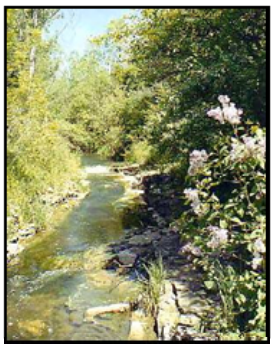
# HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW

## FINAL REPORT



**April 2009**

## EXECUTIVE SUMMARY

This Report presents the observations, recommendations and conclusions made by an Independent Community Panel (ICP) of the City of Hamilton's stormwater management program. The ICP was comprised of five professionals with expertise related to watershed planning, flood prevention, wastewater engineering, stormwater management, landscape architecture and insurance. The composition of the ICP was exactly the same as it was for the initial peer review undertaken in 2006. The ICP included: Carl Bodimeade, Dr. Yiping Guo, Dr. Paul Kay, Paul Kovacs, and Mark Schollen. Hardy Stevenson and Associates Limited (HSAL) facilitated the peer review process.

The peer review process was initiated by senior municipal staff in December of 2008 to assess the progress of Hamilton's stormwater management program since 2006. Specifically, the ICP was reconvened to comment on the execution of the 26 recommendations presented to the Storm Emergency Response Group (SERG) and Hamilton City Council and to put forth new recommendations if applicable.

This Report outlines the approach and methodology employed by the ICP to undertake the peer review and presents observations, recommendations and conclusions based on the ICP's careful review of the background materials provided by staff of Water and Wastewater, Capital Planning and Implementation, Public Health, Development Engineering, Operations and Maintenance, Budgets and Finance, SERG, consultants working on municipal projects, and their cumulative professional knowledge and experience.

The ICP respectfully submits 23 recommendations for the City of Hamilton's consideration. The recommendations were presented to the SERG on Monday March 23rd, 2009. This Report incorporates input provided by the SERG and the ICP members at that meeting.

The ICP thanks the City of Hamilton for providing them the opportunity to complete the peer review process.

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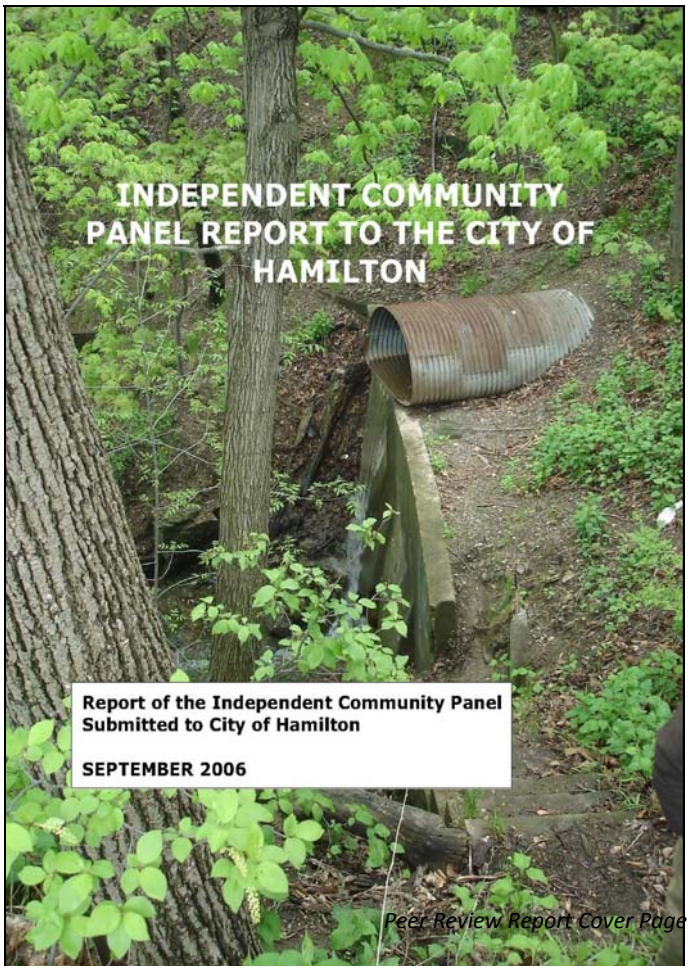
## APPENDICES

## 1.0 BACKGROUND

An ICP was established by the City of Hamilton in response to the storm events of 2005. The ICP was appointed in March of 2006 with a mandate to review the causes, effects and outcomes of storm events and to make recommendations to Hamilton City Council. The ICP was responsible for: a) addressing the cause and effect of inclement weather on the stormwater management/drainage systems in Hamilton; b) establishing a communication strategy to assist in educating the general public on issues concerning risk management and compensation; c) commenting on the draft City of Hamilton Stormwater Master Plan; and d) reviewing insurance issues and consulting with the insurance industry.[1]

HSAL was retained by the City of Hamilton to assemble the ICP and to facilitate the peer review process. HSAL brought together five professionals with expertise related to watershed planning, flood prevention, waste water engineering, storm water management, landscape architecture and insurance to undertake the peer review. A final report recommending 26 initiatives was presented to the SERG in September of 2006 and Hamilton City Council in October of 2006. The recommendations included a mix of policy, infrastructure improvement, management, communication and public education initiatives.



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The City of Hamilton had been implementing the recommended initiatives for a little more than two years when senior municipal staff moved to reconvene the ICP for a second peer review process. In December of 2008, HSAL reconvened the ICP to evaluate the progress of Hamilton's stormwater management program to date. The second peer review process differed from the first in that it was initiated by municipal staff rather than Hamilton City Council.

HSAL and the ICP presented the observations and recommendations contained herein to the SERG on Monday March 23rd, 2009. We understand this Final Peer Review Report will be presented to the Public Works Committee by municipal staff in June of 2009.

[1] Public Works Department Report to Public Works Infrastructure and Environment Committee, February 13th, 2006.

## 2.0 INDEPENDENT COMMUNITY PANEL

The ICP is comprised of five professionals with expertise related to watershed planning, flood prevention, waste water engineering, storm water management, landscape architecture and insurance. The composition of the ICP is exactly the same as it was for the first peer review process. The City of Hamilton retained the ICP members as professional consultants meaning they were financially compensated for their efforts. The following provides a brief overview of the ICP members, their qualifications and professional experience:

- **Carl Bodimeade, P.Eng**

  Carl Bodimeade is a Professional Engineer with more than 25 years of experience related to water and wastewater collection and treatment, site remediation and hydrogeological investigations. Carl is Vice President of Hatch Mott MacDonald's water and wastewater infrastructure services branch in Ontario. He also serves as Chair of the ICP.

- **Dr. Yiping Guo, B.Sc., M.A.Sc., Ph.D, P.Eng**

  Dr. Guo is an Associate Professor in the Civil Engineering Department at McMaster University. Dr. Guo's research interests include uncertainty analysis, watershed planning and stormwater management. He has more than 15 years of experience related to teaching, research and engineering design. The development of analytical probabilistic stormwater models is currently the focus of Dr. Guo's research.

- **Dr. Paul Kay, B.Sc., M.S., Ph.D**

  Paul Kay is an Associate Professor in, and Chair of, the Department of Environment and Resource Studies at the University of Waterloo. His research interests include climate change and water resource management. He is a member of the Canadian Water Resources Association and the International Water Resource Association.

- **Paul Kovacs**

  Paul Kovacs is an insurance specialist with more than 25 years of public policy formation experience. Paul is Executive Director of the Institute for Catastrophic Loss Reduction, President of the Property and Casualty Insurance Compensation Corporation, and is an Adjunct Professor in the Economics Department at the University of Western Ontario.

- **Mark Schollen, B.L.Arch., O.A.L.A., C.S.L.A., A.S.L.A**

  Mark Schollen is a landscape architect and Principal of Schollen and Company Inc. With more than 20 years of experience, Mark is a recognized expert in the fields of natural channel design, non-structural stormwater management, environmental restorations, habitat creation and enhancement, and landscape management. Mark is also a Sessional Lecturer at the John H. Daniels Faculty of Architecture, Landscape and Design at the University of Toronto.

The ICP is comprised of seasoned professionals who are highly regarded in their respective areas of specialization. All five members have lived or worked in the City of Hamilton at some point in their careers. Collectively, the ICP possesses the knowledge, skills and experience necessary to put forth unbiased observations and sound recommendations for future stormwater management initiatives for the City of Hamilton.

## 3.0 SCOPE OF REVIEW

The ICP was reconvened to evaluate the City of Hamilton's stormwater management performance since 2006. Specifically, the ICP was asked to comment on the execution of the 26 recommendations presented to the SERG and Hamilton City Council and to put forth new recommendations if applicable. HSAL was retained to facilitate the peer review process and to oversee the preparation of a report that will be presented to the Public Works Committee by municipal staff. HSAL and the ICP presented these recommendations to the SERG on Monday March 23rd, 2009. HSAL subsequently incorporated feedback provided by the SERG into the Final Peer Review Report.

The ICP completed the following tasks through the peer review process:

- reviewed background material provided by City of Hamilton;
- participated in one meeting with Hamilton Water and Wastewater;
- participated in one meeting with the SERG;
- liaised with HSAL to prepare interview questions;
- consulted with municipal staff from Water and Wastewater, Capital Planning and Implementation, Public Health, Development Engineering, Operations and Maintenance, Budgets and Finance, and consultants working on municipal stormwater projects;
- provided input into the Draft Peer Review Report;
- presented their observations and recommendations to the SERG; and
- provided input into the Final Peer Review Report.

A copy of the ICP Terms of Reference approved by the City of Hamilton is included as Appendix A.

## 4.0 APPROACH AND METHODOLOGY

The ICP employed the following approach and methodology when undertaking the peer review:

### 4.1 Initiation

The ICP peer review process was initiated in December of 2008 when HSAL participated in a project start-up meeting with Sanja Ivanovic, Project Manager, Capital Planning and Implementation and municipal staff. From Hamilton, the meeting was attended by Jillian Stephen, Capital Planning and Implementation; Sally Young-Lee, Development Engineering; Udo Ehrenberg, Water and Wastewater; Dan McKinnon, Water and Wastewater; and Kelly Anderson, Public Affairs Coordinator (General Manager's Office). The purpose of the meeting was to provide HSAL with an overview of the stormwater management initiatives Hamilton has undertaken since 2006. A copy of the meeting agenda and minutes has been included as Appendix B.

### 4.2 Reviews

Municipal staff provided HSAL a number of background materials at the project start-up meeting. HSAL forwarded these materials to the ICP members and continued to liaise between Sanja Ivanovic, Project Manager, Capital Planning and Implementation and the ICP to request and distribute materials throughout the peer review process. The ICP members requested additional background materials as follow-up to their meetings with Water and Wastewater and the SERG. A complete list of materials reviewed by the ICP has been included as Appendix C.

### 4.3 Meetings

HSAL facilitated a meeting with the ICP members and the SERG on Monday January 12th, 2009. The purpose of the meeting was to update the SERG on the peer review process and to provide the ICP members an opportunity to ask municipal staff general questions related to Hamilton's stormwater management program. Carl Bodimeade, ICP Chair facilitated an open question and answer session which was followed by a focused discussion on the 26 recommendations. A copy of the meeting agenda and minutes has been included as Appendix B.

HSAL facilitated a similar meeting with the ICP members and representatives of Water and Wastewater on Friday January 16th, 2009. The purpose of the meeting was to provide the ICP members an opportunity to ask municipal staff technical questions related to Hamilton's stormwater management program. The ICP members also had the opportunity to ask questions related to communications and public consultation as Kelly Anderson, Public Affairs Coordinator, General Manager's Office was in attendance. A copy of the meeting agenda and minutes has been included as Appendix B.

### 4.4 Interviews

HSAL interviewed the following consultants and municipal divisions to obtain supplemental information and clarification for the ICP members:

- Water and Wastewater - Chris Gainham, Senior Project Manager was asked to elaborate on details related to Hamilton's Inflow/Infiltration rate and the design storm used to develop the Water and Wastewater Master Plan.

- Development Engineering - Enzo Florio, Project Manager was asked to clarify a map that was provided to the ICP identifying priority areas within the City of Hamilton.

- McCormick Rankin Corporation (MRC) - Pippy Warburton, Project Coordinator and Karen Hofeauer, Project Engineer were asked questions pertaining to the modeling work that was done for the Lower East End Storm Drainage Study and recommendations put forth by MRC to alleviate flooding within that study area.

- Health Protection - Rob Hall, Director of Health Protection Branch was asked to describe whether (and how) Hamilton informs members of the public about the potential health risks associated with living adjacent to stormwater management ponds.

- Capital Planning and Implementation - Robert Norman, Manager of Open Space Development and Park Planning was asked questions related to Hamilton's policies concerning stormwater management facilities within municipal parks. He was also asked questions related to parkland dedication.

- Operations and Maintenance - Al Dore, Manager of Parks and Cemeteries was asked questions related to Hamilton's policies concerning stormwater management facilities within municipal parks. He was also asked questions related to parkland dedication.

- Operations and Maintenance - Scott Plante, Urban Forestry Planning and Protection Coordinator and Tami Sadonoja, Urban Forestry Technician were asked questions related to Hamilton's database of municipal trees and the team's strategies for addressing impending diseases and pest infestations.

HSAL conducted the interviews after liaising with the ICP members to develop the interview questions. Detailed notes were taken during each of the interview sessions. The notes were reviewed by those HSAL interviewed for accuracy. Revised notes were subsequently forwarded to ICP members for their review. A copy of the interview notes has been provided in Appendix D.

### 4.5 Reports

The ICP members worked closely with HSAL to prepare a Draft Peer Review Report that summarized their observations and recommendations for enhancing Hamilton's stormwater management program. The Draft Peer Review Report was presented to the SERG on Monday March 23rd, 2009. HSAL prepared detailed minutes of this meeting which were forwarded to municipal staff for review and approval. Feedback provided at the meeting and on the Draft Report was subsequently incorporated into this Final Peer Review Report. A copy of the presentation and meeting minutes has been included as Appendix E.

### 4.6 Completion

The ICP peer review process will be deemed complete once the City of Hamilton receives the Final Peer Review Report. The Final Peer Review Report will be presented to the Public Works Committee by municipal staff.

## 5.0 OBSERVATIONS

The ICP observed that the City of Hamilton is making progress in its efforts to develop and implement a technically sound stormwater management program. However, it appears the sense of urgency has waned, progress has slowed and municipal staff find themselves faced with significant challenges. As a result, the City of Hamilton needs to renew its commitment to developing innovative and proactive solutions to its stormwater management problems and is relying on other municipalities to take the lead in developing best practices. More specifically, the ICP observed the following:

***1. Hamilton appreciates and respects the cumulative knowledge and experience of the ICP members.***

This is evident from the fact that the second peer review process was initiated by senior municipal staff and both Water and Wastewater and the SERG meetings were well-attended by a multi-disciplinary team of enthusiastic participants. Participants included representatives from Capital Planning and Implementation, Operations and Maintenance, Budgets and Finance, Public Health, Development Engineering, General Manager's Office (Public Affairs), and Water and Wastewater. The extent of inter-departmental involvement in the review process is encouraging and demonstrates municipal staff is cognizant of the multi-dimensional complexity of stormwater management issues within the City of Hamilton.

A considerable amount of information, knowledge and experience was exchanged between municipal staff and the ICP members during the peer review process. Municipal staff provided the ICP extensive, relevant, informative and useful background materials to review. Requests for additional materials were responded to promptly by Sanja Ivanovic, Project Manager, Capital Planning and Implementation. Participants and ICP members contributed to a collective body of stormwater management knowledge by sharing professional experiences and by citing best practices from municipalities across Canada. Paul Kovacs, ICP Member and John McLennan, Risk Management Insurance Coordinator, Budgets and Finance for example enhanced the participants' understanding of insurance practices as they relate to stormwater management while Carl Bodimeade, ICP Member and Kelly Anderson, Public Affairs Coordinator, General Manager's Office brainstormed alternative communication strategies for educating the public on wet weather events and stormwater management initiatives.

***2. Hamilton has been addressing all of the 26 recommendations put forth by the ICP through the initial peer review process.***

The City of Hamilton has made considerable progress on a policy level by adopting the Water and Wastewater Master Plan (2006) and the Stormwater Master Plan (2007). The City of Hamilton has initiated a Basement Flood Relief Pilot Program and Flood Aware Preparedness Program. Hamilton is a member of several provincial working groups including: Urban Flooding Working Group, Ministry of Environment (MOE) Stormwater Management Working Group, and Municipal Stormwater Rural and Urban Working Groups. Notwithstanding the solid progress made to date, the City of Hamilton lags behind other municipalities in the following areas:

a) Embracing and encouraging the implementation of Low Impact Development techniques and alternative innovative stormwater management solutions.

Many municipalities within the Greater Toronto Area (GTA) have introduced and implemented alternative development standards (e.g., City of Toronto's Green Development Standards) that are aimed at furthering the implementation of source controls, non-structural stormwater management solutions and rainwater harvesting/recycling technologies. Many municipalities (e.g., Town of Markham and City of Waterloo) have approved innovative stormwater management systems including large-scale infiltration systems, biofilters, wetlands, and sub-surface attenuation systems as demonstration projects. These demonstration projects are viewed as a means to evaluate the performance and longevity of alternative stormwater management technologies with a commitment to long-term monitoring as a condition of approval.

b) Amending policies and standards to encourage innovation in the design of stormwater management systems.

Many GTA municipalities have updated their catalogues of standards related to stormwater management infrastructure, roads, and services to support the integration of Low Impact Development/initiatives into commercial, residential and institutional developments and the design of roads and storm sewer infrastructure.

c) Strengthening partnerships with local Conservation Authorities.

Partnerships with local Conservation Authorities present the opportunity to promote innovative stormwater management practices, implement demonstration projects and produce joint public communication and social marketing programs. The Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation Authority (CVC) collaborate with a number of municipalities to co-fund pilot projects, provide monitoring expertise and complement public awareness and information programs. The ICP was encouraged to learn partnerships have formed between the City of Hamilton and Hamilton Conservation Authority, Niagara Peninsula Conservation Authority, Conservation Halton and The Grand River Conservation Authority to prepare Stewardship Plans for stream remediation projects within existing urban areas.

d) Working closely with the Parks Maintenance Section (Operations and Maintenance) and Open Space Development Section (Capital Planning and Implementation) in an effort to explore opportunities to integrate stormwater management infrastructure into park spaces.

The integration of stormwater management infrastructure into parks and other spaces within the public realm may present the best opportunity to achieve Hamilton's stormwater management objectives in existing neighbourhoods. Close collaboration with municipal parks staff from Parks Maintenance and Open Space Development is necessary to define the criteria for determining the potential to integrate stormwater management facilities into park spaces. Typically, sub-surface stormwater management infrastructure can be implemented within most parks without compromising utility or recreational opportunities. Many municipalities are now developing protocols and criteria to address this issue and Hamilton should be initiating inter-departmental discussions to establish a foundation for eventual policy formulation.

***3. Hamilton is following the lead of other municipalities in terms of best stormwater management practices and innovative solutions.***

The City of Hamilton participates in the establishment of stormwater management best practices and innovative solutions through the Urban Flooding Working Group, Municipal Stormwater Rural and Urban Working Groups and MOE Stormwater Management Working Group. It is evident that the City of Hamilton is an enthusiastic participant in all these groups and municipal staff are eager to see Hamilton become more proactive and creative in their efforts to plan for (and respond to) severe storms and stormwater management issues.

While the City of Hamilton recently hosted the second of two workshops focused on Low Impact Development, several other municipalities are leading the way in the process of implementing and monitoring Low Impact Development and innovative stormwater management technologies. Hamilton should consult with these municipalities to gain valuable insight to guide the development of Hamilton's own programs. Specific case studies that could be of value to the City of Hamilton include:

**a)** Honda Canada Campus, Markham

Large scale corporate head office, research and development and distribution centre employing infiltration, filtration, permeable pavement and other techniques to reduce reliance on end-of-pipe stormwater management infrastructure.

**b)** Bill Crothers Secondary School, Markham

Secondary school and athletic centre with full on-site stormwater management system including rainwater recycling/irrigation system, biofilters and wetlands.

**c)** Durham College/University of Ontario Institute of Technology, Oshawa

Combination of biofilters, constructed urban linear wetlands and ponds treat runoff from the north central campus.

