Appendix N
Combined Sewer System Operational Plan - Executive Summary

CITY OF
LANCASTER, OHIO

WATER POLLUTION CONTROL DEPARTMENT

COMBINED SEWER SYSTEM OPERATIONAL PLAN

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MALCOLM PIRNIE

ENVIRONMENTAL ENGINEERS, SCIENTISTS & PLANNERS

1.1 Background

The City of Lancaster owns and operates a wastewater treatment facility, the Lancaster Water Pollution Control Facilities (WPCF) located at 800 Lawrence Street in Lancaster, Ohio. The WPCF discharges to the Hocking River under authority of a National Pollution Discharge Elimination System (NPDES) permit issued by the Ohio EPA.

The wastewater collection system is also operated under the regulatory authority of the NPDES permit. Lancaster's wastewater collection system consists of sanitary sewers, pump stations and combined sewers. The combined sewers were designed in the early 1900s to collect both sanitary and storm water together. The key feature of combined sewers are overflow structures known as combined sewer overflows or CSOs. These structures were designed to relieve excess flow (both sanitary and storm flow) into adjacent receiving streams when the flow exceeded the capacity of the system. In 1994 the United States Environmental Protection Agency issued its National CSO Policy to address pollution concerns related to combined sewer overflows. This policy is implemented in Ohio by requirements placed in NPDES permits by the Ohio EPA.

In order to reduce basement flooding, plan for future growth and anticipate NPDES CSO requirements, the City of Lancaster prepared the following:

- An updated city wide map of all sewers in an electronic format (see Figure 3-1 at the end of the plan).
- A Wastewater Collection System Monitoring Plan. This plan monitored sewer flows during dry weather periods (i.e. periods without rain) as well as during wet weather periods (i.e. periods with rain). This information was used to develop the sewer system computer model, characterization report and operational plan listed below. In addition to flow monitoring, the plan included sampling of CSOs and documentation of CSO activation. The Wastewater Collection System Monitoring Plan is provided in Appendix H for reference.
- A fecal coliform sampling plan to determine the extent of fecal coliforms in local streams.
- A CSO solids and floatable study to determine the extent solids and floatables are present in CSO discharges.
- A computer model of the City of Lancaster's sewer system based on XP-Software's Stormwater Management Model (XP-SWMM).
- Identification of basement flooding areas.
- A Combined Sewer System Characterization Report. The report describes collection system components such as siphons, pump stations, combined sewer overflows and collection areas. This report also evaluates the current sewer collection system capacity during dry weather and wet weather. Storm sewer alternatives to reduce basement flooding were developed and discussed as part of this report.

- A Combined Sewer System Operational Plan (this document) implementing the National CSO Policy's Nine Minimum Controls which are required by the City's NPDES permit.

1.2 Combined Sewer System Operational Plan

This document is the City of Lancaster's Combined Sewer System Operational Plan. This document summarizes the implementation of the National CSO Policy's Nine Minimum Controls. This includes the operation and maintenance procedures of the City of Lancaster pertaining to its combined sewer system as well as sampling, flow monitoring and other information collected by the City that may be relevant.

The Nine Minimum Controls, as defined by the United States Environmental Protection Agency (USEPA), are simple, low-tech, low cost, controls intended to reduce CSOs and their impact on receiving streams. The nine minimum controls are technology-based measures that are easily implemented in a short period of time. The nine minimum controls as defined by the EPA are:

1.	Proper operation and maintenance of the sewer system and CSO outfalls.	Chapter 4
2.	Maximize use of the collection system for storage.	Chapter 5
3.	Review and modification of pretreatment requirements.	Chapter 6
4.	Maximize flow to the POTW for treatment.	Chapter 7
5.	Prevent dry weather overflows.	Chapter 8
6.	Control of solid and floatable materials.	Chapter 9
7.	Pollution prevention.	Chapter 10
8.	Public notification.	Chapter 11
9.	Monitor CSOs to characterize impacts and efficiency of controls.	Chapter 12

The implementation of each minimum control by the City of Lancaster is discussed in a separate chapter of this plan, beginning with Chapter 4, and is summarized below. Chapters 2 and 3 provide introductory and background information on Lancaster's combined sewer system.

