~ 0.32	~~0.39~~ 0.43
Glacier	1145	-27	-30	27	17	33	22	5800	4760	~~0.24~~ 0.25	~~0.32~~ 0.34
Golden	790	-27	-30	30	17	36	22	4750	3770	~~0.26~~ 0.27	~~0.35~~ 0.37
Gold River	120	-8	-11	31	18	37	23	3230	2350	~~0.24~~ 0.26	~~0.32~~ 0.35
Grand Forks	565	-19	-22	34	20	39	24	3820	2900	~~0.30~~ 0.32	~~0.40~~ 0.42
Greenwood	745	-20	-23	34	20	39	24	4100	3160	~~0.30~~ 0.32	~~0.40~~ 0.42
Hope	40	-13	-15	31	20	37	25	2820	2130	~~0.47~~ 0.52	~~0.63~~ 0.69
Jordan River	20	-1	-3	22	17	27	22	2900	1900	~~0.44~~ 0.48	~~0.55~~ 0.61
Kamloops	355	-23	-25	34	20	38	24	3450	2670	~~0.30~~ 0.33	~~0.40~~ 0.44
Kaslo	545	-17	-20	30	19	35	23	3830	2910	~~0.23~~ 0.24	~~0.31~~ 0.33

Kelowna	350	-17	-20	33	20	38	24	3400	2510	~~0.30~~ 0.32	~~0.40~~ 0.42
Kimberley	1090	-25	-27	31	18	36	22	4650	3680	~~0.25~~ 0.26	~~0.33~~ 0.35
Kitimat Plant	15	-16	-18	25	16	31	21	3750	2830	~~0.36~~ 0.40	~~0.48~~ 0.53
Kitimat Townsite	130	-16	-18	24	16	30	21	3900	2980	~~0.36~~ 0.40	~~0.48~~ 0.53
Ladysmith	80	-7	-9	27	19	32	24	2920	2130	~~0.32~~ 0.35	~~0.40~~ 0.44
Langford	80	-4	-6	27	19	33	23	2750	1770	~~0.32~~ 0.35	~~0.40~~ 0.44
Lillooet	245	-21	-23	34	20	39	24	3400	2610	~~0.33~~ 0.36	~~0.44~~ 0.48
Lytton	325	-17	-20	35	20	40	24	3300	2410	~~0.32~~ 0.35	~~0.43~~ 0.47
Mackenzie	765	-34	-38	27	17	33	21	5550	4530	~~0.25~~ 0.28	~~0.32~~ 0.35
Masset	10	-5	-7	17	15	21	18	3700	2600	~~0.50~~ 0.55	~~0.61~~ 0.67
McBride	730	-29	-32	29	18	36	23	4980	3990	~~0.27~~ 0.30	~~0.35~~ 0.39
McLeod Lake	695	-35	-37	27	17	33	21	5450	4430	~~0.25~~ 0.28	~~0.32~~ 0.35
Merritt	570	-24	-27	34	20	39	24	3900	2980	~~0.33~~ 0.36	~~0.44~~ 0.48
Mission City	45	-9	-11	30	20	36	25	2850	1990	~~0.32~~ 0.35	~~0.43~~ 0.47
Montrose	615	-16	-18	32	20	37	24	3600	2690	~~0.26~~ 0.27	~~0.35~~ 0.37
Nakusp	445	-20	-22	31	20	36	24	3560	2660	~~0.25~~ 0.26	~~0.33~~ 0.35
Nanaimo	15	-6	-8	27	19	33	24	2920	2130	~~0.38~~ 0.42	~~0.48~~ 0.53
Nelson	600	-18	-20	31	20	36	24	3500	2600	~~0.25~~ 0.26	~~0.33~~ 0.35
Ocean Falls	10	-10	-12	23	17	28	22	3400	2510	~~0.44~~ 0.48	~~0.59~~ 0.65
Osoyoos	285	-14	-17	35	21	40	25	3100	2220	~~0.30~~ 0.32	~~0.40~~ 0.42

Parksville	40	-6	-8	26	19	32	24	2990	2320	~~0.40~~ 0.44	~~0.48~~ 0.53
Penticton	350	-15	-17	33	20	38	24	3350	2460	~~0.30~~ 0.32	~~0.40~~ 0.42
Port Alberni	15	-5	-8	31	19	37	24	3100	2220	~~0.24~~ 0.26	~~0.32~~ 0.35
Port Alice	25	-3	-6	26	17	31	21	3010	2000	~~0.24~~ 0.26	~~0.32~~ 0.35
Port Hardy	5	-5	-7	20	16	25	20	3440	2370	~~0.36~~ 0.40	~~0.48~~ 0.53
Port McNeill	5	-5	-7	22	17	27	21	3410	2350	~~0.36~~ 0.40	~~0.48~~ 0.53
Port Renfrew	20	-3	-5	24	17	29	21	2900	1900	~~0.42~~ 0.46	~~0.52~~ 0.57
Powell River	10	-7	-9	26	18	32	23	3100	2220	~~0.39~~ 0.43	~~0.48~~ 0.53
Prince George	580	-32	-36	28	18	34	22	4720	3750	~~0.28~~ 0.31	~~0.37~~ 0.41
Prince Rupert	20	-13	-15	19	15	24	19	3900	2770	~~0.43~~ 0.47	~~0.54~~ 0.59
Princeton	655	-24	-29	33	19	39	24	4250	3300	~~0.27~~ 0.30	~~0.36~~ 0.40
Qualicum Beach	10	-7	-9	27	19	33	24	2990	2320	~~0.41~~ 0.45	~~0.48~~ 0.53
Queen Charlotte City	35	-6	-8	21	16	25	20	3520	2440	~~0.50~~ 0.55	~~0.61~~ 0.67
Quesnel	475	-31	-33	30	17	36	21	4650	3680	~~0.24~~ 0.26	~~0.31~~ 0.34
Revelstoke	440	-20	-23	31	19	36	23	4000	3070	~~0.24~~ 0.25	~~0.32~~ 0.34
Salmon Arm	425	-19	-24	33	21	38	25	3650	2740	~~0.29~~ 0.30	~~0.39~~ 0.41
Sandspit	5	-4	-6	18	15	22	19	3450	2380	~~0.59~~ 0.65	~~0.72~~ 0.79
Sechelt	25	-6	-8	27	20	33	25	2680	1830	~~0.38~~ 0.42	~~0.48~~ 0.53
Sidney	10	-4	-6	26	18	32	22	2850	1860	~~0.34~~ 0.37	~~0.42~~ 0.46
Smithers	500	-29	-31	26	17	32	22	5040	4050	~~0.30~~ 0.33	~~0.40~~ 0.44

Smith River	660	-45	-47	26	17	30	21	7100	5980	~~0.24~~ 0.26	~~0.30~~ 0.33
Sooke	20	-1	-3	21	16	27	20	2900	1900	~~0.38~~ 0.42	~~0.48~~ 0.53
Squamish	5	-9	-11	29	20	35	25	2950	2080	~~0.38~~ 0.42	~~0.50~~ 0.55
Stewart	10	-17	-20	25	16	31	21	4350	3400	~~0.27~~ 0.30	~~0.36~~ 0.40
Tahsis	25	-4	-6	26	18	32	23	3150	2120	~~0.26~~ 0.29	~~0.34~~ 0.37
Taylor	515	-35	-37	26	18	31	22	5720	4690	~~0.30~~ 0.33	~~0.40~~ 0.44
Terrace	60	-19	-21	27	17	33	22	4150	3210	~~0.27~~ 0.30	~~0.36~~ 0.40
Tofino	10	-2	-4	20	16	25	20	3150	2120	~~0.51~~ 0.56	~~0.68~~ 0.75
Trail	440	-14	-17	33	20	38	24	3600	2690	~~0.26~~ 0.27	~~0.35~~ 0.37
Ucluelet	5	-2	-4	18	16	23	20	3120	2100	~~0.51~~ 0.56	~~0.68~~ 0.75
Vancouver Region											
Burnaby (Simon Fraser Univ.)	330	-7	-9	25	17	31	22	3100	2220	~~0.35~~ 0.39	~~0.47~~ 0.52
Cloverdale	10	-8	-10	29	20	35	25	2700	1850	~~0.33~~ 0.36	~~0.44~~ 0.48
Haney	10	-9	-11	30	20	36	25	2840	1980	~~0.33~~ 0.36	~~0.44~~ 0.48
Ladner	3	-6	-8	27	19	33	24	2600	1750	~~0.37~~ 0.41	~~0.46~~ 0.51
Langley	15	-8	-10	29	20	35	25	2700	1850	~~0.33~~ 0.36	~~0.44~~ 0.48
New Westminster	10	-8	-10	29	19	35	24	2800	1940	~~0.33~~ 0.36	~~0.44~~ 0.48
North Vancouver	135	-7	-9	26	19	32	24	2910	2050	~~0.34~~ 0.37	~~0.45~~ 0.50
Richmond	5	-7	-9	27	19	33	24	2800	1940	~~0.36~~ 0.40	~~0.45~~ 0.50
Surrey (88 Ave & 156 St.)	90	-8	-10	29	20	35	25	2750	1900	~~0.33~~ 0.36	~~0.44~~ 0.48

Vancouver (City Hall)	40	-7	-9	28	20	34	25	2825	1970	~~0.34~~ 0.37	~~0.45~~ 0.50
Vancouver (Granville St. & 41st Ave)	120	-6	-8	28	20	34	25	2925	2060	~~0.36~~ 0.40	~~0.45~~ 0.50
West Vancouver	45	-7	-9	28	19	34	24	2950	2080	~~0.36~~ 0.40	~~0.48~~ 0.53
Vernon	405	-20	-23	33	20	38	24	3600	2690	~~0.30~~ 0.32	~~0.40~~ 0.42
Victoria Region											
Victoria	10	-4	-6	24	17	30	21	2650	1730	~~0.46~~ 0.51	~~0.57~~ 0.63
Victoria (Gonzales Hts)	65	-4	-6	24	17	30	21	2700	1690	~~0.46~~ 0.51	~~0.57~~ 0.63
Victoria (Mt Tolmie)	125	-6	-8	24	16	30	20	2700	1730	~~0.46~~ 0.48	~~0.57~~ 0.60
Whistler	665	-17	-20	30	20	36	25	4180	3240	~~0.24~~ 0.26	~~0.32~~ 0.35
White Rock	30	-5	-7	25	20	31	25	2620	1770	~~0.33~~ 0.36	~~0.44~~ 0.48
Williams Lake	615	-30	-33	29	17	34	21	4400	3450	~~0.27~~ 0.30	~~0.35~~ 0.39
Youbou	200	-5	-8	31	19	36	24	3050	2180	~~0.26~~ 0.29	~~0.32~~ 0.35
Alberta											
Athabasca	515	-35	-38	27	19	32	23	6000	5000	~~0.27~~ 0.28	~~0.36~~ 0.38
Banff	1400	-31	-33	27	16	33	20	5500	4520	~~0.26~~ 0.27	~~0.32~~ 0.34
Barrhead	645	-33	-36	27	19	32	23	5740	4750	~~0.35~~ 0.37	~~0.44~~ 0.46
Beaverlodge	730	-36	-39	28	18	33	22	5700	4710	~~0.27~~ 0.28	~~0.36~~ 0.38
Brooks	760	-32	-34	32	20	37	24	4880	3940	~~0.35~~ 0.37	~~0.44~~ 0.46
Calgary	1045	-30	-32	28	17	34	21	5000	4050	~~0.38~~ 0.40	~~0.48~~ 0.50
Campsie	660	-33	-36	27	19	32	23	5750	4760	~~0.33~~ 0.35	~~0.44~~ 0.46

