Wet Weather Team Project Meeting Materials

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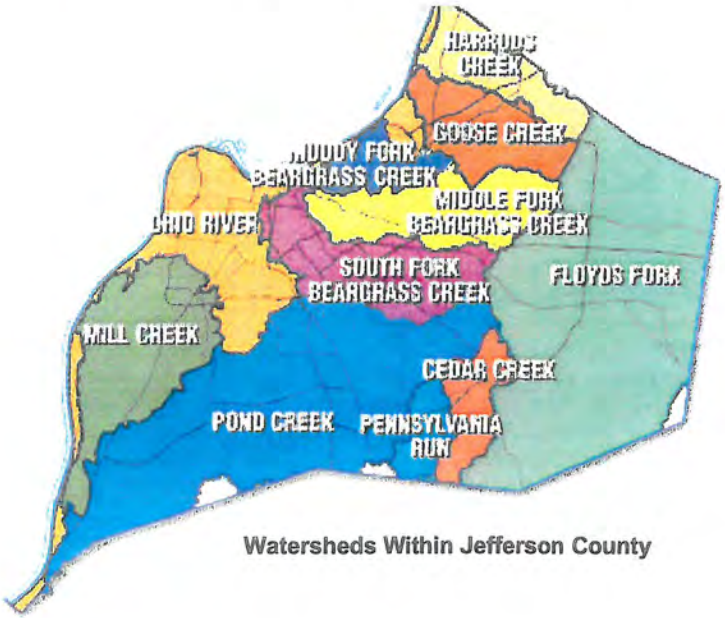
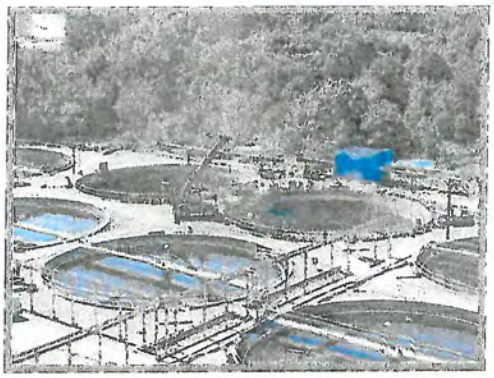
WWT Stakeholders Meeting # 21 9/23/2008

MSD

Louisville and Jefferson County
Metropolitan Sewer District



Watersheds Within Jefferson County



Agenda

Draft Agenda
Louisville and Jefferson County Metropolitan Sewer District (MSD)
Wet Weather Team Meeting #21

Tuesday, September 23, 2008, 4:20-8:30 PM
MSD Main Office, Board Room
700 West Liberty St., Louisville

Meeting Objectives:

- Review and discuss the projects and programs included in MSD's draft Integrated Overflow Abatement Plan (IOAP).
- Learn about the expected water quality benefits of the IOAP and the results of the technical team's analysis of the IOAP with respect to the Wet Weather Team's programmatic values.
- Review and discuss the anticipated costs and rate impacts of the IOAP, the project implementation schedule, and the draft funding plan.
- Review and identify changes needed to the draft Wet Weather Team stakeholder group support memo to the MSD Board and the vision for the IOAP.
- Identify next steps and expectations for the next meeting of the Wet Weather Team.

4:20 PM **Participants Arrive and Get Settled**

4:30 PM **Introductions, Review Agenda and Ground Rules (10 minutes)**

- Review meeting objectives and ground rules.

4:40 PM **Wet Weather Project Updates and Observations (20 minutes)**

- Updates on issues related to the Wet Weather Team Project and follow-up items from the last Wet Weather Team meeting.
- WWT stakeholder updates and announcements.

5:00 PM **Integrated Overflow Abatement Plan Projects Discussion – Part I (60 minutes)**

- Review the anticipated costs and high-level benefits of the IOAP.
- Review the regulatory requirements for the Integrated Overflow Abatement Plan, including the "knee of the curve" analysis, and MSD's anticipated regulatory compliance strategy for the IOAP.
- Learn about the expected water quality benefits of the IOAP and the results of the technical team's analysis of the programmatic values in relation to the IOAP.
- Review and discuss the summary of IOAP projects and programs, including projects to address specific combined and separate sewer overflows, green infrastructure programs and projects, and private property infiltration and inflow (I&I) reduction.

6:00 PM **Dinner Break (25 minutes)**

Dinner will be provided for Wet Weather Team members.

- Note: If needed, there may be small group meetings during dinner for WWT members to discuss the draft education plan and/or the draft monitoring plan.

6:25 PM **Opportunity for Observer Comments (10 minutes)**

6:35 PM **IOAP Projects Discussion – Part II (60 minutes)**

- Review and discuss the anticipated total costs of the IOAP and the associated impacts on MSD's rates.
- Review and discuss the draft implementation schedule for IOAP projects.
- Update on any changes made to the IOAP funding plan based on information about total program costs, rate impacts, and the project implementation schedule.

7:35 PM **Wet Weather Team Stakeholder Support Memo and IOAP Vision (35 minutes)**

- Review the draft Wet Weather Team stakeholder group support memo to the MSD Board and the latest draft of the IOAP vision.
- Identify changes needed to the support memo and/or the IOAP vision based on the Wet Weather Team's deliberations.

8:10 PM **Opportunity for Observer Comments (10 minutes)**

8:20 PM **Wrap Up and Next Steps (10 minutes)**

- Determine whether a follow-up meeting is needed on Wednesday, September 24, 2008, and review plans and expectations for that meeting, if applicable.
- Review the overall process and schedule for finalizing the IOAP by the end of the year, including the Wet Weather Team meeting on Thursday, December 4, 2008.

8:30 PM **Adjourn**

Note: A potential follow-up meeting is scheduled for **Wednesday, September 24, 2008, from 4:30 to 8:30 PM** at MSD's main office. We will determine at the September 23rd meeting whether this meeting will be necessary and whether we will need the full meeting time.

Final Meeting Summary
Wet Weather Team Meeting #21
Tuesday, September 23, 2008
MSD Main Office, Louisville

The Wet Weather Team (WWT), chartered by the Louisville and Jefferson County Metropolitan Sewer District (MSD), met on September 23, 2008, at MSD's main office. The objectives of the meeting were to:

- Review and discuss the projects and programs included in MSD's draft Integrated Overflow Abatement Plan (IOAP).
- Learn about the expected water quality benefits of the IOAP and the results of the technical team's analysis of the IOAP with respect to the Wet Weather Team's programmatic values.
- Review and discuss the anticipated costs and rate impacts of the IOAP, the project implementation schedule, and the draft funding plan.
- Review and identify changes needed to the draft Wet Weather Team stakeholder group support memo to the MSD Board and the vision for the IOAP.

Wet Weather Project Updates and Announcements

The following Wet Weather Project updates and announcements were noted at the meeting.

- Wind Storm: MSD Executive Director Bud Schardein said that MSD had 200 pump stations without primary power during the recent wind storm, yet MSD worked quickly to restore service and reduce overflows. Out of 240,000 customers, there were only 13 basement backups from the storm. MSD also used tanker trucks to haul over 1 million gallons of wastewater that would have otherwise been discharged into buildings or local waterways.
- Green Solutions and Summit Held in August 2008: Mr. Schardein noted that the Louisville and Jefferson County community will be seeing a lot more "green" solutions and water quality benefits over the period that the IOAP will be implemented. In addition to the necessary water quality improvements from the IOAP, there will also be changes to stormwater management. MSD organized a "summit" in August 2008 with the Louisville Mayor, the President of the University of Louisville, the Superintendent of Jefferson County Public Schools, and Louisville Metro Government Department Heads. At the meeting, Strand Associates presented a potential vision for green infrastructure in the community based on the analysis conducted by MSD's IOAP technical team. The agencies agreed to share information on capital projects and coordinate to improve water quality.
- Regional Best Management Practices Manual: MSD has been coordinating with other local communities on developing a regional manual on best management practices (BMPs) for stormwater management. MSD is working on updating the design manual, including incorporating some suggestions from WWT members.
- Partnership for a Green City: MSD is an active participant in the Partnership for a Green City, which now has a Stormwater Committee. As part of this effort, MSD is evaluating options to offer credits for stormwater reduction.
- EPA Green Infrastructure Workshop: Brian Bingham of MSD noted that EPA plans to host a national workshop on green infrastructure in Louisville this fall, probably in November. This workshop will be open to the public and will include presentations on a variety of topics.

- MS4 Program: MSD and other agencies that share responsibility for the municipal separate storm sewer system (MS4) program will be working on revisions to the permit. The draft MS4 permit for Lexington, KY is currently out for public comment; the draft MS4 permit for Louisville could potentially be released in November 2008. Brian Bingham of MSD offered to potentially host a meeting with WWT members and others who might be interested in providing input on the program.
- Beargrass Creek TMDL: Gary Swanson of CH2M HILL said that the Kentucky Division of Water released the draft total maximum daily load (TMDL) allocations for fecal coliform in Beargrass Creek. The draft TMDL report is out for public review; it is available from www.water.ky.gov. The draft TMDL calls for CSOs and non-point source pollution to each be reduced by 95 percent.

Project WIN Integrated Overflow Abatement Plan Discussion

Angela Akridge of MSD and Gary Swanson of CH2M HILL presented an overview of MSD's IOAP program. Highlights of the program include the following.

- CSO controls achieve approximately 95 percent wet weather capture. This level of control complies with EPA's CSO Policy, and remaining overflows do not "cause or contribute" to water quality standards violations.
- SSO controls eliminate all documented and suspected SSOs up to at least a 2-year design storm, removing an average of 290 million gallons of overflow volume per year (based on an average of 2005–2007). This level of SSO control accepted elsewhere in EPA Region 4.
- The IOAP includes 65 gray infrastructure projects across Jefferson County (including conveyance, storage, and treatment projects), along with inflow and infiltration (I/I) reduction and green infrastructure programs.
- The proposed construction and implementation schedule meets all consent decree requirements.
- The estimated capital costs are $843 million, which is consistent with preliminary planning numbers.
- Estimates of consent decree rate impacts previously presented are consistent with projected consent decree cash flow.
- The IOAP is being leveraged to support other community water quality programs. Implementing the IOAP is a substantial and critical building block for overall water quality improvement.

As part of this presentation, Mr. Swanson and Ms. Akridge reviewed examples of "knee of the curve" cost-effectiveness graphs, the Green Cost Tool used in the design of green infrastructure components of the IOAP, the results of the technical team's evaluation of the IOAP in terms of the WWT's programmatic values, and the additional work remaining to complete the IOAP by the end of the year.

WWT members asked a number of clarifying questions in response to the presentation and also provided the following comments.

- A few WWT members asked whether more information was available about the numbers of projects that provided benefits to specific values, such as the numbers that were presented for the asset protection value. Gary Swanson of CH2M HILL said that those analyses could be done.
- In response to a question about project locations, members of the technical team referred to a map of CSO projects posted on the wall that had circles drawn on it showing the general areas where project sites could be located. In addition, in the Draft IOAP that will be released for public review there will be a project map for each project. Many of the potential project sites are on public properties.
- A few WWT members noted that it could be useful to have information about other project alternatives that were considered, but not selected. In answering questions from the public, it would

be helpful to be able to explain how the benefits of one project site (or project type) outweigh those of other alternatives.

- Several WWT participants commented on the need for a robust process to engage the public in areas that will be affected by IOAP projects. It will be important to have full disclosure and transparency.
  - MSD said that in addition to releasing the Draft IOAP for public comment and holding a series of Project WIN public meetings about it this fall, MSD would also do its regular practice of public outreach for every construction site (e.g., design meetings, "pardon our dust" meetings, etc.).
  - WWT members suggested potentially involving Metro Council members to assist with setting up public meetings and engaging with community leaders regarding IOAP projects.
- Some WWT members asked whether it would be possible for MSD to work with other agencies to increase the implementation levels for green infrastructure solutions beyond the levels shown in the Green Cost Tool. MSD noted that the green infrastructure incentive programs will be designed to leverage additional private and public investment in green infrastructure.
- Some WWT members noted that it will be important for MSD to monitor green infrastructure projects and report back to the community about the results they achieve. A few WWT members added that additional water quality monitoring would also be useful to show the program's benefits.
- Other general comments WWT stakeholders made about the IOAP program included:
  - The IOAP shows the significant amount of work that MSD and the technical team have done. The IOAP is based on a systematic, thorough analysis, and the results are consistent with the community values the WWT identified at the beginning of the process.
  - There will be challenges ahead with the public process around the IOAP (hence the need for a robust process, as noted above); however, participants also expressed hope that the public will understand how both green and gray solutions work to improve water quality in the community.
  - Some WWT members noted that they appreciated that the program meets EPA's baseline requirements and that the program is front-loaded with a heavy emphasis on green solutions.

After taking comment, the facilitation team asked members to provide their overall impressions of the IOAP as reflected in the presentations by Gary Swanson and Angela Akridge. All stakeholder group members present at the meeting indicated support for the IOAP, and many members were complimentary of the Technical Team and MSD for the work they had done on the plan.

Draft WWT Stakeholder Memorandum and Integrated Overflow Abatement Plan Vision

Rob Greenwood of Ross & Associates reviewed the major changes made to the draft WWT stakeholder support memo and IOAP vision since the version that was distributed to the Wet Weather Team in August 2008. These changes included incorporating information about the CSO, SSO, and green infrastructure projects proposed in the IOAP (project types, numbers, and control levels); listing the specific anticipated water quality benefits from the IOAP; adding details about MSD's work to collaborate with other entities on community water quality improvements; and including a list of the stakeholder members of the WWT.

WWT comments on the draft WWT stakeholder support memo and IOAP vision included the following.

- A few WWT members commented on the opening paragraph of the draft WWT stakeholder support memo, which included language that the stakeholders had "unanimous support" for the IOAP.
  - WWT members noted that the WWT will not have had the time to review the full draft of the IOAP, so the opening paragraph should be revised to be more accurate with respect to the stakeholder group's role (e.g., the WWT stakeholder group's support could be tied to the vision for the IOAP, which the WWT developed, but not the entirety of the plan).

- WWT members also commented that the WWT's support for the IOAP program is based on the information that has been provided and on the WWT's current understanding of the program.
- A few WWT stakeholder commented that the opening paragraph should reflect strong support from the WWT for MSD's program, even if the word "unanimous" is not used.

- Several WWT stakeholders commented that there should be more than one rain garden project in MSD's IOAP. With regard to the proposed initial set of green infrastructure demonstration projects, WWT members asked, "Where's the 'wow' factor?"
  - A few WWT stakeholders suggested that green infrastructure projects should be placed where a lot of people would see them.
  - Some WWT participants said that it could also be useful to highlight the green projects that are already in the community to help raise awareness.
- A few WWT participants expressed interest in the community's MS4 stormwater program and the additional green projects would be undertaken in the context of MS4 implementation.

Observer Comments

Two observers commented at the WWT meeting, as follows.

- One observer asked a series of questions related to how the IOAP would address sewer overflows near and upstream of Cherokee Park and overflows in the Beechwood Village area. Members of the technical team and MSD responded by indicating that all SSOs would be eliminated with the IOAP, to a minimum control level of a two-year design storm. MSD's IOAP will also address CSOs near Cherokee Park and eliminate the need to pump overflows in Beechwood Village.
- Another observer commented that it was unclear whether there would be an ordinance or other regulations to enforce behavior changes. MSD indicated that the IOAP does not require an ordinance, since that would need to be adopted by Metro Government. MSD has researched ways to control I/I from private properties, including a potential ordinance. The technical team's analysis has shown that controlling private sources of I/I will be important to overall IOAP success.

Wrap Up and Next Steps

- The facilitation team will revise the draft WWT stakeholder support memo and IOAP vision based on the meeting's discussions, and will circulate revised drafts to WWT members for review the week of September 29, 2008. After hearing from WWT members, the facilitation team will work with MSD, the technical team, and WWT stakeholders to finalize the documents so they can be submitted to the MSD Board with the draft IOAP by October 15, 2008.
- The MSD Board will meet on October 27, 2008 to review the draft IOAP, and soon after the Board meeting MSD will release the draft IOAP for a 30-day public comment period.
- MSD will schedule a series of Project WIN public meetings and a formal public hearing during the public comment period. Wet Weather Team members are encouraged to attend the public meetings.
- The next Wet Weather Team meeting will be on December 4, 2008. Potential meeting topics include:
  - Review comments on the draft IOAP from MSD Board and members of the public;
  - Discuss proposed responses and changes to the IOAP; and
  - Discuss the final draft WWT stakeholder support memo and IOAP vision (for inclusion with the final IOAP MSD will submit to EPA and the Kentucky Division of Water by the end of 2008).

Meeting Participants

Wet Weather Team Stakeholders

Susan Barto, Mayor of Lyndon
Stuart Benson, Louisville Metro Council, District 20
Charles Cash, Louisville Metro Planning & Design Services Department
Allan Dittmer, University of Louisville
Laura Douglas, E.ON U.S. LLC
Faye Ellerkamp, City of Windy Hills
Arnita Gadson, West Jefferson County Community Task Force / Kentucky Environmental Quality Commission
Mike Heitz, Louisville Metro Parks Department
Tom Herman, Zeon Chemicals
Rick Johnstone, Deputy Mayor, Louisville Metro Mayor's Office
Bob Marrett, CMB Development Company
Kurt Mason, Jefferson County Soil and Water Conservation District
Judy Nielsen, Louisville Metro Department of Public Health and Wellness
Bruce Scott, Kentucky Waterways Alliance
Tina Ward-Pugh, Louisville Metro Council, District 9
David Wicks, Jefferson County Public Schools

MSD Personnel

Angela Akridge, MSD Regulatory Policy Manager
Brian Bingham, MSD Regulatory Management Services Director
Mark Johnson, MSD Director of Engineering/Operations and Chief Engineer
Bud Schardein, MSD Executive Director

Facilitation and Technical Support

Rob Greenwood, Ross & Associates Environmental Consulting
Gary Swanson, CH2M HILL
Jennifer Tice, Ross & Associates Environmental Consulting

Meeting Observers

Nathalie Andrews, Portland Museum
Susan Bahng, O'Brien & Gere
Gary Boblitt, HDR
Jim Bruggers, Courier-Journal
Kristen Crumpton, Tetra Tech
Samantha Davis, Louisville Metro Council, District 9
Steve Emly, MSD
Marion Gee, MSD
Kandris Goodwin, MSD
Justin Gray, MSD
Sue Green, MSD
Derek Guthrie, citizen
Teena Halbig, Floyds Fork Environmental Association (FFEA)
Jim Huiting, Tetra Tech

Clarence Hixson, citizen
Clay Kelly, Strand Associates
Tim Kraus, O'Brien & Gere
John Lyons, Strand Associates
Chad McCormick, Stantec
Matt Meunier, City of Jeffersontown
Phil Scott, O'Brien & Gere
Wesley Sydnor, MSD
Ram Vliddagiri, The Corradino Group
Major Waltman, Louisville Olmstead Park Conservancy (LOPC)

Meeting Materials

- Agenda for the 9/23/08 WWT Meeting
- Wet Weather Team Meeting Schedule (updated September 2008)
- Summary of the 7/15/08 WWT Meeting
- WWT Idea List Crosswalk
- Draft Post Construction Compliance Monitoring Plan
- Draft IOAP Public Program Plan
- Project WIN Integrated Overflow Abatement Plan Presentation
- Integrated Overflow Abatement Plan Project Summary
- CSO Long Term Control Plan Recommended Projects
- Sanitary Sewer Discharge Plan Recommended Projects
- Green Cost Tool – Combined Sewer Area Evaluation
- IOAP Preferred Project List Draft Schedule
- Draft WWT Stakeholder Support Memo and IOAP Vision (9/23/08 Draft)

Wet Weather Team Meeting Schedule
(as of September 2008)

Meeting Number	Date	Location
2006 Wet Weather Team Meetings		
1	Thursday, July 20, 2006	MSD Central Maintenance Facility
2	Tuesday, August 15, 2006	Morris Forman Wastewater Treatment Plant
3	Tuesday, September 12, 2006	MSD Central Maintenance Facility
4	Tuesday, December 5, 2006	MSD Central Maintenance Facility
2007 Wet Weather Team Meetings		
5	Thursday, January 18, 2007	MSD Central Maintenance Facility
6	Tuesday, February 13, 2007	MSD Main Office, Downtown Louisville
7	Thursday, March 15, 2007	MSD Main Office, Downtown Louisville
8	Thursday, April 19, 2007	MSD Main Office, Downtown Louisville
9	Tuesday, May 22, 2007	Floyds Fork Wastewater Treatment Plant
10	Thursday, June 21, 2007	MSD Main Office, Downtown Louisville
11	Thursday, August 2, 2007	MSD Main Office, Downtown Louisville
12	Thursday, September 20, 2007	MSD Main Office, Downtown Louisville
13	Thursday, October 18, 2007	MSD Main Office, Downtown Louisville
14	Thursday, December 6, 2007	MSD Main Office, Downtown Louisville
2008 Wet Weather Team Meetings		
15	Tuesday, January 15, 2008	MSD Main Office, Downtown Louisville
16	Tuesday, February 26, 2008	MSD Main Office, Downtown Louisville
17	Thursday, April 3, 2008	MSD Main Office, Downtown Louisville
18	Thursday, May 15, 2008	MSD Main Office, Downtown Louisville
19	Thursday, June 19, 2008	MSD Main Office, Downtown Louisville
20	Tuesday, July 15, 2008	MSD Main Office, Downtown Louisville
21	Tuesday, September 23, 2008 & Wednesday, September 24, 2008	MSD Main Office, Downtown Louisville
~~22~~	~~Thursday, November 20, 2008~~ **(Meeting Rescheduled)**	~~MSD Main Office, Downtown Louisville~~
22	Thursday, December 4, 2008 **(New Meeting Date)**	MSD Main Office, Downtown Louisville

Wet Weather Team Idea List Crosswalk
Working Draft – September 10, 2008

The following is an annotated list of the solution ideas, education and outreach ideas, and data requests and monitoring suggestions identified by Wet Weather Team (WWT) members. The Louisville and Jefferson County Metropolitan Sewer District (MSD) has reviewed these ideas over the course of the WWT process and has included many of the ideas in MSD's draft Integrated Overflow Abatement Plan (IOAP). Other ideas have not been included in the IOAP because they were not feasible or out of scope.

Color Guide

This document uses color-coded annotations to distinguish between items that were considered and/or are included in the IOAP and items that were not considered or not included in the IOAP.

Annotation	Color Guide
[Included], [Implicitly Included], [Considered]	Items that are followed by **green text** were considered for the IOAP and are either included or implicitly included in the IOAP.
[Considered, But Not Included]	Items that are followed by **red text** were considered but not included in the IOAP.
[Not Considered, Out of Scope]	Finally, items in **blue text** were not considered as they were considered to be out of scope.

When known, additional notes about how MSD and the technical team have addressed an idea is provided. The idea lists appear in this document in this order: (1) solution ideas, (2) education and outreach ideas, and (3) data requests and monitoring suggestions. The ideas and numbering systems from the idea lists have not changed, but annotations have been added.

What's New (July-September Updates to the Idea Lists)

Solution Ideas

1. (II-A-10) – Consider alternatives for the billing structure that would address the communication challenges associated with having a separate consent decree surcharge. Suggestions include:
    a. Get rid of (or phase out) the separate consent decree surcharge. **[Phase out is under consideration and will likely be recommended by staff – final decision is by MSD Board]**
    b. Increase the consent decree surcharge so it covers all of the capital costs for constructed consent decree projects. **[Considered, but determined to be difficult to implement due to an inability to definitively separate the consent decree (CD) costs from non-consent decree costs]**

Education and Outreach Ideas

1. (I-B-12-f) – Find a truthful and transparent way to explain the rate increases to the public, including describing what the rate increases are paying for (consent decree and other expenditures). **[Will be included in presentation made for final round of public meetings]**

Data Requests and Monitoring Suggestions

1. (I-A-10) – Prepare a chart showing how a typical bill would change each year, including the wastewater and drainage fees and the consent decree surcharge. Also, show how MSD's rates compare to those of other communities. **[Have distributed this information to the stakeholder group, and will include this in presentation made for final round of public meetings.]**

2. (I-A-11) – Provide a breakdown of the anticipated consent decree capital expenditures and anticipated other capital expenditures each year of funding the consent decree. **[Will be addressed in cash flow discussion, IOAP Vol. 1, Ch. 6]**
3. (I-A-12) – Additional explanation of the IOAP and examples of how the consent decree has changed (or will change) the schedule of other MSD projects. **[Will be included as part of overall cash flow discussion, IOAP Vol. 1, Ch. 6.]**

Solution Ideas

I. Project Alternatives

A. Stormwater Best Management Practices (Non-Structural)

1. Influence behavior of residential and commercial landowners through education. [Note: See the Education and Outreach Idea List for more ideas about educational efforts to influence behaviors.] **[Included in Project WIN Public Information, Education, and Involvement Plan (Education Plan) IOAP Vol. 1, Ch. 6]**
    a. Promote water conservation practices: rain gardens, rain barrels, and responsible alternatives for sump pumps and downspout connections.
    b. Encourage stewardship: removing invasive vegetation from riparian zones, planting wetlands, litter cleanups, etc.
    c. Conduct education on environmentally sustainable ways of using fertilizer and weed killer, and other stormwater best management practices to neighborhood groups.
    d. Discourage chemical treatment of and mowing near waterways to help keep debris from waterways.
2. Regularly distribute billing inserts (like LG&E's) to MSD customers with facts and tips to encourage certain behaviors (e.g., lawn chemical management, pet waste management, landscaping practices). **[Included in Education Plan]**
3. Conduct a baseline survey and follow-up surveys of residents to determine whether education and outreach efforts are effective in changing behavior and perceptions on issues related to the IOAP. **[Included in Education Plan]**
4. Hold "CSO Action Days" during or right after a hard rain to promote behavior change (e.g., don't use your dishwasher, wait to do your laundry, etc.). [Note: More details on this idea are in the Education and Outreach Ideas List.] **[Considered for Education Plan]**
5. Encourage the use of best management practices for chemical use in lawn management practices. **[Considered but out of scope for IOAP, will be referred to the municipal separate storm sewer system (MS4) program]**
    a. Inform greens keepers about best management practices (BMPs), since non-point source runoff is made worse by golf course chemicals.
6. Develop a pledge for customers that clearly lays out behaviors that will help MSD meet Consent Decree requirements. For an example, see http://www.watershedpledge.org (see also II-C-4). **[Considered for Education Plan, something similar is planned under recognition program]**
7. Invite people to "join" Project WIN by installing rain gardens, rain barrels, reducing their use of lawn chemicals, etc. **[Included in Education Plan]**
    a. Add a page to MSD's website where people can submit notes or pictures of their efforts.
    b. Give out plaques or other awards to those who "join."

B. Stormwater Best Management Practices (Structural, including Green Infrastructure Solutions)

1. Use landscaped areas to control stormwater runoff. **[Included in Green Infrastructure Projects and Programs]**
2. Encourage homeowners to construct rain gardens and use rain barrels. **[Included in Green Infrastructure Programs and Education Plan]**
3. Install French drains along roads to accept stormwater runoff (see also detailed suggestions listed for Beechwood Village below). **[Considered, but not included; green streets are the preferred approach]**
4. Develop specific design parameters or standards for stormwater best management practices and low impact development techniques and include these in an MSD Design Manual. The Design Manual should provide guidance for approaches including, but not limited to, the following:
    a. Pervious pavement
    b. Level spreaders
    c. Riparian buffers
    d. Vegetated swales
    e. Wet ponds
    f. Wet ponds with forebays (small basins that settle out incoming sediment before it is delivered to a stormwater BMP)
    g. Wetlands

    [Will be addressed in MS4 program]
5. Consider incorporating aspects of the LEED green building standards into MSD design manuals for structural BMPs. **[Considered but will not be required, incentives are the preferred approach]**
6. Increase tree canopy. **[Included in Green Infrastructure Projects and Programs]**
    a. Ensure that urban CSO areas have at least a 30 percent tree canopy.
    b. Initiate a tree-planting program with a goal to increase tree canopy in neighborhoods.
7. Work with the community group "Women of Vision" to create a meditation garden in the West End that could also act as a rain garden or roof runoff demonstration. **[Considered but not included due to difficulty with site selection and liability issues]**
8. Conduct demonstration projects. [Note: Overlaps with demonstration projects in Education and Outreach Ideas List.] Specific ideas for projects include: **[Included in Green Infrastructure Projects and Education Plan]**
    a. Create a demonstration area in each Jefferson County watershed to demonstrate and interpret healthy stream habitats and what MSD is doing to study and protect them. **[Considered]**
    b. Create some sustainable lawns as pilot projects. **[Not included – Sustainable lawns are not part of green infrastructure projects for runoff reduction]**
    c. Develop a green infrastructure best management practice site similar to SD1 (Sanitation District Number 1 of Northern Kentucky). **[Under active consideration]**
    d. Add green demonstration/education facilities to old urban schools. **[Considered]**
    e. Use the Butchertown Greenway Pump Station that is offline for an education and demonstration facility. **[Considered but not included]**
9. Plant native plants with deep root systems. **[Included as part of Green Infrastructure rain gardens and green streets]**

10. Maintain existing detention/retention basins – many may not function properly due to lack of maintenance. **[Implicitly Included for MSD owned facilities, primarily an MS4 issue for non-MSD facilities]**
11. Design structural stormwater best management practices to be multiple use and eco-friendly. **[Implicitly Included, see Eco-Friendly Solutions Performance Measurement Matrix]**
    a. Design detention ponds and stream buffers for recreational use.
    b. Make use of detention facilities as sports fields
    c. Incorporate trails along streams to provide recreational opportunities.
12. Convert alley stormwater systems into infiltration systems using pervious pavement. **[Included in Green Infrastructure Projects]**
    a. Potential areas could include the central business district and the west end.

C. CSO and SSO Point Source Controls

1. Disconnect downspouts and/or sump pumps (e.g., by developing educational initiatives aimed at landowners). **[Included in Green Infrastructure Programs and Education Plan]**
    a. One potential target for a downspout disconnection program could be school buildings.
2. Yard signs similar to those used in Portland's residential Downspout Disconnection Program could be useful for education and outreach about MSD's IOAP. [Note: This idea overlaps with the Education Ideas List.] Specific ideas for signs include: **[Included in Education Plan]**
        i. Messages such as "I disconnected my downspout" and/or "I have a rain barrel."
        ii. The bottom of the sign could invite readers to "ask me" for more information.
3. Increase enforcement and inspections of downspout and sump pump connections. **[Considered, see January 2008 Ordinance Presentation]**
    a. Incorporate inspections into the property-transfer process (e.g., as another inspection with the sale of existing homes). For example, MSD could deputize the state plumbing inspector, which has the authority to go into private property, to conduct inspections of downspouts. MSD could pay on a per building basis for those inspections. **[Considered, see January 2008 Ordinance Presentation]**
4. Look at large parking lots as potential sites for wastewater storage facilities. Organizations might be willing to have a covered storage facility built below a ground-level parking lot. In addition, there could be opportunities to add value for the property owner, by building a parking garage as a replacement and/or by providing credit for any non-point source pollution reduction associated with the project. **[Considered, will implement storage under Public Works East Yard, and potentially under a privately owned car wash]**
5. Repair and seal all building laterals. **[Considered and included in infiltration and inflow (I&I) reduction plans]**
6. Act on any sump pump or other illegal connection issues uncovered during the course of MSD's regular operations and maintenance work on the sanitary and combined sewer systems. **[Implicitly Included]**

D. General/Other Solutions

1. Leverage and coordinate the IOAP efforts with MSD's MS4 stormwater management permitting responsibilities. **[Included in Vision]**
2. Conduct green infrastructure demonstration projects with monitoring components built in, to help demonstrate the overall effectiveness of green infrastructure solutions. **[Included]**

a. Start with small, visible projects ("quick wins" – e.g., in a particular neighborhood, near a Rubbertown plant). **[Included]**

3. Preserve rural character where possible. **[Considered as part of benefit cost performance evaluation framework]**
4. Create a localized resource database to support green infrastructure development efforts (e.g., provide information on contractors that install pervious pavements). Specific ideas include:
    a. Develop a list of environmentally approved chemicals for use in lawn/landscape management.
    b. Landscape architects could provide green options for projects and developments.

    [Assigned to Stormwater Committee of The Partnership for a Green City (Green City Partnership)]
5. Do not rule out flow-reduction techniques to address SSOs for any watershed. **[Implicitly Included – I&I reduction assumptions built into the development of SSO projects]**
6. Look at combining different types of control options, including opportunities to reduce flows of water into the sewer system (e.g., from housing units) in tandem with other types of solutions. For example, combining storage and flow-reduction approaches could make it possible to use a smaller-sized storage facility. **[Included, see Vision and CSO Understandings Document]**
7. Involve community members in addressing the root causes of SSOs (e.g., by working with the Metro Council, community organizers, and neighborhood groups). **[Included in Education Plan]**
8. Challenge preconceived notions of what U.S. EPA will accept in terms of the role of source control in an SSO elimination plan. **[Implicitly Included, see SSO Understandings Document]**
    a. Use technical feasibility and cost effectiveness as the primary basis for deciding the level of source control to meet regulatory compliance obligations, and work with relevant regulatory bodies to justify the basis for this approach. **[Implicitly Included, see SSO Understandings Document]**
9. Consider wet weather sewer overflow control strategies that reduce future maintenance issues. **[Considered, benefit-cost ratio based on Total Present Worth Costs that include future maintenance costs]**
10. When choosing initial green infrastructure projects, consider avoiding areas where there were problems with seepage and backups during the 1997 storm, as it may be useful to avoid known problem areas. **[Considered, green infrastructure program includes recommendation of site-specific geotechnical evaluations]**

E. Site-Specific Solutions (Considered in Addition to the Solutions Listed Above)

Beechwood Village

1. Construct a park-like wet detention area in the wooded area of St. Matthews Park. **[Considered, but not included since the park is outside the CSO area, and St. Mathews Park handles its own drainage]**
2. Install new sanitary lines and laterals to homes, and pumps for basement facilities when requested by the homeowner. **[Considered and included in final design]**
3. Install French drains on either side of roadways to accept stormwater runoff. The drains would be continuous trenches filled with gravel and covered by turf. The drains could also accept discharges from sump pumps and downspouts. **[Considered but not included, selected approach installs new sanitary sewers and reuses existing sewers for stormwater and sump pump discharges]**

4. Install perforated pipe in the French drains so they can discharge more freely when they flood. The piped drain system would need to be a combination of gravity and pump depending on the topography and discharge point(s). **[Considered, but not included, as green streets are the preferred approach]**
5. If a solid pipe system is used, the system could discharge to constructed wetlands designed to treat stormwater. Possible sites for constructed wetlands are the forest north of the Community Park and the detention pond for the bank on Shelbyville Road at the Beechwood Village entrance. **[Considered but not included, since water in existing sewers is expected to be primarily groundwater, already very clean. Constructed wetlands for stormwater treatment will be referred to MS4 program.]**
6. Restore natural stream banks for the Sinking Fork north of Shelbyville Road where the big pump now sits. **[Considered but outside the scope of the IOAP]**

Beargrass Creek – Middle Fork

1. Restore the Middle Fork between Grinstead crossing and confluence. **[Outside the scope of the IOAP, except as noted below]**
    a. Restore wetlands and improve aquatic health in the following areas:
        i. The isolated quarry areas to the north of the interstate between Grinstead and Payne (which receives a small CSO discharge). One specific idea is to remove sediments from these areas.
        ii. The old meander into which CSO 127 discharges and the wet meadow in its bend.
    b. Work with the City of Louisville, the Parks, and the private sector to turn this area into a greenway that connects the waterfront with Cherokee and Seneca Parks, and eventually with parks in Saint Matthews, with a bikeway from Saint Matthews to downtown.
    c. Close CSOs in this area using projects that reduce flooding and improve water quality. **[Considered and included in the final plan]**
2. CSOs 125, 126, 127, 144, and 166; and CSOs 86 and 140 could potentially be treated at one facility (some pumping would be required). This could be a visible project that could help link areas in the community. **[Consolidation of CSOs was considered, and most Middle Fork CSOs consolidated into regional solutions]**
3. Potentially develop the River Metals property (a brownfield near the Girl Scouts Building) as a storage or wetlands treatment area. **[Considered – storage will be recommended near the River Metals property, but only a small part of the parcel is needed]**
4. Establish wetlands at Seneca Park and Old Cannons Lane. **[Outside the scope of the IOAP]**
5. Consider locations/sites for storage solutions that are closer to the SSOs in the Anchor Estates Pump Station watershed than the potential location presented at the 9/20/07 WWT meeting. **[Considered a variety of sites. Final plan eliminates all but one SSO by added conveyance. Remaining storage solution is accomplished within existing MSD pump station site.]**
6. Utilize parks property orphaned by I-64 as a detention basin for the Beals Branch sewershed CSO. Restore the sediment-filled wetland at the confluence of Beals Branch and the Middle Fork as a treatment wetland for the basin's discharge. **[Considered property but a different location was selected. Wetland treatment of CSOs is not permitted in areas of potential public contact (considered sewage treatment plant).]**

Beargrass Creek – South Fork

1. Restore the South Fork between I-264 and Eastern Parkway. **[Outside the scope of the IOAP]**
    a. Restore the stream channel, along with the wet meadows and woods in the floodplain.
    b. Coordinate with landowners (e.g., the City of Louisville and Bellarmine College) on the restoration of the stream segment, which is part of a "nature education" corridor and is subject to MSD conservation easements.
    c. Potentially make this area into a bikeway as part of the solution.
2. Create a rain garden in the Germantown area to intercept stormwater flowing to a variety of minor CSOs at the old trolley turnaround. **[Considered in green infrastructure evaluation]**

Beargrass Creek – Muddy Fork

1. Restore Eva Bandman Park.
    a. Convert the park into restored wetlands with a boardwalk for visitors. **[Outside the scope of the IOAP]**
    b. Include the park as part of the solution for the CSOs that discharge at the confluence by having it receive their stormwater. **[Considered but drainage basin for these CSOs extend long distances from the confluence, costs favored another solution]**
2. Tie the impaired section of Beargrass Creek to newly created wetlands, near Eva Bandman Park. **[Outside the scope of the IOAP]**
3. Incorporate green infrastructure into the Arts Center. **[Comment unclear, but green infrastructure being considered for all new major construction by Louisville Metro]**
4. Turn the MSD pump station into an interpretive center. **[Considered but not included due to benefit-cost considerations]**
5. For CSOs 132, 154, and 167:
    a. Conduct a concentrated effort to disconnect downspouts in this area. **[Considered for Green Infrastructure Programs]**
    b. Use incentives to get people to help solve the problem in this area. In particular, educate people about ways to reduce non-point source pollution. **[Considered for Education Plan]**
    c. Acquire properties in flood-prone areas by paying more than fair market value for the homes (as compensation to homeowners for having to move). These areas could then be used to create detention or retention basins, or other facilities/structures to reduce wet-weather sewer overflows. [Note: Purchasing properties in flood-prone areas is also listed in Section III.] **[Not Considered, Out of Scope]**