**d)** Bridal Path Porous Storm Sewer System, Toronto

Reverse slope boulevards and porous storm sewers infiltrate stormwater from the road network.

**e)** Terraview Park/Willowfield Garden Park, Toronto

A sub-surface filtration bed and infiltration gallery treat stormwater from the local storm drainage system. A sports field and playground are located over these sub-surface facilities.

**f)** Toronto Green Development Standards

Guidelines to encourage the use of source controls, enhanced urban tree canopy, green roofs and other Low Impact Development techniques to achieve sustainability objectives.

In addition, the TRCA has initiated a project aimed at exploring opportunities to retrofit stormwater management and sustainability solutions into six existing neighbourhoods as well as a project that examines the potential to retrofit private residential properties with source controls to mitigate stormwater impacts.

Hamilton should adopt a more pro-active approach to encourage the application of Low Impact Development technologies as well as to begin to deal with issues related to the strategic implementation of retrofit stormwater solutions in the urban area through the modification of design standards in advance of development pressures.

When meeting with the SERG and Water and Wastewater, the ICP described how demand management strategies (including efficient technologies and economic instruments) could reduce per capita and total water use, which in turn reduces pressure for increased wastewater capacity. Dry-weather flows, which would be affected, are a small volume in the combined sewer system, so would not have a large effect on storm flow issues. However, every reduction of capacity demand is helpful, and in this case may provide more room for stormwater before the hard (and expensive) measures of increasing capacity are needed. In addition, there would be ancillary benefits of reduced demands for supply and wastewater treatment, beneficial to both the City of Hamilton and its residents.

The ICP heard that Hamilton is 'moving full speed ahead' to promote residential programs, such as downspout disconnection, adoption of in-house water efficient devices etc. Yet, Hamilton lags behind leaders such as the Region of Waterloo and the City of Toronto with respect to these programs. Hamilton seems very cautious in these programs, for example its language suggests the residents 'consider' downspout disconnection, rather than 'requiring' them to do so. The ICP does not know whether a cautious tone or a strong tone (based on regulation) would be more effective in achieving adoption with a program designed to relieve pressure on sewer capacity. Hamilton might consider a meta-study of the experiences elsewhere to guide it in this choice.

With respect to climate change, the ICP heard how the City of Hamilton is a member of the Urban Flooding Working Group and MOE Stormwater Management Working Group which discuss the implications climate change is having on stormwater management and flooding. The ICP also heard how municipal staff are having difficulty quantifying the impact climate change is having on storms. The ICP challenged municipal staff to consider how the City of Hamilton could become a leader in addressing climate change and the impact it is having on severe storm damage risk. It appears municipal staff recognize climate change as a factor, but are waiting for other municipalities to develop strategies and to identify mechanisms to better manage risk. The City of Hamilton should consult the City of London where municipal engineers have commissioned research to secure predictions of future precipitation intensity, duration and frequency that could provide a basis for water and stormwater management.

***4. Hamilton has brought together an advanced team of experts to support technical studies.***

The City of Hamilton has retained Aquafor Beech to calibrate/validate part of the MOUSE model and Stantec to implement a Real Time Control (RTC) system and all pipes model. Kije Sipi Ltd. provided a Storm Characterization Study of the 2004-2006 events providing useful perspective on magnitude, duration and frequency that can be used to calibrate the hydrologic models. McCormick Rankin Corporation is in the final stages of completing the Lower East End Storm Drainage Study. The ICP members are pleased to see knowledgeable and experienced consultants are being retained to complete technical studies. Close liaison with consultant teams will provide municipal staff technical guidance for future studies, pointing out cause and effect of severe storm events, and evaluating different remedial options.

***5. Hamilton is making decisions based on technically sound quality data.***

It is evident that extensive data searches, assembling and verification were performed by municipal staff and consultants for the Stormwater Master Plan, Water and Wastewater Master Plan, and Lower East End Storm Drainage Study. Combined, this data represents valuable information municipal staff will be able to draw upon for future initiatives and modeling work. This data should be stored in a central database where they can be updated regularly. Municipal staff should prepare for the challenge of storing, formatting and updating this data so they remain accurate, sound, and useful.

***6. Hamilton's responses to the 2006 recommendations focus strongly on physical infrastructure.***

The City of Hamilton has responded to the recommendations put forth by the ICP in 2006 almost entirely in terms of physical infrastructure e.g., its adequacy to cope with storm-generated flows and with anticipated growth of settlement. The ICP learned about one non-physical response to flooding - a Basement Flood Relief Pilot Program. Hamilton's definition of 'at-risk' neighbourhoods has been based on reports of flooding in combination with assessment of the capacity of the sewer systems. The ICP believes it would be valuable to know (especially in considering the design of such relief programs) the social factors that might be at work in exposure to flooding risk, impacts, and ability to respond through risk-avoidance or impact-mitigation activity. Socio-economic factors such as family structure, age, income, and education might be important variants that affect the suitability and uptake of relief programs. The ICP does not know if a one-design-fits-all program is appropriate, or if variable design, or variable marketing, would be more effective. Hamilton might consider partnerships with institutions such as universities to involve students looking for thesis projects to undertake this research.

***7. Hamilton has an opportunity to be more proactive in planning for climate change.***

Weather and climate data are important inputs to both the planning of the storm water system and its management. The City of Hamilton recognizes the capacity of its stormwater system is too small to cope with storms of the day particularly in the Lower East End. One solution is to improve routing of stormwater during extreme wet-weather events, so that the various CSO facilities may operate efficiently. Weather data, in particular the day-to-day experience (actual and forecast) of precipitation events, are needed for monitoring storm water inputs to the conveyance systems. The ICP heard that a project began in 2008 to create a RTC system. With a two-hour lead-time in forecasting, the system should help direct emergency response efforts in an effective manner. The project is expected to be completed in 2012. In support of this and similar efforts to be responsive to weather events, Hamilton should investigate the establishment of a local weather-radar station and its integration into the short-term forecasting system as recommended in the report from Kije Sipe Consultants. As well, Hamilton should study whether existing rain gauges are sufficiently integrated into a network regardless of the agency operating the gauges and adequate for modeling and forecasting purposes. For example, is the spatial distribution of gauges (seemingly concentrated in areas draining into Hamilton Harbour) sufficient to produce a good representative sample of rainfall throughout the urban area?

In their study of the recent storms and flooding events, Kije Sipe Consultants demonstrated the large spatial variation in total precipitation (especially for the summer thunderstorm events) in intensity-duration-frequency (IDF) statistics (related to topographic position with respect to the escarpment), in extent of the storms (particularly locations of peak rainfall), and in storm characteristics (total rainfall, maximum intensity, duration, and estimated return periods). The ICP heard how the City of Hamilton uses a 5-year return period to design storm sewers in conformity with standard practice in municipalities and has started using the 24-hour SCS design storms for their design of major drainage and storage facilities. The application of the same storm characteristics to the entire region in planning exercises is considered by municipal staff to overestimate the stormwater input into the system because the storms are localized. Yet, the spatially concentrated extreme events of 2005 and 2006, especially those of much less frequent return period (approximately 50 years), generated so much water that the CSOs were compromised.

Conversations with municipal staff revealed that the need to consider the implications of climate change is acknowledged. Kije Sipe Consultants recommended development of 'a new approach to drainage design and planning based on the spatial characteristics of rainfall that incorporate a mechanism to integrate climate changes.' However, little has been done in this regard. It is very clear to climatologists that statistics, such as the frequency of extreme events, have changed and are changing even more. Therefore, IDF statistics used to model the 5-year storm, upon which infrastructure planning is based, need to be updated. In this regard, municipal staff reported Hamilton is 'keeping its ear to the ground' regarding recommendations to come from the Urban Flooding Working Group and MOE Stormwater Management Working Group.

Hamilton should consider being more proactive with regard to planning for climate change. It is not enough to plan for population and settlement growth thirty years into the future (as in the GRIDS planning exercise) without considering the implications of climate change very likely to occur in that same time period. The old IDF statistics are not appropriate. The technical and economic difficulty of applying new design standards for older, built-up parts of Hamilton, are very real and formidable. Nevertheless, Hamilton might consider 'what if' scenario exercises to evaluate the resilience of the system to potential changes in the magnitude and frequency of storm events. Such scenarios could also be used in sensitivity studies, to evaluate the impacts of various programs meant to reduce stormwater and generate flow rates. Some exercises in this vein already exist e.g., the simulation study of the impact of downspout disconnections in the Lower East End.

***8. Hamilton faces significant challenges to fully implementing its stormwater management program.***

The ICP commends the work municipal staff have been doing to establish best practices and to implement the City of Hamilton's stormwater management program. The following opportunities exist for Hamilton to further this work by overcoming some of these challenges:

**a) Resources**

Resources dedicated to stormwater management would make a significant impact on how effective municipal staff are at developing and implementing the City of Hamilton's stormwater management program. Resources in the form of funding and labour would enable the Public Works Department to not only undertake Storm Drainage Studies in priority communities, but upgrade and build the infrastructure required to handle flows generated by severe storms. Similarly, additional resources would enable the Public Affairs Coordinator to facilitate focus group discussions with residents and business owners in affected areas, distribute 'Flood Aware' communication materials more regularly, and develop a Stormwater Management Communications Plan and establish on-going monitoring and assessment of programs.

**b) Political Support**

Political support would prove invaluable to municipal staff dedicated to progressing Hamilton's stormwater management program. A political champion would provide the momentum required to obtain dedicated funding for stormwater management initiatives and support for municipal by-laws that would strengthen social marketing campaigns and encourage alternative design solutions and best practices. A political champion would also provide another line of communication between Council, senior administration, municipal staff and the citizens of Hamilton. The ICP understands local politicians are informed about 'Flood Aware' and have on occasion written about the program in local newspapers. An opportunity exists to better inform local politicians and to involve them in the stormwater management process particularly those representing affected communities.

**c) Communication**

Communication with the local insurance industry would better enable the City of Hamilton to develop a more holistic and accurate understanding of the basement flooding problem. The ICP learned Risk Management Section (Budgets and Finance Division) has had little contact with the local insurance industry. Municipal staff understand considering only claims filed with the municipality understates the severity of the basement flooding problem, but they are hesitant to open these lines of communication with insurance companies. There are alternative sources of information the City of Hamilton could access including the Insurance Bureau of Canada and SMC Insurance Services - a private, for profit group that sells information to municipalities and insurance companies which describes past losses. The ICP points to the Cities of Toronto and Peterborough as examples of municipalities that have been proactive in communicating with insurance companies. In both cases, the municipalities are having frank discussions with insurers admitting they have not solved their basement flooding problems entirely, but are developing and implementing plans for dealing with the problems.

Opportunity exists for the City of Hamilton to work more closely with the local Conservation Authorities to promote public awareness with a joint message. This communication effort would complement the 'Flood Aware' program and may be effective in reaching a broader audience through more frequent exposure. For example, this partnership arrangement could make 'Flood Aware' communication materials available on the web-sites of the four local Conservation Authorities, affording better opportunities for exposure and presenting the impression of a more unified multi-level government approach to addressing stormwater management and flooding issues.

Excellent public communications materials have been produced in the past, such as the Hamilton Spectator, July 2007 Insert. For public communications to be effective, they must be repeated frequently with the same level of visibility. The ICP notices the level of public communication and education carried by the City of Hamilton appears to have decreased over the last year. Also, the communication tools are less 'high profile' and have been the responsibility of a number of municipal departments, sometimes in conjunction with external agencies such as the Conservation Authorities. The City of Hamilton should devote more resources to its public communication program to ensure that its residents receive frequent, consistent communications with adequate visibility to reach the majority of them. Resources should also be devoted to formally evaluate the effectiveness of specific initiatives and the overall program. The ICP heard that budget and time restrictions have prevented such evaluations to date. Hamilton might consider partnering with institutions such as universities to develop survey instruments and to analyze returns to provide municipal staff with useful feedback. These initiatives could be undertaken by graduate students as thesis projects.

The City of Hamilton has prepared an impressive map displaying the reports of flooding incidents in the 2005 and 2006 storms. However, it is clear to the ICP that there is no way of judging the completeness of this data set. The interpretation of magnitude of risk (such as the number of properties affected) remains largely unknown while patterns that emerge may adequately suggest areas that are 'at risk.' Hamilton relies on tally of calls from affected residents or reports from Councillors about the calls their offices receive. The ICP heard that residents may be reluctant to report flooding for fear of implications to their insurance status. Hamilton should develop a strategy that encourages flooding reports while assuring the affected residents that there would be no repercussions.

**d) Integration**

Presently, the Forestry and Horticulture Section (Operations and Maintenance) is doing a good job of managing Hamilton's urban forest resources. Forestry and Horticulture maintains an inventory of over 131,000 trees and maintenance is staged using a grid cycle based on geographic areas progressing from west to east. They presently do not use the tree database to track and monitor insect or disease problems, but is developing an Emerald Ash Borer Management Plan. Given that limb loss, leaf litter and other tree related debris can be a key factor contributing to the constriction or blockage of storm sewer culverts and infrastructure, enhanced communication between the Forestry and Horticulture Section and the SERG may be effective in pre-empting potential obstructions to the storm sewer system by focusing maintenance efforts in areas of the City of Hamilton where: the system is particularly vulnerable to obstruction; the street tree population is comprised of trees of species, age, class or health characteristics that may result in high proportion of limb loss/dead fall during storm events; and the species assemblage is vulnerable to pests or disease that could result in limb loss, dieback or mortality.

The objective of the enhanced inter-departmental communication protocol would be to identify areas of concern within the City of Hamilton that may warrant more intensive monitoring or care to ensure that risks of flooding due to obstruction in order to facilitate pro-active management.

Enhanced integration with the Parks Maintenance Section (Operations and Maintenance) and Open Space Development Section (Capital Planning and Implementation) may present opportunities to optimize the ability to achieve stormwater management objectives by retrofitting sub-surface stormwater management facilities into existing parks. In some cases, existing parks and other spaces in the public realm may represent the only opportunity to implement stormwater management infrastructure to the benefit of the function of the overall system. To date it appears from the interview responses that the Parks Maintenance and Open Space Development Sections are involved only in a peripheral way with the SERG and stormwater management issues in particular. As Hamilton moves forward to embrace Low Impact Development scenarios, incentives offered by the municipality may include the elimination of conventional stormwater management ponds in favour of sub-surface filtration, attenuation and infiltration systems that could be located in part within park lands, buffers or other open space blocks. In response, these sections need to be engaged in:

- Setting out criteria to define under what circumstances stormwater management facilities may be incorporated into existing and proposed parks (e.g., preservation of existing recreational facilities and functions, requirements for maintenance of stormwater management infrastructure and resultant impacts on park use etc.). Generally, sub-surface facilities can be successfully integrated into parks without compromising function but the parks department needs to define the 'ground rules' related to the potential to integrate such facilities into parks.

- Helping to define policies that would govern the integration of stormwater management and Low Impact Development technologies in proposed parks within the future development scenario.

It is important that Parks Maintenance and Open Space Development be involved with the SERG to begin to explore potential directions to address these two considerations with the objectives of positioning the City of Hamilton ahead of the trend that is already playing out in various GTA municipalities.

Improved integration with Road Operations and Maintenance Section (Operations and Maintenance) with respect to the issue of street sweeping and grass cutting would be beneficial to minimize the potential for storm sewer invert blockage resulting from leaf litter, dead fall and grass clippings. Some correlation between the frequency and timing of street sweeping activities and the composition of street tree population would be beneficial to maximize the effectiveness of street sweeping efforts. Forestry and Horticulture inventory information could be utilized to define areas within Hamilton where levels of leaf and limb litter may be proportionally higher than in other areas based on species, age and disease data.

**e) Tools**

Municipal by-laws would strengthen the communication materials developed through the 'Flood Aware' program by providing clear, strong and direct language adopted by Council. The language and tone presented in existing communication materials such as the Public Works Community Updates on Stormwater Management are soft and uncertain which compromises their effectiveness in the community. The social marketing campaign will likely continue to have modest impact on community behavior until it is supported by strong municipal by-laws. The ICP notes the messages presented in Hamilton's 'SOS - Snow off Sidewalks' campaign are much stronger because they are supported by By-law No. 03-296. The SOS campaign appears to be more successful than the 'Flood Aware' campaign. The ICP suggests the City of Hamilton refer to communication materials prepared by the City of Edmonton for suggestions on how municipal by-laws can strengthen social marketing campaigns. Edmonton is a leader in the development of by-laws that provide a foundation for active community involvement in managing the risk of damage from severe storms.

The establishment of Low Impact Development guidelines would further the City of Hamilton's progressive approach to addressing long-term stormwater management objectives. The ICP understands the City of Hamilton hosted two workshops (November 2008 and February 2009) which included discussions between staff, consultants, home builders, agencies and Conservation Authorities. When developed, the guidelines should address the full suite of technologies including source controls, non-structural solutions, rainwater harvesting and reuse, as well as passive solutions such as enhancing urban tree canopy cover throughout the municipality.

***9. An overall, integrated plan for Hamilton's stormwater programs and initiatives must be developed.***

The City of Hamilton should develop an overall long-term plan integrating all its present stormwater initiatives and programs. The Stormwater Master Plan and the Water and Wastewater Master Plan both have elements of what is required in such a plan. However, they are separate documents, relating to the separated sewer and combined sewer areas respectively, therefore a lack of integration tends to arise over time. The next update of the Stormwater and Water and Wastewater Master Plans (which should be updated every five years) would be an opportunity for development of such an overall, integrated plan. An example which the Hamilton may wish to consider is the City of Toronto's Wet Weather Flow Management Master Plan.

The integrated plan should identify projects, programs, and schedules for specific stormwater management initiatives and priorities, and quantify the resources (funding and labour) required to ensure they take place as required.

***10. Funding must be provided for stormwater infrastructure.***

Municipal staff are to be commended for investing the best, most cost-effective and fair means of funding stormwater infrastructure, and the cost of treating wastewater from combined sewers which results, in a city such as Hamilton. The ICP notes that in the Council Report entitled '*Recommended Water, Wastewater and Storm Budget' (FCS08108/PW08135) (City Wide)* dated November 27th, 2008, the following statements were made:

> '*Stormwater management in North America is in transition as demands of aging infrastructure, environmental stewardship, protection of the community from water related disasters and other costs of service combine to stretch scarce financial resources. In response, many cities are turning to a stormwater utility model in order to secure stable funding for operation of existing assets, infrastructure optimization, future improvement and enhancements and to support watershed management goals.*
>
> *Unlike water/sewer, gas or electricity utilities, stormwater service to runoff discharges generally cannot be metered. Therefore, the fee structure is typically determined using a GIS database and extracting parcel land-use classifications, area, applying a run-off coefficient and a unit area charge.*
>
> *In Canada, Edmonton, Regina, Saskatoon, Strathcona County, St. Albert and Aurora have implemented a stormwater/land drainage utility; Calgary and Winnipeg have partial utilities in place and Kitchener/Waterloo is currently conducting a feasibility study.'*

The ICP also draws Hamilton's attention to the public consultation process that Kingston Utilities has recently initiated regarding the possible implementation of a stormwater utility model for the City of Kingston. The ICP wish to emphasize that the funds from a stormwater utility model, should it be adopted, must be dedicated to ongoing stormwater and combined sewer infrastructure and programs.

***11. Hamilton requires a champion to recoup the sense of urgency and momentum that existed in 2006.***

The ICP was originally established by the City of Hamilton in response to the storm events of 2005. The severity of these storms caused a sense of urgency to review existing policies, procedures and practices. The ICP was convened at a time when momentum was building at the City of Hamilton to develop new responses and preventative measures to stormwater management. A considerable amount of work has been undertaken since then, but it appears the momentum and leadership evident in 2006 has waned. Municipal staff continue to make progress on stormwater management, but their efforts appear to lack the same sense of urgency. The ICP proposes one reason for this change in attitude is that stormwater management issues are being addressed by a committee that has largely been folded into ongoing activities. The ICP suggests the City of Hamilton research how the City of Peterborough has responded to similar concerns by establishing long-term dedicated funding for flood damage risk reduction, creating a new position responsible for leading stormwater management initiatives and reporting progress directly to the municipal administrator, and by sustaining political leadership. This approach could replace the present SERG as the City's stormwater initiatives evolve into a more planned, long-term program rather than 'emergency response.'

