



REPORT TO

CORPORATE SERVICES, STRATEGIC PLANNING AND PROPERTY COMMITTEE

COOLING STRATEGY STATUS UPDATE (ALL WARDS)

*“I can do all things through HIM who strengthens me.”
Philippians 4:13 (NRSVCE)*

Created, Draft	First Tabling	Review
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M. Iafrate, Senior Coordinator, Renewal
 M. Farrell, Coordinator, Materials Management
 P. de Cock, Comptroller, Business Services
 D. Friesen, (Acting) Executive Superintendent of Facilities Services

RECOMMENDATION REPORT

Vision:

At Toronto Catholic we transform the world through witness, faith, innovation and action.

Mission:

The Toronto Catholic District School Board is an inclusive learning community uniting home, parish and school and rooted in the love of Christ.

We educate students to grow in grace and knowledge to lead lives of faith, hope and charity.



Rory McGuckin
 Director of Education

D. Koenig
 Associate Director
 of Academic Affairs

L. Noronha
 Associate Director of Facilities,
 Business and Community
 Development, and
 Chief Financial Officer

A. EXECUTIVE SUMMARY

This report provides an update on the status of various initiatives undertaken by the Facilities Department to address the comfort of students and staff during hot weather. The approach is multi-pronged, consisting of the following:

- A phased program to install air conditioning in libraries or gymnasiums to create cooling centres in the 146 TCDSB schools that do not have air conditioning;
- A phased program to provide pedestal fans in classrooms in schools with no mechanical ventilation, starting with third floor classrooms, which tend to be the hottest;
- Phased relocation of newer air conditioned portables to replace older portables without air conditioning, along with installation of air conditioning units in older portables that are being retained;
- Evaluating the effectiveness of solar film on windows exposed to solar heat gain, with the intent to roll out installation if proven effective at a test school; and
- Working with Parent Councils who have raised funds to install portable air conditioning units in libraries (or other suitable room) as temporary cooling centres in schools in Phases 3 and 4 of the Cooling Centre roll-out.

Phase 1 of the Cooling Centre Program, consisting of 37 schools, is well underway with installation to start in June and completion expected by September 2019. It has been determined that installation can be carried out while a school is occupied, therefore Phase 2 may be able to commence in the fall of 2019 after completion of Phase 1.

The cumulative staff time required to prepare this report was 20 hours.

B. PURPOSE

To update Trustees on the various cooling strategies that are currently under review or in the process of implementation in non- air conditioned schools as we approach the cooling season.

C. BACKGROUND

1. ***The evolution of the Board’s current cooling strategy since 2016 is documented in various reports and Board motions as follows:***
 - March 2016, Corporate Services, Strategic Planning and Property Committee (CS), Board resolution to become an “Net Zero Energy” board;
 - June 6, 2016, CS, *Passive Cooling for Schools Without Air Conditioning*;
 - March 9, 2017, CS, collection of indoor air temperatures at 12 schools approved;
 - May 13, 2017, Student Achievement and Well-being Committee, *Revisions to TCDSB Hot Weather Standard Operating Procedure for Schools* approved;
 - June 8, 2017, CS, *Status Update Regarding Amendments to TCDSB Hot Weather Standard Operating Procedure*, including appended report: *Status Update on the Collection of Indoor Air Temperatures in Non-Air Conditioned Schools*;
 - December 13, 2017, CS, *Status Update Regarding the Collection of Interior Temperatures in Non-Air Conditioned Schools*, including approval of a four-year phased plan to add cooling centres to non-air conditioned schools, funded by the School Renewal Grant (SRG);
 - April 12, 2018, CS, *Annual Portable Plan*, including approval of a phased plan to install air conditioning in all portables over a period of five years with a budget of \$160,000 per year, funded by SRG;
 - June 6, 2018, CS, trustee inquiry regarding the feasibility of portable air conditioning units for classroom cooling;
 - September 13, 2018, CS, *Cooling Centres Program Status Update*, including an outline of a pilot program to provide pedestal fans for third storey classrooms in 12 schools;
 - December 12, 2018, CS, *2018-2019 School Renewal Plan*, including approval of a project budget of \$2.25 million (M) for Phase 1 of the Cooling Centre roll out.
2. ***Phase 1 of the Cooling Centre Program consists of 44 schools.*** The installation of Cooling Centres in 8 of these schools is being carried out in

conjunction with Child Care and/or Capital addition projects. The remaining 37 schools are listed in Appendix A.