Downtown Louisville/Central Business District

1. Consider taking advantage of planned construction on Main Street in downtown Louisville to construct the CSO solutions at a lower cost. **[Considered and included in green infrastructure considerations]**

Floyds Fork Watershed

1. Look for opportunities for green infrastructure in the Floyds Fork watershed, as it is the last undeveloped area in Jefferson County. **[Floyds Fork is in the separate sewer area, so green infrastructure in that area is an MS4 issue]**
2. Protect Floyds Fork with riparian buffers and other preservation efforts. **[Same as 1 above]**

Other Watershed and Site-Specific Solutions

1. Create an 800-acre lake in the southwest portion of Jefferson County. Use a dam/flood wall to build it and include marshes around it. **[Considered, But Not Included]**
2. Examine other sites for green infrastructure opportunities, such as:
    a. Pond Creek Lake and the southwest pump stations (this area has been studied already by the Corp of Engineers) **[This is in separate sewer area so green infrastructure is an MS4 issue]**
    b. The Bradley Property **[Same as 2a above]**

II. Funding Ideas and Incentives

A. Cost Allocation Strategies

1. Equitably assign costs (focus areas for the financial equity value): **[Considered for Funding Plan]**
    a. Consider the burden on fixed income and low-income populations. **[Considered for Funding Plan]**
        i. Spread payments over a longer time period if this would reduce the burden on lower income residents.
    b. Rates and fees that are linked to the cost to serve (i.e., the level of impact). **[Considered for Funding Plan]**
    c. Consider how the community develops to make sure that everyone pays into the solution. **[Considered for Funding Plan]**
2. Charge residences differently depending on the area of impervious surfaces on properties (and therefore the amount of stormwater runoff that would be generated). **[Considered for green infrastructure incentive program; it has not yet been determined whether the program will include construction subsidies, drainage credits, or both. Currently residential properties are all charged same fee, so implementing this would require modifying the drainage rate structure.]**
3. Require lower development fees for areas that already have sewer capacity (e.g., urban areas in need of re-investment). **[Not an IOAP issue]**
4. Bill based on increased water usage—the more you use, the higher the rate. **[Considered, But Not Included in lieu of winter averaging]**
5. Develop an equitable plan for joint funding for permeable pavement efforts. **[Considered for Green Infrastructure Programs and Projects]**
6. Extend MSD's senior citizen's discount program to ensure that it helps people who face financial hardship. Ideas include: **[Included, see July 2008 Funding Plan Presentation]**
    a. Consider people's ability to pay, not simply their age, and provide assistance and/or discounts to low-income populations.
    b. Evaluate whether the square footage of people's homes could be used as an indicator of the need for financial assistance.
    c. Examine the verification and process and criteria that LG&E uses for its Winterhelp program.
7. General principles for funding and cost allocation:

a. Have higher rates in the near term to avoid future balloon payments. **[Considered for Funding Plan]**
b. Create balance between what the community pays now and what the community will pay later. **[Considered for Funding Plan]**
c. Do not increase rates so much that they drive companies or residents to move elsewhere. **[Included, see Vision and July 2008 Funding Plan Presentation]**
d. Use the community's resources wisely. This will involved dealing with issues such as the Big 4 SSOs, but also working on long-term strategies to improve water quality such as promoting behavior change through education. **[Implicitly Included, see WWT financial values]**

8. Charge higher rates for people with the ability to pay in order to provide resources to offer incentives to people who "do the right thing" and discounts to people who need financial assistance. **[Considered for Funding Plan]**
9. Consider charging residences that have septic tanks more on their drainage bills than other residences. **[Considered, but not included due to questions about legality]**
10. Consider alternatives for the billing structure that would address the communication challenges associated with having a separate consent decree surcharge. Suggestions include:
    a. Get rid of (or phase out) the separate consent decree surcharge. **[Phase out is under consideration and will likely be recommended by staff; final decision is by MSD Board]**
    b. Increase the consent decree surcharge so it covers all of the capital costs for constructed consent decree projects. **[Considered, but determined to be difficult to implement due to an inability to definitively separate consent decree from non-consent decree costs]**

B. Funding Sources/Options

1. Consider using volunteers to reduce costs. **[Considered and will be incorporated where possible, but not a reliable resource that can be committed to in the IOAP]**
2. Consider solutions that could meet the objectives of multiple agencies (e.g., water quality and flood control improvements) and therefore could potentially receive funding from multiple sources. **[Considered and incorporated into green infrastructure program]**
3. Consider additional user charges that could be used as a result of adopting a different rate schedule. **[Considered, but not included at this time]**
4. Maintaining a certain level of bond rating could be a way of setting limits on how much money MSD borrows versus how much it generates in internal revenues. **[Included, see Vision and July 2008 Funding Plan Presentation]**
5. Consider not borrowing any money. **[Considered, But Not Included]**
6. Balance the impact of potential financial packages on MSD's bond rating, rates, and cash flow/liquidity. **[Included, see Vision and July 2008 Funding Plan Presentation]**

C. Incentives *[Note: Incentives related to a potential ordinance to address private sources of infiltration and inflow (I&I) are located in Section III-A-Regulatory Requirements/Policies]*

1. Provide incentives for "preferred" behaviors, such as: **[Included in Green Infrastructure Programs]**
    a. Installing/using green roofs and permeable pavement. **[Included in Green Infrastructure Programs]**

b. Increasing tree canopy, changing plantings, and other activities to reduce runoff from people's yards. **[Included in Green Infrastructure Programs]**

c. Reducing use of lawn chemicals. **[Not Considered, Out of Scope]**

d. Controlling the spread of invasive species. **[Not Considered, Out of Scope]**

2. Offer incentives for developers to use cost-effective, eco-friendly solutions (e.g., low impact development techniques, stormwater best management practices). **[Included in Green Infrastructure Programs]**

    a. One idea for an incentive is to offer drainage credits. **[Considered, may be part of green infrastructure program, see April 2008 Funding Presentation]**

        i. Offer drainage credits to companies that put money into water education for the community. For example, give companies a one dollar discount for every five dollars spent on community education. **[Considered but not included]**

    b. Develop incentives for developers to use the greenest and simplest solutions for new development (e.g., moving permit applications to the front of the review line). **[Considered but not included]**

3. Charge reduced wastewater rates to property owners that use eco-friendly techniques to reduce stormwater runoff. **[Considered, see April 2008 Funding Presentation]**

4. Reduce fees for families or businesses who sign a pledge that clearly lays out behaviors that will help MSD meet Consent Decree requirements (see also I-A-6). **[Considered but not included due to sustainability and validation uncertainties]**

    a. In critical CSO neighborhoods, provide free rain barrels to people who sign the pledge. **[Considered as part of the green infrastructure program]**

5. Develop compensation credits to help alleviate financial burden to developers and property owners. **[Incentives considered as part of green infrastructure program]**

6. Reduce rates for houses that are certified (i.e., through inspections) as eliminating inflow from their properties into the sewer systems. **[Considered, see April 2008 Funding Presentation]**

7. Develop and administer a "forgivable loan" program that would cover the replacement of a private lateral line when an inspection reveals that it contributes to an SSO. **[Considered, see January 2008 Ordinance Presentation]**

    a. The loan would be up to a maximum amount set by MSD for the private contracting work and would be forgiven at the end of, for example, 20 years, if the homeowner made no illicit connections. If illicit connections were made, the loan would be due in its full amount, civil penalties would apply, and water would be disconnected after a grace period if the illicit connections weren't removed.

    b. The loan program would require regular inspections.

    c. The loan would come due via lien if the homeowner sold the property, but the new homeowner could negotiate with MSD for a new loan but with a new twenty year term.

8. Consider not charging based on winter water usage, as this could potentially remove an incentive to conserve water, since water usage varies more in the summer. **[Considered, But Not Included, see July 2008 Funding Presentation]**

9. Consider incentives for development in areas where there is less impact on the sewer system (i.e., encouraging lower impact development). **[Considered incentives in green infrastructure program]**

    a. There could be a role for impact fees in encouraging development in areas where there is less impact on the sewer system. **[Considered to be outside the scope of IOAP]**

10. Consider using requirements when needed in addition to incentives to ensure that solutions are maintained. **[Considered, see January 2008 Ordinance Presentation and SSO Understandings Document]**
11. Consider revising the potential financial incentive for vegetated roofs; $4 per square foot might not be sufficient. **[Considered; incentives developed through business case evaluation, but likely will have different levels of incentives for downtown area, and to get the program started]**

III. Ideas Partly or Completely Outside the Scope of MSD's Wet Weather Consent Decree

A. Municipal Government Actions (Only Partly within MSD's Control)

Regulatory Requirements/Policies

1. Improve the development review process for new subdivisions. Deny permits for subdivisions or any new homes if the plant in the area is above capacity. **[Implemented in MSD's System Capacity Assurance Plan (SCAP), which is a part of MSD's Capacity, Management, Operation, and Maintenance (CMOM) Program, but not part of the IOAP]**
2. Require that regional detention ponds in post-developed areas provide filtration for storms that occur every two years or less. **[Out of Scope –MS4 issue]**
3. Require post-development runoff to be equal to pre-development runoff. **[Out of Scope –MS4 issue]**
4. Develop mandatory or alternative green solutions for development projects (e.g., by changing development codes). **[Not an MSD issue]**
5. Determine impervious surface limits for individual watersheds. **[Impervious percentage only one part of land-use planning relative to water quality – not an MSD issue]**
6. Deny permits for sites within CSO or SSO sewersheds that have any incidents of illegal connections to the sewer system to limit impacts on already overloaded systems. **[Wet weather offsets are required (as noted in the IOAP Vision), but permits are not denied if the waste water treatment plant has capacity, per MSD's SCAP]**
7. Use wet weather capacity (instead of dry weather capacity) of the sewer system as the baseline for approving new development. **[Both considered in MSD's SCAP]**
8. Develop an ordinance to address private sources of infiltration and inflow. Ideas related to a potential ordinance include: **[Considered (along with all items below), see January 2008 Ordinance Presentation and SSO Understandings Document]**

   Authority and Responsibility for Inspections and Enforcement

   a. Develop an ordinance that would allow MSD or a plumbing inspector to enter homes to identify sources of infiltration and inflow (e.g., broken foundation drains). MSD could subsidize or help pay for the costs of the inspections.
   b. Require contractors and plumbers working on private property to check for sources infiltration and inflow.
   c. Adopt a requirement for inspections of private properties for sources of infiltration and inflow any time a building permit is issued (e.g., for an addition to an existing home).
   d. The ordinance should have the flexibility to allow people other than plumbing inspectors to conduct inspections of private properties.
      i. Allow other types of inspectors to do the inspections.
      ii. Allow property owners to make repairs themselves and then have certified inspectors inspect the repairs.

iii. It may be better from an accountability perspective to not have MSD do the inspections, repair work, and enforcement.

Trigger for Inspections

e. Use a proactive approach to inspecting properties (such as the approach used in Johnson County, KS) that would allow MSD to target high-priority areas.

f. Use two approaches for triggering property inspections: require inspections during the property transfer process, and also proactively target certain neighborhoods/areas for inspections.

Scope

g. Have the ordinance address issues with the combined sewer system as well as the sanitary sewer system (e.g., look at ways to reduce runoff and limit impervious cover in the CSO area).

h. Expand the scope of the ordinance to include:

i. An outright ban on downspouts, sump pumps, and basement drains.

ii. A requirement that new parking lots and parking lots that are going to be repaved have more stormwater controls.

Financial Assistance

i. MSD should provide financial assistance to the community related to the ordinance.

j. The ordinance should include a cost-sharing component.

Other

k. Develop legislation related to private sources of infiltration and inflow that would:

i. Prohibit clear water connections to the sanitary system.

ii. Require homeowners to maintain the lateral line.

iii. Provide for civil penalties for homeowners and plumbers for illicit connections or failure to repair the lateral line.

iv. Disconnect water supply after a brief grace period if the problems aren't corrected.

v. Give MSD the authority to inspect when an SSO occurs downstream of any sanitary connection.

vi. Describe a process MSD would use when it must inspect sanitary connections upstream from an SSO, including notice and information about the program.

vii. This new inspection process should begin immediately with the "Big 4" SSOs, but could be implemented when MSD detects others.

l. A draft ordinance should be reviewed by a county/city attorney.

<u>Opportunities to Encourage/Use Green Infrastructure in Development Projects</u>

1. Utilize very large basins or lakes in new development areas and in rural areas. For new developments, create larger detention/retention basins. **[Out of Scope – MS4 issue]**
2. Preserve existing natural systems, vegetation, and trees during development, rather than removing and rebuilding them. Take advantage of existing assets in development opportunities. **[Out of Scope – MS4 issue]**
3. Look at green parking opportunities along business corridors. **[Considered for Green Infrastructure Projects]**

4. Look at opportunities to develop more upward and infill already developed areas (i.e., increase density). **[Not in MSD control]**
5. Develop a "complete streets" program policy to encourage "parkway-like" streets and reduce stormwater run-off. **[Not in MSD control]**
6. Form partnerships with housing developers to minimize impervious surfaces. **[Not in MSD control]**
7. The parking lot on Frankfort Avenue could utilize porous pavement for public parking. **[Incentives for pervious pavement parking lots included in green infrastructure program]**
8. Develop a recognition program for those who use green infrastructure. **[Included in Education Plan]**
9. Opportunities in schools: **[Considered for green infrastructure projects and partnerships]**
    a. Incorporate green elements into the three new research facilities being planned at the University of Louisville.
    b. Turn school grounds into "ecological playgrounds" for neighborhoods.
10. Look at opportunities to incorporate green infrastructure into brownfield development (e.g., in Park Hill Corridor). **[Not in MSD control]**
11. Prepare a draft best management practice for developers on using green infrastructure. **[Not in MSD control]**

<u>Opportunities to Link MSD Efforts to Existing Partnerships and Programs</u>

1. Develop a "comprehensive solution" for local environmental improvement and education efforts. **[Outside the Scope of IOAP]**
    a. Fund and staff a collaborative planning effort to link the environmental education programs of multiple local agencies (MSD, Louisville Water Company, Metro government departments, Mayor's Office, TARC, etc.) together, develop specific goals and assessment systems, and then hold agencies accountable to those goals.
2. Encourage local government agencies (e.g., Jefferson County Public Schools, Metro Parks) to adopt preventative practices to decrease stormwater runoff and wastewater volumes (e.g., low-flow toilets, pervious pavement, additional tree coverage, etc.). **[Considered for Green Infrastructure Programs]**
3. Integrate green projects into planning efforts underway. **[Considered and underway]**
4. Work with the Green City Partnership (an initiative involving the Louisville Metro Government, Jefferson County Public Schools, and the University of Louisville) on green infrastructure efforts. The Metro Green Initiative should be a leader for the community's Green City Partnership. **[Included, see Vision and already underway]**
5. Consider green infrastructure in the context of healthy activity improvement projects and projects that promote greater walk-ability in neighborhoods. **[Outside the scope of IOAP]**
6. Make use of neighborhood plans. There could be opportunities to incorporate green infrastructure into the 14 neighborhood plans and 6 neighborhood assessments that are being developed, as well as in neighborhood plans that well be developed in the future. **[Will be part of Green City Partnership participation]**
7. Convene a group of local authority figures (e.g., the mayor, the president of the University of Louisville, and others) to coordinate and work collaboratively on community environmental improvement initiatives. (WWT members suggested that an appropriate time for a meeting like this might be summer 2008, when more of the details of MSD's draft IOAP are known.) **[Meeting convened in August 2008, and IOAP vision of green collaboration was presented**

and endorsed. Note: This meeting will be mentioned in the WWT project updates session at the September WWT meeting.]

Opportunities for MSD to Collaborate with Other Entities

1. Coordinate with planning and zoning departments and other governmental entities around the value of green infrastructure. **[Considered for Green Infrastructure Programs]**
2. Partner with schools to relate students' community service efforts with green projects. **[Considered for Education Plan]**
3. Coordinate with other regional entities to build a major treatment plant near the Salt River. **[Outside the Scope of IOAP]**
4. Consider linking IOAP construction projects to road construction efforts. **[Will coordinate schedules when possible – existing process in place to do this to some extent]**
    a. One potential place for such a linkage is the road construction occurring in the Goose Creek Pump Station area.
5. Work with governmental entities to "lead by example" by eliminating infiltration and inflow entering the sewer systems from government-owned properties. **[Included in Green Infrastructure Programs and Projects]**
6. Consider where development will occur in the future, in order to avoid having similar wet weather problems related to private sources of infiltration and inflow in the future. **[Considered in build-out evaluation during hydraulic modeling of sewers]**
7. Partner with other cities and states that have wet weather consent decrees to collectively ask federal representatives to seek additional government funds for wastewater and stormwater management improvement efforts. **[MSD is part of National Association of Clean Water Agencies (NACWA) which is spearheading this effort]**
8. Coordinate with other agencies to examine the total impacts of all utility costs (water, wastewater, energy, gas) on customers. **[Will be considered in affordability analysis]**
9. Help the community implement a watershed approach to improving water quality that includes addressing stormwater and non-point source pollution in addition to CSOs and SSOs. **[Out of Scope – MS4 issue]**
10. Form partnerships with people and agencies who work on climate change issues (e.g., the new committee in the Green City Partnership). **[MSD is working with Green City Partnership]**
11. Network with partners on education activities. **[Included in Education Plan]**
12. Work with the Green City Partnership to develop potential incentives. **[Underway]**
13. Develop a collaborative agreement on green infrastructure with other entities (e.g., schools, city and county government) such as the Memorandum of Understanding between Cincinnati Public Schools, the City of Cincinnati, and the County of Hamilton, Ohio regarding sustainable design "green" guidelines. **[Working as part of Green City Partnership]**
14. At the intersection of Grinstead and Lexington Road, work with the Kentucky Department of Transportation to redirect stormwater flows from the interchange into a wetland. **[Project currently in design]**
15. Work with Metro Parks to collect stormwater into a cistern at Beringer Spring. **[Outside the scope of IOAP]**

B. MSD Actions Not Related to Sewer Overflow Issues

1. Purchase properties within the floodplain. **[Not Considered, Out of Scope]**
    a. Buy land that is flooded on a regular basis and turn it into parks.

b. When building a detention basin, buy properties in the floodplain that are most impacted.

2. Improve implementation and enforcement of the Sediment Control Act. **[Not Considered, Out of Scope]**
3. Partner with local lawn care companies to promote Louisville Green (MSD's organic fertilizer). **[Not Considered, Out of Scope]**
4. Do not give rebates during droughts and do not give special rates for irrigation meters for residential or commercial entities for lawn care, as this could be seen as encouraging lawns, which can contribute to water quality problems (e.g., runoff containing fertilizers and pesticides). **[Planned changes in rates would charge based on winter months, so drought and irrigation credits no longer will be given]**

C. Green Infrastructure Ideas Not Related to Wet Weather Issues

1. Heine Brothers Coffee is looking for five acres for an urban farm to grow produce and sell to local restaurants. **[Not Considered, Out of Scope]**
2. The "86-64" community effort to remove portions of I-64 could be an opportunity to reclaim the waterfront and promote public transportation such as light rail. **[Not Considered, Out of Scope]**
3. Utilize the open space in parks for green infrastructure. **[Considered]**
4. Develop and educate residents about urban farming opportunities. **[Not Considered, Out of Scope]**
5. Teach and promote sensible/responsible development. **[Part of this is included in green infrastructure and public education programs]**
6. Require parking lots to provide shaded areas. **[Not Considered, Out of Scope]**
7. Establish a tree ordinance to protect specific trees (identified based on species, age, etc.) and require mitigation if the protect trees are damaged or removed. **[Not Considered, Out of Scope]**
8. Protect or improve water quality and flood control for developments. **[Out of Scope – MS4 issue]**

Education and Outreach Ideas

I. MSD Integrated Overflow Abatement Plan Education and Outreach Efforts

A. Education/Outreach Program Characteristics

1. MSD should expand upon its existing education and outreach efforts, including Project WIN and other MSD programs such as Living Lands and Waters. **[Included in Education Plan]**
2. Education efforts should be comprehensive, adequately resourced, and human scale to encourage behavior changes (e.g., stewardship practices). **[Considered]**
3. To be successful, public involvement efforts should include: **[Included in Education Plan]**
    a. A corporate or programmatic identity: logo, leader, advisory board, budget, mission, goals, website, etc.
    b. Communications: announcements, fliers, newsletters, radio/TV appearances, etc.
    c. Stewardship: removing invasive vegetation from riparian zones, planting wetlands, [and yes] litter cleanups
    d. Education: stream science, water quality monitoring
    e. Conservation: promoting rain gardens, rain barrels, and responsible alternatives for sump pumps and downspout connections.
    f. Coordination: linking the public involvement activity with MSD and the wet weather team
    g. Celebration: festivals, canoe floats, and other events that call positive attention to the area's waterways
4. Outreach efforts should show people that there is an open and transparent process within which MSD is making decisions on behalf of the community. **[Included, see Project WIN website]**

B. Audiences, Objectives, and Messages

1. Target education efforts in "critical CSO neighborhoods" and schools in those areas. **[Included in Education Plan]**
    a. Use a targeted direct-mail approach to help address local, site-specific problems.
2. Involve commercial and industrial customers and solutions through PR and planning, not just residential customers. **[Included in Education Plan]**
3. Make a presentation to the full Metro Council. **[Done once and will be repeated during the public comment period for the draft IOAP]**
4. Work with schools (in conjunction with Earth Day and river/creek cleanups) to involve both students and parents. **[Included in Education Plan]**
5. Message ideas:
    a. Develop positive educational messages about the value of clean water to supplement other education and outreach messages. (CSO warning signs, river sweeps, and other elements of MSD's outreach activities send a negative message about the community's water resources.) **[Included in Education Plan]**
    b. Can the "water is dirty, stay away from it" signs that EPA designated include a promise that the public can change the situation? **[Considered for future implementation in Education Plan]**
    c. Translate Consent Decree activities into dollar impacts for residents. **[Considered for Education Plan]**

d. Communicate that we have no choice but must comply with the requirements of the consent decree in a timely manner. **[Considered for Education Plan]**

e. Help people understand how they are connected to the problem. **[Included in Education Plan]**

f. Help change the perception people have of streams to a positive one (people think that streams are "dead"). **[Implicitly Included, see Education Plan key messages]**

g. Help people understand that green infrastructure can be incorporated into urban areas, since urban areas can be redeveloped. **[Considered for Green Infrastructure Projects]**

h. Craft messages explaining the importance of addressing private sources of infiltration and inflow, and people's personal responsibility for addressing it. **[Included in Education Plan]**

i. Create community ownership of the solutions. **[Included in Education Plan]**

j. Stress that there are two sides to EPA compliance, and note that programs will affect some people more directly than others because of the way the sewer system has developed over time: **[Considered for Education Plan]**

    i. What MSD is going to do with its infrastructure that will affect the whole community.

    ii. What citizens and businesses will be asked to do.

k. Inform the community that EPA is targeting three parts of the sewer system: CSO sewersheds, the "Big 4" SSO sewersheds, and the other SSO sewersheds. **[Considered for Education Plan]**

l. Help people understand that, even though people are paying for MSD to address its Consent Decree responsibilities through the Consent Decree rate surcharge, the community as a whole must help solve the problem. **[Included in Education Plan]**

m. Help people understand the differences between the combined sewer system and the sanitary sewer system. **[Included in Education Plan and on Project WIN website]**

n. Explain funding concepts and choices to the public. Showing side-by-side cost comparisons could be a particularly useful way of doing this. **[Will be included in presentation for fourth round of public meetings]**

o. Thoroughly explain the financial assistance component of any private infiltration and inflow reduction program. **[Considered, see SSO Understandings Document and January 2008 Ordinance Presentation]**

p. Some information from MSD's Sewer Overflow Response Protocol training (such as how MSD prepares for wet weather events) could be useful to share with the public, potentially during weather forecasts. **[Considered for Education Plan]**

q. Educate people about the benefits of green projects that are the result of partnerships between MSD and other agencies. **[Considered for Green Infrastructure Programs]**

6. Involve neighborhoods in identifying potential green infrastructure solutions (e.g., by having a neighborhood competition to get grassroots ideas for potential solutions). **[Incorporated into Project WIN public meetings]**

7. Develop education programs for schools that allow children to take information home. **[Included in Education Plan]**

    a. Participate in the two existing environmental education school magnet programs. (These programs are located at Portland and Cane Run elementary schools.)

8. Educate local leaders on the need for source reduction. One way to do this would be to show them the cost of specific solutions to SSO and CSO problems. **[Will be done as part of private property ordinance support]**
9. Explain problems and programs related to SSOs directly to homeowners (individually if necessary), and enlist neighborhood associations and other neighborhood institutions to help when appropriate. **[Considered for Education Plan]**
10. Conduct an aggressive education effort before instituting any new requirement that would address private-side infiltration and inflow sources. **[Considered, see January 2008 Ordinance Presentation and SSO Understandings Document]**
11. Develop and implement a public information and involvement strategy for each of the three parts of the sewer system that EPA is targeting: the "Big 4" SSO sewersheds, the other SSO sewersheds, and the CSO sewersheds. **[Considered for Education Plan]**
    a. Each area should be mapped and made publicly available on MSD's website.
    b. Public information should roll out in consecutive waves so the different programs can be explained to the larger community and the direct effects can be explained to the parts of the community that may need to do more to make them work.
    c. The first wave of public information should address the "Big 4" SSO sewersheds, followed by the other SSO sewersheds, and then the CSO sewersheds.
12. Communicate effectively with the community regarding rate increases. **[Considered for Education Plan]**
    a. Keep the message positive. **[Included in Education Plan]**
    b. Include as part of the message that the alternative to the IOAP is having the federal courts impose requirements on the community.
    c. Tell residents what they are getting for their money and how these efforts are improving public health. **[Included in Education Plan]**
    d. Help people feel involved in the process and understand that they have some responsibility for helping solve the problem (e.g., through communications that ask, "can you help us?" instead of "we're going to do this"). **[Included in Education Plan]**
    e. Help residents understand what they are paying for and what the community has to do to improve water quality and comply with the Consent Decree. **[Included in Education Plan]**
    f. Find a truthful and transparent way to explain the rate increases to the public, including describing what the rate increases are paying for (consent decree and other expenditures). **[Will be included in presentation made for final round of public meetings]**
13. Share the messages from MSD's IOAP Vision at Project WIN public meetings and with builders and other contractors. **[Considered for Education Plan]**
14. Develop a continuing education program for elected officials and other government bodies such as the Planning Commission and governing boards of other cities in Jefferson County. **[Outside the scope of IOAP]**

C. General Outreach and Education Strategies and Techniques

1. Use a variety of communication media to inform Louisville residents about issues, opportunities, and activities related to the IOAP and the Consent Decree. Examples include: **[Included in Education Plan]**
    a. feature articles and/or advertisements in the Courier Journal **[Included]**
    b. direct mail **[Included]**

c. public service announcements on television **[Included]**
d. radio (WLOU/WLLV 1350 and 101.3 FM for the west) **[Included]**
e. e-mail lists ("UofL announcements" to University of Louisville employees, e-mail lists for Metro Council members) **[Included]**
f. website(s) (provide information, as well as solicit input and questions) **[Included]**
g. community meetings ("piggy back" on other events/meetings such as the Mayor's Night Out, community association meetings, Metro Council meetings, etc.) **[Considered for Project WIN meetings]**
h. media "groundbreaking" events **[Included]**
i. 5-minute DVD video (highlight the central issues and indicate the short and long-term consequences) **[Included]**
j. hold a "creek concert" to raise awareness of stream issues to young people **[May be considered in future, but not currently in the plan]**
k. develop/use a Kentucky State Fair Exhibit (permanent or traveling) **[Included]**
l. hold a speaker's forum and/or have a group of people available that could speak at community meetings and events **[Included]**
m. work with the Mayor's press staff and the Louisville Metro Neighborhoods Department to get the word out **[Included]**
n. hold a press conference **[Included]**
o. communicate about Project WIN through small city newsletters **[Considered and will be included for targeted neighborhood messages when appropriate]**

2. Develop/use posters and visual displays to illustrate concepts to the public and provide context to IOAP activities. Specific suggestions include: **[Included in Project WIN public meetings, in Education Plan, and Project WIN website]**
   a. Schematic of a combined sewer overflow **[Included]**
   b. Schematic of sump pumps and downspouts connected to sanitary sewers **[Included]**
   c. Map of the combined sewer area and outfalls against blue line streams and landmarks (road system would do) **[Included]**
   d. Map of SSO outfalls including the sewersheds of the "big four," as above **[Included]**
   e. Water Quality maps from the Beargrass Creek report card, also water quality info about Ohio River related to CSO outfalls. **[Water quality information to be included on Project WIN web site, water quality outcomes will be part of public meetings]**
   f. Comparison of city sewer rates indicating which cities have consent decrees **[Included]**
   g. Time frames for the major deliverables in the Consent Decree **[Included]**
   h. Create visible representations of the solution, since they can be helpful for explaining project concepts to the public. Use these visual representations when soliciting community input. **[Included]**
3. Initiate a dialog with neighborhoods, potentially including door-to-door outreach, to better understand local water quality problems and to solicit local input on potential solutions. **[Considered but not used except in limited situations due to resource requirements]**
4. Develop a speakers bureau to attend chamber/business association meetings and other groups that use speakers. **[Included in Education Plan]**
5. Conduct demonstration projects (Note: Overlaps with demonstration projects in Solution Ideas List). Specific ideas include: **[Included in Green Infrastructure Projects and Education Plan]**

a. Create a demonstration area in each Jefferson County watershed to demonstrate and interpret healthy stream habitats and what MSD is doing to study and protect them. **[Considered]**
b. Strategically place demonstration projects (e.g., porous pavement) near neighborhoods. **[Considered]**
c. Create some sustainable lawns as pilot projects. **[Not included – sustainable lawns are not part of green infrastructure projects for runoff reduction]**
d. Develop a green infrastructure best management practice site similar to SD1 (Sanitation District Number 1 of Northern Kentucky). **[Under active consideration]**
e. Add green demonstration/education facilities to old urban schools. **[Considered]**
f. The Clifton neighborhood is motivated, so would be a good demonstration area to show the effects of behavior change. **[Considered, but geology is not favorable for large scale demonstration]**
g. Use the Butchertown Greenway Pump Station that is offline for an education and demonstration facility. **[Considered but not included]**
h. Cluster demonstration projects in one spot, so that people can view and compare multiple approaches to reducing flows into the sewer stream. **[Considered but logistically difficult]**

6. Present "Where is your CSO or SSO?" information on-line: On the MSD or LOGIC website, have the ability to type in your address and have it call up the location of the CSO or SSO that the property owner's waste goes to. The website could describe the watershed that contributes water and runoff to that individual CSO or SSO. **[Considered but not included at this time]**
7. Support the identification of public watershed advocates for each Jefferson County watershed. Each watershed needs a public advocate. It could be connected with a nature center, or be an independent citizen advocacy group. **[Considered but not included at this time]**
8. Make MSD facilities visitor friendly. For example, add educational exhibits around the flood wall, the history of flooding, etc. to the Beargrass Creek Pump Station and near the flood detention basins at the Fairgrounds. **[Not Considered, Out of Scope]**
9. Have MSD employees be educational ambassadors, as a way of making Louisville environmentally literate. **[Considered]**
10. Public meeting ideas: **[Considered for Project WIN public meetings]**
    a. To increase attendance, consider latching onto other meetings. **[Considered]**
    b. Ideas for places/ways to advertise the public meetings: **[All items Considered]**
        i. Churches
        ii. PTA meetings.
        iii. Metro Council and neighborhood newsletters
        iv. Channel 25 (Metro Louisville programming)
        v. Short recorded messages on phones
        vi. Send announcements about the public meetings through the Department of Neighborhoods distribution list to get word out to neighborhood groups.
        vii. Listservs
        viii. Get the word out at local schools so kids can take information home to their parents.
        ix. Local TV or NPR piece
        x. Homeowners Association newsletters

xi. Suburban city newsletters

c. Start public meeting presentations with information on rates to get people's attention. **[Considered]**

d. At public meetings, consider the fact that people need time to digest information from presentations and written materials. **[Considered]**

e. Avoid using acronyms in presentations and discussions with community members. **[Considered]**

f. Conduct direct outreach to block watch groups, neighborhood associations, and business associations to identify neighborhood leaders. **[Considered]**

g. Give people at least two weeks advance notice of the public meetings. **[Did for Project WIN public meetings]**

h. Have the Metro Council representative for the local area host the public meetings. **[Considered and often accomplished]**

i. Hold public meetings at local schools, maybe in conjunction with other meetings that are already taking place. **[Considered]**

j. Give information that is as specific in terms of location as possible at the public meetings. **[Did for Project WIN public meetings]**

k. Advertise some of the potential solutions being considered, and hold the meetings near some of the likely places of disruption, as a way to get people to attend public meetings. **[Considered and will be part of public comment announcement]**

l. Bring up the green aspects of the IOAP at public meetings in order to find more partners for MSD to collaborate with on green projects. **[Considered]**

11. Add a portal to MSD's website where people can submit comments on Project WIN; run a public service announcement to inform people about the issues and the website address for submitting comments. **[Considered for Education Plan]**

    a. Add a feature to the enhanced web portal that will allow homeowners to enter their addresses to see their proximity to local SSO and CSO zones and the problems associated with the zones. MSD could use its LOJIC database to design this feature.

    b. On the web portal, indicate whether projects are green or gray solutions, or whether the projects combine green and gray techniques.

12. Develop and run an information booth at selected festivals in the community (similar to the booth used for Project XL). **[Part of current MSD program]**

13. Use the potential disruption along Hikes Lane (part of the Big Four SSO plan) as an opportunity for broader education of the public about wet weather sewer overflow issues. **[Considered as tie in for public meetings about the project]**

14. Yard signs similar to those used in Portland's residential Downspout Disconnection Program could be useful for education and outreach about MSD's IOAP. [Note: Overlaps with CSO and SSO Point Source Controls in Solution Ideas List.] Specific ideas for signs include: **[Included in Education Plan]**

    a. Messages such as "I disconnected my downspout" and/or "I have a rain barrel."

    b. The bottom of the sign could invite readers to "ask me" for more information.

15. Invite people to "join" Project WIN by installing rain gardens, rain barrels, reducing their use of lawn chemicals, etc. **[Included in Education Plan]**

    a. Add a page to MSD's website where people can submit notes or pictures of their efforts.

    b. Give out plaques or other awards to those who "join."

16. Consider strategies for conducting targeted outreach and providing feedback about monitoring results to specific neighborhoods. Ideas include:
    a. Create displays about specific green infrastructure projects (porous pavement, a green roof, etc.) that describes the project, its expected benefits, and what the results have been. **[Considered for Green Infrastructure Projects and Education Plan]**
17. Develop additional educational challenges related to Project WIN, similar to the Project WIN marketing campaign competition conducted with local high schools in spring 2008. One opportunity for such an activity is Public Health Week. **[Will be considered in on-going program]**
18. Develop an educational facility (potentially near MSD's office) similar to the Northern Kentucky Sanitation District No. 1 "Public Service Park" (http://www.sd1.org/psp/psp.asp), which includes examples of green infrastructure and stormwater best management practices, hands-on exhibits illustrating how pollutants enter local waterways, and other information. **[Under consideration]**
19. Develop videos that MSD could show on Metro TV (Chanel 25) or distribute by other means. Ideas include:
    a. Show potential disasters or other problems that could happen (e.g., water issues in Sudan) as a "hook" to get people's attention. **[Considered but advertising consultants advise against it]**
    b. Provide the history of MSD as an agency (e.g., the problems Louisville faced in the past, why MSD was created, etc.) as a "hook" to encourage people to learn more about what challenges MSD and the community face and what will be coming in the future. **[Underway]**
    c. Show how MSD's infrastructure works and how common problems occur (e.g., when sump pumps are always running). **[Underway]**
20. Provide parents with information at children's sporting events by setting up a tent or kiosk. **[Considered, especially when tied to specific neighborhood upcoming project or emerging issue]**
21. Consider "stepping up" outreach and education efforts when there is a crisis. In particular, remind people about the causes of the problem and explain how they can help reduce and prevent future problems. **[Considered and will be incorporated]**
22. Establish a "block watch" style targeted outreach approach for neighborhoods associated with individual CSO or SSO areas. **[Considered but not implemented]**

D. Education to Change Behavior [Overlaps with Behavior Change Strategies in Solution Ideas List]

1. Influence behavior of residential and commercial landowners through education. **[Included in Education Plan]**
    a. Promote water conservation practices: rain gardens, rain barrels, and responsible alternatives for sump pumps and downspout connections. **[Included]**
    b. Encourage stewardship: removing invasive vegetation from riparian zones, planting wetlands, litter cleanups, etc. **[Considered for green infrastructure programs and Education Plan]**
    c. Conduct education regarding fertilizer, weed killer, and other stormwater best management practices to neighborhood groups. **[Not Considered, Out of Scope]**
    d. Develop and educate residents about urban farming opportunities. **[Not Considered, Out of Scope]**

e. Teach and promote sensible/responsible development. **[Considered for MSD participation, but not primarily MSD issue]**

f. Discourage chemical treatment and mowing near waterways to help keep debris from waterways. **[Not Considered, Out of Scope]**

g. Provide information on where people can obtain rain barrels, plants for rain gardens, and other resources for reducing stormwater runoff and infiltration and inflow (I&I) to the sewer system, as well as information on how to find contractors to fix I&I issues and/or to construct green infrastructure solutions. **[Included in Education Plan and Green Infrastructure Program]**

2. Regularly distribute billing inserts (like LG&E's) to MSD customers with facts and tips to encourage certain behaviors (e.g., lawn chemical management, pet waste management, landscaping practices). **[Included in Education Plan]**
3. Hold "CSO Action Days" (like Ozone Action Days) during or right after a hard rain to raise awareness and promote behavior change (e.g., don't use your dishwasher or clothes washer, wait to drain your bathtub, etc.). **[Considered for Education Plan]**
    a. This "Action Day" strategy could leverage existing communication networks or set up an e-mail list to periodically distribute notices that describe actions people can take to reduce their impacts.
4. Develop a pledge for customers that clearly lays out behaviors that will help MSD meet Consent Decree requirements. For an example, see http://www.watershedpledge.org **[Considered but not implemented]**
5. Encourage the use of best management practices for chemical use in lawn management practices. **[Out of Scope – MS4 issue]**
    a. Inform greens keepers about best management practices (BMPs), since non-point source runoff is made worse by golf course chemicals.
6. Provide technical assistance to support behavior-change efforts. **[Part of MSD's current operations]**
7. Develop a program in which residents could pay a small fee for MSD or another agency to conduct a water/wastewater audit on a house similar to the energy audits offered by LG&E. **[Not Considered, Out of Scope]**
8. Establish a recognition program for neighborhood efforts to implement, maintain, and monitor green infrastructure projects. **[Included in Education Plan]**
    a. Look for opportunities (similar to the lawn sign idea) that recognize individual accomplishments and also advertise for Project WIN.
9. Encourage community opinion leaders to change their behavior by adopting green solutions and communicate these efforts through Project WIN. **[Included]**
10. Create a direct link between neighborhoods and the CSOs they border and make the neighborhoods responsible for the maintenance and monitoring of the area. **[Considered but not included due to uncertainty of sustainability]**
11. Consider involving adults (as well as school children) in activities such as monitoring, maintenance of green infrastructure projects, and stream/river cleanups. **[Part of existing river sweeps]**
    a. Consider using canoes in the creek cleanup events. **[Part of Floyds Fork river sweep]**

E. Monitoring, Evaluation, and Accountability

1. Conduct a baseline survey and follow-up surveys of residents to determine whether education and outreach efforts are effective in raising awareness and in changing behavior and perceptions on issues related to the IOAP. [Note: This is also in the Data Request and Monitoring Suggestions List.] **[Included in Education Plan and Monitoring Plan]**
    a. Develop a survey instrument (potentially with a coalition of cities) and use it every year.
    b. Include questions about who watches Metro TV and how people value the community's water resources in surveys about the effectiveness of Project WIN education and outreach efforts.
2. Collect baseline data, monitor performance, and ensure "high stakes accountability" for all of the education and outreach objectives of the IOAP. **[Considered for Monitoring Plan]**
    a. Evaluate the extent to which citizens value clean water, support MSD, understand best management practices for homes and businesses, and have a basic understanding of ecological conditions and processes.
3. Consider creating/supporting an evaluation center to evaluate and document the effectiveness of education and outreach programs. **[Considered and implemented on limited basis]**
4. Develop a "report card" for MSD's IOAP to post on MSD's Project WIN website and publish it in print format regularly (e.g., annually). This report card would report on performance measures related to the goals of MSD's IOAP and implementation of the consent decree. **[Considered and will be implemented over the next year]**
5. Support volunteer monitoring efforts. **[Out of scope of IOAP]**
    a. Support efforts such as those practiced by the Salt River Watershed Watch program (http://kywater.org/watch/salt/).
    b. Support a volunteer monitoring program to monitor water quality in streams across the county. [Note: this is also in the Data Request and Monitoring Suggestions List]
6. Display monitoring data as part of an interpretive center. The display could be interactive and provide real-time data on the temperature of the water, pH, and other water quality and stream flow conditions that MSD monitors. [Note: this is also in the Data Request and Monitoring Suggestions List] **[Being considered, but cost and logistics are challenging, and this is not as high of a priority as other current activities]**

II. Ideas Partly or Completely Outside the Scope of MSD's Wet Weather Consent Decree

A. *Municipal Government Actions (Only Partly within MSD's Control)*

1. Develop a "comprehensive solution" for local environmental improvement and education efforts.
    a. Fund and staff a collaborative planning effort to link the environmental education programs of multiple local agencies (MSD, Louisville Water Company, Metro government departments, Mayor's Office, TARC, etc.) together, develop specific goals and assessment systems, and then hold agencies accountable to those goals.

