Adopted by Council at its meeting held November 19, 2012 [M499-2012]
/AA
Windsor, Ontario November 19, 2012

REPORT NO. 80 of the
ENVIRONMENT, TRANSPORTATION & PUBLIC SAFETY STANDING COMMITTEE
of its meeting held October 24, 2012

Present:

Councillor J. Gignac
Councillor A. Halberstadt
Councillor R. Jones
Councillor H. Payne
Councillor F. Valentinis

That the following recommendations of the Environment and Transportation Standing Committee **BE APPROVED:**

Moved by Councillor Gignac, seconded by Councillor Halberstadt,

1) That the Chief Administrative Officer and City Clerk **BE AUTHORIZED** to sign the amended Memorandum of Agreement (MOA) with Health Canada, satisfactory in form to the City Solicitor, in financial content to the City Treasurer and in technical content to the City Engineer, to continue the partnership with Health Canada to enhance and expand the Heat Alert and Response System with an additional funding grant from Health Canada of up to $20,000 over two (2) years.

2) That the report *"Urban Heat Island Effect in Windsor, ON: An Assessment of Vulnerability and Mitigation Strategies"* as well as the associated heat vulnerability mapping for the City of Windsor produced in partnership with Health Canada and the City of Windsor, **BE RECEIVED** for information.

3) That the Parks and Facilities division **BE APPROVED** to retain a summer co-op student in 2013 to assist with the completion of a feasibility study on reducing the urban heat island effect at city parks and public spaces.

Carried.

Clerk's Note: The report authored by the City Engineer dated October 4, 2012 entitled "Continued Partnership with Health Alert Response System (HARS), Urban Heat Island Study and Heat Vulnerability Mapping" is ***attached*** as background information.

LIVELINK 16171, MH/11217

CHAIRPERSON

DEPUTY CLERK

NOTIFICATION:				
Name	Address	Email Address	Telephone	FAX

Item No. 2

THE CORPORATION OF THE CITY OF WINDSOR
Environment, Transportation & Public Safety Standing Committee - Administrative Report

MISSION STATEMENT:
"The City of Windsor, with the involvement of its citizens, will deliver effective and responsive municipal services, and will mobilize innovative community partnerships"

LiveLink REPORT #: 16171 MH/11217	**Report Date: October 4, 2012** 3433 hg
Author's Name: Averil Parent	**Date to Standing Committee: October 24, 2012**
Author's Phone: 519 253 7111 ext. 290	**Classification #:**
Author's E-mail: aparent@city.windsor.on.ca	

To: **Environment & Transportation Standing Committee**

Subject: **Continued Partnership with Health Canada for the Heat Alert Response System (HARS), Urban Heat Island Study and Heat Vulnerability Mapping.**

1. RECOMMENDATION:

City Wide: X Ward(s): ____

1) That the Chief Administrative Officer and City Clerk **BE AUTHORIZED** to sign the amended Memorandum of Agreement (MOA) with Health Canada, satisfactory in form to the City Solicitor, in financial content to the City Treasurer and in technical content to the City Engineer, to continue the partnership with Health Canada to enhance and expand the Heat Alert and Response System with an additional funding grant from Health Canada of up to $20,000 over two (2) years.

2) That the report *"Urban Heat Island Effect in Windsor, ON: An Assessment of Vulnerability and Mitigation Strategies"* as well as the associated heat vulnerability mapping for the City of Windsor produced in partnership with Health Canada and the City of Windsor, **BE RECEIVED** for information.

3) That the Parks and Facilities division **BE APPROVED** to retain a summer co-op student in 2013 to assist with the completion of a feasibility study on reducing the urban heat island effect at city parks and public spaces.

EXECUTIVE SUMMARY: N/A

2. BACKGROUND:

Beginning in 2009, the City of Windsor and Health Canada partnered to develop a Heat Alert and Response Plan and the associated Stay Cool Windsor Essex campaign, which was launched successfully in June 2011. This partnership was renewed in 2012 in a second MOA (M30/2012) with Health Canada committing to provide an additional $60,000 in funding over 2 years. Of this

funding, $20,000 was committed towards the completion of an Urban Heat Island Study, as well as a heat vulnerabilities map for the City of Windsor.

The urban heat island effect (UHIE) is the resulting temperature difference between urban and surrounding rural areas. This phenomenon occurs due to patterns of urban development which result in the conversion of vegetated, permeable land areas into urban landscapes dominated by high albedo and impervious surfaces that absorb a high percentage of solar radiation (Rosenzweig *et al.,* 2006). The impact of the UHIE can result in average air temperatures approximately 3˚C higher than surrounding areas (EPA, 2009).