Camrose	740	-33	-35	29	19	34	23	5500	4520	~~0.31~~ 0.33	~~0.39~~ 0.41
Canmore	1320	-31	-33	28	17	34	21	5400	4430	~~0.30~~ 0.32	~~0.37~~ 0.39
Cardston	1130	-29	-32	30	19	35	23	4700	3770	~~0.58~~ 0.61	~~0.72~~ 0.76
Claresholm	1030	-30	-32	30	18	35	22	4680	3750	~~0.46~~ 0.48	~~0.58~~ 0.61
Cold Lake	540	-35	-38	28	19	33	23	5860	4860	~~0.29~~ 0.30	~~0.38~~ 0.40
Coleman	1320	-31	-34	29	18	34	22	5210	4250	~~0.50~~ 0.53	~~0.63~~ 0.66
Coronation	790	-32	-34	30	19	36	23	5640	4660	~~0.30~~ 0.32	~~0.37~~ 0.39
Cowley	1175	-29	-32	29	18	34	22	4810	3870	~~0.81~~ 0.85	~~1.01~~ 1.06
Drumheller	685	-32	-34	30	18	36	22	5050	4100	~~0.35~~ 0.37	~~0.44~~ 0.46
Edmonton	645	-30	-33	28	19	34	23	5120	4160	~~0.36~~ 0.38	~~0.45~~ 0.47
Edson	920	-34	-37	27	18	32	22	5750	4760	~~0.37~~ 0.39	~~0.46~~ 0.48
Embarras Portage	220	-41	-43	28	19	32	23	7100	6040	~~0.28~~ 0.29	~~0.37~~ 0.39
Fairview	670	-37	-40	27	18	32	22	5840	4850	~~0.26~~ 0.27	~~0.35~~ 0.37
Fort MacLeod	945	-30	-32	31	19	36	23	4600	3670	~~0.54~~ 0.57	~~0.68~~ 0.71
Fort McMurray	255	-38	-40	28	19	33	23	6250	5230	~~0.28~~ 0.29	~~0.35~~ 0.37
Fort Saskatchewan	610	-32	-35	28	19	34	23	5420	4450	~~0.34~~ 0.36	~~0.43~~ 0.45
Fort Vermilion	270	-41	-43	28	18	32	22	6700	5660	~~0.23~~ 0.24	~~0.30~~ 0.32
Grande Prairie	650	-36	-39	27	18	32	22	5790	4800	~~0.32~~ 0.34	~~0.43~~ 0.45
Habay	335	-41	-43	28	18	32	22	6750	5710	~~0.23~~ 0.24	~~0.30~~ 0.32
Hardisty	615	-33	-36	30	19	36	23	5640	4660	~~0.29~~ 0.30	~~0.36~~ 0.38

High River	1040	-31	-32	28	17	33	21	4900	3960	~~0.52~~ 0.55	~~0.65~~ 0.68
Hinton	990	-34	-38	27	17	33	21	5500	4520	~~0.37~~ 0.39	~~0.46~~ 0.48
Jasper	1060	-31	-34	28	17	34	22	5300	4330	~~0.26~~ 0.27	~~0.32~~ 0.34
Keg River	420	-40	-42	28	18	32	22	6520	5490	~~0.23~~ 0.24	~~0.30~~ 0.32
Lac La Biche	560	-35	-38	28	19	33	23	6100	5090	~~0.27~~ 0.28	~~0.36~~ 0.38
Lacombe	855	-33	-36	28	19	34	23	5500	4520	~~0.32~~ 0.34	~~0.40~~ 0.42
Lethbridge	910	-30	-32	31	19	36	23	4500	3580	~~0.53~~ 0.56	~~0.66~~ 0.69
Manning	465	-39	-41	27	18	32	22	6300	5280	~~0.23~~ 0.24	~~0.30~~ 0.32
Medicine Hat	705	-31	-34	32	19	37	23	4540	3610	~~0.38~~ 0.40	~~0.48~~ 0.50
Peace River	330	-37	-40	27	18	32	22	6050	5040	~~0.24~~ 0.25	~~0.32~~ 0.34
Pincher Creek	1130	-29	-32	29	18	34	22	4740	3800	~~0.77~~ 0.81	~~0.96~~ 1.01
Ranfurly	670	-34	-37	29	19	34	23	5700	4710	~~0.29~~ 0.30	~~0.36~~ 0.38
Red Deer	855	-32	-35	28	19	34	23	5550	4570	~~0.32~~ 0.34	~~0.40~~ 0.42
Rocky Mountain House	985	-32	-34	27	18	33	22	5640	4660	~~0.29~~ 0.30	~~0.36~~ 0.38
Slave Lake	590	-35	-38	26	19	31	23	5850	4850	~~0.28~~ 0.29	~~0.37~~ 0.39
Stettler	820	-32	-34	30	19	36	23	5300	4330	~~0.29~~ 0.30	~~0.36~~ 0.38
Stony Plain	710	-32	-35	28	19	33	23	5300	4330	~~0.36~~ 0.38	~~0.45~~ 0.47
Suffield	755	-31	-34	32	20	37	24	4770	3830	~~0.39~~ 0.41	~~0.49~~ 0.51
Taber	815	-31	-33	31	19	36	23	4580	3650	~~0.50~~ 0.53	~~0.63~~ 0.66
Turner Valley	1215	-31	-32	28	17	33	21	5220	4260	~~0.52~~ 0.55	~~0.65~~ 0.68

Valleyview	700	-37	-40	27	18	32	22	5600	4620	~~0.34~~ 0.36	~~0.42~~ 0.44
Vegreville	635	-34	-37	29	19	34	23	5780	4790	~~0.29~~ 0.30	~~0.36~~ 0.38
Vermilion	580	-35	-38	29	19	35	23	5740	4750	~~0.29~~ 0.30	~~0.36~~ 0.38
Wagner	585	-35	-38	26	19	31	23	5850	4850	~~0.28~~ 0.29	~~0.37~~ 0.39
Wainwright	675	-33	-36	29	19	35	23	5700	4710	~~0.29~~ 0.30	~~0.36~~ 0.38
Wetaskiwin	760	-33	-35	29	19	34	23	5500	4520	~~0.31~~ 0.33	~~0.39~~ 0.41
Whitecourt	690	-33	-36	27	19	32	23	5650	4670	~~0.28~~ 0.29	~~0.37~~ 0.39
Wimborne	975	-31	-34	29	18	35	22	5310	4340	~~0.32~~ 0.34	~~0.40~~ 0.42
Saskatchewan											
Assiniboia	740	-32	-34	31	21	36	25	5180	4300	~~0.39~~ 0.41	~~0.49~~ 0.51
Battrum	700	-32	-34	32	20	37	24	5080	4210	~~0.43~~ 0.45	~~0.54~~ 0.57
Biggar	645	-34	-36	30	20	35	24	5720	4820	~~0.36~~ 0.38	~~0.45~~ 0.47
Broadview	600	-34	-35	30	21	35	25	5760	4850	~~0.36~~ 0.38	~~0.46~~ 0.48
Dafoe	530	-35	-37	29	21	34	25	5860	4950	~~0.29~~ 0.30	~~0.37~~ 0.39
Dundurn	525	-35	-37	30	21	35	25	5600	4700	~~0.36~~ 0.38	~~0.46~~ 0.48
Estevan	565	-32	-34	32	22	37	25	5340	4450	~~0.41~~ 0.43	~~0.52~~ 0.55
Hudson Bay	370	-36	-38	29	21	34	25	6280	5350	~~0.29~~ 0.30	~~0.37~~ 0.39
Humboldt	565	-36	-38	28	21	33	25	6000	5080	~~0.31~~ 0.33	~~0.39~~ 0.41
Island Falls	305	-39	-41	27	20	32	24	7100	6130	~~0.26~~ 0.27	~~0.35~~ 0.37
Kamsack	455	-34	-37	29	22	34	26	6040	5120	~~0.32~~ 0.34	~~0.40~~ 0.42

Kindersley	685	-33	-35	31	20	36	24	5550	4650	~~0.36~~ 0.38	~~0.46~~ 0.48
Lloydminster	645	-34	-37	28	20	34	24	5880	4970	~~0.32~~ 0.34	~~0.40~~ 0.42
Maple Creek	765	-31	-34	31	20	36	24	4780	3920	~~0.36~~ 0.38	~~0.45~~ 0.47
Meadow Lake	480	-38	-40	28	20	33	24	6280	5350	~~0.30~~ 0.32	~~0.40~~ 0.42
Melfort	455	-36	-38	28	21	33	25	6050	5130	~~0.28~~ 0.29	~~0.36~~ 0.38
Melville	550	-34	-36	29	21	34	25	5880	4970	~~0.32~~ 0.34	~~0.40~~ 0.42
Moose Jaw	545	-32	-34	31	21	36	25	5270	4390	~~0.41~~ 0.43	~~0.52~~ 0.55
Nipawin	365	-37	-39	28	21	33	25	6300	5370	~~0.30~~ 0.32	~~0.38~~ 0.40
North Battleford	545	-34	-36	29	20	34	24	5900	4990	~~0.36~~ 0.38	~~0.46~~ 0.48
Prince Albert	435	-37	-40	28	21	33	25	6100	5180	~~0.30~~ 0.32	~~0.38~~ 0.40
Qu'Appelle	645	-34	-36	30	22	35	26	5620	4720	~~0.33~~ 0.35	~~0.42~~ 0.44
Regina	575	-34	-36	31	21	36	25	5600	4700	~~0.39~~ 0.41	~~0.49~~ 0.51
Rosetown	595	-34	-36	31	20	36	24	5620	4720	~~0.39~~ 0.41	~~0.49~~ 0.51
Saskatoon	500	-35	-37	30	21	35	25	5700	4800	~~0.36~~ 0.38	~~0.46~~ 0.48
Scott	645	-34	-36	30	20	35	24	5960	5040	~~0.36~~ 0.38	~~0.45~~ 0.47
Strasbourg	545	-34	-36	30	22	35	26	5600	4700	~~0.33~~ 0.35	~~0.42~~ 0.44
Swift Current	750	-31	-34	31	20	36	24	5150	4270	~~0.43~~ 0.45	~~0.54~~ 0.57
Uranium City	265	-42	-44	26	19	30	22	7500	6510	~~0.27~~ 0.28	~~0.36~~ 0.38
Weyburn	575	-33	-35	31	23	36	27	5400	4510	~~0.38~~ 0.40	~~0.48~~ 0.50
Yorkton	510	-34	-37	29	21	34	25	6000	5080	~~0.32~~ 0.34	~~0.40~~ 0.42

Manitoba											
Beausejour	245	-33	-35	29	23	33	26	5680	4780	~~0.32~~ 0.34	~~0.41~~ 0.43
Boissevain	510	-32	-34	30	23	34	26	5500	4610	~~0.41~~ 0.43	~~0.52~~ 0.55
Brandon	395	-33	-35	30	22	35	25	5760	4850	~~0.39~~ 0.41	~~0.49~~ 0.51
Churchill	10	-38	-40	25	18	29	22	8950	7890	~~0.43~~ 0.45	~~0.55~~ 0.58
Dauphin	295	-33	-35	30	22	35	26	5900	4990	~~0.32~~ 0.34	~~0.40~~ 0.42
Flin Flon	300	-38	-40	27	20	32	24	6440	5500	~~0.28~~ 0.29	~~0.35~~ 0.37
Gimli	220	-34	-36	29	23	33	26	5800	4890	~~0.32~~ 0.34	~~0.40~~ 0.42
Island Lake	240	-36	-38	27	20	31	23	6900	5940	~~0.29~~ 0.30	~~0.37~~ 0.39
Lac du Bonnet	260	-34	-36	29	23	33	26	5730	4830	~~0.29~~ 0.30	~~0.37~~ 0.39
Lynn Lake	350	-40	-42	27	19	31	23	7770	6770	~~0.29~~ 0.30	~~0.37~~ 0.39
Morden	300	-31	-33	30	24	34	27	5400	4510	~~0.41~~ 0.43	~~0.52~~ 0.55
Neepawa	365	-32	-34	29	23	34	26	5760	4850	~~0.35~~ 0.37	~~0.44~~ 0.46
Pine Falls	220	-34	-36	28	23	32	26	5900	4990	~~0.31~~ 0.33	~~0.39~~ 0.41
Portage la Prairie	260	-31	-33	30	23	34	26	5600	4700	~~0.36~~ 0.38	~~0.46~~ 0.48
Rivers	465	-34	-36	29	23	33	26	5840	4930	~~0.36~~ 0.38	~~0.46~~ 0.48
Sandilands	365	-32	-34	29	23	33	26	5650	4750	~~0.32~~ 0.34	~~0.40~~ 0.42
Selkirk	225	-33	-35	29	23	33	26	5700	4800	~~0.32~~ 0.34	~~0.41~~ 0.43
Split Lake	175	-38	-40	27	19	31	23	7900	6890	~~0.31~~ 0.33	~~0.39~~ 0.41
Steinbach	270	-33	-35	29	23	33	26	5700	4800	~~0.32~~ 0.34	~~0.40~~ 0.42