## 6.0 RECOMMENDATIONS

The ICP respectfully submits 23 recommendations for the City of Hamilton's consideration. The ICP offers these recommendations as ways Hamilton could vault into the lead. Many of our recommendations are less about how Hamilton may catch up to coping with the problem, and more about how it can develop a far-sighted pro-active approach. Also, the emphasis has shifted from what the SERG or other staff are doing and needs to do (our original assessment work) and more on what the City of Hamilton as a corporation should do to enable staff to develop a leading pro-active program. The ICP developed the recommendations based on their careful review of background material, consultations with municipal staff and consultants working on municipal stormwater projects, and their cumulative professional knowledge and experience. The recommendations are presented below and in Appendix F as they relate to the original recommendations put forth in 2006.

- **Recommendation 09-1 -** The City of Hamilton should work more closely with the local Conservation Authorities to produce a joint communication program to promote the 'Flood Aware' program to a broader audience.

- **Recommendation 09-2 -** The City of Hamilton should work more closely with the local Conservation Authorities to implement and monitor pilot projects to demonstrate the potential of Low Impact Development and innovative stormwater management technologies within both the retrofit and new development scenarios.

- **Recommendation 09-3 -** The City of Hamilton should broaden inter-departmental involvement in the SERG to engage Open Space Development, Park Maintenance and Forestry and Horticulture Sections in the process of exploring innovative design and management objectives to enhance the performance of Hamilton's overall stormwater management system.

- **Recommendation 09-4 -** The City of Hamilton's Parks Maintenance Section and Open Space Development Section should help the Strategic Planning Section in developing guidelines and policies to address the potential to integrate sub-surface stormwater management infrastructure into parks and open spaces in support of Low Impact Development objectives.

- **Recommendation 09-5 -** The City of Hamilton should amend its stormwater management, servicing and road design standards to encourage the application of innovative stormwater management systems and Low Impact Development technologies.

- **Recommendation 09-6** - The City of Hamilton should carry out a cost-benefit analysis to confirm that its present stormwater design criteria give the optimum balance between risk reduction and cost.

- **Recommendation 09-7 -** The City of Hamilton's Forestry and Horticulture Section should continue to monitor and track the presence of pests and diseases as a means to identify areas of potential vulnerability that may require management effort in the future in order to minimize the potential for obstruction of storm sewer infrastructure by dead fall.

- **Recommendation 09-8 -** The City of Hamilton's Forestry and Horticulture Section should collaborate with Roads Operations and Maintenance to assist in targeting areas within Hamilton that may require more frequent street sweeping/ground maintenance due to the propensity of certain species to produce leaf litter/limb debris based on the composition of the vegetation community by species or age class.

- **Recommendation 09-9 -** The City of Hamilton should employ accepted techniques to properly maintain its stormwater detention ponds.

- **Recommendation 09-10 -** The City of Hamilton should continue to undertake additional Master Drainage Plan Studies for priority areas where flooding has a high chance of occurring. These studies should identify existing drainage problems and recommend alternative remedial options.

- **Recommendation 09-11** - The City of Hamilton should develop a long-term plan integrating all its present stormwater initiatives and programs. The next update of the Stormwater Master Plan (which should be updated every five years) would be an opportunity to formulate such a plan.

- **Recommendation 09- 12 -** The City of Hamilton should store its stormwater data in a central database where they can be updated regularly. Municipal staff should prepare for the challenge of storing, formatting and updating these data so they remain accurate, sound and useful.

- **Recommendation 09-13** - The City of Hamilton should establish a new 'Stormwater Coordinator' position. The Coordinator would be responsible for linking stormwater management initiatives across municipal departments and would interface with established contact people in each department. The Stormwater Coordinator would report progress directly to the Municipal Administrator.

- **Recommendation 09-14** - The City of Hamilton should not reduce its present communications resources and in fact should devote more resources to its public communication program to ensure that its residents receive frequent, consistent communications with adequate visibility to reach the majority of them. Resources should also be devoted to formally evaluate the effectiveness of specific initiatives and the overall program.

- **Recommendation 09-15** - The City of Hamilton should better inform members of Council on social marketing programs such as 'Flood Aware' and make stronger efforts to involve them in stormwater management.

- **Recommendation 09-16** - The City of Hamilton should be proactive in communicating with the insurance industry to develop a holistic and accurate understanding of the flooding problem.

- **Recommendation 09-17** - The City of Hamilton should enact municipal by-laws with clear, strong and direct language to strengthen communication materials thereby making social marketing programs like 'Flood Aware' more effective.

- **Recommendation 09-18** - The City of Hamilton should ensure that the appropriate municipal staff are fully aware of the content and use of its Emergency Plan, Hazard Identification Risk Assessment and Severe Storms Emergency Response Sub-Plan.

- **Recommendation 09-19** - The City of Hamilton should continue to investigate the possibility of adopting a 'stormwater utility' model as a means of funding its stormwater and combined sewer infrastructure and programs in a sustainable, cost-effective and fair manner.

- **Recommendation 09-20** - The City of Hamilton should build concern about climate change into planning in a deliberate fashion such as running simulations to identify implications of likely or possible changes in IDF statistics.

- **Recommendation 09-21** - The City of Hamilton should build-in social factors of vulnerability to complement the usual physical factors of risk (occurrence).

- **Recommendation 09-22** - The City of Hamilton should investigate the establishment of a local weather-radar station and its integration into the short-term forecasting system as recommended in the report from Kije Sipe Consultants to be responsive to weather events.

- **Recommendation 09-23** - The City of Hamilton should dedicate targeted resources (funding and labour) to specific stormwater management initiatives identified priorities by municipal staff.

## 7.0 CONCLUSION

The risk of severe storm damage across the City of Hamilton has increased in recent years. Climate change, aging infrastructure and population growth are factors that threaten to further increase the risk of damage. At the same time, the City of Hamilton is making considerable progress in its efforts to develop and implement a strong and effective program to address this concern.

The ICP commends the work undertaken by municipal staff since 2006 and recognizes the effort that went into preparing the Water and Wastewater Master Plan and the Stormwater Master Plan. Hamilton's stormwater management program is not only strong at a policy level, but at a technical and implementation level as well. The program is based on quality data that has been collected, analyzed and managed by knowledgeable staff and skilled consultants. The program is also informed by multi-disciplinary teams, inter-departmental involvement, and relationships with key stakeholders such as Conservation Authorities, insurance companies, politicians and local residents. The ICP was particularly impressed with the quality of the public communication materials that have been developed and distributed in recent years.

The City of Hamilton is well-positioned to become a leader in establishing best practices and innovative solutions to stormwater management issues provided it can overcome the challenges standing in its way. The ICP recognize municipal staff are working hard to do the best they can with limited resources, political support and tools such as bylaws that contain strong, clear language. Communication channels between departments, municipal levels, key stakeholders and members of the public are also not as strong as they could be. Despite the best efforts of municipal staff, the City of Hamilton is lagging behind other municipalities in addressing climate change, developing Low Impact Development guidelines and dealing with insurance matters. The ICP challenges the City of Hamilton to become a leader in stormwater management. Hamilton must be proactive in every effort it makes to protect its neighbourhoods and residents from the risk of severe storm damage. A good place to start might be renaming the SERG from 'Storm Emergency Response Group' to 'Storm Emergency Prevention Group' or something of similar connotation.

The City of Hamilton would benefit tremendously from a long-term plan that integrates all municipal stormwater management policies, programs and procedures. The ICP believe the Stormwater Master Plan and the Water and Wastewater Master Plan both have elements of what is required of such a plan. The ICP encourages Hamilton to consider developing such a plan the next time the Stormwater Master Plan is updated.

While the sense of urgency felt in 2006 may have waned and progress may have slowed, the ICP believes the second peer review provides an opportunity to re-energize stormwater management practices at the City of Hamilton. Hamilton should guard against potential complacency as extreme storm events are sure to continue.

**~ APPENDIX A ~**

# HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW
# TERMS OF REFERENCE

## INTRODUCTION

An Independent Community Panel (ICP) was established by the City of Hamilton in response to the storm events of 2005. The ICP was appointed in March of 2006 with a mandate to review the causes, effects and outcomes of storm events and to make recommendations to Hamilton Council. The ICP was responsible for: a) addressing the cause and effect of inclement weather on the storm management/drainage systems in Hamilton; b) establishing a communication strategy to assist in educating the general public on issues concerning risk management and compensation; c) commenting on the draft City of Hamilton Storm Water Master Plan; and d) reviewing insurance issues and consulting with the insurance industry.

Hardy Stevenson and Associates Limited (HSAL) was retained by Hamilton to assemble the ICP and to facilitate the peer review process. HSAL brought together five professionals with expertise related to watershed planning, flood prevention, waste water engineering, storm water management, landscaping and insurance to undertake the peer review. A final report recommending 26 initiatives was presented to the Hamilton Storm Event Response Group (SERG) and Hamilton City Council in September of 2006. The recommendations included a mix of policy, infrastructure improvement, communication and public education initiatives.

## MANDATE

The ICP has been reconvened to evaluate the City of Hamilton's performance to date. Specifically, the ICP will comment on the 26 initiatives and provide new recommendations if applicable. HSAL will facilitate the peer review process and oversee the preparation of a final report that will be presented to the Public Works Committee by municipal staff.

## RESPONSIBILITIES

The ICP will undertake the following tasks:

- Review background material provided by City of Hamilton Strategic Planning;
- Participate in one meeting with Hamilton Water and Wastewater;
- Participate in one meeting with Hamilton Storm Event Response Group;
- Liaise with HSAL to prepare interview questions;
- Consult with municipal staff from Water and Wastewater, Capital Planning and Implementation, Public Health, Development Engineering, Operations and Maintenance, Budgets and Finance, and consultants working on municipal stormwater projects;
- Provide input into the Draft Peer Review Report;
- Present the Draft Peer Review Report to the Hamilton Storm Event Response Group; and
- Provide input into the Final Peer Review Report.

HSAL will undertake the following tasks:

- Prepare for and attend a start-up meeting with municipal staff;
- Prepare a Terms of Reference for the ICP;
- Serve as ICP Secretariat (e.g., record meeting minutes, distribute background materials);
- Facilitate one meeting with Hamilton Water and Wastewater Division;
- Facilitate two meetings with Hamilton Storm Event Response Group;
- Interview Water and Wastewater, Development Engineering, Health Protection, Capital Planning and Implementation, Operations and Maintenance and McCormick Rankin Corporation on behalf of the ICP;
- Draft a Peer Review Report;
- Present the Draft Peer Review Report to the Hamilton Storm Event Response Group; and
- Finalize the Peer Review Report.

## HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW
## TERMS OF REFERENCE

### DURATION

The peer review process will be initiated on Tuesday December 16th, 2008 and will be completed by the end of April 2009 as outlined in the following schedule:

**ICP REVIEW SCHEDULE**

| | DECEMBER | JANUARY | | | | FEBRUARY | | | | MARCH | | | | | APRIL | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 12 | 19 | 26 | 2 | 9 | 16 | 23 | 2 | 9 | 16 | 23 | 30 | 6 | 13 | 23 |
| PROJECT INITIATION | | | | | | | | | | | | | | | | | |
| Prepare for and attend start-up meeting with municipal staff | ★ Dec 16th | | | | | | | | | | | | | | | | |
| Draft Terms of Reference for Peer Review Team | | | | | | | | | | | | | | | | | |
| Finalize Terms of Reference with municipal staff and SERG | | | | | | | | | | | | | | | | | |
| ICP PEER REVIEW SECRETARIAT | | | | | | | | | | | | | | | | | |
| Record meeting minutes and prepare correspondence | | | | | | | | | | | | | | | | | |
| Distribute background materials to be reviewed | | | | | | | | | | | | | | | | | |
| Obtain supplemental material requested by Peer Review Team | | | | | | | | | | | | | | | | | |
| FACILITATION | | | | | | | | | | | | | | | | | |
| Meeting with Hamilton Water and Wastewater Division (1) | | | | | | | | | | | | | | | | | |
| Meeting with SERG (1) | | | | | | | | | | | | | | | | | |
| Manage Peer Review Team (conference calls, internal meetings etc.) | | | | | | | | | | | | | | | | | |
| INTERVIEWS | | | | | | | | | | | | | | | | | |
| Liaise with Peer Review Team to prepare interview questions | | | | | | | | | | | | | | | | | |
| Hamilton Water and Wastewater Division | | | | | | | | | | | | | | | | | |
| McCormick Rankin Corporation | | | | | | | | | | | | | | | | | |
| Hamilton Parks Department | | | | | | | | | | | | | | | | | |
| Hamilton Forestry Department | | | | | | | | | | | | | | | | | |
| Hamilton Public Health | | | | | | | | | | | | | | | | | |
| REPORTING | | | | | | | | | | | | | | | | | |
| Draft a Peer Review Report | | | | | | | | | | | | | | | | | |
| Present a Draft Peer Review Team Report to SERG | | | | | | | | | | | | | ★ | | | | |
| PROJECT COMPLETION | | | | | | | | | | | | | | | | | |
| Finalize Peer Review Report | | | | | | | | | | | | | | | | | ★ |

**~ APPENDIX B ~**

HARDY STEVENSON AND ASSOCIATES

**HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW**
**PROJECT START-UP MEETING**

**Tuesday December 16th, 2008**
**Hamilton City Centre, Room 320A**
**10:00 am - 12:00 pm**

**Chair:** Melissa Clements, Hardy Stevenson and Associates Limited

**Minutes:** Dave Hardy, Hardy Stevenson and Associates Limited

**Subject:** Facilitation Services for Independent Community Panel Review

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| TIME | AGENDA ITEM |
|---|---|
| 10:00 | Introductions |
| 10:10 | Overview of Facilitation Services |
| 10:15 | Confirmation of Work Plan and Schedule |
| 10:25 | Distribution and Overview of Background Materials for ICP Review |
| 10:45 | Status Report on the 26 Recommended Initiatives |
| 11:45 | Future Meetings<br><br>a) SERG - Monday January 12th, 2009<br>9:00 am - 12:00 pm, Room 320A<br><br>b) WWW - Friday January 16th, 2009<br>9:00 am - 12:00 pm, Room 400E |
| 11:50 | Other Business |

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HARDY STEVENSON AND ASSOCIATES

**HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW**
**PROJECT START-UP MEETING MINUTES**

**Tuesday December 16th, 2008**
**Hamilton City Centre, Room 320A**
**10:00 am - 12:00 pm**

**Chair:** Melissa Clements, Hardy Stevenson and Associates Limited

**Minutes:** Hardy Stevenson and Associates Limited

**Subject:** Facilitation Services for Independent Community Panel (ICP) Review

**Attendees:** Sanja Ivanovic - Strategic Planning, Capital Planning and Implementation
Jillian Stephen - Strategic Planning, Capital Planning and Implementation
Sally Yong-Lee - Infrastructure Planning, Development Engineering
Udo Ehrenberg - Infrastructure and Source Water Planning, Water and Wastewater
Dan McKinnon - Customer Service and Community Outreach, Water and Wastewater
Kelly Anderson - Public Affairs Coordinator, General Manager's Office
Cameron Dunning - Strategic Planning, Capital Planning and Implementation
Dave Hardy - Principal, Hardy Stevenson and Associates Limited

**Distribution:** SERG and Panel Members

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| AGENDA TOPIC | ACTION |
|---|---|
| **Work Plan and Schedule**<br><br>• Jillian Stephen confirmed the move to reconvene the ICP was an initiative driven by staff. A report will be presented to Public Works Committee.<br><br>• Udo Ehrenberg questioned the purpose of the January 16th, 2009 meeting with Water and Wastewater.<br><br>• Melissa Clements explained the meeting will provide the ICP an opportunity to ask staff questions regarding the background materials and steps taken to address the 26 recommendations.<br><br>• Udo suggested Chris Gainham be added to the list of invitees and requested an agenda and list of questions be distributed to staff in advance of the January meetings. | • HSAL to prepare an agenda and list of questions to be circulated to staff in advance of the January meetings.<br><br>• Sanja Ivanovic to invite Chris Gainham and Jim Macauley to the January 16th meeting. |

| AGENDA TOPIC | ACTION |
|---|---|
| • Dan McKinnon suggested Jim Macauley be invited to the Water and Wastewater meeting as well.<br><br>• Dan also suggested John McLennan be interviewed for his input into recommendations related to insurance matters.<br><br>• Dave Hardy suggested Carl Bodimeade participate in the interview with McCormick Rankin. Udo suggested Chris Gainham participate as well.<br><br>• Jillian suggested a date be selected for the second meeting between SERG and the ICP sooner rather than later. | • HSAL to forward Sanja a proposed meeting date for the February session with SERG. |
| **Distribution and Overview of Background Materials for ICP Review**<br><br>• Sanja provided HSAL with the following materials:<br><br>a) Water and Wastewater Master Plan (2006)<br>b) Stormwater Master Plan (2007)<br>c) July 2007 Hamilton Spectator Insert<br>d) Basement Flood Relief Program (Pilot Program) Notice<br>e) Aquafor Beech proposal regarding MOUSE simulation package<br>f) Email correspondence regarding downspout disconnection<br>g) Budget information regarding Kenilworth Underpass<br>h) Seasonal advertisements regarding spring and winter flooding<br><br>• The following materials are available on the City's website:<br><br>a) Wet Weather Control Master Plan Phase 3 and 4<br>b) Lower East End Storm Drainage Study and Stormwater Management Investigation<br>c) Mountainview Neighbourhood Storm Drainage Study and Stormwater Management Facility Location Review<br>d) Greenhill Avenue Storm Drainage Study<br><br>• Sanja will email HSAL the following materials:<br><br>a) Municipal Emergency Plan (2005)<br>b) Emergency Response Sub Plan #6<br>c) Community Communications Outreach Plan | • Sanja to forward HSAL additional background material by email.<br><br>• HSAL to download materials from the City's website and to forward all materials to the ICP members. |
| **Status Report on the 26 Recommended Initiatives**<br><br>• Sanja provided an overview of the steps taken to date regarding the recommended initiatives. Refer to Attachment 1 for details. | |

| AGENDA TOPIC | ACTION |
| --- | --- |
| **Future Meetings**<br><br>The following meetings, dates and locations were confirmed:<br><br>• SERG - Monday January 12th, 2009<br>9:00 am - 12:00 pm, Room 320A<br><br>• WWW - Friday January 16th, 2009<br>9:00 am - 12:00 pm, Room 400E | • Sanja to prepare and distribute a list of meeting participants to attendees to ensure everyone who should attend is invited. |

Enclosure: Attachment 1

HARDY STEVENSON AND ASSOCIATES

**HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW**
**SERG MEETING**

**Monday January 12th, 2009**
**Hamilton City Centre, Room 400E**
**9:00 am - 12:00 pm**

**Co-Chairs:** Melissa Clements, Hardy Stevenson and Associates Limited
Carl Bodimeade, Hatch Mott MacDonald

**Minutes:** Melissa Clements, Hardy Stevenson and Associates Limited

**Subject:** Status Update on 26 Recommendations

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| TIME | AGENDA ITEM |
|---|---|
| 9:00 | Introductions |
| 9:10 | ICP Review Status |
| 9:25 | Project Schedule |
| 9:30 | Question and Answer Session<br>• Panel Members to ask questions regarding initiatives taken regarding the 26 recommendations. |
| 11:45 | Future Meetings - HSAL Presentation of Final Report<br>a) SERG - Tuesday February 24th, 2009<br>1:00 pm - 3:00 pm, Room TBD |
| 11:50 | Other Business |

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HARDY STEVENSON AND ASSOCIATES

**HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW**
**SERG MEETING MINUTES**

**Monday January 12th, 2009**
**Hamilton City Centre, Room 400E**
**9:00 am - 12:00 pm**

**Chair:** Melissa Clements, Hardy Stevenson and Associates Limited
Carl Bodimeade, Hatch Mott MacDonald

**Minutes:** Hardy Stevenson and Associates Limited

**Subject:** Status Update on 26 Recommendations

**Attendees:** Sanja Ivanovic - Strategic Planning, Capital Planning and Implementation
Nahed Ghbn - Strategic Planning, Capital Planning and Implementation
Elizabeth Panicker - Strategic Planning, Capital Planning and Implementation
John Morgante - Design and Construction, Development Engineering
John McLennan - Risk Management, Budgets and Finance
Dan McKinnon - Customer Service and Community Outreach, Water and Wastewater
Enzo Florio - Infrastructure Planning, Development Engineering
Carl Bodimeade - ICP Member
Dr. Yiping Guo - ICP Member
Mark Schollen - ICP Member
Dr. Paul Kay - ICP Member
Paul Kovacs - ICP Member