    [Note: This is also in the Solution Ideas List.] **[Out of Scope]**
2. Transform governmental facilities to be role models and learning laboratories—demonstrate how to do the right thing.
    a. Encourage local government agencies (e.g., Jefferson County Public Schools, Metro Parks) to adopt preventative practices to decrease stormwater runoff and wastewater volumes (e.g., low-flow toilets, pervious pavement, additional tree coverage, etc.).

[Note: This is also in the Solution Ideas List.] **[Considered for Green Infrastructure Programs]**

3. Work with other building inspectors to raise awareness of wet weather issues during inspections. **[Will be part of private property ordinance, if enacted]**
4. Create a centralized water education center, such as the Gwinnett Environmental & Heritage Center in Gwinnett County, Georgia. **[Outside the scope of the IOAP]**
5. Develop and support an urban environmental education center. A possible location could be at Shawnee Park, which is a site for one of the big detention basins. **[Outside the scope of the IOAP]**

Data Requests and Monitoring Suggestions

I. Requests for Information to Support WWT Deliberations

A. Requests for Information on Current Conditions and Current Plans for the IOAP

1. Data on how fecal coliform levels change with flow volumes. **[Extensive water quality data will be displayed on Project WIN website]**
2. Data on where water quality sampling is currently done in relation to recreational areas. **[Addressed in post construction compliance monitoring presentation, May 2008]**
3. Current data MSD has on water quality in stream reaches (as aquatic health is an issue in some, but not all, stream reaches). **[Extensive water quality data will be displayed on Project WIN web page]**
4. How MSD's development fees compare to development fees in other places. **[Considered, but information about development fees is generally not comparable across municipalities since municipalities use different rate and fee structures]**
5. Specific information on the percentage of backups that are the result of MSD's activities as opposed to private property issues. **[Information not available, as MSD only tracks backups that are due to MSD asset failure]**
6. Cincinnati's rates before the community started to respond to its consent decree. **[Addressed orally at a WWT meeting; information about Cincinnati's current rates has also been distributed in WWT meeting materials]**
7. Information on the "root causes" of wet weather CSO and SSO problems (e.g., the CSO volume attributable to residential downspouts) to assist with IOAP decision making. *[Note: This is an ongoing request.]* **[Information provided during WWT meetings]**
8. Information on the differences between what is legal and required in the sanitary sewer system and the combined sewer system (e.g., whether or not it is legal to connect a sump pump to the combined sewer system). **[Addressed in WWT meetings]**
9. Additional information on the proposed Project WIN Public Information and Outreach program, including plans to develop an educational book (such as the "Kid WIN" book shown in the June 2008 WWT presentation) and details of MSD's plans to expand activities with middle schools. **[Addressed in general in IOAP, but year by year specific programs will be addressed in an ongoing partnership with JCPS]**
10. Prepare a chart showing how a typical bill would change each year, including the wastewater and drainage fees and the consent decree surcharge. Also, show how MSD's rates compare to those of other communities. **[Have distributed this information to the stakeholder group, and will include this in the presentation made for final round of public meetings.]**
11. Provide a breakdown of the anticipated consent decree capital expenditures and anticipated other capital expenditures each year of funding the consent decree. **[Will be addressed in cash flow discussion, IOAP Vol. 1, Ch. 6]**
12. Additional explanation and examples of how the consent decree has changed (or will change) the schedule of other MSD projects. **[Will be included as part of overall cash flow discussion, IOAP Vol. 1, Ch. 6.]**

B. Requests for Information of the Effectiveness and Costs of Potential Solutions

1. Information on the long-term effectiveness of strategies that rely on source prevention (e.g., rain gardens). **[Information provided during WWT meetings]**
2. Quantitative information on the benefits and/or effectiveness of eco-friendly solutions currently used by MSD. **[Green infrastructure investment worksheet presented to the stakeholder group at the July 2008 meeting]**
3. Additional information on the benefits and challenges of different control approaches (e.g., why a storage solution might be preferable to a transport solution for a particular area). *[Note: This is an ongoing request.]* **[Addressed when solutions were presented – ongoing need]**
4. Information on the costs and benefits of a regulatory approach to address private I&I as compared to other control strategies. **[Analysis underway and will be shared at September 2008 WWT meeting]**
    a. Include information showing how the marginal costs of this approach compare to costs of other approaches and overall program costs, as there could be a lot of opposition to a new private I&I reduction program because of costs. **[Will be included in IOAP and shared with WWT for private property I&I ordinance discussion]**
    b. One potential cost comparison could be comparing the costs of a private I&I reduction program using an ordinance to the costs of building a large underground storage facility to recover a similar amount of I&I. **[Will be included in IOAP]**
5. Additional information on the effectiveness of green infrastructure solutions (e.g., websites or other resources). **[Website addresses given at July 2008 stakeholder meeting]**
6. Information on whether other communities have experienced any issues with their green infrastructure efforts (e.g., Chicago's Green Alley Program). **[Papers from several communities have been collected and will be included in IOAP]**
7. Data on community use of rain barrels over time in communities that have rain barrel programs. **[Data not available or not easily accessible]**
8. Information on the amount of runoff that a mature tree would absorb. **[Presented during green infrastructure investment discussion]**

C. Process Suggestions

1. Conduct assessments of different watersheds to find the best opportunities for green infrastructure. **[Incorporated into green infrastructure analysis]**
2. Conduct additional analysis of the potential effects of behavior change and green infrastructure strategies at reducing flows into MSD's sewer systems. **[Incorporated into green infrastructure analysis]**
3. Examine how choices about funding sources affect the total wastewater and stormwater rates that residents pay. **[Addressed at the January 15, 2008 Wet Weather Team meeting]**
4. Provide examples illustrating the implications of different combinations of funding sources (e.g., loans, bonds, pay-as-you-go) for funding the IOAP, in order to better understand the tradeoffs. **[Addressed at the January 15, 2008 Wet Weather Team meeting]**
5. Ask someone from the Kentucky Resources Council or one of the MSD consultants to look at the current Kentucky Plumbing Code to see if it is as strong as it needs to be as it relates to CSOs and SSOs. **[Considered—Code is adequate for new construction but enforcement of existing systems is not]**

6. Involve experts in making financial decisions, given the relationships among the timing of projects, cash flows, bond rating, and other factors. **[Incorporated into Funding Plan analysis]**
7. Include information on the amount of debt remaining to be paid after the Consent Decree implementation period in future funding presentations. **[Discussed at July 2008 WWT meeting]**
8. Develop a flow diagram or decision tree showing the process for identifying and selecting projects. **[Distributed at the May 2008 WWT meeting]**
9. Use a consistent format to show the results of the benefit-cost analysis of CSO and SSO project alternatives. Using a standard format facilitates the WWT's understanding of the information as well as the credibility of the analysis. **[Will do in future presentations and materials]**
10. Create a map that shows the CSO and SSO overflow locations and/or a reference guide to help readers identify the locations of projects and overflow locations. **[Map will be kept on Project WIN website – too complex for simple presentation. Data about CSO and SSO locations were also included in July 2008 WWT meeting materials.]**
11. Develop a map showing the locations of green infrastructure demonstration project sites. **[Will be kept current on Project WIN website]**

II. Suggestions Related to the IOAP Monitoring, Evaluation, and Research Plan

A. Suggestions Related to Water Quality and Public Health Monitoring

1. Consider monitoring water quality and flow at additional locations, based upon the IOAP's objectives and the performance measures developed for the program. Potential new monitoring locations to consider include: **[Considered, see April 2008 Monitoring Plan presentation]**
    a. Intensely used public access sites within Beargrass Creek
    b. Stream segments MSD does not monitor currently, such as Buechel Branch and upper South Fork of Beargrass Creek
    c. Additional locations within the Floyds Fork watershed
2. Collect environmental performance data such as biological indexes of aquatic health (fish counts, macro-invertebrate sampling, etc.), nutrient sampling, downstream pollutant load, and tree cover or other measures of habitat restoration efforts. **[Considered, see April 2008 Monitoring Plan presentation]**
3. Look for data on the public health impacts of polluted water (collected by the School of Public Health or the Health Department and included in an annual report). **[Currently use CDC data as local data is very limited; MSD will use public health data to the extent available]**
4. Involve the research community (e.g., students at the University of Louisville's School of Public Health) in water quality monitoring and data analysis. **[MSD currently supports data analysis program at University of Louisville that should be reaching out to all appropriate expertise]**
5. Consider whether to use EPA's quality control protocols for water quality monitoring efforts. **[MSD has upgraded water quality data protocols as addressed in the post construction compliance monitoring program]**
6. Support volunteer monitoring efforts. **[Outside scope of IOAP]**
    a. Support efforts such as those practiced by the Salt River Watershed Watch program (http://kywater.org/watch/salt/).
    b. Support a volunteer monitoring program to monitor water quality in streams across the county. [Note: this is also in the Education and Outreach Ideas List.]
7. Display stream monitoring data as part of an interpretive center. The display could be interactive and provide real-time data on the temperature of the water, pH, and other water quality and

stream flow conditions that MSD monitors. [Note: this is also in the Education and Outreach Ideas List.] **[Being considered, but cost and logistics are challenging, and this is not as high of a priority as other current activities]**

B. Suggestions Related to the Effectiveness of Green Infrastructure Projects

1. Build monitoring components into green infrastructure projects to help demonstrate the overall effectiveness of green infrastructure solutions. **[Included in Monitoring Plan]**
2. Pick a CSO catchment area and study the effects of rain barrels and rain gardens. **[Considered for Monitoring Plan]**
3. In order to gain information on the long-term effectiveness of strategies that rely on source prevention, conduct a demonstration project in a small area, and compare the changes in pollutant loading and stormwater flows to those of other areas. **[Included in Monitoring Plan and Green Infrastructure Projects]**
4. Keep track of how the rain barrels distributed to property owners actually work. **[Part of MSD's current practice]**

C. Suggestions Related to the Effectiveness of Behavior Change Efforts

1. Conduct separate research and data analysis to supplement any data collected through surveys about people's behavior. **[Considered for Monitoring Plan and Green Infrastructure Programs]**
2. Conduct a baseline survey and follow-up surveys of residents to determine whether education and outreach efforts are effective in raising awareness and in changing behavior and perceptions on issues related to the IOAP. [Note: This is also in the Education and Outreach Ideas List.] **[Included in Education Plan and Monitoring Plan]**
    a. Develop a survey instrument (potentially with a coalition of cities) and use it every year.
    b. Include questions about who watches Metro TV and how people value the community's water resources in surveys about the effectiveness of Project WIN education and outreach efforts.

D. Suggestions Related to the Presentation of Information in the IOAP

1. Model the water quality benefits of stormwater reduction efforts and present this information to EPA along with the benefits of overflow abatement efforts. **[Will do]**
2. Present the results of water quality monitoring so they show the benefits of overflow abatement (e.g., don't focus on bacteria levels only during rain events, as this obscures the fact that streams usually meet the bacteria criteria at other times). **[Will do]**

E. Other Suggestions

1. Monitor customer satisfaction data (e.g., number of hits on MSD's website, number of requests for information, customer satisfaction surveys). **[Included as part of Monitoring Plan]**

SECTION 6.5: POST CONSTRUCTION COMPLIANCE MONITORING

6.5.1 INTRODUCTION

Post construction compliance monitoring is intended to analyze the impact and validate multiple aspects of IOAP projects and initiatives. In order to develop and implement effective monitoring, MSD will use methods that have proven effective with historical and current monitoring efforts. This experience is critical in determining the most accurate methods for characterizing capital project impacts and programmatic effectiveness. Challenges presented by supplementing gray infrastructure with green infrastructure will be addressed with clear objectives and by establishing progressive monitoring methods. With a mixture of gray and green infrastructure, monitoring behavior changes as well as implementing adaptive management will be crucial to the success of future projects.

This section discusses MSD's historical and current monitoring efforts such as flow and asset monitoring, water quality sampling, and the long term monitoring network. Compliance monitoring objectives are defined as well as and the monitoring approach for each major overflow abatement technology outlined within this plan. Gray and green infrastructure monitoring, sewer rehabilitation for inflow and infiltration reduction, behavior change, data quality, and adaptive management are key elements of that equation. A flow chart clearly outlining the Post Construction Compliance Monitoring process can be seen in Figure 6.5.1.

6.5.2 HISTORICAL AND CURRENT EFFORTS

MSD has been monitoring environmental data sets for almost 20 years for a variety of reasons. Data have been collected for baseline conditions and event based evaluations for precipitation, sewer and stream samples, and automated physiochemical analyses. Wet chemistry analyses on sewer and stream data, and in-depth biological indicator species and habitat analyses have also been an important part of MSD data collection. Additionally, customer requests and overflow tracking have been conducted to identify problem areas and track system performance on an event basis.

Rain data has been collected continuously on a network of rain gauges across Jefferson County since the early 1990s. In 2003, a network of Onerain radar rainfall data was added to fill in the gaps in physical distance between the rain gauges. Rain data is simultaneously evaluated with many of the other data sets to help determine the timing and impact of wet weather. A map of the rain gauges and the Onerain radar grid is located in Figure 6.5.2.

Sewer flow meters have been in place in various locations in the MSD collection system since the early 1990s. The data is used to assess baseline conditions, locate inflow and infiltration, determine sewer overflow volumes, and assist sewer modeling efforts. The majority of the historical meters were temporary meters used for evaluation studies, but MSD has installed several permanent meters that are used for real time control conveyance and storage within our larger pipes to reduce overflows. A map of historical and current MSD flow monitoring sites is displayed in Figure 6.5.3.

In addition to the sewer flow meters, MSD has telemetry on over 2000 pieces of equipment in the collection system, the majority of which are at sewer pumping stations. From pump run times, known pump capacities, and wet well levels, MSD can calculate flow at many of the locations without flow meters. A map of all MSD telemetered equipment is located in Figure 6.5.4.

There are 28 stream sites in and around Jefferson County that have had sondes installed since the year 2000. These sites are referred to as the stream Long Term Monitoring Network (LTMN). The data collected at the LTMN sites is an important part of tracking wet weather flow and calculating pollutant loadings. Sondes collect dissolved oxygen, pH, temperature, and conductivity readings every 15 minutes, which enables MSD to see diurnal patterns in those data series as well as longer term trends. 26 of the 28 sites also contain stream flow gauges which are maintained by USGS. The data are transmitted remotely and available real-time on the USGS web site (http://waterdata.usgs.gov/ky/nwis/rt). The equipment housing and communications ports for the stream flow meters are shared with MSD's automated sondes. A map of the LTMN locations is located in Figure 6.5.5.

Surface water and wastewater samples are collected on stream and sewer locations respectively and delivered to the laboratory for analysis on a routine basis and for special projects. The laboratory analyzes the samples for a variety of pollutants including bacteria, conventional pollutants, nutrients, and metals.

6.5.3 CONSENT DECREE COMPLIANCE MONITORING OBJECTIVES

MSD has established a clear set of objectives in order to fulfill the requirements set out by the Consent Decree. MSD is committed to meeting the regulations set forth by local, state, and federal agencies as well as the WWT Stakeholder Group. The WWT Stakeholder Group has a clearly defined set of values which they feel are important to MSD and the community. Those values played a decisive role in evaluating the projects and programs presented within this plan. These objectives will be met through the use of effective project monitoring and management.

6.5.4 COMPLIANCE MONITORING COMPONENTS

The primary components to be addressed with compliance monitoring are as follows:

- Gray Infrastructure
- Green Infrastructure
- I&I reduction and Private Property Program
- Behavior Change

MSD will implement the following strategies to achieve compliance monitoring goals:

- Adaptive Management
- Data Quality Assurance
- Systematic Performance

6.5.4.1 Gray Infrastructure

Gray solutions have been the standard solutions to storm water management for many years. Even with a big movement in recent years towards using more green solutions, there is still a need for gray solutions. Large areas of impervious surface and areas subject to heavy rain events are often effectively dealt with through the use of sophisticated gray infrastructure. Evaluating the success of gray infrastructure consists primarily of flow monitoring, water quality sampling, and assessments of storage and conveyance. The results from those monitoring efforts, along with carefully studied green infrastructure test sites, will allow MSD to recalibrate hydraulic and water quality models, which directly impact the sizing, expectations and implementation of gray solutions and projects.

Flow Monitoring

Flow monitoring is an important tool in monitoring the success of gray solutions. MSD will utilize flow monitors to measure changes in new and rehabilitated sewer lines, manholes, and pump stations. They will also be used to measure influent and effluent flow in treatment plants, as well as overall flow at storage facilities.

MSD currently has six permanent sewer flow meters in place throughout the county and is proposing thirty-eight additional permanent sewer flow meters. Additionally, MSD will install temporary flow meters in areas affected by capital construction, green infrastructure, and sewer rehabilitation. The temporary flow meters will be installed a minimum of every two years. MSD will supplement permanent flow meter data to express a more accurate portrayal of the effectiveness of the projects, and support the recalibration of hydraulic models.

Event Monitoring

MSD currently maintains SSO and CSO inspection schedules. The inspections attempt to determine whether an overflow event has occurred at known SSOs and CSOs. If an overflow event has occurred, the crew tries to determine the cause of overflow and the volume of overflow. SSOs are inspected in accordance with protocols established in MSD's Sewer Overflow Response Plan (SORP). CSOs are visually inspected on a weekly basis. There are also sewer flow meters installed in CSOs that overflow more than ten million gallons a year. Those volumes are determined by AAOV calculations used in modeling. By December 31, 2010, MSD will install peak level indicators on all CSOs that are deemed accessible and are not equipped with flow meters. The peak level indicators will assist MSD crews in identifying overflow events at CSOs.

Water Quality Sampling

As stated in Section 6.5.2, automated water quality measurements are recorded on fifteen minute intervals at the twenty-eight LTMN sites in Jefferson County. As part of the recreational contact sampling program, MSD collects bacteria samples at each LTMN location five times per month during the recreational contact season. Quarterly samples are also taken at these sites to gather more in depth readings of conventional pollutants, nutrients, and metals.

As part of the IOAP, MSD will conduct wet weather water quality sampling at least twice every two years at the LTMN sites. Nutrients, metals, and typical sonde readings will be taken over a 48-hour period during a minimum one-half inch rain event. The 48-hour period will capture the readings before, during, and after the rain event to demonstrate pollutant loading in the stream during wet weather.

MSD currently tests many areas within treatment plants. This testing will continue, but an emphasis will be placed on effluent flow. With the removal and addition of treatment facilities, it is important to effectively monitor the quality of water being placed into streams. This is especially important at the new high-rate treatment facility at Southwest Pump Station and West County Water Treatment Plant. Testing will follow guidelines and agreements per the specifications in Section 3 of the ISSDP. These tests will help to determine whether MSD projects have been effective in positively impacting pollutant loading and nutrient levels being discharged to streams and the Ohio River. Water quality data trended over several years will support more accurately calibrated water quality models.

6.5.4.2 Green Infrastructure, I&I Reduction, and Private Property Program

Monitoring green infrastructure, I&I reduction projects, and the effects of a private property program does not diverge far from the methods of monitoring gray infrastructure. Flow monitoring, rain gauges, and water quality sampling are still important in determining the success of green initiatives. Gauging the support of the community and their willingness to participate is absolutely crucial to success; however, the success of green infrastructure, I&I reduction, and the private property programs will ultimately be gauged by the reduction of sewer overflows. MSD will gauge the success or failure of these programs in each overflow area when deciding to implement further expansion.

The types of green options that will be vital components of MSD's strategy are green roofs, downspout disconnection, rain gardens, bioswales, and pervious pavement. The combination of these components, in small test areas, will allow MSD to monitor their success at reducing stormwater runoff. Similarly, sewer rehabilitation, such as manhole repair and sewer lining, can reduce I&I and, in conjunction with a program to remove illicit sewer connections from private property, can greatly reduce overflow volumes in a collection system.

Case Study Flow Monitoring

Changes in storm water levels caused by downspout disconnection, dry wells, and pervious pavement will be monitored by utilizing flow meters and rain data. MSD will evaluate seventeen green projects (Volume 2, Section 3.2.1.4) and three I&I case study projects (to be determined by July 1, 2009). A site near each of the case study areas may be used as a control site – one which has a similar size, ratio of impervious surface to pervious surface, and land use.

Preconstruction testing will be performed on both sites by placing a flow meter downstream of each location to measure flow in the storm sewer during wet weather events. A rain gauge will be placed at each location to accurately measure rainfall. After construction and installation of either green infrastructure or I&I reduction measures at a study location, testing will resume at both this and the control sites. Post construction data will be compared to preconstruction data to determine the effectiveness of the green or rehabilitation solutions, utilizing the control site response for comparison. For each case, a brief summary will be generated to report the findings. A case study performed in Burnsville, Minnesota by Barr Engineering Company (www.landandwater.com Volume 48, No. 5) utilized a similar style of testing. This case study can be seen in Appendix 6.5.1. A sample test location setup with the ideal layout for case study flow monitoring is displayed in Figure 6.5.6.

Site Specific Monitoring

Site specific monitoring is necessary to provide a uniquely detailed look at the effects of green solutions. Three green roof projects (Volume 2, Section 3.2.1.4) will receive site specific monitoring to establish efficacy in reducing runoff. For pre- and post-construction, downspouts affected by the green roof will be monitored to gather flow data. Downspouts will be redirected to a holding tank(s) where water will be allowed to pond and eventually overflow. Water quality samples will be taken from the water collected in the holding tank. Additionally, a rain gauge will be placed on the roof to accurately determine the volume of rain which fell on the roof during each event. Temperature readings will also be taken on the ground and roof to determine any difference in heat caused by roof materials.

Programmatic elements of the overflow abatement plan, which will be implemented in areas too large to monitor project specifically, must demonstrate their effectiveness through hydraulic models. These models will be recalibrated a minimum of every two years based on flow monitoring from additional permanent and temporary monitors. The programmatic elements to be evaluated using the models include green infrastructure projects such as downspout disconnection, green roofs, and pervious pavement focused on the combined sewer area along with inflow and infiltration reduction and a possible sump pump disconnection and illicit connection removal in the separate sanitary area.

6.5.4.3 Community Behavior Changes

As part of the Louisville Metro community, MSD feels a great sense of responsibility to inform and involve the people of the community. The Public Participation and Agency Interaction, outlined in detail in Volume 1, Section 3.1 of the IOAP, was established as an effort to implement strategies which will allow MSD to develop relationships with the community and set a high standard for public awareness. Project WIN (Waterway Improvements Now) has led this effort creating greater public awareness through the use public notifications, public meetings and presentations, media outlets, and expanding the scope and participation of the WWT Stakeholder Group.

Education and public outreach can be a powerful tool; therefore, monitoring the success of the Public Participation and Agency Interaction program is necessary for sustaining support and participation. In order to successfully monitor the value of the Public Participation and Agency Interaction program, MSD has decided to integrate several components such as customer surveys, web page feedback, and customer relations follow-up.

Customer Surveys

Customer surveys are a useful way to effectively obtain feedback. Annual surveys will be sent via direct mail. Consistent data collection will allow MSD to measure customer trends. The first round of annual surveys will be deployed in 2009 to establish a baseline.

Web Page Feedback

MSD's Project WIN website will be modified in 2009 to allow customers to obtain and provide information in a more interactive way. A blog-style interface will be utilized, since it is an established, familiar internet feature, and could offer a unique style of interaction between MSD and the public.

Customer Relations Follow-up

MSD regularly contacts customers to ensure that they are satisfied with the services and/or products they have received. MSD will follow-up with many of the owners and custodians of new green solutions to make sure they are pleased with their products, answer any questions about maintaining their products, and receive feedback and suggestions.

6.5.4.4 Adaptive Management

The IOAP has been developed based on front-end consideration of source control and green infrastructure. This means that more traditional "gray" infrastructure in the IOAP has been sized after considering both (1) the anticipated flow-reduction benefits of programmatic and site-specific green infrastructure solutions and (2) the anticipated effectiveness of other source control approaches, including reduction of private sources of I&I. Green infrastructure and I/I controls will be implemented as early as practical, to allow data to be gathered on the flow reduction benefits that occur. Prior to the final design of supporting gray solutions, the actual flow reduction performance will be documented and compared against the estimated targets. The final sizing of the gray solutions will then be based on actual documented performance of the green solutions and I/I controls previously implemented.

This approach to "right-sizing" gray infrastructure in response to demonstrated source reduction performance is known as adaptive management. This implementation approach is highly dependent on post-construction compliance monitoring and performance evaluation efforts. The post-construction compliance monitoring and evaluation plan for the IOAP includes: (a) water quality monitoring to document the benefits of overflow abatement, (b) sewer flow monitoring to document the collective impact of both source control and gray solution implementation, (c) overflow events analysis to assist in recalibrating flow models, (d) gray and green infrastructure project-specific performance monitoring, and (e) measurement of the effectiveness of source control pilot projects and behavior-change efforts.

Adaptive management means that MSD will periodically reassess its CSO management and unauthorized discharge elimination approaches based on the monitoring and evaluation results. A major tool in this reassessment is recalibrating both hydraulic and water quality models based on field measurements that can directly compare "before and after" conditions. This reassessment will include reevaluating the effectiveness of green solutions and I/I control approaches, and adjusting the types and characteristics of projects planned for later phases of implementation. At this time there is recognition that historical weather trends may not be as reliable as in the past due to potential changes in the climate. The IOAP's adaptive management approach will allow MSD to monitor evolving weather pattern developments and adjust its plans as more data become available.

6.5.4.5 Data Quality Assurance

Monitoring gray and green infrastructure produces a wide variety of data, and that data comes from several internal and external sources. Assuring that procedures associated with the life of a data point or data set are carried out with the highest quality is a top priority for MSD. MSD intends to implement several quality assurance practices to ensure data accuracy.

MSD will establish comprehensive data quality assurance procedures by December 31, 2009. Procedures will be created for environmental data points such as rain, sewer flow, stream flow, laboratory, and sonde. Varying aspects of the data point, from collection, delivery, formatting, storage, and analysis, will be covered by the procedures. Establishing thorough procedures

ensures quality data for design, construction, monitoring, and modeling. The following are examples of items that will be included in the data quality procedures.

Rain data is collected by MSD through a network of rain gauges, and Nexrain provides a network of radar driven rainfall data. Both data sets provide the data in a live feed to databases at MSD, so there is little opportunity for the data to be corrupted; however, there are opportunities for the data sets to have gaps or become misaligned. A quarterly report will be established to compare the two data sets and check for those types of errors. Data sets found to have missing or misaligned data will be either corrected or tagged as incorrect.

Flow meter data are currently collected by MSD through the use of telemetry and direct data downloads. The six permanent sewer flow meters are on telemetry and collected by the Plant Information Server (PI Server). The telemetry and PI Server systems will also be utilized for the thirty-eight proposed permanent meters. Permanent flow meter data will be evaluated on a monthly basis to ensure the flow meters are reading accurately and that data are being stored correctly. Temporary sewer flow meter data and data from a sewer flow meter installed by a contracted company will be uploaded directly from the flow meter and delivered to MSD. Pertinent information about the flow meter will be added to Hansen, MSD's asset management system, as a sewer flow meter asset, and the high resolution data will be migrated to an Oracle database. In the migration process, a quality assurance application will identify records outside of acceptable parameters. Corrections and verification will be made as necessary.

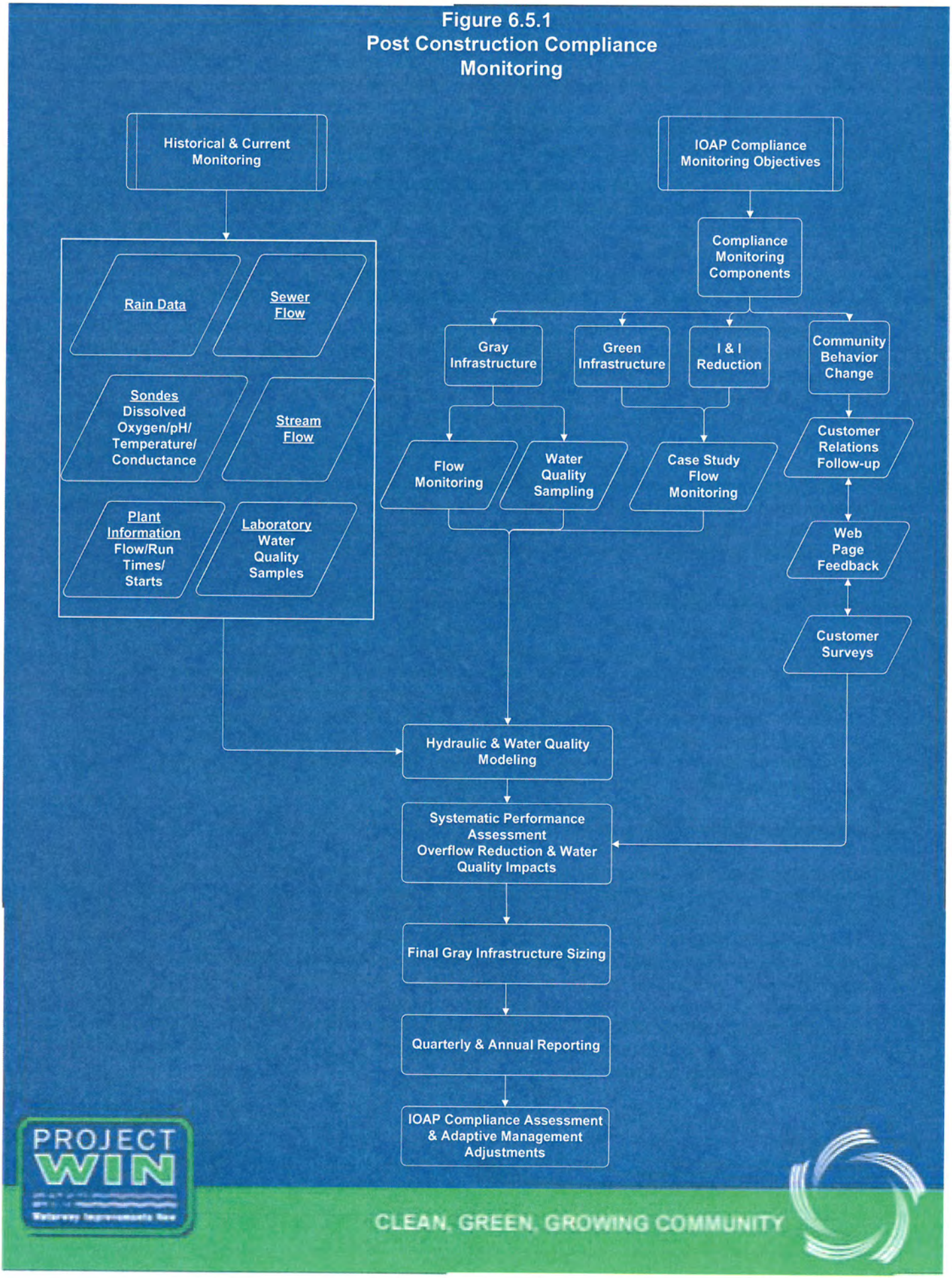
Quality Assurance for Water Quality Sampling and Instrument Calibration

Currently, MSD's Field Engineering Services personnel attend training annually. This course provides standards for collecting and delivering water quality samples and calibrating sondes. In addition, MSD will set up an annual training session with USGS. This training will act as supplemental and more in-depth training on sonde calibration and maintenance. Training with USGS will ensure more accurate data for water quality analysis. A quarterly report of USGS and MSD sonde data will be analyzed to ensure that data, especially before and after instrument calibrations, are accurate. Further adjustments to training procedures and collection and calibration methods will be made as necessary.

6.5.4.6 Systematic Performance

Monitoring systematic performance involves the use of environmental data, collected from monitoring overflow abatement technologies along with rainfall and stream parameters, to further enhance hydraulic and water quality models and to accurately report overflow reductions and associated stream water quality improvements. As the IOAP projects and programs are implemented over time and compliance monitoring data is collected, the existing conditions for the models will be adjusted and the typical year rainfall and design storms will be simulated to demonstrate compliance with plan targets. If this periodic assessment proves the plan to be less effective in overflow abatement and water quality improvements, adjustments will be made within the plan to adapt and refocus efforts toward the original targets and communicate success to regulatory agencies.

