SANITARY SEWER OVERFLOW (SSO) OVERFLOW CONTROL PROGRAM

Introduction

Over the next several years the City will be implementing a major program to control overflows of untreated wastewater from the sewer system under wet weather conditions. Control options are still under analysis with a major decision deadline in 2007. Regardless of the specifics of the final control program, costs will be in the millions. The implementation compliance schedule will extend to at least 2010 and as long as 2017 depending on the final control option selected for implementation. This is a long-standing problem with no easy fix. Many other communities with older sewer systems, in Michigan and nationwide, are struggling with this problem.

What is a Sanitary Sewer Overflow (SSO)?

The City Sanitary Sewer System is designed to carry wastewater flows. It is not designed to carry an excessive amount of storm water or groundwater. However, storm water and groundwater (referred to as Inflow and Infiltration or I/I) reach the sanitary sewer system under wet weather conditions in such volume to cause the system to surcharge and overflow untreated wastewater (known as a Sanitary Sewer Overflow or SSO) to the river in violation of state law.

Wastewater flows

On an annual average basis more than half the flow from the City to the wastewater plant comes from inflow and infiltration. This is water that does not need treatment except for being mixed with wastewater. The average flow spread over the city population comes to 166 gallons per person per day. However, metered water use is only 72 gallons per person per day. While this results in additional cost for treatment of these excess flows, the real problem is the peak flow under wet weather conditions. The daily peak flow rate from the City under dry weather conditions is between 1400 and 1500 gallons per minute (gpm). The sewer system design peak rate is 6600 gpm. When flows exceed this design rate the main interceptor sewer begins to back up and surcharge. If flows exceed 7500 gpm for over a few hours, the system surcharges to the point where an overflow occurs. Over the past ten years there were 5 such overflows, or an average of an overflow every two years. The overflows typically occur when there is a combination of saturated ground and precipitation (and/or snowmelt) severe enough to also bring the river to flood stage.

Consent Order and Compliance Schedule

Prior to 2000 the City had reported SSOs as uncontrollable bypasses and MDEQ (Michigan Department of Environmental Quality) had accepted these occurrences as uncontrollable. In 2000 the MDEQ enforcement policy changed. At first the MDEQ sought total elimination of all SSOs. While an admirable goal, this would be cost prohibitive for communities with older sewer systems. Once MDEQ realized the state-wide scope of the problem and the cost implications for “total” elimination, the policy evolved to set a remedial design standard for older systems with a goal of reducing wet weather overflows to a frequency of less than one in ten years.

Last fall the City entered a consent order with the Michigan Department of Environmental Quality to undertake a major SSO control program. The City was assessed fines and costs in the amount of $22,500 for past overflows. The consent order includes a compliance schedule and stipulated penalties for failure to meet any date in the compliance schedule. The City Council committed to addressing this problem, but it took over four years of negotiations with MDEQ to arrive at realistic terms to the Order. The alternative to entering the Consent Order was to face court action with the likelihood of much more significant fines and costs, and a court ordered compliance schedule with much less City input or control.

What is being done?

The consent order essentially has two separate compliance schedules. The first deals with further reducing “traditional” sources of inflow and infiltration to the sewer system. These sources include: 1)

inflow of storm water from roof drains, catch basins or area drains, leaky manholes covers and interconnections with storm sewers, and 2) infiltration of groundwater through leaks in pipes and manholes below the groundwater table. This part of the compliance program is defined. Inflow sources will be addressed over a three-year period with approximately one-third of the city addressed each year. "Traditional" infiltration sources (i.e. those on the public sewer system) will be addressed over a five-year period.

Flows from footing drains?
The second compliance track deals with groundwater entering the sanitary sewer system through private home footing drains. Analysis to date indicates this a major source of excessive flow reaching the sewer system. An estimated 1,000 homes (about 1 in 5) are believed to be contributing clear groundwater to the sanitary system. Data indicate an average contribution rate of 5 gpm from such connections under saturated ground and wet weather conditions. That is an estimated contribution rate of 5,000 gpm compared to the sewer system's peak design flow rate of 6600 gpm.

How are footing drains connected?
Footing or foundation drains are essentially perforated pipe, typically in pea stone, installed around a basement footing (may be exterior or interior but typically both), to intercept and drain groundwater away so it doesn't build up and leak through basement walls. Older homes and homes without basements generally do not have such drains. Homes built in the late 1940s, 1950s and 1960s often had such footing drains directly connected underground to the sanitary building sewer (gravity connection) and are not readily evident. A City Ordinance in 1963 prohibited such connections, but they may have been allowed under the state plumbing code until the 1970s. After the 1970s homes with basement footing drains were typically connected to a sump in the basement with a pump that should discharge this clear water to a storm sewer or out onto the ground. However, many such pumps have been improperly connected to discharge to the City sanitary sewer. Such sump pumps typically discharge 40 to 60 gpm. To keep up with an average flow rate of 5 gpm, the sump pump only needs to cycle on every 10 to 15 minutes to discharge over 7,000 gallons of clear water to the sanitary sewer system in a day's time.

The City will require separation of improper sump pump connections to the sanitary sewer system. How to best handle gravity footing drain connections is still under analysis. More information will follow and your cooperation will be necessary to solve this problem.