Swan River	335	-34	-37	29	22	34	26	6100	5180	~~0.28~~ 0.29	~~0.35~~ 0.37
The Pas	270	-36	-38	28	21	33	25	6480	5540	~~0.29~~ 0.30	~~0.37~~ 0.39
Thompson	205	-40	-43	27	19	31	23	7600	6600	~~0.28~~ 0.29	~~0.36~~ 0.38
Virden	435	-33	-35	30	23	34	26	5620	4720	~~0.36~~ 0.38	~~0.46~~ 0.48
Winnipeg	235	-33	-35	30	23	34	26	5670	4770	~~0.36~~ 0.38	~~0.45~~ 0.47
Ontario											
Ailsa Craig	230	-17	-19	30	23	34	26	3840	3050	~~0.37~~ 0.41	~~0.48~~ 0.53
Ajax	95	-20	-22	30	23	34	26	3820	3030	~~0.37~~ 0.41	~~0.48~~ 0.53
Alexandria	80	-24	-26	30	23	34	26	4600	3740	~~0.31~~ 0.34	~~0.40~~ 0.44
Alliston	220	-23	-25	29	23	33	26	4200	3380	~~0.28~~ 0.31	~~0.36~~ 0.40
Almonte	120	-26	-28	30	23	34	26	4620	3760	~~0.32~~ 0.35	~~0.41~~ 0.45
Armstrong	340	-37	-40	28	21	32	24	6500	5530	~~0.22~~ 0.24	~~0.30~~ 0.33
Arnprior	85	-27	-29	30	23	34	26	4680	3820	~~0.29~~ 0.32	~~0.37~~ 0.41
Atikokan	400	-33	-35	29	22	33	25	5750	4810	~~0.22~~ 0.24	~~0.30~~ 0.33
Attawapiskat	10	-37	-39	28	21	32	24	7100	6120	~~0.30~~ 0.33	~~0.41~~ 0.45
Aurora	270	-21	-23	30	23	34	26	4210	3390	~~0.34~~ 0.37	~~0.44~~ 0.48
Bancroft	365	-28	-31	29	23	33	26	4740	3870	~~0.25~~ 0.28	~~0.32~~ 0.35
Barrie	245	-24	-26	29	23	33	26	4380	3540	~~0.28~~ 0.31	~~0.36~~ 0.40
Barriefield	100	-22	-24	28	23	32	26	3990	3190	~~0.37~~ 0.41	~~0.47~~ 0.52
Beaverton	240	-24	-26	30	23	34	26	4300	3470	~~0.28~~ 0.31	~~0.36~~ 0.40

Belleville	90	-22	-24	29	23	33	26	3910	3110	~~0.34~~ 0.37	~~0.43~~ 0.47
Belmont	260	-17	-19	30	24	34	27	3840	3050	~~0.37~~ 0.41	~~0.47~~ 0.52
Borden (CFB)	225	-23	-25	29	23	33	26	4300	3470	~~0.28~~ 0.31	~~0.36~~ 0.40
Bracebridge	310	-26	-28	29	23	33	26	4800	3920	~~0.27~~ 0.30	~~0.35~~ 0.39
Bradford	240	-23	-25	30	23	34	26	4280	3450	~~0.28~~ 0.31	~~0.36~~ 0.40
Brampton	215	-19	-21	30	23	34	26	4100	3290	~~0.34~~ 0.37	~~0.44~~ 0.48
Brantford	205	-18	-20	30	23	34	26	3900	3110	~~0.33~~ 0.36	~~0.42~~ 0.46
Brighton	95	-21	-23	29	23	33	26	4000	3200	~~0.37~~ 0.41	~~0.48~~ 0.53
Brockville	85	-23	-25	29	23	33	26	4060	3250	~~0.34~~ 0.37	~~0.44~~ 0.48
Burk's Falls	305	-26	-28	29	22	33	25	5020	4120	~~0.27~~ 0.30	~~0.35~~ 0.39
Burlington	80	-17	-19	31	23	35	26	3740	2960	~~0.36~~ 0.40	~~0.46~~ 0.51
Cambridge	295	-18	-20	29	23	33	26	4100	3290	~~0.28~~ 0.31	~~0.36~~ 0.40
Campbellford	150	-23	-26	30	23	34	26	4280	3450	~~0.32~~ 0.35	~~0.41~~ 0.45
Cannington	255	-24	-26	30	23	34	26	4310	3480	~~0.28~~ 0.31	~~0.36~~ 0.40
Carleton Place	135	-25	-27	30	23	34	26	4600	3740	~~0.32~~ 0.35	~~0.41~~ 0.45
Cavan	200	-23	-25	30	23	34	26	4400	3560	~~0.34~~ 0.37	~~0.44~~ 0.48
Centralia	260	-17	-19	30	23	34	26	3800	3010	~~0.37~~ 0.41	~~0.48~~ 0.53
Chapleau	425	-35	-38	27	21	31	24	5900	4950	~~0.23~~ 0.25	~~0.30~~ 0.33
Chatham	180	-16	-18	31	24	34	27	3470	2710	~~0.34~~ 0.37	~~0.43~~ 0.47
Chesley	275	-19	-21	29	22	33	25	4320	3490	~~0.35~~ 0.39	~~0.45~~ 0.50

Clinton	280	-17	-19	29	23	33	26	4150	3330	~~0.36~~ 0.40	~~0.46~~ 0.51
Coboconk	270	-25	-27	30	23	34	26	4500	3650	~~0.27~~ 0.30	~~0.35~~ 0.39
Cobourg	90	-21	-23	29	23	33	26	3980	3180	~~0.38~~ 0.42	~~0.49~~ 0.54
Cochrane	245	-34	-36	29	21	33	24	6200	5240	~~0.27~~ 0.30	~~0.35~~ 0.39
Colborne	105	-21	-23	29	23	33	26	3980	3180	~~0.38~~ 0.42	~~0.49~~ 0.54
Collingwood	190	-21	-23	29	23	33	26	4180	3360	~~0.30~~ 0.33	~~0.39~~ 0.43
Cornwall	35	-23	-25	30	23	34	26	4250	3420	~~0.32~~ 0.35	~~0.41~~ 0.45
Corunna	185	-16	-18	31	24	34	27	3600	2830	~~0.37~~ 0.41	~~0.47~~ 0.52
Deep River	145	-29	-32	30	22	34	25	4900	3980	~~0.27~~ 0.30	~~0.35~~ 0.39
Deseronto	85	-22	-24	29	23	33	26	4070	3260	~~0.34~~ 0.37	~~0.43~~ 0.47
Dorchester	260	-18	-20	30	24	34	27	3900	3110	~~0.37~~ 0.41	~~0.47~~ 0.52
Dorion	200	-33	-35	28	21	32	24	5950	5000	~~0.29~~ 0.32	~~0.39~~ 0.43
Dresden	185	-16	-18	31	24	34	27	3750	2970	~~0.34~~ 0.37	~~0.43~~ 0.47
Dryden	370	-34	-36	28	22	32	25	5850	4940	~~0.22~~ 0.24	~~0.30~~ 0.33
Dundalk	525	-22	-24	29	22	33	25	4700	3830	~~0.33~~ 0.36	~~0.42~~ 0.46
Dunnville	175	-15	-17	30	24	34	27	3660	2890	~~0.36~~ 0.40	~~0.46~~ 0.51
Durham	340	-20	-22	29	22	33	25	4340	3510	~~0.34~~ 0.37	~~0.44~~ 0.48
Dutton	225	-16	-18	31	24	35	27	3700	2920	~~0.37~~ 0.41	~~0.47~~ 0.52
Earlton	245	-33	-36	29	22	33	25	5730	4790	~~0.35~~ 0.39	~~0.45~~ 0.50
Edison	365	-34	-36	28	22	32	25	5740	4840	~~0.23~~ 0.25	~~0.31~~ 0.34

Elliot Lake	380	-26	-28	29	21	33	24	4950	4030	~~0.30~~ 0.33	~~0.38~~ 0.42
Elmvale	220	-24	-26	29	23	33	26	4200	3380	~~0.28~~ 0.31	~~0.36~~ 0.40
Embro	310	-19	-21	30	23	34	26	3950	3150	~~0.37~~ 0.41	~~0.48~~ 0.53
Englehart	205	-33	-36	29	22	33	25	5800	4860	~~0.32~~ 0.35	~~0.41~~ 0.45
Espanola	220	-25	-27	29	21	33	24	4920	4000	~~0.33~~ 0.36	~~0.42~~ 0.46
Exeter	265	-17	-19	30	23	34	26	3900	3110	~~0.37~~ 0.41	~~0.48~~ 0.53
Fenelon Falls	260	-25	-27	30	23	34	26	4440	3600	~~0.28~~ 0.31	~~0.36~~ 0.40
Fergus	400	-20	-22	29	23	33	26	4300	3470	~~0.28~~ 0.31	~~0.36~~ 0.40
Forest	215	-16	-18	31	23	35	26	3740	2960	~~0.37~~ 0.41	~~0.48~~ 0.53
Fort Erie	180	-15	-17	30	24	34	27	3650	2880	~~0.36~~ 0.40	~~0.46~~ 0.51
Fort Erie (Ridgeway)	190	-15	-17	30	24	34	27	3600	2830	~~0.36~~ 0.40	~~0.46~~ 0.51
Fort Frances	340	-33	-35	29	22	33	25	5440	4550	~~0.23~~ 0.25	~~0.31~~ 0.34
Gananoque	80	-22	-24	28	23	32	26	4010	3210	~~0.37~~ 0.41	~~0.47~~ 0.52
Geraldton	345	-36	-39	28	21	32	24	6450	5490	~~0.22~~ 0.24	~~0.30~~ 0.33
Glencoe	215	-16	-18	31	24	35	27	3680	2900	~~0.34~~ 0.37	~~0.43~~ 0.47
Goderich	185	-16	-18	29	23	33	26	4000	3200	~~0.37~~ 0.41	~~0.48~~ 0.53
Gore Bay	205	-24	-26	28	22	32	25	4700	3830	~~0.34~~ 0.37	~~0.44~~ 0.48
Graham	495	-35	-37	29	22	33	25	5940	4990	~~0.22~~ 0.24	~~0.30~~ 0.33
Gravenhurst (Muskoka Airport)	255	-26	-28	29	23	33	26	4760	3890	~~0.28~~ 0.31	~~0.36~~ 0.40
Grimsby	85	-16	-18	30	23	34	26	3520	2760	~~0.36~~ 0.40	~~0.46~~ 0.51

