



## Utilization of Water Quality Monitoring Data to Support the City of Detroit's Long Term Combined Sewer Overflow Control Plan

### BRIEF SUMMARY

#### **Background**

The vast majority of the City of Detroit is served by a combined sewer system that evolved over the last 100 years as the City expanded. Combined sewer systems carry both sanitary household discharge and storm water runoff together in one pipe. During large rainfall events or when snowmelt occurs, the capacity of the sewer system and the Wastewater Treatment Plant (WWTP) can be exceeded resulting in overflows to the Detroit and Rouge Rivers. These overflows are referred to as Combined Sewer Overflows (CSOs). The Michigan Department of Environmental Quality (MDEQ) requires all municipalities served by combined sewer systems, like Detroit, to develop a CSO control plan to eliminate or adequately treat CSO to meet the Federal and State of Michigan standards before discharge to the receiving waters of the State. The City of Detroit submitted a Long Term CSO Control Plan to the MDEQ in 1996 and will be submitting a plan update in December of 2008.

#### **How the City of Detroit is addressing the CSO requirements?**

In order to develop a cost-effective CSO control plan that meets Federal and State standards and best uses the City's financial resources, the City recommended using a demonstrative approach in developing the final Long Term CSO Control Plan. The demonstrative approach uses both receiving water quality data and treatment performance data from pilot CSO control facilities to define the level of

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## Questions that need to be answered on Detroit River water quality

The objectives of the water quality monitoring program are to evaluate the condition of the existing Detroit River water quality, impact of untreated CSO on the Detroit River water quality, and impact of treated CSO on the Detroit River water quality. The monitoring program is focused on answering the following questions:

1. Do CSO reduce the dissolved oxygen (DO) in the Detroit River below the water quality standards of 7 mg/l? Low DO concentrations are indicative of the presence of organic material in the water.
2. Do CSO create aesthetic and other use impairments (such as recreational water contact and water supply due to high bacteria concentrations)?
3. Do untreated and treated CSO discharges have an ecological impact on the aquatic communities?
4. What is the spatial and temporal extent of the CSO discharge plumes?

control required to meet the water quality objectives at the time of discharge. Therefore, four CSO pilot facilities and a water quality monitoring program of the Detroit and Rouge Rivers are being implemented to collect data to support the development of the final City of Detroit Long Term CSO Control Plan.

The City of Detroit has shared the information collected to date from the pilot facilities performance evaluation as well as the water quality monitoring at various national and international conferences. This is a brief summary of the technical paper presented at the 2004 State of the Strait Conference that focuses on the Detroit River water quality monitoring program. The program was undertaken to answer the questions shown in the adjacent box. Activities undertaken and the finds are presented below.

### What is being done to answer questions about the Detroit River water quality?

- Continuous monitors have been installed at four locations along the Detroit River during the warm months of the year since year 2000. These monitors measure many parameters such as DO, pH, turbidity, and temperature before, during and after CSO occurs.
- Shoreline surveys have been conducted to evaluate appearance of the water body and debris that may have been deposited along the shore.
- In-stream bacteria sampling has been conducted.
- Detroit River biological community (Benthic Macroinvertebrate) surveys have been conducted.
- CSO plume tracking surveys have been conducted to determine the extent of the plume.

### What are the findings to date?

- The CSO plume affects 500 feet; 20% of the Detroit River channel width. [Click here to view plume monitoring data.](#)
- Public water intakes are not impacted by DWSD CSO plume.
- Dissolved oxygen levels are always >7 mg/L standard. [Click here to view data and findings.](#)
- The Detroit River was found clear, colorless and generally had no odor.
- Bacteria levels exceed standards within the CSO discharge plume. [Click here to view aesthetic and bacterial impairment data and findings.](#)
- No adverse impact on the biological community from CSO discharge has been observed to date. [Click here to view ecological impact findings.](#)