As the southernmost city in Canada, Windsor's humid climate results in warm summer temperatures. As a result, Windsor records the greatest number of days annually with the Humidex reaching 35 or higher (Berry *et al.,* 2011). Due to the City's climate trends, urban form, and the large amount of industrial land use, there is a strong presence of the UHIE. Combined with an increasing number of extreme heat days, there is a considerable health risk to Windsor residents. The intensity of the UHIE may increase in the future based on climate projections that predict a near tripling of the number of hot days greater than 30°C (86°F) by 2100.

Extended periods of high temperatures may lead to heat related illnesses including heat cramps, heat rash, heat edema, fainting, heat exhaustion and heat stroke. The temperature increases associated with the urban heat island effect may increase heat-related mortality in urban hot spots. For example, during the 1995 heat wave in Chicago, approximately 500 individuals died from heat related illness, while 70,000 individuals died of similar causes during the European heat wave in August 2003 (Stone *et al.,* 2010).

3. DISCUSSION:

Similar to the summer of 2011, the summer of 2012 did not fail to warn residents of the dangers associated with extreme heat events. As with the summer of 2011, the topic of extreme heat dominated the local news for most of the month of July. The hottest day of the season was on July 4, when temperatures reached 37.9 °C with a Humidex reading of 46. Below is a breakdown of hot days and heat alerts called over the summer of 2012.

Table 1: Number of Hot Days and Heat Alerts in Windsor-Essex County

Month	Days over 30 °C (per Environment Canada)	Heat Alert Level 1's	Heat Alert Level 2's
2011 Summary	**31**	**6** (covering 9 days)	**4** (covering 13 days)
May 2012	**3** (May 20, 25, 28)	**0**	**0**
June 2012	**9** (June 9, 10, 19, 20, 21, 27, 28, 29, 30)	**2** (June 19, 20, 28)	**0**
July 2012	**11** (July 1, 2, 4, 6, 7, 13, 15, 16, 17, 22, 23)	**3** (July 17, 22, 23, 26)	**1** (July 3 – 7)
August 2012	**7** (August 2, 3, 4, 5, 24, 25, and 26)	**2** (August 4, 31)	**0**
September 2012	**1** (Sept 3)	**0**	**0**
Total	**31**	**7** (covering 10 days)	**1** (covering 5 days)

The daily temperature results are recorded from the Windsor Airport, however based on the urban heat island effect, those individuals located in 'hot spots' likely experienced several more days above 30°C than reported in the table above. This is one of the reasons Health Canada has continued to be involved in the development of the Stay Cool Windsor-Essex campaign and more recently has taken interest in the urban heat island effect in Windsor.

To complete an Urban Heat Island Study, one graduate level summer co-op student was hired in 2012 to develop a report on the local urban heat island effect in Windsor. This study included a review of policies and best practices being adopted in other regions and used this research to recommend actions which may be feasible in this area. The Urban Heat Island Study is one of the key actions required to address recommendations in the *Assessment of Vulnerability to the Health Impacts of Extreme Heat in the City of Windsor* report, and is also an adaptation action item discussed in the Climate Change Adaptation Plan.

To supplement the study, a heat vulnerabilities map of the City of Windsor was developed in consultation with the Geomatics division. This map includes heat imaging as well as statistical information on vulnerable communities in Windsor-Essex. The Health Canada report *Assessment of Vulnerability to the Health Impacts of Extreme Heat in the City of Windsor* was used to build the vulnerability layers and point data information included in the map.

The finalized Urban Heat Island Effect study and associated heat vulnerability mapping for the City of Windsor is attached for information. These resources have been developed in consultation with Health Canada, as well as the Planning, Parks and Facilities, Forestry and Horticulture, Engineering and Geomatics departments of the City of Windsor.

The creation of vulnerability mapping in combination with the thermal mapping serves two purposes. First, the mapping provides a visualization tool that can be used to identify and prioritize areas for action from a planning and public health perspective. Second, during an extreme heat event, the vulnerability mapping can be used to coordinate response to areas with higher vulnerabilities. Currently, the development of such mapping is being discussed regionally as a useful tool for the regional emergency planners.

Health Canada has reviewed the Urban Heat Island Study and is looking to continue the partnership with the City of Windsor. Health Canada is proposing that during 2013, the results from the urban heat island study be used to conduct feasibility studies on a selection of City parks and public spaces on the best methods to reduce the heat and increase thermal comfort. A summer co-op student will be retained by Parks & Facilities to complete the study. The $10,000 provided through the partnership with Health Canada will offset the cost of retaining the student.

City parks provide a plethora of social, ecological and environmental benefits to the community. In particular, they are important for the physical and mental health of the population as they provide safe and enjoyable areas to do exercise and relax.

