



Update on Cooling Centres

To: Finance, Budget and Enrolment Committee

Date: 6 June, 2018

Report No.: 06-19-3678

Strategic Directions

- Build Strong Relationships and Partnerships Within School Communities to Support Student Learning and Well-Being

Recommendation

It is recommended that the update report on Cooling Centres be received.

Context

The following report provides an update on strategies to improve occupant comfort during warm weather.

Background

There are several issues that impact the TDSB as it relates to air conditioned spaces, those issues include building age, building design, electrical infrastructure and changing weather patterns. Each is discussed in more detail below:

Building Age

The average age of the TDSB buildings is over 60 years, with the bulk of the schools constructed in the mid-1950's to accommodate the emerging baby boom students. This is twice the average building age for the surrounding Boards such as Peel, Durham, and York. Typically, buildings reflect the techniques and practices prevailing at the time they are constructed, and schools are no different. Given the Toronto climate of 60 to 80 years ago, great attention was paid to the heating system, with 100% redundancy being common. Newer buildings were built to different standards with emphasis on energy efficiency, leading to lower heat gain/loss from the exterior.

Mechanical Cooling

Natural ventilation was the traditional method of choice for providing occupant comfort, occasionally augmented by general exhaust fans. The use of air handling equipment became prevalent in larger schools in the early to mid-1950's. In spite of this, mechanical cooling (air conditioning) was extremely rare for several reasons; the technology was very expensive at the time, the equipment was not particularly reliable and the prevailing approach was that investing in school air conditioning presented a negative cost benefit, since schools were closed during the peak cooling season (July and August). Consequently, the vast majority of schools were built without provisions for air conditioning.

Electrical infrastructure

The electrical infrastructure serving the majority of older TDSB schools is over-extended. Original assumptions about power requirements did not reflect today's reality. This is reflected by issues related to the use of modern equipment such as computers, smart boards and other modern appliances. Schools which have single phase, residential type power supplies are still common in the downtown area of Toronto. This situation is in stark contrast with the schools of the surrounding boards where the majority of the buildings are newer; air conditioning is prevalent, and they are served by modern power distribution equipment.

Weather/Climate Change

Unrelated to the age and condition of TDSB building stock and infrastructure, is a new global reality where climate change is impacting weather patterns. Summers are warmer; heat waves are more intense and became more frequent during the school year (i.e. during the months of June and September). With more than 80% of its building stock inadequately ventilated and lacking air conditioning, the TDSB is particularly affected by the double effect of poor HVAC systems and the change in seasonal temperatures.

We have studied the historical data for the month of June and September for the period of 1955 to 2017. Appendix B attached; illustrates the following observations:

- Amount of energy required to cool the building is on the rise from 1955 to date.
- The average daily maximum temperature has slightly increased.
- The number of days with daily maximum temperature over 28 C is on the rise.
- The number of days with daily maximum temperature over 30 C is on the rise.
- All of the four mentioned observations have intensified since 2004.

All of the above indicate that in the month of June and September, students are currently experiencing warmer temperatures than before.

Action Plan and Associated Timeline

Emergency Cooling Centres

As a follow up to our report of 09 May 2018, we are happy to report that every school that does not have air conditioning (AC), now has a permanent or a temporary cooling centre (refer to Appendix A). Facilities will continue the four year plan to implement permanent cooling centres in all schools that are not air-conditioned. This program is expected to be completed by September 2021.

Limited as it is, this program imposes a strain on the renewal program of other system and building components such as roofing, heating plants, sanitary systems, lighting and fire alarm systems, etc.

With the current funding levels allocated for systems renewal and backlog reduction, undertaking a more ambitious program to provide air conditioning on a larger scale in the old Toronto schools is virtually impossible. A brief review of the sheer number of buildings requiring both HVAC and electrical power supply upgrades make the capital requirements impossible to meet using current funding algorithms. Estimates for implementing such a major project range upwards from \$350 to \$400 million, when taking into account the necessary power upgrades and abatement of designated substances. This expenditure will have to be repeated at approximately 30 years intervals, as the equipment reaches the end of its life expectancy.

The capital costs of adding air conditioning to the TDSB buildings will be accompanied by annual maintenance costs in the range of \$2 million (escalating as the equipment ages) and annual utility costs of \$2.5 million for operating the systems during the cooling season of mid-May to June and September to mid-October (escalating with the cost of Hydro as determined by the local utilities supplier).

In this sense, the TDSB's financial requirements for air conditioning far exceed those of other Ontario Boards, which have not only substantially fewer but also more modern buildings. The costs expressed herein are so massive that a dedicated program must be devised at the Provincial level; it is inconceivable that any regular renewal or school improvement funding program can even come close to financing a program of such scale.

TDSB Strategies to Improve Occupant Comfort

Over the past year, Facility Services has identified/implemented several pilot projects to test new products/equipment or modifying procedures aimed at improving the comfort of the students and staff during warm weather (May 15 to June 30 and September 1 to

October 15). We have also established cost estimates for each initiative in order to study the cost/benefit of each measure and the associated affordability. The following initiatives are recommended to be undertaken in fiscal year 2019-2020.

1. Early Morning Free Cooling

School air handling systems have the ability to introduce 100% fresh air into buildings during periods of the day when the outdoor air temperature is cooler than the indoor temperature. This mode of operation is called “free cooling” and during summer months typically occurs in the early morning. To maximize free cooling opportunities in our schools, caretakers have been advised to start their air handlers earlier in the morning (up to 4 am) during periods of hot weather. Additional free cooling operation will help to flush out warm, stagnant air from buildings and replace it with cooler outside air. Automated controls will reduce the amount of fresh air entering the building when the outdoor air temperature gets too hot and free cooling is no longer available.

Similarly, staff can increase free cooling opportunities in their classrooms by timing the opening and closing of windows. Staff should open the windows whenever they feel that the outside temperature is cooler than the inside temperature. The cost of this initiative is estimated at \$140K per year to cover the cost of the utility bill. This initiative will start this Spring.

2. Upgrade replacement window standards

Since a significant amount of heat gain infiltrates a classroom through the windows, upgrading the properties of the windows will reduce heat gain. All new windows are double glazed, with Argon gas fill that enhances the thermal performance. We have also added a “Low-E” coating to reflect the sunlight including the infrared light (heat) from the exterior leading to a reduction to the solar heat gain.

