INFORMATION REPORT

TO:	Mayor and Members Board of Health
COMMITTEE DATE:	December 10, 2018
SUBJECT/REPORT NO:	Clean Air Hamilton 2017 Progress Report (BOH18038) (City Wide)
WARD(S) AFFECTED:	City Wide
PREPARED BY:	Shelley Rogers (905) 546-2424, Ext. 1275 Trevor Imhoff (905) 546-2424, Ext. 1308
SUBMITTED BY & SIGNATURE:	Kevin McDonald Director, Healthy Environments Division Public Health Services

Council Direction:

Clean Air Hamilton reports annually to Board of Health on the trends of local air quality and the actions undertaken by members of Clean Air Hamilton to address local air quality in Hamilton.

Information:

Clean Air Hamilton is a community initiative to improve air quality in the City of Hamilton. It has a diverse membership with representation from environmental organizations, industry, businesses, academic institutions, citizens and different levels of government (federal, provincial and municipal). Initiated in 1998, Clean Air Hamilton works to improve air quality throughout the City of Hamilton and meet all ambient air quality criteria. The Board of Health supports the work of Clean Air Hamilton through an annual budget of $56,000.

Clean Air Hamilton hosted a strategic visioning workshop in 2016 and has identified five strategic themes related to air quality improvements to focus on for the following two to three years. These include:

- Governance & Structure;
- Air Zone Management;
- Transportation;
- Air Monitoring; and,
- Dust and Particulate Matter ($PM_{2.5}$) Mitigation.

Further details can be found in Appendix A, as well as summarized below.

Air Quality in Hamilton

Many air pollutants' annual percentages have decreased over time as measured at Ministry of the Environment, Conservation and Parks (MECP) (formally the Ministry of the Environment and Climate Change) downtown air monitoring station (Station 29000).

Total reductions in pollutant levels since the mid-1990's are:

- Total suspended particulate (TSP) – 57% total reduction over 20 years;
- Inhalable particulate matter (PM_{10}) – 37% total reduction over 20 years;
- Respirable particulate matter ($PM_{2.5}$) – 26% total reduction over 18 years;
- Nitrogen dioxide (NO_2) – 54% total reduction over 20 years;
- Sulphur dioxide (SO_2) – 46% total reduction over 20 years;
- Total reduced sulphur odours – 98% total reduction over 20 years;
- Benzene – 89% total reduction over 20 years; and,
- Polycyclic aromatic hydrocarbons (PAH) measured as benzo[a]pyrene – 78% total reduction over 20 years.

Prior to 2016, $PM_{2.5}$ concentrations monitored at MECP's Station 29000 were above the Canadian Ambient Air Quality Standards of 10 micrograms per cubic metre ($\mu g/m^3$). In 2016 and 2017 $PM_{2.5}$ concentrations were at 7.9 and 8.46 $\mu g/m^3$ respectively. The standards are scheduled to become more stringent in 2020 so continued effort to reduce particulate matter levels will be required.

Air Quality Health Index

The Ontario MECP replaced the Air Quality Index on June 24, 2015 with the Air Quality Health Index. Updates to the Board of Health (BOH10008) and (BOH10008(a)) were provided regarding the implementation of this new reporting structure in Hamilton. The Air Quality Health Index is a scale designed to assist citizens to develop an understanding of air quality and the impact on one's health. It is a health protection tool that will help limit one's short-term exposure by providing advice to citizens, including vulnerable individuals and recommended activity levels during all levels of air quality. The Air Quality Health Index scale is from 1 to 10+ with ranges and activity recommendations for at risk populations and the general population.

Table 1: Air Quality Health Index Categories and Health Messages[1]

Health Risk	Air Quality Health Index	Health Messages	
		At Risk Population*	General Population
Low	1 – 3	Enjoy your usual outdoor activity.	Ideal air quality for outdoor activities.
Moderate	4 – 6	Consider reducing or rescheduling strenuous activities outdoors, if you are experiencing symptoms.	No need to modify your usual outdoor activities unless you experience symptoms such as coughing and throat irritation.
High	7 – 10	Reduce or reschedule strenuous activities outdoors. Children and the elderly should also take it easy.	Consider reducing or rescheduling strenuous activities outdoors if you experience symptoms such as coughing and throat irritation.
Very High	Above 10	Avoid strenuous activities outdoors. Children and the elderly should also avoid outdoor physical exertion.	Reduce or reschedule strenuous activities outdoors, especially if you experience symptoms such as coughing and throat irritation.