Guelph	340	-19	-21	29	23	33	26	4270	3440	~~0.28~~ 0.31	~~0.36~~ 0.40
Guthrie	280	-24	-26	29	23	33	26	4300	3470	~~0.28~~ 0.31	~~0.36~~ 0.40
Haileybury	210	-32	-35	30	22	34	25	5600	4660	~~0.34~~ 0.37	~~0.44~~ 0.48
Haldimand (Caledonia)	190	-18	-20	30	23	34	26	3750	2970	~~0.34~~ 0.37	~~0.44~~ 0.48
Haldimand (Hagersville)	215	-17	-19	30	23	34	26	3760	2980	~~0.36~~ 0.40	~~0.46~~ 0.51
Haliburton	335	-27	-29	29	23	33	26	4840	3960	~~0.27~~ 0.30	~~0.35~~ 0.39
Halton Hills (Georgetown)	255	-19	-21	30	23	34	26	4200	3380	~~0.29~~ 0.32	~~0.37~~ 0.41
Hamilton	90	-17	-19	31	23	35	26	3460	2700	~~0.36~~ 0.40	~~0.46~~ 0.51
Hanover	270	-19	-21	29	22	33	25	4300	3470	~~0.34~~ 0.37	~~0.44~~ 0.48
Hastings	200	-24	-26	30	23	34	26	4280	3450	~~0.32~~ 0.35	~~0.41~~ 0.45
Hawkesbury	50	-25	-27	30	23	34	26	4610	3750	~~0.32~~ 0.35	~~0.41~~ 0.45
Hearst	245	-35	-37	29	21	33	24	6450	5490	~~0.23~~ 0.25	~~0.30~~ 0.33
Honey Harbour	180	-24	-26	29	23	33	26	4300	3470	~~0.30~~ 0.33	~~0.39~~ 0.43
Hornepayne	360	-37	-40	28	21	32	24	6340	5380	~~0.22~~ 0.24	~~0.30~~ 0.33
Huntsville	335	-26	-29	29	22	33	25	4850	3970	~~0.27~~ 0.30	~~0.35~~ 0.39
Ingersoll	280	-18	-20	30	23	34	26	3920	3120	~~0.37~~ 0.41	~~0.48~~ 0.53
Iroquois Falls	275	-33	-36	29	21	33	24	6100	5150	~~0.29~~ 0.32	~~0.37~~ 0.41
Jellicoe	330	-36	-39	28	21	32	24	6400	5440	~~0.22~~ 0.24	~~0.30~~ 0.33
Kapuskasing	245	-34	-36	29	21	33	24	6250	5290	~~0.24~~ 0.26	~~0.31~~ 0.34
Kemptville	90	-25	-27	30	23	34	26	4540	3690	~~0.32~~ 0.35	~~0.41~~ 0.45

Kenora	370	-33	-35	28	22	32	25	5630	4730	~~0.23~~ 0.25	~~0.31~~ 0.34
Killaloe	185	-28	-31	30	22	34	25	4960	4070	~~0.27~~ 0.30	~~0.35~~ 0.39
Kincardine	190	-17	-19	28	22	32	25	3890	3100	~~0.37~~ 0.41	~~0.48~~ 0.53
Kingston	80	-22	-24	28	23	32	26	4000	3200	~~0.37~~ 0.41	~~0.47~~ 0.52
Kinmount	295	-26	-28	29	23	33	26	4600	3740	~~0.27~~ 0.30	~~0.35~~ 0.39
Kirkland Lake	325	-33	-36	29	22	33	25	6000	5050	~~0.30~~ 0.33	~~0.39~~ 0.43
Kitchener	335	-19	-21	29	23	33	26	4200	3380	~~0.29~~ 0.32	~~0.37~~ 0.41
Kitchenuhmaykoosib / Big Trout Lake	215	-38	-40	26	20	30	23	7450	–	~~0.31~~ 0.34	~~0.42~~ 0.46
Lakefield	240	-24	-26	30	23	34	26	4330	3500	~~0.30~~ 0.33	~~0.38~~ 0.42
Lansdowne House	240	-38	-40	28	21	32	24	7150	6160	~~0.24~~ 0.26	~~0.32~~ 0.35
Leamington	190	-15	-17	31	24	34	27	3400	2650	~~0.37~~ 0.41	~~0.47~~ 0.52
Lindsay	265	-24	-26	30	23	34	26	4320	3490	~~0.30~~ 0.33	~~0.38~~ 0.42
Lion's Head	185	-19	-21	27	22	31	25	4300	3470	~~0.37~~ 0.41	~~0.48~~ 0.53
Listowel	380	-19	-21	29	23	33	26	4300	3470	~~0.34~~ 0.37	~~0.43~~ 0.47
London	245	-18	-20	30	24	34	27	3900	3110	~~0.37~~ 0.41	~~0.47~~ 0.52
Lucan	300	-17	-19	30	23	34	26	3900	3110	~~0.37~~ 0.41	~~0.48~~ 0.53
Maitland	85	-23	-25	29	23	33	26	4080	3270	~~0.34~~ 0.37	~~0.44~~ 0.48
Markdale	425	-20	-22	29	22	33	25	4500	3650	~~0.32~~ 0.35	~~0.41~~ 0.45
Markham	175	-21	-23	31	24	35	27	4000	3200	~~0.34~~ 0.37	~~0.44~~ 0.48
Martin	485	-35	-37	29	22	33	25	5900	4950	~~0.22~~ 0.24	~~0.30~~ 0.33

Matheson	265	-33	-36	29	21	33	24	6080	5130	~~0.30~~ 0.33	~~0.39~~ 0.43
Mattawa	165	-29	-31	30	22	34	25	5050	4130	~~0.25~~ 0.28	~~0.32~~ 0.35
Midland	190	-24	-26	29	23	33	26	4200	3380	~~0.30~~ 0.33	~~0.39~~ 0.43
Milton	200	-18	-20	30	23	34	26	3920	3120	~~0.34~~ 0.37	~~0.43~~ 0.47
Milverton	370	-19	-21	29	23	33	26	4200	3380	~~0.34~~ 0.37	~~0.43~~ 0.47
Minden	270	-27	-29	29	23	33	26	4640	3780	~~0.27~~ 0.30	~~0.35~~ 0.39
Mississauga	160	-18	-20	30	23	34	26	3880	3090	~~0.34~~ 0.37	~~0.44~~ 0.48
Mississauga (Lester B. Pearson Int'l Airport)	170	-20	-22	31	24	35	27	3890	–	~~0.34~~ 0.37	~~0.44~~ 0.48
Mississauga (Port Credit)	75	-18	-20	29	23	33	26	3780	3000	~~0.37~~ 0.41	~~0.48~~ 0.53
Mitchell	335	-18	-20	29	23	33	26	4100	3290	~~0.35~~ 0.39	~~0.45~~ 0.50
Moosonee	10	-36	-38	28	22	32	25	6800	5820	~~0.26~~ 0.29	~~0.35~~ 0.39
Morrisburg	75	-23	-25	30	23	34	26	4370	3530	~~0.32~~ 0.35	~~0.41~~ 0.45
Mount Forest	420	-21	-24	28	22	32	25	4700	3830	~~0.32~~ 0.35	~~0.41~~ 0.45
Nakina	325	-36	-38	28	21	32	24	6500	5530	~~0.22~~ 0.24	~~0.30~~ 0.33
Nanticoke (Jarvis)	205	-17	-18	30	23	34	26	3700	2920	~~0.37~~ 0.41	~~0.48~~ 0.53
Nanticoke (Port Dover)	180	-15	-17	30	24	34	27	3600	2830	~~0.37~~ 0.41	~~0.48~~ 0.53
Napanee	90	-22	-24	29	23	33	26	4140	3320	~~0.34~~ 0.37	~~0.43~~ 0.47
Newcastle	115	-20	-22	30	23	34	26	3990	3190	~~0.37~~ 0.41	~~0.48~~ 0.53
Newcastle (Bowmanville)	95	-20	-22	30	23	34	26	4000	–	~~0.37~~ 0.41	~~0.48~~ 0.53

New Liskeard	180	-32	-35	30	22	34	25	5570	4630	~~0.34~~ 0.37	~~0.43~~ 0.47
Newmarket	185	-22	-24	30	23	34	26	4260	3430	~~0.30~~ 0.33	~~0.38~~ 0.42
Niagara Falls	210	-16	-18	30	23	34	26	3600	2830	~~0.34~~ 0.37	~~0.43~~ 0.47
North Bay	210	-28	-30	28	22	32	25	5150	4230	~~0.27~~ 0.30	~~0.34~~ 0.37
Norwood	225	-24	-26	30	23	34	26	4320	3490	~~0.32~~ 0.35	~~0.41~~ 0.45
Oakville	90	-18	-20	30	23	34	26	3760	2980	~~0.37~~ 0.41	~~0.47~~ 0.52
Orangeville	430	-21	-23	29	23	33	26	4450	3610	~~0.28~~ 0.31	~~0.36~~ 0.40
Orillia	230	-25	-27	29	23	33	26	4260	3430	~~0.28~~ 0.31	~~0.36~~ 0.40
Oshawa	110	-19	-21	30	23	34	26	3860	3070	~~0.37~~ 0.41	~~0.48~~ 0.53
Ottawa (Metropolitan)											
Ottawa (Barrhaven)	98	-25	-27	30	23	34	26	4500	3600	~~0.32~~ 0.35	~~0.41~~ 0.45
Ottawa (City Hall)	70	-25	-27	30	23	34	26	4440	3650	~~0.32~~ 0.35	~~0.41~~ 0.45
Ottawa (Kanata)	98	-25	-27	30	23	34	26	4520	3670	~~0.32~~ 0.35	~~0.41~~ 0.45
Ottawa (M-C Int'l Airport)	125	-25	-27	30	23	34	26	4500	3650	~~0.32~~ 0.35	~~0.41~~ 0.45
Ottawa (Orléans)	70	-26	-28	30	23	33	26	4500	3650	~~0.32~~ 0.35	~~0.41~~ 0.45
Owen Sound	215	-19	-21	29	22	33	25	4030	3220	~~0.34~~ 0.37	~~0.44~~ 0.48
Pagwa River	185	-35	-37	28	21	32	24	6500	5530	~~0.22~~ 0.24	~~0.30~~ 0.33
Paris	245	-18	-20	30	23	34	26	4000	3200	~~0.33~~ 0.36	~~0.42~~ 0.46
Parkhill	205	-16	-18	31	23	35	26	3800	3010	~~0.37~~ 0.41	~~0.48~~ 0.53
Parry Sound	215	-24	-26	28	22	32	25	4640	3780	~~0.30~~ 0.33	~~0.39~~ 0.43

Pelham (Fonthill)	230	-15	-17	30	23	34	26	3690	2910	~~0.33~~ 0.36	~~0.42~~ 0.46
Pembroke	125	-28	-31	30	23	34	26	4980	4090	~~0.27~~ 0.30	~~0.35~~ 0.39
Penetanguishene	220	-24	-26	29	23	33	26	4200	3380	~~0.30~~ 0.33	~~0.39~~ 0.43
Perth	130	-25	-27	30	23	34	26	4540	3690	~~0.32~~ 0.35	~~0.41~~ 0.45
Petawawa	135	-29	-31	30	23	34	26	4980	4090	~~0.27~~ 0.30	~~0.35~~ 0.39
Peterborough	200	-23	-25	30	23	34	26	4400	3560	~~0.32~~ 0.35	~~0.41~~ 0.45
Petrolia	195	-16	-18	31	24	34	27	3640	2870	~~0.37~~ 0.41	~~0.47~~ 0.52
Pickering (Dunbarton)	85	-19	-21	30	23	34	26	3800	3010	~~0.37~~ 0.41	~~0.48~~ 0.53
Picton	95	-21	-23	29	23	33	26	3980	3180	~~0.38~~ 0.42	~~0.49~~ 0.54
Plattsville	300	-19	-21	29	23	33	26	4150	3330	~~0.33~~ 0.36	~~0.42~~ 0.46
Point Alexander	150	-29	-32	30	22	34	25	4960	4040	~~0.27~~ 0.30	~~0.35~~ 0.39
Port Burwell	195	-15	-17	30	24	34	27	3800	3010	~~0.37~~ 0.41	~~0.47~~ 0.52
Port Colborne	180	-15	-17	30	24	34	27	3600	2830	~~0.36~~ 0.40	~~0.46~~ 0.51
Port Elgin	205	-17	-19	28	22	32	25	4100	3290	~~0.37~~ 0.41	~~0.48~~ 0.53
Port Hope	100	-21	-23	29	23	33	26	3970	3170	~~0.37~~ 0.41	~~0.48~~ 0.53
Port Perry	270	-22	-24	30	23	34	26	4260	3430	~~0.34~~ 0.37	~~0.44~~ 0.48
Port Stanley	180	-15	-17	31	24	35	27	3850	3060	~~0.37~~ 0.41	~~0.47~~ 0.52
Prescott	90	-23	-25	29	23	33	26	4120	3310	~~0.34~~ 0.37	~~0.44~~ 0.48
Princeton	280	-18	-20	30	23	34	26	4000	3200	~~0.33~~ 0.36	~~0.42~~ 0.46
Raith	475	-34	-37	28	22	32	25	5900	4950	~~0.22~~ 0.24	~~0.30~~ 0.33