3. Eliminating the Window Limiters

To comply with the Ontario Building Code, window limiters are installed in all window vents to prevent the window from opening more than 4 inches. This is a safety measure designed to prevent children from falling out of windows. A negative impact of these limiters is that they restrict the amount of fresh air flowing to the classrooms. Working with the TDSB window shop and our Design Unit in Facilities, we managed to fabricate a window vent (the operable portion of the window) that can be pushed out using new hardware. This type of window complies with Code requirements. By pushing the entire window vent out, air circulation will be doubled compared to the conventional type. This type of window will be used on the second floor only, as classroom temperatures are usually higher during warmer months. Using it on the ground floor could be a safety hazard to the students as it projects out of the wall. These types of windows will be used

in a pilot project beginning in June 2019. We will solicit feedback from the end users before implementing it on all our future window replacement projects.

4. Wall Fans

Although fans do not decrease the air room temperature, the air current helps evaporate the sweat from the skin. The evaporation process requires heat which is taken from the skin, leaving it feeling cooler. Our first pilot project with fans used ceiling fans; however the cost was high, especially when asbestos was present in the ceiling space. We subsequently switched to 24 inch wall mounted fans, which are one third of the cost of ceiling fans. Two fans are placed in each classroom and each fan has a variable speed switch to adjust to the required speed. A pilot project took place at Casandra Public School and was well received by the school community. The cost of this initiative is approximately \$10.1M if implemented in all schools without AC. It will take four years to implement this initiative starting 2019-2020 school year.

5. Installing Blinds on Exterior Windows – East & South Elevations

Classrooms facing direct sunlight endure higher temperatures than those that do not. Providing adequate shading to the windows will reduce the heat in these classrooms. Some schools have blinds in all of the classrooms, however, others do not; therefore we have allowed blinds for half of the elevation of the schools (the half exposed to direct summer sunlight). To implement this initiative in all schools without air-conditioning, a total budget of \$7M is required. It will take approximately four years to implement this initiative.

6. Misting Zones

This initiative involves a misting station located on the exterior side of the building. Students playing outside on a hot day can cool themselves in this station. Schools can incorporate the use of these stations in their physical activities program. One misting station has been installed at the Elms PS and was well received by the community. The cost of one station is approximately \$9K. If all schools without AC request the installation of a station, the total cost of this program will be \$3.8M and will take approximately four years to complete.

7. Evaporative Cooling Units

AC units cool the air and drop the humidity level, however, they are expensive to install and consume a lot of energy. In dry climates, evaporation cooling units are used to cool the air and increase the humidity. These are low tech, relatively inexpensive devices and consume little energy. Surprisingly, these units are now available locally. In a climate like ours, these units will cool the air which is desirable, but will also increase the humidity which is not desirable. We are conducting a pilot project in few schools to

determine how the occupants feel about the comfort levels. A drawback of the use of these units is that they need to be manually filled with water every three hours. The cost of providing two units in a classroom is \$500. There is no installation cost as these units are plug-in. If the results of the pilot project are positive, we could make this option available to the schools, if requested. If all schools were interested in having these units installed in the classrooms facing sunny elevations, the total cost would be approximately \$1.7M

Many schools have inquired about the use of fundraising or donations towards air conditioning. We cannot accept these appliances for a number of reasons including concerns over student safety if they are not installed correctly, increased potential for electrical overload due to limited circuits in classrooms and EDU restrictions on the use of fundraising for items covered under a provincial grant. The following points are taken from the EDU Guideline for School Fundraising:

- Funds raised for school purposes should not be used to support items funded through provincial grants, such as classroom learning materials, textbooks and repairs or for capital projects that significantly increase operating costs.
- Examples of Unacceptable Uses of Fundraising Proceeds include Facility renewal, maintenance, or upgrades funded through provincial grants such as structural repairs, sanitation, emergency repairs, or replacing flooring due to wear and tear.

Summary

Historically, TDSB has been at a substantial disadvantage relative to other Boards as the majority of its buildings are older, poorly designed from an HVAC perspective, with limited power supply sources. As a result, very few have air conditioning and the vast majority of the equipment (not only related to cooling) has exceeded its life expectancy. The TDSB currently experiences a multi-billion dollar backlog of repair work, which prevents it from undertaking initiatives to increase the total number of air conditioned buildings.

Resource Implications

Outlined above

Communications Considerations

N/A

Board Policy and Procedure Reference(s)

N/A

Appendices

- Appendix A: Cooling Centres 2019
- Appendix B: Toronto Weather Data Graphs 1955 to 2017

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Cooling Centre schedule										
Sr. #	Ward #	Name of School	>80% AC in school	2016 - 2017 PILOT	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	N/A	Comments
1	16	Adam Beck Junior Public School		Y						
2	12	A Y Jackson Secondary School	Y							
3	5	Africentric Alternative School						Y		
4	21	Agincourt Collegiate Institute				Y				
5	21	Agincourt Junior Public School			Y					
6	21	Agnes Macphail Public School					Y			
7	21	Albert Campbell Collegiate Institute	Y							
8	1	Albion Heights Junior Middle School	Y							
9	21	Alexander Stirling Public School						Y		
10	21	Alexmuir Junior Public School	Y							
11	9	Alexander Muir/Gladstone Ave Junior and Senior Public School			Y					
12	9	The Grove Community School			Y					share building with above school
13	8	Allenby Junior Public School			Y					
14	10	ALPHA Alternative Junior School						Y		
15	21	Alvin Curling Public School	Y							
16	6	Amesbury Middle School						Y		HOLD
17	5	Ancaster Public School					Y			
18	7	Annette Street Junior and Senior Public School			Y					
19	7	High Park Alternative Junior School			Y					share building with above school
20	18	Anson Park Public School			Y					
21	21	Anson S Taylor Junior Public School		Y						
22	12	Arbor Glen Public School	Y							
23	8	Armour Heights Public School			Y					
24	12	Avondale Elementary Alternative School	Y							
25	12	Avondale Public School	Y							
26	12	Avondale Secondary Alternative School	Y							
27	6	Bala Avenue Community School				Y				
28	16	Balmy Beach Community School				Y				
29	21	Banting and Best Public School				Y				
30	8	Baycrest Public School	Y							
31	12	Bayview Middle School	Y							
32	1	Beaumonde Heights Junior Middle School					Y			
33	13	Bedford Park Public School		Y						
34	19	Bellmere Junior Public School		Y						
35	19	Bendale Business and Technical Institute							N/A	will be demolished
36	19	Bendale Junior Public School			Y					
37	13	Bennington Heights Elementary School			Y					
38	21	Berner Trail Junior Public School	Y							
39	13	Bessborough Drive Elementary and Middle School			Y					
40	20	Beverly Glen Junior Public School	Y							
41	5	Beverly Heights Middle School				Y				
42	10	Beverly School						Y		
43	10	Subway Academy II						s		share building with above school
44	18	Birch Cliff Public School			Y					
45	18	Birch Cliff Heights Public School			Y					
46	18	Birchmount Park Collegiate Institute	Y							
47	4	Blacksmith Public School	Y							
48	15	Blake Street Junior Public School	Y							
49	15	East Alternative School of Toronto	Y							share building with above school
50	18	Blantyre Public School	Y							
51	5	Blaydon Public School			Y					
52	18	Bliss Carman Senior Public School					Y			
53	9	Bloor Collegiate Institute							N/A	will be demolished
54	9	Alpha II Alternative School						s		share building with above school
55	3	Bloorlea Middle School					Y			
56	2	Bloordale Middle School	Y							
57	13	Blythwood Junior Public School		Y						
58	16	Bowmore Road Junior and Senior Public School				Y				

