SANITATION DISTRICT NO. 1

May 11, 2009

Acting Director of the Division of Enforcement
Department for Environmental Protection
300 Fair Oaks Lane
Frankfort, KY 40601

Chief, Environmental Enforcement Section
Environmental and Natural Resources Division
U.S. Department of Justice
601 D street NW
Washington, DC 20005
DOJ Case No. 90-5-1-1-08591

Chief, Water Program Enforcement Branch
Water Management Division
U.S. Environmental Protection Agency, Region 4
Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, Georgia 30303

Re: Consent Decree Case No. 2:05-cv-00199-WOB

Dear Gentlemen:

Pursuant to the above-referenced Consent Decree, Sanitation District No. 1 (SD1) was required to document its compliance with the Nine Minimum Controls (NMC), including proposed projects to be performed to ensure that compliance with the NMC is achieved by no later than twenty-four months after entry of the Consent Decree. SD1's NMC Compliance Report was submitted on March 12, 2008 to the EPA and Cabinet and received regulatory approval on July 6, 2008.

SD1 is required to submit an annual report on its implementation of the NMCs within sixty days after each anniversary date of the original submission. The enclosed report is intended to demonstrate SD1's compliance with such implementation as of April 18, 2009.

A certification as required by the Consent Decree is also enclosed (Consent Decree paragraph 38).

1045 EATON DRIVE • FT. WRIGHT, KENTUCKY 41017-9681 • PH: (859) 578-7450 • FAX: (859) 331-2436

I am confident in the integrity of the enclosed document, and I am certain that its content not only satisfies regulatory requirements, but also helps further the mission and vision of SD1 by establishing aggressive, proactive, achievable measures to protect water resources and enhance the quality of life in Northern Kentucky.

If you have any questions or concerns, do not hesitate to contact me at 859-578-7465 or by e-mail at jeger@sd1.org.

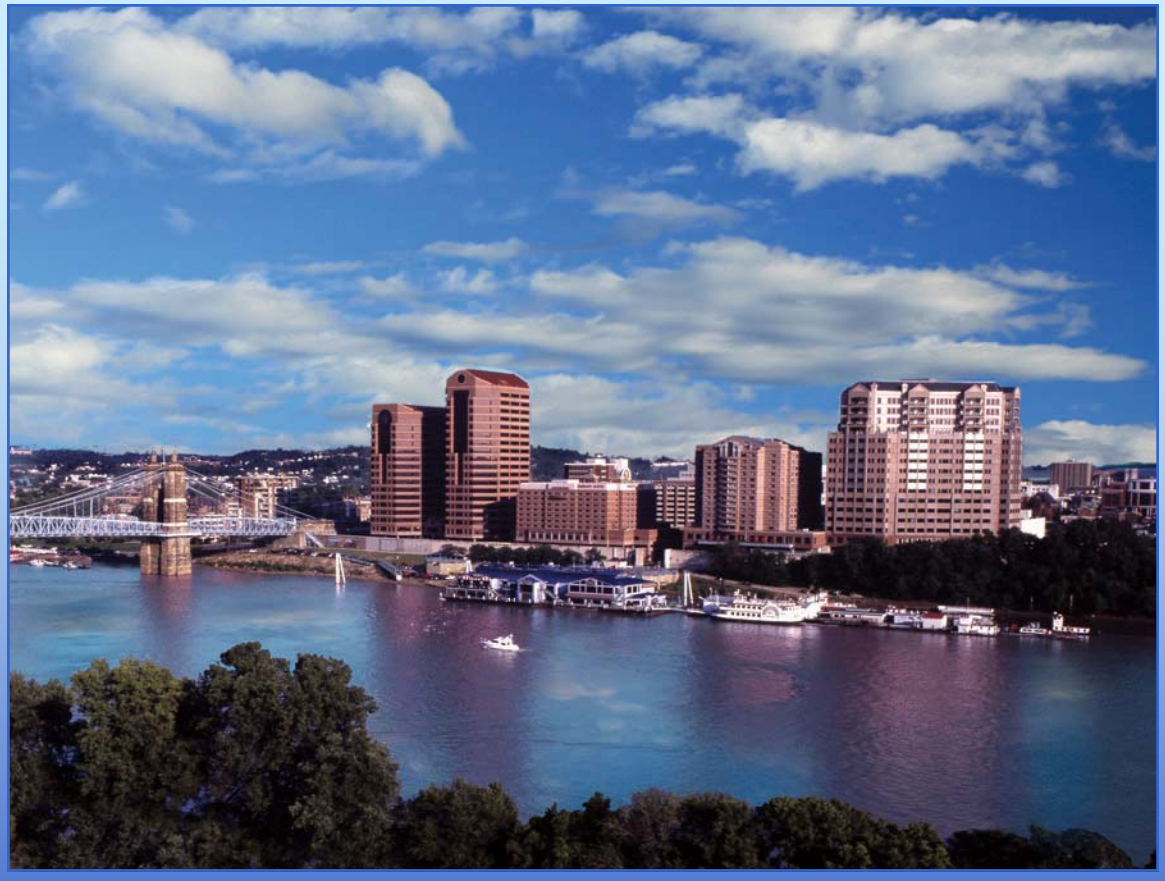
Best regards,

Jeffery A. Eger
General Manager

JAE/jh
Enclosures

Nine Minimum Controls
Annual Compliance Report

Sanitation District No. 1
May 11, 2009



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CERTIFICATION

Nine Minimum Controls Annual Compliance Report
Consent Decree Case No. 2:05-cv-00199-WOB

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering such information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Jeffery A. Eger
General Manager

May 11. 2009
Date

COMMONWEALTH OF KENTUCKY

)ss.

COUNTY OF Kenton

The foregoing instrument was acknowledged before me this 11 day of May, 2009 by Jeffery A. Eger, General Manager of Sanitation District. No. 1.

Linda Hamberg
NOTARY PUBLIC

State-Large County, Kentucky

My commission expires: May 9. 2010

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NINE MINIMUM CONTROLS ANNUAL COMPLIANCE REPORT

May 11, 2009

Sanitation District No. 1
1045 Eaton Drive
Ft. Wright, KY 41017

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LIST OF ACRONYMS AND ABBREVIATIONS

Cabinet	Kentucky Energy and Environment Cabinet
CSAP	Continuous Sewer Assessment Program
CSO	Combined Sewer Overflow
CSS	Combined Sewer System
DWO	Dry Weather Overflow
EPA	U.S. Environmental Protection Agency
gbaMS	GBA Master Series (information tracking system)
KYTC	Kentucky Transportation Cabinet
MG	Million Gallons
NMC	Nine Minimum Controls
NSU	Non-Significant User
O&M	Operations and Maintenance
SD1	Sanitation District No. 1
S&F	Solids & Floatables
SIU	Significant Industrial User

SECTION 1. INTRODUCTION

1.1 Overview

On April 18, 2007, Sanitation District No. 1 (SD1) entered into a Consent Decree with the U.S. Environmental Protection Agency (EPA) and the Kentucky Energy and Environment Cabinet (Cabinet) to address sanitary sewer overflows and combined sewer overflows (CSOs) in an effort to improve water quality throughout SD1's service area. As part of this agreement, SD1 was required to document its compliance with the Nine Minimum Controls (NMC) for CSOs as set forth in the CSO Control Policy, including proposed projects to be performed to ensure that compliance with the NMC is achieved by no later than twenty-four months after entry of the Consent Decree.

SD1's NMC Compliance Report was submitted on March 12, 2008 to the EPA and Cabinet and received regulatory approval on July 6, 2008. The approved NMC Compliance document can be viewed on SD1's website: http://www.sd1.org/documents/NMC_Compliance_Report_Compiled_3.12.08.pdf.

1.2 Report Objective

Pursuant to the Consent Decree, SD1 is required to submit an annual report on its implementation of the NMCs within sixty days after each anniversary date of the original submission. The enclosed report is intended to demonstrate SD1's compliance with such implementation as of April 18, 2009.

SECTION 2. ADDITIONAL COMPLIANCE ACTIVITIES

SD1's approved NMC Compliance Report outlined additional activities to be performed, with compliance schedules, which would aid in effectively achieving regulatory compliance and reducing CSO occurrences throughout the combined sewer system (CSS) area. Each of these tasks, aside from those identified as "ongoing" or "to be conducted as part of the Watershed Plans," were scheduled to ensure compliance by April 18, 2009. A comprehensive listing and detailed description of the additional activities are recounted in Appendix A of this report, which also includes the current status and section where each task is referenced within this report.

Nearly all of the tasks listed in Appendix A are 100% complete. Those listed as "ongoing" or "to be conducted as part of the Watershed Plans" are either long-term goals that will continue to progress during subsequent report periods, or are tasks that are continuous and do not have a firm start and end date. There are three additional compliance activities that were not completed during the current reporting period for various reasons and require further explanation, which is provided in Table 2.1.

Table 2.1 Current Status of Remaining NMC Additional Compliance Activities

Item	Activity	Implementation Schedule	Status
NMC 1			
Collection System O&M – Pump Stations	In coordination with CMOM begin utilizing the pump station inspection module in gbaMS to record, track, and document pump station inspections.	30-Jun-08	This task was delayed until the annual updates to gbaMS could be instituted, which would make this transition occur more smoothly. The gbaMS upgrade was completed February 10, 2009. Staff members are currently in the process of updating and merging a significant amount of data needed to implement this process. Once complete, gbaMS will have the ability to record pump station inspections.
NMC 2			
In-Line Storage Program	Complete installation of new diversions at Main and McKinney Streets in conjunction with new development.	31-Dec-08	The construction schedule for this project was delayed due to project issues between the developer and its contractors. In addition, the decline of the economy and lending markets caused the developer to halt progress on the work due to its inability to secure tax increment financing for the development. SD1 is currently in negotiations with the developer to begin work again on the project. SD1 anticipates that the new sewer and diversion structures will continue construction starting in the summer of 2009. Progress on this project will be included as part of future NMC Annual Compliance Reports. The existing interceptor and diversions have remained fully functioning with no loss of service.
NMC3			
Grit Pits	Construct replacement diversions on Main and McKinney Street CSOs with grit sumps and floatables baffle and bar rack.	Scheduled under NMC 2	

SECTION 3. NINE MINIMUM CONTROLS

The following sections present detailed descriptions of SD1's continued compliance efforts, including its implementation of the additional activities listed in Appendix A. These compliance efforts are in direct response to the Consent Decree requirements, to the guidance provided in the CSO Control Policy and the EPA's Guidance for Nine Minimum Controls, and takes into account the additional activities listed in SD1's NMC Compliance Report.

3.1 NMC #1: Proper Operation and Regular Maintenance Programs for the Sewer System and CSO Outfalls

The purpose of this control is to establish operation, maintenance, and inspection procedures to ensure that the CSS and treatment facility will perform as effectively as possible to maximize treatment of combined sewage and reduce the magnitude, frequency, and duration of CSOs.

SD1 has continued to effectively utilize its computerized maintenance management system, GBA Master Series (gbaMS), to schedule and track its operation and maintenance (O&M) activities. The following section describes some of the major activities performed in both the separate and combined sewer system through implementation of regularly scheduled O&M activities for key assets in the CSS, as well as SD1's formal Continuous Sewer Assessment Program (CSAP).

3.1.1 CSO Diversions

Proper O&M of diversions is critical to prevent dry weather overflows (DWO) and to maximize the diversion of flow into the interceptor for conveyance to treatment.

Diversion Inspections

SD1's target frequency is to inspect each diversion once per week as well as after every rainfall event. When needed, diversion inspections and cleaning frequencies are modified in response to DWOs that have occurred. Using standardized reports from gbaMS, wet weather monitoring personnel review the actual rate of diversion inspections on a monthly basis to verify that the program goals are being met.

The information gathered from diversion inspections is used to identify the location of DWOs and measures to eliminate them from reoccurring (described further in Section 3.5.1). In 2008, SD1 equipped all diversions with monitoring blocks to better detect DWOs through visual observation.

Diversion Cleaning

Inspection records for 2008 indicate that very little debris was found during inspections, and inspectors were able to clean diversions, if needed, with simple cleaning measures.

There were only 27 work orders generated that required Customer Service crews to perform more intensive cleaning.

3.1.2 Catch Basins

Proper O&M of catch basins is needed to maintain their function and to help reduce the volume of solids and floatables (S&F) entering the combined sewers. SD1's first step in understanding the maintenance and cleaning needs for its catch basins resulted in the implementation of a Combined Sewer Catch Basin Inspection Program. This program began with a system-wide inventory and inspection of all catch basins in the CSS. Based on the results of this process, a plan for a new Catch Basin O&M program was developed. The key objectives of this program were identified in SD1's NMC Compliance Report as additional activities to perform under NMC 1, as shown in Appendix A.

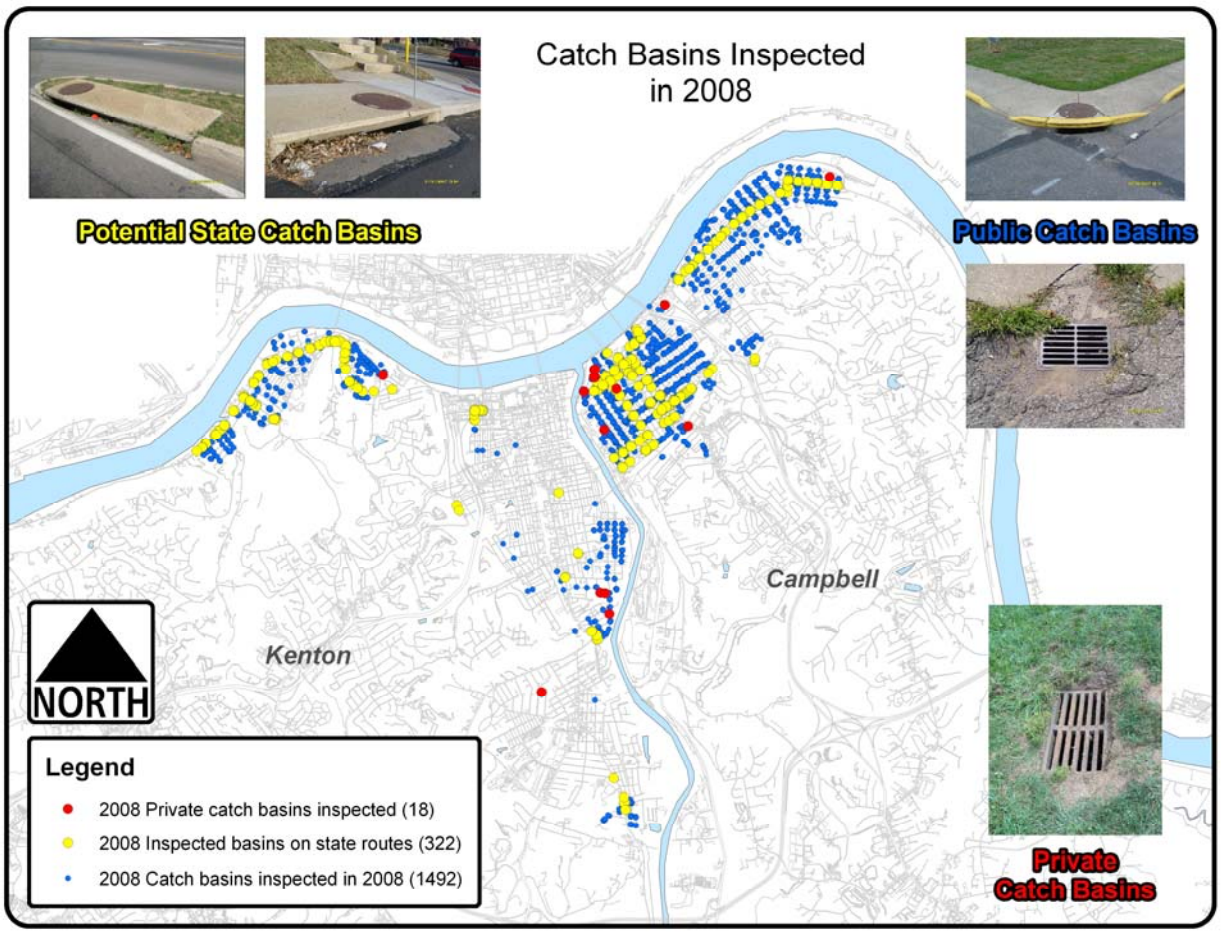
During initial implementation of the Catch Basin O&M program, SD1 determined that further measures were needed in order to reflect the overall asset management-based approach that SD1 is taking with all of its O&M efforts.

Catch Basin Inspections

One of the first steps to this revised approach included performing quality assurance and quality control measures on the data obtained from the 2007 initial system-wide inventory as part of the annual inspection of each catch basin in the CSS. To implement this process, one full-time employee was assigned to inspect each catch basin in the CSS at least once per year and to verify the inventory data. In the early stages of this inspection program, SD1 found that there were a significant number of catch basins in the CSS that are not owned by SD1. Many of these catch basins are owned by the Kentucky Transportation Cabinet (KYTC) or by private property owners.

Because these additional catch basins influence the effectiveness of SD1's measures to keep S&F from entering the CSS, the location, condition, and debris levels of these additional catch basins needed to be determined. Therefore, SD1 began identifying, mapping and inspecting the additional catch basins identified along with the catch basins owned by SD1. The catch basin inspections were organized by drainage area and the additional catch basins were inspected along with SD1 owned basins. Data, condition, and amount of debris were recorded for each inspected catch basin. The map in Figure 3.1 illustrates SD1's inspection progress throughout 2008.

Figure 3.1 2008 Catch Basin Inspections Map



From January 1, 2008 to December 31, 2008 SD1 inspected 340 catch basins owned by others and 1,492 of the 3,302 catch basins owned by SD1 (SD1 actually conducted 1,717 inspections on its own catch basins but some were inspected multiple times throughout the year due to the frequency of cleaning). Although this modified inspection program has slowed the progress of inspecting all SD1-owned catch basins on a yearly basis, the data being collected is providing a comprehensive understanding of all catch basins in the CSS. This data will allow SD1 to make informed decisions on its methods of capturing debris across the CSS before it enters the sewers. SD1 estimates that this inspection process will continue through 2010 in order to verify SD1's catch basin data and to identify and map the location of the additional catch basins owned by others. To ensure adequate and proper maintenance of SD1's catch basins throughout this process, additional personnel have been assigned to inspect all catch basins that were inspected in 2008, while one full-time person continues inspecting all remaining catch basins in the CSS not already inspected in 2008. This process will ensure that all SD1-owned catch basins are inspected on a yearly basis as well as continuing the inventorying and mapping of the additional catch basins identified. Once complete, SD1 will be able to better assess the frequency and need for inspections and cleaning of all the catch basins in the CSS.

Catch Basin Cleaning

From January 1, 2008 through December 31, 2008, SD1 completed 1,210 cleaning work orders on a total of 1,062 catch basin structures and removed 596 cubic yards of debris. In addition, SD1 began developing a structure for a cost-effective and proactive cleaning program that would provide an appropriate schedule for routine cleaning based on the structure's need. Along with the catch basin retrofit program to trap solids & floatables (discussed in Section 3.6.2), SD1 implemented a pilot study in 2008 in three areas to assess cleaning frequency needs. The pilot study is currently ongoing and the results will provide recommended cleaning frequencies for catch basins. This approach will allow SD1 to more effectively and proactively prioritize and implement the necessary cleaning and maintenance required to ensure the effectiveness of the catch basins in keeping S&F out of the CSS.

In addition, SD1 met with KYTC in November 2008 to discuss the findings of the inspections made on KYTC-owned catch basins. KYTC expressed an interest in collaborating with SD1 to develop a program in which SD1 would be reimbursed to clean and maintain the catch basins owned by KYTC. An agreement between SD1 and KYTC for this work is currently being drafted and discussions are currently underway so that cleaning work may begin in 2009.

SD1 is also evaluating the opportunity to install catch basins upstream of the point of connection to the CSS to trap S&F from private basins. In some instances this approach has been found to be more effective for SD1 to keep S&F from private basins out of the CSS rather than taking enforcement action. However, SD1 will pursue enforcement action, as needed, on privately owned catch basins.

3.1.3 Grit Pits

Proper O&M of grit pits is needed to prevent short circuiting that can cause grit and sediment to pass through and settle within the interceptor or cause re-suspension of previously captured grit and sediment. During the period of January 1, 2008 through December 31, 2008, SD1 removed approximately 358 cubic yards of grit from its interceptor sewers through regularly scheduled cleanings of SD1's three grit pits in Bromley, Newport, and Bellevue. In addition, construction of a fourth grit pit was completed in the fall of 2008 in Covington. The amount of grit and sediment removed from the interceptor is documented in gbaMS in order to evaluate the effectiveness of the grit pit operation.

3.1.4 Pump Stations

Proper O&M of the pump stations in the CSS is critical since they convey flow from one portion of the interceptor to another and provide flood protection of the local cities during elevated river levels. Loss of an interceptor or flood pump station can result in significant dry and wet weather overflows.

Employee Training

In 2008, SD1 was able to secure grant funds to provide pump station maintenance personnel additional specialized job training. Personnel attended Gateway Community College and completed the Industrial Maintenance Electrical Principles class. SD1 will continue to seek grant funds to support additional training.

Critical Assessment of Stressed Pump Stations

In coordination with SD1's Capacity, Management, Operations and Maintenance Program, a list of stressed pump stations was compiled during 2008. An in-house engineer was then selected to perform a critical assessment of the identified stressed pump stations.

To begin the assessment, the stressed pump stations were ranked and prioritized based on an overall condition score, which took into account the following maintenance factors:

- Electrical & Instrumentation equipment
- Pumps and valves
- Pipes and guide rails
- Wet well
- Capacity and Inflow/Infiltration
- Stations and grounds
- Spare parts
- Grease/odor control
- Historical reoccurring issues and general comments

The first phase of the critical assessment focused on the forty highest priority pump stations as indicated by the condition scores. A team of personnel conducted site visits at each of the forty pump stations in order to physically identify and assess the problems and potential solutions. Several meetings were conducted with internal pump station maintenance and operating personnel in order to identify specific problems, discuss potential solutions and scopes of work, and assign departmental tasks and action items, including a schedule for completion. Throughout this process, SD1 coordinated with external consulting engineers to perform testing and further evaluation to determine the preferred solution for the identified pump station deficiencies.

SD1 will continue its efforts in developing a proactive schedule for addressing the identified deficiencies at each pump station in the combined and separate sewer systems, and establishing a yearly asset management-based budget to support this plan and the regular O&M of SD1's pump stations.

3.1.5 Continuous Sewer Assessment Program (CSAP)

The purpose of SD1's CSAP is to utilize a proactive and coordinated asset management-based approach to assessing the sewer infrastructure's condition and life cycle in both the CSS and separate sewer system, and managing and prioritizing the

cleaning and rehabilitation of the sewers and associated manholes. A detailed process diagram of the entire program can be found in Appendix B.

