Rethinking Storm Water Management Standards

City of Stratford Experience

ICLR Basement Flooding Symposium
May 26, 2011
IMAGES OF STRATFORD

The following images courtesy of Stratford Tourism Alliance
IMAGES
OF
STRATFORD
July 28, 2002
The following images courtesy of the Beacon Herald
The City is using our basements as toilets. Use at own risk! Where is our taxpaying $$$ going?
City’s Emergency Aid Program

- Initiated Sunday July 29, 2002 (the day after).
- Up to $5,000 per household after insurance.
- Includes up to $1,000 for lost wages.
- 994 claimants.
- 880 claims paid - total of $1,261,429
- Average compensation of $1,433 per claim.
- Top five insurers represented 60.5% of claims.
- 124 claimants with no insurance.
- Further 133 may have had no sewer back up coverage.
Class Action Law Suit

- Initiated shortly after the flood.
- Claimed $210,000,000.
- Class Action Suit certified.
- 7 years to settle out of court.
- Final payout for City - $7,700,000.
- No admission of liability.
Historical Perspective
Previous Events

- 1983

- July 2000 - localized to Norfolk/Elgin area.

- February 2001 - localized to Norfolk/Elgin area.
Response Previous Floods

- 1972 Wyllie & Ufnal Sanitary Sewer Study.
- Identified cross connections
- Concludes adequate capacity for existing and predicted future flow conditions.
- Mid 1980 city wide camera study and smoke tests.
- Identification and Elimination of cross connections.
Sanitary Sewer Master Plan

- To analyze sanitary collection system and to identify problem areas and solutions.
- Evaluated existing and future development.
- Public Open Houses on June 27/02 and Nov. 27/02.
- $35,000,000 in priority projects proposed.
- $16,500,000 in strategic projects proposed.
Next Steps

- Class EA to implement Sanitary Master Plan.
- Storm Sewer Master Plan.
- Class EA to implement Storm Master Plan.
- $$$Money$$$
Goal – Prepare a comprehensive action plan for the planning and implementation of the required changes and/or improvements to the storm system infrastructure to meet current and future needs.
Storm System Master Plan Objectives

- What is the existing storm system performance?
- Is there spare capacity to also service the annexed lands?
- What improvements are required to the existing system?
- Review and update City drainage policies & standards, as required.
- Creation of city-wide computer model that we continue to use today.
MASTER PLAN STUDY AREA

- Entire City - 2208 ha.
- Annex Areas - 447 ha.
- Length of Pipes - 135 km
- Largest Pipe - 3.8 m dia.
- Priority Area - 1932 ha.
  (includes internal & external areas)
South Side Study Area

- South Side of City - 2000 ha.

- Master Plan Priority Areas
  - Lorne Avenue Outlet System
  - Collegiate Arch Outlet System
  - Systems west of Romeo St. S that discharge to the Avon River and Lake Victoria.
MASTER PLAN ACTIVITIES

- Review of City drainage policies and standards;

- Development of a system improvement strategy that allows solutions to be developed based on local features;

- **Field Activities**
  - sewer flow monitoring program;
  - drainage system inventory;
  - natural environment inventories;

- Review & updating of natural environment data (UTRCA and MNR)
MASTER PLAN ACTIVITIES

- Preparation of a detailed hydraulic model of over 600 pipes;

- Assessment of storm sewer capacities;

- Assessment of major drainage system flow and ponding areas.
DRAINAGE SYSTEM COMPONENTS

- PRIVATE DRAIN CONNECTIONS - SEPARATE PDCs
DRAINAGE SYSTEM COMPONENTS

- **MINOR SYSTEM**
  - convenience system
  - storm sewers
  - swales, gutters

- **MAJOR SYSTEM**
  - extreme rainfall runoff
  - overland drainage
  - roadways
  - channels
DRAINAGE SYSTEM COMPONENTS

- MAJOR SYSTEM RUNOFF EVENT
Basements & foundation drains set above the 100-year HGL and above the water table;

Foundation drains (weepers) are to be sump pumped to a storm PDC to provide basement isolation;

Flow depths will be limited on local, collector roads, and arterial roads (e.g., 1 lane free from flooding in each direction on arterials).
DRAINAGE POLICY UPDATE

- Low points along the road grade should not exist unless the low points are conveying flow to the major system (e.g., Avon River, Lake Victoria, major drains);

- Minor system conveyance or detention storage of runoff from the event shall be considered where no suitable major storm outlet exists;

- Property shall be protected from surface flooding during the event;

- Roofwater leaders are to be discharged directly to ground in all cases.
DRAINAGE POLICY UPDATE

- NEW DEVELOPMENT CONNECTIONS
FLOW MONITORING

City of Stratford
City Wide Storm System Master Plan

Monitoring Locations

- Flow & Level Monitor
- Crest Gauge
- Rainfall Gauge (St Ambrose School)

Locales:
- Collegiate Arch Outlet System
- Lorne Avenue Outlet System
Hydraulic Model
MAJOR DRAINAGE REVIEW

- Identify Low Points where overland runoff has an insufficient outlet to a major watercourse or lake;

- Identify potential flood hazards due to Major Flow from large external areas;

- Identify areas where the minor system may capture runoff from extreme rainfall events (potential to 'oversize' sewers in these areas).
Storm Master Plan Recommendations

Three Categories:

- Capital Works.
- Programs.
- Policy Measures.
Capital Works

P1 – Lorne Ave Outlet System  $50+M.
P2 – Collegiate Arch System  $15+M.
Others  $5+M.
5 yr. Inspection & Maintenance  $.5M
Programs

1. Monitoring identified areas (5yrs)  $0.1M
2. Flow Reduction Areas (5 yrs)  $0.125M
3. PDC Isolation (10 yrs)  $0.55M

- On-site stormwater controls to control 250 year post-development design flow rates plus quality controls.
Policy Measures

- Design Storm – Local
- Design Storm – Trunk
- Major Overland Flow
- Minimum Pipe Diameter
  - Main
  - Catchbasins
- Building Connection Size
- Foundation Drain Connection
- 5 yr (full flow) 250-yr (check HGL)
- As above
- 250 yr.
- 300 mm.
- 250 mm.
- 100 mm.
- Sump pump to storm
Storm Class EA
Where Are We Now?

- Sanitary Class EA Capital Priority Program to be complete in 2011.
- Storm Ponds (5) Completed > $15M
- Some Storm Sewers in place.
- 250 year storm criteria being applied.
- Class Action settled out of court for $7.7M
QUESTIONS?
THANK-YOU

Ron Shaw
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City of Stratford