Sr. #	Ward #	Name of School	>80% AC in school	2016 - 2017 PILOT	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	N/A	Comments
59	1	Braeburn Junior School	Y							
60	17	Brian Public School			Y					
61	2	Briarcrest Junior School			Y					
62	20	Bridlewood Junior Public School			Y					
63	21	Brimwood Boulevard Junior Public School	Y							
64	2	Broadacres Junior School					Y			
65	17	Broadlands Public School					Y			
66	9	Brock Public School				Y				
67	6	Brookhaven Public School	Y							
68	20	Brookmill Boulevard Junior Public School	Y							
69	21	Brookside Public School	Y							
70	4	Brookview Middle School					Y			
71	11	Brown Junior Public School	Y							
72	15	Bruce Public School				Y				
73	19	Buchanan Public School				Y				
74	2	Burnhamthorpe Collegiate Institute					Y			
75	21	Burrows Hall Junior Public School	Y							
76	21	C D Farquharson Junior Public School		Y						
77	6	C R Marchant Middle School	Y							
78	4	C W Jefferys Collegiate Institute	Y							
79	15	CALC Secondary School					Y			
80	5	Calico Public School			Y					
81	12	Cameron Public School		Y						
82	1	Caring and Safe School LC1	Y							
83	15	Caring and Safe School LC4	Y							
84	9	Carleton Village Junior and Senior Sports and Wellness Academy			Y					
85	17	Cassandra Public School			Y					
86	18	Cedar Drive Junior Public School	Y							
87	19	Cedarbrae Collegiate Institute	Y							
88	19	Cedarbrook Public School					Y			
89	11	Cedarvale Community School					Y			
90	22	Centennial Road Junior Public School			Y					
91	10	Central Toronto Academy					Y			former Central Commerce CI
92	10	Horizon Alternative Senior School					s			share building with above school
93	2	Central Etobicoke High School					Y			
94	10	Central Technical School	Y							
95	4	Chalkfarm Public School			Y					
96	6	Charles E Webster Public School					Y			
97	10	Charles G Fraser Junior Public School					Y			
98	5	Charles H Best Junior Middle School					Y			
99	19	Charles Gordon Senior Public School	Y							
100	21	Chartland Junior Public School			Y					
101	21	Delphi Secondary Alternative School			Y					share building with above school
102	22	Charlottetown Junior Public School			Y					
103	17	Cherokee Public School	Y							
104	15	Chester Elementary School					Y			
105	20	Chester Le Junior Public School	Y							
106	22	Chief Dan George Public School		Y						
107	18	Chine Drive Public School					Y			
108	14	Church Street Junior Public School					Y			
109	14	Native Learning Centre					Y			share building with above school
110	19	Churchill Heights Public School					Y			
111	12	Churchill Public School	Y							
112	18	Clairlea Public School				Y				
113	1	Claireville Junior School				Y				
114	12	Claude Watson School for the Arts	Y							
115	12	Cliffwood Public School	Y							
116	18	Cliffside Public School					Y			
117	10	Clinton Street Junior Public School			Y					
118	10	Contact Alternative School	Y							
119	6	Cordella Junior Public School				Y				
120	22	Cornell Junior Public School	Y							
121	18	Corvette Junior Public School		Y						

Sr. #	Ward #	Name of School	>80% AC in school	2016 - 2017 PILOT	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	N/A	Comments
122	15	Cosburn Middle School	Y							
123	11	Cottingham Junior Public School					Y			
124	18	Courcelette Public School						Y		HOLD
125	16	Crescent Town Elementary School	Y							
126	12	Cresthaven Public School					Y			
127	17	Crestview Public School	Y							
128	12	Cummer Valley Middle School			Y					
129	16	D A Morrison Middle School	Y							
130	17	Dallington Public School				Y				
131	18	Danforth Gardens Public School						Y		
132	15	Danforth Collegiate and Technical Institute							N/A	
133	15	Greenwood Secondary School							N/A	share building with above school. School closed.
134	19	David and Mary Thomson Collegiate Institute							N/A	To be demolished
135	3	David Hornell Junior School					Y			
136	20	David Lewis Public School					Y			
137	11	Davisville Junior Public School							N/A	School moved to Vaughan Road. Capital project. New School
138	11	Spectrum Alternative Senior School							N/A	School moved to Vaughan Road. Capital project. New School
139	4	Daystrom Public School				Y				
140	11	Deer Park Junior and Senior Public School					Y			
141	13	Denlow Public School	Y							
142	6	Dennis Avenue Community School					Y			
143	4	Derrydown Public School			Y					
144	10	Dewson Street Junior Public School				Y				
145	15	Diefenbaker Elementary School	Y							
146	2	Dixon Grove Junior Middle School						Y		
147	17	Don Mills Collegiate Institute						Y		
148	17	Don Mills Middle School						Y		
149	17	Don Valley Middle School	Y							
150	17	Donview Middle Health and Wellness Academy						Y		
151	19	Donwood Park Public School			Y					
152	19	Dorset Park Public School			Y					
153	9	Dovercourt Public School				Y				
154	5	Downsview Secondary School	Y							
155	5	Downsview Public School			Y					
156	14	Downtown Alternative School						Y		
157	21	Dr Marion Hilliard Senior Public School	Y							
158	20	Dr Norman Bethune Collegiate Institute	Y							
159	12	Drewry Secondary School	Y							
160	4	Driftwood Public School			Y					
161	5	Dublin Heights Elementary and Middle School			Y					
162	16	Duke of Connaught Junior and Senior Public School					Y			
163	15	Dundas Junior Public School						Y		
164	15	SEED Alternative School						s		share building with above school
165	13	Dunlace Public School			Y					
166	12	Earl Haig Secondary School	Y							
167	16	Earl Beatty Junior and Senior Public School					Y			
168	15	Earl Grey Senior Public School					Y			
169	16	Earl Haig Public School			Y					
170	16	East York Collegiate Institute	Y							
171	16	East York Alternative Secondary School	Y							
172	15	Eastdale Collegiate Institute					Y			
173	22	Eastview Public School					Y			
174	2	Eatonville Junior School				Y				
175	19	Edgewood Public School			Y					
176	11	Eglinton Junior Public School			Y					
177	4	Elia Middle School					Y			
178	22	Elizabeth Simcoe Junior Public School					Y			
179	12	Elkhorn Public School				Y				
180	19	Ellesmere-Statton Public School					Y			
181	1	Elmbank Junior Middle Academy						Y		