**Distribution:** SERG and Panel Members

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| AGENDA TOPIC | ACTION |
|---|---|
| **ICP Review Status**<br><br>• The ICP was reconvened in December of 2008 to assess Hamilton's performance to date with respect to the 26 recommendations. The ICP will review each recommendation individually and provide new recommendations where applicable.<br><br>• HSAL will facilitate the peer review process and oversee the preparation of a final report which will be presented to the Public Works Committee by municipal staff.<br><br>• HSAL met with Sanja Ivanovic and staff on December 16th, 2008 for a start-up meeting where background material was provided for review. | |

| AGENDA TOPIC | ACTION |
|---|---|
| **Project Schedule**<br><br>The schedule was distributed to all attendees:<br><br>• ICP will meet SERG and Water and Wastewater the week of January 12th.<br>• HSAL will interview key stakeholders the week of January 19th.<br>• ICP will draft individual reports the week of January 26th.<br>• HSAL will draft a consolidated report the week of February 9th.<br>• Staff and SERG will review draft report the week of February 16th.<br>• HSAL will present the final report to SERG on February 24th. | |
| **Question and Answer Session**<br><br>• Carl Bodimeade chaired this portion of the meeting. Carl clarified that technical questions regarding the Water and Wastewater Master Plan would be left for Friday's meeting with Water and Wastewater and suggested an open question and answer session be followed by a review of the 26 recommendations specifically.<br><br>• Carl Bodimeade began by commending SERG's communication efforts to date and asked about the feedback residents have provided regarding the Flood Aware Program. Carl also questioned whether or not the SERG Communication Plan had been updated since 2007.<br><br>SERG members agreed Kelly Anderson, Public Affairs Coordinator is the most appropriate person to answer questions regarding communications. Kelly did not attend the meeting so it was decided the ICP would save questions related to communications for her.<br><br>• Dr. Yiping Guo asked whether Hamilton was monitoring the stream restoration process associated with the Red Hill Valley Expressway. Dr. Guo described the importance of long-term monitoring to assess the success of stream restoration processes. Dr. Guo would like to see Hamilton involved in more long-term monitoring programs.<br><br>Elizabeth Panicker confirmed municipal staff are involved in a long-term monitoring program and offered to provide the ICP with a copy of the Monitoring Plan. Elizabeth also noted municipal staff are undertaking an Erosion Study as well and offered to provide the ICP with the Terms of Reference.<br><br>• Paul Kovacs asked how well Hamilton understands the flooding problem e.g., how frequent flooding events are occurring.<br><br>John McLennan identified two sources for receiving flood data: 1) claims filed by residents; and 2) reports residents file with Local Councillors. John explained that information is shared between the two data sources, but the data sources are not integrated electronically. | • Sanja Ivanovic to invite Kelly Anderson to the Friday January 16th meeting with Water and Wastewater.<br><br>• Sanja to provide HSAL with copies of the Red Hill Valley Expressway Stream Restoration Monitoring Plan and the TOR for the Erosion Study for distribution to the ICP members. |

| AGENDA TOPIC | ACTION |
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| • Paul Kovacs asked whether Hamilton has requested information from (or provided information to) the insurance companies.<br><br>John McLennan reported that Hamilton has done neither. John agreed with Paul that only considering claims filed with the municipality understates the severity of the problem.<br><br>Paul shared two other potential data sources with John: 1) Insurance Bureau of Canada; and 2) SMC Insurance Services which is a private, for profit group that sells a product to insurance companies which describes losses.<br><br>Paul encouraged John to follow-up with the brokerage association that has approached him and to engage in an open discussion with them. Paul described how other municipalities (e.g., Toronto, Peterborough) have been proactive in talking to insurance companies. In both cases, the municipalities admitted they had not solved the problem entirely, but presented plans for dealing with the problem and presented the budget figures they estimated were required to make significant progress. Paul described how these frank discussions were well received by the insurance industry.<br><br>John noted Hamilton has been having more open conversations with insurance providers since 2006. John also noted Hamilton has not been sued by an insurance provider since 2006.<br><br>• Paul Kovacs asked whether Hamilton collects data on the number of residents purchasing sewer back-up coverage and whether or not coverage is available.<br><br>John McLellan reported few residents have had their insurance discontinued because of flooding claims.<br><br>• Paul Kovacs asked whether or not Hamilton has considered initiating a reporting program separate from insurance claims.<br><br>John McLellan described how Hamilton does not promote reporting. Residents contact their Local Councillor out of experience.<br><br>Enzo Florio described how residents were encouraged to attend sessions for the Lower East End Storm Drainage Study regardless of whether or not they had filed an insurance claim. The open invitation to residents enabled Hamilton to obtain additional information for the Study.<br><br>• Mark Schollen asked whether there was a representative from operations and maintenance or urban forestry on the SERG.<br><br>SERG is comprised of representatives from the following municipal divisions: | |

| AGENDA TOPIC | ACTION |
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| Water and Waste Water<br>Development Engineering<br>Capital Planning and Implementation<br>Operations and Maintenance<br>Budgets and Finance<br>Emergency Planning<br>General Manager's Office<br><br>SERG meets bi-monthly.<br><br>Bill Weaver, Operations and Maintenance was suggested as a potential new member in response to Mark's question.<br><br>• Mark Schollen asked whether the evaluation presented in the Aquafor Beech report was applied to all stormwater management ponds in Hamilton. Mark explained the usefulness of such a tool in allocating expenditures to obtain the greatest yield.<br><br>Elizabeth Panicker explained how an operations and maintenance manual was being drafted by municipal staff and how the manual will include an evaluation check-list.<br><br>Dan McKinnon noted the approved budget is not sufficient.<br><br>• Mark Schollen commended the work Hamilton has done with their Flood Aware Program. Mark suggested Hamilton take things a step further by: 1) providing incentives; 2) educating residents about new products available to homeowners; and 3) encouraging residents to do things a little differently e.g., installing permeable pavement rather than asphalt when resurfacing driveways.<br><br>Elizabeth Panicker noted municipal staff organized/held a one day workshop last year to discuss possible incentive programs for low impact development. A second workshop will be held on February 6th, 2009.<br><br>• Dr. Paul Kay asked whether storm events that did not meet the city-wide criteria would ever be placed on the emergency response list. Reference to Recommendation 2.<br><br>John McLellan noted Carla McCracken should be contacted for more information on the Hazardous Risk Assessment criteria.<br><br>• Paul Kovacs commented that the design criteria of storms that goes into the MOUSE model does not appear too extreme. Paul asked whether Hamilton has considered amending their assumptions given climate change.<br><br>John Morgante explained the model applied to the Old City of Hamilton is based on historical data while the model applied to new developments includes criteria for larger storms. A minor storm system has a 5 year return period while a major storm system has a 100 year return period. | • Sanja to contact Carla McCracken for information regarding the Hazardous Risk Assessment criteria. |

| AGENDA TOPIC | ACTION |
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| Enzo Florio noted the IDF curves have been updated with 2004 and 2005 storm data.<br><br>• Dr. Paul Kay asked whether Hamilton has considered building 'what if' scenarios into their model.<br><br>Enzo Florio noted Hamilton is in the process of developing a Real Time Control (RTC) model for the entire piped system.<br><br>John Morgante described how provincial IDF curves take climate change into account and how Hamilton is not being proactive, but watching how other municipalities and the Province are dealing with the issue.<br><br>Paul Kovacs described how the City of London undertook their own study to obtain their own numbers at their own cost.<br><br>Elizabeth Panicker noted Hamilton is an active participant in the Urban Flooding Working Group led by the Ministry of Environment (MOE). The Group is comprised of 7 - 8 municipalities and a handful of Ministries who discuss climate change and IDF curves.<br><br>Carl Bodimeade asked whether Hamilton has a plan for harmonizing stormwater management criteria across the former municipalities.<br><br>John Morgante confirmed a report does exist and will make it available to the ICP for review.<br><br>Carl Bodimeade asked whether Hamilton has received any inquiries from residents asking about stormwater management standards across the former municipalities.<br><br>Enzo Florio has not received any such questions from residents.<br><br>• Carl Bodimeade suggested Hamilton consider studying areas that may be at risk, but have yet to experience flooding.<br><br>Enzo Florio responded that Hamilton has identified such areas for future study and will provide the ICP a map identifying the proposed study boundaries along with the boundaries of studies already completed.<br><br>**- 5 MINUTE BREAK –**<br><br>• Dr. Yiping Guo described a study undertaken by one of his students in which Hamilton was a participant. The study found that the majority of stormwater management ponds in Southern Ontario have reached their design life and require remedial action to make them fully functional again. Richmond Hill for example is considering dredging their ponds to regain their full capacity. Dr. Guo asked whether Hamilton had budget for similar initiatives. | • Sanja to provide HSAL with the Criteria and Guidelines for Stormwater Infrastructure Design for distribution to the ICP members.<br><br>• Sanja to provide HSAL with a map identifying the boundaries of areas identified for future study as well as areas where studies have been completed. |

| AGENDA TOPIC | ACTION |
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| Elizabeth Panicker described how the operations and maintenance manual that staff are preparing will include cost estimates for pond restoration. Once finalized, the manual will help in the preparation of operating budgets.<br><br>• Paul Kovacs commended Hamilton on their communications material. Paul commented the tone and wording was more cautious than the tone and wording presented by other municipalities e.g., Edmonton and asked why a more aggressive approach is not being taken.<br><br>Enzo Florio explained that the wording in Hamilton Bylaws must be changed before communications can be more direct. Hamilton runs the risk of promoting something that contravenes its Bylaws at the present time.<br><br>• Mark Schollen described how public lands provide opportunities for implementing new design standards for low impact development.<br><br>John Morgante confirmed Hamilton is serious about low impact development, but has a long way to go. The Parks Department must be involved in these initiatives.<br><br>• Dr. Paul Kay asked what new material Hamilton will be presenting to residents in its communications material in the future.<br><br>Dan McKinnon described how a number of new programs will grow out of the Water and Wastewater Master Plan e.g., rebates for low flush toilets, outreach programs like the Children's Water Festival, and automated meter reading.<br><br>• 11:05 the discussion turned to the 26 recommendations. **Please refer to Attachment 1 for details.** | |
| **Future Meetings**<br><br>• SERG - Tuesday February 24th, 2009<br>1:00 pm - 3:00 pm, Room TBD | |

Enclosure: Attachment 1

HARDY STEVENSON AND ASSOCIATES

**HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW**
**WATER AND WASTEWATER MEETING**

**Friday January 16th, 2009**
**Hamilton City Centre, Room 320A**
**9:00 am - 12:00 pm**

**Co-Chairs:** Melissa Clements, Hardy Stevenson and Associates Limited
Carl Bodimeade, Hatch Mott MacDonald

**Minutes:** Melissa Clements, Hardy Stevenson and Associates Limited

**Subject:** Status Update on 26 Recommendations

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| TIME | AGENDA ITEM |
|---|---|
| 9:00 | Introductions |
| 9:10 | ICP Review Status |
| 9:25 | Project Schedule |
| 9:30 | Question and Answer Session<br>• Panel Members to ask questions regarding initiatives taken regarding the 26 recommendations. |
| 11:45 | Future Meetings - HSAL Presentation of Final Report<br>a) SERG - Tuesday February 24th, 2009<br>1:00 pm - 3:00 pm, Room TBD |
| 11:50 | Other Business |

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HARDY STEVENSON AND ASSOCIATES

**HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW**
**WATER AND WASTEWATER MEETING MINUTES**

**Friday January 16th, 2009**
**Hamilton City Centre, Room 320A**
**9:00 am - 12:00 pm**

**Chair:** Melissa Clements, Hardy Stevenson and Associates Limited
Carl Bodimeade, Hatch Mott MacDonald

**Minutes:** Hardy Stevenson and Associates Limited

**Subject:** Status Update on 26 Recommendations

**Attendees:** Sanja Ivanovic - Strategic Planning, Capital Planning and Implementation
Nahed Ghbn - Strategic Planning, Capital Planning and Implementation
Elizabeth Panicker, Strategic Planning, Capital Planning and Implementation
Gord Baguley - Infrastructure and Source Water Planning, Water and Wastewater
Bert Posedowski - Water Distribution and Wastewater Collection, Water and Wastewater
Christopher Gainham - Infrastructure and Source Water Planning, Water and Wastewater
Kelly Anderson - Public Affairs Coordinator, General Manager's Office
Carl Bodimeade - ICP Member
Dr. Yiping Guo - ICP Member
Mark Schollen - ICP Member
Dr. Paul Kay - ICP Member
Paul Kovacs - ICP Member

**Distribution:** Attendees, SERG and Panel Members

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| AGENDA TOPIC | ACTION |
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| **ICP Review Status**<br><br>• The ICP was reconvened in December of 2008 to assess Hamilton's performance to date with respect to the 26 recommendations. The ICP will review each recommendation individually and provide new recommendations where applicable.<br><br>• HSAL will facilitate the peer review process and oversee the preparation of a final report which will be presented to the Public Works Committee by municipal staff. | |

| AGENDA TOPIC | ACTION |
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| • HSAL met with Sanja Ivanovic and staff on December 16th, 2008 for a start-up meeting where background material was provided for review. | |
| **Project Schedule**<br><br>The schedule was distributed to all attendees:<br><br>• ICP met with SERG and Water and Wastewater the week of January 12th.<br>• HSAL will interview key stakeholders the week of January 19th.<br>• ICP will draft individual reports the week of January 26th.<br>• HSAL will draft a consolidated report the week of February 9th.<br>• Staff and SERG will review draft report the week of February 16th.<br>• HSAL will present the final report to SERG on February 24th. | |
| **Question and Answer Session**<br><br>• Carl Bodimeade chaired this portion of the meeting. Carl suggested an open question and answer session be followed by a review of the 26 recommendations specifically.<br><br>• The session began with the ICP members asking Kelly Anderson, Public Affairs Coordinator questions related to communication and consultation.<br><br>• Carl Bodimeade asked what feedback residents had provided regarding the Flood Aware Program.<br><br>Kelly Anderson explained Hamilton does not formally track responses to community initiatives - residents provide feedback post-incidence. Kelly has not received any feedback from businesses, but does believe Council members are aware of the program given one Councillor wrote about the program in the Hamilton Spectator. Kelly has ongoing discussions with Health Protection. Kelly has received no negative comments to date.<br><br>• Carl Bodimeade asked whether or not the SERG Communication Plan had been updated since 2006.<br><br>Kelly Anderson described how new seasonal ads were prepared in 2008, but no revisions have been made to the Communication Plan. Kelly noted the goals and stakeholder groups identified in the Plan remain the same and that the Plan will likely be updated in 2009.<br><br>• Dr. Paul Kay asked Kelly Anderson what data she would like to measure and what would be required to gather and analyse the data.<br><br>Kelly Anderson would like to survey affected residents and facilitate focus group discussions in the most impacted neighbourhoods. Additional staff and financial resources are required to undertake this scope of work. Kelly suggested some of the work could be done by students. | |

| AGENDA TOPIC | ACTION |
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| • Dr. Paul Kay complimented the content of the Flood Aware materials and commented on the importance of following-up on community programs. Dr. Kay described the difficulty he had finding the Flood Aware website and asked whether residents had commented on web access.<br><br>Kelly Anderson admitted the Hamilton website requires some work which is why she chose an easy URL for the Flood Aware Program and includes the URL address on all printed materials.<br><br>• Paul Kovacs asked whether communication initiatives were centralized within the City of Hamilton.<br><br>Kelly Anderson replied that communication is decentralized throughout Hamilton, but representatives from various departments meet regularly to discuss broad issues. The various departments do not review all of the materials the others produce.<br><br>• Paul Kovacs complimented the quality of the materials produced for the Flood Aware Program. Paul commented on the soft tone presented in the materials and questioned why the messages were not stronger. Edmonton was cited as a good example where strong and clear language is presented in communication material.<br><br>Kelly Anderson explained the language included in the printed materials is based on input provided by SERG and Risk Management. Hamilton is trying to take a partnership approach e.g., 'Hamilton is doing this ... therefore you could do this ...' Kelly agreed with Paul that the language could be more aggressive.<br><br>• Paul Kovacs commented Bylaws could help with this.<br><br>• Dr. Yiping Guo described how public education must be integrated into the communication process. Dr. Guo stressed the importance of having residents understand Hamilton is experiencing storms with larger return periods than what the City can afford to design for and as a result overflow occurs. Dr. Guo suggested Hamilton hire a university student to assist with communicating this message.<br><br>• Mark Schollen asked whether the Conservation Authorities are involved in the communications.<br><br>Kelly Anderson noted she does not have a relationship with the Conservation Authorities, but will consider developing one in the future.<br><br>Elizabeth Panicker noted she had worked with the four Conservation Authorities to produce two brochures (one urban and one rural source control). Elizabeth noted she would provide Sanja Ivanovic copies of the brochures for the ICP.<br><br>• Mark Schollen suggested Kelly Anderson consider implementing a pilot program (with the Conservation Authorities) in the flood prone areas. | • Sanja Ivanovic to provide HSAL with the brochures referred to by Elizabeth Panicker. |

| AGENDA TOPIC | ACTION |
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| • Carl Bodimeade commented that the July 2008 flyer was excellent and asked whether there were plans to produce another one this year.<br><br>• Kelly Anderson does have plans to produce another flyer in the spring or summer. The flyer will present results from ongoing studies, update residents on the basement pilot project and relay any other new information Hamilton has. Kelly would like to have the budget required to make the flyer an annual occurrence.<br><br>• Carl Bodimeade thanked Kelly Anderson for her input and directed the panel to ask municipal staff questions related to water and wastewater.<br><br>• Carl asked whether Hamilton had an overall Inflow and Infiltration Plan.<br><br>Chris Gainham described how Inflow and Infiltration (I and I) was initiated in 2004 and how it relates to the separated system. Hamilton has 115 flow monitors dispatched to collect data which is used to assess storm severity, calibrate the model, assess system capacity, score catchments, and to identify hot spots.<br><br>Hamilton will initiate another study on the separated system in the spring of 2009. The next phase will involve sanitary sewer field investigation of priority catchments, identification of defects and cross-connections, rehabilitation works, and follow-up flow monitoring. The data will be used to recommend rehabilitation initiatives. The monitors will be reinstalled post-rehab for reassessment. This study will provide a snapshot of the problems existing on both the public and private sides.<br><br>• Carl Bodimeade asked whether Hamilton had plans to look at the combined system.<br><br>Chris Gainham explained Water and Wastewater is working with Capital Planning and Implementation to look at capacity and cited the Lower East End Storm Drainage Study as an example.<br><br>McCormick Rankin has built an all pipes model and has identified local (neighbourhood) capital projects to alleviate flooding.<br><br>Water and Wastewater will be developing an all pipes model for the entire city. The existing model includes trunk mains only. An all pipes model will enable Hamilton to identify bottlenecks and make recommendations for improvement. The model will also provide a tool for designing new systems and replacing/sizing older systems.<br><br>• Carl Bodimeade asked whether residents disconnecting their downspouts would have a significant impact on capacity.<br><br>Chris Gainham discussed the results of an AWS Study which found a decrease in total volume (varied between 5% and 20%) due to downspout disconnection. | • Sanja Ivanovic to provide HSAL with a copy of the AWS Study for distribution to the ICP. |