Chapter 4 - Operation and Maintenance Program

This minimum control has been implemented. This chapter describes the City of Lancaster's operation and maintenance program including personnel, training, budget, equipment, sewer inspection/cleaning, record keeping, etc. Highlights of the chapter are provided below:

- Personnel & Training: The Water Pollution Control Department (WPCD) consists of 23 full-time positions. Training is provided for safety purposes (e.g. confined space entry) and whenever necessary for proper operation and maintenance.
- Budget: The 1998 Water Pollution Control Department's Budget was $5,502,000 with $551,000 dedicated to wastewater collection.
- Customer complaints: The WPCD typically responds to complaint calls within 24 hours.

- Inspections: A video camera truck is used to inspect sewers when necessary. Pump stations are inspected daily. Combined sewer overflows are inspected on a biweekly basis at a minimum.
- Maintenance and Cleaning: Problem sewers are cleaned weekly. Maintenance and cleaning of sewers and siphons is provided when necessary. A list of known maintenance problem areas is provided in Chapter 4. Many of these problems were found during flow monitoring and sampling efforts in 1995 and 1996. This includes areas of known deposition problems. The most critical deposition problem, the 27-inch sewer from CSO 1027 to South Broad Street, is presently being cleaned.
- Infiltration/Inflow Reduction Projects:
  - CSO 1010: A temporary plug has been installed in this CSO which is suspected of allowing stormwater to backflow into the system. If the plug does not cause flooding problems, the plug will be made permanent and the CSO will be abandoned. Similar investigations are planned for CSO 1022 and 1024.
  - Flow Metering: The city will use its flowmeters to search for sources of I/I. The City is presently investigating the area around Zimmer and Ohio streets which was identified as potentially having a significant amount of I/I during the 1995 Sewer System Evaluation.
  - Floodgates: The WPCD has been installing floodgates in recent years on CSO overflows prone to river intrusion or backflow from the stormwater system.
- Future CSO Improvement projects include:
  - Temporary overflow plugging and flow monitoring at CSO 1005 to see if it can be eliminated or if its weir elevation can be raised.
  - New sewer construction to eliminate CSO 1007.
  - Improving access to CSO 1005 (if not eliminated).
  - Improving access to siphons CSO 1006 and 1036.
- Street Sweeping/Catch Basins: The City of Lancaster Street Department performs street sweeping and catch basin cleaning.
- Sewer Map and Atlas: The WPCD has developed an electronic sewer map and atlas to be used as an updatable reference for all city storm and sanitary sewers.
- Computer Model: The WPCD has developed a computer model of its sanitary sewer system which can be used to analyze the system's response to new loads and developments.
- Records: Records are maintained of all maintenance work orders through a computerized process managed by the WPCD. Records of sewer drawings are stored and available for use in the City Engineer's Office in City Hall.

Chapter 5 - Maximize Use of Collection System for Storage

This control has been implemented. Over the past 15 years the City of Lancaster has performed numerous sewer system studies and implemented their recommendations for reducing infiltration and inflow (I/I) in its sewer system. These efforts are summarized in this chapter and demonstrate one method of maximizing storage by reducing I/I.

The city has also installed numerous floodgates (or flapgates) on the discharge of CSOs prone to reverse flow from receiving streams or storm sewers during high stream levels. By

keeping this source of inflow out, the city has increased the storage available in the system.

This chapter also uses the XP-SWMM computer model of the Lancaster Sewer System to estimate the amount of storage available in the sewer system. After considering the necessity of protecting homes from flooded basements, it was concluded that only a small amount of storage was available in the sewer system.

Chapter 6 - Review Pretreatment Requirements

This control has been implemented. In Chapter 6, the existing Industrial Pretreatment Program (IPP) is summarized, including the number of significant industrial users in the combined sewer area and the flow they contribute. As a percentage of dry weather flow to the plant, the industrial user contribution has decreased from over 35% to only 20% in the past twenty years. The historical trend of the reduction of metals in the Lancaster Water Pollution Control Facility (WPCF) sludge since the beginning of the IPP is also provided to show the effectiveness of the IPP and to demonstrate the reduced impact of industrial flows in CSOs. No changes in the existing IPP are necessary.

Chapter 7 - Maximize Flow to the Treatment Plant

This control has been implemented. The WPCF's influent pumping capacity was increased from 6 MGD to 12.5 MGD (18 MGD through primary treatment) during a 1989 upgrade of the plant. In a subsequent project completed in 1997, the plant was further modified to treat 18 MGD. Hydraulic tests performed in 1997 confirm the plant can treat at least 18 MGD on a hydraulic basis for a short period of time.

The calibrated XP-SWMM computer model of the sanitary sewer system was used to confirm that the sewer system can and does convey the peak capacity of 18 MGD to the plant.