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182	1	Elmlea Junior School	Y							
183	4	Emery Collegiate Institute	Y							
184	4	Emery EdVance Secondary School	Y							share building with above school
185	21	Emily Carr Public School					Y			
186	17	Ernest Public School					Y			
187	10	Essex Junior and Senior Public School						Y		
188	10	Hawthorne II Bilingual Alternative Junior School						s		share building with above school
189	3	Étienne Brûlé Junior School			Y					
190	2	Etobicoke Collegiate Institute						Y		
191	3	Etobicoke School of the Arts				Y				
192	3	Etobicoke Year Round Alternative Centre	Y							
193	9	F H Miller Junior Public School					Y			
194	9	Fairbank Memorial Community School			Y					
195	8	Fairbank Public School					Y			
196	20	Fairglen Junior Public School			Y					
197	18	Fairmount Public School					Y			
198	5	Faywood Arts-Based Curriculum School					Y			
199	17	Fenside Public School			Y					
200	7	Fern Avenue Junior and Senior Public School						Y		
201	12	Finch Public School				Y				
202	4	Firgrove Public School	Y							
203	5	Fisherville Senior Public School						Y		
204	5	North West Year Round Alternative Centre						s		share building with above school
205	21	Fleming Public School	Y							
206	8	Flemington Public School			Y					
207	11	Forest Hill Collegiate Institute	Y							
208	11	Forest Hill Junior and Senior Public School			Y					
209	17	Forest Manor Public School					Y			
210	6	Frank Oke Secondary School						Y		HOLD
211	15	Frankland Community School	Y							
212	13	Fraser Mustard Early Learning Academy						Y		
213	22	Galloway Road Public School					Y			
214	7	Garden Avenue Junior Public School					Y			
215	13	Gateway Public School	Y							
216	18	General Brock Public School						Y		
217	19	General Crerar Public School					Y			
218	9	General Mercer Junior Public School					Y			
219	6	George Anderson Public School			Y					
220	22	George B Little Public School			Y					
221	6	George Harvey Collegiate Institute						Y		HOLD
222	18	George P Mackie Junior Public School					Y			
223	19	George Peck Public School			Y					
224	3	George R Gauld Junior School					Y			
225	17	George S Henry Academy						Y		
226	6	George Syme Community School	Y							
227	16	George Webster Elementary School	Y							
228	17	Georges Vanier Secondary School	Y							
229	10	Givins/Shaw Junior Public School					Y			
230	20	Glamorgan Junior Public School	Y							
231	16	Gledhill Junior Public School			Y					
232	16	Glen Ames Senior Public School					Y			
233	8	Glen Park Public School	Y							
234	19	Glen Ravine Junior Public School						Y		
235	8	Glenview Senior Public School					Y			
236	19	Golf Road Junior Public School						Y		
237	16	Gordon A Brown Middle School					Y			
238	4	Gosford Public School			Y					
239	4	Gracedale Public School					Y			
240	6	Gracefield Public School					Y			
241	1	Greenholme Junior Middle School					Y			
242	17	Greenland Public School					Y			
243	13	Grenoble Public School				Y				
244	21	Grey Owl Junior Public School						Y		
245	22	Guildwood Junior Public School				Y				

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246	4	Gulfstream Public School					Y			
247	18	H A Halbert Junior Public School					Y			
248	6	H J Alexander Community School	Y							
249	10	Harbord Collegiate Institute	Y							
250	13	Harrison Public School			Y					
251	6	Harwood Public School				Y				
252	22	Heather Heights Junior Public School						Y		
253	22	Ben Heppner Vocal Music Academy						s		share building with above school
254	21	Henry Kelsey Senior Public School	Y							
255	22	Henry Hudson Senior Public School	Y							
256	21	Heritage Park Public School	Y							
257	10	Heydon Park Secondary School						Y		
258	22	Highcastle Public School			Y					
259	1	Highfield Junior School	Y							
260	22	Highland Creek Public School					Y			
261	20	Highland Heights Junior Public School					Y			
262	20	Jean Augustine Girls' Leadership Academy					Y			share building with above school
263	12	Highland Middle School						Y		
264	5	Highview Public School					Y			
265	11	Hillcrest Community School						Y		
266	12	Hillmount Public School	Y							
267	2	Hilltop Middle School					Y			
268	11	Hodgson Middle School							N/A	Cancelled - Major project planned
269	2	Hollycrest Middle School	Y							
270	12	Hollywood Public School			Y					
271	7	Howard Junior Public School	Y							
272	4	Humber Summit Middle School						Y		
273	2	Humber Valley Village Junior Middle School			Y					
274	7	Humbercrest Public School			Y					
275	7	Humberside Collegiate Institute				Y				
276	1	Humberwood Downs Junior Middle Academy	Y							
277	11	Humewood Community School	Y							
278	19	Hunter's Glen Junior Public School				Y				
279	10	Huron Street Junior Public School				Y				
280	7	Indian Road Crescent Junior Public School					Y			
281	14	Inglennook Community School			Y					
282	20	Inglewood Heights Junior Public School			Y					
283	19	Ionview Public School					Y			
284	21	Iroquois Junior Public School	Y							
285	14	Island Public/Natural Science School						Y		
286	3	Islington Junior Middle School	Y							
287	20	J B Tyrrell Senior Public School	Y							
288	18	J G Workman Public School						Y		
289	11	J R Wilcox Community School						Y		
290	19	Tredway Woodsworth Public School	Y							
291	22	Jack Miner Senior Public School						Y		
292	15	Jackman Avenue Junior Public School			Y					
293	3	James S Bell Junior Middle Sports and Wellness Academy	Y							
294	14	Jarvis Collegiate Institute				Y				
295	14	Jesse Ketchum Junior and Senior Public School			Y					
296	18	John A Leslie Public School				Y				
297	20	John Buchan Senior Public School	Y							
298	1	John D Parker Junior School	Y							
299	3	John English Junior Middle School						Y		
300	13	John Fisher Junior Public School						Y		
301	2	John G Althouse Middle School			Y					
302	22	John G Diefenbaker Public School						Y		
303	19	John McCrae Public School						Y		
304	8	John Polanyi Collegiate Institute						Y		
305	8	John Ross Robertson Junior Public School						Y		
306	8	John Wanless Junior Public School			Y					
307	22	Joseph Brant Public School	Y							
308	22	Joseph Howe Senior Public School	Y							
309	8	Joyce Public School			Y					