Figure 6.5.1
Post Construction Compliance Monitoring



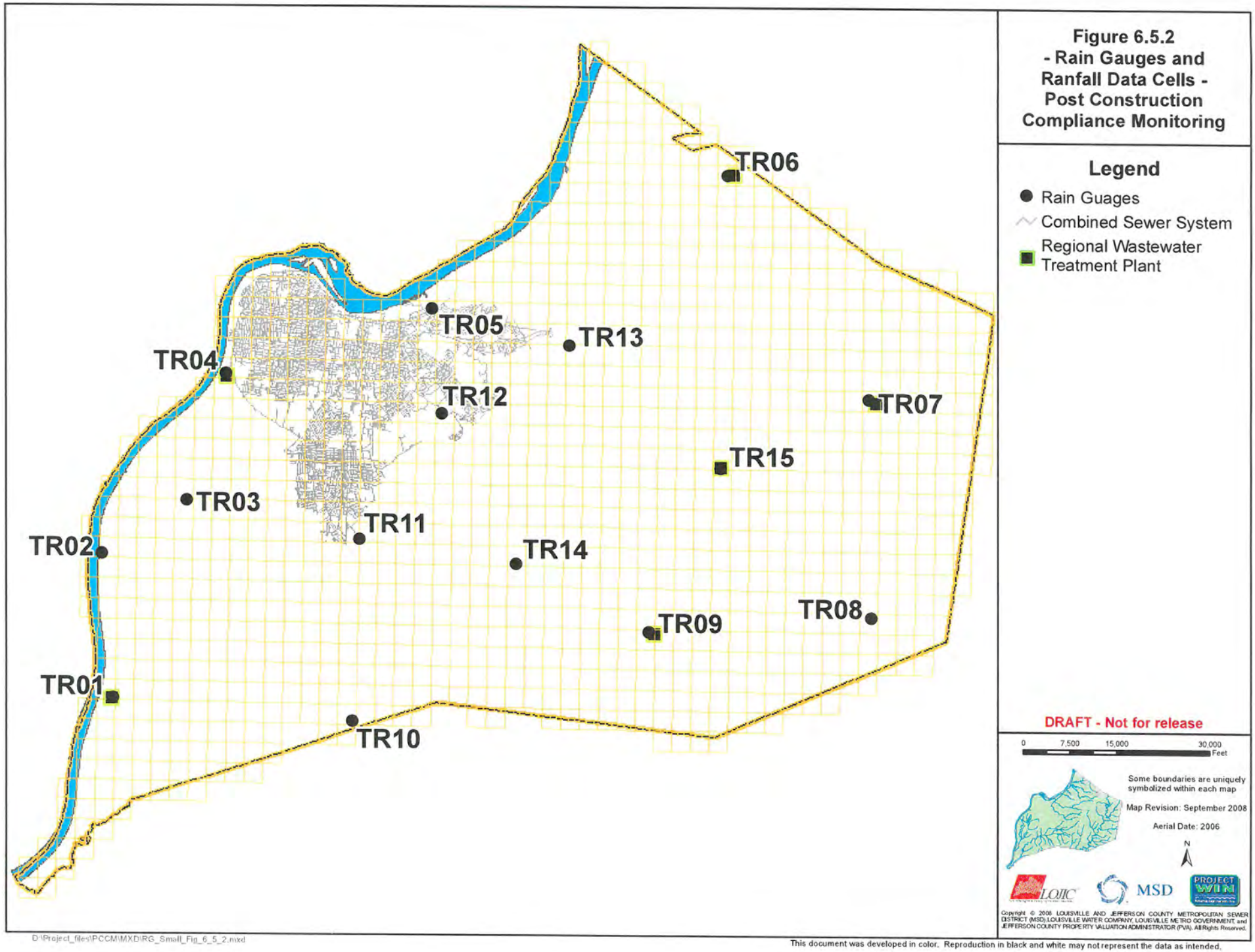


Figure 6.5.2
- Rain Gauges and Ranfall Data Cells -
Post Construction Compliance Monitoring

Legend

- Rain Guages
- Combined Sewer System
- Regional Wastewater Treatment Plant

DRAFT - Not for release

0 7,500 15,000 30,000 Feet

Some boundaries are uniquely symbolized within each map

Map Revision: September 2008

Aerial Date: 2006

N

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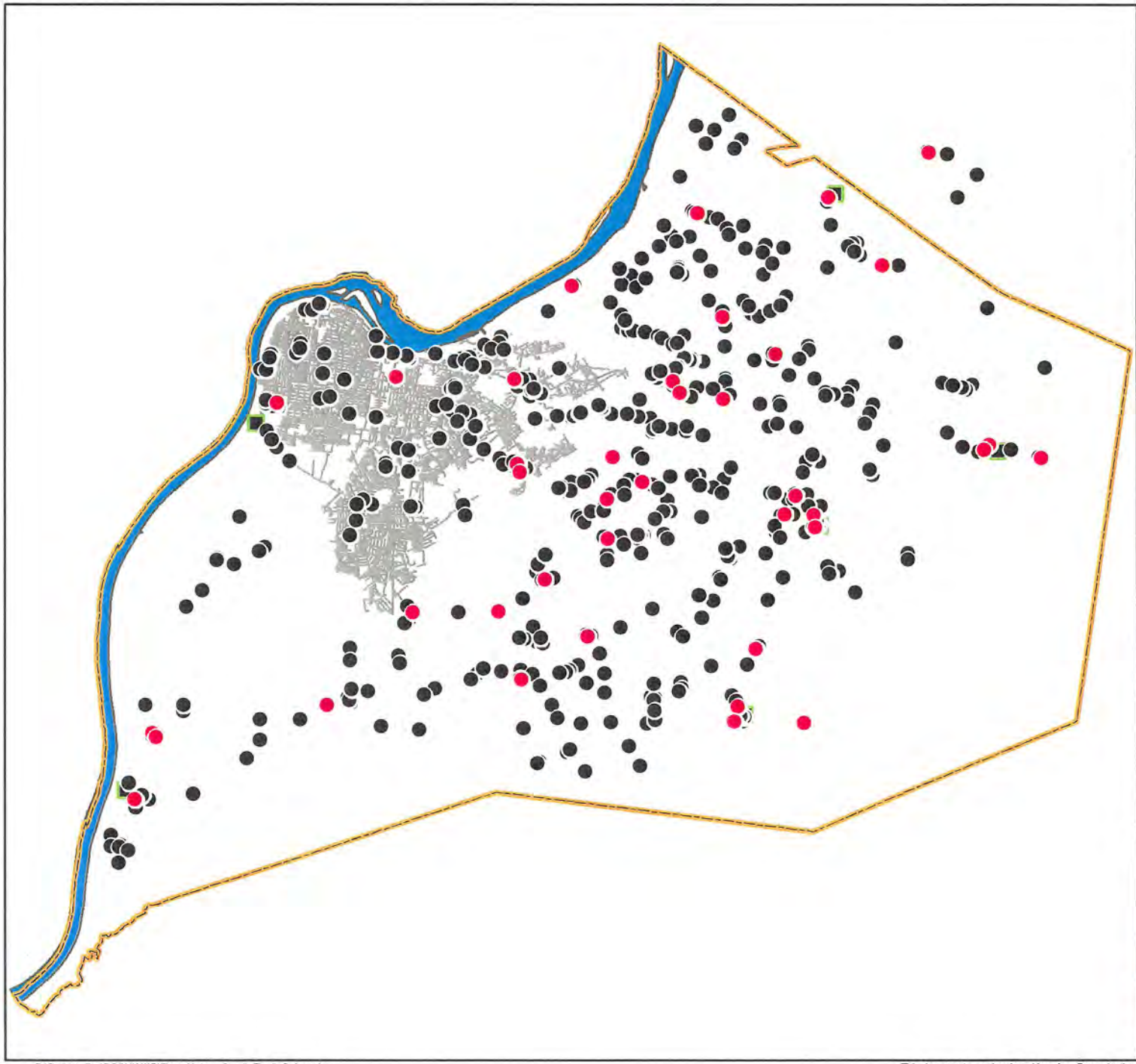

Figure 6.5.3
- Historical Flow Meters -
Post Construction Compliance Monitoring

Legend

- Current Flow Monitors
- Historical Flow Meters
- Combined Sewer System
- Regional Wastewater Treatment Plant

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0 7,000 14,000 28,000 Feet

Some boundaries are uniquely symbolized within each map

Map Revision: September 2008

Aerial Date: 2006

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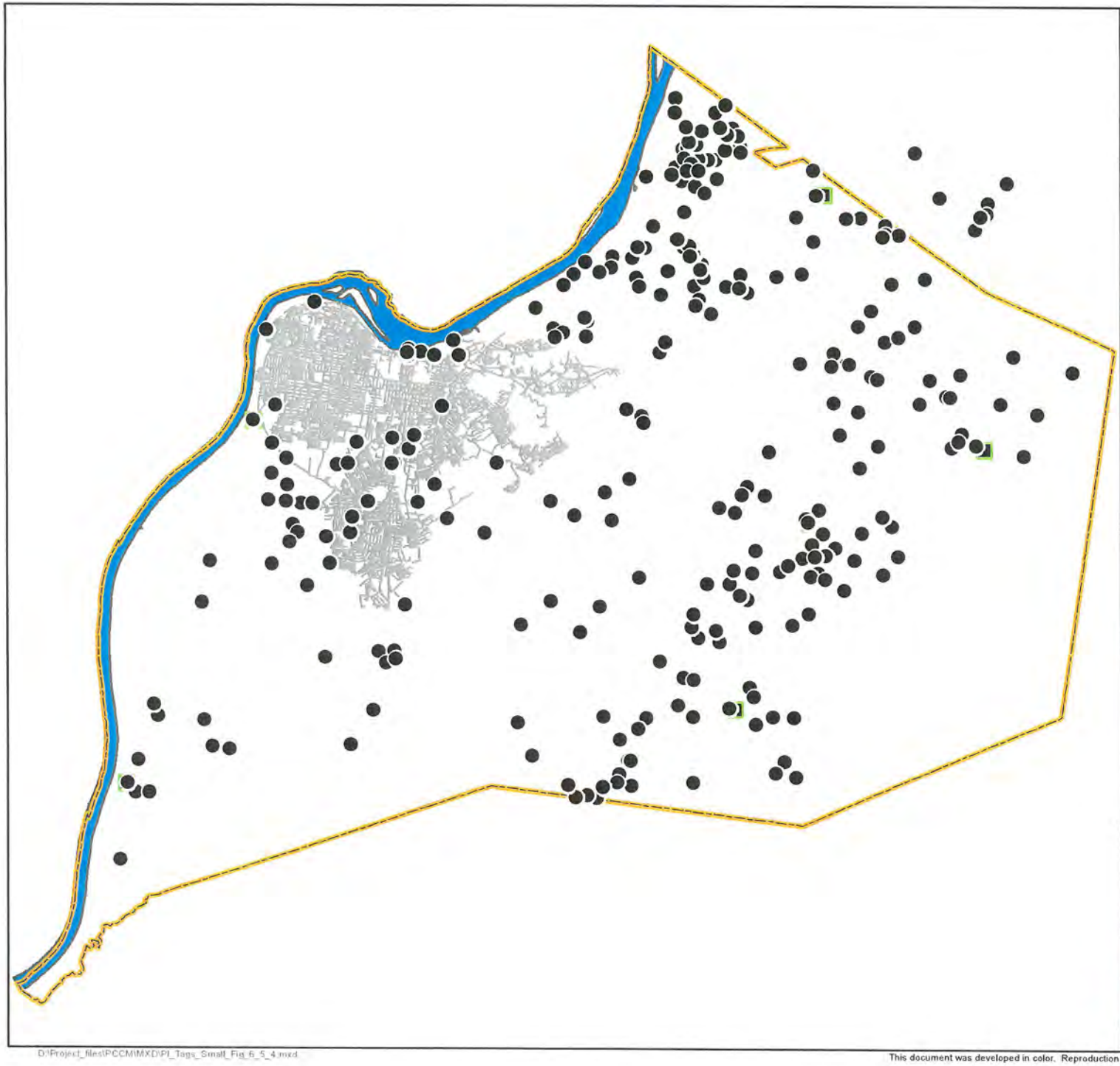

Figure 6.5.4
- Telemetered Monitoring Locations - Post Construction Compliance Monitoring

Legend

- Telemetered Monitoring Locations
- Combined Sewer System
- Regional Wastewater Treatment Plant

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Some boundaries are uniquely symbolized within each map

Map Revision: September 2008

Aerial Date: 2006

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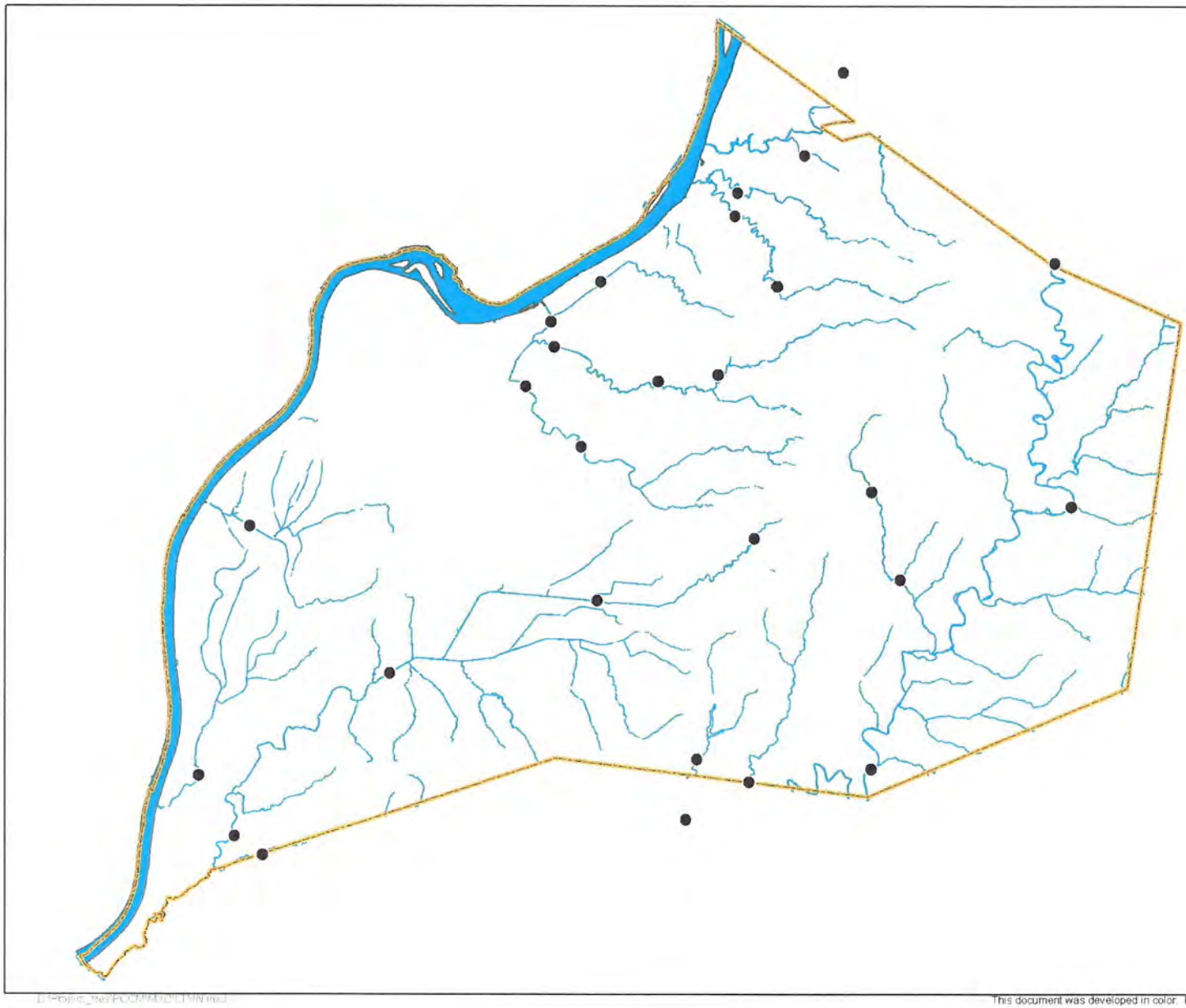

Figure 6.5.5
- Stream Long Term Monitoring Network - Post Construction Compliance Monitoring

Legend

- LTMN

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0 7,000 14,000 28,000 Feet

Map Locator

Some boundaries are uniquely symbolized within each map

Map Revision: July 2008

Aerial Date: 2006

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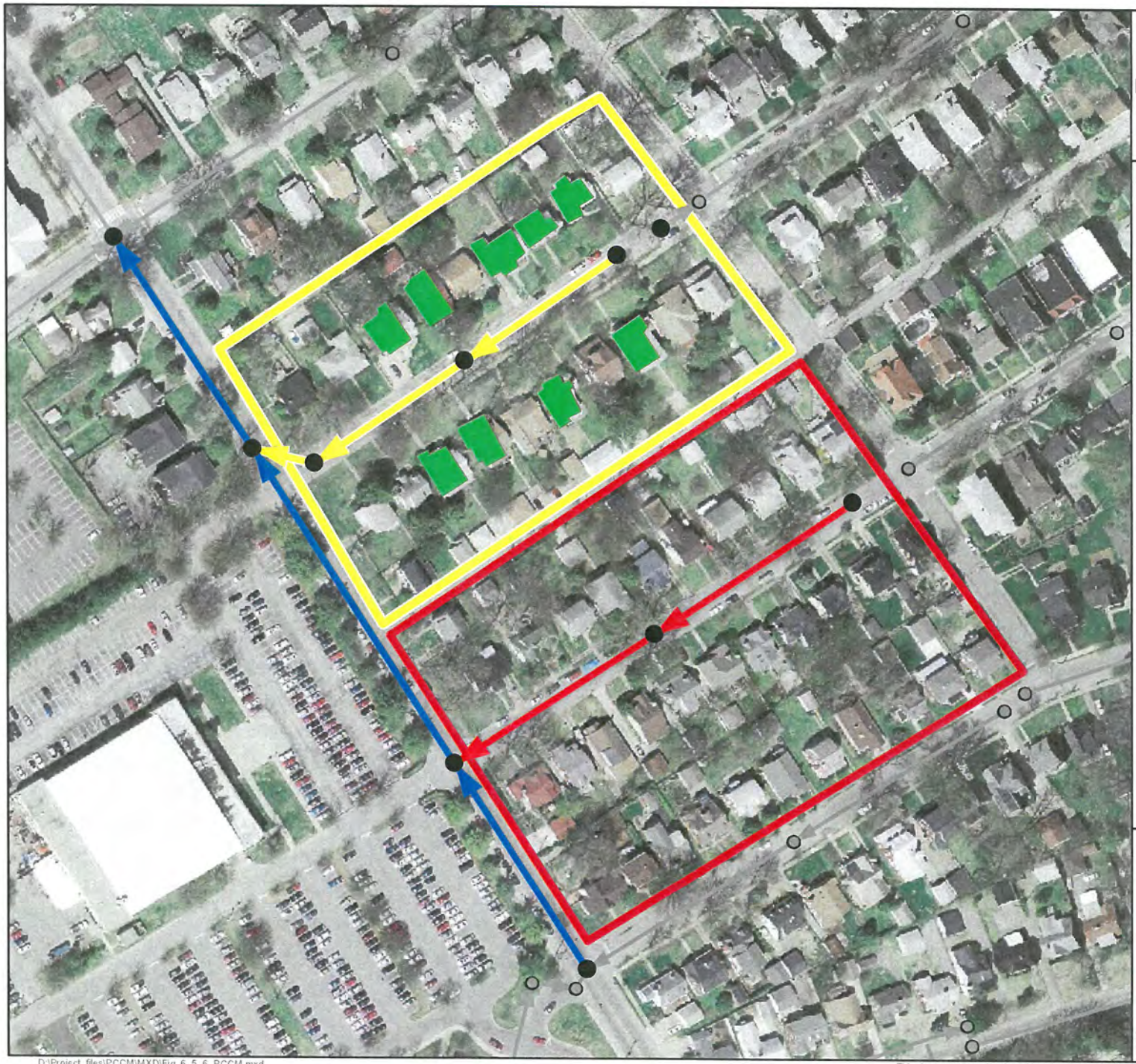

Figure 6.5.6
- Example Downspout Disconnection Testing Area - Post Construction Compliance Monitoring

Legend

- PCCM MH
- PCCM Test
- PCCM Receiving
- PCCM Control
- Sewers
- Boundary 1
- Boundary 2
- PCCM Disconnect

DRAFT - Not for release

0 65 130 260 Feet

Some boundaries are uniquely symbolized within each map

Map Revision: September 2008

Aerial Date: 2006

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Burnsville, MN Rainwater Gardens

A Burnsville home before and after construction of a rainwater garden that filters large quantities of stormwater.

Although stormwater runoff carries more than 85 percent of pollutants to Minnesota's lakes and rivers, the increasing volume of that runoff from impervious surfaces is just as big a problem. Parking lots, roads, and drainage pipes send stormwater directly into lakes and rivers; the amount and force of that runoff result in flooding and shoreline erosion, including the destruction of plants. In addition, the stormwater carries harmful substances to lakes and rivers: sediment, which reduces water clarity, and phosphorus from fertilizers, oil and grease and atmospheric deposition, which promote the growth of algae. One increasingly popular way to filter and reduce the volume of stormwater runoff is with rainwater gardens.

By capturing runoff in shallow depressions and letting it to soak into the ground, rainwater gardens not only lowers the peak flow, but increases the base flow of water that reaches lakes and streams, but help recharge stores of groundwater in aquifers. Moreover, they filter out sediment and other

pollutants like oil, grease, and heavy metals by catching about the first inch of runoff, which contains the highest concentration of pollutants. Rainwater gardens transform stormwater from a destructive carrier of pollution into a source of sustenance for plant and wildlife habitats: the plants thrive on nitrogen and phosphorus, while their stems trap sediment. Rainwater gardens are being incorporated into many new and existing areas for their environmental benefits, as well as their natural beauty.

Minneapolis-based Barr Engineering Company began working with the city of Burnsville, Minnesota, in early 2002 to develop a plan for improving the water quality of Crystal Lake by adding rainwater gardens to a 20-year-old neighborhood. To measure the effectiveness of the gardens, two nearly identical neighborhoods were chosen for the project: one to be "retrofitted" with 17 rainwater gardens, and the other, just one street away, to serve as a control site.

Leslie Yetka, a water resources specialist for the city of Burnsville, got the ball rolling by obtaining funds for a stormwater-treatment study — $30,000 from the city and a $117,000 grant from the Metropolitan Council, which is a regional planning agency for the seven-county Twin Cities metro area. The challenge she faced was finding an affordable way to significantly reduce runoff from residential areas that already had curbing and conventional storm sewers in place. Leslie explains, "We didn't have room for traditional treatment approaches such as stormwater ponds, so we needed to focus more on treating the runoff at its source, or basically at each home." The Dakota County Soil and Water Conservation District provided initial technical expertise in evaluating alternative stormwater-treatment practices at a residential-lot level. Then Leslie hired Barr to help identify which treatment technique, within the scope of the study funds, would result in the greatest reduction of runoff.

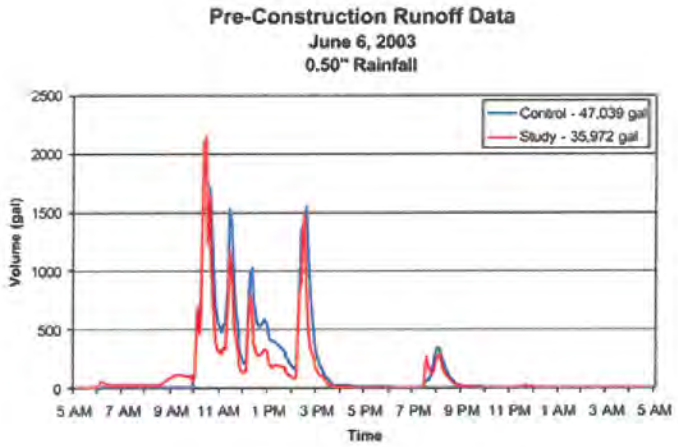
After discussing budgets, goals, options, and constraints, they determined that rainwater gardens offered the most promising solution for decreasing the amount of stormwater entering Crystal Lake. Barr would design the rainwater gardens and select appropriate plantings, as well as work with Leslie in educating homeowners and overseeing the construction process.

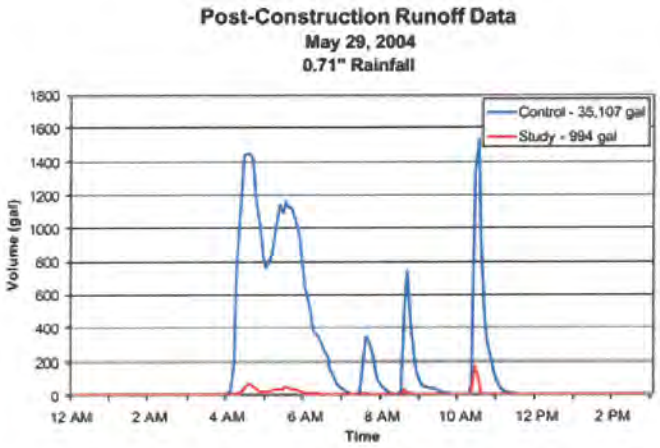
Cuts in the curb allow stormwater to enter the gardens from the street.

At the start of the project, in February 2002, the engineering firm worked simultaneously on two things:

1. With Leslie, talking to residents who lived around Crystal Lake and hosting a series of seminars to explain what was being done to improve water quality in the lake and how rainwater gardens could help
2. Evaluating the suitability of the soil and the existing topography of neighborhoods for their ability to support effective rainwater gardens

That spring, after three potential sites had been identified, Leslie helped to determine which neighborhood would offer the greatest percentage of voluntary participation in the program. On the street chosen to receive the rainwater gardens, an astonishing 85 percent of residents agreed to participate by planting the gardens and performing minor maintenance on them — far exceeding the anticipated 30 percent buy-in. The resulting plan called for 17 gardens at 14 homes; 13 would be in front yards, four in back yards.





Before work on the rainwater gardens could start, two seasons' worth of stormwater data from both the selected neighborhood and the "control" neighborhood needed to be collected. Barr installed gauges to measure how much runoff poured into Crystal Lake from each neighborhood. Later, the same gauges would show how successful the gardens were in reducing the volume of stormwater entering the lake.

The next step, in March 2003, was to design the gardens. Kurt Leuthold, P.E., a Barr civil engineer, performed runoff calculations to determine the amount of stormwater that the neighborhood received annually; designed retaining walls to allow the gardens to exist a foot below street level and to keep their appearance neat; sized the gardens to fit within utility lines and city easements; and specified the removal and addition of soil where necessary to ensure that each garden had adequate drainage to the sand underneath them.

To prevent soil compaction, excavating equipment was kept on the street.

After completion of the engineering work, Fred Rozumalski, a registered landscape architect at Barr, met with homeowners to review drawings, approve garden sizes, and explain the choices residents could make about the type of rainwater garden that would be created in their yard. There were three options: perennial, wildflower, and shrub gardens. Because plants in a wildflower garden tend to spread quickly without regular maintenance — resulting in an unkempt appearance — most residents chose a combination of the less labor-intensive perennial and shrub gardens, whose plants stay put and help sustain a groomed-looking rainwater garden. One back yard does feature a wildflower garden, which Fred describes as a "little patch of prairie," suited to its out-of-the-way location.

While Fred met with individual homeowners to show them pictures of suitable plants and draw up plans with customized planting maps, the construction work—excavating and grading—was sent out for bid. Most of the large companies invited to bid submitted very high cost estimates, due in part to the fact that the job was small but tricky because the gardens were located on streetside easements inside grids of water, sewer, power, telephone, and cable TV lines. The best prices came from small companies; the city awarded the work to Mike Tix of Mike's Lawn and Landscape, based in Hastings, Minnesota, whose staff completed the work with enthusiasm and meticulousness for less than the budget ceiling of $50,000.

In September, it was time to plant the flowers and shrubs. Fred, Kurt, and Leslie, along with a few other engineering staff members, showed up in the neighborhood on a Saturday morning and helped homeowners complete the

planting by noon. The residents had planned a potluck lunch and spent the rest of the afternoon eating, talking, and strolling up and down the street, admiring each other's gardens. It was the commitment and dedication of these homeowners, says Fred, that made the Burnsville rainwater garden project "probably the most fun and rewarding project I've worked on in my eight years at Barr."

The results of the project are rewarding, too. Once cuts were made in the curb to allow stormwater to enter the gardens from the street, the amount of runoff entering Crystal Lake from the neighborhood dropped drastically. Compared to its sister street with no gardens, the study street contributes about 90 percent less stormwater to the lake. The decrease in runoff volume means that less phosphorus and sediment are entering the lake, too, which helps preserve water clarity and fish populations; it also minimizes the sudden rise in water level that usually follows a storm and contributes to shoreline erosion. Although runoff data are still being analyzed, Leslie says the results far exceed her expectations. Her goals are to use this project to demonstrate the success of rainwater gardens and to begin incorporating the study's findings into other existing and new neighborhoods in Burnsville.

The gardens were designed to be neat and colorful so that homeowners would enjoy and be motivated to care for them.

The project is unique in Minnesota — and perhaps the country — because it involved fitting gardens into a neighborhood that already had a traditional curb-and-gutter design. Curb cuts at each garden capture road runoff, which is the most significant source of stormwater from a neighborhood. Also, these gardens are believed to be some of the first designed for attractiveness, high

performance, and ease of maintenance in a residential setting.

Because it was a pioneering project, both the city and Barr learned a few lessons that will help future projects go more smoothly. For instance, they probably won't waste time soliciting bids from large construction firms, and they'll likely incorporate eight-inch stone "drop waterfalls" to help slow the speed at which runoff enters
the gardens (a feature that was added to the Burnsville gardens toward the end of the project).

Soil quality was improved with compost and carefully graded.

Leslie is often asked how the city obtained such a high level of participation for the study. She says one of the keys was having both an engineer to design the gardens and a landscape architect who met with individual homeowners and worked closely with them to come up with planting designs that fit not only their properties, but also their levels of commitment for long-term maintenance. "As soon as most of the homeowners met Fred," says Leslie, "and found out they essentially had a landscape architect at their disposal, they were like kids in a candy store!"

She also credits personal service and attention to detail for the high participation rate. "What the homeowners really cared most about was having a beautifully designed garden to enhance their property, so aesthetics were primary to them," she says. "Runoff treatment was secondary, for the most part. Also, we spent a lot of time meeting with the homeowners trying to educate them about runoff and water quality and why this study was

important."

According to Fred, a frequent reason that rainwater gardens don't succeed with homeowners is that, if not thoughtfully planned, the gardens can look weedy and uncontrolled. That's why his designs incorporated clean edges, stone retaining walls, and flowers and shrubs that are colorful, functional, and prone to stay confined to a garden. To best ensure not only the gardens' visual appeal but their effectiveness at filtering stormwater, Fred and Kurt amended the upper layers of soil with a generous amount of compost, which was needed to both support the selected plantings and provide a high degree of drainage to the sandy layer of soil underneath.

Another aspect of the project that contributed to technical success was careful site surveying. The neighborhood's topography, landscaping features, and utility lines were all factored into garden design. And the tremendous amount of construction oversight, which Leslie concedes may not be feasible in some cases, allowed the gardens to be constructed exactly as planned. In addition to the necessity for what Kurt calls "precision excavating" within the utility grid in each yard, there was little room for error in elevations, because the gardens wouldn't function as designed if established at too high or too low a ground level. Leslie says a contractor like Mike Tix, who pays close attention to detail, is extremely important, as is having earth grades and soil compaction checked regularly during construction.

Since the project began, the Dakota County Soil and Water Conservation District has conducted home-runoff audits on each lot in the study neighborhood to provide homeowners with information on ways to further reduce runoff from their properties, such as redirecting downspouts, installing rain barrels to capture roof runoff, adding gutters in strategic locations, and aerating the lawn to enhance rainwater infiltration.

[Note: This document contains Sections 3.3-3.5 of MSD's Draft Integrated Overflow Abatement Plan; this is the part of the Public Participation and Agency Interaction Chapter (chapter 3) that relates to future plans for the public program (starting in 2009). The rest of the chapter (Sections 3.1-3.2) discusses the public notification, outreach, and education activities that MSD has already conducted (since 2005), including the Wet Weather Team stakeholder process. (Please contact the facilitation team if you would like to see the full draft of chapter 3, which is over 50 pages long.) A list of acronyms used in this document is attached to the end of this document for your reference.]

3.3 FUTURE PUBLIC PROGRAM FROM JANUARY 2009- DECEMBER 2024

During the development of the IOAP, the primary focus areas of the public notification, education, and outreach program were related to required notifications of overflow events, education and input on Consent Decree response strategies, and building support for the community investments that will be required to achieve the requirements of the Consent Decree. As the IOAP moves from the planning to the implementation stage, the public program will remain a vital part of MSD's response strategy. While the future objectives of the public program will have a slightly different focus, MSD anticipates that the future program will continue many of the practices that have been successful over the past few years.

3.3.1 Objectives of the Future Public Program

The objectives of a public program during the implementation stage are expected to be as follows:

- Continue the required notifications of overflow events intended to protect public health (NMC 8 and SORP requirements);
- Instill a sense of value and personal ownership and responsibility for clean water that includes:
    - Promote sustained voluntary participation in private-side I/I control and green infrastructure programs to reduce loadings on the sewer system;
    - Reinforce the need to reduce water use during rain events;
    - Encourage behavior modification to prevent pollution through source control by residential and industrial/commercial customers (NMC 3 and 7);
- Maintain continued support and understanding of the required financial investment;
- Educate children (and teachers) through formal and informal measures to ensure a depth of knowledge of water quality issues, promote the personal use of best practices to reduce sewer overflows, and instill deeply rooted values around water quality, thereby reinforcing the long-term sustainability of voluntary participation; and
- Continue support to customers through neighborhood-specific informational needs as sewer system evaluation studies are conducted, construction projects are planned, or as

targeted source reduction programs require homeowner participation in plumbing modifications and similar activities.

The following describes in more detail how MSD's future public program will address each of these objectives.

3.3.2 Notification Programs

MSD will continue to implement both the event notification and the program notification as described in Section 3.2.1. The following programs will continue for the duration of Project WIN and beyond.

3.2.2.1 Warning Signs

MSD will continue to maintain approximately 1,100 Overflow Advisory signs along the creeks and the Kentucky side of the Ohio River. Sign locations will be reviewed annually, with signs added or subtracted based on changes in land use, stream accessibility, etc.

To ensure continued notification and recognition, MSD staff will continue to annually inspect the installed signs. Signs will be repaired, replaced, relocated, or cleaned as appropriate. To aid in the tracking of these signs an inventory in the Hansen Asset Management software is maintained.

3.3.2.2 Project WIN Website

The Project WIN section of the MSD website will be maintained as a full sub-website. MSD's Home Page will continue to provide the screen crawls and alerts about potential rain and CSO and SSOs as well as up-to-date information from the RTC system Other current and timely information will continue to be displayed on this Project WIN Home Page.

The Project WIN website will continue to contain the Consent Decree, Public Information including copies of power point presentations from public meetings and MSD Board Meetings; required annual reports to EPA and the State, and quarterly and technical reports (LTCP, CMOM, NMC, and SORP).

3.3.2.3 Electronic Notification

MSD will continue the programmatic approach to public notification including a wide variety of electronic communication forms as documented below.

Website: From MSD's Home Page, the public can access the Project WIN section of the website. Clicking on the Project WIN logo brings up the Project WIN site, which includes a link to sign up for overflow advisory emails warning when significant precipitation has caused overflows in MSD's system. Since it is electronic and contains "real time" information, the website is an important component of public notification. The Project WIN website provides

important information on the condition of area streams, and shows a warning if overflows are likely to be happening or have happened in the past 48 hours.

Web page stoplights and supplemental information: Overflow alert messages in the form of screen crawls are maintained on the Project WIN website. The website's home page features a simulated traffic light to inform the public of the overflow advisory level as current conditions:

- "Green" for no overflows;
- "Red" when rainfall occurs and conditions for overflows is likely.

The rain gauge network is utilized to automatically trigger the "red" condition when any rain gauge tributary to the CSO area receives more than 0.1-inches of rain, or any other rain gauge in the county receives more than 0.25 inches of rain.

- The notification alert lights remain on the website for 48 hours after the rainfall has ended to reinforce the message that the public should avoid water body contact.
- The screen crawl is located below the notification lights with up-to-date information about weather conditions and alerts about contact with waters.

Blending Events Notification: On February 13, 2008, MSD added a notification of blending events at the Jeffersontown Wastewater Treatment Plant to the Public WIN website. The blending notification is in addition to the overflow alert.

Jeffersontown Wastewater Treatment Plant
Blended Flow Data

As of 2/12/08, MSD is providing near real time flow information on blended flow from this plant. Up to 60 days of historical data is presented below. You may also view all historical data.

Start Date/Time	End Date/Time	Amount (Gal.)

E-mail notifications: The public can voluntarily sign up to receive automatic email alerts about the potential overflows based on wet weather conditions. On the MSD Home Page, customers can register by clicking on the Project WIN E-mail Notification list message.

Press and Public Service Announcements: Overflow alert messages are provided to radio, TV, and other local media for announcements.

3.2.2.4 Written Notices

MSD will continue to utilize many forms of written notification to communicate with customers.

Door Hangers: MSD uses two types of door hangers for notification to residents. One door hanger is distributed to homeowners following a sewer backup that has the potential to cause basement or surface flooding. The other door hanger is distributed to neighborhoods that could be affected by dry weather overflows that reach receiving waters in significant quantities.

Direct Mail within 500 ft. of Waterways: MSD will continue an annual public notification via a letter sent to each customer within 500 feet of Beargrass Creek and the Kentucky side of the Ohio River as determined by GIS plot. The purpose of the notification is to provide general awareness and warning information about overflows and steps the public should take to protect its health.

Water Quality Warnings Prior to Onset of Recreational Season: MSD will continue to provide annual public notification in the form of a bill inserts, newsletters, and newspaper advertisements. These notifications are targeted in the spring to coincide with the beginning of recreational season. This notification provides a general overview of the potential for sewer overflows and informs the public about water body contact and public health concerns.

Brochures: MSD will maintain and periodically update the brochures on SSOs and CSOs. Brochures will be distributed at public meetings, and other public events; brochures will also be supplied to the Louisville Metro Council Members for distribution at their District meetings.

Newsletters and other MSD publications: MSD will continue to use its three regular newsletters to disseminate Project WIN information. The "Update" is a monthly publication with a regular feature section on Project WIN and progress to date on the overflow abatement program. The "Crosscurrents" is a quarterly newsletter that also includes up-to-date information about CSOs and SSOs in a Project WIN section. The Annual Report provides an overview of MSD operations for the year. While these newsletters are not real time notification in the same sense as the website, signs, or email notifications, they provide consistent reminders about important issues relative to health impacts of sewer overflows, and are an integral part of the notification process.

Public Meetings: MSD will continue a robust public information program and will participate in numerous public meetings that are set up around the Louisville Metro region and at other public events. Public meetings are held on a variety of topics. As with the newsletters, public meetings do not typically provide real time notification, but do serve as another outreach opportunity to inform the public about sewer overflow impacts. MSD currently schedules approximately 150 public meetings annually.

Media and Newspaper Articles: As part of general media relations and specific Project WIN press releases, MSD will continue to provide the media with printed articles about overflows, MSD's overflow abatement efforts, and public meetings.

3.3.3 Personal Responsibility and Behavior Modification

A public education and outreach program is essential to encourage behavioral changes and create a sustainable overflow abatement program. MSD will continue to reach out to the public about personal behaviors and individual actions and how people impact the results of the overflow abatement program. These messages will continue to focus on private sewers, household and gardening practices, consumer behavior, sustainability, and green infrastructure.

The recommended gray infrastructure program will not eliminate all overflows under all conditions nor will it guarantee that harmful pollutants do not reach the surface waters under some conditions. Behavior changes related to commercial and individual housekeeping (e.g. control of FOG, elimination of illegal clear water connections to the sanitary sewers, etc.), gardening, and drainage and consumer practices can maximize the potential for the sewerage infrastructure to abate overflows. MSD will continue to implement a public outreach program to inform and educate the general public and specific targeted audiences to add value to and ensure optimal results of the (gray) infrastructure program. The IOAP program assumes a high-level of individual actions to reduce I/I, control stormwater volumes through green infrastructure, and reduce pollutant loads on our streams through active pollution prevention implemented at the level of individual homes and businesses.

3.3.3.1 Sustainability of Green Infrastructure Initiatives

Sustainability goes hand in hand with green infrastructure; both are focused on long-term ability to improve our waterways and reduce impacts on the natural environment so that we can maintain a high quality of life. The WWT along with the technical experts have focused on participation of individuals and integration of green infrastructure as two essential aspects of the Project WIN program in order to assure that it is sustainable and produces results.

Green infrastructure can make parts of Louisville Metro more like a sponge and less like a funnel. That means anything from barrels and gardens that capture rain, to rooftops covered by plants that absorb moisture, to new designs for streets and parking lots that direct rain into the ground, to planting more trees and restoring wetlands. The green solutions are especially suited for areas with combined sewers because keeping stormwater from pouring into sewer lines will directly reduce overflows.

MSD will continue to explore all reasonable and feasible opportunities for green infrastructure, and will work in partnership with the Mayor's office and other Regional Initiatives such as the Partnership for Green City, to not only create a vision for green infrastructure, but also to make it happen. A formal partnership has recently been formed by Louisville Metro Government, Jefferson County Public Schools, the University of Louisville, and MSD to coordinate planned construction programs and to identify opportunities to better leverage public agency green infrastructure initiatives. MSD will continue its leadership in the Rain Garden Program, the Rain Barrel program, tree planting program and working with the Metro Parks department on riparian buffers and conservation easements. The message of "Clean, Green, Growing Community" will continue to be delivered and demonstrated to the public to support engagement and adoption of the green infrastructure practices and programs. The long-term objective is that green infrastructure will be integrated across Metro programs and across the population of the Louisville Metro region as part of daily life and plans for the future.