As reported in SD1's 2008 CMOM Annual Report, SD1 is using a combination of both internal and external resources to implement the CSAP. In response to the required activities of the CSAP and other Consent Decree-related tasks, SD1 hired eight new Collection Systems customer service crew members and purchased three new closed circuit television trucks, which supports a total of seven in-house crews. SD1 also entered into contracts with Sewer Optical Services and SWS Environmental to perform closed circuit television inspections, Inframetrics to inspect pipes in the CSS using the Aquazoom technology, and AMTEC to perform sonar inspections of sewers and interceptors where water levels precluded closed circuit television inspections.

To help coordinate these activities, one employee in the Capital Improvement Program Department was assigned as the in-house staff member to filter all work orders and serve as the liaison between the Collection Systems Department and Capital Improvement Program Department. In addition, two full-time personnel in the Capital Improvement Program Department are managing the CSAP and contractor inspection crews.

Table 3.1 summarizes the work completed by both internal and external crews under the CSAP for both the CSS and separate sewer system from January 1, 2008 to December 31, 2008.

Table 3.1 CSAP Activities
(January 1, 2008 through December 31, 2008)

Repairs and Replacements	Total
Sewer Line Replacements	67
Sewer Line Point Repairs	193
Manhole Repairs	483
Manhole Replacements	67
New Manhole Installations	17
Inspection and Cleaning	
Feet of Line Inspected using Closed Circuit Television	1,334,253
Feet of Line Inspected using Aquazoom	138,608
Feet of Line Inspected using Sonar	13,747
Total Feet of Sewer Line Inspected	**1,486,608**
Total Feet of Sewer Line Cleaned	706,441

Data Integration & Automation

SD1 has continued its efforts to automate the CSAP to eliminate the need for manual data entry and manual work order generation. The programming of the CSAP process diagram logic in an interim database is complete, and the interim database is fully functional. The final CSAP database development and automation that will communicate directly with gbaMS is nearly complete. The final CSAP database

programming logic is currently being tested against the interim database for debugging to ensure that the pipes are scored accurately and the appropriate next action is generated before putting the final CSAP database into operation. Once the final CSAP database is in operation, automatic next action, work order generation, and work scheduling will be possible. In addition, SD1 is currently updating the way data is stored and labeled in gbaMS to align better with the CSAP and corresponding next actions.

3.2 NMC #2: Maximum Use of Collection System for Storage

The purpose of this control is to maximize the use of the collection system by making relatively simple modifications to the CSS to enable the existing sewers to store wet weather flows until capacity is available in the downstream collection and treatment systems in order to reduce CSO volume.

3.2.1 Adjustment of Regulator Settings

In 2008, SD1 began implementing an action plan to address diversions susceptible to DWOs (described in Section 3.5.1). As part of this plan, the regulator settings upstream of those diversions were evaluated and adjusted, where appropriate, to ensure maximization of flow from the collection system to the interceptor. Adjustments that have been made are identified in Appendix C.

3.2.2 Addition of Tide Gates at Outfalls

SD1 investigated the feasibility of preventing the inflow of river water into the CSS during elevated river levels as part of its River Water Intrusion Mitigation Feasibility study (discussed in Section 3.5.1). The study included an assessment of each outfall and the type of improvements needed to prevent inflow from the river into the CSS. The improvements generally identified the need to install duckbill-type check valves on the CSO outfall pipes to provide passive check valve service. The results from this study are being used to create a long-term improvement program to be implemented in coordination with SD1's Watershed Plans. SD1's Watershed Plans will contain more information on the study conducted and the recommended river water intrusion program.

3.2.3 In-Line Storage Analysis

SD1 continued its evaluation and field investigations of the CSS to determine which targeted locations could be utilized to maximize in-line storage and provide system-wide benefits in overflow reduction. SD1's calibrated and validated model was a critical tool for maximizing the benefits of targeted in-line storage while minimizing the potential risks associated with fixed weirs that raise the hydraulic grade line in the incoming trunk sewers during rain events.

Based on the analysis, and consideration of local conditions at locations where eight feet of freeboard could not be provided but risk of basement or surface flooding is low

(several locations justified relaxation of the freeboard criteria), 19 locations were selected as having in-line storage potential. It is important to note that a number of these locations were identified through NMC related programs as known or potential DWO locations and thus the control measures at those sites also provide protection during dry weather.

The location and current status of these projects are as listed in Table 3.2 and a map of the project locations is shown in Figure 3.2. In Table 3.2, baseline numbers include no Ohio River Influence and no changes to the Bromley Wet Well settings and "With Weir" numbers include no Ohio River Influence and modified Bromley Wet Well settings (see Section 3.4.2).

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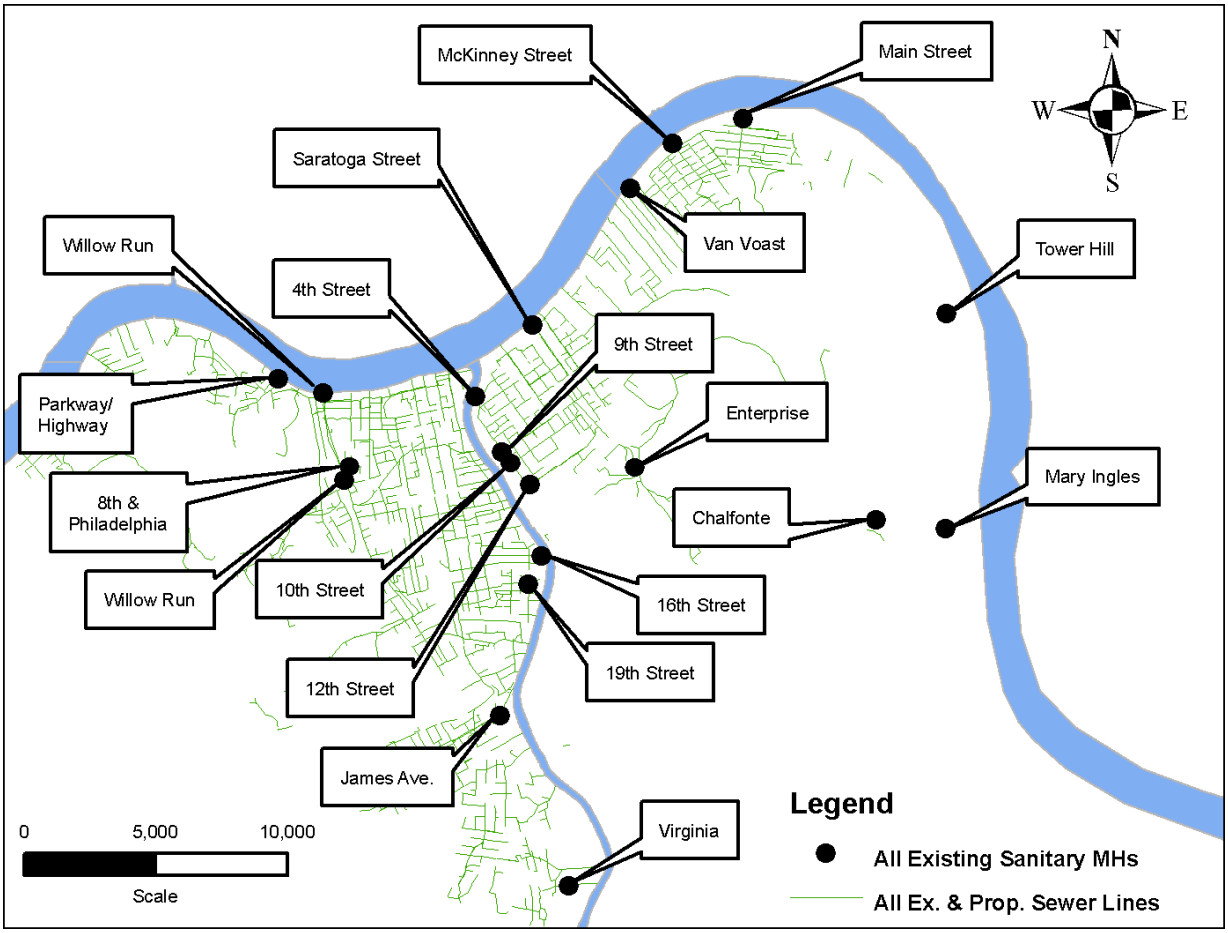
Table 3.2 In-line Storage Program Summary

Diversion	Name	Type of Control	Status	Baseline Activations	Baseline Volume (MG)	"With Weir" Activations	"With Weir" Volume (MG)
0820001	4th Street	Static Weir	Installed	65	71.38	62	69.99
0840005	9th Street	Static Weir	Installed	65	25.69	2	0.15
0840027	10th Street	Static Weir	Installed	52	2.03	57	3.54
0910064	James Avenue	Static Weir	Installed	100	153.74	66	132.49
1480129	8th & Philadelphia	Static Weir	Installed	77	624.76	76	547.98
1480116	Willow Run Static Weir	Static Weir	Installed				
1490027	Parkway/ Highway	Static Weir	Installed	36	11.47	9	1.60
0930066	19th Street	Static Weir & Baffle	Installed	62	28.84	62	28.84
0770006	Saratoga Street	Static Weir	Installed	65	6.55	26	2.28
0930014	16th Street	Static Weir	Installed	3	0.04	0	0.00
0730009	12th Street	Static Weir	Installed	75	2.44	75	1.93
0730028	12th Street	Static Weir	Installed	81	8.31	81	7.17
1880021	Virginia	Static Weir	Installed	21	2.80	16	2.45
0690008	Enterprise	Static Weir	Planned	4	0.11	4	0.07
0600037	Van Voast	Static Weir	Installed	3	0.12	2	0.01
0330099	Tower Hill	Elevated Overflow Pipe	Installed	6	0.15	4	0.08
0340044	Mary Ingles	Elevated Overflow Pipe	Installed	31	1.00	4	0.04
0570030	Main Street	Static Weir & Baffle	Planned[1]	56	36.29	5	2.79
0570011	McKinney Street	Static Weir & Baffle	Planned[1]	62	49.69	18	24.58
	Other Diversions				601		668
				Total	**1,623**		**1,491**
						Total Reduction	**132**

[1] *See section 2 for anticipated schedule for construction.*

In a typical year, system-wide, the static controls are projected to lead to a 132 MG reduction in CSO volume. Additionally, SD1 will continue to evaluate in-line storage as opportunities through ongoing asset management activities and as opportunities to partner with developers arise.

Figure 3.2 Locations Proposed for In-Line Storage



Included in the 21 locations noted above, are the two in-line storage locations at the Main Street and McKinney Street diversions that were created as part of SD1's efforts to identify opportunities for collection system upgrades in concert with new development. Efforts are currently underway to replace 8,000 ft of the existing 27-inch Ohio River Interceptor with approximately 6,600 linear feet of 84-inch and 1,300 linear feet of 110-inch diameter pipe to provide 2.2 million gallons (MG) of in-line storage. (See Section 2 for the current status of this project.)

3.3 NMC#3: Review and Modification of Pretreatment Requirements

The purpose of this control is to minimize the impacts of discharges into the CSS from non-domestic sources during wet weather events, and to minimize CSO occurrences by modifying inspection, reporting and oversight procedures within the approved pretreatment program. SD1's efforts to inventory and characterize non-domestic dischargers, further evaluation and possible revisions to the permit requirements of the Significant Industrial Users (SIUs) in the combined sewer area, identification and analysis of the non-significant users, and coordination activities are described in the following section.

3.3.1 Permitting

Standard Permits

In 2008, SD1 permitted two new SIUs: Augur Metal Products in Independence (Categorical Industrial User) and Northbend Biofuels in Burlington (Non-categorical Industrial User). Neither of these industries is located within the CSS. With these additions, SD1 has a total of 56 permitted SIUs in its collection system.

Compliance Monitoring

In 2008 SD1 approved the following short term specialty discharges:

- NPT Landfill - Underground Storage Tank
- GES Environmental - Underground Storage Tank
- APEX - Underground Storage Tank
- KMS Plumbing - Unusual Discharge (Floor Cleaning)
- Ky Waterworks - Soil Remediation Project
- St. Luke Hospital - Unusual Discharge (Glycol)
- Camco - Unusual Discharge (Misc)

Enforcement

SD1 issued the following enforcement actions during 2008:

- 47 Notice of Violations (The only violation in the CSS was issued to Louis Trauth Dairy due to a pH violation detected during one of the semi-annual sampling events.)
- $15,628 in administrative fines were issued for the 47 Notice of Violations
- 1 Administrative Order issued to Club Chef for pH violations

Evaluation of SIU Permits

SD1 conducted an initial desktop analysis to evaluate the potential for SIUs to contribute to CSO impacts. Of the seven total SIUs tributary to the CSS, two (Interplastics and Poder Kote Inc.) discharge only sanitary waste and one (McGinnis, Inc.) is a batch discharger that only discharges to the CSS with SD1's approval during dry weather. At the beginning of the analysis there were four SIUs (Louis Trauth Dairy, Northern Kentucky Water District, Newport Aquarium, and Imperial Sugar) permitted to discharge at any time, including times during wet weather. The analysis identified potential concerns with the permit limits of specific pollutants that could be discharged by the four SIUs during wet weather. Therefore, SD1 developed a synoptic sampling program to further investigate if any of these SIUs contribute to CSO impacts.

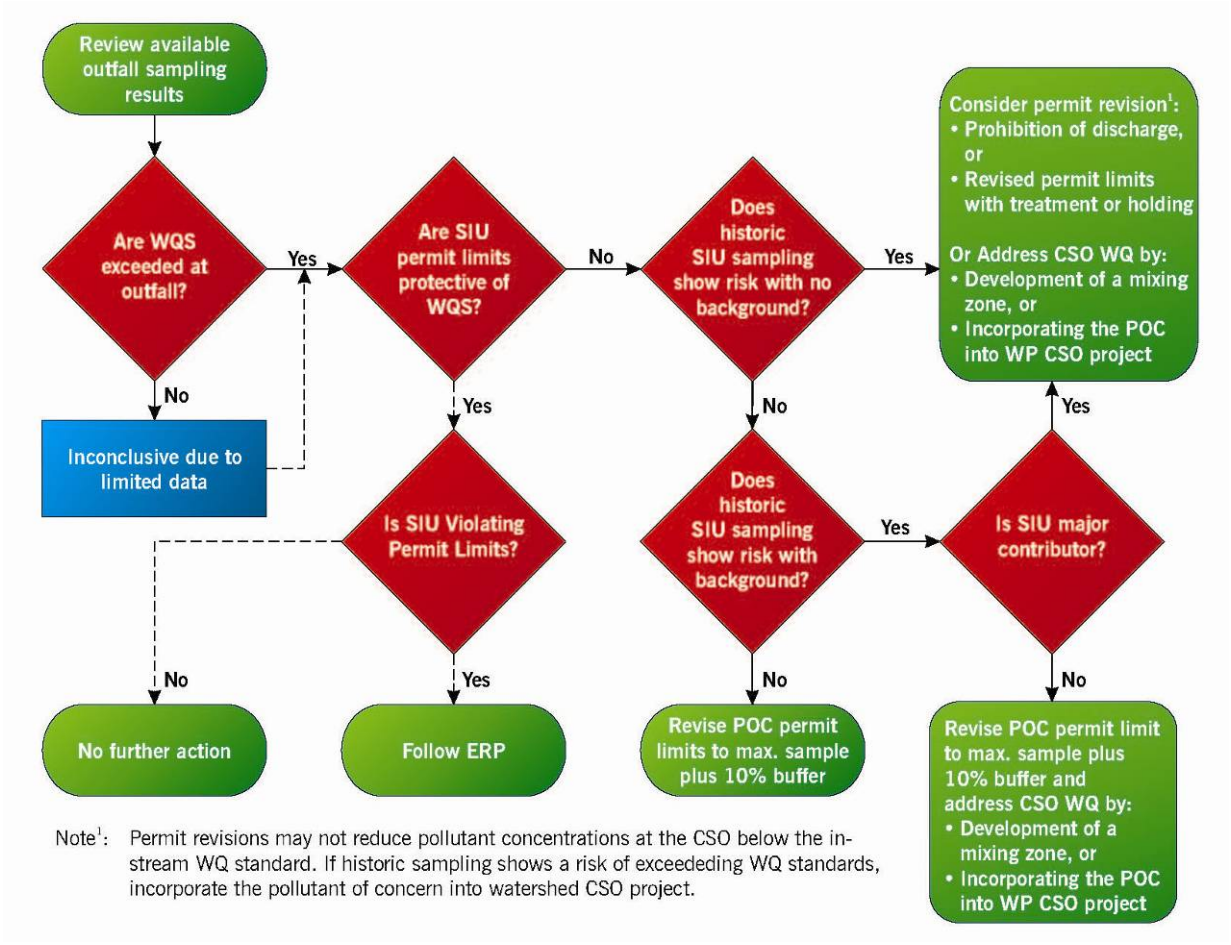
Synoptic Sampling Program

The synoptic sampling began in January 2008 and continued in two phases through December 2008. During that time, flow at the affected CSOs were synoptically monitored and sampled at the tributary industry. The collected data underwent analysis in early 2009.

Existing water quality data was first evaluated to determine if pollutant concentrations in the CSOs were above the in-stream water quality standards. Data from 1996 was

originally used for this purpose as well as the outfall sampling that was completed as part of the synoptic sampling (see Section 3.9.1). The data showed that there were high levels of some pollutants in the CSOs. Further analysis was then conducted to determine if the SIU permit limits are protective of water quality. A flow chart outlining this analysis process is shown in Figure 3.3.

Figure 3.3 Analysis Process to Determine Potential for Water Quality Impacts Due to SIUs in the CSS



SIU Analysis Findings

The CSO outfall water quality sampling data from the synoptic sampling program shows that each of the five CSOs sampled had at least one event where copper, lead, selenium or zinc concentrations were above the in-stream water quality standards. All samples for cadmium and silver were below detection limits. This data is consistent with earlier water quality sampling data that was collected in 1996. It is also consistent with results of additional characterization sampling completed during 2008 at CSO outfalls without tributary SIUs. This suggests that high metals concentrations may not be related to a specific industry.

Prior to the synoptic sampling program, SIU permit limits and historical (2002 through 2007) sampling results were analyzed to determine if the permit limits could be

considered protective of water quality. This analysis assumed that there was no background concentration of these pollutants in the combined sewage ahead of the SIU discharge. Table 3.3 shows which SIU permit limits flagged as potentially needing revision.

Table 3.3 Permit Limits that Flagged as Potentially Needing Revision

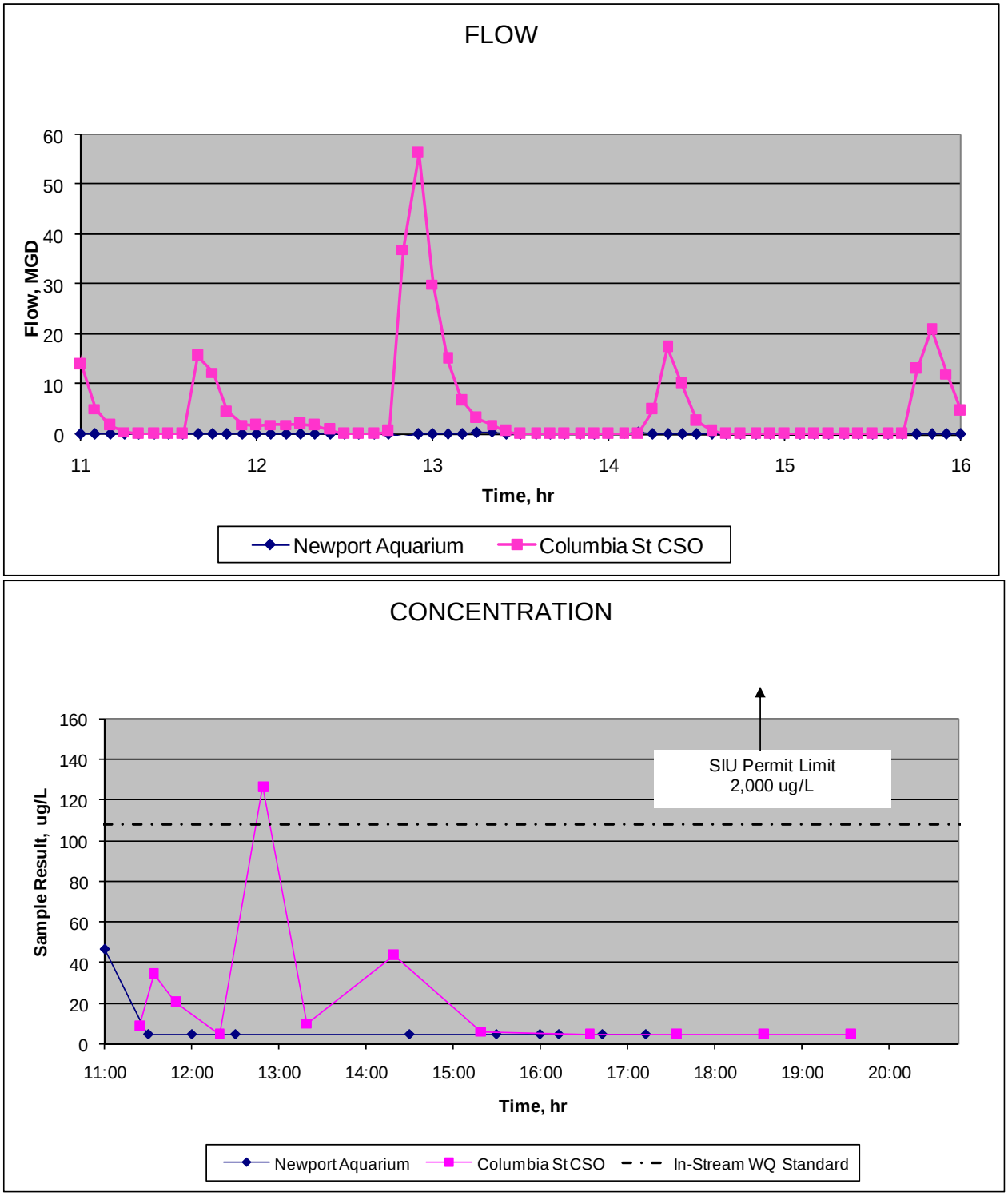
SIU	Permit Limits Identified for Potential Revision
Louis Trauth Dairy	Cadmium, Copper, Selenium, Silver & Zinc
Northern Kentucky Water District	Cadmium, Copper, Lead, Nickel, Selenium, Silver & Zinc