Chapter 8 - Prevent Dry Weather Overflows

This control has been implemented. This chapter identifies current procedures used for identifying and reporting dry weather overflows and summarizes the results of the dry weather overflow monitoring conducted in 1995 and 1996 in conjunction with the CSO flow monitoring. (Chapter 4 discusses the biweekly (minimum) monitoring of all CSO headwalls for dry weather overflows.)

This chapter concludes that dry weather overflows are rare in the Lancaster system. However, it also identifies several CSO structures that are vulnerable to dry weather overflows (CSO structures 1005 and 1007) and describes future CSO projects that will increase the resistance of the system to dry weather overflows.

Chapter 9 - Control of Solid and Floatable Materials

This control has been implemented. This chapter describes the sampling performed on CSO outfalls and storm sewer outfalls in 1996. This sampling confirmed that Lancaster's CSOs do not discharge a significant amount of objectionable material. It was concluded that no modifications to the Lancaster combined sewer system was necessary to control solid and floatable material.

Chapter 10 - Pollution Prevention

This control has been implemented. This chapter describes the current pollution prevention and public education efforts of the City's Water Pollution Control Department (WPCD). It also summarizes county and state programs that impact the Lancaster area. A new part of this public education effort is a brochure to be developed by the WPCD devoted to CSO issues. This brochure will be distributed with sewer bills to the residents of Lancaster.

Chapter 11 - Public Notification

This control has been implemented. This chapter summarizes the fecal coliform sampling performed on streams in the Lancaster area during the summer of 1996.

It was concluded that water quality standards were met during dry weather in areas impacted by Lancaster's CSOs, however these CSOs did discharge fecal coliforms during wet weather. It was also noted that there exist sources of fecal coliforms upstream of the City of Lancaster that were sufficient to violate water quality standards during dry and wet weather.

Due to the presence of fecal coliforms in CSO discharges, it was decided to install notification signs at each CSO structure. An example of the sign is provided in this chapter for reference.

Chapter 12 - Monitor CSOs to Characterize Impacts and Efficacy of Controls

This control has been implemented. This chapter describes the CSO sampling that was performed in 1995 and 1996. Each CSO was monitored to determine its frequency of activation. Representative samples were taken at selected CSOs to estimate the pollutant concentration contained in CSO discharges. The results of this sampling are provided in this chapter. The concentration of pollutants in Lancaster's CSOs appeared to be typical of urban area combined sewers exhibiting a first-flush effect.

The most important part of this chapter is the discussion of receiving stream impacts. The Ohio EPA's stream sampling program is in the process of completing a report on the aquatic health of the Hocking River and its tributaries. The report will be based on the Ohio EPA's most recent sampling effort which was performed in 1995. The report has not been finalized yet, however preliminary conclusions document continued improvement in the Hocking River. Specifically, it no longer found aquatic life impacts from Lancaster's CSOs in the Hocking River through Lancaster. In fact, the Hocking River is making great progress in attaining its designated water quality standard. It is anticipated that the Ohio EPA will find that the Hocking River is in full or partial attainment over 100% of its length for the first time since their stream monitoring program began.

The Ohio EPA did identify high fecal coliforms and some sanitary floatable debris attributable to CSO activity in the Hocking River. The City of Lancaster investigated these impacts as part of the 1995 Sewer System Evaluation. The conclusions of these investigations are discussed in Chapters 8 and 9, respectively.

The only CSO impact area identified by the Ohio EPA from their 1995 sampling is in the lower portion of the Baldwin Run, near the Lawrence Street bridge. A total of five CSOs

discharge to the Baldwin Run and one to an upstream tributary. Two of these CSOs (CSO 1019 and 1026) activate frequently and discharge in the lower portion of Baldwin Run, just upstream of the Lawrence Street bridge. Although the 1995 sampling found only a "partial" attainment of water quality standards in this stretch, it is still an improvement from the 1990 and 1982 sampling which found this segment in "non" attainment. The only "non" attainment status found in the 1995 sampling is likely due to a discharge related to construction activity which is no longer active.

Due to the improvement of all streams impacted by Lancaster CSOs, no further action is planned by the City to further implement this minimum control.

1.3 Conclusion

The City of Lancaster is committed to complying with the combined sewer provisions of its NPDES permit. The City of Lancaster has successfully implemented the applicable portions of the Nine Minimum Controls as described in its Combined Sewer System Operational Plan.

+ + END OF CHAPTER 1 + +