3.3.3.2 Participation in Private I/I Initiatives: I/I is the major cause of sanitary sewer overflows. The more success MSD has in the control of I/I, the smaller the SSO control facilities can be. Successful I/I control also will benefit the community with savings in capital construction, operations and maintenance, and interruption in neighborhoods. MSD data, along with data collected from other clean water utilities and national reports, all indicate that I/I from

private sewers (laterals which connect the private building to the public sewer) cause at least 50 percent of I/I in most collection systems. MSD's past experience with sewer rehabilitation suggests that without broad based maintenance of private sewers, I/I may not be significantly reduced. Consequently, the WWT has encouraged MSD to work with the Louisville Metro Council to adopt a local ordinance to inspect and repair private sewers. Regardless of whether an ordinance is adopted or not, a broad based outreach program that informs and educates the public will be necessary to ensure that private-side I/I is effectively reduced. MSD is currently considering a program to provide for the repair or replacement of private sewer laterals as a service and an additional measure of I/I control.

3.3.3.3 Pretreatment and Pollution Prevention: Consistent with NMC 3, MSD administers a comprehensive Industrial Pretreatment Program. As part of the continued application of this program, the MSD public program will continue to focus on FOG for both industrial and commercial businesses. FOG control is a mainstream program, and most clean water agencies around the country have a commercial FOG program aimed at commercial bakeries, restaurants and other business that prepare or process food. MSD will continue working with its industrial and commercial customers, with particular attention given to food service establishments to ensure that they understand their obligations under MSD's Waste Discharge Regulations (WDRs) and to provide them with the information and technical support needed to prevent FOG-related sewer blockages. MSD will also continue the active residential FOG information program through the continued distribution of brochures ("Fat-Free Sewers") and grease scrappers at public events where MSD participates.

In the ongoing public program, pollution prevention (NMC 7, P2) will be a prominent component of the program. The difference between the Industrial Pretreatment Program and the pollution prevention program is that pretreatment focuses on industrial or commercial establishments and the pollution prevention program focuses on government or personal actions that prevent pollutants from entering the waste stream. Often pollution prevention programs are the same as public outreach or education programs, since preventing the pollutant from entering the waste stream can only be accomplished if the public is aware. MSD will continue its existing pollution prevention program including:

- Cooperation with related activities performed by Louisville Metro such as: street sweeping, Operation Brightside litter pick-up programs and other Metro pollution prevention programs activities. MSD will work to maximize the efficiency of those operations and determine the amounts solids and floatables are prevented from entering the CSS and the SSS.
- Implementation of the Hazardous Materials Ordinance, which requires users with hazardous materials on site to submit a spill prevention and control plan.
- Continued response to spills of hazardous materials and incidents involving discharges to the sewer system and providing spill mitigation kits to the Louisville Metro and Suburban Fire Departments to absorb vehicle fluids rather than flushing to the sewer.
- Continued implementation of the Erosion Prevention and Sediment Control Ordinance.

- Facilitation of annual clean sweep events to remove trash and debris from the waterways in Jefferson County.
- Improvement and distribution of informational outreach materials that are targeted to inform customers and residents about activities that can be practiced within their homes to assist in the reduction of overflows and/or the reduction of pollutants contributed to the combined or separate systems.

3.3.3.4 Support for Sustained Investment

The hundreds of millions of dollars of public money needed to implement the overflow abatement program indicate the need for a comprehensive, ongoing public outreach and education program. The objective of an ongoing public outreach program is to ensure acceptance of the priorities and choices of the infrastructure program and that over a long period of time there continues to be a willingness to pay for the infrastructure.

MSD's public outreach program successfully gained the approval of elected officials to enter into debt and raise rates to cover that debt in order to finance Project WIN projects. MSD fully understands that it was not only the WWT team process, but also the public meetings and the public hearing that helped MSD establish the priorities and schedule for the overflow abatement program. Continued participation of the public and a continued public outreach program will be essential throughout the entire Project WIN program in order to continue the support for ongoing rate increases that will be necessary. The ongoing public program will utilize the same media strategy (public meetings. newsletters, website, brochures, bill inserts and press and other electronic media) to continue to tell the story of what, why, where, how and most importantly the benefits and results of Project WIN.

3.3.3.5 Educate Children

To ensure the sustainability of all the programs required for Consent Decree compliance, the active support and participation of all MSD's customers must continue for generations to come. An active program supporting environmental education in our schools can help create good stewards of the environment.

MSD will continue and expand its investment in education of primary and secondary level students as described in Section 3.2.4 through a variety of programs to ensure the delivery of information about our environment. MSD's goal will be to instill in its future customers an understanding of the value of clean water, and the role that personal responsibility plays in protecting the rivers and streams of Jefferson County.

MSD will expand the educational support program to include any private, parochial, or charter schools that are interested in partnering with MSD's environmental education program. In addition, JCPS has expressed interest in expanding the Eastern High School partnership model to more high schools. It is MSD's goal to use each of its six regional wastewater treatment plants (WWTPs) as the basis for an environmental engineering partnership with a nearby high school.

3.3.3.7 Neighborhood Specific Information Needs

In addition to service area wide initiatives, MSD's public program will also support the specific information needs of neighborhoods. Examples of the initiatives that will be implemented on a neighborhood basis are as follows:

- Project-specific meetings conducted during the design phase of IOAP projects to get neighborhood input on project constraints, opportunities, and preferences relative to the project;
- "Pardon Our Dust" meetings informing people about upcoming construction projects that may affect their neighborhood;
- Sanitary Sewer Evaluation Study (SSES) program notifications, informing residents about upcoming sewer evaluation projects such as smoke testing, sewer cleaning, and closed-circuit television (CCTV) inspection that may involve partial street closures, access to back-yard manholes, or require specific actions to be taken by homeowners;
- Private property I/I reduction programs that may include voluntary or mandatory inspections of sewer laterals, basement connections, and downspout connections requiring MSD staff or contractors access to private property;
- Green infrastructure focus areas to encourage widespread use of green infrastructure practices such as downspout disconnects, installation of rain barrels and rain gardens, and pervious pavement on driveways and sidewalks in areas of the CSS where the potential for a high level of runoff reduction has been identified and assumed in the sizing of gray control components.

3.3.4 Program Messages

Consistent messages are an important part of any public program. Consistency provides for repetition and reinforcement of messages, maximizing the opportunities for retention of the message, and for sustainable behavior changes resulting from the public program.

The Project WIN public program is a subset of MSD's overall public program, so the messages of Project WIN must also be consistent with MSD's general program of *Clean, Green, Growing Community.*

Some general principles of the Project WIN messages are as follows:

- Convey all positive messages, all the time;
- Educate and create sense of being part of a WINning team, especially when focused on modification of personal behavior and habits;
- Maintain compliance with the letter and intent of regulatory requirements (i.e., don't allow a positive message to "sugar-coat" a tough regulatory requirement to the point that the intent of the regulation is lost); and
- Support the Project WIN capital plan and operating initiatives.

Consistent with these general principles, some specific program-wide messages will be used time after time. This program is intended not only to inform the public but also to educate the public about its part in achieving the CWA goals as part of the WINning Team.

The program has taken the key messages as developed by the WWT and refined them for the ongoing outreach and education to the public as follows.

Our Community Values Clean Streams and Rivers - Our streams and rivers provide an intrinsic value to our community. Clean, healthy and diverse streams and rivers provide a high quality of life for Louisville Metro.

Protecting Public Health is Our Primary Concern - Project WIN is working to ensure our streams and rivers are healthy and clean. There will be times when one has to be careful about contact with waters. Working together we can ensure clean waterways for your family's health and enjoyment.

Your Investment Is Producing Results - Recognize the value and results of the investment in clean streams and rivers. Clean waterways are worth the investment.

Be Part of a WINning Team - Focus on personal behavior, each person can make a difference. Participate in our team projects and initiatives. Provide feedback to MSD.

Supplementing these general messages will be a seasonal approach to specific themes. Consistent with the seasonal messages conveyed by MSD during the IOAP development, the calendar year will be divided into four seasons and messages/activities will be targeted to specific audiences that are subsets of the general public. These seasons are:

- The Rainy Season; February through April
- The Summer Season; May through July
- The Fall Season; August through October
- The Holiday Season; November through January

The activities and public messages are consistent with the season, as described previously in Section 3.1.

3.3.5 Future Approaches and Available Media

The public program has a wide variety of audiences and a corresponding variety of media approaches to connect with those audiences. The audience for the future program will be a comprehensive cross-section of the Louisville Metro region.

In the future, the public program will use a variety of tools and media sources to reach out to these groups and deliver the specific messages. Table 3.4 shows the wide range of media that MSD anticipates to be used. Over the course of the program, it is expected that enhancements will be made as the technology improves, as the effectiveness of these tools is measured and based on feedback from the specific audiences.

TABLE 3.4 MEDIA APPROACHES FOR VARIOUS AUDIENCES

AUDIENCE	Public Meeting & Community Events	Web Portal to Project Win Information	Speaker's Bureau & Technical Support	Print Advertisement, Press Releases	Public TV Video, TV & Radio PSA	Recognition Program	Targeted brochures, pamphlets, FAQs, etc.	Reports, Newsletters & Billing Inserts	Demonstration Projects	Direct Mail & Phone Surveys	Educational Programs and	Signage at Overflows	Tours, Demonstrations, Workshops
General Public	√	√	√	√	√	√	√	√	√	√		√	√
Homeowners	√	√	√	√	√	√	√	√	√	√			√
Targeted Neighborhoods	√		√			√	√		√	√			√
Builders		√	√			√	√		√	√			√
Restaurants		√	√			√	√		√	√			√
Schools	√	√	√				√		√		√		√
MSD Employees		√				√	√	√	√				√
Green Infrastructure Partners	√	√	√			√	√		√		√		√

3.3.3.2 Annual Calendar of Events

Table 3.X presents an example calendar of public program events that are envisioned during Project WIN implementation. As noted elsewhere, the program will be continually evaluated for its effectiveness, and changes may be made in the program as indicated by changing needs, opportunities, or as technology advances dictate.

3.4 REPORTING AND AGENCY MEETINGS

During the development of the overflow abatement plans, there was frequent and scheduled regulatory agency interaction designed to facilitate open communication between MSD and the regulators regarding the progress of Project WIN and the compliance with the Consent Decree requirements.

3.4.1 Quarterly and Monthly Reports

Consistent with the requirements of the Consent Decree, MSD prepared regular reports for the State of Kentucky and EPA Region 4. Thus far, MSD has prepared three annual reports, Fiscal

Year (FY) 2006, 2007 and 2008; and quarterly reports for the State and EPA. These reports are posted on the MSD website under the Project WIN, Public Document Repository.

Reports are prepared for each of the four quarters of the calendar year: January through March; April through June; July through September; and October through December. Reports are submitted to EPA and the State within 30 days of the end of the new quarter. The reports include specific information about activities consistent with the requirements of the Consent Decree, including the progress on the Early Action Project and the progress toward the development of the Overflow Abatement Plan, which includes the LTCP and the SSDP. These reports are posted on the Project WIN Public Document Repository.

3.4.1.1 Meetings with State and Federal Consent Decree Partners

In addition to quarterly reports, MSD has initiated periodic face-to-face meetings with technical team members from the State and EPA to discuss the progress of the Project WIN overflow abatement program. During 2008, three specific meetings of the Technical team took place:

- February 25, 2008 in Southern KY with EPA Region 4 and the State staff;
- April 16, 2008 in Louisville Metro with the EPA Region 4 and State staff;
- June 2008, in Louisville Metro with State staff.

Regular meetings with the regulatory agencies facilitate communication and understanding of the priorities and requirements of the overflow abatement program and coordination between agencies. Copies of the agendas and meeting minutes from each of these meetings are included in Appendix ___.

3.4.1.2 Bi-weekly Conference Calls

Conference calls were scheduled on a bi-weekly basis between technical staff from MSD, EPA, and Kentucky Division of Water (KDOW). These calls ensured regular communication about the progress of both the technical analysis and the public program overflow aspects of abatement plans. In addition to reporting on the progress of the plans, MSD answered questions posed by the State and EPA. The bi-weekly conference calls encourage partnerships and open-communication to ensure common goals and perspectives and to reach success. Additionally, the process is more efficient with no surprises for both parties. A scheduled appointment also clears up confusion about monthly or quarterly reports.

Over the period of the development of the overflow abatement plans, all parties have felt free to informally reach out to each other via e-mails and phone calls to ask questions and clarify technical issues.

3.5 MEASURING EFFECTIVENESS

The public program is required by the NMCs, the LTCP, the SORP, and the Consent Decree. The NMCs and the LTCP requirements under the CSO Policy require that the effectiveness of the controls be measured to determine if they have met the goals of the Policy and the requirement of the CWA. This is not intended as a pass/fail system; rather this is an adaptive management approach to water quality attainment.

3.5.1 Evaluation of Impacts of Public Program

The impacts of the public participation plan will focus on four specific components:

- Support for rate increases to carry out the plan;
- Participation in the WWT;
- Support for the adoption of the IOAP; and
- Participation in the public program, other than meetings, focused on behavior changes and implementation of green and sustainable infrastructures.

The first measure has already validated the effectiveness of the public program. Between the fall of 2005 and the summer of 2007, the public program reached so many people that the Louisville Metro Council passed the rate increase of 33% with only one dissenting member. The Council was able to vote this way because constituents understood the need for wet weather overflow abatement, attended the meetings, read the flyers, bill stuffers, magazines and newspaper articles, and advertisements. The public approved the program in the most basic way it happens at the local government level, with their pocketbooks.

The second and the third measures have proven thus far to be effective; MSD has been fortunate to have a talented and fully engaged WWT. This team has provided the guidance that MSD needed to develop the IOAP. The process of establishing values, goals and objectives for the IOAP was the critical step for the public process to develop priorities for the program, as called for in the guidance for the LTCP and SSDP development. The continued participation of this team and these individuals in the program will also be another measurement of success.

The third measure, the adoption of the IOAP, is critical because the public hearing for the plan is an integral part of the public program. The outreach began with four series of meetings at which the public reviewed the development of the plan, especially how their input and concerns were taken into account. This all led up to the public hearings, which could have derailed the plan if the public concerns and issues were not already addressed. The completion and delivery of this plan, as required by the CSO Policy and the Consent Decree, validate the effectiveness of the public program.

The last measure, the participation of individuals and groups in the public programs, other than meetings, focused on behavior changes and implementation of green and sustainable

infrastructures. This will be measured over time and is a softer measurement. For these elements, there are some direct measures and some indirect measures.

3.5.2 Measures Reaching All Aspects of the Program

A direct measurement of the program is to determine how many homeowners have inspected their private sewers and how many have made repairs of the sewer. This direct measurement would validate the public outreach regarding the potential new ordinance and the importance of it for overflow abatement. The indirect measurements will measure the potential support of the program and the potential for long-term behavior changes and sustainable solutions.

3.5.2.1 Rain Barrel Program as a Surrogate for Information Received

The rain barrel program is a surrogate for success of distributing information to the public and an example of an indirect measurement of success of the public program. The messages about personal housekeeping and gardening behaviors are usually accompanied by the offer of rain barrels; when the public asks and pays for the rain barrels, this is a positive measurement that the messages are reaching the public.

MSD will continue to report on rain barrel events and the number of rain barrels given away or sold (either by MSD directly or by other agencies supported by MSD) each calendar year, beginning with an estimate of rain barrels distributed prior to 2009, and then an annual tally each year beginning in 2009.

3.5.2.2 Participation in Clean Up and Tree Planting Events

Other positive and indirect measurements of the public program are the number of and participation in tree planting, street sweeping, waterway cleanup, and other similar civic events. The measurement is even more telling if the participation in these events increases. Such increased number of events or participation in the events would indicate that the public program reaches more and broader members of the public.

3.5.2.3 Characterize Public Who Has Been Reached

The varied approach for the public program plan means that various methods are used to target different segments of the public. Each aspect of the program, starting in 2009, will characterize the targeted public and the messages that are being delivered. This will provide a baseline for understanding, over time, if the public is reacting to these messages with changed behavior.

When MSD has paid for advertising, the media can supply the statistics of who is "reached" by the advertisements. Again, the characterization of the target public will support the understanding of the effectiveness and the determination of whether this is an appropriate media outlet for MSD's messages.

The Project WIN Annual Report starting in 2009 will include not only the outreach method, but also the characterization of the target public and why this is an appropriate target for MSD's messages.

3.5.2.4 What Has Been Feedback From Public?

Feedback directly from the public is important and in a local government agency can take several forms, including votes from elected officials based on what their constituents have asked; feedback from opinion leaders such as the feedback given by the members of the WWT or others which is offered opportunistically (in an informal setting) or formally with surveys or in meetings; surveys which are not targeted but are set up to get a broad statistically varied public; and anecdotal feedback which is most often informal and indirect.

Local government relies on the vote of the elected officials to provide direct feedback, and MSD will be no different. MSD management have and will continue to seek the feedback of community opinion leaders, generally in an informal way to determine the reception of the messages delivered in the public program, and the methods of delivery. The continued participation of the WWT and their feedback on these issues will be important to this overall measurement of effectiveness.

For information that is more precise and to ensure that the public program is on the right track, MSD will institute an annual customer survey starting in 2009. The results will be reported in the Project WIN Annual Report, as will the adjustments and adaptations that are indicated by this feedback method.

3.5.3 Other Measurements of Effectiveness of the Public Program

The long-term effectiveness of the public program cannot be fully measured in one year or even five. The goal of the continued efforts is to make these messages commonly accepted and sustainable without MSD initiation. When these messages are used in everyday and broad-based communication, we will achieve one measure of effectiveness. Here are two examples:

- When we commonly see messages at gardening centers about taking care to use appropriate amounts of chemical and fertilizers and to use them at the appropriate time to protect our waters, we will know that we have developed a sustainable message.
- When the gardening section and the home and food sections of the newspapers and other electronic mass media carry our messages about FOG, use of pesticides and fertilizers, and other household practices, we will know that these messages are in the mainstream and sustainable.

Another long-term measurement of effectiveness will be the planning and implementation of green infrastructure by both the public and private developers. This will come about due to messages not only from MSD, but also across public and private organizations. However, the actual understanding that green infrastructure is not just a concept, but also can improve our

water quality and our quality of life, can be attributed to specific messages of MSD's public program. This measurement will be over the life of the program.

One other long-term measurement of the effectiveness of the public program will be to measure the I/I, grease blockages, quality of the overflows, and number and volume of overflows. In effect, the measurements of the overall effectiveness of the IOAP will also be a measure of the effectiveness of the public program. This is a measurement of the approval of the infrastructure program (paying for it) and the measurement of the participation of the individuals and changing behaviors, because the program has been designed with the expectation that there will be changes in personal behaviors and practices to support the gray and green infrastructure in the IOAP.

APPENDIX 1

ACRONYMS IN THE DRAFT PUBLIC PROGRAM PLAN, SEPTEMBER 2008

CMOM	Capacity, management, operation, and maintenance
CSO	Combined sewer overflow
CSS	Combined sewer system
CWA	Clean Water Act
FOG	Fats, oils, and grease
GIS	Geographic information system
I/I	Inflow and Infiltration
IOAP	Integrated Overflow Abatement Plan
LTCP	Long Term Control Plan
NMC	Nine Minimum Controls
PSA	Public Service Announcement
RTC	Real time control
SORP	Sewer Overflow Response Protocol
SSDP	Sanitary Sewer Discharge Plan
SSO	Sanitary sewer overflow
SSS	Sanitary sewer system
WDR	Waste discharge requirements
WIN	Waterway Improvements Now

INTEGRATED OVERFLOW ABATEMENT PLAN

PROJECT SUMMARY – DRAFT OF 9/20/08

OVERALL BENEFITS OF THE IOAP

- MSD's Integrated Overflow Abatement Plan (IOAP) includes both a Long-Term Control Plan (LTCP) for CSOs and a Sanitary Sewer Discharge Plan (SSDP) for SSOs. Project selection for each plan was determined through a benefit-cost evaluation, with benefits based on protecting community values.
- The suite of projects selected for the LTCP result in approximately 95% capture of wet weather combined sewage during an average year.
    - Remaining CSO loads will no longer "cause or contribute" to water quality standard violations in the Ohio River.
        - Peak fecal coliform counts are reduced 54%, from 100,000 cfu/100mL to 46,000 cfu/100 mL (downstream from Morris Forman Wastewater Treatment Plant).
        - With background loads eliminated, monthly average and monthly maximum standards would be met 100% of the time.
    - Remaining CSO loads probably no longer "cause or contribute" to water quality standard violations in Beargrass Creek (BGC).
        - Peak fecal coliform counts are reduced 18%, from 44,300 cfu/100mL to 37,400 cfu/100 mL (at BGC mouth).
        - With background loads eliminated, monthly average standards would be met 100% of the time, and monthly maximum standards would be met 94% of the time.
- The suite of projects selected for the SSDP results in the elimination of capacity-related SSOs up to the site-specific level of protection.
    - Elimination of an average of 145 SSO events per year (average of 2005–2007)
    - Elimination of an average of 290 MG of overflow volume per year (average of 2005–2007)

LONG-TERM CONTROL PLAN PROJECT SUMMARY

- LTCP includes 19 new gray infrastructure projects for CSO control:
    - 4 sewer separation
    - 13 storage basin projects (in-line and off-line, most in-line storage projects have a Real-Time Control component)
    - Replacement and expansion of the Nightingale Sanitary Pump Station
    - 1 high-rate wet weather treatment (screening, settling, and disinfection)
- The wet weather capture of approximately 95% is accomplished based on site-specific levels of control based on benefit cost optimization.
    - 6 projects result in no overflows in a typical year – these locations would only overflow as a result of very large storms.
    - 1 project would result in 4 overflows per year in a typical year.
    - 11 projects result in 8 overflows per year in a typical year.
- Green infrastructure reduces initial LTCP gray infrastructure program costs by $40 million—potential future savings could double or triple.

- Annual green infrastructure program front-end loaded to maximize benefits on downsizing future gray infrastructure. Programmatic components include:
  - Downspout disconnect program
  - Green roof construction subsidies or incentives
  - Green roads and alleys partnership incentives
  - Pervious pavement sidewalks and parking lot incentives
  - Urban reforestation cost sharing
- MSD-funded demonstration projects provide performance benchmarks for the annual program. Proposed demonstration projects include:
  - 6 bioswale/biofiltration projects
  - 1 rain garden
  - 3 pervious concrete alleys
  - 5 infiltration dry wells

SANITARY SEWER DISCHARGE PLAN PROJECT SUMMARY

- SSDP includes 41 gray infrastructure projects:
  - 12 conveyance capacity upgrades
  - 19 storage projects (in-line and off-line, many with pipe upgrades also)
  - 10 pump station upgrades, eliminations, or replacements that include the elimination of 5 small wastewater treatment plants in the Prospect area, and potentially includes the elimination of the Jeffersontown Wastewater Treatment Plant
- Site-specific level of protection also determined by the value-based benefit cost evaluation, resulting in the following levels of protection:
  - 29 projects eliminate overflows up to the 2-year storm.
  - 7 projects eliminate overflows up to the 5-year storm.
  - 5 projects eliminate overflows up to the 10-year storm.
- Inflow and infiltration (I/I) reduction assumptions reduce initial program costs by $17 million, potential future savings could double that. Program considerations include:
  - Pipe rehabilitation and manhole repairs targeted to areas of high wet weather peak flows
  - Sealing manholes or relocating pipe installed in areas that may become inundated by flooding
  - Repair of property service connections and elimination of illicit private property connections
  - Annual program front-end loaded to maximize benefits of downsizing gray infrastructure
  - I/I reduction targets are not achievable without private-side I/I control
- 5 major projects in Interim Sanitary Sewer Discharge Plan:
  - 4 sewer replacements or major interceptor relief sewers that include the elimination of one small wastewater treatment plant
  - Expansion of the Derek R Guthrie Water Quality Treatment Center (formerly known as the West County Wastewater Treatment Plant) to add 100 MGD of treatment capacity to accommodate increased capture of wet weather flows

CSO Long Term Control Plan Recommended Projects - DRAFT 9/19/08

Project Name	Project ID	Technology	Project Description
I-64 and Grinstead Drive Storage Basin	L_MI_MF_127_M_09B_B_A	Off-line Storage	This project is to provide a 2.74 off-line storage facility consisting of a covered concrete basin for CSOs 125, 126, 127 & 166 to reduce overflows to no more than 8 OF/YR. The proposed site is south of I-64 near CSO 127. Annual volume stored is approximately 50.05 MG, operated 52 times per year.
CSO 140 Sewer Separation	L_MI_MF_140_S_08_A_A	Sewer Separation	This project includes the construction of a new storm water system consisting of 1,665 LF of 15" pipe in street, 4,185 LF of 15" pipe out of street, 145 LF of 21" pipe in street, 1,140 LF of 21" pipe out of street, 815 LF of 24" pipe in street, 805 LF of 24" pipe out of street, 530 LF of 36" pipe in street and 480 LF of 42" pipe in street.
Clifton Heights Storage Basin	L_MU_MF_154_M_09B_B_A	Off-line Storage	This project includes a 6.55 MG underground covered storage basin for CSOs 132, 154 and 167 (8 OF/YR). The proposed site is north of Drescher Bridge Avenue near the old Fischers Packing Plant. The facility will require a 6.55 MGD PS to return the stored flow back to the interceptor.
Paddy's Run Wet Weather Treatment Facility	L_OR_MF_015_M_13_B_B	High-Rate Treatment	This project is to provide a 50 MGD RTB High Rate Treatment Facility for CSOs 015 and 191. The HRT is started at the beginning of the event and RTC is used to store 9.6 MG in the outfall during the peak of the event. The basin is located in the vicinity of the Paddy's Run FPS adjacent to the outfall. Annual volume treated is approximately 17 MG, operated 11 times per year.
Portland Wharf Storage Basin	L_OR_MF_019_S_13_B_A	In-line and Off-line Storage	This project includes an 6.37 MG underground covered concrete basin for CSO 019. The basin is located in the vicinity of Portland Wharf Park. The facility will require a 6.37 MGD PS to return the stored flow back to the interceptor via a FM under the floodwall and I-64. Project also includes 1.8 MG of ILS using an adjustable gate. Project includes an allowance for park improvements (floodwall cut/gate structure).
Story Avenue and Main Street Storage Basin	L_OR_MF_020_S_09B_B_A	Off-line Storage	This project includes the construction of a 0.13 MG off-line underground covered storage basin for CSO 20. The proposed site is northwest of the Franklin Street / Buchanan Street intersection. The facility will require a small pump station to pump the stored flow to the Buchanan Street pump station following the wet weather event.
CSO 58 Sewer Separation	L_OR_MF_058_S_08_A_A	Sewer Separation	This project includes the construction of a new storm system consisting of 785 LF of 15" pipe in street and 1010 LF of 15" pipe out of street. It also includes 220 LF of 18" pipe in street.
Southwestern Parkway Storage Basin	L_OR_MF_105_M_13_B_A	In-line and Off-line Storage	This project includes a 5.08 MG underground covered concrete basin for CSOs 104, 105, and 189 and ILS in the WO and the NWI for a total of 8.8 MG using adjustable gates. The basin is located in the vicinity of Shawnee Park. The facility will be filled and emptied by gravity. Project includes allowance for park improvements. Project design base upon 0 overflows per year.
13th Street and Rowan Street Storage Basin	L_OR_MF_155_M_09B_B_B	Off-line Storage	This project includes a 66" collector and 14.44 MG underground covered concrete basin for CSOs 022, 023, 050, 051, 052, 053, 054, 055, 056, 150, 155, 156, 208, and CRD. The proposed site is south of I-64, north of Rowan Street. The facility requires a 14.44 MGD PS. Project includes 6 diversion structures at $100,000 each, plus $2.3M for extra excavation.
CSO 160 Sewer Separation	L_OR_MF_160_S_08_A_A	Sewer Separation	This project includes the construction of a new storm water system consisting of 425 LF of 15" pipe in street.

Project Name	Project ID	Technology	Project Description
Towhead Island Storage Basin	L_OR_MF_172_S_09B_B_A	Off-line Storage	This project includes a 0.12 MG underground covered concrete basin for CSO 172 (zero OF/YR). The proposed site is near River Road/CSX RR. The facility will be a pump out operation.
18th and Northwestern Pky Storage Basin	L_OR_MF_190_S_09B_B_A	Off-line Storage	This project includes a 1.31 MG underground covered concrete basin for CSO 190 (8 OF/YR). The proposed site is near I-64 in the vicinity of CSO 190. The project includes a 1.31 MGD pump out facility.
Algonquin Parkway Storage Basin	L_OR_MF_211_M_13_B_A	In-line and Off-line Storage	This project includes a 4.84 MG underground open concrete basin for CSOs 016, 210, and 211. The basin is located on MSD property near MFWTP. The facility will be a gravity in-gravity out operation. Project also includes ILS at two locations within the SO for a total of 16.1 MG of storage.
Nightingale PS Replacement	L_SO_MF_018_S_03_A_A	New Pump Station	The project involves replacement of the existing Nightingale Pump Station with a new 60 MGD pump station, and providing a parallel force main to the point of discharge to the downstream gravity interceptor
Lexington Road and Payne Street Storage Basin	L_SO_MF_083_M_09B_B_A	Off-line Storage	This project includes an 7.31 MG off-line covered storage basin for CSOs 83, 84, 118, 119, 120, 121, 141, 153 & 082 to reduce overflows to no more than 8 per year. The proposed site is near the SFBGC off Lexington Road. The basin will require an 7.31 MGD PS to return the stored flow to the interceptor after the event.
Logan Street and Breckinridge Street Storage Basin	L_SO_MF_092_M_09B_B_D	Off-line Storage	This project includes a 11.83 MG underground covered storage basin for CSOs 113, 152, 91, 92, 146, 179, 149, 117 & the 11 SBR CSOs. The basin is located on Louisville Metro property. The facility will require a 11.83 MGD PS to return stored flow to the BGI over a 24 hour period. (CSOs 92 & 179 have 0 AAOV and the SBR CSOs assume continued use of the SBR-ILS Facility).
CSO 93 Sewer Separation	L_SO_MF_093_S_08_A_A	Sewer Separation	This project includes the construction of a new storm water system consisting of 2,975 LF of 12" pipe in street plus 350 LF of 12" out of street.
Calvary / Creekside Storage Basin	L_SO_MF_097_M_09B_B_D	Off-line Storage	This project includes a 3.46 MG underground covered storage basin for CSOs 97, 106, 110, 111, 137, 148, and 151. The basin is located adjacent to undeveloped property between SFBGC and a cemetery. The facility will require a 3.46 MGD PS to return stored flow to the interceptor over a 24 hour period.
Story Avenue and Spring Street Storage Basin	L_SO_MF_130_S_09B_B_A	Off-line Storage	This project includes the construction of a 0.01 MG off-line underground covered storage basin for CSO 130 (8 OF/YR). The proposed site is near the Webster Street sewer south of Story Avenue. The facility will operate gravity in-pump out.

Project Name	Project ID	Technology	Project Description
Green Infrastructure Program and Initial Projects			
Green Infrastructure Annual Program	Annual Budget	Varies	The green infrastructure program budget is an annual investment level established to achieve the level of storm water runoff reduction assumed in sizing the gray infrastructure solutions
Parking Lot Bioswale MSD Main Office	L_OR_MF_053_S_12_A_A	Biofiltration	Green parking lot in MSD's Main Office Building parking lot.
Green Parking Lot 7th and Cedar	L_OR_MF_053_S_12_A_B	Biofiltration	Green parking lot in Louisville Metro parking lot
Green Parking Lot 2nd and Broadway	L_OR_MF_181_S_12_A	Biofiltration	Green parking lot at JCC
Biofiltration Swales 3rd and Ormsby	L_OR_MF_198_S_12_A	Biofiltration	Biofiltration swales along 3rd Street north of Ormsby
Green Parking Lot 6th and Muhammad Ali	L_OR_MF_022_S_12_A	Biofiltration	Green parking lot in SE corner of Louisville Metro parking lot
Rain Garden 6th and Broadway	L_OR_MF_028_S_12_A	Rain Garden	Perimeter rain garden in parking lot across from C-J
Permeable Alley 17th and W Hill St	L_MC_MF_015_S_12_A	Permeable Concrete	Permeable alley bounded by S 17th St, Dixie Highway, W Hill Street and Gaulbert
Permeable Alley 7th and Market	L_OR_MF_053_S_12_A_C	Permeable Concrete	Retrofit Congress Alley to permeable concrete
Permeable Alley Campbell St and Main	L_SF_MF_121_S_12_A	Permeable Concrete	Retrofit Billy Goat Strut Alley to permeable concrete
Green Street 12th and Jefferson	L_OR_MF_208_S_12_A	Biofiltration	Green Street along Baxter Park and 12th St at Baxter
Dry Well I-264 off-ramp at Bank	L_OR_MF_189_S_12_A	Dry Well	Dry well in interchange of I-264
Dry Well I-264 on-ramp at Bank	L_OR_MF_019_S_12_A	Dry Well	Dry well in interchange of I-264
Dry Well I-264 and Gibson Ln	L_OR_MF_191_S_12_A_A	Dry Well	Dry well in interchange of I-264
Dry Well Russell Lee Drive	L_OR_MF_191_S_12_A_C	Dry Well	Dry well in median along Russell Lee Drive
Dry Well near JFK Montessori School	L_OR_MF_191_S_12_A_B	Dry Well	2 dry wells near the JFK Montessori Elementary School.

Sanitary Sewer Discharge Plan Recommended Projects - DRAFT 9/19/08

Project Name	Project ID	Technology	Project Description
Idlewood In-line Storage	S_CC_CC_70158_M_09A_C	In-line Storage	In-line storage with 955 LF of (84" to 120") pipe to store wet weather peak flow, and upgrade 1,747 LF open cut (8" to 15") sewer to increase hydraulic capacity during wet weather peak flows
Fairmount Rd. PS In-line Storage	S_FF_CC_81316_M_09A_C	In-line Storage	Upsize influent lines with 407 LF of 36" pipe to create upstream in-line storage
Little Cedar Creek Interceptor Improvements	S_CC_CC_67997_M_01_C	Pipe Upgrades	Upsize 3,701 LF of (12" to 21") open cut and 215 LF of 21" bore and jack sewer
Bardstown Rd. PS Improvements	S_CC_CC_MSD1025_S_03_B	Pump Station Upgrades	Increase the pump capacity by 70% to 0.53 MGD peak flow.
Meadow Stream PS In-line Storage	S_HC_HC_MSD1082_S_09A_C	In-line Storage	Inline storage with dual 243 LF, 120" parallel pipes to store wet weather peak flow.
Kavanaugh Rd. PS Improvements	S_CC_HC_MSD1085_S_03_A	Pump Station Upgrades	Upgrade PS to 0.84 MGD and 2,458 LF of 8" FM to handle wet weather peak flows
Woodland Hills PS Diversion	S_FF_FF_NB01_S_01_C_A	Pipe Upgrades	Replace the existing overflow and automated gate (to the Woodland Hills PS) with a double barrel overflow that consists of two-15 LF 12" diameter pipes. The upstream invert of the pipes needs to be 2 inches above the upstream invert of the exiting gravity pipe in MH 82058. This new invert elevation will allow dry weather flow to gravity drain through the interceptor, but anything greater than DWF will be diverted to the PS by an overflow pipe thus reducing the surcharge further down the gravity line.
Eden Care PS In-line Storage	S_FF_FF_NB02_S_09A_C_A	In-line Storage	In-line storage with 90 LF of 48" pipe (replacing a section of 8")
Ashburton PS Improvements & Diversion	S_FF_FF_NB03_M_01_C_A	Upgrade Force Main & Pipes	Divert flow from Ashburton PS by upgrading 370 LF of FM from 2" to 6" and adding 115 LF of 8" gravity sewer, also eliminates the overflow at Olde Copper Ct PS
Jeffersontown WWTP Elimination	S_JT_JT_NB01_M_01_C_A	Off-line Storage & Pipe Upgrades	Upsize the interceptor (6,200 LF) from Grassland to the WWTP. Storage basin (5.7 MG) at the WWTP site and a new PS with capacity of 10 MGD. 32,100 LF of 24" force main constructed to convey flows to the Hikes Lane Interceptor (HLI).
Chenoweth Hills WWTP Elimination, Chenoweth Run and Chippewa PS Improvements	S_JT_JT_NB01A_M_03_C	Pump Station & Force Main Upgrades	Upgrade Chenoweth Run PS to handle peak flow of 2.7 MGD and upsize entire 8,030 LF of force main to 12". Chenoweth Hills WWTP elimination. Upgrade Chippewa PS to handle peak flow of 0.15 MGD. Replace 2,595 LF of 15" to 18" sewer pipe for Chenoweth Hills WWTP diversion.
Dell Rd and Charlene Pkwy Interceptor Improvements	S_JT_JT_NB02_M_01_C	Pipe Upgrades	Upsize interceptor downstream of Charlane and Dell Road overflows with 4,000 LF of (10"-21") sewer.
Raintree & Marian Ct PS Eliminations	S_JT_JT_NB03_M_01_C	Pipe Upgrades	Eliminate Marian Ct. and Raintree PSs by installing 455 LF of 8" sewer from Marian Ct. PS and 400 LF of 8" sewer from Raintree PS to divert flows to the Southeast Diversion system, additional 1,175 LF of 15" sewer upgrades is required upstream of the diversion.
Monticello PS Elimination	S_JT_JT_NB04_M_01_A	Pipe Upgrades	Eliminate Monticello PS by diverting to West County with approximately 625 LF of 8" sewer.
Middle Fork Relief Interceptor, Wet Weather Storage, and UMFPS Diversion	S_MISF_MF_NB01_M_01_C_A1	Off-line Storage & Pipe Upgrades	Construct 30" force main diversion to HLI (10,200 LF), construct Middle Fork Relief Interceptor (6,900 LF) between Oxmoor Mall and Upper Middle Fork Lift Station (UMFLS), construct 1.5 MG covered basin near Car Wash Site and 17.3 MG open basin at Buechel Site

Project Name	Project ID	Technology	Project Description
Goose Creek PS Improvements & Wet Weather Storage	S_MI_MF_NB04_M_03_B	Storage & Force Main Upgrades	Construct 0.5 MG storage basin near Devondale PS. Upsize 16" force main at Goose Creek PS to 20" force main. Upgrade Goose Creek PS to 7.2 MGD. Replace Saurel Rd 4" force main with 6" force main. Upsize a total of 3,300 LF of force main.
Anchor Estates In-line Storage & PS Eliminations	S_MI_MF_NB06_M_01_B_C	In-line Storage & Diversion	Construct 4,180 LF of 8" diversion gravity pipe for Vannah Way and Anchor Estates No. 1 PS, and construct 230 LF of 72" pipe at Anchor Estates No. 2 PS to provide inline storage, SSES upstream of Anchor Estates No. 2 PS.
Klondike Interceptor	S_SD_MF_NB04_S_01_B_A	Pipe Upgrades	This solution involves 2,830 LF of 30" gravity interceptor connecting to the HLI where the Jeffersontown Branch 1 24" force main solution connects to the HLI. The SED Branch 4 solution was priced with a 30" gravity interceptor constructed to the HLI minus the cost of the 24" Jeffersontown force main along the same route.
Sutherland Interceptor	S_SD_MF_NB05_M_01_A	Pipe Upgrades	Construct 670 LF of 18" and 1,070 LF of 15" interceptor in place of existing 10" from manhole 16649 to BGI
Mellwood System Improvements & PS Eliminations	S_OR_MF_NB01_M_01_B	Pump Station Upgrades, Pipe Upgrades & Diversion	Replace 1890 LF of gravity sewer flowing into Mockingbird Valley PS, upgrade Mellwood Ave PS to handle peak flow of 3.5 MGD and flood-proof PS, upsize approximately 1240 LF of 6" force main with 15" force main for Mellwood Ave PS, installation of 400 LF of 8" pipe for Winton PS diversion and 2210 LF of 15" pipe for Mockingbird Valley PS diversion to alternate systems.
Leland Rd. Relief Sewer	S_OR_MF_NB02_S_01_B	Pipe Upgrades	Relief sewer for Leland Road overflow, 325 LF of 8" open cut sewer
Prospect WWTP Eliminations	S_OR_MF_NB04_M_03_B_B	Pump Station & Pipe Upgrades	Upsize 8,300 LF of interceptor upstream of Muddy Fork PS. Upgrade pumps at Muddy Fork, Winding Falls/Phoenix Hill PS and New Market PS. Upsize force main from Muddy Fork PS from 14" to a 24". Construct new 7.2 MGD Harrods Creek PS and 24,000 LF of 24" force main to pump flow to Hite Creek WWTP.
Charleswood Interceptor Extension	S_PO_WC_PC03_M_01_C	Pipe Upgrades	Upsize additional 1,846 LF of gravity sewer downstream of the Charleswood Interceptor connection to correct capacity problems. Cooper Chapel PS will be eliminated by the Charleswood Interceptor project.
Cinderella PS Wet Weather Storage	S_PO_WC_PC04_M_09B_C	Off-line Storage	Off-line 0.22 MG gravity operated covered storage basin at Cinderella PS
Lantana PS Wet Weather Storage	S_PO_WC_PC05_M_0109B_C	Off-line Storage & Pipe Upgrades	Construct offline covered storage basin at Lantana PS (0.08 MG). Additional 241 LF of sewer improvements (10" - 15") required upstream of PS.
Government Center PS Wet Weather Storage	S_PO_WC_PC06_M_0109B_C	Off-line Storage & Pipe Upgrades	Construct offline covered storage basin at Government Center PS (0.31 MG). Additional 290 LF of sewer improvements (10" - 12") required upstream of PS.
Avanti PS Wet Weather Storage	S_PO_WC_PC07_M_09B_C	Off-line Storage	Construct offline covered storage basin at Avanti PS (0.023 MG).
Lea Ann Way System Improvements	S_PO_WC_PC08_M_01_C	Pipe Upgrades	3,255 LF of open cut sewer (12" to 18") upstream improvements for Lea Ann Way PS
Outer Loop & Caven Ave Wet Weather Storage	S_PO_WC_PC09_M_09B_C	Off-line Storage	Construct offline covered storage basin at Caven Ave PS (0.21 MG) and offline open storage basin behind the Meijer (1.58 MG) on Preston Hwy.
Leven PS Wet Weather Storage	S_PO_WC_PC10_M_09B_C	Off-line Storage	Construct offline covered storage basin at Leven PS (0.12 MG).
Shively Interceptor	S_MC_WC_NB01_M_01_C	Pipe Upgrades	Construct a combination of gravity sewers (19,345 open cut) to eliminate 5 pump stations, project currently in budget as Shively Interceptor capital project
East Rockford PS Relocation	S_MC_WC_NB02_S_0103_C	Pump station replacement and relocation	Relocate and replace East Rockford PS at 300 GPM. 150 LF of 4" force main will need to be replaced. Additional 150 LF of 10" gravity improvements required to relocate PS.
Lucas Ln. PS In-line Storage	S_FF_BT_NB01_S_09A_C_B	In-line Storage	Install two, 90 LF, 54" wide parallel storage pipes that branch off the gravity main prior to the Lucas Lane PS to provide inline storage.