*People with heart or breathing problems are at greater risk. Follow your doctor's usual advice about exercising and managing your condition.

The MECP have three air quality monitoring stations in Hamilton which provide the data used to calculate the Air Quality Health Index. For approximate locations of air monitoring see Appendix A. Two different air quality alerts are issued during periods of poor air quality. A Special Air Quality Statement will be issued when the Air Quality Health Index is a high risk (>6) and is forecast to last for 1-2 hours. If the high risk Air Quality Health Index is forecast to be a persistent duration of at least 3 hours, then a Smog and Air Health Advisory will be issued.

In 2017 Hamilton experienced only two Special Air Quality Statements and no Smog and Air Health Advisory instances. Clean Air Hamilton does note that air quality can be variable at a local neighbourhood level and some areas of Hamilton can be impacted more than others by air pollutants.

Sulphur Dioxide and Benzene and Benzo[a]pyrene Air Quality Standards

In 2017, the Environmental Registry of Ontario released Environmental Bill of Rights

postings for sulphur dioxide, benzene and benzo[a]pyrene. The standards are based on health effects on humans and the environment.

The air quality standards for sulphur dioxide are decreasing to 100 µg/m^3 averaging over a one hour period (previously 690 µg/m^3) and the average annual standard will be 10 µg/m^3. The 24 hour standard for sulphur dioxide is being removed and replaced with the more stringent the one hour and annual standards. These new standards will be incorporated into Schedule 3 and take effect on July 1, 2023. See Table 2 below.

Table 2: Sulphur Dioxide Air Quality Standards and Upper Risk Thresholds

Time Period	Current Standard (µg/m^3)	Standard effective July 1, 2023 (µg/m^3)
Half Hour	830	830
One Hour	690	100
24 Hour Standard	275	None
Annual Average	None	10

Upper risk thresholds have will be introduced into Schedule 6, with a limit of 830 µg/m^3 in a half hour period and 690 µg/m^3 within a one hour period coming into effect on January 1, 2019.

The new benzene and benzo[a]pyrene standards consider the "cumulative impacts from multiple air pollution sources. The policy applies to air emissions of benzene and benzo[a]pyrene in the Hamilton/Burlington area and benzene in the Sarnia/Corunna area."[2] New and expanding facilities operating in the Hamilton/Burlington area will be required to provide emission models and certain actions, described in the policy, will be required for compliance, depending on existing ambient air quality concentrations. The new standards came into effect on October 1, 2018 for new facilities and current facility expansion applications. For more information please see the Government of Ontario's Environmental Registry website (https://ero.ontario.ca/notice/013-1680).

Clean Air Hamilton Programs 2017

A) Enhanced Fresh Air For Kids:

In 2017, Green Venture and Corr Research teamed up to provide the Enhanced Fresh Air for Kids program to five Hamilton elementary schools. The focus of the project is to educate students, teachers and the public about air quality around schools and the impact of engine idling. The program was delivered to St. Martin of Tours, Lawfield, Cathy Wever, Hillcrest and Adelaide Hoodless elementary schools, with classroom work, in-the–field air monitoring and at-school anti-idling awareness campaigns.

Students were educated on the importance of air quality, the Air Quality Health Index and gained an awareness of how their actions can impact and improve the air in their neighbourhoods. Students measured $PM_{2.5}$ and PM_{10} in their neighbourhoods. The MECP Mobile Air Monitoring van was also used to monitor air quality in the vicinity of the schools. These data were developed into air quality maps which students used to decide on their best ways to travel to and from their school.

The 2017 Enhanced Fresh Air for Kids program featured an enhanced anti-idling campaign. The program included anti-idling education where Green Venture led classrooms in the development of banners, pamphlets, key chains and other advertising material. Blitzes were included to set a measureable baseline for the success of the program. The initial blitzes took place at the beginning of the program in the fall and follow-up blitzes the following spring after the campaign was complete. Four of the five schools completed the secondary blitzes and collected data was used to form the conclusion of the success of the project. The schools found a 25% decrease in the number of cars idling between the blitzes with an increase to the total number of cars. Cathy Wever showed the largest decrease of 54%. The estimated reduction of greenhouse gas emissions equates to 7,858 kg CO_2 annually.