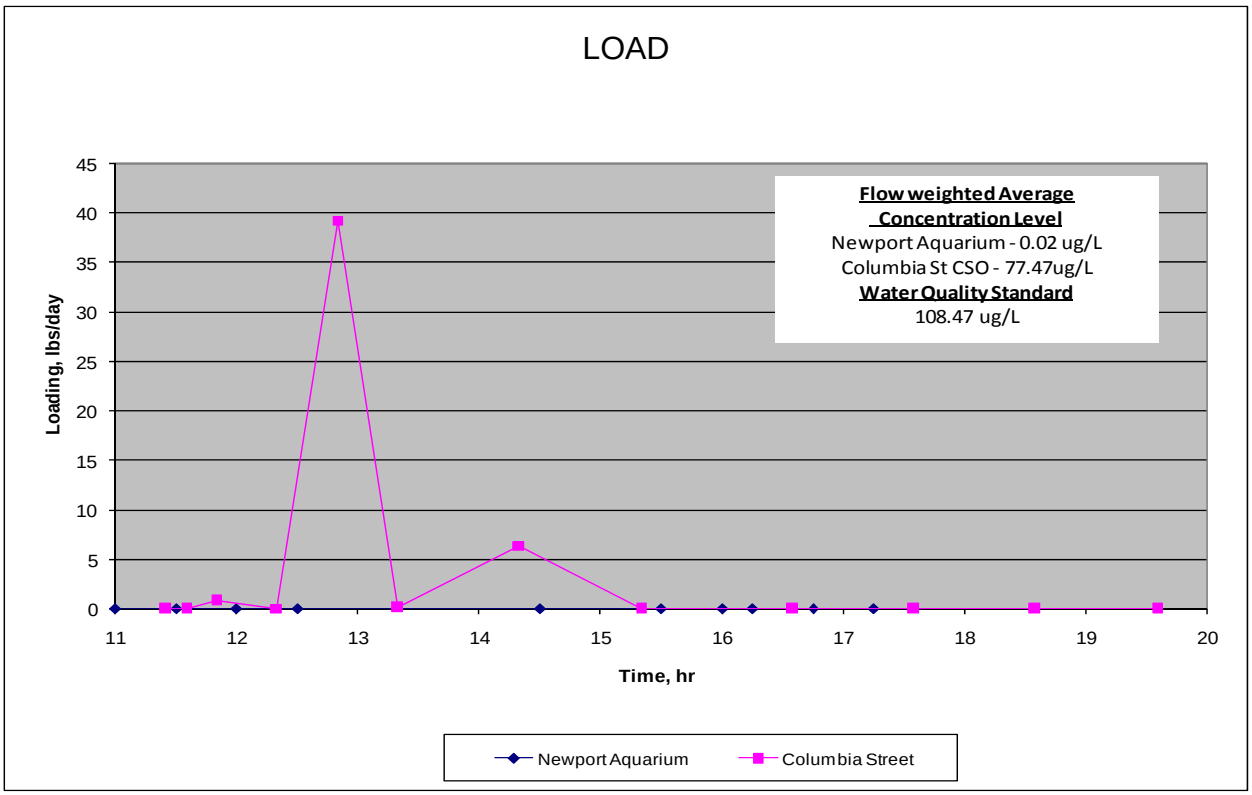
Where a concern with the permit limits was identified, a similar analysis was completed using the historical maximum sample concentrations, which in some cases were as much as 10 times lower than the existing permit limit. If the maximum sample concentration showed a risk with no background concentration in the combined sewage, the SIU discharge could directly lead to concentrations in excess of the in-stream water quality standard in the outfall during small wet weather events. This analysis indicated a potential risk for cadmium, copper, and zinc from the Northern Kentucky Water District discharge. Subsequently, Northern Kentucky Water District modified their treatment process such that they only need to discharge to the collection system intermittently and SD1 modified Northern Kentucky Water District's permit to require SD1 permission to discharge during wet weather only under extreme conditions. Louis Trauth Dairy's sampling results did not show a risk.

Based on the above analyses, only Northern Kentucky Water District was shown to be a direct risk to water quality at the outfall. However, it was also confirmed that Louis Trauth Dairy, Newport Aquarium, and Imperial Sugar were contributing some portion to already high levels of some pollutants at the outfall. Therefore, the synoptic sampling results were used to develop a background concentration of pollutants of concern in the trunk sewers serving these industries, which was utilized along with modeled and monitored flows to attempt to determine if any of these SIUs are a major contributor to high levels of these pollutants and if a course of action for dealing with the pollutants is needed.

Monitored flows, and sampled pollutant concentrations collected as part of the synoptic sampling program were utilized to develop pollutant loads from the industry and at the outfall. Figure 3.4 shows graphs prepared for Newport Aquarium and the Columbia Street CSO for lead during synoptic sampling event number seven. In this example, the flow graph shows that flow from the CSO is much greater than the discharge from Newport Aquarium. The concentration graph shows that the concentration of lead in the SIU discharge is above 40 micrograms per liter before the CSO event starts, but drops to less than 10 micrograms per liter for the duration of the event. Because of the combination of lower flow and concentration, the load graph shows that the load from the SIU is much less than the load at the outfall. Additionally, even during a CSO event, only a portion of the flow from the industry is discharged with the CSO.

Figure 3.4 Newport Aquarium and Columbia Street CSO Flow, Lead Concentration and Lead Load Graphs for Event 7 (6/3/2008)





The remainder is diverted to the interceptor and conveyed to the treatment plant for additional treatment. Similar evaluations were completed for each industry where synoptic sampling results showed the concentration of a particular pollutant in the CSO was above the in-stream water quality standards. In every case, it was found that the SIU was not a significant contributor to the concentration of a particular pollutant at the outfall.

This analysis resulted in recommendations for particular SIUs and pollutants that are currently being implemented. As described above, the permit for the Northern Kentucky Water District was amended during 2008 so that there will be no wet weather discharges to the CSS unless permission is granted, under extreme conditions, by SD1. Individual pollutant permit limits have been evaluated for each of the remaining three SIUs, and where necessary, permit limits may be revised to minimize the potential for these SIUs to contribute to CSO impacts. Additional measures to address high levels of some pollutants in the CSOs are now being evaluated as part of SD1's Watershed Planning process.

3.3.2 Investigation

Non-Significant User (NSU) Evaluation

In addition to the increased monitoring of SIUs, SD1 has also continued to inventory and characterize NSUs over the past year. In May 2008, SD1 completed an audit of the Non-Domestic Dischargers within the service area. These locations were mapped to determine if there were clusters of NSUs that required further evaluation. While a single

industry may not have a measurable impact on SD1's system, a group of NSUs may discharge like pollutants that, in total, could potentially contribute to CSO impacts. Table 3.4 indicates the six clusters of NSUs identified to discharge like pollutants. Table 3.5 highlights the pollutants of concern and the corresponding sources.

SD1 contacted the dental and funeral home establishments in the Winchester and 9th Street clusters in order to meet and conduct facility inspections. During the meetings and facility inspections best management practices were discussed, informational materials were distributed, and pretreatment was evaluated. The establishments in the identified clusters were found to be using the best management practices and no concerns were noted. The dentists for example, had traps to catch metal fillings and were disposing of other materials properly.

Table 3.4 NSU Clusters

Outfall	Outfall ID	Cluster NSUs
Winchester	0880081	Dentists (2) Dental Lab (1) Funeral Homes (2)
9th Street	0840005	Dentists (2) Funeral Homes (2) Hotels/Motels (2)
Columbia Street	0790084	Hotels/Motels (1) Car Wash (1)
Madison	1440212	Hotels/Motels (2)
Main Street	1470093	Hotels/Motels (1) Laundry (1)
Willow Run	1480187	Hotels/Motels (4)

Table 3.5 NSU Cluster Pollutants of Concern

NSU Type	POC	Origin
Dentist/Dental Lab	Mercury Silver Lead Dehydes • Formaldehyde • Glutaraldehyde	Elemental & Amalgam X-ray Fixer & Undeveloped Film Foil X-ray packets & Lead Aprons Chemical Disinfectants
Funeral Home	Formaldehyde Phenol	Equip. Disinfection & Embalming Embalming
Hotel/Motel, Laundry, Car Wash	Surfactants Phosphates	Detergent Sequestering Builder

SD1 is currently inspecting and evaluating the remaining NSU clusters listed in Table 3.4 above, and expects to be complete with this list in the second quarter of 2009. SD1 is also in the process of creating a best management practice brochure for distribution

to NSUs in the CSO areas and will be distributing those to laundries, hotels, and other similar businesses on an as-needed basis.

Should concerns be found in the future with clusters of NSUs, SD1 may require pretreatment at the establishments or may identify a suitable sampling location downstream of the cluster and perform additional sampling to determine if problem pollutants are actually present. If a problem pollutant is identified, synoptic sampling at the cluster establishments and the outfall would be completed to identify which establishment requires additional corrective action.

3.3.3 Coordination

SD1 created the informational piece in Appendix D to educate local fire departments on who to contact in the event of an industrial fire or spill. Throughout 2008, postcards were distributed to the members of the Northern Kentucky Emergency Planning Committee, including the Emergency Managers from Boone, Campbell, and Kenton Counties. The following local fire departments were provided the information: Erlanger, Covington, Hebron, Alexandria, Point Pleasant, Union, Ft. Wright, Burlington, Newport, and Central Campbell.

SD1's safety personnel will periodically issue reminders and continue to distribute the information to other local fire departments, the Northern Kentucky Fire Chiefs Association, and Northern Kentucky Hazmat and Greater Cincinnati Hazmat Units.

3.4 NMC#4: Maximization of Flow to POTW for Treatment

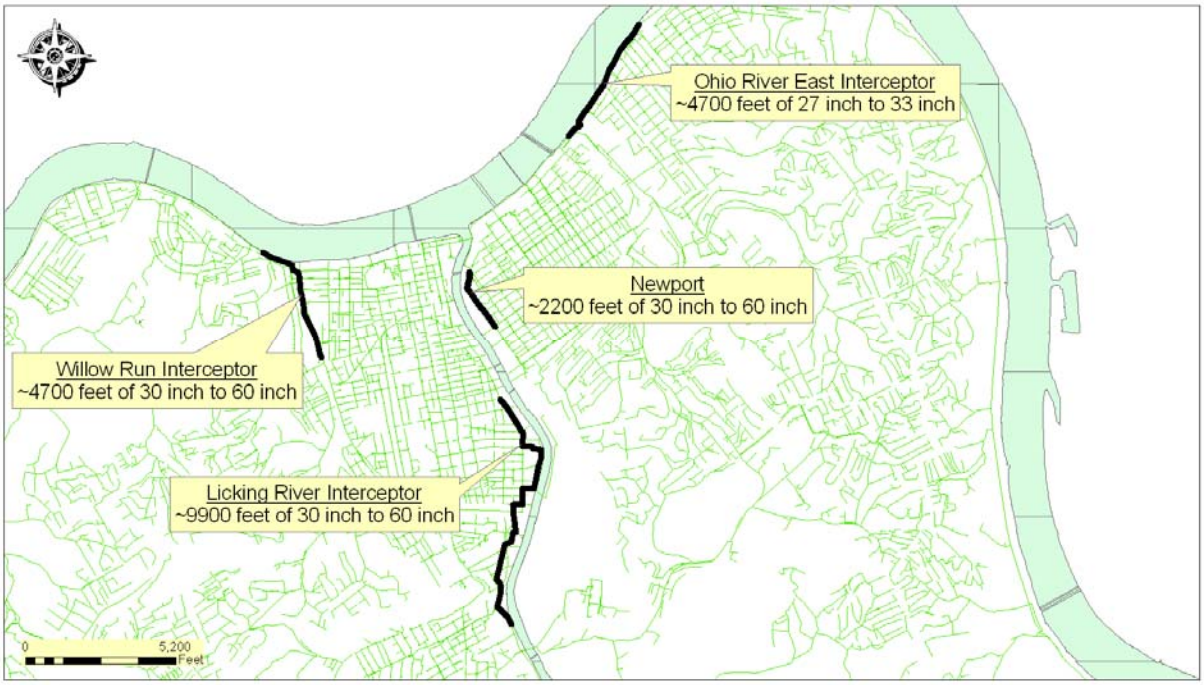
The purpose of this control is to maximize flow to the treatment plant by making simple modifications to the CSS and treatment plant to enable as much wet weather flow as possible to reach the treatment plant, thereby minimizing the magnitude, frequency, and duration of CSOs that flow untreated into receiving waters.

3.4.1 Collection Interceptor

In September 2007, SD1 conducted an evaluation and assessment of its interceptor sewers using an integrated closed circuit television and Sonar inspection. The results of this investigation found that large amounts of grit, rock and debris were significantly reducing the capacity and proper operation of the Willow Run, Ohio River East, Licking River, and Newport interceptors. In an effort to re-gain the capacity and reduce CSOs, these interceptors were selected for cleaning as part of SD1's Targeted Sewer Cleaning Program, as shown on the map in Figure 3.5.

In July 2008, SD1 awarded a contract to Doetsch Industrial Services to clean and televise approximately 21,500 linear feet of pipe in these specified areas and to gather defect data to be used for post cleaning rehabilitation analysis and planning.

Figure 3.5 Targeted Sewer Cleaning Program Vicinity Map



Work began in September 2008 and continued until inclement weather conditions and elevated river levels occurred in December. Continued work is scheduled to commence once weather conditions improve and is anticipated to begin again in early summer of 2009. Included in Appendix E is a collection of photos that highlight the following progress made through December of 2008:

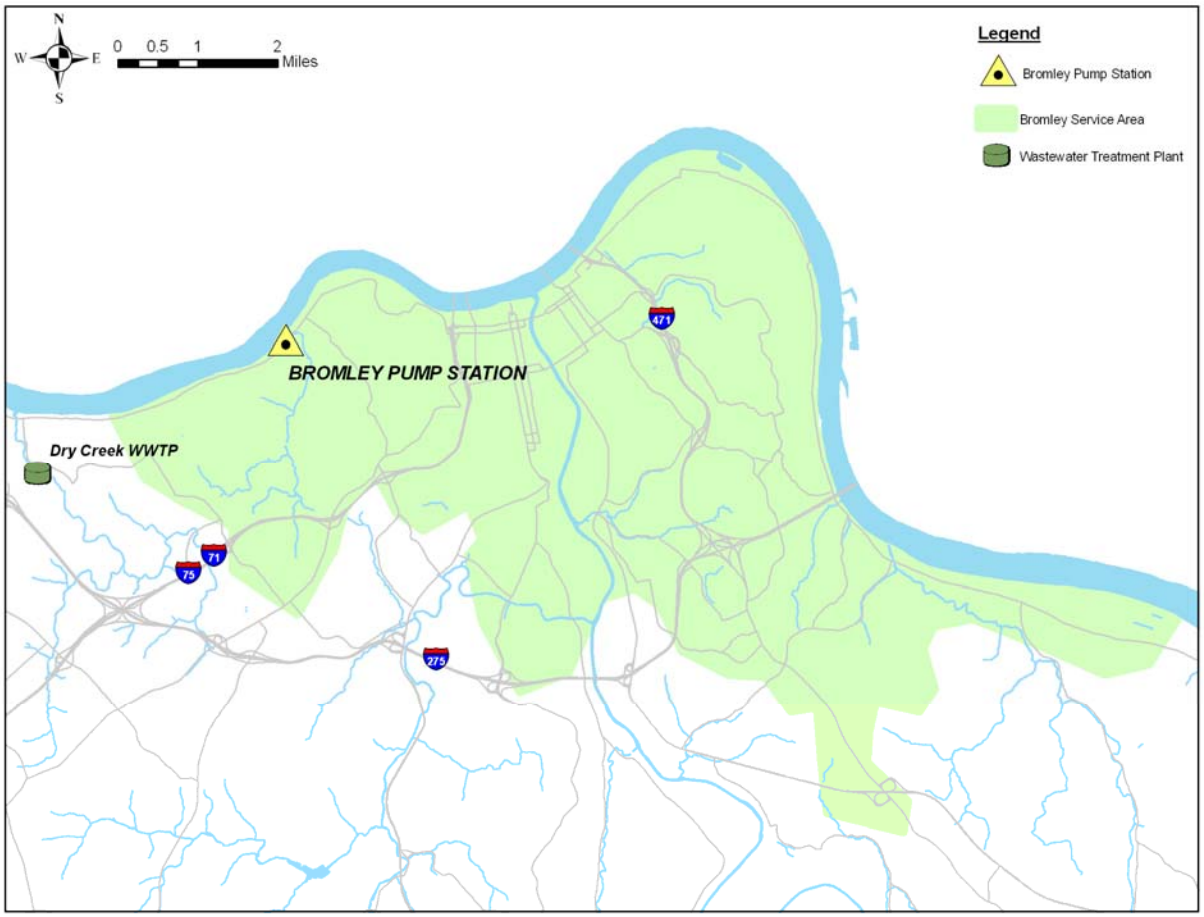
- Willow Run interceptor
  - 308 tons of debris removed
  - 4,000 feet cleaned and inspected
- Licking River interceptor
  - 452 tons of debris removed
  - 7,792 feet cleaned
  - 5, 480 feet inspected
- Newport interceptor
  - Began removing heavy material by hand from the 66” pipes

Continued inspection and cleaning of SD1’s interceptors will be done in accordance with SD1’s CSAP as demonstrated in the process diagram in Appendix B.

3.4.2 Bromley Pump Station

The Bromley Pump Station is the largest pump station that SD1 operates and conveys all flows tributary to the CSS directly to the Dry Creek Waste Water Treatment Plant. Figure 3.6 shows the outline of the area serviced by the Bromley Pump Station.

Figure 3.6 Bromley Pump Station Service Area



Bromley Pump Station has four constant speed pumps which can be operated in multiple combinations. Two pumps are 900 HP (the "large" pumps) and two pumps are 300 HP (the "small" pumps). To establish the capacity of the station, pump testing was completed in August 2008. At the time of testing, all four pumps were not run together due to potential impacts of slug load flows to the Dry Creek Waste Water Treatment Plant. Table 3.6 shows the pump test results.

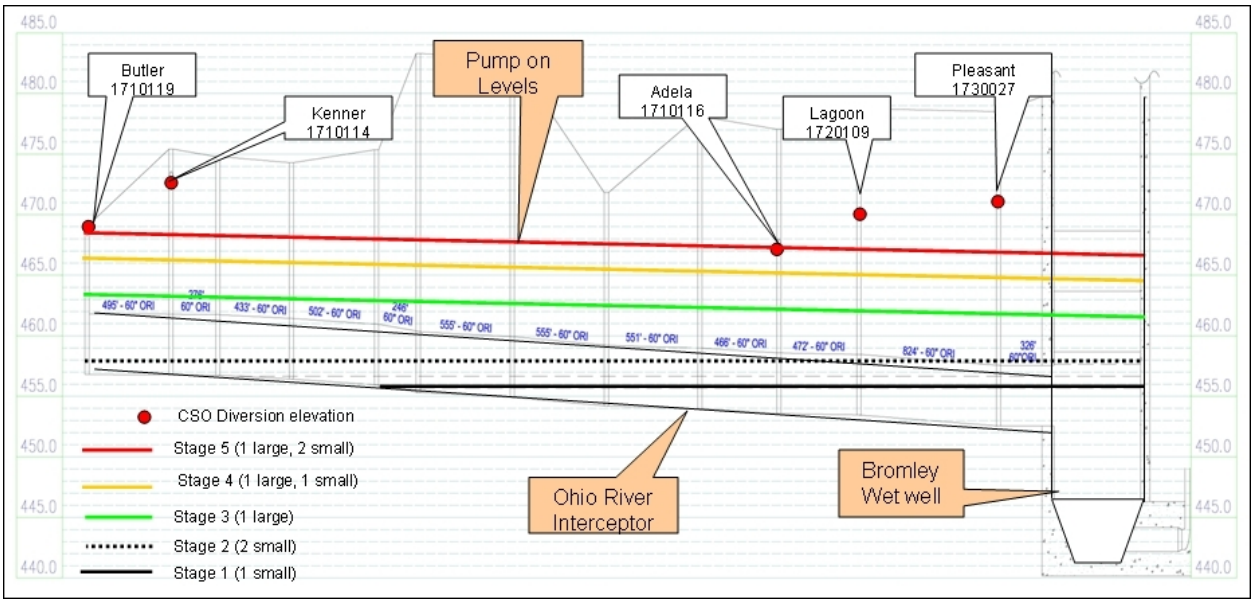
Table 3.6 Bromley Pump Station Tested Capacities

Operation Condition (pumps on)	Modeled Output (MGD)
1 small	9
2 small	17.5
1 large	25.4
1 large, 1 small	30
1 large, 2 small	33.5 (FIRM)

With the current wet well settings at Bromley pump station, the hydraulic grade line in the upstream interceptor is above the crown of the pipe before the first small pump turns on. Additionally, the wet well level required to operate one large pump is higher than several upstream diversions. During higher wet weather flows the hydraulic gradeline backs up in the interceptor and causes overflows to occur due to backflow through the CSO diversions. Figure 3.7 shows the relationship between the wet well settings for pump operation, the interceptor, and the upstream diversion elevations. The Figure shows that the CSOs are already overflowing from the interceptor before the remaining pumps turn on at the Bromley Pump Station.

These current wet well settings were developed to reduce the potential for excessive vibration and cavitation in the pumps. This occurs because these pumps require a significant amount of "suction head". Suction head occurs on the suction side of a pump, where the pump action creates a low pressure zone. In some cases, the pressure can drop low enough that the vapor pressure of the fluid can be reached at the ambient temperature, thus resulting in boiling (bubble formation) of the fluid. Boiling in turn leads to reduced efficiency of the pumps and can cause pump cavitation and damage.

Figure 3.7 Bromley Pump Station Wet Well Settings



An evaluation was then conducted to assess the potential benefit and feasibility of lowering the settings to pump more flow at lower water levels. The evaluation included assessments of:

- Potential cavitation due to Net Positive Suction Head or NPSH
- Potential for inlet vortexing
- Bar screen limitations
- Cycling issues

Impacts at Dry Creek Wastewater Treatment Plant

The evaluation used the hydraulic model and a traditional desktop hydraulics analysis to assess hydraulic issues. The results of the desktop analysis showed that the lower stage settings could not be lowered due to vortexing concerns. However, there was some merit in lowering the "On" settings for the higher stages. The hydraulic model was then used to evaluate the potential benefits of lowering the pump "On" settings as well as lowering the pump "Off" settings. The modeling showed that lowering the wet well settings could potentially reduce CSO volume by nearly 80 MG in a typical year. For comparison, it would take approximately 6 MG of storage to achieve the same level of benefit that this change provides. As a clearly cost-effective option, the "On" setting adjustments were implemented and are currently being tested during wet weather to evaluate the effects on the Dry Creek Wastewater Treatment Plant. A concern with the new pump operation is the effect at the Dry Creek Wastewater Treatment Plant headworks. Under certain conditions, which depend on the type of rainfall, the bar screens can be quickly blinded and cause flooding. Since the new Bromley Pump Station wet well settings will increase the chance of this occurrence, additional attention is needed during rainfall events to prevent operational problems. The actual increased risk of flooding will not be known until these new settings are in operation for some time. Therefore, there will potentially be modifications to the current settings as the overall operations are tested.