Project Name	Project ID	Technology	Project Description
Riding Ridge PS Improvements	S_HC_HN_NB01_S_03_C_A	Pump Station Upgrades	Upgrade Riding Ridge PS to handle peak flow of 0.075 MGD.
Gunpowder PS In-line Storage	S_HC_HN_NB02_S_09A_C_B	In-line Storage	Replace 120 LF of 8" with 60" sewer pipe to provide inline storage, 28 LF of additional pipe upgrades required.
Fox Harbor In-line Storage	S_HC_HN_NB03_M_09A_A_A	In-line Storage	Replace two 8" (total 133 LF) pipes upstream and east of the Fox Harbor #2 LS with 24" and 60" pipes respectively. For Fox Harbor #1: Install (194 LF of 24" to 54") parallel storage pipes
Fairway View PS Improvements	S_HC_HS_NB01_S_03_C_A	Pump Station Upgrades	Upgrade the three pumps at PS to discharge: 100, 100, and 120 GPM (previously 88 GPM each).
Deep Creek In-line Storage	S_HC_HS_NB02_S_09A_C_A	In-line Storage	Replace two 8" gravity sewers immediately upstream of the Deep Creek PS with 150 LF of 42" and 170 LF of 30" sewer pipe respectively to provide inline storage.
Lake Forest PS Improvements	S_FF_LF_NB01_S_03_C_A	Pump Station Upgrades	Install two new 122 GPM pumps at Lake Forest PS (previously 83 GPM).
St. Rene Rd. PS In-line Storage	S_FF_CH_NB01_S_09A_C_A	In-line Storage	Replace 42 LF of 8" with 48" pipe just upstream of the St. Rene Rd. PS.
Camp Taylor System Improvements	S_SF_MF_30917_M_09_A	Off-line Storage & Pipe Upgrades	A pumped 0.038 MG storage basin at the PS to store excess wet weather flows, 3,395 LF of 8" pipe to convey flow to basin. Replace priority sewers based on maintenance history. Complete SSES of all sewers and identify additional sewers to be replaced in later phases.
Source Reduction Projects and Program			
I/I Reduction Program		Varies	Annual budget to complete a variety of I/I reduction projects for SSO control, capacity assurance, and general asset management
Hazelwood PS I/I Investigation	S_OR_MF_55665_S_07_C	Infiltration Reduction	Targeted for I/I source control (I/I rehab and private property program)
Sonne PS I/I Investigation	S_OR_MF_42007_07_C	Infiltration Reduction	Targeted for I/I source control (I/I rehab and private property program)
Edsel PS I/I Investigation	S_PO_WC_PC11_M_07_C	Infiltration Reduction	Targeted for I/I source control (I/I rehab and private property program)
Derington Ct. PS I/I Investigation	S_OR_MF_NB03_07_C	Infiltration Reduction	Targeted for I/I source control (I/I rehab and private property program)
Parkview Estates I/I Investigation	S_SD_MF_NB03_07_C	Infiltration Reduction	Targeted for I/I source control (I/I rehab and private property program)
Floydsburg Rd. I/I Investigation and Rehab	S_HC_HC_MSD1086_M_07_C_B	Infiltration Reduction	Targeted for I/I source control (I/I rehab and private property program)
Interim Sanitary Sewer Discharge Plan Projects			
Beechwood Village Sewer Replacement		Sewer Replacement	Replace the sanitary sewers in Beechwood Village and provide relief sewer to off-load the Sinking Fork Interceptor
Hikes Lane/Highgate Springs Pump Station		Interceptor Relief	Intercept flow served by Highgate Springs Pump Station to allow closure of the station. Provide 72-inch interceptor from pump station to Southeast Diversion
Southeast Diversion		Interceptor Relief	Minor modifications to gate controls at SED, and construct relief interceptor to off-load Southeast Interceptor
Northern Ditch Diversion Interceptor		Interceptor Relief	Construct 84-inch diversion interceptor from the Northern Ditch PS to the Pond Creek Interceptor
Derek R Guthrie Water Quality Treatment Center		High rate secondary treatment	Expand the wet weather capacity of the plant from 96 MGD to 200 MGD

Green Cost Tool - Combined Sewer Area Evaluation

Project Information								Typical Year							Program Implementation				Years 15
Source	Impervious Area		Total Number	BMP Type	Implementation Level	BMP Unit Cost		Annual Runoff to CSS existing (gal)	Annual Runoff to CSS with Green Control (gal)	Gallons Removed from CSS	Total BMP Cost	Cost Per Gallon Removed	MSD Unit Benefit		sf	units	Unit Cost	Total Cost	Annual Cost
	ft^2	ac				Cost													
Roofs	138,366,262	3,176	100,038																
Public	17,555,568	403	1,956	Extensive Vegetated Roof	7%	$15	/ft^2	374,975,012	353,648,308	21,326,704	$18,433,346	$0.86	$5	/ft^2	1,228,890		$5	$6,398,011	$426,534
				Tray System Vegetated Roof	3%	$10	/ft^2	374,975,012	369,350,387	5,624,625	$5,266,670	$0.94	$3	/ft^2	526,667		$3	$1,687,388	$112,493
Commercial	25,214,491	579	5,468	Extensive Vegetated Roof	1%	$15	/ft^2	538,564,407	534,188,571	4,375,836	$3,782,174	$0.86	$5	/ft^2	252,145		$5	$1,312,751	$87,517
				Tray System Vegetated Roof	1%	$10	/ft^2	538,564,407	535,871,585	2,692,822	$2,521,449	$0.94	$3	/ft^2	252,145		$3	$807,847	$53,856
Industrial	37,639,241	864	2,963	Extensive Vegetated Roof	1%	$15	/ft^2	803,948,631	797,416,548	6,532,083	$5,645,886	$0.86	$5	/ft^2	376,392		$5	$1,959,625	$130,642
				Tray System Vegetated Roof	1%	$10	/ft^2	803,948,631	799,928,888	4,019,743	$3,763,924	$0.94	$3	/ft^2	376,392		$3	$1,205,923	$80,395
Single Family Residential	57,956,962	1,331	89,651	Downspout Disconnection	10%	$250	/downspout	1,237,921,357	1,114,129,221	123,792,136	$5,795,696	$0.05	$1,602	/downspout	n/a	23,183	$250	$5,795,696	$386,380
				Rain Barrel	0%	$165	/rain barrel	1,237,921,357	1,237,921,357	0	$0	$0.00	$0	/rain barrel		0	$0	$2,475,000	$165,000
Roads	135,311,649	3,106	NA																
Local	115,125,717	2,643	NA	Green Street	1%	$40	/ft^2	2,459,007,146	2,213,106,432	245,900,715	$46,050,287	$0.19	$64	/ft^2	1,151,257		$40	$46,050,287	$3,070,019
				Sink Holes	NA	NA	/sinkhole	2,459,007,146	NA	NA	NA	NA	NA	/sinkhole	NA		NA	NA	NA
				Dry Wells*	0%	$30,000	/dry well	2,459,007,146	2,459,007,146	0	$0	$0.00	N/A	/dry well		0	$30,000	$0	$0
				Urban Reforestation	14,000	N/A	/tree	2,459,007,146	2,447,807,146	11,200,000	NA	NA	$240	/tree		14,000	$240	$3,360,000	$224,000
Highways	10,010,932	230	NA	Dry Wells*	0%	$30,000	/dry well	213,826,708	213,826,708	0	$0	$0.00	N/A	/dry well		0	$30,000	$0	$0
				Biofiltration	0.5%	$20	/ft^2	213,826,708	203,135,373	10,691,335	$100,109	$0.01	$641	/ft^2	5,005		$20	$100,109	$6,674
Alleys	10,175,000	234	550	Green Alley - Type A	5%	$27	/ft^2	217,331,091	205,445,797	11,885,294	$13,736,250	$1.16	$7	/ft^2	508,750		$7	$3,565,588	$237,706
				Green Alley - Type B	5%	$18	/ft^2	217,331,091	205,445,797	11,885,294	$9,157,500	$0.77	$7	/ft^2	508,750		$7	$3,565,588	$237,706
Parking/Sidewalks/Driveways	158,576,057	3,640																	
Public	28,609,624	657	NA	Biofiltration	5%	$20	/ft^2	611,082,143	305,541,071	305,541,071	$2,860,962	$0.01	$641	/ft^2	143,048		$20	$2,860,962	$190,731
Commercial	39,372,747	904	NA	Biofiltration	1%	$20	/ft^2	840,975,142	756,877,628	84,097,514	$787,455	$0.01	$641	/ft^2	39,373		$20	$787,455	$52,497
Industrial	41,870,557	961	NA	Biofiltration	0.50%	$20	/ft^2	894,326,667	849,610,334	44,716,333	$418,706	$0.01	$641	/ft^2	20,935		$20	$418,706	$27,914
Single Family Residential	48,723,129	1,119	NA	Biofiltration	0.50%	$20	/ft^2	1,040,692,952	988,658,305	52,034,648	$487,231	$0.01	$641	/ft^2	24,362		$20	$487,231	$32,482
										946,316,153					5,414,112			$82,838,167	**$5,522,544**
															Program Admin		5%	$4,141,908	$276,127
															TOTAL			**$86,980,075**	**$5,798,672**

Rainfall Input	
Design Storm	Annual Rainfall
(in)	(in)
1	42.83

Gray Stormwater Control Unit Cost Assumptions	
Cost/gallon captured	$0.30

Green Cost per Gallon Removed:	$0.09

IOAP Preferred Project List

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Activity ID	Activity Name	Budgeted Total Cost	Start	Finish
L-MI-MF-127-M	I-64 & Grinstead SB	$11,644,100		31-Dec-17
L-MI-MF-140-S	CSO 140 Sewer Sep	$3,149,900		31-Dec-15
L-MU-MF-154-M	Clifton Heights SB	$13,872,300		31-Dec-18
L-OR-MF-015-M	Paddy's Run WW Trtmt Facility	$24,944,400		31-Dec-14
L-OR-MF-019-S	Portland Wharf SB	$20,001,800		31-Dec-19
L-OR-MF-020-S	Story Ave & Main St SB	$1,625,650		31-Dec-13
L-OR-MF-058-S	CSO 58 Sewer Sep	$1,361,100		31-Dec-14
L-OR-MF-105-M	Southwestern Pkwy SB	$17,616,919		31-Dec-18
L-OR-MF-155-M	13th St & Rowan St SB	$49,676,900		31-Dec-20
L-OR-MF-160-S	CSO 160 Sewer Sep	$236,600		31-Dec-15
L-OR-MF-172-S	Towhead Island SB	$982,800		31-Dec-12
L-OR-MF-190-S	18th St & Northwestern Pkwy SB	$4,513,600		31-Dec-17
L-OR-MF-211-M	Algonquin Pkwy SB	$17,296,500		31-Dec-18
L-SO-MF-018-S	Nightingale PS Repl	$14,839,500		31-Dec-16
L-SO-MF-083-M	Lexington Rd & Payne St SB	$23,242,700		31-Dec-21
L-SO-MF-092-M	Logan St & Breckinridge St SB	$30,318,600		31-Dec-17
L-SO-MF-093-S	CSO 93 Sewer Sep	$951,600		31-Dec-15
L-SO-MF-097-M	Calvary/Creekside SB	$13,724,100		31-Dec-14
L-SO-MF-130-S	Story Ave & Spring Street SB	$1,077,050		31-Dec-16
L-X-GI-CF	Green Infrastructure Projects	$47,000,000		31-Dec-23
L-Z-Stor	Drain Rel S If Required to Drain Storage	$26,000,000		31-Dec-20
S I-BWV	Sys Imp Beechwood Village Sewer Repl	$12,603,500		31-Mar-11
S I-HP	HGS PS Hikes Ln/Highgate Springs PS	$25,127,700		31-Oct-12
S I-NDD	Northern Ditch Diversion Interceptor	$19,579,300		31-Jul-11
S I-SED	Southeast Diversion	$1,743,300		31-Aug-11
S I-WC WTP	Derek R Guthrie WQ Trtmt Center	$96,707,000		31-Dec-11
S-CC-CC-67997-M	Little Cedar Creek Interceptor Im...	$1,875,940		
S-CC-CC-70158-M	Idlewood ILS	$2,317,237		31-Dec-23
S-CC-CC-MSD1025-S	Bardstown Rd PS Improvments	$280,800		31-Dec-21
S-FF-BT-NB01-S	Lucas Ln PS ILS	$183,234		31-Dec-21
S-FF-CC-81316-M	Fairmount Rd PS ILS	$217,034		31-Dec-23
S-FF-CH-NB01-S	St. Rene Rd PS ILS	$29,900		31-Dec-21
S-FF-FF-NB01-S	Woodland Hills PS Diversion	$19,500		31-Dec-21
S-FF-FF-NB02-S	Eden Care PS ILS	$53,300		31-Dec-21
S-FF-FF-NB03-M	Ashburton PS Imprv & Diversion	$118,300		31-Dec-21
S-FF-HC-MSD1085-S	Kavanaugh Rd PS Improv	$1,110,200		
S-FF-HC-MSD1086-M	Floydsburgh Rd I/I Invest & Red	$1,050,904		31-Dec-14
S-FF-LF-NB01-S	Lake Forest PS Improv	$76,700		31-Dec-15
S-HC-HC-MSD1082	Meadow Stream PS ILS	$998,400		25-Mar-12
S-HC-HN-NB01-S	Riding Ridge PS Improv	$27,300		31-Dec-14

2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Actual Work Critical Remaining Work Summary
Remaining Work Milestone

IOAP Preferred Project List

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Activity ID	Activity Name	Budgeted Total Cost	Start	Finish
S-HC-HN-NB02-S	Gunpowder PS ILS	$175,500		31-Dec-21
S-HC-HN-NB03-M	Fox Harbor ILS	$327,600		31-Dec-21
S-HC-HS-NB01-S	Fairway View PS Improv	$87,100		31-Dec-14
S-HC-HS-NB02-S	Deep Creek ILS	$188,500		31-Dec-16
S-JT-JT-NB01	Jeffersontown WWTP Elim	$23,736,700		31-Dec-21
S-JT-JT-NB01A	Chen Hills WWTP Elim & PSs Elim	$3,159,107		31-Dec-15
S-JT-JT-NB02	Dell Rd & Charlene Pkwy Interceptor	$916,500		31-Dec-22
S-JT-JT-NB03	Raintree & Marian Ct PS Elim	$617,500		31-Dec-21
S-JT-JT-NB04	Monticello PS Elim	$206,700		31-Dec-22
S-MC-MF-55665-13	Hazelwood PS I/I Investigation	$173,443		31-Dec-16
S-MC-WC-NB01 SHIV	Shively Interceptor	$15,316,600		29-May-14
S-MC-WC-NB02	East Rockford PS Relocation	$1,067,300		31-Dec-21
S-MI-MF-M-NB04	Goose Creek PS Improv & WW SB	$2,844,400		
S-MI-MF-M-NB06	Anchor Estates ILS & PS Elim	$1,060,800		31-Dec-13
S-MISF-MF-NB01-M1	Buechel Basin	$13,184,600		31-Dec-13
S-MISF-MF-NB01-M2	UMF PS Diversion & Storage	$13,184,600		31-Dec-23
S-OR-MF-42007-S	Sonne PS I/I Investigations	$887,900		
S-OR-MF-NB01-01	Mellwood System Improv & PS ...	$3,047,200		
S-OR-MF-NB02-01	Leland Rd Relief Sewer	$53,300		31-Dec-21
S-OR-MF-NB03-09	Derington Ct PS I/I Investigations	$377,000		31-Dec-17
S-PO-WC-PC03-M	Charleswood Interceptor Extensi...	$603,200		31-Dec-22
S-PO-WC-PC04-M	Cinderella PS WW Storage	$1,079,000		31-Dec-23
S-PO-WC-PC05-M	Lantana PS WW Stroage	$434,200		31-Dec-22
S-PO-WC-PC06-M	Government Center PS WW Stor...	$1,842,750		
S-PO-WC-PC07-M	Avanti PS WW Storage	$179,725		31-Dec-21
S-PO-WC-PC08-M	Lea Ann Way System Improv	$826,800		31-Dec-23
S-PO-WC-PC09-M	Outer Loop & Caven Ave WW St...	$3,594,692		
S-PO-WC-PC10-M	Leven PS WW Storage	$630,500		31-Dec-22
S-PO-WC-PC11-M	Edsel PS I&I Investigation	$366,912		31-Dec-15
S-SD-MF-NB03	Parkview Estates I&I Invest	$284,830		31-Dec-12
S-SD-MF-NB04	Klondike Interceptor	$557,700		31-Dec-15
S-SD-MF-NB05	Sutherland Interceptor	$414,700		31-Dec-23
S-SF-MF-30917-S	Camp Taylor #1-System Improv	$2,280,200		31-Dec-22
S-X-I&I Rehab-CF	I&I Reduction Program	$45,000,000		31-Dec-23
S-Z-Camp Taylor P2	Replace Sewers	$6,500,000		21-Oct-13
S-Z-Camp Taylor P3	Compl SSES Recomdtns	$19,500,000		31-Dec-23
S-Z-OR-MF-NB04-03BB	ORFM Improvs	$7,194,200		31-Dec-15
S-Z-Prospect Elim	Prospect Eliminations	$10,656,100		31-Dec-23
S-Z-STP CCP Mods	To WWTP	$2,600,000		

2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Draft Wet Weather Team Stakeholder Subgroup Support Memo to MSD Board Regarding MSD's Draft Integrated Overflow Abatement Plan
Working Draft – September 23, 2008

[Note: Substantive Changes and Additions since the August 2008 Draft Are Highlighted]

MEMORANDUM

TO: Louisville and Jefferson County Metropolitan Sewer District Board

FROM: Membership of the Wet Weather Team Stakeholder Subgroup

DATE: [Date – October XX, 2008]

SUBJECT: Draft Integrated Overflow Abatement Plan

This memo is being submitted by the stakeholder members of the Wet Weather Team (WWT) to express our unanimous support for the Draft Integrated Overflow Abatement Plan (IOAP) as staff of the Louisville and Jefferson County Metropolitan Sewer District (MSD) transmits the plan to the MSD Board. Through this memorandum, we review the composition and charge of the Wet Weather Team, describe the results of the stakeholder subgroup's deliberations, and outline our support for the Draft IOAP. The attached "Vision for MSD's Integrated Overflow Abatement Plan" summarizes the Wet Weather Team's common understanding of the high-level architecture and components of the IOAP (see Attachment #1). As stakeholder members of the WWT, we support this vision for improving wet weather sewer overflow management in our community.

Wet Weather Team Composition and Charge

The Wet Weather Team consists of community representatives, elected officials, MSD personnel, and technical consultants. The nineteen stakeholders on the Wet Weather Team include individuals recognized as community opinion leaders associated with environmental advocacy, business and industry, elected officials, local government, community neighborhood, recreation, public health, environmental justice, and organized labor interests (see Attachment #2 for a list of WWT stakeholder subgroup members). WWT stakeholders have not formally represented their specific affiliated organizations as part of the team, but rather have provided input reflective of the broad interest areas in which they lead.

MSD chartered the stakeholder subgroup of the Wet Weather Team to "provide guidance on the development of an integrated Wet Weather Program that will comply with applicable regulatory requirements and will minimize the impacts of wet weather discharges on water quality, aquatic biota, and human health." Through MSD's consent decree with the U.S. Environmental Protection Agency (EPA) and the Kentucky Environmental and Public Protection Cabinet, the Wet Weather Team was charged with two primary tasks: (1) preparing a plan for funding MSD's overflow abatement program and (2) developing a program for public information, education, and involvement. In addition to these tasks, MSD sought guidance from WWT stakeholders on MSD's overall investment, policy, and performance choices in the development of the IOAP.

Results of the Wet Weather Team's Deliberations

The Wet Weather Team met 21 times from July 2006 through September 2008 and provided input on all major components of the IOAP, as well as the analytic framework and the public involvement process

MSD used to develop the IOAP. There are four areas of the WWT stakeholder subgroup's deliberations that we would like to highlight for the Board, as follows.

1. Development of the Analytic Framework: The WWT stakeholders, along with other WWT members, identified and agreed upon a set of community values to use in the development of MSD's IOAP. We also advised MSD's technical team on a performance evaluation framework for using those values to evaluate alternatives for MSD's IOAP. The performance evaluation framework includes both a benefit-cost scoring methodology for selecting the best alternatives at the project level and a systematic process for considering values that relate to the program as a whole. (This analytic framework is further described in the attached vision.) We believe that this analytic framework is rigorous, transparent, and replicable, and that it provides an effective way to understand and balance tradeoffs among potentially conflicting community interests.

2. Application of the Analytic Framework: The WWT stakeholder subgroup has reviewed examples of how MSD's technical team has used the values-based performance evaluation framework to evaluate project alternatives to address combined sewer overflow (CSO) and sanitary sewer overflow (SSO) problems in our community. Moreover, we have also reviewed and provided input on how the technical team has evaluated the IOAP according to the WWT's programmatic community values—customer satisfaction, economic vitality, education, environmental justice and equity, financial equity, and financial stewardship. We believe that the analytic framework has been applied consistent with the WWT's expectations in the development of the IOAP and has produced a robust, replicable, and transparent analysis.

3. IOAP Vision: We helped develop the attached "Vision for MSD's Integrated Overflow Abatement Plan" along with the MSD personnel and technical consultants who are on the Wet Weather Team. This vision summarizes the WWT's common understanding of the high-level architecture and components of the IOAP, and it documents the WWT's consensus about several crucial issues for the community related to the IOAP. The vision outlines the expected water quality benefits of the IOAP; the levels of control for CSOs and SSOs in our community; the range of control options in the IOAP; the analytic framework and process used to select control options; the public information, education, and involvement program (known as "Project WIN"); the monitoring, evaluation, and adaptive management plan; future development considerations relevant to the IOAP; and the IOAP funding plan. As stakeholder members of the WWT, we support this vision for improving wet weather sewer overflow management in our community.

4. Summary of IOAP Projects: We believe the project mix and outcomes that form the backbone of the IOAP reflect responsiveness to MSD's consent decree while ensuring wise and effective use of our community's resources. The IOAP project mix is based upon a front-end consideration of green infrastructure and other source control approaches. The types of projects in the IOAP include source control (including green infrastructure and inflow and infiltration reduction [I&I] efforts), storage, conveyance, treatment, and sewer separation. There are 19 gray infrastructure projects and 15 green infrastructure demonstration projects in the Long Term Control Plan for CSOs. The Sanitary Sewer Discharge Plan for SSOs includes 41 gray infrastructure projects and a private property I&I reduction program. Project budgets also include an enhanced site restoration allowance. The IOAP projects represent a necessary, but not the only, building block for water quality improvement in the community.

The stakeholder subgroup of the Wet Weather Team appreciates the opportunity to have contributed to MSD's IOAP development efforts. We look forward to the MSD Board's review of the Draft IOAP and the public review and comment period that will follow. The Wet Weather Team plans to meet in early

December to review and discuss the feedback on the Draft IOAP from MSD Board members and the public. Based on those discussions we may provide additional comments for the MSD Board to consider before MSD submits the Final IOAP to EPA and the State of Kentucky by December 31, 2008.

Attachment #1: Vision for MSD's Integrated Overflow Abatement Plan
[Substantive Changes and Additions since the August 2008 Draft Are Highlighted]

This document summarizes the vision for MSD's Integrated Overflow Abatement Plan (IOAP), as understood and endorsed by the Wet Weather Team (WWT).

Scope of the Integrated Overflow Abatement Plan and Expected Water Quality Benefits

The Louisville and Jefferson County Metropolitan Sewer District's Integrated Overflow Abatement Plan is a long-term plan to control combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) in the community. The IOAP is expected to improve water quality in both Jefferson County streams and the Ohio River. The expected water quality benefits of the IOAP include: (a) reductions in the peak levels of bacteria in Beargrass Creek and other Jefferson County waterways and (b) a reduction in the duration of wet weather impairment of local waterways (i.e., the number of days that bacteria levels exceed water quality standards during periods of wet weather). The water quality improvements will be greater in tributaries to the Ohio River than in the Ohio River. The IOAP—in coordination with other community water quality initiatives (further described below)—will also improve water quality under ambient conditions.

The specific benefits from the IOAP include the following:

- The suite of projects selected for the Long Term Control Plan (LTCP) for CSOs will result in approximately 95 percent capture of wet weather combined sewage during an average year.
- Remaining CSO loads (after removing background) will no longer "cause or contribute" to water quality standard violations in the Ohio River. Peak fecal coliform counts are modeled to be reduced by 54 percent, from 100,000 cfu/100mL to 46,000 cfu/100 mL (downstream from Morris Forman Wastewater Treatment Plant).
- Remaining CSO loads will probably no longer "cause or contribute" to water quality standard violations in Beargrass Creek. Peak fecal coliform counts are modeled to be reduced by 18 percent, from 44,300 cfu/100mL to 37,400 cfu/100 mL (at the mouth of Beargrass Creek).
- The suite of projects selected for the Sanitary Sewer Discharge Plan (SSDP) for SSOs will result in the elimination of capacity-related SSOs up to the site-specific level of protection (described below).
- The SSO projects are anticipated to eliminate of an average of 145 SSO events per year and an average of 290 million gallons of overflow volume per year (average of 2005–2007).

Along with delivering water quality improvements from sewer overflow control, MSD participates in other community water quality improvement efforts. Sewer overflow control is essential to meeting water quality standards, but overflow control alone is not enough to meet water quality standards. In light of this challenge, MSD will continue to leverage its role in supporting broader water quality improvement efforts in the community. The IOAP will be one of the key elements of MSD's participation in those water quality improvement efforts. In particular, the IOAP will be complementary to other wet weather and water quality programs managed by MSD and/or by other community partners. These complementary efforts include, but are not limited to, the Mayor's "Go Green Louisville" Initiative, the Partnership for a Green City, Metro Louisville's Municipal Separate Storm Sewer System (MS4) discharge permit, and initiatives of Jefferson County Public Schools (JCPS), private developers, and other entities.[1]

[1] More information about these initiatives is available on the following websites: Go Green Louisville (www.louisvilleky.gov/GoGreen), Partnership for a Green City (www.partnershipforagreencity.org), and MS4 program (www.msdlouky.org/insidemsd/wwwq/ms4).

The specific ways in which MSD is collaborating with other entities on community water quality improvement initiatives include the following:

- Green City Partnership: MSD is actively working with Louisville Metro Government, JCPS, and the University of Louisville to improve water quality through the Partnership for a Green City. The Partnership has established a Stormwater Committee that will be identifying opportunities to improve water quality associated with planned capital projects.
- Metro Government: MSD is an active participant in the Mayor's Go Green Louisville Initiative, which includes in its vision a commitment to focus on financially sustainable measures that improve air and water quality, land use, and energy efficiency. In coordination with this initiative, MSD is partnering with Louisville Metro Government on several green infrastructure demonstration projects in the IOAP.
- MS4 Program: MSD will coordinate IOAP implementation with the agencies that share implementation of the MS4 Program—including Metro Louisville government, small cities that handle their own drainage, and the Kentucky Department of Transportation. The MS4 program will draw upon the opportunities identified through the green infrastructure analysis conducted by MSD's IOAP technical team and the ideas suggested by WWT members during the development of the IOAP.

The IOAP—as part of MSD's wet weather consent decree response—will be a federally enforceable action plan for sewer overflow abatement. Although many IOAP projects and programs will provide multiple benefits to the community, the scope of the IOAP is limited to commitments that directly relate to MSD programs and activities to address combined sewer overflow (CSO) and sanitary sewer overflow (SSO) issues. Other community water quality programs, which may be partly or completely out of MSD's control, can provide synergistic benefits with the IOAP, but they do not fall under the same level of federal enforcement. These programs may, however, have different mechanisms for ensuring accountability (e.g., the State of Kentucky oversees the MS4 stormwater permit that MSD and several other agencies hold). As noted above, MSD anticipates coordinating IOAP implementation with the water quality improvement initiatives of Louisville Metro Government and other public and private entities, even though these broader initiatives may not explicitly be part of the IOAP.

Values-Based Performance Evaluation Framework Used to Develop the IOAP

MSD developed the IOAP using a values-based performance evaluation framework established by the Wet Weather Team. This analytic framework includes both a robust benefit-cost scoring methodology for evaluating and selecting project alternatives and a systematic process for evaluating the IOAP programmatically. The Wet Weather Team identified and agreed upon the following eleven community values that underpin the analysis and selection of alternatives for the IOAP.

Project-Specific Values **[Reordered to be alphabetical]**

- Asset protection
- Eco-friendly solutions
- Environmental enhancement
- Public health enhancement
- Regulatory performance

Programmatic Values

- Customer satisfaction
- Economic vitality
- Education
- Environmental justice and equity
- Financial equity
- Financial stewardship

Using the structured decision-making process as framed by the Wet Weather Team, MSD developed and evaluated overflow abatement control options for the IOAP based on managing risks to these community values. In particular, MSD's technical team analyzed each project alternative considered for the IOAP in terms of potential benefits and costs, where "benefits" are quantified based on the anticipated reduction in risks to the community values and "costs" reflect the total capital and operational costs of the alternative. The benefit-cost analysis influences the selection of site-specific abatement approaches or technologies, site-specific levels of protection (within the boundary conditions for CSOs and SSOs described below), and the relative priority of projects for implementation.

Several of the Wet Weather Team's community values relate to financial considerations, including the cost-effectiveness of individual solutions and the program as a whole (financial stewardship), the affordability of the program's total costs for the community (economic vitality), and how the costs are allocated among different segments of the population (financial equity). The Wet Weather Team has used the results of the values-based benefit-cost analysis of project alternatives to provide context to discussions about the appropriate level of investment in the IOAP.

The WWT's discussions about total program costs and the selection of projects for the IOAP have considered, as directed in EPA's CSO Control Policy, a "knee of the curve" analysis to determine where the increment of pollution reduction achieved in the receiving water diminishes compared to the increased costs. In addition to this analysis, the community's level of investment in the IOAP has been considered in the context of anticipated future requirements and other needs for MSD services, including stormwater compliance needs associated with Metro Louisville's MS4 permit and requirements to meet the forthcoming total maximum daily load (TMDL) allocations for Beargrass Creek. This consideration of other water quality investment needs is important since sewer overflow control alone will not be sufficient to meet water quality standards.

Control Levels for Combined Sewer Overflows and Sanitary Sewer Overflows

Under the Clean Water Act, CSOs are permitted discharges in wet weather, as long as they are managed to avoid degradation of water quality in the receiving streams. EPA's CSO Control Policy[2] sets specific abatement targets for CSOs. To be permitted, wet-weather CSOs must be controlled so that either water quality standards are achieved or the permit-holder can show that the CSO discharges do not cause or contribute to exceedances of water quality standards. Based on EPA's CSO Control Policy, EPA may respond to MSD's proposed strategy for controlling wet weather CSO discharges indicating a need for a temporary variance or suspension of water quality standards during wet weather. Variances are temporary, not permanent, solutions to achieve compliance with the Clean Water Act. As stated in EPA's CSO Control Policy, variances are reviewable generally every three years.

CSO projects in the IOAP have the following levels of control:

- 6 projects result in no overflows in a typical year; these locations would only overflow as a result of very large storms.
- 1 project would result in four overflows per year in a typical year.
- 11 projects result in eight overflows per year in a typical year.

MSD's strategy for SSO control reflects the fact that SSOs, unlike wet-weather CSOs, are unauthorized discharges that must be "eliminated" under the Clean Water Act. In the IOAP, the values evaluation framework has been used to determine the appropriate level of control of SSOs, although the minimum level of protection is a two-year design storm. A two-year design storm is defined as a storm with a 50

[2] EPA's Combined Sewer Overflow Control Policy is available at http://cfpub1.epa.gov/npdes/cso/cpolicy.cfm.

percent probability of occurring in a given year. Consistent with an analysis of sixty years of historical weather patterns for Jefferson County, the IOAP uses a three-hour "cloud burst" storm, with a statistically anticipated rainfall of 1.8 inches, as the two-year design storm. The Cities of Atlanta, Cincinnati, and Knoxville also use a two-year design storm as the minimum protection level for SSOs. The approach of using the values evaluation framework to determine the SSO control level means that solutions to address certain SSOs have been designed to protect against larger storms (e.g., a five-year storm instead of a two-year storm) because they yield a higher benefit-cost ratio in the analysis of project alternatives.

SSO projects in the IOAP have the following levels of control:

- 29 projects eliminate overflows up to the 2-year storm.
- 7 projects eliminate overflows up to the 5-year storm.
- 5 projects eliminate overflows up to the 10-year storm.

Components of MSD's Integrated Overflow Abatement Plan

Control options in the IOAP (the IOAP "toolkit") include source control (including green infrastructure and infiltration and inflow [I&I] reduction efforts), storage, conveyance/transport, treatment, and sewer separation. MSD's technical team has used the benefit-cost tool to compare the project alternatives and program elements considered for inclusion in the IOAP. The specific mix of control options for individual CSO or SSO locations in the IOAP is driven by the benefit-cost analysis of how the project alternatives affect the WWT's community values and site-specific considerations. Project alternatives are built around MSD's existing infrastructure (e.g., large diameter pipes and wastewater treatment plants) and draw on synergistic benefits from other MSD projects (e.g., the "Big Four" SSO projects). Furthermore, project budgets include an enhanced site restoration allowance to fund localized opportunities to restore streams and other waterways near the sites of overflow abatement projects.

Driven by the values-based benefit-cost analysis, the IOAP reflects a balanced mix of green and gray solutions to prevent and control sewer overflows. "Green" solutions include options such as green roofs, rain gardens, rain barrels, porous pavement, and bioretention, while "gray" solutions include options such as storage, treatment, conveyance/transport, and sewer separation. In addition to site-specific green infrastructure projects, the IOAP contains programmatic green solutions that reduce flow at multiple CSO sites (e.g., a rain barrel program) and that involve partnerships with other public and private entities. Green infrastructure investments are estimated to reduce the initial costs of CSO gray infrastructure projects by $40 million; potential future savings could double or triple this figure.

The 19 gray infrastructure projects to control CSOs include:

- 4 sewer separation projects;
- 13 storage basin projects (in-line and off-line, most in-line storage projects have a Real-Time Control component);
- Replacement and expansion of the Nightingale Sanitary Pump Station; and
- 1 high-rate wet weather treatment (screening, settling, and disinfection).

The 41 gray infrastructure projects to control SSOs include:

- 12 conveyance capacity upgrades;
- 19 storage projects (in-line and off-line, many with pipe upgrades also); and
- 10 pump station upgrades, eliminations, or replacements that include the elimination of 5 small wastewater treatment plants in the Prospect area, and potentially includes the elimination of the Jeffersontown Wastewater Treatment Plant.