Sr. #	Ward #	Name of School	>80% AC in school	2016 - 2017 PILOT	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	N/A	Comments
310	3	Karen Kain School of the Arts						Y		
311	7	Keele Street Public School	Y							
312	7	Mountview Alternative Junior School	Y							share building with above school
313	6	Keelesdale Junior Public School				Y				
314	20	Kennedy Public School						Y		
315	10	Kensington Community School						Y		
316	16	Kew Beach Junior Public School					Y			
317	16	Kimberley Junior Public School			Y					
318	16	Beaches Alternative Junior School			Y					share building with above school
319	10	King Edward Junior and Senior Public School					Y			
320	7	King George Junior Public School			Y					
321	17	Kingslake Public School						Y		
322	1	Kingsview Village Junior School	Y							
323	2	Kipling Collegiate Institute						Y		
324	19	Knob Hill Public School					Y			
325	3	Lakeshore Collegiate Institute				Y				
326	4	Lamberton Public School	Y							
327	6	Lambton Park Community School	Y							
328	3	Lambton-Kingsway Junior Middle School	Y							
329	20	L'Amoreaux Collegiate Institute	Y							
330	3	Lanor Junior Middle School			Y					
331	8	Lawrence Heights Middle School						Y		
332	8	Lawrence Park Collegiate Institute				Y				
333	13	Leaside High School					Y			
334	8	Ledbury Park Elementary and Middle School				Y				
335	17	Lescon Public School			Y					
336	15	Leslieville Junior Public School			Y					
337	21	Lester B Pearson Collegiate Institute	Y							
338	12	Lester B Pearson Elementary School					Y			
339	12	Lillian Public School			Y					
340	14	Lord Dufferin Junior and Senior Public School	Y							
341	10	Lord Lansdowne Junior Public School						Y		
342	10	Da Vinci School						s		share building with above school
343	19	Lord Roberts Junior Public School						Y		
344	21	Lucy Maud Montgomery Public School			Y					
345	7	Lucy McCormick Senior School	Y							
346	20	Lynngate Junior Public School			Y					
347	20	Lynnwood Heights Junior Public School					Y			
348	21	Macklin Public School					Y			
349	16	Malvern Collegiate Institute				Y				
350	21	Malvern Junior Public School	Y							
351	19	Manhattan Park Junior Public School					Y			
352	6	Maple Leaf Public School			Y					
353	22	Maplewood High School				Y				
354	13	Marc Garneau Collegiate Institute	Y							
355	14	Market Lane Junior and Senior Public School	Y							
356	2	Martingrove Collegiate Institute	Y							
357	21	Mary Shadd Public School					Y			
358	19	Maryvale Public School					Y			
359	18	Mason Road Junior Public School					Y			
360	11	Maurice Cody Junior Public School	Y							
361	12	McKee Public School	Y							
362	11	McMurrich Junior Public School						Y		
363	22	Meadowvale Public School			Y					
364	1	Melody Village Junior School	Y							
365	22	Military Trail Public School					Y			
366	2	Mill Valley Junior School	Y							
367	21	Milliken Public School					Y			
368	2	Millwood Junior School					Y			
369	17	Milne Valley Middle School				Y				
370	15	Monarch Park Collegiate Institute	Y							
371	15	School of Life Experience	Y							share building with above school
372	10	Montrose Junior Public School					Y			
373	10	Delta Alternative Senior School					Y			share building with above school

Sr. #	Ward #	Name of School	>80% AC in school	2016 - 2017 PILOT	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	N/A	Comments
374	22	Morrish Public School					Y			
375	15	Morse Street Junior Public School	Y							
376	17	Muirhead Public School			Y					
377	14	Nelson Mandela Park Public School	Y							
378	12	Newtonbrook Secondary School					Y			
379	10	Niagara Street Junior Public School			Y					
380	18	Norman Cook Junior Public School					Y			
381	13	Norman Ingram Public School					Y			
382	3	Norseman Junior Middle School			Y					
383	21	North Agincourt Junior Public School			Y					
384	1	North Albion Collegiate Institute	Y							
385	19	North Bendale Junior Public School						Y		
386	20	North Bridlewood Junior Public School				Y				
387	1	North Kipling Junior Middle School	Y							
388	8	North Preparatory Junior Public School					Y			
389	11	North Toronto Collegiate Institute	Y							
390	11	Northern Secondary School				Y				
391	13	Northlea Elementary and Middle School	Y							
392	5	Northview Heights Secondary School						Y		
393	16	Norway Junior Public School	Y							
394	5	Oakdale Park Middle School				Y				
395	18	Oakridge Junior Public School						Y		
396	9	Oakwood Collegiate Institute						Y		
397	10	Oasis Alternative Secondary School						Y		
398	17	O'Connor Public School						Y		
399	10	Ogden Junior Public School			Y					
400	10	Orde Street Public School						Y		
401	11	Oriole Park Junior Public School			Y					
402	10	Ossington/Old Orchard Junior Public School						Y		
403	13	Owen Public School	Y							
404	10	Palmerston Avenue Junior Public School			Y					
405	15	Pape Avenue Junior Public School					Y			
406	13	Park Lane Public School					Y			
407	3	Park Lawn Junior Middle School						Y		
408	7	Parkdale Collegiate Institute						Y		
409	7	Parkdale Junior and Senior Public School	Y							
410	2	Parkfield Junior School						Y		
411	16	Parkside Elementary School	Y							
412	20	Parkview Alternative School						Y		
413	20	Caring and Safe School LC2						s		share building with above school
414	20	Pauline Johnson Junior Public School			Y					
415	9	Pauline Junior Public School						Y		
416	6	Pelmo Park Public School			Y					
417	21	Percy Williams Junior Public School						Y		
418	9	Perth Avenue Junior Public School	Y							
419	5	Pierre Laporte Middle School						Y		
420	12	Pineway Public School					Y			
421	12	Pleasant Public School					Y			
422	17	Pleasant View Middle School	Y							
423	22	Poplar Road Junior Public School						Y		
424	21	Port Royal Public School	Y							
425	6	Portage Trail Community School	Y							
426	16	Presteghn Heights Elementary School			Y					
427	2	Princess Margaret Junior School			Y					
428	15	Queen Alexandra Middle School			Y					
429	7	Queen Victoria Public School	Y							
430	18	R H King Academy						Y		
431	15	R H McGregor Elementary School	Y							
432	12	R J Lang Elementary and Middle School					Y			
433	17	Ranchdale Public School	Y							
434	9	Rawlinson Community School			Y					
435	9	Regal Road Junior Public School			Y					
436	18	Regent Heights Public School			Y					
437	17	Rene Gordon Health and Wellness Academy					Y			