B) Building Community Awareness & Action Regarding Respirable Particulate Pollution in Hamilton:

Environment Hamilton is a Hamilton based not-for-profit organization that promotes environmental protection. In 2017, Clean Air Hamilton provided funding to Environment Hamilton to initiate their Building Community Awareness & Action Regarding Respirable Particulate Pollution in Hamilton program. The goal of the program was to educate citizens by assembling a group of volunteers to assist in building low cost particulate matter sensors to be deployed in stationary locations across the lower city.

Citizens were engaged through six community workshops and two youth workshops that were held to build and deploy the sensors. Volunteers were recruited through ten neighbourhoods in Hamilton. They were educated on air quality, behavioural change and the health effects of particulate matter. They were also informed on the reporting methods of problem sources of poor air quality and identification of priority locations for action. The youth workshops included walkabouts through the participants' neighbourhoods with particulate matter sensors. The collected data was then discussed with the participants increasing knowledge and awareness of the health impacts related to air quality.

Environment Hamilton used Arduino sensors to collect data. The sensors use infrared light and heat resistors to measure the amount of particulate matter in the air. Arduino is an open-source electronics platform that can be modified to perform interactive projects. The information collected can be viewed on Environment Hamilton's online air mapping system (www.inhalemap.com). The air mapping system can be used as an educational tool for citizens to increase knowledge and awareness of air quality in their neighbourhoods as well as the health impacts related to air quality.

2017 Clean Air Hamilton Website Update

City of Hamilton Staff are responsible for maintaining and updating the Clean Air Hamilton website. In 2017, City staff recruited 2Gen Interactive to redesign the Clean Air Hamilton Website (www.cleanairhamilton.ca). The Website contains Hamilton specific air quality information, health information, Clean Air Hamilton projects and programs, resources, meeting minutes and current events within Hamilton related to air quality.

Air Quality Programs in 2018

Clean Air Hamilton identified three programs to improve air quality in 2018, whose funding the Board of Health approved (BOH18020):

1. Cycle Hamilton Coalition Inc. Friendly Streets Hamilton ($12,000);
2. Green Venture and Corr Research Inc. Fresh Air for Kids ($10,700); and,
3. Green Venture for Bus Brains – School Bus Monitoring ($5,877).

The results of these programs will be reported in the Clean Air Hamilton 2018 Air Quality Progress Report and presented to the Board of Health in 2019.

Future Actions

There has been substantial improvement in Hamilton's air quality since the 1970s; however air pollution continues to create adverse health impacts to Hamilton residents. Continued, concerted actions are imperative in the City of Hamilton. Collaboration from individuals, organizations, industries, the City of Hamilton and other levels of government are required to reach our goals.

- Continue to support and undertake all the recommendations of the Air Quality Task Force (BOH13029) and BOH report (BOH18016) in the areas of air modelling and monitoring, planning education and outreach, green infrastructure and updating of municipal policies that encourage and facilitates behavioural change to active and sustainable transportation and alternative forms of renewable and efficient energy for buildings;
- Continue to support and encourage Hamiltonians to reduce their transportation-based emissions through the use of transportation alternatives including: public

transit, bicycles, walking, hybrid or electric vehicles, etc. and support policies such as complete streets and transportation demand management; and,

- Encourage the continued efforts of the MECP and industry to reduce air borne contaminant in the City of Hamilton and the Province of Ontario.

Appendices and Schedules Attached

Appendix A to Report BOH18038 – Clean Air Hamilton 2017 Air Quality Progress Report

References

[1] Government of Ontario, Ministry of the Environment, Conservation and Parks (2017). What is the Air Quality Health Index? Retrieved from: (http://www.airqualityontario.com/science/aqhi_description.php).

[2] Government of Ontario. (2017). Environmental Registry. Retrieved from: (https://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTMzODAx&statusId=MjA1MDU4)