The IOAP includes both an annual green infrastructure program and 15 initial green infrastructure demonstration projects. The green infrastructure program is front-end loaded to maximize benefits on downsizing future gray infrastructure. Programmatic components include downspout disconnect program, green roof construction subsidies or incentives, green roads and alleys partnership incentives, pervious pavement sidewalks and parking. Proposed green infrastructure demonstration projects include:

- 6 bioswale/biofiltration projects;
- 1 rain garden;
- 3 pervious concrete alleys; and
- 5 infiltration dry wells.

[Note: The following paragraph is no longer "on hold."]

MSD's technical team has analyzed potential options to control private sources of I&I into the sanitary sewer system, including building laterals, downspouts, sump pumps, and foundation drains. This analysis indicates that private-side I&I control is an essential part of the IOAP, and it will reduce the overall anticipated costs of overflow abatement. The technical team has analyzed options for adopting a requirement for inspections of private properties (e.g., during the property transfer process, when building permits are issued, when contractors install roof and gutter systems, when plumbers connect sump pumps, and/or at other times), along with providing some form of cost share and conducting an aggressive education campaign. MSD will work with Metro Government to support further development and adoption of an ordinance supporting these requirements. Although I&I reduction is particularly relevant to SSO control (since the sanitary sewer system was not designed to accept inflow), it may be useful to have similar requirements for the combined sewer system.

As a guiding principle, MSD's IOAP has been developed based on front-end consideration of source control and green infrastructure. This means that more traditional "gray" infrastructure in the IOAP has been sized after considering both (1) the anticipated flow-reduction benefits of programmatic and site-specific green infrastructure solutions and (2) the anticipated effectiveness of other source control approaches, including reduction of private sources of I&I. Green solutions in the IOAP will be implemented as soon as possible, to allow data to be gathered on the flow reduction benefits that occur. Prior to the final design of supporting gray solutions, the actual flow reduction performance will be documented and compared against the estimated targets. The final sizing of the gray solutions will then be based on actual documented performance of the green solutions previously implemented.

Public Information, Education, and Involvement Program

Education and public involvement are critical to the long-term implementation success of the IOAP. MSD uses the term "Project WIN" (Waterway Improvements Now) to describe its consent decree response activities to the public. The ongoing public information, education, and involvement program for Project WIN is designed to accomplish the following objectives:

1. Generate a sense of personal ownership and responsibility for clean water;
2. Promote and sustain participation in critical voluntary programs in the IOAP, including private-side I&I control and green infrastructure;
3. Promote public acceptance and support for the financial investments required to achieve consent decree and Clean Water Act compliance; and
4. Encourage support for other agency programs or legislation that supports overflow abatement efforts.

To achieve these objectives, the Project WIN education and public involvement program uses a wide range of communication media. In particular, the program includes the following elements:

- Public meetings and community events;
- Enhanced web portal for Project WIN;
- Speaker's bureau and technical support;
- Print and electronic media (e.g., print advertisements, press releases, targeted brochures and pamphlets, reports, newsletters, billing inserts, public TV video, radio announcements, etc.);
- Recognition programs;
- Demonstration projects;
- Tours, demonstrations, and workshops;
- Enhanced school partnerships; and
- Annual effectiveness monitoring through direct mail and phone surveys.

These public involvement efforts are focused on several key audiences, including the general public, schools and children, and target groups such as property owners, project neighborhoods, builders, and restaurants. Focusing education efforts on children is important to ensure the long-term sustainability of voluntary programs in the IOAP. For the general public, MSD is using five key messages:

1. Value clean water.
2. Your investment is paying dividends, and our water is getting cleaner.
3. Protecting public health is critically important.
4. MSD and many community partners are working hard to improve water quality.
5. You can make a difference in improving water quality.

Monitoring, Evaluation, and Adaptive Management

MSD's IOAP will use an adaptive management implementation approach based on monitoring and evaluation efforts. MSD's post-construction compliance monitoring and evaluation plan for the IOAP includes: (a) water quality monitoring, (b) sewer flow monitoring, (c) overflow events analysis, (d) gray and green infrastructure project performance monitoring, and (e) measurement of the effectiveness of source control and behavior-change efforts. MSD will adapt its CSO management and SSO elimination approaches based on the monitoring and evaluation results; this may include recalibrating models, "right-sizing" gray solutions, reevaluating the effectiveness of green solutions, and adjusting the types and characteristics of projects planned for later phases of implementation. At this time there is recognition that historical weather trends may not be as reliable as in the past due to potential changes in the climate. The IOAP's adaptive management approach will allow MSD to monitor evolving weather pattern developments and adjust its plans as more data become available.

Future Development Considerations

Solutions in the IOAP consider future development based on the community's long-term land-use plan, Cornerstone 2020.[3] IOAP solutions are designed to accommodate the anticipated impacts of population growth and land-use development in that the solutions consider the effects of growth on connections to existing infrastructure that is upstream from existing overflow points. The IOAP is not, however,

[3] For more information about the Cornerstone 2020 plan, see www.louisvilleky.gov/PlanningDesign/Cornerstone+2020.htm.

intended to provide capacity for all future growth predicted by Cornerstone 2020. Cases where the growth outlined in Cornerstone 2020 would logically be provided by new infrastructure, and not hydraulically dependent on or connected to the IOAP solution, have not been considered part of the IOAP. In summary, the solutions in the IOAP have been designed and sized to account for the impacts of anticipated growth on existing infrastructure, but the IOAP itself is not intended to build the capacity needed for growth.

MSD's Capacity, Management, Operations, and Maintenance (CMOM) Program, which is part of MSD's Consent Decree response but separate from the IOAP, includes standard operations and maintenance activities practices designed to, among other things, investigate capacity-constrained areas of the sewer system. The CMOM program also includes a System Capacity Assurance Program focused on providing capacity for current and future service needs.

Continued development in the community will require MSD to implement measures to reduce wet-weather flows. MSD will use a three-to-one offset of wet-weather flows from new development. This means that existing flows entering MSD's sanitary sewer systems will be reduced at a ratio of three gallons for every new gallon added. MSD's flow reduction efforts will be designed to correct deficiencies in the existing sewer system in the same geographic areas (sewersheds) of the system affected by the flows from new development. MSD will track flow reduction "credits" to ensure that the flow reductions occur in the appropriate geographic locations to offset the new flows. (This three-to-one offset approach is based on the City of Knoxville's Capacity Assurance Program.) The MSD Board will develop the fee structure for the offset plan.

Funding Plan

The funding plan for the IOAP is designed to cover the twenty-year period over which IOAP capital projects will be constructed to improve MSD's sewer infrastructure to meet the requirements of the consent decree. The IOAP funding plan is based on the following three principles:

- Rates and fees for the IOAP must pay MSD's operating costs and debt service.
- MSD's current bond rating (AA) should, at a minimum, be maintained.
- Rates and fees should allow for continued economic development in the community and a strong local economy.

These principles for the funding plan affect the amount of money MSD may borrow at any one time and the level of increases in rates and fees needed to fund capital and operating expenses for IOAP implementation.

MSD will fund the IOAP primarily through a combination of annual rate increases and bond issues or other loans. MSD also plans to pursue grants, line-item appropriations, and public/private partnerships (e.g., recapture agreements) to help pay for capital construction costs, as appropriate; however, the funding plan is not built around these funding sources since they are less certain. Using the estimate that the consent decree will cost $843 million in capital expenditures, average bills for residential customers are expected to increase from 4.4 to 6.5 percent annually through 2021. This means that the average residential bill would increase from $29.58 in 2008 to approximately $55.28 by 2021 due to the consent decree capital construction expenses. Along with these rate increases, MSD expects to borrow approximately $1.15 billion by 2021 based on the estimates of capital costs; this would increase MSD's debt service payments from $94 million annually to $163 million annually by 2025.[4] A mixture of fixed and variable rate borrowings is anticipated. These rate increases and loans would be used to address both

[4] This estimate assumes that interest rates are in the 5 to 6 percent range.

IOAP construction costs and other MSD capital needs for infrastructure renewal, replacement, and expansion.

Estimates of IOAP costs appear to be within community tolerance for rate increases; however, the rate increases could nevertheless be difficult for some segments of the population to afford, especially in the context of other expenses. For this reason, the Wet Weather Team has considered potential ways to provide discounts to customers that face financial hardship. In the IOAP funding plan, MSD proposes a few changes to MSD's existing rate structure for the Board to consider. These changes are designed to accomplish two objectives: (1) provide discounts for low-income populations and (2) ensure steady and predictable revenue flows overall. The specific rate structure changes proposed in the IOAP funding plan include the following.

- Residential customers will be billed based on winter consumption.
- MSD will work with the Louisville Water Company to evaluate whether to bill customers on a monthly basis.
- The senior citizens discount program will be expanded.

As noted above, MSD will construct the capital projects in the IOAP over a twenty-year period, in order to meet the regulatory requirements of the consent decree and achieve compliance with the Clean Water Act. Many of the elements of the IOAP—including the Project WIN education program, operations and maintenance of IOAP projects, and monitoring and evaluation programs—will also continue past the construction phase of the IOAP. MSD is committed to making sure that the IOAP programs and projects provide for long-term improvements in water quality in Louisville and Jefferson County.

Attachment #2: Members of the Wet Weather Team Stakeholder Subgroup
[Note: This is a new attachment.]

Member	Organization*
Steve Barger	Labor
Susan Barto	Mayor of Lyndon
Stuart Benson	Louisville Metro Council, District 20
Charles Cash	Louisville Metro Planning & Design Services Department
Allan Dittmer	University of Louisville
Laura Douglas	E.ON U.S. LLC
Faye Ellerkamp	City of Windy Hills
Arnita Gadson	West Jefferson County Community Task Force / Kentucky Environmental Quality Commission
Mike Heitz	Louisville Metro Parks Department
Tom Herman	Zeon Chemicals
Rick Johnstone	Deputy Mayor, Louisville Metro Mayor's Office
Bob Marrett	CMB Development Company, LLC
Kurt Mason	Jefferson County Soil and Water Conservation District
Judy Nielsen	Louisville Metro Health Department
Lisa Santos	Irish Hill Neighborhood Association
Bruce Scott	Kentucky Waterways Alliance
David Tollerud	University of Louisville, School of Public Health and Information Sciences
Tina Ward-Pugh	Louisville Metro Council, District 9
David Wicks	Jefferson County Public Schools

*Stakeholders on the Wet Weather Team do not formally represent their specific affiliated organizations, but rather seek to provide input reflective of the broad interest areas in which they lead. Along with the stakeholder subgroup, the Wet Weather Team includes MSD personnel and technical consultants.

Project WIN
Integrated Overflow Abatement Plan

PROJECT WIN
Waterway Improvements Now

September 23, 2008

Presentation Outline

Part One
- Plan Overview
- Program Benefits
- Compliance Approach
- Project Descriptions

Part Two
- Schedule
- Program Costs
- Cash Flow and Rate Impacts

Program Overview (1 of 2)

All your burning questions answered on two slides

- CSO controls achieve approximately 95% wet weather capture. This level of control complies with EPA's CSO Policy; remaining overflows do not "cause or contribute" to water quality standards violations
- SSO controls eliminate all documented and suspected SSOs up to at least a 2 year design storm, removing an average of 290 MG of overflow volume per year (average of 2005 – 2007). This level of SSO control accepted elsewhere in EPA Region 4
- 64 projects across the county include conveyance, storage, treatment, I/I reduction and green infrastructure

Program Overview (2 of 2)

All your burning questions answered on two slides

- Proposed schedule meets all Consent Decree requirements
- Estimated capital costs are $843 million, consistent with preliminary planning numbers
- IOAP is being leveraged to support other community water quality programs
- Estimates of Consent Decree rate impacts previously presented are consistent with projected Consent Decree cash flows

Implementing the IOAP is a substantial and critical building block for overall water quality improvement

How Did We Get Here?

Summary of the Decision Process

- Wet Weather Team defined, prioritized, and established performance measures for important community values
- Project-specific values used to select alternative approaches, determine optimal level of control, and prioritize scheduling
  - Asset protection (reduce flooding and basement back-ups)
  - Eco-friendly solutions (energy consumption, use of natural systems, enhancement of recreational opportunities, neighborhood compatibility, etc.)
  - Environmental protection (reduction of pollutant loads, habitat protection, aesthetics)
  - Public health (reduce contact with potential pathogens)
  - Regulatory performance (CSO discharge volume and frequency, SSO frequency)

Benefit/Cost Analysis

Transparent and Auditable Process

Untreated CSO Average Annual Overflow Volume (AAOV)		75 MG+ AAOV	45 - 74MG AAOV	20 - 44 MG AAOV	5 - 19 MG AAOV	>0 - 4 MG AAOV	No discharge	Environmental impacts of CSO discharges are directly related to the volume of untreated overflow discharged. Reduction in overflow volume is therefore the most direct way of measuring positive impacts of CSO control. Since travel times are relatively short during wet weather in both the BGC watersheds and in the Ohio River through Jefferson County, there is no significant die-off of pathogens or in-stream treatment of conventional pollutants. Environmental impacts of pollutants are therefore cumulative, and not tied to any individual discharge location (except the the upper most discharge in the watershed). Total overflow volumes will be used to represent environmental impacts, with a smaller range of flows for Beargrass Creek, given its smaller size, and the smaller size of the CSOs that discharge to it.	CSO discharge volumes will be determined from the hydraulic models of the CSS, during the "typical year" rainfall		
Untreated CSO Average Annual Overflow Volume (AAOV)		200 MG+ AAOV	75 - 199 MG AAOV	30 - 74 MG AAOV	5 - 29 MG AAOV	>0 - 4 MG AAOV	No discharge				
		Most Severe Impact				Least Impact	No Impact				
		5	4	3	2	1	0	Assumptions	Base Case Score	Alternative Score	Total Score
Most Likely	5	25	20	15	10	5	0	Base Score: AAOV = 17MG for 54 events	10		10
	4	20	16	12	8	4	0				0
	3	15	12	9	6	3	0				0
	2	10	8	6	4	2	0				0
Least Likely	1	5	4	3	2	1	0	Alternative Score:AAOV=0		0	0
Not Possible	0	0	0	0	0	0	0	Total Score			10

First cut resulted in suite of preferred abatement alternatives that address every CSO and every capacity-related SSO

Level of Control
Analyzed for Each Project

SSO Location Description	Solution Technology Details	Preferred Project ID or Cost Sheet Name	Solution Design Level	Project Description	Benefit/Cost Ratio (Present Worth Costs)
Located in Idlewood Subdivision and Rileywood Estates near Sprigwood Ln (close to Bardstown Rd), north of I-265, next to Cedar Creek and a tributary to Cedar Creek	In-line Storage	S_CC_CC_70158_M_09A_C	1 year (D)	In-line storage with 633 LF of (72") pipe to store wet weather peak flow, and upgrade 2,069 LF open cut (10" to 15") sewer	39.68
			2 year (C)	In-line storage with 955 LF of (84" to 120") pipe to store wet weather peak flow, and upgrade 1,747 LF open cut (8" to 15") sewer pipes upstream to eliminate bottlenecks.	31.36
			5 year (B)	In-line storage with 955 LF of (108" to 144") pipe to store wet weather peak flow, and upgrade 1,747 LF open cut (8" to 15") sewer	27.11
On MSD owned Fairmount Rd PS (MSD1022-PS) property, north of Fairmount Rd and east of Bardstown Rd, next to Big Run Stream, in Glenmary Subdivision	In-line Storage	S_FF_CC_81316_M_09A_C	1 year (D)	Upsize influent lines with 54 LF of 48" pipe to create upstream in-line storage	48.33
			2 year (C)	Upsize influent lines with 407 LF of 36" pipe to create upstream in-line storage to store wet weather peak flows	27.00
			5 year (B)	Upsize influent lines with 247 LF to 96" and 160 LF to 72" of pipe to create upstream in-line storage	19.22
Located in Creek Hollow Subdivision off Johnson School Rd (just north of I-265), next to Little Cedar Creek	Pipe Upgrades	S_CC_CC_67997_M_01_C	1 year (D)	Upsize 686 LF of 21" open cut and 215 LF of 21" tunneling sewer in the area	6.61
			2 year (C)	Upsize lines from upstream SSO on downstream to an area with more capacity. Upsize 3,701 LF of (12" to 21") open cut and 215 LF of 21" tunneling sewer in the area	23.86
			5 year (B)	Upsize 8,029 LF of (12" to 21") open cut and 215 LF of 21" tunneling sewer in the area	17.43
Located south of I-265 and just west of Old Bardstown Rd, immediately downstream of Bardstown Road PS in Cambridge Commons Garden Homes	Pump Station Upgrades	S_CC_CC_MSD1025_S_03_B	2 year (C)	Increase the pump capacity by 25% to 0.39 MGD peak flow.	29.42
			5 year (B)	Increase the pump capacity by 70% to 0.53 MGD peak flow.	46.50
			10 year (A)	Increase the capacity of the pump station with an additional 100% of hydraulic capacity to 0.64 MGD peak flow.	33.85

Level of Control
Analyzed for Each Project

ProjectID	Receiving Water	ProjectType	TPW Benefit/Cost Ratio 0 OF/Year	TPW Benefit/Cost Ratio 2 OF/Year	TPW Benefit/Cost Ratio 4 OF/Year	TPW Benefit/Cost Ratio 8 OF/Year
L_MI_MF_127_M_09B_B_A	Middle Fork BGC	Offline Storage	35.2	31.99	37.13	38.75
L_MI_MF_140_S_08_A_A	Middle Fork BGC	Sewer Separation	30.95	30.95	30.95	30.95
L_MU_MF_154_M_09B_B_A	Muddy Fork BGC	Offline Storage	26.66	29.12	30.39	31.93
L_OR_MF_015_M_13_B_B	Ohio River	ILS /w Treatment	2.23	2.83	5.54	9.3
L_OR_MF_019_S_13_B_A	Ohio River	ILS /w Offline Storage	8.48	8.85	10.44	10.5
L_OR_MF_020_S_09B_B_A	Ohio River	Offline Storage	35	31.39	29.6	70.83
L_OR_MF_058_S_08_A_A	Ohio River	Sewer Separation	87.24	87.24	87.24	87.24
L_OR_MF_105_M_13_B_A	Ohio River	ILS /w Offline Storage	30.62	28.41	28.85	22.72
L_OR_MF_155_M_09B_B_B	Ohio River	Offline Storage	31.08	26.46	34.56	31.82
L_OR_MF_172_S_09B_B_A	Ohio River	Offline Storage	80.63	51.34	52.69	56.18
L_OR_MF_190_S_09B_B_A	Ohio River	Offline Storage	36.98	34.17	31.48	41.49
L_OR_MF_211_M_13_B_A	Ohio River	ILS /w Offline Storage	28.98	28.39	28.57	37.24
L_SO_MF_083_M_09B_B_A	South Fork BGC	Offline Storage	45.76	42.66	49.72	50.71
L_SO_MF_092_M_09B_B_D	South Fork BGC	Offline Storage	38.05	47.44	44.87	48.1
L_SO_MF_093_S_08_A_A	South Fork BGC	Sewer Separation	70.49	70.49	70.49	70.49
L_SO_MF_097_M_09B_B_D	South Fork BGC	Offline Storage	68.39	72.86	87.45	90.95
L_SO_MF_130_S_09B_B_A	South Fork BGC	Offline Storage	48.1	35.53	43.14	65.94

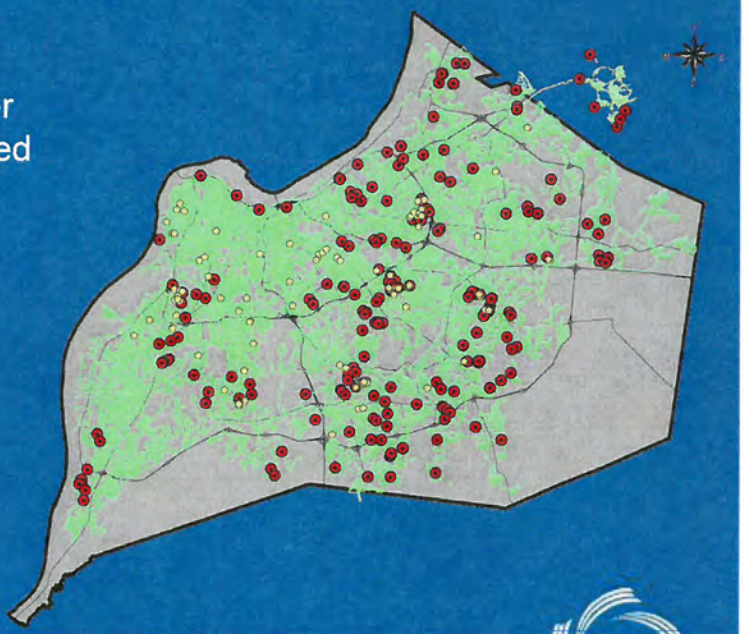
Benefit/Cost applied to level of control sizing for both CSO and SSO preferred abatement alternatives

IOAP Program Benefits

Project-Specific Values Determined Project Selection

Asset protection

- 40 projects reduced sewer surcharging and associated basement back-ups
- 3 projects reduced the potential for surface flooding in the combined sewer area



PROJECT WIN
Waterway Improvements Now

IOAP Program Benefits

Project-Specific Values Determined Project Selection

Environmental Enhancement

- 95%+ of wet weather combined sewage captured and treated (2.1 billion gallons per year more than captured today)
- 290 million gallons per year (average over 2005 – 2007) of SSOs captured and treated

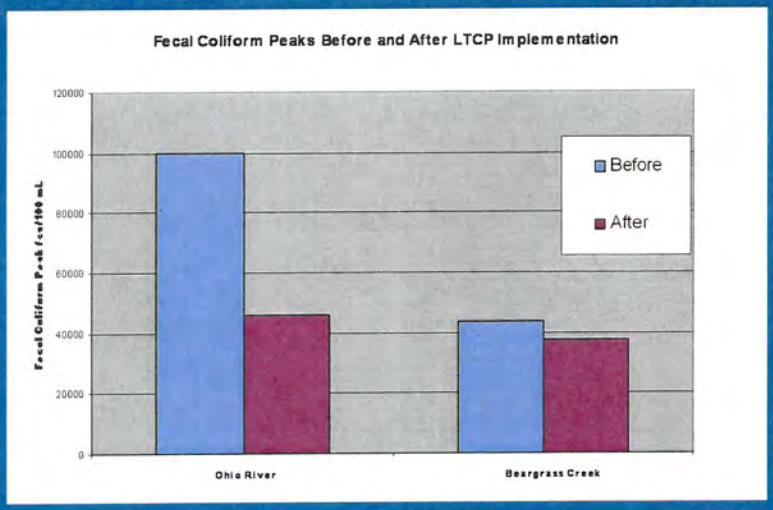
PROJECT WIN
Waterway Improvements Now

IOAP Program Benefits

Project-Specific Values Determined Project Selection

Public Health

- Peak fecal coliform counts reduced more than 50% in Ohio and 18% in BGC (typical year)
- 100+ SSO events per year (average) eliminated, reducing risk of public contact with raw sewage



IOAP Program Benefits

Project-Specific Values Determined Project Selection

Eco-Friendly Solutions

- 10% + of initial CSO control budget allocated to green infrastructure (front end loaded to allow evaluation and reallocation of budget based on performance)
- "Enhanced site restoration" directed to reduce historical overflow impacts on aquatic and riparian environments
- Source control assumed up front in both LTCP and SSDP

IOAP Program Benefits

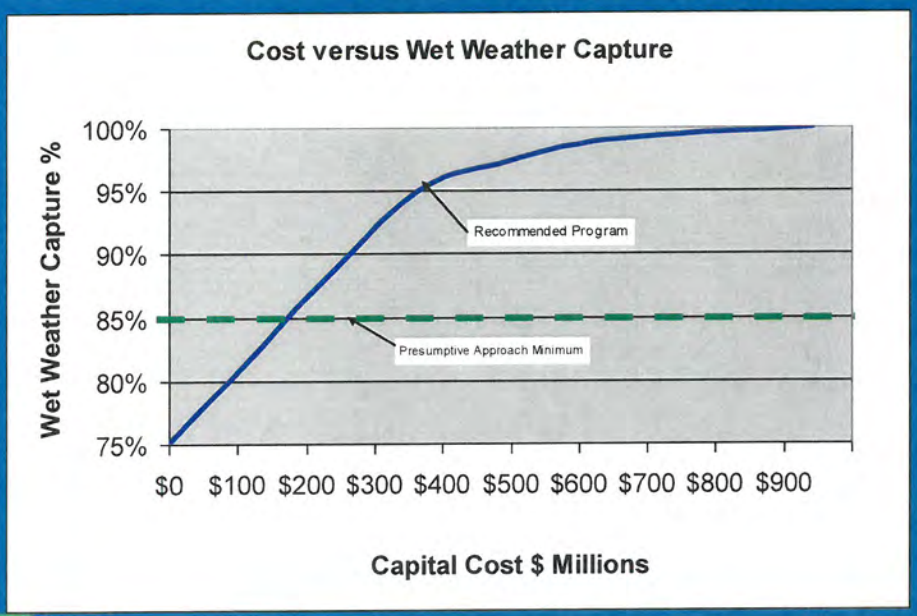
Project-Specific Values Determined Project Selection

Regulatory Performance

- 95% wet weather capture complies with EPA "presumptive approach" for CSO control
- 95% wet weather capture supported by "knee of the curve" evaluation
- Remaining CSOs alone (no background sources) do not cause significant WQ standards violations, complying with EPA "demonstrative approach"

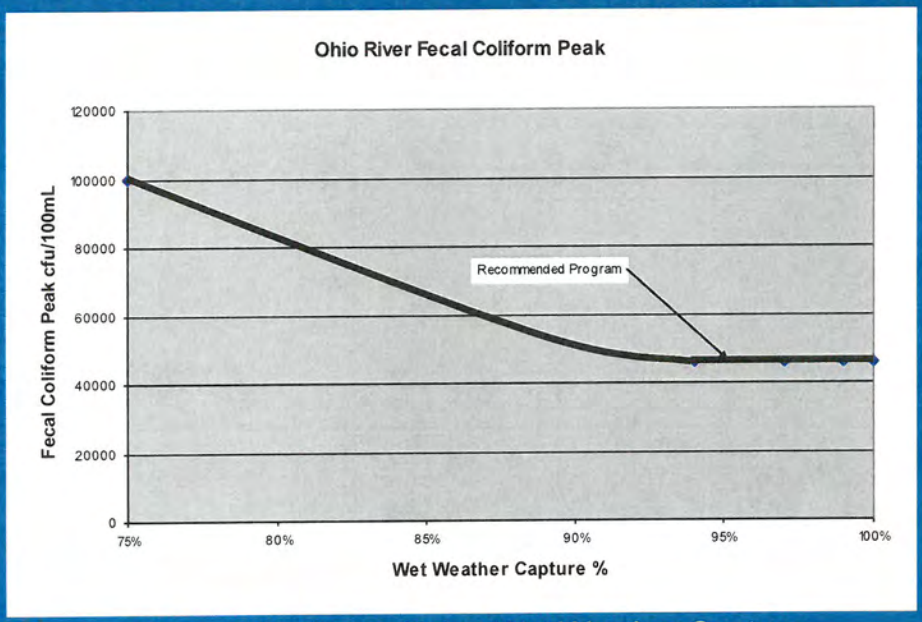
CSO Wet Weather Capture

Complies with EPA's "Presumptive Approach"



CSO Wet Weather Capture

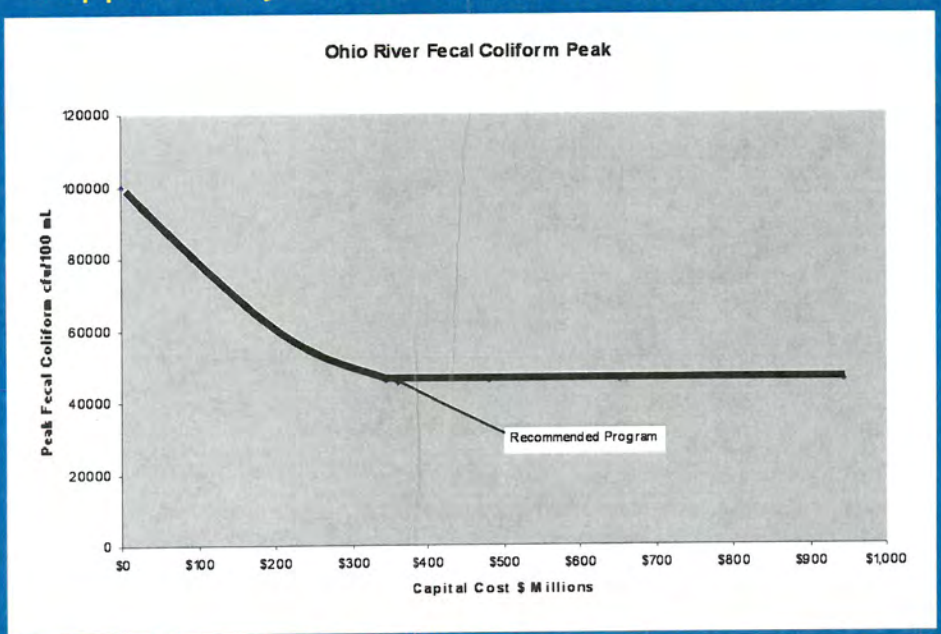
Supported by "Knee of the Curve" Evaluation



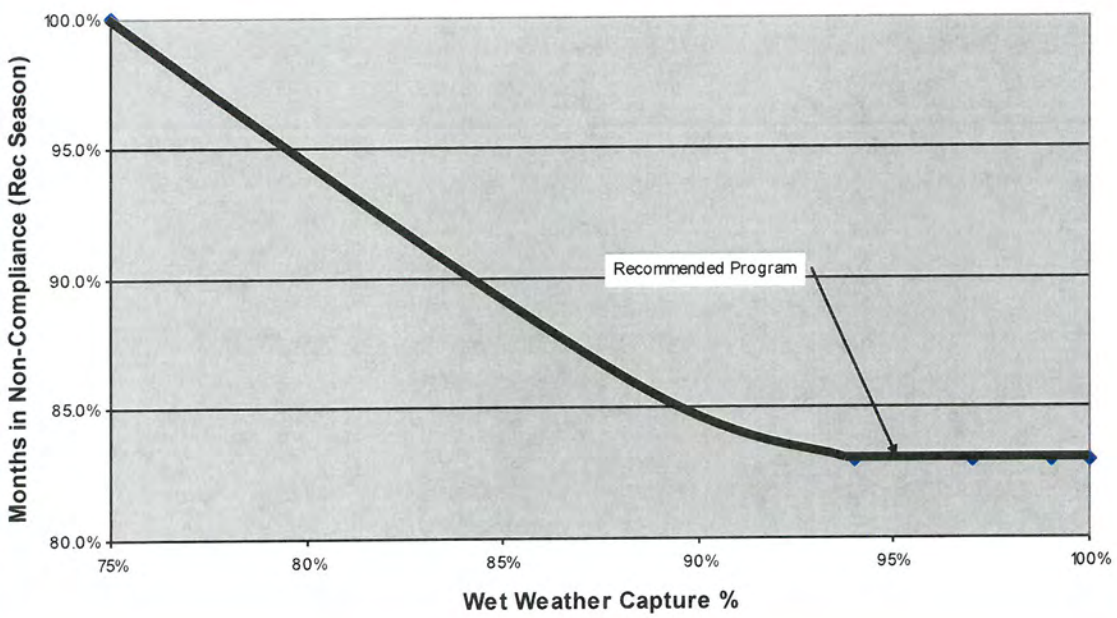
Knee of the Curve Using Wet Weather Capture

CSO Wet Weather Capture

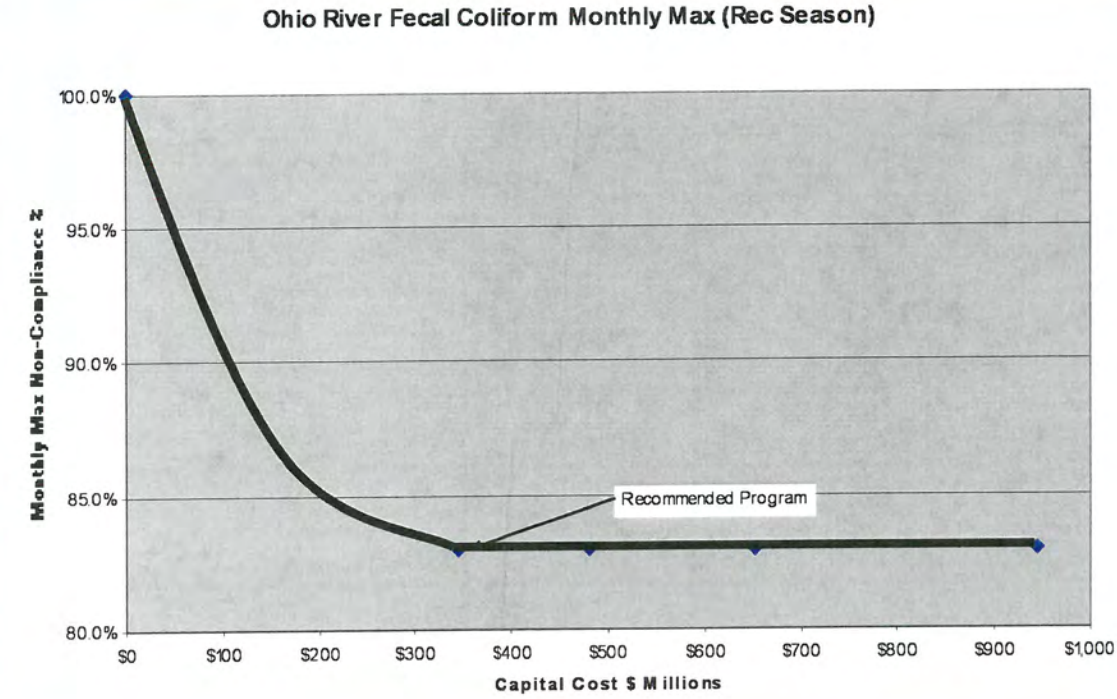
Supported by "Knee of the Curve" Evaluation