Figure 3.8 shows the backwater in the interceptor upstream of the Bromley Pump Station with the new "On" settings for all stages that include a large pump. It shows the higher stages turning on long before the level reaches the diversion elevations. Figure 3.9 shows an example of the model-predicted flow before and after the wet well settings change. The figure shows how much more flow is being pumped with the new settings.

Figure 3.8 New "On" Settings for the Bromley Pump Station

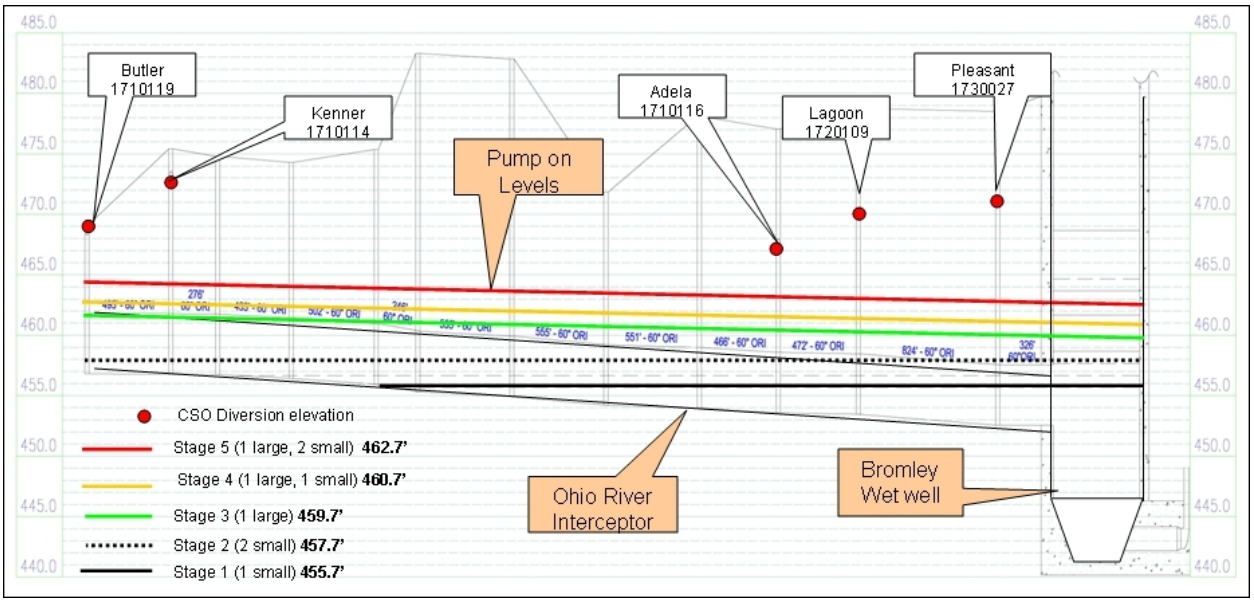
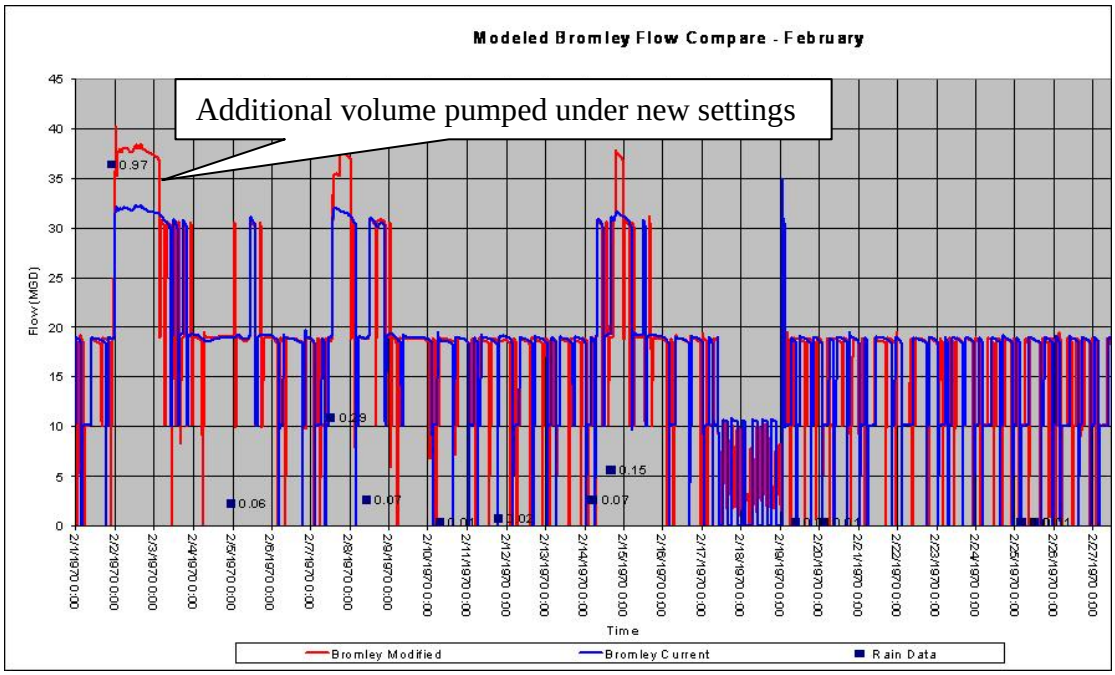


Figure 3.9 Model Output Before and After Bromley Pump Station Wet Well Changes



3.5 NMC#5: Elimination of CSOs during Dry Weather

The purpose of this control is to ensure overflows do not occur in the CSS during dry weather conditions by implementing measures that focus on proper and efficient collection system operation.

3.5.1 Investigations to Identify Potential DWO Locations

In conjunction with the routine CSO diversion inspections under NMC 1, inspectors visually look for debris and blockages that may trigger a DWO or would affect the ability of the diversion to maximize the flow entering the interceptor during rainfall. Diversions that are found to have DWOs or have the potential to overflow during dry weather are evaluated in further detail to determine a recommended course of action which, for one time occurrences, may include more frequent monitoring of that diversion and tracking. Diversions where multiple DWOs have occurred are further evaluated for additional actions, which may include:

- Catch basin modifications to reduce solids that may cause DWO risk at the downstream diversion.
- Permanent modifications to the diversion, such as removing a weir plate, removing the bar rack over the diversion or upsizing the diversion pipe.
- Targeted cleaning upstream or at diversions to address solids deposits.

- More frequent inspections for those with a configuration considered susceptible to DWOs or for previously modified locations to confirm that the issue has been sufficiently addressed.
- Permanent monitoring for early warning at locations where other measures have failed to address the issue.

SD1 is using the above types of corrective measures to eliminate DWOs.

In 2008, 15 DWOs occurred, which is down from 20 DWOs in 2007 and 25 DWOs in 2006. A summary of the DWO events that occurred in 2008, including the locations, causes of the overflows, estimated overflow volumes, and the actions taken to prevent the overflows from re-occurring is provided in Table 3.7. (A more detailed description of the overflows can be found in SD1's 2008 quarterly reports submitted to the Kentucky Division of Water and EPA.)

Table 3.7 Dry Weather CSOs
(January 1, 2008 through December 31, 2008)

Structure ID#	Location	Date	Overflow Cause	Estimated Volume	Corrective Action Taken
0820001	4th St. CSO Chamber	4/29/2008	Debris in bar rack	290,000 gallons	A new diversion weir was designed and scheduled for construction to prevent overflows due to debris in the bar rack.
		7/17/2008	Debris in bar rack	154,000 gallons	The construction of a new diversion weir wall was in progress at the time of this overflow.
		10/9/2008	Debris in bar rack.	500 gallons	Modified inspection procedures - daily, during and after a rain event, and immediately the day following a rain event. In addition, the bar rack is cleaned at least twice per week or more frequently, as needed.
0910055	Eastern & Meinken CSO Diversion	4/1/2008	Blockage of Debris	8,000 gallons	Retrofitted catch basins upstream to trap solids & floatables. The dry weather sewer was also examined for upsizing to pass debris.
0910005	Oakland and Florist, CSO Diversion	11/5/2008	Blockage of Debris	30,000 gallons	The pipe was replaced to eliminate the defects that were trapping debris.

0910064	Ashland Oil CSO Diversion	2/1/2008	Bypass pumping operations by a contractor during construction of Covington grit pit.	6,200,000 gallons	The contractor adjusted the pump elevation to allow an appropriate level of flow, and the pipes were cleaned to remove the suspended grit.
		10/27/2008	Targeted sewer cleaning process.	1,157,000 gallons	The flow restriction and debris were removed and the overflow was stopped. When complete, the cleaning project will increase flow capacity in the interceptors.
0960032	Patton St, CSO Diversion	10/30/2008	Construction debris	192,000 gallons	The outside contractor performing work and SD1 inspectors were instructed about protecting the diversion and dry weather sewer from construction debris during work. Actions will be taken in the future to route flows around the diversion or install a temporary device to keep debris from entering the diversion sewer.
1420079	11th St, CSO Diversion	2/27/2008	Blockage of Mud and Debris from High River Level	72,000 gallons	Alternatives, such as duck-bill type check valves, are being evaluated under the river water intrusion mitigation feasibility study.
1500131	Altamont St, CSO Outfall	11/25/2008	Blockage of Debris	780,000 gallons	The debris was removed from the line and re-inspected to ensure the blockage was completely cleared. The dry weather pipe is currently being evaluated for replacement.
1710068	Butler St, CSO Diversion	3/17/2008	Blockage of Mud and Debris from High River Level	33,000	A duck-bill type check valve was installed to reduce the inflow of river water into the diversion pipe.
1710119	Butler St, CSO Outfall	12/8/2008	Blockage of Debris	48,000 gallons	The pipe was replaced to eliminate the defects that were trapping debris.

1730008	Rohman St. CSO Diversion	3/3/2008	Construction debris	1,000 gallons	Our construction foreman and crews were instructed about protecting the diversion and dry weather sewer from construction debris during work. Actions will be taken in the future to route flows around the diversion or install a temporary device to keep debris from entering the diversion sewer.
		6/11/2008	Blockage of Mud and Debris from High River Level	33,000 gallons	Alternatives, such as duck-bill type check valves, are being evaluated under the river water intrusion mitigation feasibility study.
1850150	Church Street, Taylor Mill	9/14/2008	Power failure at the Banklick Pump Station - flow backed up in the influent sewers	490,000 gallons	The Banklick Pump Station is scheduled to receive a permanent backup generator in 2009 in accordance with SD1's approved Pump Station Operation Plan for Backup Power.

In addition, inspectors have continued to implement the action plan established in SD1's NMC Compliance Report for the locations identified at that time to be susceptible to dry-weather overflows. As a result of the findings from the routine diversion inspections, new locations with potential for DWOs have been added to the list. Included in Appendix C is an updated action plan that lists all of the current locations identified, the reason for consideration, the recommended course of action, and the action taken. These locations continue to be monitored as part of the normal inspection routine.

3.5.2 River Water Intrusion Mitigation Feasibility

SD1 conducted a detailed River Water Intrusion Mitigation Feasibility analysis in 2008 to understand the effects of the United States Army Corps of Engineer's Flood Protection System on the CSOs and to identify alternatives to mitigate river water intrusion into elements of the sewer system that are located below the water table both under normal and elevated river levels. A discussion of such analysis and the recommended alternatives for reducing river water intrusion into the collection system will be presented in SD1's Watershed Plans due June 30, 2009.

3.5.3 Pump Station Back-Up Power

SD1 received regulatory approval of the Pump Station Operation Plan for Backup Power on May 14, 2008 and has continued to make progress on the two remaining combined system pump stations to be addressed with back-up power solutions as follows:

- Second Street Pump Station: A permanent generator has been installed and is fully operational.
- Banklick Pump Station: The initial analysis is complete and the installation drawings for an onsite generator are in progress.

3.6 NMC#6: Control of Solid and Floatable Materials in CSOs

The purpose of this control is to reduce the amount of solid and floatable material discharged to water bodies through wet weather CSOs through the implementation of simple measures such as: baffles, screens, catch basin modifications, and nets.

3.6.1 Public Education

Print Media
Throughout 2008, SD1 published the educational information shown in Appendix F in "What's Happening," a county-specific publication that is mailed to every resident in Boone, Campbell and Kenton counties. The same message was used to create the "Not Down My Drain!" bill insert also shown in Appendix F. In 2008, this bill insert was sent to SD1's residential customers to inform them of proper disposal methods for common household products and grease that can clog sewer lines and cause overflows.

Storm Drain Marking Program
SD1 has organized a volunteer storm drain marking program geared towards Girl Scouts, Boy Scouts, school groups and concerned citizens. SD1 provides all materials and storm drain markers to perform the project. To promote the program, a brochure was developed and distributed at city buildings, mailed to scout leaders and displayed at SD1's front counter. SD1 employees also assisted in marking catch basins. During the 2007-2008 school year (August 2007 through June 2008), approximately 130 drains were marked in the Northern Kentucky area using a marker that says, "NO DUMPING – DRAINS TO STREAM." In the fall of 2008 (July 2008 – October 2008), volunteers marked more than 640 drains in the Northern Kentucky area.

In the fall of 2008, two additional marker styles were ordered. The first marker incorporates both English and Spanish warnings and says, "NO DUMPING – DRAINS TO WATERWAYS" and "NO CONTAMINE." The marker is used by volunteer groups for drain marking. The second new marker is round and says, "NO DUMPING – DRAINS TO WATERWAYS." This marker has a Duracast surface (polyurethane "dome" applied to the face of the marker) that protects it against mechanical and

chemical abrasion and increases ultraviolet light resistance. This durable version is used by SD1 field crews only and is bolted to the catch basin during structure repairs.

3.6.2 Catch Basin Modifications

SD1 began retrofitting catch basins with bells and grated inlets as a method of reducing the amount of S&F entering the CSS. Catch basin rehabilitation and replacement work, including these modifications, are currently being scheduled based on established priority areas upstream of recurring DWOs. Crews focus on completing the projects in the highest priority area before moving onto projects in the next priority area. The following methodology is used to determine which modification is appropriate:

- Catch basins that are in need of structural repair have a bell installed at the time of repair.
- Catch basins that are in need of total rehabilitation are replaced with both grated inlets and bells.
- Catch basins that have no rehabilitation or repair needs but are able to be retrofitted have a bell installed.
- All SD1-owned catch basins in priority areas upstream of recurring DWOs are retrofitted or replaced to have a bell installed. SD1 also evaluates the need to address additional catch basins owned by others to trap solids & floatables.

From January 1, 2008 to December 31, 2008, SD1's construction crews performed 22 catch basin repairs with bells installed, 159 catch basin replacements with grated inlets and bells installed, and 105 catch basin retrofits with bells. An example of a retrofitted catch basin is shown in Figure 3.10.

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Figure 3.10 Example of a Retrofitted Catch Basin with Bell to Trap S&F

3.6.3 In-line and End-of-Pipe Controls

A key part of the NMC effort was the implementation of the pilot simple S&F program. The goal of the program was to assess the benefits and risks associated with implementing simple controls at diversions and outfalls to control the release of S&F through the outfall. An analysis was done to select the initial locations for the installation of various control technologies. These included weirs, baffles, and end of pipe netting. Figure 3.11 shows the locations of these pilot locations.

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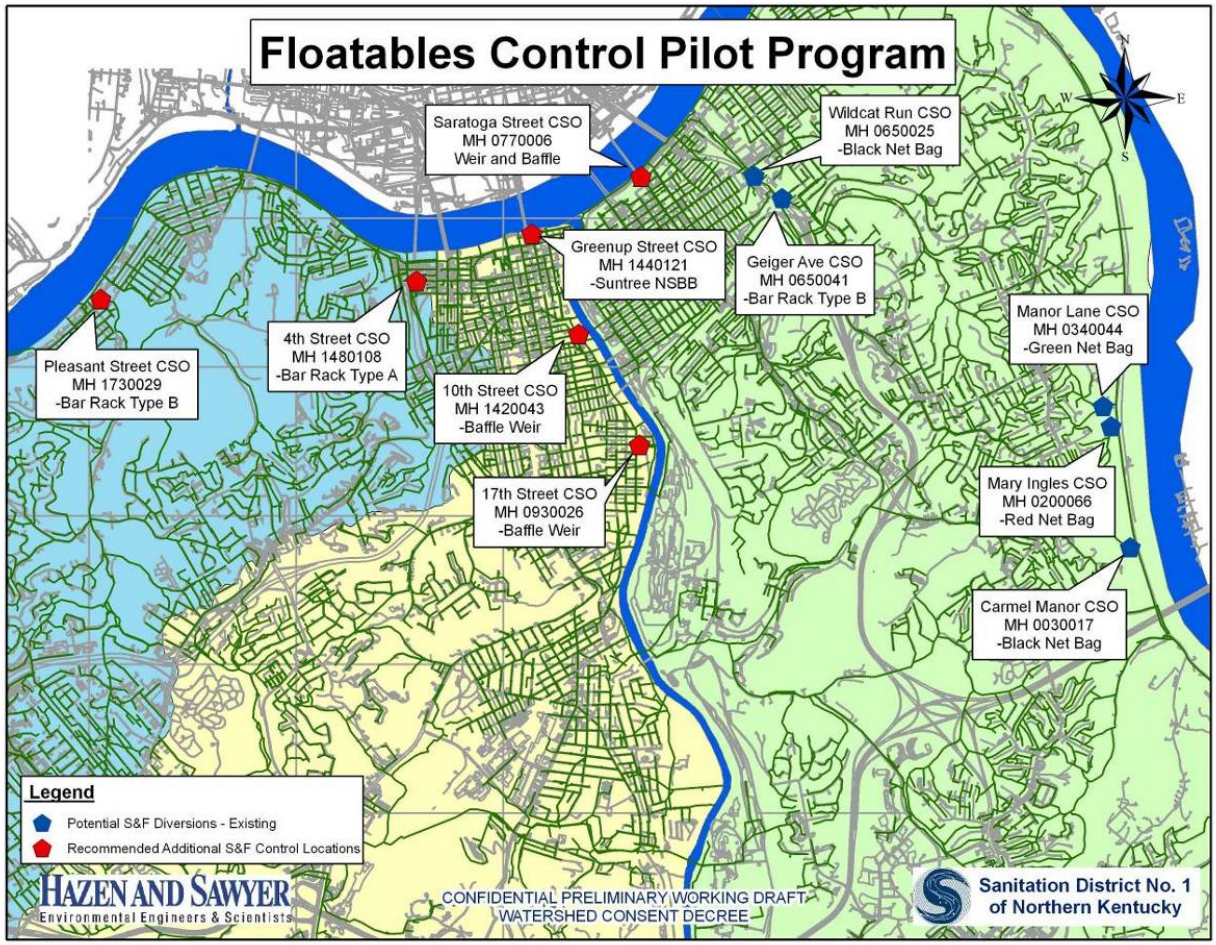
Figure 3.11 Pilot Simple S&F Control Locations



The types of simple S&F controls that were installed are discussed in SD1's NMC Compliance Report. The pilot monitoring of the installed controls began in December 2007 and the installed controls were observed during 10 separate storm events through June 2008. Findings from the observations are described below for each technology. In addition, examples of the pilot program observations and the data collected are included in Appendix G.

Bar Racks

The key consideration in designing a bar rack system is the hydraulic design criteria. SD1 selected bar rack heights set to avoid basement backups should the bar rack blind during the rain event. As discussed in the NMC Compliance Report, the upstream Hydraulic Grade Line was set to not exceed 8' below grade with the bar rack or control installed. Bar racks were installed in 3 locations and both types of bar racks were generally ineffective at capturing S&F. Observations related to this technology are as follows:

- Due to hydraulic limitations at the installation locations, the height of the pilot bar racks was limited to around 6-inches. SD1 evaluated other diversion locations in

our system and found that they have similar hydraulic restrictions that would further limit the height and/or require increasing the bar spacing.

- The bar racks were observed to overtop during events with less than two month return frequencies. Overtopping allowed any floatables that were initially retained to pass by the control and out the outfall, and thus were not effective in capturing solids & floatables.
- A minor amount of debris (ex. a single bottle or plastic bag, or some natural debris) was captured on the racks during most events, which required manual cleaning to avoid blinding or caused negative treatment during subsequent events.

Weir and Baffle

Weirs and baffles were installed in 3 locations and were found to be slightly more effective than simple bar racks. The key consideration in designing a baffle system is the hydraulic design criteria. SD1 selected baffle heights set to avoid basement backups. The same hydraulic design creiteria used for bar racks was also used for the weirs and baffles. These design criteria then set the underflow velocity, and similarly, the peak flow. If underflow velocities or peak flows are too high, S&F may potentially be pulled under the baffle. If peak flows are too high and insufficient upstream storage is provided flows will overtop the baffle and S&F will be lost through the outfall. Care must also be taken in design to not introduce too much headloss and adversely impact the upstream hydraulic grade line which could lead to basement backups.

- At the 10th Street and 17th Street locations where hydraulics dictated that the existing weir could not be raised, the baffle was installed upstream of the existing weir and extended down in the dry weather sump. At these locations, the baffle overtopped during every CSO event, except one at 17th Street. At the Saratoga location, hydraulic conditions allowed a weir to be installed 3’-6” high in the existing diversion manhole. This weir was found to be effective, and the control only overtopped one time during the observed rain events. Observations related to this technology are as follows:
- Because of the configuration, floatables retained behind the weir and baffle would be carried with the flow diverted to the interceptor as the wet weather flow subsides. This made it difficult to quantify the amount of materials retained in the collection system, even when the baffle was not overtopped.
- Surcharging occurs at diversions throughout the SD1 system during a majority of rain events. At 10th and 17th Streets, where hydraulic design precluded raising the weir, the baffle also could not be made tall enough to keep from overtopping even in small storms.
- At Saratoga, the initial evaluation indicated that the hydraulics would allow raising the weir to nearly the crown of the influent pipe. This raised the baffle above the crown of the pipe and thus at this location overtopping occurred much less frequently. This location had sufficient hydraulics available to make the weir and baffle effective for trapping S&F.
- Little or no maintenance was required post event at these locations because retained debris was washed to the interceptor with the underflow.

