

## ASSESSING THE EFFECTS OF HYDRAULIC LOAD REDUCTION ON WASTEWATER TREATMENT PLANT PERFORMANCE

**CLIENT:** Environment Canada

**LOCATION:** Hamilton, Ontario, Canada

### **PROJECT DESCRIPTION**

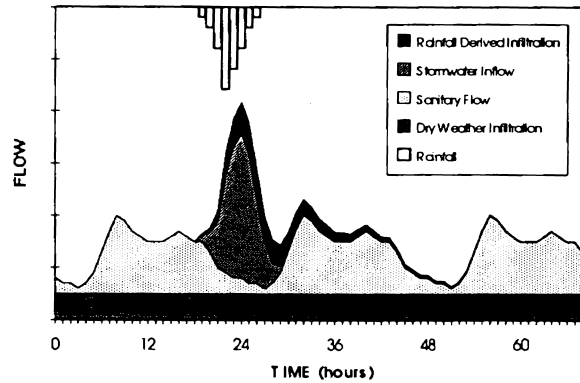
Many treatment processes are particularly sensitive to the magnitude and variations of the hydraulic load. Accordingly, water management strategies designed to reduce the hydraulic load to a plant should have a definite positive impact on wastewater treatment plant performance. For this project, **the Hamilton Woodward Avenue WPCP and its tributary area were used to demonstrate the effects of flow management programs on wastewater treatment performance.** The analysis included continuous modelling of wastewater treatment plant performance under various flow conditions.

A major problem in assessing the effect of hydraulic load reduction on wastewater treatment plant performance is that the influent flow usually consists of four major time-varying components which includes sanitary flow, dry weather infiltration, stormwater inflow, and rainfall derived infiltration.

Simulated Woodward WPCP influent flows for this project were based on actual hourly plant flow data which represented the wettest and driest years of the past 10 years. Plant flow was decomposed into its respective components with a custom collection system model that also generated hourly influent water quality concentrations based on flow components. **Flow reduction and management programs simulated included: pricing policies; residential water conservation devices; and inflow and infiltration reduction programs.** *(over)*



- Ø Flow management simulations conducted



## RESULTS

- Ø Reduction of pollutant loads achieved by hydraulic load reduction

A hydraulic load reduction program, particularly through water conservation and infiltration reduction, can create significant reductions in receiving water pollutant loading. This study **showed TSS and BOD annual pollutant load reductions of 10% to 45%** for various hydraulic load reduction conditions.

For the Hamilton Woodward WPCP, hydraulic load reductions alone would not be sufficient to achieve effluent pollutant loads that will be required by the Remedial Action Plan (RAP) for Hamilton Harbour. However, RAP based increases in water and sewer use rates can be used as an incentive for water conservation.

Annual operation and maintenance cost savings associated with reduced hydraulic load reduction, while significant, are lower than the projected costs of a comprehensive flow reduction program. Therefore, the savings in capital expenditure due to flow reduction will determine if a hydraulic load reduction program is economically viable.

- Ø Coordination of capital works and water conservation programs to achieve cost savings

Expected **decreases in predicted future flow due to flow reduction can be used to reduce the cost of currently proposed capital works.** This would include reducing the size of CSO control storage facilities and tertiary treatment at the Hamilton Woodward WPCP. By carefully staging proposed capital works, and co-ordinating their design with a water conservation program, significant capital savings may be realized.