Knee of the Curve Using Program Costs

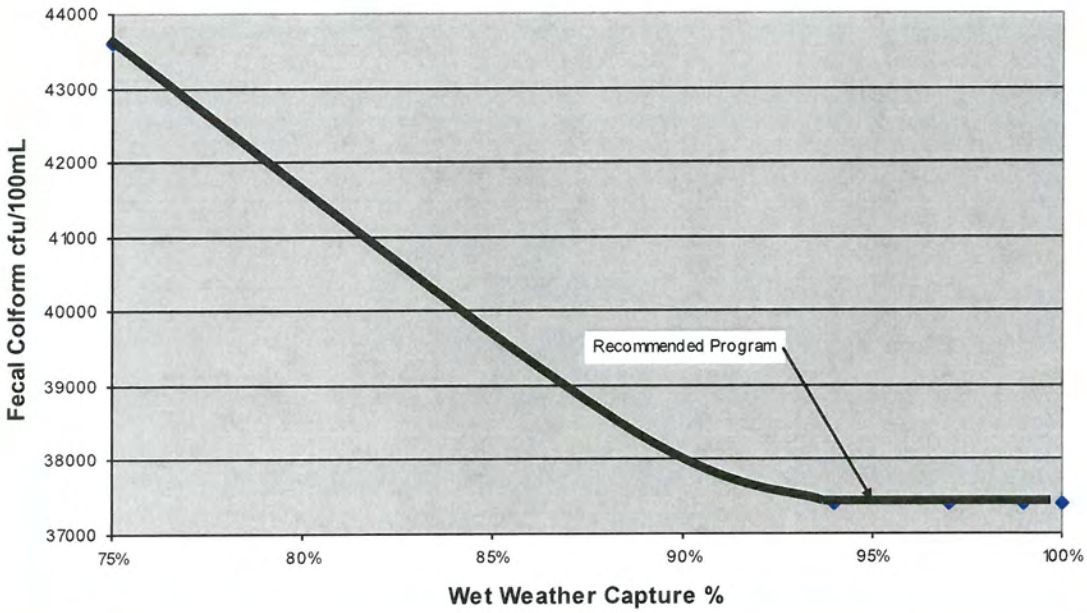


Knee of the Curve Using Wet Weather Capture

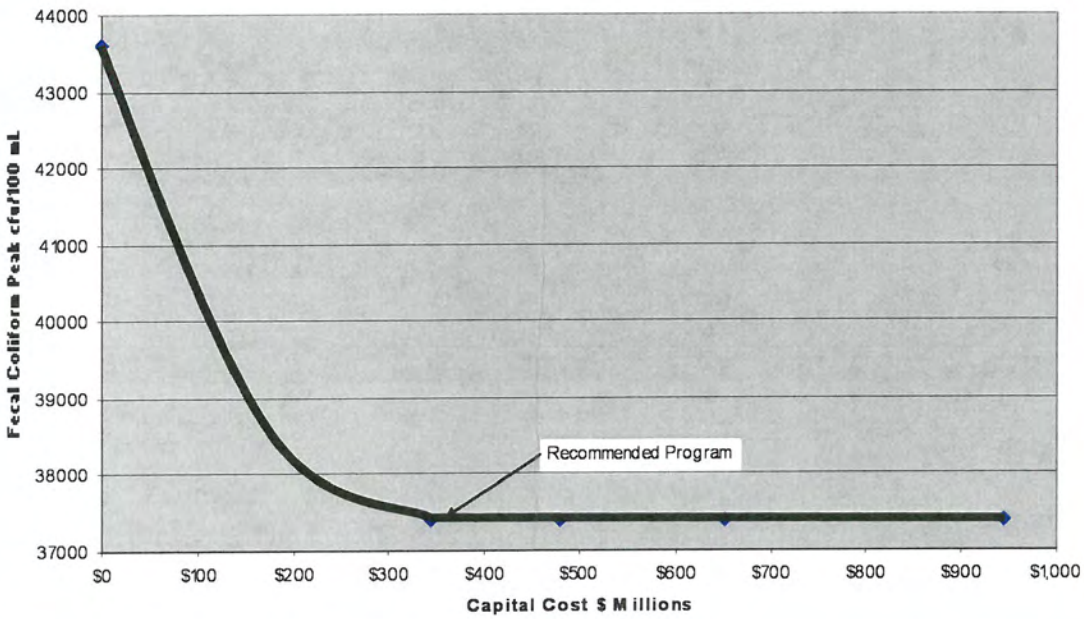


Knee of the Curve Using Program Costs

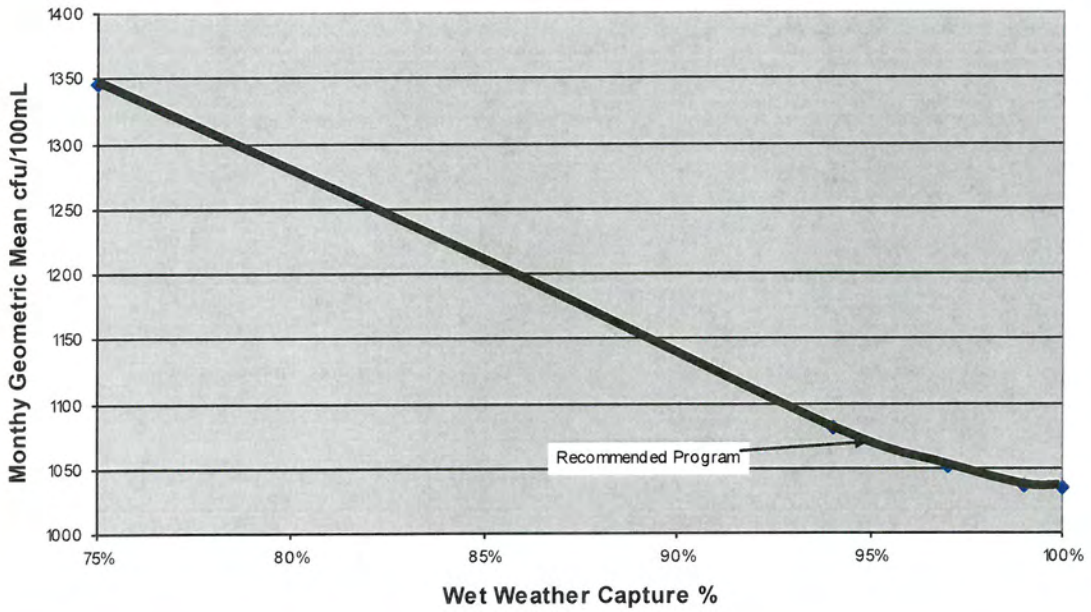
Beargrass Creek Fecal Coliform Peak



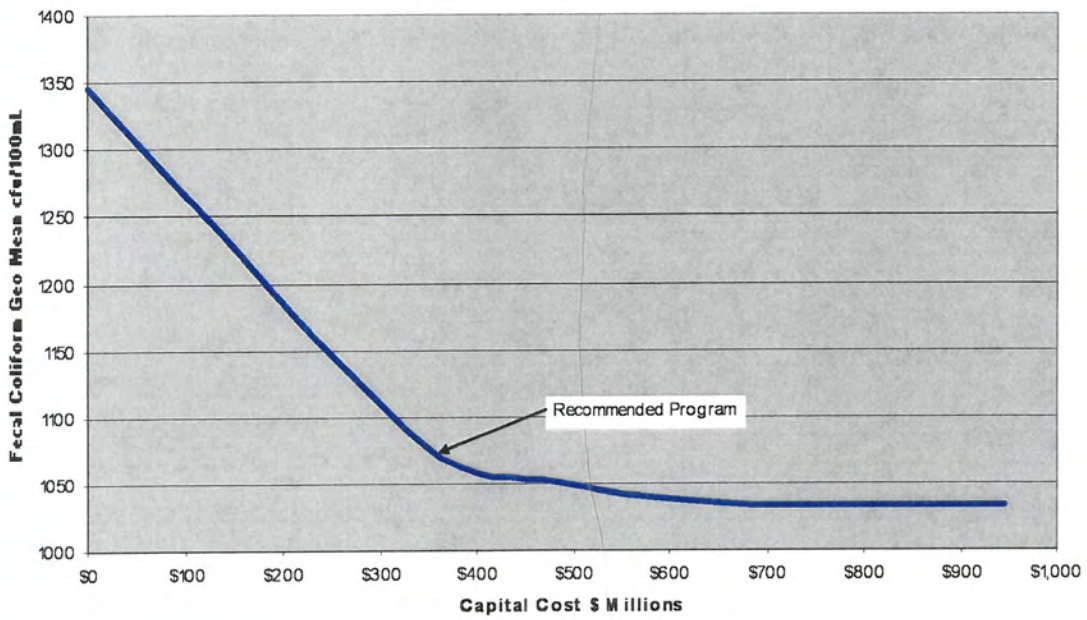
BGC Fecal Coliform Peak



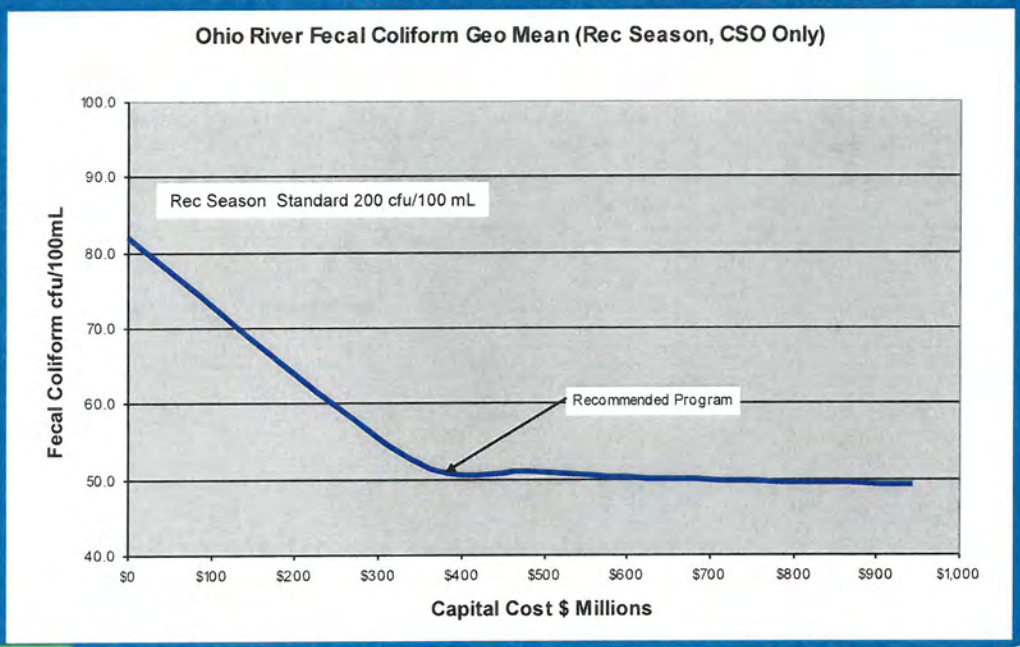
BGC Fecal Coliform Geo Mean (Rec Season)



Beargrass Creek Fecal Coliform Geo Mean

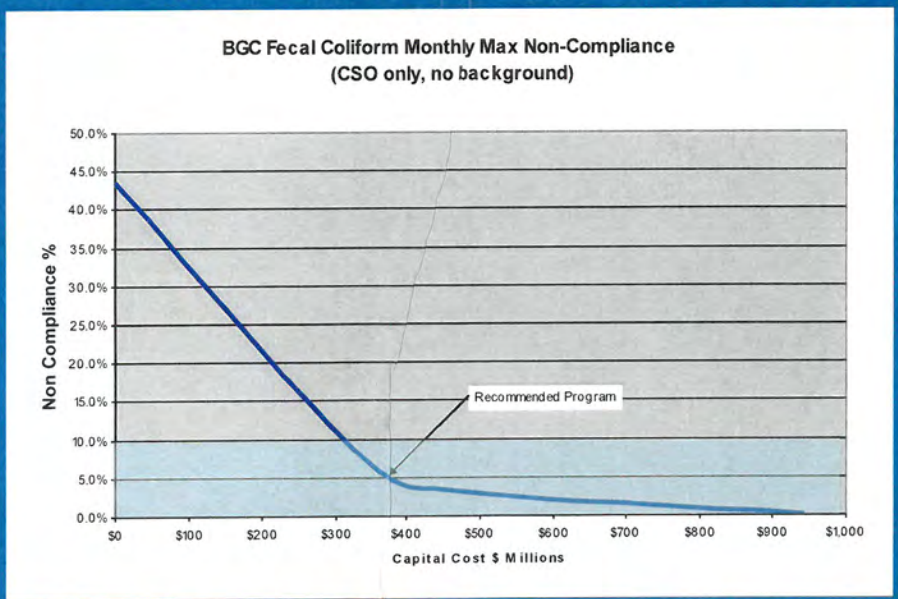


Remaining CSOs Do Not Impact Ohio River Water Quality



Complies with EPA's "Demonstrative Approach"

Remaining CSOs Have Minor Impact on Beargrass Creek Water Quality



This is a necessary step in achieving TMDL objectives in the watershed

SSDP Provides Water Quality Benefits

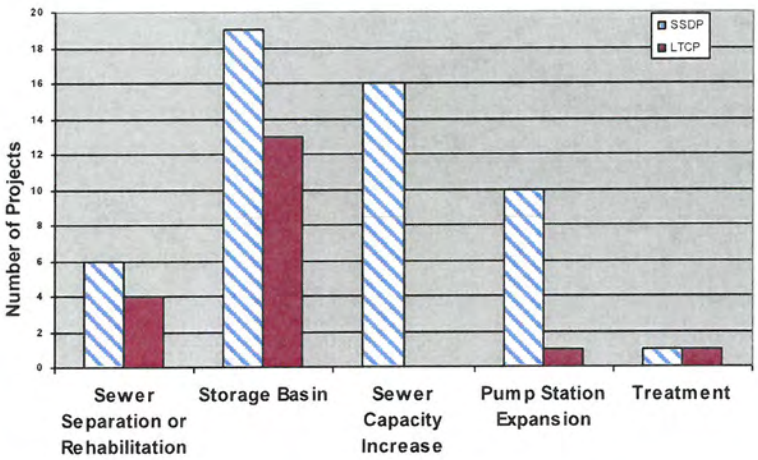
Localized Impacts Can Be Significant

- Capture 290 MG of Wet Weather Overflows
  - 100 tons BOD5 and almost 200 tons of solids
  - Average of 2005 – 2007 normalized for rainfall
- Eliminate or Upgrade Jeffersontown WWTP
  - Eliminate "blending" at JTWTP
  - Provide full secondary treatment of all sanitary sewage from area
- Eliminate 5 Small Treatment Plants Discharging to Harrod's Creek
  - Nutrient loading main concern
  - Watershed severely impacted by suburban runoff

IOAP Projects

- Total program capital costs $673 million in today's dollars
- CSO control projects $324 million
- SSO control projects $349 million (includes ISSDP)

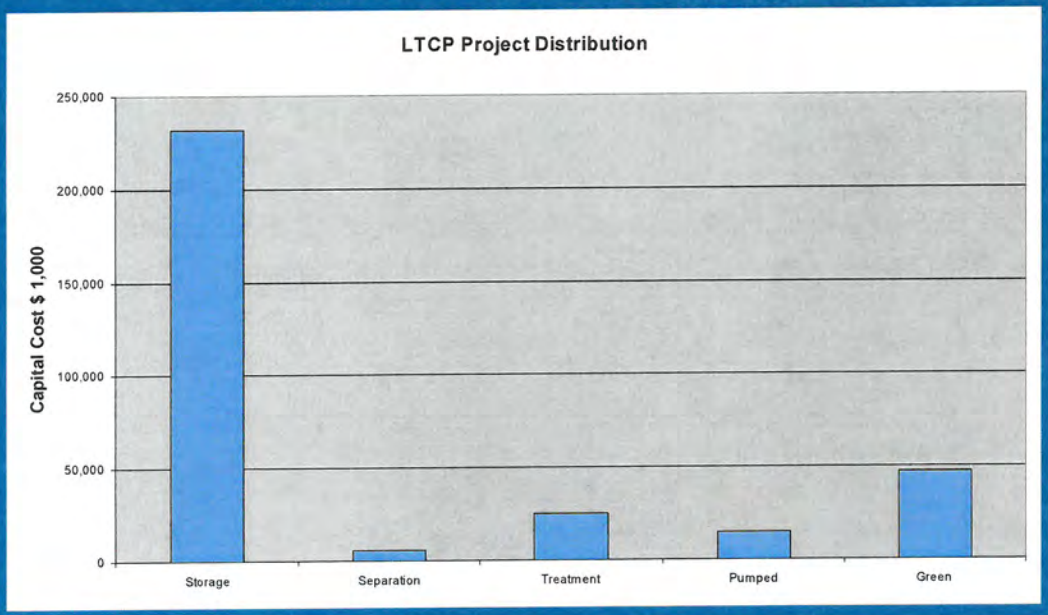
Projects Include Diverse Technology Solutions



CSO Program

- 19 Gray infrastructure budget $277 million
  - 4 Sewer Separations
  - 13 Storage basins
  - Replacement and expansion of Nightingale Pump Station
  - 1 High-Rate Wet Weather Treatment
- Green infrastructure budget $47 Million
  - Demonstration projects
    - Bioswale/biofiltration
    - Rain garden
    - Pervious alleys
    - Infiltration dry wells and sink holes

Storage Dominates LTCP Project Cost Allocation



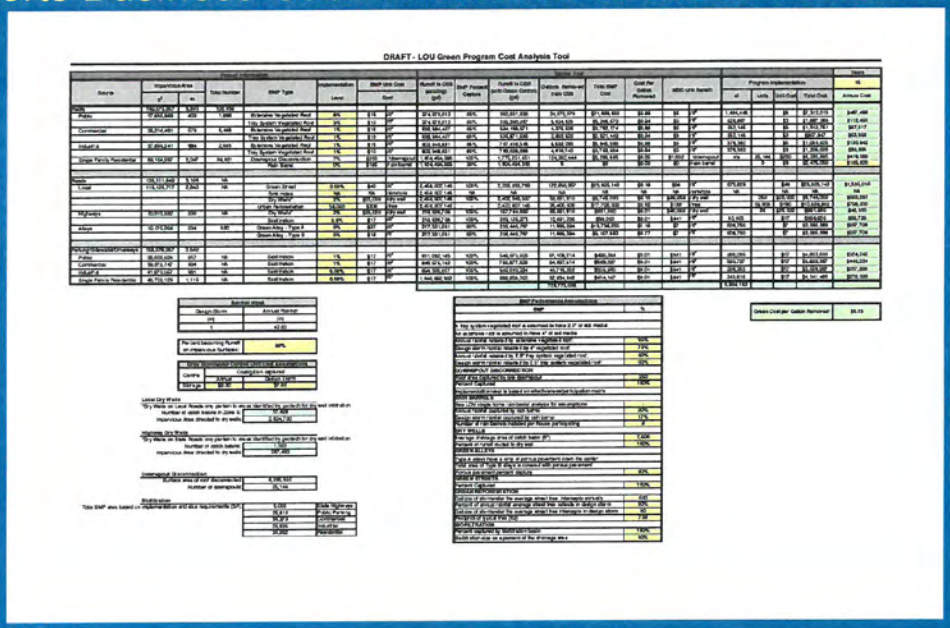
Source Control Investments

Front-Loaded to Maximize Gray Reductions

- LTCP Green Infrastructure initial $47 million
- $40 Million budgeted in first 6 years of program
- Annual program includes demonstration projects, subsidies, and incentives
- Program includes line items for:
  - Downspout disconnects, rain gardens, rain barrels
  - Green roofs
  - Green streets & dry wells
  - Pervious pavement
  - Urban reforestation
- Adaptive management allows greater investment based on demonstrated performance

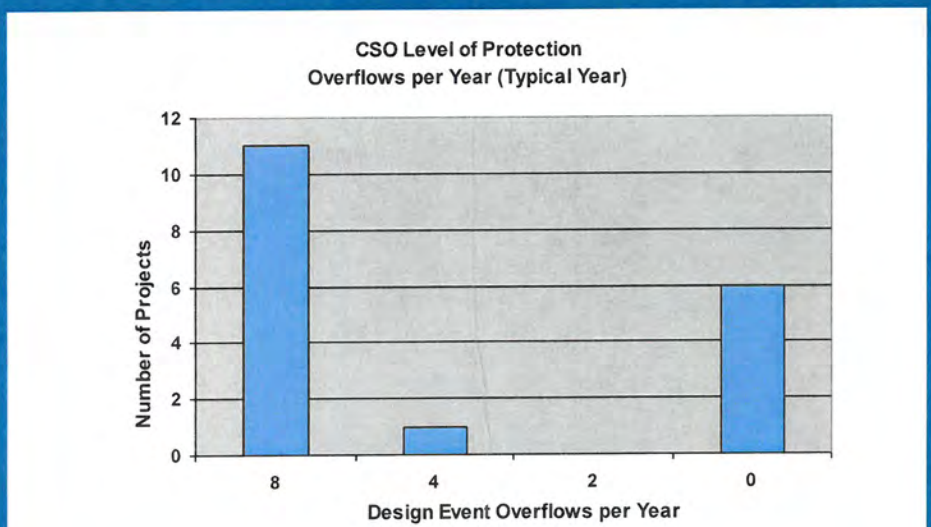
Green Infrastructure Cost Model

Supports Business Case Evaluation of Green Performance


DRAFT - LOU Green Program Cost Analysis Tool

Level of Control

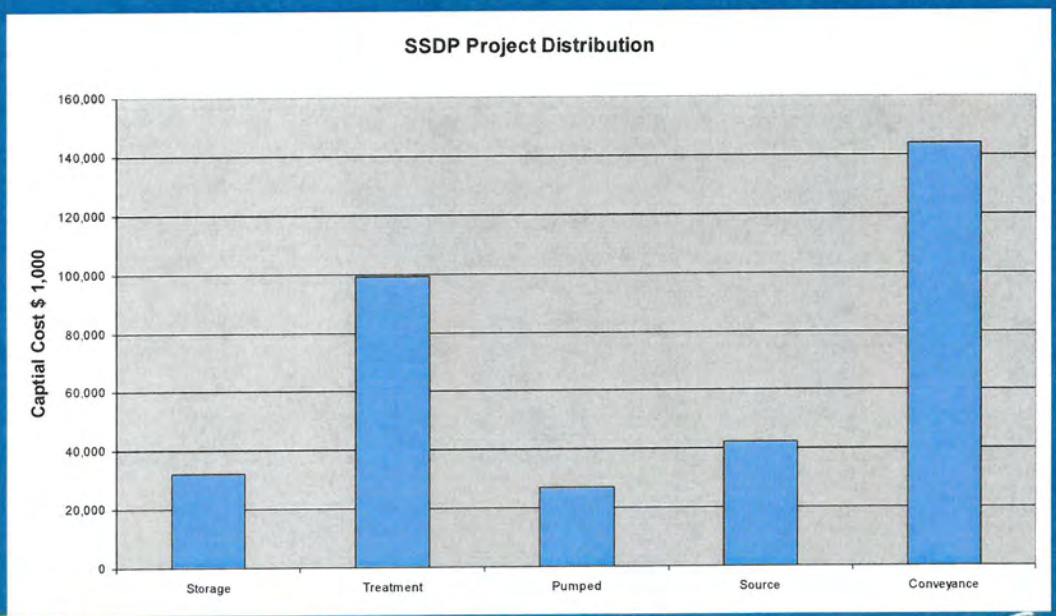
Primarily Determined by Benefit Cost Analysis



SSDP Projects

- Gray infrastructure budget $304 million (includes ISSDP)
  - 16 conveyance capacity
  - 19 storage
  - 10 pump station upgrades or expansions
  - 1 wastewater treatment expansion
- Source control (I/I removal and pipe rehab) $45 Million program

Conveyance Is Primary Cost Element of SSDP



Source Control Investments

Front-Loaded to Maximize Gray Reductions

SSDP Assumed I/I Reduction Value $17 million

- Sewer & manhole rehab
- Property service connection repair
- Private property program essential to program success

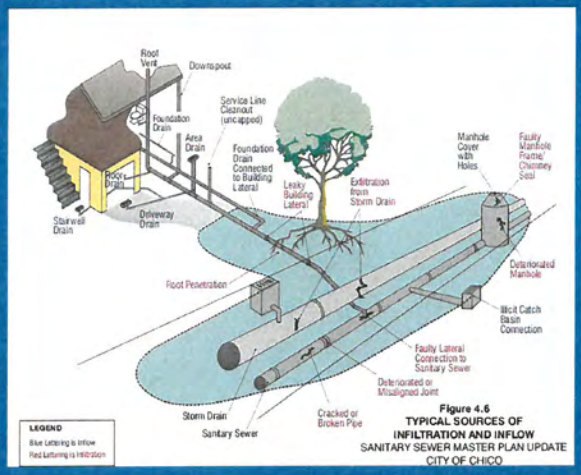
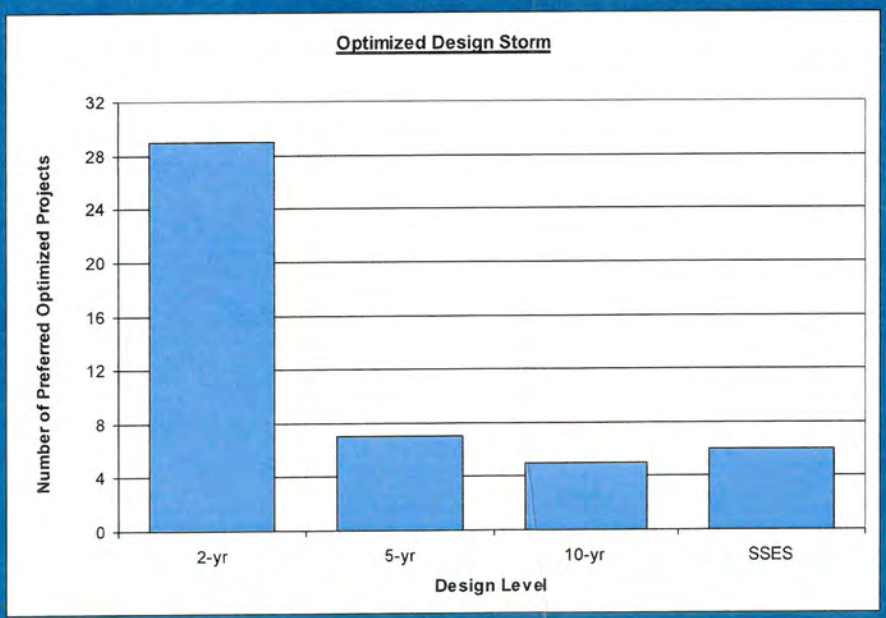


Figure 4.6
TYPICAL SOURCES OF INFILTRATION AND INFLOW
SANITARY SEWER MASTER PLAN UPDATE
CITY OF CHICO

Adaptive Management Allows Greater Savings Based on Demonstrated Performance

SSDP Level of Control

Primarily Determined by Benefit Cost Analysis



Let's Eat!

Project WIN
Integrated Overflow Abatement Plan
(Part 2)

PROJECT WIN
Waterway Improvements Now

September 22, 2008

Program Overview (Part 2)

- Proposed schedule meets all Consent Decree requirements
- Estimated capital costs are $843 million, consistent with preliminary planning numbers
- Estimates of Consent Decree rate impacts previously presented are consistent with projected Consent Decree cash flows

Program Schedule

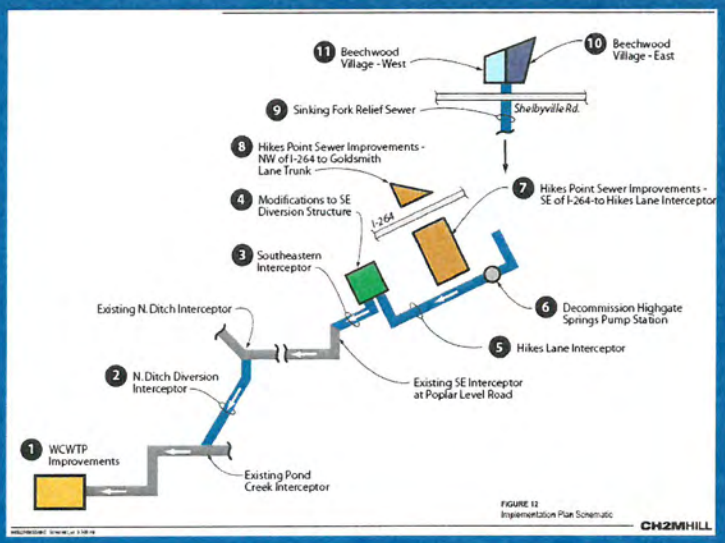
Meets All Consent Decree Milestones

- Beechwood Village and Southeast Diversion SSOs – December 31, 2011
  - Beechwood Village Sewer Reconstruction
  - Sinking Fork Interceptor Relief
  - Northern Ditch Diversion Interceptor
  - DRGWQTC Wet Weather Treatment
- Highgate Springs Pump Station and Hikes Point Area SSOs – December 31, 2013
  - Hikes Lane Interceptor
  - SED Gate Modifications and Southeast Interceptor Relief
- LTCP Projects All Complete by December 31, 2020
- SSDP Projects All Complete by December 31, 2024

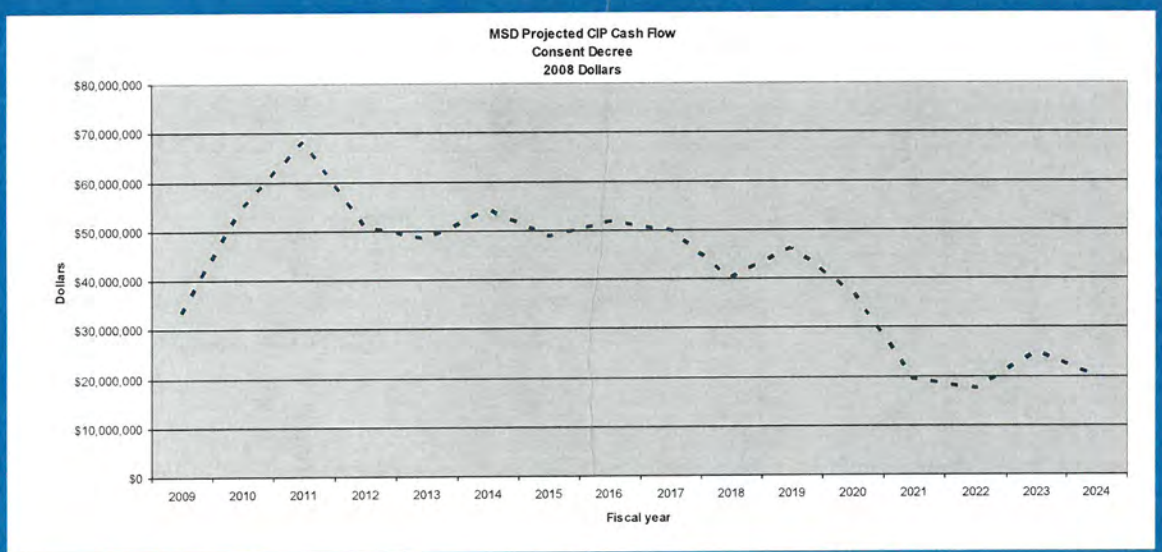
Schedule Sequencing

Determined by Benefit/Cost and Other Factors

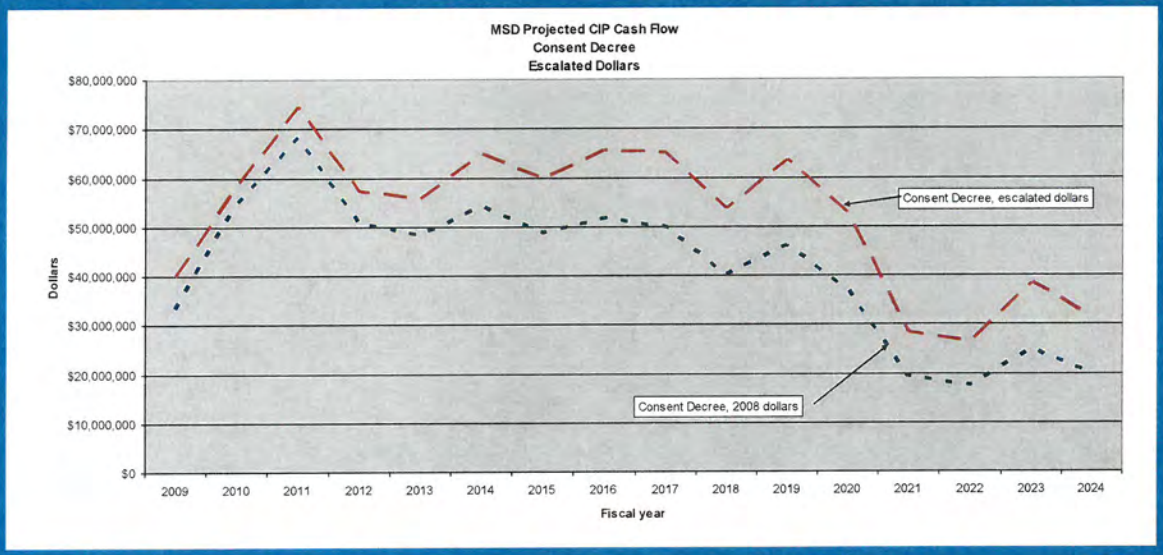
- Consent Decree milestones highest priority
- Enabling Projects sequenced as needed
- Source control and green infrastructure front-end loaded to allow performance demonstration
- Benefit/Cost rank ordered the remaining projects
- Cash flow leveling set final schedule positions



Project Capital Costs
$670 Million in 2008 Dollars

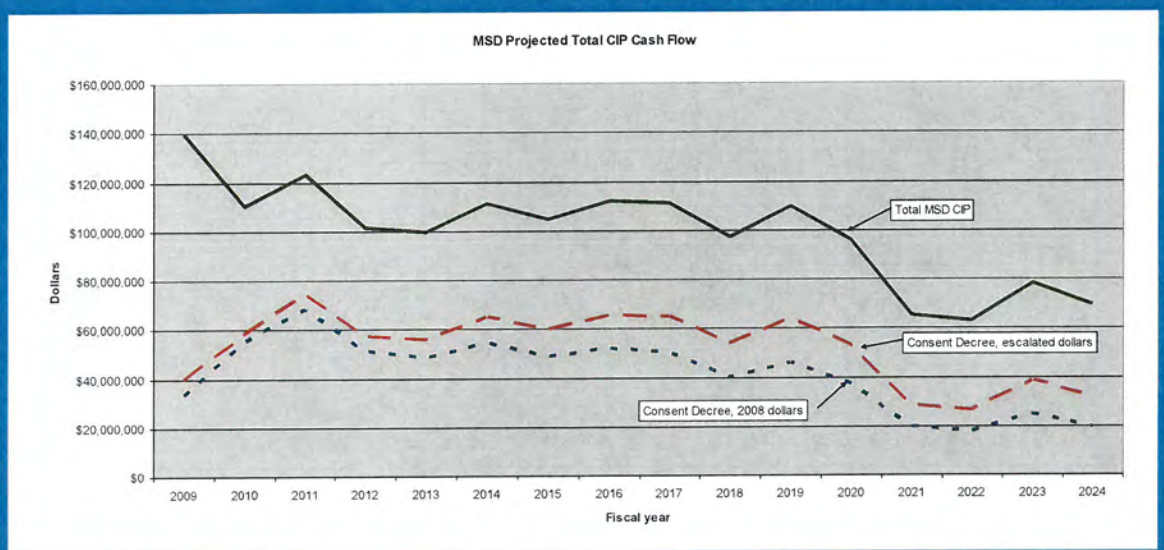


Project Capital Costs
$843 Million in Escalated Dollars



Long-term inflation rate assumed at 3% per year

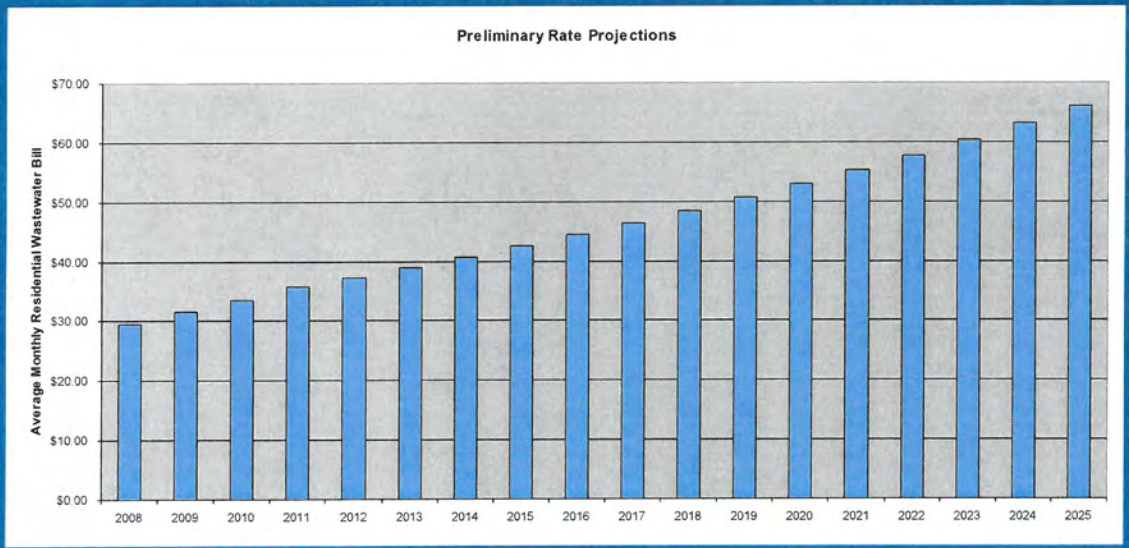
MSD's Total Capital Program
Projected Cash Flow



Rate projections must fund all MSD's activities

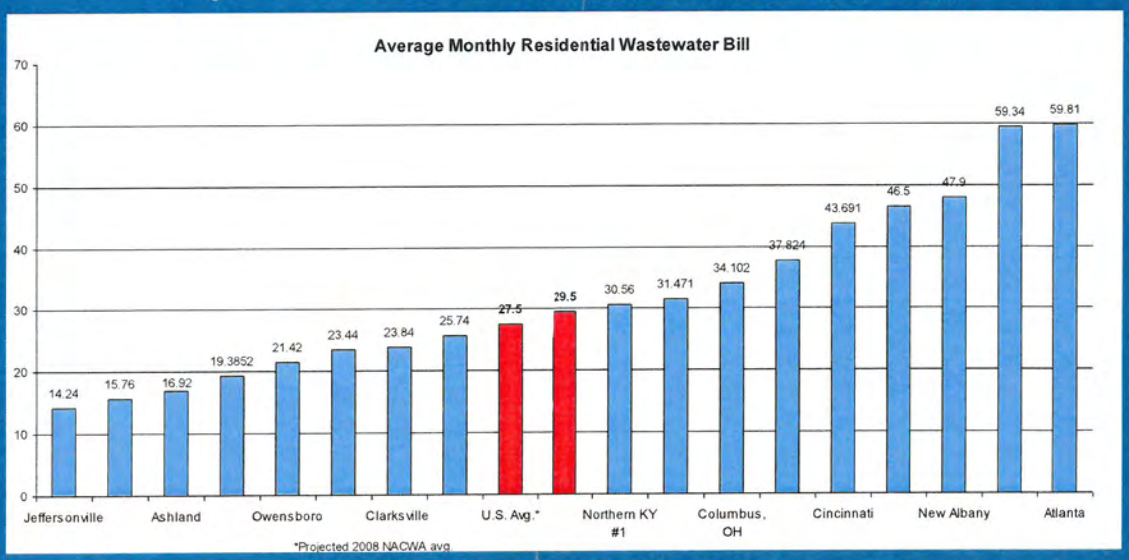
Preliminary Rate Projections

Confirm Previous Presentation



MSD's Rates

Projected to Remain Near National Average



Assumes other agencies face similar inflation and regulatory pressure

Long-Term Rate Projections

Many Factors Affect Long-Term Rate Changes

- Other MSD future costs that will impact rates
  - MS4 program
  - Floyd's Fork, Harrod's Creek, Beargrass Creek TMDL response
  - Flood pump station repair, rehabilitation, and replacement
- Unknown factors that will affect future rates
  - Inflation rate in construction market (highly volatile lately)
  - Municipal bond market factors (highly unstable lately)
  - New regulations
  - Impact of climate change
  - Future Board actions

Projections presented are based on best information currently available

Evaluation of Programmatic Values

Considers Entire Suite of Projects

- Customer Satisfaction (service continuity, avoid nuisances)
- Economic Vitality (affordability of rates)
- Education (integral to the program)
- Environmental Justice and Equity (site selection, facilities configuration, avoid nuisances)
- Financial Equity (cost of service, recognize ability to pay)
- Financial Stewardship (cost effectiveness, level of control)

Customer Satisfaction

Addressed Through Project Selection and Definition

- Service Continuity
  - Eliminating 6 small plants
  - Eliminating 7 pump stations
  - Cost estimating guidelines provide for redundant equipment and standby generators
- Odor Control
  - Odor control guidance applied consistently to establish need to cover and/or provide odor control equipment on storage basins and pump stations
- Avoidance of nuisances
  - Generally project specific issues relative to construction impacts, visual screening, etc.

Economic Vitality

Cost of Program Agrees with Preliminary Estimates

- Current rates near national average
- Preliminary rate increases projected at 5 – 6.5 % per year
- Projected rate increases include allowances for future MSD programs
  - MS4 permit program
  - Flood protection upgrades
  - Project DRI
  - "Business as usual" (plant upgrades and expansions, service extension etc.)

Education

Included as On-going Program

- Promote and sustain participation in green infrastructure
- Support compliance with future private property I/I reduction programs
- Build a sense of personal responsibility and understanding of individual actions that contribute to water quality
- Ensure continued support for clean water initiatives now, and future generations of MSD customers

Environmental Justice and Equity

Guards Against Placing Unfair Burden on Minority and Low-Income Population

- Site selection followed uniform criteria
  - Overflow locations across the county, most solutions near the overflow point
  - Added loads sent primarily to existing facilities on Ohio River due to gravity flow and discharge standard considerations
  - No homes or private business displaced
  - Screened sites or buried facilities preferred
- Facilities configuration determined by cost estimating design criteria and other written guidance
  - Uniform application of written criteria
  - Uniform application of written odor control criteria
- Avoiding other nuisance conditions typically addressed during design phase

Financial Equity

Cost of Service Approach Tempered by Consideration of Ability to Pay

- Rate structure based on cost of service model
- Winter averaging and monthly billing will be recommended to MSD Board
- Subsidies and incentives for green infrastructure and I/I control based on business models that calculate comparable value to MSD
- Will recommend expansion of existing senior citizen, low income discount program to MSD Board

Financial Stewardship

Cost Effectiveness and Level of Control Considerations

- Broad range of alternatives considered
  - Technology
  - Individual versus regional combinations and clusters
  - Level of control
- Rigorous benefit/cost evaluation ensured cost effective approach
- Knee of curve evaluations demonstrate high level of control, but not past the point of diminishing returns

Schedule To Complete

Much Work Remains

- Work to complete IOAP
  - Complete documentation of programmatic values
  - Final hydraulic and water quality model runs
  - Final review of project costs
  - Final review of schedule
  - Finish final draft of all 3 volumes and distribute for public review
  - Prepare responsiveness summary for comments received
  - Prepare and submit final IOAP before December 31, 2008
- Public outreach events remaining
  - Tape this presentation for use on Metro TV
  - Hold final round of public meetings Oct/Nov
  - Issue public notice for plan review and comment near Oct 28
  - Hold public hearing during review process
  - Final WWT meeting December 4, 2008
  - Board action December 8, 2008

Questions?