| AGENDA TOPIC | ACTION |
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| Chris Gainham provided an overview of the Real Time Control (RTC) system. RTC is being implemented to automate Hamilton's collection system. RTC was initiated in November of 2008 and is expected to be substantially complete by 2013. RTC is an automation tool that controls gates, pumps, CSO tanks and other flow regulators in the system thereby optimizing pipe capacity. RTC will enable Hamilton to store wastewater in systems to reduce overflows. Opportunities exist to combine RTC with flood alleviation e.g., Lower East End.<br><br>• Dr. Yiping Guo asked what kind of flow monitors had been installed.<br><br>Chris Gainham reported area velocity meters had been installed. A few of the metres have wireless technology and cellular paging options. Chris explained how data loggers gather information on site and how Hamilton's consultants download this information roughly once every two weeks. Data is logged in five minute intervals. Rain gauges are not heated which means they can not measure winter precipitation or snow melt. Hamilton relies on data provided by Environment Canada for snow melt.<br><br>• Dr. Yiping Guo asked how Hamilton determines the cause of infiltration once a problem has been identified.<br><br>Chris Gainham noted desktop studies of the data are the first step in assessing an I/I problem and the shape of the hydrograph can indicate the nature of the problem. Smoke testing is undertaken and crews are dispatched to problem sites for further field investigation.<br><br>• Dr. Yiping Guo asked whether the all pipes model could be used to identify bottlenecks. Dr. Guo also asked about the model's accuracy.<br><br>Chris Gainham confirmed the all pipes model could identify bottlenecks.<br><br>Chris described how the model was calibrated with recent flow data. Hamilton has been successful in capturing some large storm events lately.<br><br>Hamilton will validate the calibration and assumptions made for each of the separate models (e.g., models created for each area specific study) during the all pipes model process for the entire city. Chris noted a DHI Mike Urban Model was used along with an RDII component. Provisions were made for RDII across the entire system.<br><br>• Dr. Yiping Guo asked what the forecasting lead time was for RTC.<br><br>Chris Gainham noted it was two hours into the future.<br><br>• Dr. Yiping Guo asked whether Lake Ontario affects the accuracy of the RTC forecasting.<br><br>Chris Gainham described how Hamilton has looked at the sensitivity of the system e.g., storm track, escarpment effect, lake effect etc. and did not find the effects to be overwhelming. Chris agrees this issue should be looked at more. | |

| AGENDA TOPIC | ACTION |
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| • Paul Kovacs asked to what extent are the problems related to the private system or the public system.<br><br>Chris Gainham replied that both sides could do better.<br><br>• Paul Kovacs referred to material released by the Federation of Canadian Municipalities and asked if Hamilton has quantified its infrastructure deficit.<br><br>Chris Gainham estimated the cost for projects identified in the city-wide master plan (collection system) to be $500 million. Costs associated with the Woodward project would raise the total to $1.4 billion.<br><br>• Bert Posedowski described how Hamilton has a good strategy for ranking sewer pipes to attack the worst ones first. Hamilton's system is structurally good, but there are problems related to capacity. The pipes in the Lower East End for example are structurally sound, but they are too small to handle the flows.<br><br>• Paul Kovacs asked what private property owners could do and whether Hamilton has a formal method of identifying problems.<br><br>Chris Gainham explained that staff must be in the ground to accurately identify problems. Hamilton will be developing plans that involve residents on a neighbourhood by neighbourhood basis.<br><br>Chris explained that Hamilton is monitoring new neighbourhoods to see if wet weather flow problems exist. Development Engineering is undertaking pressure tests and working with developers to convince them it is in their best interest to connect into the system properly.<br><br>• Paul Kovacs asked whether Bylaws could be used in new development areas to enhance the system.<br><br>Chris Gainham described how Engineering Design Guidelines exist for new subdivision infrastructure. The problem is that the guidelines are not always enforced due to a shortage of inspectors in the city. A lack of staff is leading to a breakdown in quality control.<br><br>• Dr. Paul Kay asked what discussions Hamilton has had with respect to climate change.<br><br>Chris Gainham noted Hamilton is a member of the Urban Flooding Working Group which discusses the implications climate change is having on stormwater and flooding. Chris described the difficulty Hamilton is having quantifying the impact climate change is having on every storm.<br><br>Bert Posedowski described how the capacity problems associated with local systems has changed. Hamilton knows something has changed e.g., is it the change in the amount of impervious land surface or is it climate change? | |

| AGENDA TOPIC | ACTION |
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| • Dr. Paul Kay asked whether the models for new development areas take into account climate change.<br><br>Chris Gainham described how an extreme storm event occurred during the design phase for the Waterdown Treatment Plant. The design process took into account the magnitude of the storm event because it was a large historic storm. Hamilton expects the frequency and magnitude of storms will increase under a global warming scenario.<br><br>• Paul Kovacs asked whether Hamilton is looking at water demand.<br><br>Chris Gainham described how Customer Service and Community Outreach is in the process of developing a Water Conservation Master Plan.<br><br>Bert Posedowski noted Hamilton is moving towards water conservation initiatives e.g., low flow showerheads, low flush toilets and rain barrels.<br><br>• Mark Schollen asked what emphasis is being placed on source controls.<br><br>Sanja Ivanovic described how staff attended a workshop on low impact development in November of 2008. A similar workshop will be held for consultants on February 6th, 2009. Sanja commented they want to know what they are going to get in return for implementing low impact development measures. Consultants such as A J Clarke will be participating in the workshop along with other companies who work with Hamilton. Hamilton is looking for a cross-section of participants.<br><br>• Mark Schollen asked whether Hamilton has looked into using a matrix like the one presented in the report prepared by Philips Engineering.<br><br>Sanja Ivanovic commented on the problem of ownership e.g., who will take ownership of features requiring ongoing maintenance? Hamilton is considering this question and is in the process of developing a response.<br><br>• Carl Bodimeade asked whether there was a particular reason a five year storm was applied to the Water and Wastewater Master Plan.<br><br>Chris Gainham confirmed a five year storm was applied to all catchments across the City of Hamilton. Chris noted Hamilton is considering the capacity of the system in specific areas to see if it is appropriate when capital projects come up.<br><br>Chris also noted Hamilton is revisiting the IDF curves to update them with rainfall data from the last fifteen years.<br><br>• 11:00 the discussion turned to the 26 recommendations. **Please refer to Attachment 1 for details.** | |

| AGENDA TOPIC | ACTION |
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| **Future Meetings**<br><br>• SERG - Tuesday February 24th, 2009<br>1:00 pm - 3:00 pm, Room TBD | |

Enclosure: Attachment 1

| NO. | RECOMMENDATION | MUNICIPAL INITIATIVES |
|---|---|---|
| 1 | The City of Hamilton should take a proactive approach to designing for severe storm events and take advantage of cost effective opportunities when they arise as part of future stormwater infrastructure planning. | • Stormwater Master Plan (2007)<br>• Low Impact Development Workshops in November of 2008 and February of 2009. Involve staff, consultants, agencies, and conservation authorities.<br>• Water and Wastewater is implementing a Real Time Control (RTC) system process for combined sewer flows. Stantec and BPR-CSO were retained in November to complete the RTC project and all pipes model with an anticipated substantial completion date of January 20th, 2012. |
| 2 | The City of Hamilton should place 'severe storms' on the City's emergency response list. | • Municipal Emergency Plan (2005)<br>• Emergency Response Sub Plan #6 deals with flooding.<br>• A severe storm must be a city-wide catastrophe in order for it to be placed on the emergency response list. An event such as Hurricane Hazel would be placed on the list. The Hazard Identification Risk Assessment List does not mean that there are not other potential hazards. The City's Emergency Plan is designed to be applied to any and all emergency situations including severe storms/flooding regardless of be in on the "top ten list" or not. |
| 3 | The City of Hamilton should take an area-wide perspective of the effects of climate change and severe storms. In addition to considering areas that are experiencing flood and sewer back-ups now, also plan for surrounding streets and neighbourhoods that may be affected 10 years from now. | • Stormwater Master Plan (2007)<br>• Water and Wastewater Master Plan (2006)<br>• Lower East End Storm Drainage Study<br>• Urban Flooding Working Group has been established to deal with issues at a policy level.<br>• Municipal Stormwater Rural and Urban Working Groups have been established with similar compositions to the Urban Flooding Working Group. |

| NO. | RECOMMENDATION | MUNICIPAL INITIATIVES |
|---|---|---|
| | | • Basement Flood Relief Program (Pilot Program) has been initiated. It is a one year program where participants receive a maximum of $3,000 for the inspection and installation of a backwater valve. Applications are due January 30th, 2009. The pilot program will include ±100 properties in Wards 3, 4, and 8.<br><br>• Stormwater Management Working Group - Hamilton is a representative on this Ministry of Environment (MOE) initiative. |
| 4 | The City of Hamilton should make areas where problems have been experienced in the past a priority for investigation and appropriate actions. | • Lower East End Storm Drainage Study<br><br>• MountView Neighbourhood Storm Drainage Study and Stormwater Management Facility Location Review.<br><br>• Inflow and Infiltration Study was initiated in 2005. Sanitary sewer evaluations and remedial measures in pre-selected areas of concern to begin in the spring of 2009. XP Storm was used because staff had experience with it and the data was available. All aspects of the sewer system could be included using MOUSE.<br><br>• Basement Flood Relief Program (Pilot Program)<br><br>• Enzo Florio noted Hamilton is looking at other areas that have been identified as being 'at risk.' Paul Kovacs advised making Council aware of other areas under consideration. |
| 5 | The City of Hamilton should recalibrate its model at a finer level of detail and apply it to assess storm causes and effects at a neighbourhood level. | • Aquafor Beech has been retained to calibrate/validate the MOUSE model. A copy of the proposal dated May 5th, 2008 was provided to HSAL by Sanja Ivanovic. This will be an all pipes model for West Central Mountain.<br><br>• McCormick Rankin completed a similar exercise for the Lower East End part of the City.<br><br>• MountView Neighbourhood Storm Drainage Study and Stormwater Management Facility Location Review |

| NO. | RECOMMENDATION | MUNICIPAL INITIATIVES |
|---|---|---|
| | | • Inflow and Infiltration Study was initiated in 2005. Sanitary sewer evaluations and remedial measures in pre-selected areas of concern to begin in the spring of 2009.<br>• Basement Flood Relief Program (Pilot Program) |
| 6 | The City of Hamilton should evaluate both the benefits and costs of providing infrastructure to accommodate extreme storms so that policy discussions are carried out in an informed manner, recognizing both the positive and negative impacts. | • Carl Bodimeade referred to a diagram in Section 4.2.6 of the ICP Report. The ICP suggested Hamilton should use the most effective way to determine how funds should best be allocated. |
| 7 | The City of Hamilton would benefit from becoming more aggressive in looking for opportunities to create water courses, recover former natural water courses, and complete stream remediation in existing urban areas. | • A partnership has formed between the City and the Hamilton Conservation Authority. Hamilton is a representative on the Implementation and Stakeholder Advisory Team. Stewardship Plans are prepared and recommendations implemented.<br>• An Erosion Assessment Master Plan has been initiated.<br>• A number of day-lighting projects are underway where underground water courses (former storm sewers) are being re-naturalized and brought to the surface. |
| 8 | The City of Hamilton's storm conveyance areas and stormwater detention ponds should be examined for the ability to integrate non-structural initiatives and natural processes and functions. | • Strategic Planning is in the process of drafting landscape guidelines for stormwater management ponds. |
| 9 | The City of Hamilton is encouraged to assess, on a case by case basis, opportunities to improve stormwater infrastructure, such as converting single catch basins to double catch basins at appropriate key locations. | • Lower East End Storm Drainage Study<br>• McCormick Rankin is working on solutions for the Kenilworth Underpass.<br>• Runoff is being redirected away from problem areas and catch basins are being blocked off. |

| NO. | RECOMMENDATION | MUNICIPAL INITIATIVES |
|---|---|---|
| | | • Water and Wastewater is creating a database for inlets that get 'blinded' with debris. Crews are dispatched in advance of storms to clear away debris. |
| 10 | The City of Hamilton is encouraged to continue to promote city-wide stormwater effect prevention measures at a household level. | • Brochures have been posted on the municipal website regarding spring and winter flooding. Community updates have also been published in local newspapers. |
| 11 | The City of Hamilton ought to commit to maintaining or intensifying the density of the rain gauge network and to the use of leading edge technology for better weather forecasting and make the gauge network permanent. | • Water and Wastewater is implementing a Real Time Control (RTC) system. RTC will enhance and expand the existing RG network and provide Hamilton with the tools to produce custom and automated wet weather event reports. Wet weather forecasting tools will also be included which will give Hamilton advanced notice of events that may result in urban flooding.<br>• Radar Analysis Storm Categorization Study analysed recent storms. |
| 12 | The City of Hamilton should continue to look carefully at the impact of urban development on major stormwater systems and sub-watershed systems on a broader basis as urban development approvals are reviewed. | • Stormwater Master Plan (2007)<br>• Water and Wastewater Master Plan (2006)<br>• Hamilton is embracing Low Impact Design Standards and conducting workshops to introduce concepts. The storm sewer development permits are to comply with watershed design criteria dictated by the Watershed and Sub-watershed Plans where they exist and new Criteria and Guidelines and Storm Drainage Policy.<br>• Development permits are to comply with Watershed and Sub-watershed Master Plans where they exist and Criteria and Guidelines and Storm Drainage Policy. Sub-watershed Master Plans are more detailed for new development areas. |
| 13 | The City of Hamilton should continue to amalgamate and consolidate the best stormwater management policies and actions from former municipalities. | • Stormwater Master Plan (2007) |

| NO. | RECOMMENDATION | MUNICIPAL INITIATIVES |
|---|---|---|
| | | • Water and Wastewater Master Plan (2006)<br>• Refer to email correspondence regarding downspout disconnection.<br>• Criteria and Guidelines for Stormwater Infrastructure Design and Storm Drainage Policy. |
| 14 | The City of Hamilton should consider developing a comprehensive, overall Flood Reduction Program to mitigate the impacts of severe storms, placing a priority for action in the neighbourhoods most at risk. | • Lower East End Storm Drainage Study<br>• MountView Neighbourhood Storm Drainage Study and Stormwater Management Facility Location Review<br>• Greenhill Avenue Storm Drainage Study<br>• SERG has identified other studies to undertake and will provide the ICP with a map outlying the proposed study boundaries. |
| 15 | The City of Hamilton should focus on capital expenditure projects that return the greatest benefits for the funds expended. | • Refer to documentation regarding Kenilworth Underpass. Sanja Ivanovic is awaiting further information. Kenilworth Underpass was a focus area in the Lower East End Storm Drainage Study. |
| 16 | The City of Hamilton should enhance its stormwater impact avoidance program and provide adequate staffing if funding is available. | • Sanja Ivanovic is awaiting information. |
| 17 | The City of Hamilton should consider undertaking a pilot project to address areas affected by stormwater. Before implementing the program, the City must first confirm that flooding and sewer back-up problems are not due to deficiencies in the sewer system. | • Basement Flood Relief Program (Pilot Program) has been initiated. It is a one year program where participants receive a maximum of $3,000 for the inspection and installation of a backwater valve. Applications are due January 30th, 2009 and estimates are due June 30th, 2009. The pilot program will include ±100 properties in Wards 3, 4, and 8. The properties were chosen based on claim data and suitability for monitoring e.g., Hamilton wanted properties where entire streets could be monitored. Properties are located in the separated sewer system area and the combined sewer system area. The properties will be monitored for one year before analysis is undertaken. |

| NO. | RECOMMENDATION | MUNICIPAL INITIATIVES |
|---|---|---|
| 18 | The pilot project should involve the financing and installation of backflow prevention devices at a street level. | • Refer to Recommendation 17. |
| 19 | The City of Hamilton should engage in discussions with local insurance companies about the efforts it is taking to address storm effects. | • John McLennan reported that Hamilton has not requested information from (or provided information to) insurance companies.<br>• John noted Hamilton has been having more open conversations with insurance providers since 2006. John also noted Hamilton has not been sued by an insurance provider since 2006. |
| 20 | The City of Hamilton should encourage residents to report all flooding experiences to the City and enhance its ability to respond effectively. | • Udo Ehrenberg and Dan McKinnon confirmed no clear reporting and/or documentation process exists. Residents quite often report incidences to their local Councillor and that information does not always make it back to the appropriate municipal departments. The August 5th, 2008 storm event was poorly recorded.<br>• John McLennan identified two sources for receiving flood data: 1) claims filed by residents; and 2) reports residents file with Local Councillors. John explained that information is shared between the two data sources, but the data sources are not integrated electronically.<br>• Paul Kovacs shared two other potential data sources: 1) Insurance Bureau of Canada; and 2) SMC Insurance Services which is a private, for profit group that sells a product to insurance companies which describes losses.<br>• Hamilton has a hotline residents may call during storm events. Local Councillors have been instructed to redirect resident calls to this hotline.<br>• Carl Bodimeade suggested an on-line form be included on the Flood Aware Program website. |
| 21 | The City of Hamilton should build its own awareness and then communicate to residents on what private insurance can and can not do. | • John McLennan reported that Hamilton has not requested information from (or provided information to) the insurance companies. |

| NO. | RECOMMENDATION | MUNICIPAL INITIATIVES |
|---|---|---|
| 22 | The City of Hamilton should undertake a 'social marketing plan' as the core element of a communications plan. | • Community Communications Outreach Plan<br>• Flood Aware Preparedness Program (www.hamilton.ca/FloodAware)<br>• July 2007 Insert in the Hamilton Spectator was also delivered to every home in Hamilton by Free Press. Seasonal advertisements regarding spring and winter flooding are posted in community newspapers.<br>• Municipal staff prepare communication updates for Councillors and public service announcements are distributed to all media outlets. |
| 23 | The communications plan that Hamilton adopts should be city-wide and should encourage residents to take proactive efforts to avoid future flooding events. | • Refer to Recommendation 22. |
| 24 | The City of Hamilton should produce and distribute a comprehensive stormwater impact mitigation brochure. | • Refer to Recommendation 22. |
| 25 | The City of Hamilton should engage its residents and businesses in a community-wide discussion about policy questions. | • Newspaper advertisements have been most effective to date. John McLellan described the difficulty of engaging residents who have not been impacted by flooding. Open houses put on by Local Councillors could provide a forum for engaging residents and businesses. |
| 26 | The City of Hamilton should engage its Medical Officer of Health to provide advice to residents. | • July 2007 Insert included health tips and advice.<br>• Kelly Anderson has ongoing discussions with Health Protection. |

**~ APPENDIX C ~**

## ICP BACKGROUND MATERIAL

The following is a list of materials provided to the ICP as of March 23rd, 2009:

- Water and Wastewater Master Plan (2006)
- Stormwater Master Plan (2007)
- July 2007 Hamilton Spectator Insert
- Basement Flood Relief Program (Pilot Program) Notice
- Aquafor Beech proposal regarding MOUSE simulation package
- Email correspondence regarding downspout disconnection
- Budget information regarding Kenilworth Underpass
- Seasonal advertisements regarding spring and winter flooding
- Mount View Neighbourhood Storm Drainage Study and Stormwater Management Facility Location
- Municipal Emergency Plan (2005)
- Emergency Response Sub Plan #6
- Map identifying study area boundaries (prepared by Enzo Florio)
- Greenhill Avenue Storm Drainage Study (report to the Public Works Committee)
- TOR for Sub-committee Established for Phases 3 and 4 Municipal Class EA process for CSO Control and Wastewater Treatment Plant Expansion
- Criteria and Guidelines for Stormwater Infrastructure Design (Including hard copies of Appendix A and G)
- Emergency Response Roles and Organized Response material from Carla McCracken
- Kelly Anderson's responses to ICP Questions
- AWS Study referred to by Chris Gainham
- Storm Drainage Policy, 2005
- Criteria and Guidelines for Stormwater Infrastructure Design (Digital copies of all appendices)
- Influents Spring 2007journal article
- SERG Conference Information
- Brochures referred to by Elizabeth Panicker (Hamilton in partnership with Conservation Authorities)
- Monitoring Plan for Red Hill Valley Expressway Stream Restoration
- Terms of Reference for the Erosion Study
- Radar Analysis Storm Categorization Study
- Hard copies of the maps presented in the Stormwater Master Plan and Water and Wastewater Master Plan

**~ APPENDIX D ~**

Responses provided by:

- Chris Gainham - Infrastructure and Source Water Planning, Water and Wastewater 905 546 2424 x.3421

*(1) What is your current specification of inflow/infiltration rate for the design of sanitary sewers? Did the former municipalities use the same rate? Based on findings from your inflow/infiltration study, do you plan (or have you already modified) to modify your regulated I/I rate? Will the rate be uniform city-wide, or should it be area specific? Any specific considerations/justifications incorporating the findings from the recent stormwater master plan?*

- For greenfield development areas, the current specification rate is a range between 0.2 and 0.4 l/s/ha. 0.2 l/s/ha is applied to areas serviced by relatively deep storm sewers while 0.4 l/s/ha is applied to areas serviced by relatively shallow storm sewers. The 0.2 to 0.4 l/s/ha range is not considered acceptable when the response is rapid.