Rayside-Balfour (Chelmsford)	270	-28	-30	29	21	33	24	5200	4280	~~0.35~~ 0.39	~~0.45~~ 0.50
Red Lake	360	-35	-37	28	21	32	24	6220	5290	~~0.22~~ 0.24	~~0.30~~ 0.33
Renfrew	115	-27	-30	30	23	34	26	4900	4020	~~0.27~~ 0.30	~~0.35~~ 0.39
Richmond Hill	230	-21	-23	31	24	35	27	4000	3200	~~0.34~~ 0.37	~~0.44~~ 0.48
Rockland	50	-26	-28	30	23	34	26	4600	3740	~~0.31~~ 0.34	~~0.40~~ 0.44
Sarnia	190	-16	-18	31	24	34	27	3750	2970	~~0.37~~ 0.41	~~0.47~~ 0.52
Sault Ste. Marie	190	-25	-28	29	22	33	25	4960	4040	~~0.33~~ 0.36	~~0.44~~ 0.48
Schreiber	310	-34	-36	27	21	31	24	5960	5010	~~0.29~~ 0.32	~~0.39~~ 0.43
Seaforth	310	-17	-19	30	23	34	26	4100	3290	~~0.35~~ 0.39	~~0.45~~ 0.50
Shelburne	495	-22	-24	29	23	33	26	4700	3830	~~0.31~~ 0.34	~~0.40~~ 0.44
Simcoe	210	-17	-19	30	24	34	27	3700	2920	~~0.35~~ 0.39	~~0.45~~ 0.50
Sioux Lookout	375	-34	-36	28	22	32	25	5950	5030	~~0.22~~ 0.24	~~0.30~~ 0.33
Smiths Falls	130	-25	-27	30	23	34	26	4540	3690	~~0.32~~ 0.35	~~0.41~~ 0.45
Smithville	185	-16	-18	30	23	34	26	3650	2880	~~0.33~~ 0.36	~~0.42~~ 0.46
Smooth Rock Falls	235	-34	-36	29	21	33	24	6250	5290	~~0.25~~ 0.28	~~0.32~~ 0.35
Southampton	180	-17	-19	28	22	32	25	4100	3290	~~0.37~~ 0.41	~~0.48~~ 0.53
South River	355	-27	-29	29	22	33	25	5090	4190	~~0.27~~ 0.30	~~0.35~~ 0.39
St. Catharines	105	-16	-18	30	23	34	26	3540	2780	~~0.36~~ 0.40	~~0.46~~ 0.51
St. Marys	310	-18	-20	30	23	34	26	4000	3200	~~0.37~~ 0.41	~~0.47~~ 0.52
St. Thomas	225	-16	-18	31	24	35	27	3780	3000	~~0.37~~ 0.41	~~0.47~~ 0.52

Stirling	120	-23	-25	30	23	34	26	4220	3400	~~0.31~~ 0.34	~~0.40~~ 0.44
Stratford	360	-18	-20	29	23	33	26	4050	3240	~~0.35~~ 0.39	~~0.45~~ 0.50
Strathroy	225	-17	-19	31	24	35	27	3780	3000	~~0.37~~ 0.41	~~0.47~~ 0.52
Sturgeon Falls	205	-28	-30	29	21	33	24	5200	4280	~~0.27~~ 0.30	~~0.35~~ 0.39
Sudbury	275	-28	-30	29	21	33	24	5180	4260	~~0.36~~ 0.40	~~0.46~~ 0.51
Sundridge	340	-27	-29	29	22	33	25	5080	4180	~~0.27~~ 0.30	~~0.35~~ 0.39
Tavistock	340	-19	-21	29	23	33	26	4100	3290	~~0.35~~ 0.39	~~0.45~~ 0.50
Temagami	300	-30	-33	30	22	34	25	5420	4490	~~0.29~~ 0.32	~~0.37~~ 0.41
Thamesford	280	-19	-21	30	23	34	26	3950	3150	~~0.37~~ 0.41	~~0.48~~ 0.53
Thedford	205	-16	-18	31	23	35	26	3710	2930	~~0.37~~ 0.41	~~0.48~~ 0.53
Thunder Bay	210	-31	-33	29	21	33	24	5650	4710	~~0.29~~ 0.32	~~0.39~~ 0.43
Tillsonburg	215	-17	-19	30	24	34	27	3840	3050	~~0.34~~ 0.37	~~0.44~~ 0.48
Timmins	300	-34	-36	29	21	33	24	5940	4990	~~0.27~~ 0.30	~~0.35~~ 0.39
Timmins (Porcupine)	295	-34	-36	29	21	33	24	6000	5050	~~0.29~~ 0.32	~~0.37~~ 0.41
Toronto Metropolitan Region											
Etobicoke	160	-20	-22	31	24	35	27	3800	3010	~~0.34~~ 0.37	~~0.44~~ 0.48
North York	175	-20	-22	31	24	35	27	3760	2980	~~0.34~~ 0.37	~~0.44~~ 0.48
Scarborough	180	-20	-22	31	24	35	27	3800	3010	~~0.37~~ 0.41	~~0.47~~ 0.52
Toronto (City Hall)	90	-18	-20	31	23	35	26	3520	2760	~~0.34~~ 0.37	~~0.44~~ 0.48
Trenton	80	-22	-24	29	23	33	26	4110	3300	~~0.37~~ 0.41	~~0.47~~ 0.52

Trout Creek	330	-27	-29	29	22	33	25	5100	4200	~~0.27~~ 0.30	~~0.35~~ 0.39
Uxbridge	275	-22	-24	30	23	34	26	4240	3410	~~0.33~~ 0.36	~~0.42~~ 0.46
Vaughan (Woodbridge)	165	-20	-22	31	24	35	27	4100	3290	~~0.34~~ 0.37	~~0.44~~ 0.48
Vittoria	215	-15	-17	30	24	34	27	3680	2900	~~0.37~~ 0.41	~~0.47~~ 0.52
Walkerton	275	-18	-20	30	22	34	25	4300	3470	~~0.36~~ 0.40	~~0.46~~ 0.51
Wallaceburg	180	-16	-18	31	24	34	27	3600	2830	~~0.35~~ 0.39	~~0.45~~ 0.50
Waterloo	330	-19	-21	29	23	33	26	4200	3380	~~0.29~~ 0.32	~~0.37~~ 0.41
Watford	240	-17	-19	31	24	35	27	3740	2960	~~0.37~~ 0.41	~~0.47~~ 0.52
Wawa	290	-34	-36	26	21	30	24	5840	4900	~~0.30~~ 0.33	~~0.39~~ 0.43
Welland	180	-15	-17	30	23	34	26	3670	2900	~~0.34~~ 0.37	~~0.43~~ 0.47
West Lorne	215	-16	-18	31	24	35	27	3700	2920	~~0.37~~ 0.41	~~0.47~~ 0.52
Whitby	85	-20	-22	30	23	34	26	3820	3030	~~0.37~~ 0.41	~~0.48~~ 0.53
Whitby (Brooklin)	160	-20	-22	30	23	34	26	4010	3210	~~0.35~~ 0.39	~~0.45~~ 0.50
White River	375	-39	-42	28	21	32	24	6150	5200	~~0.22~~ 0.24	~~0.30~~ 0.33
Wiarton	185	-19	-21	29	22	33	25	4300	3470	~~0.34~~ 0.37	~~0.44~~ 0.48
Windsor	185	-16	-18	32	24	35	27	3400	2650	~~0.37~~ 0.41	~~0.47~~ 0.52
Wingham	310	-18	-20	30	23	34	26	4220	3400	~~0.36~~ 0.40	~~0.46~~ 0.51
Woodstock	300	-19	-21	30	23	34	26	3910	3110	~~0.34~~ 0.37	~~0.44~~ 0.48
Wyoming	215	-16	-18	31	24	34	27	3700	2920	~~0.37~~ 0.41	~~0.47~~ 0.52
Québec											

Acton Vale	95	-24	-27	30	23	34	26	4620	3790	~~0.27~~ 0.28	~~0.35~~ 0.37
Alma	110	-31	-33	28	22	32	25	5800	4860	~~0.27~~ 0.28	~~0.35~~ 0.37
Amos	295	-34	-36	28	21	32	24	6160	5210	~~0.25~~ 0.26	~~0.32~~ 0.34
Aylmer	90	-25	-28	30	23	34	26	4520	3620	~~0.32~~ 0.34	~~0.41~~ 0.43
Baie-Comeau	60	-27	-29	25	19	29	22	6020	5070	~~0.39~~ 0.41	~~0.50~~ 0.53
Baie-Saint-Paul	20	-27	-29	28	21	32	24	5280	4350	~~0.37~~ 0.39	~~0.48~~ 0.50
Beauport	45	-26	-29	28	22	32	25	5100	4180	~~0.33~~ 0.35	~~0.42~~ 0.44
Bedford	55	-24	-26	29	23	33	26	4420	3610	~~0.29~~ 0.30	~~0.37~~ 0.39
Beloeil	25	-24	-26	30	23	34	26	4500	3680	~~0.29~~ 0.30	~~0.37~~ 0.39
Brome	210	-25	-27	29	23	33	26	4730	3880	~~0.29~~ 0.30	~~0.37~~ 0.39
Brossard	15	-24	-26	30	23	34	26	4420	3610	~~0.34~~ 0.36	~~0.44~~ 0.46
Buckingham	130	-26	-28	30	23	33	26	4880	3970	~~0.31~~ 0.33	~~0.40~~ 0.42
Campbell's Bay	115	-28	-30	30	23	34	26	4900	3980	~~0.25~~ 0.26	~~0.32~~ 0.34
Chambly	20	-24	-26	30	23	34	26	4450	3630	~~0.31~~ 0.33	~~0.40~~ 0.42
Coaticook	295	-25	-27	28	22	32	25	4750	3840	~~0.27~~ 0.28	~~0.35~~ 0.37
Contrecoeur	10	-25	-27	30	23	34	26	4500	3680	~~0.34~~ 0.36	~~0.43~~ 0.45
Cowansville	120	-25	-27	29	23	33	26	4540	3710	~~0.29~~ 0.30	~~0.37~~ 0.39
Deux-Montagnes	25	-25	-27	29	23	33	26	4440	3630	~~0.29~~ 0.30	~~0.37~~ 0.39
Dolbeau	120	-32	-34	28	22	32	25	6250	5290	~~0.27~~ 0.28	~~0.35~~ 0.37
Drummondville	85	-26	-28	30	23	34	26	4700	3860	~~0.27~~ 0.28	~~0.35~~ 0.37