Net Bags

Net bags were found to be effective at capturing all types of S&F, including rubble, sanitary trash, leaves, rags, and even rodents. At the Mary Ingles location for example, the nets were changed 5 times during the pilot monitoring period. The weight of the debris captured ranged from 1.5 pounds to 8 pounds with an average of over 5 pounds of debris captured and disposed of each time. Observations related to this technology are as follows:

- Net bags are effective at capturing all types of S&F. This is a proven technology that has been employed at numerous locations around the country using larger expensive proprietary systems.
- Net bags can be installed on elevated outfall pipes that daylight at the termination point.
- The net bags require handling by SD1 field personnel for removal and replacement. Many of SD1's elevated outfall pipes discharge in undeveloped areas that are not accessible by vehicle. Due to these handling limitations, use of the net bags is limited to elevated outfall pipes smaller than 24-inches where the velocity of discharge is low and the net bags can be made accessible.

Nutrient Separating Baffle Box

The effectiveness of the engineered S&F control installed at the Greenup Street location in Covington (NSBB unit) was documented during the pilot observations. The screen basket captured leaves and twigs, bottles, wrappers and other plastic debris, and glass. Settleable solids settled out into one of three sediment sumps. After skimming and settling, flow undergoes further treatment passing under a skimming baffle that incorporates an adsorbent boom, aimed at capturing additional floating debris and hydrocarbons. Between events, SD1 cleans the unit using a vactor truck. First materials captured by the screen are removed and then the contents of the sumps, including retained CSO and the settled solids, are removed. Observations related to this technology are as follows:

- As a capital project beyond the scope of the NMC program, the installation of the NSBB unit followed an involved design phase that included hydraulic analyses and related replacement of the diversion and conveyance structures to account for the new hydraulic impacts.
- Additional uplift protection against flotation due to groundwater and elevated river levels was designed for the chamber that houses the NSBB unit, and the uplift protection needed to be installed on the chamber once it was set in the excavation.
- Site issues included shutting down a portion of a municipal parking area and a partial street closure and resulting traffic controls.
- The existing easement had to be modified to provide sufficient space to construct the facility. The project also required coordination with the city to account for a planned riverwalk.
- The total construction cost for the engineered S&F control at Greenup Street was $248,500.

Final Program

As described in the NMC Compliance Report, SD1 committed to installation of simple S&F controls at CSO locations where found to be effective and feasible. Utilizing findings from the pilot monitoring program, SD1 has continued to expand installation of the simple S&F controls to all CSOs where effective controls are feasible. Given the effectiveness found with the net bags, and larger weir and baffle installations, the effort has focused on finding additional locations where each could be installed. As was noted above, the pilot monitoring program results showed that bar racks were ineffective in removing S&F due to blinding and height limitation issues, and therefore, these were no longer considered a viable alternative.

Taking the lessons learned from the pilot S&F control observations; additional analysis was completed to determine where additional effective and feasible simple S&F controls could be installed without significant upstream flooding risk. This analysis identified six new S&F locations beyond the 15 previously listed in SD1's NMC Compliance Report. However, as noted above, the two pilot bar rack locations at 4th Street and Pleasant Street were found to be maintenance intensive and ineffective at capturing S&F. Therefore, these two bar racks are being removed.

Table 3.8 lists the locations of existing or under construction S&F controls and the type of control installed. The program includes 19 controls, including nets at 9 CSOs, a bar rack at one CSO, and baffles at 9 CSOs. In addition to Greenup Street, the engineered S&F control baffle chambers planned at Main Street, McKinney Street and Garrard Street include sumps to capture grit and other solids that can settle. In addition to the locations listed below, the locations listed in Table 3.2 for inline storage also provide significant S&F reduction through CSO reduction and the diversion of additional wet weather flow to the Dry Creek Wastewater Treatment Plant for treatment.

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Table 3.8: Current S&F Control Program

CSO/Diversion	Name	Type of Control	Status
1490172	Swain Court	Black Net	Installed
0910084	Meiken/Eastern	Black Net	Installed
1440121	Greenup Street	Engineered S&F Control Nutrient Separating Baffle Box (solids sump, screen and baffle)	Installed
0650098	Wildcat Run	Black Net	Installed
0340051	Manor Lane	Green Net	Installed
0200069	617 Mary Ingles	Green Net	Installed
0030031	Carmel Manor	Black Net	Installed
0650041	Geiger Avenue	Type "B" Bar Rack	Installed
0770006	Saratoga Street	Weir	Installed
1440156	Garrard Street	Engineered S&F Control Baffle Chamber w/Bar Rack Above Baffle	To be Installed as part of Watershed Plans
1420043	10th Street	Baffle	Installed
0930026	17th Street	Baffle	Installed
0330100	Tower Hill	Green Net	Installed
0340050	Lester Ln.	Black Net	Installed
0930050	19th St.	Baffle	Installed
0930066	19th St.	Weir and baffle	Installed
0360079	Anchor Inn	Black Net	Installed
0570030	Main Street	Engineered S&F Control Baffle Chamber w/Bar Rack Above Baffle	To be Installed as described in Section 2
0570011	McKinney Street	Engineered S&F Control Baffle Chamber w/Bar Rack Above Baffle	To be Installed as described in Section 2

This final program greatly expands upon the S&F control locations identified in SD1's NMC Compliance Report. Simple S&F controls are not applicable at many diversions due to upstream hydraulic concerns and their associated ineffectiveness. At those locations, S&F will be controlled by the system-wide, programmatic implementation of other control measures:

- Source controls through catch basin modifications and cleaning
- Public education program (sanitary trash)
- Regulation of construction site runoff
- Street cleaning (street trash) to be conducted by the local cities, and

- Grit pits (grit and other settleable solids) installed along the interceptor sewers

SD1 will also continue to evaluate additional S&F control measures as a component of projects to be implemented with SD1's Watershed Plans.

3.6.4 Construction of Grit Pits

In 2008, SD1 completed the installation of the Covington grit pit on the Licking River Interceptor. Through regular cleaning, as described under NMC 1, the grit pit will improve the ability of the interceptor to convey flows to the Bromley Pump Station and remove possible sources of pollutants that may enter the CSS. Pictures from the construction of the grit pit are shown in Figure 3.12.

Figure 3.12 Construction of the Covington Grit Pit on the Licking River Interceptor

3.7 NMC# 7: Pollution Prevention

The purpose of this control is to minimize various forms of pollution from entering into the CSS and compromising the water quality of the receiving water body and/or SD1's conveyance and treatment infrastructure. As the Northern Kentucky regional storm water agency, many components of SD1's approach to pollution prevention is implemented as required by EPA National Pollutant Discharge Elimination System Phase II MS4 regulations and reported in SD1's storm water annual reports.

In that regard, SD1 uses a wide-ranging approach to pollution prevention from public education and programmatic initiatives to physical efforts such as street sweeping and catch basin cleaning. The following sections describe some of the major activities that demonstrate SD1's continued commitment to this minimum control.

3.7.1 Public Education Programs

Public Service Park

Dedicated to those who enhance Northern Kentucky's quality of life through public service, Public Service Park is an example of SD1's leadership in water pollution prevention practices, also known as best management practices. The park is an aggressive approach to empower and educate the public on the vital importance of protecting our waterways for future generations. Featuring storm water best management practices and cutting edge public educational programming, Public Service Park is targeted at all audiences ranging from the development community, to students, to the general public who can follow a self-guided tour. Thousands of people have toured Public Service Park over the past year, including both local groups and groups outside of the area. Among SD1's visitors in 2008 were Governor Steven Beshear and a research group from China studying water treatment processes.

- More than 370 adults toured Public Service Park in 2008, including consultants, engineers, developers, environmentalists and parent chaperones.
- More than 2,000 students toured Public Service Park in 2008, including elementary through college age students and boy/girl scouts.

Classroom Presentations

SD1 is committed to empowering students to protect the environment and has reached thousands of students this year through interactive school presentations. During the 2007-2008 school year, these presentations introduced more than 2,900 students and scouts to concepts such as point source and non-point source pollution. In the fall of 2008, more than 1,030 students participated in the lesson. SD1 uses an interactive model called the Enviroscape to teach the negative impact of polluted storm water runoff on local waterways.

Northern Kentucky University "Protecting Water Resources Course"

In an effort to expand storm water education to students in different grade levels, SD1 conducted several meetings with Northern Kentucky University to see if a college course could be developed about storm water. Dr. Rebecca Kelley from Northern Kentucky University developed a lecture and lab that revolves around the topic of storm water. The course was presented to Northern Kentucky University curriculum coordinators and was successfully approved.

Starting in the fall of 2009, this storm water course titled "Protecting Water Resources" will be taught to college students. This 200-level course can accommodate 40 students a semester – approximately 80 students a year. SD1 plans to assist Northern Kentucky University with some of the lecture and lab components. A student survey at the beginning and end of the class, class projects and exam results will help track the success of this program.

Earth Day

SD1 held an internal environmental campaign during the week of Earth Day 2008 to educate employees on changes in behavior, in the workplace and at home, that can have a positive impact on the environment. The theme for Earth Week was "Greening the District: Reduce, Reuse, Recycle" with each day focusing on part of the theme. The festivities for each day are listed below:

- (Day One) *Greening the District: Reduce, Reuse, Recycle:* Monday, April 21, all employees received an Earth Week newsletter and a rain barrel brochure. Employees who read the rain barrel brochure and completed the survey were entered for a chance to win a donated 63-gallon, green, recycled plastic rain barrel.
- *(Day Two) Greening the District: Reduce:* Tuesday, April 22, was Earth Day. To promote waste and energy reduction, all employees received an email with simple tips for reducing their consumption of energy and products. A donated jar opener made of recycled tire material was given to each employee. Listed on the jar opener were ways employees could "reduce" their carbon footprint.
- *(Day Three) Greening the District: Reuse:* Wednesday, April 23, an email was sent with tips on how to reuse items at SD1. All employees received a donated reusable grocery bag.
- *(Day Four) Greening the District: Recycle:* Thursday, April 24, an email was sent to all employees listing tips on how to recycle items at SD1. All employees received a donated, recyclable thermos mug made of all recycled material. SD1 also purchased new recycle bins for conference rooms and break rooms.
- *(Day Five) Greening the District: Review and Respond:* Friday, April 25, all employees received an email recapping the week and a donated packet of sunflower seeds.

3.7.2 Land Disturbance/Sediment and Erosion Control

SD1's Storm Water Rules and Regulations established a land disturbance permit process, which is applicable for any land disturbance activity greater than or equal to one acre that occurs within the storm water service area. All construction activities within the storm water service area that disturb greater than or equal to one acre of land now receive a permit from SD1 prior to the commencement of the activity. SD1's plan review process includes examination of sediment and erosion controls to ensure that adequate controls are put in place. Appropriate best management practices must be cited and installed properly for plans to be approved.

During 2008, SD1 issued 55 Land Disturbance Permits, 36 Grading Permits and 8 Clearing Permits. Since the program started, SD1 has issued 434 Land Disturbance Permits, 241 Grading Permits and 44 Clearing Permits.

3.7.3 Household Hazardous Waste Management

SD1 continues its partnership with the Northern Kentucky Household Hazardous Waste Action Coalition. This unique coalition is comprised of local governments and

organizations and is sponsored by area businesses. SD1 serves as the chair of the coalition, which meets about once a quarter.

Computer/Mercury/TV Recycling Event

A recycling event for the residents of Boone, Campbell and Kenton Counties was hosted on November 15, 2008 at SD1. Computers and mercury have been collected during this event in the past, however due to the upcoming digital transition, televisions were included in this year's event. The turnout was overwhelming, with more than 500 cars coming through to drop off items. The results from the event are summarized below:

- Televisions = 27,914 lbs
- Electronics = 31,032 lbs
- Mercury = 90 lbs
- Fluorescent Bulbs = 792 lbs

Environmental Enterprises provided the recovery and recycling of items containing mercury (i.e. thermometers, liquid mercury, fluorescent bulbs, etc). Apex technologies collected the televisions and electronics.

3.8 NMC#8: Public Notification

The purpose of this control is to reduce exposure to potential health risks caused by CSOs by informing the public of the location of CSOs, the actual occurrences of CSOs, the possible health and environmental effects of CSOs, and the recreational or commercial activities curtailed as a result of CSOs.

Signage

SD1 has updated and replaced all warning signage posted near CSO outfalls (Figure 3.13), and has developed and installed new public education signs to put in locations near public access to water to warn about unsafe conditions during and after rainfall events (Figure 3.14). The new warning signs posted at the CSO outfalls are written in English and Spanish, provide improved graphics, and display SD1's web address. The new public education signs are designed to catch your attention, provide warning language, a history of CSOs in the area, discussion on solutions, and provide SD1's contact phone number and website. The map in Figure 3.15 indicates the locations throughout the service area where CSO signage is posted.

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Figure 3.13 New CSO Warning Sign

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Figure 3.14 CSO Public Education Sign

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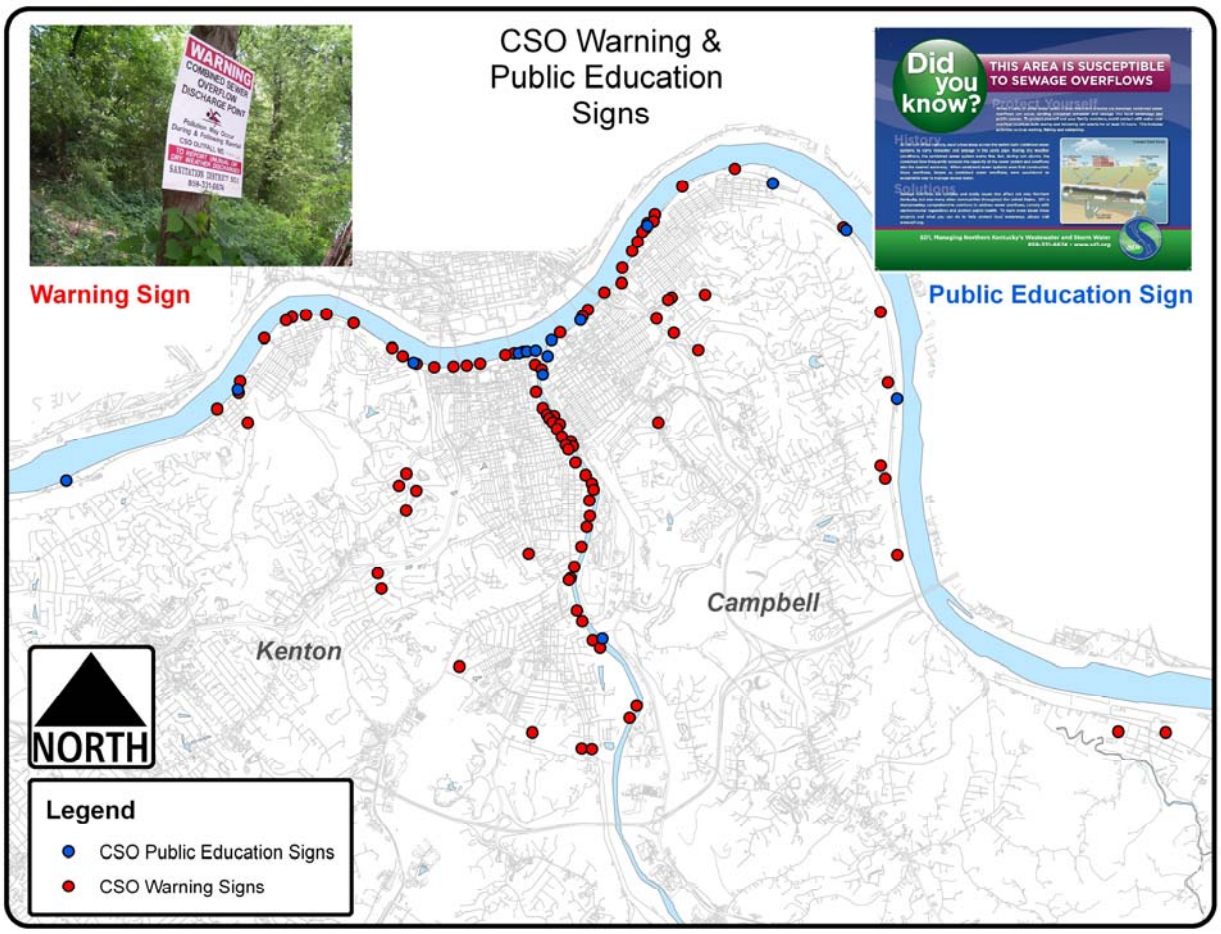
Figure 3.15 CSO Sign Location Map



Real-time Notifications

Throughout 2008, SD1 issued email wet weather advisories alerting those who requested to be on the distribution list that weather conditions could potentially cause a CSO. There are currently 77 individuals on the distribution list, which includes members of the general public, Northern Kentucky community leaders, local Water Districts, and SD1's Watershed Community Council members. Individuals can sign up to receive this e-mail notification by filling out a request form on SD1's website at http://www.sd1.org/wastewater/overflow.asp, or by e-mailing a request to info@sd1.org. SD1 has recently created a system that has automated its website to ensure notifications are being sent in a timely manner.

In addition, SD1 has had discussions with the Metropolitan Sewer District of Greater Cincinnati (MSDGC) and the Ohio River Valley Water Sanitation Commission (ORSANCO) to identify coordination opportunities for automated wet weather notification through a joint website. SD1 will continue to explore these partnering opportunities as a means to find affordable, automated and coordinated notifications.

3.9 NMC#9: Monitoring to Characterize CSO Impacts

The purpose of this control is to determine the occurrence and apparent impacts of CSOs through visual inspections and other simple methods, to gain an understanding on overflow occurrences and water quality problems that reflect use impairments caused by CSOs. Changes in such occurrences can provide a preliminary indication of the effectiveness of the NMC.

3.9.1 Infrastructure Characterization

Hydraulic Modeling Program
SD1's existing sanitary sewer system is represented in the following five distinct model networks all modeled using Wallingford Software's InfoWorks CS (collection (i.e. sewer) systems) model, as shown in Figure 3.16:

- Bromley Model: represents the total area that is tributary to the Bromley Pump Station and contains the entire SD1 combined sewer network.
- Dry Creek Model: represents the total area that is tributary to the Lakeview Pump Station and tributary to the Dry Creek Wastewater Treatment Plant by gravity (including pumped flows from Florence).
- Taylorsport Model: represents the total area that is tributary to the Taylorsport Pump Station.
- Eastern Regional Model: represents the total area that is tributary to the Eastern Regional Water Reclamation Facility.
- Western Regional Model: represents SD1's system tributary to the proposed Western Regional Water Reclamation Facility following construction of the treatment plant and the tributary gravity sewers and tunnel.

These models were originally developed as part of other projects previously undertaken and recently updated as part of the characterization efforts involved in developing SD1's Watershed Plans. This was necessary so that the most recent changes within the SD1 sewer system, including updated sewer connectivity and pump station capacities, could be reflected in the models.

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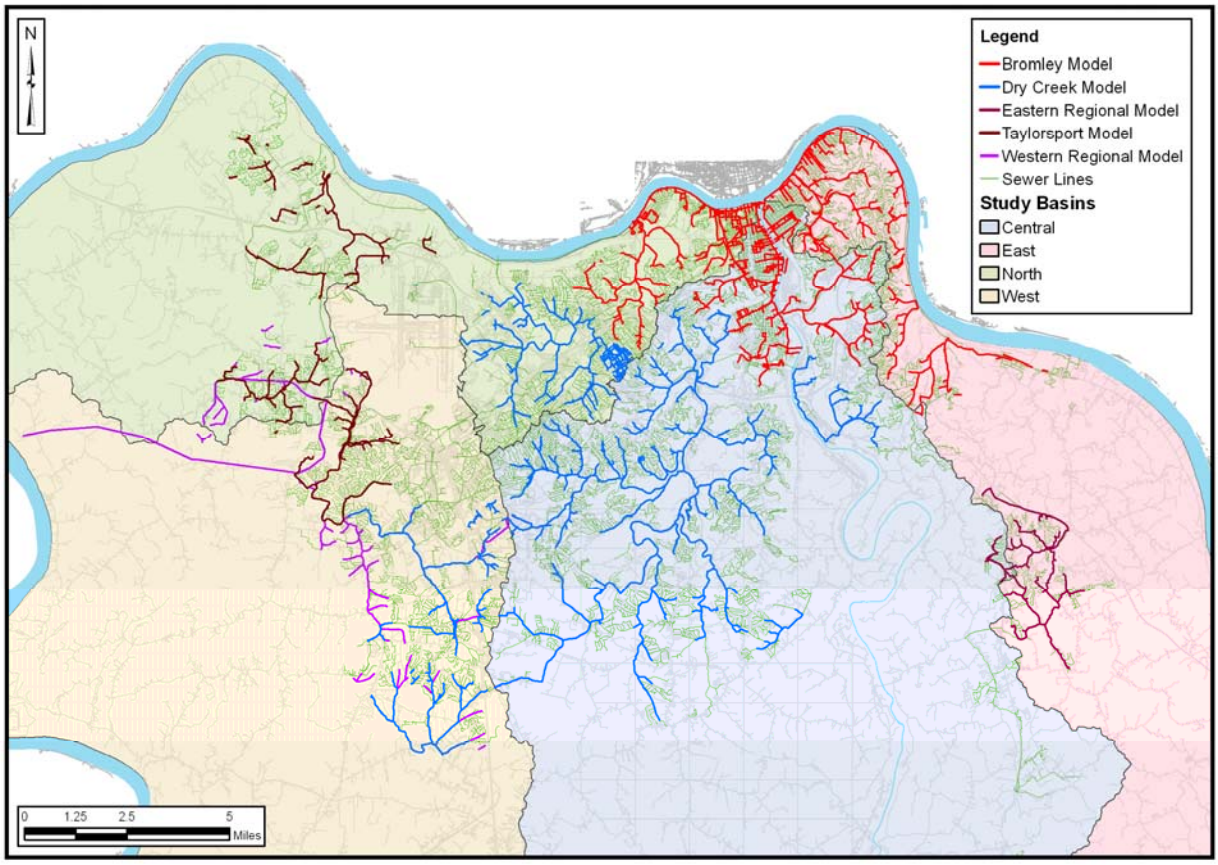
Figure 3.16 Extent and Location of SD1's Hydraulic Model



SD1 completed a year-long flow monitoring program in 2008, consisting of more than 245 flow meters and 45 rain gauges installed throughout the combined and separate sewer systems, that was utilized to update the calibration and validation of the system-wide hydraulic models. This calibration was undertaken to provide a model network that could confidently be used as a planning level tool in preparing SD1's Watershed Plans. In addition to the use of the models for planning future capital improvements, the models are also being used to provide information about the current performance of SD1's system. Based on the results of the model calibration and verification, SD1 has developed a highly calibrated and verified hydraulic model that provides an accurate representation of the sewer system. SD1 made these investments so that the models can be used to accurately understand how CSOs respond during rain events, when CSOs begin and end, and to calculate the frequencies and overflow volumes that occur. This tool allows SD1 to have confidence in the results of the overflow volumes from the sewer system and to provide estimates of the overflow locations within the system for reporting purposes. The models are intended to take the place of maintaining a system-wide, real-time alarm system to record when overflows begin and end. The same data can be accurately provided and understood through the calibrated models. Flow meters and rain gauges will be installed periodically as improvements and changes are made to the collection system to collect data that will be used to update the hydraulic models. This will ensure that the models remain an accurate tool for planning and reporting. This

approach is consistent with SD1's commitment to understand and provide the best available information on overflow activity.