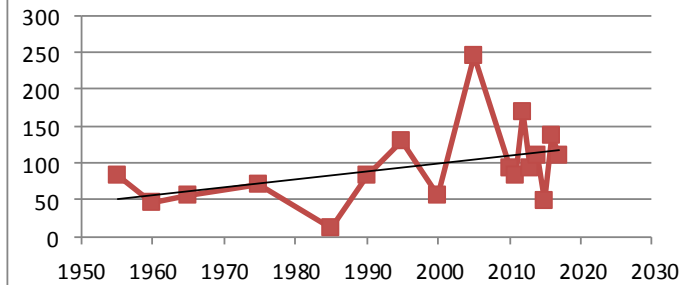
Sr. #	Ward #	Name of School	>80% AC in school	2016 - 2017 PILOT	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	N/A	Comments
438	2	Richview Collegiate Institute						Y		
439	13	Rippletown Public School			Y					
440	1	Rivercrest Junior School			Y					
441	15	Riverdale Collegiate Institute	Y							
442	18	Robert Service Senior Public School					Y			
443	6	Rockcliffe Middle School					Y			
444	5	Rockford Public School				Y				
445	15	Roden Public School	Y							
446	15	Equinox Holistic Alternative School	Y							share building with above school
447	13	Rolph Road Elementary School			Y					
448	14	Rose Avenue Junior Public School						Y		
449	14	Rosedale Heights School of the Arts						Y		
450	14	Rosedale Junior Public School						Y		
451	6	Roselands Junior Public School						Y		
452	2	Rosethorn Junior School						Y		
453	22	Rouge Valley Public School	Y							
454	17	Roywood Public School						Y		
455	7	Runnymede Collegiate Institute						Y		
456	7	Runnymede Junior and Senior Public School				Y				
457	10	Ryerson Community School			Y					
458	10	Downtown Vocal Music Academy of Toronto			Y					share building with above school
459	18	SATEC @ WA Porter Collegiate Institute	Y							
460	18	Scarborough Centre for Alternative Studies						Y		
461	18	South East Year Round Alternative Centre						s		share building with above school
462	18	Caring and Safe School LC3						s		share building with above school
463	18	Samuel Hearne Middle School	Y							
464	19	Scarborough Village Public School	Y							
465	1	School of Experiential Education						Y		
466	3	Second Street Junior Middle School					Y			
467	16	Secord Elementary School			Y					
468	16	Selwyn Elementary School					Y			
469	17	Seneca Hill Public School			Y					
470	2	Seneca School					Y			
471	3	Seventh Street Junior School	Y							
472	17	Shaughnessy Public School	Y							
473	5	Sheppard Public School				Y				
474	9	Shirley Street Junior Public School				Y				
475	9	City View Alternative Senior School				Y				share building with above school
476	4	Shoreham Public Sports and Wellness Academy	Y							
477	20	Silver Springs Public School	Y							
478	2	Silverthorn Collegiate Institute	Y							
479	6	Silverthorn Community School	Y							
480	3	Sir Adam Beck Junior School	Y							
481	21	Sir Alexander Mackenzie Senior Public School	Y							
482	20	Sir Ernest MacMillan Senior Public School	Y							
483	20	Sir John A Macdonald Collegiate Institute					Y			
484	22	Sir Oliver Mowat Collegiate Institute	Y							
485	20	Sir Samuel B Steele Junior Public School						Y		
486	22	Sir Wilfrid Laurier Collegiate Institute	Y							
487	22	Native Learning Centre East	Y							share building with above school
488	21	Sir William Osler High School						Y		
489	17	Sloane Public School					Y			
490	1	Smithfield Middle School			Y					
491	14	Sprucecourt Public School						Y		
492	13	St Andrew's Middle School						Y		
493	19	St Andrews Public School						Y		
494	19	Alternative Scarborough Education 1						s		share building with above school
495	2	St George's Junior School						Y		
496	22	St Margaret's Public School						Y		
497	4	Stanley Public School				Y				
498	12	Steelesview Public School			Y					
499	20	Stephen Leacock Collegiate Institute	Y							
500	5	Stilecroft Public School				Y				
501	5	Summit Heights Public School					Y			