Farnham	60	-24	-26	29	23	33	26	4500	3680	~~0.29~~ 0.30	~~0.37~~ 0.39
Fort-Coulonge	110	-28	-30	30	23	34	26	4950	4030	~~0.25~~ 0.26	~~0.32~~ 0.34
Gagnon	545	-34	-36	24	19	28	22	7600	6600	~~0.30~~ 0.32	~~0.39~~ 0.41
Gaspé	55	-25	-26	26	20	30	23	5500	4570	~~0.37~~ 0.39	~~0.48~~ 0.50
Gatineau	95	-25	-28	30	23	34	26	4600	3690	~~0.32~~ 0.34	~~0.41~~ 0.43
Gracefield	175	-28	-31	30	23	34	26	5080	4160	~~0.25~~ 0.26	~~0.32~~ 0.34
Granby	120	-25	-27	29	23	33	26	4500	3680	~~0.27~~ 0.28	~~0.35~~ 0.37
Harrington Harbour	30	-27	-29	19	16	23	20	6150	5200	~~0.56~~ 0.59	~~0.72~~ 0.76
Havre-Saint-Pierre	5	-27	-29	22	18	26	22	6100	5150	~~0.49~~ 0.51	~~0.63~~ 0.66
Hemmingford	75	-24	-26	30	23	34	26	4380	3570	~~0.31~~ 0.33	~~0.40~~ 0.42
Hull	65	-25	-28	30	23	34	26	4550	3650	~~0.32~~ 0.34	~~0.41~~ 0.43
Iberville	35	-24	-26	29	23	33	26	4450	3630	~~0.32~~ 0.34	~~0.41~~ 0.43
Inukjuak	5	-36	-38	21	15	26	19	9150	8100	~~0.37~~ 0.39	~~0.48~~ 0.50
Joliette	45	-26	-28	29	23	33	26	4720	3870	~~0.28~~ 0.29	~~0.36~~ 0.38
Kuujjuaq	25	-37	-39	24	17	29	21	8550	7520	~~0.47~~ 0.49	~~0.60~~ 0.63
Kuujjuarapik	20	-36	-38	25	17	29	20	7990	6980	~~0.37~~ 0.39	~~0.48~~ 0.50
Lachute	65	-26	-28	29	23	33	26	4640	4570	~~0.31~~ 0.33	~~0.40~~ 0.42
Lac-Mégantic	420	-27	-29	27	22	31	25	5180	4470	~~0.27~~ 0.28	~~0.35~~ 0.37
La Malbaie	25	-26	-28	28	21	32	24	5400	3800	~~0.37~~ 0.39	~~0.48~~ 0.50
La Pocatière	55	-24	-26	28	22	32	25	5160	4240	~~0.39~~ 0.41	~~0.50~~ 0.53

La Tuque	165	-30	-32	29	22	33	25	5500	4260	~~0.27~~ 0.28	~~0.35~~ 0.37
Lennoxville	155	-28	-30	29	22	33	25	4700	3790	~~0.25~~ 0.26	~~0.32~~ 0.34
Léry	30	-24	-26	29	23	33	26	4420	3610	~~0.33~~ 0.35	~~0.42~~ 0.44
Loretteville	100	-26	-29	28	22	32	25	5200	4280	~~0.32~~ 0.34	~~0.41~~ 0.43
Louiseville	15	-25	-28	29	23	33	26	4900	4030	~~0.34~~ 0.36	~~0.43~~ 0.45
Magog	215	-26	-28	29	23	33	26	4730	3880	~~0.27~~ 0.28	~~0.35~~ 0.37
Malartic	325	-33	-36	29	21	33	24	6200	5240	~~0.25~~ 0.26	~~0.32~~ 0.34
Maniwaki	180	-30	-32	29	22	33	25	5280	4350	~~0.24~~ 0.25	~~0.31~~ 0.33
Masson	50	-26	-28	30	23	33	26	4610	3700	~~0.31~~ 0.33	~~0.40~~ 0.42
Matane	5	-24	-26	24	20	28	23	5510	4580	~~0.43~~ 0.45	~~0.55~~ 0.58
Mont-Joli	90	-24	-26	26	21	30	24	5370	4440	~~0.41~~ 0.43	~~0.52~~ 0.55
Mont-Laurier	225	-29	-32	29	22	33	25	5320	4390	~~0.23~~ 0.24	~~0.30~~ 0.32
Montmagny	10	-25	-28	28	22	32	25	5090	4170	~~0.37~~ 0.39	~~0.47~~ 0.49
Montréal Region											
Beaconsfield	25	-24	-26	30	23	34	26	4440	3630	~~0.33~~ 0.35	~~0.42~~ 0.44
Dorval	25	-24	-26	30	23	34	26	4400	3590	~~0.34~~ 0.36	~~0.44~~ 0.46
Laval	35	-24	-26	29	23	33	26	4500	3680	~~0.33~~ 0.35	~~0.42~~ 0.44
Montréal (City Hall)	20	-23	-26	30	23	34	26	4200	3410	~~0.34~~ 0.36	~~0.44~~ 0.46
Montréal-Est	25	-23	-26	30	23	34	26	4470	3650	~~0.34~~ 0.36	~~0.44~~ 0.46
Montréal-Nord	20	-24	-26	30	23	34	26	4470	3650	~~0.33~~ 0.35	~~0.42~~ 0.44

Outremont	105	-23	-26	30	23	34	26	4300	3500	~~0.34~~ 0.36	~~0.44~~ 0.46
Pierrefonds	25	-24	-26	30	23	34	26	4430	3620	~~0.33~~ 0.35	~~0.42~~ 0.44
Sainte-Anne-de-Bellevue	35	-24	-26	29	23	33	26	4460	3640	~~0.33~~ 0.35	~~0.42~~ 0.44
Saint-Lambert	15	-23	-26	30	23	34	26	4400	3590	~~0.34~~ 0.36	~~0.44~~ 0.46
Saint-Laurent	45	-23	-26	30	23	34	26	4270	3470	~~0.34~~ 0.36	~~0.44~~ 0.46
Verdun	20	-23	-26	30	23	34	26	4200	3410	~~0.34~~ 0.36	~~0.44~~ 0.46
Nicolet (Gentilly)	15	-25	-28	29	23	33	26	4900	3980	~~0.33~~ 0.35	~~0.42~~ 0.44
Nitchequon	545	-39	-41	23	19	27	22	8100	7080	~~0.29~~ 0.30	~~0.37~~ 0.39
Noranda	305	-33	-36	29	21	33	24	6050	5100	~~0.27~~ 0.28	~~0.35~~ 0.37
Percé	5	-21	-24	25	19	29	23	5400	4470	~~0.49~~ 0.51	~~0.63~~ 0.66
Pincourt	25	-24	-26	29	23	33	26	4480	3660	~~0.33~~ 0.35	~~0.42~~ 0.44
Plessisville	145	-26	-28	29	23	33	26	5100	4180	~~0.27~~ 0.28	~~0.35~~ 0.37
Port-Cartier	20	-28	-30	25	19	29	22	6060	5110	~~0.42~~ 0.44	~~0.54~~ 0.57
Puvirnituq	5	-36	-38	23	16	29	21	9200	8150	~~0.47~~ 0.49	~~0.60~~ 0.63
Québec City Region											
Ancienne-Lorette	35	-25	-28	28	23	32	26	5130	4210	~~0.32~~ 0.34	~~0.41~~ 0.43
Lévis	50	-25	-28	28	22	32	25	5050	4130	~~0.32~~ 0.34	~~0.41~~ 0.43
Québec	120	-25	-28	28	22	32	25	5080	4160	~~0.32~~ 0.34	~~0.41~~ 0.43
Sainte-Foy	115	-25	-28	28	23	32	26	5100	4180	~~0.32~~ 0.34	~~0.41~~ 0.43
Sillery	10	-25	-28	28	23	32	26	5070	4150	~~0.32~~ 0.34	~~0.41~~ 0.43

Richmond	150	-25	-27	29	22	33	25	4700	3860	~~0.25~~ 0.26	~~0.32~~ 0.34
Rimouski	30	-25	-27	26	20	30	23	5300	4370	~~0.41~~ 0.43	~~0.52~~ 0.55
Rivière-du-Loup	55	-25	-27	26	21	30	24	5380	4450	~~0.39~~ 0.41	~~0.50~~ 0.53
Roberval	100	-31	-33	28	21	32	24	5750	4810	~~0.27~~ 0.28	~~0.35~~ 0.37
Rock Island	160	-25	-27	29	23	33	26	4850	3990	~~0.27~~ 0.28	~~0.35~~ 0.37
Rosemère	25	-24	-26	29	23	33	26	4550	3720	~~0.31~~ 0.33	~~0.40~~ 0.42
Rouyn	300	-33	-36	29	21	33	24	6050	5100	~~0.27~~ 0.28	~~0.35~~ 0.37
Saguenay	10	-30	-32	28	22	32	25	5700	4760	~~0.28~~ 0.29	~~0.36~~ 0.38
Saguenay (Bagotville)	5	-31	-33	28	21	32	24	5700	4760	~~0.30~~ 0.32	~~0.38~~ 0.40
Saguenay (Jonquière)	135	-30	-32	28	22	32	25	5650	4710	~~0.27~~ 0.28	~~0.35~~ 0.37
Saguenay (Kénogami)	140	-30	-32	28	22	32	25	5650	4710	~~0.27~~ 0.28	~~0.35~~ 0.37
Sainte-Agathe-des-Monts	360	-28	-30	28	22	32	25	5390	4470	~~0.27~~ 0.28	~~0.35~~ 0.37
Saint-Eustache	35	-25	-27	29	23	33	26	4500	3680	~~0.29~~ 0.30	~~0.37~~ 0.39
Saint-Félicien	105	-32	-34	28	22	32	25	5850	4900	~~0.27~~ 0.28	~~0.35~~ 0.37
Saint-Georges-de-Cacouna	35	-25	-27	26	21	30	24	5400	4470	~~0.39~~ 0.41	~~0.50~~ 0.53
Saint-Hubert	25	-24	-26	30	23	34	26	4490	3670	~~0.34~~ 0.36	~~0.44~~ 0.46
Saint-Hubert-de-Rivière-du-Loup	310	-26	-28	26	21	30	24	5520	4590	~~0.31~~ 0.33	~~0.40~~ 0.42
Saint-Hyacinthe	35	-24	-27	30	23	34	26	4500	3680	~~0.27~~ 0.28	~~0.35~~ 0.37
Saint-Jean-sur-Richelieu	35	-24	-26	29	23	33	26	4450	3630	~~0.32~~ 0.34	~~0.41~~ 0.43
Saint-Jérôme	95	-26	-28	29	23	33	26	4820	3960	~~0.29~~ 0.30	~~0.37~~ 0.39

Saint-Jovite	230	-29	-31	28	22	32	25	5250	4340	~~0.26~~ 0.27	~~0.33~~ 0.35
Saint-Lazare / Hudson	60	-24	-26	30	23	34	26	4520	3700	~~0.33~~ 0.35	~~0.42~~ 0.44
Saint-Nicolas	65	-25	-28	28	22	32	25	4990	4070	~~0.33~~ 0.35	~~0.42~~ 0.44
Salaberry-de-Valleyfield	50	-23	-25	29	23	33	26	4400	3590	~~0.33~~ 0.35	~~0.42~~ 0.44
Schefferville	550	-37	-39	24	16	28	20	8550	7520	~~0.33~~ 0.35	~~0.42~~ 0.44
Senneterre	310	-34	-36	29	21	33	24	6180	5220	~~0.25~~ 0.26	~~0.32~~ 0.34
Sept-Îles	5	-29	-31	24	18	28	22	6200	5240	~~0.42~~ 0.44	~~0.54~~ 0.57
Shawinigan	60	-26	-29	29	23	33	26	5050	4130	~~0.27~~ 0.28	~~0.35~~ 0.37
Shawville	170	-27	-30	30	23	34	26	4880	3970	~~0.27~~ 0.28	~~0.35~~ 0.37
Sherbrooke	185	-28	-30	29	23	33	26	4700	3790	~~0.25~~ 0.26	~~0.32~~ 0.34
Sorel	10	-25	-27	29	23	33	26	4550	3720	~~0.34~~ 0.36	~~0.43~~ 0.45
Sutton	185	-25	-27	29	23	33	26	4600	3770	~~0.29~~ 0.30	~~0.37~~ 0.39
Tadoussac	65	-26	-28	27	21	31	24	5450	4520	~~0.41~~ 0.43	~~0.52~~ 0.55
Témiscaming	240	-30	-32	30	22	34	25	5020	4100	~~0.25~~ 0.26	~~0.32~~ 0.34
Terrebonne	20	-25	-27	29	23	33	26	4500	3680	~~0.31~~ 0.33	~~0.40~~ 0.42
Thetford Mines	330	-26	-28	28	22	32	25	5120	4200	~~0.27~~ 0.28	~~0.35~~ 0.37
Thurso	50	-26	-28	30	23	34	26	4820	3910	~~0.31~~ 0.33	~~0.40~~ 0.42
Trois-Rivières	25	-25	-28	29	23	33	26	4900	3980	~~0.34~~ 0.36	~~0.43~~ 0.45
Val-des-Sources	245	-26	-28	29	22	33	25	4800	3890	~~0.27~~ 0.28	~~0.35~~ 0.37
Val-d'Or	310	-33	-36	29	21	33	24	6180	5220	~~0.25~~ 0.26	~~0.32~~ 0.34