Outfall and SIU Synoptic Sampling Program

SD1's 2007-2008 outfall sampling program was designed to support multiple project activities. The primary purpose was to support the system characterization phase of the Watershed Planning effort by sampling multiple outfall types (sanitary sewer overflow, CSO, and storm water discharges). This was necessary so that a load could be calculated for each outfall using the measured concentrations and the model-calculated discharge volumes. These loads could then be entered into the watershed and water quality tools so that the impact of sanitary sewer overflow and CSO activations on the water bodies could be assessed. Certain sampling locations were also selected to assess potential SIU impacts (as described in Section 3.3.1).

Approximately 20 outfall locations were sampled for 10 wet weather events between June 2007 and December 2008. Given the extended duration of the program (approximately 15 months), the number of locations were not static; as data was collected and specific analysis needs were identified, the program allowed for locations to be added, dropped, or relocated to maximize the value of collected data. In selecting the sampling locations, SD1 took into account a prioritization process as well as access, tributary area land use, and likelihood of activation. The program's goal was to capture water quality data from a variety of source types and land uses. Locations were selected that had the highest potential to provide quality data for a large number of storm events and would be safe to access at all times of day. Automatic samplers were used, and the sampling protocol was to collect multiple samples during each event to define the time variation in concentrations and loadings. Samples were analyzed for several constituents, but bacteria densities were of most interest for collection system and water quality characterization efforts. Event Mean Concentrations were developed for both fecal coliform and E. coli bacteria for seven of the sampling events; evaluation and analysis of data from the final three sampling events is currently ongoing. A map of all the locations selected for sampling is shown in Figure 3.17.

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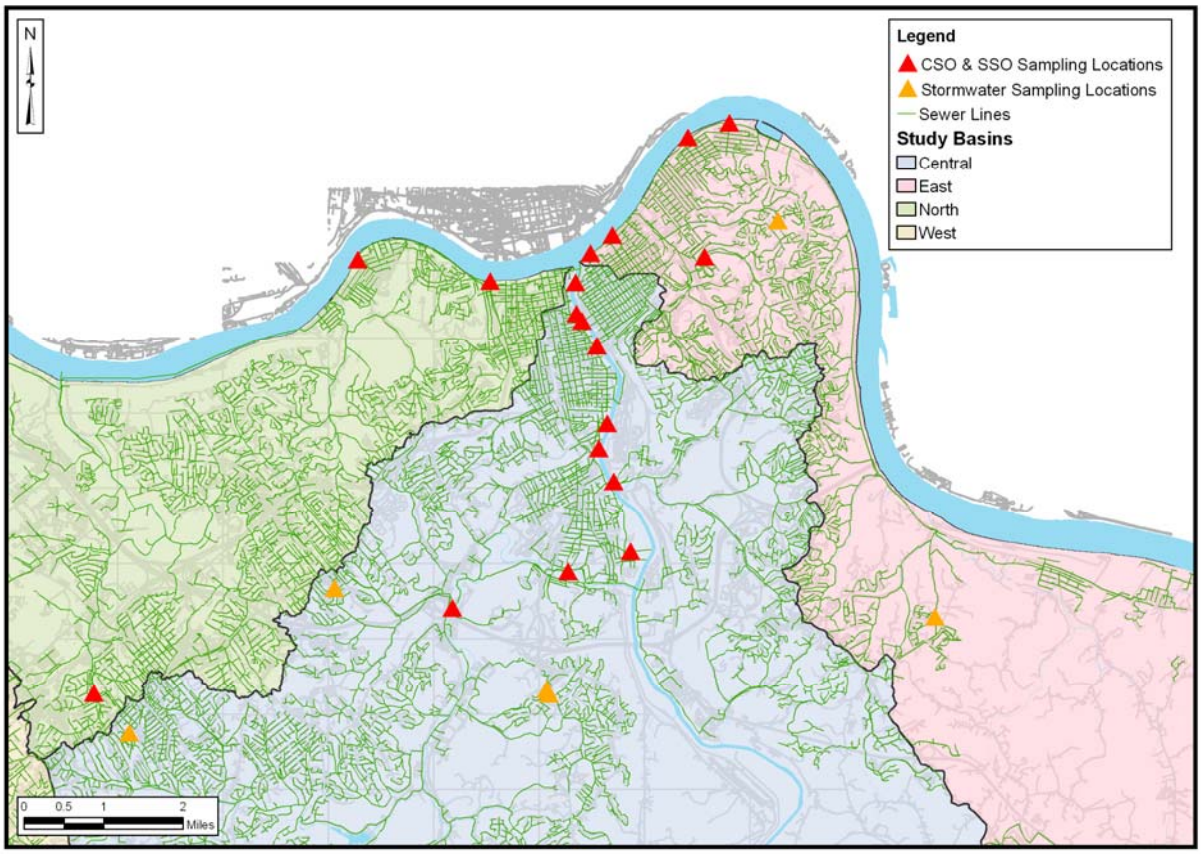
Figure 3.17 Outfall Sampling Locations



3.9.2 Watershed Characterization

Watershed and Water Quality Modeling Program
SD1 has developed two types of water quality modeling tools – the Watershed Assessment Tool and detailed watershed and water quality models. These tools were developed to assess impacts of bacteria (primarily fecal coliform since substantially more fecal coliform data existed than other bacteria indicators at the time of model development).

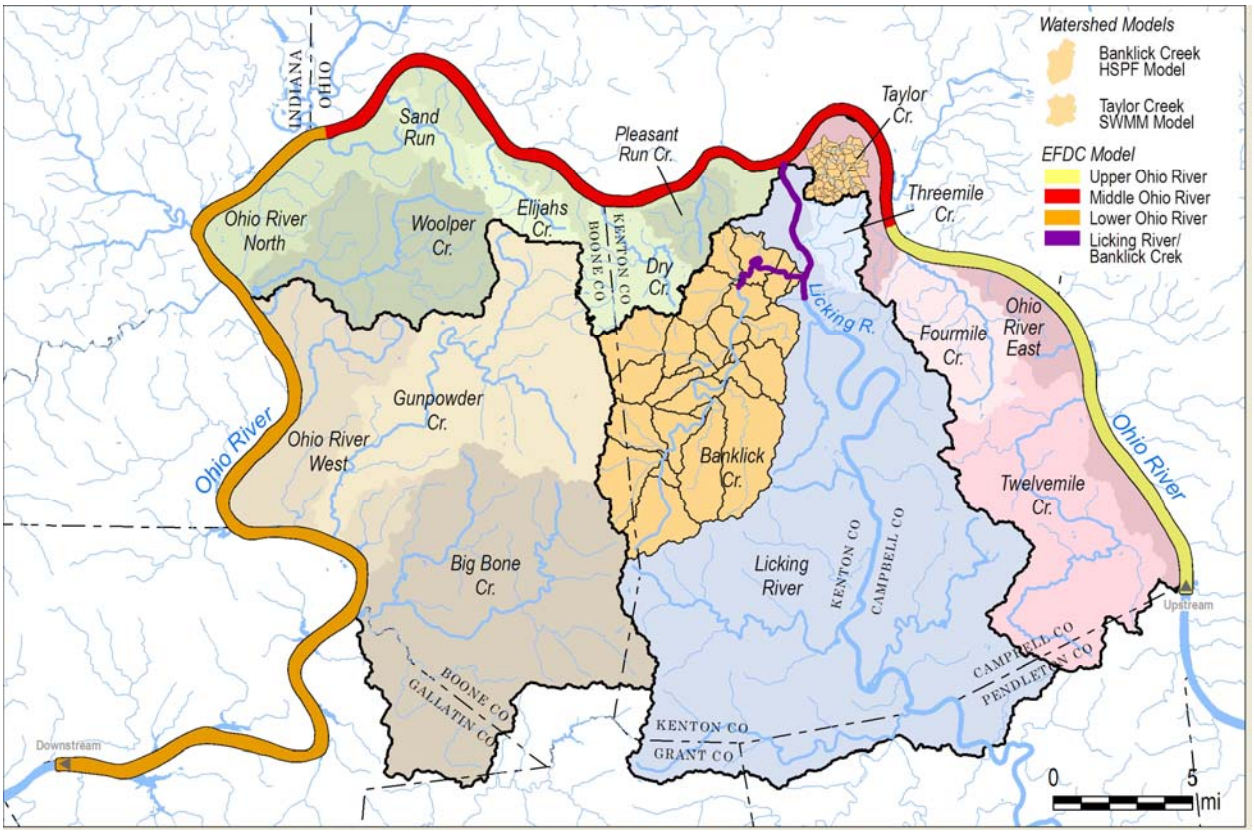
The Watershed Assessment Tool's estimates represent annual fecal coliform bacteria loads based on source characteristics, including loading potential, slope and proximity to stream. This information enables SD1 to evaluate relative impacts of pollutants on water quality and to examine relative contributions of different sources at the subwatershed, watershed, and regional scales.

In addition to the Watershed Assessment Tool, SD1 recently developed the following three watershed and water quality models. These models will serve as essential planning tools when developing cost-effective alternatives to reducing overflow occurrences and improving water quality in rivers and streams within the Northern Kentucky area.

- Ohio/Licking/Banklick Creek Water Quality Model: developed in partnership with the Metropolitan Sewer District of Greater Cincinnati using EPA's Environmental Fluid Dynamics Code. The hydrodynamic portion of the model includes 90 miles of the Ohio River. Approximately 5.5 miles of the lower Licking River and 4.0 miles of lower Banklick Creek are also included in the model. The water quality portion of the model includes 46 miles of the Ohio River (as depicted by the yellow and red river segments) and the lower portions of the Licking River and Banklick Creek (as depicted by the purple river/creek segments).
- Banklick Creek Watershed Hydrologic Simulation Program Fortran Model
- Taylor Creek Watershed Storm Water Management Model

The extent of the detailed models is shown in Figure 3.18.

Figure 3.18 Watershed and Water Quality Models



The watershed and water quality models were developed in conjunction with the infrastructure models (Section 3.9.1). The models were applied to define the impact of current stressors on in-stream water quality; identify important sources under different environmental conditions; forecast the impacts and benefits of different land development and pollutant control scenarios; and identify data gaps. These computer models integrate watershed and water quality data and define the link between sources of bacteria and water quality impacts. The models calculate in-stream bacteria densities for each hour of the simulation along the length of tributaries and mainstem

streams. The models were developed (or updated) using the in-stream dry weather and wet weather monitoring data; infrastructure model calculations of sewer overflow volumes; CSO, sanitary sewer overflow, and storm water outfall sampling data; updated land use/land cover data; and other information.

Watershed Monitoring Program

The purpose of SD1's Watershed Monitoring Program is to collect in-stream water quality, habitat, macroinvertebrate, and fish data. This program includes dry weather monitoring (base flow conditions) throughout Northern Kentucky watersheds, and wet weather monitoring (rainfall/runoff conditions) and biological assessments in key watersheds. Water quality, aquatic habitat, biological, flow, climate, and source concentration/density data have been obtained, reviewed and compiled in a database, which SD1 updates annually with new information.

To date, up to three rounds of dry weather monitoring have been completed in all sixteen watersheds; between 50 and 75 locations have been sampled each year (since 2006). Wet weather monitoring (where teams sample a location multiple times during a rainfall event) is being conducted in key watersheds on a rotating basis through 2010. To date, wet weather monitoring has been completed for 38 locations in eight watersheds. In addition to these locations, SD1 also funds thirteen continuous monitoring stations in cooperation with the USGS to collect 15-minute stage, flow and water quality measurements. Monitoring locations are shown in Figure 3.19.

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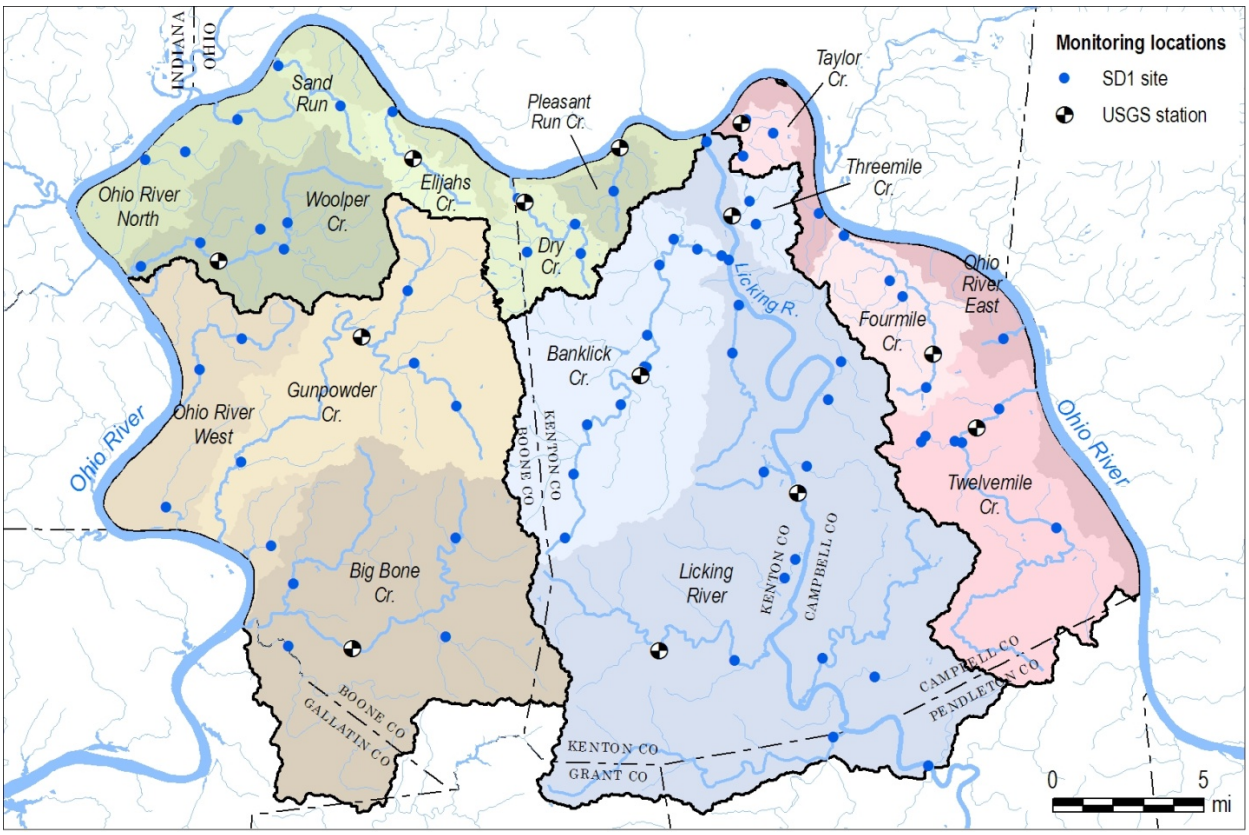
Figure 3.19 Monitoring Locations



SD1 intends to continue the monitoring program so that the resulting data can be used to identify trends in water quality and provide feedback on the effectiveness of pollutant controls and other actions to improve water quality.

3.9.3 CSO Monitoring

During 2008, SD1 tested three sites for permanent monitoring and real time alarming for DWOs. The monitors worked well for collecting data during wet weather that was then used in the development and calibration of SD1's hydraulic models. However, the monitors were not reliable indicators of a DWO because of consistent false alarms caused by fluctuating river levels that back flowed into the outfalls. The level for the alarms was adjusted to test different settings but the false alarms could not be resolved. In addition, crews were erroneously deployed to respond to the false alarms, which was an inefficient use of SD1's limited resources.

Moving forward, SD1 will evaluate the need and value of selecting representative locations for permanent monitoring to continue to monitor and characterize the collection system and CSOs in coordination with its watershed planning efforts.

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APPENDIX A:

Additional Compliance Activities

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Additional Activities Identified in 2008 NMC Compliance Report

Item	Activity	Implementation Schedule	Status	Described in Annual Report Section
NMC 1 Proper Operation and Regular Maintenance				
Collection System O&M - Diversions	Review periodically, the actual rate of inspections and verify that the goal of one inspection per week is being met.	Monthly	Implemented Process	3.1.1
Collection System O&M – Catch Basins	Complete all catch basin cleaning work orders (501).	30-Aug-08	Complete	3.1.2
	Add bells to the catch basins identified as able to be retrofitted with bells (343).	Ongoing	Implemented Process	3.6.2
	When a catch basin is being repaired or replaced, retrofit or replace with grated, trapped type with bells or other retrofit to trap solids and floatables.	Ongoing	Implemented Process	3.6.2
	Inspect all catch basins yearly and record inspection data within gbaMS. Develop work orders within gbaMS to clean or repair as needed. Continue to utilize PM system to identify basins where more frequent cleaning is needed. Record and document amount of debris removal.	Ongoing	Implemented Process	3.1.2
Collection System O&M – Pump Stations	In coordination with CMOM, compile a list of stressed pump stations in both the CSS and SSS and identify either an internal or external engineer to perform a critical assessment of the PS to identify solutions in coordination with CMOM program.	31-Mar-08	Complete	3.1.4
	In coordination with CMOM begin utilizing the pump station inspection module in gbaMS to record, track, and document pump station inspections.	30-Jun-08	In-progress	2
	In coordination with CMOM, prospective classes for pump station maintenance personnel at Gateway Community College will be identified, and coordination with the District's Human Resources will occur to assess the feasibility of attendance at these classes.	Throughout 2008	Complete	3.1.4
Collection System O&M – Gravity Sewers	In coordination with CMOM, continue to make progress toward automating work-order generation based on CSAP process diagram.	Throughout 2008	Complete	3.1.5
	In coordination with CMOM, assign one in-house staff member to filter all work orders and serve as the liaison between the Collection Systems Department and Engineering Department.	30-Jun-08	Complete	3.1.5
	Develop recommendations for targeted cleaning of interceptor based on TISCIT sonar/CCTV inspection results.	29-Feb-08	Complete	3.4.1
	Develop specifications, bid cleaning contract, and hire a contractor to perform the interceptor cleaning.	31-Jul-08	Complete	3.4.1
	Hire CCTV Contractor to support CSAP.	30-Apr-08	Complete	3.1.5

Additional Activities Identified in 2008 NMC Compliance Report

Item	Activity	Implementation Schedule	Status	Described in Annual Report Section
NMC 2: Maximum Use of Collection System for Storage				
In-Line Storage Program	Design and install static weirs at 9th Street and 10th Street in Newport.	31-Oct-08	Complete	3.2.3
	Complete installation of new diversions at Main and McKinney Streets in conjunction with new development.	31-Dec-08	In-progress	2
	Conduct field investigations and final hydraulic modeling for potential static weirs at Parkway/Highway and James Avenue.	30-Aug-08	Complete	3.2.3
	Complete planned in-line storage modifications at Parkway/Highway and James Avenue, if found to be feasible.	18-Apr-09	Complete	3.2.3
	Examine the potential for capital projects to increase in-line storage at Willow Run, 4th Street, and Pleasant Street and incorporate projects into the Watershed Plans.	To be conducted as part of the Watershed Plans	To be conducted as part of the Watershed Plans.	3.2.3
NMC 3 Review and Modification of Pretreatment Program				
Revise CSS SIU permits	Complete synoptic sampling	30-Jun-08	Complete	3.3.1
	Analyze sampling data and complete revisions to SIU permits	30-Sep-08	Complete	3.3.1
NSU Evaluation	Update database on NSUs in Kenton and Campbell Counties	31-Mar-08	Complete	3.3.2
	Evaluate NSUs in Kenton and Campbell Counties to determine if clusters exist with the potential to impact water quality. Permit NSUs as necessary.	31-Dec-08	Complete	3.3.2
Fire Department Notification	Design and create a pamphlet for distribution to local fire departments to educate them on whom to contact in the event of an industrial fire or spill.	30-Sep-08	Complete	3.3.3
NMC 4 Maximization of Flow and Treatment				
Maximize Collection - Interceptor	Develop recommendations for targeted cleaning of the interceptor based on the TISCIT sonar/CCTV inspection results.	29-Feb-08	Complete	3.4.1
	Develop specifications, bid cleaning contract, and hire a contractor to perform interceptor cleaning.	31-Jul-08	Complete	3.4.1
	Complete the installation of the Covington grit pit on the Licking River Interceptor.	30-Aug-08	Complete	3.6.4
	Document the effectiveness of the grit pits in terms of sediment removed from the interceptor.	Ongoing	Implemented Process	3.1.3
	Follow the CSAP program for continued inspection and cleaning of the interceptor.	Ongoing	Implemented Process	3.4.1
Maximize Collection – Bromley Pump Station	Evaluate the feasibility of lowering the wet well settings for the pumps to allow the first large pump to turn ON at a lower HGL to potentially reduce upstream overflows.	Begin March 2008 and complete investigation by May 31, 2008. Implement any resulting changes by July 31, 2008	Complete	3.4.2