D. EVIDENCE/RESEARCH/ANALYSIS

COOLING CENTRES

1. ***A Project Manager has been retained to coordinate and expedite the installation of Cooling Centres that are not part of Child Care or Capital projects.*** In February, 2019, Jones Lang LaSalle (JLL) Real Estate Services Inc. was appointed through a competitive Request for Proposal (RFP) process, to provide project management (PM) services for 37 schools in Phase 1 of the cooling centre installation program. Following evaluation of their performance in Phase 1, the contract may be extended to complete the program, for which a fee proposal has been received.
2. ***Engineering and Environmental consultants have been retained to prepare performance and designated substances specifications for 37 Phase 1 schools.*** In April, 2019, contracts were awarded to Mat4site Engineering Inc. and to Safetech Environmental, through a competitive Request for Quotation (RFQ) process. Under the direction of the PM, the specification will be tendered to design-build contractors. This methodology will be piloted with 9 schools which were previously identified for May, June and September indoor air temperature data collection in in 2017. These 9 school are highlighted in the Phase 1 list in Appendix A.
3. ***The 9 school pilot is intended to optimize the process such that a typical Cooling Centre can be installed within a week or two from start to finish.*** Tendering of a design-build contract for the 9 schools is expected in May-June, with installation in June-July. The remaining 28 Phase 1 schools will follow shortly after, through multiple teams of contractors. All 37 Cooling Centres are expected to be completed by September 2019.

AIR CONDITIONING IN PORTABLES

4. ***All portables at TCDSB schools will eventually be air conditioned through both relocation and refurbishment.*** Planning and Maintenance staff are developing a comprehensive five-year implementation plan to provide air conditioning in all portables. The plan will include removal of older portables without air conditioning and relocation of newer air conditioned

portables, following completion of new schools and additions, along with installation of air conditioning units in older portables that are being retained and/or refurbished.

FANS

5. ***Fans are a quick, low cost, low energy-use means of providing relief in hot classrooms.*** The use of fans is recommended in the TCDSB approved Hot Weather Standard Operating Procedure (SOP), by the City of Toronto Medical Officer of Health and by the Ontario Association of Parents in Catholic Education (OAPCE) in feedback received during consultation in 2017. Sample pedestal fans have been tested in a few locations in order to select the appropriate type and size. Feedback has been mixed, with cooling effectiveness confirmed, but with concerns about noise and the blowing of papers around the classroom.
6. ***Pedestal fans will be installed in third floor classrooms in 12 pilot schools this spring.*** Competitive quotes have been received for the type of fan selected based on the sample testing, and the contract award approval process is underway to purchase 116 fans. These fans are heavy enough that they cannot easily “walk away,” but still portable enough to be moved around within the classroom or between classrooms, to provide optimal relief depending on factors such as solar heat gain, natural ventilation available and activity level. If the feedback is positive, additional fans will be purchased for the remaining non-air conditioned third storey classrooms. This initiative is funded from the Operations and Maintenance budget.
7. ***The feasibility of installing ceiling fans in some locations is being explored.*** As suggested during the Hot Weather SOP consultation, large industrial ceiling fans may be an effective means of providing relief in hot classrooms. However, insufficient ceiling height and the presence of asbestos in ceiling finishes in many TCDSB schools may limit the application of this solution. The feasibility in each non-air conditioned school will be investigated in conjunction with the Cooling Centre implementation.

SOLAR WINDOW FILM

8. ***Solar heat gain is a major contributor to the higher temperatures experienced in schools.*** Facilities staff have installed a solar reducing film

on a sample large window area at St. Gregory Catholic School to test its effectiveness in reducing temperatures in the building. Temperature in the area will be monitored with the use of temperature data loggers.

9. ***If proven to be effective, solar window film could be a significant component of the Board's cooling strategy.*** Following evaluation of the temperature data and a positive cost/benefit analysis, an implementation plan will be developed for the application of the film on windows where solar gain is significant. This would be funded from the Operations and Maintenance budget.

PORTABLE AIR CONDITIONING FOR CLASSROOMS

10. ***Portable air conditioning units are in use in some TCDSB classrooms.*** Most of these units have been installed to provide medically required cooling for students with special needs, or installed in areas that operate in the summer. Some units serve child care spaces, funded and installed by the child care operators.
11. ***In response to the trustee inquiry in June 2018 regarding the feasibility of portable air conditioning units for classroom cooling, an engineering consultant was engaged to carry out a study.*** One of the Phase 1 Cooling Centre pilot schools, St. Cecilia Catholic School, was chosen as a test site to review system cost, and impact to school infrastructure and operations, of portable air conditioning vs. permanent VRF (variable refrigerant fluid) split system air-conditioning (the system to be installed for library cooling centres). Refer to Appendix B for the detailed report by SAB Engineering Inc.
12. ***Electrical system upgrades would be required in many non-air conditioned TCDSB schools in order to air condition all classrooms at a cost of approximately \$200,000.00 per school.*** As noted in the SAB report, this is true whether installing portable air conditioners or VRF split systems, however, due to their more efficient design, the VRF system could cover approximately 40% more space at St. Cecilia than portable air conditioners without a power upgrade (12 classrooms for the VRF vs. 7 classrooms for the portable units).