The microclimate of parks and playgrounds can have an influence on the level of physical activity (Semenzato et al. 2011). Studies indicate that physical comfort is linked to ambient air temperature and exposure to direct solar radiation (Nikolopoulou & Lykoudis 2006). Good landscape design can help reduce the localized ambient air temperature and direct exposure to the sun, thereby increasing human comfort and supporting higher levels of physical activity (Brown & Gillespie 1995).

Building on this premise, this project aims to conduct an assessment of Windsor's parks and playgrounds to determine characteristics that may either improve or reduce human comfort to heat and then, based on best practice in the literature, to propose recommended actions (both design and policy considerations) to improve upon existing park design. This is a particularly important time to consider thermal comfort in Windsor's parks and playgrounds, as by 2025 all of Windsor's playgrounds will need renovating to meet standards outlined in Ontario's Accessibility for Ontarians with Disabilities Act.

Few communities in Canada have conducted an assessment of thermal comfort in public parks. The results from this innovative project could be shared among the wider planning and public health communities at conferences, workshops, webinars and online through written case studies.

4. RISK ANALYSIS:

The risks and vulnerabilities associated with extreme heat and the urban heat island effect are well documented in the attached report. Since 2009, the City of Windsor has worked in collaboration with Health Canada with Memorandum of Agreements (MOAs). Matching funds are not required and funds are dispersed by Health Canada upon completion of the deliverables. To date, the time lines of deliverables have been achieved.

5. FINANCIAL MATTERS:

The amendment to the MOA will provide additional financial support totalling $20,000 through 2014. The payment of funds will occur with the following deliverables:

Table 2: MOA Deliverables

Deliverable	Time Frame	Payment
Urban heat island research coordination summary report	2012/2013	$10,000
Feasibility Study on reducing heat at City parks and public spaces	2013/2014	$10,000

These funds are provided by Health Canada to assist the City of Windsor with expenses associated with the projects, which may include development of resources, additional mapping and supplemental staff (summer co-op). The funds will be managed by the Environmental Coordinator and added to the existing capital budget ID (7093001) in order to accurately track all expenditures related to this funded initiative.

Approximately $10,000 will be allocated towards hiring a co-op student to conduct a feasibility study to reduce heat at City parks and public spaces. Existing funds are available to retain the student in the capital budget, which will be replaced upon the completion of the deliverable.

All costs for this initiative have been funded from the grant money provided. No matching funds are required for this grant. All staff time to date has been in-kind support.

6. CONSULTATIONS:

Mike Clement – Manager, Parks Development
Stay Cool Windsor Essex Committee; County of Essex Emergency Planner, Canadian Red Cross, Windsor Essex Community Housing Corporation, Windsor Essex County Health Unit
Health Canada

7. CONCLUSION:

The City of Windsor is one of the leading Canadian municipalities with respect to developing and implementing a heat alert and response system. Our continuing partnership with Health Canada has allowed for the development of critical resources including the Urban Heat Island Study and subsequent vulnerability mapping which can now be used by city administration and Council to mitigate the urban heat island effect. As climate change continues to increase summer temperatures in Windsor, these policy and operational changes become even more imperative.

Averil Parent
Environment and Sustainability Coordinator

Chris Manzon
Acting Senior Manager of Pollution Control

Giovanni Miceli
Executive Director of Parks & Facilities

Michael Palanacki
Executive Director of Operations

Mario Sonego
City Engineer and Corporate Leader
Environmental Protection and Transportation

For **Onorio Colucci**
Chief Financial Officer/City Treasurer &
Corporate Leader Finance and Technology

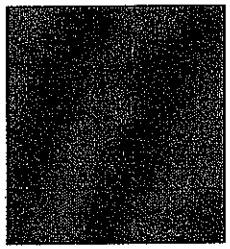
Helga Reidel
Chief Administrative Officer

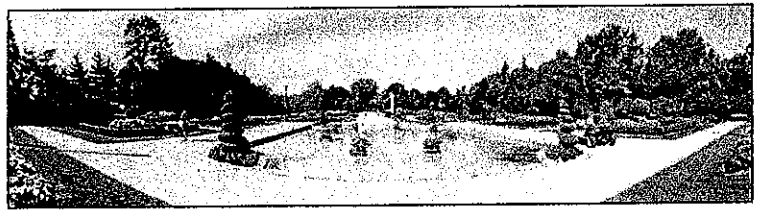
APPENDICES: Urban Heat Island Study (Enclosed for Mayor & Council due to size)
DEPARTMENTS/OTHERS CONSULTED:
Name:
Phone #: 519 ext.

NOTIFICATION :				
Name	Address	Email Address	Telephone	FAX

Environment, Transportation &
Public Safety Standing Committee
October 24, 2012
Item 2 – Mayor & Council only

The Urban Heat Island Effect in Windsor, ON: An Assessment of Vulnerability and Mitigation Strategies





Laura De Carolis

Report Prepared for the City of Windsor
August, 2012