Additional Activities Identified in 2008 NMC Compliance Report

Item	Activity	Implementation Schedule	Status	Described in Annual Report Section
NMC 5 Elimination of Dry Weather Overflows				
Corrective Measures for Chronic DWO Diversions	Continue implementing action plan in Appendix P developed for each location susceptible to DWOs.	18-Apr-09	Complete	3.5.1
	Implement CB O&M Program.	See NMC 1	Complete	3.1.2
CSO Inspections	Add blocking to remaining diversions where feasible.	30-Jun-08	Complete	3.1.1
RWI Mitigation Feasibility Analysis	Complete analysis and recommend alternatives for reducing river water intrusion into the collection system. Recommendations to be incorporated into the Watershed Plans.	18-Apr-09	To be completed as part of WS plans.	3.5.1
Backup Power Implementation for CSS PS Facilities	Implement backup power at Banklick and 2nd Street Pump Stations.	Progress being tracked as part of the Pump Station Operation Plan for Backup Power	Complete	3.5.2
NMC 6 Solids and Floatables Control				
Public Education	Source reduction (including personal hygiene products) material in What's Happening!.	30-May-08	Complete	3.6.1
	Source reduction (including personal hygiene) mail insert.	29-Feb-08	Complete	3.6.1
Grit Pits	Construct replacement diversions on Main and McKinney Street CSOs with grit sumps and floatables baffle and bar rack.	Scheduled under NMC 2	In-progress	2
	Complete the installation of the Covington grit pit on the Licking River Interceptor.	30-Aug-08	Complete	3.6.4
Solids & Floatables Control Program	Complete simple solids and floatables control pilot study and summarize results.	March 31, 2008 Weather Dependent	Complete	3.6.3
	Depending on results of pilot study recommend locations to install additional simple solids and floatables controls.	Recommendations by July 31, 2008	Complete	
	Install additional simple solids and floatables controls where found to be effective and feasible.	Complete installations by April 18, 2009		
	Identify locations for pilot engineered solids and floatables controls installations.	Complete recommendations by April 18, 2009	Complete	
	Install pilot engineered solids and floatables controls and monitor.	As part of the Watershed Plans	Complete	
	Identify engineered solids and floatables controls for remaining outfalls as part of CSO solutions.	As part of the Watershed Plans	To be completed as part of WS plans.	
	Document solids and floatables capture under catch basin and simple solids and floatables control programs.	Ongoing	Implemented Process	

Additional Activities Identified in 2008 NMC Compliance Report

Item	Activity	Implementation Schedule	Status	Described in Annual Report Section
NMC 8 Public Notification Additional Activities				
Public Notification	Evaluate feasibility of automated real time notification on the website in conjunction with Cincinnati MSD and ORSANCO.	18-Apr-09	Complete	3.8
	Automate real time hot-line & email notifications.	31-Dec-08	Complete	
	Develop and install signs to put at locations other than CSO outfalls to warn about potential unsafe conditions during and after rainfall events and include the web address where they can get additional information on CSOs. These locations could be locations where the public accesses the Ohio River for recreation such as a marina.	30-Aug-08	Complete	
	Replace all signs with new signs with better graphics in Spanish and English, and with the District's web site address and contact phone number on the sign prompting people to check the website for more information.	31-Jul-08	Complete	
NMC 9 Characterize Overflows				
Infrastructure Characterization	Update and Calibrate Hydraulic Models based on the 12 month Flow and Rain monitoring programs.	31-Jul-08	Complete	3.9.1
Watershed Characterization	Update and Calibrate Ohio River, Licking River, and Banklick Creek Hydrodynamic and Water Quality Models.	29-Aug-08	Complete	3.9.2
CSO Inspections and Monitoring	Test up to three locations for permanent monitoring and real time alarming.	Complete evaluation June 30, 2008	Complete	3.9.3
	Complete monitoring and sampling program of SIUs and CSO Outfalls.	30-Jun-08	Complete	3.9.1

APPENDIX B:

Continuous Sewer Assessment Process Diagram

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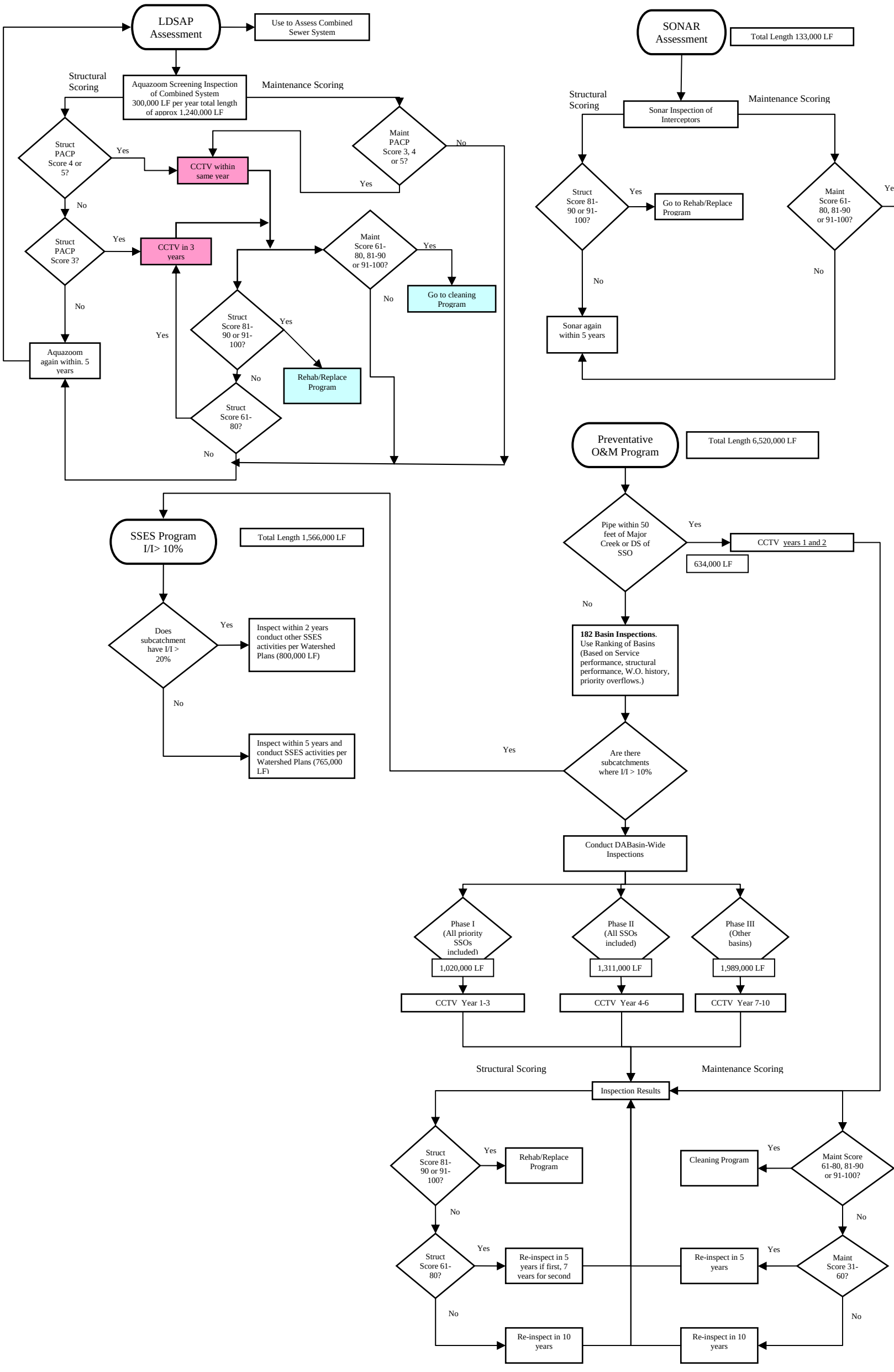
Sanitation District No. 1
Continuous Sewer Assessment Program

Process Diagram
11/17/08

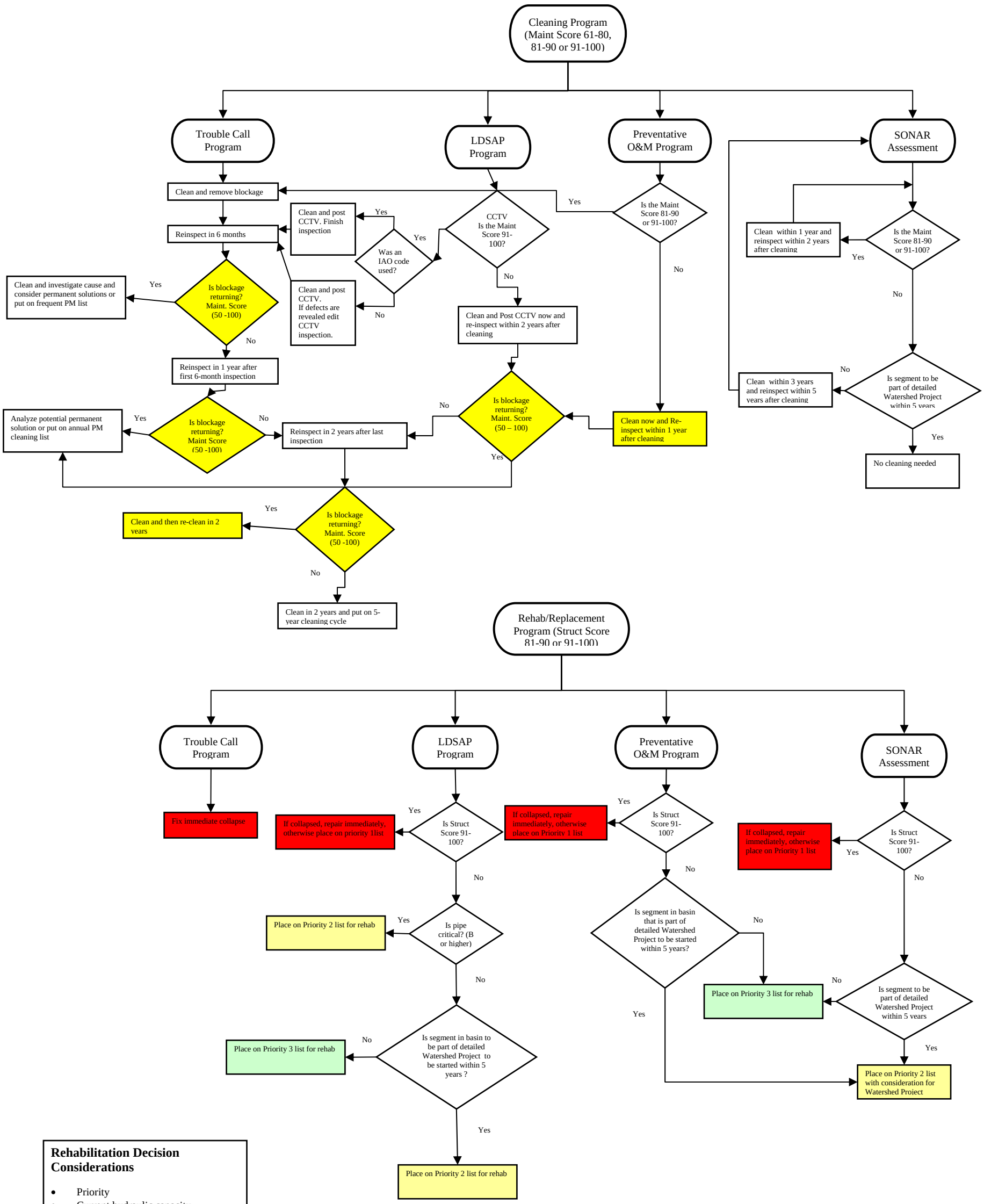
CONFIDENTIAL PRELIMINARY WORKING DRAFT WATERSHED CONSENT DECREE



Sanitation District No. 1
Continuous Sewer Assessment Program

Process Diagram
11/17/08

CONFIDENTIAL PRELIMINARY WORKING DRAFT WATERSHED CONSENT DECREE



Rehabilitation Decision Considerations

- Priority
- Current hydraulic capacity
- Proximity to other pipes (basin basis)
- Watershed Planning
- Extent of defects
- Constructability

APPENDIX C:

Dry Weather Overflow Recommendations

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Dry Weather Overflow Recommendations

ID	Location	Basin	Configuration	ST Orifice Gap (2001)	DWF Bypass Potential	Diversion DWF Bypass Potential Comments	Notes from "leaping weir adjustments.xls"	Notes from CSO Inspection Visit	Notes from ADS email 3/27/07	Handwritten notes on GBA summary	Recommended Action	Action Taken
1870031	47th Street, Covington	Central	Standard horizontal orifice		Known Chronic			Weir fully open; debris noted in street and nearby catch basins		Oveflows due to blockages	Weir is fully open but overflows have continued and appear to be related to debris; examine potential to retrofit or replace catch basins in area to reduce debris.	All tributary catch basins have been retrofitted. Contiinue to monitor.
0820001	4th Street, Newport	East	Weir with Side Outlet		Known Chronic			Upstream catch basins have significant debris.		Bar screen blockage	Clean upstream catch basins. Increase maintenance frequency of diversion bar rack and track performance. Issue work order to remove bar rack if necessary.	Weir wall was raised to reduce DWO's. We inspect daily and clean 2-3 times per week.
0840005	9th & Lowell, Newport	East	Weir with Side Outlet		Known Chronic	Almost bypassing when in field.		2006 blockage was due to grit in the main diversion. 2007 overflow was due to leaky weir. Several washout basins upstream of this diversion.			Replace plate on end of outfall with new weir and proceed with CSAP and monitor performance. Examine potential to replace washout catch basins.	Weir replaced to prevent DWOs and provide inline storage.
1710098	Ash Street, Ludlow	North	Standard horizontal orifice		Known Chronic		Weir plate has been removed.	Diversion is one of the first to activate under Bromley backwater effect - so, this area is part of the Bromley "pool," meaning increased chance for floatables to sit around and block the diversion when levels subside. Diversion is also highly impacted by high river levels, with note that debris is even carried in through outfall sewer. More debris, more risk of diversion blockage when levels subside.			Examine the potential to retrofit or replace the catch basins tributary to the diversion to reduce debris that is contributing to the blockage. Continue tracking performance after Bromley wet-well levels are adjusted as much as possible (being pursued by SD1 under another NMC). Debris conditions contributing to blockages may be reduced. Consider prioritizing this outfall under the upcoming river intrusion prevention program, to be implemented under the Watershed Plan. After installation of river intrusion protection, continue tracking performance; again, debris conditions contributing to blockages may be reduced.	Catch basin retrofits in progress. Bromley wet well settings lowered.
0910055	Eastern Ave. near cross with James Avenue	Central	Standard horizontal orifice		Known Chronic	4 of 6 catch basins upstream are washouts		Weir fully open. Lots of debris in nearby catchbasins.		Oveflows due to blockages	Weir is fully open but overflows have continued and appear to be related to debris; Several basins are washouts -examine potential to retrofit or replace catch basins in area to reduce debris	Catch basin retrofits are complete. Contiinue to monitor.
0770006	Saratoga St, Newport	East	Standard horizontal orifice		Known Chronic			Prior history of grease blockages due to Newport on the Levy. Opened orifice plate.		Debris was caught on bars protecting diversion during the first event in 2006. Bars later removed and subsequent blockages occurred in the main line.	Increase weir height in conjunction with NMC 2 and NMC 6 and track performance as part of simple solids and floatable control pilot to confirm that diversion is not adversely affected. Utilize FOG program to minimize grease from nearby restaruants.	New weir installed to trap solids and floatables. FOG program has reduced grease. Diversion being cleaned after each rain event.
0910027	in Eastern Ave, next to Flood station	Central	Standard horizontal orifice	3"			Adj. weir to fully open	Weir fully open; Problem prior to opening plate		NA	Track performance based on new weir settings.	Continue to monitor performance.
0930041	next to end of E 19th St	Central	Standard horizontal orifice	16"			w/o to remove plate will not fit thru m/h frame.	Weir fully open; Problem prior to opening plate		NA	Track performance based on new weir settings - Issue work order to remove plate if necessary.	The plate has been removed. Continue to monitor performance.
0930066	along Glenway Ave, next to pump station	Central	Standard horizontal orifice	2.5"			weir full open	Weir fully open; Problem prior to opening plate		NA	Track performance based on new weir settings.	Continue to monitor performance.
0930083	cross of Glenway Ave and Durrett St	Central	Standard horizontal orifice	2.5"			adj. weir full open	Weir fully open; no problems since plate was opened		NA	Track performance based on new weir settings.	Continue to monitor performance.
0910025	in the west side of Eastern Ave and near Flood station	Central	Standard horizontal orifice	10"			adj. weir to full limits still has an overhang of approx. 4 inches.	Weir fully open; yard waste is a problem		NA	Track performance based on new weir settings - Issue work order to remove plate if necessary - Examine catch basins in area for possible repairs.	CBs can be replaced or retrofitted to trap debris. Move forward with retrofits.
1420025	cross of E 8th St and Garrard St	Central	Standard horizontal orifice	2.25"			weir adj. 1/4 open will need w/o to move plate it is cemented in place.	Small gap in plate - can't open - mortared in; bad for debris; catch basins need repaired/replaced		Repaired catch basins in this area to keep debris out of system. Has decreased overflows	Track performance based on new weir settings - Issue work order to remove plate if necessary; Continue catch basin repair.	The plate has been removed. Continue to monitor performance.
0910031	along Eastern Ave; next to Flood Station	Central	Standard horizontal orifice	5"			adj. weir to full limits still has an overhang of approx.2 inches.	Weir fully open		Opening gap in leaping weir would solve problem	Track performance based on new weir settings - Issue work order to remove plate if necessary.	Confirm plate has been removed. Continue to monitor performance.
1420079	Eastern edge of 11th St.	Central	Standard horizontal orifice	4"			adjusted weir to full limits still has an overhang of approx. 3-4 inches.	Weir fully open; repaired catch basins significantly reduced overflows		Repaired or replaced catch basins in this area to keep debris out of system. Has decreased overflows.	Track performance based on new weir settings - Issue work order to remove plate if necessary; Continue catch basin repair.	Continue to monitor performance.
0330099	Tower Hill Road	East	Weir with Side Outlet	-		Weir Damaged - H_2S has eaten away at weir wall. (2"-3" to weir)		Comfirm if FM to see if this site activates. (Brandon)			Chalk to confirm activation and evaluate elimination; replace diversion if necessary.	Continue to monitor performance. Manhole is being replaced and outfall pipe is being raised 2ft.
0360018	Anchor Inn (Rte. 8)	East	Elevated Outfall Pipe	-	Possible			Overflow is only 12-inches above dwf pipe			Chalk to confirm issue.	Continue to monitor performance. Dversion manhole and outfall pipe are being modified.
0530058	Wilson Road	East	Bypass Structure	-	Possible			Bypass to culvert under road. To be eliminated by SD1.			Being addressed under Wilson/Water Works Road Improvements.	New sewer completed. CSO eliminated.
0600016	Ward Avenue	East	Standard horizontal orifice	39 inches		Due to screen on incoming flow.					Increase maintenance frequency; Consider removing some or all of bars.	Removed bar racks and opened plate full open.

Dry Weather Overflow Recommendations

ID	Location	Basin	Configuration	ST Orifice Gap (2001)	DWF Bypass Potential	Diversion DWF Bypass Potential Comments	Notes from "leaping weir adjustments.xls"	Notes from CSO Inspection Visit	Notes from ADS email 3/27/07	Handwritten notes on GBA summary	Recommended Action	Action Taken
0610080	Taylor Avenue	East	Special horizontal orifice	8 inches	Known Chronic	Due to screen on incoming flow.		History of blockage in main line & release due to lack of adequate bypass pump capacity. (GBA)			Increase maintenance frequency; Open weir plate and track performance.	Removed bar racks and fully opened plate.
0730028	12th Street	East	Elevated Outfall Pipe	-	Possible						No known history; chalk to confirm; if issue check hydraulics and raise weir	Continue to monitor performance. Weir was raised 12/08.
1480123	Dalton Street	North	Special horizontal orifice	2.5 inches			Weir adjusted 1/4 open		NA	Opening gap in leaping weir would solve problem	Implement simple option first: open weir plate to full extent and track performance.	The plate has been removed. Continue to monitor performance.
1480097	3rd Street at I-75	North	Standard horizontal orifice	2.5 inches			Weir adjusted 1/4 open		Plate was open 5"; ADS removed for meter install	Opening gap in leaping weir would solve problem	Weir plate recently removed; track performance.	Continue to monitor performance.
1490027	Parkway/Highway	North	Standard horizontal orifice	24.5 inches			Weir adjusted 3/4 open		NA	NA	Implement simple option first: open weir plate to full extent and track performance.	Inline storage and new weir wall complete by BCI 4-09.
1710068	Butler Street	North	Standard horizontal orifice	25.5 inches			Weir full open		NA	Removed catch basin lead from diversion manhole. Has decreased overflows.	Track impact of catch basin change.	Replaced CB and outfall. DWO on 3/17/2008 due to mud from high river. Interceptor backed up into diversion. Tideflex valve installed on CSO outfall.
1480129	8th and Philadelphia Street	North	Special horizontal orifice	6.5 inches			Weir adjusted 1/4 open		NA	Replaced and/or repaired catch basins in this D.H. has decreased overflows.	Implement simple option next: open weir plate to full extent and track performance.	Inline storage and new weir wall complete by BCI 4-09.
1480012	3rd Street at Liquor Store (LS)	North	Standard horizontal orifice	9.5 inches			Weir adjusted 1/2 open		Plate is open about halfway	NA	Implement simple option first: open weir plate to full extent and track performance.	Plate has been opened to full extent. Continue to monitor.
1730008	Rohman St.	North	Standard horizontal orifice	28.5 inches			Weir full open			DWO on 3/3/2008 cause - blockage in mainline	Blockage due to construction debris from our construction crews working in the area.	Our construction foreman and crews were instructed about protecting the diversion and dry weather sewer from construction debris during work. Actions will be taken in the future to route flows around the diversion or install a temporary device to keep debris from entering the diversion sewer.
1480103	320 Cresent Ave	North	Weir wall with side outlet								Raise weir to at least top of dry weather pipe.	The weir has been raised.
730009	12th Street	East	Weir wall with side outlet		Known chronic						Raise weir to at least top of dry weather pipe.	Raised weir by 12 inches / modifications were completed 12/08.
1880021	Virginia	Central	Weir wall with side outlet		Known chronic						Raise weir to at least top of dry weather pipe.	Raised weir by 12 inches / modifications were completed 12/08.
690008	Enterprise	East	Weir wall with side outlet		Known chronic						Raise weir to at least top of dry weather pipe.	Remove storm line/raise weir 12" - ongoing.
730028	12th Street	East	Weir wall with side outlet		Known chronic						Raise weir to at least top of dry weather pipe.	Raised weir by 12 inches / modifications were completed 12/08.
600037	Van Voast	East	Weir wall with side outlet		Known chronic						Raise weir to at least top of dry weather pipe.	Raised weir by 12 inches / modifications were completed 12/08.
330099	Tower Hill	East	Weir wall with side outlet		Known chronic						Raise weir to at least top of dry weather pipe.	Replaced manhole-raise outfall pipe 2 feet completed April 2009
340044	Mary Ingles	East	Elevated outfall pipe								Raise weir to at least top of dry weather pipe.	Install elbow 4' above outlet and removed bar - completed 12/08.
270062	Chalfonte	East	Weir wall with side outlet		Chronic						Raise weir to at least top of dry weather pipe.	Raised weir to top of outlet pipe - completed 12/08.