- Hamilton applies 0.2 l/s/ha (or something close to it) to developed areas across the city. Areas experiencing rapid infiltration are flagged as being problematic. Hamilton maintains a list of catchments requiring follow-up testing e.g., smoke testing. The 0.2 l/s/ha rate is based on widely accepted engineering convention.

- The 0.2 l/s/ha rate was applied across the former Regional Municipality of Hamilton-Wentworth in 1974. The 0.4 l/s/ha rate was applied to the former Town of Ancaster in 1990 where stormwater management techniques were more prevalent.

- Chris clarified that Hamilton is not bound by the 0.2 l/s/ha to 0.4 l/s/ha range. Hamilton responds to excessive areas on a case by case basis when they are identified. New catchments are monitored to ensure potential problems are caught early on. Hamilton for example caught the I/I problem in Binbrook early.

- It is difficult to monitor new development areas because sufficient development does not exist in the early stages e.g., flows are too low to monitor. Sometimes, newly developed areas initially show high I/I rates as developers allow foundations to remain open (uncapped) thereby allowing foundations to serve as collection basins. This is not acceptable practice, but is difficult to control. Where possible, Hamilton monitors new developments for one or two wet weather seasons during build-out.

- Data collected during the monitoring process is used to calibrate the all pipes model. Opportunity exists to monitor conditions further and to reassess the model, assess I/I and system capacity, and support operations and maintenance of the wastewater system.

- Hamilton is being proactive in their monitoring efforts and is monitoring the majority of the city. Staff have also put forth ideas for gathering more information on identified problem areas e.g., dye testing fixtures and roof leaders in new development areas and smoke testing new catchments.

- For I/I clarification, the response does not only have to be rapid. Delayed or gradual responses which result in the infiltration of significant volumes of groundwater into the system are also not considered acceptable. Hamilton takes a holistic approach to identifying and analysing I/I problems taking into consideration the fact that urban watersheds are dynamic systems and the same watershed can respond to wet weather flow differently from event to event, storm to storm.

*(2) In the Water & Wastewater Master Plan, Section 12.4 notes that in the combined sewer system area a 5 year storm is acceptable for design of the system capacity. Section 14.4 says "...to achieve economic viability capacity, capacity allowed for storm flow has been set at a 5 year storm". Upon what basis was the assessment made that designing for the 5 year storm will "...achieve economic viability..."? Was any cost benefit analysis made of the cost of increasing (or decreasing) the design storm vs. the cost upgrading of sewer system?*

- It was in 1942 that Hamilton began using a Modified Rational Method that included a 73.8 mm/hr peak intensity. This form of intensive approach can not be applied to a continuous simulation model such as the MOUSE model. Instead, Hamilton now uses a Soil Conservation Service distribution design storm that applies a 5 year 24 hour design storm across the entire City of Hamilton. The result is comparable to the Modified Rational Method that was based on a 50 year storm. The Soil Conservation Service approach yields a slightly more intense storm. The peak intensity is 79.29 mm/hr which is comparable to the former design standard. The 1942 IDF curve was an update to the 1922 curve. Hamilton has documentation the method was used in 1922.

- Hamilton did not undertake a complete cost-benefit analysis.

- Hamilton is using actual flow modelling data to reassess assumptions put forth in the Water and Wastewater Master Plan. The Plan was developed using the MOUSE model and actual flow monitoring and rainfall data collected from nearly 60 monitors and 17 rain gauges. Hamilton is also following up on recommendations presented in the Plan with additional real measured data.

** Interview notes were reviewed by Chris Gainham February 3rd, 2009.*

Responses provided by:

- Enzo Florio, Infrastructure Planning, Development Engineering 905 546 2424 x.2829

*(1) With respect to the map provided by Enzo Florio on January 15th, could the shaded areas be labeled? Also, have the areas been prioritized in terms of investigation and then remedial measures? If so, what is the priority and on what criterion was it based?*

- Sanja Ivanovic will provide the ICP with a labelled map.

- Enzo Florio described how the map is intended to identify general areas deemed to be 'potentially at risk' based mainly on July and August 2005 rainfall events. The general areas were to be refined as study work plans were developed.

- The five initial areas were prioritized and the initial progression was intended to be: 1) Mount View; 2) Lower East End; and 3) Central Mountain. Enzo noted they were to investigate, report, recommend, and implement mitigation measures into municipal work plans and budgets as warranted.

- Mount View was assigned the highest priority due to the intensity of rainfall experienced and the extent of flooding that occurred in the area compared to other areas under consideration. Mount View residents were hit particularly hard between July 26th and August 19th, 2005 and the City recognized this area needed to be looked at sooner.

- On December 1st, 2006 Hamilton experienced a rainfall event that exposed another 'potentially at risk' area - Greenhill Avenue Area Storm Drainage Study.

- Hamilton will investigate other areas as they appear in addition to the five larger general areas. Hamilton would like to be as proactive in these circumstances as possible rather than be reactive.

Responses provided by:

- Pippy Warburton, Project Coordinator 519 741 1464
- Karen Hofeauer, Project Engineer
- Andrea Kauppinen, Project Manager is away until February 9th

*(1) With respect to the Lower East End Study, how are the major stormwater flow systems modeled? Describe the advantages and disadvantages of the model you selected to use. Do you have detailed topographical information (e.g., to the extent of street and individual house levels) for the delineation of overland flow routes? Is the modeling tool compatible with the resolution of your input data?*

- The major overland flows are not modeled with the Mike Urban Model. The model components model the minor flows (those within the sewers). This is acceptable given most of the problems in the Lower East End are related to sewer back-ups.

- Topographic maps were examined to develop a good overall understanding of the overland drainage patterns in the Lower East End.

- Advantages - the Mike Urban (MOUSE) model is compatible with the city-wide model. Hamilton selected Mike Urban after reviewing various other models. Hamilton chose this model in part because of its ability to run real-time scenarios. Another advantage is the model's ability to model complex systems and the ease of testing 'what if' scenarios. The model is also more stable than other models MRC has worked with.

- Disadvantages - the model set-up procedures are rather complicated and the LEEDS model took longer to set-up than MRC anticipated. The model assumes all flows are captured by the sewer system. This is an important assumption MRC kept in mind throughout the modeling exercise.

- MRC has 1.0 m and 0.5 m contour mapping of the entire study area and plan and profile data for most of the study area. Basement elevations are shown on some plan and profile drawings, but this data is not available for every house within the study area. MRC made some assumptions about basement elevations where needed based on top of manhole elevations provided by Hamilton's Hanson database. MRC subtracted a certain depth from the surveyed top of manhole elevation closest to the individual homes and compared the data to the hydraulic grade lines in sewers. MRC found that areas where the assumed basement elevations where below the modeled hydraulic grade lines generally matched-up well to the problem areas the team had identified on a 'hot spot map.'

- The model is compatible with the resolution of MRC's input data.

*(2) What were the main problems you encountered during the modeling exercises (e.g., lack of data or model convergence problems) and how did you overcome them? From the modeling results, can you tell the exact cause(s) of basement flooding or street flooding for specific sub-areas?*

- A great deal of time was spent trying to understand how Hamilton gathered its data (database information) and exactly what data was available. Also, this part of Hamilton has a very complex and interconnected sewer system (web-like) that required extra time in setting-up the model. Specifically, all the non-typical sewer connections (manhole channels, weirs, orifices, static gate settings etc.) were not in the municipal database. A great deal of time was spent reviewing the plan and profile drawings for connection details.

- Over 2,000 plan and profile drawings (provided by Hamilton) were used to piece together an accurate and holistic image of the study area's sewer system. Hamilton was very helpful and completed most of the required field work (e.g., on-site inspections, video recordings, measurements) required to make sound estimates, verify drawings, and to confirm assumptions about the system.

- From the modeling results, MRC can draw reasonable conclusions about why basement flooding would or would not occur for most of the study area. However, there are a few streets in the outlying areas where the cause remains unclear. For these locations MRC has confirmed there is adequate capacity in the system and there are no sewer bottlenecks in these areas, but one or two flooding complaints have been reported by residents. Basements may be particularly low relative to the sewer in these areas and/or system blockages may have occurred. Problems could also be related to private drain connections. MRC is recommending further investigations be undertaken in these areas.

- Each street has a unique set of problems e.g., sewers are too small for the flows being produced or bottlenecks exist. In many areas, the sewer elevations are too high relative to the basement elevations. In general, the Lower East End is very flat so an undersized sewer in this area has a much greater impact than undersized sewers in other (steeper) parts of the city. The model has helped to identify the cause of flooding on streets where a large number of residents have filed flooding complaints.

*(3) What are the main things you learned from the modelling exercise?*

- This part of Hamilton's sewer system is very complex and interconnected. Care must be taken delineating sewer sheds given many streets have both a combined and storm sewer e.g., partially separated.

- Hamilton has an incomplete history of its sewer system. Hamilton Public Library has sewer-related newspaper articles dating to the late 1800s, but not all of the records provide a comprehensive account of how planned projects were (or were not) implemented.

- There is a need for a more accurate and detailed sewer database that includes details of sewer connections e.g., manhole channels, weirs, orifices, static gate settings etc.

- MRC recognized the model is a useful and necessary tool, but that it has limitations and requires the user to have a good understanding of the limitations to critically review results.

*(4) With respect to the Kenilworth Underpass, what causes flooding to occur there? Did you encounter any uncertainties in the process of reaching this conclusion? How have you dealt with these uncertainties?*

- Flooding occurs because there is a sewer restriction (bottleneck) just downstream of the Kenilworth Underpass in the combined sewer. In addition, the underpass is located along an overland flow route and the storm sewer at the sag is undersized with respect to current standards.

- There was uncertainty amongst municipal departments as to whether or not a bottleneck exists due to the complexity and history of the system. Different departments had different theories. The uncertainty was dealt with through ongoing discussions between MRC and the municipal departments - sharing of information.

*(5) What remedial works and capital projects have been recommended by MRC to alleviate flooding in the Lower East End?*

- MRC has made preliminary recommendations in the Main Street area between Ottawa and Kenilworth (MOKC) and for a sewer upgrade along London Street.

- In the short-term, MRC recommended disconnecting catch basins and letting flow run overland to the Dunsmure Road storm relief sewer via roadways. MRC also recommended blocking a sewer connection between Kenilworth and Main Street. The long-term recommendation is still being evaluated.

- For the Centre Mall reconstruction, MRC has recommended obtaining an easement to divert flows across the property to an underutilized sewer.

- MRC has modeled 90 potential remedial measures (designed to a conceptual level) which include upgrading sewers, sewer diversions, limiting inlet capacity and a large storage/conveyance tunnel. The storage/conveyance tunnel option includes installing a large pipe tunnel that would convey excess flows east-west along Maple Avenue and north along Strathearne Avenue following the hydro right-of-way where possible. This option is estimated to cost $50 million. All of these potential measures are still being evaluated (cost-benefit, overlapping benefits etc.) and results of the evaluation along with the recommendations will be included in the Study Report.

- MRC is in the process of transferring data to Stantec for the Real Time Control (RTC) project.

** Interview notes were reviewed by Pippy Warburton February 9th, 2009.*

Reponses provided by:

- Scott Plante - Forestry and Horticulture, Operations and Maintenance, 905 546 2424 x.7375
- Tami Sadonoja - Forestry and Horticulture, Operations and Maintenance 905 546 2424 x.5495

*(1) Does the Forestry and Horticulture Section maintain a database that:*

- *Documents and maps the general species composition, age and condition of street trees within the City?*
- *Indentifies areas of concern with respect to tree health, age and decline?*
- *Document trends in disease or other stressors that affect tree health, both in terms of species type and geographic extent?*

- Hamilton does not have a Private Tree By-Law
- Forestry and Horticulture maintains an inventory of all municipal trees within Hamilton's urban area
- Municipal trees include those located on municipal property e.g., road allowances, parks, and cemeteries
- The inventory includes approximately 131,000 trees
- Inventory includes data related to species, diameter, health and condition, but not age
- Inventory does not include tree maintenance initiatives undertaken by municipal staff
- Data is mapped to an accuracy of 30 cm on a tree layer that covers urban areas only
- Tree maintenance is undertaken on a ten year grid cycle for the former City of Hamilton; crews move from west to east across 118 grid areas (77 are located below the escarpment)
- Trees in high target areas (e.g., downtown) are monitored more frequently - high target areas are those where there are a large number of people and/or vehicles
- Tree maintenance is reactive in the outlying areas of the city where crews respond to resident notifications
- Forestry and Horticulture maintains a list of individual trees that are monitored on an annual basis; the list includes mature trees that are of advanced age and/or are in poor health
- Geographic areas of concern are not officially identified and no formal program exists for monitoring them
- Staff is on standby 24/7 to respond to storm damage locations; priority is given to making locations safe e.g., response crews will take down trees caught in hydro lines during the night and return to a site in the morning to clear away debris as required
- Forestry and Horticulture has ±45 maintenance staff

*(2) Does the Forestry and Horticulture Section have in place strategies to address likely impending diseases or pest infestations, notably Emerald Ash Borer? Such strategies would:*

- *Forecast the potential impact on tree populations in Hamilton*
- *Identify target areas where tree health/survival impacts are likely to be severe*
- *Recommend monitoring activities to track pest infestation/disease spread*
- *Recommend actions to manage impacted trees to prevent hazardous conditions and remove deadfall/litter before it falls to minimize the likelihood of obstruction of culverts and/or storm sewer inlets*
- *Execute focused branch litter clean up in areas with species that are prone to limb/small branch loss after high wind events*

- Forestry and Horticulture does not use the tree database to track and monitor insects or disease

- Forestry and Horticulture is working with Burlington, Oakville, Milton and Conservation Halton to create an Emerald Ash Borer Management Plan; this is a recent initiative that will continue throughout 2009

- Council approved a Gypsy Moth Control Plan in April of 2008; an aerial spray program of woodlots, parkland and residential areas was undertaken by the City of Hamilton, Hamilton Conservation Authority, and the Royal Botanical Gardens over the summer months; public open houses were hosted by all three groups working cooperatively

- Forestry and Horticulture has issued Urban Forest Pest Advisories for Asian Longhorn Beetle and Emerald Ash Borer

- Forestry and Horticulture will identify cosmetic diseases (e.g., tar spot and powdery mildew) for property owners, however there are presently no effective treatments

** Interview notes were reviewed by Tami Sadonoja February 12th, 2009.*

## HAMILTON INDEPENDENT REVIEW COMMITTEE
## INTERVIEW - OPEN SPACE DEVELOPMENT (CAPITAL PLANNING AND IMPLEMENTATION) AND PARK MAINTENANCE (OPERATIONS AND MAINTENANCE)

Responses provided by:

- Robert Norman - Open Space Development, Capital Planning and Implementation, 905 546 2424 x.2298
- Al Dore - Parks Maintenance, Operation and Maintenance, 905 546 2424 x.4334

*(1) Does the City of Hamilton own any parks that incorporate stormwater management facilities such as infiltration galleries, filtration beds, or holding tanks or permeable pavement?*

- Al Dore confirmed the City of Hamilton does own parks that incorporate stormwater management facilities, but neither him nor Rob Norman were familiar with any being approved since amalgamation (2001).

- Robert Norman cited Stroud Park in Ward 1 as a historical example where a stormwater management tank was installed within the park. The tank was installed many years after the park was constructed.

- Robert Norman explained that if the idea of installing a stormwater tank under a park were to be considered, investigations would need to be undertaken to determine the minimum soil depth for sustaining sports fields (with irrigation), sub-surface drainage, sports field lighting poles and foundations. It was also be critical to ensure the park would remain flat to accommodate sports fields and recreation facilities identified and would not have any impact from side slopes to a tank.

- Public Works would also be concerned about potential maintenance implications/access/dredging the tank would have on the park design and function versus a separate stormwater management pond. All of these issues would have to be addressed in developing a policy related to stormwater tanks in parks.

*(2) Does Open Space Development and/or Parks Maintenance Sections have policies that govern whether or not subsurface stormwater management facilities can be integrated into municipal parks? If so, does this policy address the issues of credit for parkland dedication for new developments?*

- Public Works does not support adding stormwater ponds within park boundaries or taking stormwater ponds as parkland development credit through subdivision development.

- Formal parkland dedication is required to be flat tableland that will support the provision of sports fields, children's playgrounds and multi-purpose courts etc. Robert Norman feels stormwater management ponds would severely compromise or become a safety issue for providing these facilities in parks. It is therefore not acceptable to combine stormwater ponds with parkland dedication.

- Public Works does not have any concerns with locating a stormwater pond beside a park provided the stormwater function is outside the park boundary.

*(3) If the City does have policies that prohibit the integration of stormwater management facilities in parks or that do not allow for the acceptance of the lands above subsurface stormwater management facilities as a component of the 5% parkland dedication at this time, would the City consider amending its policies to modify this position?*

- Hamilton does not have such policies.

*(4) Is parks maintenance staff kept informed of the requirements for maintenance of storm sewer inlets and watercourses/drainage ways to ensure that obstructions do not occur? Is there communication between the SERG and Open Space Development and Parks Maintenance Sections with respect to this issue?*

- From a functional perspective, maintenance of these ponds is the responsibility of the Roads Operation and Maintenance Department and not Open Space Development or Parks Maintenance Sections. Parks Maintenance is only responsible for maintenance from an aesthetics point of view. Parks Maintenance is not consulted by the SERG.

*(5) Is there a need for better integration between the activities of the SERG, Public Works, Forestry and Horticulture, and the Open Space Development and Parks Maintenance Sections to address issues related to storm sewer/channel maintenance and stormwater management in general?*

- Al Dore feels there is a need for better integration between the activities of these groups. It would be helpful if a Landscape Management Plan and associated annual operating budget impacts were identified, addressed, and discussed.

** Interview notes were reviewed by Al Dore February 10th, 2009.*

Responses provided by:

- Robert Hall, Director of Health Protection Branch, Public Health 905 546 2424 x.3571

*(1) Do residents living adjacent to stormwater quality control detention ponds know that sediments accumulating at the bottom of these ponds might be toxic? How do you deal with or plan to deal with this?*

- Public Health Services is mandated under the *Health Protection and Promotion Act* to ensure that when a potential health hazard is identified, actions are taken to reduce or eliminate a public health risk. Risk is assessed by looking at:

  - Route of exposure to the public (e.g., inhalation, ingestion or dermal absorption) of a contaminant. In the case of stormwater management ponds, Robert assumes the sediments are contaminated, but are under water where residents are not exposed to them. Robert further assumes that there is no consistent route of exposure if the ponds are not used as drinking water sources or recreational facilities (e.g., beaches). Robert feels simply living near a stormwater management pond does not pose an adverse health risk.

  - Level of contamination. Robert questioned the toxicity levels of the contaminants. Depending on the levels, MOE would be able to determine if the levels exceed their thresholds for contamination. There is no risk to the public if contaminant levels are less than MOE guidelines. If contaminant levels are greater than MOE guidelines then action must be taken to ensure the public is protected from the sediments. Robert noted that MOE guidelines must be adhered to when sediments are removed. Public Health Services is involved in reviewing the work plan for sediment removal to ensure removal does not result in an increased risk of exposure to nearby residents.

- From a public health perspective, Robert is more concerned about the water in the ponds than he is about the sediments. Stormwater management ponds can serve as breeding grounds for disease causing vectors such as mosquitoes that transmit West Nile Virus. Public Health Services monitors stormwater management ponds for larvae and treats ponds (when necessary) to reduce the number of mosquitoes that could come from them.

- Robert also noted that in terms of the bacteriological safety of water, he would be more concerned with residents using stormwater management ponds as recreational beaches as dermal contact or ingestion of water is more likely to be unsafe due to bacteria.

