Real Time Control
To Manage Wet Weather Flows

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Infrastructure and Source Water Planning

Environment & Sustainable Infrastructure
Presentation Overview

• What is RTC?

• Why RTC & What Will it Achieve?

• Background

• Major Tasks

• Description of Proposed RTC System

• Next Steps

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What is RTC?

Computerized optimization for control of:

- Flow gates & chambers, CSO Tanks, pump stations
- Sensors that measure flow, level, status (more eyes and ears in the system)
- Assists operators in making complex decisions over a very vast sewer network and in response to spatially variable and dynamic storms
Typical Static Control of CSO - Does not respond dynamically to flows resulting from storms, overflowing into Woodward WWTP. Moderate wet weather flows into Woodward WWTP.
Replacing static CSO structures with gates that modulate in response to storms and varying flows reduces CSO volume and meets targets!
Why RTC?

• Existing infrastructure lends itself to RTC because it already has gates, CSO tanks, pump stations and other necessary components.

• Leverages same hydraulic model as used by SERG team.

• Represents the best “bang for your buck” solution for CSO control with the least investment in new infrastructure vs. next best option!

• Delist Hamilton Harbour as a pollutant hotspot and Area of Concern.
What Will RTC Achieve - The Targets!

- MOE Procedure F-5-5
  90% System-wide CSO Capture
  Beach/Recreational Water Body Contact Protection

POLLUTANT LOADINGS!
- Hamilton Harbour Remedial Action Plan (HHRAP)
  CSO Pollution Targets for Total Suspended Solids,
  Phosphorous, Ammonia-Nitrate

FREQUENCY!
- Sensitive Area Targets – Cootes Paradise
  No more than one CSO per year in an Average Year
Background - What has been completed or is in progress?

- Completion of RTC strategy development
- Completion of preliminary design of RTC regulators, sampling and flow monitoring to ensure design meets quality objectives.
- Real Time Control System Integration for System Operation (in-progress)
Biggest RTC benefit: controlling the frequent small and medium storm CSO events
Overview of the City’s Interceptor
Sewers and CSO’s
Greatest Volume of CSO along Burlington St. Outfalls

Also provide the greatest opportunity to reduce overflow volume.

Location Plan
Major Tasks/Subprojects

1) RTC Computer Model (complete) & All-Pipes Model Development (underway)

2) CSO Pollutant and Flow Characterization Program (complete)
   • refining final volume control needed based on pollutant concentration.
   • designed to be repeated on a regular 5 yr schedule to satisfy compliance commitments and track our progress as required by the Ministry of the Environment.

3) Design of RTC Construction/Enhancement Projects and Computer Architecture
   • CSO control, surcharge control, operational improvements
Refinement/calibration of hydraulic model; flow/rain monitoring & field verification
CSO pollution characterization

Custom sampling stations → analysis → results
refine RTC operation & designs

Hamilton RTC CSO Sampling Results to Date
Total Suspended Solids

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Example of what’s in the ground:
Existing Site Requiring Upgrade: Ferrie and Ferguson Actuator and Sluice Gate

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Example of CSO Outfall – Planned new gate/regulator to capture CSO at Wellington/Burlington

In an average year we overflow here 44 times
Total volume of overflow is ~345,000 m³ (138 Olympic swimming pools) of CSO in an average year
System Upgrades and RTC Implementation

- CSO Storage Tanks: 79.5%
- WWTP Primary Upgrades: 84%
- RTC Phase 1 & 2: 90%

TSS 125 mg/l
### RTC Tank & Regulator Upgrades for CSO Control – Phase 1

<table>
<thead>
<tr>
<th>Site Location</th>
<th>Cost Estimate</th>
<th>Type of Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wellington / Burlington</td>
<td>$3.6M</td>
<td>New Site - CSO Control</td>
</tr>
<tr>
<td>Mary / Ferrie</td>
<td>$1.4M</td>
<td>Existing Site - upgrade required</td>
</tr>
<tr>
<td>Main-King CSO tank</td>
<td>$3.8M</td>
<td>New Control Site + Tank instr. &amp; pump modifications– maximize tank use</td>
</tr>
<tr>
<td>Kenilworth / Burlington</td>
<td>$4.3M</td>
<td>New Site - CSO Control</td>
</tr>
<tr>
<td>Strathearn / Burlington</td>
<td>$4.8M</td>
<td>New Site - CSO Control</td>
</tr>
<tr>
<td>Greenhill CSO tank</td>
<td>$0.9M</td>
<td>Existing Site Retrofits – maximize tank use</td>
</tr>
<tr>
<td>Red Hill Creek Super Pipe</td>
<td>$0.2M</td>
<td>New Actuator/Power-back-up &amp; Control Philosophy – maximize tank use</td>
</tr>
<tr>
<td>Bluebell/Lavender</td>
<td>$0.02M</td>
<td>Existing Site – Weir Adjustment</td>
</tr>
<tr>
<td>Dundas Equalization Tank</td>
<td>$0.4M</td>
<td>Existing Site - Pump Upgrades (to regulate flows from Waterdown to Woodward)</td>
</tr>
<tr>
<td>Sterling CSO</td>
<td>$0.6M</td>
<td>Existing Site - Weir Adjustment</td>
</tr>
<tr>
<td>Main/Ewen Chamber and McMaster CSO Tank</td>
<td>$1.8M</td>
<td>Existing Site – Sluice gates and pump modifications to maximize tank use</td>
</tr>
<tr>
<td><strong>Total Phase 1 CSO Control Sites</strong></td>
<td><strong>$21.62M</strong></td>
<td></td>
</tr>
</tbody>
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- **Community**
- **People**
- **Processes**
- **Finance**

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## RTC Regulator Upgrades – Phase 2

<table>
<thead>
<tr>
<th>Site Location</th>
<th>Cost Estimate</th>
<th>Type of Site</th>
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</thead>
<tbody>
<tr>
<td>Ferguson / Ferrie</td>
<td>$1.7M</td>
<td>Existing Site-New Regulator</td>
</tr>
<tr>
<td>Wentworth / Rosemary</td>
<td>$1.5M</td>
<td>Existing Site-New Regulator</td>
</tr>
<tr>
<td>Hillyard/Burlington</td>
<td>$2.1M</td>
<td>New Site-New Regulator</td>
</tr>
<tr>
<td>Gage / Burlington</td>
<td>$2.2M</td>
<td>Existing Site-New Regulator</td>
</tr>
<tr>
<td>Burlington/Ferguson</td>
<td>$0.9M</td>
<td>Existing Site-New Regulator</td>
</tr>
<tr>
<td>Burlington / Ottawa</td>
<td>$1.8M</td>
<td>Existing Site-New Regulator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Added to Phase 1 Sites, designed to achieve 90% control</th>
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</thead>
<tbody>
<tr>
<td>Total Phase 2</td>
<td>$10.2M</td>
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<tr>
<td>Total Phase 1 &amp; 2 RTC</td>
<td>$31.82M</td>
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Next Steps

- Proceed with property acquisition to Q3 2011
- 3 sites to be funded via Canadian Strategic Infrastructure Fund (CSIF) with completion by Q3 2012.
- Remaining Phase 1 sites/some Phase 2 to be budgeted 2013-15.
- Rest of Phase 2 sites budgeted 2015-17.