New additions
Configuration considered susceptible to DWO, but no known issue
Visual evidence of recent overflow from field inspections
Input from field crews on weir plate settings
Recurring entries in GBA

APPENDIX D:

Industrial Fire or Spill Postcard

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APPENDIX E:

2008 Targeted Sewer Cleaning Photos

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2008 Targeted
Sewer Cleaning Program

Licking River Interceptor

452 Tons of Debris Removed
7,792 Feet Cleaned / 5, 480 Feet Inspected

Willow Run Interceptor

308 Tons of Debris Removed
4,000 Feet of Line Cleaned and Inspected

Newport Interceptor

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APPENDIX F:

Public Education Print Media

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Not Down My Drain!

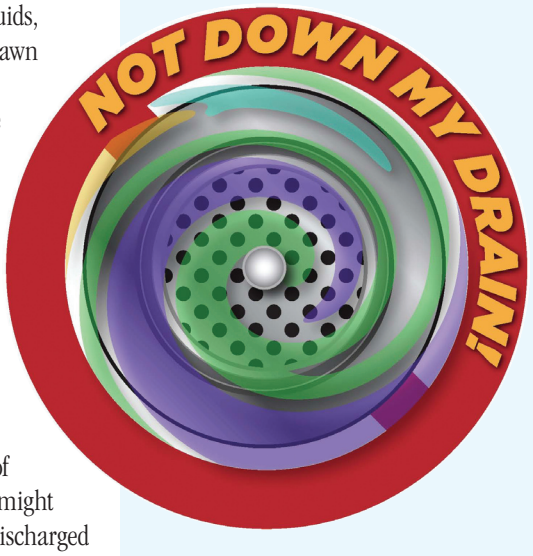
Did you know that what you flush or pour down your drain can affect local waterways and the environment? Protect Northern Kentucky's watersheds by:

- Disposing of household grease (meat fats, lard, cooking oil, shortening, butter and margarine, etc.), diapers, condoms and personal hygiene products in the garbage can.

When flushed or washed down the drain, these materials can clog pipes and cause raw sewage to overflow into your home or yard. In addition, when high flows occur in the sewer system during periods of rainfall or snowmelt, these materials can mix with sewage and be discharged directly into basements, public areas or local rivers and streams.

- Properly disposing household products such as cleansers, beauty products, medicine, auto fluids, used motor oil, paint, and lawn care products at your local household hazardous waste facility.

Wastewater treatment plants are designed to treat organic materials, not hazardous chemicals. When flushed or washed down the drain, these hazardous chemicals can diminish the effectiveness of the treatment process, and might allow contaminants to be discharged into local waterways.



Protect Northern Kentucky's watersheds by properly disposing of household waste materials.

Partnering to Save Money

Sanitation District No. 1 (District) and the Transit Authority of Northern Kentucky (TANK) have partnered to make field trips to Public Service Park, located at the District's main office building, more affordable to local schools.

While the District's educational field trip has always been free, schools were responsible to cover the expense of transportation to and from Public Service Park. Last school year, TANK agreed to use transit buses to provide transportation for each spring field trip. This service will continue during the 2007-2008 school year, for both fall and spring field trips.

TANK will use the commute to and from Public Service Park to educate students on TANK services and what their organization is doing to help protect the environment.

This fall, more than 830 students, teachers and chaperones from local elementary schools were given the opportunity to ride a TANK bus to the District's main office site and experience an interactive tour of Public Service Park.

Students arrive for their field trip on a TANK bus.

Variety of Ways to Pay

Did you know that there are several ways for you to pay your sanitation bill? Using cash, check, Visa, MasterCard or Discover, you can:

- Pay in person by stopping by the District's main office during regular business hours.
- Pay by phone (check payments require an additional fee).
- Mail your payment directly to our lockbox. We provide you with a self-addressed envelope included in your bill.
- Pay online.* This option allows you to pay from a savings account as well as checking account or credit card. In addition, this option allows you the choice of setting up direct withdrawal. When registering, you will need a copy of your original bill.

** Please note that in order to pay online you must register your account and by doing so, you agree to only receive your statements electronically.*

Sanitation District No. 1

Hours of Operation:
Monday-Friday, 8 am-4:30 pm

1045 Eaton Drive
Fort Wright, KY 41017
phone: 859/578-7450

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RETHINK WATERSHEDS
www.sd1.org

Did you know?

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RETHINK WATERSHEDS
www.sd1.org

APPENDIX G:

Pilot S&F Controls Program Observations

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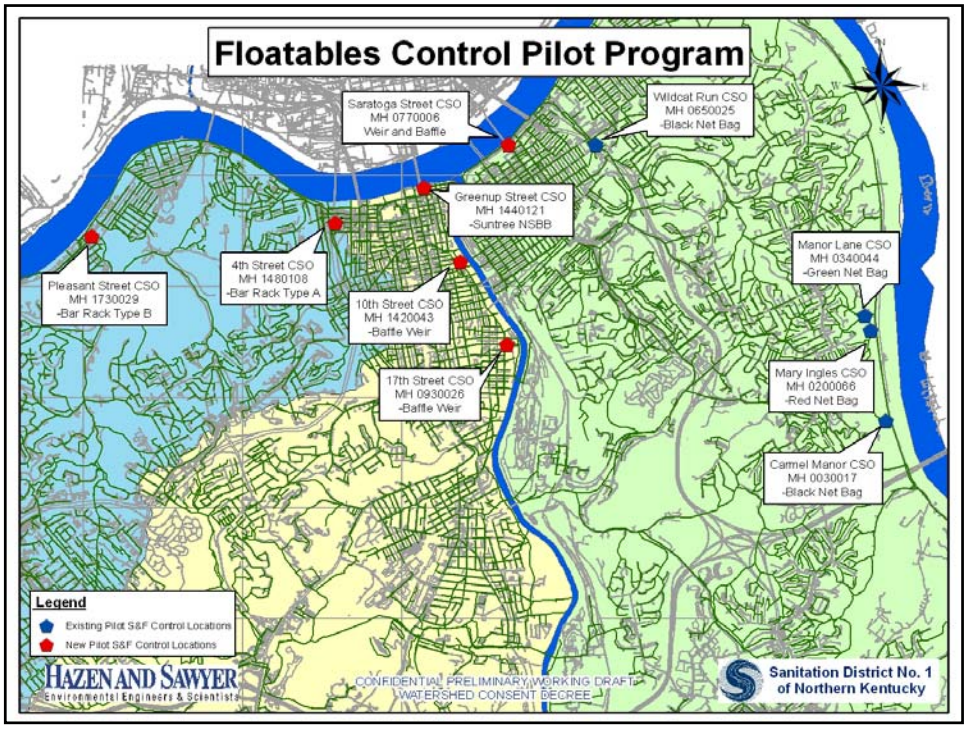
Pilot Solids & Floatables Control Program Observations

Managing Northern Kentucky's Wastewater and Storm Water
SD1

Pilot S&F Control Pilot Program

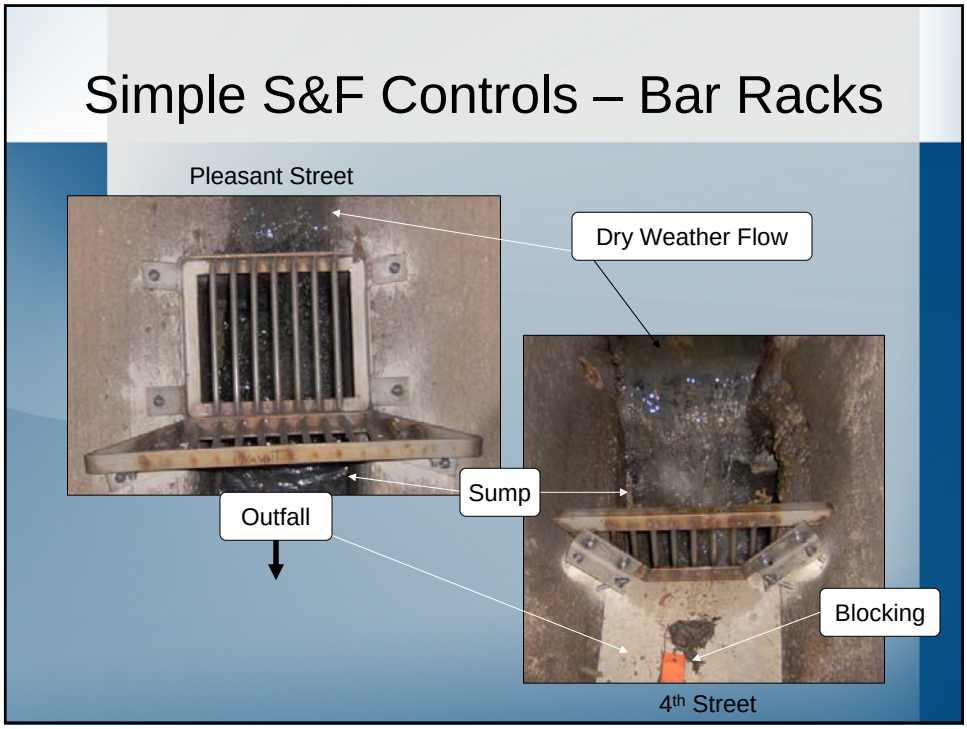
- Implemented pilot program to test effectiveness and maintenance requirements of simple controls
- Observations began in December 2007
  - Observations documented on forms
    - Observed one or more controls during 10 separate storm events through June 2008
    - Good observations from at least 4 events at each location
  - Nets were not observed like simple and constructed controls
    - Replaced and weighed when necessary
    - Replacement and weight input into GBA

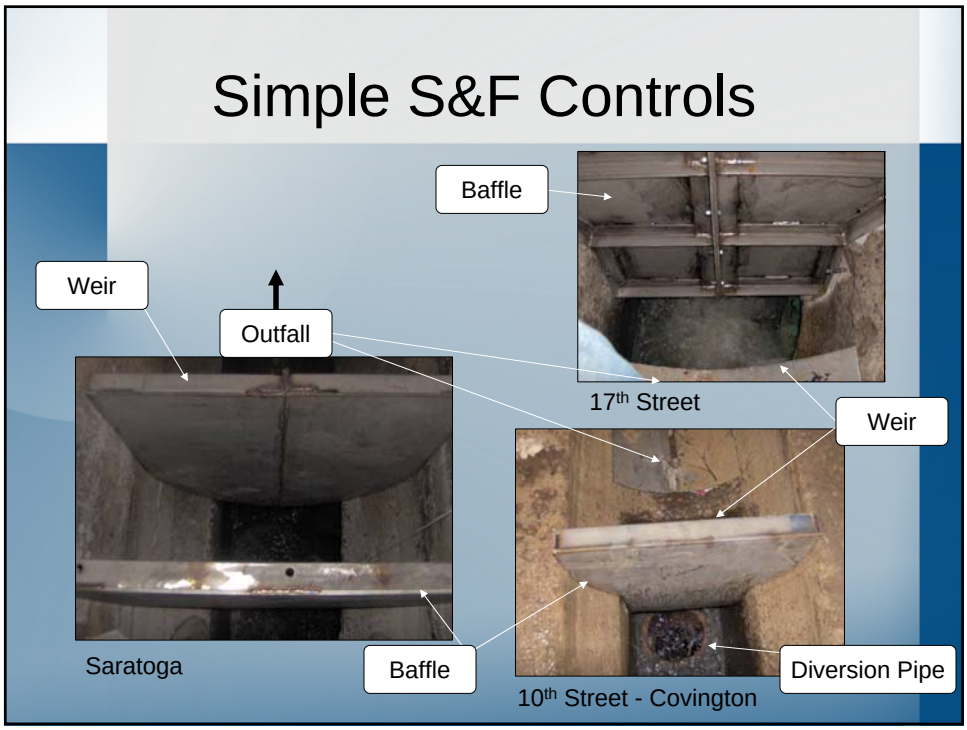


Solids and Floatables Control Pilot Observations
Rainfall and Overflow Statistics

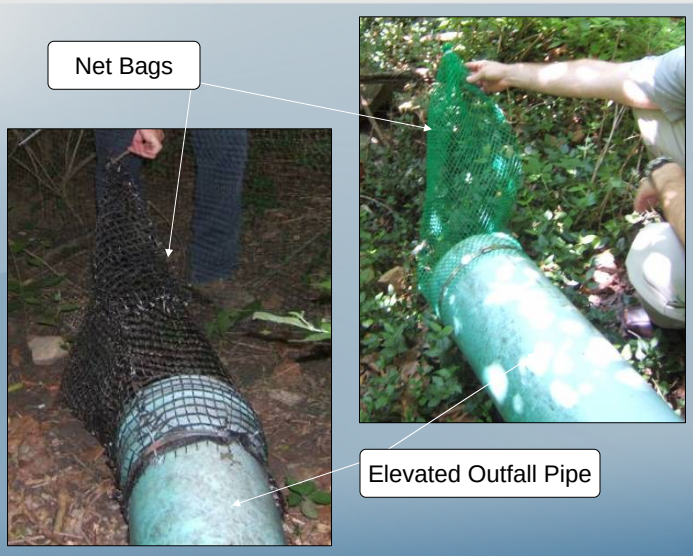
Observ-ation Date	RG-01 Rain Depth (in)	RG-01 Rain Dur-ation	15 min. Depth Return	Total Depth Return	Modeled Overflow Volume (MG)					
					Pleas-ant St	4th St	10th St	17th St	Sara-toga St	Green-up NSBB
12/10/07	1.09	46.83	< 2 mo.	< 2 mo.	0.083	0.078	0.045	0.000	0.180	0.010
12/12/07	0.36	4.00	< 2 mo.	< 2 mo.	0.001	0.007	0.011	0.000	0.044	0.000
12/13/07	0.76	13.17	< 2 mo.	< 2 mo.	0.018	0.020	0.028	0.000	0.083	0.000
12/28/07	0.12	6.92	< 2 mo.	< 2 mo.	0.000	0.000	0.001	0.000	0.004	0.000
12/29/07	0.00	0.00	N/A	N/A	0.00	0.00	0.00	0.00	0.00	0.00
1/8/08	0.51	4.42	< 2 mo.	< 2 mo.	0.078	0.041	0.024	0.000	0.118	0.001
1/29/08	0.66	8.17	< 2 mo.	< 2 mo.	0.003	0.024	0.023	0.000	0.126	0.000
2/5/08	2.25	34.00	4 mo.	6 mo.	0.270	0.193	0.179	0.067	0.656	0.148
3/18/08	4.73	41.42	< 2 mo.	5 yr.	0.481	0.321	0.467	0.000	1.143	0.000
4/3/08	1.88	39.58	< 2 mo.	4 mo.	0.173	0.152	0.142	0.000	0.414	0.019
6/3/08	1.72	8.25	3 mo.	6 mo.	0.225	0.332	0.234	0.068	0.786	0.150

Good event results

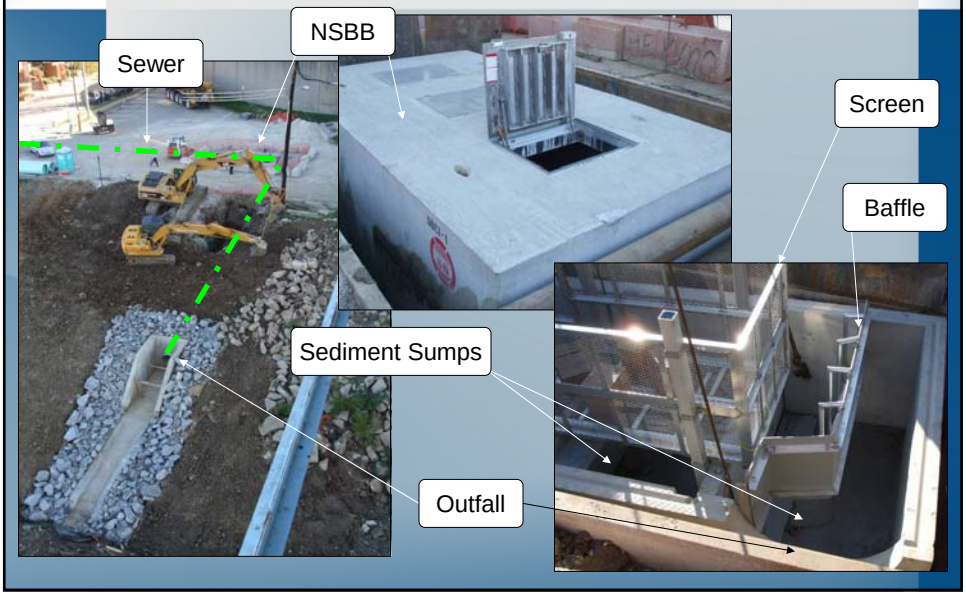

Simple S&F Controls – Bar Racks
Pleasant Street
Dry Weather Flow
Sump
Outfall
Blocking
4th Street


Simple S&F Controls
Baffle
Weir
Outfall
17th Street
Weir
Saratoga
Baffle
10th Street - Covington
Diversion Pipe

Simple S&F Controls – Net Bags



Engineered S&F Control



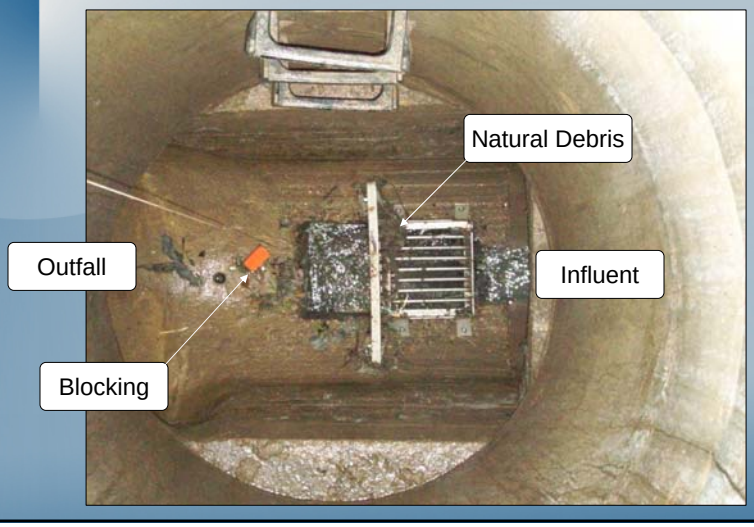
Select Observations

- Pleasant Street
- Bar rack type B
- June 3, 2008 rain event
  - Rainfall duration: 8.58 hrs
  - Event rainfall depth: 1.23 in
  - 15 min. depth return interval: 3 month
  - Total depth return interval: 6 month
  - Modeled overflow: 225,000 gallons

Note: Rainfall statistics are from gage closest to control

Select Observations

- Pleasant Street – Prior to Rain Event



Select Observations

- Pleasant Street – During Rain Event

Select Observations

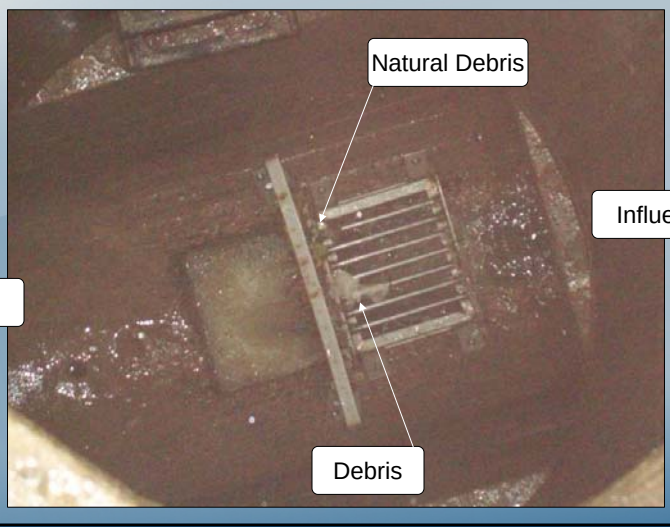
- Pleasant Street – During Rain Event

Select Observations

- Pleasant Street – After Rain Event

Select Observations

- Pleasant Street – After Rain Event



Select Observations

- 17th Street
- Baffle
- June 3, 2008 rain event
  - Rainfall duration: 8.58 hrs
  - Event rainfall depth: 1.69 in
  - 15 min. depth return interval: 3 month
  - Total depth return interval: 6 month
  - Modeled overflow: 68,000 gallons

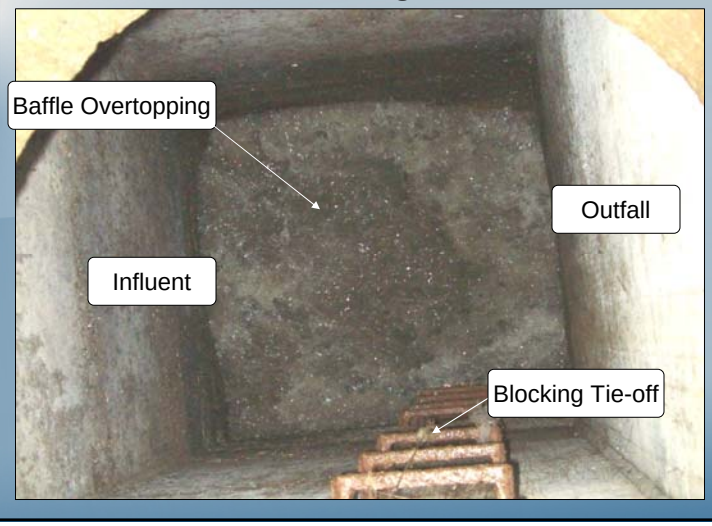
Note: Rainfall statistics are from gage closest to control

Select Observations

- 17th Street – Before Rain Event

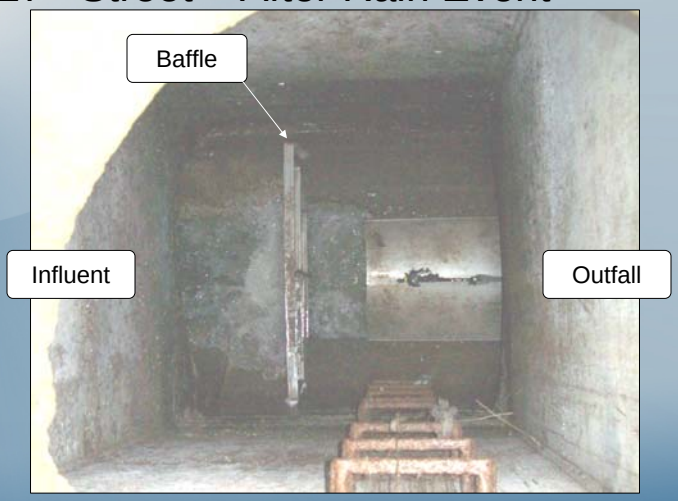
Select Observations

- 17th Street – During Rain Event



Select Observations

- 17th Street – After Rain Event



Logged Net Changes

- Mary Ingles
  - 5 lbs (12/4/07)
  - 6 lbs (12/5/07)
  - 1½ lbs (12/11/07)
  - 8 lbs (12/26/07)
  - 5 lbs (6/19/08)