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March 15, 2004

Sierra Club Central Ohio Group
1710 Dorsetshire Rd.
Columbus, OH 43229

Attn: Pat Marida, Jeff Cox

RE: Columbus Annual SSO and WIB Report - 2003
CEA No. 04013

Dear Pat and Jeff:

Carpenter Environmental Associates, Inc. (CEA) has been retained by the Sierra Club Central Ohio Group to review and analyze the "City of Columbus, Department of Public Utilities, Annual SSO and WIB Report, 2003." CEA was requested to review and analyze the report and to put the results reported into context with published benchmarking studies and with CEA's experience with SSO rates throughout the country.

In order to put the number of SSOs and basement back ups in context with other locations, it is necessary to convert the absolute number of occurrences to a rate of occurrence by normalizing the SSOs and other discharges as occurrences per 100 miles of sewer per year (SSOs/100 mi/year). In addition to combined sewers and storm sewers, the City operates 2,363 miles of sanitary sewers[1]. The length of sanitary sewers operated by the City was used to normalize the City's SSO data.

The Actual Number of SSOs is Likely Under Reported

The City of Columbus (City) has adjusted its reporting procedures during 2003 and the data provided in the report are based upon current reporting procedures. The occurrence of an SSO at Designed Sewer Relief (DSR) points where the City has installed flow meters to support its modeling effort is straight forward and likely accurately reported. The flow meters measure the height of sewage in manholes and if the sewage had risen to a level above the overflow point an SSO occurred. Where flow meters are not present, the City uses chalk and blocks to determine if an overflow has occurred. Chalk and blocks can only indicate if at least one SSO has occurred between inspections. The City appears to only inspect the DSRs using chalk and blocks approximately weekly. When indications of a SSO were observed during an inspection,

[1] Personal communication Susen Galli, CEA with Lora Young-Mohr, City of Columbus, Division of Sewers, March 9, 2004.

the City reported the SSO as occurring at least once during the time between inspections, e.g. "at least once between 4/1 and 4/8."

The practice of inspecting approximately once per week and reporting at least once occurrence during that time period, very likely results in under reporting of the actual number of SSO events. Review of wet weather discharges shows that over one third of the (199 out of 504) reports of wet weather SSOs are reported as "at least once between date and date." Inspection of Appendix A, Summary of Wet Weather Overflows", reveals that on a number of occurrences when one or more DSRs were reported to have at least one overflow, DSRs where flow meters were installed reported two or more days with overflows during that period. It is reasonable to assume that at some of these DSRs more than one overflow occurred during the time period being reported and the City under its current methods of inspecting simply did not know they occurred. The City should inspect its DSRs daily to ensure that all SSOs are accurately reported.

The Volume of SSOs Reported is High

Based upon review of volumes of SSOs reported elsewhere, the volume of SSOs reported by Columbus is very high. Columbus has reported a single SSO in excess of 72,000,000 gallons and numerous SSOs in excess of 1,000,000. In other jurisdictions, such large SSOs have resulted in multimillion-dollar fines from State agencies. To place Columbus' SSO volume in context, Cincinnati's most active SSO was estimated to discharge approximately 75,000,000 gallons per year while during the last year Columbus' had a SSO discharge over 72,000,000 gallons in a single date.

The volume of SSOs appears to have only been reported for those DSR's at which a flow meter has been temporarily installed. It is unclear if and or how Columbus estimates the volume of sewage discharged at any location at which a flow meter is installed. In any event, the annual report clearly does not contain volume estimates from a fair number of SSOs.

The City's SSO Rate is many times Higher than SSO Rates in Nationwide Studies

The City reports 504 known SSOs during wet weather, 35 SSOs during dry weather, and 346 instances of Water in Basement (WIB), which really is sewage in basements. The number of dry weather SSOs appears to be much lower than one would expect in Columbus' sewer system, but for comparison purposes, we have taken the numbers as reported.

The 539 SSOs reported result in a SSO rate of 22.8 SSO/100 mi/year. When basement backups are included the rate increases to 37.45 SSO/100 mi/year. These rates are from five to over ten times higher than the rates found in major benchmarking studies performed in recent years.

Two of the benchmarking studies separated basement backups from other SSOs. Black and Veach performed both of these studies with funding provided by the American Society of Civil Engineers and USEPA. The 1999 Black and Veach study found a median[2] of 4.38 SSO/100 mi/year without basement backups and 6.31 SSO/100 mi/year including basement backups[3]. The City has an SSO rate, both with and without basement backups about five times higher than the median found in the 1999 study. The 2000 Black and Veach study found a median of 2.01 SSO/100 mi/year without basement backups and 3.68 SSO/100 mi/year including basement backups[4]. The City has an SSO rate, both with and without basement backups over ten times higher than the median found in the 2000 study.

The remaining three benchmarking studies included, but did not separate the rate of, basement backups. They reported median SSO rates of 1.72 SSO/100 mi/year[5], 4.7 SSO/100 mi/year[6], and 3.82 SSO/100 mi/year[7]. The City's SSO rate, including basement backups, again is five to over ten times higher than the median of other utilities studied. The City's high SSO rate is particularly striking because the methods used to identify SSOs from DSR points likely understates the actual number of SSOs from these points.

We appreciate the opportunity to be of service to the Sierra Club. Please let me know if you have questions or would like additional information.

Sincerely,

CARPENTER ENVIRONMENTAL ASSOCIATES, INC.

Bruce A. Bell, Ph.D., P.E., DEE
President

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[2] In comparing a specific utility such as Columbus with benchmarks from various studies, the median provides a more realistic comparison than the average because inspection of the data shows that one or two utilities with very high SSO rates skews the average upward unrealistically.

[3] ASCE/Black and Veach, "Optimization of Collection System Maintenance Frequencies and System Performance", February 1999.

[4] ASCE/Black and Veach, "Protocols for Identifying Sanitary Sewer Overflows", June 2000.

[5] Arbour and Kerri, "Collection Systems: Methods for Evaluating and Improving Performance", California State University Sacramento, 1998.

[6] Greenberg, Kenneth D., Expert Report in United States v. City of Los Angeles, October 15, 2004. This represents a study by EPA Region 9 of collection systems in Region 9 using 1999 and 2000 data.

[7] RW Beck, "Benchmarking Analysis of the Collection System Division Metropolitan Wastewater Department City of San Diego, California, February 2000.