** Interview notes were reviewed by Robert Hall February 10th, 2009.*

**~ APPENDIX E ~**

HARDY STEVENSON AND ASSOCIATES

**HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW**
**SERG MEETING**

**Monday March 23rd, 2009**
**Hamilton City Centre, Room 320A**
**2:00 pm - 4:00 pm**

**Chair:** Dave Hardy, Hardy Stevenson and Associates Limited

**Minutes:** Melissa Clements, Hardy Stevenson and Associates Limited

**Subject:** Presentation of the Draft Peer Review Report

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| TIME | AGENDA ITEM |
|---|---|
| 2:00 | Introductions |
| 2:10 | PowerPoint Presentation of the Draft Peer Review Report |
| 2:40 | Question and Answer Session<br>• SERG members will have an opportunity to ask the ICP members questions related to their observations, recommendations and conclusions. |
| 3:20 | Short Break |
| 3:30 | Question and Answer Session (Continued)<br>• SERG members will have an opportunity to ask the ICP members any outstanding questions they may have related to the peer review process. |
| 3:50 | Next Steps |

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HARDY STEVENSON AND ASSOCIATES

**HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW**
**SERG MEETING MINUTES**

**Monday March 23rd, 2009**
**Hamilton City Centre, Room 320A**
**2:00 pm - 3:30 pm**

**Chair:** Dave Hardy, Hardy Stevenson and Associates Limited

**Minutes:** Hardy Stevenson and Associates Limited

**Subject:** Presentation of the Draft Peer Review Report

**Attendees:**
Jillian Stephen - Strategic Planning, Capital Planning and Implementation
Sanja Ivanovic - Strategic Planning, Capital Planning and Implementation
Nahed Ghbn - Strategic Planning, Capital Planning and Implementation
Elizabeth Panicker - Strategic Planning, Capital Planning and Implementation
Michael Ferguson - Strategic Planning, Capital Planning and Implementation
John Morgante - Design and Construction, Development Engineering
Gord Baguley - Infrastructure and Source Water Planning, Water and Wastewater
Bert Posedowski - Water Distribution and Wastewater Collection, Water and Wastewater
John McLennan - Risk Management, Budgets and Finance
Kelly Anderson - Public Affairs Coordinator, General Manager's Office
Harry Krinas - Asset Management, Capital Planning and Implementation
Bob Paul - Road Operations and Maintenance, Operations and Maintenance
Carla McCracken - Emergency Management Coordinator, Emergency Planning
Carl Bodimeade - ICP Member
Dr. Yiping Guo - ICP Member
Mark Schollen - ICP Member
Dr. Paul Kay - ICP Member

**Distribution:** SERG and Panel Members

| AGENDA TOPIC | ACTION |
|---|---|
| **Introductions**<br>• The meeting began with all participants introducing themselves. | |
| **Presentation**<br>• Dave Hardy delivered a 20 minute PowerPoint presentation of the Draft Peer Review Report. The presentation addressed the following: | |

| AGENDA TOPIC | ACTION |
|---|---|
| ➢ Background<br>➢ Independent Community Panel<br>➢ Scope of the Review<br>➢ Approach and Methodology<br>➢ Observations<br>➢ Recommendations<br>➢ Conclusions<br>➢ Next Steps | |
| **Question and Answer Session**<br><br>• Dave Hardy facilitated an open question and answer session where SERG members were invited to ask the ICP questions related to their observations, recommendations and conclusions as well as any other aspect of the peer review process.<br><br>• The session began with Jillian Stephen thanking the ICP for preparing what she considered to be a good report. Jillian asked that a clear link be drawn between the old recommendations and the new recommendations in the Final Peer Review Report.<br><br>• Jillian Stephen asked the ICP to describe methods in which socio-economic data could be obtained by the City of Hamilton.<br><br>Dr. Paul Kay described how quality data could be obtained by linking social surveys with census data. Hamilton could employ students to ask residents the following questions:<br><br>1) Do you report basement flooding? Why or why not?<br><br>2) Do you understand your responsibilities regarding basement flooding?<br><br>3) Do you know how to report a flood in your basement when it occurs?<br><br>Undertaking social surveys would better enable municipal staff to identify barriers to reporting, tailor municipal programs and to develop a better understanding of flooding problems in target areas.<br><br>• Jillian Stephen asked the ICP how often other municipalities are distributing communication materials to their residents and how often the City of Hamilton should be distributing its material.<br><br>Carl Bodimeade complimented municipal staff on the quality of the July 2007 Hamilton Spectator Insert. Carl noted the City of Hamilton has not distributed an equivalent communication piece since that time and suggested one be developed and distributed at least once a year.<br><br>Dr. Paul Kay described how Waterloo mails flyers to residents with their bi-monthly utility bills. | • ICP to ensure old recommendations are linked to new recommendations in the Final Peer Review Report. |

| AGENDA TOPIC | ACTION |
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| • Jillian Stephen asked the ICP whether other municipalities have positions similar to the 'Stormwater Coordinator' position being proposed.<br><br>Carl Bodimeade cited the City of Peterborough and the City of Edmonton as municipalities which may have similar positions.<br><br>• Jillian Stephen asked the ICP if there was a specific amount (or percentage) of funding it thought was required to implement the recommendations.<br><br>Carl Bodimeade noted the ICP had no specific numbers in mind. Carl then described the stormwater utility model the ICP recommended Hamilton investigate. Carl explained how the utility model helps ensure fairness - a large format retail store should pay considerably more than a single family residence due to the larger amount of 'impervious area' which will generate stormwater runoff requiring collection and possibly treatment In Hamilton, the cost of managing stormwater is buried within the property tax. The ICP is proposing Hamilton employ a utility model to draw-out that cost so residents can see the actual cost (have a closer connection). Carl noted there are more than 400 utilities in operation across the United States as well as a few operating in Canada. The City of Kingston has initiated a public consultation program regarding utility models.<br><br>Nahed Ghbn commented on the cost increase implication with utility models - the need to link development of utility models with socio-economic surveys.<br><br>• Bert Posedowski asked if clearing catch basins would make capacity issues worse. Bert feels there is a capacity problem in the system.<br><br>Carl Bodimeade replied the answer depends on the nature of the existing infrastructure across the City of Hamilton. The problems in the Lower East End are related to capacity issues while those in the Mount View area are related to surface flooding.<br><br>Mark Schollen explained that the ultimate solution is to slow-down the rate in which water enters the system across the municipality. Mark described work being undertaken in Forest Hill, Toronto to install permeable driveways to reduce the rate in which runoff enters the system.<br><br>• Jillian Stephen asked whether other municipalities are integrating sub-surface stormwater management infrastructure into parks and open spaces.<br><br>Mark Schollen described how Markham and Richmond Hill are moving in this direction (away from using stormwater detention ponds). Mark explained how the intent is to maximize efficiency and not to reduce the amount of parkland dedication.<br><br>• Nahed Ghbn asked what storm the City of Hamilton should be designing for in case they consider climate change. Nahed commented that while the London model may be a good one, it is not applicable to Hamilton e.g., to design stormwater systems for a 500 year storm. | |

| AGENDA TOPIC | ACTION |
|---|---|
| Dr. Paul Kay recommended the City of Hamilton not blanket the entire city with one requirement, but rather apply a more cautious approach to vulnerable areas. The Real Time Control (RTC) model will assist Hamilton in determining an appropriate storm to design their system for.<br><br>Carl Bodimeade described how a cost-benefit analysis would also help the City of Hamilton determine an appropriate storm. The result will be a trade-off between investment in stormwater infrastructure and risk reduction.<br><br>• Jillian Stephen asked the ICP what it felt would be an appropriate interval for peer reviews.<br><br>Dr. Yiping Guo suggested a review should be undertaken once the Water and Wastewater Master Plan and the Stormwater Master Plan are updated in 2-3 years.<br><br>• Kelly Anderson informed the ICP that another communications position was recently eliminated by the City of Hamilton. Kelly feels it will be a challenge to implement some of the recommendations put forth by the ICP given the lack of resources dedicated to communications.<br><br>Carl Bodimeade suggested summer or co-op students may be a way to supplement Hamilton's full-time communications staff when necessary.<br><br>• John Morgante explained that new development is designed with a minor and a major system where the minor is designed to the 5 year and the major to the 100 year or regional storm.<br><br>John noted that Hamilton has dealt with harmonization of the storm deign between all area municipalities through the criteria and guidelines. John also explained the model for climate change is not a local or regional model, but a global model and science is not there yet. Initial results indicate Hamilton will experience smaller major storms although more frequent. John agrees Hamilton could be a leader in this field and climate change should be considered especially when dealing with erosion.<br><br>• Dr. Paul Kay admitted retrofitting is difficult when existing infrastructure is involved and described how sensitivity studies would assist Hamilton in determining priority areas.<br><br>• John Morgante indicated that he did not feel Recommendations 9 and 11 were appropriate given the work undertaken by the City of Hamilton.<br><br>Dr. Yiping Guo noted the ICP would review the recommendations.<br><br>• Carla McCracken identified Recommendation 19 as being a good one. Carla described how 150 municipal staff are identified as 'responders' who have been receiving four to six hours of training annually since 2004 in addition to a three-day basic emergency management course that has been adapted to Hamilton's needs. The course is run twice a year and accommodates 32 staff each session. Carla also has plans to do more work with municipal staff regarding personal preparedness. | |

| AGENDA TOPIC | ACTION |
|---|---|
| • Bert Posedowski suggested the ICP separate their recommendations into two groups: 1) those that address the combined system; and 2) those that address the separated system.<br><br>• Jillian Stephen thanked the ICP for their time and input and Carl Bodimeade thanked the SERG for inviting them back for a second peer review process. | |
| **Next Steps**<br><br>• Strategic Planning will review the Draft Peer Review Report over the next three weeks. HSAL will incorporate feedback provided by the SERG and Strategic Planning into the Final Peer Review Report which will be presented to the Public Works Committee by municipal staff in June. | |

# HAMILTON INDEPENDENT COMMUNITY PANEL REVIEW

## DRAFT REPORT PRESENTATION

March 23rd, 2009

# AGENDA

- 2:00 Introductions
- 2:10 Draft Peer Review Report Presentation
- 2:40 Question and Answer Session

  SERG members will have an opportunity to ask the ICP members questions related to their observations, recommendations and conclusions.
- 3:20 Short Break
- 3:30 Question and Answer Session

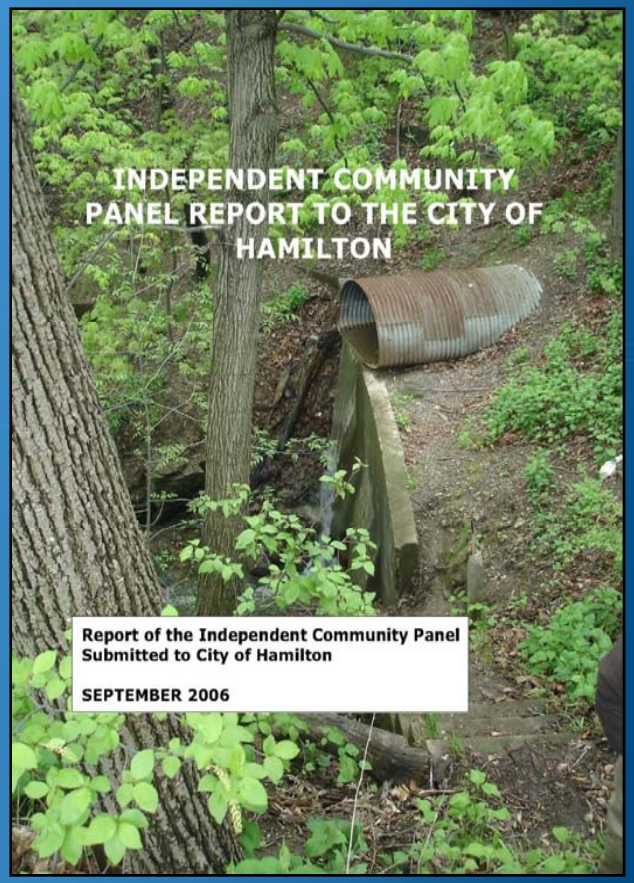
  SERG members will have an opportunity to ask the ICP members any outstanding questions about the peer review process.
- 3:50 Next Steps

# PRESENTATION OVERVIEW

- Background
- Independent Community Panel
- Scope of the Review
- Approach and Methodology
- Observations
- Recommendations
- Conclusions
- Next Steps

# BACKGROUND

- ICP was appointed in 2006 in response to the severe storm events of 2005/06
- Mandate was to review the causes, effects and outcomes of storm events and to make recommendations to City Council
- HSAL convened a team of professionals with expertise in watershed planning, flood prevention, wastewater engineering, stormwater management, landscape architecture and insurance
- ICP submitted a Final Report with 26 recommendations



# INDEPENDENT COMMUNITY PANEL

- Membership is the same as it was in 2006
  - Carl Bodimeade, P.Eng. - ICP Chair
  - Dr. Yiping Guo, B.Sc., M.A.Sc., Ph.D., P.Eng.
  - Dr. Paul Kay, B.Sc., M.S., Ph.D.
  - Paul Kovacs
  - Mark Schollen, B.L.Arch., O.A.L.A., C.S.L.A., A.S.L.A.
- HSAL facilitated the peer review process

# SCOPE OF REVIEW

- Reconvened to assess Hamilton's performance since 2006
  - Comment on the execution of the 26 recommendations
  - Put forth new recommendations if applicable
- Prepare a Final Report to be presented to the Public Works Committee by municipal staff
- Senior municipal staff initiated the second peer review process

Public Works Community Update on Stormwater Management

Hamilton Public Works

Hamilton's Storm Event Response Group

Kenilworth Ave. underpass

Mother Nature is unpredictable

Flood Protection Tips

Do your part

Help prevent flooding in your neighbourhood

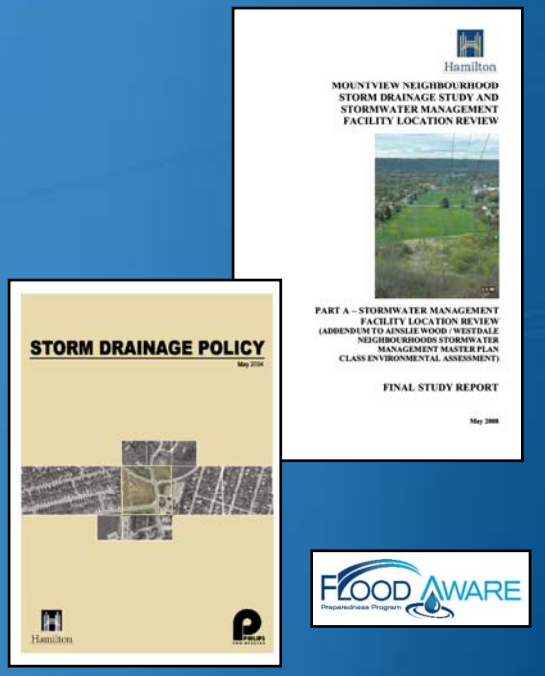
Flood Aware Program

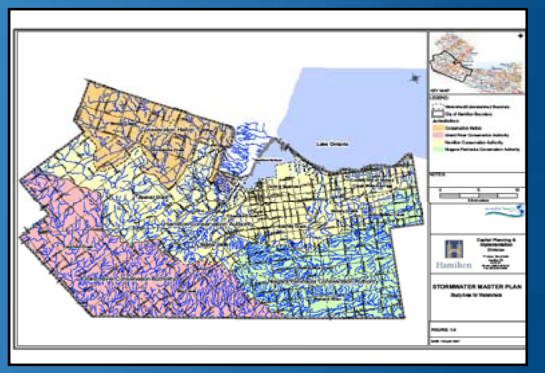
Insurance Recommendations

Process for making a Property Damage Claim with the City of Hamilton

# APPROACH AND METHODOLOGY

- Start-up meeting in December of 2008
- Review of background material
  - Policy documents, technical reports, storm drainage studies, department reports, media advisories, public communications etc.
- ICP meetings with the SERG and the WWW Division
- Interviews with WWW, Parks, Forestry, Public Health Services and McCormick Rankin Corporation
- Draft Peer Review Report and presentation to the SERG
- Final Peer Review Report



# OBSERVATIONS

- Hamilton has been addressing all of the 26 recommendations put forth by the ICP through the initial peer review process.
- Hamilton is following the lead of other municipalities in terms of best stormwater management practices and innovative solutions.
- Hamilton has brought together an advanced team of experts to support technical studies.
- Hamilton is making decisions based on technically sound quality data.

# OBSERVATIONS

- Hamilton's responses to the 2006 recommendations focus strongly on physical infrastructure.
- Hamilton has an opportunity to be more proactive in planning for climate change.
- Hamilton faces significant challenges to fully implementing its stormwater management program.
- An overall, integrated plan for Hamilton's stormwater programs and initiatives must be developed.
- Adequate, long-term funding must be provided for stormwater infrastructure and programs.
- Hamilton requires a champion to recoup the sense of urgency and momentum that existed in 2006.

# RECOMMENDATIONS

- **09-1 -** The City of Hamilton should work more closely with the local Conservation Authorities to produce a joint communication program to promote the 'Flood Aware' program to a broader audience.

- **09-2 -** The City of Hamilton should work more closely with the local Conservation Authorities to implement and monitor pilot projects to demonstrate the potential of Low Impact Development and innovative stormwater management technologies within both retrofit and new development scenarios.

- **09-3 -** The City of Hamilton should broaden inter-departmental involvement in the SERG process to engage Parks and Forestry in the process of exploring innovative design and management objectives to enhance the performance of Hamilton's overall stormwater management system.

# RECOMMENDATIONS

- **09-4 -** The City of Hamilton's Parks Office should develop guidelines and policies to address the potential to integrate sub-surface stormwater management infrastructure into parks and open spaces in support of Low Impact Development objectives.
- **09-5 -** The City of Hamilton should amend its stormwater management, servicing and road design standards to encourage the application of innovative stormwater management systems and Low Impact Development technologies.
- **09-6** - The City of Hamilton should carry out a cost-benefit analysis to confirm that its present stormwater design criteria give the optimum balance between risk reduction and cost.

# RECOMMENDATIONS

- **09-7 -** The City of Hamilton's Forestry Section should continue to monitor and track the presence of pests and diseases as a means to identify areas of potential vulnerability that may require management effort in the future in order to minimize the potential for obstruction of storm sewer infrastructure by dead fall.

- **09-8 -** The City of Hamilton's Forestry Section should collaborate with Roads Maintenance and Operations to assist in targeting areas within Hamilton that may require more frequent street sweeping/ground maintenance due to the propensity of certain species to produce leaf litter/limb debris based on the composition of the vegetation community by species or age class.

- **09-9 -** The City of Hamilton should employ the most advanced techniques and adopt the most current and scientifically sound planning and design methodologies given stormwater management techniques and approaches to the planning and design of stormwater management facilities are evolving rapidly.

# RECOMMENDATIONS

- **09-10 -** The City of Hamilton should continue to undertake additional Master Drainage Plan Studies for priority areas where flooding has a high chance of occurring. These studies should identify existing drainage problems and recommend alternative remedial options.
- **09-11** - The City of Hamilton should review, revise or establish new stormwater management related policies, procedures and regulations related to infill development or re-development paying particular attention to avoidance of storm drainage bottlenecks.
- **09-12** - The City of Hamilton should develop a long-term plan integrating all its present stormwater initiatives and programs. The next update of the Stormwater Master Plan (which should be updated every five years) would be an opportunity to formulate such a plan.

# RECOMMENDATIONS

- **09- 13 -** The City of Hamilton should store its stormwater data in a central database where they can be updated regularly. Municipal staff should prepare for the challenge of storing, formatting and updating these data so they remain accurate, sound and useful.

- **09-14** - The City of Hamilton should establish a new 'Stormwater Coordinator' position. The Coordinator would be responsible for linking stormwater management initiatives across municipal departments and would interface with established contact people in each department. The Stormwater Coordinator would report progress directly to the Municipal Administrator.

- **09-15** - The City of Hamilton should devote more resources to its public communication program to ensure that its residents receive frequent, consistent communications with adequate visibility to reach the majority of them. Resources should also be devoted to formally evaluate the effectiveness of specific initiatives and the overall program.

# RECOMMENDATIONS

- **09-16** - The City of Hamilton should better inform members of Council on social marketing programs such as 'Flood Aware' and make stronger efforts to involve them in stormwater management.
- **09-17** - The City of Hamilton should be proactive in communicating with the insurance industry to develop a holistic and accurate understanding of the flooding problem.
- **09-18** - The City of Hamilton should enact municipal by-laws with clear, strong and direct language to strengthen communication materials thereby making social marketing programs like 'Flood Aware' more effective.
- **09-19** - The City of Hamilton should ensure that the appropriate municipal staff are fully aware of the content and use of its Emergency Plan, Hazard Identification Risk Assessment and Severe Storms Emergency Response Sub-Plan.