13. *In addition to electrical requirements, portable air conditioning units are not suitable as a large scale permanent solution to TCDSB hot classrooms for the following reasons:*

- They cannot be tied into the Building Automation System (BAS). Lack of adequate control of indoor temperatures is cited in the 2019-2023 Energy Conservation and Demand Management (ECDM) Plan (which is the subject of another report due to June Corporate Services Committee) as one of the reasons why energy conservation from 2014-2018 fell far short of the goal set out in the previous ECDM Plan.
- They must be vented to the outside, requiring cutting through windows, increasing the risk of break-ins and rain penetrations, and reducing daylighting and natural ventilation.
- The condensate reservoir must be manually emptied; large scale installation would create a large burden on custodial staff.
- They are designed for residential applications, therefore a minimum of two units is required to adequately cool a classroom, three units for larger classrooms;
- Life expectancy is only about 10 years.
- They are inefficient and the electricity usage would increase utility costs significantly and thwart the energy conservation goals of the ECDM Plan.
- The benefits for a few days each school year do not justify the system-wide cost, particularly if electrical system upgrades are required. Use of School Renewal funds would divert a large proportion of the Renewal budget from necessary building component replacements and upgrades.
- They are noisy and unattractive and take up floor space.

14. *Portable air conditioning units may be suitable to provide temporary cooling in small areas.* For schools in Phases 3 and 4 of the Cooling Centre Program, three portable units could provide temporary cooling in a typical library until the more efficient, permanent VRF equipment can be installed. While Ministry of Education fundraising guidelines for acceptable use of CSPC funds do not allow purchases that add an operating cost to the system, the funds could be used for this purpose as the Board is planning to create the operating cost anyway. Portable units are also an acceptable solution to address medical needs and they can (and should) be moved to follow a student as they change classrooms from year to year.

D. METRICS AND ACCOUNTABILITY

1. Project budgets for Phases 2 to 4 of the Cooling Centre Program will require approval in the 2019-2023 Renewal Plan report to Board expected in the fall of 2019.
2. The performance of the PM in implementing the Cooling Centre Program will be evaluated upon completion of Phase 1. If successful, and pending approval of the project budgets in the Renewal Plan, the PM contract will be extended for Phases 2 to 4.
3. A further report outlining the five year phased implementation plan for air conditioning of portables will be provided to the Board.
4. Every Ontario school board is required to prepare a five year Energy Conservation and Demand Management (ECDM) Plan, and post it on the board website by July 1, 2019. TCDSB's 2019-2023 ECDM Plan, to be presented in a report to the Corporate Services Committee in June, does not take into account the addition of air conditioning to existing schools. With an energy use reduction goal of 11% with respect to the 2017-2018 baseline year, it will be critical to closely monitor the use of air conditioning in the new cooling centres, and of existing portable air conditioning units, to ensure that the indoor air temperature is not lower than Board approved set point of 25°C during schools hours and that rooms are not cooled when not in use.
5. Another report anticipated for the June 2019 Corporate Services Committee will outline the findings from the Net Zero Energy Study that has been underway for the past year. This report will address the impact of air conditioning on the Board's 2016 resolution to become a Net Zero Energy board. As with the ECDM Plan, this report will emphasize the need for indoor temperature control.

E. IMPLEMENTATION, STRATEGIC COMMUNICATIONS AND STAKEHOLDER ENGAGEMENT PLAN

1. It is anticipated that a standard cooling centre installation will take one to two weeks with minimal disruption, therefore staff recommend that the installation work can be carried out during the school year. Board staff will

work with the school administration staff to safely coordinate the work. The Phase 1 cooling centre work is expected to be completed by September 2019.

2. Subject to the availability and approval of funding, Phases 2 to 4 of the Cooling Centre implementation may be able to follow immediately after completion of Phase 1. This would result in completion of the installation of cooling centres in all schools sooner than originally anticipated.
3. A communication announcing the installation of the cooling centre will be provided to the school prior to the work commencing. A letter to send home to parent/guardians will also be provided to the school principal.
4. Facilities staff will work with Parent Councils who have raised funds to install portable air conditioning units in libraries (or other suitable room) as temporary cooling centres in schools in Phases 3 and 4 of the Cooling Centre roll-out.
5. Parent Councils inquiring about the purchase of portable air conditioning units for classrooms will be provided with the information in this report as to why this is not allowable and advised to consider the purchase of pedestal fans instead.
6. The potential to expand the provision of fans to second floor non-air conditioned classrooms will be reviewed once fans have been supplied to all third floor classrooms, subject to availability of funding. The PM team will also evaluate the feasibility and expedite installation of ceiling fans on the upper floor of schools with three or more storeys, where feasible.
7. The current cooling strategy implements all recommendations related to facilities made by OAPCE in April 2017. In addition to OAPCE, consultations on the 2017 Hot Weather SOP were carried out with Toronto Public Health, the Joint Health and Safety Committees, Elementary and Secondary Principals' Association presidents, Toronto Children's Services, child care operators in TCDSB schools, and other Ontario school boards.

F. RECOMMENDATION

That the Board of Trustees endorse the cooling strategy outlined in this report.