Sr. #	Ward #	Name of School	>80% AC in school	2016 - 2017 PILOT	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	N/A	Comments
502	13	Sunny View Junior and Senior Public School					Y			
503	3	Sunnylea Junior School				Y				
504	7	Swansea Junior and Senior Public School			Y					
505	20	Tam O'Shanter Junior Public School					Y			
506	18	Taylor Creek Public School					Y			
507	19	Tecumseh Senior Public School					Y			
508	20	Terraview-Willowfield Public School			Y					
509	20	Terry Fox Public School				Y				HOLD
510	1	The Elms Junior Middle School						Y		
511	1	Boys Leadership Academy						s		share building with above school
512	10	The Waterfront School	Y							
513	10	City School	Y							share building with above school
514	1	Thistleton Collegiate Institute				Y				
515	21	Thomas L Wells Public School	Y							
516	13	Thornccliffe Park Public School	Y							
517	17	Three Valleys Public School					Y			
518	20	Timberbank Junior Public School				Y				
519	21	Tom Longboat Junior Public School					Y			
520	4	Topcliff Public School			Y					
521	5	Tumpane Public School					Y			
522	3	Twentieth Street Junior School	Y							
523	2	Valleyfield Junior School			Y					
524	13	Valley Park Middle School	Y							
525	17	Victoria Park Collegiate Institute	Y							
526	16	Victoria Park Elementary School					Y			
527	17	Victoria Village Public School					Y			
528	20	Vradenburg Junior Public School		Y						
529	15	Wandering Spirit School							N/A	Cooling centre part of capital project
530	15	Subway Academy I							N/A	Cooling centre part of capital project. Share building with above school
531	18	Walter Perry Junior Public School					Y			
532	7	Warren Park Junior Public School					Y			
533	3	Wedgewood Junior School			Y					
534	2	Wellesworth Junior School	Y							
535	10	West End Alternative School						Y		
536	2	West Glen Junior School					Y			
537	22	West Hill Collegiate Institute						Y		
538	22	West Hill Public School	Y							
539	1	West Humber Collegiate Institute	Y							
540	1	West Humber Junior Middle School	Y							
541	11	West Preparatory Junior Public School						Y		
542	22	West Rouge Junior Public School					Y			
543	7	Western Technical-Commercial School						Y		
544	7	THESTUDENTSCHOOL						s		share building with above school
545	7	Ursula Franklin Academy						s		share building with above school
546	1	Westmount Junior School						Y		
547	6	Weston Memorial Junior Public School			Y					
548	6	Weston Collegiate Institute	Y							
549	4	Westview Centennial Secondary School						Y		
550	2	Westway Junior School					Y			
551	15	Westwood Middle School	Y							
552	19	Wexford Collegiate School for the Arts	Y							
553	19	Wexford Public School				Y				
554	21	White Haven Public School	Y							
555	14	Whitney Junior Public School			Y					
556	15	Wilkinson Junior Public School			Y					
557	15	William Burgess Elementary School			Y					
558	22	William G Davis Junior Public School				Y				
559	22	William G Miller Public School						Y		
560	16	William J McCordic School	Y							
561	5	William Lyon Mackenzie Collegiate Institute						Y		
562	16	Williamson Road Junior Public School						Y		

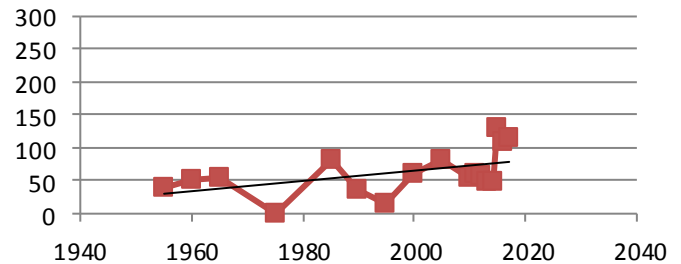
Sr. #	Ward #	Name of School	>80% AC in school	2016 - 2017 PILOT	2017 - 2018	2018 - 2019	2019 - 2020	2020 - 2021	N/A	Comments
563	22	Willow Park Junior Public School					Y			
564	12	Willowdale Middle School			Y					
565	5	Wilmington Elementary School					Y			
566	14	Winchester Junior and Senior Public School			Y					
567	13	Windfields Middle School	Y							
568	11	Winona Drive Senior Public School			Y					
569	19	Winston Churchill Collegiate Institute						Y		
570	15	Withrow Avenue Junior Public School	Y							
571	15	Quest Alternative Senior School	Y							share building with above school
572	19	Woburn Collegiate Institute	Y							
573	19	Woburn Junior Public School						Y		
574	17	Woodbine Middle School	Y							
575	17	North East Year Round Alternative Centre	Y							share building with above school
576	6	York Humber High School	Y							
577	6	York Memorial Collegiate Institute	Y							
578	13	York Mills Collegiate Institute	Y							
579	8	Yorkdale Secondary School						Y		
580	12	Yorkview Public School			Y					
581	4	Yorkwoods Public School					Y			
582	12	Zion Heights Middle School	Y							
		Total Count	172	10	108	50	109	109	9	

Toronto Weather Data: 1955 to 2017

June: Number Of Cooling Degree Days

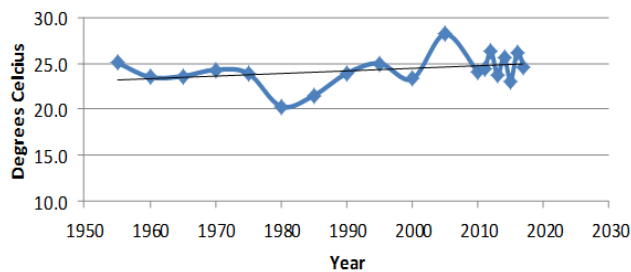


September: Number Of Cooling Degree Days

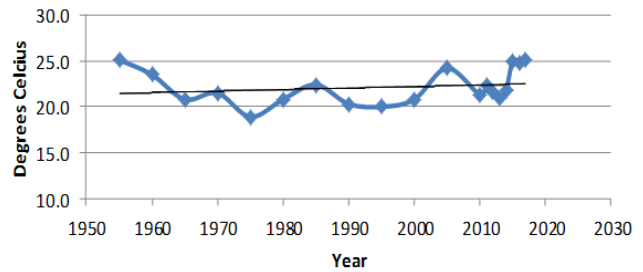


A cooling degree day reflects the amount of time that the temperature is above 65° F or 18° C. It is used to determine how much energy is needed to cool a building.

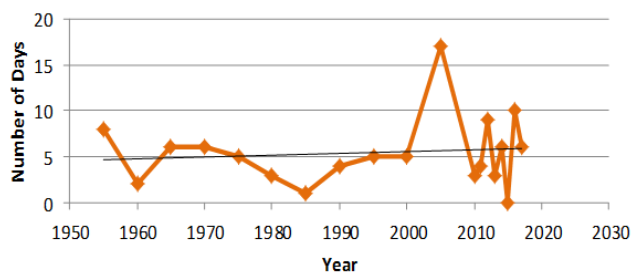
June: Average Daily Max Temperature



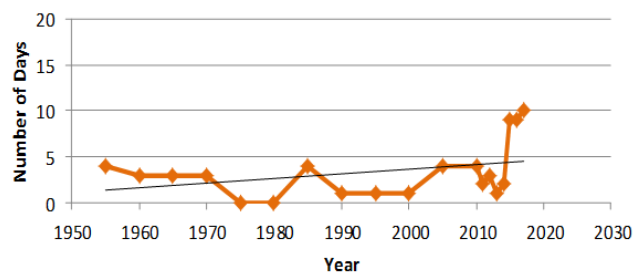
Sept: Average Daily Max Temperature



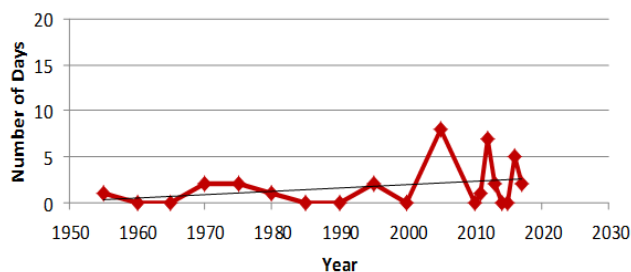
June: Number of Days with Daily Max Temp Over 28°C