Varennes	15	-24	-26	30	23	34	26	4500	3680	~~0.31~~ 0.33	~~0.40~~ 0.42
Verchères	15	-24	-26	30	23	34	26	4450	3630	~~0.34~~ 0.36	~~0.43~~ 0.45
Victoriaville	125	-26	-28	29	23	33	26	4900	3980	~~0.27~~ 0.28	~~0.35~~ 0.37
Ville-Marie	200	-31	-34	30	22	34	25	5550	4610	~~0.31~~ 0.33	~~0.40~~ 0.42
Wakefield	120	-27	-30	30	23	34	26	4820	3910	~~0.27~~ 0.28	~~0.34~~ 0.36
Waterloo	205	-25	-27	29	23	33	26	4650	3810	~~0.27~~ 0.28	~~0.35~~ 0.37
Windsor	150	-25	-27	29	23	33	26	4700	3860	~~0.25~~ 0.26	~~0.32~~ 0.34
New Brunswick											
Alma	5	-21	-23	26	20	29	23	4500	3600	~~0.37~~ 0.41	~~0.48~~ 0.53
Bathurst	10	-23	-26	30	22	34	25	5020	4100	~~0.37~~ 0.41	~~0.48~~ 0.53
Boiestown	65	-25	-28	29	21	33	24	4900	–	~~0.30~~ 0.33	~~0.39~~ 0.43
Campbellton	30	-26	-28	29	22	33	25	5500	4570	~~0.35~~ 0.39	~~0.45~~ 0.50
Edmundston	160	-27	-29	28	22	32	25	5320	4500	~~0.30~~ 0.33	~~0.38~~ 0.42
Fredericton	15	-24	-27	29	22	33	25	4670	3760	~~0.30~~ 0.33	~~0.38~~ 0.42
Gagetown	20	-24	-26	29	22	32	25	4460	3560	~~0.31~~ 0.34	~~0.40~~ 0.44
Grand Falls	115	-27	-30	28	22	32	25	5300	4450	~~0.30~~ 0.33	~~0.38~~ 0.42
Miramichi	5	-24	-26	30	22	34	25	4950	4030	~~0.32~~ 0.35	~~0.41~~ 0.45
Moncton	20	-23	-25	28	21	31	24	4680	3770	~~0.39~~ 0.43	~~0.50~~ 0.55
Oromocto	20	-24	-26	29	22	33	25	4650	3740	~~0.30~~ 0.33	~~0.39~~ 0.43
Sackville	15	-22	-24	27	21	30	24	4590	3680	~~0.38~~ 0.42	~~0.49~~ 0.54

Saint Andrews	35	-22	-24	25	20	28	23	4680	3770	~~0.35~~ 0.39	~~0.45~~ 0.50
Saint John	5	-22	-24	25	20	28	23	4570	3670	~~0.41~~ 0.45	~~0.53~~ 0.58
Shippagan	5	-22	-24	28	21	32	24	4930	4010	~~0.49~~ 0.54	~~0.63~~ 0.69
St. George	35	-21	-23	25	20	28	23	4680	3770	~~0.35~~ 0.39	~~0.45~~ 0.50
St. Stephen	20	-24	-26	28	22	31	25	4700	3790	~~0.33~~ 0.36	~~0.42~~ 0.46
Woodstock	60	-26	-29	30	22	34	25	4910	3990	~~0.29~~ 0.32	~~0.37~~ 0.41
Nova Scotia											
Amherst	25	-21	-24	27	21	31	24	4500	3600	~~0.37~~ 0.41	~~0.48~~ 0.53
Antigonish	10	-17	-20	27	21	31	24	4510	3610	~~0.42~~ 0.46	~~0.54~~ 0.59
Bridgewater	10	-15	-17	27	20	30	23	4140	3250	~~0.43~~ 0.47	~~0.55~~ 0.61
Canso	5	-13	-15	25	20	29	23	4400	3500	~~0.48~~ 0.53	~~0.61~~ 0.67
Debert	45	-21	-24	27	21	31	24	4500	3600	~~0.37~~ 0.41	~~0.48~~ 0.53
Digby	35	-15	-17	25	20	28	23	4020	3130	~~0.43~~ 0.47	~~0.55~~ 0.61
Greenwood (CFB)	28	-18	-20	29	22	32	25	4140	3250	~~0.42~~ 0.46	~~0.54~~ 0.59
Halifax Region											
Dartmouth	10	-16	-18	26	20	29	23	4100	3210	~~0.45~~ 0.50	~~0.58~~ 0.64
Halifax	55	-16	-18	26	20	29	23	4000	3110	~~0.45~~ 0.50	~~0.58~~ 0.64
Kentville	25	-18	-20	28	21	31	24	4130	3240	~~0.42~~ 0.46	~~0.54~~ 0.59
Liverpool	20	-16	-18	27	20	30	23	3990	3100	~~0.48~~ 0.53	~~0.61~~ 0.67
Lockeport	5	-14	-16	25	20	28	23	4000	3110	~~0.47~~ 0.52	~~0.60~~ 0.66
Louisbourg	5	-15	-17	26	20	30	23	4530	3630	~~0.51~~ 0.56	~~0.65~~ 0.72

Lunenburg	25	-15	-17	26	20	29	23	4140	3250	~~0.48~~ 0.53	~~0.61~~ 0.67
New Glasgow	30	-19	-21	27	21	31	24	4320	3420	~~0.43~~ 0.47	~~0.55~~ 0.61
North Sydney	20	-16	-19	27	21	31	24	4500	3600	~~0.46~~ 0.51	~~0.59~~ 0.65
Pictou	25	-19	-21	27	21	31	24	4310	3410	~~0.43~~ 0.47	~~0.55~~ 0.61
Port Hawkesbury	40	-17	-19	27	21	31	24	4500	3600	~~0.48~~ 0.53	~~0.61~~ 0.67
Springhill	185	-20	-23	27	21	31	24	4540	3640	~~0.37~~ 0.41	~~0.48~~ 0.53
Stewiacke	25	-20	-22	27	21	30	24	4400	3500	~~0.39~~ 0.43	~~0.50~~ 0.55
Sydney	5	-16	-19	27	21	31	24	4530	3630	~~0.46~~ 0.51	~~0.59~~ 0.65
Tatamagouche	25	-20	-23	27	21	31	24	4380	3480	~~0.43~~ 0.47	~~0.55~~ 0.61
Truro	25	-20	-22	27	21	30	24	4500	3600	~~0.37~~ 0.41	~~0.48~~ 0.53
Wolfville	35	-19	-21	28	21	31	24	4140	3250	~~0.42~~ 0.46	~~0.54~~ 0.59
Yarmouth	10	-14	-16	22	19	25	22	3990	3100	~~0.44~~ 0.48	~~0.56~~ 0.62
Prince Edward Island											
Charlottetown	5	-20	-22	26	21	30	24	4460	3650	~~0.44~~ 0.48	~~0.56~~ 0.62
Souris	5	-19	-21	27	21	31	24	4550	3650	~~0.45~~ 0.50	~~0.58~~ 0.64
Summerside	10	-20	-22	27	21	31	24	4600	3690	~~0.47~~ 0.52	~~0.60~~ 0.66
Tignish	10	-20	-22	27	21	31	24	4770	3860	~~0.51~~ 0.56	~~0.66~~ 0.73
Newfoundland and Labrador											
Argentia	15	-12	-14	21	18	25	22	4600	3620	~~0.59~~ 0.65	~~0.75~~ 0.83
Bonavista	15	-14	-16	24	19	28	22	5000	4000	~~0.66~~ 0.73	~~0.84~~ 0.92

Buchans	255	-24	-27	27	20	31	24	5250	4240	~~0.47~~ 0.52	~~0.60~~ 0.66
Cape Harrison	5	-29	-31	26	16	30	20	6900	5920	~~0.47~~ 0.52	~~0.60~~ 0.66
Cape Race	5	-11	-13	19	18	23	22	4900	3900	~~0.82~~ 0.90	~~1.05~~ 1.16
Channel-Port aux Basques	5	-13	-15	19	18	23	22	5000	4000	~~0.61~~ 0.67	~~0.78~~ 0.86
Corner Brook	35	-16	-18	26	20	30	23	4760	3770	~~0.43~~ 0.47	~~0.55~~ 0.61
Gander	125	-18	-20	27	20	31	24	5110	4110	~~0.47~~ 0.52	~~0.60~~ 0.66
Grand Bank	5	-14	-15	20	18	24	22	4550	3570	~~0.58~~ 0.64	~~0.74~~ 0.81
Grand Falls	60	-26	-29	27	20	31	24	5020	4020	~~0.47~~ 0.52	~~0.60~~ 0.66
Happy Valley-Goose Bay	15	-31	-32	27	19	31	23	6670	5700	~~0.33~~ 0.36	~~0.42~~ 0.46
Labrador City	550	-36	-38	24	17	28	20	7710	6710	~~0.31~~ 0.34	~~0.40~~ 0.44
St. Anthony	10	-25	-27	22	18	26	22	6440	5380	~~0.68~~ 0.75	~~0.87~~ 0.96
Stephenville	25	-16	-18	24	19	28	23	4850	3860	~~0.45~~ 0.50	~~0.58~~ 0.64
St. John's	65	-15	-16	24	20	28	23	4800	3810	~~0.61~~ 0.67	~~0.78~~ 0.86
Twin Falls	425	-35	-37	24	17	28	21	7790	6880	~~0.31~~ 0.34	~~0.40~~ 0.44
Wabana	75	-15	-17	24	20	27	23	4750	3760	~~0.59~~ 0.65	~~0.75~~ 0.83
Wabush	550	-36	-38	24	17	28	20	7710	6710	~~0.31~~ 0.34	~~0.40~~ 0.44
Yukon											
Aishihik	920	-44	-46	23	15	27	19	7500	6500	~~0.27~~ 0.28	~~0.38~~ 0.40
Dawson	330	-50	-51	26	16	30	19	8120	7100	~~0.22~~ 0.23	~~0.31~~ 0.33
Destruction Bay	815	-43	-45	23	14	27	18	7800	6790	~~0.42~~ 0.44	~~0.60~~ 0.63