# RECOMMENDATIONS

- **09-20** - The City of Hamilton should continue to investigate the possibility of adopting a 'stormwater utility' model as a means of funding its stormwater and combined sewer infrastructure and programs in a sustainable, cost-effective and fair manner.
- **09-21** - The City of Hamilton should build concern about climate change into planning in a deliberate fashion such as running simulations to identify implications of likely or possible changes in IDF statistics.
- **09-22** - The City of Hamilton should build-in social factors of vulnerability to complement the usual physical factors of risk (occurrence).

# RECOMMENDATIONS

- **09-23** - The City of Hamilton should investigate the establishment of a local weather-radar station and its integration into the short-term forecasting system as recommended in the report from Kije Sipe Consultants to be responsive to weather events.

- **09-24** - The City of Hamilton should dedicate targeted resources (funding and labour) to specific stormwater management initiatives identified priorities by municipal staff.

# CONCLUSIONS

- Risk of severe storm damage has increased in recent years and climate change, aging infrastructure and growth threaten to further increase the risk of damage
- Municipal staff are doing the best they can with the limited resources, political support and tools they have
- Hamilton is lagging behind other municipalities in addressing issues such as climate change, Low Impact Development and insurance
- Hamilton must be proactive in its efforts to protect its neighbourhoods and its residents from the risk of severe storm damage

# CONCLUSIONS

- Hamilton needs a long-term plan that integrates all municipal stormwater management policies, programs and procedures
- Hamilton is making considerable progress in its efforts to develop and implement a strong and effective program to address these concerns
- Hamilton's program is not only strong at a policy level, but at a technical and implementation level as well
- Hamilton is well-positioned to become a leader in establishing best practices and innovative solutions

# NEXT STEPS

- Strategic Planning to review the Draft Peer Review Report
- HSAL to incorporate feedback provided by the SERG
- HSAL to submit the Final Peer Review Report to Hamilton
- Final Report to be presented to the Public Works Committee by municipal staff

**~ APPENDIX F ~**

| NO. | 2006 RECOMMENDATIONS | MUNICIPAL INITIATIVES | 2009 RECOMMENDATIONS |
|---|---|---|---|
| 1 | The City of Hamilton should take a proactive approach to designing for severe storm events and take advantage of cost effective opportunities when they arise as part of future stormwater infrastructure planning. | • Stormwater Master Plan (2007)<br>• Low Impact Development Workshops in November of 2008 and February of 2009. Involve staff, consultants, agencies, and conservation authorities.<br>• Water and Wastewater is implementing a Real Time Control (RTC) system process for combined sewer flows. Stantec and BPR-CSO were retained in November to complete the RTC project and all pipes model with an anticipated substantial completion date of January 20th, 2012. | • **Recommendation 09-5 -** The City of Hamilton should amend its stormwater management, servicing and road design standards to encourage the application of innovative stormwater management systems and Low Impact Development technologies. |
| 2 | The City of Hamilton should place 'severe storms' on the City's emergency response list. | • Municipal Emergency Plan (2005)<br>• Emergency Response Sub Plan #6 deals with flooding.<br>• A severe storm must be a city-wide catastrophe in order for it to be placed on the emergency response list. An event such as Hurricane Hazel would be placed on the list. The Hazard Identification Risk Assessment List does not mean that there are not other potential hazards. The City's Emergency Plan is designed to be applied to any and all emergency situations including severe storms/flooding regardless of be in on the "top ten list" or not. | • **Recommendation 09-18** - The City of Hamilton should ensure that the appropriate municipal staff are fully aware of the content and use of its Emergency Plan, Hazard Identification Risk Assessment and Severe Storms Emergency Response Sub-Plan. |

| NO. | 2006 RECOMMENDATIONS | MUNICIPAL INITIATIVES | 2009 RECOMMENDATIONS |
|---|---|---|---|
| 3 | The City of Hamilton should take an area-wide perspective of the effects of climate change and severe storms. In addition to considering areas that are experiencing flood and sewer back-ups now, also plan for surrounding streets and neighbourhoods that may be affected 10 years from now. | • Stormwater Master Plan (2007)<br>• Water and Wastewater Master Plan (2006)<br>• Lower East End Storm Drainage Study<br>• Urban Flooding Working Group has been established to deal with issues at a policy level.<br>• Municipal Stormwater Rural and Urban Working Groups have been established with similar compositions to the Urban Flooding Working Group.<br>• Basement Flood Relief Program (Pilot Program) has been initiated. It is a one year program where participants receive a maximum of $3,000 for the inspection and installation of a backwater valve. Applications are due January 30th, 2009. The pilot program will include ±100 properties in Wards 3, 4, and 8.<br>• Stormwater Management Working Group - Hamilton is a representative on this Ministry of Environment (MOE) initiative. | • **Recommendation 09-10 -** The City of Hamilton should continue to undertake additional Master Drainage Plan Studies for priority areas where flooding has a high chance of occurring. These studies should identify existing drainage problems and recommend alternative remedial options.<br>• **Recommendation 09-11** - The City of Hamilton should develop a long-term plan integrating all its present stormwater initiatives and programs. The next update of the Stormwater Master Plan (which should be updated every five years) would be an opportunity to formulate such a plan. |
| 4 | The City of Hamilton should make areas where problems have been experienced in the past a priority for investigation and appropriate actions. | • Lower East End Storm Drainage Study<br>• MountView Neighbourhood Storm Drainage Study and Stormwater Management Facility Location Review.<br>• Inflow and Infiltration Study was initiated in 2005. Sanitary sewer evaluations and remedial measures in pre-selected areas of concern to begin in the spring of 2009. XP Storm was used because staff had experience with it and the data was available. All aspects of the sewer system could be included using MOUSE. | • **Recommendation 09-10 -** The City of Hamilton should continue to undertake additional Master Drainage Plan Studies for priority areas where flooding has a high chance of occurring. These studies should identify existing drainage problems and recommend alternative remedial options. |

| NO. | 2006 RECOMMENDATIONS | MUNICIPAL INITIATIVES | 2009 RECOMMENDATIONS |
|---|---|---|---|
| | | • Basement Flood Relief Program (Pilot Program)<br>• Enzo Florio noted Hamilton is looking at other areas that have been identified as being 'at risk.' Paul Kovacs advised making Council aware of other areas under consideration. | |
| 5 | The City of Hamilton should recalibrate its model at a finer level of detail and apply it to assess storm causes and effects at a neighbourhood level. | • Aquafor Beech has been retained to calibrate/validate the MOUSE model. A copy of the proposal dated May 5th, 2008 was provided to HSAL by Sanja Ivanovic. This will be an all pipes model for West Central Mountain.<br>• McCormick Rankin completed a similar exercise for the Lower East End part of the City.<br>• MountView Neighbourhood Storm Drainage Study and Stormwater Management Facility Location Review<br>• Inflow and Infiltration Study was initiated in 2005. Sanitary sewer evaluations and remedial measures in pre-selected areas of concern to begin in the spring of 2009.<br>• Basement Flood Relief Program (Pilot Program) | |
| 6 | The City of Hamilton should evaluate both the benefits and costs of providing infrastructure to accommodate extreme storms so that policy discussions are carried out in an informed manner, recognizing both the positive and negative impacts. | • Carl Bodimeade referred to a diagram in Section 4.2.6 of the ICP Report. The ICP suggested Hamilton should use the most effective way to determine how funds should best be allocated. | • **Recommendation 09-6** - The City of Hamilton should carry out a cost-benefit analysis to confirm that its present stormwater design criteria give the optimum balance between risk reduction and cost. |

| NO. | 2006 RECOMMENDATIONS | MUNICIPAL INITIATIVES | 2009 RECOMMENDATIONS |
|---|---|---|---|
| 7 | The City of Hamilton would benefit from becoming more aggressive in looking for opportunities to create water courses, recover former natural water courses, and complete stream remediation in existing urban areas. | • A partnership has formed between the City and the Hamilton Conservation Authority. Hamilton is a representative on the Implementation and Stakeholder Advisory Team. Stewardship Plans are prepared and recommendations implemented.<br>• An Erosion Assessment Master Plan has been initiated.<br>• A number of day-lighting projects are underway where underground water courses (former storm sewers) are being re-naturalized and brought to the surface. | • **Recommendation 09-2 -** The City of Hamilton should work more closely with the local Conservation Authorities to implement and monitor pilot projects to demonstrate the potential of Low Impact Development and innovative stormwater management technologies within both the retrofit and new development scenarios.<br>• **Recommendation 09-3 -** The City of Hamilton should broaden inter-departmental involvement in the SERG to engage Open Space Development, Park Maintenance and Forestry and Horticulture Sections in the process of exploring innovative design and management objectives to enhance the performance of Hamilton's overall stormwater management system.<br>• **Recommendation 09-4 -** The City of Hamilton's Parks Maintenance Section and Open Space Development Section should help the Strategic Planning Section in developing guidelines and policies to address the potential to integrate sub-surface stormwater management infrastructure into parks and open spaces in support of Low Impact Development objectives. |
| 8 | The City of Hamilton's storm conveyance areas and stormwater detention ponds should be examined for the ability to integrate non-structural initiatives and natural processes and functions. | • Strategic Planning is in the process of drafting landscape guidelines for stormwater management ponds. | • **Recommendation 09-2 -** The City of Hamilton should work more closely with the local Conservation Authorities to implement and monitor pilot projects to demonstrate the potential of Low Impact Development and innovative stormwater management technologies within both the retrofit and new development scenarios. |

| NO. | 2006 RECOMMENDATIONS | MUNICIPAL INITIATIVES | 2009 RECOMMENDATIONS |
|---|---|---|---|
| | | | • **Recommendation 09-3 -** The City of Hamilton should broaden inter-departmental involvement in the SERG to engage Open Space Development, Park Maintenance and Forestry and Horticulture Sections in the process of exploring innovative design and management objectives to enhance the performance of Hamilton's overall stormwater management system.<br><br>• **Recommendation 09-4 -** The City of Hamilton's Parks Maintenance Section and Open Space Development Section should help the Strategic Planning Section in developing guidelines and policies to address the potential to integrate sub-surface stormwater management infrastructure into parks and open spaces in support of Low Impact Development objectives.<br><br>• **Recommendation 09-9 -** The City of Hamilton should employ accepted techniques to properly maintain its stormwater detention ponds. |
| 9 | The City of Hamilton is encouraged to assess, on a case by case basis, opportunities to improve stormwater infrastructure, such as converting single catch basins to double catch basins at appropriate key locations. | • Lower East End Storm Drainage Study<br><br>• McCormick Rankin is working on solutions for the Kenilworth Underpass.<br><br>• Runoff is being redirected away from problem areas and catch basins are being blocked off.<br><br>• Water and Wastewater is creating a database for inlets that get 'blinded' with debris. Crews are dispatched in advance of storms to clear away debris. | |

| NO. | 2006 RECOMMENDATIONS | MUNICIPAL INITIATIVES | 2009 RECOMMENDATIONS |
|---|---|---|---|
| 10 | The City of Hamilton is encouraged to continue to promote city-wide stormwater effect prevention measures at a household level. | • Brochures have been posted on the municipal website regarding spring and winter flooding. Community updates have also been published in local newspapers. | |
| 11 | The City of Hamilton ought to commit to maintaining or intensifying the density of the rain gauge network and to the use of leading edge technology for better weather forecasting and make the gauge network permanent. | • Water and Wastewater is implementing a Real Time Control (RTC) system. RTC will enhance and expand the existing RG network and provide Hamilton with the tools to produce custom and automated wet weather event reports. Wet weather forecasting tools will also be included which will give Hamilton advanced notice of events that may result in urban flooding.<br>• Radar Analysis Storm Categorization Study analysed recent storms. | • **Recommendation 09-22** - The City of Hamilton should investigate the establishment of a local weather-radar station and its integration into the short-term forecasting system as recommended in the report from Kije Sipe Consultants to be responsive to weather events. |
| 12 | The City of Hamilton should continue to look carefully at the impact of urban development on major stormwater systems and sub-watershed systems on a broader basis as urban development approvals are reviewed. | • Stormwater Master Plan (2007)<br>• Water and Wastewater Master Plan (2006)<br>• Hamilton is embracing Low Impact Design Standards and conducting workshops to introduce concepts. The storm sewer development permits are to comply with watershed design criteria dictated by the Watershed and Sub-watershed Plans where they exist and new Criteria and Guidelines and Storm Drainage Policy.<br>• Development permits are to comply with Watershed and Sub-watershed Master Plans where they exist and Criteria and Guidelines and Storm Drainage Policy. Sub-watershed Master Plans are more detailed for new development areas. | • **Recommendation 09-2 -** The City of Hamilton should work more closely with the local Conservation Authorities to implement and monitor pilot projects to demonstrate the potential of Low Impact Development and innovative stormwater management technologies within both the retrofit and new development scenarios.<br>• **Recommendation 09-5 -** The City of Hamilton should amend its stormwater management, servicing and road design standards to encourage the application of innovative stormwater management systems and Low Impact Development technologies. |

| NO. | 2006 RECOMMENDATIONS | MUNICIPAL INITIATIVES | 2009 RECOMMENDATIONS |
|---|---|---|---|
| 13 | The City of Hamilton should continue to amalgamate and consolidate the best stormwater management policies and actions from former municipalities. | • Stormwater Master Plan (2007)<br>• Water and Wastewater Master Plan (2006)<br>• Refer to email correspondence regarding downspout disconnection.<br>• Criteria and Guidelines for Stormwater Infrastructure Design and Storm Drainage Policy. | |
| 14 | The City of Hamilton should consider developing a comprehensive, overall Flood Reduction Program to mitigate the impacts of severe storms, placing a priority for action in the neighbourhoods most at risk. | • Lower East End Storm Drainage Study<br>• MountView Neighbourhood Storm Drainage Study and Stormwater Management Facility Location Review<br>• Greenhill Avenue Storm Drainage Study<br>• SERG has identified other studies to undertake and will provide the ICP with a map outlying the proposed study boundaries. | • **Recommendation 09-11** - The City of Hamilton should develop a long-term plan integrating all its present stormwater initiatives and programs. The next update of the Stormwater Master Plan (which should be updated every five years) would be an opportunity to formulate such a plan. |
| 15 | The City of Hamilton should focus on capital expenditure projects that return the greatest benefits for the funds expended. | • Refer to documentation regarding Kenilworth Underpass. Sanja Ivanovic is awaiting further information. Kenilworth Underpass was a focus area in the Lower East End Storm Drainage Study. | |

| NO. | 2006 RECOMMENDATIONS | MUNICIPAL INITIATIVES | 2009 RECOMMENDATIONS |
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| 16 | The City of Hamilton should enhance its stormwater impact avoidance program and provide adequate staffing if funding is available. | • Sanja Ivanovic is awaiting information. | • **Recommendation 09-13** - The City of Hamilton should establish a new 'Stormwater Coordinator' position. The Coordinator would be responsible for linking stormwater management initiatives across municipal departments and would interface with established contact people in each department. The Stormwater Coordinator would report progress directly to the Municipal Administrator.<br><br>• **Recommendation 09-23** - The City of Hamilton should dedicate targeted resources (funding and labour) to specific stormwater management initiatives identified priorities by municipal staff. |
| 17 | The City of Hamilton should consider undertaking a pilot project to address areas affected by stormwater. Before implementing the program, the City must first confirm that flooding and sewer back-up problems are not due to deficiencies in the sewer system. | • Basement Flood Relief Program (Pilot Program) has been initiated. It is a one year program where participants receive a maximum of $3,000 for the inspection and installation of a backwater valve. Applications are due January 30th, 2009 and estimates are due June 30th, 2009. The pilot program will include ±100 properties in Wards 3, 4, and 8. The properties were chosen based on claim data and suitability for monitoring e.g., Hamilton wanted properties where entire streets could be monitored. Properties are located in the separated sewer system area and the combined sewer system area. The properties will be monitored for one year before analysis is undertaken. | |

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| 18 | The pilot project should involve the financing and installation of backflow prevention devices at a street level. | • Refer to Recommendation 17. | |
| 19 | The City of Hamilton should engage in discussions with local insurance companies about the efforts it is taking to address storm effects. | • John McLennan reported that Hamilton has not requested information from (or provided information to) insurance companies.<br>• John noted Hamilton has been having more open conversations with insurance providers since 2006. John also noted Hamilton has not been sued by an insurance provider since 2006. | • **Recommendation 09-16** - The City of Hamilton should be proactive in communicating with the insurance industry to develop a holistic and accurate understanding of the flooding problem. |
| 20 | The City of Hamilton should encourage residents to report all flooding experiences to the City and enhance its ability to respond effectively. | • Udo Ehrenberg and Dan McKinnon confirmed no clear reporting and/or documentation process exists. Residents quite often report incidences to their local Councillor and that information does not always make it back to the appropriate municipal departments. The August 5th, 2008 storm event was poorly recorded.<br>• John McLennan identified two sources for receiving flood data: 1) claims filed by residents; and 2) reports residents file with Local Councillors. John explained that information is shared between the two data sources, but the data sources are not integrated electronically.<br>• Paul Kovacs shared two other potential data sources: 1) Insurance Bureau of Canada; and 2) SMC Insurance Services which is a private, for profit group that sells a product to insurance companies which describes losses. | |

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| | | • Hamilton has a hotline residents may call during storm events. Local Councillors have been instructed to redirect resident calls to this hotline.<br><br>• Carl Bodimeade suggested an on-line form be included on the Flood Aware Program website. | |
| 21 | The City of Hamilton should build its own awareness and then communicate to residents on what private insurance can and can not do. | • John McLennan reported that Hamilton has not requested information from (or provided information to) the insurance companies. | • **Recommendation 09-16** - The City of Hamilton should be proactive in communicating with the insurance industry to develop a holistic and accurate understanding of the flooding problem. |
| 22 | The City of Hamilton should undertake a 'social marketing plan' as the core element of a communications plan. | • Community Communications Outreach Plan<br><br>• Flood Aware Preparedness Program (www.hamilton.ca/FloodAware)<br><br>• July 2007 Insert in the Hamilton Spectator was also delivered to every home in Hamilton by Free Press. Seasonal advertisements regarding spring and winter flooding are posted in community newspapers.<br><br>• Municipal staff prepare communication updates for Councillors and public service announcements are distributed to all media outlets. | • **Recommendation 09-14** - The City of Hamilton should not reduce its present communications resources and in fact should devote more resources to its public communication program to ensure that its residents receive frequent, consistent communications with adequate visibility to reach the majority of them. Resources should also be devoted to formally evaluate the effectiveness of specific initiatives and the overall program.<br><br>• **Recommendation 09-15** - The City of Hamilton should better inform members of Council on social marketing programs such as 'Flood Aware' and make stronger efforts to involve them in stormwater management. |

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| 23 | The communications plan that Hamilton adopts should be city-wide and should encourage residents to take proactive efforts to avoid future flooding events. | • Refer to Recommendation 22. | • **Recommendation 09-1 -** The City of Hamilton should work more closely with the local Conservation Authorities to produce a joint communication program to promote the 'Flood Aware' program to a broader audience. |
| 24 | The City of Hamilton should produce and distribute a comprehensive stormwater impact mitigation brochure. | • Refer to Recommendation 22. | • **Recommendation 09-1 -** The City of Hamilton should work more closely with the local Conservation Authorities to produce a joint communication program to promote the 'Flood Aware' program to a broader audience. |
| 25 | The City of Hamilton should engage its residents and businesses in a community-wide discussion about policy questions. | • Newspaper advertisements have been most effective to date. John McLellan described the difficulty of engaging residents who have not been impacted by flooding. Open houses put on by Local Councillors could provide a forum for engaging residents and businesses. | • **Recommendation 09-15** - The City of Hamilton should better inform members of Council on social marketing programs such as 'Flood Aware' and make stronger efforts to involve them in stormwater management. |
| 26 | The City of Hamilton should engage its Medical Officer of Health to provide advice to residents. | • July 2007 Insert included health tips and advice.<br>• Kelly Anderson has ongoing discussions with Health Protection. | |