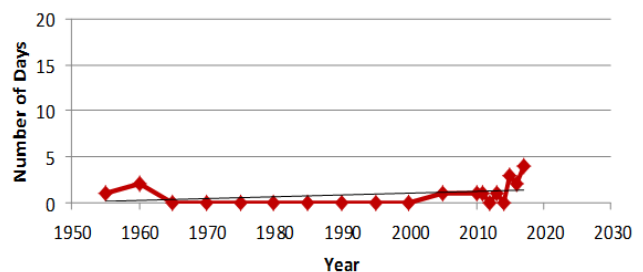
Sept: Number of Days with Daily Max Temp Over 28°C



June: Number of Days with Daily Max Temp Over 31°C

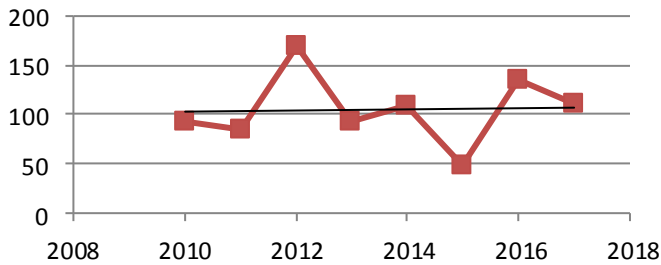


Sept: Number of Days with Daily Max Temp Over 31°C

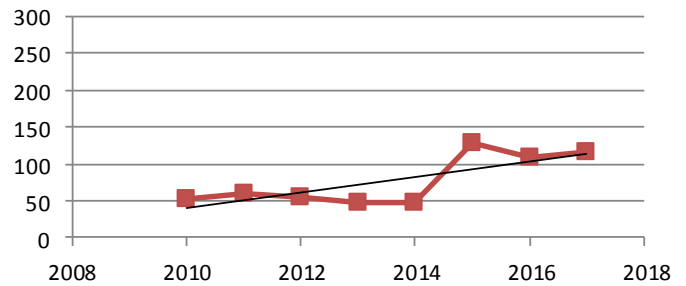


Toronto Weather Data: 2010 to 2017

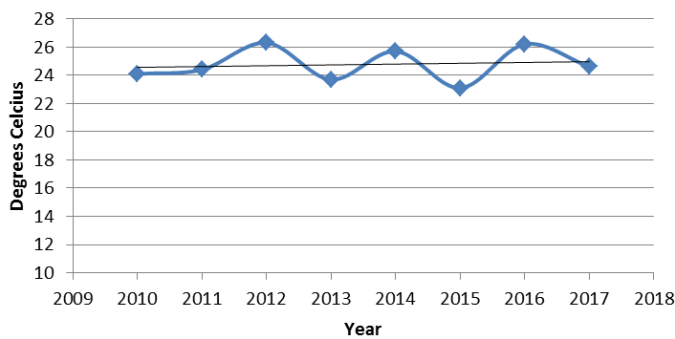
June: Number Of Cooling Degree Days



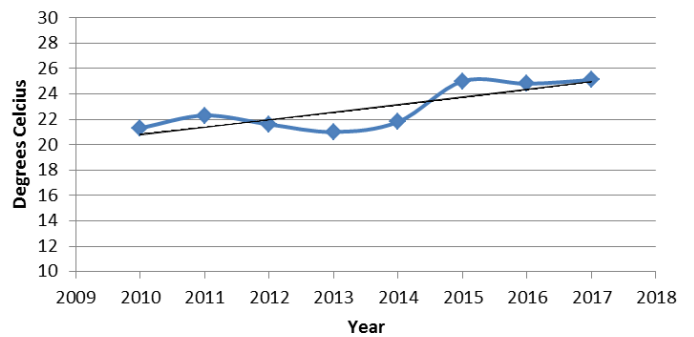
September: Number Of Cooling Degree Days



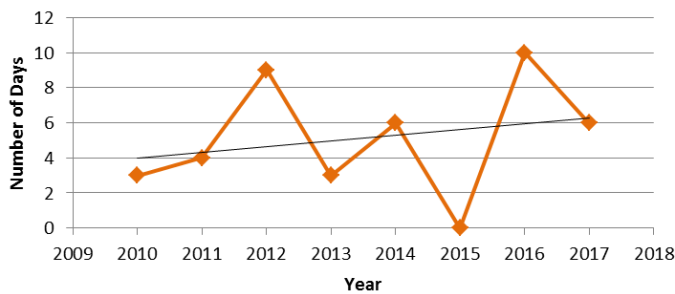
June: Average Daily Max Temperature



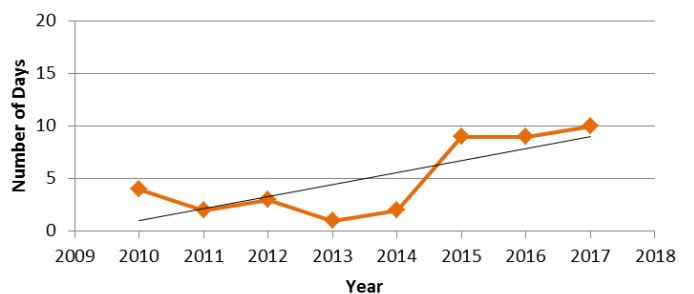
Sept: Average Daily Max Temperature



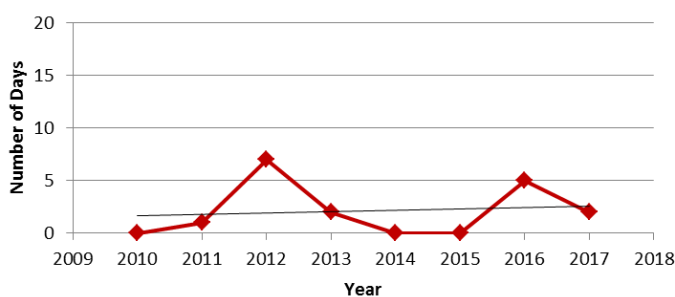
June: Number of Days with Daily Max Temp Over 28°C



Sept: Number of Days with Daily Max Temp Over 28°C



June: Number of Days with Daily Max Temp Over 31°C



Sept: Number of Days with Daily Max Temp Over 31°C