Faro	670	-46	-47	25	16	29	20	7300	6310	~~0.26~~ 0.27	~~0.35~~ 0.37
Haines Junction	600	-45	-47	24	14	29	18	7100	6120	~~0.24~~ 0.25	~~0.34~~ 0.36
Snag	595	-51	-53	23	16	27	19	8300	7280	~~0.22~~ 0.23	~~0.31~~ 0.33
Teslin	690	-42	-44	24	15	28	19	6770	5800	~~0.26~~ 0.27	~~0.34~~ 0.36
Watson Lake	685	-46	-48	26	16	30	20	7470	6470	~~0.26~~ 0.27	~~0.35~~ 0.37
Whitehorse	655	-41	-43	25	15	30	19	6580	5610	~~0.29~~ 0.30	~~0.38~~ 0.40
Northwest Territories											
Aklavik	5	-42	-44	26	17	29	20	9600	8540	~~0.31~~ 0.33	~~0.40~~ 0.42
Behchokǫ̀ / Rae-Edzo	160	-42	-44	25	17	28	20	8300	7280	~~0.31~~ 0.33	~~0.40~~ 0.42
Echo Bay / Port Radium	195	-42	-44	22	16	25	19	9300	8250	~~0.41~~ 0.43	~~0.53~~ 0.56
Fort Good Hope	100	-43	-45	28	18	31	21	8700	7660	~~0.34~~ 0.36	~~0.44~~ 0.46
Fort McPherson	25	-44	-46	26	17	29	20	9150	8100	~~0.31~~ 0.33	~~0.40~~ 0.42
Fort Providence	150	-40	-43	28	18	32	21	7620	6620	~~0.27~~ 0.28	~~0.35~~ 0.37
Fort Resolution	160	-40	-42	26	18	30	21	7750	6740	~~0.30~~ 0.32	~~0.39~~ 0.41
Fort Simpson	120	-42	-44	28	19	31	22	7660	6660	~~0.30~~ 0.32	~~0.39~~ 0.41
Fort Smith	205	-41	-43	28	19	32	22	7300	6310	~~0.30~~ 0.32	~~0.39~~ 0.41
Hay River	45	-38	-41	27	18	31	21	7550	6550	~~0.27~~ 0.28	~~0.35~~ 0.37
Inuvik	45	-43	-45	26	17	30	20	9600	8540	~~0.31~~ 0.33	~~0.40~~ 0.42
Mould Bay	5	-44	-46	11	8	15	12	12900	11730	~~0.45~~ 0.47	~~0.58~~ 0.61
Norman Wells	65	-43	-45	28	18	31	21	8510	7480	~~0.34~~ 0.36	~~0.44~~ 0.46

Tungsten	1340	-49	-51	26	16	30	20	7700	6700	~~0.34~~ 0.36	~~0.44~~ 0.46
Ulukhaktok / Holman	10	-39	-41	18	12	23	16	10700	9600	~~0.67~~ 0.70	~~0.86~~ 0.90
Wrigley	80	-42	-44	28	18	31	21	8050	7040	~~0.30~~ 0.32	~~0.39~~ 0.41
Yellowknife	160	-41	-44	25	17	29	20	8170	7150	~~0.31~~ 0.33	~~0.40~~ 0.42
Nunavut											
Alert	5	-43	-44	13	8	18	12	13030	11860	~~0.59~~ 0.62	~~0.75~~ 0.79
Arctic Bay	15	-42	-44	14	10	19	14	11900	10760	~~0.43~~ 0.45	~~0.55~~ 0.58
Arviat	5	-40	-41	22	16	27	20	9850	8780	~~0.45~~ 0.47	~~0.58~~ 0.61
Baker Lake	5	-42	-44	23	15	28	19	10700	9600	~~0.42~~ 0.44	~~0.54~~ 0.57
Eureka	5	-47	-48	12	8	17	12	13500	12310	~~0.43~~ 0.45	~~0.55~~ 0.58
Igluligaarjuk / Chesterfield Inlet	10	-40	-41	20	14	25	18	10500	9410	~~0.44~~ 0.46	~~0.56~~ 0.59
Iqaluit	45	-40	-41	17	12	21	16	9980	8900	~~0.51~~ 0.54	~~0.65~~ 0.68
Iqaluktuuttiaq / Cambridge Bay	15	-41	-44	18	13	23	17	11670	10540	~~0.39~~ 0.41	~~0.50~~ 0.53
Isachsen	10	-46	-48	12	9	17	13	13600	12410	~~0.47~~ 0.49	~~0.60~~ 0.63
Kangiqiniq / Rankin Inlet	10	-41	-42	21	15	26	19	10500	9410	~~0.47~~ 0.49	~~0.60~~ 0.63
Kanngiqtugaapik / Clyde River	5	-40	-42	14	10	19	14	11300	10180	~~0.43~~ 0.45	~~0.55~~ 0.58
Kugluktuk / Coppermine	10	-41	-43	23	16	27	19	10300	9210	~~0.36~~ 0.38	~~0.46~~ 0.48
Nottingham Island	30	-37	-39	16	13	21	17	10000	8920	~~0.61~~ 0.64	~~0.78~~ 0.82

Resolute	25	-42	-43	11	9	16	13	12360	11210	~~0.46~~ 0.48	~~0.59~~ 0.62
Resolution Island	5	-32	-34	12	10	16	14	9000	7960	~~0.96~~ 1.01	~~1.23~~ 1.29
Salliq / Coral Harbour	15	-41	-42	20	14	25	18	10720	9620	~~0.45~~ 0.47	~~0.58~~ 0.61

Notes to Table [C-1] C-1:

(1) The hourly wind pressure data are used in Subclause 3.2.4.3.(2)(b)(ii).

(2) July design temperatures based on historical observations are provided for the design of mechanical cooling systems. See Note A-Table C-1.

Note A-Table C-1 Historical July Design Temperatures.

Analysis of the energy performance of buildings does not indicate an increased risk of overheating in buildings when mechanical cooling systems are provided and sized using historical July temperatures in the context of a future climate scenario. However, sizing mechanical cooling systems based on future 50-year July temperature projections could result in oversized cooling equipment, which could increase construction costs. Also, the equipment may never experience the elevated temperature condition during its expected service life, which is considerably less than 50 years.

Oversized cooling equipment could decrease the building's energy efficiency and increase energy costs. The oversizing could also lead to increased short-cycling of equipment and to inability of the equipment to meet latent loads, resulting in potentially excessive indoor humidity levels. In addition, increased short-cycling could decrease the service life of the equipment.

Therefore, for the purpose of the design of mechanical cooling system equipment, Table C-1 provides July temperatures based on historical observations.

Impact analysis

The following summarizes the updates to the climate design parameters forming part of NECB Table C-1. The revisions are to account for the potential future climate change effects expected over the 50-year design life of buildings and building components.

January 2.5% Design Temperatures

This parameter is used for the design of heating systems in buildings. The values of this parameter are projected to increase for all reference locations in the future as a consequence of climate warming; therefore, the current historical NECB values are deemed appropriate and are recommended to continue to be used for design. Overall, no change to the NECB 2020 design values of this parameter is expected.

January 1% Design Temperatures

This parameter is also used to design heating systems in buildings. The values of this parameter are projected to increase for all locations in the future as a consequence of climate warming; therefore, the current historical NECB values are considered appropriate and are recommended to continue to be used for design. Overall, no change to the NECB 2020 design values of this parameter is expected.

July 2.5% Dry and Wet Temperatures

This parameter is used for the design of cooling and dehumidifying systems in buildings. To minimize the risk of overheating, the projected values of this parameter are provided for the design of fenestration shading systems, design of advanced fenestration and glazing, and design of the enhanced building envelope. However, for the design of air handling and mechanical cooling equipment, the historical observed values for this parameter are maintained.

Using a July design temperature based on historical observations for the design of mechanical cooling equipment will

- reduce the risk of oversized cooling equipment
- maintain energy efficiency and energy costs for cooling
- minimize equipment short-cycling and maintain service life of equipment
- reduce the risk of excessive indoor humidity levels

Degree Days below 18ºC

This parameter is used to identify the required levels of insulation in the building. The values for this parameter are projected to decrease for all locations in the future as a consequence of climate change; therefore, the current values are deemed appropriate and are recommended to continue to be used for design. Overall, no change to the NECB 2020 design values of this parameter is expected.

1/10 hourly wind pressure (Q_{10})

Table 1 is a summary of changes projected for values of this parameter as a consequence of climate change over the typical design life of buildings (50 years).

Table 1. 1/10 Hourly Wind Pressure

Province or Territory	Number of Locations	$\Delta Q_{10} \leq 0\%$	$0\% < \Delta Q_{10} \leq 5\%$	$5\% < \Delta Q_{10} \leq 10\%$	$10\% < \Delta Q_{10} \leq 15\%$	$\Delta Q_{10} > 15\%$
British Columbia	108	0	15	48	45	0
Alberta	55	0	26	29	0	0
Saskatchewan	31	0	9	22	0	0
Manitoba	24	0	10	14	0	0
Ontario	230	0	0	92	138	0
Quebec	125	0	63	62	0	0
New Brunswick	18	0	0	4	14	0
Nova Scotia	25	0	0	11	14	0
Prince Edward Island	4	0	0	2	2	0
Newfoundland and Labrador	18	0	0	8	10	0
Yukon	9	0	9	0	0	0

Table 1. 1/10 Hourly Wind Pressure (Continued)

Province or Territory	Number of Locations	$\Delta Q_{10} \leq 0\%$	$0\% < \Delta Q_{10} \leq 5\%$	$5\% < \Delta Q_{10} \leq 10\%$	$10\% < \Delta Q_{10} \leq 15\%$	$\Delta Q_{10} > 15\%$
Northwest Territories	17	0	5	12	0	0
Nunavut	16	0	11	5	0	0
Total	**680**	**0**	**148**	**309**	**223**	**0**

Across the 680 locations over a 50-year future timeframe, the projected changes in values of this parameter increase ranging from 3.5% to 12%. Since all locations are projected with future increases in Q_{10}, these increased values are the future projected values.

1/50 hourly wind pressure (Q_{50})

Table 2 is a summary of the changes projected for values of this parameter as a consequence of climate change over the typical design life of buildings (50 years).

Table 2. 1/50 Hourly Wind Pressure

Province or Territory	Number of Locations	$\Delta Q_{50} \leq 0\%$	$0\% < \Delta Q_{50} \leq 5\%$	$5\% < \Delta Q_{50} \leq 10\%$	$10\% < \Delta Q_{50} \leq 15\%$	$\Delta Q_{50} > 15\%$
British Columbia	108	0	23	85	0	0
Alberta	55	0	55	0	0	0
Saskatchewan	31	0	31	0	0	0
Manitoba	24	0	24	0	0	0
Ontario	230	0	0	230	0	0
Quebec	125	0	125	0	0	0
New Brunswick	18	0	0	18	0	0
Nova Scotia	25	0	0	25	0	0
Prince Edward Island	4	0	0	4	0	0
Newfoundland and Labrador	18	0	0	18	0	0
Yukon	9	0	9	0	0	0
Northwest Territories	17	0	17	0	0	0
Nunavut	16	0	16	0	0	0
Total	**680**	**0**	**300**	**380**	**0**	**0**

Across the 680 locations over a 50-year future timeframe, the projected changes in this parameter range from 5% to 10%. Since all locations are projected with future increases in Q_{50}, the increased values are the future projected values. Where changes are greater than 5%, the design of air barriers would need to account for increased pressure.

References

(1) Cannon, A.J., Jeong, D.I., Zhang, X., and F. W. Zwiers. Climate-resilient buildings and core public infrastructure 2020: an assessment of the impact of climate change on climatic design data in Canada. Issued by Environment and Climate Change Canada. 2020.

(2) Hong, H. P., Tang, Q., Yang, S. C., Cui, X. Z., Cannon, A. J., Lounis, Z., and Irwin, P. (2021). Calibration of the design wind load and snow load considering the historical climate statistics and climate change effects. *Structural Safety*, 93, 102135.

Enforcement implications

There are no foreseeable enforcement implications.

Who is affected

Designers, architects, building regulators and building owners.

OBJECTIVE-BASED ANALYSIS OF NEW OR CHANGED PROVISIONS

NECB20 Div.B Appendix C (first printing)

N/A